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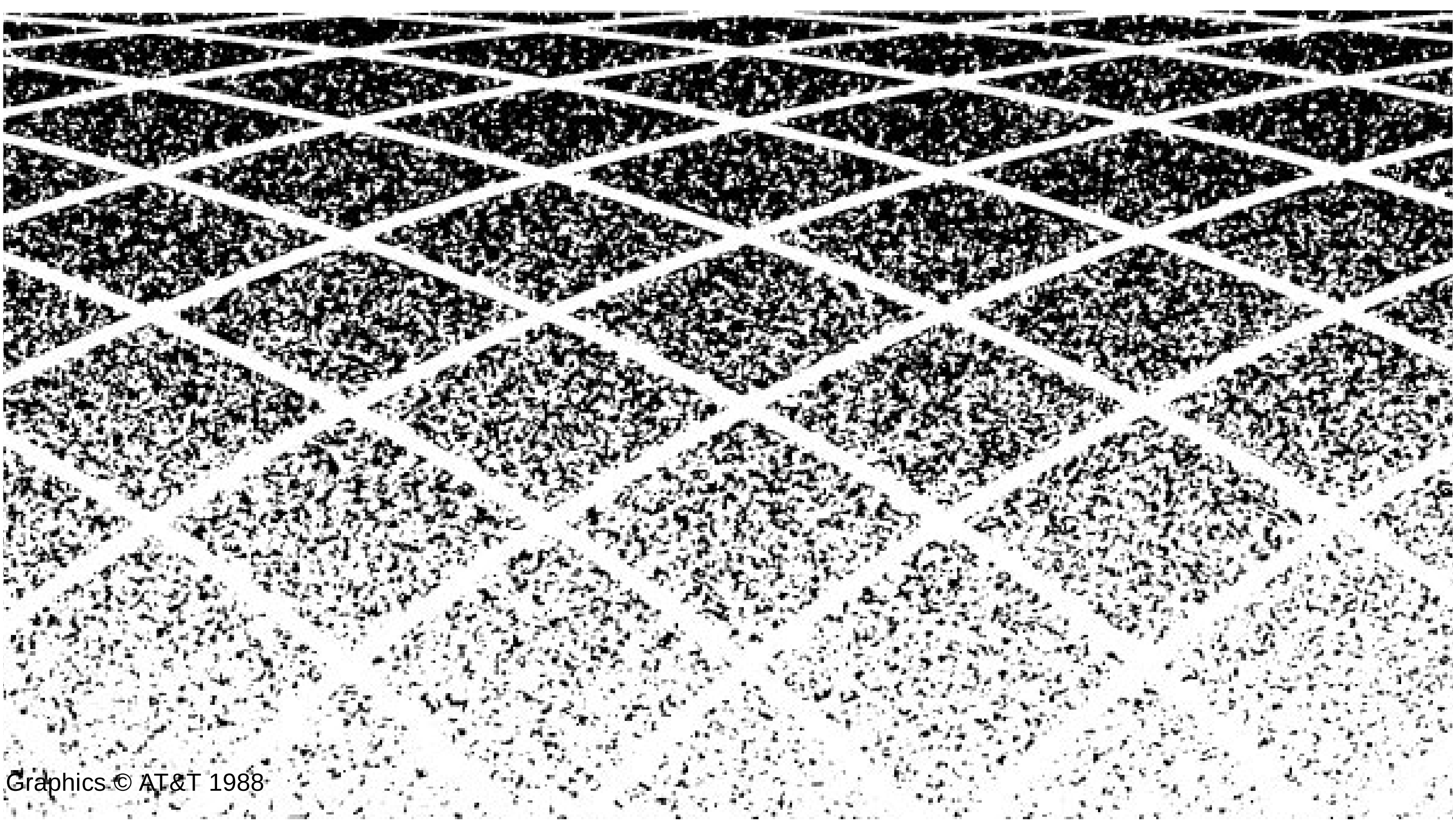
Issue 1
September 1996

DEFINITY Enterprise Communications Server Release 5 System Description and Specifications



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About This Document

Purpose

The purpose of this document is to briefly describe the DEFINITY® Enterprise Communications Server at an overview level. Descriptions of Release 5 and Generic 3 Version 4 (G3V4) are provided in this document.

This document is not intended to replace or modify the instructions provided in other task-specific documentation. Refer to "Related Documents".

Intended Audience

This document is primarily intended for customers, Lucent Technologies marketing and sales, and field technicians. This document is also intended for educators and trainers to understand and teach basic DEFINITY information to field technicians and customer personnel.

Systems Supported

This document covers the system updates from G3V4 to Release 5. The primary area of interest in this document is the Release 5 system. This document provides overview information on the DEFINITY Enterprise Communications Server and the DEFINITY Wireless Business System.

Previous systems are described in *DEFINITY Communications System Generic 3 System Description and Specifications*, 555-230-206.

Document Organization

This document consists of the following chapters, appendices, glossary, and index:

- Chapter 1, "Overview of DEFINITY" — Introduces Release 5 and presents an overview of hardware, architecture, and maintenance. This chapter also provides a brief functional description of the systems.
- Chapter 2, "Site Requirements" — Briefly describes physical dimensions, weight, typical floor plans, and temperature and humidity requirements. AC and DC power systems and ground wiring is also covered.
- Chapter 3, "Cabinets, Carriers, and Circuit Packs"— Describes the main system hardware components and the minimum cabinet and carrier configurations of various systems. The function of each circuit pack is also provided.
- Chapter 4, "Architecture" — Describes the operating system, applications software (call processing, maintenance, and administration), internal connectivity, and protocols handled by the system.
- Chapter 5, "Maintenance"— Briefly describes maintenance software and hardware, tests, procedures, error logs, and alarm logs.
- Chapter 6, "Technical Specifications" — Lists the specifications for capabilities and performance.
- Appendix A, "Wireless Business Solutions"— Provides brief descriptions of FreeWorks™ Wireless Telecommunications products.
- Appendix B, "System Capacity Limits" — Provides the capacities of each system from G3V4 through Release 5.
- Abbreviations — Alphabetic listing of the abbreviations found in this document.
- Glossary — Alphabetic listing and definitions of terms used in this document.
- Index — Alphabetic listing of topics presented in this document.

Conventions Used in This Document

- The word *system*, is a general term encompassing Release 5 and includes references to the DEFINITY Enterprise Communications Server.
- DEFINITY Systems are called: G3V4, Release 5; Release 5vs; Release 5si, and Release 5r.
- All occurrences of G3siv4, G3siV4+m, Release 5si, and Release 5si + memory are called Release 5si unless a specific configuration is required to differentiate between product offerings.
- All occurrences of Release 5r refer to G3rV4 and Release 5r.
- Information in this document is applicable to G3V4 through Release 5 unless otherwise specified.
- DEFINITY Enterprise Communications Server is abbreviated DEFINITY ECS.

Trademarks

This document contains references to the following Lucent Technologies trademarked products:

- ACCUNET®
- AUDIX®
- Callmaster™
- CallVisor™
- CONVERSANT®
- DEFINITY®
- Forum™
- MEGACOM®
- SYSTIMAX®
- TELESEER®
- TRANSTALK™

The following products are trademarked by their respective vendor:

- Audichron® is a registered trademark of Audichron Company
- Music Mate® is a registered trademark of Harris Corporation
- PagePac® is a registered trademark of Harris Corporation, Dracon Division
- Zone Mate® is a registered trademark of Harris Corporation

Related Documents

The following documents are useful for system-related information:

- *DEFINITY Enterprise Communications Server Release 5 Feature Description*, 555-230-301
- *DEFINITY Enterprise Communications Server Release 5 System Description and Specifications*, 555-230-210
- *DEFINITY Enterprise Communications Server Release 5 Maintenance for R5vs/si,* 555-204-105
- *DEFINITY Enterprise Communications Server Release 5r Maintenance for R5r,* 555-230-105
- *AT&T Network and Data Connectivity Reference*, 555-025-201
- *GBCS Products Security Handbook*, 555-025-600
- *DEFINITY Wireless Business System Users Guide,* 555-232-105
- *DEFINITY Wireless Business System Installation and Test Guide,* 555-232-102
- *DEFINITY Wireless Business Systems System Interface*, 555-232-108
- *DEFINITY Enterprise Communications Server Release 5 Installation and Test for Multi-Carrier Cabinets, 5*55-230-112
- *DEFINITY Enterprise Communications Server Release 5 Installation and Test for Single-Carrier Cabinets, 5*55-230-894
- *DEFINITY Enterprise Communications Server Release 5 Implementation,* 555-230-302
- *DEFINITY Enterprise Communications Server Release 5 Upgrades and Additions for R5vs/si,* 555-230-120
- *DEFINITY Enterprise Communications Server Release 5 Upgrades and Additions for R5r,* 555-230-121

How to Order Documentation

In addition to this document, installation and test, maintenance, and administration documents are available. A complete list of the DEFINITY Release 5 documents can be found in the *Business Communications System Publications Catalog*, 555-000-010.

This document and any other DEFINITY documentation can be ordered directly from the Lucent Technologies Business Communications System Publications Fulfillment Center at 1-317-361-5353 or toll free at 1-800-457-1235.

How to Comment on This Document

Lucent Technologies welcomes your feedback. Please fill out the reader comment card at the front of this manual and return it. Your comments are of great value and help improve our documentation.

If the reader comment card is missing, fax your comments to 1-303-538-1741, and mention this document's name and number, *DEFINITY Enterprise Communications Server Release 5 System Description and Specifications*, 555-230-210.

Standards Compliance

The equipment presented in this document complies with the following (as appropriate):

- ITO-T (Formerly CCITT)
- ECMA
- ETSI
- IPNS
- DPNS
- National ISDN-1
- National ISDN-2
- ISO-9000
- ANSI
- FCC Part 15 and Part 68
- EN55022
- EN50081
- EN50082
- CISPR22
- Australia AS3548 (AS/NZ3548)
- IEC950
- UL 1459
- UL1950
- CSA C222 Number 225
- TS001

Electromagnetic Compatibility Standards

This product complies with and conforms to the following:

- Limits and Methods of Measurements of Radio Interference Characteristics of Information Technology Equipment, EN55022 (CISPR22), 1993
- EN50082-1, European Generic Immunity Standard
- FCC Parts 15 and 68
- Australia AS3548

NOTE:
The system conforms to Class A (industrial) equipment. Voice terminals meet Class B requirements.

- Electrostatic Discharge (ESD) IEC 1000-4-2
- Radiated radio frequency field IEC 1000-4-3
- Electrical Fast Transient IEC 1000-4-4
- Lightning effects IEC 1000-4-5
- Conducted radio frequency IEC 1000-4-6
- Mains frequency magnetic field IEC 1000-4-8
- Low frequency mains disturbance

The system conforms to the following:

- Electromagnetic compatibility General Immunity Standard, part 1; residential, commercial, light industry, EN50082-1, CENELEC, 1991
- Issue 1 (1984) and Issue 2 (1992), Electrostatic discharge immunity requirements (EN55024, Part 2) IEC 1000-4-2
- Radiated radio frequency field immunity requirements IEC 1000-4-3
- Electrical fast transient/burst immunity requirements IEC 1000-4-4

European Union Standards

Lucent Technologies Business Communications Systems declares that the DEFINITY equipment specified in this document bearing the “CE” mark conforms to the European Union Electromagnetic Compatibility Directives.

The “CE” (Conformité Europeénne) mark indicates conformance to the European Union Electromagnetic Compatibility Directive (89/336/EEC) Low Voltage Directive (73/23/EEC) and Telecommunication Terminal Equipment (TTE) Directive (91/263/EEC) and with i-CTR3 Basic Rate Interface (BRI) and i-CTR4 Primary Rate Interface (PRI) as applicable. The “CE” mark is applied to the following Release 5 products:

- Global AC powered Multi-Carrier Cabinet (MCC)
- DC powered Multi-Carrier Cabinet (MCC) with 25 Hz ring generator
- AC powered Single-Carrier Cabinet (SCC) with 25 Hz ring generator
- AC powered Compact Single-Carrier Cabinet (CSCC) with 25 Hz ring generator
- Enhanced DC Power System

Overview of DEFINITY

1

This document supports the DEFINITY® Generic 3 Version 4, and Release 5, and emphasizes Release 5. This chapter presents the system at an overview level and covers the following topics:

- Business Package Options
- The DEFINITY System
- Time Division Multiplexing
- System Components and Configurations
- Cabinets and Architecture
- Connections to the External Environment
- Duplication
- Administration
- Comparisons Between System Versions
- Upgrades and Additions

Business Package Options

This section briefly describes the two primary types of system business packages available for G3V4 and earlier systems: the Advantage Business Package (ABP) and the Premier Business Package (PBP).

NOTE:
The Advantage Business Package and the Premier Business Package are not available on Release 5 and later systems. For Release 5 and later, all systems include the Premier Business Package capabilities.

The Advantage Business Package is used in G3vsV4 or G3sV4 systems. The administered “Premier Business Package” field on the Customer Option Form is set to “n.”

The Premier Business Package is used in G3vsV4, G3sV4, G3iV4, or G3siV4 systems. The administered “Premier Business Package” field on the Customer Option Form is set to “y.” Contact your Lucent Technologies representative for more information about the business package options.

NOTE:
Refer to DEFINITY Communications System Generic 3 Version 4 Implementation, 555-230-655, for more information about setting the “Premier Business Package” field on the Customer Option Form. This field is not available on Release 5 and later systems.

Table 1-1 describes the G3V4 business package options. Table 1-1 also describes the availability of the duplication option for a particular system. Any of these systems can be used in the United States or in other countries.

Table 1-1. Types of Business Packages (G3V4 and Earlier)

Type of System	Advantage Business Package (ABP)	Premier Business Package (PBP)	Duplication Option
G3vsV4 & G3sV4 Issue 1	Yes	Yes	No
G3iV4 Issue 1	No	Yes	Yes
G3rV4 Issue 1	No	No	Yes
G3vsV4 Issue 3	Yes	Yes	No
G3siV4 Issue 3	No	Yes	No
G3siV4+m Issue 3	No	Yes	Yes
G3rV4 Issue 3	No	No	Yes

The DEFINITY Enterprise Communications Server

The DEFINITY Enterprise Communications Server (ECS) is a digital switch that processes and routes voice communications (telephone calls) and data communications from one endpoint to another. See Figure 1-1.

All endpoints are external to the system. The voice and data going to and from the endpoints enter and leave the system through “port circuits.” Because the switching is digital, the system makes high-speed connections between analog and digital trunks, data lines connected to host computers, data entry terminals and Personal Computers (PCs), and groups of terminals and/or computers.

The system converts all external analog signals to internal digital signals. Incoming digital signals are not converted. Inside the system, voice is always coded digitally. Outgoing digital signals from the system to analog lines and trunks are converted to analog.

NOTE:
The hardware items shown in Figure 1-1 may vary in actual appearance. These items are shown for illustration purposes only.

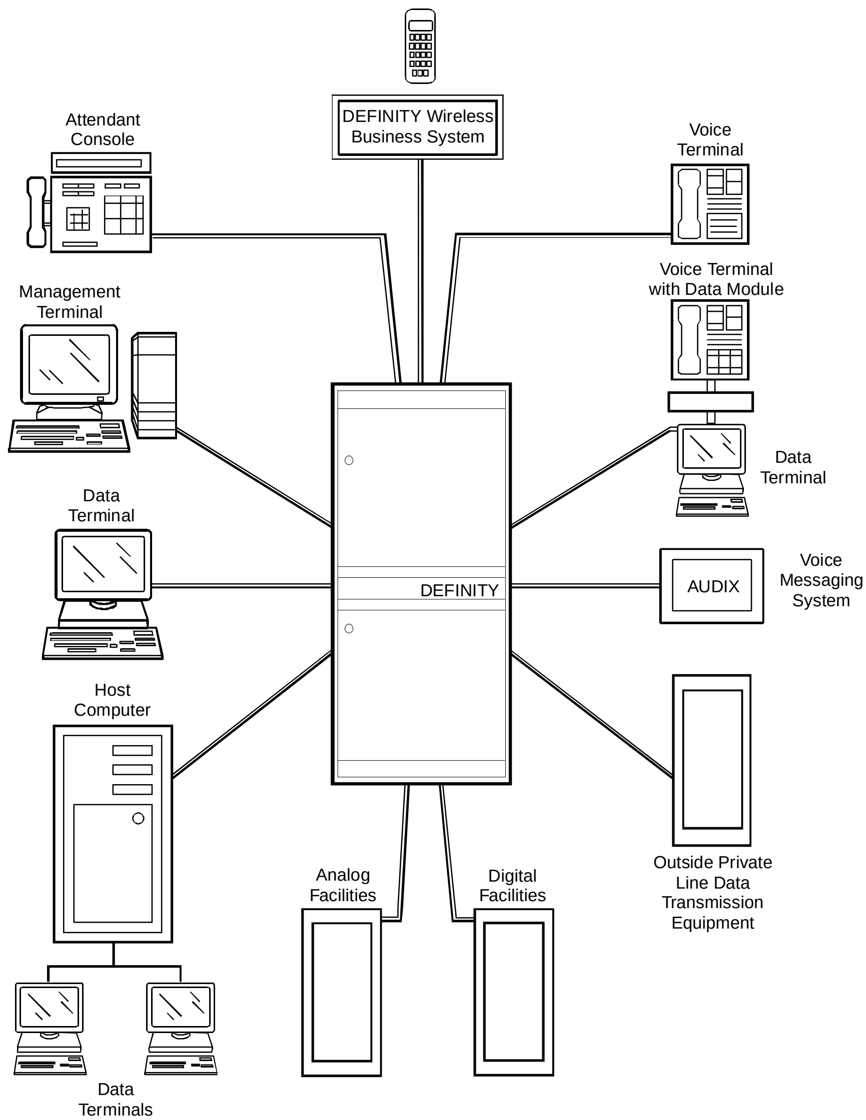

Figure 1-1. The System as a Digital Switch

Time Division Multiplexing

Multiplexing is used to interleave signals from multiple port circuits into one communication path. Time Division Multiplexing (TDM) is a switching technique that splits a large bandwidth (range of frequencies) in the frequency domain into many small time slots in the time domain. Each time slot carries a signal from one of the multiple port circuits. Two time slots are used in a two-party call. Each party transmits (talks) on one time slot and receives (listens) on another time slot.

Figure 1-2 shows the time slots generated in the system. Two system framing pulses frame 256 time slots on each of two TDM buses for a total of 512 time slots. 483 slots are used for calls. The other 29 slots carry tones, messages, and optional features such as Music-on-Hold.

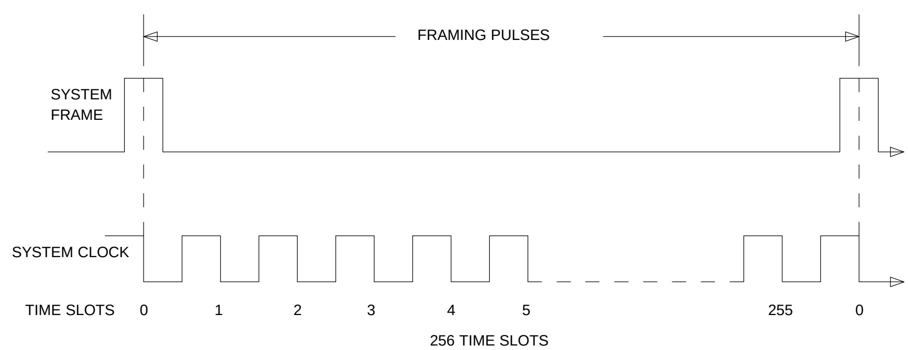

Figure 1-2. Time Division Multiplexing Time Slot Generation

System Components

The basic system component is the Port Network (PN) consisting of port circuits connected to internal buses to allow the circuits to communicate with each other.

Processor Port Network

The required Processor Port Network (PPN) contains the Switch Processing Element (SPE). The SPE is a computer that operates the system, processes calls, and controls the PN containing the port circuits.

Expansion Port Network

An Expansion Port Network (EPN) (optional) contains additional ports that increase the number of connections from the system to trunks and lines.

Center Stage Switch

A Center Stage Switch (CSS) (optional for three PNs or less) in G3rV4 and Release 5r is the central interface between the PPN and the EPNs. The CSS consists of one, two, or three Switch Nodes (SN). For G3V4 and Release 5, one SN can expand the system from one EPN to up to 15 EPNs. Two SNs can expand the system to up to 29 EPNs. Three SNs can expand the system to up to 43 EPNs.

NOTE:
The number of EPNs that can be connected with two or three SNs may be less than the numbers given depending on the internal SN traffic.

Main System Configurations

Figure 1-3 shows the five main system configurations. Chapter 3, "Cabinets, Carriers, and Circuit Packs" describes these configurations in more detail. The main configurations are:

1. Basic system consisting of a Processor Port Network (PPN) only.
2. Directly-connected system with two PNs (one PPN and one EPN) connected directly together.
3. Directly-connected system with three PNs (one PPN and two EPNs) connected directly together.
4. Center Stage Switch (CSS)-connected system with up to 15 EPNs interconnected by one Switch Node (SN) to the PPN.
5. CSS-connected system with up to 29 EPNs interconnected by two SNs to the PPN, and up to 43 EPNs interconnected by three SNs to the PPN.

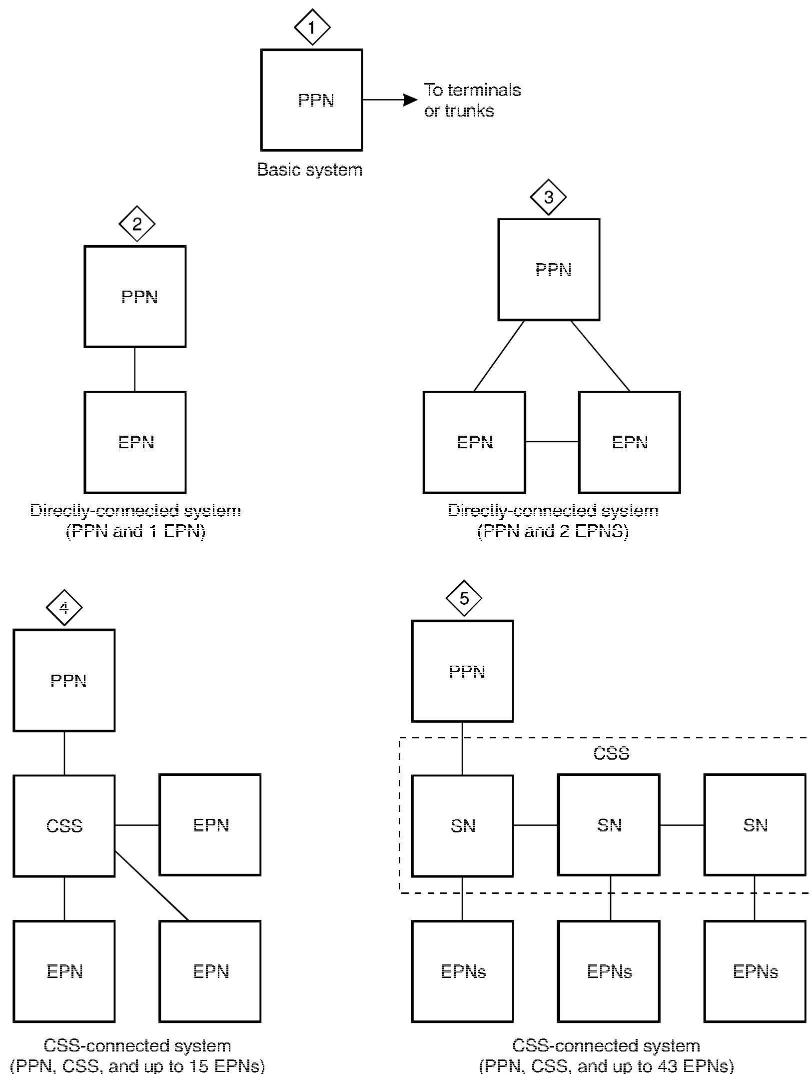

Figure 1-3. Main System Configurations

System Configurations

Figure 1-4 shows a directly-connected system with a Switch Processing Element (SPE) in the Processor Port Network (PPN). Buses are distributed throughout the PPN and two Expansion Port Networks (EPNs), routing voice calls and data calls between external trunks and lines.

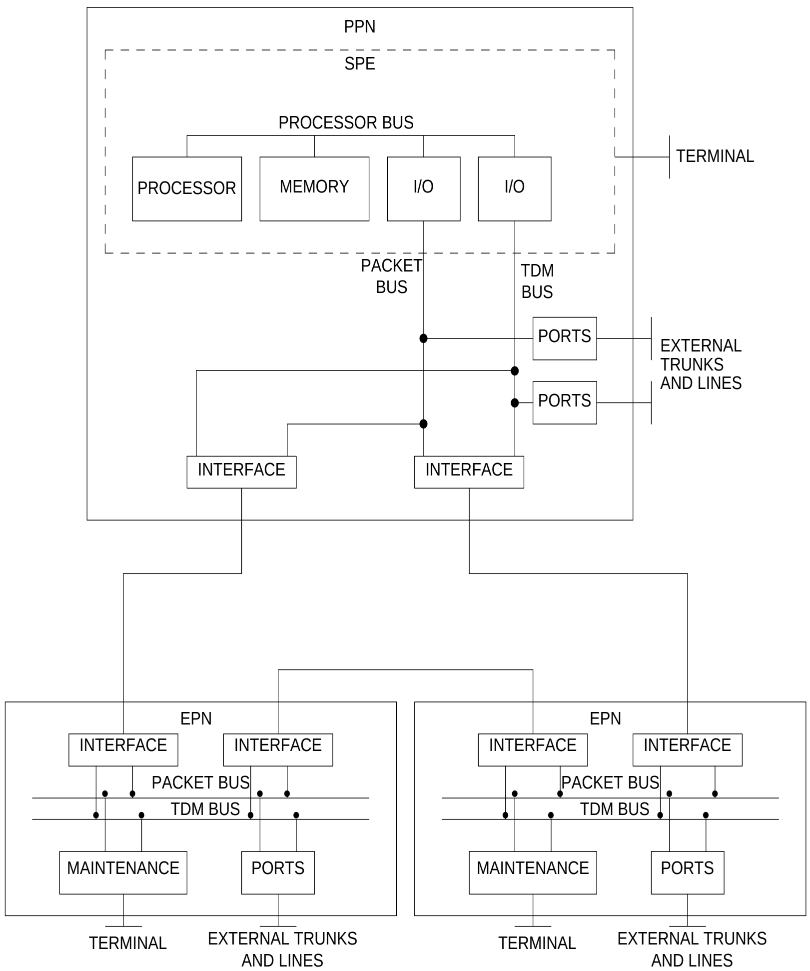

Figure 1-4. Components of a Directly-Connected System

Figure 1-5 shows a system with the added Center Stage Switch (CSS) to route voice and data calls between external trunks and lines.

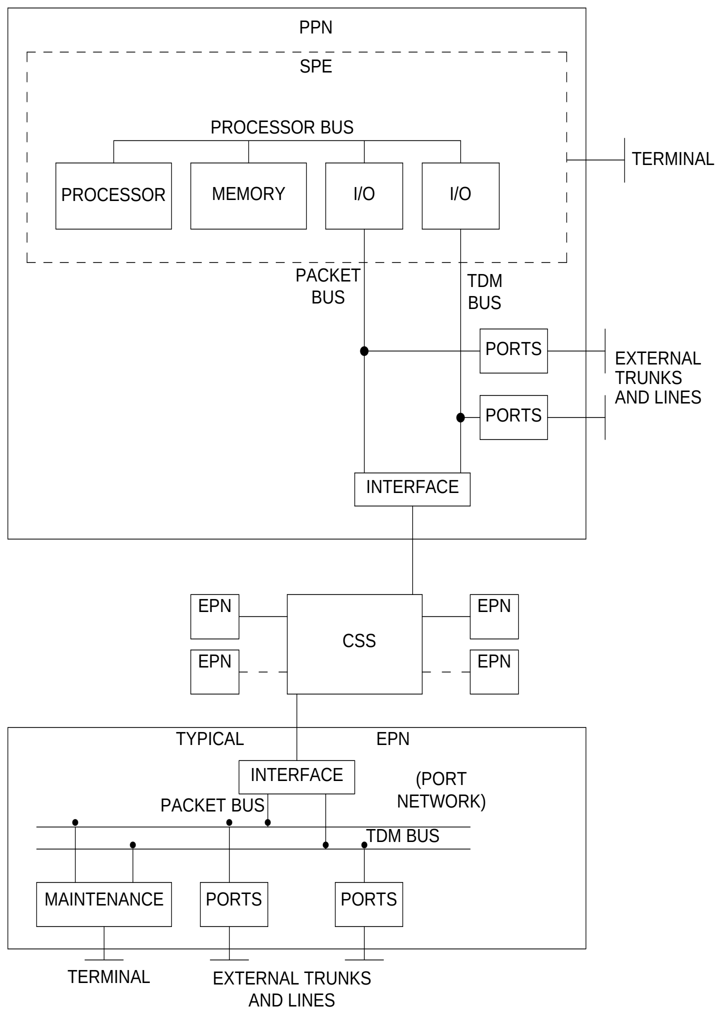

Figure 1-5. Components of a CSS-Connected System

Switch Processing Element (SPE)

When a device, such as a voice terminal, goes off-hook or signals call initiation, the Switch Processing Element (SPE) receives a signal from the port circuit connected to the device. The digits of the called number are collected and the switch is set up to make a connection between the calling and called devices.

The SPE consists of the following control circuits connected by a processor bus:

- *Processor:* All Release 5 systems use a Reduced Instruction Set Computer (RISC) processor. The TN790 Processor circuit pack is used in Release 5vs and Release 5si systems. The UN331B is used in Release 5r systems. These circuit packs are described in more detail in Chapter 3, "Cabinets, Carriers, and Circuit Packs".
- *Memory:* Release 5vs and Release 5si systems use 16 Mbytes of flash Read Only Memory (ROM) and 8 Mbytes of Dynamic Random Access Memory (DRAM) resident on the TN790 Processor circuit pack. An additional 4 Mbytes (total of 12 Mbytes) of DRAM is required for the increased system capacities provided by Release 5si + memory. Release 5r systems require three TN1650 Memory circuit packs to provide a total of 96 Mbytes of DRAM.
- *Storage:* In Release 5vs and Release 5si systems, translations are stored in non-volatile memory on a PCMCIA memory card. In Release 5r systems, the disk drive is a non-volatile system bootstrap and translation storage device.
- *Input/Output (I/O) circuits:* act as interfaces between the Switch Processing Element (SPE) and the Time Division Multiplexing (TDM) bus and packet bus.
- *Maintenance interface:* connects the system to an administration terminal and monitor power failure, clock signals and temperature sensors.

Port Network (PN)

The Port Network (PN) consists of the following components:

- *Time Division Multiplexing (TDM) bus:* runs internally throughout each Port Network (PN) and is terminated on each end. The bus consists of two eight-bit parallel buses: bus A and bus B. These buses carry switched digitized voice and data signals and control signals between all port circuits and between port circuits and the Switch Processing Element (SPE). The port circuits place digitized voice and data signals on a TDM bus. Bus A and bus B are normally active simultaneously.
- *Packet bus:* runs internally throughout each Port Network (PN) and is terminated on each end. The packet bus is an 18-bit parallel bus that carries many logical links. These links are the communications paths carrying control messages from the Switch Processing Element (SPE), through port circuits, to endpoints such as terminals and adjuncts.

The packet bus carries the following types of logical links between some specific port circuits in the system. See Table 1-2.

Table 1-2. Packet Bus Logical Links

Logical Link	Release 5vs	Release 5si	Release 5r
ISDN BRI D-Channels	Packet Only	Packet Only	Packet Only
ISDN PRI D-Channels	TDM Only	Packet or TDM	Packet Only
X.25 Links (Including DCS)	TDM Only	TDM Only	Packet Only
Switch Node Interfaces	Not Available	Not Available	Packet Only
Remote Management Terminal	TDM Only	TDM Only	Packet Only

- *Port circuits*: form analog/digital interfaces between the Port Network (PN) and external trunks and devices providing links between these devices and the TDM bus and packet bus. Incoming analog signals are converted to Pulse-Code Modulated (PCM) digital signals and placed on the TDM bus by port circuits. Port circuits convert outgoing signals from PCM to analog for external analog devices. All port circuits are connected to the TDM bus and only specific ports connect to the packet bus.
- *Interface circuits*: located in the PPN and in each EPN. These are types of port circuits that terminate fiber optic cables connecting TDM buses and the packet bus from the PPN cabinet to the TDM buses and packet bus of each EPN cabinet. The fiber optic cable also connects the Center Stage Switch (CSS) to the PPN and the EPNs. These interface and cabling terminations provide a transmission path between the port circuits in different Port Networks (PNs).

  An Expansion Interface (EI) circuit pack terminates each end of a cable connecting the PPN to an EPN, each end of a cable connecting an EPN to another EPN, and the Port Network (PN) end of a cable connected between a PN carrier and a Switch Node (SN) carrier.

  A Switch Node Interface (SNI) circuit pack terminates the SN carrier end of a cable connected between an SN carrier and a PN.
- *DS1/E1 interface circuits*: provides conversion from fiber interface to DS1/E1 interface between Port Networks (PNs) for DS1/E1 remoting.
- *Service circuits*: provide connection to an external terminal to monitor, maintain, and troubleshoot the system. The service circuits also provide tone production and detection as well as call classification, modem pooling, recorded announcements, and speech synthesis.

Center Stage Switch — Release 5r Only

Figure 1-6 shows the Center Stage Switch (CSS) linking the Processor Port Network (PPN) to Expansion Port Networks (EPNs) via the Switch Node Interface (SNI) circuit packs in a Switch Node (SN) carrier. An SN reduces the amount of interconnect cabling between the PPN and the EPNs by acting as a "hub" to distribute cabling.

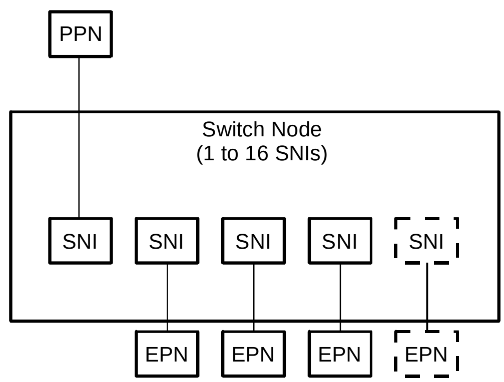

Figure 1-6. CSS with Switch Nodes (SNs)

A system using a Center Stage Switch (CSS) can be connected from one to up to 44 PNs. The CSS can consist of up to three SN carriers. The CSS can also consist of two, four, or six SN carriers (duplicated SNs) in a critical reliability system.

Each SN contains from one to 16 Switch Node Interface (SNI) circuit packs. Each interface can be connected by fiber optic cable to a PN or another SN. One interface is always connected to the PPN and one is connected to each EPN.

In a high reliability system (with duplicated processor), two SNI circuit packs are connected to the PPN, allowing up to 15 PNs to be connected to one SN and up to 29 PNs to be connected to two SNs, and up to 43 PNs to be connected to three SNs.

NOTE:
Heavy inter-SN traffic requires more SN-to-SN connections, reducing the number of EPNs that can be connected.

Architecture

The system architecture consists of two main components:

- The Oryx/Pecos real-time, multi-processing operating system. Oryx/Pecos supports the Switch Processing Element (SPE).
- Applications layer consisting of three major subsystems:
  1. Call processing: starts up and completes calls and manages voice and data in the system.
  2. Maintenance: detects faults, recovers operations, and performs tests in the system.
  3. System management: controls the internal processes necessary to install, administer, and maintain the system.

Logical interconnectivity between system components refers to the two kinds of logical links into the SPE:

- System links for internal system control.
- Application links used by external applications such as adjuncts.

Chapter 4, "Architecture" describes the system architecture in more detail.

Cabinets

The system cabinets house all components, including the power supply. A cabinet contains at least one carrier in an enclosed shelf with vertical slots to hold circuit packs. The circuit packs fit into connectors attached to the rear of the slots. Chapter 2, "Site Requirements" describes the power supplies and Chapter 3, "Cabinets, Carriers, and Circuit Packs" describes the cabinets.

There are three cabinet types:

1. Compact Single-Carrier Cabinet consisting of one wall-mountable carrier.
2. Single-Carrier Cabinet consisting of one carrier. Up to four Single-Carrier Cabinets can be stacked to comprise one Port Network (PN). This PN is sometimes referred to as a “cabinet” or a “cabinet stack.” Up to three cabinet stacks can be installed in a system.
3. Multi-Carrier Cabinet containing one to five carriers.

Compact Single-Carrier Cabinet

Figure 1-7 shows a Compact Single-Carrier Cabinet with a hinge attaching it to a wall.

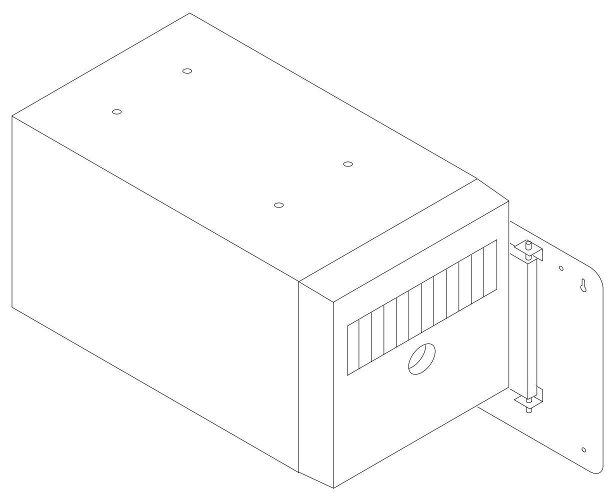

Figure 1-7. Compact Single-Carrier Cabinet

The Compact Single-Carrier Cabinet is only used as a PPN and is standard reliability only (no duplication). This carrier is used in G3vsV4 and Release 5vs systems and can be mounted on a tabletop or to a wall. The carrier contains dedicated and universal port slots with four dedicated control circuit pack slots and ten port slots. The AUX connector on the rear of the carrier provides power for one attendant console and one emergency transfer panel.

This carrier supports Basic Rate Interface (BRI), Adjunct Switch Applications Interface (ASAI), and packet bus. However, the Compact Single-Carrier Cabinet cannot be connected to additional cabinets because its Time Division Multiplexing (TDM) bus cannot be extended.

Chapter 3, "Cabinets, Carriers, and Circuit Packs" provides more detailed descriptions of this cabinet and the circuit packs inside the cabinet.

Single-Carrier Cabinets

Figure 1-8 shows a typical Single-Carrier Cabinet.

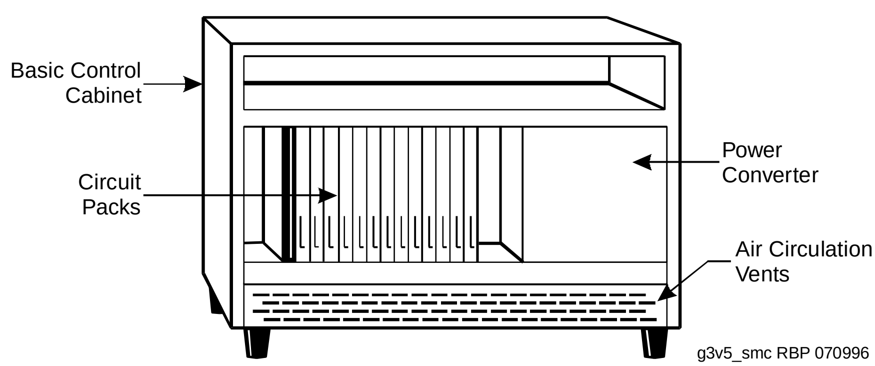

Figure 1-8. Typical Single-Carrier Cabinet

There are four types of Single-Carrier Cabinets:

1. Basic Control Cabinet.
2. Duplicated Control Cabinet
3. Expansion Control Cabinet
4. Port Cabinet

Chapter 3, "Cabinets, Carriers, and Circuit Packs" provides more detailed descriptions of Single-Carrier Cabinets and circuit packs in the cabinets.

Figure 1-9 shows a typical stacked system with up to four Single-Carrier Cabinets.

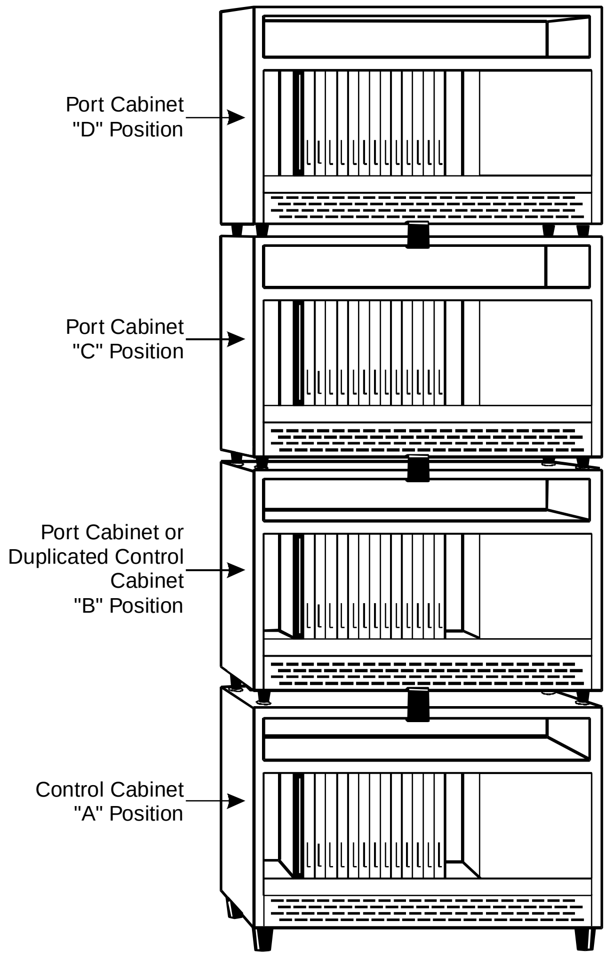

Figure 1-9. Typical Cabinet Stack (Four Cabinets Maximum)

Multi-Carrier Cabinets

Figure 1-10 shows a typical AC powered Multi-Carrier Cabinet.

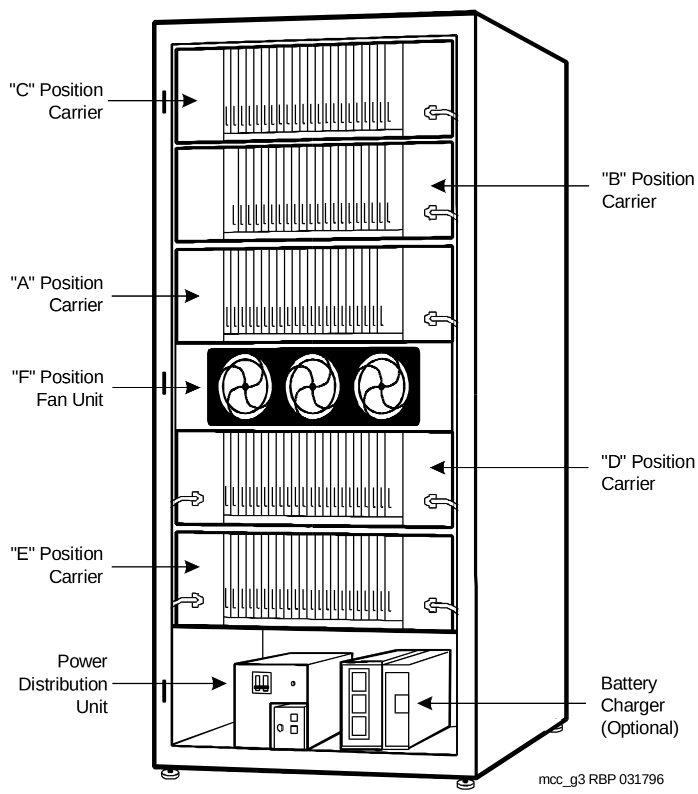

Figure 1-10. Typical Multi-Carrier Cabinet

There are three types of Multi-Carrier Cabinets:

1. Processor Port Network (PPN) cabinet: contains the ports, Switch Processing Element (SPE), an interface to an Expansion Port Network (EPN) cabinet (optional), and a Switch Node (SN) in a Center Stage Switch (CSS)-connected system (optional).
2. Expansion Port Network (EPN) cabinet: contains additional ports, interfaces to the PPN and other EPN cabinets, the maintenance interface, and an SN in a CSS-connected system (optional).
3. Auxiliary cabinet: contains equipment used for optional system-related hardware, such as rack-mounted equipment.

The following carriers can be installed in multi-carrier Processor Port Network (PPN) and Expansion Port Network (EPN) cabinets:

- Control Carrier: located only in the PPN cabinet
- Duplicated Control Carrier: optional and located only in the PPN cabinet
- Port Carrier: optional and located in the PPN and EPN cabinets
- Expansion Control Carrier: located only in the EPN cabinets
- Switch Node (SN) Carrier: optional and located in G3rV4 and Release 5r PPN and/or EPN cabinets

Chapter 3, "Cabinets, Carriers, and Circuit Packs" provides more detailed descriptions of Multi-Carrier Cabinets and circuit packs in the cabinets.

Connecting to the External Environment

The system can be connected to trunks. Trunks are communications paths that transmit voice and data signals between the system and a Central Office (CO) and/or other switching systems. The system can also be connected to networks (public and private); a series of communications devices, such as terminals and computers interconnected for sharing.

Peripherals, such as digital data lines connected to data endpoints can also be connected to the system. This type of equipment is called Data Terminal Equipment (DTE). Data originates and/or terminates at DTE equipment.

Other peripherals include terminals to administer and maintain the system and auxiliary equipment for features such as loudspeaker paging and music-on-hold.

Figure 1-11 shows a typical system with a Processor Port Network (PPN) and an Expansion Port Network (EPN) cabinet.

NOTE:
Actual equipment may appear different than the equipment shown.

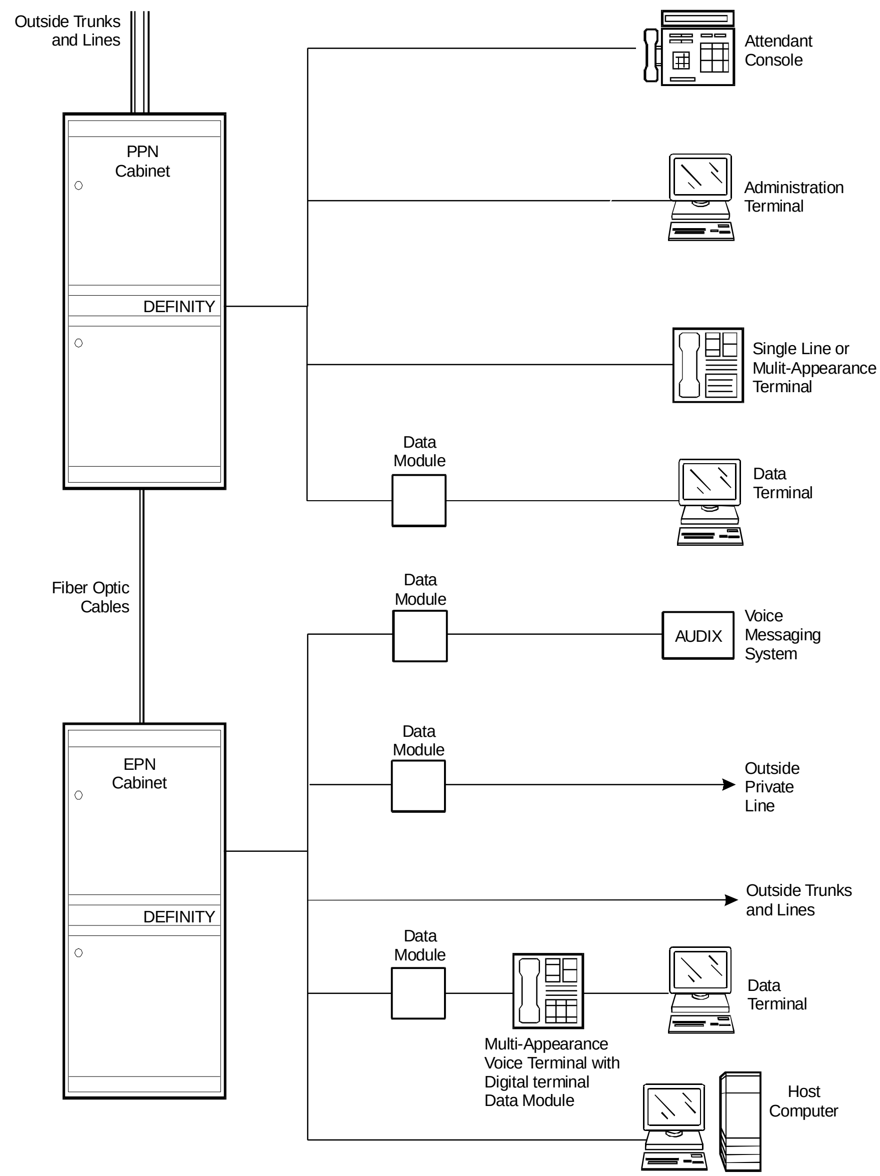

Figure 1-11. Typical Connections to the External Environment

Terminals Supported

The following terminals are supported by a DEFINITY System:

- 8400-series DCP Voice/Voice Terminals connect to a digital line circuit pack and allow the use of both I-Channels for voice. Release 5 and later software increases the number of characters displayed from 15 to 27 for calls involving a single ID. If more than one party's ID is displayed, the name display is truncated to 15 characters.

  These terminals also display the full 8-bit OPTREX character set of graphical characters, including Eurofonts, and the Japanese katakana character alphabet.
- World Class BRI sets extend the existing ISDN-BRI to allow interconnection of terminals designed to a variety of BRI specifications. In Release 5, the World Class BRI set is modified to support multimedia endpoints.
- 9400 Series DCP terminals 9403B, 9410D, and 9434D display the full 8-bit OPTREX character set of graphical characters, including Eurofonts, and the Japanese katakana character alphabet.
- 9100 Series analog terminals (9101, 9103, 9110).
- PC Console allows a desktop computer to be used as a PC-based attendant console.
- Analog 500, 2500, 71xx-series, and 81xx-series sets.
- 300 Series attendant consoles (302A, 302B, 302C1).
- 602/603 CallMaster sets. The 603 terminals display the full 8-bit OPTREX character set of graphical characters, including Eurofonts, and the Japanese katakana character alphabet.

NOTE:
Many other terminals are available. Contact your Lucent Technologies representative for more information.

Duplication

Duplication is the extent that components are made redundant. Duplication minimizes single failure points that can interrupt call processing. Three system duplication options are available:

1. Standard Reliability
2. High Reliability
3. Critical Reliability

As duplication increases, the maximum number of port carriers and consequent port circuit packs per cabinet decreases. Refer to Chapter 3, "Cabinets, Carriers, and Circuit Packs" for more information.

International Requirements

The system provides connectivity to lines and trunks and allows connection to analog and digital Central Office (CO) trunks specific to the regulations of many countries. Other provisions include enhancements to the 24- and 32-channel ISDN-PRI and polarity-reversal signaling on loop-start CO trunks. Refer to *AT&T Network and Data Connectivity*, 555-025-201. Internal switch operations allow English, Spanish, French, Italian, and a user defined language for telephone displays. Visually impaired attendant service using American or United Kingdom English and Italian voice synthesis is also provided. Other enhancements include:

- Enhanced Distributed Communications System (EDCS) providing remote calling and called party restriction checking; administrable local and remote Direct Inward Dialing (DID) application of intercept treatment; display called-line status for an attendant; and intrusion from an attendant.
- Multi-Frequency Compelled Release 2 (MFC-R2) DID and Direct Inward/Outward Dialing (DIOD) signaling.
- Broadband dial tone detection and misoperation handling.

Operations include administrable selection of terminal-display languages, country-specific tone plans and customizable tones within the selected tone plan. Other operations include country-specific transmission, conference-loss and tone-loss plans, country-specific ringing cadences, Periodic Pulse Metering (PPM) of 12 kHz or 16 kHz, and A-Law or Mu-Law companding.

Administrable selection of ISDN and non-ISDN bit-oriented digital protocols is provided. Administrable selection of analog line and trunk port impedances and gain and loss characteristics is also provided. Protocol interfaces, such as DS1 (at 1.544 Mbps) and European Conference of Postal and Telecommunications rate 1 (CEPT1) (at 2.048 Mbps) are also provided. DS1/E1 ports can be administered to provide DS1 framing, signaling, line coding, and companding required on CEPT1 trunks.

Administration

A management terminal, connected to the system, is used to administer the system. Commands are entered at the terminal to access and display screens (forms). The forms are used to list data, and to add, change, and remove system and voice terminal features. Figure 1-12 shows typical administration forms.

```
                                                                  Page 1 of X
                                        STATION
Extension: 300_    BCC: _                TN: 1                       COR: 1
     Type: 8110_                   Lock Messages? n                  COS: 1
     Port: _______________         Security Code: ____     Coverage Path 1: ____
     Name: ___________________________                     Coverage Path 2: ____


   STATION OPTIONS
                Data Module? ___             Personalized Ringing Pattern: ___
             Display Module? ___                         Message Lamp Ext: ____
           Display Language: __________
                                                          Coverage Module? ___
```

```
                                                                  Page 2 of X
                                        STATION

   FEATURE OPTIONS
           LWC Reyeption? msa=spc       Auto Select Any Idle Appearance? _
          LWC Activation? y                      Coverage Msg Retrieval? y
             CDR Privacy? y                                 Auto Answer? none
   Redirect Notification? y                            Data Restriction? n
 Per Button Ring Control? n                   Idle Appearance Preference? _
   Bridged Call Alerting? n
  Active Station Ringing: ______                 Restrict Last Appearance? _
                                                           Feature Module? _


              AUDIX Name: ______
   Messaging Server Name: ______                  Audible Message Waiting? _
                                                        Disp Client Redir? _
                                              Select Last Used Appearance? _
```

Figure 1-12. Typical Administration Form with Default Entries (Release 5r)

System administration is detailed in the following documents:

- For Release 5: *DEFINITY Enterprise Communications Server Release 5 Implementation*, 555-230-302
- For Generic 3 Version 4: *DEFINITY Communications System Generic 3 Version 4 Implementation*, 555-230-655

Comparisons Between Versions

Table 1-3 and Table 1-4 compare the system and cabinet versions.

Table 1-3. Comparing System Versions

System	Processor	PPN	Maximum EPNs	Direct- or CSS-Connected	Reliability Option
G3vsV4	80386	1	0	Does Not Apply	Standard Only
G3rV4	RISC	1	43	Direct or CSS	Standard, High, or Critical
G3siV4	80386	1	0	Does Not Apply	Standard, High, or Critical
G3siV4+m	80386	1	2	Direct	Standard, High, or Critical
Release 5vs and G3vsV4	RISC	1	0	Does Not Apply	Standard Only
Release 5si	RISC	1	0	Does Not Apply	Standard, High, or Critical
Release 5si + memory	RISC	1	2	Direct	Standard, High, or Critical
Release 5r	RISC	1	43	Direct or CSS	Standard, High, or Critical

Table 1-4. Comparing Carriers in Single-Carrier Cabinets

Cabinet	Release 5vs	Release 5si	Release 5si + memory
Basic control	Does Not Apply	PPN	PPN
Duplicated control	Does Not Apply	PPN	PPN
Compact control	PPN	Does Not Apply	Does Not Apply
Port	Does Not Apply	PPN	PPN and EPN
Expansion control	Does Not Apply	EPN	EPN

Upgrades and Additions

An *upgrade* changes the hardware and software of a previously installed system to the hardware and software of a later system version. An upgrade is performed when call processing demands an increased system size, an enhanced feature set is needed, or other changes in customer requirements are needed.

An *addition* consists of adding voice terminals, circuit packs, cabinets, or software features to an existing system without upgrading the version of the system. The system design simplifies additions and upgrades and aids the customer in planning and managing system growth.

Refer to one of the following documents:

- *DEFINITY Enterprise Communications Server Release 5 Upgrades and Additions for R5vs/si,* 555-230-120
- *DEFINITY Enterprise Communications Server Release 5rUpgrades and Additions for R5r,* 555-230-121

Site Requirements

2

This chapter briefly describes the following topics:

- Site Requirements
- Main Distribution Frame
- Floor Plans
- Environmental Considerations
- Cabinet Power Sources
- Cabinet Cooling Fans
- System Protection

Recommended floor plans as well as procedures to plan power and grounding requirements before installation are provided in: *DEFINITY Communications System Generic 2 and System 85 Equipment Room Floor Plans and Specifications*, 555-104-603.

Procedures to install a complete system are provided in the following documents:

- *DEFINITY Enterprise Communications Server Release 5 Installation and Test for Multi-Carrier Cabinets*, 555-230-112
- *DEFINITY Enterprise Communications Server Release 5 Installation and Test for Single-Carrier Cabinets*, 555-230-894

Site Requirements

This section describes the floor and wall area required for the multi-carrier and single-carrier systems and associated peripheral equipment installed in the equipment room. Also included is the floor loading specifications (cabinet weight).

Floor Area

Floor area requirements in the equipment room vary between multi-carrier and single-carrier systems. Table 2-1 and Table 2-2 provide the dimensions for Multi-Carrier Cabinets. Table 2-3 through Table 2-5 provide the dimensions for Single-Carrier Cabinets.

Multi-Carrier Cabinets

The following system equipment and optional peripheral equipment occupies the following floor area in the equipment room. Table 2-1 describes the Multi-Carrier Cabinets including the Auxiliary Cabinet, the Global AC Cabinet, and the Global DC Cabinet.

Table 2-1. Dimensions for Multi-Carrier Cabinets

Height	Width	Depth	Clearance
70 inches (1.8 m)	32 inches (81 cm)	28 inches (71 cm)	Rear 38 inches (97 cm) Front 36 inches (91 cm)

Table 2-2 describes the dimensions for the Cable Slack Manager.

Table 2-2. Cable Slack Manager Dimensions

Height	Width	Depth	Clearance
7 inches (18 cm)	32 inches (81 cm)	38 inches (97 cm)	38 inches (97 cm) between cabinet and wall

Single-Carrier Cabinets

Table 2-3, Table 2-4, and Table 2-5 detail the system equipment and optional peripheral equipment occupying the following floor area in the equipment room.

Table 2-3 describes the dimensions for the DC Power Cabinet.

Table 2-3. DC Power Cabinet Dimensions

Height	Width	Depth	Clearance	Floor Area
20 Inches (51 cm)	27 inches (69 cm)	22 inches (56 cm)	38 inches (97 cm) Front and Rear	8 square feet (0.74 square m)

Table 2-4. Cabinet Dimensions for Single-Carrier Cabinets

Height (1-4 Cabinet Stacks)	Width	Depth	Clearance
1-Cabinet 20 inches (51 cm) 2-Cabinet 39 inches (99 cm) 3-Cabinet 58 inches (1.5 m) 4-Cabinet 77 inches (2 m)	27 inches (69 cm)	22 inches (56 cm)	38 inches (97 cm) between cabinet and wall

Table 2-5. Cable Slack Manager

Height	Width	Depth	Clearance
7 inches (18 cm)	32 inches (81 cm)	38 inches (96 cm)	38 inches (97 cm) between cabinet and wall

Large Battery Cabinet

Table 2-6 describes the dimensions for the cabinet containing the large batteries.

Table 2-6. Large Battery Cabinet

Cabinet Type	Height	Width	Depth
100 Amp	27 inches (69 cm)	55 inches (140 cm)	21 inches (53 cm)
200 Amp	42 inches (107 cm)	55 inches (140 cm)	21 inches (53 cm)
300 Amp	42 inches (107 cm)	55 inches (140 cm)	21 inches (53 cm)
400 Amp	57 inches (145 cm)	55 inches (140 cm)	21 inches (53 cm)

Floor Loading

This section provides the floor-loading requirements for multi-carrier and single-carrier systems.

Multi-Carrier Cabinets

The equipment room floor must be capable of supporting the cabinets. Floor plans are typically based on an average floor load of 50 pounds per square foot (242 kg per square meter). The plan allocates space around the front, rear, and ends of the cabinet for maintenance access and to keep the average floor loading at 50 pounds per square foot (242 kg per square meter).

NOTE:
The floor load per square foot (square meter) based on cabinet foot print area is greater than 50 pounds per square foot (242 kg per square meter). In some cases, the floor plans may require tailoring for the load carrying capabilities of the equipment room.

Table 2-7 lists the Multi-Carrier Cabinet average weights.

Table 2-7. Multi-Carrier Cabinet Weights

Cabinet Type	Weight
PPN and EPN	800 pounds (360 kg)
Auxiliary Cabinet	200 pounds (90 kg) minimum 800 pounds (362 kg) maximum

Single-Carrier Cabinets

The floor must have a commercial floor loading code of at least 50 pounds per square foot (242 kg per square meter). A maintenance area of at least 10 square feet (0.93 square meters) is required for a four-cabinet system.

The average weight of a Single-Carrier Cabinet is 125 pounds (56 kg).

Large Battery Cabinet

Table 2-8 lists the weights for the large battery cabinets.

Table 2-8. Large Battery Cabinet Weights

Type	Weight	Floor Loading
100 Amp	400 pounds (181 kg) maximum	180 pounds per square foot (81.6 kg per square meter)
200 Amp	815 pounds (370 kg) maximum	328 pounds per square foot (148 kg per square meter)
300 Amp	1480 pounds (671 kg) maximum	476 pounds per square foot (216 kg per square meter)
400 Amp	1580 pounds (717 kg) maximum	625 pounds per square foot (283 kg per square meter)

Main Distribution Frame

The Main Distribution Frame (MDF) equipment must be a specified distance from the system and must meet specific requirements.

For new installations, the MDF may be installed by Lucent Technologies personnel. For detailed information regarding the MDF and other site requirements, refer to the following documents:

- *DEFINITY Communications System Generic 1 and Generic 3 Main Distribution Field Design*, 555-230-630
- *DEFINITY Communications System Generic 3 Planning and Configuration*, 555-230-601

NOTE:
The MDF must be wired to the external environment (trunks and lines outside of the building) by telephone company personnel.

Floor Plans

Floor plans of the system and peripheral equipment vary depending on the size and shape of the equipment room and the extent of planned future growth; including the MDF. The wall behind a system cabinet must be clear of all objects (pictures, shelves, and so forth) not required by the system. The entire area behind a cabinet must be reserved for the MDF and the Cable Slack Manager (when provided). Figure 2-1 through Figure 2-4 show typical floor plans. All dimensions are shown in inches. Refer to Table 2-13, Table 2-14 and Table 2-15 for power requirements.

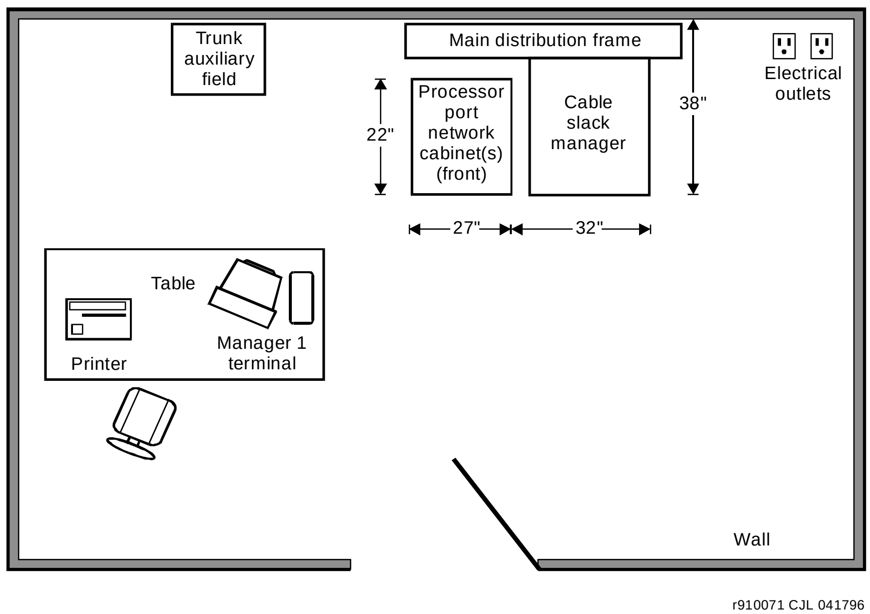

Figure 2-1. Typical Single-Carrier Cabinet Floor Plan

Single-Carrier Cabinet Configuration Guidelines

The MDF is located directly behind the Cable Slack Manager. The table for the management terminal and optional printer is located to the left, away from the equipment area, to allow service access. See "Table Area" on page 2-11 for table area requirements.

- The power outlets should be located outside the MDF area and must not be controlled by a wall switch or be shared with other equipment.
- The trunk/auxiliary field may be located inside the MDF.
- The system must be grounded by one of the approved methods. See "Approved Grounds" on page 2-33.

- Each cabinet requires either: NEMA 5-15R or 5-20R receptacle (or equivalent) for United States installations or: local IEC cord set (or equivalent) for non-United States installations.
- Earthquake protection may be required depending on the geographical location of the site. Refer to "Earthquake Protection" on page 2-43.
- Each cabinet uses 10-foot cables from the “A” and “B” cabinet positions and 15-foot cables from the “C” and “D” cabinet positions. Fiber connections between PNs use a 20-foot fiber optic cable.

Multi-Carrier Cabinet Configuration Guidelines

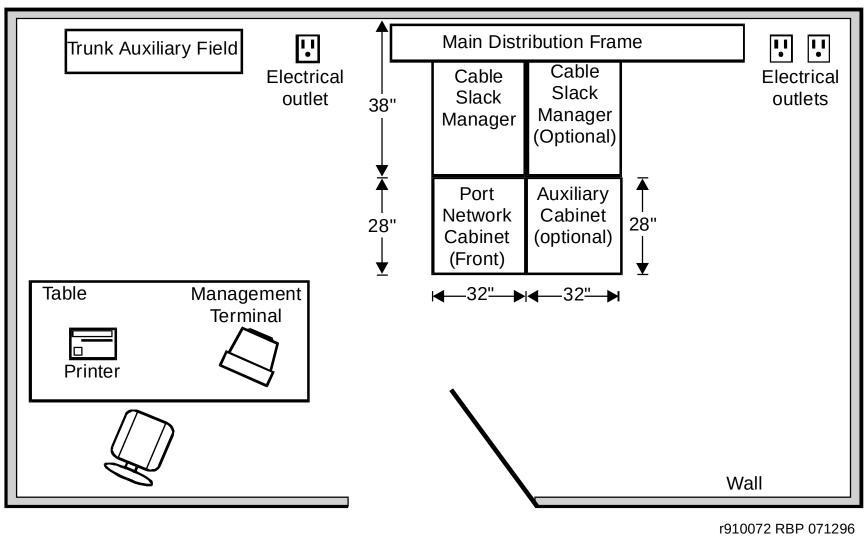

Figure 2-2. Typical Multi-Carrier Cabinet Floorplan

The table for the management terminal and optional printer is located to the left, away from the equipment area, to allow service access. See "Table Area" on page 2-11 for table area requirements. The following information applies to Figure 2-2 through Figure 2-5:

- The power outlets should be located outside the MDF area and must not be controlled by a wall switch or be shared with other equipment.
- The PPN cabinets require either a NEMA 5-50R receptacle (or equivalent) or a NEMA L14-30R receptacle (or equivalent) power outlet or: 220 VAC, 50-60 Hz power outlet for the Global AC Cabinet.
- The Auxiliary Cabinet requires a NEMA 5-20R receptacle (or equivalent).
- Allow at least 3 feet (91.4cm) of space in front of the cabinet to permit the door to open.

- The system must be grounded by one of the approved methods. See "Approved Grounds" on page 2-33.
- Earthquake protection may be required depending on the geographical location of the site. Refer to "Earthquake Protection" on page 2-43.
- The trunk/auxiliary field may be located inside the MDF.
- Each cabinet uses 10-foot cables from the “D” and “E” cabinet positions and 15-foot cables from the “A”, “B”, and “C” cabinet positions. Fiber connections between PNs use a 20-foot fiber optic cable.

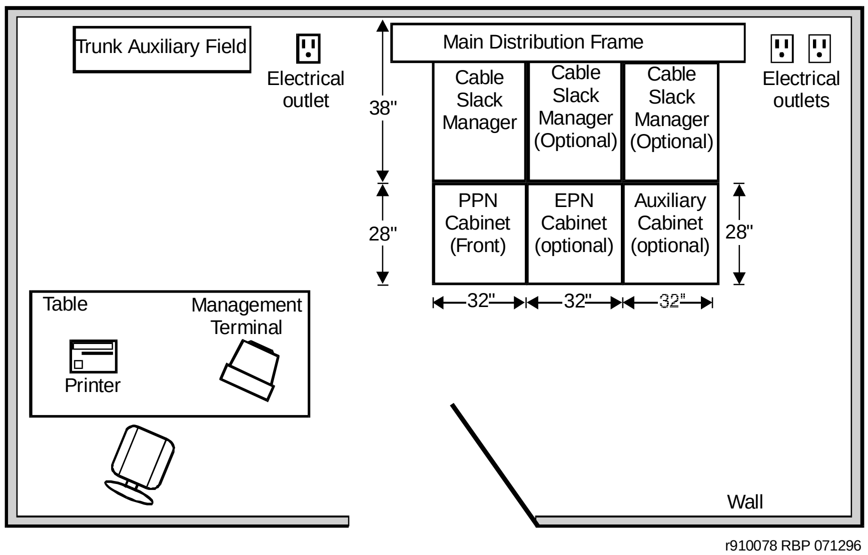

Figure 2-3. Typical Floorplan with EPN and Auxiliary Cabinet

This floor plan shows the recommended locations for a typical Multi-Carrier Cabinet installation. Note the MDF is located directly behind the Cable Slack Managers.

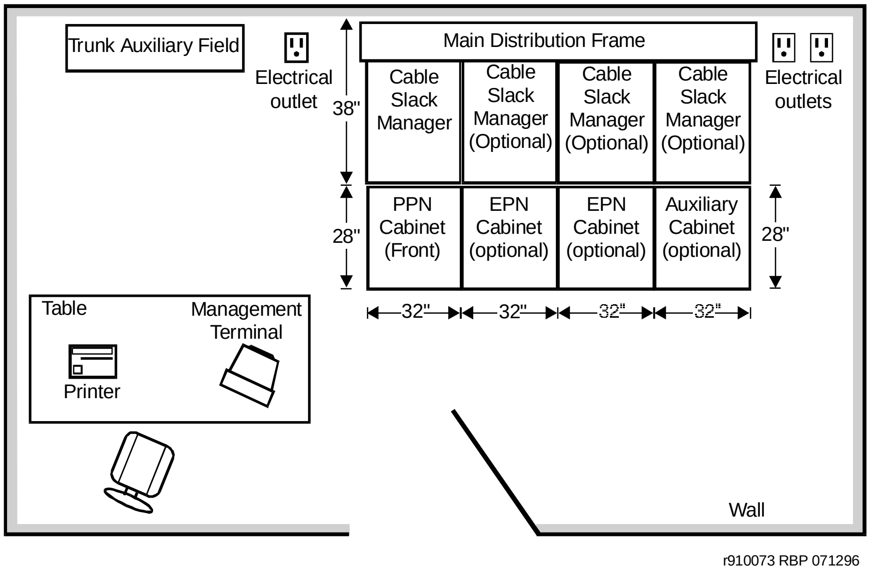

Figure 2-4. Typical Floor Plan with EPN and Auxiliary Cabinets

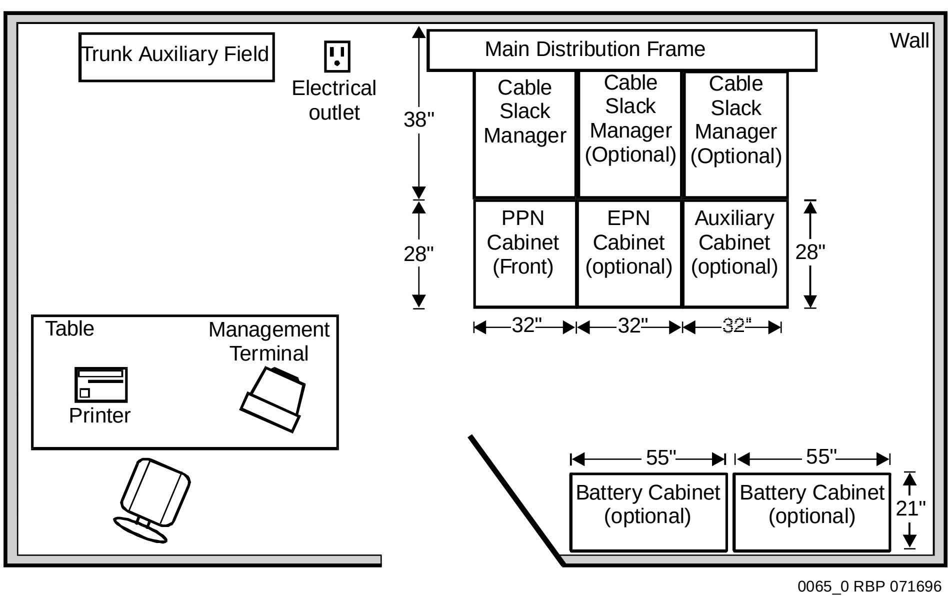

Figure 2-5. Typical Floor Plan with EPN and Battery Cabinets

Table Area

The table area in the equipment room is reserved for the management terminal and an optional printer. The 510A or 510D personal terminal, or a 715, 2900/715, or 715 BCS-2 Business Communications System (BCS) terminal can be used. The terminals each require approximately 3.2 square feet (0.3 square m) of area. The 510A or 510D with optional keyboard require approximately 2.1 square feet (0.2 square m) of area.

Refer to *572 Printer and 573 Printer*, 999-300-562, for more information on optional printers that require table or floor area considerations.

Environmental Considerations

This section details the environmental considerations for the Multi-Carrier Cabinets and Single-Carrier Cabinets. For information about the DEFINITY Wireless Business System, refer to Appendix A, 'Wireless Business Solutions".

Heat Dissipation

Multi-Carrier Cabinets

The typical heat dissipation of a fully loaded (five carriers) Multi-Carrier Cabinet is shown in Table 2-9.

Table 2-9. Typical Heat Dissipation of Multi-Carrier Cabinets

BTUs Per Hour	Gram-Calories Per Hour	Watts
4200 (Excluding Terminals)	1058	1232
6600 (Including Terminals)	2016	1935

Single-Carrier Cabinets

The typical heat dissipation of one Single-Carrier Cabinet is shown in Table 2-10.

Table 2-10. Typical Heat Dissipation of Single-Carrier Cabinets

BTUs Per Hour	Gram-Calories Per Hour	Watts
1700 (One Cabinet Including Terminals)	438	499
5700 (Cabinet Stack Including Terminals)	1436	1672

Altitude and Air Pressure

At altitudes above 5,000 feet (1,525 meters), the maximum short-term temperature limit is reduced by 1 degree Fahrenheit for each 1,000 feet (305 meters) of elevation above 5,000 feet (1,525 meters). For example: at sea level, the maximum short-term temperature limit is 120 degrees Fahrenheit (49 degrees Celsius). At 10,000 feet (3,050 meters), the maximum short-term temperature limit is 115 degrees Fahrenheit (46 degrees Celsius).

The normal operating air pressure range is: 9.4 to 15.2 psi (pounds per square inch) (648 to 1,048 millibars).

Temperature and Humidity

The equipment must be installed in a well-ventilated area. Maximum equipment performance is obtained at an ambient room temperature between 40 and 120 degrees Fahrenheit (4 and 49 degrees Celsius) for short term operation (not more than 72 consecutive hours or 15 days in a year) and up to 110 degrees Fahrenheit (43 degrees Celsius) for continuous operation.

The relative humidity range is 10 to 95 percent at up to 84 degrees Fahrenheit (29 degrees Celsius). Above this, maximum relative humidity decreases from 95 percent down to 32 percent at 120 degrees Fahrenheit (49 degrees Celsius). Installations outside these limits may reduce system life or affect operation. The recommended temperature and humidity range is 65 to 85 degrees Fahrenheit (18 to 29 degrees Celsius) at 20 to 60% relative humidity. See Table 2-11.

Table 2-11. Temperature and Relative Humidity

Room Temperature (Degrees Fahrenheit)	Room Temperature (Degrees Celsius)	Relative Humidity (%)
40 to 84	4.4 to 28.8	10 to 95
86	30.0	10 to 89
88	31.1	10 to 83
90	32.2	10 to 78
92	33.3	10 to 73
94	34.4	10 to 69
96	35.6	10 to 65
98	36.7	10 to 61
100	37.8	10 to 58
102	38.9	10 to 54
104	40.0	10 to 51
106	41.1	10 to 48
108	42.2	10 to 45
110	43.3	10 to 43
112	44.4	10 to 40
114	45.6	10 to 38
116	46.7	10 to 36
118	47.8	10 to 34
120	48.9	10 to 32

Air Purity

The cabinet should not be installed where the air may be contaminated by excessive dust, lint, carbon particles, paper fiber contaminants, or metallic contaminants. Corrosive gases above the levels in Table 2-12 must be avoided.

Table 2-12. Corrosive Gas Concentrations

Contaminant	Average Concentration
Particulate matter	185 micrograms/cubic meter
Nitrate in particulate matter	12 micrograms/cubic meter
Total hydrocarbons equivalent to methane	10 ppm (parts per million)
Sulphur dioxide	0.20 ppm (parts per million)
Oxides of nitrogen	0.30 ppm (parts per million)
Total oxidants equivalent to ozone	0.05 ppm (parts per million)
Hydrogen sulfide	0.10 ppm (parts per million)

NOTE:
Single-Carrier and Multi-Carrier Cabinets contain an air filter to reduce particulates flowing through the equipment. The Compact Single-Carrier Cabinet does not contain an air filter.

Lighting

Lighting should be bright enough to allow personnel to perform their tasks. The recommended light intensity is 50 to 70 footcandles to meet the Occupational Safety and Health Act (OSHA) standards.

Radio Frequency Noise

Noise is introduced into the system through trunk or station cables, or both. However, electromagnetic fields near the system control equipment may also cause noise in the system. Therefore, the system and cable runs should not be placed in areas where a high electromagnetic field strength exists. Radio transmitters (AM or FM), television stations, induction heaters, motors with commutators of 0.25 horsepower (187 watts) or greater, and similar equipment are leading causes of interference.

Small tools with universal motors are generally not a problem when they operate on separate power lines. Motors without commutators generally do not cause interference. Field strengths below 1.0 volt per meter are unlikely to cause interference.

Weak fields can be measured by a tunable meter. Field strengths greater than 1.0 volt per meter can be measured with a broadband meter.

The field strength produced by radio transmitters can be estimated by dividing the square root of the emitted power in kilowatts by the distance from the antenna in kilometers. This yields the approximate field strength in volts per meter and is relatively accurate for distances greater than about half a wavelength (150 meters for a frequency of 1000 kHz).

Acoustic Noise Levels

Acoustic noise levels are provided below. In all types of cabinet configurations, if the system cabinet door is open, there is an additional 1 dBA (decibels measured acoustically) of noise.

Multi-Carrier Cabinets

At a distance of five feet (1.5 m), the noise produced by a five-carrier cabinet varies from 51 dBA at low to 56 dBA at high fan speeds. When the tape drive is fast winding, there is an additional 2 dBA of noise. When a tape drive is reading data, there is an additional 1 dBA of noise.

Single-Carrier Cabinets

The noise produced by the system at a distance of five feet (1.5 meters) is:

- 1 cabinet — 48 dBA
- 2 cabinets — 50 dBA
- 3 cabinets — 52 dBA
- 4 cabinets — 53 dBA

Cabinet Power Sources

This section describes AC and DC power sources used by the cabinets.

AC Power

Power feeders from a dedicated AC power source (usually located outside the building) are connected to an AC load center. These feeders do not power other equipment. The AC load center distributes the power to receptacles. The power cord from the AC power distribution unit in each Multi-Carrier Cabinet and AC power supply in each Single-Carrier Cabinet is plugged into a receptacle.

Either of the following power sources can supply 60 Hz power to the AC load in Release 5 systems and in later G3V4 systems:

- Single-phase, 4-wire, 120/240 VAC supplying 240 VAC. This source has three hot wires plus a ground wire. See Figure 2-6.
- Three-phase, 4-wire, 120/208 VAC supplying 208 VAC. This source has two hot wires and one ground wire. See Figure 2-7.
- Single-phase, 3-wire, 208 or 240 VAC. This source has two hot wires and one ground wire. See Figure 2-8 on page 2-18.

Either of the following power sources can supply 50 Hz power to the AC load in Release 5 systems:

- International 4-wire, Y, 220/380 VAC. This source has three hot wires, one neutral wire, and one ground wire. See Figure 2-9 on page 2-19.
- International Delta, 3-wire, 220 or 240 VAC. This source has three wires. See Figure 2-10 on page 2-19.

NOTE:
The type of power required by a Multi-Carrier Cabinet is shown on the cabinet's rear door. The type of power required by a Single-Carrier Cabinet is shown on the cabinet's rear cover.

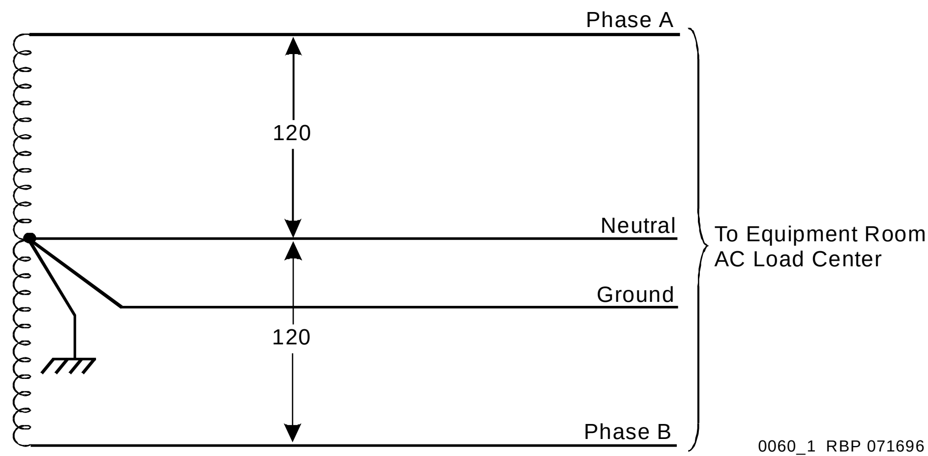

Figure 2-6. Single-Phase, 120/240 VAC, 60 Hz Source

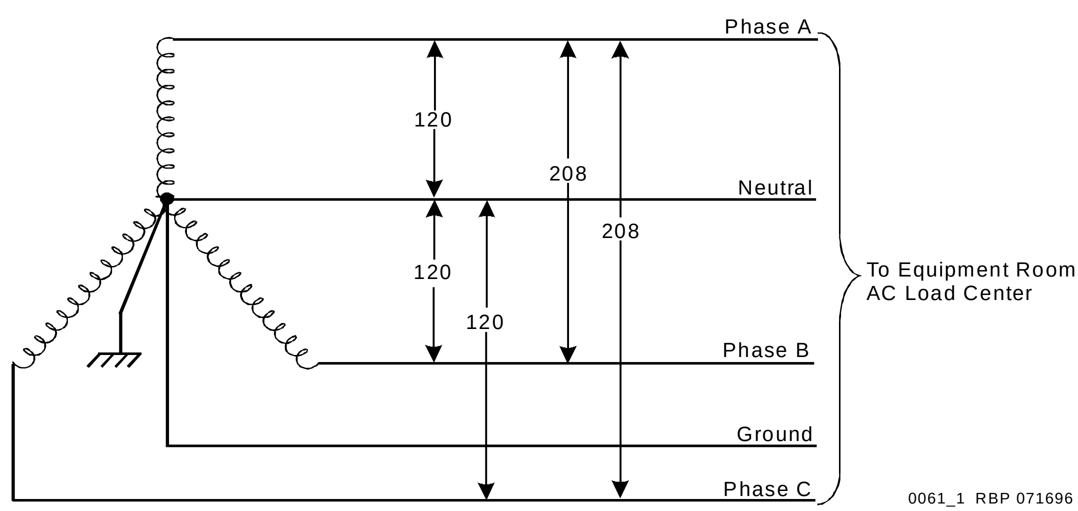

Figure 2-7. Three Phase, 4-Wire, 120/208 VAC, 60 Hz Source

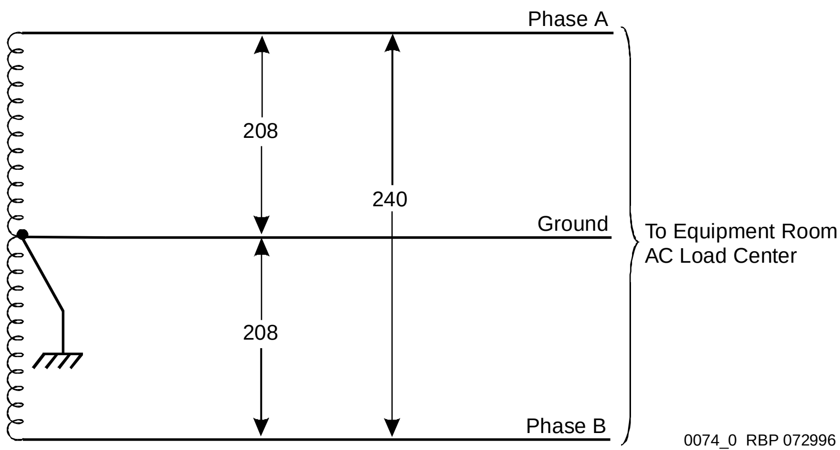

Figure 2-8. Single-Phase, 3-Wire, 208 or 240 VAC, 60 Hz Source

50 Hz Power Sources in Release 5 Systems

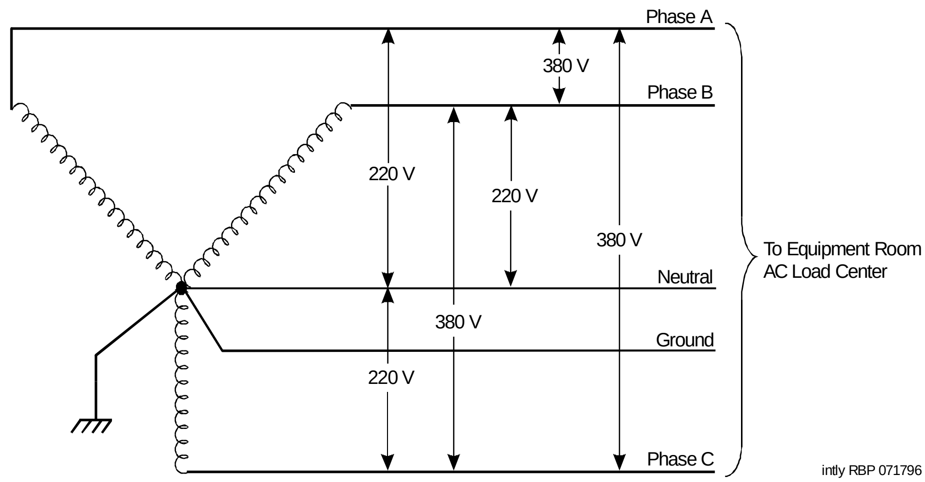

Figure 2-9. International 4-Wire, 220/380 VAC, 50 Hz Source

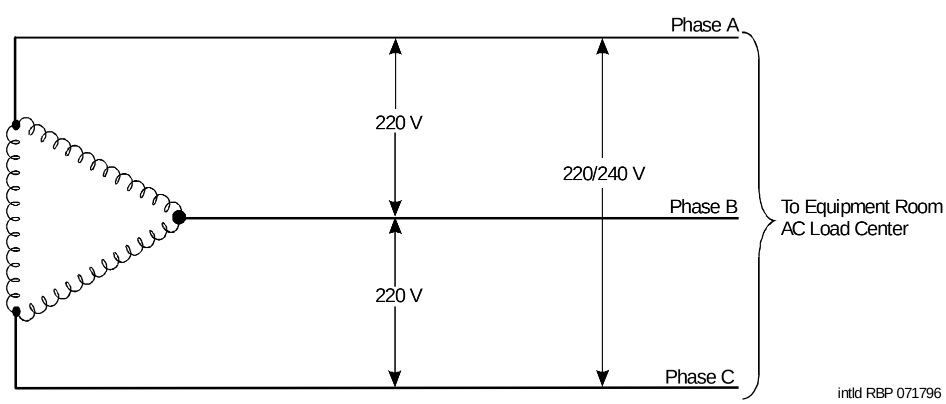

Figure 2-10. International Delta, 3-Wire, 220 or 240 VAC, 50 Hz Source

Table 2-13 lists the AC power sources that can supply power to an AC load in a cabinet. A NEMA receptacle (or equivalent) is connected to the wires from the unit. The AC power cord from the power input of each unit is plugged into a receptacle.

Contact your Lucent Technologies representative for the required list number for each power source application.

Table 2-13. Cabinet AC Power Sources

Power Sources	Power Distribution Unit	Power Input
Single phase 120 VAC with neutral Single phase 240 VAC with neutral, or single phase of 3-phase, 208 VAC with neutral	AC power distribution (J58890CE-1 and J58890CE-2) Multi-Carrier Cabinet	120 VAC, 60 Hz NEMA 5-50R 208/240 VAC, 60 Hz NEMA L14-30R
Single Phase 176-264 VAC	AC Power distribution (J58890CH-1) Multi-Carrier Cabinet	200-240 Volts, 50-60 Hz NEMA L6-30R. Installations outside the United States require a receptacle suitable for use in the country of installation.
Single phase 120 VAC with neutral Single phase of 220 VAC or Single phase of 240 VAC	AC power supply (WP-91153) Single-Carrier Cabinet	120 VAC, 60 Hz NEMA 5-20R or 5-15R 220/240 VAC at country-specific receptacle
Single phase 120 VAC with neutral Single phase of 220 VAC or Single phase of 240 VAC	AC power supply (WP-90510) Compact Single-Carrier Cabinet	120 VAC 60 Hz NEMA 5-20R or 5-15R 220/240 VAC at country-specific receptacle

DC Power

DC-powered cabinets containing a J58890CF Power Distribution Unit require a -42.5 to -54.2 VDC source at up to 75 Amps. Refer to "Multi-Carrier Cabinet Power System" on page 2-22, or to "Single-Carrier Cabinet Power Systems" on page 2-36 for more information. For DEFINITY Wireless Business System power requirements, refer to Appendix A.

AC Load Center Circuit Breakers

Table 2-14 lists the AC load center circuit breakers for AC-powered cabinets.

Table 2-14. Circuit Breakers for AC-Powered Cabinets

Cabinet Type	Circuit Breaker Size
Multi-Carrier Cabinet (120 VAC) 60 Hz	50 Amps
Multi-Carrier Cabinet (208 VAC) 60 Hz	30 Amps
Multi-Carrier Cabinet (240 VAC) 60 Hz	30 Amps
Multi-Carrier Cabinet (200-240 VAC) 50-60 Hz	30 Amps
Single-Carrier Cabinet (120 VAC)	15 or 20 Amps
Compact Single-Carrier Cabinet (120 VAC)	15 Amps
Compact Single-Carrier Cabinet (240 VAC)	7 Amps
Auxiliary Cabinet (120 VAC)	20 Amps

Table 2-15 lists the load center circuit breakers for DC-powered cabinets.

Table 2-15. Circuit Breakers for DC-Powered Cabinets

Cabinet Type (-48 VDC)	Circuit Breaker Size
Multi-Carrier Cabinet	75 Amps
Single-Carrier Cabinet	25 Amps
Auxiliary Cabinet	20 Amps

Multi-Carrier Cabinet Power System

These power systems consist of an AC or DC power distribution unit in the bottom of each cabinet and cabling to distribute output voltages to power unit circuit packs in the carriers. These power systems also consist of power converter circuit packs in the carriers supplying DC power to the circuit pack slots. Chapter 3, "Cabinets, Carriers, and Circuit Packs" describes the AC version 631DA1 and 631DB1 power units and the DC version 644A, 645B, and 649A power converters.

Table 2-16 lists the input and output voltages of power unit circuit packs in the carriers of Multi-Carrier Cabinets.

Table 2-16. Power Units in Multi-Carrier Cabinets

	AC Power Input	DC Power Inputs	DC Power Inputs	DC Power Outputs	DC Power Outputs	DC Power Outputs
Unit Type	**120 VAC**	**144 VDC**	**-48 VDC**	**+5 VDC 60 Amps**	**-5 VDC 6 Amps**	**-48 VDC 8 Amps**
AC 631DA1	Yes	Yes	No	Yes	No	No
AC 631DB1	Yes	Yes	No	No	Yes	Yes
DC 644A	No	No	Yes	Yes	No	No
DC 645B	No	No	Yes	No	Yes	Yes
DC 649A	No	No	Yes	Yes	Yes	10 Amps

AC and DC Power Distribution

A typical AC power distribution unit for a Multi-Carrier Cabinet contains the circuit breakers, ring generator, optional batteries, and optional battery charger. The power distribution cables carry 120 VAC during normal operation and 144 VDC from optional batteries if AC power fails. Another cable connects 120 VAC to the battery charger.

DC-powered cabinets require a -42.5 to -54.2 VDC source at up to 75 Amps.

AC Power Distribution

AC Power Distribution Unit and Battery Charger (J58890CE-2)

Figure 2-11 shows an AC Power Distribution Unit (List 9 or List 10). This unit is located at the bottom of some Multi-Carrier Cabinets.

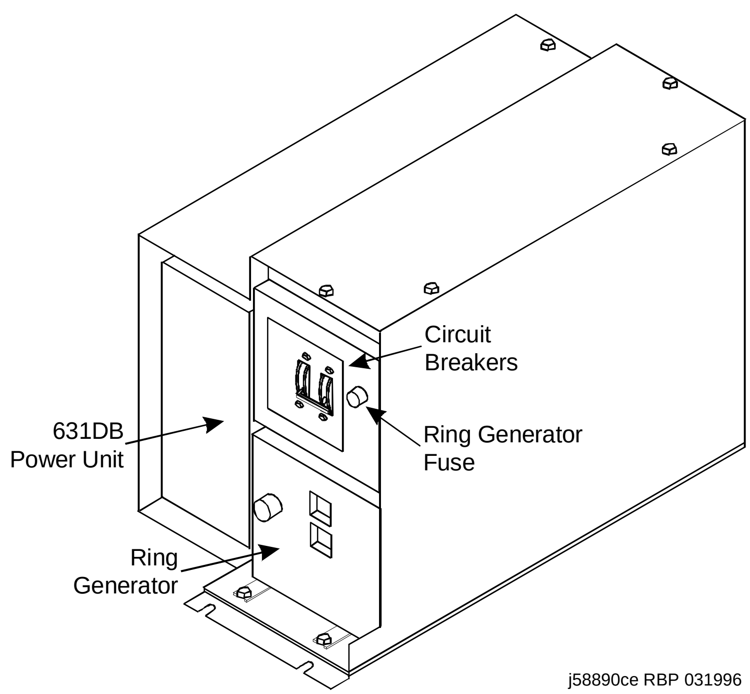

Figure 2-11. AC Power Distribution Unit (J58890CE-2) — Front

The AC Power Distribution Unit contains the following components:

- Circuit breaker
- Electromagnetic Interference (EMI) filter
- Ring generator
- AC input fuse
- 20 Amp fuses
- Signal connector
- -48 VDC fan power

The optional battery charger (List 11) is located in the bottom of some Multi-Carrier Cabinets. See Figure 2-12.

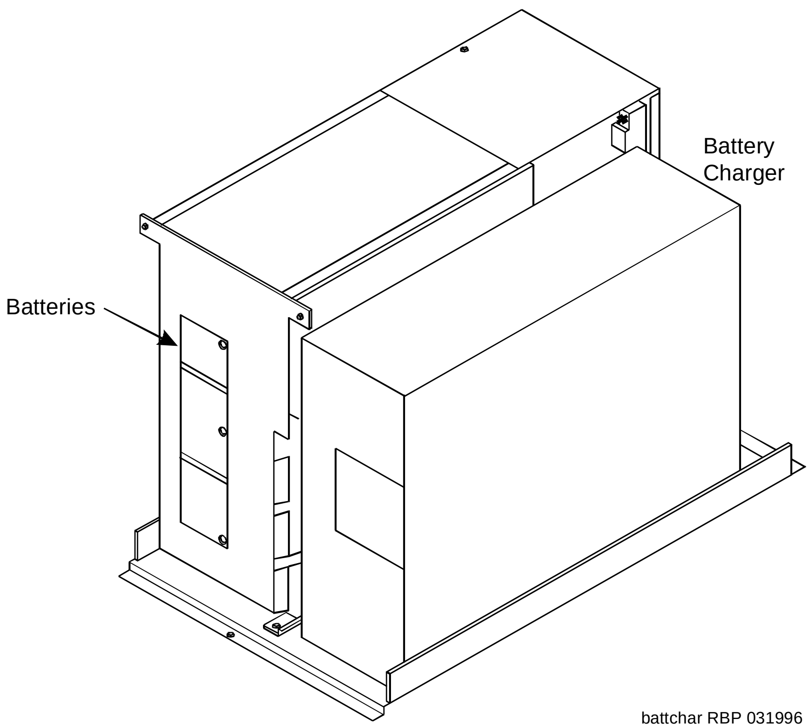

Figure 2-12. Battery Charger (Optional Part of J58890CE-2) — Front

The charger is used only without an Uninterruptible Power Supply (UPS). The charger contains:

- Three 48 VDC batteries for backup power to the cabinet
- A DC power relay to switch the batteries into the power circuit when a main power failure is detected

Circuit Breaker

The circuit breaker protects the AC input power to the cabinet and serves as the main AC input disconnect switch. The circuit breaker has two poles for 120 VAC or three poles for 208/240 VAC. If a problem develops, the circuit breaker automatically trips (opens) and removes the AC power input.

48 VDC Batteries

The three 48 VDC batteries are connected in series to produce a nominal 144 VDC, fused at 20 Amps. The batteries are trickle-charged from the battery charger.

Battery Charger

When AC power is restored after an outage, the battery charger converts a 120 VAC input to DC voltage that recharges the batteries (usually within 24 hours).

DC Power Relay

This relay disconnects the batteries from a system when AC power is being used. The relay also disconnects the batteries if power fails for more than ten minutes in a standard reliability system, five minutes in high reliability and critical reliability systems, and ten minutes in an Expansion Port Network (EPN). This protects the batteries from being over-discharged.

Electromagnetic Interference (EMI) Filters

The EMI filters suppress noise voltage on the AC input line to the unit.

Ring Generator

The ring generator converts the -48 VDC input to a 67 VAC to 100 VAC, 20 Hz or 25 Hz ringing voltage. The analog line circuit packs use this AC voltage output to ring voice terminals. The AC outputs are routed from the ring generator to port carriers, expansion control carriers, and control carriers.

Fuses

20 Amp fuses protect the power on each cable going from the AC power distribution unit to power converters in the carriers.

Figure 2-13 shows AC power distribution in some Multi-Carrier Cabinets. The DC power distribution cables are located on both sides of the cabinet. These cables provide power to each of the carriers. The optional battery charger is located on the right side of the power distribution unit.

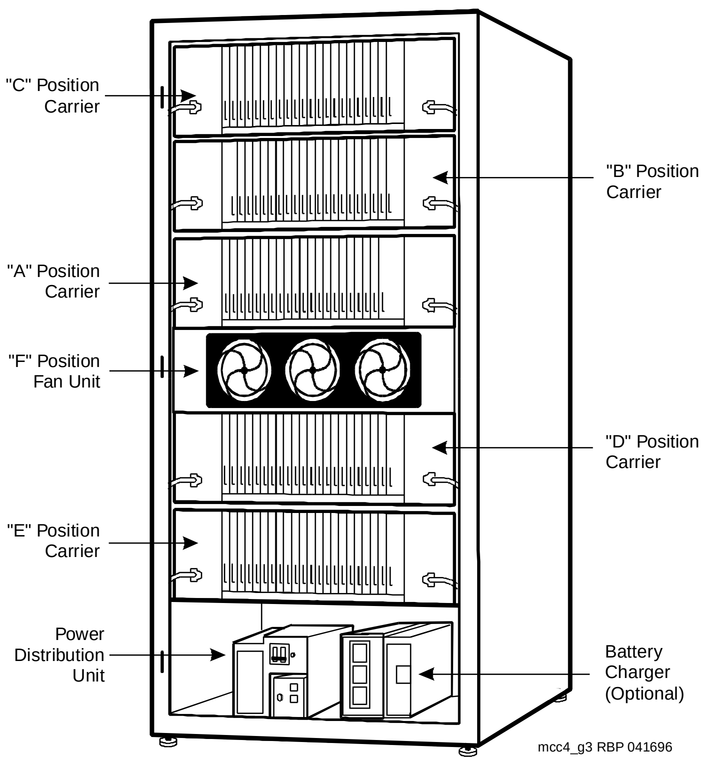

Figure 2-13. AC Power Distribution in Multi-Carrier Cabinets

Power Backup

If AC power fails, three 48 VDC batteries power the system for 10 seconds in a PPN cabinet, for 15 seconds in an EPN cabinet, and for 10 minutes in the Control Carrier in a standard reliability system. The batteries also provide system power for five minutes in the Control Carrier in high reliability and critical reliability systems, and for 10 minutes in the Expansion Control Carrier in the "A" position of an EPN cabinet (Release 5r only).

Uninterruptible Power Supply

An external UPS provides a longer backup time than holdover batteries and can replace the batteries and battery charger. The unit is connected from the AC power source to a cabinet’s AC power cord. If AC power fails, the unit supplies its own AC power to the cabinet.

Power Distribution Unit (J58890CH-1)

Figure 2-14 shows a power distribution unit used in some Multi-Carrier Cabinets. The unit is located at the bottom of the cabinet.

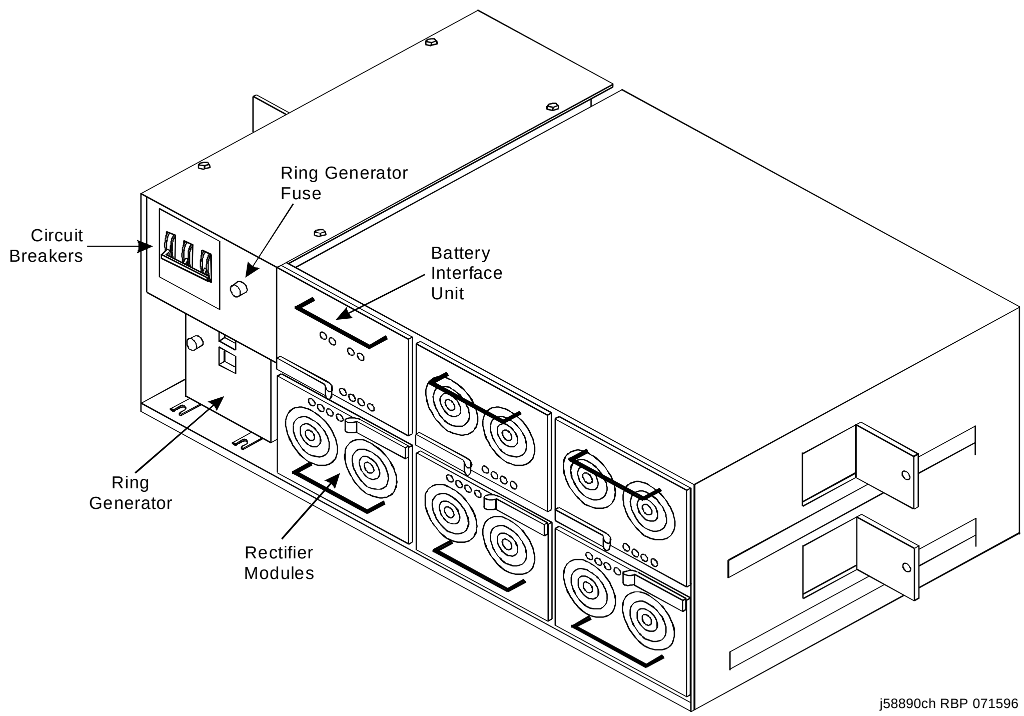

Figure 2-14. AC Power Distribution Unit (J58890CH-1) — Front

Power Backup

Small Batteries

The small battery is located at the center rear of the Multi-Carrier Cabinet. This eight Amp Hour (AH) battery is fused for short circuit protection and is charged by the J58890CH-1. The batteries also contain a thermal sensor that changes the charging voltage depending on battery temperature.

The small batteries provide short-term battery holdover. If AC power fails, 48 VDC batteries power the system for 10 seconds in a PPN cabinet, for 15 seconds in an EPN cabinet, and for 10 minutes in the Control Carrier in a standard reliability system. The batteries also provide system power for five minutes in the Control Carrier in high reliability and critical reliability systems, and for 10 minutes in the Expansion Control Carrier in the "A" position of an EPN cabinet (Release 5r only).

Figure 2-15 shows the small battery assembly.

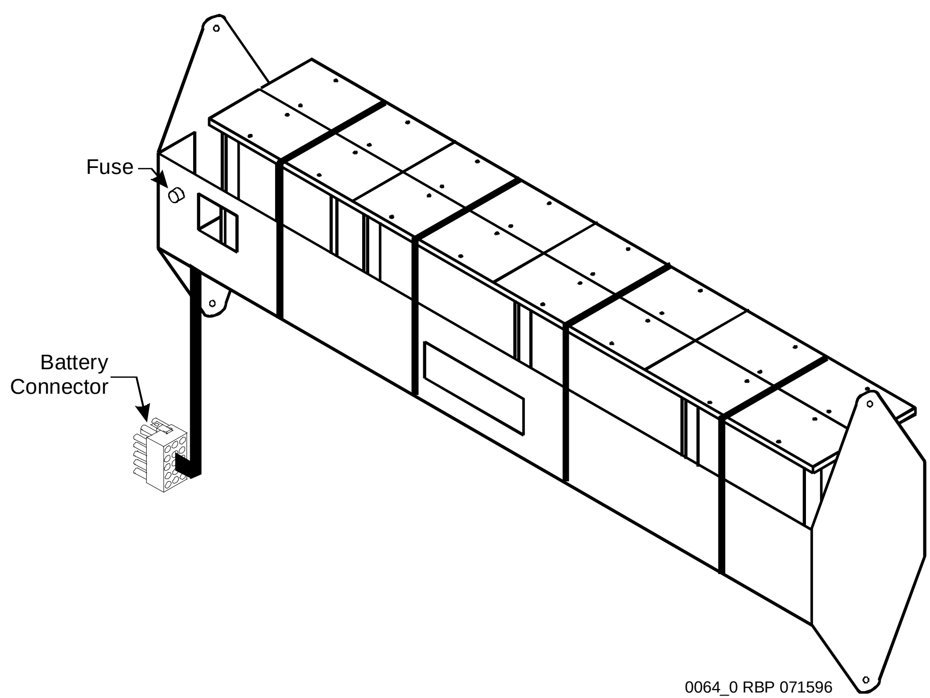

Figure 2-15. Small Battery Assembly

Large Batteries

The large batteries are located in a battery cabinet and can supply holdover times of 2 to 8 hours depending on the size of the battery. The batteries are circuit breaker protected and are charged by the J58890CH-1. The batteries also contain a thermal sensor that change the charging voltage depending on the battery temperature.

The batteries provide extended holdover. Battery holdover and recharge times for a typical 2500 Watt load are shown in Table 2-17.

Table 2-17. Battery Holdover and Recharge Times

Cabinet Type	Holdover Time	Recharge Time
100 Amp	2 Hours	7 Hours
200 Amp	4 Hours	13 Hours
300 Amp	6 Hours	20 Hours
400 Amp	8 Hours	26 Hours

Figure 2-16 shows typical large battery cabinets (200 Amp shown).

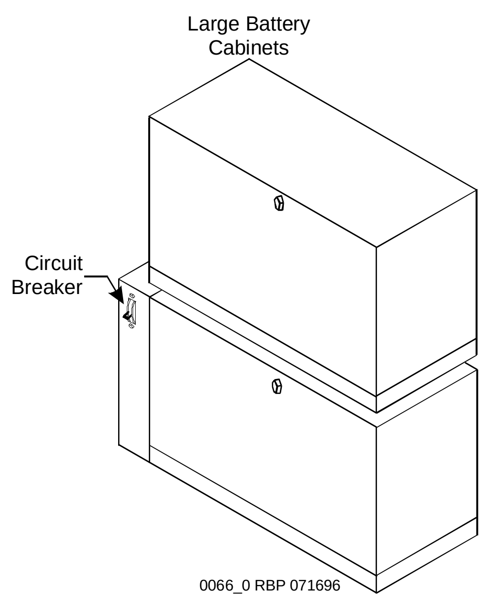

Figure 2-16. Typical Large Battery Cabinets

DC Power Distribution

DC Power Distribution Unit (J58890CF-2)

Figure 2-17 shows a power distribution unit used in some DC-powered Multi-Carrier Cabinets. The unit is located at the bottom of the cabinet and contains the ring generator, 20 Amp circuit breakers, terminal blocks, and fan power required by the system.

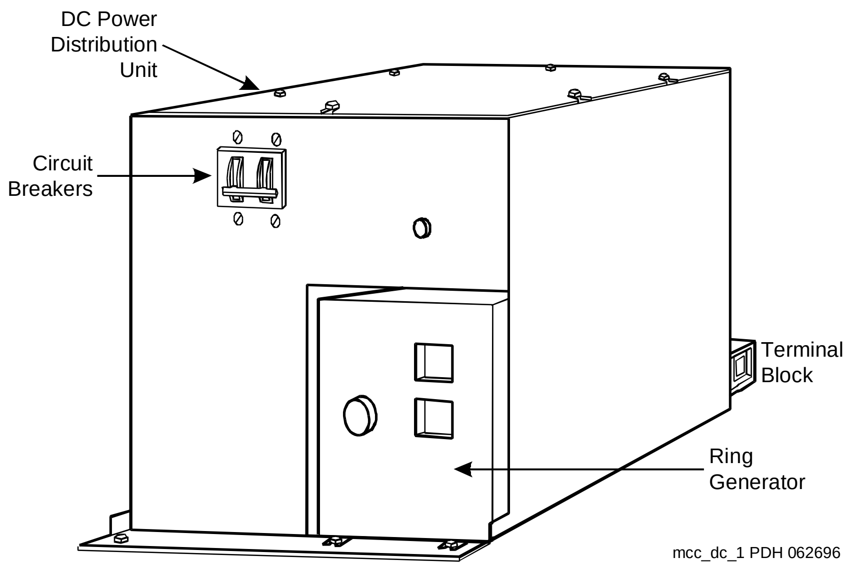

Figure 2-17. DC Power Distribution Unit (J58890CF-2) — Front

Ground Isolation

Each peripheral connected to a G3V4 or Release 5 system, via the asynchronous Electronic Industries Association (EIA) RS-232 interface, requires either a 105C or a 116A Isolator Interface. The interface is used to isolate grounding between the system and external adjuncts.

The interface is located behind a PPN Control Carrier or behind an EPN Expansion Control Carrier. The 105C or the 116A is installed at the RS-232 interface between the peripheral equipment and the interface connector.

Figure 2-18 shows the power distribution in some Multi-Carrier Cabinets with short-term battery holdover (small battery). In Release 5 and later systems, the power distribution cables are located on the right hand side of the cabinet only. This is because the 649A DC Power Converter circuit pack replaces two power converters mounted at either end of each carrier. Two 649As and two cables are required for Switch Node (SN) carriers.

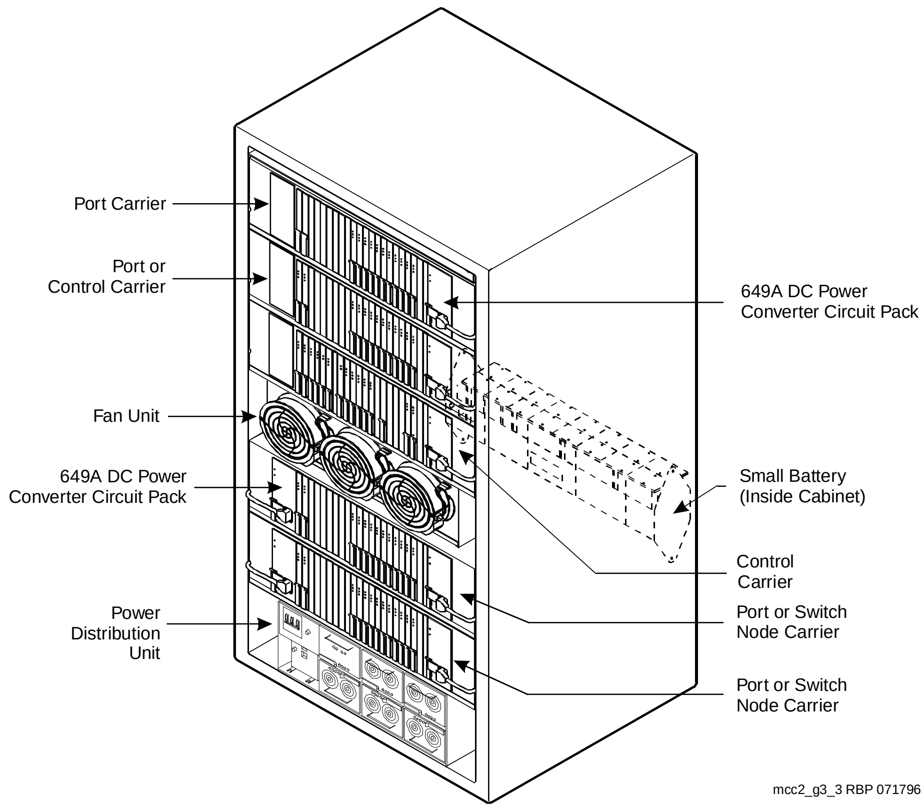

Figure 2-18. Power Distribution in Multi-Carrier Cabinets

Figure 2-19 shows the DC power distribution in some Multi-Carrier Cabinets with extended battery backup (large batteries). In Release 5 and later systems, the power distribution cables are located on the right hand side of the cabinet only. This is because the 649A DC Power Converter circuit pack replaces two power converters mounted at either end of each carrier. Two 649As and two cables are required for Switch Node (SN) carriers.

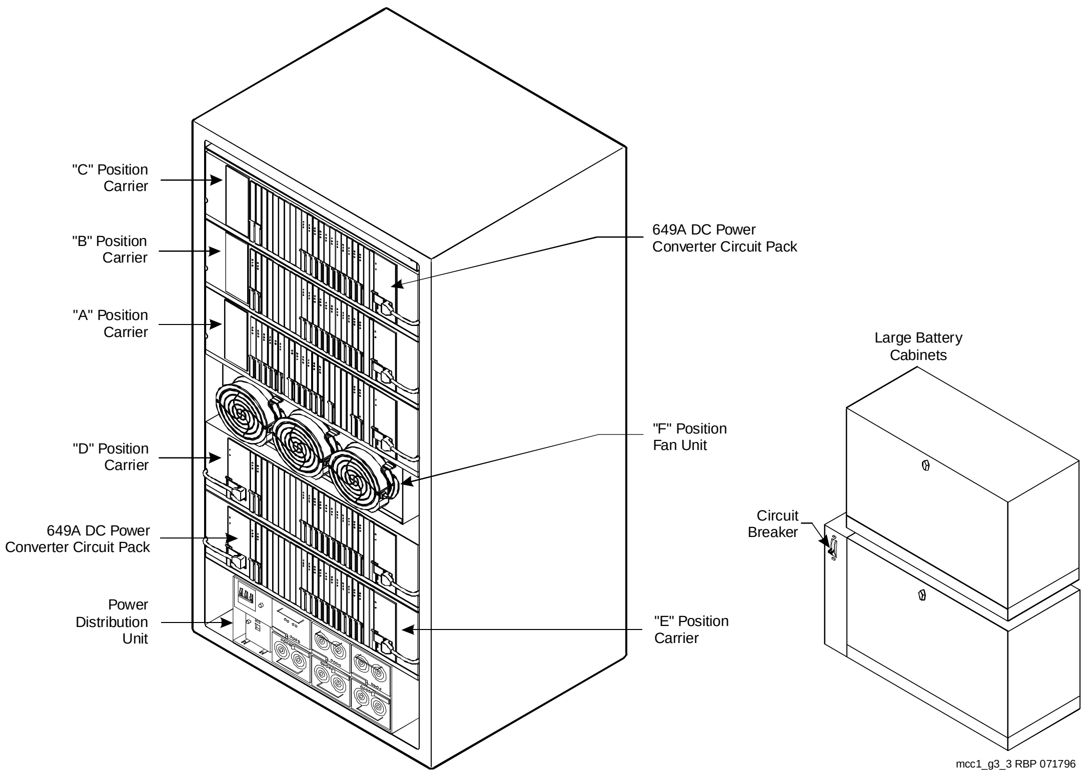

Figure 2-19. DC Power Distribution in Multi-Carrier Cabinets

DC Power Converter (649A)

The 649A converts the -48 VDC from the power distribution unit to outputs of -48 VDC at 10 Amps, +5 VDC at 60 Amps, and -5 VDC at 6 Amps. These outputs are then distributed to circuit pack slots in the carriers.

NOTE:
Refer to Chapter 3, "Cabinets, Carriers, and Circuit Packs" for a detailed description of the 649A DC Power Converter.

AC and DC Grounding

Approved Grounds

An approved ground is the closest acceptable medium for grounding the building entrance protector, the entrance cable shield, or single-point ground of the system.

If more than one type of approved ground is available on the premises, the grounds must be bonded together as required in Section 250-81 of the National Electrical Code, or the applicable electrical code in the country where the equipment is installed.

Protective Grounds

Grounded Building Steel — The metal frame of the building where it is effectively grounded by one of the following grounds: acceptable metallic water pipe, concrete encased ground, or a ground ring.

Acceptable Water Pipe — Underground water pipe, at least 1/2 inch (1.3 cm) in diameter, in direct contact with the earth for at least 10 feet (3 meters). The pipe must be electrically continuous (or made electrically continuous by bonding around insulated joints, plastic pipe, or plastic water meters), to the point where the protector ground wire is connected.

A metallic underground water pipe must be supplemented by the metal frame of the building, a concrete encased ground, or a ground ring.

If these grounds are not available, the water pipe ground can be supplemented by one of the following types of grounds:

- Other local metal underground systems or structures — Local underground structures such as tanks and piping systems
- Rod and pipe electrodes — A 5/8 inch (1.6 cm) solid rod or 3/4 inch (1.9 cm) conduit or pipe electrode driven to a minimum depth of 8 feet (2.5 meters)
- Plate electrodes — Must have a minimum of 2 square feet (0.18 square meters) of metallic surface exposed to the exterior soil

Concrete Encased Ground — An electrode encased by at least 2 inches (5 cm) of concrete and located within and near the bottom of a concrete foundation or footing in direct contact with the earth. The electrode must be at least 20 feet (6 meters) of one or more steel reinforcing bars or rods 1/2 inch (1.3 cm) in diameter, or at least 20 feet (6 meters) of bare, solid copper, 4 AWG wire.

Ground Ring — A buried ground that encircles a building or structure at a depth of at least 2.5 feet (0.8 meter) below the earth's surface. The ground ring must be at least 20 feet (6 meters) of 2 AWG, bare, copper wire.

Approved Floor Grounds

Approved floor grounds are those grounds on each floor of a high-rise building suitable for connection to the ground terminal in the riser closet and to the cabinet equipment single-point ground terminal. Approved floor grounds may include the following:

- Building steel
- The grounding conductor for the secondary side of the power transformer feeding the floor
- Metallic water pipes
- Power feed metallic conduit supplying panel boards on the floor
- A grounding point specifically provided in the building for the purpose

WARNING:
If the approved ground or approved floor ground can only be accessed inside a dedicated power equipment room, then connections to this ground should be made by a licensed electrician.

NOTE:
All protective grounds must be electrically connected together to form a single grounding electrode system.

Coupled Bonding Conductor

Figure 2-20 shows Coupled Bonding Conductor (CBC) grounding in an AC-powered cabinet. A minimum one-foot spacing is maintained between the CBC and other power and ground leads.

In AC-powered systems, the system single-point ground terminal block is located on the AC load or AC protector cabinet.

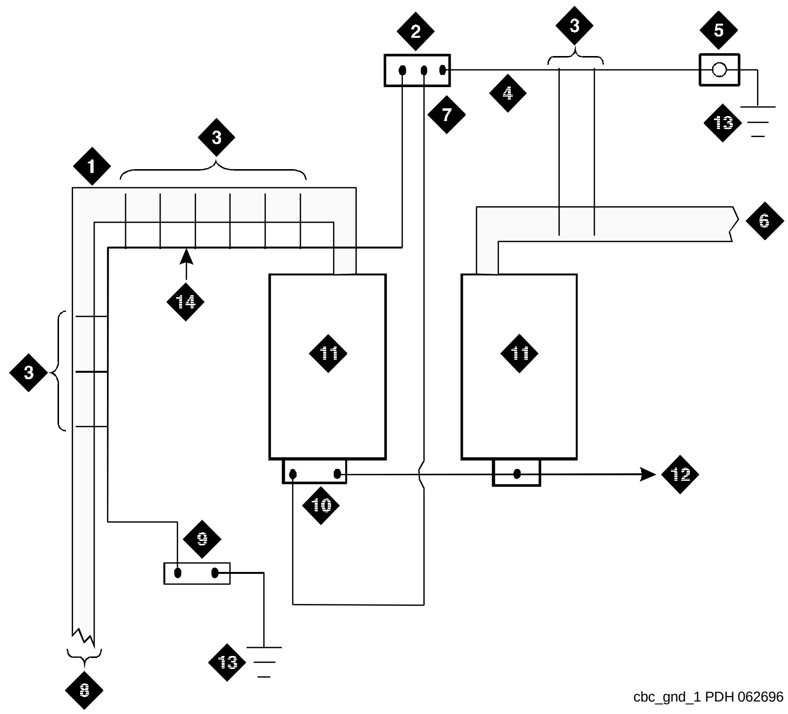

Figure 2-19 Notes

1. 25-Pair Tip and Ring Cables to Cabinets
2. CBC Terminal Block
3. Tie Wraps
4. Cable Shield or Six Spare Pairs
5. Ground on Carbon Block Protector or Equivalent
6. Trunk Cable
7. 10 AWG Wire
8. To System Cabinets
9. System Single-Point Ground Terminal Block
10. Cross-Connect Ground Block
11. Main Distribution Frame (MDF)
12. To Other Ground Blocks
13. Approved Ground
14. Coupled Bonding Conductor (10 AWG)

Figure 2-20. CBC Grounding in an AC-Powered Cabinet

Single-Carrier Cabinet Power Systems

Each Single-Carrier Cabinet has one AC or one DC power supply that distributes DC power and AC ringing voltage to the circuit pack slots in the cabinet. The Compact Single-Carrier Cabinet has an AC power supply only.

AC Power Supply (WP-91153)

In an AC-powered cabinet, a single, plug-in, multi-output AC power supply is located in the power supply slot. A power cord, with a three-prong plug on one end and an appliance connector on the other end, connects the supply to a dedicated AC power source.

The inputs to the power supply can be (depending on list version):

- 120 VAC, 60 Hz, 15 Amp to 20 Amp; three wires in the power cord: one hot wire, one neutral wire, and one ground wire
- 220 VAC or 240 VAC, 50 Hz, 10 Amp; three wires in the power cord: one hot wire, one neutral wire, and one ground wire

The AC power supply produces the following DC outputs: +5 VDC, -5 VDC, -48 VDC, +12 VDC, and a battery-charging voltage. The DC outputs are distributed on the cabinet backplane to the circuit pack slots.

The AC power supply also produces AC ringing voltage. The AC ringing voltage output value and frequency depend on the country of use. The power supply has a circuit breaker and EMI filtering.

A holdover circuit in the power supply allows a system to operate normally during AC power interruptions. When AC input power fails, reserve batteries supply power to the memory and processor circuit packs and fans for two minutes. All port circuit packs are inactive during this time. The power supply contains a battery charger to charge the holdover batteries.

DC Power Supply (676B)

In a DC-powered Single-Carrier Cabinet, a single, plug-in multi-output DC power supply is located in the power supply slots.

A -48 VDC source supplies power to the 676B DC power supply at up to 25 Amps. The 676B produces the following outputs: +5 VDC, -5 VDC, -48 VDC, and +12 VDC. The outputs are distributed on the cabinet backplane to the slots for the circuit packs. The AC ringing voltage output value and frequency depend on the country of use. The power supply has circuit breakers and EMI filtering.

DC Power Distribution Unit (J58890CG)

The J58890CG is used with Single-Carrier Cabinets. See Figure 2-21. Individual DC output connectors can power up to four Single-Carrier Cabinets. Each output connector is separately fused at 25 amps (fuses are located inside the unit). The input to the DC distribution unit is from the DC Power Cabinet.

The J58890CG is required when the distance between the DC Power Cabinet and the cabinet stack is greater than 30 feet (9 m).

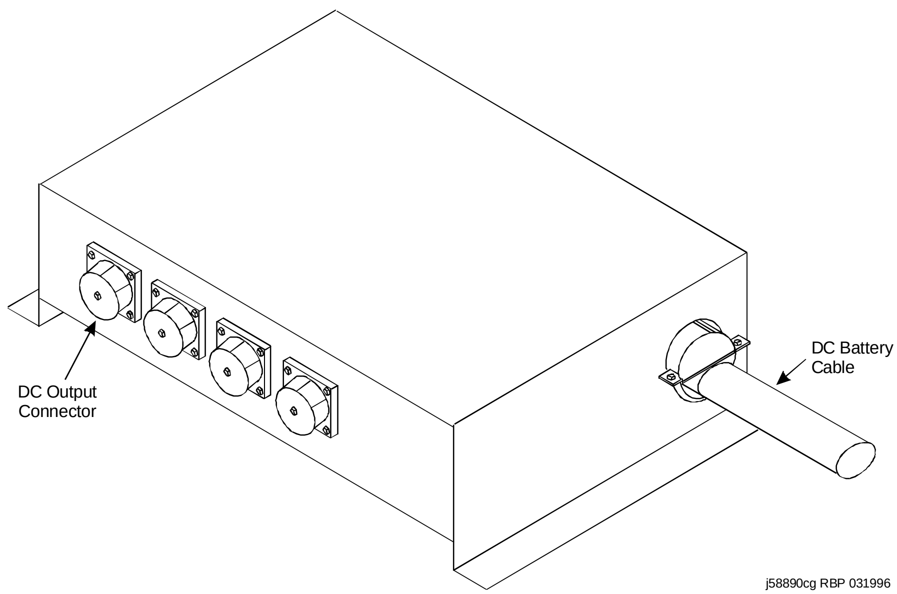

Figure 2-21. DC Power Distribution Unit (J58890CG)

DC Power Cabinet (J58890R)

The J58890R is used with Single-Carrier Cabinets. See Figure 2-22. The cabinet is shown with the front cover removed.

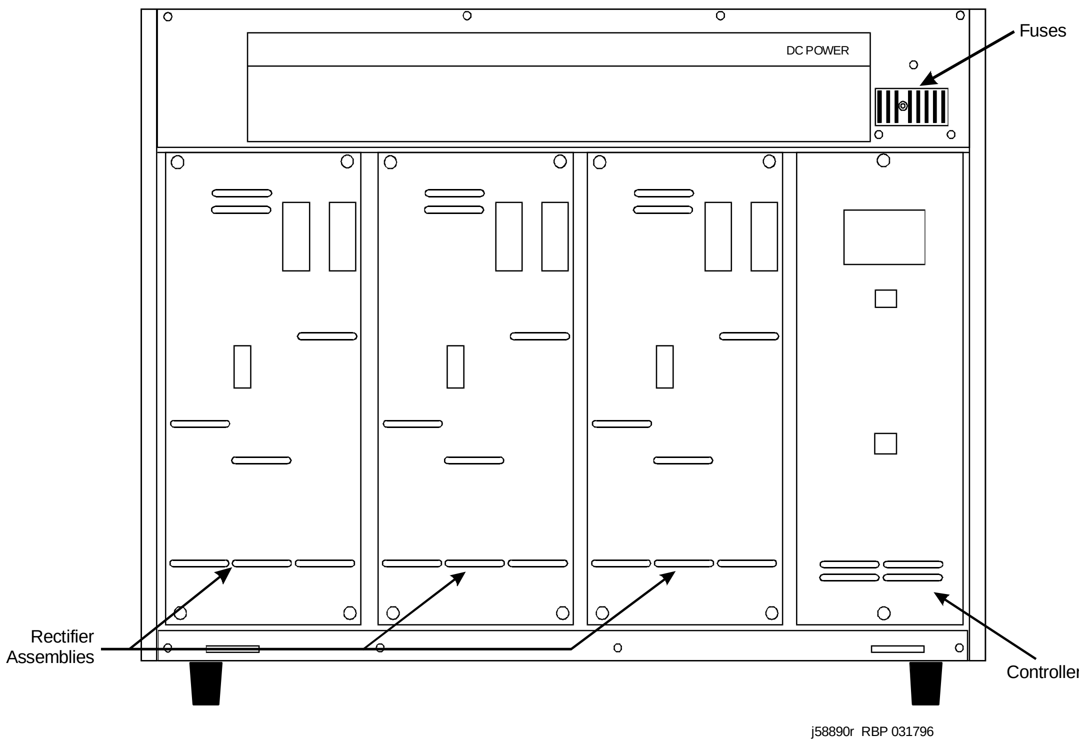

Figure 2-22. DC Power Cabinet (J58890R) — Front

Each rectifier assembly can supply up to 50 Amps of DC current. A minimum of two rectifiers are installed in each DC Power Cabinet to supply a total of 100 Amps. A third rectifier assembly can be installed and is used as a backup only.

Each Single-Carrier Cabinet can draw up to 15 Amps. Up to three DC Power Cabinets can be stacked to supply power to Single-Carrier Cabinets stacks.

Each output connector is separately fused at 25 amps (fuses are located inside each DC rectifier assembly).

NOTE:
A J58890CG DC Power Distribution Unit is required if the distance between the DC Power Cabinet and the cabinet stack is greater than 30 feet (9 m).

AC Power Supply in a Compact Single- Carrier Cabinet (WP-90510)

In the Compact Single-Carrier Cabinet, a plug-in, multi-output, auto-ranging, AC power supply is mounted above the carrier at the top of the cabinet. A power cord, with a three-prong plug on one end and an appliance connector on the other end, connects the supply to a dedicated AC power source.

The inputs to the power supply can be (depending on list version):

- 120 VAC, 50 Hz to 60 Hz, 6 Amp; three wires in the power cord: one hot wire, one neutral wire, and one ground wire
- 220 VAC or 240 VAC, 50 Hz to 60 Hz, 3 Amp; three wires in the power cord: one hot wire, one neutral wire, and one ground wire

The AC power supply produces the following outputs: +5 VDC, -5 VDC, and -48 VDC. The outputs are distributed on the cabinet backplane to the circuit pack slots. The AC ringing voltage output value and frequency depend on the country of use. The power supply has EMI filtering.

A holdover circuit in the power supply allows a system to operate normally during AC power interruptions.

Cabinet Cooling Fans

This section describes the cooling fans in Multi-Carrier, Single-Carrier, and Compact Single-Carrier Cabinets.

Multi-Carrier Cabinet Fans

Figure 2-23 shows a side view of the fans in a Multi-Carrier Cabinet. Fan and air filter positions and air flow directions from the front and rear fans are shown.

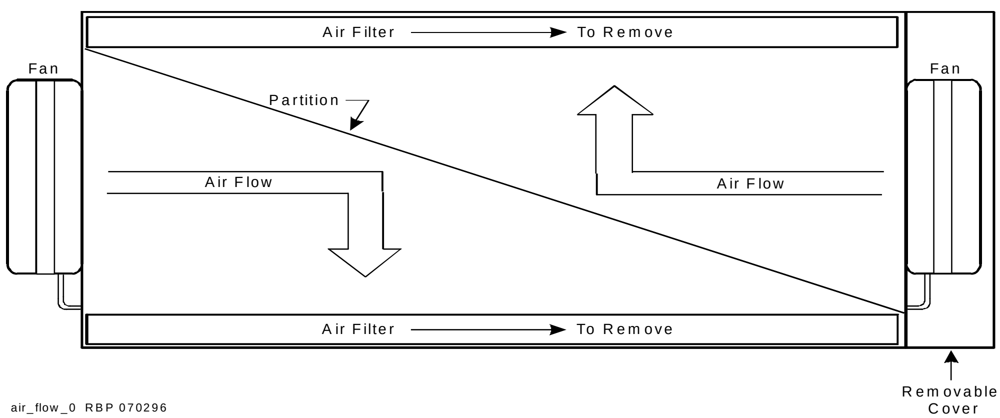

Figure 2-23. Fans in Multi-Carrier Cabinet

Two fan units are mounted near the center of the cabinet (one in the front and one in the rear). Each fan unit consists of three fans. A removable air filter is provided above and below each fan unit. Four sensors monitor the cabinet temperature. Three sensors are inside the cabinet top and one sensor is inside the cabinet bottom. One of the top sensors affects the speed of the front fans and the bottom sensor affects the speed of the rear fans.

A speed control and thermal alarm circuit in each fan monitors the thermal sensors. When a sensor indicates a change in cabinet temperature, the circuit in a fan changes that fan's speed accordingly.

A power cable from the power distribution unit connects -48 VDC to each fan, +5 VDC to the speed control and thermal alarm circuit in each fan, and temperature sensor signals to the equivalent circuit in each fan. One pair of wires goes to each fan circuit. Alarm signals are also routed to the equivalent circuit in each fan. One pair of wires goes to each fan circuit.

A minor alarm is sent to the processor circuit pack in the PPN cabinet and the maintenance circuit pack in an EPN cabinet if any fan's speed drops below minimum. A minor alarm is also generated if a fan has stopped due to loss of -48 VDC. A major alarm is sent by one of the cabinet top thermal sensors if the exhaust temperature reaches 149 degrees Fahrenheit (65 degrees Celsius).

Another cabinet top sensor senses if the exhaust temperature reaches 158 degrees Fahrenheit (70 degrees Celsius). If so, the system shuts down and the Emergency Transfer is invoked.

Single-Carrier Cabinet Fan Unit

Four constant-speed fans are mounted at the top rear of the cabinet. The fans receive -48 VDC from a cable plugged into the motherboard on the bottom of the cabinet. An air filter is located below the fan unit. Air flows down through the filter over the circuit packs. The filter can be removed and cleaned or replaced when necessary.

If the cabinet temperature reaches 158 degrees Fahrenheit (70 degrees Celsius), the temperature sensor in the power supply causes the system to shut down and the Emergency Transfer is invoked.

Compact Single-Carrier Cabinet Fan Unit

Two constant-speed fans are mounted at the top rear of the cabinet. The fans receive -48 VDC from a cable plugged into the motherboard on the bottom of the cabinet. There is no air filter. Air flows from the outside, into the bottom of the cabinet, around the circuit packs, and out through the rear of the cabinet.

If the cabinet temperature reaches 158 degrees Fahrenheit (70 degrees Celsius), the temperature sensor in the power supply causes the system to shut down and the Emergency Transfer is invoked.

System Protection

This section details how the system is protected against overvoltage, lightning, sneak current, and earthquake damage.

Overvoltage Protection

Protection from hazardous voltages and currents is required for all off-premises (out-of-building) trunks, lines, and terminal installations. Both over-voltage (lightning, power induction, and so forth) protection and sneak current protection are required.

The following devices protect the system from overvoltages:

- Analog trunks use the 507B Sneak Protector. Over-voltage protection is normally provided by the local telephone company.
- Analog voice terminals can use one of the following types of combined over-voltage and sneak current protection:
  - Carbon block with heat coil for UL code 4B1C
  - Gas tube with heat coil for UL code 4B1E-W
  - Solid state with heat coil for UL code 4C1S
- DCP and ISDN-BRI terminals use the solid state 4C3S-75 with heat coil protector.

Sneak Current Protection

Sneak current protection uses fuses to protect building wiring between the network interface and trunk circuits when exposed to extraneous power. The fuses also protect the circuit packs.

All incoming and outgoing trunks and off-premises station lines pass through the sneak fuses. 507B Sneak fuse panels are installed on the system side of the network interface.

Lightning Protection

A Coupled Bonding Conductor (CBC) in the cabinet ground wiring protects the system from lightning. See Figure 2-20 on page 2-35. The CBC runs adjacent to wires in a cable and causes mutual coupling between itself and the wires. The mutual coupling reduces the potential differences resulting from lightning surges. The conductor can be a 10 gauge ground wire, a continuous cable sheath surrounding wires within a cable, or six unused pairs of wire within a cable, twisted and soldered together.

The CBC is connected from the cabinet single-point ground bar in an AC-powered cabinet or the ground discharge bar in a DC-powered cabinet to the terminal bar at the Main Distribution Frame (MDF).

When an Auxiliary cabinet is provided, a 6 AWG wire connects the system cabinet single-point ground block to the Auxiliary cabinet ground block. The ground wire is routed as close as possible to the cables connecting the system cabinet to the cabinet.

If equipment is not mounted in the Auxiliary cabinet, the power supply for this equipment must be plugged into one of the two convenience outlets located on the rear of the Multi-Carrier Cabinet to preserve ground integrity. The convenience outlet is fused at 5 Amps. A dedicated maintenance terminal is usually plugged into the other convenience outlet.

Earthquake Protection

When earthquake or disaster bracing is required, the cabinets can be bolted to the floor. Additional bracing may be required in certain areas. Earthquake zones for the United States and Canada are shown in Figure 2-24. A greater susceptibility to earthquakes is indicated by a higher number. In the United States, 0 represents the lowest susceptibility and 4 represents the highest. In Canada, 0 represents the lowest susceptibility and 3 represents the highest.

NOTE:
This seismic data is from the “Uniform Building Code” International Conference of Building officials, 1975 Whittier, California, United States. Other seismic data is from “The Supplement to the National Building Code of Canada” 1980 NRCC No. 17724.

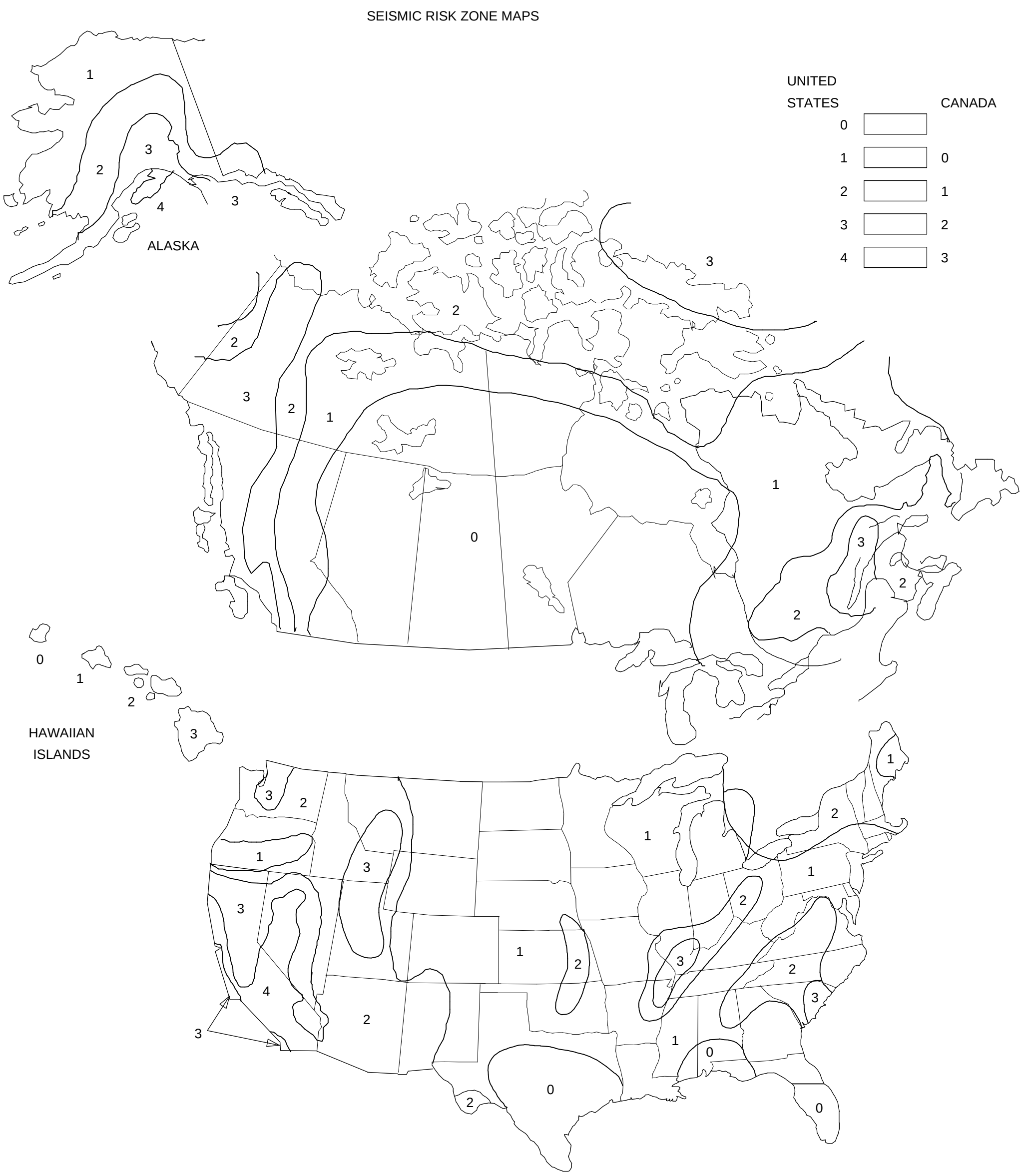

Figure 2-24. United States and Canada Earthquake Environment

3 Cabinets, Carriers, and Circuit Packs

This chapter describes the cabinets, carriers, and circuit packs, their functions, physical specifications, and interconnections. This chapter also describes minimum cabinet and carrier configurations. The configurations are described relative to combinations of cabinet interconnection options and system duplication options. This chapter is presented in the following order:

- Multi-Carrier Cabinets
- Carriers in Multi-Carrier Cabinets
- Single-Carrier Cabinets
- Carriers in Single-Carrier Cabinet Stacks
- Minimum Cabinet Configurations
- Cabinet Configuration in Directly-connected Systems
- Cabinet Configuration in Center Stage Switch-connected Systems
- Cabling to On- and Off-Premises Systems
- Circuit Packs and Related Hardware
- DEFINITY Adjuncts

NOTE:
To determine required types and numbers of cabinets, carriers, circuit packs, or adjuncts before installation, contact your Lucent Technologies representative.

Multi-Carrier Cabinets

This section describes the Processor Port Network (PPN), Expansion Port Network (EPN), Auxiliary, and AC power cabinets.

Figure 3-1 shows the front of a DC-powered Multi-Carrier Cabinet. A Multi-Carrier Cabinet can be used as a PPN cabinet or an EPN cabinet.

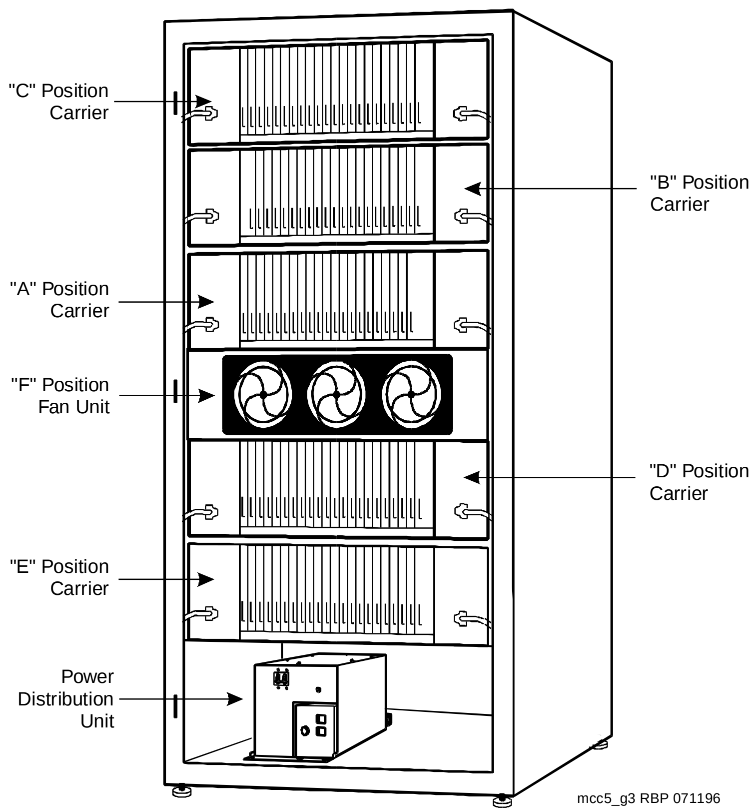

Figure 3-1. Typical DC-Powered Multi-Carrier Cabinet Layout

Cabinets

Doors on the front and rear of the Multi-Carrier Cabinet protect the internal equipment and allow easy access to the circuit packs.

Each cabinet is equipped with casters. Leveling feet keep the cabinet from rolling. Each corner of a cabinet can be bolted to the floor, if required.

AUX Connector Capacity

The AUX (auxiliary) connector is located on the rear of the Control Carrier. See Figure 3-6 on page 3-10. Up to three Attendant Consoles can be powered by the AUX connector in the “A” position in Release 5 cabinets. Only one Attendant Console can be connected in Release 5vs cabinets.

Up to seven Emergency Transfer Panels can be powered by the AUX connector in the “A” position in Release 5 cabinets. Only one Emergency Transfer Panel can be connected in Release 5vs cabinets.

Processor Port Network Cabinet (J58890A)

Figure 3-2 shows a PPN cabinet containing the following carriers, including their J-identification numbers, and quantities:

- Port Carrier (J58890BB) — One to four
- Control Carrier (J58890AH) in G3siV4+m and Release 5si + memory — One in all configurations
- Duplicated Control Carrier (J58890AJ) G3siV4+m and Release 5si + memory — One in high or critical reliability configurations
- Processor Carrier (J58890AP) in Release 5r — One in all systems, two in high reliability and critical reliability systems
- Switch Node (SN) Carrier (J58890SA) in Release 5r with a Center Stage Switch (CSS) — One in standard and high reliability systems or two in critical reliability systems

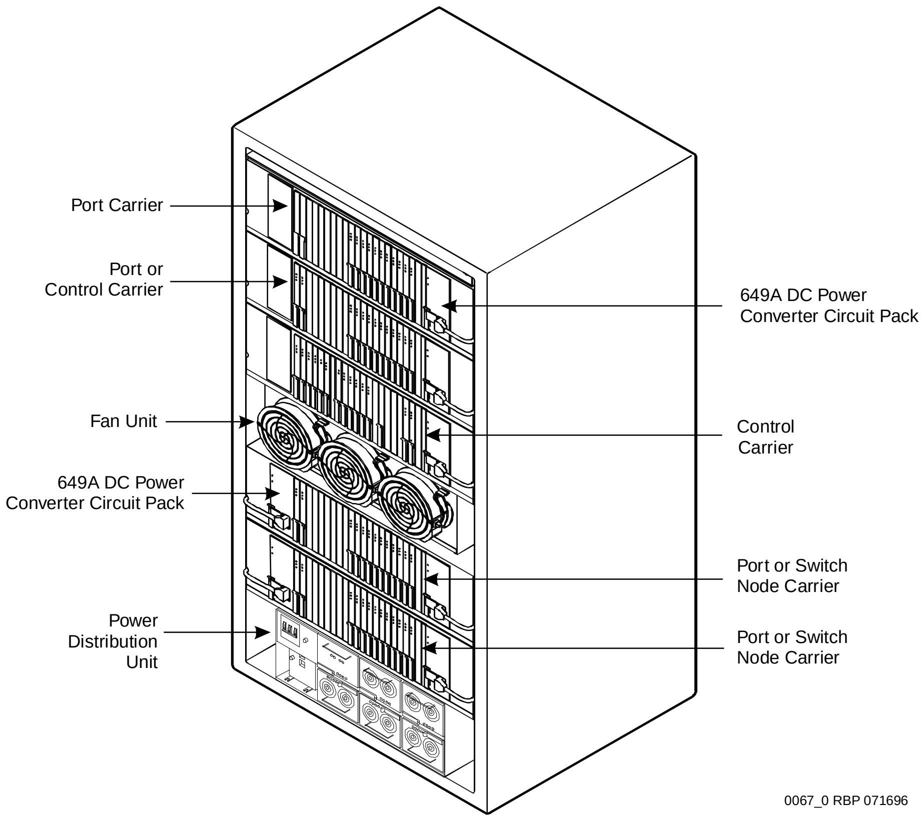

Figure 3-2. Typical Multi-Carrier PPN Cabinet (J58890A)

Expansion Port Network Cabinet (J58890A)

Figure 3-3 shows an EPN cabinet containing the following carriers (J-identification numbers and quantities are included):

- Port Carrier (J58890BB) — One to four
- Expansion Control Carrier (J58890AF) — One
- Switch Node (SN) Carrier (J58890SA) in Center Stage Switch (CSS)-connected Release 5r systems only: zero, one, or two when required

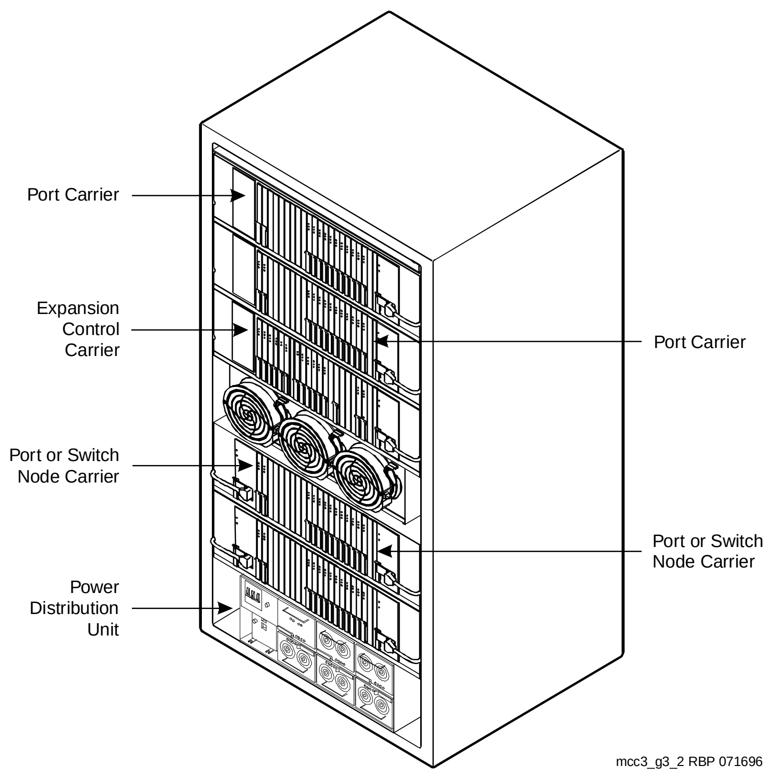

Figure 3-3. Typical Multi-Carrier EPN Cabinet (J58890A)

Auxiliary Cabinet (J58886N)

Figure 3-4 shows an Auxiliary cabinet containing hardware used to install optional equipment. The cabinet allows carrier, rack (width: 23 inches; 58.4 cm), and panel types of mountings. An Auxiliary cabinet contains the following:

- Fuse panel (J58889AB); distributes -48 VDC to fused cabinet circuits
- AC power receptacle strip; provides switched and non-switched 120 VAC receptacles
- DC connector block; required when the Auxiliary cabinet is powered by an external DC source, or an AC to DC power supply that converts AC power provided by the AC power strip switched-outlet to the required DC power

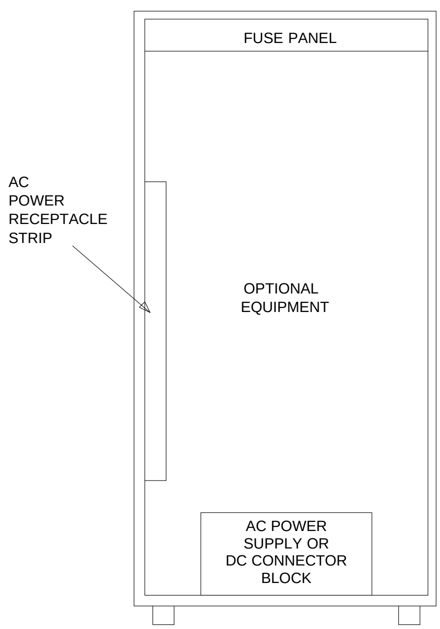

Figure 3-4. Auxiliary Cabinet (J58886N)

Carriers in Multi-Carrier Cabinets

This section describes the following types of carriers that can be installed in Multi-Carrier Cabinets:

- Control Carrier (J58890AH) located only in the G3siV4+m and Release 5si+ memory PPN cabinet. Contains Switch Processing Element (SPE) circuit packs to perform call processing, maintenance, and administration. These carriers also contain port circuit pack slots.
- Duplicated Control Carrier (J58890AJ) (optional) located only in G3siV4+m and Release 5si + memory PPN configuration. Contains duplicated SPE circuit packs to perform call processing, maintenance, and administration identical to the Control Carrier. The duplicated Control Carriers also contain port circuit pack slots. Only G3siV4+m, Release 5si+ memory, G3rV4, and Release 5r support duplication (the Release 5r Control Carriers are used for duplication).
- Processor Carrier (J58890AP) located only in the G3rV4 and Release 5r PPN cabinets. Contains SPE circuit packs to perform call processing, maintenance, and administration. These carriers do not contain port circuit pack slots. Two J58890AP carriers are used in the PPN for high and critical reliability (duplicated processor) systems.
- Port Carrier (J58890BB) (optional) located in the PPN and EPN cabinets. Contains port, service, and tone/clock circuit packs.
- Expansion Control Carrier (J58890AF) located only in the EPN cabinets. Contains extra port circuit packs, tone-clock, maintenance interface, and Expansion Interface (EI) circuit packs.
- Switch Node (SN) Carrier (J58890SA) in Release 5r (optional) located in the PPN cabinet and/or EPN cabinets. Contains Switch Node Interface (SNI) circuit packs composing the CSS.

Carrier Circuit Pack Slots

There are two primary types of circuit pack slots in the carriers:

- Port: colored purple and can accept any purple-labeled circuit pack
- Control: colored white and can accept only a circuit pack assigned to that slot

Each port slot is connected to a 50-pin connector on the carrier’s rear panel. A cable is attached to each connector and is routed to the Main Distribution Frame (MDF).

Each slot containing a fiber optic interface circuit pack (Expansion Interface or Switch Node Interface) is connected to a 50-pin connector on the carrier’s rear panel. A fiber optic transceiver can be attached directly to this connector without connecting to the MDF.

A current limiter board (CFY1B) is plugged into the backplane of the Control Carrier located in the “A” position only. The board supplies: emergency transfer logic, current-limited power, 5 VDC to trip the main circuit breaker in an over-temperature condition, and to operate the ringing transfer relay. Two terminators on the backplane terminate each end of the processor expansion bus.

The following apparatus blank faceplates (specified with widths) cover unused circuit pack slots in the carriers to maintain proper air flow:

- Z100A1 (0.75 inches) (1.9 cm)
- Z100C (0.5 inches) (1.27 cm)
- Z100D (0.25 inches) (.64 cm)

NOTE:
Throughout this section, the power units shown in the front views of the carriers are provided as examples only. See Table 3-21 on page 3-55 for a list of optional power units.

NOTE:
In illustrations throughout this book, a “BRG” is shown below the POWER UNIT slot in certain carriers. This means the POWER UNIT slot can include a 50 Hz Broadband Ringing Generator (BRG) when optioned for France.

Control Carrier (J58890AH)

The J58890AH is used in G3siV4+m and Release 5si + memory configurations. See Figure 3-5.

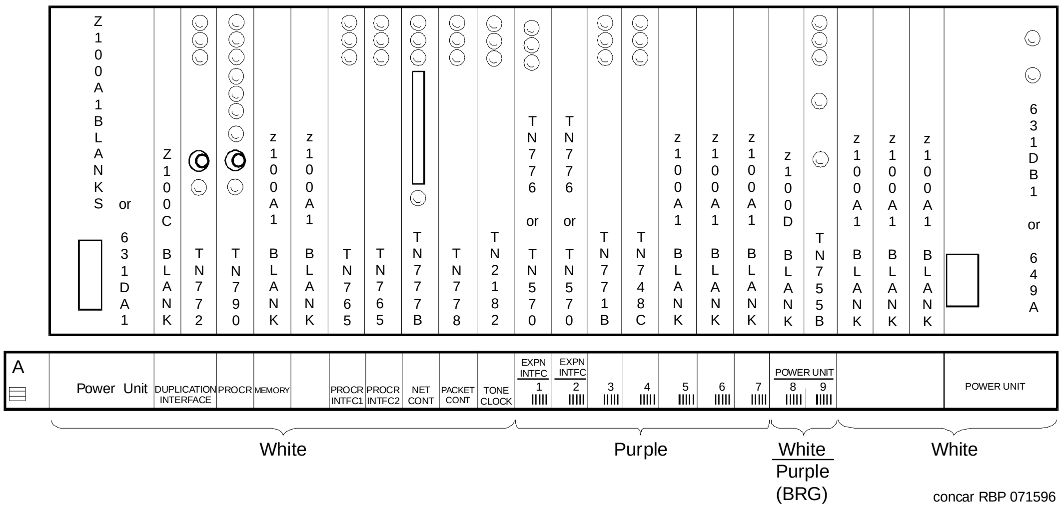

Figure 3-5. Control Carrier (J58890AH) — Front

This carrier has dedicated white-colored circuit pack slots that always contain specific control circuit packs. Purple-colored slots can contain any port circuit packs. Dual-colored slots may contain any port circuit pack or the designated white-colored circuit packs (such as an Expansion Interface or power unit). AC or DC power units supply power to the carrier.

NOTE:
The TN786B Processor circuit pack is used in G3siV4 and G3siV4+m systems. The optional CPP1 Memory circuit pack installed next to the TN786B Processor circuit pack. The TN786B and CPP1 are not used in Release 5 and later systems. Release 5 and later systems use the TN790 Processor circuit pack.

Figure 3-6 and Table 3-1 describe the connectors on the rear of the Control Carrier.

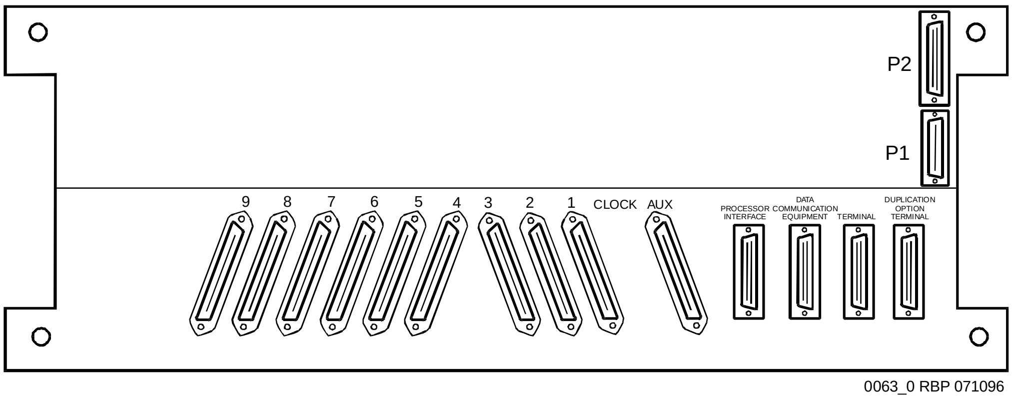

Figure 3-6. Control Carrier (J58890AH) — Rear

Table 3-1. Control Carrier (J58890AH) Connectors

Connector	Function
1 to 9 (A1 to A9)	50-pin connectors provide interfaces between port circuit packs and the MDF or fiber transceiver.
AUX (Auxiliary)	Provides interface for customer alarms, attendant console power, or emergency power transfer panels. Provides interface for internal modem for remote maintenance.
Processor Interface	Connects directly to the Processor Interface circuit pack. Provides a BX.25 protocol interface for communication between the circuit pack and external DCE equipment. This connection can only be used with standard reliability option.
Data Communications Equipment	Connects the processor to CDR equipment, system printer, or to an external modem for remote maintenance. This connector can be used with any reliability option.
Terminal	Connects a management terminal to the processor in standard reliability systems. In critical reliability systems, connects a terminal to the processor in its Control Carrier.
Duplication Option Terminal	Used in high and critical reliability systems to connect an administration terminal to the active processor via the duplication interface slot position.
P1	Provides position indicator of the carrier, power to fans, and access to alarm and control circuits.
P2	Provides control signals to the carrier.

Duplicated Control Carrier (J58890AJ)

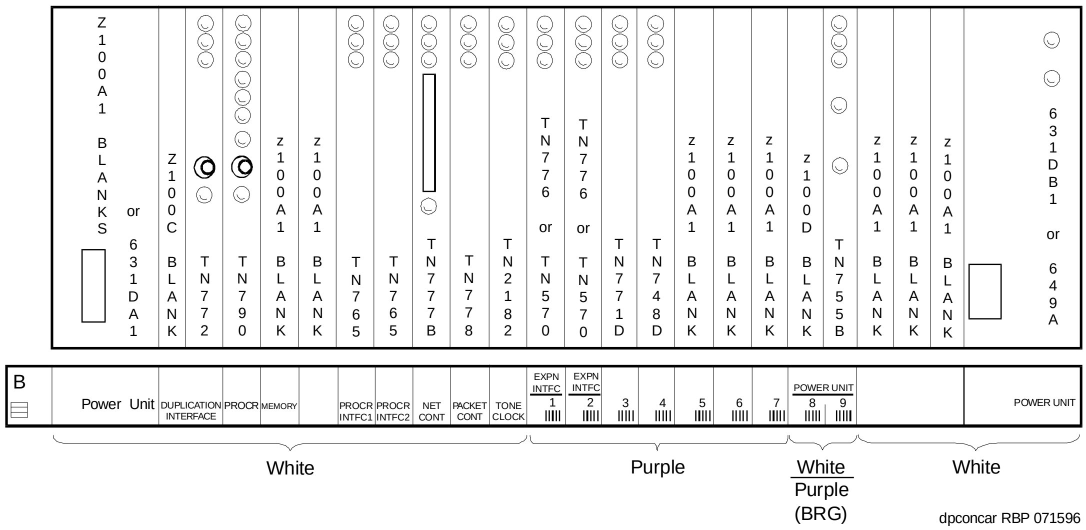

Figure 3-7. Duplicated Control Carrier (J58890AJ) — Front

The J58890AJ Duplicated Control Carrier is used in the G3siV4+m and Release 5si + memory configurations. See Figure 3-7.

This carrier has dedicated white-colored circuit pack slots that always contain specific control circuit packs. The purple-colored circuit pack slots can be equipped with any port circuit packs. Dual-colored slots may contain any port circuit pack or the designated white-colored circuit packs (such as an Expansion Interface or power unit).

AC or DC power units supply power to the carrier.

NOTE:
The TN786B Processor circuit pack is used in G3siV4 and G3siV4+m systems. The optional CPP1 Memory circuit pack installed next to the TN786B Processor circuit pack. The TN786B and CPP1 are not used in Release 5 and later systems. Release 5 and later systems use the TN790 Processor circuit pack.

Figure 3-8 and Table 3-2 describe the connectors on the rear of the duplicated control carrier.

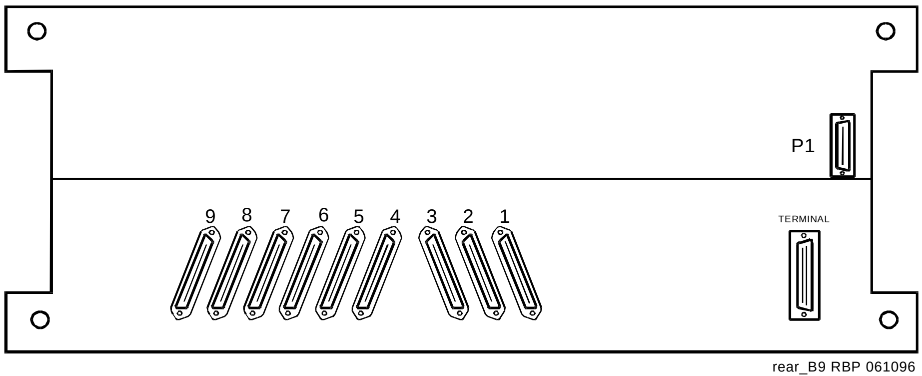

Figure 3-8. Duplicated Control Carrier (J58890AJ) — Rear

Table 3-2. Duplicated Control Carrier (J58890AJ) Connectors

Connector	Function
1 to 9 (B1 to B9)	50-pin connectors provide interfaces between port circuit packs and the MDF or fiber transceiver
Terminal	Connects a management terminal to the processor in its duplicated Control Carrier
P1	Provides position indicator of the carrier and access to alarm and control circuits

Processor Carrier (J58890AP)

Figure 3-9 shows the J58890AP Processor Carrier and its circuit packs. This carrier is used in Release 5r only and contains only dedicated slots used for control circuit packs composing the Switch Processing Element (SPE). It does not contain port circuit pack slots.

AC or DC power units, located at each end of the carrier, supply the power to the carrier. The Processor Carrier always contains three memory circuit packs and one packet interface circuit pack.

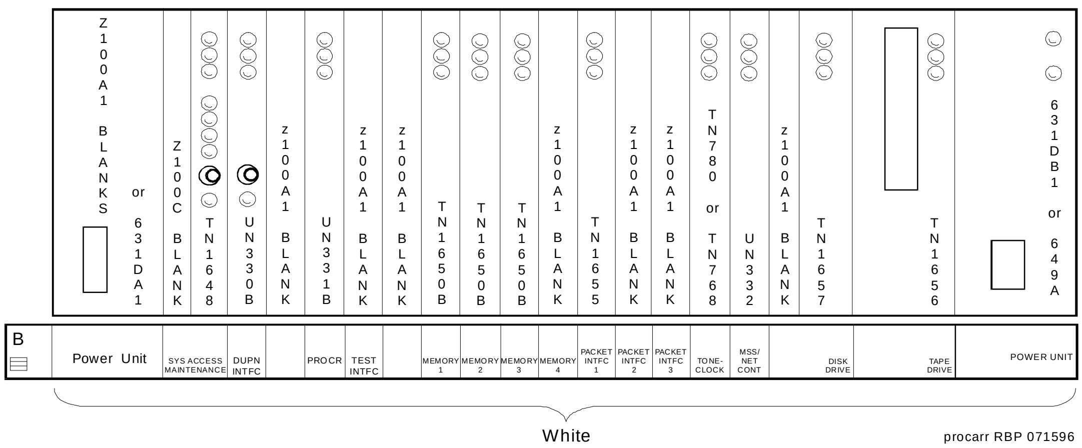

Figure 3-9. Processor Carrier (J58890AP) — Front

Figure 3-10 and Table 3-3 describe the connectors on the Processor Carrier rear panel.

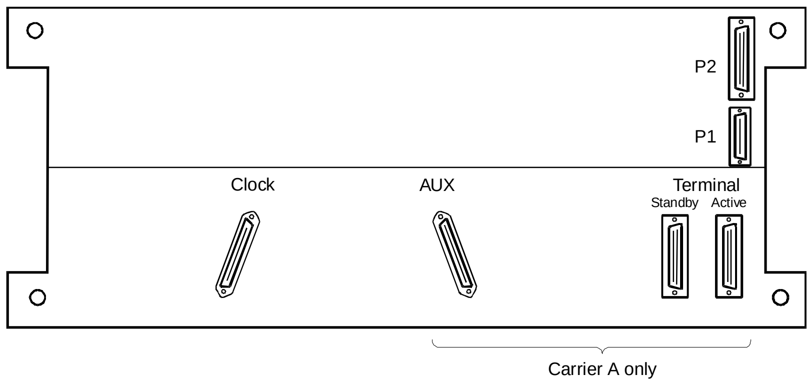

Figure 3-10. Processor Carrier (J58890AP) — Rear

Table 3-3. Processor Carrier (J58890AP) Connectors

Connector	Function
Clock (Stratum 3 Clock)	Provides interface to a Stratum 3 Clock for digital frame timing. This is not a time-of-day clock.
AUX (Auxiliary)	Provides interface for customer alarms, attendant console power, emergency power transfer panels, and internal modem interface for remote maintenance.
Terminal, Active	Connects a management terminal to the System Access and Maintenance (SYSAM) circuit pack in the active Processor Carrier.
Terminal, Standby	Used only in duplicated processors to connect a management terminal to the standby Processor Carrier.
P1	Provides position indicator of the carrier and access to alarm and control circuits.
P2	Provides control signals to the carrier.

Port Carrier (J58890BB)

Figure 3-11 shows the Port Carrier and circuit packs. A Port Carrier contains:

- Port slot locations 1 to 20 for the port circuit packs. A dedicated slot contains an optional tone-clock circuit pack used for port carriers in the "B" position of an EPN cabinet in critical reliability systems. Slot 2 contains an optional Expansion Interface (EI) circuit pack.
- Power unit-service slots in which power unit circuit packs or maintenance circuit packs can be installed.
- AC or DC power units located at each end of the carrier.

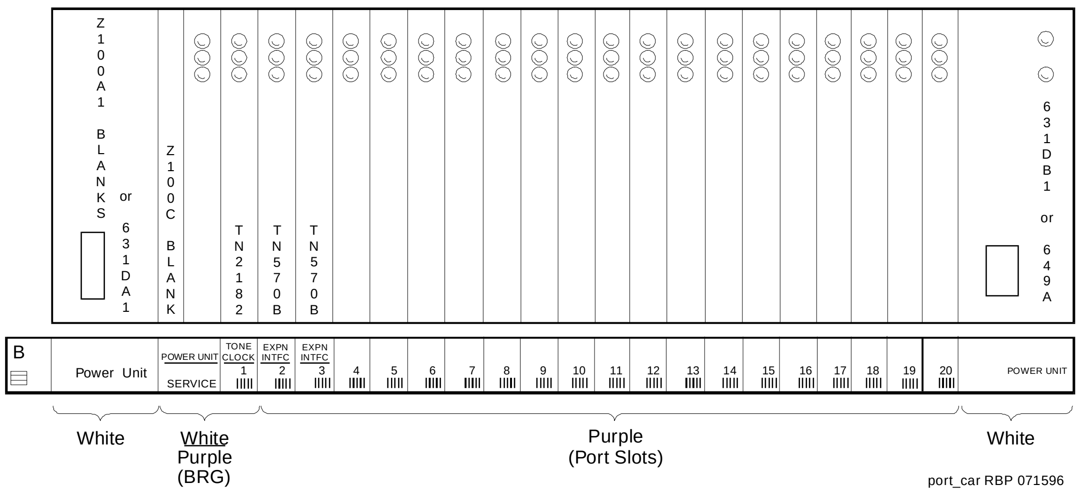

Figure 3-11. Port Carrier (J58890BB) — Front

Figure 3-12 and Table 3-4 describe the connectors on the rear of the Port Carrier.

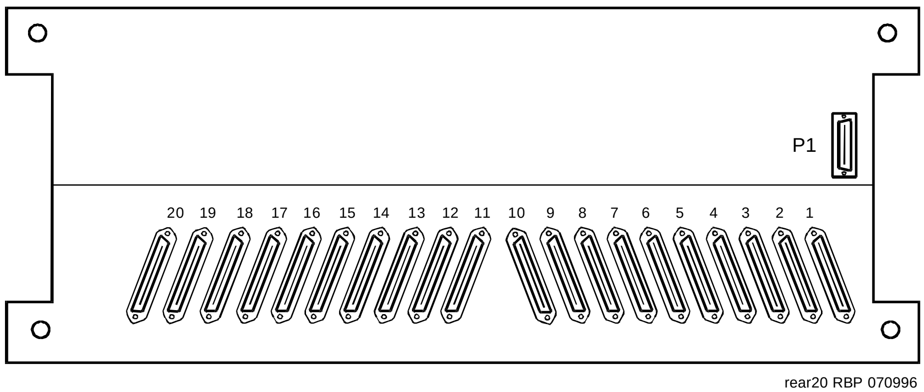

Figure 3-12. Port Carrier (J58890BB) — Rear

Table 3-4. Port Carrier (J58890BB) Connectors

Connector	Function
1 to 20	Ports interfacing between circuit pack slots and the MDF or fiber transceiver
P1	Provides position indicator of the carrier and access to alarm and control circuits

Expansion Control Carrier (J58890AF)

Figure 3-13 shows a typical Expansion Control Carrier and the port circuit packs. The carrier contains an Expansion Interface (EI) circuit pack in port slots 1 and 2 used in a fiber optic cabling path to another cabinet or the Center Stage Switch (CSS) in the same cabinet These slots may contain optional port circuit packs.

The carrier also contains port slots 3 to 19 and the AC or DC power units. The Maintenance and Tone-Clock circuit packs are also shown. An optional neon power unit can be in slots 18 and 19.

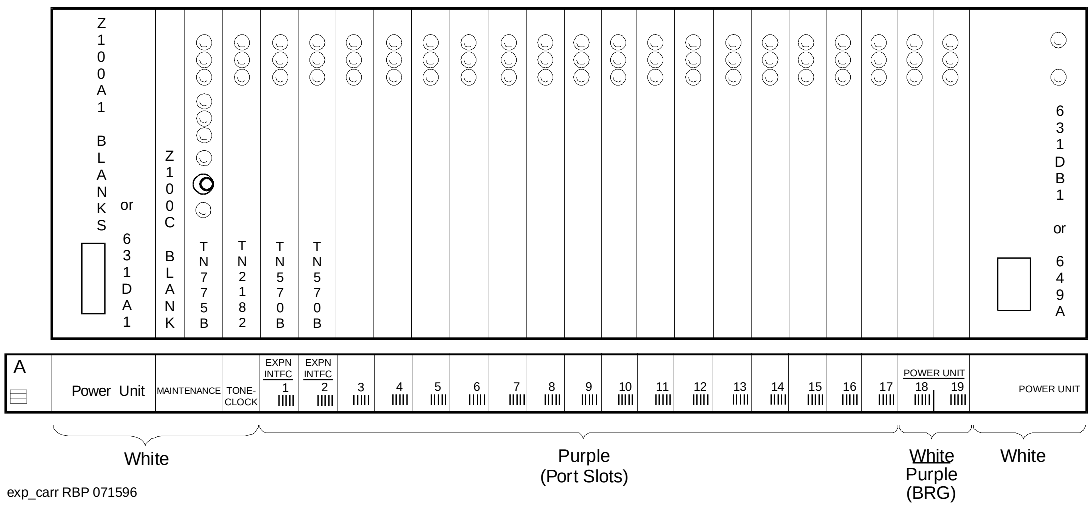

Figure 3-13. Expansion Control Carrier (J58890AF) — Front

Figure 3-14 and Table 3-6 describe the connectors on the rear of the Expansion Control Carrier.

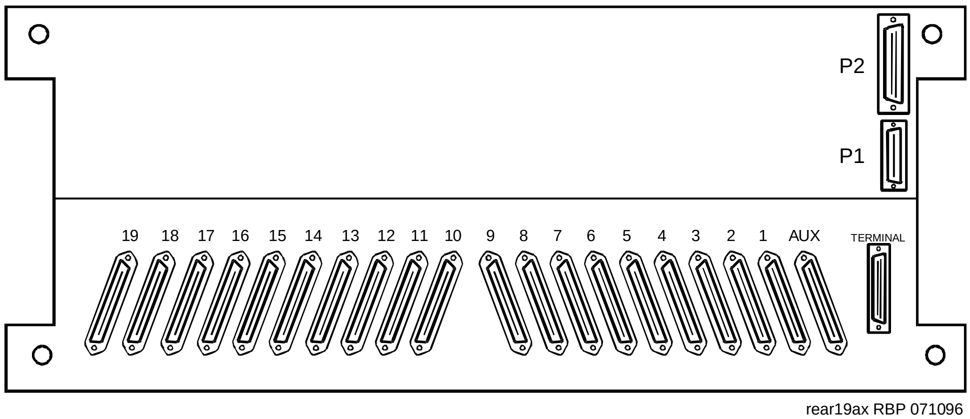

Figure 3-14. Expansion Control Carrier (J58890AF) — Rear

Table 3-5. Expansion Control Carrier (J58890AF) Connectors

Connector	Function
1 and 2 (A1 and A2)	Provides a fiber optic cable interface to an Expansion Interface (EI) circuit pack in slot 1; or a copper cable interface for a DS1 Converter
1 to 19 (A1 to A19)	Provides interfaces between port circuit packs and the MDF
AUX	Provides interface for customer alarms, attendant console power, and emergency power transfer panels
TERMINAL	Connects a management terminal to the Maintenance circuit pack in an Expansion Control Carrier
P1	Provides position indicator of the carrier and access to alarm and control circuits
P2	Connects ringing voltage from the ring generator to the carrier and produces control signals

Switch Node (SN) Carrier (J58890SA)

Figure 3-15 shows a typical J58890SA Switch Node (SN) Carrier and the circuit pack slots. This carrier is used in Release 5r only. AC or DC power units at each end of the carrier supply power to the carrier.

The carrier contains the switch node clock and the Switch Node Interface (SNI) circuit packs that compose the CSS. A carrier can contain up to 16 SNI circuit packs; one or two TN1654 DS1 Converter circuit packs (Release 5 only) and/or an Expansion Interface (EI) circuit pack; and two AC or DC Power Unit circuit packs.

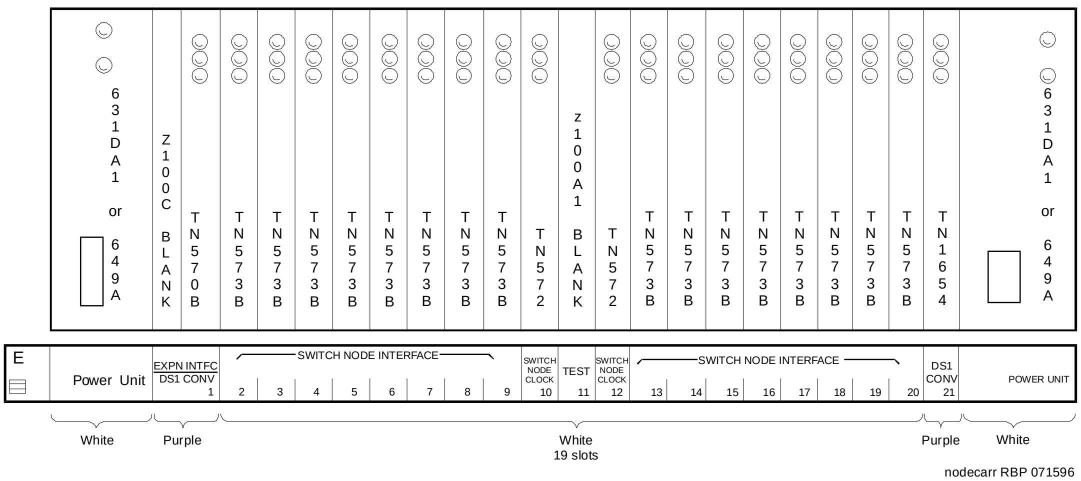

Figure 3-15. Switch Node Carrier (J58890SA) — Front

Figure 3-16 and Table 3-6 describe the connectors on the rear of the carrier.

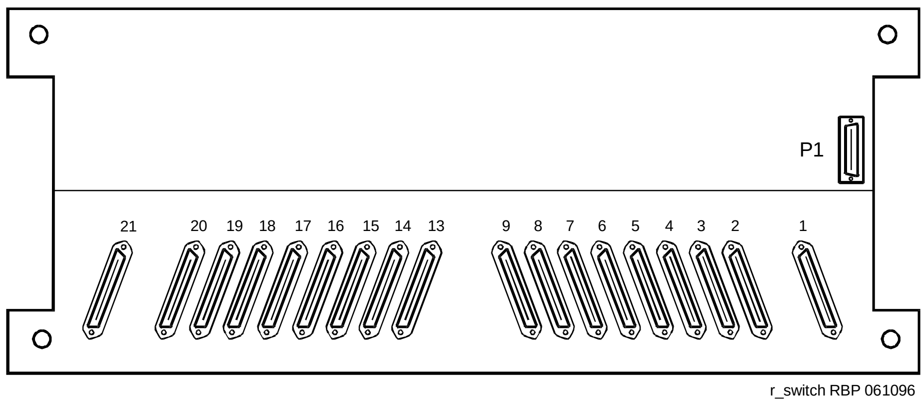

Figure 3-16. Switch Node Carrier (J58890SA) — Rear

Table 3-6. Switch Node Carrier (J58890SA) Connectors

Connector	Function
1 (E1)	Expansion Interface (EI) connector for the cable between the EI circuit pack in slot 1 and the SNI circuit pack in slot 2 for a duplicated PPN only. Also used for a DS1 Converter circuit pack in slot 1.
2 to 9 and 13 to 20 (E2 to E19 and E13 to E20)	SN ports that are fiber optic cabling interfaces to the SNI circuit packs and other circuit packs connected to SN ports or circuit packs in EPNs.
21 (E21)	Interface to connect the DS1 Converter circuit pack to the MDF and an SNI circuit pack.
P1	Provides the position indicator of the SN carrier and provides access to alarm and control circuits.

Single-Carrier Cabinets

This section describes the following types of Single-Carrier Cabinets:

- Basic Single-Carrier Control Cabinet (J58890L) — G3siV4, G3siV4+m, Release 5si, and Release 5si + memory
- Duplicated Single-Carrier Control Cabinet (J58890M) — G3siV4+m and Release 5si + memory
- Expansion Single-Carrier Control Cabinet (J58890N) — G3siV4+m, Release 5si + memory, and Release 5r
- Single-Carrier Port Cabinet (J58890H) — G3siV4, G3siV4+m, Release 5si, Release 5si + memory, and Release 5r
- Compact Single-Carrier Control Cabinet (J58890S) — Release 5vs
- DC Power Distribution Cabinet

Figure 3-17 shows a typical Single-Carrier Cabinet. Each cabinet has vertical slots that hold circuit packs. A blank faceplate covers each unused slot.

NOTE:
Throughout this section, the power units shown in the front views of the carriers are provided as examples only. See Table 3-21 on page 3-55 for a list of optional power units.

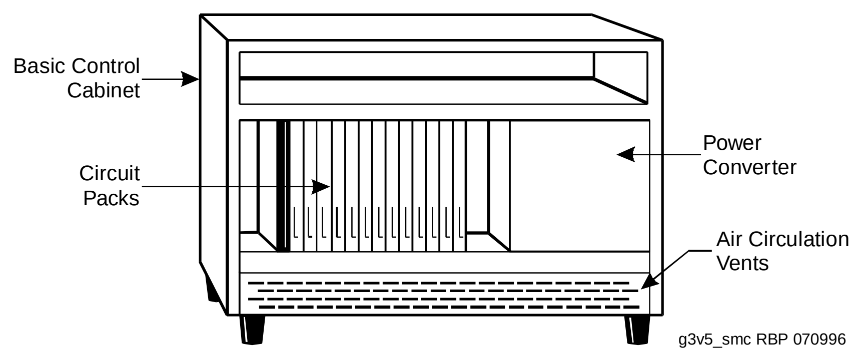

Figure 3-17. Typical Single-Carrier Cabinet

A maximum of four Single-Carrier Cabinets can be stacked on top of each other. See Figure 3-18.

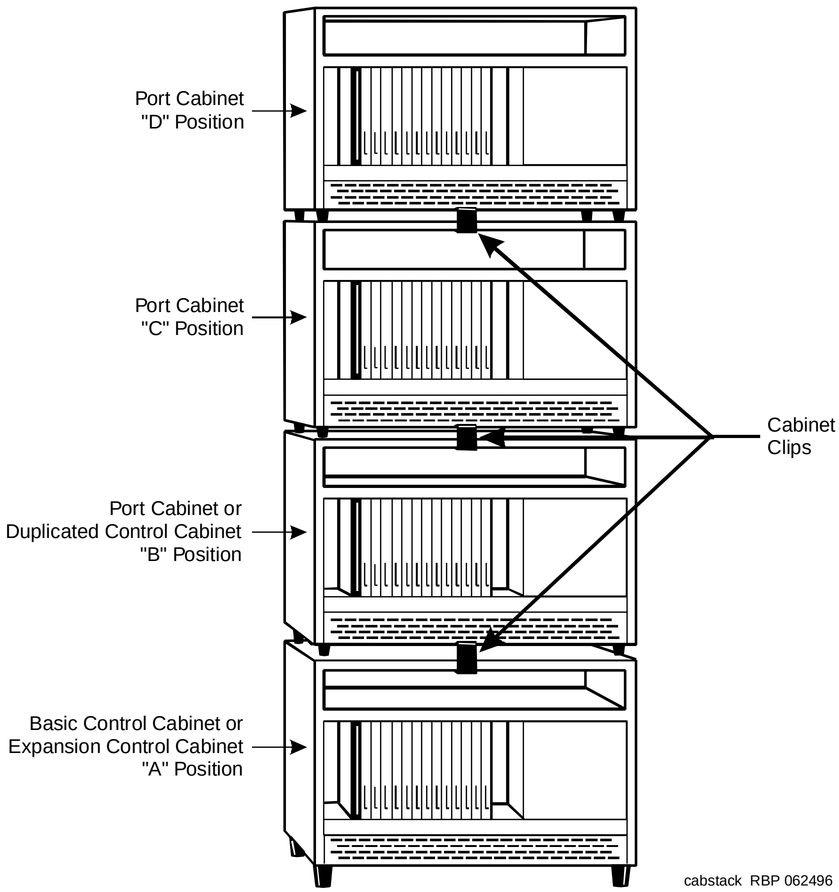

Figure 3-18. Typical Single-Carrier Cabinet Stack

Each stack of Single-Carrier Cabinets requires at least one basic Control Cabinet on the bottom of the stack. The maximum number of port cabinets per stack is three.

The positions of the stacked cabinets are labeled "A" through "D." The position of the basic Control Cabinet or Expansion Control Cabinet is always labeled "A." Additional port cabinet positions are labeled "B," "C," and "D," sequentially, as required. The duplicated Control Cabinet is labeled “B” when provided.

Cabinet clips on the front of the cabinets connect the cabinets together. At the rear of the cabinets, a ground plate connected between cabinets provides ground integrity. Chapter 2, "Site Requirements" describes the power and ground requirements for Single-Carrier Cabinets.

Carrier Circuit Pack Slots

There are two types of circuit pack slots in the carriers:

- Port: colored purple and can accept any purple-labeled circuit pack
- Control: colored white and can accept only a circuit pack assigned to that slot

Each port slot in a Port Carrier, an Expansion Control Carrier, and a Control Carrier in G3siV4 or Release 5si is connected to a 50-pin connector on the carrier's rear panel. A cable is attached to each connector and is routed to the MDF.

The following apparatus blank faceplates (specified with widths) are used:

- 158J (4 inches) (9.2 cm) covers area to left of slot 1 in port cabinets
- 158P (0.75 inches) (1.9 cm) covers any unused slot.
- 158N (0.50 inches) (1.27 cm) used in DEFINITY AUDIX™ R3 and CallVisor ASAI® over the DEFINITY Local Area Network (LAN) Gateway R1
- 158G (0.25 inches) (.63 cm) used with TN755B or TN2202

NOTE:
In the illustrations throughout this book, a "BRG" is shown below the POWER UNIT slot in certain carriers. This means the POWER UNIT slot can include a 50 Hz Broadband Ringing Generator (BRG) when optioned for France.

Carriers in Single-Carrier Cabinets

Basic Control Cabinet (J58890L)

The basic Control Cabinet is located in the Processor Port Network (PPN) only and contains ports, a control complex to perform call processing, and an interface to an optional duplicated control cabinet. This carrier also provides the interface for the STRATUM 3 Clock.

Figure 3-19 shows a basic Control Cabinet containing dedicated white-colored circuit pack slots that house specific control circuit packs. Purple-colored slots can be equipped with any port circuit packs. Also see Table 3-7 on page 3-25. Dual-colored slots may contain any port circuit pack or the designated white-colored circuit packs (such as an Expansion Interface or power unit).

AC or DC power units supply power to the carrier.

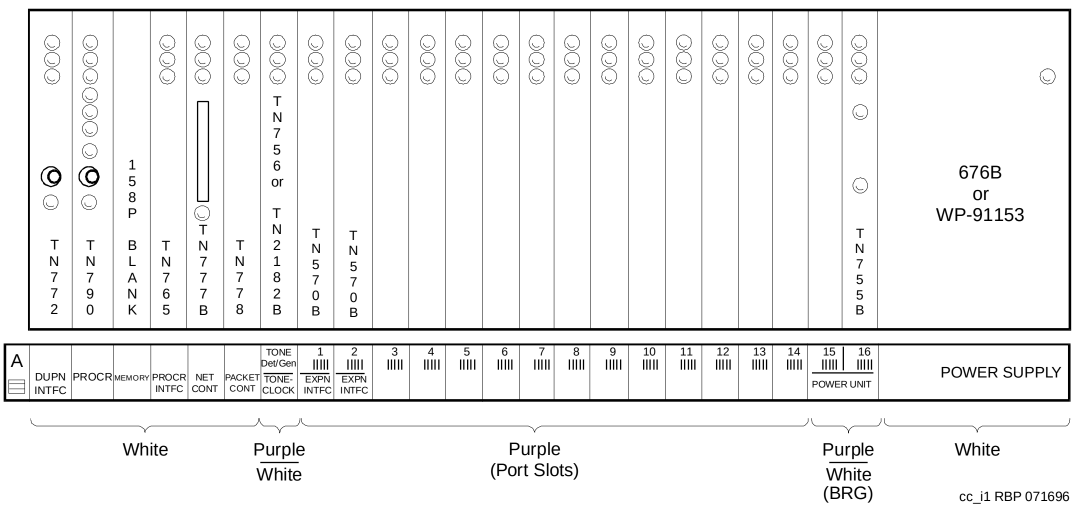

Figure 3-19. Basic Control Cabinet (J58890L) — Front

NOTE:
The TN786B Processor circuit pack is used in G3siV4 and G3siV4+m systems. The optional CPP1 Memory circuit pack installed next to the TN786B Processor circuit pack. The TN786B and CPP1 are not used in Release 5 and later systems. Release 5 and later systems use the TN790 Processor circuit pack. The TN796B Processor circuit pack may be used in G3siV4 systems. This circuit pack is identical to the TN786B except the CPP1 connectors are removed.

Figure 3-20 and Table 3-7 detail the connectors on the Control Cabinet rear panel.

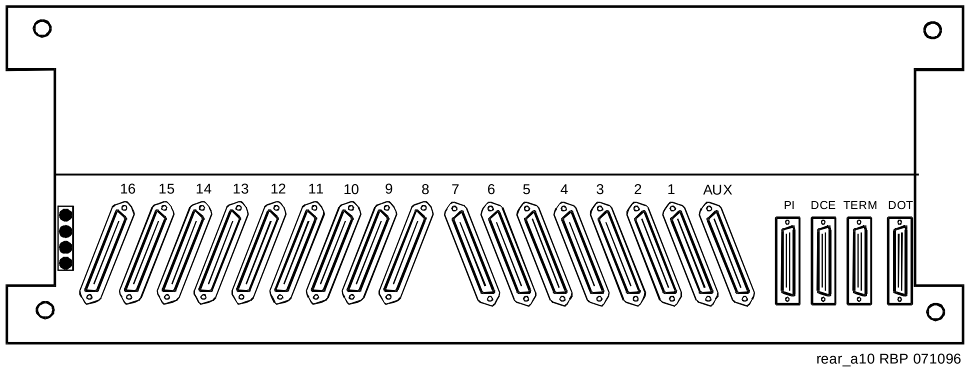

Figure 3-20. Basic Control Cabinet (J58890L) — Rear

Table 3-7. Basic Control Cabinet (J58890L) Connectors

Connector	Function
1 to 16 (A1 to A16)	50-pin connectors interface between port circuit packs and the MDF or a fiber transceiver.
AUX (Auxiliary)	Provides interface for customer alarms, attendant console power, emergency power transfer panels, and internal modem for remote maintenance.
PI (Processor Interface)	Connects directly to the Processor Interface circuit pack. Provides a BX.25 protocol interface for communication between the circuit pack and external DCE equipment. This connection can only be used with standard reliability option.
DCE	Connects the processor to Call Detail Recording (CDR) equipment, system printer, or an external modem for remote maintenance.
TERM (Terminal)	Connects an administration terminal to the processor circuit pack in standard reliability systems. Can be used to access the standby Switch Processing Element (SPE). The TERM connector always connects to the processor in its own carrier.
DOT (Duplication Option Terminal)	Used in high reliability and critical reliability systems to connect an administration terminal to the active processor via the duplication interface slot. The DOT connector can be used to connect to the processor in another carrier.

Duplicated Control Cabinet (J58890M)

The Duplicated Control Cabinet is optional and is located only in the PPN in G3siV4+m and Release 5si + memory. See Figure 3-21. This cabinet contains ports, a duplicated control complex, and an interface to a designated Expansion Control Cabinet.

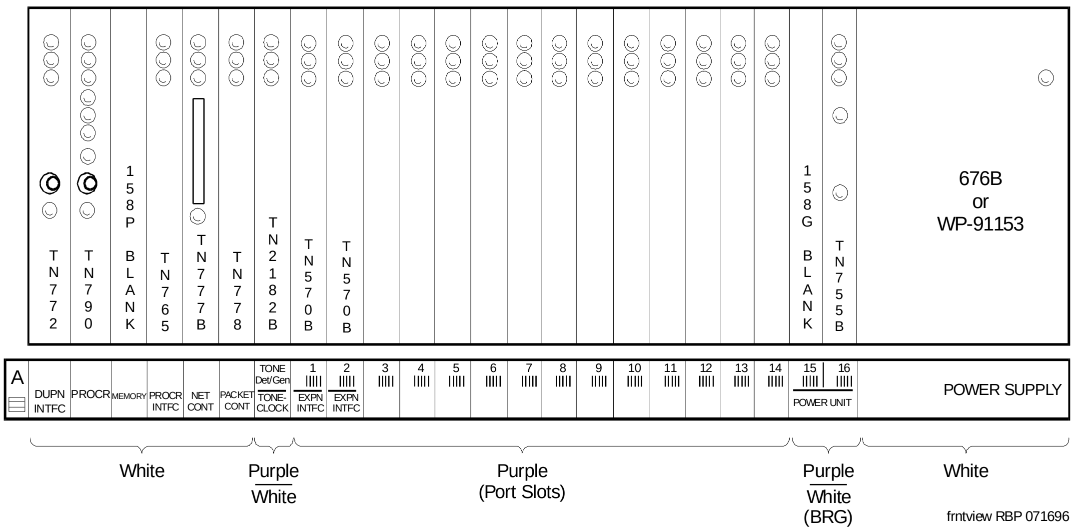

Figure 3-21. Duplicated Control Cabinet (J58890M) — Front

The cabinet contains dedicated white-colored circuit pack slots that are only equipped with designated control circuit packs. The purple-colored circuit pack slots can be equipped with any port circuit packs.

An AC or DC power supply, located at right side of the cabinet, supplies power to the cabinet. The cabinet is equipped with a duplication interface circuit pack in slot DUPN INTFC.

NOTE:
The TN786B Processor circuit pack is used in G3siV4 and G3siV4+m systems. The optional CPP1 Memory circuit pack installed next to the TN786B Processor circuit pack. The TN786B and CPP1 are not used in Release 5 and later systems. Release 5 and later systems use the TN790 Processor circuit pack. The TN796B Processor circuit pack may be used in G3siV4 systems. This circuit pack is identical to the TN786B except the CPP1 connectors are removed.

Figure 3-22 and Table 3-8 detail the connectors on the rear of the Duplicated Control Cabinet.

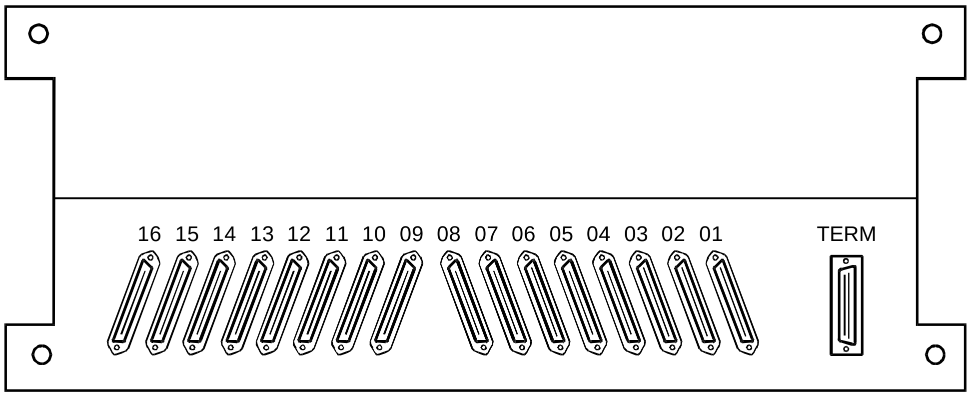

Figure 3-22. Duplicated Control Cabinet (J58890M) — Rear

Table 3-8. Duplicated Control Cabinet (J58890M) Connectors

Connector	Function
01 to 16 (A01 to A16)	50-pin connectors provide interfaces between port circuit packs and the MDF or a cable access panel (if provided).
TERM (Terminal)	Connects an administration terminal to the Processor circuit pack in the duplicated control cabinet (in its own cabinet) if the duplication interface circuit pack fails in the Control Carrier.

Expansion Control Cabinet (J58890N)

The Expansion Control Cabinet is optional and is located only in an EPN in G3siV4+m, G3rV4, Release 5si + memory, and Release 5r. This cabinet contains ports, tone-clock, interface to a port cabinet, and a maintenance interface.

Figure 3-23 shows an Expansion Control Cabinet. In an EPN stack of cabinets, this cabinet is the first in a stack of Single-Carrier Cabinets. This cabinet contains optional port circuit packs in port slots 2 to 17. See Table 3-9.

The AC or DC power supply, located at the right side of the cabinet, supplies power to the cabinet.

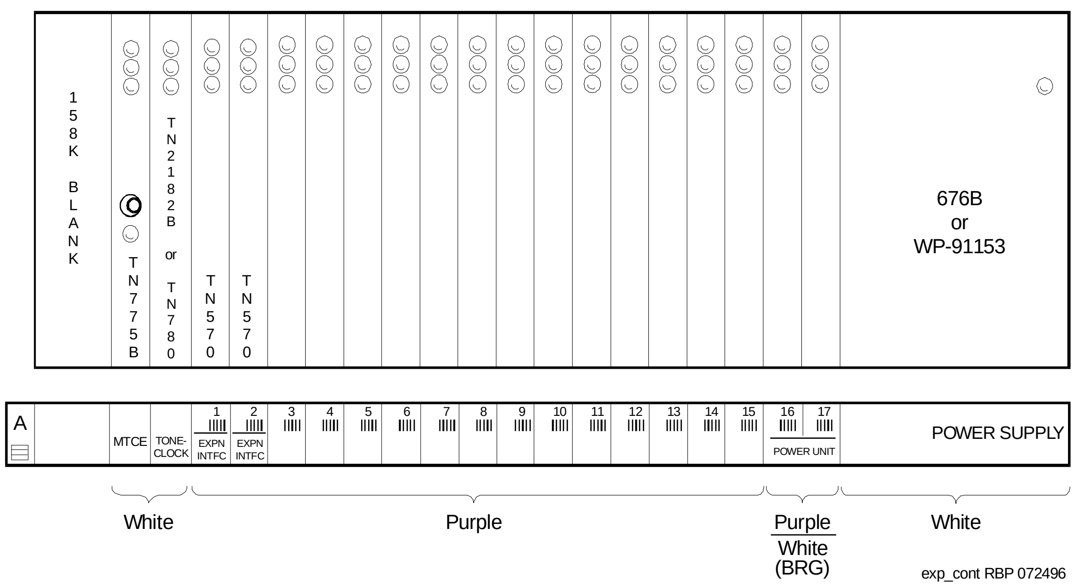

Figure 3-23. Expansion Control Cabinet (J58890N) — Front

Figure 3-24 and Table 3-9 detail the connectors on the rear of the Expansion Control Cabinet.

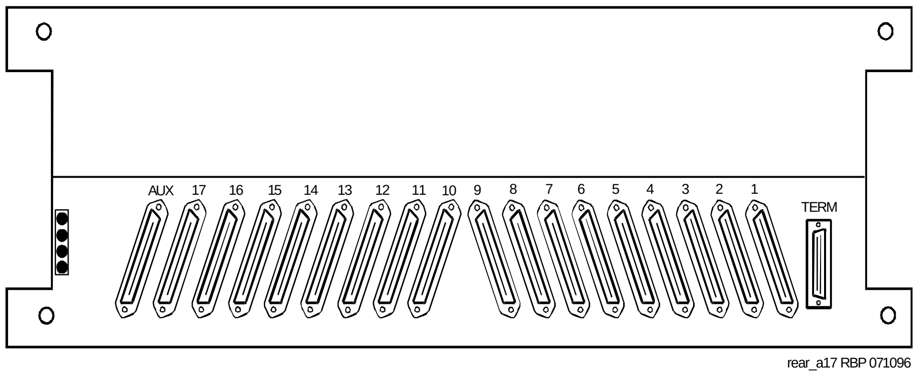

Figure 3-24. Expansion Control Cabinet (J58890N) — Rear

Table 3-9. Expansion Control Cabinet (J58890N) Connectors

Connector	Function
1 (A1)	Fiber optic cable interface between an Expansion Interface (EI) circuit pack in slot 1 and an EI circuit pack in another PN.
2 to 17 (A2 to A17)	Ports providing interfaces between circuit packs and the MDF or fiber transceiver.
AUX (Auxiliary)	Provides interface for customer alarms, attendant console power, and emergency power transfer panels.
TERM (Terminal)	Connects an administration terminal to the Maintenance circuit pack.

Port Cabinet (J58890H)

The port cabinet is located in the PPN and in EPNs. This cabinet contains ports and an interface to an Expansion Control Cabinet. See Figure 3-25.

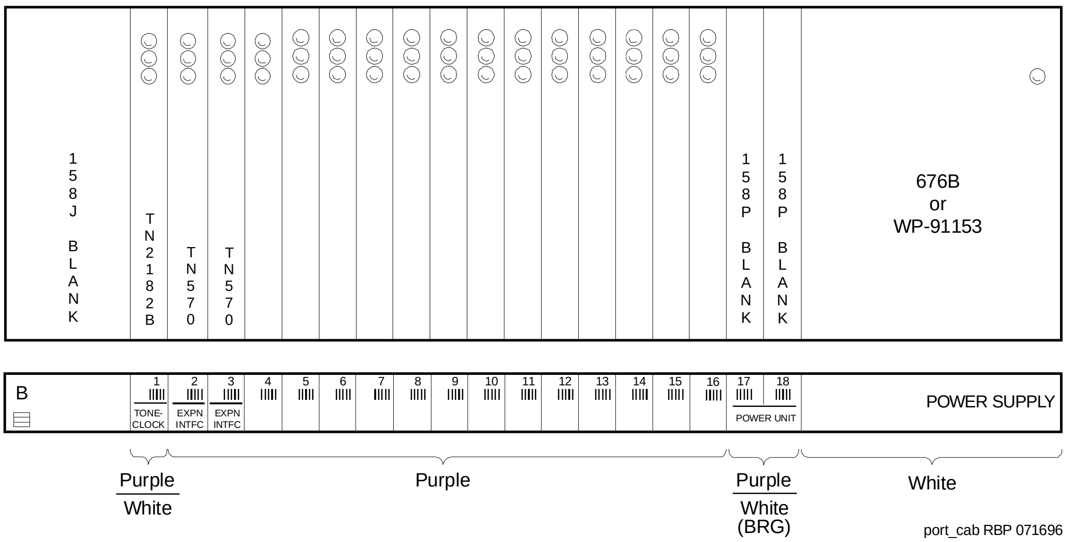

Figure 3-25. Port Cabinet (J58890H) — Front

Figure 3-25 shows a port cabinet containing a port carrier. The cabinet contains optional port circuit packs in port slots 1 to 18, and any of the following circuit packs, if required: tone-clock circuit pack in slot 1, Expansion Interface circuit pack in slot 2, and a neon power unit in slots 17 and 18.

The AC or DC power supply, located at the right side of the cabinet, supplies power to the cabinet. See Table 3-10.

Figure 3-26 and Table 3-10 detail the connectors on the rear of the Port Cabinet.

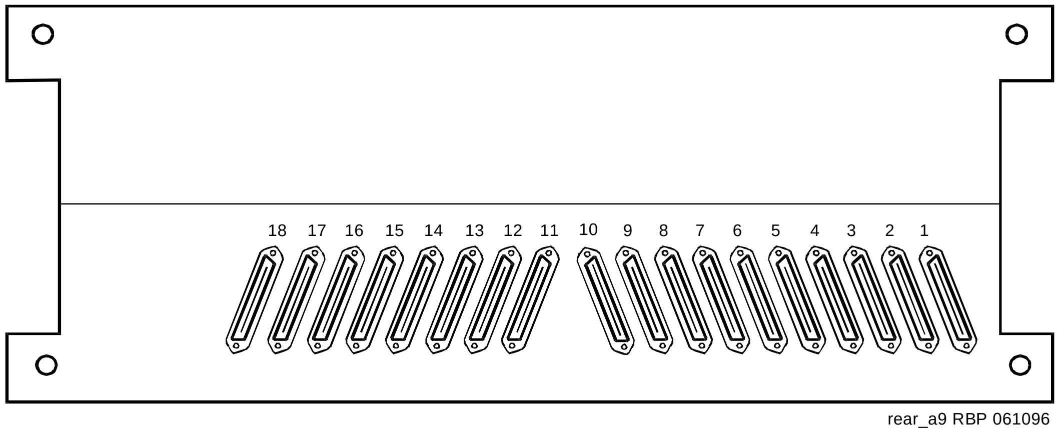

Figure 3-26. Port Cabinet (J58890H) — Rear

Table 3-10. Port Cabinet (J58890H) Connectors

Connector	Function
2 to 3 (B2 to B3)	Expansion Interface (EI) port that provides an interface for the fiber optic cable between the EI circuit pack in slot 2 or 3 and another Port Network (PN)
1 to 18 (B1 to B18)	Interface ports between circuit packs and the MDF

Compact Single-Carrier Cabinet (J58890S)

Figure 3-27 shows the Compact Single-Carrier Cabinet for Release 5vs and G3vsV4.

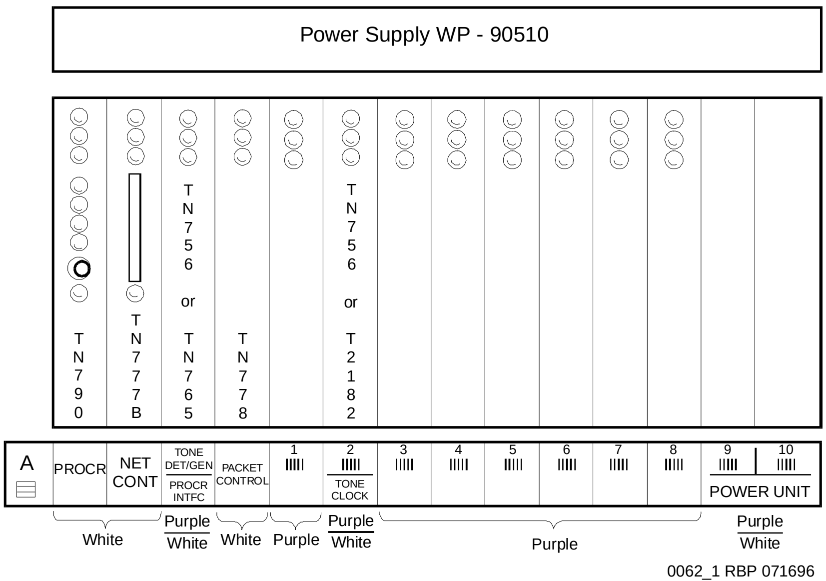

Figure 3-27. Compact Single-Carrier Cabinet (J58890S) — Front

The cabinet contains four dedicated white-colored circuit pack slots only equipped with designated control circuit packs:

- PROCR slot containing the TN790, the TN796B, or the TN786B Processor circuit pack
- NET CONT slot containing the TN777B Network Control circuit pack
- TONE DET/GEN PROC INTFC slot containing the TN765 Processor Interface circuit pack or the TN756 Tone Generator/Detector circuit pack or TN2182 Tone-Clock circuit pack. When both the TN765 and TN756 or the TN765 and TN2182 are used, the TN765 or TN2182 is placed in port slot 2.
- PACKET CONTROL slot containing the TN778 PACCON circuit pack
- DEFINITY AUDIX R3 is installed in port slots 7-10

The Compact Single-Carrier Cabinet can contain optional port circuit packs in slots 1 to 10. An AC power supply, located at the top of the cabinet, supplies power to the cabinet.

Figure 3-28 and Table 3-11 detail the connectors on the rear of the cabinet.

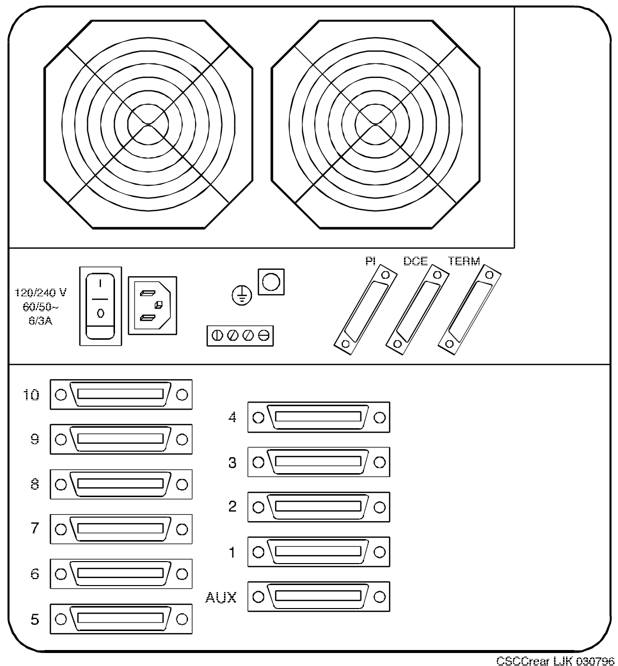

Figure 3-28. Compact Single-Carrier Cabinet (J58890S) — Rear

Table 3-11. Compact Single-Carrier Cabinet (J58890S) Connectors

Connector	Function
1 to 10	50-pin connectors interface between port circuit packs and the MDF or a cable access panel.
AUX (Auxiliary)	Provides interface for customer alarms, attendant console power, or emergency power transfer panels, and internal modem for remote maintenance.
PI (Processor Interface)	Connects directly to the Processor Interface circuit pack. Provides a BX.25 protocol interface for communication between the circuit pack and external DCE equipment. This connection can only be used with standard reliability option.
DCE	Connects the processor to Call Detail Recording (CDR) equipment, system printer, or an external modem for remote maintenance.
TERM (Terminal)	Connects to a management terminal.

Minimum Cabinet Configurations

Minimum cabinet configurations in Multi-Carrier Cabinets and in stacks of Single-Carrier Cabinets serve as the foundations on which to build cabinets in directly-connected systems and Center Stage Switch (CSS)-connected systems. The Compact Single-Carrier Cabinets cannot be duplicated or connected to other cabinets.

Also described are the carrier and cabinet locations of the following minimum required circuit packs:

- Tone-Clock
- Expansion Interface (EI)
- Expansion Port Network (EPN) Maintenance

A minimum cabinet configuration is determined by the following criteria:

— Cabinet interconnection options (directly connected and Center Stage Switch (CSS)-connected)

— System duplication options (standard reliability, high reliability, and critical reliability)

— Traffic engineering to determine the number of Port Networks (PNs)

Table 3-12, Table 3-13 and Table 3-14 list the minimum required carriers and circuit packs in PPN and EPN cabinets or cabinet stacks. The connection options are for directly- connected systems and CSS-connected systems.

Table 3-12. Minimum Requirements for PPN Cabinet

Duplication Option	Connection Option	Control Carriers	Switch Node Carriers	Tone-Clocks
Standard Reliability	Direct	1	0	1
	CSS (Release 5r Only)	1	0 or 1[1]	1
High Reliability	Direct	2	0	2
	CSS (Release 5r Only)	2	0 or 1[1]	2
Critical Reliability	Direct	2	0	2
	CSS (Release 5r Only)	2	0 or 2[1]	2

1. The first SN is normally located in the PPN. The second and third are normally located in an EPN to support up to 44 PNs. The first SN may be located in an EPN.

Table 3-13. Minimum Requirements for an EPN Cabinet

Duplication Option	Connection Option	Expansion Control Carriers	Switch Node Carriers	Tone-Clocks	Expansion Interfaces In EPN
Standard Reliability	Direct	1	0	1	Equals number of PNs
	CSS (Release 5r Only)	1	0 or 1[1]	1	1
High Reliability	Direct	1	0	1	Equals number of PNs
	CSS (Release 5r Only)	1	0 or 1[1]	1	1
Critical Reliability	Direct	1	0	2	Twice number of PNs
	CSS (Release 5r Only)	1	0 or 2[1]	2	2

1. The first SN is normally located in the PPN. The second and third are normally located in an EPN to support up to 44 PNs. The first SN may be located in an EPN. Up to three EPNs can be directly-connected.

Table 3-14. Minimum Requirements for a Two-PN Multi-Carrier Cabinet EPN (Release 5r Only)

Duplication Option	Connection Option	Control Carriers	Switch Node Carriers	Tone-Clocks	Expansion Interfaces
Standard reliability	Direct	1	0	2	4
	CSS	1	0	2	2
High reliability	Direct	1	0	2	4
	CSS	1	0	2	2
Critical reliability	Direct	1	0	4	8
	CSS	1	0	4	4

Standard Reliability Systems

The standard reliability configuration is available in all systems. A standard reliability system has no duplicated hardware and includes:

- One Control Carrier
- One Tone-Clock circuit pack per PN
- Port Networks interconnected by single cables

Optional carriers in the Multi-Carrier Cabinets are port carriers that can be added as required. In Release 5r, a Switch Node (SN) carrier can be added to Position "E" as required. Optional port carriers are determined by traffic engineering.

The top half of Figure 3-29 shows standard reliability Multi-Carrier Cabinets. The bottom half of Figure 3-29 shows standard reliability Single-Carrier Cabinets.

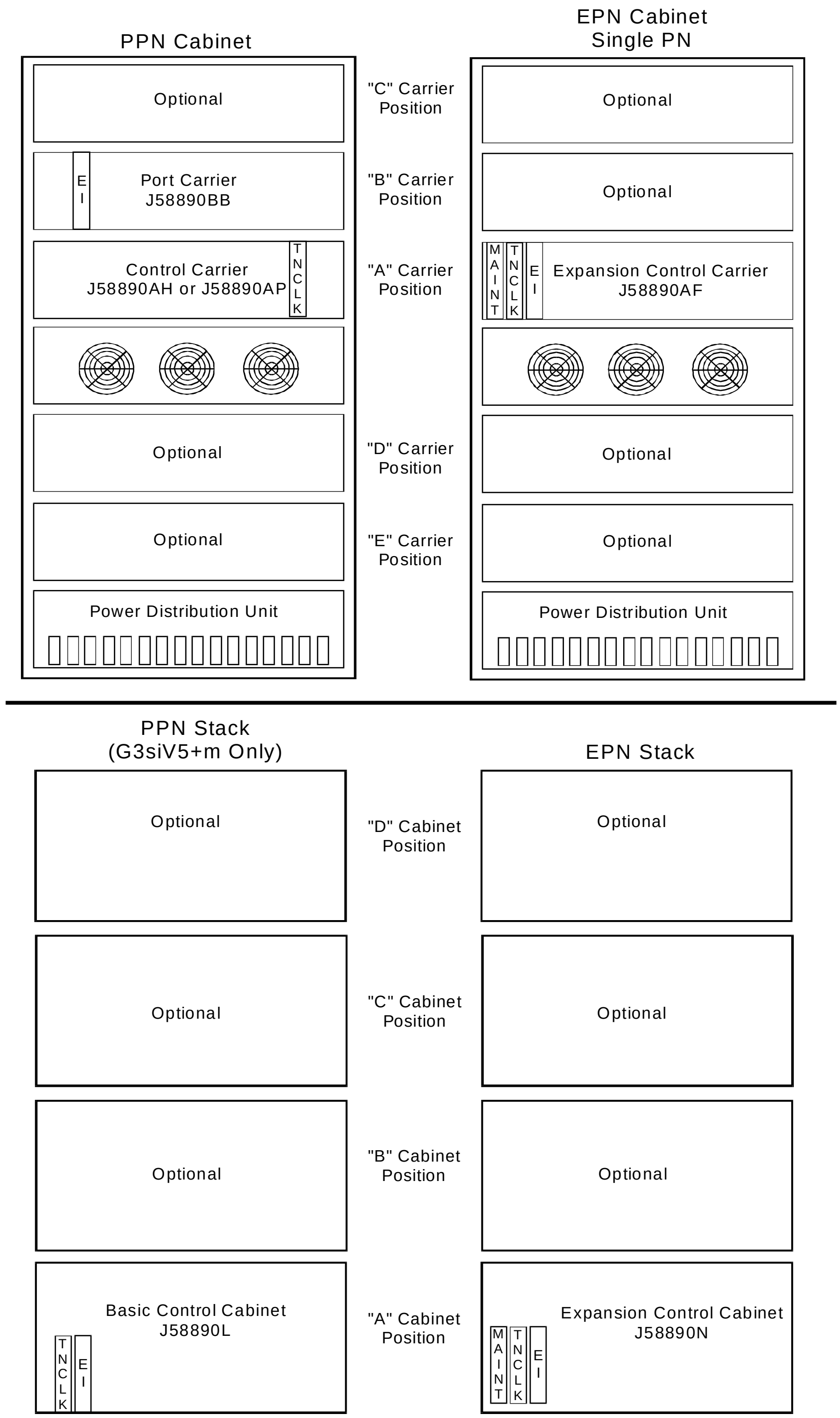

Figure 3-29. Minimum Single PN Configurations

Figure 3-30 shows the only two-PN cabinet configuration. It is only used in Release 5r systems.

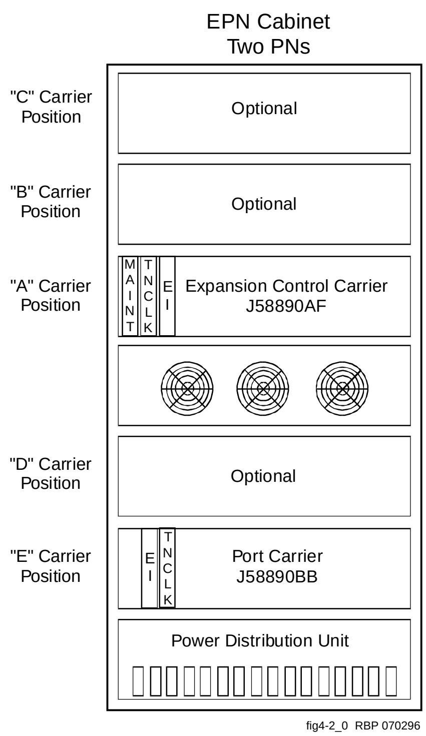

Figure 3-30. Minimum Two PN Configuration (Release 5r Only)

High Reliability Systems

High reliability is available in G3siV4+m, Release 5si + memory, and Release 5r. These systems require:

- Duplicate Control Carriers in the PPN cabinet
- Duplicate tone-clock circuit packs in the PPN cabinet
- One tone-clock circuit pack per EPN
- Port Networks interconnected by single cables
  - — The PPN requires duplicate connectivity to the Switch Node (SN)
  - — The SN requires duplicate Switch Node (SN) clocks

Figure 3-31 shows a minimum high reliability system. The SN carrier is shown in the PPN cabinet for a CSS-connected Release 5r.

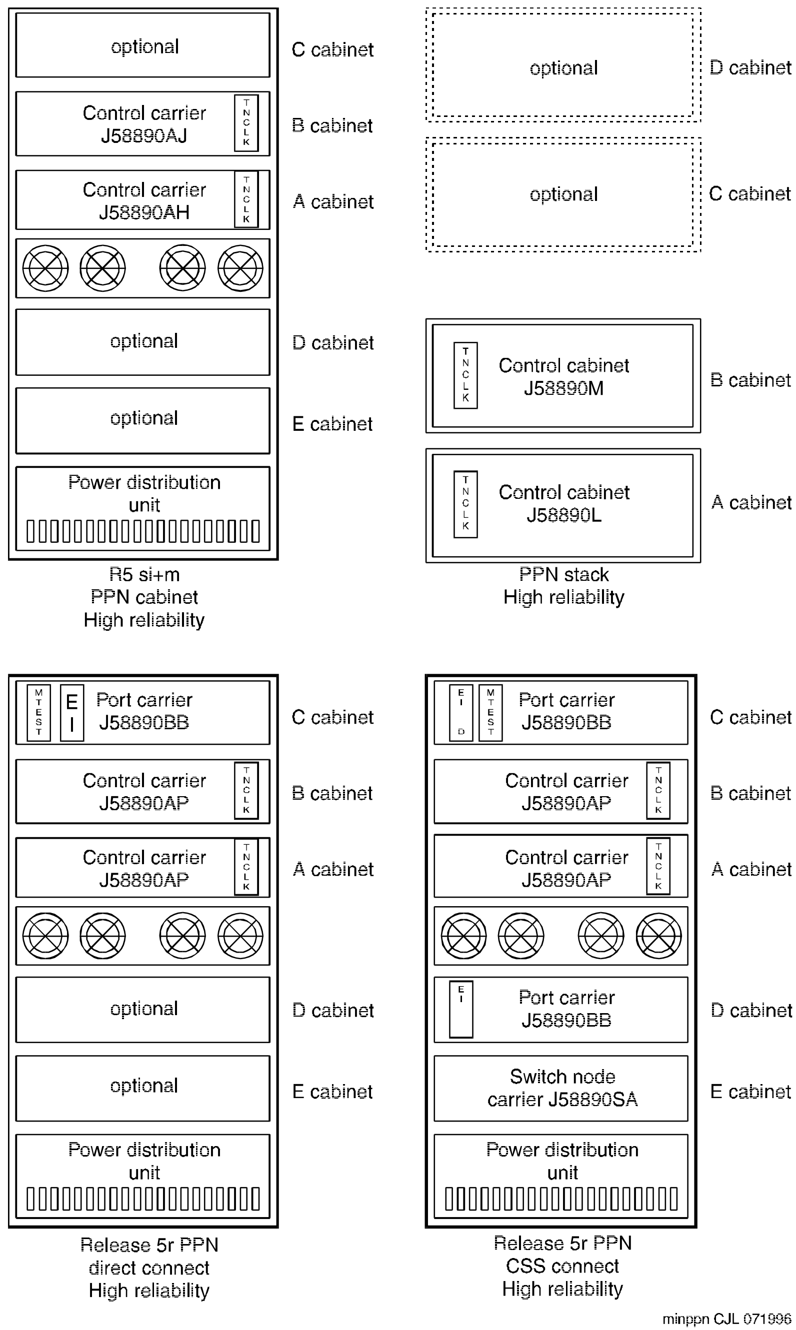

Figure 3-31. Minimum High Reliability PPN Configuration

Critical Reliability Systems

Critical reliability systems are available in G3siV4+m, Release 5si + memory, and Release 5r. These systems require:

- Duplicate Control Carriers in the PPN cabinet and EPN cabinet
- Duplicate Tone-Clock circuit packs in the PPN cabinet and EPN cabinets
- Port Networks interconnected by duplicated cables
- Duplicate Switch Node carriers in the Center Stage Switch (CSS) (Release 5r only)

Figure 3-32 shows the minimum cabinet configuration in critical reliability systems.

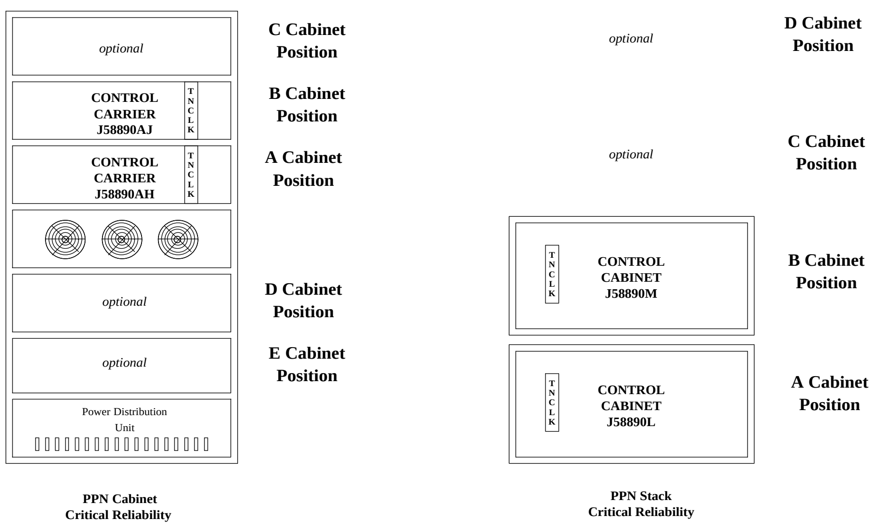

Figure 3-32. Minimum Critical Reliability PPN Configuration

Critical reliability systems require the duplication of carriers in PPN and EPN cabinets and cabinet stacks.

Figure 3-33 shows the minimum PPN cabinet configurations in critical reliability, directly-connected systems and CSS-connected systems.

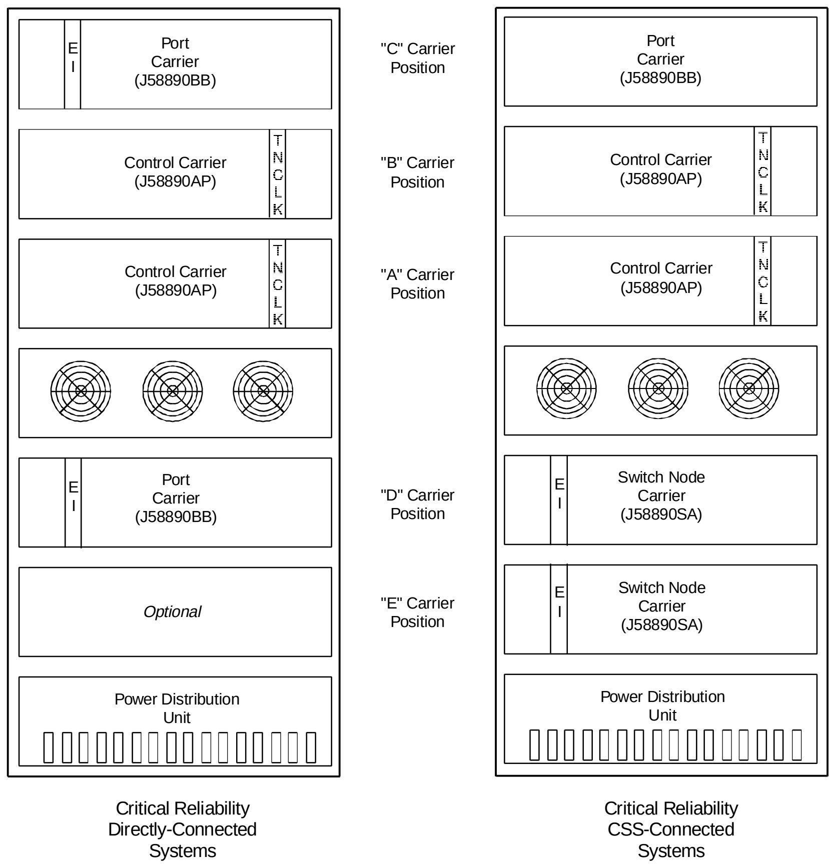

Figure 3-33. Minimum Critical Reliability PPN and CSS Configurations

Directly-Connected Cabinet Configurations

A directly-connected system is one that is connected to another cabinet via metallic or fiber cables and is not connected through a Center Stage Switch (CSS). Each directly-connected system has a maximum of three cabinets. In the first cabinet, the Expansion Interface (EI) circuit pack is not required in a single PN (PPN only) system because no connection to another cabinet is required.

NOTE:
Release 5si + memory accommodates up to three Single-Carrier Cabinet stacks (one PPN and two EPNs).

Standard Reliability

Table 3-15 lists the required EI circuit pack slots, tone-clock circuit pack slots, maintenance circuit pack slots, and remaining port circuit pack slots in a standard reliability directly-connected system.

Table 3-15. Standard Reliability Directly-Connected Multi-Carrier Cabinet

Port Networks	EIs	Tone-Clocks	Remaining Port Slots	Service Slots (Release 5r, Release 5si + memory
1 PPN only	0	1	89 (Release 5si + memory 80 (Release 5r)	4 (Depends on Traffic)
2 One PPN and one EPN	2	2	186 (Release 5si + memory) 176 (Release 5r)	8 (Depends on Traffic)
3 One PPN and two EPNs	6	3	281 (Release 5si + memory) 271 (Release 5r)	12 (Depends on Traffic)

High Reliability

High reliability is available on G3siV4+m, Release 5si + memory, G3rV4, and Release 5r only. Table 3-16 lists the required EI circuit pack, tone-clock circuit pack slots, maintenance circuit pack slots, and remaining port circuit pack slots in a high reliability, directly-connected system. In the first cabinet, the EI circuit pack is not required in a single PN (PPN only) system because no connection to another cabinet is required.

Table 3-16. High Reliability Directly-Connected Multi-Carrier Cabinet

Port Networks	EIs	Tone-Clocks	Remaining Port Slots	Service Slots
1 PPN only	0	2	78 (Release 5si + memory) 60 (Release 5r)	3 (Depends on Traffic)
2 One PPN and one EPN	2	3	175 (Release 5si + memory) 156 (Release 5r)	7 (Depends on Traffic)
3 One PPN and two EPNs	6	4	270 (Release 5si + memory) 251 (Release 5r)	11 (Depends on Traffic)

Critical Reliability

Critical reliability is available on G3siV4+m, Release 5si + memory, G3rV4, and Release 5r only. Table 3-17 lists the required EI circuit pack slots, tone-clock circuit pack slots, and remaining port circuit pack slots in critical reliability, directly connected systems. The port carrier in cabinet 1 is optional in systems with only one PN, but is required in systems with two or three PNs.

No EI circuit packs are required for systems with only a PPN because no connection is required to another cabinet. The EI circuit packs shown in cabinet 1 are shown in their Release 5r positions. These are installed in the Control Carriers in cabinet 1 of G3siV4+m and Release 5si + memory.

NOTE:
Release 5vs, G3siV4, and Release 5si do not support multiple cabinets.

Table 3-17. Critical Reliability Direct-Connected Systems Multi-Carrier Cabinet

Port Networks	EIs	Tone-Clocks	Remaining Port Slots	Service Slots
One PPN only	0	2	78/59 Release 5r	3
One PPN and one EPN	4	4	172/152 Release 5r	7
One PPN and two EPNs	12	6	262 (Release 5si + memory) 241 (Release 5r)	11

Cabinet Configurations in a CSS-Connected System

A CSS-connected Release 5r supports up to 44 Port Networks (PNs).

Standard Reliability

Table 3-18 lists up to 44 Port Networks (PNs) for a low traffic, standard reliability CSS-connected system with up to three Switch Nodes (SNs). Also included is the required expansion interfaces, tone-clocks, service slots, unused port slots, and remaining port slots. Standard reliability systems with one Switch Node can contain up to two DS1 Converter circuit packs in the Switch Node. Standard reliability systems can only contain one maintenance circuit pack.

In most cases, the maximum number of PNs with two and three Switch Nodes may be less than the number given in the tables because traffic considerations will require more than one inter-Switch Node link.

Table 3-18. Standard Reliability CSS-Connected Systems

Port Networks	Switch Nodes	Port Slots	Service Slots	Expansion Interfaces	Tone-Clocks	Unused Port Slots	Remaining Port Slots
3	1	218	9	3	3	4	214
4	1	317	13	4	4	5	312
5	1	416	17	5	5	6	410
6	1	515	21	6	6	7	508
7	1	614	25	7	7	8	606
8	1	713	29	8	8	9	704
9	1	812	33	9	9	10	802
10	1	911	37	10	10	11	900
11	1	1010	41	11	11	12	998
12	1	1109	45	12	12	13	1096
13	1	1208	49	13	13	14	1194
14	1	1307	53	14	14	15	1292
15	1	1406	57	15	15	16	1390
16	1	1505	61	16	16	17	1488
17	2	1604	65	17	17	18	1586
18	2	1703	69	18	18	19	1684
19	2	1802	73	19	19	20	1782

Continued on next page

Table 3-18. Standard Reliability CSS-Connected Systems — *Continued*

Port Networks	Switch Nodes	Port Slots	Service Slots	Expansion Interfaces	Tone-Clocks	Unused Port Slots	Remaining Port Slots
20	2	1901	77	20	20	21	1880
21	2	2000	81	21	21	22	1978
22	2	2099	85	22	22	23	2076
23	2	2198	89	23	23	24	2174
24	2	2297	93	24	24	25	2272
25	2	2396	97	25	25	26	2370
26	2	2495	101	26	26	27	2468
27	2	2594	105	27	27	28	2566
28	2	2693	109	28	28	29	2664
29	2	2792	113	29	29	30	2762
30	2	2891	117	30	30	31	2860
31	3	2990	121	31	31	32	2958
32	3	3089	125	32	32	33	3056
33	3	3188	129	33	33	34	3154
34	3	3287	133	34	34	35	3252
35	3	3386	137	35	35	36	3350
36	3	3485	141	36	36	37	3448
37	3	3584	145	37	37	38	3546
38	3	3683	149	38	38	39	3644
39	3	3782	153	39	39	40	3742
40	3	3881	157	40	40	41	3840
41	3	3980	161	41	41	42	3938
42	3	4079	165	42	42	43	4036
43	3	4178	169	43	43	44	4134
44	3	4277	173	44	44	45	4232

High Reliability

Table 3-19 lists up to 43 Port Networks (PNs) for a low traffic, high reliability CSS-connected system. Also included is the required expansion interfaces, tone-clocks, service slots, unused port slots, and remaining port slots. High reliability systems with one Switch Node can contain up to two DS1 Converter circuit packs in the Switch Node. High reliability systems can only contain one maintenance circuit pack.

Table 3-19. High Reliability CSS-Connected Systems

Port Networks	Switch Nodes	Port Slots	Service Slots	Expansion Interfaces	Tone-Clocks	Unused Port Slots	Remaining Port Slots
3	1	198	10	4	4	5	193
4	1	297	14	5	5	6	291
5	1	396	18	6	6	7	389
6	1	495	22	7	7	8	487
7	1	594	26	8	8	9	585
8	1	693	30	9	9	10	683
9	1	792	34	10	10	11	781
10	1	891	38	11	11	12	879
11	1	990	42	12	12	13	977
12	1	1089	46	13	13	14	1075
13	1	1188	50	14	14	15	1173
14	1	1287	54	15	15	16	1271
15	1	1386	58	16	16	17	1369
16	2	1485	62	17	17	18	1467
17	2	1584	66	18	18	19	1565
18	2	1683	70	19	19	20	1663
19	2	1782	74	20	20	21	1761
20	2	1881	78	21	21	22	1859
21	2	1980	82	22	22	23	1957
22	2	2079	86	23	23	24	2055
23	2	2178	90	24	24	25	2153
24	2	2277	94	25	25	26	2251
25	2	2376	98	26	26	27	2349
26	2	2475	102	27	27	28	2447
27	2	2574	106	28	28	29	2545

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Table 3-19. High Reliability CSS-Connected Systems — *Continued*

Port Networks	Switch Nodes	Port Slots	Service Slots	Expansion Interfaces	Tone-Clocks	Unused Port Slots	Remaining Port Slots
28	2	2673	110	29	29	30	2643
29	3	2772	114	30	30	31	2741
30	3	2871	118	31	31	32	2839
31	3	2970	122	32	32	33	2937
32	3	3069	126	33	33	34	3035
33	3	3168	130	34	34	35	3133
34	3	3267	134	35	35	36	3231
35	3	3366	138	36	36	37	3329
36	3	3465	142	37	37	38	3427
37	3	3564	146	38	38	39	3525
38	3	3663	150	39	39	40	3623
39	3	3762	154	40	40	41	3721
40	3	3861	158	41	41	42	3819
41	3	3960	162	42	42	43	3917
42	3	4059	164	43	43	44	4015
43	3	4158	168	44	44	45	4113

In most cases, the maximum number of PNs with two and three Switch Nodes may be less than the number given in the tables because traffic considerations will require more than one inter-Switch Node link.

Critical Reliability

Table 3-20 lists up to 44 Port Networks (PNs) for a low traffic, critical reliability CSS-connected system. Also included is the required expansion interfaces, tone-clocks, service slots, unused port slots, and remaining port slots. Critical reliability systems with one Switch Node (SN) can contain up to four DS1 Converter circuit packs in the Switch Node. Critical reliability systems can contain up to 42 maintenance circuit packs.

Table 3-20. Critical Reliability CSS-Connected Systems

Port Networks	Switch Nodes	Port Slots	Service Slots	Expansion Interfaces	Tone-Clocks	Unused Port Slots	Remaining Port Slots
3	1	138	9	6	6	9	209
4	1	237	13	8	8	13	304
5	1	336	17	10	10	17	399
6	1	435	21	12	12	21	494
7	1	534	25	14	14	25	589
8	1	633	29	16	16	29	684
9	1	732	33	18	18	33	779
10	1	831	37	20	20	37	874
11	1	930	41	22	22	41	969
12	1	1029	45	24	24	45	1064
13	1	1128	49	26	26	49	1159
14	1	1227	53	28	28	53	1254
15	1	1326	57	30	30	57	1349
16	1	1425	61	32	32	61	1444
17	2	1524	65	34	34	65	1539
18	2	1623	69	36	36	69	1634
19	2	1722	73	38	38	73	1729
20	2	1821	77	40	40	77	1824
21	2	1920	81	42	42	81	1919
22	2	2019	85	44	44	85	2014
23	2	2118	89	46	46	89	2109
24	2	2217	93	48	48	93	2204
25	2	2316	97	50	50	97	2299
26	2	2415	101	52	52	101	2394
27	2	2514	105	54	54	105	2489

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Table 3-20. Critical Reliability CSS-Connected Systems — *Continued*

Port Networks	Switch Nodes	Port Slots	Service Slots	Expansion Interfaces	Tone-Clocks	Unused Port Slots	Remaining Port Slots
28	2	2613	109	56	56	109	2504
29	2	2712	113	58	58	113	2599
30	2	2811	117	60	60	117	2694
31	3	2910	121	62	62	121	2789
32	3	3009	125	64	64	125	2884
33	3	3108	129	66	66	129	2979
34	3	3207	133	68	68	133	3074
35	3	3306	137	70	70	137	3169
36	3	3405	141	72	72	141	3264
37	3	3504	145	74	74	145	3359
38	3	3603	149	76	76	149	3454
39	3	3702	153	78	78	153	3549
40	3	3801	157	80	80	157	3544
41	3	3900	161	82	82	161	3739
42	3	3999	165	84	84	165	3834
43	3	4098	165	86	86	169	3929
44	3	4197	169	88	88	173	4024

In most cases, the maximum number of PNs with two and three Switch Nodes may be less than the number given in the tables because traffic considerations will require more than one inter-Switch Node link.

Cabling to On- and Off-Premises Systems

Cabling from the system to on-premises and off-premises systems is used to establish communications paths between the system's line port circuits and trunk port circuits to external trunks, lines, and DTE equipment. The cabling from the system routes to the following locations:

- Through the network interface to off-premises trunks and lines going to the Central Office (CO) and remote equipment.
- Premises (house) wiring (data lines) going to information outlets (modular jacks) used for DTE and on-premises station sets.

Main Distribution Frames (MDFs) are termination points for equipment cabling and distribution cabling. Connections are made between those termination points to establish communications paths throughout the system. Two major types of distribution frames are:

- The *Main Distribution Frame (MDF)* is the field on which terminations and cross-connections for CO trunks, equipment cabling, and distribution cabling are made.
- The *Intermediate Distribution Frame (IDF)* is any cross-connect field between the MDF and the endpoint workstations. The terminations and cross-connections are made for the distribution cabling from the MDF, from other IDFs, and from the site wiring from information outlets.

Circuit Packs and Related Hardware

This section describes the circuit packs and related hardware installed in slots in Multi-Carrier Cabinets and Single-Carrier Cabinets. The circuit packs are listed by apparatus code in Table 3-21 on page 3-55. After the table, the circuit packs and their functions are provided.

All circuit packs are approximately 8 inches (20 cm) by 13 inches (33 cm). The following connectors are attached to one end of a circuit pack: 200-pin connector to a “TN”-labeled circuit pack and a 300-pin connector to a “UN”-labeled circuit pack. Faceplates on the circuit packs are sized to fill the width of a slot, typically 0.75 inches (1.9 cm). A color code on each faceplate identifies the circuit type.

Each circuit pack faceplate has a standard pattern of three LEDs and indicate the following conditions:

- Red indicates a fault condition
- Green indicates a test condition
- Yellow indicates a busy condition

A special grounding latch on each circuit pack protects it from electrostatic discharge during installation.

CAUTION:
A wrist strap must be worn when installing a circuit pack in a cabinet. A jack is provided on each cabinet for this purpose.

Types of Circuit Packs

Four types of circuit packs can be installed in carriers:

1. *Port circuit packs*: provide links between analog and digital lines, trunks, networks, and external communications equipment, and the Time Division Multiplexing (TDM) bus and packet bus. These circuit packs can be installed in any purple-colored port slot.
2. *Control circuit packs*: include processor, memory, network control, disk control, tape control, protocol interfaces, duplication, and maintenance. These circuit packs are installed in dedicated white-colored slots in the control carrier and do not operate in any other slots.
3. *Service circuit packs*: produce and detect tones, synthesize speech, classify calls, record announcements, and allow the system to be accessed for administration and troubleshooting.
4. *Power Converter circuit packs*: supply DC voltages to the port, control, and service circuit packs in the carriers and Single-Carrier Cabinets. These circuit packs supply AC ringing voltages to analog line circuit packs and are installed in dedicated white-colored slots only.

Port Circuit Packs

Figure 3-34 shows the components common to all port circuit packs:

- Bus buffers
- Sanity and Control Interface (SAKI)
- Microprocessor with external Random Access Memory (RAM)
- Network Processing Elements (NPEs) or Switch Conferencing for Time Division Multiplexing in Concentration Highway (SCOTCH NPE)

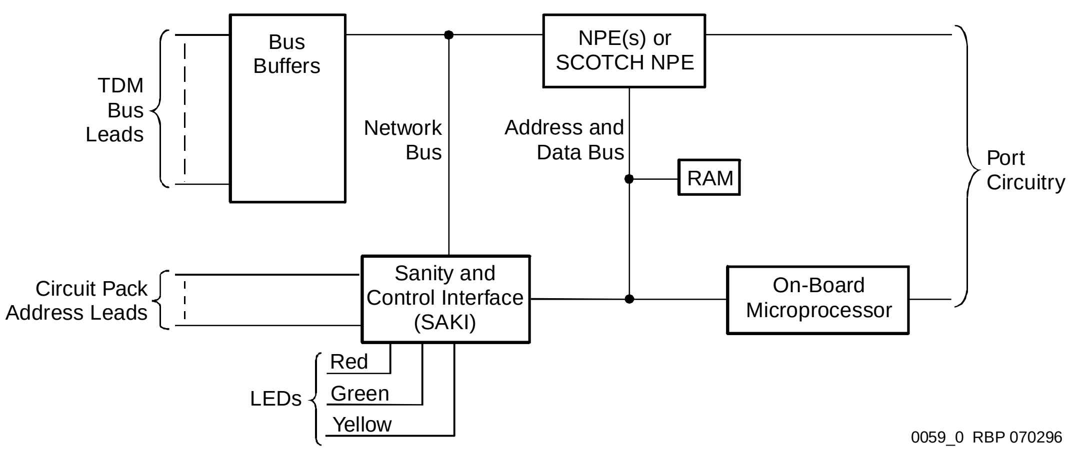

Figure 3-34. Common Components of Port Circuit Packs

Bus Buffers

The bus buffers are the digital interface between the Time Division Multiplexing (TDM) bus wires on the backplane and the circuitry on the circuit pack. They receive or transmit on either of the two 8-bit TDM buses.

SAKI

The Sanity and Control Interface (SAKI) is the circuit pack interface to the TDM bus. It receives control channel information from the bus and sends the information to the microprocessor. Conversely, the microprocessor sends control channel information to the SAKI, which sends it to the TDM bus.

The SAKI also controls status indicator LEDs on the circuit pack, initiates start-up procedures when power is turned on, checks the circuit pack's microprocessor for sanity, and re-initializes the microprocessor in case of problems. If a problem is detected, the SAKI takes the defective circuit pack out of service either on command from the Switch Processing Element (SPE) or when the SAKI determines that interference is present in control time slots on the circuit pack.

Microprocessor with External RAM

The microprocessor performs all low-level functions such as scanning for changes and relay operations. In general, the microprocessor carries out commands received from the SPE and reports status changes to the SPE. Some port circuit packs contain more than one microprocessor. The external RAM stores control channel information and port-related information.

Network Processing Elements

The Network Processing Elements (NPEs), or a high-density Switch Conferencing for Time Division Multiplexing in Concentration Highway (SCOTCH), perform conference and gain-adjustment functions. An NPE (under control from the microprocessor) can connect a port circuit to any TDM bus time slot. Each port circuit pack has from one to six NPEs or a SCOTCH NPE.

Circuit Packs in DEFINITY

Table 3-21 lists the circuit packs by apparatus code. After the table, detailed descriptions of each circuit pack function are provided.

Table 3-22 on page 3-92 lists the available adjuncts. After the table, detailed descriptions of each adjunct are provided.

Table 3-21. Circuit Packs and Circuit Modules

Apparatus Code	Name	Type
631DA1	AC Power Unit	Power
631DB1	AC Power Unit	Power
644A1	DC Power Unit	Power
645B1	DC Power Unit	Power
649A	DC Power Converter	Power
676B	DC Power Supply	Power
982LS	Current Limiter	Power
CFY1B	Current Limiter	Power
CPP1	Memory Expansion	Control
ED-1E546 (TN2169) (TN2170) (TN566) (TN567)	DEFINITY AUDIX R3 System	Port Assembly
ED-1E546 (TN2208) (TN2170)	Call Visor ASAI over the DEFINITY (LAN) Gateway R1	Port Assembly
TN417	Auxiliary Trunk	Port
TN419B	Tone-Clock	Control
TN420B/C	Tone Detector	Service
TN429	Direct Inward/Outward Dialing (DIOD) Trunk	Port
TN433	Speech Synthesizer	Service
TN436B	Direct Inward Dialing Trunk	Port
TN437	Tie Trunk	Port
TN438B	Central Office Trunk	Port
TN439	Tie Trunk	Port

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Table 3-21. Circuit Packs and Circuit Modules — *Continued*

Apparatus Code	Name	Type
TN447	Central Office Trunk	Port
TN457	Speech Synthesizer	Service
TN458	Tie Trunk	Port
TN459B	Direct Inward Dialing Trunk	Port
TN464C/ D/E/ F	DS1/E1 Interface - T1, 24 Channel - E1, 32 Channel	Port
TN465/B/C	Central Office Trunk	Port
TN467	Analog Line	Port
TN468B	Analog Line	Port
TN479	Analog Line	Port
TN497	Tie Trunk	Port
TN553	Packet Data Line	Port
TN556/B	ISDN-BRI 4-Wire S/T-NT Line (A-Law)	Port
TN570/B/C	Expansion Interface	Port
TN572	Switch Node Clock	Control
TN573/B	Switch Node Interface	Control
TN574	DS1 Converter - T1, 24 Channel	Port
TN577	Packet Gateway	Port
TN722B	Digital Signal Level 1 Tie Trunk	Port
TN725B	Speech Synthesizer	Service
TN726/B	Data Line	Port
TN735	MET Line	Port
TN742	Analog Line	Port
TN744/B	Call Classifier	Service
TN744/C/D	Call Classifier - Detector	Service
TN746/B	Analog Line	Port
TN747B	Central Office Trunk	Port
TN748/B/C/D	Tone Detector	Service
TN750/B/C	Announcement	Service
TN753	Direct Inward Dialing Trunk	Port
TN754/B	Digital Line 4-Wire DCP	Port

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Table 3-21. Circuit Packs and Circuit Modules — *Continued*

Apparatus Code	Name	Type
TN755B	Neon Power Unit	Power
TN756	Tone Detector	Service
TN758	Pooled Modem	Port
TN760B/C/D	Tie Trunk	Port
TN762B	Hybrid Line	Port
TN763B/C/D	Auxiliary Trunk	Port
TN765	Processor Interface	Control
TN767B/C/D/E	DS1 Interface - T1, 24 Channel	Port
TN768	Tone-Clock	Control
TN769	Analog Line	Port
TN771D	Maintenance/Test	Service
TN772	Duplication Interface	Control
TN773	Processor	Control
TN775/B	Maintenance	Service
TN776	Expansion Interface	Port
TN777/B	Network Control	Control
TN778	Packet Control	Control
TN780	Tone-Clock	Control
TN786	Processor	Control
TN786B	Processor	Control
TN789	Radio Controller	Control
TN790	Processor	Control
TN796B	Processor	Control
TNPRI/BRI	PRI to BRI Converter	Port
TN1648	System Access/Maintenance	Control
TN1650B	Memory	Control
TN1654	DS1 Converter - T1, 24 Channel/E1, 32 Channel	Port
TN1655	Packet Interface	Control
TN1656	Tape Drive	Control
TN1657	Disk Drive	Control

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Table 3-21. Circuit Packs and Circuit Modules — *Continued*

Apparatus Code	Name	Type
TN2135	Analog Line	Port
TN2136	Digital Line 2-Wire DCP	Port
TN2138	Central Office Trunk	Port
TN2139	Direct Inward Dialing Trunk	Port
TN2140/B	Tie Trunk	Port
TN2144	Analog Line	Port
TN2146	Direct Inward Dialing Trunk	Port
TN2147/C	Central Office Trunk	Port
TN2149	Analog Line	Port
TN2180	Analog Line	Port
TN2181	Digital Line 2-Wire DCP	Port
TN2182/B	Tone-Clock -Tone Detector and Call Classifier	Control
TN2183	Analog Line	Port
TN2184	DIOD Trunk	Port
TN2198	ISDN-BRI 2-Wire U Interface	Port
TN2199	Central Office Trunk	Port
TN2202	Ring Generator	Power
TN2224	Digital Line, 24-Port, 2-Wire DCP	Port
UN330B	Duplication Interface	Control
UN331B	Processor	Control
UN332	Mass Storage/Network Control	Control
WP-90510	AC Power Supply (Compact Single-Carrier Cabinet)	Power
WP-91153	AC Power Supply (Single-Carrier Cabinet)	Power

631DA1 AC Power Unit

The 631DA1 accepts 120 VAC 60 Hz and produces the +5 VDC at 60 Amps available on the carrier backplanes.

If the AC input power fails, the unit converts 144 VDC supplied by optional batteries in the AC power distribution unit to +5 VDC. A circuit in the battery charger detects the highest equivalent AC or DC input voltage and switches in the correct input voltage.

631DB1 AC Power Unit

The 631DB1 accepts 120 VAC 60 Hz and produces -48 VDC at 8 Amps and -5 VDC at 6 Amps available on the carrier backplanes. The -48 VDC also supplies power to the cabinet fans.

If the AC input power fails, the unit converts 144 VDC supplied by optional batteries in the AC power distribution unit to -48 VDC and -5 VDC. A circuit in the optional battery charger detects the highest equivalent AC or DC input voltage and switches in the correct input voltage.

644A1 DC Power Unit

The 644A1 converts a -48-VDC input to a +5-VDC output at 60 Amps. The +5 VDC is distributed on the carrier backplanes to circuit pack slots in the carriers.

645B1 DC Power Unit

The 645B1 converts a -48 VDC input to outputs of -48 VDC at 8 Amps and -5 VDC at 6 Amps. The -48 VDC and -5 VDC are distributed on the carrier backplanes to circuit pack slots in the carriers.

649A DC Power Converter — Multi-Carrier Cabinets

The 649A Power Converter converts a -48 VDC input into outputs of -48 VDC at 10 Amps, +5 VDC, and -5 VDC at 6 Amps. The outputs are distributed to circuit pack slots in the carriers. Only one 649A converter is required per carrier except for Switch Node (SN) carriers. SN carriers require two converters; one on each end. The use of the 649A allows an increase in the number of terminals supported per carrier.

The 649A is not compatible with the 644A or the 645B Power Converters and is used in G3V4R3 and later systems.

676B DC Power Supply

A -48 VDC source supplies power to the DC power supply at up to 25 Amps. The 676B DC Power Supply produces the following DC outputs: +5 VDC, -5 VDC, -48 VDC, and +12 VDC. The DC outputs are distributed on the cabinet backplane to the slots for the circuit packs. The AC ringing voltage output value and frequency depend on the country of use. The power supply has circuit breakers and Electromagnetic Interference (EMI) filtering.

982LS Current Limiter

The 982LS connects to the rear of the Processor circuit pack slot only in the Processor Port Network (PPN) in G3siV4, G3siV4+m, Release 5si, and Release 5si + memory. The 982LS provides current-limited accessory 48 VDC, emergency transfer logic, current-limited 5 VDC to trip main circuit breaker if high temperature is detected, and duplicated 48 VDC to fans in the PPN cabinet.

CFY1B Current Limiter

The CFY1B is used only in: Release 5r PPNs, Multi-Carrier Cabinet EPNs, and Single-Carrier Cabinet EPNs. The unit connects to the rear of the maintenance board slot and provides current-limited accessory 48 VDC, emergency transfer logic, current-limited 5 VDC to trip main circuit breaker if high temperature is detected, and duplicated 48 VDC to fans in the EPN cabinet.

CPP1 Memory Expansion

The CPP1 is attached to the TN786B Processor circuit pack in G3iV4 and G3siV4+m and supplies an additional 4 Mbytes of Dynamic Random Access Memory (DRAM) used for system software, customer translations, and call processing maintenance. The CPP1 has the same access time as the TN786B memory.

NOTE:
This circuit pack is not used in Release 5 and later systems.

ED-1E546 — DEFINITY AUDIX R3 System (TN2169, TN2170, TN566, TN567)

The DEFINITY AUDIX R3 system allows a person to record and exchange voice messages over the telephone when direct communication is inconvenient or unnecessary. The unit is installed in five adjacent slots in a carrier. Preferably, the five rightmost slots are used.

The TN566/B and TN567 Multifunction circuit pack holds the Central Processing Unit (CPU), controllers, memory devices, and signal processors.

TN566/B circuit pack operates with the TN2169 Alarm circuit pack to provide monitoring for system power and environmental status, -48 VDC to +12 VDC power conversion for the disk drive and tape drive, and remote terminal access. The TN2170 alarm (with LAN interface) circuit pack provides a connection to an external LAN in addition to all of the functions provided by the TN2169.

The 160 Mbyte or 600 Mbyte tape drive data cassette recorder distributes software onto a disk, stores periodic backups of data, installs software releases, and removes core dumps and other maintenance information.

A 148, 248, 456, 800 Mbyte, or 1 Gbyte disk drive stores customer data, boots the system, and logs system error information. Depending on the disk drive sizes, the unit can handle from 300 to 2000 local and remotely administered subscribers. The unit has eight ports, two of the ports are used for each voice terminal. See the DEFINITY AUDIX System, System Description, 585-300-210, for more information.

ED-1E546 — CallVisor ASAI Over the DEFINITY LAN Gateway R1 (TN2208 and TN2170)

Provides a direct connection between a DEFINITY LAN Gateway R1 system and an Ethernet LAN for transport of ASAI links. This unit is installed in five contiguous slots in a carrier. Preferably, the five rightmost slots are used.

The TN2208 Multi-function circuit pack holds the CPU, controller, and memory devices. The TN2208 operates with the TN2170 Alarm with Ethernet Interface circuit pack to provide monitoring for system power and environmental status, -48 VDC to +12 VDC power conversion for the disk drive and tape drive, and remote terminal access.

The mass storage/cabling combination provides an interface to a 160 Mbyte tape drive, a 456 Mbyte disk drive, and associated I/O cables. All application-specific labeling is provided, as required.

TN417 Auxiliary Trunk — Non-United States

The TN417 provides four ports for on-premises trunk applications such as Music-on-Hold, Loudspeaker Paging, Code Calling, and Recorded Telephone Dictation Access. Each port has T, R, SZ, SZ1, S, S1 signal leads. The TN417 supports Audichron announcement equipment. TN417 supports A-Law companding.

This circuit pack has been replaced by the TN763D Auxiliary Trunk circuit pack.

TN419B Tone-Clock — Italy, Australia, United Kingdom

The TN419B supplies call progress tones specific to the indicated country, touch tones, answer-back tones, and trunk transmission test tones. The TN419B provides 2 MHz and 160 kHz clocks, and the 8 kHz frame clock. This circuit pack can transmit the system clock and tones on either TDM bus A, TDM bus B, or both. This circuit pack contains a ringing voltage alarm detection circuit.

This circuit pack has been replaced by the TN2182 Tone Clock - Tone Detector and Call Classifier circuit pack.

TN420C Tone Detector

The TN420C can be administered to detect and analyze tones on the TDM bus. The TN420C has two Network Processing Elements (NPEs) with eight channels that provide four Dual Tone Multi-Frequency (DTMF) receiver ports, two general purpose tone detector ports, and two digital loop-around ports. Tones must be companded in A-Law code only.

This circuit pack has been replaced by the TN2182 Tone Clock - Tone Detector and Call Classifier or the TN744C Call Classifier - Detector circuit pack.

TN429 DIOD Trunk — Japan

The TN429 provides eight ports for Direct Inward/Outward Dialing (DIOD) trunks. Each port has Tip and Ring signal leads. This circuit pack is required for the Japan ANI feature where the calling number is passed through to the DEFINITY System. An in-band detector/converter may be required. Contact your Lucent Technologies representative.

TN433 Speech Synthesizer — Italy

The TN433 provides four ports that retrieve fixed messages for Leave Word Calling, Automatic Wakeup, and Visually Impaired Attendant Console features. Examples of the messages are: good morning, time-of-day, and extension number. Each of the ports has touch-tone detection. The TN433 has administrable Mu-Law and A-Law companding.

TN436B Direct Inward Dialing Trunk — Australia

The TN436B provides eight ports for Direct Inward Dialing (DID) independently connected to a public network. Each port is an interface between a two-wire analog line from a CO and the four-wire TDM network in the system. The TN436B has administrable timers.

TN437 Tie Trunk — Australia

The TN437 provides four ports for four-wire E & M lead signaling tie trunks. The TN437 provides selectable trunk type for outgoing calls and incoming calls: automatic (default), immediate, wink start, and delay dial. The TN437 also supports administrable timers, A-Law companding, and selectable standard reliability Type 5 signaling or E & M Type 5 signaling.

This circuit pack has been replaced by the TN760D Tie Trunk circuit pack.

TN438B Central Office Trunk

The TN438B provides eight ports for loop-start CO trunks. Each port has Tip and Ring signal leads. The TN438B can detect 12 kHz and 50 Hz periodic metering pulses from the CO. Additional features include call still held timing and automatic guard fault detection circuitry.

TN439 Tie Trunk — Australia and Japan

The TN439 provides four ports for two-wire tie trunks with loop disconnect signaling. The TN439 has administrable A-Law and Mu-Law companding and administrable timers.

TN447 Central Office Trunk — United Kingdom

The TN447 provides eight analog CO trunk ports. Each port has Tip and Ring signal leads and connects to a two-wire analog line. The TN447 uses ground-start trunk signaling, 50 Hz Periodic Pulse Metering (PPM) detection and counting, and administrable timers.

This circuit pack has been replaced by the TN2147 Central Office Trunk circuit pack.

TN457 Speech Synthesizer — United Kingdom

The TN457 provides four ports that retrieve fixed United Kingdom-accent spoken messages for Leave Word Calling, Automatic Wakeup, and Visually Impaired Attendant Console features. Examples of the messages are: good morning, time-of-day, and extension number. Each of the ports has touch-tone detection. The TN457 has administrable A-Law and Mu-Law companding.

TN458 Tie Trunk — United Kingdom

The TN458 provides four ports for four-wire E & M lead signaling tie trunks. The TN458 has administrable A-Law and Mu-Law companding and timers. The TN458 can be administered on each port for connection to Type 1 E & M standard (unprotected) format, Type 1 E & M compatible (unprotected) format, Type 1 E & M compatible (protected) format, and Type 5 simplex format.

This circuit pack has been replaced by the TN760D Tie Trunk circuit pack.

TN459B Direct Inward Dialing Trunk — United Kingdom

The TN459B provides eight ports for immediate-start or wink-start Direct Inward Dialing (DID) trunks. Each port has Tip and Ring signal leads. Each port is an interface between a two-wire analog line from a CO and the four-wire TDM network in the system. The TN459B has administrable timers and a backward busy circuit that complies with signaling requirements.

TN464C/D/E/F DS1/E1 Interface — T1, 24 Channel and E1, 32-Channel

The TN464C and later suffix circuit packs support Digital Signal Level 1 (DS1) rate (24 channel) and E1 rate (32 channel) digital facility connectivity. All TN464 suffixes support CO, Tie, DID, and Off Premises Station (OPS) port types using the robbed-bit signaling protocol, the proprietary Bit-Oriented Signaling (BOS) 24th channel signaling protocol, and the DMI-BOS 24th channel signaling protocol. The circuit packs also support ISDN-PRI connectivity DS1 or E1. For ISDN-PRI applications, the signaling (D) channel is connected from the TN464 to the TN778 Packet Control (Release 5si) or TN1655 Packet Interface (Release 5r) via the LAN bus.

In DS1 (24 channel) mode, a DSX1 interface is provided to the DS1 facility. The TN464 circuit packs provide board-level administrable A-Law and Mu-Law companding, CRC-4 generation and checking (E1 only), and Stratum 3 clock capability.

The TN464E and later suffixes provide test jack access to the DS1 or E1 line and support the 120A Integrated Channel Service Unit (CSU).

The TN464F and later suffix is required to communicate with CONVERSANT®. The TN464F and later is also required to obtain the enhanced maintenance capabilities of the enhanced Integrated Channel Service Unit (ICSU) feature.

Protocols for Channel Associated Signaling (CAS) for multiple countries are available. For more information, contact your Lucent Technologies representative.

All TN464 suffixes have Line Out (LO) and Line In (LI) signal leads. The Line Out and Line In leads are unpolarized balanced pairs.

TN465/B/C Central Office Trunk — Multi-Country

The TN465 provides eight analog CO trunk ports and uses loop-start trunk signaling, 12 kHz and 16 kHz Periodic Pulse Metering (PPM) detection and counting, and administrable timers. The TN465B provides battery reversed signaling. The TN465C provides multi-country selectable signaling. For more information, contact your Lucent Technologies representative.

TN467 Analog Line — United Kingdom and Australia

The TN467 provides eight ports used as an interface between analog voice terminals and the TDM bus. The TN467 has administrable A-Law and Mu-Law companding, and complex input impedance. This circuit pack provides secondary lightning protection.

This circuit pack has been replaced by the TN2183 Analog Line circuit pack.

TN468B Analog Line — United Kingdom and Australia

The TN468B provides 16 analog line ports. Each port has Tip and Ring signal leads. The TN468B is defaulted to A-Law companding and allows a down-link message to override the default and choose Mu-Law companding. The TN468B has administrable ring patterns and secondary lightning protection.

This circuit pack has been replaced by the TN2183 Analog Line circuit pack.

TN479 Analog Line

The TN479 has 16 ports and supports three ringer loads and three simultaneous ringing ports. Only one voice terminal can have an LED message waiting indicator (neon message waiting indicators are not supported). The TN479 also supports Mu-Law companding.

Terminal types supported include: 500-Type, 2500-Type, 7100 Series, 8102-Type, 8110-Type, and 9100 Series. The maximum range (using 24 gauge wire) with the 500-Type, 2500-Type, and 7102A terminals is 3,000 feet (914 m). The maximum range with the 8100-Series and 9100-Series terminals is 2,500 feet (762 m). See Table 6-6 on page 6-20.

NOTE:
The 7101A/7103A terminals are not supported.

TN497 Tie Trunk — Italy

The TN497 provides four ports for two-wire tie trunks with loop disconnect signaling. Each port can be administered for A-Law and Mu-Law companding, timers, Translatore Giunzione Uscente (TGU) (outgoing tie), Translatore Giunzione Entrante (TGE) (incoming tie), and Translatore Giunzione Interno (TGI) (internal tie).

TN553 Packet Data Line — Release 5r Only

The TN553 has 12 ports that can be connected through a Main Distribution Frame (MDF) to a TN726B circuit pack and provides software-administered connections between the Switch processing Element (SPE) and system access ports. Inside the system, the TN553 connects to the packet bus and converts mode-2 protocol to mode-3 protocol connecting the TN726B to the TDM bus for asynchronous Electronic Industries Association (EIA) connections to adjuncts.

TN556/B ISDN-BRI Line — 4-Wire S/T-NT Interface

The TN556 has 12 ports connecting to ISDN-BRI terminals. Each port on a TN556 has TXT, TXR, PXT, and PXR signal leads. Up to eight ports can be used for Adjunct Switch Application Interface (ASAI) links. Each port operates at 192 kbps per second and has two B-channels and one D-channel (not used to carry data). The TN556 requires a packet control circuit pack (TN778).

The TN556 has a range of up to 3300 feet (1005 m) maximum from the system to the voice terminal (22 gauge wire) and uses standard protocol ANSI T1.605. See Table 6-6 on page 6-20. The TN556 also has multipoint support; 24 terminals can be connected, where each terminal uses one B-channel and shares the D-channel. In multi-support connectivity, two voice terminals, or one voice terminal and one data terminal, or two data terminals can be connected to each port.

The TN556 circuit pack supports A-Law or Mu-Law companding.

TN570/B Expansion Interface

The TN570 Expansion Interface (EI) is used in G3siV4+m, G3rV4, Release 5si + memory, and Release 5r systems. This circuit pack is an interface between the TDM bus and packet bus, and fiber optic links interconnecting cabinets. It is used in a Port Network (PN) between a PN and another PN in a directly connected system, and between a PN and an Switch Node Interface (SNI) in a switch node carrier in a Center Stage Switch (CSS)-connected system.

The TN570 provides control channel connectivity and time-slot interchanging between the PPN and EPNs. It is used when ISDN-BRI and/or ASAI is connected in an EPN, and is always used in Release 5r.

The TN570 carries circuit-switched data, packet-switched data, network control, timing control, and DS1 control. This circuit pack also communicates with the TN775B maintenance circuit pack in an EPN to send the EPN environmental and alarm status to the Switch Processing Element (SPE).

TN572 Switch Node Clock

The TN572 distributes the timing signals that synchronize the Switch Node (SN) carrier in Release 5r. The TN572 also receives maintenance data.

TN573/B Switch Node Interface

The TN573 routes circuit, packet, and control messages and is used in Release 5r. The TN573 is an interface (installed in an SN carrier in a CSS that terminates a fiber optic link from a Switch Node Interface (SNI) in an SN carrier to an SNI in another SN carrier, an Expansion Interface (EI) in a PPN, and an EI in an EPN. One TN573 is used per Port Network (PN) and supports the TN574 DS1 Converter circuit pack.

The TN573B and higher provides an interface to the single-mode fiber optic transceiver and supports the TN1654 DS1 Converter circuit pack.

TN574 DS1 Converter — T1, 24 Channel (G3rV4)

The TN574 is used in G3rV4 and earlier systems when the coupling distance between the PPN and an EPN exceeds five miles, or private right-of-way is not available. Coupling is provided by a DS1 converter complex and is limited to 100 circuit miles. The converter complex consists of a pair of TN574 circuit packs and associated DS1 facilities. The converter complex is installed in place of fiber optic cable and supports from one to four facilities.

This circuit pack has been replaced by the TN1654 in Release 5 and later systems.

TN577 Packet Gateway — Release 5r Only

The TN577 Packet Gateway (PGATE) provides four RS-423 physical ports for X.25 protocol interfaces between the system and adjuncts. In this application, PGATE functions as the data communications interface unit providing protocol conversion between the X.25 protocol and the Mode 3 protocol carried across the LAN Bus.

The X.25 protocol (Levels 1 and 2) are terminated and the data reformatted into the ISDN Packet Mode protocol for transport across the LAN Bus. Supported adjuncts include AUDIX, Call Management System (CMS), and Message Server Adjunct (MSA).

The TN577 also supports the Distributed Communications System (DCS) environment by providing X.25 signaling through one of the RS-423 physical ports, or back through the system using the TDM Bus to the appropriate DS1 or tie trunk circuit pack.

TN722B Digital Signal Level 1 Tie Trunk

The TN722B has 24 independent trunk connections to a 1.544-Mbps DS1 facility. Each trunk transmits data at 64 kbps common channel or 56 kbps robbed bit. The TN722B has three types of digital tie trunk interfaces: voice-grade DS1, Alternate Voice/Data (AVD) DS1 tie trunks, and Digital Multiplexed Interface (DMI).

The TN722B provides Bit-Oriented Signaling (BOS) on the automatic, immediate-start, delay-dial, and release-link trunks. A TN722B has LBACK1, LBACK2, LO, LO high, LI, and LI high signal leads.

This circuit pack has been replaced by the TN767 DS1 Interface circuit pack.

TN725B Speech Synthesizer — United States

The TN725B has four ports that send voice message information to voice terminals to activate Leave Word Calling, Automatic Wakeup, Voice Message Retrieval, and Do Not Disturb features. The ports can detect tones.

TN726/B Data Line

The TN726B has eight serial asynchronous EIA ports with modem interfaces connected through Asynchronous Data Units (ADUs) to EIA ports (such as RS-232) on DTE equipment. The TN726B uses Mode 2 or Mode 3 data transfer protocol. The DTE equipment can be adjuncts and peripheral equipment such as data terminals, printers, host computers, personal computers (PCs), graphics and facsimile systems, and Call Detail Acquisition and Processing Systems (CDAPSs).

With software-administered system access ports, a TN726B is connected through a Main Distribution Frame (MDF) to a TN553 Packet Data Line circuit pack. The TN553 then converts Mode 2 protocol to Mode 3 protocol transferring the TN726B from the packet bus to the TDM bus for EIA connections.

Each port on a TN726B has TXT (terminal, transmit, and tip), TXR (terminal, transmit, and ring), PXT (port, transmit, and tip), and PXR (port, transmit, and ring) signal leads.

TN735 MET Line

The TN735 has four ports that connect to Multi-button Electronic Telephone (MET) sets. Each port has Tip and Ring (analog voice) and BT, BR, LT and LR (digital signals to control terminals) signal leads.

TN742 Analog Line

The TN742 has eight ports, each with Tip and Ring signal leads. The TN742 supports on-premises (in-building) or off-premises wiring (out-of- building only with certified protection equipment) with either touch-tone or rotary dialing and with or without the LED message waiting indicators. The message waiting indicators are not supported off premises. The TN742 does not support neon message waiting indicators. The TN742 supports Mu-Law companding but does not support administrable timers. The TN742 has secondary lightning protection.

The TN742 supports three ringer loads, such as three voice terminals with one ringer load each. Only one voice terminal can have a LED message waiting indicator. Up to four simultaneous ports can be ringing.

The TN742 also supports queue warning level lamps associated with the Direct Department Calling (DDC) and Uniform Call Distribution (UCD) features. These circuit packs support recorded announcements associated with the Intercept Treatment feature, dictation machines associated with the Recorded Telephone Dictation Access feature, and the PagePac Paging System for the Loudspeaker Paging feature. Additional support is provided for external alerting devices associated with the Trunk Answer Any Station (TAAS) feature and modems.

The terminal types supported include: 500-Type, 2500-Type, 7100 Series, 8102-Type, 8110-Type, and 9100-Series terminals. The maximum range (using 24 gauge wire) with 500-Type, 2500-Type, and 7102A terminals is 20,000 feet (6096 m). The maximum range (using 24 gauge wire) with 7101A/7103A terminals is 15,200 feet (4633 m). The maximum range (using 24 gauge wire) with 8100-series and 9100-series terminals is 10,000 feet (3048 m). See Table 6-6 on page 6-20.

This circuit pack has been replaced by the TN746B Analog Line circuit pack.

TN744 Call Classifier

The TN744 has eight tone detectors used in Vector Prompting, Outgoing Call Management (OCM), and call prompting applications in the United States and Canada. The TN744 detects special intercept tones used in network intercept tone detection in OCM. The TN744 also detects tones when a CO answers a call. The TN744 does not classify data calls. Instead, a tone detector circuit pack classifies the calls. If the TN744 has not classified the call within 60 seconds, it is removed from the call and timed far-end supervision classifies the call.

The TN744 provides tone generation and detection for R2-MFC DID signaling used in non-United States installations. The TN744 also allows gain or loss to be applied to Pulse Code Modulation (PCM) signals received from the bus and supports A-Law and Mu-Law companding. The TN744 detects 2025 Hz, 2100 Hz, or 2225 Hz modem answerback tones and provides normal broadband and wide broadband dial tone detection. For MFC, the TN744 vintage 7 or greater Call Classifier is required.

TN744/B/C Call Classifier — Detector

The TN744/B/C circuit pack has eight ports of tone detection on the TDM bus. The TN744/B/C does not support call progress tone generation or clocking.

The TN744/B/C processor supports digital signal processing of PCM signals on each port to detect tones and other signals. Generation of signaling tones is also supported for applications such as R2-MFC, Spain MF, and Russia MF. Gain (or loss) and conferencing can be applied to PCM signals received from the TDM bus. Additional support includes DTMF detectors to collect address digits during dialing, and A-Law and Mu-Law companding.

NOTE:
The features of the ASAI basic and ASAI adjunct must be activated for the Call Classifier feature to operate. This circuit pack operates in many different countries. Contact your Lucent Technologies representative for more information.

TN744D Call Classifier — Detector — Multi-Country

The TN744D circuit pack has eight ports of tone detection on the TDM bus. The TN744D does not support call progress tone generation or clocking.

The TN744D supports all of the functions of the TN744C plus additional call classifier options for various countries. The TN744D processor supports digital signal processing of PCM signals on each port to detect tones and other signals. Generation of signaling tones is also supported for applications such as R2-MFC, Spain MF, and Russia MF. Gain (or loss) and conferencing can be applied to PCM signals received from the TDM bus. Additional support includes DTMF detectors to collect address digits during dialing, and A-Law and Mu-Law companding.

In normal operation, a port on the TN744D may serve as an incoming register for Russia MFR (Multi-Frequency shuttle Register signaling). The port detects up to 15 forward MFR signals and generates up to 15 backward MFR signals. As an outgoing register, the port generates up to 15 forward MFR signals and detects up to 15 backward MFR signals. The signals are frequency pairs where each tone pair is given a signal number.

NOTE:
The features of the ASAI basic and ASAI adjunct must be activated for the Call Classifier feature to operate. This circuit pack operates in many different countries. Contact your Lucent Technologies representative for more information.

TN746/B Analog Line

The TN746/B has 16 ports. Each port supports one voice terminal, such as 500 (rotary dial) and 2500 terminals (DTMF dial). LED message waiting indicators are not supported off premises. The TN746 does not support neon message waiting indicators. The ringer load for this circuit pack is three. Auxiliary equipment, such as answering machines, modems, and amplifier handsets, is not supported.

The TN746B supports on-premises (in-building) wiring with either touch-tone or rotary dialing and with or without the LED and neon message waiting indicators. The TN746B supports off-premises wiring (out-of-building only with certified protection equipment) with either DTMF or rotary dialing, but LED or neon message waiting indicators are not supported off-premises.

The TN746/B, along with a TN755B Power Unit per carrier or per Single-Carrier Cabinet, supports voice terminals equipped with neon message waiting indicators (on-premises use only). The TN746/B supports three ringer loads, only one voice terminal can have an LED or neon message waiting indicator. The TN746/B is an interface between analog voice terminal lines and the TDM/packet bus and consists of a ringing application circuit and port I/O circuits.

The TN746 supports MU-Law companding but does not support administrable timers. The TN746B vintage 6 and later circuit packs support A-Law and Mu-Law companding and administrable timers. The TN746 supports queue warning level lamps associated with the DDC and UCD features, recorded announcements associated with the Intercept Treatment feature, and PagePac paging system for the Loudspeaker Paging feature. Additional support is provided for external alerting devices associated with the TAAS feature, neon message waiting indicators, and modems. Secondary lightning protection is provided on the TN746B only. The TN746B supports up to eight simultaneous ports ringing.

Terminals supported by the TN746 include: 500-Type, 2500-Type, 7102A Series, 8102-Type, and 8110-Type terminals. Terminals supported by the TN746B include: 500-Type, 2500-Type, 7100 Series, 8102-Type, 8110-Type, and 9100 Series terminals.

For TN746, the maximum range (using 24 gauge wire) with 500-Type, 2500-Type, and 7102A terminals is 3100 feet (945 m). The maximum range with 8100-series terminals is 2500 feet (762 m). For TN746B, the maximum range with 500-Type, 2500-Type, and 7100 Series terminals is 20,000 feet (6096 m). The maximum range with 7101A/7103A terminals is 15,200 feet (4633 m). The maximum range with 8100-series and 9100-series terminals is 12,000 feet (3657 m). See Table 6-6 on page 6-20.

The TN746 supports a 7102A terminal but does not support 7101A or 7103A terminals. The TN746B allows ringing on four ports of each half of the circuit pack for a maximum of eight simultaneous ports ringing. A user attempting to ring one half of the circuit pack when all four ports are busy receives a busy tone.

TN747B Central Office Trunk

The TN747B has eight ports for loop-start or ground-start CO, foreign exchange (FX), and Wide Area Telecommunications (WATS) trunks. Each port has Tip and Ring signal leads. A port can be connected to a PagePac paging system. The TN747B supports the Abandoned Call Search feature in Automatic Call Distribution (ACD) applications (if the CO has this feature).

Vintage 12 or greater of the TN747B also provides battery reversed signaling.

TN748/B/C/D Tone Detector

The TN748C and TN748D have four touch-tone receivers and two general-purpose tone receivers to detect call progress tones, modem answer-back tones, transmission test tones, and noise. The circuit packs provide dial tone detection required for the Automatic Route Selection (ARS) feature, off-premises (out-of-building) keyboard dialing, and off-premises abbreviated dialing. Tones must be companded in Mu-Law code only.

This circuit pack has been replaced by the TN2182 Tone Clock - Tone Detector and Call Classifier or the TN744C Call Classifier circuit pack.

TN750/B Announcement

The TN750 and TN750B record and store announcements to be played back on demand as part of a calling feature. The TN750 has sampling rates of 16, 32, or 64 kbps. The TN750 records announcement times of up to four minutes and 16 seconds at 32 kbps and eight minutes and 32 seconds at 16 kbps. The TN750B can record messages from on- or off-premises voice terminals.

The TN750B can store up to 128 recorded announcements of eight maximum minutes total. The TN750B has 16 channels and each can play any announcement. Five call connections can listen to each channel. This means a total simultaneous call capacity of 80 calls in Release 5si. 255 callers can be connected to each channel in Release 5r.

TN750C Announcement

The TN750C Announcement circuit pack records and stores announcements that can be played back on demand as part of a calling feature. The TN750C is required for the Multiple Integrated Announcements feature. However, the first circuit in a system with multiple announcement circuit packs can be a TN750B.

The TN750C provides on-board Flash memory to provide internal backup of announcements on the circuit pack. This eliminates the need for a 30-40 minute restore/download process after a power failure or system reload, and allows support for multiple circuit packs. Use of multiple announcement circuit packs allows a more efficient method of providing many kinds of announcements.

If more than one TN750C is installed, the slot location must be specified for the save/restore commands. A yellow LED on the circuit pack indicates the save/restore function is in progress. If the translation card is removed before the LED goes out, the restore/save will not be completed.

Equipping ten circuit pack provides a total capacity of 2560 seconds (at 32 kbps) and 160 ports. In other words, 160 announcements can play simultaneously. The 16 kbps compression rate (adequate for VDN of Origin Announcements) provides a total capacity of 5210 seconds.

The TN750C supports all the features of the TN750B in addition to providing reduced power-up restore time and elimination of manual saving. The TN750C also provides improved management of integrated announcements.

TN753 Direct Inward Dialing Trunk

The TN753 has eight ports used for immediate-start and wink-start Direct Inward Dialing (DID) trunks. Each port has Tip and Ring signal leads. For Czechoslovakia and the Commonwealth of Independent States, vintage 17 (or greater) is required. The TN753 supports A-Law and Mu-Law companding with vintage 17 (or greater).

TN754/B — Digital Line — 4-Wire DCP

The TN754/B has eight asynchronous 4-wire DCP ports that can be connected to 7400 series and 8400-series digital voice terminals, attendant consoles, or data modules. The TN754B has administrable A-Law and Mu-Law companding.

A TN755B Neon Power Unit is required for each carrier where neon message waiting indicators are connected.

The TN754B supports the 8400-series terminal types. The maximum range of the 8400-series terminals using 24 gauge wire is 3,500 feet (1067 m). See Table 6-6 on page 6-20.

TN755B Neon Power Unit

The TN755B produces 150 VDC to operate neon message waiting lamps on terminals connected to TN746B analog line circuit packs installed in the carriers.

This circuit pack and the neon message waiting function are not available on systems configured for France balanced ringing using the TN2202 Ring Generator circuit pack.

TN756 Tone Detector

The TN756 has four touch-tone receivers and two general-purpose tone receivers to detect call progress tones, modem answer-back tones, transmission test tones, and noise. The circuit packs provide dial tone detection required for the ARS feature, off-premises (out-of-building) keyboard dialing, and off-premises abbreviated dialing. The TN756 is used only in System 75 R1V3 XE and R1V4 applications where MF generation/detection is not required. The TN756 was replaced by the TN741 and TN748B.

This circuit pack has been replaced by the TN2182 Tone Clock - Tone Detector and Call Classifier circuit pack.

TN758 Pooled Modem

The TN758 has two conversion resources ports (such as a trunk data module) for switched connections between digital data endpoints (data modules) and analog data endpoints (modems). The TN758 supports Mu-Law companding only.

TN760B/C/D Tie Trunk

The TN760D has four ports used for Type 1 or Type 5 four-wire E & M lead signaling tie trunks, that can be automatic, immediate-start, wink-start, and delay-dial. Each port on a TN760D has T, R, T1, R1, E, and M signal leads. The TN760D provides release link trunks required for the CAS feature and has administrable A-Law and Mu-Law companding.

Option switches on each TN760D port can select connections to Type 1 E & M standard (unprotected) format, Type 1 E & M compatible (unprotected) format, Type 1 E & M compatible (protected) format, and Type 5 simplex format.

For Belgium, Czechoslovakia, the Commonwealth of Independent States, and the Netherlands, use vintage 11 or greater.

TN762B Hybrid Line

The TN762B has eight ports connecting to multi-appearance hybrid analog and digital voice terminals. It can connect to 7300-series telephones, an MDC-9000 (cordless telephone), and an MDW-9000 (cordless telephone with separate base station and charging stations).

Each port on a TN762B has VT and VR (analog voice), CT, CR, P-, and P+ (digital signals that control terminals) signal leads.

TN763B/C/D Auxiliary Trunk

The TN763B/C/D has four ports. Each port has T, R, SZ, SZ1, S, and S1 signal leads. The circuit pack is used for on-premises applications such as music-on-hold, loudspeaker paging, code calling, and recorded telephone dictation access. The TN763C supports recorded announcement equipment.

The TN763D can be administered to select A-Law or Mu-Law companding.

TN765 Processor Interface — All Except Release 5r

The TN765 has four data links to the TDM bus and a link through the memory bus to the processor. The TN765 is an interface to the 3B2 MSA, DCS, ISDN, and AUDIX interface service. The TN765 allows direct access to one data link from an EIA port on the circuit pack in AC-powered standard reliability systems. The other data links connect to a digital line circuit and a 7400D Data Module to access a Message Service Adjunct (MSA), DCS, Call Management System (CMS), ISDN, or AUDIX. Data links can connect to DS1 tie trunks to access DCS or ISDN applications.

The TN765 terminates BX.25 and ISDN Link Access Procedure on the D-Channel (LAPD) protocols. The Multi-Carrier Cabinet supports two TN765 circuit packs using a total of eight data links. Single-Carrier Cabinet, and Compact Single-Carrier Cabinets support only one TN765 circuit pack using four data links.

TN767B/C/D/E DS1 Interface — T1, 24 Channel

The TN767B and later suffix circuit packs support DS1 rate digital facility connectivity. The circuit packs support CO, Tie, DID, and Off-Premises Stations (OPS) port types using the robbed-bit signaling protocol. These circuit packs also support ISDN-PRI connectivity in Release 5. For these applications, the signaling (“D”) channel is either:

1. Connected from the TN767 to the TN765 Processor Interface via a permanent switched call over the TDM bus or
2. Terminated at the TN778 Packet Control (PRI over PACCON feature) or
3. Terminated at the TN1655 Packet Interface (Release 5r).

All TN767 circuit packs provide a DSX1 level physical interface to the DS1 facility and require a TN464C or greater DS1 interface. The TN767 has unpolarized Line Out (LO) and Line In (LI) signal lead pairs.

The TN767E and later suffix is required to communicate with CONVERSANT. The TN767E and later is also required to obtain the enhanced maintenance capabilities of the enhanced Integrated Channel Service Unit (ICSU) feature.

DS1 tests include short duration loopback tests at the DS1 board edge or the 120A (if used), long duration Bit Error Rate (BER) loopback tests at the far-end CSU, and long duration BER one-way DS1 facility tests. Other tests include single error injection capability provided for loopback testing and loopback testing specifically designed to locate DS1 facility faults.

TN768 Tone-Clock

The TN768 supplies timing, including Stratum 4 timing, to the Port Network (PN). It produces the following tones: call progress, touch tones, answer-back, and trunk transmission test. The TN768 has 2 MHz, 160 kHz, and 8 kHz clocks. The TN768 can transmit the system clock and tones on either TDM bus A, TDM bus B, or both.

This circuit pack has been replaced by the TN2182 Tone Clock - Tone Detector and Call Classifier circuit pack.

TN769 Analog Line

The TN769 has eight ports, each with Tip and Ring signal leads. The TN769 supports on-premises or off-premises wiring (with certified protection equipment) with either touch-tone or rotary dialing and with or without LED or neon message waiting indicators. The message waiting indicators are not supported off premises. The TN769, along with a TN755B Power Unit per carrier or per Single-Carrier Cabinet, is required to support neon message waiting indicators.

The TN769 supports three ringer loads, such as three voice terminals with one ringer load each. Only one voice terminal can have an LED or neon message waiting indicator. The TN769 supports up to four simultaneous ports ringing, provides secondary lightning protection, and supports Mu-Law companding.

The TN769 supports queue warning level lamps associated with the Direct Department Calling (DDC) and Uniform Call Distribution (UCD) features. These circuit packs support recorded announcements associated with the Intercept Treatment feature, dictation machines associated with the Recorded Telephone Dictation Access feature, and the PagePac Paging System for the Loudspeaker Paging feature. Additional support is provided for external alerting devices associated with the Trunk Answer Any Station (TAAS) feature and modems.

The TN769 supports 500-Type, 2500-Type, 7100 Series, 8102-Type, 8110-Type, and 9100-Series terminals. The maximum range (using 24 gauge wire) with 500-Type, 2500-Type, and 7102A terminals is 20,000 feet (6096 m). The maximum range with 7101A and 7103A terminals is 15,200 feet (4633 m). The maximum range with 8100-series and 9100 Series terminals is 10,000 feet (3048 m). See Table 6-6 on page 6-20.

TN771D Maintenance/Test

The TN771D performs maintenance functions. These functions include packet bus reconfiguration that allows diagnosis and correction of recoverable packet bus failures before the Link Access Procedure on the D-Channel (LAPD) links fail. LAPD is a link-layer protocol on the ISDN-BRI and ISDN-PRI data link layer (level 2). LAPD provides data transfer between two devices and error and flow control on multiple logical links. It recovers packet bus failures involving up to three malfunctioning leads (one or two data or parity leads and one control lead) by swapping spare leads with the malfunctioning leads.

Other maintenance functions include ISDN-PRI testing, which originates and terminates loopback tests on ISDN facilities. It provides bit and block error rate information indicating ISDN facility quality.

A TN771D is required in all standard reliability PPNs and critical reliability EPNs, all standard reliability PPNs when packet end points (BRI and/or ASAI) are supported, and in all critical reliability systems when packet endpoints are supported.

TN772 Duplication Interface

The TN772 selects the active Switch Processing Element (SPE) (control complex) in high reliability and critical reliability systems in Release 5si. The TN772 also coordinates the interchange of SPEs.

The TN772 controls the memory shadowing function with the duplication option, terminates the environmental sensors, and controls the integrated battery supply and charging circuits. The TN772 is also responsible for selecting the active SPE, selecting the active tone-clock circuit pack, and providing an administration terminal interface in place of the processor. A second TN772 circuit pack resides in the duplicated control carrier/cabinet and requires a cable connection to the Duplication Interface circuit pack in the basic control carrier/cabinet.

TN773 Processor

The TN773 Processor circuit pack can be divided into two portions: a 286 processor and an 80188 Maintenance/Tape Processor (MTP). The MTP executes the maintenance code and tape control code and communicates with the 286 processor through a dual port RAM and with DMA into the 286's main memory.

The TN773 provides outgoing alarm reporting, a dedicated RS-232 management terminal interface, and an RS-232 CDR interface. The TN773 supports SPE sanity monitoring and reset control and also supports the duplications option.

The MTP supports four data channels used to communicate between the MTP and the Syscon, management terminal, CDR device, and a modem.

TN775/B Maintenance

The TN775 and TN775B are used in maintenance and monitor power failure signals in an EPN cabinet in Release 5si and Release 5r. These circuit packs also monitor the clock, monitor and control the power supplies and battery charger, and monitor air flow and high temperature sensors. These circuit packs provide two serial links to communicate with Expansion Interface (EI) circuit packs, and provide an RS-232 interface for connection to an administration terminal. Each circuit pack contains a three-position switch to control emergency power transfer.

TN776 Expansion Interface — G3V4 si+m and Release 5si + memory

The TN776 connected to the TDM bus in one Port Network (PN) is an interface between that PN and the TDM bus extended to another PN. The TN776 packages the TDM control channel with Link Access Procedure on the D-Channel (LAPD) for transmission over the fiber link between cabinets. The TN776 provides the time-slot interchange between cabinets.

A system with ASAI/BRI or with PRI signaling via the packet bus (PACCON) requires TN570 Expansion Interface circuit packs in place of TN776 circuit packs.

TN777/B Network Control — All Except Release 5r

The TN777B communicates control channel messages between the Processor circuit pack and the distributed network of port circuit packs on the TDM bus. The circuit pack also controls the four data channels that process and route information directly from the Processor circuit pack to customer- connected equipment. Some of the possible equipment connections are data services facilities, Call Detail Recording (CDR) devices, an on-premises remote pooled modem or administration terminal, or an off-premises administration terminal. Some of these connections require data modules.

The TN777B has the time-of-day clock with battery backup for power failure or low voltage conditions. This circuit pack has a 24-hour clock used with record keeping and system maintenance. The TN777B monitors the status of the system clocks and alerts the processor circuit pack in the event of a failure of any clock. The TN777B supports the high reliability option and handles all the control channel messages from the PPN or EPN networks over the TDM bus. This circuit pack utilizes a memory card (Flash card) for software upgrades and for saving translations, announcements, and core dumps.

TN778 Packet Control — Release 5si and Release 5 vs

The TN778 interfaces the packet bus with the SPE and terminates Link Access Procedure on the D-Channel (LAPD) links. The TN778 supports packet bus signaling for ISDN D-channel signaling for ASAI applications and for packet bus maintenance. Packet bus signaling occurs over the LAPD links and terminates (at level 2) on the packet control circuit pack. The TN778 provides a protocol processing capability to interface the SPE with the packet bus and communicates with the SPE using a message-based interface, a shared memory based interface, and a combination of these interfaces.

Other features include packet bus loop-around testing, monitoring of the packet bus to detect packet bus faults in standard reliability systems, and maintaining of signaling links during planned SPE interchanges with the duplication option.

TN780 Tone-Clock

The TN780 connects to and monitors an optional external Stratum 3 clock used for digital frame timing. It also couples the clock output to local clocks. The TN780 supplies master timing to the system and produces the following tones: call progress, touch tones, answer-back, and trunk transmission test. It has 2 MHz, 160 kHz, and 8 kHz clocks. This circuit pack can transmit the system clock and tones on either TDM bus A, TDM bus B, or both.

The TN780 can be administered to produce five tone plans (for countries outside the United States) other than the United States tone plan. Six tones can be customized in each plan. The TN780 supports Mu-Law or A-Law companding.

TN786 Processor — G3vsV4, G3sV4, G3iV4

The TN786 manages the system and executes stored programs to perform call processing and maintenance. The Processor circuit pack consists of one 80386SX, 16 MHz, Intel processor, 7 Mbytes of Flash ROM used for the system program, 4 Mbytes of DRAM used for customer translations, an interface to the MBUS, and logic to support the shadowing function in duplicated systems.

The TN786 monitors its sanity and reports processor failures, monitors and controls circuit pack conditions, releases or resets the processor on duplicated systems, monitors and controls cabinet power supplies, manages alarm panel LEDs for system status, and provides direct access to a management terminal.

TN786B Processor — G3vsV4, G3sV4, G3iV4

The TN786B contains a 16 MHz 386SX CPU, 7 Mbytes of Flash Read Only Memory (ROM), 4 Mbytes of Random Access Memory (RAM), and an 80188 Maintenance Processor (MTP). The MTP provides the same functionality as the MTP on TN773 except tape is not supported. The MTP contains field upgradable 32 Kb of RAM, 64Kb of Flash ROM, a 1200/2400 Baud modem, three serial ports, and the emergency transfer and power management functions.

The ROM and RAM are two-way interleaved to achieve effective one wait state performance and are expandable to a maximum of 14 and 12 Mbytes, respectively. This expansion is achieved by the addition of a CPP1 Memory circuit pack. The CPP1 contains 0 Mb of ROM and 4 MB of RAM. A special inter-board bus allows memory devices on the CPP1 to operate with the same cycle times as the TN786B's onboard memory. All RAM writes are shadowed to the M Bus for use in duplicated systems. The ROM is electrically erasable (Flash) and can be written by the CPU to allow field upgrades. The RAM is dual ported to the CPU and is used for interprocessor communications.

For some G3V4 systems, the TN786B Processor and CPP1 Memory circuit packs have been replaced by the TN796B Processor circuit pack.

TN789 Radio Controller

The TN789 circuit pack is an interface between a Release 5 system and two Wireless Fixed Base (WFB) radio units. The TN789 circuit pack contains a main processor to handle Data Line Circuit (DLC) and upper Medium Access (MAC) layers of firmware. The TN789 also contains two lower MAC processors; one for each radio interface. Each radio interface is referred to as an “I2” interface.

The I2 link is the connection between the Radio Controller (RC) and the WFB. The RC supports up to two I2 links, each link consisting of two pairs of twisted-pair cable: the transmit pair, the receive pair, and the local power pair. The transmit pair transfers WFB control and frame information from the RC to the WFB. The receive pair transfers status and frame information from the WFB to the RC. If the RC cannot provide power to the WFB, a third pair (to WFB) can be used to supply local power. Whenever possible, the transmit pair and the receive pair provide phantom power from the RC to the WFB.

The TN789 can reside in either the system or the network adjunct. Each circuit pack includes a standard TDM bus interface from a system, two radio interfaces to two separate radio units, and two synchronization ports. In addition, two RS-232 interfaces are provided; one for a debug terminal and the other for setting up the wireless terminal.

TN790 Processor — All Except Release 5r

The TN790 Processor circuit pack is a board level replacement for the TN786B/CPP1 combination. The TN790 board does not support a mezzanine board for memory expansion (no CPP1 board is used with TN790). The TN790 provides a performance increase compared to the TN786B/CPP1 combination. The Reduced Instruction Set Computer (RISC) processor platform runs at 40 MHz and includes all of the functions of the TN786B Processor circuit pack as well as providing an operating system base (MIPS) more common with Release 5r. Diagnostics for the TN790 circuit pack are enhanced over earlier systems. The TN790 is compatible with the Processor Interface circuit pack (TN765), the PACCON circuit pack (TN778), the NETCON circuit pack (TN777B), and the Duplication Interface circuit pack (TN772).

The TN790 is available in Release 5 and later (except Release 5r) and provides 16 Mbytes of Flash ROM (Read Only Memory). The Flash ROM is compatible with the NETCON Flash cards and is programmed using the +12 VDC supplied by the NETCON circuit pack.

The TN790 is factory-populated with Dynamic Random Access Memory (DRAM). The DRAM can be “seen” remotely by field technicians to determine the memory configurations at each site. The amount of DRAM can be increased depending on customer requirements. Contact your Lucent Technologies representative.

The TN790 contains an on-board modem with a maximum speed of 9.6 kbps and complies with V.32 (9.6 kbps communication) and V.42 (error detection and correction) protocols. The TN790 can support an external modem, if needed. The external modem interface can take the place of the CDR port since CDR connections can be provided by other methods. An external modem and an Asynchronous Data Unit (ADU) or data module may be required to support a system printer or CDR device.

The TN790 is not compatible with pre-Release 5 systems. Previous systems must be upgraded to Release 5 before the TN790 Processor circuit pack is installed.

TN796B Processor — G3V4 Only

The TN796B Processor circuit pack is intended for use in G3vsV4 and G3siV4 systems. The TN796B is used in PACCON-equipped, LAN-enhanced G3V4 systems. This system enhancement allows BRI, ASAI, and improved PRI operation. The TN796B is identical in function to the TN786B Processor circuit pack except the CPP1 Memory circuit pack is not used.

NOTE:
For a more detailed description of the processor circuit pack, refer to section "TN786B Processor — G3vsV4, G3sV4, G3iV4" on page 3-81. Only the major differences between the TN786B and the TN796B are described in this section.

The CPP1 connectors do not exist on the TN796B circuit pack. This architecture allows a circuit pack to be installed next to the TN796B. The TN796B board code does not allow this circuit pack to be used in DEFINITY ECS Release 5 systems.

TNPRI/BRI PRI to BRI Converter

The TNPRI/BRI circuit pack converts ISDN-PRI to a BRI trunk side interface. A single PRI CCITT I.421 interface from the TN464F DS1 Interface circuit pack is converted to up to eight BRI CCITT I.420 interfaces plus a proprietary 2 Mbit per second "expansion interface." This additional interface is connected to a second TNPRI/BRI circuit pack to provide up to seven additional BRI interfaces (for a total of 15 BRI interfaces). Administration and maintenance is performed using an RS-232 port on the circuit pack connected to a local ASCII-based management terminal.

TN1648 System Access/Maintenance — Release 5r Only

The TN1648 is an SPE component used for maintenance. A processor in the TN1648 runs control routines that connect to maintenance software in the RISC processor. The TN1648 has a five-LED alarm panel and a toggle switch to manually inhibit automatic emergency transfer of PPN analog lines.

The TN1648 provides two RS-232 interfaces for connection to an administration terminal and, with duplication, connection to a standby maintenance terminal. The TN1648 also provides a Tip and Ring port with a built-in modem allowing a remote administration terminal to access the system.

The circuit pack allows connection to the management terminal and connection to and termination of one end of the processor bus. Other maintenance items include:

- PPN alarm monitors and outputs including auxiliary alarms for auxiliary equipment and environmental monitoring for over-temperature conditions.
- Power supply sense and control for the A, B, C, D, and E carriers.
- Emergency transfer control in the event of a catastrophic failure. The circuit consists of a three-position toggle switch. The switch may be moved into manual forced-on, manual forced-off, or automatic position.
- Non-volatile memory containing the time-of-day clock, the Initialization and Administration System (INADS) telephone number, login password, and product identification.
- Alarm panel information with Major, Minor, and Warning LEDs, an ACKnowledge LED, and an Emergency Transfer LED.

TN1650B Memory — Release 5r Only

The TN1650B Memory circuit pack contains 32 Mbytes of Dynamic Random Access Memory (DRAM) and error detection and correction circuitry to ensure information integrity. The TN1650B is used for system software, customer translations, and call processing maintenance.

TN1654 DS1 Converter — T1, 24 Channel and E1, 32 Channel — Release 5r Only

The TN1654 DS1 Converter circuit pack is a replacement for the TN574 DS1 Converter circuit pack in Release 5 and later systems. The TN1654 converter complex is installed in place of the conventional fiber and supports from one to four T1 or E1 facilities, providing a total of 92 T1 channels (or 120 E1 channels) in each direction between the PPN and the EPN. This capacity is enough for an EPN to easily support several hundred stations.

The architecture of the Release 5r provides for EPNs that are remotely located from the PPN. EPNs located within five miles of the PPN may be coupled using fiber optic cable. When the remoting distance between the PPN and the EPN exceeds five miles or private right-of-way is not available, connect using a DS1 converter complex. A DS1 converter complex consists of a pair, one at each end, of DS1 converter circuit packs and the associated T1/E1 facilities. A new set of Y-cables is required by the TN1654 to connect to a TN570/B Expansion Interface circuit pack for communication to the system.

TN1655 Packet Interface — Release 5r Only

The TN1655 provides the communication path between the SPE and the packet bus in the PPN. This path is used by the EPNs and the CSS, via EI circuit packs in the PPN, to communicate with the Processor circuit pack.

The TN1655 provides the Link Access Procedure on the D-Channel (LAPD) (Digital Multiplexed Interface (DMI) Mode-3 terminations of communication links across the packet bus that go to the processor circuit pack.

The TN1655 provides termination for ISDN-BRI and ISDN-PRI signaling links, expansion archangel links connecting the processor to the expansion archangels on EI circuit packs in each Port Network (PN), and center stage control network links connecting the processor with Switch Node Interface (SNI) circuit packs in the CSS.

The TN1655 also provides termination to the DCS links — Call Detail Recording (CDR) and adjuncts such as AUDIX, and to 8,192 LAPD links. The TN1655 also supports firmware downloading.

TN1656 Tape Drive — Release 5r Only

The TN1656 contains a Small Computer System Interface (SCSI) tape drive that stores 3 Mbytes to 120 Mbytes of system software, including customer translations, bootstrap image, and any core dumps.

TN1657 Disk Drive — Release 5r Only

The TN1657 contains a 180 Mbyte Small Computer System Interface (SCSI) disk drive. The TN1657 reduces the boot time of the system.

TN2135 Analog Line — Italy

The TN2135 provides 16 analog line ports and ground key detection. Each port has Tip and Ring signal leads. The TN2135 is defaulted to A-Law companding and allows a down-link message to override the default and choose Mu-Law companding. The TN2135 has administrable ring patterns and secondary lightning protection.

TN2136 Digital Line — 2-Wire DCP

The TN2136 provides eight ports for connecting the system to 2-wire DCP endpoints such as 84xx series stations, 302C1 Attendant Console, 8400B Data Modules, and so forth. The TN2136 has administrable A-Law and Mu-Law companding.

This circuit pack has been replaced by the TN2181 Digital Line circuit pack.

TN2138 Central Office Trunk — Italy

The TN2138 provides eight analog loop start CO trunk ports. Each port has Tip and Ring signal leads. The TN2138 has 50Hz, 12kHz, and 16kHz Periodic Pulse Metering (PPM).

TN2139 Direct Inward Dialing Trunk — Italy

The TN2139 provides eight analog Direct Inward Dialing (DID) trunk ports for analog DID signaling. Each port has Tip and Ring signal leads.

TN2140/B Tie Trunk — Italy and Hungary

The TN2140 provides four ports for four-wire E & M lead signaling tie trunks. The TN2140 provides continuous E & M signaling and discontinuous E & M signaling. Administrable A-Law and Mu-Law companding and standard Type 1 and Type 5 signaling is also provided.

TN2144 Analog Line — Netherlands

The TN2144 provides 16 analog line ports and ground key detection. Each port has Tip and Ring signal leads. The TN2144 is defaulted to A-Law companding and allows a down-link message to override the default and choose Mu-Law companding. The TN2144 has administrable ring patterns and secondary lightning protection.

This circuit pack has been replaced by the TN2183 Analog Line circuit pack.

TN2146 Direct Inward Dialing Trunk — Belgium

The TN2146 provides eight analog Direct Inward Dialing (DID) trunk ports. Each port has Tip and Ring signal leads. The TN2146 uses four (one for each pair of ports) Dual Subscriber Line Audio Processing Circuits (DSLACs) administered to meet trunk transmission characteristics. The DSLACs can be set to either a resistive or complex balance impedance in the voice or AC talk path on the trunk interfaces. The DSLACs convert analog signals to digital signals and vice-versa to match the analog DID trunks to the system’s digital TDM bus.

Companding in the TN2146 firmware is set to the default A-Law and can be administered to select Mu-Law companding.

TN2147/C Central Office Trunk — Multi-Country

The TN2147 provides eight analog CO trunk ports. Each port has Tip and Ring signal leads.

The TN2147 uses four (one for each pair of ports) Dual Subscriber Line Audio Processing Circuits (DSLACs) to be administered to meet a given transmission and impedance requirement. The DSLACs convert analog signals to digital signals and digital signals to analog signals to interface the analog CO trunks to the system's digital TDM bus.

The TN2147C provides multi-country selectable signaling such as loop-start signaling, and Earth-calling and loop-calling guarded clearing signaling.

TN2149 Analog Line — Belgium

The TN2149 provides 16 analog line ports. Each port has Tip and Ring signal leads. The TN2149 is defaulted to A-Law companding and allows a down-link message to override the default and choose Mu-Law companding. The TN2149 has administrable ring patterns and secondary lightning protection.

This circuit pack has been replaced by the TN2183 Analog Line circuit pack.

TN2180 Analog Line — Spain and Germany

The TN2180 provides 16 analog line ports. Each port has Tip and Ring signal leads. The TN2180 has administrable A-Law and Mu-Law companding, ring patterns, and secondary lightning protection.

This circuit pack has been replaced by the TN2183 Analog Line circuit pack.

TN2181 Digital Line — 2-Wire DCP

The TN2181 has 16 DCP ports that can be connected to 2-wire terminals such as the 8400-series digital voice terminals and the 302C1 Attendant Console. The maximum range of the 8400-series terminals using 24 gauge wire is 3,500 feet (1067 m). SeeTable 6-6 on page 6-20.

The TN2181 supports either A-Law or Mu-Law companding (software selectable). The TN2181 also supports the 8400-series data modules.

TN2182/B Tone-Clock — Tone Detector and Call Classifier

The TN2182/B Tone-Clock integrates the tone generator, tone detection-call classifier, system clock, and synchronization functions onto one circuit pack for use in standard, high, and critical reliability systems. The TN2182/B supports eight ports for tone detection and allows gain or loss to be applied to PCM signals received from the bus. The TN2182/B provides Stratum 4 enhanced clock accuracy, supports MFC signaling (such as Russia MF).

The TN2182/B provides continuous, cadenced, and mixed tones, allows administrable setting of tone frequency and level, detects 2025 Hz, 2100 Hz, or 2225 Hz modem answerback tones, and provides normal and wide broadband dial tone detection.

The TN2182/B supports A-Law and Mu-Law companding. In most configurations, the two- or three-board combination of tone generator, tone detector, and/or call classifier can be replaced with this one circuit pack, freeing one or two port slots.

The TN2182/B also supports Russia MFR (Multi-Frequency shuttle Register signaling).

TN2183 Analog Line — Multi-Country

The TN2183 provides 16 analog line port interfaces. Each port provides a voice channel to the system from a Tip/Ring pair. Each port also sends or receives signaling to and from the connected station. Examples of stations are an analog telephone set, answering machine, facsimile, and loop-start “CO port” AUDIX.

The TN2183 provides rotary digit 1 recall, ground-key recall, and programmable flash timing. Additional support is provided for selectable ringing cadence, LED message waiting, and secondary lightning protection. The TN2183 also supports balanced ringing (when configured for France with TN2202 Ring Generator circuit pack) and DTMF sending levels appropriate for CONVERSANT. The TN2183 is impedance and gain selectable for multiple countries. For more information, contact your Lucent Technologies representative.

TN2184 DIOD Trunk — Germany

The TN2184 Direct Inward/Outward Dialing (DIOD) Trunk contains 4 port circuits, each interfacing a 2-wire analog CO trunk with the TDM switching network of the system. Each port allows incoming and outgoing calls to include addressing information being received from the CO for incoming calls and addressing information being sent to the CO for outgoing calls. It detects Periodic Pulse Metering (PPM) signals for call charge accounting on outgoing calls.

The TN2184 combines the features of both a CO trunk and a DID trunk to provide both outgoing and incoming calls with addressing information in both directions.

TN2198 ISDN-BRI — 2-Wire U Interface

The TN2198 allows connection to the ANSI standard 2-wire U-Interface. The 2-wire interface from the TN2198 connects to an NT1 network interface. The 4-wire interface on the other side of the NT1 may have one or two telephones connected to it. The TN2198 does not provide a trunk-side interface.

The TN2198 contains 12 ports that interface at the ISDN U reference point. For each port, information is communicated over two 64 kbps bearer channels called B1 and B2, and over a 16 kbps channel called the demand channel, or D channel. The D channel is used for signaling. Channels B1 and B2 can be circuit switched simultaneously. The D channel is always packet switched. The TN2198 requires a packet control circuit pack (TN778) on Release 5si. The circuit switched connections have a Mu-Law or A-Law option (on a per-board basis) for voice operation and operate as 64 kbps clear channels when in the data mode.

The D channel supports the Link Access Procedure on the D-Channel (LAPD) protocol and is consistent with the CCITT Q.920 Recommendations for D channel signaling.

In a multiple terminal environment, the B channels are shared only on a per-call basis. For example, if the B2 channel is used for data, then the use of B2 by one terminal excludes the others from having access to it. When a device communicates over the D channel to access B1 or B2, that channel is owned until the call is taken down (no party on line). The D channel is always shared among the terminals. The TN2198 interfaces with the TDM bus and packet bus in the DEFINITY backplane and terminates with 12 ISDN basic access ports.

The TN2198 has a long range of up to 18,000 feet (5486 m) (maximum) from the system to the NT1 device and uses standard protocol ANSI T1.601. The TN2198 has a 160 kbps line rate, consisting of two bearer channels at 64 Kb channels each, the D channel at 16 Kb, framing at 12 Kb, and maintenance at 4 Kb. The circuit pack uses demand channel (ringing, tone, and so forth), 16 kbps channel, and supports up to 24 telephones or data modules per circuit pack.

TN2199 Central Office Trunk — Russia

The TN2199 is a 4-port, 3-wire, loop-start trunk circuit pack that can be used as a DID trunk, CO trunk (2-way, one-way incoming, or one-way outgoing CO). The TN2199 combines the functionality of the DID trunk and the one-way outgoing CO trunk (DIOD trunk). This circuit pack is used in conjunction with the Call Classifier circuit pack (TN744D or later suffix) or the Tone-Clock-Tone Detector (TN2182B or later suffix) to accomplish R2-MFC signaling.

TN2202 Ring Generator — France

The TN2202 ring generator circuit pack supplies 50 Hz ringing power. The TN2202 supplies balanced ringing, via a modified backplane, to terminals connected to the TN2183 Multi-Country Analog Line circuit pack when administered for France analog transmission.

The TN2202 plugs into the Power Unit slot and is required for each carrier containing analog lines (one in a Single-Carrier Cabinet or one in each port carrier of a Multi-Carrier Cabinet). A one-lead modification is required in each backplane using TN2202. This is true for all products made for France.

The TN2202 produces two symmetrical voltages (typically 28V rms) with respect to ground, and takes -48 VDC, -5 VDC, and ground from the backplane and generates 2 x 28V rms with added -48 VDC.

TN2224 Digital Line, 24-Port, 2-Wire DCP

The TN2224 has 24 DCP ports that can be connected to 2-wire terminals such as the 8400-series digital voice terminals and the 302C1 Attendant Console. The maximum range of the 8400-series terminals using 24 gauge wire is 3,500 feet (1066 m). See Table 6-6 on page 6-20.

The TN2224 is installed in Release 5 or later systems and supports either A-Law or Mu-Law companding (software selectable).

UN330B Duplication Interface — Release 5r Only

In high reliability and critical reliability systems with two SPEs, one UN330B resides in each SPE and connects to the other UN330B. The UN330Bs provide control and communication paths between the SPEs to keep the redundant standby (inactive) SPE ready to assume control if the active SPE fails. The UN330Bs select active/standby mode for the two SPEs, shadow (copy) the active SPE memory writes into the standby SPE memory, and support inter-SPE communications.

The duplication channel is a bidirectional high-speed path between the two SPEs. When memory shadowing is activated, all shadowed memory writes on the active processor’s bus are sent across the link and written into the standby processor’s memory. Standby memory writes are not sent to the active processor.

UN331B Processor — Release 5r Only

The UN331B controls the system and executes stored programs that perform call processing activity and maintenance. The UN331B is a RISC designed around a MIPS R3000A CPU operating at 33 MHz. It employs 32-bit address and data buses to obtain and execute instructions at a rate approaching one instruction per clock cycle. The 256-kbyte instruction cache with burst-mode refill and 256-kbyte data cache are key to the performance of the processor. A read/write buffer chip tailors the UN331B to the call processing environment.

Peripheral devices residing on the UN331B are positioned outside the CPU-cache structure and interface to the CPU through the read/write buffers. These peripherals include 512-kbytes of ROM for the monitor, counters/timers, UARTs, control/status/error registers, and the logic that provides bus arbitration and the Bus Time-Out feature.

The UN331B interfaces to the 32-bit multiplexed address/data processor bus (PM-Bus) and the 32-bit processor expansion bus (PX-Bus). The PM-Bus is used for all processor write operations and single-word (four-byte) read operations. Multiple-word or burst reads are performed using the PM-Bus to transfer the address to main memory, then the words of the burst are returned using both the PM-Bus and PX-Bus.

UN332 Mass Storage/Network Control — Release 5r Only

The UN332 provides an interface between the UN331B Processor and the Small Computer System Interface (SCSI) bus for access to the Mass Storage System (MSS) such as a disk drive. The UN332 also provides TDM network control for the PPN, and terminates one end of the processor-multiplexed bus.

WP-90510 AC Power Supply

The WP-90510 AC Power Supply is used in a compact Single-Carrier Cabinets. The plug-in, multi-output, auto-ranging, AC power supply is mounted above the carrier at the top of the cabinet. A power cord with a three-prong plug on one end and a single connector on the other end connects the supply to a dedicated AC power source.

WP-91153 AC Power Supply

The WP-91153 is used in a Single-Carrier Cabinets powered from an AC source. The single, plug-in, multi-output AC power supply is located in the power supply slot. A power cord with a three-prong plug on one end and a single connector on the other end connects the supply to a dedicated AC power source.

DEFINITY Adjuncts

Table 3-22 lists the adjuncts available for G3V4 and later systems. After the table, detailed descriptions of each adjunct are provided.

Table 3-22. DEFINITY Adjuncts

Apparatus Code	Name	Type
120A	Integrated Channel Service Unit Module	Adjunct
122A	Music-on-Hold Interface	Port
300A	Single-Mode Fiber Optic Transceiver	Network
315x Series	Channel Service Unit	Adjunct
9823A or 9823B	Multi-Mode Fiber Optic Transceiver	Network
BU3200A/B	Battery Interface Unit	Power
	Busy Tone Disconnect	Port
CAT 1500 Series	Asynchronous Transfer Mode Interface	Port
Customer-Provided	External Alarm	Port
	Forum Personal Communications Manager	Adjunct
RM0850HA100	Rectifier/Power Module	Power
TNCCSC-1	CCSC-1 PRI to DASS Converter	Port
TNCCSC-2	CCSC-2 ISDN PRI to DPNSS Converter	Port
	European Standard Paging Access (ESPA)	Adjunct

120A Channel Service Unit (CSU) Module

The 120A Channel Service Unit (CSU) module connects to either a TN464E/F or a TN767D/E Digital Signal Level 1 (DS1) circuit pack on one end. The other end is connected to the network interface Smart Jack. The 120A is powered from the +5 VDC port carrier power supply and uses a maximum of 1.2 Watts.

In combination with the DS1 circuit pack, it provides the essential functions formerly provided by external CSUs. The TN464/767 and switch administration support all framing and line coding options. The 120A is small, a little larger than a wallet, and is easier to install than an externally mounted CSU and does not require any option switch settings.

Vintage 2 of the 120A CSU Module (the 120A2) provides enhancements to support the payload loopback function available when the ESF framing format is optioned. This loopback is controlled from the network side using the data link provided by the ESF framing format. This provides a loopback of data back to the network and operates as defined in AT&T TR54016-1989.

122A Music-on-Hold Interface — France

A highly reliable music source is provided by the wall-mounted 122A adjunct circuit pack. It provides the correct electrical transformation between a port of the TN2183 analog line circuit and a customer-provided music source. The 122A monitors the customer-provided music source, and, if music is not present at the input, switches to a “Hold Tone” generated by the interface itself.

300A Single-Mode Fiber Optic Transceiver

The 300A is a single-mode lightwave transceiver that transmits and receives light up to 115,000 feet (22 miles or 35 km). Single-Mode fiber optic cable is connected from the lightwave transceiver on one EPN carrier to the lightwave transceiver on another PPN or EPN carrier. The cable consists of two separate 8-10-micron core diameter fiber optic cables. The fiber optic connection allows full duplex (simultaneous bidirectional) transmission.

Fiber loss must be less than 17dB. Saturation may occur if distances are short; simple in-line attenuators may be required if the total loss on the fiber link is less than 10dBm. An Optical Time Domain Reflectometer (OTDR) test is recommended to determine specific fiber optic hardware requirements.

315x-Series Channel Service Unit

The 315x-series of the Channel Service Unit (CSU) interface between the T1 digital network and the Customer Premises Equipment (CPE). A CSU provides an interface between the DSX1 levels of a Digital Signal Level 1 (DS1) Interface circuit pack and the levels of a DS1 transmission facility. It provides the following:

- Isolates the DS1 interface circuit pack from DC voltages that may be present on the facility
- Provides jacks to allow test access to the receive and transmit signals between the DS1 circuit pack and the CSU
- Provides secondary surge protection between the DS1 facility and the DS1 circuit pack
- Provides loopbacks for the signals from the DS1 circuit pack and from the facility for fault isolation purposes
- Software configuration menus display on a Liquid Crystal Display (LCD) for quick and easy operation

The Model 3150 units can be mounted on a desktop or on a shelf. The Model 3151 is a circuit card installed into a COMSPHERE® 3000-Series Carrier.

9823A or 9823B Multi-Mode Fiber Transceiver

The 9823A-Type lightwave transceiver transmits light up to 4,900 feet (0.93 miles or 1.5 km). The 9823B lightwave transceiver transmits light up to 25,000 feet (4.73 miles or 7.6 km). Multi-mode fiber optic cable is connected from the lightwave transceiver on one carrier to the lightwave transceiver on the other carrier. The cable consists of two separate 62.5-micron diameter fiber optic cables. The fiber optic connection allows full duplex (simultaneous bidirectional) transmission.

BU3200A/B Battery Interface Unit

The Battery Interface Unit (BIU) controls the RM0850HA100 Rectifier Modules, manages the batteries, and reports the status of system power. The Battery Interface Unit provides the emergency power off option and provides all battery alarm interfaces for internal and external alarms.

The BU3200B provides RS-232 alarms connections (RXD, DTR, DSR, TXD, RS-232 GRD, and RTS).

Busy Tone Disconnect — Non-United States

This adjunct provides the method to detect disconnect of incoming calls connected via loop start 2-wire analog trunks used in some countries where the Public Switched Telephone Network (PSTN) sends voice band tones instead of line disconnect to indicate the caller has disconnected while the called end remains connected. This adjunct is needed to prevent connecting abandoned calls to the answering call center agent, locking up trunk-to-trunk connections, or locking up connections to repetitive announcements.

CAT1500 Asynchronous Transfer Mode Interface

The Asynchronous Transfer Mode (ATM) Interface is a high speed access concentrator for data networking in Local Area Network (LAN), campus, and Wide Area Network (WAN) environments. Data rates can be as high as 155 Mbps (Mega bits per second).

The ATM Access Concentrator (AAC) is a small external adapter with a built-in Channel Service Unit (CSU). The AAC takes a DEFINITY T1 interface and maps it into a T1 ATM cell stream that can interface ATM switches or provide direct access to ATM network services. The ATM interface allows proper operation of the Multimedia Call Handling (MMCH) feature and can carry voice, video, data, and image information. The AAC adapter uses ATM circuit emulation to provide constant bit rate service and divides up to 20 DEFINITY DS0s into up to 20 different locations.

In addition, the AAC can take data traffic on a serial V.35/RS-449/X.21 interface or an Ethernet interface and combine this data stream with virtual trunks on the T1 ATM interface.

Each ATM multiplexer can be configured for ATM, Frame Relay, SMDS (Switched Megabit Data Service), T1, and E1. Up to four ports are supported by the AAC. An AAC-3 is used for T3 and E3.

External Alarm

The external alarm allows analog line ports to be used as additional external device alarm inputs to the DEFINITY System. This feature operates with all supported analog line circuit packs and with all maintenance circuit packs. This interface does not include a contact relay closure.

Each analog port used for this feature must be administered as an external alarm connection. This administration includes information identifying the port, the external device connected to the port, the alarm level assigned to the external device, and the “product identifier” of the adjunct or external equipment.

Forum Personal Communications Manager

The Forum Personal Communications Manager (PCM) is available outside the United States. The PCM uses a Forum switch, which can serve as an adjunct to DEFINITY ECS, to manage mobility. The system uses Cordless Telephone Generation 2 (CT2) technology, which is a global standard for wireless telephone service. This standard defines the radio interface between the Forum pocket telephones and the base stations in the system.

Forum’s System Manager provides superior system administration capabilities. The Forum Personal Communications Manager can accommodate even the largest businesses. It has the following maximum capacities:

- 500 wireless telephones
- 126 base stations
- 6 PRI interfaces
- 1 Sun workstation
- 14.4 (minimum Baud rate) modem
- 2 maintenance telephones
- 4 million square foot coverage area

RM0850HA100 Rectifier Module

The Rectifier Module is designed to operate as an integral part of a complete power system with battery backup. The modules operate in a redundant, high reliability mode to provide -48 VDC at 850 Watts to a common power bus.

TNCCSC-1 PRI to DASS Converter

The TNCCSC-1 circuit pack converts ISDN-PRI to a DASS interface. DASS is a 2 Mbit per second interface using a 75 Ohm coaxial transmission facility. Up to two TN464F DS1 Interface circuit packs can be supported by a single TNCCSC-1 circuit pack. A “Y” cable and 888B 75 Ohm Coaxial Adapter are used to connect to the public network facility.

TNCCSC-2 PRI to DPNSS Converter

The TNCCSC-2 circuit pack converts ISDN-PRI to a DPNSS interface. DPNSS is a 2 Mbit per second interface using a 75 Ohm coaxial transmission facility. Up to two TN464F DS1 Interface circuit packs can be supported by a single TNCCSC-2 circuit pack. A “Y” cable is used to connect to the public network facility.

ESPA Radio Paging

The European Standard Paging Access (ESPA) radio paging interface is the western European standard paging protocol.

Architecture

4

This chapter describes the following architecture and protocols:

- Functional overviews of operating system layer and applications layer
- Internal connectivity — Logical links spanning cables and optical fibers between system components
- Protocols handled by the system

The Release 5 architecture evolved from the previous versions of DEFINITY. Code in Release 5r supports a Center Stage Switch (CSS), processor connectivity, multiple port networks per cabinet, integrated provisioning, and the World Class Core (WCC) features. Except for the logical links that link system components, the architecture is equivalent in both G1 and G3V1. G3V1 architecture evolved into Release 5vs/si/si + memory and R3V1 architecture evolved into Release 5r.

Operating System Layer

Oryx/Pecos, the operating system is a proprietary real-time system supporting multiprocessing applications with message-passing between processes. Drivers are provided for interfacing to the system network, mass storage, and other peripherals.

Applications Layer

The applications layer consists of three major subsystems: call processing, management (administration), and maintenance.

Call Processing

Call processing is the sequence of actions needed to connect, disconnect, and manage voice and data calls in a communications system. Figure 4-1 shows the actions to connect a call.

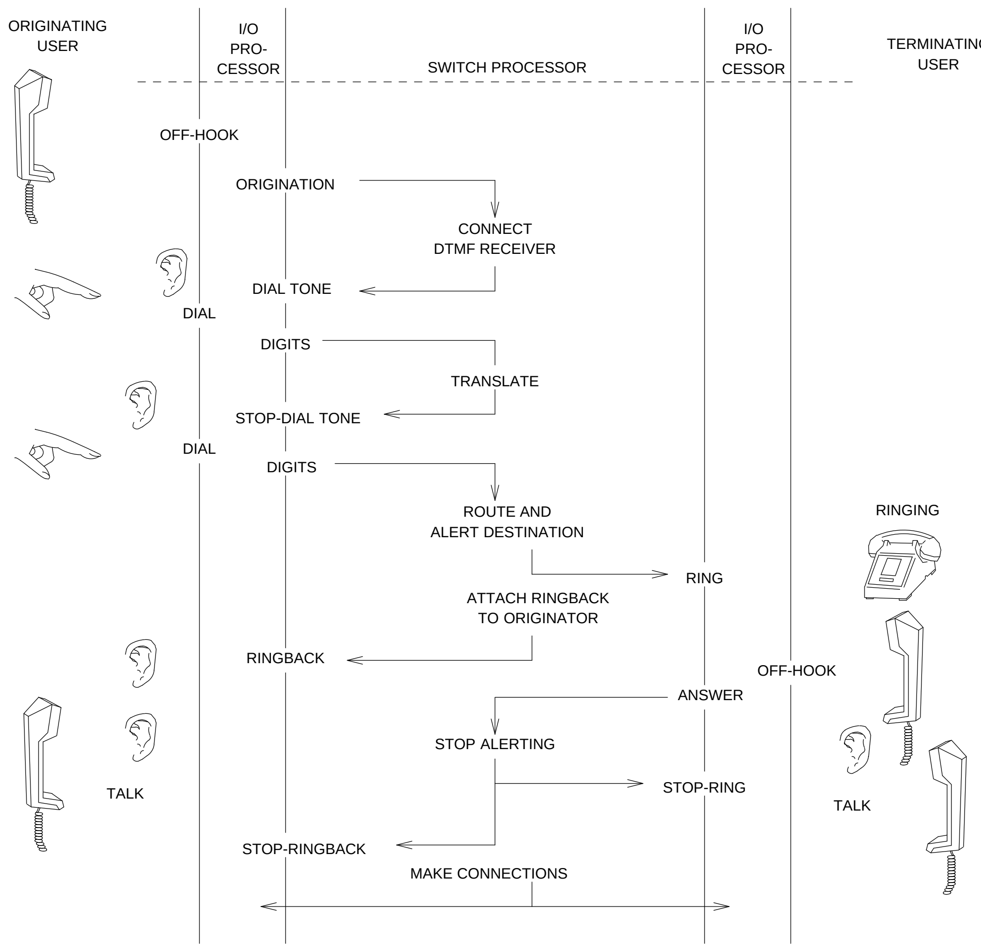

Figure 4-1. Basic Call Example

Management functions employed in processing a call are:

- Terminal handling — Use of voice terminals ranging from a single-line analog set to a simultaneous voice/data station with display, multiple call appearances, feature buttons, and data module. Various trunks interconnect the terminals with other switching systems or a CO switch

- Resource management — Management of resources such as DTMF receivers, time slots for circuit connections, tone generators, and internal software records for call processing, messaging, measurements, and call detail recording.
- Call sequencing control — Control of the sequencing logic that takes a call (such as a conference call) from one state to another.
- Routing and termination selection — Controls the selection of a terminating endpoint for a call. Some areas covered by routing and termination selection are hunting, bridging, coverage, least-cost routing, and routing data calls through modem-pooled resources.

A basic call model consists of these components:

- The *call* ties all the parties of a connection together and is defined by a record of these parties and the sequencing control logic that controls a call from origination to termination.
- The *user* is the person using a terminal or a set of terminals. The user is realized by the user manager described in the layered software architecture on the following page.
- The *group* appears as a party on the call and contains a set of users. The hunt group, for example, specifies how a user should be selected from a group to receive a call. The group is realized by a group manager in the layered software architecture discussed below.

Processes providing messaging and station services, and network and resource management functions are organized into a layered set of cooperating processes as described below and shown in Figure 4-2 on page 4-5:

- The *service control layer* contains a service dispatcher process and a process for each of the different services of the switch. In the service control layer are the following:
  - — Call process — Provides the control and sequence logic for call setup and takedown, and for feature operations in the system.
  - — Message service — Provides control for messaging services (such as Leave Word Calling).
  - — Station service — Provides miscellaneous station services such as integrated directory service, time-of-day display, and the programming of some translation data from the user's terminal.
- The *resource control layer* provides general resource management for the services, service-specific functions, and the line-to-terminal signaling. System resources managed include the switch network, DTMF receivers, tones, trunks, voice terminals, data terminals, groups and databases such as the system dial plan, and the name and number directory. Service-specific functions provided are call routing, queuing, terminal administration, and maintenance. In the resource layer are the following:

  - The group manager contains all translation data for group membership and group properties, and maintains the state of the group and its members.
  - The user manager contains both the user and terminal management software, and status information. It presents an abstract user or virtual terminal interface to the upper layers of software while handling the signaling with terminals at the driver layer. It also arbitrates terminal access contention among switch services, maintenance, and system administration.
  - The dial-plan manager provides access to and interpretation of translation databases, including the system dial plan, the name/number directory, user permissions, least-cost routing patterns, and speed-calling numbers.
  - The connection manager manages network resources and network control signaling and arbitrates among switch services, system maintenance, and administration for network resources.

- The *driver layer* encompasses the operating system drivers and the firmware in the intelligent port circuits of the communications network. Drivers include the Switch-Control Channel Driver (SCD), packet control driver, a timer driver, and maintenance circuit pack driver.

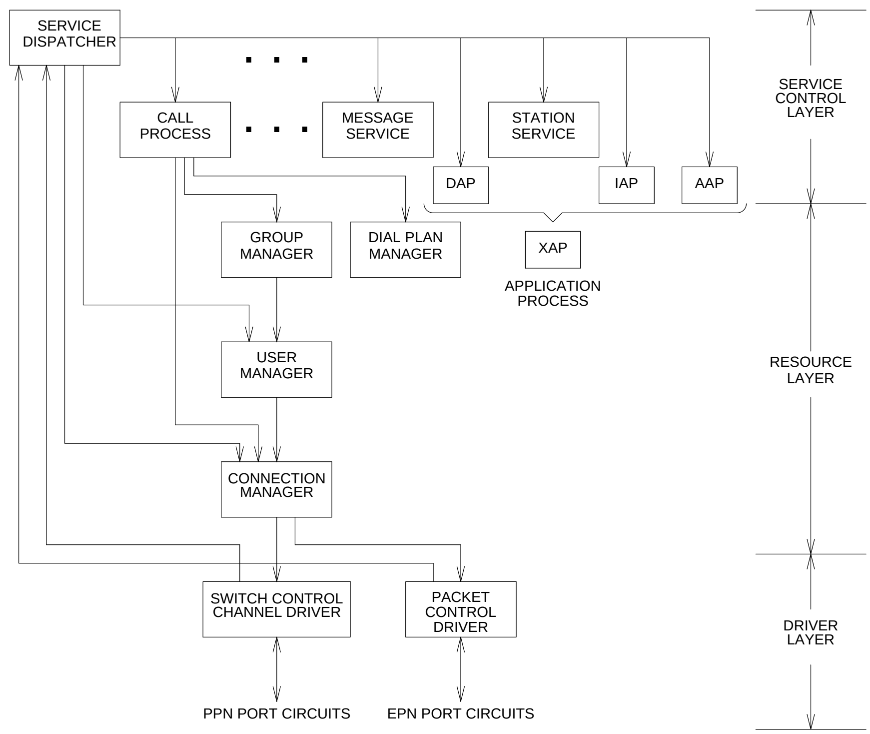

Figure 4-2. Switch Services Software Structure

Call processing features can be classified into the following six categories:

1. *Voice management* — includes communication capability.
2. *Data management* — allows planning, controlling, and effective use of data.
3. *Network services* — assure interconnection of private network (trunks and switching facilities dedicated for business or organizations).
4. *System management* — administers, controls, and maintains the system and generates system usage reports.
5. *Hospitality services* — include the lodging and health industries. Hotels, motels, and hospitals can better manage property and provide services to guests or patients.
6. *Call management services* — generally for industries receiving many calls and allow balanced call distribution to a group of voice terminals.

Management

Management software controls the internal processes to install, administer, and maintain the system. A layered software architecture presents capabilities to the user in a simple and straightforward a manner while the internal complexity of the system remains transparent.

Through the use of an online video display terminal, management software permits a customer or technician to install, test, rearrange, and change equipment and services, and select user and system options.

Enhanced administration features are available through a PC or through terminals attached to other support systems, such as Single Site Management (SSM) and Network Management (NM) modules of Modular System Management (MSM).

System management software provides four functions available through the management terminal:

1. *Measurement collection and reporting* — provides formatted reports of hourly traffic data on engineered resources such as trunk groups.
2. *Maintenance testing and reporting* — provides demand testing of circuit packs, terminal equipment, and the display of system error and alarm logs.
3. *Translation data backup* — provides backup to a on tape device.
4. *Translation database management* — provides four functions:
   - Data view mapping allows a user to display and change all translation data related to a station, trunk, or feature as a single task.
   - Database validation ensures data entered into the system is individually correct and consistent with other data, for example, extensions assigned to stations are consistent with the dialing plan.
   - Form transactions ensure all translation data entered on a system form are either accepted as valid or rejected as inconsistent.
   - Concurrency control allows for multiple terminal users and ensures switch services software does not use critical data being changed.

System management software consists of the three layers shown in Figure 4-3:

1. The *user interface and control* layer provides users with access to the system through a terminal or through the X.25 remote link.
2. The *command execution and validation* layer consists of the following software modules: measurement collection and storage, administration database update and validation, maintenance command execution, and translation backup on tape.

3. The *data access and storage* layer consists of the administration database access module and processes that store translation data.

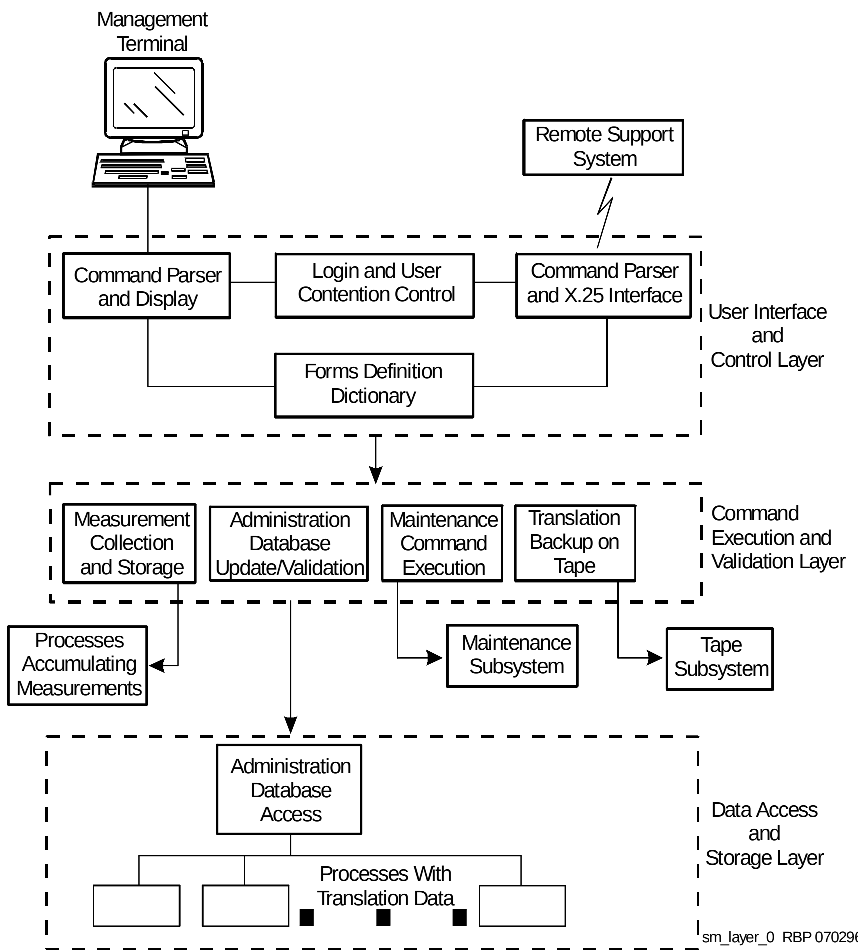

Figure 4-3. System Management Layered Software

To support larger line size switches, management software allows the system administrator or technician to address a circuit pack with a cabinet number, carrier letter, and slot number to accommodate multiple port networks. The management software also allows the support of multiple simultaneous administrators to allow high translation change activity associated with large switches. PC-based enhancements such as bulk station administration allows the user to perform global changes or edits for stations on the PC before downloading to the switch and for stations already downloaded to the switch. The PC is used to make rapid changes to large amounts of station data.

A protocol to ensure reliable data transfer for PC and Operations Support System Interfaces (OSSIs) is provided. OSSI performs provisioning and maintenance functions on the switch and supplies features to minimize service installation costs and support of a large line switch including:

- Administration without Hardware (AWOH) allows terminal translations to be entered before the hardware ports are assigned, so port assignment can be performed later either manually or automatically. AWOH also provides support of additional terminal types such as attendant consoles, voice data terminals, data modules, Distributed Digital-Port Multiplexer (DDPM) endpoints, BRI sets, analog queue warning ports, and recorded announcement. Refer to *DEFINITY Enterprise Communications Server Release 5 Implementation,* 555-230-302, for more information.
- Terminal Translation Initialization (TTI) associates the terminal translation data with a specific port location through the entry of special codes and an extension number from a connected but untranslated terminal. The amount of labor for system initialization, major additions, rearrangements, and changes is greatly reduced.

Maintenance

Maintenance software offers a high level of service with minimum disruption to the system. Its interface with other software and hardware provides a quick and highly reliable fault-detection system and recovery action. If a problem occurs that cannot be solved by recovery action, LEDs on the circuit packs and/or alarm and error logs quickly indicate isolatable component faults.

G3rV4 and Release 5r maintenance software supports multiple concurrent administration and maintenance user sessions. This allows two or more terminals to be connected to the switch to perform simultaneous administration and maintenance tasks. Commands such as test, busyout, and release on different hardware elements can be administered at the same time from more than one terminal as long as the commands are not conflicting (they do not act on the same data).

NOTE:
Refer to Chapter 5, "Maintenance" for more information regarding maintenance software and hardware.

Each of the following areas contributes to the overall reliability of the system:

Initialization

Each software or hardware component must be "initialized" (processes started, stations supplied power, and so forth). Maintenance software initializes the system at boot time, including creating and starting processes, and inserting the circuit packs and ports.

Switch Processing Element (SPE) Recovery

Recovery restart levels aid in maintaining SPE stability over transient hardware or software errors. The SPE is the control complex that runs call processing, maintenance, and administration software. The SPE is also responsible for extensive hardware background testing performed by firmware and hardware on the circuit packs. If problems are detected, inline error messages are sent to maintenance software on the SPE.

Maintenance software periodic and scheduled testing is also performed. Periodic tests consist of nondestructive tests and are typically run once an hour. Scheduled tests (including destructive tests) are defined by the customer and are run once a day. These tests insure all errors are found and recovery or alarming can take place.

Error Analysis

Maintenance software increments software counters, performs tests, and/or recovery actions when inline errors are reported (typically by firmware), other errors are reported from software processes, and when periodic, scheduled, or demand testing for maintenance objects is performed. If software error counters go over threshold, additional testing and/or recovery is performed as appropriate.

Demand Testing

Various demand tests check system sanity and individual maintenance objects. A "test long" command includes destructive tests and a "test short" command includes nondestructive tests for most hardware maintenance objects.

Busyout and Release

System technicians can remove components from normal service for testing and troubleshooting and to bring them back into normal service after testing.

Duplication

For system elements requiring high reliability, options provide a spontaneous interchange to a duplicate component if a serious failure occurs. SPE interchange can also be set in System Maintenance to *not* automatically switch to a duplicate component during maintenance.

Other Activities

These include control and manipulation of emergency transfer, power and environmental sensing, and treatment of the system as a maintained component.

Internal Connectivity

This section describes the logical links that traverse the physical links of the system, such as, wires, cables, and fiber optic cables.

Release 5r Connectivity

There are two kinds of links into the SPE: system links and application links. The endpoints for both links can be ports on either the PPN or any EPN. System links are discussed on the following pages. Application links are discussed on page 4-14.

System Links

System links are established for internal system control. The general types of system links to the SPE are ISDN signaling, Expansion Archangel Links (EALs), and Center Stage Control Network (CSCN).

ISDN Signaling

For ISDN connectivity, the D-channel goes over the packet bus through BRI circuit packs to stations or through DS1 interface circuit packs to PRI trunks. See Figure 4-4.

Connectivity is directly between the SPE and the endpoint; signals do not terminate at the EALs if they travel between the SPE and the EPN.

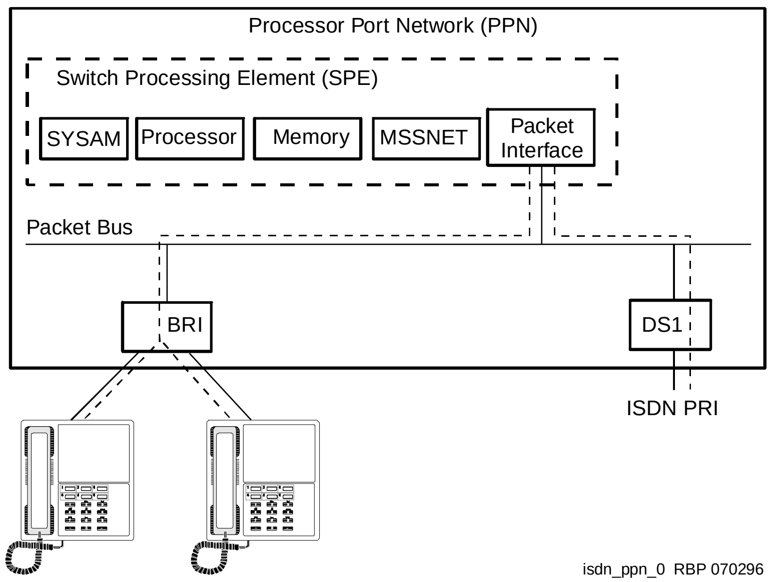

Figure 4-4. ISDN Signaling in a PPN

If the BRI or DS1 interface circuit packs are in an EPN, the link goes over the packet bus in the PPN, through the Expansion Interface (EI) circuit pack in the PPN and CSS, through the EI circuit pack in the EPN, onto the EPN packet bus, and finally to the appropriate port circuit pack.

Connectivity is directly between the SPE on the PPN and the endpoint (station or trunk). See Figure 4-5.

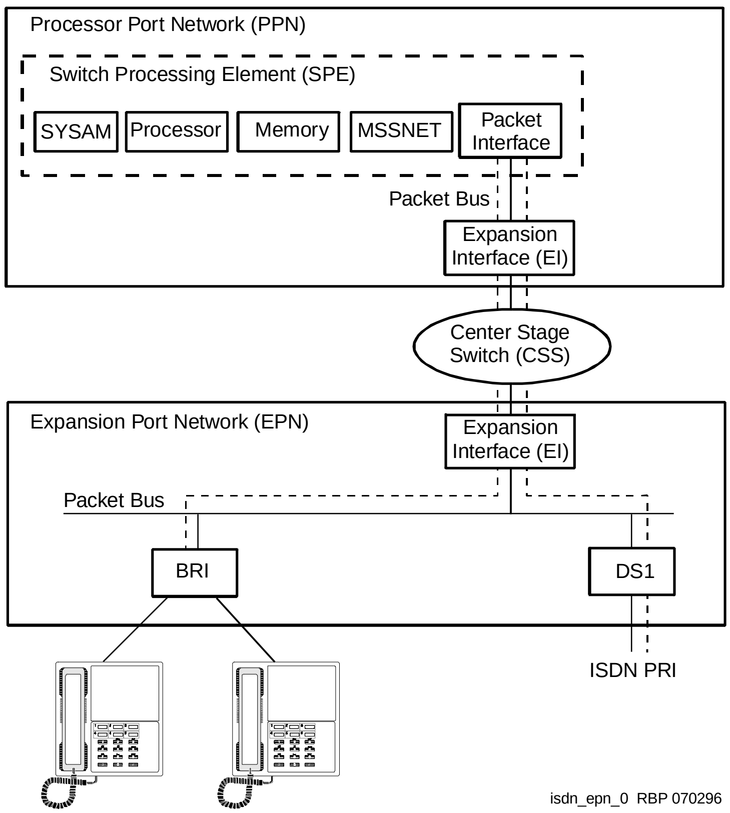

Figure 4-5. ISDN Signaling in an EPN

Expansion Archangel Links

In the PPN, communication between the SPE and the ports takes place over a control channel in the TDM bus through a network control microprocessor called the archangel (AA). The AA communicates with microprocessors located on each port circuit pack in a PPN. The AA controls operation of the control channel by granting bus usage to a specific angel or group of angels. In EPNs the AA is called the expansion archangel (EAA). See Figure 4-6. The EAA communicates with all the ports in the EPN in the same way that the AA does in the PPN.

EALs are links between an Expansion Interface circuit pack serving as an AA to the SPE via the PKTINT circuit pack. The protocol, format, and content of the messages received from port circuit packs in an EPN are transferred over these links.

The EAL goes from the PKTINT circuit pack, across the packet bus through the EI circuit pack and the CSS, and terminates in the EAL. Messages sent to ports on the EPN are first sent to the EAL which, in turn, sends them over the TDM bus control channel in the EPN to the ports. See Figure 4-6.

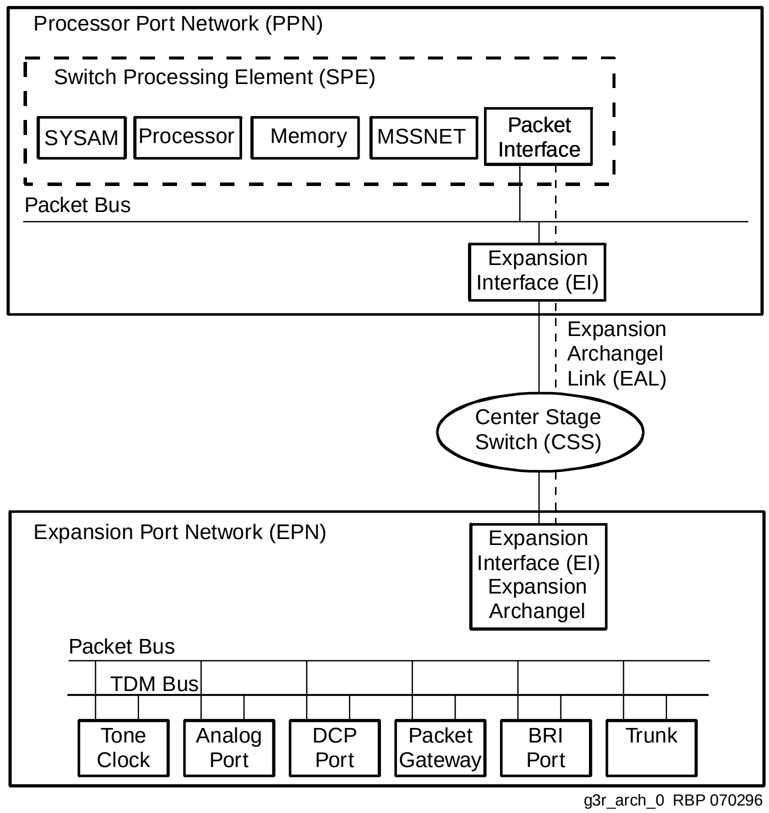

Figure 4-6. Expansion Archangel Link (EAL)

Center Stage Control Network (CSCN)

Center Stage Control Network (CSCN) links are packet bus connections between the SPE and a CSS SNI used for call setup and maintenance.

Local Indirect Neighbor Links (LINLs) are stage control network links between the SPE and an SNI connected to the PPN. Remote Indirect Neighbor Links (RINLs) are stage control network links between the SPE and an SNI with an EPN connected to it. See Figure 4-7.

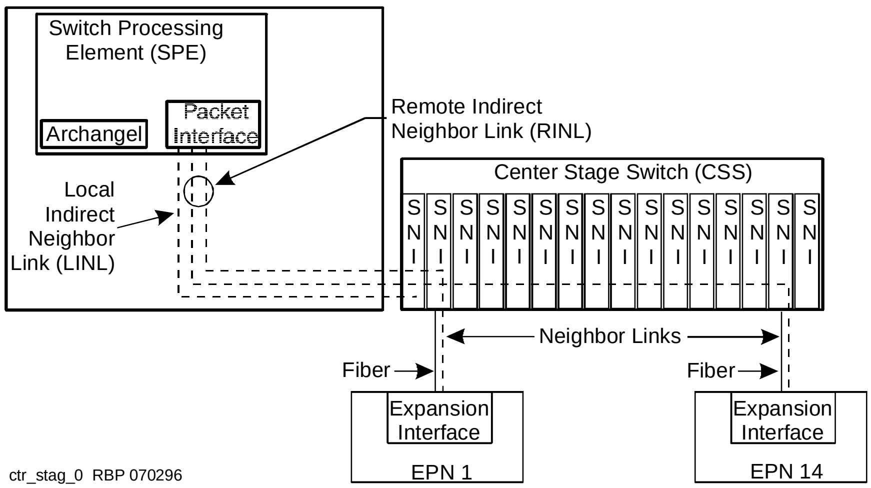

Figure 4-7. Center Stage Control Network Links

To set up a circuit connection between two PNs, messages are sent from the SPE over the CSCN links to each SNI connected to the PNs. This causes the appropriate connections to be made in the CSS, resulting in a voice path between a time slot on each of the respective fiber optic cables.

Application Links

Application links are used by peripherals such as X.25 AUDIX adjuncts and printers, and Call Detail Recording Utility (CDRU) adjuncts.

Adjunct Links

In Release 5r, communication between the SPE and adjuncts such as AUDIX, DCS, and Call Management System (CMS) occurs through a logical link on the packet bus to a circuit pack called the packet gateway interface (PGATE). This circuit pack converts the Link Access Procedure on the D-channel (LAPD) protocol used internally by the switch to X.25 protocol used by the adjuncts.

In certain cases, data coming from the PGATE interface circuit pack can go to a DS1 trunk to get DCS connectivity over DS1 facilities. See Figure 4-8.

In all except Release 5r, communication between the SPE and X.25 adjuncts such as AUDIX, DCS, and CMS occurs through a digital line circuit pack and a 7400D Data Module.

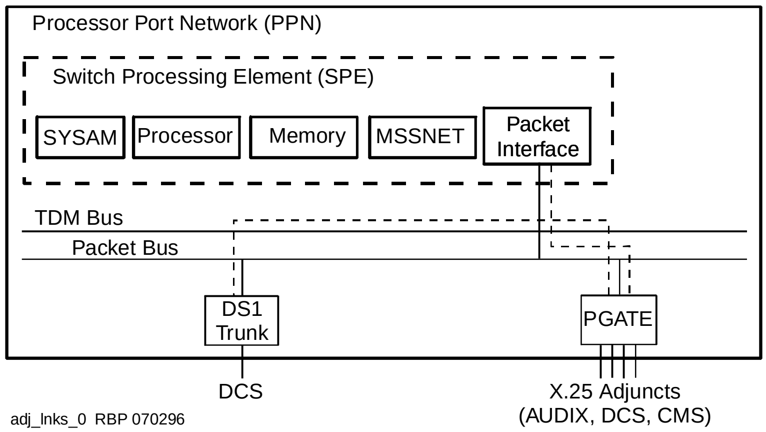

Figure 4-8. Release 5r Adjunct Links

The DCS is also supported over and under ISDN-PRI through a DS1 circuit pack. Communication between the SPE and an ASAI occurs through a logical link on the packet bus and an ISDN-BRI circuit pack.

Application Adjuncts

Connection between the SPE and RS-232 devices such as printers, Property Management System (PMS), CDRU, and remote terminals is through a data line circuit or a digital line circuit connected to a Digital Terminal Data Module (DTDM). Both of these circuits are connected only to the TDM bus, while the SPE in Release 5r has connectivity only to the packet bus.

Signals passing between the SPE and the digital line circuit or between the SPE and the data line circuit must be converted from Mode-3 protocol to Mode-2 and vice versa. See Figure 4-9.

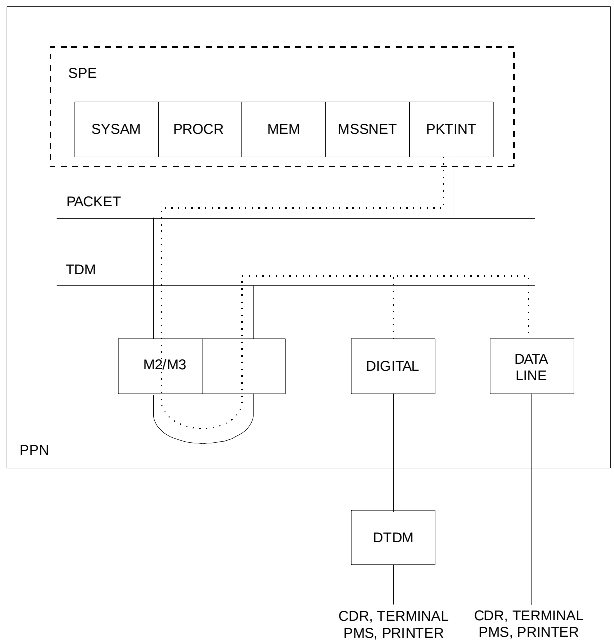

Figure 4-9. Application Adjuncts Connectivity

Release 5vs and Release 5si Connectivity

As with Release 5r, the Release 5vs and Release 5si also have two kinds of links into the SPE: System links and Application links. System links such as ISDN signaling links and expansion links are established for internal system control. Application links are used by peripherals such as AUDIX and CDRU adjuncts and printers. The endpoints for both system links and application links can be ports on either the PPN or any EPN.

System Links

The general types of system links to the SPE are ISDN signaling and expansion neighbor.

ISDN Signaling

The D-channel goes over the packet bus or the TDM bus through BRI circuit packs to stations or through DS1 circuit packs to PRI trunks. If the BRI circuit pack is in the EPN, the link goes from the PACCON in the PPN, over the packet bus in the PPN through the EI circuit pack in the PPN, through the EI circuit pack in the EPN, onto the packet bus in the EPN, and finally to the BRI circuit pack.

For the TDM bus, if the DS1 circuit pack is in the EPN, the link goes from the Processor Interface (PI) in the PPN, over the TDM bus in the PPN, through the EI circuit pack in the PPN, to the TDM bus in the EPN, and over the TDM bus to the DS1 circuit pack. See Figure 4-10.

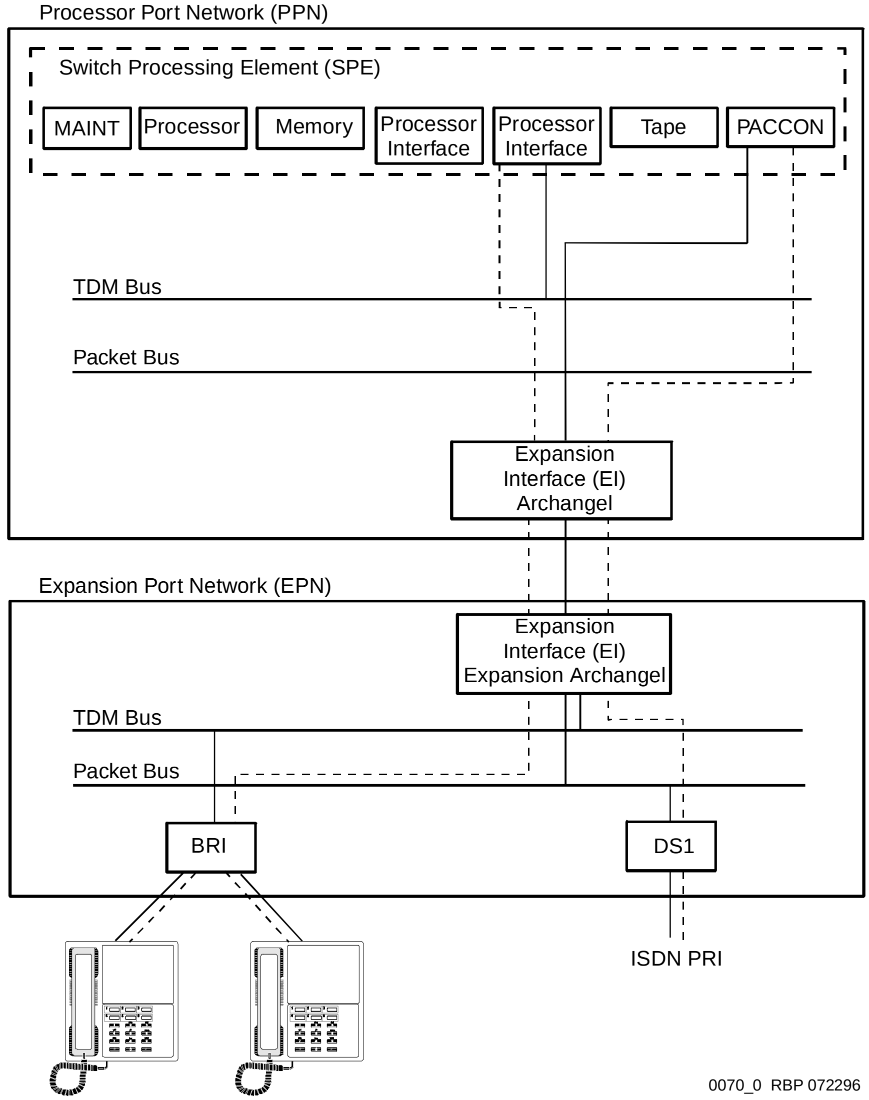

Figure 4-10. ISDN Connectivity

Expansion Neighbor

The Archangel (AA) function in each EPN is provided by the EI circuit pack connected to the PPN. The SPE controls the EPN through an extended Control-Channel Message Set (CCMS) sent across an expansion neighbor link. See Figure 4-11.

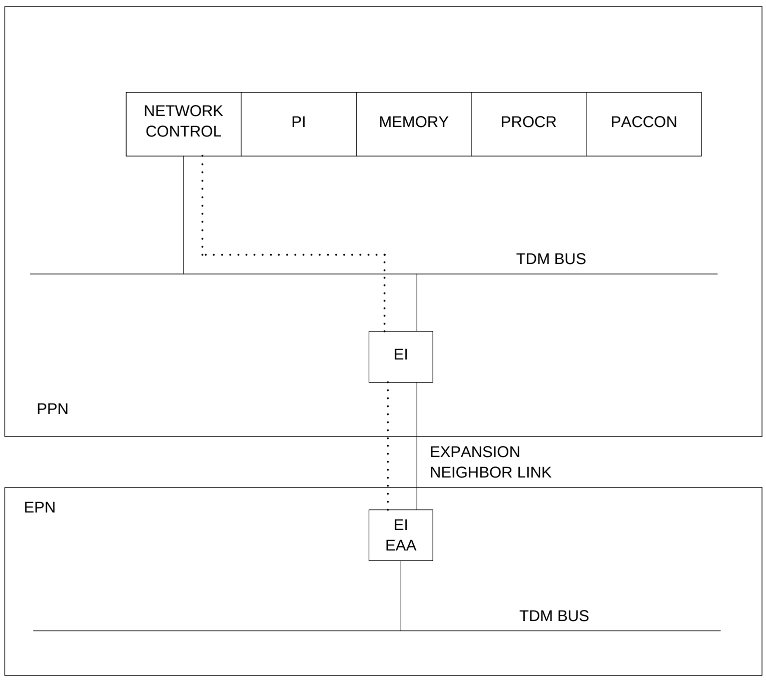

Figure 4-11. Expansion Neighbor Link

Traffic flows between the PPN processor and its destination on the EPN through the network control to the EI circuit pack in the PPN via the CCMS. Traffic travels across the optical fiber on an LAPD link to the EI circuit pack in the EPN where it is unbundled by the AA and sent to its destination over the EPN's CCMS. Figure 4-12 shows a typical Release 5si PPN and EPN configuration.

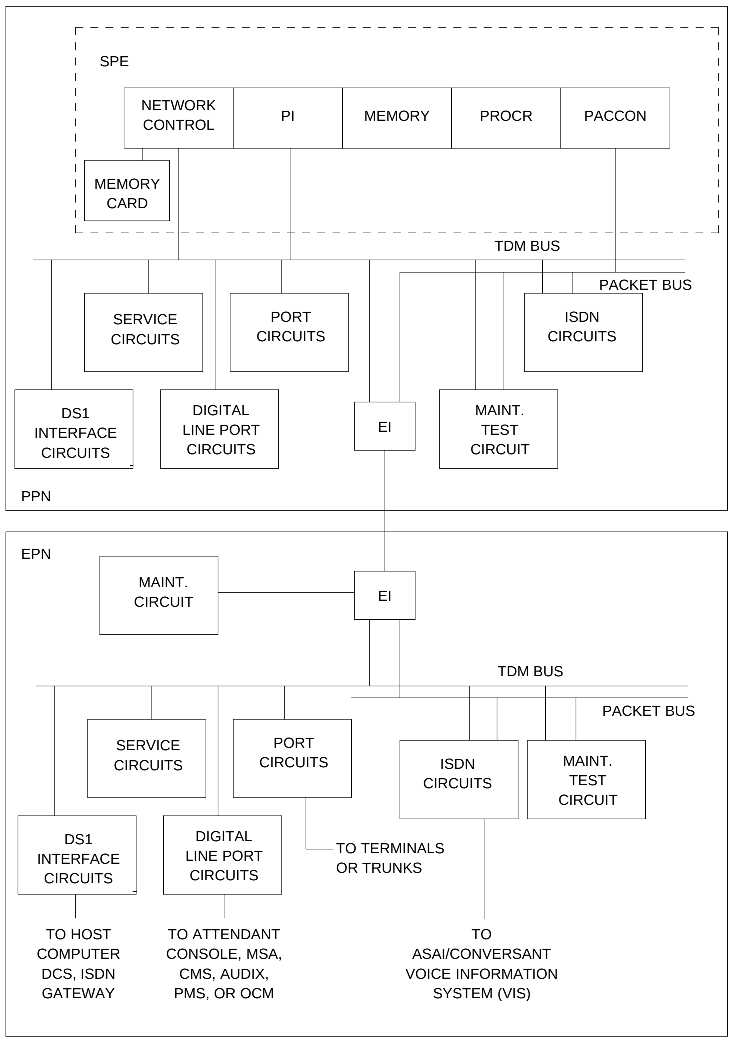

Figure 4-12. Typical Release 5si + memory Configuration

Protocols

This section describes the protocols handled by the system and the points where these protocols change. Figure 4-13 is a pictorial guide through data-transmission state changes. Figure 4-13 illustrates the flow of data from DTE equipment, like a terminal or host, through DCE equipment, like a modem or data module, into a communications port on the system. The data flow is shown by solid lines. Below these lines are the protocols used at particular points in the data stream.

Not shown in the Figure 4-13 is the treatment of D-channels in ISDN-PRI and ISDN-BRI transmissions. PRI and BRI D-channels transport information elements that contain call-signaling and caller information. These elements conform to ISDN level-3 protocol. In the case of BRI, the elements are created by the terminal or data module; for the PRI, the elements are created by the system, which inserts them into the D-channel at the DS1 port.

For ISDN transmissions, therefore, BRI terminals and data modules, and DS1 ports insert, interpret, and strip both layer-2 DCE information and layer-3 elements. Also, the DS1 port passes layer-3 elements to the system for processing.

Layers

The Open System Interconnect (OSI) model for data communications contains seven layers, each with a specific function. Communications to and through the system concern themselves only with layers 1 and 2 of the model.

Layer 1, or the *physical layer,* covers the physical interface between devices and the rules by which bits are passed. Among the physical layer protocols are RS-232, RS-449, X.21, DCP, DS1, and others.

Layer 2, or the *data-link layer*, refers to code created and interpreted by the DCE. The originating equipment can send blocks of data with the necessary codes for synchronization, error control, or flow control. With these codes, the destination equipment checks the physical-link reliability, corrects any transmission errors, and maintains the link. When a transmission reaches the destination equipment, it strips any layer-2 information the originating equipment may have inserted. The destination equipment only passes to the destination DTE equipment the information sent by the originating DTE equipment. The originating DTE equipment can also add layer-2 code to be analyzed by the destination DTE equipment. The DCE equipment treats this layer as data and passes it along to the destination DTE equipment as it would any other binary bits.

Layers 3 to 7 (and the DTE-created layer 2) are embedded in the transmission stream and are meaningful only at the destination DTE equipment. Therefore, they are shown in Figure 4-13 as "user defined," with no state changes until the transmission stream reaches its destination.

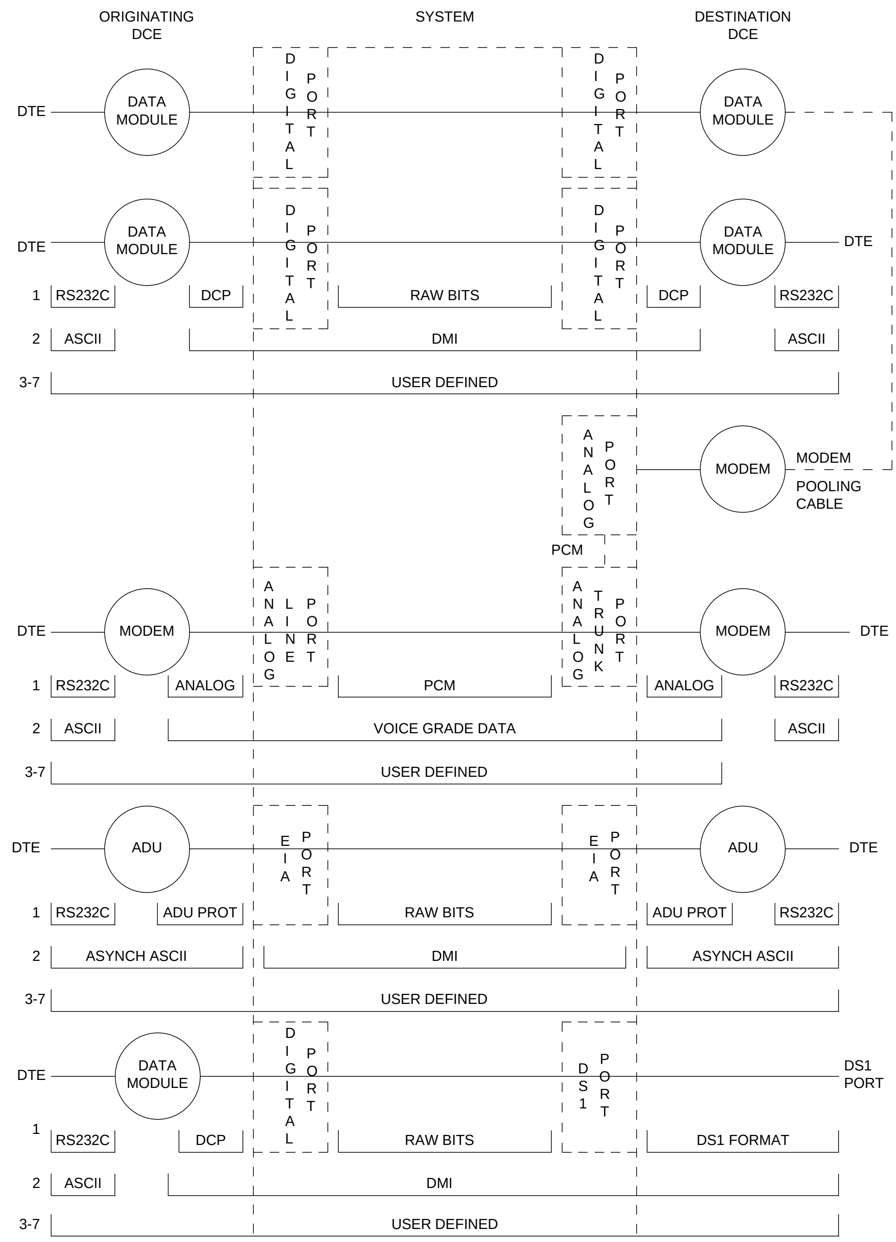

Figure 4-13. Data Transmission States

Usage

The following is a list of the protocols when data is transmitted to and through the system. The list is organized by protocol layers. Refer to Figure 4-13.

Layer-1 Protocols

Layer-1 protocols are used between the terminal or host DTE and the DCE, used between the DCE equipment and the system port, and used inside the system.

The following layer-1 protocols are used between the DTE equipment and the DCE equipment. DCE equipment can be data modules, modems, or Data Service Units (DSUs). A DSU is a device that transmits digital data to a particular digital endpoint over the public network without processing the data through any intervening private network switches.

- *RS-232* — A common physical interface used to connect DTE to DCE. This protocol is typically used for communicating up to 19.2 kbps
- *RS-449* — Designed to overcome the RS-232 distance and speed restrictions and lack of modem control
- *V.35* — A physical interface used to connect DTE to a DCE. This protocol is typically used for transmissions at 56 or 64 kbps

The following protocols are used at layer 1 to govern communication between the DCE equipment and the port. These protocols consist of codes inserted at the originating DCE and stripped at the port. The DS1 protocol can be inserted at the originating, outgoing trunk port and stripped at the destination port.

- *Digital Communications Protocol (DCP)* — A standard for a 3-channel link. This protocol sends digitized voice and digital data in frames at 160 kbps. The channel structure consists of two information (I) channels and one signaling (S) channel. Each I-channel provides 64 kbps of voice and/or data communication and the S-channel provides 8 kbps of signaling communication between the system and DTE equipment. DCP is similar to ISDN-BRI.
- *Basic Rate Interface (BRI)* — An ISDN standard for a 3-channel link, consisting of two 64-kbps bearer (B) channels and one 16-kbps signaling (D) channel. For the implementation of this standard, see *DEFINITY Communications System and System 75 and System 85 ISDN BRI Reference*, 555-025-103.
- *Primary Rate Interface (PRI)* — An ISDN standard that sends digitized voice and digital data in T1 frames at 1.544-Mbps or, for countries outside the United States, in E1 frames at 2.048-Mbps. Layer 1 (physical), layer 2 (link), and layer 3 (network) ISDN PRI protocols are defined in *AT&T System 75 and 85 — DS1/DMI/ISDN-PRI — Reference Manual*, 555-025-101. At 1.544 Mbps, each frame consists of 24 64-kbps channels plus 8 kbps for framing. This represents 23 B-channels plus 1 D-channel.

The maximum user rate is 64 kbps for voice and data. The maximum distances are based on T1 limitations. At 2.048 Mbps, each E1 frame consists of 32 64-kbps channels.

- *Analog* — A modulated voice-frequency carrier signal.
- *ADU Proprietary* — A signal generated by an ADU. The signal is for communication over limited distances and can be understood only by a destination ADU or destination system port with a built-in ADU.
- *Digital Signal Level 1 (DS1)* — A protocol defining the line coding, signaling, and framing used on a 24-channel line. Many types of trunk protocols (for example, PRI and 24th-channel signaling) use DS1 protocol at layer 1.
- *European Conference of Postal and Telecommunications rate 1 (CEPT1)* — A protocol defining the line coding, signaling, and framing used on a 32-channel line. Countries outside the United States use CEPT1 protocol.

Inside the system, data transmission appears in one of two forms:

1. Raw digital data, where the physical layer protocols, like DCP, are stripped at the incoming port and reinserted at the outgoing port.
2. Pulse Code Modulation (PCM)-encoded analog signals (analog transmission by a modem), the signal having been digitized by an analog-to-digital coder/decoder (CODEC) at the incoming port.

Layer-2 Protocols

Layer-2 protocols are given below:

- *8-bit character code* — Between the DTE equipment and the DCE equipment. Depending on the type of equipment used, the code can be any proprietary code set.
- *Digital multiplexed interface* proprietary — Family of protocols between the originating DCE and the destination DCE for digital transmission. See *DEFINITY Communications System and System 75 and System 85 DS1/DMI/ISDN PRI Reference*, 555-025-101; and *Digital Multiplexed Interface [DMI] Technical Specification,* 555-025-204.
- *Voice-grade data* — Between the originating DCE and the destination DCE for analog transmission

Protocol States

Table 4-1 summarizes the protocols used at various points in the data transmission stream. See Figure 4-13 on page 4-21.

Table 4-1. Protocol States for Data Communication

Transmission Type	Incoming DTE to DCE	OSI[1] Layer	Protocols DTE to DCE	DCE to System Port	Inside System
Analog	Modem	1	RS-232, RS-449, or V.35	analog	PCM[2]
		2	8- or 10-bit code	voice-grade data	voice-grade data
	ADU	1	RS-232	ADU proprietary	raw bits
		2	asynchronous 8-bit code	asynchronous 8-bit code	DMI[3]3
Digital	Data Module	1	RS-232, RS-449, or V.35	DCP or BRI	raw bits
		2	8-bit code	DMI	DMI
	Digital Signal Level 1 (DS1)	1	any	DS1	PCM or raw bits
		2	8-bit code	DMI or voice-grade data	DMI or voice-grade data

1. OSI means Open Systems Interconnect
2. PCM means Pulse Code Modulated
3. DMI means Digital Multiplexed Interface

Both the physical-layer protocol and the Digital Multiplexed Interface (DMI) mode used in the connection are dependent upon the type of 8-bit code used at layer 2 between the DTE equipment and DCE equipment, as listed in Table 4-2 and Table 4-3.

Table 4-2. Physical-Layer Protocol Versus Character Code

Protocol	Code
RS-232	Asynchronous 8-bit ASCII, and synchronous
RS-449	Asynchronous 8-bit ASCII, and synchronous
V.35	Synchronous

Table 4-3. Digital Multiplexed Interface (DMI) Mode Versus Character Code

DMI Mode	Code
0	Synchronous (64 kbps)
1	Synchronous (56 kbps)
2	Asynchronous 8-bit ASCII (up to 19.2 kbps), and synchronous
3	Asynchronous 8-bit ASCII, and private proprietary

Connectivity Rules

Figure 4-13 implies the following connectivity rules:

- Only the DS1 port and the analog trunk port are trunking facilities (all other ports are line ports). For communication over these facilities, the destination DCE equipment can be a hemisphere away from the system, and the signal can traverse any number of intervening switching systems before reaching the destination equipment.
- Data originating at any type of digital device, whether DCP or BRI, can exit the system at any type of digital port — BRI, digital-line, PRI, DS1, and others; as long as the call destination is equipped with a data module using the same DMI mode used at the call origin. This is because once the data enters the system through a digital port, its representation is uniform (raw bits at layer 1, and DMI at level 2), regardless of where it originated.

- Although data entering the system through an EIA port has not been processed through a data module, the port itself has a built-in data module. Inside the system, port data is identical to digital line data. Data entering the system at a DCP line port can exit at an EIA port. Conversely, data entering the system at an EIA port can exit at any DCP line port. The destination data module must be set for Mode-2 DMI communication.
- Voice-grade data can be carried over a DS1 facility as long as the destination equipment is a modem compatible with the originating modem.
- If a mismatch exists between the types of signals used by the endpoints in a connection (for example, the equipment at one end is an analog modem, and the equipment at the other end is a digital data module), a modem-pool member must be inserted in the circuit. When the endpoints are on different switches, it is recommended that the modem-pool member be put on the origination or destination system. A modem-pool member is always inserted automatically for calls to off-premises sites via analog or voice-grade trunking. For internal calls, however, the systems are capable of automatically inserting a modem-pool member.
- Data cannot be carried over analog facilities unless inside the system it is represented as a Pulse Code Modulation (PCM)-encoded analog signal. To do this for data originating at a digital terminal, the signal enters the system at a digital port and exits the system at a digital port. The signal then reenters the system through a modem-pool connection (data-module to modem to analog-port) and exits the system again at an analog port.
- Although DS1 is commonly called a trunk speed, here it names the protocol used at layer 1 for digital trunks. Some trunks use different signaling methods but use DS1 protocol at layer 1 (for example, PRI and 24th-channel signaling trunks).

Disconnect Supervision

Disconnect supervision means the CO has the ability to release a trunk when the party at the CO disconnects, and the system is able to recognize the release signal. In general, a CO in the United States provides disconnect supervision for incoming calls but not for outgoing calls. Many other countries do not provide disconnect supervision on either incoming or outgoing calls.

The system must provide the assurance that at least one party on the call can control the dropping of the call. This avoids locking up circuits on a call where no party is able to send a disconnect signal to the system. Internal operations must check to be sure one party can provide disconnect supervision. An incoming trunk that does not provide disconnect supervision is not allowed to terminate to an outgoing trunk that does not provide disconnect supervision.

In a DCS environment, an incoming trunk without disconnect supervision can terminate to an outgoing DCS trunk connecting two nodes. The incoming trunk is restricted from being transferred to a party without disconnect supervision on the terminating node.

This is because, through messaging, the terminating node knows the originating node cannot provide disconnect supervision. This messaging is not possible with non-DCS tie trunks, and the direct call is denied.

Some two-wire loop start trunks outside the United States provide busy tone disconnect in place of line signals. For these trunks, an adjunct can be attached to the trunk to listen for busy or other disconnect tone. When a tone is detected, the adjunct sends line signals for disconnect to the system.

Administration is provided for each trunk group to indicate whether it provides disconnect supervision for incoming calls and for outgoing calls.

Transfer on Ringing

A station or attendant may conference in a ringing station or transfer a party to a ringing station. When a station conferences in a ringing station and then drops the call, the ringing station is treated like a party without disconnect supervision. However, when a station transfers a party to a ringing station, the ringing station party is treated like a party with disconnect supervision. Two timers (Attendant Return Call Timer and Wait Answer Supervision Timer) are provided to ensure the call is not locked to a ringing station.

Conference, Transfer, and Call-Forwarding Denial

If a station or attendant attempts to connect parties without disconnect supervision together, the following is possible:

- *Digital Station or Local Attendant Transfer*: if a digital station attempts to transfer the two parties together, the call appearance lamp flutters, indicating a denial. If transferring to a DCS trunk, the denial may drop the call since the transfer is allowed and the other system is queried for disconnect supervision.
- *Analog Station Transfer*: if an analog station attempts to transfer two parties together by going on-hook, the analog station is no longer on the call and the transfer cannot be denied.
- *Centralized Attendant Service (CAS) Attendant Transfer*: if a CAS attempts to transfer two parties together by pressing the release key, the release link trunk is released and the branch attempts a transfer by going on-hook.
- *Station Conference/Dropout*: if a station conferences all parties, the conference is allowed since the station has disconnect supervision. When the station is dropped from the call, the call is dropped since the other parties do not have disconnect supervision.
- *Station Call Forwarding*: if a station is call forwarded off-premise to a trunk without disconnect supervision, the calling party without disconnect supervision is routed to the attendant.

Maintenance 5

The primary objective of system maintenance is to detect, report, and clear troubles as quickly as possible with minimum disruption of service. Periodic tests, automatic software diagnostic programs, and fault detection hardware allow most troubles to be traced to an individual assembly in the system.

The system hardware is maintained as a group of independent units called Maintenance Objects. These objects include circuit packs, power units, fans, tape drive, environmental sensors, and voice terminals. Each object is monitored by the system and has its own maintenance strategy.

Maintenance Subsystem

The maintenance subsystem software is responsible for initializing and maintaining the system. This software continuously monitors the system and maintains a record of errors detected. The maintenance subsystem also provides a user interface for on-demand testing and contains two general categories:

1. System-Alarmed Troubles: a remote maintenance facility (if provided), a local terminal, and any Customer-Premises Equipment (CPE) alarms are automatically alerted when these alarms are generated. Most alarms are also reported by LEDs on the circuit packs in the system.
2. User-Reported Troubles: usually result from service problems at individual voice and data terminals and are often related to alarmed conditions.

The major part of maintenance is system-alarmed troubles. The system detects and reports most problems automatically. When the trouble is repaired and is no longer detected, the alarm is automatically retired. It is not necessary for personnel to retire alarms after a problem is corrected.

Figure 5-1 shows the location of the red ALARM LED on a typical circuit pack. If an alarm is generated, the LED is steadily illuminated.

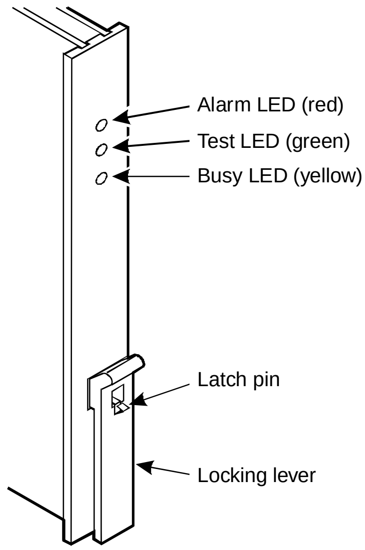

Figure 5-1. Typical Circuit Pack Front Panel Components

Hardware Used for Maintenance

The following hardware is used in fault detection diagnosis and repair:

- Maintenance circuit located on the Processor circuit pack in the Processor Port Network (PPN) cabinet. The maintenance circuit sends alarm information to a terminal, indicates system status by alarm lights, and provides emergency transfer switching and control. Other functions include monitoring and controlling the reset condition and operation of the Switch Processing Element (SPE), and monitoring and controlling the power units. The maintenance circuit also provides direct access to a terminal, provides an asynchronous modem to allow personnel to enter maintenance and administration commands at a remote terminal, and displays alarms remotely.
- Maintenance/Test circuit pack in the PPN. This circuit pack provides Integrated Services Digital Network-Primary Rate Interface (ISDN-PRI) trunk test calls and packet bus reconfiguration for critical reliability systems with the CallVisor ASAI (Adjunct Switch Application Interface).

- Maintenance circuit pack in an Expansion Port Network (EPN). This circuit pack controls the emergency transfer switch for the EPN cabinet, monitors and controls the cabinet environment and power signals, provides two serial links for communication with Expansion Interface (EI) circuit packs, and provides direct access from the EPN to a terminal.
- Maintenance terminal provides a maintenance interface for personnel.
- Two red lights on the attendant console labeled ‘‘Alm’’ and ‘‘Ack.’’ The left light is lit steadily when there is a major or minor alarm at the switch cabinet. The right light is lit steadily if the alarm has been successfully reported to a remote location. If the system is unable to report the alarm to the location, the right light flashes, signaling for the attendant to call the location and report the alarm. Both lights are unlit after the alarm is cleared or if there is no alarm.
- Duplication interface circuit pack with the high reliability and critical reliability options. This circuit pack monitors the status of each SPE, controls the state of the standby SPE, and allows maintenance to be performed on the standby SPE and the results recorded in the active SPE. The circuit pack also provides access to a terminal and has memory shadowing to update the memory of the standby SPE.
- Multi-function voice terminals allow major, minor, and warning buttons to be administered.
- Circuit pack lights indicate red (alarm), the system has detected a fault in that circuit pack, green (test), the system is running tests on that circuit pack, and yellow (busy), that circuit pack is operating.
- In-line error detection circuitry checks for correct operation.

Maintenance Tests

Maintenance tests are divided into two groups: periodic and demand. Periodic tests run automatically at fixed intervals on a specific schedule. The short tests in Release 5si systems are run hourly. The short tests in Release 5r systems are run every 15 minutes. The long tests on all systems are run every 24 hours. During heavy call processing, testing time intervals are extended.

Demand tests are run by the system when it detects a need or by personnel when required during trouble clearing activities. Demand tests include the periodic tests and others required only when trouble occurs. Some non-periodic tests may be disruptive to system operation. Using a terminal, personnel can initiate the same tests the system initiates, and the results are displayed on the terminal screen.

With the high reliability and critical reliability options, maintenance tests on the standby SPE are initiated by the active SPE. The active SPE transfers the standby SPE to the maintenance test mode before testing begins. When testing is completed, the active SPE places the standby SPE in standby mode.

Procedures

If part of the system fails any portion of the periodic tests a preset number of times, the system automatically generates an alarm. This alarm alerts personnel. The system supports three levels of alarms:

1. *Major Alarms*: failures that cause critical degradation of service and require immediate attention.
2. *Minor Alarms*: failures that cause marginal degradation of service while not rendering a crucial portion of the system inoperable. This condition requires action, but its consequences are not immediate. Problems that cause minor alarms might be impaired service in a few trunks or stations or interference with one feature across the entire system.
3. *Warning Alarms*: failures that are localized and cause no noticeable degradation of service. Warning alarms are not reported to the attendant console or a remote location.

The system sends an alarm to any CPE device such as a light, automatic dialer, a bell, or other equipment. The alarm activation level field on the system parameters maintenance screen must be administered to indicate the alarm level (major, minor, warning, or none) that activates the alarm device. Some alarm levels are adjustable by the Set Options feature.

Error and Alarm Logs

During normal operation, the maintenance software may detect an error condition related to a specific maintenance object. The system automatically attempts to repair a problem or operate around it. If a hardware component incurs too many errors, an alarm is generated.

The system maintains a record of each error and each alarm. A record of system errors is recorded in an Error Log that can be displayed on a terminal. The log is useful for analyzing problems that have not caused an alarm or when alarms cannot be retired by replacement of hardware. When errors result in alarms, the alarms are listed in the Alarm Log. This log can be displayed on a terminal. If a number of alarms are active, the Alarm Log can be used to determine the alarms that should be cleared first.

The Alarm Log and the Error Log list current unresolved conditions and past alarms and errors that provide a profile of system maintenance. Both logs are saved on tape as part of the system backup.

Terminal Alarm Notification Buttons

Terminal alarms are for customers who have administered feature buttons on voice terminals or the attendant console to represent several types of alarms. A maximum of 10 digital and/or hybrid voice terminals may be used.

When an alarm occurs, the green (status) lamp associated with the assigned button is steadily illuminated. The lamp is turned off by pressing the button associated with the lighted alarm lamp. If the lamp is turned off and the alarm has not been resolved before the maintenance software reschedules testing, the lamp illuminates again.

Local and Remote Testing

A terminal connected directly to the system or a remote terminal can be used to display error and alarm logs, test circuit packs, test system functions, turn off (busyout) and release system equipment, and reset the system.

Port Circuit Packs

A port circuit pack can be replaced without turning off power or interrupting service except in the area directly affected by the replacement. Verification tests are automatically run on the circuit pack when it is plugged in.

Related Documents

For maintenance information, see one the following documents:

- *DEFINITY Enterprise Communications Server Release 5vs/si Maintenance*, 555-204-105
- *DEFINITY Enterprise Communications Server Release 5r Maintenance*, 555-230-105

For a maintenance terminal, Customer Premises Equipment (CPE), and circuit pack installation instructions, see one the following documents:

- *DEFINITY Enterprise Communications Server Release 5 Installation and Test for Single-Carrier Cabinets*, 555-230-894
- *DEFINITY Enterprise Communications Server Release 5 Installation and Test for Multi-Carrier Cabinets*, 555-230-112

Technical Specifications

6

This chapter includes the following technical specifications on the capabilities, performance, and feature capacities:

- Representative Number of Lines
- Performance
- Additional Hardware to Use Features
- Allocation of Station Buttons
- Initialization and Recovery
- Cabling Distances
- Digital Signal Level 1 (DS1) Remoting Transmission Distance
- Tones
- Indicator Lamp Signals
- Protocols
- Transmission Characteristics
- Service Codes
- Facility Interface Codes

Representative Number of Lines

Table 6-1 lists the representative number of lines (trunks) for each configuration of Processor Port Networks (PPNs), Expansion Port Networks (EPNs), and Center Stage Switches (CSS) in G3V4 and Release 5. The actual number of lines depends on the features and characteristics of the configuration.

Table 6-1. Representative Number of Lines (Trunks)

Configuration	Release 5vs Release 5si	G3siV4+m & Release 5si+m	Release 5r
1 Processor Port network (PPN)	400 (160 in Release 5vs)	800	800
Direct connect with 1 PPN and 2 EPNs	Does Not Apply	2,400	2,400
1 Switch Node (SN) in the CSS with 1 PPN and 15 EPNs	Does Not Apply	Does Not Apply	12,500
3 SNs in the CSS with 1 PPN and 43 EPNs	Does Not Apply	Does Not Apply	25,000

Performance

Table 6-2 lists call processing performance (calls per hour) for G3V4 and Release 5.

NOTE:
Call performance can vary with different customer applications. A Processor Occupancy Evaluation (POE) may be required.

Table 6-2. Call Processing Performance (Calls Per Hour)

System Type	All Except Release 5r	Release 5r
General Business	40,000	100,000
ISDN	16,000	40,000
Automatic Call Distribution (ACD)	28,000	70,000
Inbound Call Management (ICM)	12,000	30,000
Outbound Call Management (OCM)	16,000	44,000
ASAI desk top	28,000	70,000

Table 6-3 lists response times for G3V4 and Release 5.

Table 6-3. Response Times

Attribute	Response Time
Call processing	General voice path cut-through: 750 ms Attendant ring tip: 260 ms Direct Extension Selection (DXS) lamp update: One second Announcement circuit pack upload (no call processing load): 40 minutes
System management	Four to six seconds mean response time
Maintenance	High-priority periodic tests must be completed within one hour. High-priority scheduled tests must be completed once each day, but not during busy hours.
Booting and recovery	11 minutes

Additional Hardware to Use Features

Table 6-4 describes additional hardware needed to use features. The hardware consists of circuit packs installed in carriers, devices installed in an auxiliary cabinet, and external devices. Specific circuit packs are described in Chapter 3, ‘‘Cabinets, Carriers, and Circuit Packs’’.

Not all feature applications require additional hardware; the conditions for additional required hardware are also described.

Table 6-4. Additional Hardware to Use Features

Feature	Hardware
Abandoned Call Search	Central Office (CO) trunk circuit pack.
Abbreviated Dialing	Additional call progress tone detector ports on a tone detector circuit pack if the special “wait” character is used frequently.
ACCUNET Service	Data module and printer.

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Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Adjunct Switch Application Interface (ASAI)	Port on BRI line circuit pack and a terminating resistor for each interface to be provided. Up to eight interfaces are supported. Release 5vs/si and G3vsV4/G3siV4: a packet control circuit pack is required for ASAI applications. An Expansion Interface (EI) circuit pack is also required for system connectivity in multiple port network systems. Release 5r: BRI line circuit pack is required. All: packet applications, such as ASAI, require maintenance/test circuit pack in PPN. In a critical reliability system, a maintenance/test circuit pack is required in each additional EPN.
Administered Connection	Circuit packs: data line, digital line, BRI line, pooled modem, or DS1 Interface. Data modules: 7400 series voice terminals; 7500 series BRI voice terminals with ADM.
Advice of Charge	Same hardware as ISDN and CDR. See ISDN-PRI and Call Detail Recording (CDR).
Agent Call Handling	No additional hardware required. CallMaster voice terminals are recommended for ACD agents.
Announcement	See Recorded Announcement.
Announcements — Intercept Treatment	Hardware to support recorded announcement, if equipped. See hardware required for Recorded Announcement.
Answer Machine Detection	Call classifier circuit pack (TN2182 or TN744B or later).
Attendant Direct Extension Selection With Busy Lamp Field	Selector console.
Attendant Room Status	A DXS module is required.
Audio Information Exchange (AUDIX) Adjunct Voice Mail System	Voice: AUDIX machine and appropriate ports on analog line circuit packs. Data control Link: all systems except Release 5r use the Processor Interface (PI) RS-232 connector on the rear panel of the PPN control carrier and a data module. If the PI connector is not available, a port on a digital line circuit pack and a data module are required in addition to a PI link. Release 5r: port on packet gateway circuit pack. AUDIX networking requires ports on one or more digital line circuit packs.

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Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
AUDIX (Audio Information Exchange) Embedded Voice Mail System	DEFINITY AUDIX assembly resides in five consecutive port slots in Release 5si and Release 5r; and resides in four port slots on the far right in Release 5vs. Digital Port (DP) mode does not require additional hardware for a data control link and supports only eight AUDIX ports. Control link mode requires the same additional data control link hardware as an AUDIX adjunct listed above. The administration terminal can be connected via: direct connection, modems, ADU, and G3-MA.
Automatic Alternate Routing (AAR)	AAR is provided as part of the optional Private Networking software. AAR may require additional tie trunks.
Automatic Call Distribution (ACD) Does not require added hardware.	If needed: one port on an analog line circuit pack per auxiliary queue warning level lamp. Hardware to support recorded announcement or music-on-hold. See Recorded Announcement and Music-on-Hold. Voice terminals (not 2500-type sets) are required for agents. If CMS is used, CMS hardware is required (see Call Management System).
Automatic Circuit Assurance	Voice terminal with display or a speech synthesis circuit pack.
Automatic Incoming Call Display	715 BCS, display-equipped voice terminal, or voice terminal that can display information through an attached data terminal. The terminals require a PRI or DCS link; otherwise, they are station-to-station only.
Automatic Route Selection (ARS)	No additional hardware is required for a stand-alone system. For a private network, additional tie trunks and tone detector circuit packs may be required.
Automatic Transmission Measurement System (ATMS)	TN771B Maintenance/Test circuit pack or later.
Automatic Wake-up	If voice prompting is used, a voice synthesizer circuit pack is needed. Each circuit pack has four ports to provide voice prompting. If voice synthesis announcements are used, two ports are reserved for announcements. AUDICHRON is used for customized recorded announcements. Journal printer and interface. For automatic wake-up with integrated announcement, the integrated announcement circuit pack is needed.
Barrier Code Aging	Printer and cable.
Basic Call Management System (BCMS) Reports	Printer and cable.

Continued on next page

Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Bridged Call Appearance — Multi-appearance Voice Terminal	No additional hardware is required. A Call Coverage module or expansion module can provide up to 20 bridged call appearances.
Bridged Call Appearance — Single-line Voice Terminal	No additional hardware is required. A Call Coverage module or expansion module can provide up to 20 bridged call appearances.
Busy Tone Disconnect	A Busy Tone Disconnect interface and cables are required.
Call-By-Call Service Selection (PRI) feature)	All systems except Release 5r: DS1 Interface and PI or PACCON circuit packs. Release 5r: DS1 interface circuit pack.
Call Coverage	No additional hardware is required.
Call Detail Recording (CDR) Hardware depends on the type of CDR used	All Release 5vs and Release 5si: a CDR output device can be connected to the RS-232 port on the Processor circuit pack to eliminate the need for data modules for the output devices below. Release 5r: a CDR output device is connected via either: 1. Packet data circuit pack cross-connected to a port on a data line circuit pack connected to a second data line circuit pack port and then to an ADU, or 2. Packet data circuit pack cross-connected to a port on a data line circuit pack connected to a BRI Line circuit pack connected to a 7500 Data Module or a digital line connected to a data module. Reused equipment: printer, PC, tape unit, or TELESEER unit — data module connected to a digital line circuit pack port, or a 212A modem connected to a port on an analog line circuit pack with a pooled modem. 94A LSU — data module connected to a digital line circuit pack port, or a 212A modem connected to a port on an analog line circuit pack with a pooled modem. Host computer — Private line terminated at the system with a data module. A private line modem is used if off-premises (out-of- building).
Call Forwarding All Calls	No additional hardware is required.
Call Forward Busy/ Don’t Answer	No additional hardware is required.

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Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Call Management System (CMS)	CMS adjunct; all Release 5vs and Release 5si: port on a digital circuit pack and a PI. Release 5r: port on a Packet Gateway circuit pack and, depending on distance, a 105B IDI or DSU. Alternately, a port on a Packet Gateway is connected to a data module. The data module is connected to an administered connection through a port on each of a pair of digital line circuit packs and terminates at the CMS.
Call Prompting	Each Call Prompting announcement requires a port on an Integrated Announcement circuit pack or an external announcement facility. Each announcement requires a port on an Analog Line circuit pack. The Call-Classifier circuit pack is required for touch-tone receivers to collect digits input by callers.
Call Vectoring	Announcement hardware is required. See Call Prompting.
CallVisor ASAI	A port on a BRI line circuit pack or DEFINITY LAN Gateway connected to the CallVisor Adjunct. See Integrated Services Digital Interface-Basic Rate Interface (ISDN-BRI).
Calling Party Number/Billing Number (CPN/BN)	All Release 5vs and Release 5si: an interface link (requires a PI or PACCON circuit pack) and a data module are assigned. Alternately, a port is used on a Digital Line circuit pack instead of a data module. The link is administered on the system's Processor Channel Assignments form. The link is used as an interface to an ISDN Gateway adjunct to support CPN/BN. Optional ASAI Link (see ASAI for more information). Display terminals also require ACD related hardware. See the ACD feature. G3V4 and later systems do not support ISDN Gateway.
CAS (Branch or Main)	A Tie Trunk circuit pack serves all other tie trunk applications (such as release link trunk). Alternately, the PRI DS1 Interface circuit pack can be used for the release link trunks of the CAS network.
CDR Call Splitting, CDR) Privacy	Terminal and data module.
Code Calling Access	Loudspeaker paging equipment and one port on a Auxiliary Trunk circuit pack per zone, can be shared with the Loudspeaker Paging Access feature.
Conference/Intrusion Tones	No additional hardware required.
Constellation Voice/ Data Terminal Support	A 6544 cluster controller is required to provide data connection to the host. One of the following adjunct voice terminals is required: 7401D, 7406D, 602A1, or 603D1. The adjunct voice terminal can function as a stand-alone station even if the Constellation is powered down.

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Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Cordless Telephone Support	An appropriate analog line or hybrid (MFAT) line circuit pack is used for the cordless set.
Customer-provided Equipment (CPE) Alarm	A customer-provided alarm such as a lamp, bell, or other device.
Czech Republic of Slovakia Digital MFC	Digital Tie (DS1 Interface 24/32) and Call Classifier circuit packs.
D-Channel Backup	PRI DS1 Interface circuit pack and PRI facilities. See Primary Rate Interface (PRI).
Data Call Setup	Each DCP data module requires one port on a Digital Line circuit pack. A data module shares the port with the associated voice terminal. Reused equipment: each Personal Terminal 510D or 515 BCT requires one port on a digital line circuit pack for shared use of voice and data. Each 7400, 7401D, 7404D, 7406D, or 7407D voice terminal requires one port on a digital line circuit pack for shared use of voice and data. Each BRI data module requires one port on a BRI Line circuit pack. Each 7505D w/ADM, 7506D with ADM, 7507D with ADM, 8510D with ADM, or 8520D with ADM terminal requires one port on a BRI Line circuit pack for shared use of voice and data. Each 7500 Data Module requires one port on a BRI Line circuit pack for data. Each modem requires one port on an analog line circuit pack. Modem pooling requires either a modem pool circuit pack or a port on a digital line circuit pack with a data module, and one port on an analog line circuit pack with analog modem for each conversion resource. Keyboard dialing to off-premises (out of building) data endpoints requires call progress tone detector ports on a tone detector circuit pack.
Data Only Off-premises Extensions	Data module and one port on a TN754B Digital Line circuit pack.
DCS Features (All)	All Release 5vs and Release 5si: a PI circuit pack. Release 5r: a port on a Packet Gateway circuit pack and a data module or DSU are required.
DCS Plus	PRI D-channel link: a PRI DS1 Interface circuit pack is required and, if required by the network provider, one CSU per span.
DEFINITY Extender (Personal Station Access)	DEFINITY DCP Extender required to connect to DCP stations such as the 8400-series DCP terminals (2-wire mode only).

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Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Dialed Number Identification Service (DNIS)	For non-ISDN type calls, a port on a DS1 Interface circuit pack to support MEGACOM 800 DNIS. Also requires the answering voice terminals be equipped with a display if display of trunk information is desired.
Digital Multiplexed Interface (DMI)	One PRI DS1 Interface circuit pack per 24 DMI trunks.
Direct Department Calling and Uniform Call Distribution (no added hardware required)	If needed: one port on an analog line circuit pack per queue warning level lamp. Hardware for support of recorded announcement, or Music-On-Hold if there is to be a delay announcement or music. See Recorded Announcement and Music-on-Hold.
Direct Inward Dialing (DID)	One port on a DID Trunk circuit pack for each DID trunk. If R2 MFC signaling is used, then call classifier circuit pack ports are required and must be engineered.
Direct Inward/Outward Dialing (DIOD) International	DIOD circuit pack or DS1/E1 circuit pack.
Direct Outward Dialing (DOD)	One port on a CO Trunk circuit pack for each DOD trunk.
Do Not Disturb	If voice prompting is used, one or more ports on a Voice Synthesizer circuit pack.
DS1 Integrated CSU	DS1 Interface circuit pack (TN767D or TN464E and later) and Integrated CSU module (120A1).
DS1 Tie Trunk Service	One DS1 Interface circuit pack is required per 24 Voice-Grade DS1 Tie trunks or per 23 AVD DS1 Tie trunks.
DXS Button Enhancements	Attendant Console with DXS Console addition.
E1 — 32 Channel	DS1 Interface 24/32 circuit pack. E1-32 channel is not supported in the United States.
ECMA Conformance in ISDN-PRI	DS1 Interface 24/32 circuit pack.
EIA Interface	One data line circuit pack per eight EIA interfaces, and one data module per port on the circuit pack are required.
Enhanced Voice Terminal Display	8400-series DCP terminal, 603E1 CallMaster III, or 9400-series DCP terminals are required. The 9400-series terminals are for European use only.
ESPA Radio Paging	European Standard Paging Access equipment required.

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Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Facility and Non-facility Associated Signaling	See Integrated Services Digital Network-Basic Rate Interface (ISDN-BRI).
Flexible Billing	An ASAI Adjunct Processor is required.
Generalized MFC	DS1 Interface 24/32 and Call Classifier circuit packs.
German — Digital	DS1 Interface 24/32 for German digital trunks (such as PRI).
Greece MFC	DS1 Interface 24/32 and Call Classifier circuit packs.
Inbound Call Management (ICM)	ASAI hardware (See ASAI feature). Use of ACD feature required (see ACD feature).
Integrated Announcement	See Recorded Announcement.
Intercept Treatment	Requires announcement equipment and one port on an analog line circuit pack for each announcement and for each external analog announcement device, or an AUX trunk port for each external AUX trunk device. See Recorded Announcements. For Release 5si + memory, a TN750 Announcement circuit pack can provide up to 128 announcements. Intercept treatment can be administered to the Attendant Console.
Intercom — Dial	No additional hardware is required.
Internal Automatic Answer (IAA)	All multi-function voice terminals with speakerphone or headset may be used except ISDN-BRI voice terminals.
Inter-PBX Attendant Calls	Tie trunk group between the branch and main locations.
ISDN-BRI	One BRI Line circuit pack for up to 12 endpoints using the point-to-point 4-wire T interface; one BRI Line circuit pack for up to 24 endpoints using passive bus. Release 5vs: BRI is not supported. Release 5vs/si, G3vs/siV4: Packet Control circuit pack for BRI applications. A packet Expansion Interface circuit pack is also required for system connectivity in multiple port network systems. Release 5r: no additional hardware beyond BRI Line. All systems: in packet applications, a maintenance/test circuit pack is required in the PPN for all systems. In a critical reliability system a maintenance/test circuit pack is also required in each additional EPN.
ISDN-PRI	One PRI DS1/E1 interface circuit pack provides a signaling link and up to 23 ISDN-PRI trunk group members and up to 30 for E1, 30B, and 2D channels. Release 5vs: a Processor Interface for PRI via the TDM bus and PI. Release 5vs/si, G3vs/siV4: a packet control circuit pack for PRI via the LAN bus and PACCON. Release 5r: no additional hardware beyond PRI DS1 Interface.

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Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Leave Word Calling	Display voice terminal and voice synthesis circuit pack to store the LWC message.
Look Ahead Interflow	No additional hardware is required. Interconnecting facilities must be ISDN-PRI with no interworking. Calls that interwork may interflow successfully but the ability to do so on an intelligent basis is lost, as is the Look Ahead Interflow DNIS information.
Loudspeaker Paging Access with Answerback	Loudspeaker paging equipment and one port on an auxiliary trunk circuit pack per zone. Paging interface equipment consisting of a 909-type voice coupler adapter (only if equipment is not FCC- registered) and a 24-volt power supply, per zone. This hardware can be shared with the Code Calling Access feature. If PagePac paging system equipment is used, one port on a CO trunk circuit pack, or one port on an analog line circuit pack, or one port on an auxiliary trunk circuit is used, depending on the PagePac arrangement.
Malicious Call Trace	A display set.
Mexico 2-way	DS1 Interface 24/32 and call classifier circuit packs.
MFC Enhancements	DS1 Interface 24/32 and call classifier circuit packs.
MF Shuttle	DS1 Interface 24/32 and call classifier circuit packs.
Modem Pooling	One pooled modem circuit pack per two integrated conversion resources provided. Each combined conversion resource requires one port on the digital line circuit pack, one port on an analog line circuit pack, and an analog modem and data module or 7400 terminal.
Move Agents From CMS	CMS vehicle.
Multiple Call Handling On Request or Forced	A multi-appearance set is required.
Music-on-Hold Access	Music source and one port on an auxiliary trunk or analog line circuit pack are required. A 909-type voice coupler is required if the system is not FCC-registered (United States only). A music source and one port on a TN746B or TN468B or later Analog Line circuit pack. A KS23395, L4 Music-on-Hold interface to convert a loop start port into a Music-on-Hold port. The port must be administered for this purpose. Also, a 909-type voice coupler is required if the music source is not FCC-registered (United States only). France: a port on the TN2183 Analog Line circuit pack and the 122A Music-on-Hold interface unit (wall-mounted).

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Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Names Registration	A Property Management System (PMS) can be connected through a data module and a port on a digital line circuit pack, or through an ADU and a port on a data line circuit pack. A journal printer requires a data module and a port on a digital line circuit pack, or an ADU and a port on a data line circuit pack.
National ISDN	DS1 Interface circuit pack.
Network Access — Private	One port on a tie trunk circuit pack or one port on a DS1 interface circuit pack for each trunk assigned.
Network Access — Public	One port on a CO or DIOD trunk circuit pack or one port on a DS1/E1 interface circuit pack or tie trunk circuit pack.
Night Service — Trunk Answer From Any Station	Ringing device and one port on an analog line circuit pack.
Off-Premises Data Extensions	Trunk data module or DCP Extender and one port on a digital line circuit pack.
Off-Premises Station	Cross-connecting capabilities and one port on an analog line circuit pack.
PC Application Software Translation Exchange (PASTE)	A port on a digital line or BRI Line circuit pack connected through a Personal Computer configured with the PC/PBX, PC/ISDN, or PassageWay circuit pack and application software to an appropriate voice terminal.
PC Interface (Hardware varies depending on the configuration group used)	Group 1: 7404D Voice Data Station, 31815 PC Cartridge, Standard EIA RS-232 connecting cables, an IBM-compatible PC (6300 with DOS 2.11 or later, 6300 Plus with DOS 3.1 or later, PC/XT with PC-DOS 2.0 or later, or PC/AT with PC-DOS 3.1 or later). 384K or more of RAM is recommended on PCs running integrated software applications. Group 2: 7400-series DCP terminals, PC/PBX interface card, an IBM-compatible PC (6300 or 6300 Plus with DOS 3.1 or later, or PC/XT with PC-DOS 3.1 or later. 448K or more of RAM is recommended on PCs running integrated software applications. Group 3: 7500-series ISDN-BRI Voice Terminal, up to four PC/ISDN expansion cards, an IBM-compatible PC (6300, 6300 Plus, PC/XT, PC/AT, PS/2, or Compaq), and DOS 3.1 or later.
PC/PBX Connection	A port on a TN754B Digital Line circuit pack for each PC connected.
Personal Central Office Line (PCOL)	One port on a CO trunk circuit pack for each CO, Foreign Exchange (FX), or (Wide Area Telecommunications Services (WATS) trunk assigned as a PCOL.

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Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Personal Station Access	Requires a DEFINITY Extender at both the home site and the office location (location of the DEFINITY ECS).
Power Failure Transfer	One emergency transfer panel per five or six trunks assigned to Power Failure Transfer are required, depending on panel used. The following panels are available: ■ 808A Panel — Serves up to five failure transfer terminals. The unit provides automatic ground start or loop start. ■ Z1A Panel — Serves up to six power failure transfer terminals. A ground-start key is required at each preselected voice terminal when ground-start trunks are used. ■ PORTA SYSTEMS. Model 574-5 Panel — Serves up to five failure transfer terminals. The unit provides automatic ground start or loop start.
PRI Converter	DASS - One TN464F DS1/E1 circuit pack and one TNCCSC-1 circuit pack. DPNSS - One TN464F DS1/E1 circuit pack and one TNCCSC-2 circuit pack. BRI - One TN464F DS1/E1 circuit pack and one TNPRI/BRI circuit pack.
Property Management System	For all Release 5vs and Release 5si, either: 1. Using a digital line port and a data module, or 2. Using a digital line port and an ADU. For Release 5r, either: 1. A packet data circuit pack cross-connected to a port on a data line circuit pack, connected to a second data line circuit pack port and then to an ADU, or 2. A packet data circuit pack cross-connected to a port on a data line circuit pack connected to either a BRI line circuit pack connected to a 7500 Data Module or to a digital line connected to a data module. Data line circuit pack with an ADU or a data module and port on a digital line circuit pack.
Pull Transfer	No additional hardware is required in a stand-alone configuration. In a network environment, the TGU/TGE tie trunks (TN497) are the only trunks that support the flash signaling necessary to complete the pull transfer operation between systems.
QSIG Global Networking	Same as ISDN-PRI. See ISDN-PRI.

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Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Queue Status or Queue Status Indication	One port on an analog line circuit pack for each auxiliary queue warning lamp, such as a 21C-49.
Reason Codes	No additional hardware is required.
Recorded Announcement (Announcements are provided by a port on an analog line circuit pack, a port on an auxiliary trunk circuit pack, or an integrated announcement circuit pack)	All systems except Release 5r: each analog announcement has announcement equipment, such as a unit configured with an analog interface, and one port on an analog line circuit pack. These systems can also use an announcement unit configured with an auxiliary trunk interface and port on an auxiliary trunk circuit pack. Each integrated announcement, accessed by a call, requires one port on an integrated announcement circuit pack. Up to 128 announcements can be recorded on the integrated announcement circuit pack. A network control circuit pack restores messages after a power failure. Release 5r: each analog announcement has announcement equipment, such as a unit configured with an analog interface, and one port on an analog line circuit pack. Can also use a unit configured with an auxiliary trunk interface and port on an auxiliary trunk circuit pack. Each integrated announcement, accessed by a call, has one port on an integrated announcement circuit pack. Up to 256 announcements can be recorded. Requires a system access port resource (packet data and data line combination) to save and restore announcements to the integrated announcement circuit pack(s).
Recorded Telephone Dictation Access	Telephone dictation machines and, depending on type of machine, one port on an analog line circuit pack or one port on a auxiliary trunk circuit pack for each machine assigned.
Remote Access	Dedicated trunks, such as a dedicated port on a CO trunk, or an extension number accessed by a tie trunk, DID or DIOD port circuit, if remote access is not available via DID.
Remote Administration	Network control circuit pack, a terminal, and an integrated modem pool circuit pack or a combined modem pool setup.

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Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Report Scheduler and System Printer [Requirements depend on the type of interface used for the system printer (dedicated for Report Scheduler feature)]	The printer can be a Model 470 or 570, which uses a serial interface, or it can be a compatible printer. A PC can be connected to the system printer port for collection of data. A serial interface on the PC is used for the connection. For all systems except Release 5r: the system printer is connected via either: ■ Using the DCE jack on the rear of the PPN control carrier to provide an RS-232 interface to eliminate a data module ■ Using a Digital Line port and data module ■ Using a BRI Line port and a 7500 Data Module ■ Using a Data Line port and an ADU For Release 5r: The system printer is connected via either: ■ A packet data circuit pack cross-connected to a port on a data line circuit pack connected to a second data line circuit pack and then to an ADU ■ A packet data circuit pack cross-connected to a port on a data line circuit pack connected to either a BRI line circuit pack connected to a 7500 Data Module or to a digital line connected to a data module
Russia MFR for ANI	DS1 Interface 24/32 and call classifier circuit packs.
R2-MFC	Analog or digital trunk and call classifier, such as a TN744B or greater suffix circuit pack.
Security Violation Notification	Voice terminal with a display. Security violation notification via announcements requires the integrated announcement circuit pack.
Spain MFE	DS1 Interface 24/32 and call classifier circuit packs.
Subnet Trunking	Additional call progress tone detector ports on tone detector circuit packs, if routing patterns containing “wait” symbols are used heavily and if dial tone detection is preferable to waiting for interval time-out.
SVN Refer Call with Announcements	Integrated announcement circuit pack.
System Administration Report Scheduler	See report scheduler and system printer.
System Measurements	System administration terminals are required. A system printer is required to generate paper copies of reports.

Continued on next page

Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Transfer — Outgoing Trunk to Outgoing Trunk (with Security)	Feature can be activated for trunk groups with trunks assigned to the following trunk circuit packs: TN747B Central Office Trunk, TN760C Analog Tie Trunk, and TN722B, TN767, or TN464C DS1.
Uniform Dial Plan	No additional hardware is required except as needed for DCS. See DCS feature. Tie lines are required if system-to-system communication via DCS is not over the Public Switched Telephone Network (PSTN).
United Kingdom (UK) Networking (Name/Number)	DS1 Interface 24/32 circuit pack.
VDN of Origin Announcement	Integrated announcement circuit pack.
Visually Impaired Attendant Service (VIAS)	At least one TN433 (Italy) or TN457 (United Kingdom) Speech Processor circuit pack is required. The TN725B (United States) Speech Processor circuit pack does not support VIAS.
Voice Message Retrieval	Speech synthesizer circuit pack, which has four ports to provide voice message retrieval. Traffic Engineering is required to determine the number of circuit packs.
Voice Response Integration (VRI)	No additional hardware is required. The TN744 Call Classifier circuit pack is not required by call prompting for the returning of digits in-band from CONVERSANT to the DEFINITY System; a TN748 Tone Detector is used. Basic call vectoring must be enabled to use **converse-on** vector step. Call prompting must also be enabled.
Voice Terminal Display	Display-equipped voice terminal that can be: ■ Digital terminal requiring one port on a digital line circuit pack. ■ BRI terminal requiring one port on a BRI circuit pack. ■ Hybrid terminal requiring one port on a hybrid line circuit pack.
VuStats	Terminal with display.
Wideband Switching	One DS1 Interface circuit pack (TN464C or later) for line-side and another for network facilities. Same as ISDN-PRI. See ISDN-PRI. Also requires wideband data modules.

Continued on next page

Table 6-4. Additional Hardware to Use Features — *Continued*

Feature	Hardware
World Class Core BRI	Same as ISDN-BRI. See ISDN-BRI.
World Class Tone Detection	Tone Detection Modes 1, 2, and 3 are meaningful only if the tone detectors are TN420B or greater or TN2182, or TN744D. Modes 4 and 5, the tone validation timer, and the interdigit pause are meaningful only if the tone detectors are TN744C, TN420C, or TN2182. Tone detection for countries using the same tone plan as the United States is also available using an alternate tone detector. The TN420B only recognizes tone detection modes 1, 2, and 3. TN420C, TN744C, and TN2182 recognize modes 1, 2, 3, 4, and 5, and tone validation and interdigit pause. TN2182 and TN744C recognize mode 6. TN748C provides precise tone detection for the United States tone plan.
World Class Tone Generation	Any tone generator circuit pack can be used. Most circuit packs are capable of producing all North American and international tones including 440 Hz at 17.25 dB.

Allocation of Buttons

Table 6-5 on page 6-18 lists the allocation of buttons by station type. The "Required Records and Button Units" column assumes three call appearances per station in button 1-3 with all other available buttons assigned. For call appearances other than 3, the total units are adjusted by the following:

Adjustment = (Nca-3)*(10*Ndisp)+(6*Nbri), where:
Nca = Number of call appearance (assumes first Nca button is CA)
Ndisp = total Number of display stations in system
Nbri = total Number of BRI stations in system

The following legend defines the notations in Table 6-5.

Notation	Meaning	All Except Release 5r	Release 5r
A	Attendant record	7	7
S	Basic station record	1,600	1,600
B	Large button module	2,000	None
M	Data module record	800	800
I	ISDN-BRI endpoint record	None	1,000
#	Button memory units	None	547, 200

Table 6-5. Allocation of Buttons by Station Type

Station Type	Required Records	Required Records and Button Units
Analog sets: 500, 2500, 7101A, 7103A, 7104A, 9101, 9103, and 9110	S	S+62
Analog sets: 8102, 8110	S	S+62
10MET set — 10 buttons 20MET set — 20 buttons 30MET set — 30 buttons	S S + [B] S + [B]	S+52 S+152 S+252
Hybrid set — 7303S Hybrid set — 7305S Hybrid set — 7309S	S S + [B] S	S+102 S+342 S+102
510 Business Communications Terminal (BCT) 515 Business Communications Terminal (BCT)	S + B + [B] + M S + B + M	S+322 S+232
Basic Attendant Console Enhanced Attendant Console Attendant Selector Console	A+2B A+2B A+2B	A A A
Digital set — 7401D/7401+	S	S+92
Digital set — 7403D	S	S+102
Digital set — 7404D	S + M	S+62
Digital set — 7404D w/display	S + B + M	S+192
Digital set — 7405D	S + [B]	S+342
Digital set — 7406D	S + [B]	S+282
Digital set — 7406D w/display	S + B + [B]	S+342
Digital set — 7406+	S + B + [B]	S+282
Digital set — 7406+ w/display	S + B + [B]	S+342
Digital set — 7407D	S + B + [B]	S+472
Digital set — 7407+	S + B + [B]	S+402
Digital set — 7410D	S + [B]	S+102
Digital set — 7410+	S + [B]	S+282
Digital set — 7434D	S + B + [B]	S+342
Digital set — 7434D w/call coverage module	S + 2B + [B]	S+542
Digital set — 7444D	S + B + [B]	S+472
Digital set — 8403B	S + B + [B]	S+152
Digital set — 8410B	S + B + [B]	S+102
Digital set — 8410D	S + B + [B]	S+190
Digital set — 8411B	S + B + [B]	S+102

Continued on next page

Table 6-5. Allocation of Buttons by Station Type — *Continued*

Station Type	Required Records	Required Records and Button Units
Digital set — 8411D	S + B + [B]	S+190
Digital set — 8434D	S + B + [B]	S+562
Digital set — 8405B/D/B+/D+	S + B + [B]	S+152
602A1 Personal Computer	S + B + [B]	S+342
603A1 Personal Computer	S + B + [B]	S+342
603D1 Personal Computer	S + B + [B]	S+342
Feature Module	[B]	240
Display	B	
Data Module	M	M
7400A/7400B/7400C/7400D Call	M	M
Coverage Module	B	200
EIA (PI-Simplex)	M	M
CDR	M	M
Netcon Data Channel Processor	2M	2M
Interface Link	2M	2M
Integrated Services Digital Network-Basic Rate Interface (ISDN-BRI) UDM —		M+I
— 7505D		S+I+190
— 7506D		S+I+250
— 7507D		S+I+250
— 8503D		S+I+50
— 8510T w/display		S+I+190
— 8520T w/display		S+I+290

The following notes apply to the button and data module records in Table 6-5:

- Any DCP station (except 8400-series) can add a 7400B, requiring one data module record.
- A data module can be added to a 7403D or 7405D, requiring one data module record.
- A data module (ADM-T) can be added to a 7505D, 7506D, or 7507D, requiring one data module record.
- An ISDN-BRI endpoint record is required for each distinct ISDN-BRI endpoint. Thus each voice-only, data-only, or voice-data endpoint uses one of these records.

Initialization and Recovery

The time needed to initialize a system or for a system to recover from being reset depends on the line size of the system, features activated, trunks used, and adjuncts connected to the system. The system needs at least several minutes to initialize or recover automatically from being reset.

Cabling Distances

When the system layout is determined, maximum cabling distances to the system cabinet must be considered. Table 6-6 lists the allowable intra-premises cabling distances. In case of mixed wire sizes, the table columns for 26 gauge wire are used. These cabling distances are based on a minimum of -42.5 VDC at the equipment connecting to the system.

Table 6-6. Allowable Intra-premises Cabling Distances

Equipment[1]	24 AWG Wire (0.5106 mm)		26 AWG Wire (0.4049 mm)	
	Feet	Meters	Feet	Meters
Enhanced attendant console (302C1)				
With selector console				
Phantom powered	800	244	500	152
Locally powered	5000	1524	3400	1037
Without selector console				
Phantom powered	1400	427	900	274
Locally powered	5000	1524	3400	1037
510D or 515 terminals	3000	914	2200	670
513, 610 BCT, 615 MT, 715, 2900/715, 715 BCS-2, 4410 or 4425 terminals (see also "data modules" or "EIA interface"). Maximum distance from terminal to data module or ADU	50	15.2	50	15.2
Data modules:				
Z702AL1-DSU data module base	5000	1524	4000	1219
Z703AL1-DSU data module base	5000	1524	4000	1219
7404D data module	5000	1524	4000	1219
DTDM	3400	1037	2200	670
High-speed data link	5000	1524	4000	1219
MTDM	5000	1524	4000	1219
3270 data module	5000	1524	4000	1219
7400A/B data module	5000	1524	4000	1219
8400B Plus data module	5000	1524	4000	1219

Continued on next page

Table 6-6. Allowable Intra-premises Cabling Distances — *Continued*

Equipment[1]	24 AWG Wire (0.5106 mm)		26 AWG Wire (0.4049 mm)	
	Feet	Meters	Feet	Meters
EIA interface (data line circuit pack and ADU):				
19.2 kbps	2000	610	2000	610
9.6 kbps	5000	1524	4000	1219
4.8 kbps	7000	2130	6000	1827
2.4 kbps	12000	3654	10000	3050
1.2 kbps	20000	6100	16000	4875
0.3 kbps	40000	12200	30000	9150
Voice terminals: Analog 8-port circuit pack (TN742 or TN769), on-premises or out-of-building — same premises [2] and [3]				
500- or 2500- type [4]	20000	6100	13000	3962
7100 series	15200	4633	10000	3050
8100 series	10000	3050	6300	1890
16-port circuit pack (TN746/B or TN2183), on-premises only no out-of-building or bridging [2]				
500 or 2500 type terminals without adjuncts	3100	945	2000	610
8100 series	2500	762	1500	457
16-port circuit pack (TN746B or TN2183), on-premises or out-of-building — same premises[2] and [3]				
500- or 2500-type[4]	20000	6100	13000	3962
7100 series	15200	4633	10000	3050
8100 series	12000	3654	7500	2260
Hybrid (TN762)				
7300 series (without AUX power)	1000	305	750	229
7300 series (with AUX power)	2000	610	2000	610
Digital (TN754B or TN2181) 7400D series or 8400 series				
Phantom powered	3500	1066	2200	670
Locally powered	5000	1524	4000	1219
Digital (TN754) 7400D series				
On-premises-only terminals	3000	914	2200	670
Out-of-building, same premises terminals	2400	732	1300	396

Continued on next page

Table 6-6. Allowable Intra-premises Cabling Distances — *Continued*

Equipment[1]	24 AWG Wire (0.5106 mm)		26 AWG Wire (0.4049 mm)	
	Feet	Meters	Feet	Meters
ISDN-BRI (TN556) 7500 series and 8500 series				
Termination resistor (3 feet)	1900	579	1600	488
Termination resistor (250 feet)	1600	488	1300	396
MET sets (TN735)	1000	305	650	198
Two-wire DCP (TN2181 and TN2224)	10,000	3048	6300	1890

1. If 22 gauge wire is used, contact your Lucent Technologies representative.
2. An out-of-building, same-premises, analog terminal installation requires a carbon block, gas tube, or equivalent solid state device at each end of the interbuilding cable.
3. Only 500- or 2500-type terminals can be used off-premises to a CO.
4. Point-to-point connections and terminals are within 33 feet of the jack.

ISDN-BRI Two-Wire Line Cabling Distances

The TN2198 BRI 2-Wire Line circuit pack supports various cabling configurations using 22, 24, and 26 gauge wire. Up to 18,000 feet (maximum) may be used between the TN2198 and the NT1 network interface.

Refer to Table 6-7 for the cabling distances from the NT1 network interface to the 7500-series and 8500-series voice terminals using 24 gauge and 26 gauge wire. If 22 gauge wire is used, contact your Lucent Technologies representative for cabling distances. Distances from the power closet to the voice terminal are typically less than 250 feet (75 meters).

Table 6-7. Cabling Distances from the NT1 to the ISDN-BRI Voice Terminal

Equipment		24 Gauge		26 Gauge	
		Feet	Meters	Feet	Meters
NT1 to ISDN-BRI Four-Wire Voice Terminal (7500 and 8500 Series)	Termination resistor (3 feet)	1900	579	1600	488
	Termination resistor (250 feet)	1600	488	1300	396

Fiber Optic Cabling Distances

The DEFINITY ECS may contain a Class 1 LASER device if single-mode fiber optic cable is connected to a remote Expansion Port Network (EPN).

CAUTION:
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

The requirements that determine the maximum fiber optic cabling distances for a system are:

- The mean loss and the length of the outside plant fiber cable
- The mean loss and the length of fiber cable shipped with the cabinet (including any fiber riser cable)
- The mean loss of an ST connector and the number of ST connections
- The mean loss due to the total number of splices
- Higher-order mode loss

NOTE:
If estimated fiber limits such as loss, length, excessive splices, and so forth are expected, OTDR (Optical Time Domain Reflectometer) tests should be made to ensure a successful installation of a remote Expansion Port Network (EPN) fiber link.

For multimode fiber: The 9823A lightwave transceiver transmits up to 4,900 feet or 0.93 miles (1.5 km). The 9823B lightwave transceiver transmits up to 25,000 feet or 4.73 miles (7.6 km). Multi-mode fiber optic cable consists of two separate 62.5 micron diameter fiber optic cables. The transmission speed across a fiber optic cable link between the PPN and an EPN is 32.768 Mbps.

For single-mode fiber: The 300A lightwave transceivers transmits light up to 115,000 feet or 22 miles (35 km). Fiber loss must be less than 17dB. Saturation may occur if distances are short; attenuators may be required if the total loss on the fiber link is less than 10dBm. Single-mode fiber optic cable consists of two separate 8 to 10 micron core cables. The transmission speed across a fiber optic cable link between the PPN and an EPN is 32.768 Mbps.

DS1 Remoting Transmission Distance

When the distance between cabinets is greater than 115,000 feet (35 km), or if fiber optic cabling right-of-way is not available, DS1 remoting is used for greater cabling distances. Contact your Lucent Technologies representative for exact cabling distances.

Call Progress Tones

This section details the tones generated by the systems for the United States. See Table 6-8 for the default call progress tones generated country code 1.

Table 6-8. Default Call Progress Tones

Tone	Frequency	Pattern (ms)
Answerback 3 tone	2225 Hz	3000 on followed by silence; no repeat
Answerback 5 tone	2225 Hz	5000 on followed by silence; no repeat
Bridging warning tone[1]	440 Hz	1750 on, 12000 off, 650 on; repeated
Busy tone	480 Hz + 620 Hz	500 on, 500 off; repeated
Call waiting tones:		
Internal	440 Hz	200 on followed by silence; no repeat
External or handled by attendant	440 Hz	200 on, 200 off, 200 on followed by silence; no repeat
Priority call	440 Hz	200 on, 200 off, 200 on, 200 off, 200 on followed by silence; no repeat
Call waiting ringback tone	440 Hz + 480 Hz; 440 Hz	900 on (440 Hz + 480 Hz), 200 on (400 Hz), 2900 off; repeated
Centralized attendant call: incoming call identification	480 Hz & 440 Hz & 480 Hz	100 on (480 Hz), 100 on (440 Hz), 100 on (480 Hz) followed by silence; no repeat
Coverage tone	440 Hz	600 on, followed by silence; no repeat
Confirmation tone	350 Hz + 440 Hz	100 on, 100 off, 100 on, 100 off, 100 on followed by silence; no repeat
Continuous confirmation tone	350 Hz + 440 Hz	100 on, 100 off; repeated
Dial tone	350 Hz + 440 Hz	continuous
Dial zero, attendant transfer, and test calls	440 Hz	100 on, 100 off, 100 on followed by silence; no repeat
Recall on don’t answer, audible ringing	440 Hz	300 on followed by silence; no repeat
Hold recall, hold confirmation	440 Hz	50 on, 50 off, 50 on, 50 off, 50 on, 50 off, 50 on, 50 off, 50 on followed by silence; no repeat
Camp-on recall, camp-on confirmation	440 Hz	100 on followed by silence; no repeat

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Table 6-8. Default Call Progress Tones — *Continued*

Tone	Frequency	Pattern (ms)
Executive override tone	440 Hz	3000 on followed by silence; no repeat
Intercept tone	440 Hz & 620 Hz	250 on (440 Hz), 250 on (620 Hz); repeated
Precedence audible alert tone	440 Hz + 480 Hz	1600 on, 300 off; repeated
Recall dial tone	350 Hz + 440 Hz	100 on, 100 off, 100 on, 100 off, 100 on, 100 off followed by continuous dial tone
Reorder tone	480 Hz + 620 Hz	250 on, 250 off; repeated
Remote hold tone	440 Hz	50 on, 50 off; repeated
Ringback tone	440 Hz + 480 Hz	1000 on, 3000 off; repeated
Voice signaling tone	440 Hz	1000 on followed by silence; no repeat
Zip tone	480 Hz	500 on followed by silence; no repeat

1. Used with the Busy Verification and Executive Override features, and Service Observing feature when the warning tone is enabled.

Table 6-9 lists the call progress tones available for customizing the tones. The tones in the list can be generated only when a TN780 or TN2182 Tone-Clock circuit pack is installed and the tone customizing feature is used. Tag tones are available only on the TN2182 Tone-Clock circuit pack. The tones are used to customize from one to 20 tones in the five administrable tone plans.

In Table 6-9, "Level" is the tone amplitude in decibels (dBm). “0” dBm is referenced to 1 milliwatt. To customize these tones, refer to *DEFINITY Enterprise Communications Server Release 5 Implementation*, 555-230-302.

Table 6-9. Customizable Call Progress Tones

Frequency	Level (dBm)
Null	None
330 Hz	-8.0 [1]
330 Hz + 440 Hz	-5.0 + 8.5 [1]
330 Hz + 440 Hz	-8 + -11 [1]
350 Hz	-17.25
350 Hz + 425 Hz	-4.0 [1]

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Table 6-9. Customizable Call Progress Tones — *Continued*

Frequency	Level (dBm)
350 Hz + 425 Hz	- 4.0
350 Hz + 440 Hz	-13.75
350 Hz + 440 Hz	-13.0 [1]
350 Hz + 440 Hz	-13.75 [1]
375 Hz + 425 Hz	-15.0
404 Hz	-11.0
404 Hz	-16.0
404 Hz + 425 Hz	-11.0
404 Hz + 450 Hz	-11.0
425 Hz	-4.0 [1]
425 Hz	-5.0 [1]
425 Hz	-8.0 [1]
425 Hz	-11.0 [1]
425 Hz	-17.25 [1]
440 Hz	-11.0 [1]
440 Hz	-13.0 [1]
440 Hz	-17.25
440 Hz + 350 Hz	-13.0 [1]
440 Hz + 480 Hz	-13.0 [1]
440 Hz + 480 Hz	-19.0
480 Hz + 620 Hz	-13.0 [1]
480 Hz + 620 Hz	-24.0
525 Hz	-11.0
620 Hz	-17.25
697 Hz or 700 Hz	-8.5/-8.0
770 Hz or 900 Hz	-8.5/-8.0
852 Hz or 1100 Hz	-8.5/-8.0
950 Hz	-5.0 [1]
950 Hz	-10.0 [1]
Chimes (860 Hz)	- 3.0

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Table 6-9. Customizable Call Progress Tones — *Continued*

Frequency	Level (dBm)
941 Hz or 1300 Hz	-8.5/-8.0
DMW (1000 Hz)	0.0
Square (1000 Hz)	+ 3.0
1004 Hz	0.0
1004 Hz	-16.0
1209 Hz or 1500 Hz	-7.5/-8.0
1336 Hz or 1700 Hz	-7.5/-8.0
1400 Hz	-5.0 [1]
1400 Hz	-10.0 [1]
1400 Hz	-11.0
1477 Hz or 2600 Hz	-7.5/-8.0
1633 Hz or 1004 Hz	-7.5/ 0.0
1700 Hz	-16.0 [1]
1800 Hz	-5.0 [1]
1800 Hz	-10.0 [1]
2025 Hz	-12.1
2100 Hz	-12.1
2225 Hz	-12.1
2804 Hz	-16.0
Count	None

1. Available only with TN2182 Tone-Clock circuit pack.

Audible Ringing Patterns

Table 6-10 lists the administrable audible ringing patterns that can appear on analog line circuit pack ports. The times under columns *0 - 5* are in milliseconds. *DEFINITY Enterprise Communications Server Release 5 Implementation*, 555-230-302, contains ringing pattern administration.

Table 6-10. Ringing Patterns

Bursts	Set Number					
		0	1	2	3	4	5
One	on	900	1000	1000	1000	1000	1000
	off	4100	2150	4000	4000	4000	2150
Two	on	400	300	600	400	300	400
	off	200	300	200	200	300	200
	on	300	400	200	400	300	400
	off	4100	2150	4000	4000	4100	2150
Three	on	200	100	200	200	200	200
	off	100	200	200	200	100	200
	on	200	100	200	200	200	200
	off	100	200	200	200	100	200
	on	300	400	200	200	300	200
	off	4100	2150	4000	4000	4100	2150

The following circuit packs default to the associated ringing pattern sets:

- TN2180 — Set 1
- TN2135 — Set 2
- TN2144 — Set 3
- TN468B — Set 4
- TN2149 — Set 4
- TN2181, TN2183, and TN2224 — Set 0 (administrable ringing cadence)

The following list shows the intended usage for administered ringing pattern sets:

- Set 0 — United States
- Set 1 — Japan and Spain
- Set 2 — Italy
- Set 3 — Netherlands and Sweden
- Set 4 — Australia, Belgium, and United Kingdom
- Set 5 — India, Malaysia, New Zealand, and Singapore

Multi-Frequency Compelled Tones

With Multi-Frequency Compelled (MFC) signaling used on Direct Inward Dialing (DID) and Direct Outward Dialing (DOD) trunks in countries outside the United States, a system responds to the frequencies generated by the CO with answering frequencies.

The MFC tones and signaling sequence follows the CCITT recommendations for MFC signaling defined in *Volume VI, Fascicle VI.4* of the 1989 CCITT *blue books*. CCITT is now the International Telecommunications Union (ITU).

Refer to *DEFINITY Enterprise Communications Server Release 5 Implementation*, 555-230-302, for more details.

Indicator Lamp Signals

Table 6-11 lists the lamp signals generated by the system for the attendant console and multi-appearance voice terminals.

Table 6-11. Lamp Signals Generated

Lamp Signal	Pattern in Milliseconds (ms)
Dark	Off
Lighted	On
Flashing	500 on, 500 off; repeated
Fluttering	50 on, 50 off; repeated
Broken Flutter	5 cycles of 50 on, 50 off, followed by 500 off; repeated
Wink	350 on, 50 off; repeated

Protocols

Table 6-12 lists the various protocols, with applications and maximum limitations.

Table 6-12. Protocols Used in DEFINITY

Protocol	Applications	Maximum Data Rate	Maximum Distance
DCP	Digital switch to data endpoints	64 kbps	5000 feet (1524 m) for data 3000 feet (915 m) for voice
RS-232	System to administration terminal. Data module to host computer	19.2 kbps	50 feet (15.2 m)
	Data module to printer	64 kbps	17 feet (5.9 m)
	Data module for downloading and high-speed data transfer	64 kbps	17 feet (5.9 m)
	EIA interface (Data line to ADU)[1]	 19.2 kbps 9.6 kbps 4.8 kbps 2.4 kbps 1.2 kbps 0.3 kbps	 2000 feet (610 m) 5000 feet (1524 m) 7000 feet (2130 m) 12,000 feet (3654 m) 20,000 feet (6100 m) 40,000 feet (12200 m)
RS-449	Processor Interface to Processor Interface	19.2 kbps 9.6 kbps 4.8 kbps 2.4 kbps	200 feet (61 m) 400 feet (122 m) 800 feet (244 m) 1600 feet (488 m)
SSI	715 BCS3-2 to Processor Interface 500 series printers to Processor Interface	56 kbps	5000 feet (1524[2] m)
BISYNC	Processor Interface line controller to host computer for terminal emulation (9.6 kbps)	2.4 kbps 4.8 kbps 9.6 kbps	
BX.25	Communication interface to MSA[3], DCS1, ISDN, or AUDIX	9.6 kbps	
SDCPI	Data module to Processor Interface	64 kbps	17 feet (5.9 m)

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Table 6-12. Protocols Used in DEFINITY — *Continued*

Protocol	Applications	Maximum Data Rate	Maximum Distance
RS-366	Host computer to ACU[4] Data module to ACU	 64 kbps	50 feet (15.2 m) 17 feet (5.9 m)
V.35	Data module to data endpoints	56 kbps	50 feet (15.2 m)
Category A	Data modules to terminals or cluster controller Data module in ASCII emulation mode	64 kbps 9.6 kbps	500 feet (152 m)
ISDN-BRI	Communication interface to ISDN-BRI S/T ISDN-BRI U	64 kbps 160 kbps	655 feet (199.3 m) to network interface or repeater 1310 feet (399.3 m) system to system 18,000 feet (5486.4 m) from system to network interface, and then ~2000 feet to phone
ISDN-PRI	Communication interface to ISDN-PRI	64 kbps	655 feet (199.3 m) to network interface or repeater 1310 feet (399.3 m) system to system

1. ADU means Asynchronous Data Unit
2. BCS means Business Communications System
3. MSA means Message Servicing Adjunct
4. BCS means Business Communications System

Transmission Characteristics

The system transmission characteristics comply with the American National Standards Institute/Electronic Industries Association (ANSI/EIA) standard RS-464A (SP-1378A). The following tables list some general switch transmission characteristics.

Frequency Response

Table 6-13 lists the analog-to-analog frequency response for station-to-station or station-to-CO trunk, relative to loss at 1 kHz for the United States.

Table 6-13. Analog-to-Analog Frequency Response

Frequency (Hz)	Maximum Loss (dB)	Minimum Loss (dB)
60	—	20
200	5	0
300 to 3000	1	-0.5
3200	1.5	-0.5
3400	3	0

Table 6-14 lists the analog-to-digital frequency response of the system for station or CO-trunk-to-digital interface (DS0), relative to loss at 1 kHz for the United States.

Table 6-14. Analog-to-Digital Frequency Response

Frequency (Hz)	Maximum Loss (dB)	Minimum Loss (dB)
60	—	20
200	3	0
300 to 3000	0.5	-0.25
3200	0.75	-0.25
3400	1.5	0

Insertion Loss for Port-to-Port; Analog or Digital

Table 6-15 lists the insertion loss in the system for different connection types for the United States. Table 6-16 shows the overload and cross-talk characteristics.

Table 6-15. Insertion Loss for the United States

Typical Connections	Nominal Loss (dB) at 1 kHz
On-premises to on-premises station	6
On-premises to off-premises station	3
Off-premises to off-premises station	0
On-premises station to 4-wire trunk	3
Off-premises station to 4-wire trunk	2
Station-to-trunk	0
Trunk-to-trunk	0

Table 6-16. Overload and Crosstalk

Overload level	+3 dBm0
Crosstalk loss	>70 dB

Intermodulation Distortion

Table 6-17 lists the intermodulation distortion in the system for analog-to-analog and analog-to-digital, up to 9.6 kbps data.

Table 6-17. Intermodulation Distortion

Four-Tone Method	Distortion
Second-order tone products	>46 dB
Third-order tone products	>56 dB

Quantization Distortion Loss

Table 6-18 lists the quantization distortion loss in the system for analog port to analog port.

Table 6-18. Quantization Distortion Loss

Analog Port-to-Analog Port	
Signal Level	**Distortion Loss**
0 to -30 dBm0	>33 dB
-40 dBm0	>27 dB
-45 dBm0	>22 dB

Table 6-19 lists the quantization distortion loss in the system for analog port to digital port and digital port to analog port.

Table 6-19. Quantization Distortion Loss

Analog Port-to-Digital Port or Digital Port-to-Analog Port	
Signal Level	**Distortion Loss**
0 to -30 dBm0	>35 dB
-40 dBm0	>29 dB
-45 dBm0	>25 dB

Terminating Impedance: 600 Ohms nominal
Trunk balance impedance (selectable): 600 Ohms nominal or complex Z [350 Ohms + (1 k Ohms in parallel with 0.215F)]

Impulse Noise

On 95% or more of all connections, the impulse noise is 0 count (hits) in five minutes at +55 dBrnC (decibels above reference noise with C-filter) during the busy hour.

ERL and SFRL Talking State

Echo-Return Loss (ERL) and Single-Frequency Return Loss (SFRL) performance is usually dominated by termination and/or loop input impedances. The system provides an acceptable level of echo performance if the ERL and SFRL are met.

Station-to-station	ERL should meet or exceed 18 dB SFRL should meet or exceed 12 dB
Station to 4-wire trunk connection	ERL should meet or exceed 24 dB SFRL should meet or exceed 14 dB
Station to 2-wire trunk connection	ERL should meet or exceed 18 dB SFRL should meet or exceed 12 dB
4-wire to 4-wire trunk connection	ERL should meet or exceed 27 dB SFRL should meet or exceed 20 dB

Peak Noise Level

Analog to analog — 20 dBrnC (decibels above reference noise with C-filter)

Analog to digital — 19 dBrnC

Digital to analog — 13 dBrnC

Echo Path Delay

Analog port to analog port — $\leq$ 3 ms

Digital interface port to digital interface port — $\leq$ 2 ms

Service Codes

Service codes (for the United States only) are issued by the Federal Communications Commission (FCC) to equipment manufacturers and registrants. These codes denote the type of registered terminal equipment and the protective characteristics of the premises wiring of the terminal equipment ports.

Private line service codes are as follows:

- 7.0Y — Totally protected private communications (microwave) systems
- 7.0Z — Partially protected private communications (microwave) systems
- 8.0X — Port for ancillary equipment
- 9.0F — Fully protected terminal equipment
- 9.0P — Partially protected terminal equipment
- 9.0N — Unprotected terminal equipment
- 9.0Y — Totally protected terminal equipment

The product line service code is 9.0F indicating it is terminal equipment with fully protected premises wire at the private line ports.

Facility Interface Codes

A Facility Interface Code (FIC) is a five-character code (United States only) that provides the technical information needed to order a specific port circuit pack for analog private lines, digital lines, MTS lines, and WATS lines.

Table 6-20 through Table 6-22 list the FICs. Included are service order codes, Ringer Equivalency Numbers (RENs), and types of network jacks that connect a line to a rear panel connector on a carrier.

Table 6-20. Analog Private Line and Trunk Port Circuit Packs

Circuit Pack	Facility Interface Code (FIC)	Service Order Code	Network Jack
TN742 and TN747B Off-Premises Station Port, and TN746B Off-Premises Station Port or On-Premises Station port	0L13C	9.0F	RJ21X
TN760/B/C/D Tie Trunk	TL31M	9.0F	RJ2GX

Table 6-21. Digital Trunk Port Circuit Packs

Circuit Pack	Facility Interface Code (FIC)	Service Order Code	Network Jack
TN1654 and TN574 DS1 Converter; TN722B DS1 Tie trunk; and TN767 and TN464 DS1 Interface	04DU9B,C	6.0P	RJ48C and RJ48M

Table 6-22. MTS and WATS Port Circuit Packs

Circuit Pack	Facility Interface Code (FIC)	Ringer Equivalency Number (REN)	Network Jack
TN742 and TN746B Analog Line	02LS2	None	RJ21 and RJ11C
TN747B Central Office Trunk	02GS2	1.0A	RJ21X
TN753 DID Trunk	02RV2-T	0,0B	RJ21X
TN790 Processor	02LS2	1.0A	RJ21X
TN1648 System Access and Maintenance	02LS2	0.5A	RJ21X

Wireless Business Solutions

A

Overview

This appendix briefly describes the DEFINITY Wireless Business System, the FORUM™ Personal Communications Manager (PCM), and the DEFINITY Cellular Business Systems.

FreeWorks™ Wireless Telecommunications

FreeWorks provides a complete global wireless system for the United States and other countries. The DEFINITY Wireless Business System product provides wireless applications within the United States. The FORUM™ PCM product provides CT2 (Cordless Telephone Generation 2) technology for countries outside the United States. The DEFINITY Cellular Business System provides wireless applications both in and out of a building. This system is currently used in the United States only.

Any of the above mentioned products provide greater mobility to business customers by integrating wireless capabilities into the DEFINITY Enterprise Communications Server. The primary benefits of each product include:

- Cord-quality voice service
- Wireless mobility
- Multiple floor coverage
- Access to the DEFINITY ECS calling features

Each of the three systems is ideally suited to personnel associated with building security, maintenance, and sales and may be added to an existing Release 5 system while retaining the same features and quality of service.

For more information on how to use the wireless telephone handsets, refer to the *DEFINITY Wireless Business System Users Guide*, 555-232-105.

For more information about installing the DEFINITY Wireless Business System, refer to *DEFINITY Wireless Business System Installation and Test Guide*, 555-232-102.

For information about connecting the Wireless Fixed Base to the DEFINITY system, refer to *DEFINITY Wireless Business System Interface*, 555-232-108.

Wireless Business System Components

The Wireless Business System consists of the following main components:

- Mobility Manager Software
- Radio Controllers
- Wireless Fixed Bases
- Cell Antenna Units
- Pocket Telephones
- Battery Chargers

The following subsections describe each of the above main components. Contact your Lucent Technologies representative to help in determining the types and numbers of components required at each site.

Mobility Manager

The Mobility Manager software provides maintenance and administration functions for the wireless network. This software also provides the common control and tracking of the pocket telephones as they change location inside the business premises. The Mobility manager also directs all control and voice information to the appropriate Radio Controller for each pocket telephone.

Radio Controllers

The Radio Controllers are circuit packs inside the Enterprise Communications Server. Each Radio Controller provides connects and controls up to two Wireless Fixed Bases. Radio Controllers provide the interface between the system and the network of Wireless Fixed Bases. The controllers are connected to the Wireless Fixed Bases via an I2 proprietary interface. The Radio Controller is responsible for much of the intelligence needed to maintain the quality of the radio links established between elements.

The Radio Controller circuit pack operates in all applicable DEFINITY cabinets over the full range of temperature and humidity specifications:

- 40 to 120 degrees Fahrenheit (4.4 to 48.9 degrees Celsius)
- 10% to 95% relative humidity at 84 degrees Fahrenheit (28.8 degrees Celsius)
- 10% to 45% relative humidity at 110 degrees Fahrenheit (43.3 degrees Celsius)

Wireless Fixed Bases

The Wireless Fixed Bases are the radio base stations required to change incoming calls from the system into radio signals used for transmission through the air to the appropriate pocket telephones. The bases also change the incoming radio signals from the pocket telephones into binary data before they are sent to the system.

Each base can support up to 12 simultaneous conversations. The base can also support one local cell antenna unit or up to four remote external cell antenna units. Each base is connected to a Radio Controller via an I2 interface. Each base is connected to 1 to 4 Cell Antenna Units via an I3 proprietary interface. Table A-1 details the Wireless Fixed Base (WFB) dimensions and weight.

Table A-1. Dimensions and Weight

Height	Width	Depth	Weight	Heat Dissipation (Per Hour)
5 inches (12.7 cm)	7 inches (17.8 cm)	2 inches (5.08 cm)	2 Pounds (0.9 kg)	6.82 to 34.1 BTUs (1.8 to 8.9 gram-calories)

The Wireless Fixed Base meets the requirements for “Equipment not Normally Customer Carried” and is intended for use indoors.

- 0 degrees to 120 degrees Fahrenheit (-32 to 48.9 degrees Celsius)
- 0% to 95% relative humidity

Each WFB can be phantom-powered by the I2 interface on the TN789 Radio Controller circuit pack or powered from an auxiliary AC power supply (WP-92464). The TN789 can supply 250 mA of load current if no CAUs are installed. The auxiliary AC power supply supplies 400 mA of load current. Each WFB can dissipate from 1.8 Watts to 10 Watts of power (depending on number of simultaneous calls).

NOTE:
The auxiliary power supply is required if one or more CAUs are connected to the WFB.

Cell Antenna Unit (Optional)

The Cell Antenna Unit is an optional remote antenna connecting to a Wireless Fixed Base. The antenna is used to expand a coverage area and can be located as far as 100 cable feet from its associated base. Each antenna is connected to and powered from the base via an RG59, 75 Ohm coaxial cable. The Cell Antenna Units use an I3 interface. The frequency bandwidth of the antenna is 1910 MHz to 1930 MHz.

The Cell Antenna Unit meets the requirements for “Equipment not Normally Customer Carried” and is intended for use indoors.

- 0 degrees to 120 degrees Fahrenheit (-32 to 48.9 degrees Celsius)
- 0% to 95% relative humidity

Each Cell Antenna Unit (CAU) weighs 1/2 pound (0.22 kg) and can dissipate up to 2 Watts of power. The average heat dissipation is 6.82 BTUs (1.8 gram-calories) per hour.

Pocket Telephones

Pocket telephones (9601-type) are pocket-sized portable telephones designed to operate indoors. The telephones provide two call appearances, a display that supports basic business communications needs, and a 12-button dial pad. The telephone may be used as a supplement to a wired desk telephone or may be used in place of a desk telephone.

Up to 260 telephones can be used throughout the entire coverage area of 3 million square feet (914,400 square meters). The telephone is not physically connected to the system or to any system component. Instead, the telephone uses wireless communications to a network of Wireless Fixed Bases. Only the bases are physically connected to the system.

Battery Chargers

The Battery Charger can be either wall or desk mounted and can charge a fully discharged battery in less than 1.5 hours. The charger can simultaneously charge a pocket telephone battery and a spare battery pack.

The Battery Charger meets the requirements for “Equipment not Normally Customer Carried” and is intended for use indoors.

- 32 to 120 degrees Fahrenheit (0 to 48.9 degrees Celsius)
- 0% to 95% relative humidity

Pocket Telephone Feature Access

The Class of Restriction (COR) and Class of Service (COS) features can be used to limit unauthorized access to features or services for a specific handset. Any telephone not administered on a system displays a “service denied” indication.

A pocket telephone previously administered on a system may be removed from service because it has been returned to customer inventory or reported as lost or stolen. The Mobility Manager provides a “marking” option. If a “marked” telephone attempts to access the system, a specified referral point is notified. Marked telephones are identified by their serial numbers so a user’s extension number can be assigned to a different telephone.

System Capacity Limits

B

Overview

This appendix provides information on the overall characteristics and capacities of the DEFINITY Systems.

System Capacity Limits

The maximum parameters for the DEFINITY hardware and software items are listed on the following pages. Unless otherwise noted, these parameters apply to Single-Carrier Cabinets, Compact Single-Carrier Cabinets, and Multi-Carrier Cabinet systems. Also:

- For G3V4 Issue 3 and earlier systems: when a capacity limit is the same for Advantage Business Package (ABP) and Premier Business Package (PBP), the common limit is listed. When a capacity limit for ABP and PBP differ, the ABP limit is given first followed by the PBP limit.
- Terminal and digital station capacities are reduced by such administered items as: attendant consoles, number of EAS login IDs, and number of ACD agents.

NOTE:
The Advantage Business Package and the Premier Business Package are not available in Release 5 and later systems.

NOTE:
Not all maximum capacities listed in Table B-1 through Table B-3 can be reached simultaneously with all versions or all configurations of the system.

Table B-1. Maximum System Parameters for G3V4 Issue 1

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Abbreviated Dialing (AD)				
AD Lists Per System	200	200	2,400	5,000
AD List Entry Size	24	24	24	24
AD Entries Per System	2,000	2,000	12,000	100,000
Auto Dialing Button[1]				
Entries per System	NA	NA	NA	NA
Enhanced List (System List)	NA/1	NA/1	1	1
Maximum Entries	NA/2,000	NA/2,000	10,000	10,000
Group Lists	100	100	100	1,000
Maximum Entries	100	100	100	100
Group Lists per Extension	3	3	3	3
System List	1	1	1	1
Maximum Entries	100	100	100	100
Personal Lists	200	200	2,400	5,000
Maximum Entries	100	100	100	100
Personal Lists per Extension	3	3	3	3
Applications Adjuncts				
CallVisor ASAI Adjuncts	NA	NA/4	8	8
Asynchronous Links (RS-232)	5	5	5	10
CDR Output Devices	2	2	2	2
Journal:System Printer	2:1	2:1	2:1	2:1
Property Management Systems	1	1	1	1
BX.25 Physical Links[2]	4	4	8	16
Application Processors (such as 3B2-MCS)	1	1	1	7
AUDIX Adjuncts	1	1	1	8
CMS Adjuncts	1	1	1	1
ICM Adjuncts (ISDN Gateway)	NA/1	NA/1	1	1
BX.25 Processor Channels	64	64	64	128
Hop Channels	64	64	64	128

1. No limit on the maximum number of auto dial buttons (other than the system limit on button capacity).
2. In the case of SCC/ESCC/CSCC, only four BX.25 physical links are supported in the configuration.

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Automatic Call Distribution (ACD)				
Announcements per Split	2	2	2	2
Announcements per System	128	128	128	256
Splits[1]	12/24	12/24	99	255
ACD Members per Split	150	150	200	999
Split Members per System Measured ACD Agents (Switch Limits)				
Logged-In Splits per Agent[2]				
No CMS	4	4	4	4
R2 CMS	3	3	3	3
R3 CMS	3	3	3	3
R3V2 CMS	4	4	4	4
R3V4 CMS[3]	4	4	4	4
Queue Slots per Group	200	200	200	999
Queue Slots per System	200	200	1,000	10,500
ARS/AAR				
AAR/ARS Patterns (Shared)	20/40	20/40	254	640
ARS/AAR Table Entries (NPA, NXX, RXX, HNPA, FNPA)	2,000	2,000	2,000	2,000
Choices per RHNPA Table	12	12	12	12
Digit Conversion Entries	400	400	400	400
AAR/ARS Digit Conversion				
Digits Deleted for ARS/AAR[4]	28	28	28	28
Digits Inserted for ARS/AAR	18	18	18	18
AAR/ARS Sub-Net Trunking				
Digits Deleted for ARS/AAR	28	28	28	28
Digits Inserted for ARS/AAR	36	36	36	36
Digits Sent for ARS/AAR	40	56	31	68

1. All references to Hospitality Parameter Reduction on the Customer Option form have been removed.
2. In the case where going from 4 to 3 login maximums, a change to the hunt group form is required, forcing all agents to be logged-out. In one extreme case, this is potentially avoided and R2 & R3 CMS handles the fourth login as UNSTAFFED appropriately.
3. R3V3 CMS was renamed to R3V4 CMS to match the DEFINITY System numbering.
4. Plus up to 7 inter-exchange carrier (IXC) digits.

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
ARS/AAR (continued)				
Entries in HNPA and RHNPA Tables	1,000	1,000	1,000	1,000
FRLs	8	8	8	8
Inserted Digit Strings[1]	450	450	1,200	3,000
Patterns for Measurement				
Shared Patterns for Measurement	20	20	20	25
RHNPA Tables	32	32	32	32
Routing Plans	8	8	8	8
Toll Tables	32	32	32	32
Entries per Toll Table	800	800	800	800
Trunk Groups in an ARS/AAR Pattern	6	6	6	16
UDP (Entries)	NA/240	NA/240	10,000	50,000
TOD Charts	8	8	8	8
Attendant Service				
Attendant Consoles (day:night)[2]	4:1	6:1	15:1	27:1
Attendant Console 100s Groups/Attendant	20	20	20	20
Attendant Control Restriction Groups	96	96	96	96
Centralized Attendant Service				
Release Link Trunks at Branch	NA/99	NA/99	99	255
Release Link Trunk Group at Branch	NA/1	NA/1	1	1
Release Link Trunks at Main	NA/100	NA/100	400	4,000
Release Link Trunk Groups at Main[3]	NA/32	NA/32	99	666
Other Access Queues				
Maximum Number of Queues	12	12	12	12
Maximum Number of Queue Slots[4]	30	30	80	80
Size Range of Reserved Queue	2-25	2-25	2-75	2-75
Reserved Queue Default Size	5	5	5	5

1. This is the number of 12 character inserted-digit-strings available for AAR/ARS preferences.
2. The number for G3vs is the recommended number of consoles that should be supported due to power limitations. Of the four consoles, one may be used as a night console. The software actually supports 6:1 day/night attendant consoles.
3. This number is the same as the number of trunk groups in the system.
4. Referred to as ‘‘emergency access queue length’’ in G3i.

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Attendant Service (continued)				
Queue Length	30	30	80	300
Switched Loops per Console	6	6	6	6
Authorization				
Authorization Codes	1,500	1,500	5,000	90,000
Classes of Restriction	96	96	96	96
Classes of Service	16	16	16	16
Length of Authorization Code	4-7	4-7	4-7	4-7
Length of Barrier Code	4-7	4-7	4-7	4-7
Length of Forced Entry Account Codes	NA/1-15	NA/1-15	1-15	1-15
Restricted Call List	1	1	1	1
Remote Access Barrier Codes	10	10	10	10
CDR Forced Entry Account Code List	NA/1	NA/1	1	1
Toll Call List	1	1	1	1
Unrestricted/Allowed Call Lists	10	10	10	10
Total Call List Entries	1,000	1,000	1,000	1,000
Automatic Callback Calls	20	20	240	1,500
Automatic Wakeup				
Simultaneous Display Requests	10	10	10	30
Wakeup Requests per System	200	200	2,400	15,000
Wakeup Request per Extension	1	1	1	1
Wakeup Requests per 15-minute Interval	150	150	450	950
Basic CMS				
Measured Agents or Login IDs	75	75	400	2,000
Measured Splits	12/24	12/24	99	255
Measured Trunk Groups	16/32	16/32	32	32
Measured VDNs	NA/24	NA/24	99	512
Reporting Periods				
Intervals	25	25	25	25
Days	7	7	7	7

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Cabinets				
Expansion Port Network (EPN)				
Multi-Carrier Cabinet (MCC)[1]	NA	NA	2	43
Single-Carrier Cabinet (SCC)[1]	NA	NA	8	164
Small (Upgrades only)[2]	NA	NA	2	41
Inter-Port Network Connectivity				
Port Networks	1	1	3	44
Maximum Port Networks per Cabinet	1	1	1	2
Switch Nodes (Simplex)	NA	NA	NA	3
Switch Nodes (Duplex)	NA	NA	NA	6
DS1 Converter Complex (Simplex)	NA	NA	NA	41
DS1 Converter Complex (Duplex)	NA	NA	NA	82
Processor Port Network (PPN)				
Multi-Carrier Cabinet (MCC)[3]	NA	NA	1	1
SCC/ESCC	NA	4	4	NA
CSCC	1	NA	NA	NA
Call Appearances				
Bridged Images per Appearance	7	7	7	15
Call Appearances per Station[4]	54	54	54	54
Maximum Appearances per Extension	10	10	10	10
Minimum Appearances per Extension	0	0	0	0
Total Bridged Appearances	200	200	2,400	25,000
Maximum Simultaneous Off-Hook per Call[5]	5	5	5	5
Call Coverage				
Coverage Answer Groups (CAG)	30	30	200	750
Coverage Paths	150	150	600	7,500

1. Only EPNs in G3r can be DS1-remote EPNs.
2. Small systems refer to the 2-carrier cabinet systems that are no longer sold to new customers.
3. MCC includes Medium Cabinet.
4. The number of call appearances is the sum of primary and bridged appearances; at most 10 can be primary. A maximum of 54 administrable buttons are supported for the 7434D terminal — 34 buttons in the basic terminal and an additional 20 buttons in the coverage module.
5. Does not apply to conferencing.

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Call Coverage (Continued)				
Coverage Paths Included in Call Coverage Report	100	100	100	100
Coverage Path per Station	4	4	4	4
Coverage Points in a Path	3	3	3	3
Maximum Users/Coverage Path[1]	500	500	3,500	36,065
Members per CAG	8	8	8	8
Number of Coverage Paths for which Each Station Can Be a Member	300	300	300	300
Call Detail Recording				
CDRU Trackable Extensions	200	200	2,400	25,000
Intra-Switch Call Trackable Extensions	100	100	1,000	5,000
Number of CDRUs/System[2]	1	1	1	1
Maximum Number of CDR Records Buffered in the Switch	300	300	300	1,900
Number of Records Buffered for the Primary Output Device Causing Secondary Device to be Busied Out for 2 Minutes	200	200	200	1,800
Call Forwarding (Follow-me)				
Call Forwarded Digits (off-net)	16	16	16	16
Call Forwarded Numbers	200	200	2,400	25,000
Call Park				
Attendant Group Common Shared Extension Numbers	10	10	80	80
Number of Parked Calls	180	180	723	10,604
Call Pickup Groups				
Call Pickup Members per Group	50	50	50	50
Call Pickup Members per System	200	200	2,400	25,000
Number of Groups	100	100	800	5,000

1. The maximum number of users per coverage path is equal to the number of extensions.
2. The CDRU adjunct capacity is 40,000 calls per hour, and it exceeds the system call capacity for all systems except for G3r.

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Call Vectoring				
Maximum Skills a Call Can Simultaneously Queue to	NA/3	NA/3	3	3
Priority Levels	NA/4	NA/4	4	4
Recorded Announcement	NA/128	NA/128	128	256
Steps per Vector	NA/32	NA/32	32	32
Vector Directory Numbers	NA/100	NA/100	512	20,000
CMS Measured VDNs[1]	NA/100	NA/100	512	2,000
Vectors per System	NA/48	NA/48	256	512
Number of Collected Digits for Call Prompting	NA/16	NA/16	16	16
Number of Dial-Ahead Digits for Call Prompting	NA/24	NA/24	24	24
Vector Routing Tables	NA/5	NA/5	10	100
CallVisor ASAI				
Active Station Control Association	NA	NA/250	2,000	6,000
Call Controllers per Call	NA	NA/1	1	1
Call Monitors per Call	NA	NA/14	14	14
Station Controllers per Station	NA	NA/2	2	2
Maximum Simultaneous Call Classification	NA	NA/40	40	400
Number of CallVisor ASAI Links Open and Proprietary)[2]	NA	NA/4	8	8
Notification Requests (Monitors)	NA	NA/50	170	2,000
Simultaneous Active Call Controlled Calls	NA	NA/75	300	3,000
Switch to Adjunct Associations (Routing)	NA	NA/127	127	127
Number of Open MultiQuest Billing Requests	NA	25	100	1,000
Conference Parties	6	6	6	6
Simultaneous 3-way Conference Calls[3]	161	161	483	7,084
Simultaneous 6-way Conference Calls[4]	80	80	240	3,520

1. Measured limits depend on the CMS release used.
2. Proprietary, exists in G3V3 only.
3. Simultaneous 3-way Conference Call = (483 / 3)* number PNs.
4. Simultaneous 6-way Conference Call = (483 / 6)* number PNs.

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Data Parameters				
Administered Connections	NA/24	NA/24	128	128
Alphanumeric Dialing				
Maximum Entries	50	50	200	1,250
Characters per Entry	22	22	22	22
PRI Endpoints (PE)	NA/25	NA/25	25	50
Access Endpoints (Number of Trunks)	50/100	50/100	400	4,000
Digital Data Endpoints	75	75	800	7,500
Dial Plan				
DID LDNs	8	8	8	20
EAS Agent Login IDs[1]	NA/450	NA/450	1,500	10,000
Extensions	500	500	3,500	36,065
Extension Number Portability[2]	NA/240	NA/240	10,000	50,000
Feature Dial Access Codes				
Number of Access Codes	70	70	70	70
Number of Digits	1-4	1-4	1-4	1-4
Integrated Directory Entries[3]	207	207	2,416	25,028
Maximum Extension Size	5	5	5	5
Minimum Extension Size	1	1	1	1
Miscellaneous Extensions[4]	150	150	900	3,317
Names[5]	448/464	448/464	4,215	36,511
Number of Characters in a Name	15	15	15	15
Non-DID LDNs	50	50	50	666
Prefix Extensions	Yes	Yes	Yes	Yes
Trunk Dial Access Codes				
Number of Access Codes	49/65	49/65	317	884
Number of Digits	1-4	1-4	1-4	1-4

1. Login IDs count against the “Extensions” switch capacity.
2. The numbers shown in ‘‘Extension Number Portability’’ are Uniform Dialing Plan (UDP) entries.
3. The Integrated Directory Entries = Stations + Attendant Consoles.
4. Used for PCOL groups, common shared extensions, access endpoints, administered TSCs, code calling IDs, LDNs, hunt groups, announcements, and TEGs.
5. The Number of Names = number of stations + attendant consoles + trunk groups + digital data endpoints + miscellaneous extensions.

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Do Not Disturb (DND)				
DND Requests per System	200	200	2,400	25,000
Simultaneous Display Requests	10	10	10	30
Expert Agent Selection (EAS)				
Skill Groups	NA/24	NA/24	99	255
VDN Skill Preferences	NA/3	NA/3	3	3
Maximum Skills a Call Can Simultaneously Queue to	NA/3	NA/3	3	3
Agent Login IDs	NA/450	NA/450	1,500	10,000
Maximum Skills per Agent	NA/4	NA/4	4	4
Maximum Agents that can be Logged-In				
When Each Has 4 Skills Assigned	NA/37	NA/37	125	1,300
When Each Has 1 Skill Assigned	NA/150	NA/150	500	5,200
Facility Busy Indicators				
Buttons per Tracked Resource[1]	100	100	100	500
Number of Indicators (Station and Trunk Groups)	450	450	3,600	10,000
Hunt Groups				
Announcements per Group	2	2	2	2
Announcements per System	128	128	128	256
Groups	12/24	12/24	99	255
Group Members per Group	150	150	200	999
Group Members per System	150	150	500	5,200
Queue Slots per Group	200	200	200	999
Queue Slots per System	200	200	1,000	10,500
Number of Queue Warning Lamps per Split	100	100	100	100
Number of Queue Warning Lamps per System	150	500	500	5,200

1. With G3V4 and later releases this limit is enforced. However, customers upgrading to V4 or a later release are not forced to decrease the number of buttons.

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Intercom Translation Table (ICOM)				
Automatic/Manual and Dial				
ICOM groups per system	10	10	32	256
Auto/Manual	10	10	32	256
Dial	10	10	32	256
Members per ICOM group				
Auto	32	32	32	32
Dial	32	32	32	32
Members per System	320	320	1,024	8,192
Last Number Dialed				
Entries/System[1]	282	282	3,216	32,528
Number of Digits	24	24	24	24
Leave Word Calling (Switch-Based)[2]				
Messages Stored	450	450	2,000	6,000
Messages per User	125	125	125	125
Remote Message Waiting Indicators				
Per Extension	80	80	80	80
Per System	240	240	240	1,250
Simultaneous Message Retrievers	60	60	60	400
System-Wide Message Retrievers	10	10	10	10
Malicious Call Trace				
Maximum Simultaneous Traces	16	16	16	16
MLDN				
Via DID	8	8	8	20
Via CO	50	50	50	50
Modem Pool Groups				
Mode 2/Analog				
Group Members per System	64	64	160	2,016
Number of Groups	2	2	5	63
Members per Group	32	32	32	32

1. The Last Number Dialed Entries = Stations + Digital Data Endpoints + Attendant Consoles.
2. Leave Word Calling is available in the ABP only if the Voice Mail Option is purchased.

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Networking				
CAS Nodes	NA/99	NA/99	99	99
DCS Nodes[1]				
BX.25	NA/20	NA/20	20	20
ISDN PRI	NA/20	NA/20	20	20
Hybrid	NA/20	NA/20	20	20
ENP Nodes[2]	NA/999	NA/999	999	999
Paging				
Code Calling IDs	125	125	125	125
Loudspeaker Zones	9	9	9	9
Partitions[3]				
Attendant Group	15	15	15	27
Extension Partition Group	8	8	8	8
Extension Partition	8	8	8	8
Tenant Partition	20	20	20	100
Personal CO Lines (PCOL)				
PCOL Appearances	4	4	4	16
PCOL Lines (Trunk Groups)	15	15	200	200
PCOL Trunks Per Trunk Group	1	1	1	1
Port Circuit Pack Slots[4]				
Per Expansion Port Network (EPN)				
MCC Standard Reliability	NA	NA	99	99
SCC Standard Reliability	NA	NA	71	71
Small Cabinet Standard Reliability (Upgrade only)	NA	NA	39	39

1. The actual limit in the software is 63, but due to performance considerations the recommended number of DCS Nodes is 20.
2. The numbers here are node number addresses.
3. G3V2 and G3V3 do not support Tenant Partitioning.
4. Only port slots are included in this count. For example, there are 100 port slots per MCC EPN cabinet. One slot in the cabinet is already dedicated for the Tone/Clock board. Other service circuits may be required that would further reduce the number of port slots available. In G3r and G3i carriers, the service slot may be equipped with service boards that do not require tip and ring connections

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Port Circuit Pack Slots (Continued)				
Per Processor Port Network (PPN)				
MCC Standard Reliability	NA	NA	89	80
SCC Standard Reliability	NA	NA	64	NA
ESCC Standard Reliability	NA	70	70	NA
CSCC Standard Reliability	10	NA	NA	NA
Recorded Announcements				
Analog and Auxiliary Trunk Announcements				
Analog and Auxiliary Trunk Queue Slots per Announcement	50	50	150	1,000
Analog and Auxiliary Trunk Queue Slots per System	50	50	150	1,000
Calls Connected per Announcement				
Auxiliary Trunk	50	50	150	1,000
Analog Port	50	50	150	1,000
Integrated Announcements				
Integrated Announcement Circuit Packs	1	1	5	10
Channels Connected per Integrated Announcement Circuit Pack	16	16	16	16
Calls Connected per Integrated Announcement	25	25	50	1,000
Integrated Announcement Recording Time (Minutes:Seconds)				
16 kB recording	8:32	8:32	8:32	8:32
32 kB recording	4:16	4:16	4:16	4:16
64 kB recording	2:8	2:8	2:8	2:8
Integrated Queue Slots per System[1]	25	25	50	4,000
Total Recorded Announcements	128	128	128	256

1. The G3r has been resized to 4000 queue slots for the 10 boards maximum (only 1,000 would have been needed for one board), since the common pool architecture requires a greater number of total queue slots.

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
System Administration				
Number of Logins	15	15	15	15
Administrable History File Entries	50	50	500	1,250
Simultaneous Administration Command	1	1	1	5
Simultaneous Maintenance Command	1	1	1	5
Simultaneous SM Sessions	3	3	5	8
Printer Queue Size	50	50	50	50
Speech Synthesis Circuit Packs	6	6	6	40
Channels per Speech Circuit Pack	4	4	4	4
Terminating Extension Groups (TEG)				
TEGs	32	32	32	32
Users That May Share a TEG	4	4	4	4
Time Slots				
Simultaneous Circuit Switched Calls[1]	180	180	723	7,712
Total Slots	512	512	1,536	22,528
Time Slots for Voice & Data[2]	483	483	1,449	21,208
Time Slots per Port Network	512	512	512	512
Tone Classifiers				
Tone Receivers (General)[3]	80	200	200	840
Call Classifier Boards	NA	NA	NA	NA
Classifiers / Prompting TTRs	NA	NA	NA	NA
Tone Detector Boards	NA	NA	NA	NA
General Purpose Tone Detectors	NA	NA	NA	NA
Touch-Tone Receivers	NA	NA	NA	NA
TTR Queue Size	4	4	4	4
Prompting TTR Queue Size	NA/80	NA/80	80	80

1. 241 Simultaneous Circuit-Switched Calls per port network, except G3vs and G3s with 180 and G3r with 7,712 (limited by the number of call records supported).
2. There are 483 time slots for Voice and Data per port network.
3. G3V3 Release 3 or later, or G3V4, use TN744 Call Classifier for basic TTR usage and call prompting/call classification/MFC. Also, the TN2182 Tone/Clock/Detector is used for multiple tone detection functions. The number of TN748, TN420, or TN744 boards is limited only by the number of available slots. There is a single limit on the total number of tone receiver (classifier) ports for the system. For G3V3 Release 3 or later, or G3V4: TN748/TN420 have 4 ports for TTR use, TN748/TN420 have 2 ports for GPTD use, TN744 has 8 ports for call prompting/call classification/MFC/TTR/GPTD use, and TN2182 has 8 ports for call prompting/call classification/MFC/TTR/GPTD use.

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Trunks				
DS1 Circuit Packs	8	8	30	166
Queue Slots for Trunks	32/64	32/64	198	1,332
PRI Interfaces via PI[1]	NA/4	NA/4	8	NA
PRI Interfaces via Packet Control[2]	NA	NA/8	30	NA
PRI Interfaces via PKTINT	NA	NA	NA	166
PRI Temporary Signaling Connections				
TSCs in System	NA/164	NA/164	656	4,256
Call Associated TSCs	NA/100	NA/100	400	4,000
Non Call Associated TSCs	NA/64	NA/64	256	256
Administered TSCs	NA/64	NA/64	128	128
Ringback Queue Slots	32/64	32/64	198	1,332
Total PRI Interfaces	NA/4	NA/8	30	166
Trunk Groups Hourly Measurements	25	25	25	75
Trunk Groups in the System	16/32	16/32	99	666
Trunk Members in a Trunk Group	50	50/99	99	255
Trunks in System (Including Remote Access)[3]	50/100	50/100	400	4,000
Measured Trunks in System	50	50/100	400	4,000

1. Only one Processor Interface (PI) is supported in G3vs (CSCC) and G3s (ESCC) configurations, therefore a total of 4 physical links (used for BX.25 or PRI) are available. PRI interface via the PI is not available in Germany. PRI interface via the Packet Control must be used.
2. PRI interface via the Packet Control is not available on G3vs. PRI is not available on G3vs in Germany. Other Countries must use the PI when they have the G3vs configuration.
3. G3vs has the same software capacities for stations and trunks as G3s. However, these software capacities are limited by the cabinet hardware. A typical switch would have 20 to 50 stations with 10 to 20 trunks. Station capacities can be reached only by administration without hardware (AWOH). This includes extensions administered without hardware.

Table B-1. Maximum System Parameters For G3V4 Issue 1 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Voice Terminals[1]				
Associated Data Modules (DTDMs)	75	75	800	7,500
BRI Stations[2]	NA	50	1,000	7,000
Digital Stations	80	200	2,400	25,000
Display Stations	200	200	2,400	10,000
Stations	200	200	2,400	25,000
Station Button Capacity (K Units)	68.4	68.4	700.8	5,260
VuStats				
Measured Agents or Login IDs	75	75	400	2,000
Measured Splits	12/24	12/24	99	255
Measured Trunk Groups	16/32	16/32	32	32
Measured VDNs	12/24	12/24	99	512
Reporting Periods				
Intervals	25	25	25	25
Days	1	1	1	1
Display Formats	25	25	25	25
Simultaneous Updating Displays	100	100	100	500

1. The following items detract from the total number of available “Stations” on a given switch:
   - Analog Music-On-Hold
   - Attendants
   - Modem Pool Conversion Resources
   - TAAS Port
   - Stations (Digital, Display, BRI, etc.)
   - Analog Announcements
   - Analog External Alarm Port
   - Agent Login IDs
   - ACD Agents
2. All BRI stations can be display stations (G3vs does not support BRI).

Table B-2. Maximum System Parameters for G3V4 Issue 3

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Abbreviated Dialing (AD)				
AD Lists Per System	400	400	2,400	5,000
AD List Entry Size	24	24	24	24
AD Entries Per System	2,000	2,000	12,000	100,000
Auto Dialing Button[1]				
Entries per System[1]	NA	NA	NA	NA
Enhanced List (System List)	NA/1	1	1	1
Maximum Entries	NA/2,000	2,000	10,000	10,000
Group Lists	100	100	100	1,000
Maximum Entries	100	100	100	100
Group Lists per Extension	3	3	3	3
System List	1	1	1	1
Maximum Entries	100	100	100	100
Personal Lists	400	400	2,400	5,000
Maximum Entries	100	100	100	100
Personal Lists per Extension	3	3	3	3
Applications Adjuncts				
CallVisor ASAI Adjuncts	NA	4	8	8
Asynchronous Links (RS-232)	5	5	5	10
CDR Output Devices	2	2	2	2
Journal: System Printer	2:1	2:1	2:1	2:1
Property Management Systems	1	1	1	1
BX.25 Physical Links[2]	4	4	8	16
Application Processors (such as 3B2-MCS)	1	1	1	7
AUDIX Adjuncts	1	1	1	8
CMS Adjuncts	1	1	1	1
ICM Adjuncts (ISDN Gateway)	NA/1	1	1	1
BX.25 Processor Channels	64	64	64	128
Hop Channels	64	64	64	128

1. No limit on maximum number of auto dial buttons (other than system limit on button capacity).
2. In the case of SCC/ESCC/CSCC, only four BX.25 physical links are supported in the configuration.

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Automatic Call Distribution (ACD)				
Announcements per Split	2	2	2	2
Announcements per System	128	128	128	256
Splits	12/24	24	99	255
ACD Members per Split	150	150	200	999
Split Members per System	150	150	500	5,200
Logged-In ACD Agents	150	150	500	5,200
Logged-In Splits per Agent[1]				
No CMS	4	4	4	4
R2 CMS	3	3	3	3
R3 CMS	3	3	3	3
R3V2 CMS	4	4	4	4
R3V4 CMS[2]	4	4	4	4
Queue Slots per Group	200	200	200	999
Queue Slots per System	200	200	1,000	10,500
ARS/AAR				
AAR/ARS Patterns (Shared)	20/40	40	254	640
ARS/AAR Analysis Tables	2,000	2,000	2,000	2,000
Choices per RHNPA Table	12	12	12	12
Digit Conversion Entries	400	400	400	400
AAR/ARS Digit Conversion				
Digits Deleted for ARS/AAR	28	28	28	28
Digits Inserted for ARS/AAR	18	18	18	18
AAR/ARS Sub-Net Trunking				
Digits Deleted for ARS/AAR[3]	28	28	28	28
Digits Inserted for ARS/AAR	36	36	36	36
Entries in each RHNPA Table	1,000	1,000	1,000	1,000
FRLs	8	8	8	8

1. When going from 4 to 3 login maximums, a change to the hunt group form is required. This mean all agents must be logged-out. In one extreme case, this is potentially avoided and R2 & R3 CMS handles the fourth login as UNSTAFFED, appropriately.
2. R3V3 CMS was renamed to R3V4 CMS to match the DEFINITY System numbering.
3. Plus up to seven inter-exchange carrier (IXC) digits.

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
ARS/AAR (Continued)				
Inserted Digit Strings[1]	450	450	1,200	3,000
Patterns for Measurement				
Shared Patterns for Measurement	20	20	20	25
RHNPA Tables	32	32	32	32
Routing Plans	8	8	8	8
ARS Toll Tables	32	32	32	32
Entries per Toll Table	800	800	800	800
Trunk Groups in an ARS/AAR Pattern	6	6	6	16
UDP (Entries)	NA/240	240	10,000	50,000
TOD Charts	8	8	8	8
Toll Analysis Table Entries	1,000	1,000	1,000	1,000
Attendant Service				
Attendant Consoles (day:night)[2]	4	6:1	15:1	27:1
Attendant Console 100s Groups per Attendant	20	20	20	20
Attendant Control Restriction Groups	96	96	96	96
Centralized Attendant Service				
Release Link Trunks at Branch	NA/99	99	99	255
Release Link Trunk Group at Branch	NA/1	1	1	1
Release Link Trunks at Main	NA/100	100	400	4,000
Release Link Trunk Groups at Main[3]	NA/32	32	99	666
Other Access Queues				
Maximum Number of Queues	12	12	12	12
Maximum Number of Queue Slots[4]	30	30	80	80
Size Range of Reserved Queue	2-25	2-25	2-75	2-75
Reserved Queue Default Size	5	5	5	5
Queue Length	30	30	80	300
Switched Loops per Console	6	6	6	6

1. Number of available 12 character inserted-digit-strings available for AAR/ARS preferences.
2. For G3vs, four is the recommended number of consoles supported due to power limitations. Of the four consoles, one may be used as a night console. The software actually supports 6:1 day/night attendant consoles.
3. This is the same as the number of trunk groups in the system.
4. Referred to as ‘‘emergency access queue length’’ in G3siV4+m.

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Authorization				
Authorization Codes	1,500	1,500	5,000	90,000
Station Security Code Length	4	4	4	4
Classes of Restriction	96	96	96	96
Classes of Service	16	16	16	16
Length of Authorization Code	4-7	4-7	4-7	4-7
Length of Barrier Code	4-7	4-7	4-7	4-7
Length of Account Codes	NA/1-15	1-15	1-15	1-15
Restricted Call List	1	1	1	1
Remote Access Barrier Codes	10	10	10	10
CDR Account Code List	NA/1	1	1	1
Toll Call List	1	1	1	1
Unrestricted/Allowed Call Lists	10	10	10	10
Total Call List Entries	1,000	1,000	1,000	1,000
Automatic Callback Calls	20	20	240	1,500
Automatic Wakeup				
Simultaneous Display Requests	10	10	10	30
Wakeup Requests per System	400	400	2,400	15,000
Wakeup Request per Extension	1	1	1	1
Wakeup Requests per 15-minute Interval	150	150	450	950
Basic CMS				
Measured Agents or Login IDs	75	75	400	2,000
Measured Splits	12/24	24	99	255
Measured Trunk Groups	16/32	32	32	32
Measured VDNs	NA/24	24	99	512
Reporting Periods				
Intervals	25	25	25	25
Days	7	7	7	7

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Cabinets				
Expansion Port Network (EPN)				
Multi-Carrier Cabinet (MCC[1])	NA	NA	2	43
Single-Carrier Cabinet (SCC)[1]	NA	NA	8	164
Inter-Port Network Connectivity				
Port Networks	1	1	3	44
Maximum Number of Port Networks per Cabinet	1	1	1	2
Switch Nodes (Simplex)	NA	NA	NA	3
Switch Nodes (Duplex)	NA	NA	NA	6
DS1 Converter Complex (Simplex)	NA	NA	NA	41
DS1 Converter Complex (Duplex)	NA	NA	NA	82
Processor Port Network (PPN)				
Multi-Carrier Cabinet (MCC)[2]	NA	NA	1	1
Single-Carrier Cabinet (SCC) or Enhanced Single-Carrier Cabinet (ESCC)	NA	4	4	NA
Compact Single-Carrier Cabinet	1	NA	NA	NA
Call Appearances				
Bridged Images per Appearance	7	7	7	15
Call Appearances per Station[3]	54	54	54	54
Maximum Appearances per Extension	10	10	10	10
Minimum Appearances per Extension	0	0	0	0
Total Bridged Appearances	400	400	2,400	25,000
Maximum Simultaneous Off-Hook per Call[4]	5	5	5	5

1. Only EPNs in G3r can be DS1-remote EPNs.
2. MCC includes the Medium Cabinet.
3. The number of appearances is the sum of primary and bridged appearances; at most 10 can be primary. A maximum of 54 administrable buttons are supported for the 8434D terminal — 34 buttons in the basic terminal and 20 additional buttons in the coverage module.
4. Does not apply to conferencing.

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Call Coverage				
Coverage Answer Groups (CAG)	30	30	200	750
Coverage Paths	150	150	600	7,500
Coverage Paths Including in Call Coverage Report	100	100	100	100
Coverage Paths per Station	4	4	4	4
Coverage Points in a Path	3	3	3	3
Remote Coverage Points	225	225	225	225
Maximum Users per Coverage Path[1]	700	700	3,500	36,065
Members per Call Answer Group	8	8	8	8
Call Detail Recording				
Intra-Switch Call Trackable Extensions	100	100	1,000	5,000
Maximum Number of CDR Records Buffered in Switch	300	300	300	1,900
Number of Records Buffered for the Primary Output Device to Cause Secondary Device to be Busied Out for 2 Minutes	200	200	200	1,800
Call Forwarding				
Call Forwarded Digits (off-net)	16	16	16	16
Call Forwarded Numbers	400	400	2,400	25,000
Call Park				
Attendant Group Common Shared Extension Numbers per System[2]	10	10	80	80
Number of Parked Calls	180	180	723	10,604
Call Pickup Groups				
Call Pickup Members per Group	50	50	50	50
Call Pickup Members per System	400	400	2,400	25,000
Number of Groups	100	100	800	5,000

1. The maximum number of users per coverage path is equal to the number of extensions.
2. Shared extensions must be shared among all attendant groups in the system including Tenant Partition scenarios.

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Call Vectoring				
Maximum Skills a Call Can Simultaneously Queue to	NA/3	3	3	3
Priority Levels	NA/4	4	4	4
Recorded Announcement/Analog Sources for Vector Delay	NA/128	128	128	256
Steps per Vector	NA/32	32	32	32
Vector Directory Numbers	NA/100	100	512	20,000
Audio Sources for Vector Delay				
CMS Measured VDNs[1]	NA/100	100	512	2,000
Vectors per System	NA/48	48	256	512
Number of Collected Digits for Call Prompting or CINFO	NA/16	16	16	16
Number of Dial-Ahead Digits for Call Prompting	NA/24	24	24	24
Vector Routing Tables	NA/5	5	10	100
CallVisor ASAI				
Active Station Control Associations	NA	250	2,000	6,000
Call Controllers per Call	NA	1	1	1
Call Monitors per Call	NA	14	14	14
Station Controllers per Station	NA	2	2	2
Maximum Simultaneous Call Classifications	NA	40	40	400
Number of CallVisor ASAI Links (Open and Proprietary)	NA	4	8	8
Notification Requests (Monitors)	NA	50	170	2,000
Simultaneous Active Call Controlled Calls	NA	75	300	3,000
Switch to Adjunct Associations (Routing)	NA	127	127	127
Number of Open MultiQuest Billing Requests	NA	25	100	1,000
Maximum Calls with Send DTMF Active	NA	16	16	32
Selected Listen - Disconnect Paths	NA	NA	NA	NA
LAN Gateway Circuit Pack Maximum Links	NA	4	4	4

1. Measured limits depend on the CMS release used.

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Conference Parties	6	6	6	6
Simultaneous 3-way Conference Calls[1]	161	161	483	7,084
Simultaneous 6-way Conference Calls[2]	80	80	240	3,520
Data Parameters				
Administered Connections	NA/24	24	128	128
Alphanumeric Dialing				
Maximum Entries	50	50	200	1,250
Characters per Entry	22	22	22	22
PRI Endpoints (PE)	NA/25	25	25	50
Access Endpoints (Number of Trunks)	50/100	100	400	4,000
Digital Data Endpoints	75	75	800	7,500
Dial Plan				
DID LDNs	8	8	8	20
EAS Agent Login IDs[3]	NA/450	450	1,500	10,000
Extensions	700	700	3,500	36,065
Extension Number Portability[4]	NA/240	240	10,000	50,000
Feature Dial Access Codes	77	77	77	77
Number of Access Codes	70	70	70	70
Number of Digits	1-4	1-4	1-4	1-4
Integrated Directory Entries[5]	407	407	2,416	25,028
Maximum Extension Size	5	5	5	5
Minimum Extension Size	1	1	1	1
Miscellaneous Extensions[6]	150	150	900	3,317
Names				
Number of Names[7]	648/664	664	4,215	36,511
Number of Characters in a Name	15	15	15	15

1. Simultaneous 3-way Conference Call = (483 / 3)* number PNs.
2. Simultaneous 6-way Conference Call = (483 / 6)* number PNs.
3. Login IDs count against the “Extensions” switch capacity.
4. These numbers are Uniform Dialing Plan (UDP) entries.
5. The Integrated Directory Entries = Stations + Attendant Consoles.
6. Used for PCOL groups, common shared extensions, access endpoints, administered TSCs, code calling IDs, LDNs, hunt groups, announcements, and TEGs.
7. The Number of Names = number of stations + attendant consoles + trunk groups + digital data endpoints + miscellaneous extensions.

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Dial Plan (Continued)				
Non-DID LDNs	50	50	50	666
Prefix Extensions	Yes	Yes	Yes	Yes
Trunk Dial Access Codes				
Number of Access Codes	49/65	65	317	884
Number of Digits	1-4	1-4	1-4	1-4
Do Not Disturb (DND)				
DND Requests per System	400	400	2,400	25,000
Simultaneous Display Requests	10	10	10	30
Expert Agent Selection (EAS)				
Skill Groups	NA/24	24	99	255
VDN Skill Preferences	NA/3	3	3	3
Maximum Skills a Call Can Simultaneously Queue to	NA/3	3	3	3
Maximum Agent Login IDs Administered	NA/450	450	1,500	10,000
Maximum Agent Login IDs Staffed	NA/150	150	500	5,200
Maximum Agent per Skill Pairs	NA/1800	1800	6,000	40,000
Maximum Agent per Skill Pairs Staffed	NA/150	150	500	5,200
Maximum Skills per Agent				
No CMS	NA/4	4	4	4
R3V2 CMS	NA/4	4	4	4
R3V4 CMS	NA/4	4	4	4
R3V5 CMS	NA	NA	NA	NA
Maximum Skill Levels	NA/2	2	2	2
Maximum Agents that can be Logged-In				
When Each Has 4 Skills Assigned	NA/37	37	125	1,300
When Each Has 1 Skill Assigned	NA/150	150	500	5,200
Facility Busy Indicators				
Buttons per Tracked Resource	100	100	100	500
Number of Indicators (Station and Trunk Groups)	450	450	3,600	10,000

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Hunt Groups				
Announcements per Group	1	1	1	1
Announcements per System	128	128	128	256
Groups	12/24	24	99	255
Group Members per Group	150	150	200	999
Group Members per System	150	150	500	5,200
Queue Slots per Group	200	200	200	999
Queue Slots per System	200	200	1,000	10,500
Intercom Translation Table (ICOM)				
Automatic/Manual and Dial				
ICOM groups per System	10	10	32	256
Auto/Manual	10	10	32	256
Dial	10	10	32	256
Members per ICOM group				
Auto	32	32	32	32
Dial	32	32	32	32
Members per System	320	320	1,024	8,192
Last Number Dialed				
Entries per System[1]	482	482	3,216	32,528
Number of Digits	24	24	24	24
Leave Word Calling (Switch-Based)[2]				
Messages Stored	650	650	2,000	6,000
Messages per User	125	125	125	125
Remote Message Waiting Indicators				
Per Extension	80	80	80	80
Per System	240	240	240	1,250
Simultaneous Message Retrievers	60	60	60	400
System-Wide Message Retrievers	10	10	10	10
Malicious Call Trace				
Maximum Simultaneous Traces	16	16	16	16

1. The Last Number Dialed Entries = Stations + Digital Data Endpoints + Attendant Consoles.
2. Leave Word Calling is available in the ABP only if the Voice Mail Option is purchased.

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
MLDN				
Via Direct Inward Dialing	8	8	8	20
Via Direct Inward Dialing with Tenant Partition	20	20	20	100
Via CO	99	99	99	99
Modem Pool Groups				
Mode 2/Analog				
Group Members per System	64	64	160	2,016
Number of Groups	2	2	5	63
Members per Group	32	32	32	32
Networking				
CAS Nodes	NA/99	99	99	99
DCS Nodes[1]				
BX.25	NA/20	20	20	20
ISDN PRI	NA/20	20	20	20
Hybrid	NA/20	20	20	20
EN Nodes[2]	NA/999	999	999	999
Paging				
Code Calling IDs	125	125	125	125
Loudspeaker Zones	9	9	9	9
Partitions				
Attendant Group	15	15	15	27
Ext. Partition Group	8	8	8	8
Extension Partition	8	8	8	8
Tenant Partition	20	20	20	100
Multiple Music On Hold Sources	20	20	20	100
Personal CO Lines (PCOL)				
PCOL Appearances	4	4	4	16
PCOL Lines (Trunk Groups)	15	15	200	200
PCOL Trunks Per Trunk Group	1	1	1	1

1. The actual limit in the software is 63, but due to performance considerations the recommended number of DCS Nodes is 20.
2. These are node number addresses.

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Port Circuit Pack Slots[1]				
Per Expansion Port Network (EPN)				
MCC Standard Reliability	NA	NA	99	99
SCC Standard Reliability	NA	NA	71	71
Small Cabinet Standard Reliability (Upgrade only)	NA	NA	39	39
Per Processor Port Network (PPN)				
MCC Standard Reliability	NA	NA	89	80
SCC Standard Reliability	NA	NA	64	NA
ESCC Standard Reliability	NA	70	70	NA
CSCC Standard Reliability	10	NA	NA	NA
Recorded Announcements/Audio Sources				
Analog and Auxiliary Trunk Announcements				
Analog and Auxiliary Trunk Queue Slots per Announcement	50	50	150	1,000
Analog & Auxiliary Trunk Queue Slots per System	50	50	150	1,000
Trunk Calls Connected per Announcement				
Integrated Announcements				
Integrated Announcement Circuit Packs	1	1	5	10
Channels per Integrated Announcement Circuit Pack	16	16	16	16
Calls Connected per Integrated Announcement	25	25	50	1,000
Integrated Announcement Recording Time (Minutes:Seconds)				
16 kB Recording	8:32	8:32	8:32	8:32
32 kB Recording	4:16	4:16	4:16	4:16
64 kB Recording	2:08	2:08	2:08	2:08
Integrated Queue Slots per System	25	25	50	4,000
Total Recorded Announcements	128	128	128	256

1. Only port slots are included in this count. For example, there are 100 port slots per MCC EPN cabinet with 99 port slots and one slot dedicated for the Tone-Clock circuit pack. Other service circuits may be required that would further reduce the number of port slots available. In G3r and G3siV4+m port carriers, the service slot may be equipped with service boards that do not require tip and ring connections

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
System Administration				
Number of Logins	15	15	15	15
Administrable History File Entries	50	50	500	1,250
Simultaneous Administration Commands	1	1	1	5
Simultaneous Maintenance Commands	1	1	1	5
Simultaneous System Maintenance Sessions	3	3	5	8
Number of Scheduled Reports	50	50	50	50
Speech Synthesis Circuit Packs	6	6	6	40
Channels per Speech Circuit Pack	4	4	4	4
Terminating Extension Groups (TEG)				
TEGs	32	32	32	32
Users That May Share a TEG	4	4	4	4
Time Slots				
Simultaneous Circuit-Switched Calls[1]	180	180	723	7,712
Total Slots	512	512	1,536	22,528
Time Slots for Voice and Data[2]	483	483	1,449	21,208
Time Slots per Port Network	512	512	512	512
Tone Classifiers				
Tone Receivers (General)[3]	80	200	200	840
Call Classifier Circuit Packs	NA	NA	NA	NA
Classifiers / Prompting TTRs	NA	NA	NA	NA
Tone Detector Circuit Packs	NA	NA	NA	NA
General Purpose Tone Detectors	NA	NA	NA	NA
Touch-Tone Receivers	NA	NA	NA	NA
TTR Queue Size	4	4	4	4
Prompting TTR Queue Size	NA/80	80	80	80

1. 241 simultaneous circuit-switched calls per port network, except G3si with 180 and G3r with 7,712 (limited by number of call records supported).
2. 483 time slots for voice and data per port network.
3. G3V4 and G3 Release 5 use TN744 Call Classifier for basic TTR usage as well as call prompting/call classification/MFC. Also, the TN2182 Tone/Clock/Detector is used for multiple tone detection functions. The number of TN748, TN420, or TN744 boards is limited only by the number of available slots. The number of TN2182 boards is limited. There is a single limit on the total number of tone receiver (classifier) ports for the system: TN748/TN420 have 4 ports for TTR use, TN748/TN420 have 2 ports for GPTD use, TN744 has 8 ports for call prompting/call classification/MFC/TTR/GPTD use, and TN2182 has 8 ports for call prompting/call classification/MFC/TTR/GPTD use.

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Trunks				
DS1 Circuit Packs	8	8	30	166
Queue Slots for Trunks	32/64	64	198	1,332
PRI Interfaces via PI[1]	NA/4	4	8	NA
PRI Interfaces via PACCON[2]	NA	8	30	NA
PRI Interfaces via PKTINT	NA	NA	NA	166
PRI Temporary Signaling Connections (TSCs)				
Temporary Signaling Connections in System	NA/164	164	656	4,256
Call Associated TSCs	NA/100	100	400	4,000
Non-Call Associated TSCs	NA/64	64	256	256
Administered TSCs	NA/64	64	128	128
Ringback Queue Slots	32/64	64	198	1,332
Total PRI Interfaces	NA/4	8	30	166
Trunk Groups Hourly Measurements	25	25	25	75
Trunk Groups in the System	16/32	32	99	666
Trunk Members in a Trunk Group	50	99	99	255
Trunks in System (Including Remote Access)	50/100	100	400	4,000
Measured Trunks in System	50	100	400	4,000

1. Only one Processor Interface (PI) circuit pack is supported in G3vs and G3siV4+m configurations, therefore a total of 4 physical links (used for BX.25 or PRI) are available. PRI interface via the PI is not available in Germany. PRI interface via the Packet Controller is used. PRI is not available on G3vs in Germany.
2. Other Countries must use the PI when they have the G3vs configuration.

Table B-2. Maximum System Parameters for G3V4 Issue 3 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Voice Terminals[1]				
Associated Data Modules (such as DTDMs)	75	75	800	7,500
BRI Stations[2]	NA	50	1,000	7,000
Digital Stations[3]	400	400	2,400	25,000
Display Stations	400	400	2,400	10,000
Stations[4]	400	400	2,400	25,000
Station Button Capacity (K Units)	102.8	102.8	700.8	5,260
VuStats				
Measured Agents or Login IDs	75	75	400	2,000
Measured Splits	12/24	12/24	99	255
Measured Trunk Groups	16/32	16/32	32	32
Measured VDNs	12/24	12/24	99	512
Reporting Periods				
Intervals	25	25	25	25
Days	1	1	1	1
Display Formats	25	25	25	25
Simultaneous Updating Displays	100	100	100	500

1. The following items detract from the total number of available "Stations" on a given switch:
   - — Analog Music-On-Hold
   - — Attendants
   - — Modem Pool Conversion Resources
   - — TAAS Port
   - — Stations (Digital, Display, BRI, etc.)
   - — Analog Announcements
   - — Analog External Alarm Port
   - — Agent Login IDs
   - — ACD Agents
2. All BRI stations can be display stations (G3vs does not support BRI).
3. Due to power limitations, the number of digital stations is limited. Contact your Lucent Technologies representative for more information.
4. Including extensions administered without associated hardware (for G3siV4+m and G3r). The Station Capacity for G3vs is a software limit. The physical capacity of the G3vs (10 port slots) limits its configuration from reaching the software limit.

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
Abbreviated Dialing (AD)			
AD Lists Per System	400	400/2,400	5,000
AD List Entry Size	24	24	24
AD Entries Per System	2,000	2,000/12,000	100,000
Auto Dialing Button[1]			
Entries per System[1]	7	7	7
Enhanced List (System List)	1	1	1
Maximum Entries	2,000	2,000/10,000	10,000
Group Lists	100	100	1,000
Maximum Entries	100	100	100
Group Lists per Extension	3	3	3
System List	1	1	1
Maximum Entries	100	100	100
Personal Lists	400	400/2,400	5,000
Maximum Entries	100	100	100
Personal Lists per Extension	3	3	3
Applications Adjuncts			
CallVisor ASAI Adjuncts	4	4/8	8
Asynchronous Links (RS-232)[2]	5	5	10
CDR Output Devices	2	2	2
Journal:System Printer	2:1	2:1	2:1
Property Management Systems	1	1	1
BX.25 Physical Links[3]	4	4/8	16
Application Processors (such as 3B2-MCS)	1	1	7
AUDIX Adjuncts	1	1	8
CMS Adjuncts	1	1	1
ICM Adjuncts (ISDN Gateway)	1	1	1
BX.25 Processor Channels	64	64	128
Hop Channels	64	64	128

1. No limit on maximum number of auto dial buttons (other than system limit on button capacity).
2. In Release 5si, four NETCON channels plus one direct connect. In Release 5r, 10 system ports through the Packet Data circuit pack.
3. In SCC/ESCC/CSCC, only four BX.25 physical links are supported in the configuration.

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5 — *continued*

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
Automatic Call Distribution (ACD)			
Announcements per Split	2	2	2
Announcements per System	128	128	256
Splits	24	24/99	600
ACD Members per Split	150	150/200	999
Split Members per System	300	300/1,000	10,000
Logged-In ACD Agents	150	150/500	5,200
Logged-In Splits per Agent[1]			
No CMS	4	4	4
R2 CMS	3	3	3
R3 CMS	3	3	3
R3V2 CMS	4	4	4
R3V4 CMS[2]	4	4	4
R3R5 CMS	4	20	20
Queue Slots per Group	200	200	999
Queue Slots per System	200	200/1,500	15,000
ARS/AAR			
AAR/ARS Patterns (Shared)	40	40/254	640
ARS/AAR Analysis Tables	2,000	2,000	2,000
Choices per RHNPA Table	12	12	12
Digit Conversion Entries	400	400	400
AAR/ARS Digit Conversion			
Digits Deleted for ARS/AAR	28	28	28
Digits Inserted for ARS/AAR	18	18	18
AAR/ARS Sub-Net Trunking			
Digits Deleted for ARS/AAR[3]	28	28	28
Digits Inserted for ARS/AAR	36	36	36
Entries in each RHNPA Table	1,000	1,000	1,000
FRLs	8	8	8

1. When going from 4 to 3 login maximums, a change to the hunt group form is required. This requires all agents to be logged-out. In one extreme case, this is potentially avoided and R2 & R3 CMS handles the fourth login as UNSTAFFED appropriately.
2. R3V3 CMS was renamed to R3V4 CMS to match the DEFINITY System numbering.
3. Plus up to seven inter-exchange carrier (IXC) digits.

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5 — *continued*

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
ARS/AAR (Continued)			
Inserted Digit Strings[1]	450	450/1,200	3,000
Patterns for Measurement			
Shared Patterns for Measurement	20	25	25
RHNPA Tables	32	32	32
Routing Plans	8	8	8
ARS Toll Tables	32	32	32
Entries per Toll Table	800	800	800
Trunk Groups in an ARS/AAR Pattern	6	6	16
UDP (Entries)	240	240/10,000	50,000
TOD Charts	8	8	8
Toll Analysis Table Entries	1,000	1,000	1,000
Attendant Service			
Attendant Consoles (day:night)[2]	6:1	6:1/15:1	27:1
Attendant Console 100s Groups per Attendant	20	20	20
Attendant Control Restriction Groups	96	96	96
Centralized Attendant Service			
Release Link Trunks at Branch	99	99	255
Release Link Trunk Groups at Branch	1	1	1
Release Link Trunks at Main	100	100/400	4,000
Release Link Trunk Groups at Main[3]	32	32/99	666
Other Access Queues			
Maximum Number of Queues	12	12	12
Maximum Number of Queue Slots[4]	30	80	80
Size Range of Reserved Queue	2-25	2-25/2-75	2-75
Reserved Queue Default Size	5	5	5
Queue Length	30	80	300
Switched Loops per Console	6	6	6

1. Number of available 12 character inserted-digit-strings available for AAR/ARS preferences.
2. For Release 5vs, four is the recommended number of consoles supported due to power limitations. Of these, one may be used as a night console. The software supports 6:1 day/night attendant consoles.
3. This is the same as the number of trunk groups in the system.
4. Referred to as “emergency access queue length” in Release 5si + memory.

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5 — *continued*

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
Authorization			
Authorization Codes	1,500	1,500/5,000	90,000
Station Security Code Length	8	8	8
Classes of Restriction	96	96	96
Classes of Service	16	16	16
Length of Authorization Code	4-7	4-7	4-7
Length of Barrier Code	4-7	4-7	4-7
Length of Account Codes	1-15	1-15	1-15
Restricted Call List	1	1	1
Remote Access Barrier Codes	10	10	10
CDR Account Code List	1	1	1
Toll Call List	1	1	1
Unrestricted/Allowed Call Lists	10	10	10
Total Call List Entries	1,000	1,000	1,000
Automatic Callback Calls	20	20/240	1,500
Automatic Wakeup			
Simultaneous Display Requests	10	10	30
Wakeup Requests per System	400	400/2,400	15,000
Wakeup Request per Extension	1	1	1
Wakeup Requests per 15-minute Interval	150	150/450	950
Basic CMS			
Measured Agents or Login IDs	75	75/400	2,000
Measured Splits	24	24/99	600
Measured Trunk Groups	32	32	32
Measured VDNs	24	24/99	512
Reporting Periods			
Intervals	25	25	25
Days	7	7	7
Cabinets			
Expansion Port Network			
Multi-Carrier Cabinet[1]	NA	NA/2	43
Single-Carrier Cabinet[1]	NA	NA/8	164

1. Only Expansion Port Networks in Release 5r can be DS1-remote Expansion Port Networks.

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5 — *continued*

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
Cabinets (Continued)			
Inter-Port Network Connectivity			
Port Networks	1	1/3	44
Maximum Number of Port Networks per Cabinet	1	1	2
Switch Nodes (Simplex)	NA	NA	3
Switch Nodes (Duplex)	NA	NA	6
DS1 Converter Complex (Simplex)	NA	NA	41
DS1 Converter Complex (Duplex)	NA	NA	82
Processor Port Network			
Multi-Carrier Cabinet[1]	NA	NA/1	1
Single-Carrier Cabinet	4	4	NA
Compact Single-Carrier Cabinet	1	1/NA	NA
Call Appearances			
Bridged Images per Appearance	7	7	15
Call Appearances per Station[2]	54	54	54
Maximum Appearances per Extension	10	10	10
Minimum Appearances per Extension	0	0	0
Total Bridged Appearances	400	400/2,400	25,000
Maximum Simultaneous Off-Hook per Call[3]	5	5	5
Call Coverage			
Coverage Answer Groups (CAG)	30	30/200	750
Coverage Paths	999	999	9,999
Coverage Paths Including in Call Coverage Report	100	100	100
Coverage Path per Station	4	4	4
Coverage Points in a Path	6	6	6
Remote Coverage Points	999	999	999

1. Multi-Carrier Cabinet includes the Medium Cabinet.
2. The number of call appearances is the sum of primary and bridged appearances; at most 10 can be primary. A maximum of 54 administrable buttons are supported for the 8434D terminal with expansion module — 34 buttons in the basic terminal and 20 more buttons in the expansion module.
3. Does not apply to conferencing.

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5 — *continued*

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
Call Coverage (Continued)			
Maximum Users per Coverage Path[1]	700	700/3,500	36,065
Members per Coverage Answer Group	8	8	8
Time of Day Coverage Tables	999	999	999
Time of Day Changes per Table	5	5	5
Remote Administration Coverage Paths	2	2	2
Call Detail Recording			
Intra-Switch Call Trackable Extensions	100	100/1,000	5,000
Maximum Number of CDR Records Buffered in Switch	300	300	1,900
Number of Records Buffered for the Primary Output Device to Cause Secondary Device to be Busied Out for 2 Minutes	200	200	1,800
Call Forwarding			
Call Forwarded Digits (off-net)	16	16	16
Call Forwarded Numbers	400	400/2,400	25,000
Call Park			
Attendant Group Common Shared Extension Numbers per System[2]	10	10/80	80
Number of Parked Calls	180	180/723	10,604
Call Pickup Groups			
Call Pickup Members per Group	50	50	50
Call Pickup Members per System	400	400/2,400	25,000
Number of Groups	100	100/800	5,000
Call Vectoring			
Maximum Skills a Call Can Simultaneously Queue to	3	3	3
Priority Levels	4	4	4
Recorded Announcements/Analog Sources for Vector Delay	128	128	256
Steps per Vector	32	32	32
Vector Directory Numbers	100	100/512	20,000
Audio Sources for Vector Delay			

1. The maximum number of users per coverage path equals the number of extensions.
2. Shared extensions must be shared among all attendant groups in the system including Tenant Partition scenarios.

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5— *continued*

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
Call Vectoring (Continued)			
CMS Measured VDNs[1]	100	100/512	2,000
Vectors per System	48	48/256	512
# of Collected Digits for Call Prompting or CINFO	16	16	16
Number of Dial-Ahead Digits for Call Prompting	24	24	24
Vector Routing Tables	5	10	100
CallVisor ASAI			
Active Station Control Associations	250	250/2,000	6,000
Call Controllers per Call	1	1	1
Call Monitors per Call	14	14	14
Station Controllers per Station	2	2	2
Maximum Simultaneous Call Classifications	40	40	400
Number of CallVisor ASAI Links (Open & Proprietary)	4	8	8
Notification Requests (Monitors)	50	50/300	10,000
Simultaneous Active Call Controlled Calls	75	75/300	3,000
Switch to Adjunct Associations (Routing)	127	127	127
Number of Open MultiQuest Billing Requests	25	25/100	1,000
Maximum Calls with Send DTMF Active	16	16	32
Selected Listen - Disconnect Paths	NA	NA/75	300
LAN Gateway Circuit Pack Maximum Links	4	4	4
Conference Parties	6	6	6
Simultaneous 3-way Conference Calls[2]	161	161/483	7,084
Simultaneous 6-way Conference Calls[2]	80	80/240	3,520
Data Parameters			
Administered Connections	24	24/128	128
Alphanumeric Dialing			
Maximum Entries	50	50/200	1,250
Characters per Entry	22	22	22
PRI Endpoints (PE)	25	25	50
Access Endpoints (Number of Trunks)	100	100/400	4,000

1. Measured limits depend on the CMS release used.
2. Simultaneous 3-way Conference Call = (483 / 3)* number PNs.

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5 — *continued*

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
Digital Data Endpoints	75	75/800	7,500
Dial Plan			
Direct Inward Dialing Listed Directory Numbers	8	8	20
Expert Agent Selection (EAS) Agent Login IDs[1]	450	450/1,500	10,000
Extensions	700	700/3,500	36,065
Extension Number Portability[2]	240	240/10,000	50,000
Feature Dial Access Codes	77	77	77
Number of Digits	1-4	1-4	1-4
Integrated Directory Entries[3]	407	407/2,416	25,028
Maximum Extension Size	5	5	5
Minimum Extension Size	1	1	1
Miscellaneous Extensions[4]	150	150/900	3,317
Names			
Number of Names[5]	664	664/4,215	36,511
Number of Characters in a Name	27	27	27
Non-DID LDNs	50	50	666
Prefix Extensions	Yes	Yes	Yes
Trunk Dial Access Codes			
Number of Access Codes	65	65/317	884
Number of Digits	1-4	1-4	1-4
Do Not Disturb (DND)			
DND Requests per System	400	400/2,400	25,000
Simultaneous Display Requests	10	10	30

1. Login IDs count against the “Extensions” switch capacity.
2. These are Uniform Dialing Plan (UDP) entries.
3. The Integrated Directory Entries = Stations + Attendant Consoles.
4. Used for PCOL groups, common shared extensions, access endpoints, administered TSCs, code calling IDs, LDNs, hunt groups, announcements, and TEGs (phantom extensions).
5. The Number of Names = number of stations + attendant consoles + trunk groups + digital data endpoints + miscellaneous extensions.

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5 — *continued*

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
Expert Agent Selection (EAS)			
Skill Groups	24	24/99	600
VDN Skill Preferences	3	3	3
Maximum Skills a Call Can Simultaneously Queue to	3	3	3
Maximum Agent Login IDs Administered	450	450/1,500	10,000
Maximum Agent Login IDs Staffed	150	150/500	5,200
Maximum Agent/Skill Pairs Administered	1,800	1,800/6,000	40,000
Maximum Agent/Skill Pairs Staffed	300	300/1,000	10,000
Maximum Skills Per Agent			
No CMS	20	20	20
R3V2 CMS	4	4	4
R3V4 CMS	4	4	4
R3V5 CMS	20	20	20
Maximum Skill Levels	16	16	16
Maximum Agents Logged-In			
When Each Has 20 Skills Assigned	15	15/50	500
When Each Has 4 Skills Assigned	75	75/250	2,500
When Each Has 1 Skill Assigned	150	150/500	5,200
Facility Busy Indicators			
Buttons per Tracked Resource	100	100	500
Number of Indicators (Station and Trunk Groups)	450	450/3,600	10,000
Hunt Groups (Non ACD)			
Announcements per Group	1	1	1
Announcements per System	128	128	1000
Groups	24	24/99	600
Group Members per Group	150	150/200	999
Group Members per System	300	300/1,000	10,000
Queue Slots per Group	200	200	999
Queue Slots per System	200	200/1,500	15,000

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5 — *continued*

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
Intercom Translation Table (ICOM)			
Automatic/Manual and Dial			
ICOM groups per system	10	10/32	256
Auto/Manual	10	10/32	256
Dial	10	10/32	256
Members per ICOM group			
Auto	32	32	32
Dial	32	32	32
Members per System	320	320/1,024	8,192
Last Number Dialed			
Entries per System[1]	482	482/3,216	32,528
Number of Digits	24	24	24
Leave Word Calling (Switch-Based)			
Messages Stored	650	650/2,000	6,000
Messages per User	125	125	125
Remote Message Waiting Indicators			
Per Extension	80	80	80
Per System	240	240	1,250
Simultaneous Message Retrievers	60	60	400
System-Wide Message Retrievers	10	10	10
Malicious Call Trace			
Maximum Simultaneous Traces	16	16	16
MLDN			
Via Direct Inward Dialing	8	8	20
Via Direct Inward Dialing with Tenant Partition	20	20	100
Via CO	99	99	666
Modem Pool Groups			
Mode 2/Analog			
Group Members per System	64	64/160	2,016
Number of Groups	2	2/5	63
Members per Group	32	32	32

1. The Last Number Dialed Entries = Stations + Digital Data Endpoints + attendant consoles.

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5 — *continued*

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
Networking			
CAS Nodes	99	99	99
DCS Nodes[1]			
BX.25	20	20	20
ISDN PRI	20	20	20
Hybrid	20	20	20
EN Nodes[2]	999	999	999
Paging			
Code Calling IDs	125	125	125
Loudspeaker Zones	9	9	9
Partitions			
Attendant Groups	15	15	27
Extension Partition Groups	8	8	8
Extension Partition	8	8	8
Tenant Partition	20	20	100
Multiple Music On Hold Sources	20	20	100
Personal CO Lines (PCOL)			
PCOL Appearances	4	4	16
PCOL Lines (Trunk Groups)	15	15/200	200
PCOL Trunks Per Trunk Group	1	1	1
Port Circuit Pack Slots[3]			
Per Expansion Port Network			
Multi-Carrier Cabinet Standard Reliability	NA	NA/99	99
Single-Carrier Cabinet Standard Reliability	NA	NA/71	71
Small Cabinet Standard Reliability (Upgrade only)	NA	NA/39	39

1. The actual software limit is 63, but due to performance considerations the recommended number of DCS Nodes is 20.
2. These are node number addresses.
3. Only port slots are included in this count. For example, there are 100 port slots per MCC EPN cabinet with 99 port slots and one slot dedicated to the Tone/Clock board. Other service circuits may be required that would further reduce the number of port slots available. In Release 5r and Release 5si carriers, the service slot may be equipped with service boards that do not require tip and ring connections.

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5— ***continued***

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
Port Circuit Pack Slots (Continued)			
Per Processor Port Network			
Multi-Carrier Cabinet Standard Reliability	NA	NA/89	80
Single-Carrier Cabinet Standard Reliability	NA	NA/64	NA
Enhanced Single-Carrier Cabinet Standard Reliability	70	70	NA
Compact Single-Carrier Cabinet Standard Reliability	10	NA/NA	NA
Recorded Announcements/Audio Sources			
Analog and Auxiliary Trunk Announcements			
Analog and Auxiliary Trunk Queue Slots per Announcement	150	150	1,000
Analog and Auxiliary Trunk Queue Slots per System	150	150	1,000
Trunk Calls Connected per Announcement	50	50/150	1,000
Integrated Announcements			
Integrated Announcement Circuit Packs	1	1/5	10
Channels Connected per Integrated Announcement Circuit Pack	16	16	16
Calls Connected per Integrated Announcement	25	25/50	1,000
Integrated Announcement Recording Time (Minutes:Seconds) per Circuit Pack			
16 kB Recording	8:32	8:32	8:32
32 kB Recording	4:16	4:16	4:16
64 kB Recording	2:08	2:08	2:08
Integrated Queue Slots per System	25	25/200	4,000
Total Recorded Announcements	128	128	256
System Administration			
Number of Logins	15	15	15
Administrable History File Entries	50	50/500	1,250
Simultaneous Administration Command	1	1	5
Simultaneous Maintenance Command	1	1	5
Simultaneous System Maintenance Sessions	3	5	8
Number of Scheduled Reports	50	50	50
Speech Synthesis Circuit Packs	6	6	40
Channels per Speech Circuit Pack	4	4	4

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5— *continued*

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
Terminating Extension Groups (TEG)			
TEGs	32	32	32
Users That May Share a TEG	4	4	4
Time Slots			
Simultaneous Circuit-Switched Calls[1]	180	180/723	7,712
Total Slots	512	512/1,536	22,528
Time Slots for Voice and Data[2]	483	483/1,449	21,208
Time Slots per Port Network	512	512	512
Tone Classifiers			
Tone Receivers (General)[3]	80	200	840
Call Classifier Circuit Packs	NA	NA	NA
Classifiers / Prompting TTRs	NA	NA	NA
Tone Detector Circuit Packs	NA	NA	NA
General Purpose Tone Detectors	NA	NA	NA
Touch-Tone Receivers	NA	NA	NA
TTR Queue Size	4	4	4
Prompting TTR Queue Size	80	80	80
Trunks			
DS1 Circuit Packs	8	8/30	166
Queue Slots for Trunks	64	64/198	1,332
PRI Interfaces via Processor Interface[4]	4	4/8	NA
PRI Interfaces via PACCON[5] (Packet Controller)	NA	8/30	NA

1. 241 Simultaneous Circuit-Switched Calls per Port Network, except for Release 5si with 180 Simultaneous Circuit Switched Calls and Release 5r with 7,712 (limited by the number of call records supported).
2. 483 time slots for voice and data per port network.
3. G3V4 and Release 5 use TN744 Call Classifier for basic TTR usage as well as call prompting/call classification/MFC. Also, the TN2182 Tone/Clock/Detector is used for multiple tone detection functions. The number of TN748, TN420, or TN744 boards is limited only by the number of available slots. The number of TN2182 boards is limited. There is a single limit on the total number of tone receiver (classifier) ports for the system: TN748/TN420 have 4 ports for TTR use, TN748/TN420 have 2 ports for GPTD use, TN744 has 8 ports for call prompting/call classification/ MFC/TTR/GPTD use, and TN2182 has 8 ports for call prompting/call classification/MFC/ TTR/GPTD use.
4. Only one Processor Interface (PI) circuit pack is supported in Release 5vs and Release 5si configurations, therefore a total of four physical links (used for BX.25 or PRI) are available. PRI interface via the PI is not available in Germany. PRI interface via the Packet Controller is used. PRI is not available on Release 5vs in Germany.
5. Other countries must use the PI when they have the Release 5vs configuration.

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5 — *continued*

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
Trunks (Continued)			
PRI Interfaces via PKTINT	NA	NA	166
PRI Temporary Signaling Connections (TSCs)			
TSCs in System	164	164/656	4,256
Call Associated TSCs	100	100/400	4,000
Non Call Associated TSCs	64	64/256	256
Administered TSCs	32	32/128	128
Ringback Queue Slots	64	64/198	1,332
Total PRI Interfaces	4	8/30	166
Trunk Groups Hourly Measurements	25	25	75
Trunk Groups in the System	32	32/99	666
Trunk Members in a Trunk Group	99	99	255
Trunks in System (Including Remote Access)	100	100/400	4,000
Measured Trunks in System	100	100/400	4,000
Voice Terminals[1]			
Associated Data Modules (such as DTDMs)	75	75/800	7,500
BRI Stations[2]	NA	50/1,000	7,000
Digital Stations[3]	400	400/2,400	25,000
Display Stations	400	400/2,400	10,000
Stations[4]	400	400/2,400	25,000
Station Button Capacity (K Units)[5]	102.8	102.8/700.8	5,260

1. The following items detract from the total number of available “Stations” on a switch:
   - — Analog Music-On-Hold
   - — Attendants
   - — Modem Pool Conversion Resources
   - — TAAS Port
   - — Stations (Digital, Display, BRI, etc.)
   - — Analog Announcements
   - — Analog External Alarm Port
   - — Agent Login IDs
   - — ACD Agents
2. All BRI stations can be display stations.
3. The software limit for digital stations in Release 5vs is 400 stations. Due to power limitations, the recommended limit is 120 digital stations.
4. Including extensions administered without associated hardware (for Release 5si and Release 5r configurations). The Station Capacity for Release 5vs is a software limit. The physical capacity of the Release 5vs (10 port slots) limits its configuration from reaching the software limit.
5. Station Button Capacity replaces Maximum Button Modules in pre-R1V5.1 configurations.

Table B-3. Maximum System Parameters for DEFINITY ECS Release 5 — *continued*

ITEM	Release 5vs	Release 5si 8/12 MB	Release 5r
VuStats			
Measured Agents or Login IDs	75	75/400	2,000
Measured Splits	24	24/99	600
Measured Trunk Groups	32	32	32
Measured VDNs	24	24/99	512
Reporting Periods			
Intervals	25	25	25
Days	1	1	1
Display Formats	50	50	50
Simultaneous Updating Displays	100	100	500
DEFINITY Wireless Business System			
Display Terminals (9601)	200	200/250	250
Station Button Capacity (K Units)	68.4	68.4/700.8	5,260
Radio Controller Circuit Packs[1]	8	8/30	30
Wireless Fixed Bases	16	16/60	60
Cell Antenna Units	64	64/240	240
Coverage Area (Million Square Feet)	1	1/3	3

1. For Release 5r, Radio Controller circuit packs cannot be used in DS1 remoted Expansion Port Networks (EPNs).

References

C

The following is a list of DEFINITY Enterprise Communications Server (ECS) Release 5 documents, including a brief description of each document.

To order these or other DEFINITY documents, contact the Lucent Technologies Publications Center at the address and phone number on the back of this document's title page. A complete list of Business Communications Systems (BCS) documents, including previous issues of the documents listed here, is provided in *BCS Publications Catalog,* 555-000-010.

Basic DEFINITY ECS Documents

The following are basic documents for anyone using DEFINITY ECS.

DEFINITY Enterprise Communications Server Release 5 — Pocket Reference, Issue 1, **555-230-207**

A compact reference containing hardware descriptions, system parameters, and listings of features and system configurations.

DEFINITY Enterprise Communications Server Release 5 — Feature Description, Issue 1**, 555-230-301**

Provides comprehensive technical descriptions of system features and parameters. Includes the applications and benefits, feature interactions, administration requirements, hardware and software requirements, and a brief discussion of data communications and private networking configurations.

***DEFINITY Enterprise Communications Server Release 5 — Implementation, Issue 1*, 555-230-302**

Provides step-by-step procedures for preparing the hardcopy forms that correspond to the screens and are required to implement the features, functions, and services of the system. Includes procedures for completing a communications survey. Includes an initial set of blank forms (555-230-655B, 555-230-653B).

***DEFINITY Enterprise Communications Server Release 5 — Implementation Blank Forms, Issue 1*, 555-230-303**

Provides additional blank hardcopy forms that correspond to the screens that are required to implement the features, functions, and services of the system.

Copies of these forms are automatically included with the *DEFINITY Enterprise Communications Server Release 5 Implementation, Issue 1*, 555-230-302. Use this order number to purchase additional forms.

***DEFINITY Enterprise Communications Server Release 5 — System Description and Specifications, Issue 1*, 555-230-210**

Provides a technical description of the systems and is intended for service personnel, sales personnel, and customers who need a comprehensive overview of the system. Includes descriptions of hardware, software features, technical specifications, environment requirements, maintenance requirements, and illustration of components.

***DEFINITY Enterprise Communications Server Release 5 — System Monitoring and Reporting, Issue 3*, 555-230-511**

Provides detailed descriptions of all the measurement, status, and security reports available in the system and is intended for administrators who validate traffic reports and evaluate system performance. This document was titled *Traffic Reports* for earlier systems. It includes corrective actions for potential problems.

***DEFINITY Communications System Generic 1 and Generic 3 — Installation and Test, Issue 5*, 555-230-104**

Provides descriptions of the procedures for installing and testing the system's common equipment and adjuncts. Includes setup procedures for the system management terminal, power and grounding requirements, and testing steps. Includes compete details on system wiring. Provides both domestic and international information.

DEFINITY Enterprise Communications Server Release 5 — Installation for Single-Carrier Cabinets, Issue 2**, 555-230-894**

Provides procedures and information for hardware installation and initial testing of single-carrier cabinets. This document is available in the following languages: English, German (DE), Dutch (NL), Brazilian Portuguese (PTB), European French (FR), Castillian Spanish (SP), and Japanese (JA).

To order, append the language suffix to the document number; for example, 555-230-894DE for German. No suffix is needed for the English version.

***DEFINITY Enterprise Communications Server Release 5 — Installation for Multiple-Carrier Cabinets,* 555-230-112**

Provides procedures and information for hardware installation and initial testing of multi-carrier cabinets.

DEFINITY Communications System Generic 3 Version 1.1 - Version 4 Upgrades and Additions, Issue 2**, 555-230-107**

Provides procedures for an installation technician to convert an existing DEFINITY Communications System earlier than Generic 3 Version 4 to Generic 3 Version 4.

***DEFINITY Enterprise Communications Server Release 5 — Upgrades and Additions for R5r, Issue 1,* 555-230-121**

DEFINITY Enterprise Communications Server Release 5 — Upgrades and Additions for R5vs/si, Issue 1**, 555-230-120**

Provides procedures for an installation technician to convert an existing DEFINITY Communications System Generic 3 Version 4 to DEFINITY ECS.

Included are upgrade considerations, lists of required hardware, and step-by-step upgrade procedures. Also included are procedures to add control carriers, switch node carriers, port carriers, circuit packs, auxiliary cabinets, and other equipment.

DEFINITY Enterprise Communications Server* Release 5 *— Maintenance for R5r, Issue 5**, 555-230-105**

DEFINITY Enterprise Communications Server Release 5 — Maintenance for R5vs/si, Issue 9**, 555-204-105**

Provides detailed descriptions of the procedures for monitoring, testing, and maintaining the systems. Included are maintenance commands, step-by-step trouble-clearing procedures, the procedures for using all tests, and explanations of the system’s error codes.

***DEFINITY Enterprise Communications Server Release 5 — Overview, Issue 2*, 555-230-024**

Provides a detailed overview of the system including descriptions of many of the major features, applications, hardware, system capabilities, and the support provided with the system.

***DEFINITY Communications System Generic 3 Planning and Configuration, Issue 2*, 555-230-601**

Provides step-by-step procedures for the account team in determining the customer's equipment and hardware requirements to configure a system according to the customer specifications. Includes detailed requirements and block diagrams. This document reflects Generic 3 Version 2 software, but still contains relevant information.

***BCS Products Security Handbook, Issue 5*, 555-025-600**

Provides information about the risks of telecommunications fraud and measures for addressing those risks and preventing unauthorized use of BCS products. This document is intended for telecommunications managers, console operators, and security organizations within companies.

***DEFINITY Communications System and System 75 and System 85 Terminals and Adjuncts Reference, Issue 7*, 555-015-201**

Provides descriptions of the peripheral equipment that can be used with System 75, System 85, DEFINITY Communications System, and DEFINITY ECS. This document is intended for customers and Lucent Technologies account teams for selecting the correct peripherals to accompany a system.

***DEFINITY Communications System Generic 1, Generic 3, and System 75 Voice Terminal Guide Builder, Issue 3*, 555-230-755**

Provides capability to produce laser-printed documentation for specific voice terminals. The software is supported by a comprehensive user's guide and on-line help. This product requires a 386 PC, minimum of 6MB disk space, minimum of 4MB RAM, a printer supported by Microsoft GDI printer drive, and Microsoft Windows 3.1 or higher. A mouse is recommended.

Call Center

The following list of documents are Call-Center specific.

DEFINITY

***DEFINITY Enterprise Communications Server Release 5 — Call Vectoring/EAS Guide, Issue 1*, 585-230-521**

Provides information on how to write, use, and troubleshoot vectors, which are command sequences that process telephone calls in an Automatic Call Distribution (ACD) environment. It is provided in two parts: tutorial and reference.

The tutorial provides step-by-step procedures for writing and implementing basic call vector scripts.

The reference includes detailed descriptions of the call vectoring features, vector management, vector administration, adjunct routing, troubleshooting, and interactions with management information systems (including the Call Management System).

***DEFINITY Enterprise Communications Server Release 5 — Basic Call Management System (BCMS) Operations, Issue 1*, 555-230-706**

Provides detailed instructions on how to generate reports and manage the system and is intended for telecommunications managers who wish to use Basic Call Management System (BCMS) reports and system managers responsible for maintaining the system.

CentreVu CMS

***CentreVu Call Management System Release 3 Version 5 — Administration, Issue 1,* 585-215-820**

***CentreVu Call Management System Release 3 Version 5 — Reports, Issue 1,* 585-215-821**

***CentreVu Call Management System Release 3 Version 5 — Custom Reports, Issue 1,* 585-215-822**

***CentreVu Call Management System Release 3 Version 5 — Upgrades and Migrations, Issue 1,* 585-215-826**

***CentreVu Call Management System Release 3 Version 5 — External Call History Reference, Issue 1,* 585-215-824**

***CentreVu Call Management System Release 3 Version 5 — Forecast, Issue 1,* 585-215-825**

Networks

The following list of documents are network-specific.

***DEFINITY Communications System Generic 3 Wideband Technical Reference, Issue 1*, 555-230-230**

Provides detailed information regarding the Wideband Switching feature for the system and is intended for users and technical support personnel involved with the installation, administration, and operation of this feature. This feature provides high speed end-to-end connectivity between customer endpoints where dedicated facilities are not economical or appropriate. The primary function is to support high speed video-conferencing and data applications.

***DEFINITY Communications System Generic 2.2 and Generic 3 Version 2 DS1/CEPT1/ISDN PRI Reference Manual, Issue 1*, 555-025-107**

Provides a detailed technical description of digital trunks in the DEFINITY Communications Systems. This includes trunks conforming to the DS1 standard (1.544 Mbps) and the CEPT1 standard and all other methods of signalling, including bit-oriented signalling as well as ISDN-PRI signalling. This document includes background information on these topics, information on how digital trunk capabilities have been designed into the DEFINITY Communications System and information for field personnel and customers on how to provision and administer digital trunk capabilities and features. Provides both domestic and international information.

Application Specific Documents

The following list of documents are application-specific.

***DEFINITY Enterprise Communications Server Generic 2 to Release 5 — Transition Reference, Issue 1,* 555-230-622**

Provides information on the differences in features and administration between the old and new systems when upgrading from a Generic 2 system to DEFINITY ECS.

ASAI

***DEFINITY Enterprise Communications Server Release 5 — CallVisor ASAI Planning Guide, Issue 5*, 555-230-222**

Provides procedures and directions for the account team and customer personnel for effectively planning and implementing the CallVisor Adjunct/Switch Application Interface (ASAI) PBX-Host environment. The CallVisor ASAI is a communications interface that allows adjunct processors to access switch features and to control switch calls. It is implemented using an Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI). Included are hardware and software requirements.

***DEFINITY Enterprise Communications Server Release 5 — CallVisor ASAI Protocol Reference, Issue 5*, 555-230-221**

Provides detailed layer 3 protocol information regarding the CallVisor Adjunct/Switch Application Interface (ASAI) for the systems and is intended for the library or driver programmer of an adjunct processor to create the library of commands used by the applications programmers. Describes the ISDN message, facility information elements, and information elements.

***DEFINITY Enterprise Communications Server Release 5 — CallVisor ASAI Technical Reference, Issue 5*, 555-230-220**

Provides detailed information regarding the CallVisor Adjunct/Switch Application Interface (ASAI) for the systems and is intended for the application designer responsible for building and/or programming custom applications and features.

***DEFINITY Enterprise Communications Server Release 5 — Installation, Administration, and Maintenance of CallVisor ASAI Over the DEFINITY LAN Gateway, Issue 2*, 555-230-223**

Provides procedures for installation, administration, and maintenance of the CallVisor Adjunct/Switch Application Interface (ASAI) Ethernet application over the DEFINITY LAN Gateway and is intended for system administrators, telecommunications managers, Management Information System (MIS) managers, LAN managers, and Lucent personnel. The ASAI-Ethernet application provides ASAI functionality using 10Base-T Ethernet rather than BRI as a transport media.

DEFINITY Enterprise Communications Server Release 5 — Overview, Issue 2, **555-230-225**

DEFINITY Enterprise Communications Server Release 5 — CallVisor PC ASAI Installation and Reference, Issue 3, **555-246-205**

ACD

DEFINITY Enterprise Communications Server Release 5 — Automatic Call Distribution (ACD) Agent Instructions, Issue 5, **555-230-722**

Provides information for use by agents after they have completed ACD training. Includes descriptions of ACD features and the procedures for using them.

DEFINITY Enterprise Communications Server Release 5 — Automatic Call Distribution (ACD) Supervisor Instructions, Issue 4, **555-230-724**

Provides information for use by supervisors after they have completed ACD training. Includes descriptions of ACD features and the procedures for using them.

Console Operations

DEFINITY Communications System Generic 1 and Generic 3 Console Operations, Issue 2, **555-230-700**

Provides operating instructions for the attendant console. Included are descriptions of the console control keys and functions, call-handling procedures, basic system troubleshooting information, and routine maintenance procedures.

DEFINITY Enterprise Communications Server Release 5 — Console Operations Quick Reference, Issue 2, **555-230-890**

Provides operating instructions for the attendant console. Included are descriptions of the console control keys and functions, call handling, basic system-troubleshooting information, and routine maintenance procedures. This document is available in the following languages: English, German (DE), Dutch (NL), Brazilian Portuguese (PTB), European French (FR), Colombian Spanish (SPL), and Japanese (JA).

To order, append the language suffix to the document number; for example, 555-230-894DE for German. No suffix is needed for the English version.

Hospitality

***An Introduction to DEFINITY Communications System Generic 3 Hospitality Services, Issue 1*, 555-230-021**

Provides an overview of the features available for use by the lodging and health industries to improve their property management and to provide assistance to their employees and clients. Included are brief definitions of many of the system features, descriptions of the hardware, planning considerations, and list of the system capabilities.

***DEFINITY Communications System Generic 1 and Generic 3 Hospitality Operations, Issue 2*, 555-230-723**

Provides step-by-step procedures for using the features available for use by the lodging and health industries to improve their property management and to provide assistance to their employees and clients. Includes detailed descriptions of reports.

Abbreviations

A

AA
Archangel

AAC
ATM Access Concentrator

AAR
Automatic Alternate Routing

AC
Alternating Current

ACA
Automatic Circuit Assurance

ACB
Automatic Callback

ACD
Automatic Call Distribution

ACU
Automatic Call Unit

ACW
After Call Work

AD
Abbreviated Dialing

ADAP
AUDIX Data Acquisition Package

ADM
Asynchronous Data Module

ADU
Asynchronous Data Unit

AE
Access Endpoint

AG
ASAI Gateway

AIM
Asynchronous Interface Module

AIOD
Automatic Identification of Outward Dialing

ALBO
Automatic Line Build Out

ALM-ACK
Alarm Acknowledge

AMW
Automatic Message Waiting

AN
Analog

ANI
Automatic Number Identification

AOL
Attendant Offered Load

AP
Applications Processor

APLT
Advanced Private Line Termination

ARS
Automatic Route Selection

ASAI
Adjunct Switch Applications Interface

ASCII
American Standard Code for Information Interchange

ATB
All Trunks Busy

ATD
Attention Dial

ATM
Asynchronous Transfer Mode

AUDIX
Audio Information Exchange

AUX
Auxiliary

AVD
Alternate Voice/Data

AWOH
Administration Without Hardware

AWT
Average Work Time

B

BCC
Bearer Capability Class

BCMS
Basic Call Management System

BCT
Business Communications Terminal

BER
Bit Error Rate

BLF
Busy Lamp Field

BN
Billing Number

BOS
Bit Oriented Signaling

BPN
Billed Party Number

BPS
Bits Per Second

BRI
Basic Rate Interface

BTU
British Thermal Unit

B8ZS
Bipolar Eight Zero Substitution

C

CA-TSC
Call-Associated Temporary Signaling Connection

CACR
Cancellation of Authorization Code Request

CAG
Coverage Answer Group

CAMA
Centralized Automatic Message Accounting

CARR-POW
Carrier Port and Power Unit for AC Powered Systems

CAS
Centralized Attendant Service or Call Accounting System

CBC
Coupled Bonding Conductor

CC
Country Code

CCIS
Common Channel Interoffice Signaling

CCITT
Consultative Committee for International Telephone and Telegraph

CCMS
Control Channel Message Set

CCS
Centum (Hundred) Call Seconds

CCSA
Common Control Switching Arrangement

CDM
Channel Division Multiplexing

CDOS
Customer-Dialed and Operator Serviced

CDR
Call Detail Recording

CDRP
Call Detail Record Poller

CDRR
Call Detail Recording and Reporting

CDRU
Call Detail Recording Utilities

CEM
Channel Expansion Multiplexing

CEPT1
European Conference of Postal and Telecommunications Rate 1

CI
Clock Input

CISPR
International Special Commitee on Radio Interference

cm
Centimeter

CM
Connection Manager

CMDR
Centralized Message Detail Recording

CMS
Call Management System

CO
Central Office

COR
Class of Restriction

COS
Class of Service

CP
Circuit Pack

CPE
Customer Premises Equipment

CPN
Called-Party Number

CPN/BN
Calling Party Number/Billing Number

CPTR
Call Progress Tone Receiver

CRC
Cyclical Redundancy Checking

CSA
Canadian Safety Association

CSCC
Compact Single Carrier Cabinet

CSCN
Center Stage Control Network

CSD
Customer Service Document

CSM
Centralized System Management

CSS
Center Stage Switch

CSSO
Customer Services Support Organization

CSU
Channel Service Unit

CTS
Clear to Send

CWC
Call Work Codes

D

DAC
Dial Access Code or Direct Agent Calling

dB
Decibel

dBA
Decibels in reference to Amperes

dBrnC
Decibels above reference noise with C filter

DC
Direct Current

DCE
Data Communications Equipment

DCO
Digital Central Office

DCP
Digital Communications Protocol

DCS
Distributed Communications System

DDC
Direct Department Calling

DDD
Direct Distance Dialed

DID
Direct Inward Dialed

DIOD
Direct Inward and Outward Dialing

DIVA
Data In/Voice Answer

DLC
Data Line Circuit

DLDM
Data Line Data Module

DMI
Digital Multiplexed Interface

DND
Do Not Disturb

DNIS
Dialed Number Identification Service

DOD
Direct Outward Dialing

DOSS
Delivery Operations Support System

DOT
Duplication Option Terminal

DPM
Dial Plan Manager

DPR
Dual Port RAM

DS1
Digital Signal Level 1

DS1C
Digital Signal Level-1 protocol C

DSI
Digital Signal Interface

DSU
Data Service Unit

DTDM
Digital Terminal Data Module

DTE
Data Terminal Equipment

DTGS
Direct Trunk Group Select

DTMF
Dual-Tone Multi-Frequency

DTS
Disk Tape System

DXS
Direct Extension Selection

E

E & M
Ear and Mouth (receive and transmit)

EAA
Expansion Archangel

EAL
Expansion Archangel Link

EBCDIC
Extended Binary-Coded Decimal Interexchange Code

ECC
Error Correct Code

ECMA
European Computer Manufacturers Association

EFP
Electronic Power Feed

EI
Expansion Interface

EIA
Electronic Industries Association

EMI
Electro-Magnetic Interference

EPN
Expansion Port Network

EPROM
Erasable Programmable Read Only Memory

EPSCS
Enhanced Private Switched Communications Services

ERL
Echo Return Loss

ESF
Extended Superframe Format

ESPA
European Standard Paging Access

ETA
Extended Trunk Access, also Enhanced Terminal Administration

ETN
Electronic Tandem Network

ETSI
European Telecommunications Standards Institute

F

FAC
Feature Access Code

FAS
Facility-Associated Signaling

FAT
Facility Access Trunk

FAX
Facsimile

FCC
Federal Communications Commission

FEAC
Forced Entry of Account Codes

FEP
Front End Processor

FIC
Facility Interface Codes

FNPA
Foreign Numbering-Plan Area

FRL
Facilities Restriction Level

FX
Foreign Exchange

G

G3-MA
Generic 3 Management Applications

G3-MT
Generic 3 Management Terminal

G3r
Generic 3, RISC (Reduced Instruction Set Computer)

GM
Group Manager

GPTR
General-Purpose Tone Receiver

GRS
Generalized Route Selection

H

HNPA
Home Numbering Plan Area Code

Hz
Hertz

I

IAS
Inter-PBX Attendant Service

IC
Inter-Cabinet

ICC
Intercarrier Cable

ICD
Inbound Call Director

ICDOS
International Customer Dialed Operator Serviced

ICHT
Incoming Call-Handling Table

ICI
Incoming Call Identifier

ICM
Inbound Call Management

IDDD
International Direct Distance Dialing

IDF
Intermediate Distribution Frame

IE
Information Element

IMT
Intermachine Trunk

in
Inch

INADS
Initialization and Administration System

INS
ISDN Network Service

INWATS
Inward Wide Area Telephone Service

IO
Information Outlet

ISDN
Integrated Services Digital Network

IS/DTT
Integrated Services/Digital Tie Trunk

ISN
Information Systems Network

ISO
International Standards Organization

ISV
Independent Software Vendor

ITP
Installation Test Procedures

ITU
International Telecommunications Union

IXC
Interexchange Carrier Code

K

kB
Kilobyte

kHz
Kilohertz

kbps
Kilobits Per Second

kbyte
Kilobyte

kg
Kilogram

L

LAN
Local Area Network

LAP-D
Link Access Procedure on the D-channel

LAPD
Link Access Procedure Data

LATA
Local Access and Transport Area

lb
Pound

LBO
Line Build Out

LDN
Listed Directory Number

LDS
Long-Distance Service

LEC
Local Exchange Carrier

LED
Light Emitting Diode

LINL
Local Indirect Neighbor Link

LSU
Local Storage Unit

LWC
Leave Word Calling

M

MAC
Medium Access

M-Bus
Memory Bus

MA-UUI
Message Associated User-to-User Signaling

MADU
Modular Asynchronous Data Unit

MAP
Maintenance Action Process

MAPD
Multi-Application Platform for DEFINITY

Mbps
Megabits Per Second

MCC
Multi-Carrier Cabinet

MCS
Message Center Service

MCT
Malicious Call Trace

MCU
Multipoint Control Unit

MDF
Main Distribution Frame

MDM
Modular Data Module

MDR
Message Detail Record

MEM
Memory

MET
Multibutton Electronic Telephone

MF
Multi-Frequency

MFB
Multifunction Board

MFC
Multi-Frequency Code

MHz
Megahertz

MIM
Management Information Message

MIPS
Million Instructions Per Second

MIS
Management Information System

MISCID
Miscellaneous Identification

MMCS
Multimedia Call Server

MMCH
Multimedia Call Handling

MMI
Multimedia Interface

MMS
Material Management Services

MO
Maintenance Object

MOS
Message-Oriented Signaling

MPDM
Modular Processor Data Module

MS
Message Server

ms
Millisecond

MS/T
Main Satellite/Tributary

MSA
Message Servicing Adjunct

MSG
Message Service

MSM
Modular System Management

MSS
Mass Storage System

MSSNET
Mass Storage/Network Control

MT
Management Terminal

MTDM
Modular Trunk Data Module

MTP
Maintenance Tape Processor

MTT
Multi-Tasking Terminal

MWL
Message Waiting Lamp

Mbps
Megabits Per Second

Mbyte
Megabytes

N

NANP
North American Numbering Plan

NAU
Network Access Unit

NCA/TSC
Non-Call Associate/Temporary Signaling Connection

NCOSS
Network Control Operations Support Center

NCSO
National Customer Support Organization

NEC
National Engineering Center

NEMA
National Electrical Manufacturer's Association

NETCON
Network Connection Circuit Pack

NFAS
Non-Facility Associated Signaling

NI
Network Interface

NID
Network Inward Dialing

NM
Network Management

NN
National Number

NPA
Numbering Plan Area

NPE
Network Processing Element

NQC
Number of Queued Calls

NSE
Night Service Extension

NSU
Network Sharing Unit

NXX
Public Network Office Code

O

OA
Operator Assisted

OCM
Outbound Call Management

ONS
On-Premises Station

OPS
Off-Premises Station

OPX
Off Premises Extension

OQT
Oldest Queued Time

OSHA
Occupational Safety and Health Act

OSI
Open Systems Interconnect

OSS
Operations Support System

OSSI
Operational Support System Interface

OTDR
Optical Time Domain Reflectometer

OTQ
Outgoing Trunk Queuing

P

PACCON
Packet Control

PAD
Packet Assembly/Disassembly

PBX
Private Branch Exchange

PC
Personal Computer

PCM
Pulse Code Modulation

PCOL
Personal Central Office Line

PCOLG
Personal Central Office Line Group

PCS
Permanent Switched Calls

PDM
Processor Data Module

PDS
Premises Distribution System

PE
Processing Element

PEC
Price Element Codes

PEI
Processor Element Interchange

PGATE
Packet Gateway

PGN
Partitioned Group Number

PI
Processor Interface

PIB
Processor Interface Board

PIDB
Product Image Database

PKTINT
Packet Interface

PL
Private Line

PLS
Premises Lightwave System

PMS
Property Management System

PN
Port Network

PNA
Private Network Access

POE
Processor Occupancy Evaluation

POP
Point Of Presence

PPM
Parts Per Million or Periodic Pulse Metering

PPN
Processor Port Network

PRI
Primary Rate Interface

PROCR
Processor

PSC
Premises Service Consultant

PSDN
Packet Switch Public Data Network

PT
Personal Terminal

PTC
Positive Temperature Coefficient

PTT
Postal Telephone and Telegraph

R

RAM
Random Access Memory

RBS
Robbed-Bit Signaling

RC
Radio Controller

RCL
Restricted Call List

REN
Ringer Equivalency Number

RFP
Request For Proposal

RHNPA
Remote Home Numbering Plan Area

RINL
Remote Indirect Neighbor Link

RISC
Reduced Instruction Set Computer

RLT
Release Link Trunk

RMATS
Remote Maintenance, Administration, and Traffic System

RNX
Route Number Index (Private Network Office Code)

ROM
Read-Only Memory

RPN
Routing Plan Number

RS-232C
Recommended Standard 232C

RS-449
Recommended Standard 449

RSC
Regional Support Center

S

SABM
Set Asynchronous Balance Mode

SAC
Send All Calls

SAKI
Sanity and Control Interface

SAT
System Access Terminal

SCC
Single Carrier Cabinet or Serial Communications Controller

SCD
Switch-Control Driver

SCI
Switch Communications Interface

SCO
System Control Office

SCOTCH
Switch Conferencing for TDM Bus in Concentration Highway

SCSI
Small Computer System Interface

SDDN
Software Defined Data Network

SDI
Switched Digital International

SDLC
Synchronous Data Link Control

SDN
Software Defined Network

SFRL
Single-Frequency Return Loss

SID
Station Identification Number

SIT
Special Information Tones

SMDR
Station Message Detail Recording

SN
Switch Node

SNA
Systems Network Architecture

SNC
Switch Node Clock

SNI
Switch Node Interface

SNMP
Simple Network Management Protocol

SPE
Switch Processing Element

SPID
Service Profile Identifier

SSI
Standard Serial Interface

SSM
Single Site Management

SSV
Station Service

ST3
Stratum 3 Clock Board

STARLAN
Star-Based Local Area Network

SVN
Security Violation Notification

SWG
Standard Wire Gauge

SXS
Step-by-Step

SYSAM
System Access and Administration

T

TAAS
Trunk Answer from Any Station

TABS
Telemetry Asynchronous Block Serial

TAC
Trunk Access Code

TC
Technical Consultant

TCM
Traveling Class Mark

TDM
Time Division Multiplex(ing)

TDR
Time of Day Routing

TEG
Terminating Extension Group

TEI
Terminal Endpoint Identifier

TOD
Time of Day

TOP
Task Oriented Protocol

TSC
Technical Service Center

TTR
Touch-Tone Receiver

TTT
Terminating Trunk Transmission

TTTN
Tandem Tie Trunk Network

TTY
Teletypewriter

U

UAP
Usage Allocation Plan

UART
Universal Asynchronous Transmitter

UCD
Uniform Call Distribution

UCL
Unrestricted Call List

UDP
Uniform Dial Plan

UL
Underwriter Laboratories

UM
User Manager

UNMA
Unified Network Management Architecture

UNP
Uniform Numbering Plan

UPS
Uninterruptible Power Supply

USOP
User Service Order Profile

UUCP
UNIX-to-UNIX Communications Protocol

UUI
User-to-user information

V

VAR
Value Added Reseller

VDN
Vector Directory Number

VIS
Voice Information System

VLSI
Very Large Scale Integration

VM
Voltmeter

VNI
Virtual Nodepoint Identifier

W

WATS
Wide Area Telecommunications Service

WCC
World Class Core

WCR
World Class Routing

WCTD
World Class Tone Detection

WFB
Wireless Fixed Base

WSA
Waiting Session Accept

WSS
Wireless Subscriber System

Z

ZCS
Zero Code Suppression

Glossary

Numerics

3B2 Message Server
A software application that combines voice and data messaging services for voice terminal users whose extensions are connected to a system.

800 service
A service in the United States that allows incoming calls from a certain area or areas to an assigned number for a flat-rate charge based on usage.

A

abandoned call
An incoming call, where the caller hangs up before being answered.

access code
A 1-, 2-, or 3-digit dial code used to activate or cancel a feature, or access an outgoing trunk. The star (*) and pound (#) can be used as the first digit of an access code.

access endpoint
Either a nonsignaling channel on a DS1 interface or a nonsignaling port on an analog tie trunk circuit pack that is assigned a unique extension.

access tie trunk
A trunk that connects a main communications system with a tandem communications system in an Electronic Tandem Network (ETN). An access tie trunk can also be used to connect a system or tandem to a serving office or service node. Also called ''access trunk.''

ACCUNET
A trademarked name for a family of digital services offered by AT&T in the United States.

ACD
See **Automatic Call Distribution**. ACD also refers to the "Work State" indicating the agent is on an ACD call.

ACD split (or split)
A group of extensions that are staffed by agents trained to handle a certain type of incoming call. Valid split numbers range from 1 through 99. Each number identifies a unique grouping of ACD agent positions. ACD split is also referred to as an *ACD hunt group* or *hunt group*.

ACD work modes
See **work modes**.

active-notification association
A "link" that is initiated by the adjunct allowing it to receive Event Reports for a specific switch entity, for example, an outgoing call. This association is initiated by the adjunct via the *Event Notification Request* capability.

active-notification call
A call for which Event Reports are being sent over an active-notification association (communication channel) to the adjunct. Sometimes referred to as a monitored call.

active notification domains
Domains are VDNs and ACD split extensions for which Event Notification has been requested.

adjunct-control association
A relationship initiated by an application via the *Third Party Make Call*, the *Third Party Take Control* or *Domain (Station) Control* capabilities to set up calls and control calls already in progress.

adjunct-controlled calls
Include all the calls that can be controlled using an adjunct-control association. These calls must have been originated via the *Third Party Make Call* or *Domain (Station) Control* capabilities or must have been taken control of via the *Third Party Take Control* or *Domain (Station) Control* capabilities.

adjunct-controlled splits
ACD splits administered to be under adjunct control. Agents logged into such splits must do all telephony and ACD login and/or logout and change work mode functions through the adjunct (except for auto-available adjunct controlled splits, whose agents may not be logged in and/or logged out or have their work modes changed).

adjunct-monitored calls
Include all the adjunct-controlled calls and the active-notification calls. In addition it includes calls which provide event reporting over domain-control associations.

ANSI
The **American National Standards Institute.** This is a United States professional/technical association supporting a variety of standards.

adjunct
A processor that does one or more tasks for another processor and that is optional in the configuration of the other processor.

adjunct-switch application interface (ASAI)
A recommendation for interfacing adjuncts and communications systems, based on the CCITT Q.932 specification for layer 3.

administer
To access and change parameters associated with the services or features of a system.

Administered Connection (AC)
Administered Connection is a feature that allows the switch to automatically establish and maintain end-to-end connections between access endpoints (trunks) and/or data endpoints (data modules).

administration terminal
A terminal used to administer and maintain a system. See also **terminal**.

Administration Without Hardware (AWOH)
Provides the ability to administer ports without the need for the associated terminals or other hardware to be physically present.

after call work (ACW) mode
In this mode, agents are unavailable to receive ACD calls. Agents should enter the ACW mode to perform ACD-related activities such as filling out a form after an ACD call. If agents are in the Manual-In mode and disconnect from an ACD call, they automatically enter the ACW mode. Agents normally using Auto-In mode can enter the ACW state by pressing the ACW button during a call.

agent (or ACD agent)
An answering position who receives calls directed to a split. A member of an ACD hunt group (ACD split).

agents in multiple splits
An agent may be logged into more than one split (three maximum). If, while logged into more than one split, the agent (1) answers an ACD call, (2) is in ACW mode for any split, or (3) makes or receives a direct extension call, the switch will not distribute additional ACD calls to that agent.

agent report
Provides historical traffic information for internally measured agents.

American National Standard Code for Information Interchange
See **ASCII**.

analog
The representation of information by means of continuously variable physical quantities such as amplitude, frequency, and phase.

analog data
Data that is transmitted over a digital facility in analog (pulse code modulation) form. The data must pass through a modem either at both ends or at a modem pool at the distant end.

analog telephone
A telephone that receives acoustic voice signals and sends analog electrical signals along the telephone line. Analog telephones are usually served by a single wire pair (tip and ring). The model-2500 telephone set is a typical example of an analog telephone.

analog-to-digital converter (ADC)
A device that converts an analog signal to digital form. See also **digital-to-analog converter**.

angel
A microprocessor located on each port card in a processor port network (PPN). The angel uses the control-channel message set (CCMS) to manage communications between the port card and the archangel on the controlling switch processing element (SPE). The angel also monitors the status of other microprocessors on a port card and maintains error counters and thresholds. See also **archangel**.

answerback code
An assigned number used to respond to a page from a code-calling or loudspeaker-paging system, or to retrieve a parked call.

appearance
A software process that is associated with an extension and whose purpose is to supervise a call. Also called “call appearance,” ‘‘line appearance,’’ and ‘‘occurrence.’’

application
Refers to an adjunct entity that requests and receives ASAI services or capabilities. One or more applications can reside on a single adjunct. However, the switch cannot distinguish among several applications residing on the same adjunct and treats the adjunct, and all resident applications, as a single application. The terms application and adjunct are used interchangeably throughout this document.

applications processor
A micro-computer based, program controlled computer providing application services for the DEFINITY switch. The processor is used with several user-controlled applications such as traffic analysis and electronic documentation.

architecture
The organizational structure of a system, including hardware and/or software.

ARS
See **Automatic Route Selection**.

ASCII (American National Standard Code for Information Interchange)
The standard code, using a coded character set consisting of 7-bit coded characters (eight bits, including parity check), used for information interchange among data processing systems, data communications systems, and associated equipment. The ASCII set consists of control characters and graphic characters.

asynchronous data transmission
A method of transmitting data in which each character is preceded by a start bit and followed by a stop bit, thus permitting data characters to be transmitted at irregular intervals. This type transmission is advantageous when transmission is not regular (characters typed at a keyboard). Also called ‘‘asynchronous transmission.’’ See also **synchronous data transmission**.

association
An association is a communication channel between the adjunct and switch for messaging purposes. An active association is one which applies to an existing call on the switch or to an extension on the call.

asynchronous data unit (ADU)
A data communications equipment (DCE) type device that allows direct connection between RS-232C equipment and a digital switch.

asynchronous transfer mode
The Asynchronous Transfer Mode (ATM) Interface is a high speed access concentrator for data networking in Local Area Network (LAN), campus, and Wide Area Network (WAN) environments. Data rates can be as high as 155 Mbps (Mega bits per second).

attendant
A person at a console on a customer’s premises who provides personalized service for incoming callers and voice-services users by performing switching and signaling operations. See also attendant console.

attendant console
The workstation used by an attendant. The attendant console allows the attendant to originate a call, answer an incoming call, transfer a call to another extension or trunk, put a call on hold, and remove a call from hold. Attendants using the console can also manage and monitor some system operations. Also called ‘‘console.’’ See also **attendant**.

Audio Information Exchange (AUDIX)
A fully integrated voice-mail system that can be used with a variety of communications systems to provide call-history data, such as subscriber identification and reason for redirection.

auto-in trunk groups

Those trunk groups where the CO processes all of the digits for the incoming call. Whenever the switch determines that the CO has seized a trunk from an Auto-In trunk group, it automatically (without processing any digits) connects the trunk to the destination. The destination will typically be an ACD split where(emif there are no agents available(emthe call will go into a queue in which the callers wait to be answered in the order in which they arrived.

auto-in work mode

One of four agent work modes. The work mode where an agent indicates, to the system, that the agent is ready to process another call as soon as the current call is completed. Specifically, if an agent disconnects from an ACD call while in Auto-in Work Mode, then that agent immediately becomes available to receive another ACD call. *See* **Manual-In Work Mode** for a contrast.

Automatic Call Distribution (ACD) split

Calls of a similar type are distributed among agents.

automatic trunk

A trunk that does not require the sending or receiving of addressing information because the destination is predetermined. A request for service on the trunk, called a “seizure,’’ is sufficient to route the call. The normal destination of an automatic trunk is the communications-system attendant group. Also called ‘‘automatic incoming trunk’’ and “automatic tie trunk.’’

automatic restoration

A service that restores disrupted connections between access endpoints (nonsignaling trunks) and data endpoints (devices that connect the switch to data terminal and/or communications equipment). This restoration is done within seconds of a service disruption so that critical data applications can remain operational.

auxiliary equipment

Equipment used for optional system features, such as Loudspeaker Paging and Music-on-Hold.

auxiliary trunk

A trunk used to connect auxiliary equipment, such as radio-paging equipment, to a communications system.

aux-work mode

In this mode, agents are unavailable to receive ACD calls. Agents should enter aux-work mode when involved in non-ACD activities such as taking a break, going to lunch, or placing an outgoing call.

When agents log in, they are automatically placed in the Aux-Work mode. They can then use the Auto-In or Manual-In feature to make themselves available to answer the first call.

Also, the last available agent in a split cannot enter the aux-work mode if any ACD calls are remaining in the queue. If the last available agent attempts to enter aux-work mode, the following occurs: (1) Calls in the queue are routed to the agent until the queue is empty (2) If the last available agent has an aux-work button, the light next to the button flashes until all calls in the queue are answered. When the last call is answered, the light next to the button goes on steadily, and the agent then enters aux-work mode.

B

bandwidth
The difference, expressed in Hertz, between the defined highest and lowest frequencies in a frequency range.

barrier code
A security code used with the Remote Access feature to prevent unauthorized access to the system.

baud
In telecommunications applications, a unit of transmission speed equal to the number of signal events per second. See also **bit rate** and **bits per second**.

BCC
The Bearer Capability Class (BCC) identifies the type of a call, for example, voice and different types of data. Determination of BCC is based on the call originator's characteristics for non-ISDN endpoints and on the Bearer Capability and Low-Layer Compatibility Information Elements of an ISDN endpoint. Current BCCs are:

a. 0: Voice-grade data and voice
b. 1: DMI Mode 1, 56 kbps data transmission
c. 2: DMI Mode 2, synchronous/asynchronous data transmission up to 19.2 kbps
d. 3: DMI Mode 3, 64 kbps circuit/packet data transmission
e. 4: DMI Mode 0, 64 kbps synchronous data
f. 5: Temporary Signaling Connection
g. 6: Wideband Call, 128 to 1984 kbps synchronous data

bit (binary digit)
One unit of information in binary notation having two possible states or values, 0 or 1.

bits per second (bps)
The number of binary units of information that are transmitted or received per second. See also **baud** and **bit rate**.

bit rate
The speed at which bits are transmitted, usually expressed in bits per second. Also called ''data rate.'' See also **baud** and **bits per second**.

bridge (bridging)
The appearance of a voice terminal's extension at one or more other voice terminals.

BRI
The ISDN Basic Rate Interface specification.

bridged appearance
A call appearance on a voice terminal that matches a call appearance on another voice terminal for the duration of a call.

buffer
(1) In hardware, a circuit or component that isolates one electrical circuit from another. Typically, a buffer holds data from one circuit or process until another circuit or process is ready to accept the data. (2) In software, an area of memory used for temporary storage.

bus
A multiconductor electrical path used to transfer information over a common connection from any of several sources to any of several destinations.

business communications terminal (BCT)
An integrated digital data terminal used for business applications. A BCT can function via a data module as a special-purpose terminal for services provided by a processor or as a terminal for data entry and retrieval.

BX.25
A version of the CCITT X.25 protocol for data communications. BX.25 adds a fourth level to the standard X.25 interface. This uppermost level combines levels 4, 5, and 6 of the International Standards Organization (ISO) reference model.

bypass tie trunks
A one-way, outgoing tie trunk from a tandem switch to a main switch in an electronic tandem network (ETN). Bypass tie trunks, provided in limited quantities, are used as a ‘‘last-choice’’ route when all trunks to another tandem switch are busy. Bypass tie trunks are used only if all applicable intertandem trunks are busy.

byte
A sequence of (usually eight) bits processed together.

C

cabinet
Housing for racks, shelves, or carriers that hold electronic equipment.

cable
The physical connection between two pieces of equipment (for example, cable from a data terminal to a modem (or between a piece of equipment and a termination field (for example, circuit pack I/O cables.

cable connector
A cable connector is either a jack (female) or plug (male) on the end of a cable. A cable connector connects wires on a cable to specific leads on telephone or data equipment.

call appearance, attendant console
Six buttons, labeled ‘‘a’’ through ‘‘f,’’ and used to originate, receive, and hold calls. Each button has two lights to show the status of the call appearance.

call appearance, voice terminal
A button labeled with an extension number and used to place outgoing calls, receive incoming calls, or hold calls. Two lights next to the button show the status of the call appearance or the status of the call.

call control capabilities
Call control capabilities are all the capabilities (*Third Party Selective Hold, Third Party Reconnect, Third Party Merge*) that can be used in either of the Third Party Call Control ASE (cluster) subsets: Call Control and Domain Control.

call detail recording
A switch feature that uses software and hardware to record call data (same as CDRU).

call detail recording utility (CDRU)
Applications software that collects, stores, optionally filters, and outputs call detail records for direct or polled output to peripheral devices.

call management system (CMS)
An application, running on an adjunct processor, that collects information from an Automatic Call Distribution (ACD) unit. CMS enables customers to monitor and manage telemarketing centers by generating reports on the status of agents, splits, trunks, trunk groups, vectors, and vector directory numbers (VDNs), and enables customers to partially administer the ACD feature for a communications system.

call reference value (CRV)
An identifier present in ISDN messages that serves to associate a related sequence of messages. In ASAI, the CRVs distinguish between associations.

call vector
A set of up to 15 vector commands to be performed for an incoming or internal call.

callback call
A call that is automatically returned to a voice terminal user who activated the Automatic Callback or Ringback Queuing feature.

call-waiting ringback tone
A low-pitched tone identical to ringback tone except that the tone decreases in the last 0.2 seconds (in the United States). A call-waiting ringback tone notifies the attendant that the Attendant Call Waiting feature has been activated and that the called user is aware of the waiting call. Tones in international countries may sound different.

call work code
A number, up to 16 digits, entered by Automatic Call Distribution (ACD) agents to record the occurrence of customer-defined events (such as account codes, social security numbers, or phone numbers) on ACD calls.

carrier
An enclosed shelf containing vertical slots that hold circuit packs.

carried load
The amount of traffic actually served by traffic-sensitive facilities during a given interval.

CCS or hundred call seconds
A unit of traffic measure used to determine usage. To determine usage for a facility, it is scanned every 100 seconds. If the facility is found busy, then it is assumed to have been busy for the entire scan interval. There are 3600 seconds per hour. The Roman numeral for 100 is the capital letter ‘‘C.’’ The abbreviation for call seconds is CS. Therefore, 100 call seconds is abbreviated as CCS. If a facility is busy for an entire hour, then it is said to have been busy for 36 CCS. *See also* **Erlang**.

capability
A capability is a either a request or indication of an operation. For example, a *Third Party Make Call* is a request for setting-up a call and an *Event Report* is an indication that an event has occurred.

capability groups
Capability groups are sets of capabilities, provisioned through switch administration, that can be requested by an application. Each capability group may contain capabilities from several capability groups. Capability groups are also referred to, in other documentation, as administration groups or Application Service Elements (ASEs). Capability groups denote association types. For example, *Call Control* is a type of association which allows certain functions (the ones in the capability group) to be performed over this type of association.

cause value

A Cause Value is returned in responses to requests or in event reports when a denial occurs or an unexpected condition is encountered. ASAI cause values fall into two ‘‘coding standards’’: Coding Standard 0 includes any cause values that are part of AT&T and CCITT ISDN specifications, and, Coding standard 3 includes any other ASAI cause values. This document uses a notation for cause value where the coding standard for the cause is given first, then a slash, then the cause value. For example, CS0/100 is coding standard 0, cause value 100.

CCITT

CCITT (Comitte Consultatif International Telephonique et Telegraphique) is now called *International Telecommunications Union* (ITU). See this name for information.

center stage switch (CSS)

The central interface between the processor port network (PPN) and expansion port networks (EPNs) in a CSS-connected system.

central office (CO)

The location housing telephone switching equipment that provides local telephone service and access to toll facilities for long-distance calling.

central office (CO) codes

The first three digits of a 7-digit public network telephone number in the USA. CO codes are numbered from 200 through 999.

central office (CO) trunk

A telecommunications channel that provides access from the system to the public network through the local CO.

channel

The term channel is nonspecific and must be taken in context. Channel can refer to a circuit-switched call or a communications path for transmitting voice and/or data.

In wideband, a channel refers to all of the time slots necessary to support a call. For example, an H0-channel uses six 64 kbps time slots. This definition of channel is the same whether the time slots necessary to support the call are contiguous or noncontiguous.

Channel can also refer to a DS0 on a T1 or E1 facility not specifically associated with a logical circuit-switched call. In this context, a channel is analogous to a single trunk.

channel negotiation

Channel negotiation is the process by which the channel offered in the Channel Identification Information Element (CIIE) in the SETUP message is ‘‘negotiated’’ to be another channel acceptable to the switch receiving the SETUP message and ultimately to the switch that sent the SETUP. Negotiation will only be attempted if the CIIE is encoded as *Preferred*. Channel negotiation will not be attempted for wideband calls.

circuit

(1) An arrangement of electrical elements through which electric current flows, providing one or more specific functions. (2) A channel or transmission path between two or more points.

circuit pack

A card on which electrical circuits are printed, and integrated circuit (IC) chips and electrical components are installed. A circuit pack is installed in a switch carrier.

Class of Restriction (COR)

A feature that allows up to 64 classes of call-origination and call-termination restrictions for voice terminals, voice terminal groups, data modules, and trunk groups. See also **Class of Service (COS)**.

Class of Service (COS)
A feature that uses a number (0 through 15) to specify if voice terminal users can activate the Automatic Callback, Call Forwarding—All Calls, Data Privacy, or Priority Calling features.

common control switching arrangement (CCSA)
A private telecommunications network using dedicated trunks and a shared switching center for interconnecting company locations.

communications system
The software-controlled processor complex that interprets dialing pulses, tones, and/or keyboard characters and makes the proper interconnections both within the system and external to the system. The communications system itself consists of a digital computer, software, storage device, and carriers with special hardware to perform the actual connections. A communications system provides voice and/or data communications services, including access to public and private networks, for telephones and data terminals on a customer's premises. See also **switch**.

confirmation tone
A tone confirming that a feature activation, deactivation, or cancellation has been accepted.

connectivity
The connection of disparate devices within a single system.

console
See **attendant console**.

contiguous
Contiguous refers to adjacent DS0s within one T1 or E1 facility or adjacent TDM or fiber time slots. Note that the first and last TDM bus, DS0, or fiber time slots are not considered contiguous (no wraparound). For an E1 facility with a D-channel, DS0s 15 and 17 are considered contiguous.

control cabinet
See **control carrier**.

control carrier
A carrier in a Multi-Carrier Cabinet that contains the switch processing element (SPE) circuit packs and, unlike a G3r control carrier, port circuit packs. Also called ‘‘control cabinet’’ in a single-carrier cabinet. See also **switch processing element**.

controlled station
A station that is being monitored and controlled via a domain-control association.

coverage answer group
A group of up to eight voice terminals that ring simultaneously when a call is redirected to it by Call Coverage. Any one of the group can answer the call.

coverage call
A call that is automatically redirected from the called party's extension number to an alternate answering position when certain coverage criteria are met.

coverage path
The order in which calls are redirected to alternate answering positions.

coverage point
An extension or attendant group, vector directory number (VDN), or Automatic Call Distribution (ACD) split designated as an alternate answering position in a coverage path.

covering user
A person at a coverage point who answers a redirected call.

critical reliability system

A system that has the following duplicated items: control carriers, tone-clocks, expansion interface (EI) circuit packs, and cabling between port networks (PNs) and center stage switch (CSS) in a CSS-connected system. See also **duplicated common control**, **duplicate processor-only system**, and **duplication**.

D

data channel

A communications path between two points used to transmit digital signals.

data communications equipment (DCE)

The equipment (usually a modem, data module, or packet assembler/disassembler) on the network side of a communications link that provides the functions to make the binary serial data from the source or transmitter compatible with the communications channel.

data link

The configuration of physical facilities enabling end terminals to communicate directly with each other.

data module

An interconnection device between a basic rate interface (BRI) or digital communications protocol (DCP) interface of the switch and data terminal equipment (DTE) or data communications equipment (DCE).

data path

The end-to-end connection used for a data communications link. A data path is the combination of all elements of an interprocessor communication in a distributed communications system (DCS).

data port

A point of access to a computer that uses trunks or lines for transmitting or receiving data.

data rate

See **bit rate**.

data service unit (DSU)

A device designed to transmit digital data on transmission facilities.

data terminal

An input/output (I/O) device that has either switched or direct access to a host computer or to a processor interface.

data terminal equipment (DTE)

Equipment consisting of the endpoints in a connection over a data circuit. In a connection between a data terminal and host, the terminal, the host, and their associated modems or data modules make up the DTE.

D-channel backup

D-channel backup is used with Non-Facility Associated Signaling (NFAS). With D-channel backup, a primary D-channel provides signaling for an NFAS D-channel group (two or more PRI facilities). A second D-channel, located on a separate PRI facility of the NFAS D-channel group is designated as backup for the D-channel. The failure of the primary D-channel causes an automatic transfer of call-control signaling to the backup D-channel. In this case, the backup becomes the primary D-channel, and when the previous primary is returned to service it becomes the backup D-channel.

delay-dial trunk
A trunk that allows dialing directly into a communications system (the digits are received as they are dialed).

denying a request
Denying a Request is the same as sending a negative acknowledgement (NAK), and is done by sending an Facility Information Element (FIE) with a *return error* component (a cause value is also provided). It should not be confused with the ‘‘denial’’ event report which applies to calls.

designated voice terminal
The specific voice terminal to which calls, originally directed to a certain extension number, are redirected. Commonly used to mean the “forwarded-to’’ terminal when Call Forwarding All Calls is active.

dial-repeating tie trunk
A tie trunk that transmits called-party addressing information between two communications systems.

digit conversion
A process used to convert specific dialed numbers into other dialed numbers.

digital communications protocol (DCP)
A proprietary protocol used to transmit both digitized voice and digitized data over the same communications link. A DCP link is made up of two 64 kbps information (I-) channels and one 8-kbps signaling (S-) channel.

digital data endpoints
In G3iV2, digital data endpoints include devices such as the 510D terminal or the 515-type business communications terminal (BCT).

digital multiplexed interface (DMI)
An interface that provides connectivity between a communications system and a host computer or between two communications systems using digital signal level-1 (DS1) 24th-channel signaling. DMI provides twenty three 64 kbps data channels and 1 common signaling channel over a twisted-pair connection. DMI is offered through two capabilities: bit-oriented signaling (DMI-BOS) and message-oriented signaling (DMI-MOS).

digital signal level 0 (DS0)
A single 64 kbps voice channel. A DS0 is a single 64 kbps channel in a T1 or E1 facility and consists of eight bits in a T1 or E1 frame every 125 micro-seconds.

digital signal level 1 (DS1)
A single 1.544 Mbps (United States) or 2.048 Mbps (outside the United States) digital signal carried on a T1 transmission facility. A DS1 converter complex consists of a pair, one at each end, of DS1 converter circuit packs and the associated T1/E1 facilities.

digital terminal data module (DTDM)
An integrated or adjunct data module that shares with a digital telephone the same physical port for connection to a communications system. The function of a DTDM is similar to that of a processor data module (PDM) and modular processor data module (MPDM) in that it converts RS-232C signals to DCP signals.

digital-to-analog converter
A device that converts data in digital form to the corresponding analog signals. See also **analog-to-digital converter**.

digital transmission
A mode of transmission in which the information to be transmitted is first converted to digital form and then transmitted as a serial stream of pulses.

digital trunk
A circuit in that carries digital voice and/or digital data in a telecommunications channel.

dial-repeating trunks
A PBX tie trunk that is capable of handling PBX station signaling information without attendant assistance.

direct agent
A switch feature accessed only via Adjunct Switch Applications Interface (ASAI) which allows a call to be placed in a split queue but routed only to a specific agent in that split. This allows a call to receive normal ACD call treatment (for example, announcements) and to be measured as an ACD call while ensuring that a particular agent answers.

Direct Extension Selection (DXS)
A feature on an attendant console that allows an attendant direct access to voice terminals by pressing a group select button and a DXS button.

Direct Inward Dialing (DID)
A feature that allows an incoming call from the public network (not FX or WATS) to reach a specific telephone without attendant assistance. DID calls to DID-restricted telephone lines are routed to an attendant or recorded announcement, depending on the option selected.

direct inward dialing (DID) trunk
An incoming trunk used for dialing directly from the public network into a communications system without help from the attendant.

disk drive
An electromechanical device that stores data on and retrieves data from one or more disks.

distributed communications system (DCS)
A network configuration linking two or more communications systems in such a way that selected features appear to operate as if the network were one system.

domain
Available domains are VDNs, ACD splits, and stations. The VDN domain is only used for active-notification associations, the station domain is only used for the domain-control associations. The ACD-split domain is for active-notification associations and domain-control associations.

domain-control association
A *Third Party Domain Control Request* capability initiates a unique ''CRV/link number'' combination, which is referred to as a domain-control association.

domain-controlled split
A split for which *Third Party Domain Control* request has been accepted. A domain-controlled split provides an event report for logout.

domain-controlled station
A station for which a *Third_Party_Domain_Control* request has been accepted. A domain-controlled station provides event reports for calls that are alerting, connected, or held at the station.

domain-controlled station on a call
A station active on a call which provides event reports over one or two domain-control associations.

duplicated common control
Two processors ensuring continuous operation of a communications system. While one processor is on-line, the other functions as a backup. The backup processor goes on-line periodically or when a problem condition occurs.

duplication
The use of redundant components to improve availability. When a duplicated subsystem fails, its backup redundant system automatically takes over.

duplication option
A system option that duplicates the following:

a. Control carrier containing the Switch Processing Element (SPE)

b. Expansion interface (EI) circuit packs in carriers

c. Fiber optic cabling between Port Networks (PNs)

d. Center-Stage Switch (CSS) in a CSS-connected system

E

E1
A digital transmission standard that carries traffic at the rate of 2.048 Mbps. The E1 facility is divided into 32 channels (DS0s) of 64 kbps information numbered from 0 to 31. Channel 0 is reserved for framing and synchronization information. A D-channel occupies channel 16.

ear and mouth (E & M) signaling
Trunk supervisory signaling, used between two communications systems, whereby signaling information is transferred through two-state voltage conditions (on the E and M leads) for analog applications and through a single bit for digital applications.

EIA-232
A physical interface specified by the Electronic Industries Association (EIA). EIA-232 transmits and receives asynchronous data at speeds of up to 19.2 kbps over cable distances of up to 50 feet. EIA-232 replaces RS-232 protocol in some DEFINITY applications.

electronic tandem network (ETN)
A tandem tie trunk network that has automatic call routing capabilities based on the number dialed and the most preferred route available at the time the call is placed. Each switch in the network is assigned a unique private network office code (RNX), and each voice terminal is assigned a unique extension number.

Electronics Industries Association (EIA)
A trade association of the electronics industry that establishes electrical and functional standards.

emergency transfer
If a major system failure occurs, the automatic transfer is initiated to a group of telephones capable of making outgoing calls. The system operates in this mode until the failure is repaired and the system automatically returns to normal operation. Also called ‘‘power-failure transfer.’’

end-to-end signaling
The transmission of touch-tone signals generated by dialing from a voice terminal user to remote computer equipment. A connection must first be established over an outgoing trunk from the calling party to the computer equipment. Then additional digits can be dialed to transmit information to be processed by the computer equipment.

enhanced private-switched communications service (EPSCS)
An analog private telecommunications network based on the No. 5 Crossbar and 1A ESS that provides advanced voice and data telecommunications services to companies with many locations.

Erlang
A unit of traffic intensity, or load, used to express the amount of traffic it takes to keep one facility busy for one hour. One Erlang is equal to 36 CCS. See also **Hundred Call Seconds**.

expansion archangel (EAA)
A network-control microprocessor located on an expansion interface (EI) port circuit pack in an expansion port network (EPN). The EA provides an interface between the EPN and its controlling switch processing element (SPE).

expansion-archangel link (EAL)
A link-access function on the D-channel (LAPD) logical link that exists between a switch processing element (SPE) and an expansion archangel (EA). The EAL carries control messages from the SPE to the EA and to port circuit packs in an expansion port network (EPN).

expansion control cabinet
See **expansion control carrier**.

expansion control carrier
A carrier in a Multi-Carrier Cabinet that contains extra port circuit packs and a maintenance interface. Also called “expansion control cabinet” in a single-carrier cabinet.

expansion interface (EI)
A port circuit pack in a port network (PN) that provides the interface between a PN’s time-division multiplex (TDM) bus and packet bus, and a fiber-optic link. The EI carries circuit-switched data, packet-switched data, network control, timing control, and DS1 control. In addition, an EI in an expansion port network (EPN) communicates with the master maintenance circuit pack to provide the EPN’s environmental and alarm status to the switch processing element (SPE).

expansion port network (EPN)
A port network (PN) that is connected to the TDM bus and packet bus of a processor port network (PPN). Control is achieved by indirect connection of the EPN to the PPN via a port-network link (PNL). See also **port network**.

extension-in
Extension-In (ExtIn) is the work state agents go into when they answer (receive) a non-ACD call. If the agent is in Manual-In or Auto-In and receives an extension-in call, it is recorded by CMS as an AUX-In call.

extension-out
Extension-Out (ExtOut) is the work state agents go into when they place (originate) a non-ACD call. If the agent is in Manual-In or Auto-In and places an extension-out call, it is recorded by CMS as an AUX-Out call.

external measurements
Refers to those ACD measurements that are made by the External CMS adjunct.

extension number
A 1- to 5-digit number by which calls are routed through a communications system or, with a Uniform Dial Plan (UDP) or main-satellite dialing plan, through a private network. Extension numbers are primarily used for telephones and data terminals but can also be used with specific features.

external call
A connection between a communications system user and a party on the public network or on another communications system in a private network.

F

facility
A general term used for a telecommunications transmission pathway and associated equipment.

facility associated signaling (FAS)
When a D-channel carries the signaling only for those channels on the same physical interface.

feature
A specifically defined function or service provided by the system.

feature button
A labeled button on a telephone or attendant console used to access a specific feature.

fiber optics
A technology using materials that transmit ultrawideband electromagnetic light-frequency ranges for high-capacity carrier systems.

fixed
Fixed is a trunk allocation term. In the fixed allocation scheme, the time slots necessary to support a wideband call are contiguous, and the first time slot is constrained to certain starting points.

flexible
Flexible is a trunk allocation term. The flexible allocation scheme allows the time slots of a wideband call to occupy noncontiguous positions within a single T1 or E1 facility.

floating
Floating is a trunk allocation term. In the floating allocation scheme, the time slots necessary to support a wideband call are contiguous, but the position of the first time slot is not fixed.

foreign exchange (FX)
A central office (CO) other than the one providing local access to the public telephone network.

foreign exchange trunk
A telecommunications channel that directly connects the system to a CO other than its local CO.

foreign numbering-plan area code (FNPAC)
An area code other than the local area code and must be dialed to call outside the local geographical area.

G

generalized route selection (GRS)
An enhancement to Automatic Alternate Routing/Automatic Route Selection (AAR/ARS) that performs routing based on call attributes, such as Bearer Capability Classes (BCCs), in addition to the address and facilities restriction level (FRL), thus facilitating a Uniform Dial Plan (UDP) that is independent of the type of call being placed.

glare
The simultaneous seizure of a two-way trunk by two communications systems, resulting in a standoff.

grade of service
The number of call attempts that fail to receive service immediately. Grade of service is also expressed as the quantity of all calls that are blocked or delayed.

ground-start trunk
A trunk on which, for outgoing calls, the system transmits a request for services to a distant switching system by grounding the trunk ring lead. To receive the digits of the called number, that system grounds the trunk tip lead. When the system detects this ground, the digits are sent.

H

H0
An ISDN information transfer rate for 384 kbps data defined by CCITT and ANSI standards.

H11
An ISDN information transfer rate for 1536 kbps data defined by CCITT and ANSI standards.

H12
An ISDN information transfer rate for 1920 kbps data defined by CCITT and ANSI standards.

handshaking logic
A format used to initiate a data connection between two data module devices.

Hertz (Hz)
A unit of frequency equal to one cycle per second.

high reliability system
A system having the following: two control carriers, duplicate expansion interface (EI) circuit packs in the PPN (in G3r with CSS), and duplicate switch node clock circuit packs in the switch node (SN) carriers. See also **duplicated common control**, **duplication**, **duplication option**, and **critical reliability system**.

holding time
The total length of time in minutes and seconds that a facility is used during a call.

home numbering-plan area code
The local area code. The area code does not have to be dialed to call numbers within the local geographical area.

hop
Nondirect communication between two switch communications interfaces (SCI) where the SCI message passes automatically without intermediate processing through one or more intermediate SCIs.

host computer
A computer, connected to a network, that processes data from data-entry devices.

hunt group
A group of extensions that are assigned the Station Hunting feature so that a call to a busy extension will reroute to an idle extension in the group.

I

I2 Interface

A proprietary interface used for the DEFINITY Wireless Business System for the radio controller circuit packs. Each interface provides communication between the radio controller circuit pack and up to two Wireless Fixed Bases.

I3 Interface

A proprietary interface used for the DEFINITY Wireless Business System for the Cell Antenna Units. Each Wireless Fixed Base can communicate to up to four Cell Antenna Units.

immediate-start tie trunk

A trunk on which, after making a connection with a distant switching system for an outgoing call, the system waits a nominal 65 ms before sending the digits of the called number. This allows time for the distant system to prepare to receive digits. On an incoming call, the system has less than 65 ms to prepare to receive the digits.

information exchange

The exchange of data between users of two different systems, such as the switch and a host computer, over a local area network (LAN).

information systems network (ISN)

A wide area network (WAN) and local area network (LAN) with an open architecture combining host computers, minicomputers, word processors, storage devices, PCs, high-speed printers, and nonintelligent terminals into a single packet-switching system.

inside call

A call placed from one telephone to another within the local communications system. A public or private network that provides end-to-end digital communications for all services to which users have access by a limited set of standard multipurpose user-network interfaces defined by the CCITT. Through internationally accepted standard interfaces, ISDN provides digital circuit-switched or packet-switched communications within the network and links to other ISDNs to provide national and international digital communications. See also **Integrated Services Digital Network Basic Rate Interface** and **Integrated Services Digital Network Primary Rate Interface**.

Integrated Services Digital Network Basic Rate Interface (ISDN-BRI)

The interface between a communications system and terminal that includes two 64 kbps B-channels for transmitting voice or data and one 16 kbps D-channel for transmitting associated B-channel call control and out-of-band signaling information. ISDN-BRI also includes 48 kbps for transmitting framing and D-channel contention information, for a total interface speed of 192 kbps. ISDN-BRI serves ISDN terminals and digital terminals fitted with ISDN terminal adapters. See also **Integrated Services Digital Network Primary Rate Interface**.

Integrated Services Digital Network Primary Rate Interface (ISDN-PRI)

The interface between multiple communications systems that in North America includes 24 64 kbps channels, corresponding to the North American digital signal level-1 (DS1) standard rate of 1.544 Mbytes per second.

The most common arrangement of channels in ISDN-PRI is twenty three 64 kbps B-channels for transmitting voice and data and one 64 kbps D-channel for transmitting associated B-channel call control and out-of-band signaling information. Although with non-facility-associated signaling (NFAS), ISDN-PRI can include 24 B-channels and no D-channel. See also **Integrated Services Digital Network**and **Integrated Services Digital Network Basic Rate Interface**.

intercept tone
A tone that indicates a dialing error or denial of the service requested.

interface
A common boundary between two systems or pieces of equipment.

internal call
A connection between two users within a system.

International Tele-communications Union (ITU)
Formerly known as International Telegraph and Telephone Consultative Committee (CCITT), ITU is an international organization that sets universal standards for data communications, including Integrated Services Digital Network (ISDN). ITU members are from telecommunications companies and organizations around the world. See also **BX.25**.

International Telegraph and Telephone Consultative Committee
See **International Telecommunications Union (ITU)**.

interflow
Allows calls to forward to other splits on the same PBX or a different PBX using the Call Forward All Calls switch feature.

intraflow
Allows calls to be redirected to other splits on the same PBX on a conditional or unconditional basis using call coverage ''busy,'' ''don't answer,'' or "all'' criteria.

internal measurements
Refers to those BCMS measurements that are made by the system. ACD measurements that are made external to the system (via External CMS) are referred to as external measurements.

in-use lamp
A red light on a multiappearance voice terminal that is illuminated to show which call appearance will be selected when the handset is lifted or which call appearance is active when a user is off-hook.

ISDN Gateway (IG)
A feature allowing integration of the switch and a host-based telemarketing application via a link to a gateway adjunct. The gateway adjunct is a 3B-based product that notifies the host-based telemarketing application of call events.

ISDN trunk
A trunk administered for use with Integrated Services Digital Network primary rate interface (ISDN-PRI). Also called ''ISDN facility.''

ISDN-PRI Terminal Adapter
A terminal adapter acts as interface between endpoint applications and an ISDN PRI facility. ISDN-PRI terminal adapters are currently available from other vendors and are primarily designed for video conferencing applications. Accordingly, currently available terminal adapters adapt the two pairs of video codec data (V.35) and dialing (RS-366) ports to an ISDN PRI facility.

L

light-emitting diode (LED)
A semiconductor device that produces light when voltage is applied. LEDs provide a visual indication of the operational status of hardware components, the results of maintenance tests, and the alarm status of circuit packs, and the activation of telephone features.

lightwave transceiver
Hardware that provides an interface to fiber-optic cable from port circuit packs and digital signal level-1 (DS1) converter circuit packs. Lightwave transceivers convert electrical signals to light signals and vice versa.

line
A transmission path between a communications system or CO switching system and a voice terminal or other terminal.

line port
The hardware that provides the access point to a communications system for each circuit associated with a telephone and/or data terminal.

link
A transmitter-receiver channel that connects two systems.

link-access procedure on the D-channel (LAPD)
A link-layer protocol on the Integrated Services Digital Network basic rate interface (ISDN-BRI) and primary rate interface (ISDN-PRI) data-link layer (level 2). LAPD provides data transfer between two devices, and error and flow control on multiple logical links. LAPD is used for signaling and low-speed packet data (X.25 and mode 3) on the signaling (D-) channel and for mode-3 data communications on a bearer (B-) channel.

local area network (LAN)
A networking arrangement designed for a limited geographical area. Generally, a LAN is limited in range to a maximum of 6.2 miles and provides high-speed carrier service with low error rates. Common configurations include daisy chain, star (including circuit-switched), ring, and bus.

logical link
The communications path between a processor and a basic rate interface (BRI) terminal.

loop-start trunk
A trunk on which, after establishing a connection with a distant switching system for an outgoing call, the system waits for a signal on the loop formed by the trunk leads before sending the digits of the called number.

M

main distribution frame
This device mounts to the wall inside the system equipment room. The main distribution frame (MDF) provides a connection point from the outside telephone lines, to the PBX switch, and to the inside telephone stations.

main-satellite-tributary
A private network configuration that can either stand alone or access an electronic tandem network (ETN). A “main’’ switch provides interconnection, via tie trunks, with one or more subtending

switches, called “satellites’’; all attendant positions for the main/satellite configuration; and access to and from the public network. To a user outside the complex, a main/satellite configuration appears as one switch, with one listed directory number (LDN). A “tributary’’ switch is connected to the main switch via tie trunks, but which has its own attendant positions and LDN.

maintenance
The activities involved in keeping a telecommunications system in proper working condition: the detection and isolation of software and hardware faults, and automatic and manual recovery from these faults.

management terminal
The terminal that is used by the system administrator to administer the switch. The terminal may also be used to access the BCMS feature.

major alarm
An indication of a failure that has caused critical degradation of service and requires immediate attention. Major alarms are automatically displayed on LEDs on the attendant console and maintenance or alarming circuit pack, logged to the alarm log, and reported to a remote maintenance facility, if applicable.

manual-in work mode
In this mode, agents automatically enter the ACW mode when they disconnect from an ACD call. However, in order to become available to receive another ACD call, they must then manually enter the Auto-In or Manual-In mode. *See* **Auto-In Work Mode** for a contrast.

memory
A device into which information can be copied and held, and from which the information can be obtained at a later time.

message center
An answering service that supplies agents to and stores messages for later retrieval.

message center agent
A member of a message center hunt group who takes and retrieves messages for voice terminal users.

minor alarm
An indication of a failure that could affect customer service. Minor alarms are automatically displayed on LEDs on the attendant console and maintenance or alarming circuit pack, sent to the alarm log, and reported to a remote maintenance facility, if applicable.

modem
A device that converts digital data signals to analog signals for transmission over telephone circuits. The analog signals are converted back to the original digital data signals by another modem at the other end of the circuit.

modem pooling
A capability that provides shared conversion resources (modems and data modules) for cost-effective access to analog facilities by data terminals. When needed, modem pooling inserts a conversion resource into the path of a data call. Modem pooling serves both outgoing and incoming calls.

modular processor data module (MPDM)
A processor data module (PDM) that can be configured to provide several kinds of interfaces (RS-232C, RS-449, and V.35) to customer-provided data terminal equipment (DTE). See also **processor data module**.

modular trunk data module (MTDM)
A trunk data module that can be configured to provide several kinds of interfaces (RS-232, RS-449, and V.35) to customer-provided data terminal equipment (DTE).

modulator-demodulator
See **modem**.

multiappearance voice terminal
A terminal equipped with several call appearance buttons for the same extension number, allowing the user to handle more than one call, on that same extension number, at the same time.

Multi-Carrier Cabinet
A structure that holds one to five carriers. See also **Single-Carrier Cabinet**.

Multi-Frequency Compelled (MFC), Release 2 (R2) signalling
A signal consisting of two frequency components, such that when a signal is transmitted from a switch, another signal acknowledging the transmitted signal is received by the switch. "R2" designates signaling used in the United and countries outside the United States.

multiplexer
A device used to combine a number of individual channels into a single common bit stream for transmission.

multiplexing
A process whereby a transmission facility is divided into two or more channels, either by splitting the frequency band into a number of narrower bands or by dividing the transmission channel into successive time slots. See also **time-division multiplexing**.

multi-rate
Multi-rate refers to the new N x DS0 service (see N x DS0).

N

N+1
The method of determining redundant backup requirements. For example, if four rectifier modules are required for a DC-powered Single-Carrier Cabinet, a fifth rectifier module is installed for backup.

N x DS0
N x DS0, equivalently referred to as N x 64 kbps, is an emerging standard for wideband calls separate from H0, H11, and H12 ISDN channels. The emerging N x DS0 ISDN multirate circuit mode bearer service will provide circuit-switched calls with data rate multiples of 64 kbps up to 1536 kbps on a T1 facility or up to 1920 kbps on an E1 facility. In the switch, N x DS0 channels will range up to 1984 kbps using NFAS E1 interfaces.

narrowband
A circuit-switched call at a data rate up to and including 64 kbps. All nonwideband switch calls are considered narrowband.

Non-Facility Associated Signaling (NFAS)
A method that allows multiple T1 and/or E1 facilities to share a single D-channel to form an Integrated Services Digital Network primary rate interface (ISDN PRI). If D-Channel Backup is not used, one facility is configured with a D-channel, while the other facilities that share the D-channel are configured without D-channels. If D-Channel Backup is used, two facilities are configured to

have D-channels (one D-channel on each facility), while the other facilities that share the D-channels are configured without D-channels.

On every facility, all DS0s that are not D-channels are available as B-channels. Therefore, a T1 facility without a D-channel has 24 B-channels, and an E1 facility without a D-channel has 31 B-channels.

network
A series of points, nodes, or stations connected by communications channels.

network-specific facility (NSF)
An information element in an ISDN-PRI message that specifies which public-network service is used. NSF applies only when Call-by-Call Service Selection is used to access a public-network service.

network interface
A common boundary between two systems in an interconnected group of systems.

node
A switching or control point for a network. Nodes are either "tandem'' (they receive signals and pass them on) or "terminal'' (they originate or terminate a transmission path).

O

offered load
The traffic that would be generated by all the requests for service occurring within a monitored interval, usually one hour.

othersplit
The Work State that indicates the agent is currently active on another split's call, or in ACW for another split.

P

packet
A group of bits (including a message element, which is the data, and a control information element (IE), which is the header) used in packet switching and transmitted as a discrete unit. In each packet, the message element and control IE are arranged in a specified format. See also **packet bus** and **packet switching**.

packet bus
A wide-bandwidth bus that transmits packets.

packet switching
A data-transmission technique whereby user information is segmented and routed in discrete data envelopes called ''packets,'' each with its own appended control information, for routing, sequencing, and error checking. Packet switching allows a channel to be occupied only during the transmission of a packet; on completion of the transmission, the channel is made available for the transfer of other packets. See also **BX.25** and **packet**.

paging trunk
A telecommunications channel used to access an amplifier for loudspeaker paging.

party/extension active on call
A party is on the call if it is actually connected to the call (in active talk or in held state). An originator of a call is always a party on the call. Alerting parties, busy parties, and tones are not parties on the call.

PCOL
Personal Central Office Line.

primary extension
The main extension associated with the physical station set.

principal
A station that has its primary extension bridged on one or more other stations.

personal computer (PC)
A personally controllable microcomputer.

pickup group
A group of individuals authorized to answer any call directed to an extension number within the group.

port
A data- or voice-transmission access point on a device that is used for communicating with other devices.

port carrier
A carrier in a Multi-Carrier Cabinet or a single-carrier cabinet containing port circuit packs, power units, and service circuits. Also called a ‘‘port cabinet’’ in a single carrier cabinet.

port network (PN)
A cabinet containing a TDM bus and packet bus to which the following components are connected: port circuit packs, one or two tone-clock circuit packs, a maintenance circuit pack, service circuit packs, and (optionally) up to four expansion interface (EI) circuit packs in G3. Each PN is controlled either locally or remotely by a switch processing element (SPE). See also **expansion port network** and **processor port network**.

port-network connectivity
The interconnection of port networks (PNs), regardless of whether the configuration uses direct or switched connectivity.

Primary Rate Interface (PRI)
A standard Integrated Services Digital Network (ISDN) frame format that specifies the protocol used between two or more communications systems. PRI runs at 1.544 Mbps and, as used in North America, provides 23 64 kbps B-channels (voice or data) and one 64 kbps D-channel (signaling). The D-channel is the 24th channel of the interface and contains multiplexed signaling information for the other 23 channels.

PRI endpoint (PE)
The wideband switching capability introduces PRI Endpoints on switch line-side interfaces. A PRI endpoint consists of one or more contiguous B-channels on a line-side T1 or E1 ISDN PRI facility and has an extension number. Endpoint applications have call control capabilities over PRI endpoints.

principal (user)
A person to whom a telephone is assigned and who has message center coverage.

private network
A network used exclusively for the telecommunications needs of a particular customer.

private network office code (RNX)
The first three digits of a 7-digit private network number. These codes are numbered 220 through 999, excluding any codes that have a 0 or 1 as the second digit.

processor carrier
A phrase used for ‘‘control carrier’’ in G3rV2. See also **control carrier**.

processor data module (PDM)
A device that provides an RS-232C data communications equipment (DCE) interface for connecting to data terminals, applications processors (APs), and host computers and provides a digital communications protocol (DCP) interface for connection to a communications system. See also **modular processor data module**.

processor port network (PPN)
A port network (PN) controlled by a switch processing element (SPE) that is directly connected to that PN's time-division multiplex (TDM) bus and local area network (LAN) bus. See also **port network**.

processor port network (PPN) control carrier
A carrier containing the maintenance circuit pack, tone/clock circuit pack, and switch processing element (SPE) circuit packs for a processor port network (PPN) and, optionally, port circuit packs.

Property Management System (PMS)
A stand-alone computer used by lodging and health services organizations use for services such as reservations, housekeeping, and billing.

protocol
A set of conventions or rules governing the format and timing of message exchanges to control data movement and correction of errors.

public network
The network that can be openly accessed by all customers for local or long-distance calling.

pulse-code modulation (PCM)
An extension of pulse-amplitude modulation (PAM) in which carrier-signal pulses modulated by an analog signal, such as speech, are quantized and encoded to a digital, usually binary, format.

Q

quadrant
A quadrant is a group of six contiguous DS0s in fixed locations on an ISDN PRI facility. Note that this term comes from T1 terminology (one-fourth of a T1), but there are five quadrants on an E1 ISDN PRI facility (30B + D).

A quadrant is considered available or idle when all six contiguous DS0s are idle. Otherwise, the quadrant is considered contaminated or partially contaminated. This is a dynamic condition; quadrants become idle and contaminated as calls are placed and dropped. Note that a T1 facility containing the primary or backup D-channel (23B + D) has a maximum of three idle quadrants. The fourth quadrant (DS0s 19-24) never has six contiguous idle DS0s because one is always allocated to the D-channel. On an E1 facility, channel 0 is reserved for framing and synchronization, and channel 16 contains the D-channel when present, but five quadrants are potentially available.

queue
An ordered sequence of calls waiting to be processed.

queuing
The process of holding calls in order of their arrival to await connection to an attendant, to an answering group, or to an idle trunk. Calls are automatically connected in first-in, first-out sequence.

R

random access memory (RAM)
A storage arrangement whereby information can be retrieved at a speed independent of the location of the stored information.

read-only memory (ROM)
A storage arrangement primarily for information retrieval applications.

recall dial tone
Tones signalling that the system has completed a function (such as holding a call) and is ready to accept dialing.

redirection criteria
The information administered for each voice terminal's coverage path that determines when an incoming call is redirected to coverage.

redirection on no answer
An optional feature that redirects an unanswered ringing ACD call after an administered number of rings. The call is then redirected back to the agent.

remote home numbering-plan area code (RHNPA)
A foreign numbering-plan area code that is treated as a home area code by the Automatic Route Selection (ARS) feature. Calls can be allowed or denied based on the area code and the dialed central office (CO) code rather than just the area code. If the call is allowed, the ARS pattern used for the call is determined by these six digits.

reorder tone
A tone to signal that at least one of the facilities, such as a trunk or a digit transmitter, needed for the call was not available at the time the call was placed.

report scheduler
Software that is used in conjunction with the system printer for the purpose of scheduling the days of the week and time of day that the desired reports are to be printed.

RS-232C
A physical interface specified by the Electronic Industries Association (EIA). RS-232C transmits and receives asynchronous data at speeds of up to 19.2 kbps over cable distances of up to 50 feet.

ROSE
Remote Operations Service Element is a CCITT and ISO standard that defines a notation and services that support interactions between the various entities that make up a distributed application.

S

sanity and control interface (SAKI)
A custom, very-large-scale-integration (VLSI) microchip located on each port circuit pack. The SAKI provides address recognition, buffering, and synchronization between the angel and the five control time slots that make up the control channel. The SAKI also scans and collects status information for the angel on its port circuit pack and, when polled, transmits this information to the archangel.

simplex system
A system that has no redundant hardware.

simulated bridged appearance
The same as a **temporary bridged appearance**, allows the station user (usually the principal) the ability to bridge onto a call which had been answered by another party on its behalf.

single-carrier cabinet
A combined cabinet and carrier unit that contains one carrier. See also **Multi-Carrier Cabinet**.

single-line voice terminal
A voice terminal served by a single-line tip and ring circuit (models 500, 2500, 7101A, 7103A).

small computer system interface (SCSI)
An ANSI bus standard that provides a high-level command interface between host computers and peripheral devices.

software
A set of computer programs that perform one or more tasks.

split
A condition whereby a caller is temporarily separated from a connection with an attendant. A split condition automatically occurs when the attendant, active on a call, presses the start button.

split number
The split's identity to the switch and BCMS.

split report
Provides historical traffic information for internally measured splits.

split (agent) status report
Provides the real-time status and measurement data for internally measured agents and the split to which they are assigned.

staffed
Indicates an agent position is logged-in. A staffed agent will be functioning in one of four work modes: Auto-In, Manual-In, ACW, or AUX-work.

Station Message Detail Recording (SMDR)
An obsolete term now called "CDR" (see call detail recording), which is a switch feature that utilizes software and hardware to record call data.

standard serial interface (SSI)
A communications protocol developed for use with the 500-type business communications terminals (BCTs) and the 400-series printers.

status lamp
A green light that shows the status of a call appearance or a feature button by the state of the light (lit, flashing, fluttering, broken flutter, or unlit).

stroke counts
A method used by Automatic Call Distribution (ACD) agents to record up to nine customer-defined events per call when the Call Management System (CMS) is active.

switch
Any kind of telephone switching system. See also **communications system**.

switchhook
The buttons located under the receiver on a voice terminal.

switch node (SN) carrier
A carrier containing a single switch node, power units, and, optionally, one or two digital signal level-1 (DS1) converter circuit packs. An SN carrier is located in a center stage switch (CSS).

switch node (SN) clock
The circuit pack in a switch node (SN) carrier that provides clock and maintenance alarm functions and environmental monitors for an SN.

switch node interface (SNI)
The basic building block of a switch node. An SNI circuit pack controls the routing of circuit, packet, and control messages.

switch node link (SNL)
The hardware that provides a bridge between two or more switch nodes. The SNL consists of the two switch node interface (SNI) circuit packs residing on the switch nodes and the hardware connecting the SNIs. This hardware can include lightwave transceivers that convert the SNI's electrical signals to light signals, the copper wire that connects the SNIs to the lightwave transceivers, a full-duplex fiber-optic cable, digital signal level-1 (DS1) converter circuit cards and DS1 facilities if a company does not have rights to lay cable, and appropriate connectors.

switch processing element (SPE)
A complex of circuit packs (processor, memory, disk controller, and bus-interface cards) mounted in a processor-port-network (PPN) control carrier. The SPE serves as the control element for that PPN and, optionally, for one or more expansion port networks (EPNs).

synchronous data transmission
A method of sending data in which discrete signal elements are sent at a fixed and continuous rate and specified times.

system administrator
The person who maintains overall customer responsibility for system administration. Generally, all administration functions are performed from the Management Terminal. The switch requires a special login, referred to as the system administrator login, in order to gain access to the system administration capabilities.

system printer
An optional printer that may be used to print scheduled reports via the report scheduler.

system report
Provides historical traffic information for all internally measured splits.

system status report
Provide real-time status information for internally measured splits.

system manager
A person responsible for specifying and administering features and services for a system.

system reload
A process that allows stored data to be written from a tape into the system memory (normally after a power outage).

T

T1
A digital transmission standard that in North America carries traffic at the digital signal level-1 (DS1) rate of 1.544 Mbps. A T1 facility is divided into 24 channels (DS0s) of 64 kbps information numbered from 1 to 24. These 24 channels, with an overall digital rate of 1.536 Mbps, and an 8 kbps framing and synchronization channel make up the 1.544 Mbps transmission. When a D-channel is present, it occupies channel 24.

T1 facilities are also used in Japan and some Middle-Eastern countries.

TAC
Trunk Access Code.

tandem switch
A switch within an electronic tandem network (ETN) that provides the logic to determine the best route for a network call, possibly modifies the digits outpulsed, and allows or denies certain calls to certain users.

tandem through
The switched connection of an incoming trunk to an outgoing trunk without human intervention.

tandem tie-trunk network
A private network that interconnects several customer switching systems by dial-

TEG
Terminating Extension Group.

terminal
A device that sends and receives data within a system. See also **administration terminal**.

tie trunk
A telecommunications channel that directly connects two private switching systems.

time-division multiplex (TDM) bus
A bus that is time-shared regularly by preallocating short time slots to each transmitter. In a PBX, all port circuits are connected to the TDM bus, permitting any port to send a signal to any other port.

time-division multiplexing (TDM)
Multiplexing that divides a transmission channel into successive time slots. See also **multiplexing**.

time interval
The period of time, either one hour or one-half hour, that BCMS measurements are collected for a report(s).

time slice
See **time interval**.

time slot
A time slot refers to 64 kbps of digital information structured as eight bits every 125 micro-seconds. In the switch, a time slot refers to either a DS0 on a T1 or E1 facility or a 64 kbps unit on the TDM bus or fiber connection between port networks.

time slot sequence integrity
Time slot sequence integrity means that the ‘‘N’’ octets of a wideband call that are transmitted in one T1 or E1 frame arrive at the output in the same order that they were introduced.

to control
To control means that an application can invoke Third Party Call Control capabilities using either an adjunct-control or a domain-control association.

to monitor
To monitor means that an application can receive *Event_Reports* on either an active-notification, adjunct-control, or a domain-control association.

tone ringer
A device with a speaker, used in electronic voice terminals to alert the user.

trunk
A dedicated telecommunications channel between two communications systems or central offices (COs).

trunk allocation
The manner in which trunks are selected to form wideband channels.

trunk data module
A device that provides the interface for connection between off-premises private-line trunk facilities and a G3V2 switch. The trunk data module provides conversion between the RS-232C and the Digital Communications Protocol (DCP), and can connect to direct distance dialing (DDD) modems as the DCP member of a modem pool.

trunk group
Telecommunications channels assigned as a group for certain functions that can be used interchangeably between two communications systems or central offices (COs).

U

uniform dial plan
A feature that allows a unique 4- or 5-digit number assignment for each terminal in a multiswitch configuration such as a distributed communications system (DCS) or main-satellite-tributary system.

V

vector directory number (VDN)
An extension that provides access to the Vectoring feature on the switch. Vectoring allows a customer to specify the treatment of incoming calls based on the dialed number.

vector-controlled split
A hunt group or ACD split administered with the ‘‘vector’’ field enabled. Access to such split is only possible by dialing a VDN extension. Vector-Controlled Splits cannot be Active Notification Domains.

voice terminal
A single-line or multiappearance telephone.

W

wide area telecommunications service (WATS)
A service in the USA that allows calls to a certain area or areas for a flat-rate charge based on expected usage.

wideband
A circuit-switched call at a data rate greater than 64 kbps. A circuit-switched call on a single T1 or E1 facility with a bandwidth between 128 and 1536 (T1) or 1984 (E1) kbps in multiples of 64 kbps. H0, H11, H12, and N x DS0 calls are all wideband.

wideband access endpoint
The wideband switching capability extends Access Endpoints to include wideband access endpoints. A wideband access endpoint consists of one or more contiguous DS0s on a line-side T1 or E1 facility and has an extension number. The Administered Connections feature provides call control for calls originating from wideband access endpoints.

wink-start tie trunk
A trunk with which, after making a connection with a distant switching system for an outgoing call, the system waits for a momentary signal (wink) before sending the digits of the called number. Similarly, on an incoming call, the system sends the wink signal when ready to receive digits.

work modes (or ACD work modes)
A work mode is one of four states (Auto-In, Manual-In, ACW, AUX-work) that an ACD agent enters after logging in. Immediately upon logging in, an agent enters the AUX-work mode. To become available to receive ACD calls, the agent enters either the Auto-In or Manual-In work modes. To do work associated with an ACD call, at the conclusion of the call, an agent enters the ACW mode. If an agent changes work modes while handling a call, the change becomes effective when the agent finishes the call. The system does not recognize the change until the call is completed.

To answer an ACD call, the ACD agent must specify a work mode. Generally, two methods are available: (1) by pressing the appropriate button on their voice terminal, and (2) by dialing an access code. An agent can change work modes while handling a call, but the system will not recognize the change until the call is completed. It is important that the ACD agents always accurately indicate their correct work mode, otherwise the BCMS measurements will not be accurate.

work state
An ACD agent may be a member of up to three different splits. Each ACD agent continuously exhibits a work state for every split that it is a member of. Valid work states are Avail, Unstaffed, AUX-work, ACW, ACD (answering an ACD call), ExtIn, ExtOut, and OtherSpl. An agent’s work state for a particular split may change for a variety of reasons (for example, whenever a call is answered, abandoned, the agent changes work modes, and so forth). The BCMS feature monitors the work states and uses this information to provide the BCMS reports.

write operation
The process of putting information onto a storage medium, such as a hard disk.

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