

Lucent Technologies
Bell Labs Innovations



DEFINITY[®] Communications System

Generic 3

System Description and Specifications

555-230-206
Comcode 107737231
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Notice

Every effort was made to ensure that the information in this book was complete and accurate at the time of printing. However, information is subject to change.

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Part 68: Network Registration Number. This equipment is registered with the FCC in accordance with Part 68 of the FCC Rules. It is identified by FCC registration number AS593M-13283-MF-E.

Part 68: Answer-Supervision Signaling. Allowing this equipment to be operated in a manner that does not provide proper answer-supervision signaling is in violation of Part 68 Rules. This equipment returns answer-supervision signals to the public switched network when:

- Answered by the called station
- Answered by the attendant
- Routed to a recorded announcement that can be administered by the CPE user

This equipment returns answer-supervision signals on all DID calls forwarded back to the public switched telephone network. Permissible exceptions are:

- A call is unanswered
- A busy tone is received
- A reorder tone is received

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DEFINITY is a registered trademark of Lucent Technologies in the U.S. and throughout the world. In this document, DEFINITY Communications System Generic 3 is often abbreviated to DEFINITY Generic 3 or Generic 3.

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EMC Directive 89/336/EEC
Low-Voltage Directive 73/23/EEC



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Lucent Technologies - formed as a result of AT&T's planned restructuring - designs, builds, and delivers a wide range of public and private networks, communication systems and software, consumer and business telephone systems, and microelectronics components. The world-renowned Bell Laboratories is the research and development arm for the company.

Comments

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Acknowledgment

This document was prepared by the Product Documentation Development, Lucent Technologies, Denver, CO.

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About This Document

Purpose

The purpose of this document is to briefly describe the DEFINITY® Generic 3 (G3) Version 4 system. Descriptions of V3 and earlier Generic 3 versions are also provided.

This document is *not* intended to replace or modify the instructions provided in other task-specific DEFINITY® documentation. Refer to "Related Documents" in this section and to Appendix B "References."

Intended Audience

The information in this document is intended for customers, AT&T marketing, sales, installation, and service personnel. This document is also intended for educators and trainers to understand and teach Generic 3 to AT&T and customer personnel.

Reason for Reissue

This document covers the system updates from G3V3 to G3V4 (including G3V4 Release 3).

Systems Supported

This document primarily supports DEFINITY® Generic 3 Version 4 Release 3 (G3V4R3).

How Document Is Organized

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

- Chapter 1, “Overview of DEFINITY® G3” — Introduces G3V4, presents an overview of hardware, architecture, administration and maintenance, and provides a brief functional description of the systems
- Chapter 2, “Cabinets, Carriers, and Circuit Packs” — Describes the main system hardware components
- Chapter 3, “Power and Fans” — Briefly describes AC and DC power systems, ground wiring, and cooling fan units
- Chapter 4, “Cabinet and Carrier Configurations” — Describes the various configurations of cabinets and carriers composing different systems
- Chapter 5, “Cabling” — Briefly describes cabling between carriers, between cabinets, and between the system and the external environment
- Chapter 6, “Architecture” — Describes the operating system, applications software (call processing, maintenance, and administration), internal connectivity, and protocols handled by the system
- Chapter 7, “Connections to Trunks, Lines, and Networks” — Briefly describes the types of trunks, data lines, and networks that can be connected to the system
- Chapter 8, “Connections to Peripherals” — Describes optional external data terminal equipment (DTE) and data communications equipment (DCE) that can be connected to the system
- Chapter 9, “Maintenance” — Briefly describes hardware, tests, procedures, error logs, alarm logs and the specific documentation used for maintaining and testing the system
- Chapter 10, “Environmental Requirements” — Briefly describes typical floor plans. Temperature, humidity, lighting, air purity, and noise levels requirements are also discussed
- Chapter 11, “Technical Specifications” — Lists the specifications for capabilities and performance
- Appendix A, “System Capacities” — Provides the capacities of the system, from G3V1 through G3V4R3 for each model
- Appendix A, “References” — Lists the available documentation related to the DEFINITY® Generic 3 (G3).
- Abbreviations — Alphabetic listing (in United States English) of the abbreviations found in this document
- Glossary — Alphabetic listing (in United States English) and definition of terms used in this document
- Index — Alphabetic listing (in United States English) of topics presented in this document.

Conventions Used in This Document

The following conventions are used in this document:

- The word, *system*, is a general term encompassing G3V4.
- DEFINITY[®] systems are called: G3V4; G3iV4; G3sV4; G3vsV4; G3rV4.
- It is assumed the information in this document is applicable for all versions of DEFINITY[®] G3, including V2 through V4, unless otherwise specified
- All occurrences of G3 without an “i,” “r,” “s,” or “vs.” following the “3” mean G3i, G3s, G3vs, and G3r.
- A component of a system, such as a circuit pack, occurring without reference to any specific system, is assumed to be part of G3.

Trademarks and Service Marks

Trademarks and service marks used in this document are as follows:

- ACCUNET[®] – Registered trademark of AT&T
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- DEFINITY[®] – Registered trademark of AT&T
- Intel[®] – Registered trademark of Intel Corporation
- MEGACOM[®] – Registered trademark of AT&T
- Music Mate[®] – Registered trademark of Harris Corporation
- Page Pac[®] – Registered trademark of Harris Corporation
- PORTA[®] – Registered trademark of Porta Systems Corporation
- Power Mate[®] – Registered trademark of Harris Corporation
- Talk Mate[®] – Registered trademark of Harris Corporation
- Teleseer[®] – Registered trademark of AT&T
- Zone Mate[®] – Registered trademark of Harris Corporation

Related Documents

The following AT&T documents are useful for system-related information:

- *An Introduction to DEFINITY® Communications System Generic 3*, 555-230-023
- *DEFINITY® Communications System Generic 3 Capabilities*, 555-230-496
- *DEFINITY® Communications System Generic 3 Feature Description*, 555-230-204
- *DEFINITY® Communications System Generic 3 Planning and Configuration*, 555-230-601
- *DEFINITY® Communications System Generic 2 and System 85 Equipment Room Floor Plans and Specifications*, 555-104-603
- *DEFINITY® Communications System Generic 1 and Generic 3 System Description and Specifications*, 555-230-200
- *DEFINITY® Communications System Generic 1 and Generic 3 Main Distribution Field Design*, 555-230-630
- *DEFINITY® Communications System Generic 1 and Generic 3 Installation and Test*, 555-230-104
- *DEFINITY® Communications System Generic 3 Version 4 Implementation*, 555-230-655
- *DEFINITY® Communications System Generic 1 and Generic 3i/s/vs Maintenance*, 555-204-105
- *DEFINITY® Communications System Generic 3r Maintenance*, 555-230-105
- *DEFINITY® AUDIX System Feature Descriptions*, 585-300-205
- *AT&T Network and Data Connectivity Reference*, 555-025-201
- *DEFINITY® Communications System Generic 3 Version 1.1 - Version 4 Upgrades and Additions*, 555-230-107
- *DEFINITY® Communications System Generic 3vs/s/i Version 1.1 - Version 4 Upgrades and Additions*, 555-230-108
- *DEFINITY® Communications System Generic 3r Version 1.1 - Version 4 Upgrades and Additions*, 555-230-109

How to Order Documentation

In addition to this book, other description, installation and test, maintenance, and administration books are available. A complete list of the DEFINITY Generic 3 (G3) Version 4 books can be found in the *Global Business Communications System Publications Catalog*, 555-000-010.

Other DEFINITY® G3 documentation can be ordered directly from the AT&T Global Business Communications System Publications Fulfillment Center at 1-317-361-5353.

How to Comment on This Document

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If the reader comment card is missing, fax your comments to 303-538-1741, and mention this document's name and number, *DEFINITY® Communications System Generic 3 System Description and Specifications* 555-230-206.

Standards Compliance

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

- CCITT
- ECMA
- IPNS
- DPNS
- National ISDN-1
- National ISDN-2
- ISO-9000
- ANSI
- FCC Part 15 and Part 68
- IEC950
- EN55022
- EN50082

Contact your AT&T representative for more information.

International Requirements

For global use, the Generic 3 (G3) provides connectivity to lines and trunks and allows connection to analog Central Office (CO) trunks. The Generic 3 (G3) also provides connectivity to public network Central Office (CO) switches specific to the regulations of many countries. Other provisions include enhancements to the 24- and 32-channel Integrated Services Digital Network-Primary Rate Interface (ISDN-PRI) as well as polarity-reversal signaling on loop-start CO trunks. Refer to the document *AT&T Network and Data Connectivity*, 555-025-201. This document describes connectivity from G3 to trunks used in countries outside the United States.

Internal switch operations allow English, Spanish, French, Italian, and a user-defined-language for telephone displays. Visually impaired attendant service using 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) Direct Inward Dialing (DID) and Direct Inward/Outward Dialing (DIOD) signaling
- Broadband dial tone detection and misoperation handling

Internal switch 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 1 kHz or 16 kHz, and A-Law or Mu-Law companding.

Administrable selection of Integrated Services Digital Network (ISDN) and non-ISDN bit-oriented digital protocols, including analog line and trunk port impedances and gain and loss characteristics, is provided.

Protocol interfaces, such as Digital Signal Level 1 (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 convert DS1 framing, signaling, line coding, and companding to that required on CEPT1 trunks, and vice-versa.

Electromagnetic Compatibility Standards

This product complies with and conforms to the following:

- Council Directive 89/336/EEC (including 92/31/EEC), Official Journal of the European Communities, May 3, 1989
- Limits and Methods of Measurements of Radio Interference Characteristics of Information Technology Equipment, EN55022 (CISPR22), CENELEC, 1993.
- Electromagnetic Compatibility General Emission Standard Part 1; residential, commercial, and light industry, EN50081-1, CENELEC, 1991.
- EN50082-1, Normative Standard relating to Immunity
- FCC Parts 15 and 68
- Australia AS3548



NOTE:

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

Electromagnetic Immunity Standards

The system conforms to the following:

- Electromagnetic compatibility General Immunity Standard, part 1; residential, commercial, light industry, EN50082-1, CENELEC, 1991
- IEC 801-2 Issue 1 (1984) and Issue 2 (1992), Electrostatic discharge immunity requirements (EN55024, Part 2)
- IEC 801-3, Radiated radio frequency field immunity requirements (EN55024, Part 3)
- IEC 801-4, Electrical fast transient/burst immunity requirements (EN55024, Part 4)

European Union Standards

The “CE” (Conformite Europe'enne) mark affixed to the following DEFINITY® equipment indicates it conforms to the European Union Electromagnetic Compatibility Directive (89/336/EEC), the Low Voltage Directive (73/23/EEC), and the Telecommunication Terminal Equipment (TTE) Directive complying with I-CTR3 Basic Rate Interface (BRI) and I-CTR4 Primary Rate Interface (PRI).

AT&T Global Business Communications Systems declares that the DEFINITY® equipment specified in this document conforms to the European Union (EU) Directives per the following equipment:

- AC 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 G3

1

This document supports DEFINITY® Communications Systems Generic 3 Version 2 through Version 4 (G3V2 through G3V4 Release 3).

This chapter introduces the Generic 3 system at an overview level. Previous versions of the systems are described in *DEFINITY® Communications System Generic 1 and Generic 3 System Description and Specifications*, 555-230-200.

The four current models of G3 are: G3vs, G3s, G3i, and G3r. Any of these models (G3V2 and later versions) can be used in the United States or in other countries. G3r is distinguished from G3vs, G3s, and G3i by a different processor. G3r can be configured to handle more lines and trunks and have faster call throughput than G3i. G3i can handle more lines than G3s, and G3s can handle more lines than G3vs. Appendix A details the capacities of the different systems.

This chapter covers the following topics:

- “The DEFINITY System”
- “Time Division Multiplexing”
- “System Components and Configurations”
- “Architecture”
- “Cabinets”
- “Connections to the External Environment”
- “Duplication”
- “Administration”
- “Comparing System Versions”
- “Upgrades and Additions”

The DEFINITY System

The system 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 trunks are converted to analog calls.

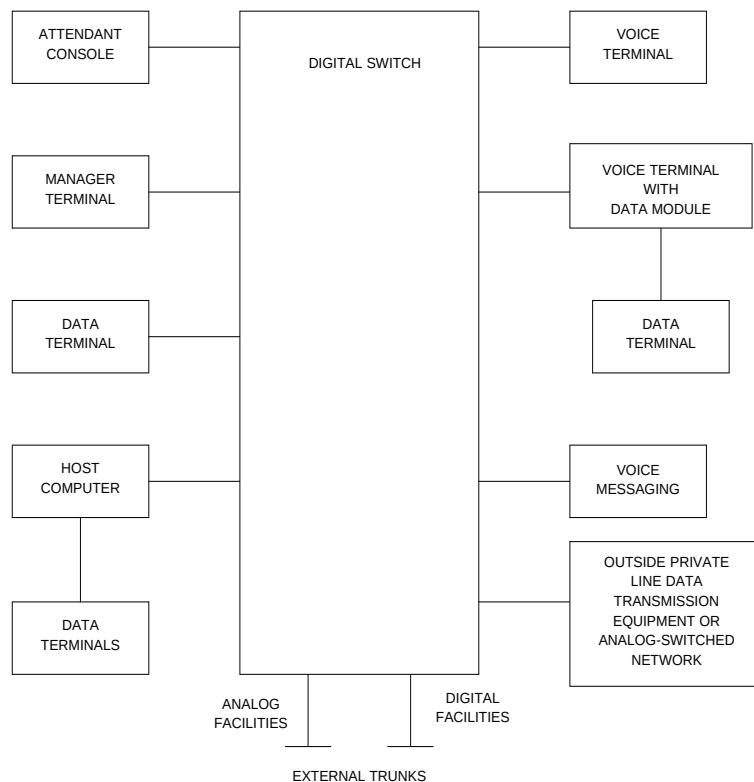


Figure 1-1. The System as a Digital Switch

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.

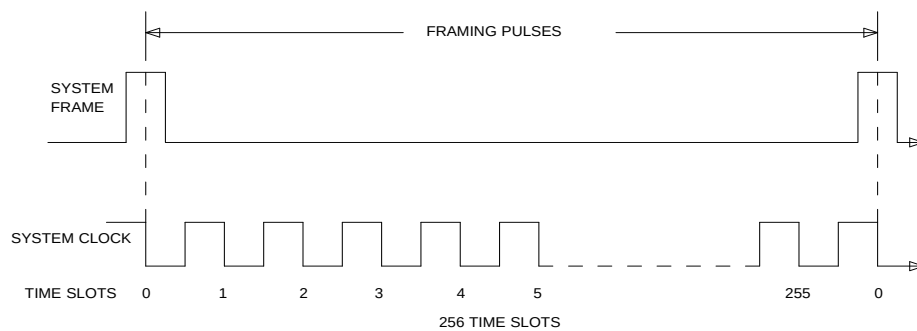


Figure 1-2. TDM Time-Slot Generation

Time Slot Interchanger

The time slot interchanger accepts input frames and produces output frames where the input time slots have been reordered. The time slot interchanger takes a slot from an input line and, according to an internal mapping table, switches that slot to an output line corresponding to the called number. The time slot interchanger also switches a slot from the called number to the line for the calling number, thus providing two-way communication.

System Components and Configurations

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

Processor Port Network (PPN)

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 Port Network. The PPN also contains the port circuits, as described above under "System Components."

Expansion Port Network (EPN)

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

Center Stage Switch

A Center Stage Switch (CSS) (optional for three Port Networks or less in G3r) is the central interface between the PPN and the EPNs. A CSS consists of one or two Switch Nodes (SN). One SN can expand the system from one EPN to up to 15, and two SNs can expand the system to up to 21 EPNs in G3V2 and 43 EPNs in G3V3 and G3V4. A CSS can be used for one or two EPNs to plan for future expansion.

Main Components

Figure 1-3 shows the components arranged in five main configurations of Port Networks (PNs) (the PPN and/or EPNs and CSSs):

1. Basic system consisting of a Processor Port Network (PPN) only
2. Directly connected systems consisting of two PNs (one PPN and one EPN) connected directly together
3. Directly connected systems consisting of three PNs (one PPN and two EPNs) connected directly together
4. CSS-connected systems in G3r consisting of up to 15 EPNs interconnected by one SN to the PPN
5. CSS-connected systems in G3r consisting of up to 21 EPNs interconnected by two SNs to the PPN, and up to 43 EPNs interconnected by three SNs to the PPN

Chapter 4, "Cabinet and Carrier Configurations", describes different PPN, EPN, and CSS configurations.

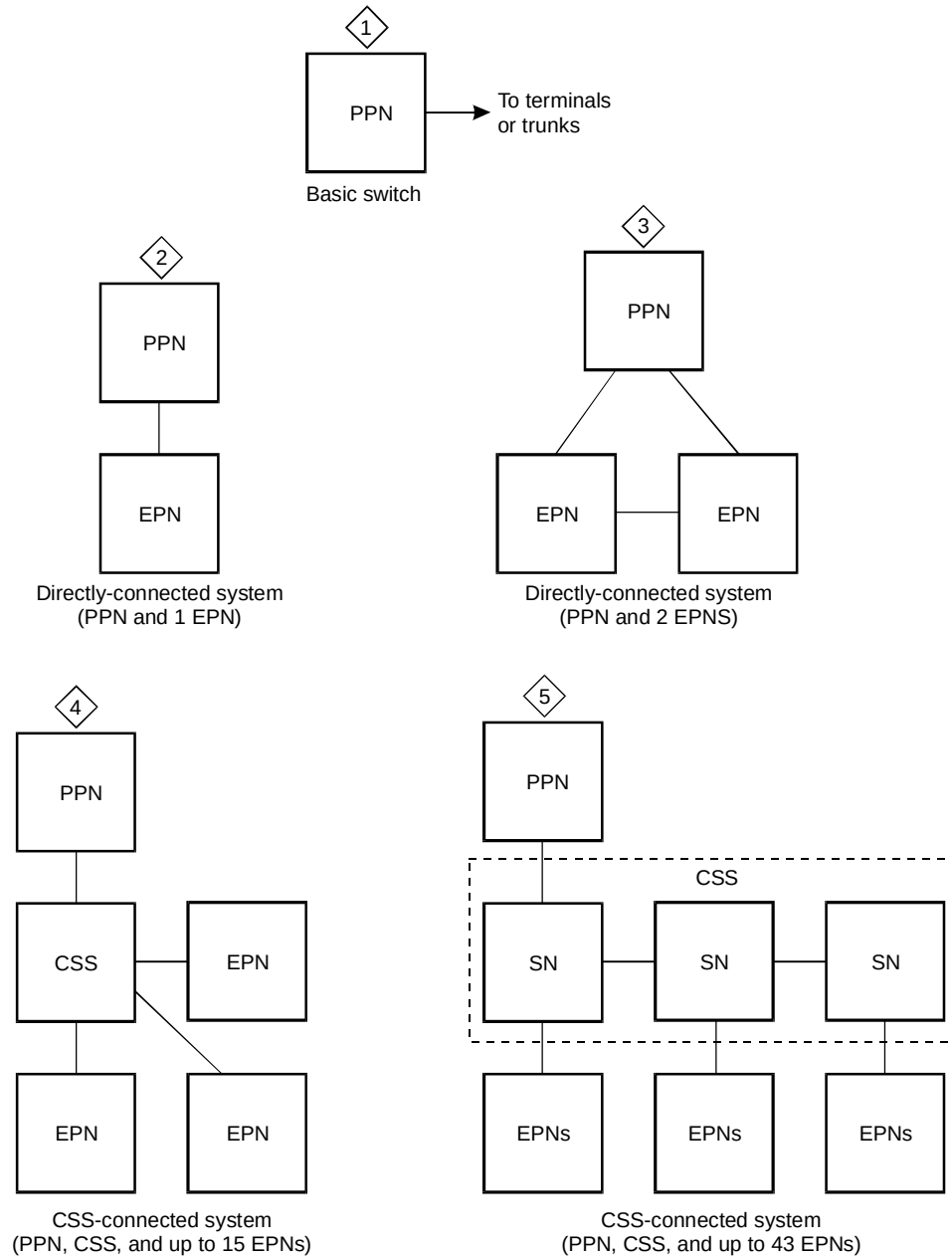


Figure 1-3. Five Main Cabinet Configurations

System Configurations

Figure 1-4 shows a directly connected system with an SPE in the PPN operating the system and processing voice calls and data calls.

The figure also shows the Port Network distributed throughout the PPN and two EPNs routing voice calls and data calls between external trunks and lines.

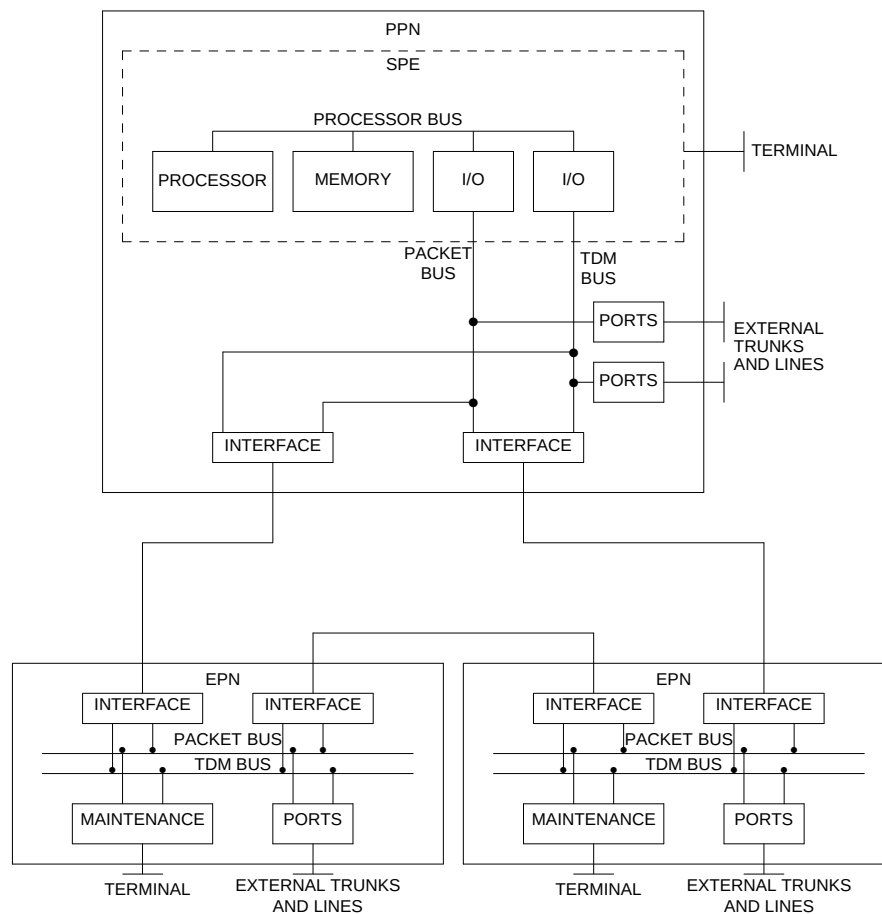


Figure 1-4. Functional Components — Directly Connected System

Figure 1-5 shows a CSS-connected system with the same functional components as a directly connected system except with the added CSS to route voice and data calls between external trunks and lines.

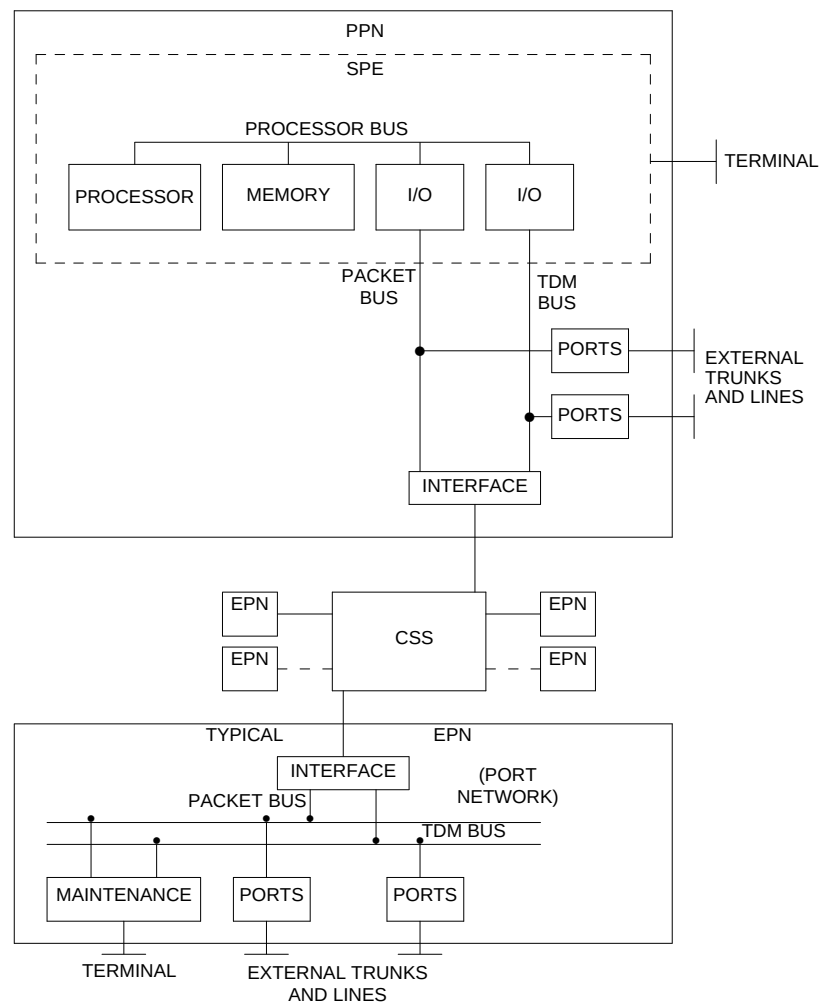


Figure 1-5. Functional Components — CSS-Connected System

Switch Processing Element (SPE)

The Switch Processing Element (SPE) processes calls as follows: when a device, such as a voice terminal, connected to the system goes off-hook or signals call initiation, the SPE receives an interrupt signal from the port circuit connected to the device. The SPE then collects the digits of the called number and sets up the switch to make a connection between the calling and called devices.

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

- *Processor*: the G3i, G3s, and G3vs (V4) use an Intel 80386 processor operating at 16 MHz. The G3r (V4) is equipped with a reduced instruction set computer (RISC) operating at 33 MHz (UN331B processor described in chapter 2). The RISC allows greater call processing speed and capacity in G3r than in G3vs, G3s, and G3i.
- *Memory*: with one of the following capacities: in G3i, G3s, and G3vs, 7 Mbytes of flash read-only memory (ROM) and 4 Mbytes of Dynamic Random Access Memory (DRAM) in the processor, as described in "TN786B Processor," in Chapter 2). 4 Mbytes of DRAM on a card (CPP1 described in Chapter 2) attached to the processor. In G3r, 64 Mbytes of DRAM on two 32-Mbyte circuit packs.

In the G3r, the disk drive is a nonvolatile system bootstrap and translation storage device. The input/output (I/O) circuits act as interfaces between the SPE and the TDM and packet buses. The maintenance interface is used to connect the system to an administration terminal to monitor power failure, clock signals and temperature sensors.

Port Network (PN)

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

- *TDM Bus*: runs internally throughout each PN and is terminated by resistors on each end. The TDM bus consists of two eight-bit parallel buses: TDM bus A and TDM bus B. These buses carry switched digitized voice and data signals and control signals between all port circuits and port circuits and the SPE. The port circuits place digitized voice and data signals on a TDM bus. TDM bus A and TDM bus B are normally active simultaneously. If one fails, the other takes over.
- *Packet Bus*: runs internally throughout each PN and is terminated by resistors on each end. The packet bus is an eight-bit parallel bus that carries two *logical links* that are the communications paths carrying control messages from the SPE, through port circuits, to endpoints such as terminals and adjuncts. The packet bus carries the following types of logical links between all port circuits:
 - Links connecting the SPE to the interface circuits (optional in G3i and G3s with packet control and required in G3r) and to the switch node interfaces (SNIs) in an SN when a CSS is present in G3r

- Integrated Services Digital Network-Basic Rate Interface (ISDN-BRI) and ISDN-Primary Rate Interface (ISDN-PRI) D-channel links
 - X.25 links including Distributed Communications System (DCS) links; X.25 is only on the packet bus in G3r; while G3s and G3i can use the packet bus or TDM; while G3vs uses TDM only for X.25.
- *Port Circuits:* form analog/digital interfaces between the PN and external trunks and devices providing links between these externals 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. Because all port circuits are connected to the TDM bus and packet bus, any port can send a signal to any other port.
 - *Interface Circuits:* in the PPN and in each EPN are types of port circuits that terminate fiber optic cables connecting TDM buses and packet bus from the PPN cabinet to the TDM buses and packet bus of each EPN cabinet. The fiber optic cable also connects the CSS to the PPN and EPNs. These interface terminations and cabling connect all port circuits together in the system.
- 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 PN-end of a cable connected between a PN carrier and an 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.
- Chapter 5, "Cabling," shows Expansion Interface (EI) and Switch Node Interface (SNI) circuit pack terminations of intercabinet cabling.
- *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 announcement, and speech synthesis.

Center Stage Switch — G3r Only

Figure 1-6 shows the Center Stage Switch (CSS) linking the PPN to EPNs via the Switch Node Interface circuit packs in a Switch Node (SN). SNs reduce the amount of interconnect cabling between the PPN and EPNs by acting as “hubs” to distribute the cabling to EPNs.

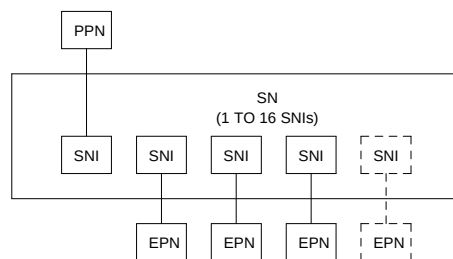


Figure 1-6. Center Stage Switch with Switch Nodes (SN)

A CSS-connected system can be connected to one PN or up to 44 PNs. The system can consist of up to three SNs. The CSS can also consist of two SN carriers, four SN carriers, or six SN carriers in a critical reliability system. Refer to Chapter 4, “Cabinet and Carrier Configurations” for more information.

Each SN contains from one to 16 Switch Node Interface (SNI) circuit packs. Each SNI circuit pack can be connected by fiber optic cable to a PN or other SN. One SNI circuit pack 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 22 PNs to be connected to two SNs, and up to 43 PNs to be connected to three SNs.

Architecture

The system architecture consists of two main parts:

- Operating system: the Oryx/Pecos real-time, multi-processing system. Oryx/Pecos supports the 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:

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

Chapter 6, "Architecture," describes the system architecture in more detail.

Cabinets

The system cabinets house all components (PPN, EPN, and CSS), including power supply equipment. 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. Every connector is connected to signal buses and power supplies in a cabinet. Chapter 2 "Cabinets, Carriers, and Circuit Packs" describes the cabinets in more detail and Chapter 3 "Power and Fans" describes the power supplies in the cabinets.

There are three cabinet types:

1. *Single-Carrier Cabinet* consisting of one carrier.
2. *Compact Single-Carrier Cabinet* (G3vs only) consisting of a wall-mountable cabinet with one carrier.
3. *Multi-Carrier Cabinet* containing one to five carriers

Figure 1-7 shows the front of a single-carrier cabinet with the door closed.

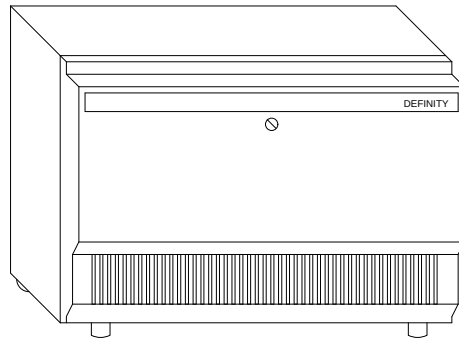


Figure 1-7. Typical Single-Carrier Cabinet

Figure 1-8 shows a compact single-carrier cabinet with a hinge attaching it to a wall.

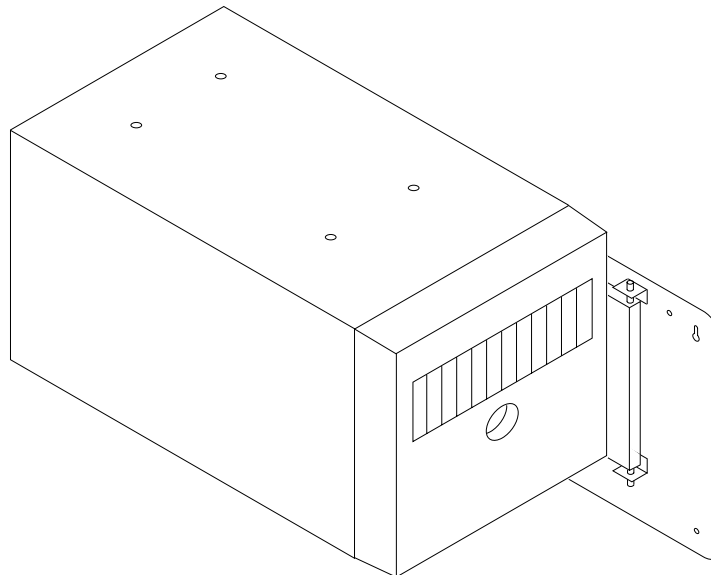


Figure 1-8. Typical Compact Single-Carrier Cabinet

Figure 1-9 shows the front of a Multi-Carrier Cabinet with the door closed.

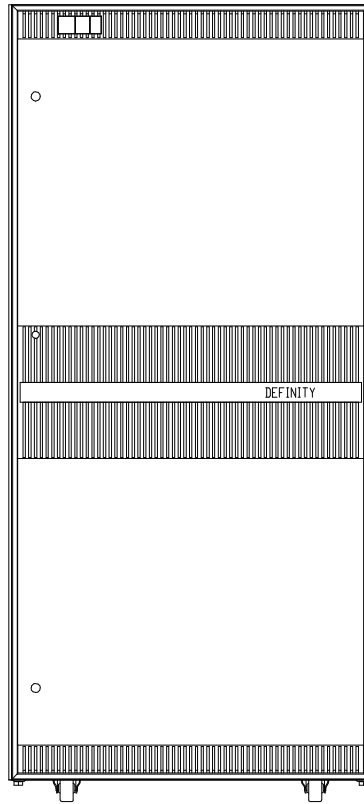


Figure 1-9. Typical Multi-Carrier Cabinet

Multi-Carrier Cabinets

There are three types of Multi-Carrier Cabinets:

1. *PPN Cabinet*: contains the SPE to perform call processing. The PPN also contains the ports, an interface to an EPN cabinet (optional), and an SN in a CSS-connected system (optional).
2. *EPN Cabinet*: contains additional ports, interfaces to the PPN cabinet 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.

The following carriers can be installed in Multi-Carrier PPN and EPN cabinets:

- *Control carrier* (located only in the PPN cabinet) contains SPE circuit packs to perform call processing, maintenance, and administration. Unlike the G3r control carrier (also called “processor carrier”), the G3i control carriers also contain port circuit pack slots.
- *Duplicated control carrier* (optional and located only in the PPN cabinet) contains duplicated SPE circuit packs, maintenance, and administration identical to the control carrier. The G3r control carrier is used for duplication. Unlike the G3r control carrier, the G3i duplicated control carriers also contain port circuit pack slots. Only G3i and G3r support duplication.
- *Port carrier* (optional in G3 and located in the PPN cabinet and EPN cabinets) contains port, service, and tone/clock circuit packs.
- *Expansion control carrier* (located only in EPN cabinets) contains extra port circuit packs, tone-clock, maintenance interface, and expansion interface.
- *SN carrier* in G3r (optional and located in the PPN and/or EPN cabinets) contains switch node interface (SNI) circuit packs composing the CSS.

Chapter 2, “Cabinets, Carriers, and Circuit Packs,” describes Multi-Carrier Cabinets, carriers, and circuit packs in the carriers.

Single-Carrier Cabinets

Single-Carrier Cabinet stacks can be used as EPNs in G3r. Chapter 2, “Cabinets, Carriers, and Circuit Packs,” has descriptions of the cabinets and circuit packs. There are four types of Single-Carrier Cabinets:

1. *Basic Control Cabinet*: (located in the PPN only in G3s and G3i) contains a control complex that performs call processing, ports, and an interface to an optional duplicated control cabinet only in G3i. This cabinet is also called an “enhanced” control cabinet. Unlike the G3V1 basic control cabinet, it has a 386 processor instead of a 286 processor, flash-ROM instead of a tape drive, and 16 port circuit pack slots instead of 10.
2. *Duplicated Control Cabinet*: (optional and located only in the PPN in G3i) contains a duplicated control complex, ports, and an interface to an expansion control cabinet. This cabinet is also called an “enhanced” duplicated control cabinet. Unlike the G3V1 duplicated control cabinet, it has a 386 processor instead of a 286 processor, flash-ROM instead of a tape drive, and 16 port circuit pack slots instead of 10.
3. *Expansion Control Cabinet*: (optional and located only in an EPN in G3i and G3r) contains ports, tone-clock, interface to a port cabinet, and maintenance interface
4. *Port Cabinet*: (located in the PPN and in EPNs) contains ports and an interface to an Expansion Control Cabinet.

Compact Single-Carrier Cabinet — G3vs

The compact Single-Carrier Cabinet is available only as G3vs, can only be used as a PPN, and can be standard reliability only (no duplication). The carrier can be mounted on a tabletop or to a wall. The carrier contains dedicated and universal port slots with three dedicated control circuit packs and ten port slots. The carrier supports phantom power for a maximum of one attendant console and one emergency transfer panel.

This carrier does not support BRI, ASAI, packet bus, and Memory Expansion CPP1, and cannot be connected to other port carriers or cabinets because its TDM bus cannot be extended.

Chapter 2, “Cabinets, Carriers, and Circuit Packs,” describes the Compact Single-Carrier Cabinet and circuit packs in the cabinet.

Connections to the External Environment

The system can be connected to trunks; communications paths that transmit voice and data signals between the system and a Central Office (CO) switch and/or other Private Branch Exchanges (PBXs). The system can also be connected to networks (public and private); a series of communications devices, such as terminals and computers interconnected to be shared.

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. See Chapter 8, “Connections to Peripherals” and Chapter 7, “Connections to Trunks, Lines, and Networks,” for more information.

Figure 1-10 shows a typical G3 system consisting of the PPN cabinet and an EPN cabinet, connected to the external environment.

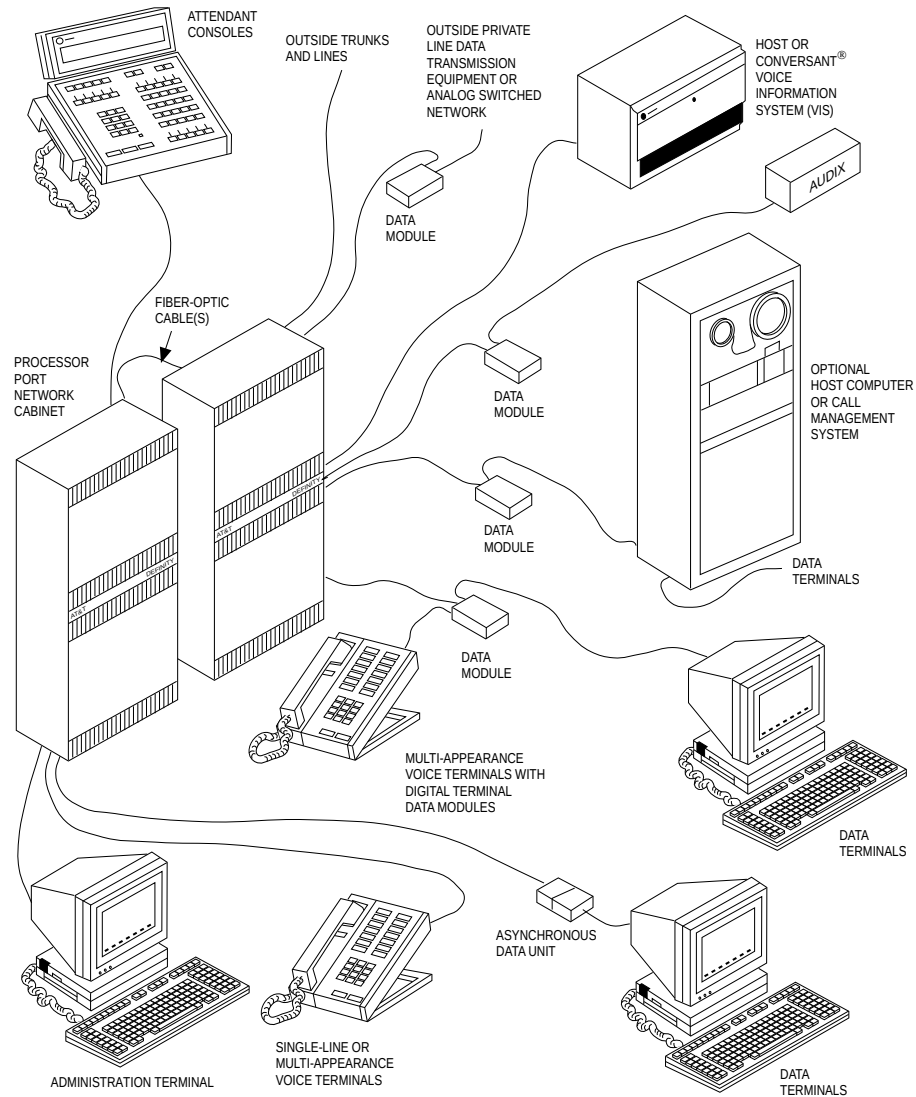


Figure 1-10. Typical Connections to External Environment

Duplication

Duplication is the extent a system's hardware 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 4, "Cabinet and Carrier Configurations" for more information.

Administration

A terminal connected to the control carrier in a Multi-Carrier Cabinet system or the control cabinet in a Single-Carrier Cabinet system is used to administer the system. Commands are entered at the terminal to access and display screens. The screens (forms) are used to list data and to add, change and remove system and voice terminal features. Screen 1-1 shows a typical administration form.

Extension: 300		STATION		Page 1 of x	
Type: 500__	BCC: 0	Lock Messages? n	COR: 1_		
Port: _____		Security Code: _____	COS: 1_		
Name: _____		Coverage Path: _____	Tests? y		
FEATURE OPTIONS					
LWC Reception: spe_____		Coverage Msg Retrieval? y			
LWC Activation? y		Auto Answer? n			
CDR Privacy? y		Data Restriction? n			
Redirect Notification? y		Call Waiting Indication? y			
Off Premise Station? y		Att. Call Waiting Indication? y			
R Balance Network? _		Distinctive Audible Alert? y			
Switchhook Flash? y		Message Waiting Indicator: _____			

Screen 1-1. Typical Administration Form with Default Entries

System administration is detailed in the following documents:

- For Generic 3 Version 2 and Version 3: *DEFINITY® Communications System Generic 3 Version 2 and Version 3 Implementation*, 555-230-653
- For Generic 3 Version 4: *DEFINITY® Communications System Generic 3 Version 4 Implementation*, 555-230-655

Comparing System Versions

Table 1-1 through Table 1-3 compare the system versions of G3.

Table 1-1. Comparing System Versions

System	Processor	PPN	Maximum EPNs	Can be Directly Connected	Can be CSS-Connected
G3s/vs	80386	1	0	N/A	N/A
G3i	80386	1	2	Yes	No
G3rV2	RISC	1	21	Yes	Yes
G3rV3,V4	RISC	1	43	Yes	Yes

Table 1-2. Comparing Carriers in Multi-Carrier Cabinets

Carrier	G3i	G3r
Control	PPN cabinet	PPN cabinet
Duplicated control	PPN cabinet	PPN cabinet
Port	PPN and EPN cabinets	PPN and EPN cabinets
Expansion	EPN	EPN
Switch Node	None	PPN and EPN cabinets

Table 1-3. Comparing Single-Carrier Cabinets

Cabinet	G3vs	G3s	G3i	G3r
Basic control	NA	PPN	PPN	NA
Duplicated control	NA	NA	PPN	NA
Compact control	PPN	NA	NA	NA
Port	NA	NA	PPN and EPN	EPN
Expansion control	NA	NA	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 makes additions easy and aids a customer in planning and managing system growth.

Refer to *DEFINITY® Communications System Generic 3 Version 1.1 - Version 4 Upgrades and Additions*, 555-230-107, for more information on upgrades and additions.

This chapter describes the Generic 3 (G3) cabinets, carriers, and circuit packs, their functions, physical specifications, and interconnections in the following order:

- “Multi-Carrier Cabinets”
- “Carriers in Multi-Carrier Cabinets”
- “Single-Carrier Cabinets”
- “Carriers in Single-Carrier Cabinets”
- “Circuit Packs and Related Hardware”

To determine required types and numbers of cabinets, carriers, circuit packs, or adjuncts before installation, refer to *DEFINITY[®] Communications System Generic 3 Planning and Configuration*, 555-230-601, or contact your AT&T representative.

Multi-Carrier Cabinets

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

⇒ NOTE:

The G3s and G3vs do not support Multi-Carrier Cabinet configurations or duplication. The G3s only supports a Single-Carrier Cabinet without duplication. The G3vs only supports a compact Single-Carrier Cabinet without duplication.

Figure 2-1 shows the front of a typical Multi-Carrier Cabinet. A Multi-Carrier Cabinet can be used as a PPN cabinet or an EPN cabinet. The cabinet positions are:

- Carriers — “A” through “E”
 - Fan Unit — “F”
 - Power Distribution Unit — “G”
-

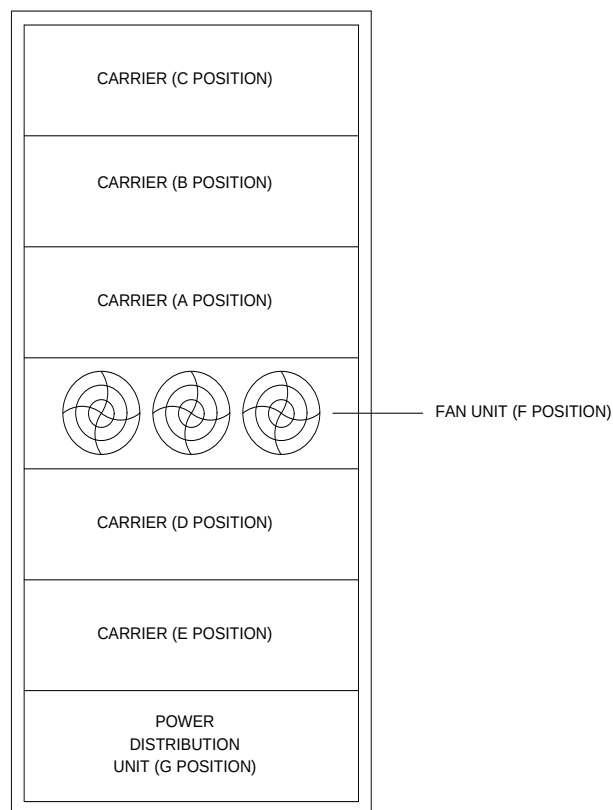


Figure 2-1. Typical Multi-Carrier Cabinet

Power Distribution

An AC or DC power distribution unit in the bottom (G position) of the cabinet distributes the main power feed to the cabinet components.

An optional battery charger and batteries are available to back up the cabinet power if external AC power fails. The fan unit in the middle of the cabinet cools the carriers. Chapter 3, "Power and Fans," describes external power sources, power distribution units, and the fan unit in Multi-Carrier Cabinets.

For more information about the electrical requirements of the installation site, refer to *DEFINITY® Communications System Generic 3 Planning and Configuration*, 555-230-601.

Cabinet Features

Doors on the front and rear of the cabinet protect the internal equipment and allow easy access. The front cabinet door is secured by screw-type latches located on the left side. The two doors at the rear of the cabinet are secured by screw-type latches located in the middle of each door. Slots at the top and bottom of the cabinet front and rear are provided for air circulation.

Each cabinet is equipped with casters. When a cabinet is in place, leveling screws keep it 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 2-6 on page 2-8.

Up to three Attendant Consoles can be powered by the AUX connector in the "A" position in G3s, G3i, and G3r Control Carriers. Only one Attendant Console can be powered from the "A" position in G3vs Control Carriers.

Up to seven Emergency Transfer Panels can be powered by the AUX connector in the "A" position in G3s, G3i, and G3r Control Carriers. Only one Emergency Transfer Panel can be connected in G3vs Control Carriers.

Processor Port Network (PPN) Cabinet (J58890A)

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

- Port Carrier (J58890BB) — One to four
 - Control Carrier (J58890AH) in G3i — One in all systems
 - Duplicated Control Carrier (J58890AJ) G3i — One in high or critical reliability system
 - Control Carrier (J58890AP) in G3r — One in all systems and two in high reliability and critical reliability systems
 - Switch Node (SN) carrier (J58890SA) in G3r — One (standard and high reliability) or two (critical reliability) with a Center Stage Switch (CSS)
-

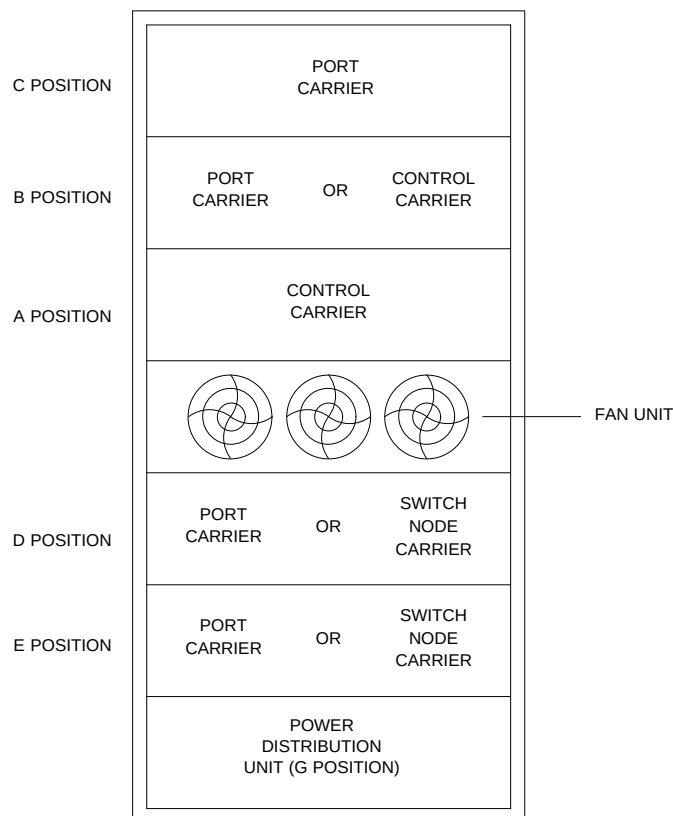


Figure 2-2. Typical Multi-Carrier PPN Cabinet (J58890A)

Expansion Port Network (EPN) Cabinet (J58890A)

Figure 2-3 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 G3r systems only: zero, one, or two when required
-

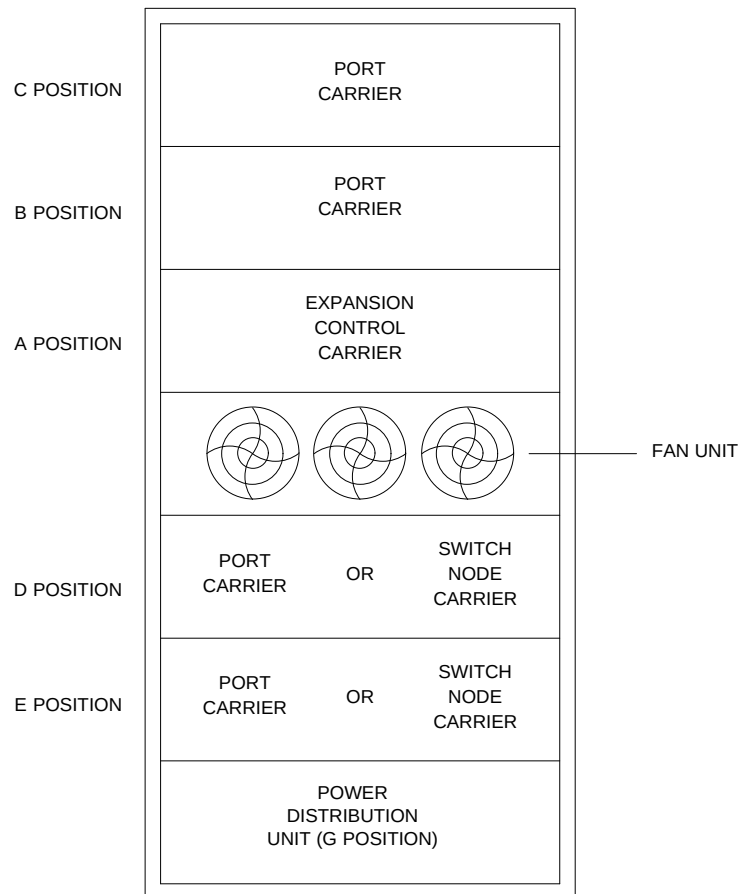


Figure 2-3. Typical Multi-Carrier EPN Cabinet (J58890A)

Auxiliary Cabinet (J58886N)

Figure 2-4 shows an Auxiliary Cabinet containing hardware used to install optional equipment. The cabinet allows carrier, rack (width: 23 in. (58.4 cm), and panel types of mountings. An auxiliary cabinet contains the following:

- Fuse Panel (J58889AB); to distribute -48 VDC to fused cabinet circuits
 - 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
-

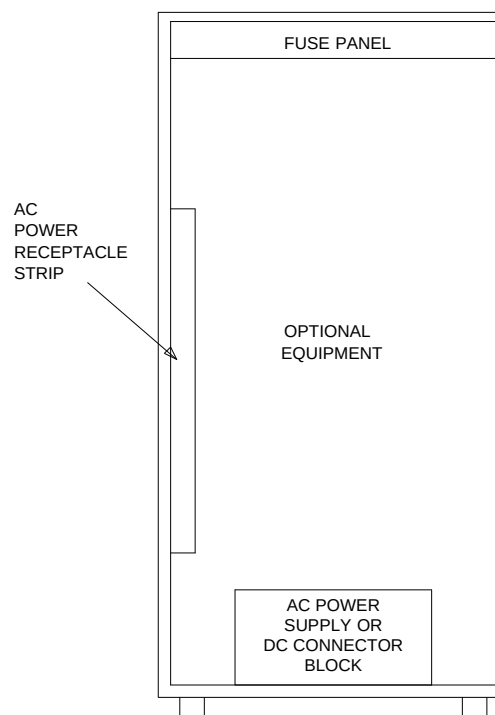


Figure 2-4. Typical Multi-Carrier Auxiliary Cabinet (J58886N)

Carriers in Multi-Carrier Cabinets

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

- Control Carrier (J58890AH) in G3i PPN cabinet
- Duplicated Control Carrier (J58890AJ) in G3i PPN cabinet
- Control Carrier (J58890AP (called “processor carrier”) in G3r PPN cabinet
- Port Carrier (J58890BB) in PPN cabinet and EPN cabinets
- Expansion Control Carrier (J58890AF) in EPN cabinets in G3i and G3r
- Switch Node Carrier (J58890SA) in G3r PPN and EPN cabinets

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

1. *Port*: colored purple and can accept any purple-labeled circuit pack
2. *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 G3i is connected to a 50-pin connector on the carrier's rear panel. A cable is routed from the connector to the Main Distribution Frame.

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

- Z100A (0.75 inches) (1.9 cm)
- Z100B (1.25 inches) (3.2 cm)
- Z100C (0.5 inches) (1.27 cm)
- Z100D (0.25 inches) (64 cm)

Throughout this section, the power units shown in the front views of the carriers are provided as examples only. See the circuit pack tables for lists of optional power units.

Control Carrier (J58890AH) — G3i

The control carrier has dedicated white-colored circuit pack slots that always contain specific control circuit packs. Purple-colored slots can contain any port circuit packs (see Figure 2-5 and Table 2-1).

AC or DC power units, located at each end of the carrier, supply power to the carrier. In G3i, the control carrier always contains the CPP1 Expansion Memory circuit pack.



Figure 2-5. G3i Control Carrier (J58890AH) — Front

Figure 2-6. Control Carrier (J58890AH) — Rear

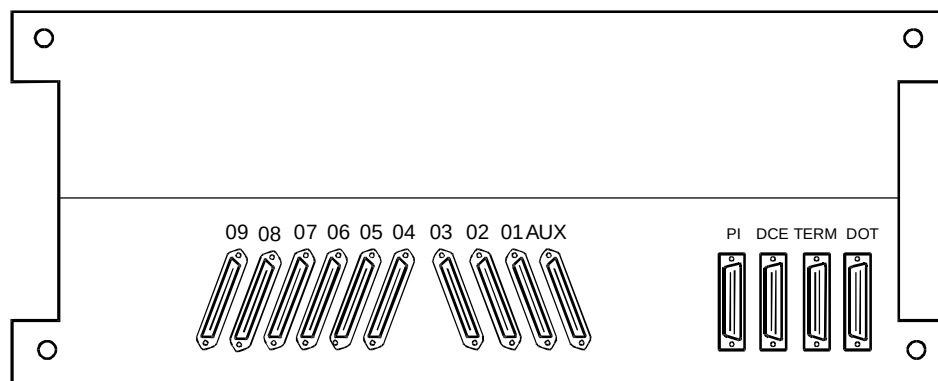


Figure 2-6. Control Carrier (J58890AH) — Rear

Table 2-1. Control Carrier (J58890AH) Rear Connectors

Connector	Function
B01 to B09 50-pin	Provides interfaces between port circuit packs and the Main Distribution Frame
AUX (auxiliary)	Provides interface for customer alarms, attendant console power, or emergency power transfer panels
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
DCE (Digital Communications Equipment)	Connects the processor to the Call Detail Recording (CDR) equipment. Can be used for any reliability option
TERM (terminal)	Connects a terminal to the processor in standard reliability systems. In critical reliability systems, connects a terminal to the processor in the duplicated control carrier if the Duplication Interface circuit pack fails in the control carrier
DOT (Duplication Option Terminal)	Used in critical reliability systems to connect an administration terminal to the duplication interface slot position

Duplicated Control Carrier (J58890AJ) — G3i

The duplicated control 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. See Figure 2-7.

AC or DC power units, located at each end of the carrier, supply power to the carrier. The carrier is equipped with a Duplication Interface circuit pack in Slot 1. The duplicated control carrier contains the CPP1 Memory circuit pack. The memory cartridge is contained in the Network Control circuit pack.

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

Connector	Function
B01 to B09 50-pin	Provides interfaces between port circuit packs and the Main Distribution Frame
TERM (terminal)	Connects an administration terminal to the processor in the duplicated control carrier if the Duplication Interface circuit pack fails in the control carrier

Control Carrier (J58890AP) — G3r

Figure 2-9 shows the Control Carrier (also called Processor Carrier) and its circuit packs. The control carrier contains only dedicated slots used for control circuit packs that compose 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 power to the carrier. The control carrier always contains two Memory circuit packs and one Packet Interface circuit pack.

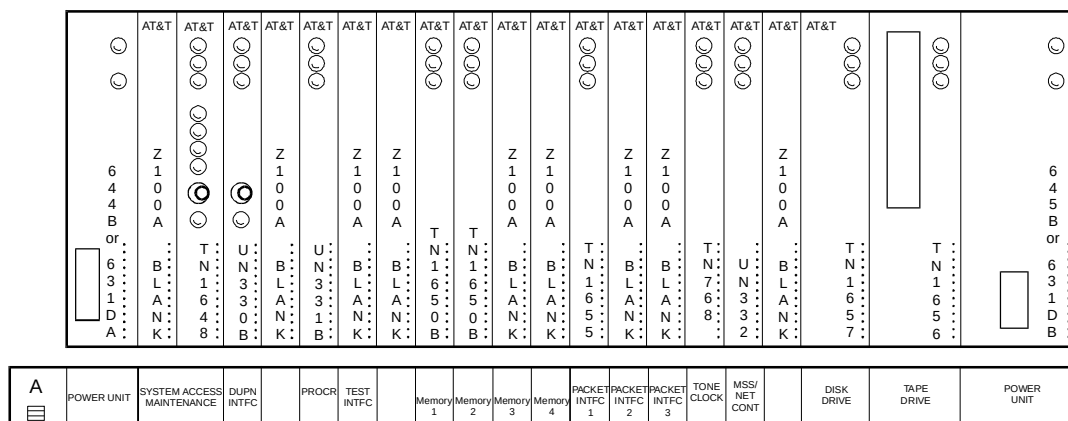


Figure 2-9. G3r Control Carrier (J58890AP) — Front

Figure 2-10 and Table 2-3 describe the connectors on the control carrier rear panel.

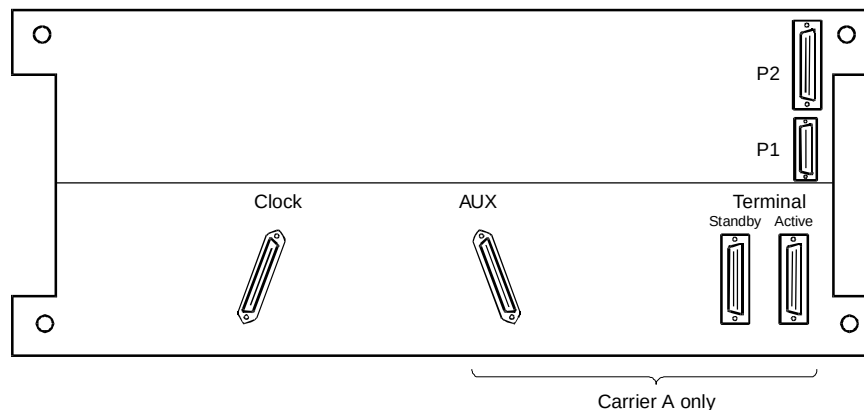


Figure 2-10. G3r Control Carrier (J58890AP) — Rear

Table 2-3. Control Carrier (J58890AP) Rear 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, or emergency power transfer panels
TERMINAL, Active	Connects an administration terminal to the System Access and Maintenance circuit pack in the control carrier
TERMINAL, Standby	Used only in duplicated processors to connect an administration terminal to the stand-by control carrier
P1	Provides position indicator of control carrier, power to fans, and access to alarm and control circuits
P2	Provides control signals to the control carrier

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 and current-limited power, including: -48 VDC to fans and ring generator, 5 VDC to trip 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.

Port Carrier (J58890BB)

Figure 2-11 shows the port carrier and the circuit packs in its port slots. A port carrier contains:

- Port slot locations 1 to 20 for the port circuit packs. Slot 1 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

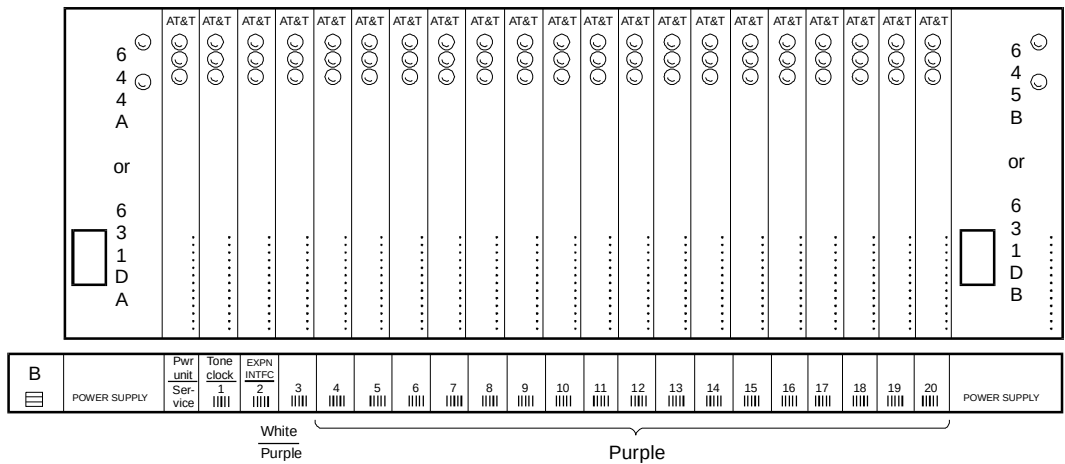


Figure 2-11. Port Carrier (J58890BB) — Front

Figure 2-12 and Table 2-4 describe the connectors on the port carrier rear panel.

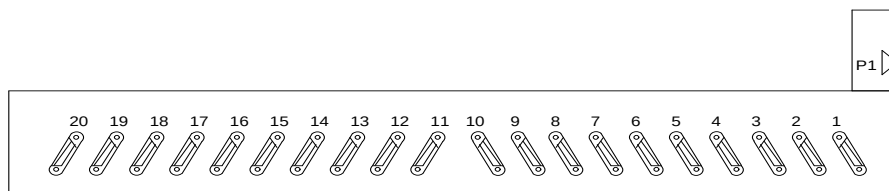


Figure 2-12. Port Carrier (J58890BB) — Rear

Table 2-4. Port Carrier (J58890BB) Rear Connectors

Connector	Function
B01 to B20	Ports interfacing between the circuit pack slots and the Main Distribution Frame
P1	Provides position indicator of port carrier, ringing voltage input to carrier, and access to alarm and control circuits

Expansion Control Carrier (J58890AF)

Figure 2-13 shows the Expansion Control Carrier and the port circuit packs. The carrier contains an Expansion Interface (EI) circuit pack in port slot 1 that is used in a fiber optic cabling path to another cabinet or the CSS in the same cabinet . The carrier also contains port slots 3 to 19 as well as the AC or DC power units located at each end of the carrier. The Tone-Clock and Maintenance circuit packs are also shown.

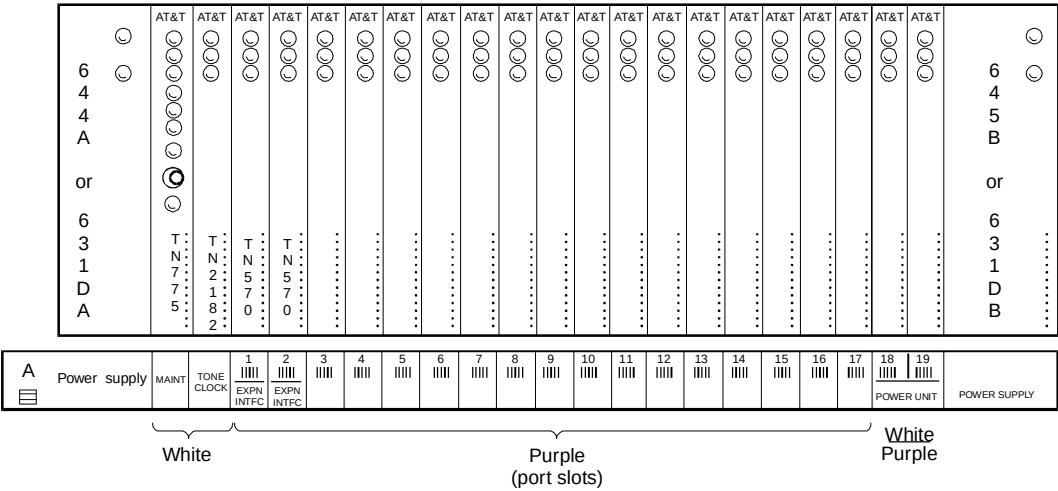


Figure 2-13. Expansion Control Carrier (J58890AF) — Front

Figure 2-14 and Table 2-5 describe the connectors on the expansion control carrier rear panel.

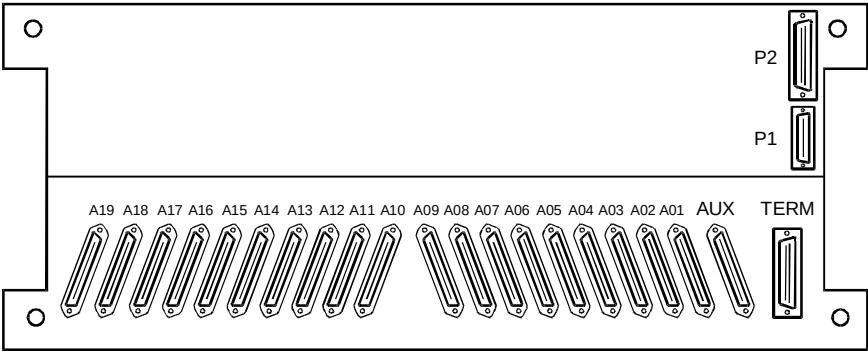


Figure 2-14. Expansion Control Carrier (J58890AF) — Rear

Table 2-5. Expansion Control Carrier (J58890AF) Rear Connectors

Connector	Function
A01	Provides fiber optic cable interface between Expansion Interface (EI) circuit pack in Slot 1 and EI circuit pack in a port carrier, control carrier (G3i) or a TN573 in an SN carrier, or for a DS1C
A02 to A19	Provides interfaces between port circuit packs and the Main Distribution Frame; an optional neon power unit can be in Slots 18 and 19
AUX (auxiliary)	Provides interface for customer alarms, attendant console power, or emergency power transfer panels
TERM (terminal)	Connects administration terminal to the maintenance circuit pack in an EPN cabinet
P1	Provides power to fans
P2	Connects ringing voltage from the ring generator to the carrier and produces control signals

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 and current-limited power, including: -48 VDC to fans and ring generator and 5 VDC to trip main circuit breaker in an over-temperature condition and to operate the ringing transfer relay.

Switch Node (SN) Carrier (J58890SA) — G3r

Figure 2-15 shows a typical Switch Node carrier and the port circuit pack slots. AC or DC power units, located at each end of the carrier, supply power to the carrier.

The carrier contains a Switch Node clock and the Switch Node Interface (SNI) circuit packs composing the CSS. A carrier can contain up to 16 SNI circuit packs; a DS1 Converter circuit pack and an Expansion Interface circuit pack; or two DS1 Converter circuit packs.

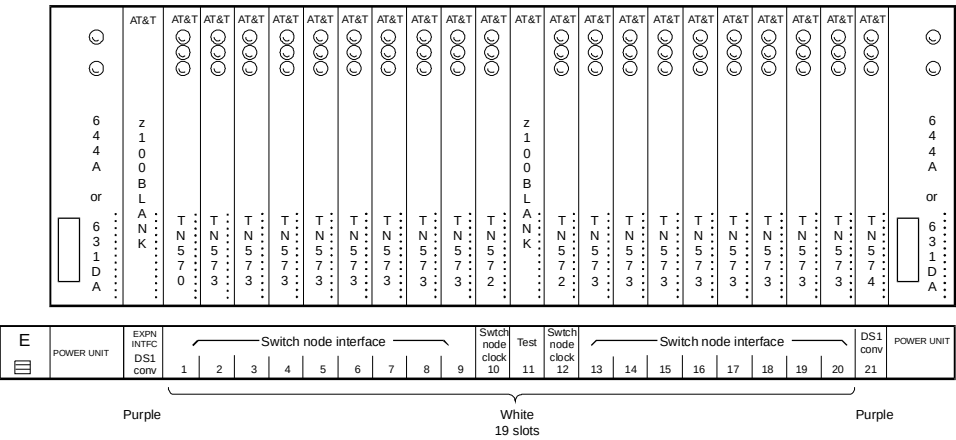


Figure 2-15. SN Carrier (J58890SA) — Front

Figure 2-16 and Table 2-6 describe the connectors on the rear panel.

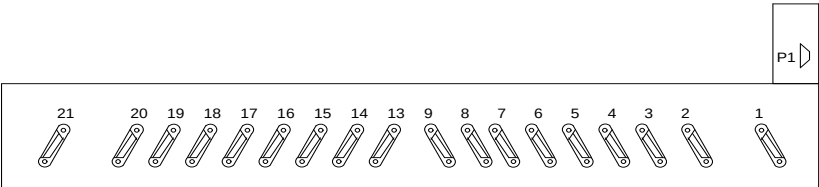


Figure 2-16. SN Carrier (J58890SA) — Rear

Table 2-6. SN Carrier (J58890SA) Rear Panel Connectors

Connector	Function
E01	Expansion Interface port for cable between the Expansion Interface circuit pack in Slot 1 and the Switch Node Interface circuit pack in Slot 2 (duplicated PPN only). Also used for a DS1 Converter
E02 to E09 and E13 to E20	Switch Node ports that are fiber optic cabling interfaces between Switch Node Interface circuit packs and other circuit packs connected to SN ports or circuit packs in EPNs
E10, E11, E12	Do not exist
E21	Interface to connect the DS1 Converter circuit pack to the Main Distribution Frame and a Switch Node Interface circuit pack
P1	Provides the position indicator of the SN carrier and access to alarm and control circuits

Single-Carrier Cabinets

This section describes the single-carrier cabinets:

- Basic Control Cabinet (J58890L) — G3s and G3i
- Duplicated Control Cabinet (J58890M) — G3i
- Expansion Control Cabinet (J58890N) — G3i and G3r
- Port Cabinet (J58890H) — G3s, G3i, and G3r
- Compact Control Cabinet (J58890S) — G3vs



NOTE:

The G3s only supports the PPN Single-Carrier Cabinet stack (4 cabinets) and does not support duplication or an EPN stack.



CAUTION:

Slots in the cabinet are provided for air circulation. Do not place materials within six inches (15.2 cm) of the front or rear of the cabinet. Improper airflow can cause overheating of internal components.

A maximum of four Single-Carrier Cabinets can be stacked on top of each other. See Figure 2-17 and Figure 2-18. Each cabinet has vertical slots to hold circuit packs. A blank faceplate covers each unused slot.

Each stack of Single-Carrier Cabinets requires at least one basic control cabinet or one expansion control cabinet on the bottom in G3s and G3i and one expansion control cabinet on the bottom in G3r. In these configurations, 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.

A screw-type latch, located below the identification stripe, secures the front door to the cabinet. The cabinet can be secured to the floor (required for earthquake protection), using adapter brackets.

Cabinet clips in the front of the cabinets connect the cabinets together. At the rear, a ground plate connected between cabinets provides ground integrity. Chapter 3, "Power and Fans," describes the power sources used in Single-Carrier Cabinets.

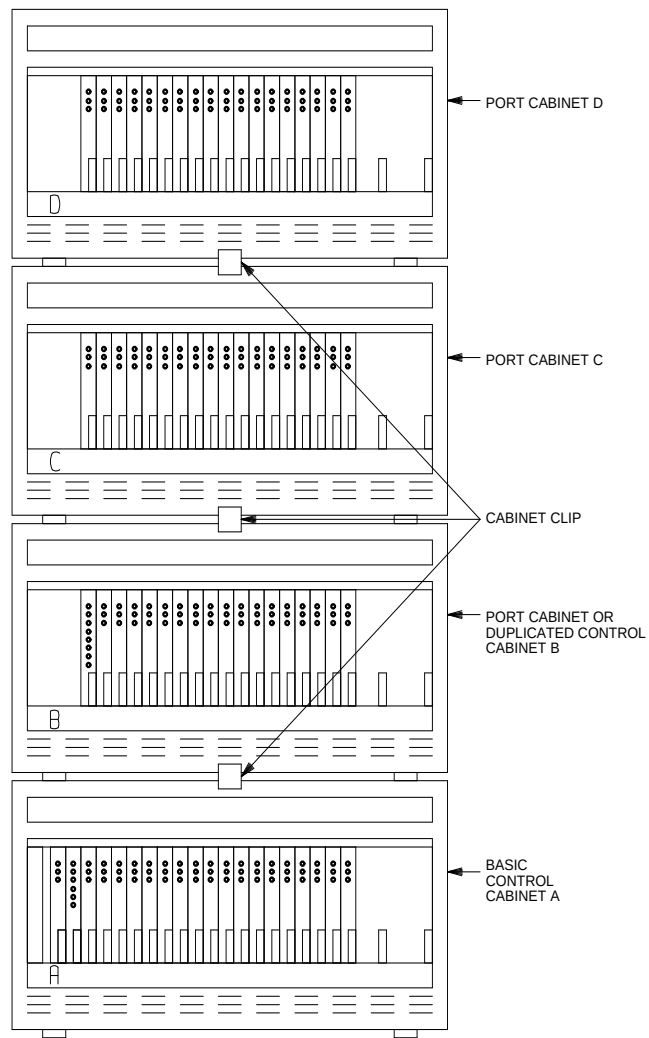


Figure 2-17. Single-Carrier Cabinet Stack — G3s and G3i

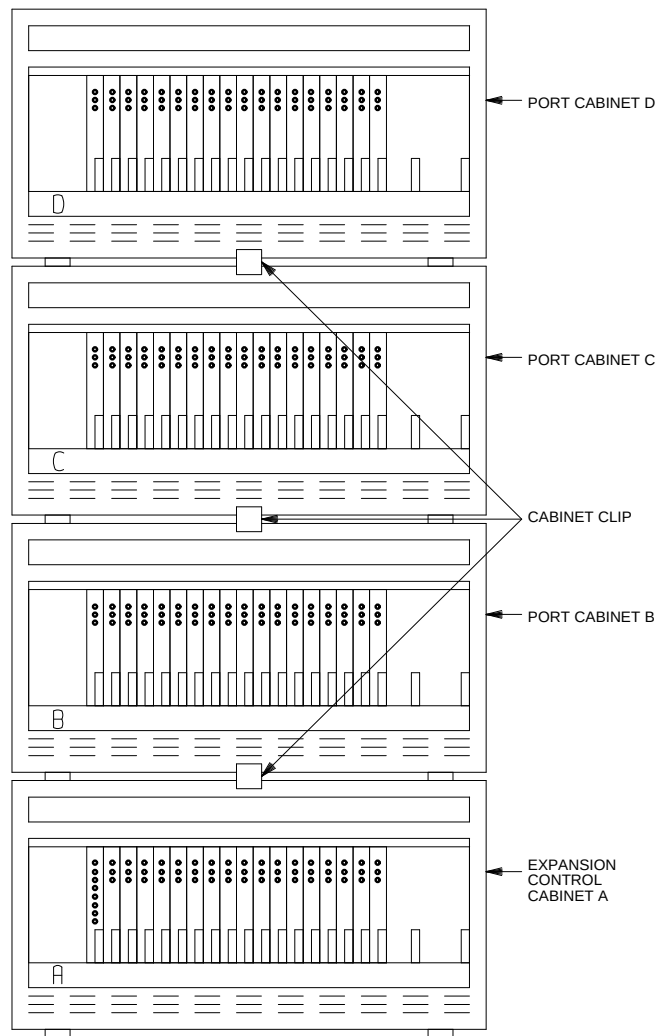


Figure 2-18. Single-Carrier Cabinet EPN Stack — G3

Dimensions and Weights

Table 2-7 lists Single-Carrier Cabinet dimensions and average weights.

Table 2-7. Single-Carrier Cabinet Dimensions and Weights

Cabinet Type	Dimensions	Weight
Control (basic and duplicated), Port and Expansion	20 in. H x 27 in. W x 22 in. D (51 cm H x 69 cm W x 56 cm D)	125 pounds (56 kg)

Heat Dissipation

The average heat dissipation of one Single-Carrier Cabinet is 1700 BTUs (438 gram-calories) per hour (including terminals). A fully-loaded stack of four cabinets dissipates about 5700 BTUs (1436 gram-calories) per hour (including terminals).

Carriers in Single-Carrier Cabinets

Two types of circuit pack slots are in Single-Carrier Cabinets:

- *Port*: colored purple and can accept any purple-labeled (not white-labeled) circuit pack
- *Dedicated*: colored white and can accept only a circuit pack assigned to that slot

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
- 158B (.75 inches) (1.9 cm) covers any unused slot.
- 158C (.50 inches) (1.27 cm) used in DEFINITY® AUDIX™ R3 and DEFINITY® LAN Gateway

Basic Control Cabinet (J58890L) — G3s and G3i

Figure 2-19 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.

This cabinet is also called an “enhanced” control cabinet because, unlike the G3V1 basic control cabinet, it has an 80386 processor instead of an 80286

processor, and flash-ROM instead of a tape drive, and 16 port slots instead of 10.

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

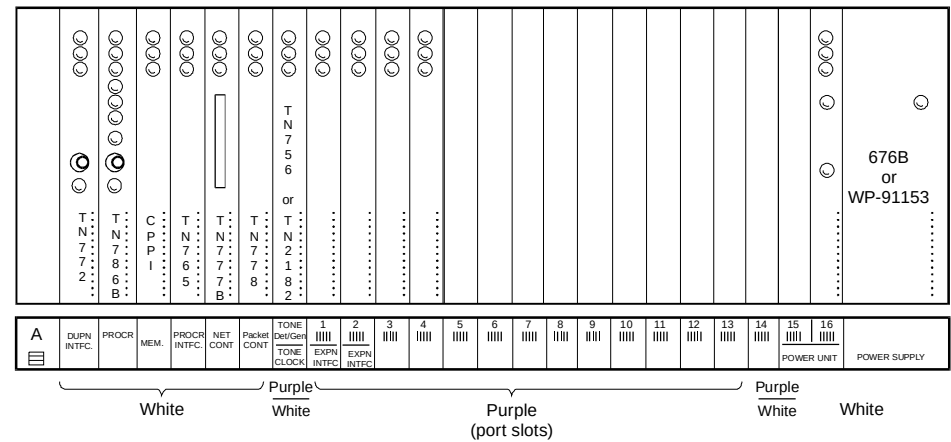


Figure 2-19. G3s and G3i Basic Control Cabinet (J58890L)
— Front

Figure 2-20 and Table 2-8 describe connectors on control cabinet rear panel.

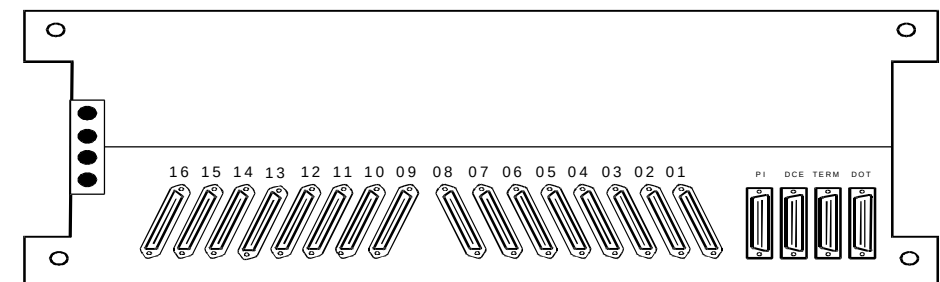


Figure 2-20. G3s and G3i Basic Control Cabinet (J58890L)
— Rear

Table 2-8. Basic Control Cabinet (J58890L) Rear Connectors

Connector	Function
A01 to A16	Provides interfaces between port circuit packs and the Main Distribution Frame or a cable access panel
AUX (auxiliary)	Provides interface for customer alarms, attendant console power, or emergency power transfer panels
PI (Processor Interface)	Connects directly to the Processor Interface circuit pack. Used only in AC standard reliability systems
DCE (Digital Communications Equipment)	Connects the processor to Call Detail Recording (CDR) equipment
TERM (terminal)	Connects an administration terminal to the maintenance circuit pack in standard reliability systems. Can be used to access a standby Switch Processing Element (SPE)
DOT (Duplication Option Terminal)	Used in high reliability and critical reliability systems to connect an administration terminal to the duplication interface slot

Duplicated Control Cabinet (J58890M) — G3i

Figure 2-21 shows a duplicated control cabinet. The cabinet contains dedicated white-colored circuit pack slots that are always equipped with specific control circuit packs. The purple-colored circuit pack slots can be equipped with any port circuit packs.

This cabinet is also called an “enhanced” duplicated control cabinet. Unlike the G3V1 duplicated control cabinet, it has a 386 processor instead of a 286 processor, and flash-ROM instead of a tape drive.

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.

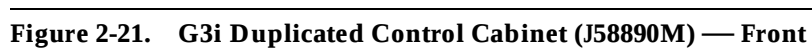




Table 2-9. G3i Duplicated Control Cabinet (J58890M) Rear Connectors

Connector	Function
B01 to B16	Provide interfaces between port circuit packs and the Main Distribution Frame or a cable access panel (if provided)
TERM (terminal)	Connects an administration terminal to the processor in the duplicated control 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 G3i and G3r. This cabinet contains port circuit packs, Tone-Clock circuit packs, Maintenance circuit pack, and provide an interface to a port cabinet.

Figure 2-23 shows an expansion control cabinet. In an EPN stack of cabinets, an expansion control cabinet is the first cabinet in a stack of Single-Carrier Cabinets. The expansion control cabinet contains optional port circuit packs in port slots 2 to 17 (see Table 2-10).

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

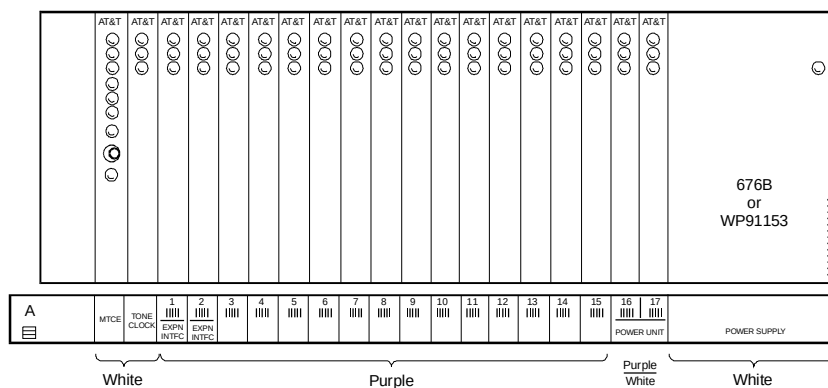
**Figure 2-23. G3i and G3r Expansion Control Cabinet (J58890N) — Front**

Figure 2-24 and Table 2-10 describe the connectors on the Expansion Control Cabinet rear panel.

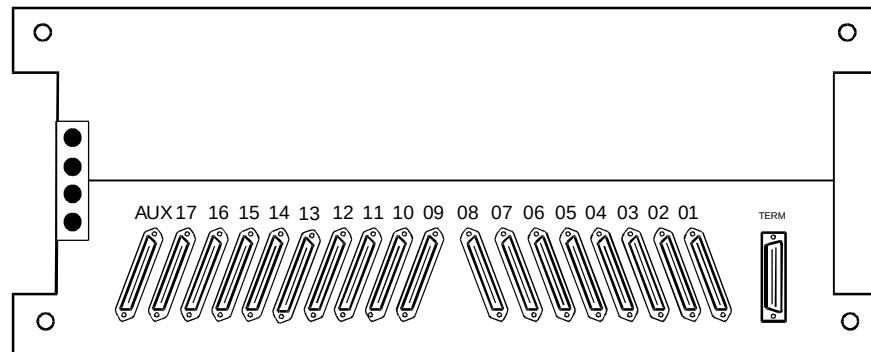


Figure 2-24. G3i and G3r Expansion Control Cabinet (J58890N)
— Rear

Table 2-10. Expansion Control Cabinet (J58890N) Rear Connectors

Connector	Function
A01	Fiber optic cable interface between an Expansion Interface (EI) circuit pack in Slot 1 and an EI circuit pack in another Port Network (PN) or Switch Node Interface circuit pack in a Switch Node carrier (G3r only). Or to interface to a DS1 Converter circuit pack in Slot 2 for G3r only.
A02 to A17	Ports providing interfaces between circuit packs and the Main Distribution Frame
AUX (auxiliary)	Provides interface for customer alarms, attendant console power, or emergency power transfer panels
TERM (terminal)	Connects 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.

Figure 2-25 shows a port cabinet containing a port carrier. The cabinet contains optional port circuit packs in port Slots 1 to 18 (see Table 2-11), and any of the following circuit packs if required: tone-clock in Slot 1, Expansion Interface 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.

Figure 2-26 and Table 2-11 describe the connectors on the rear panel.

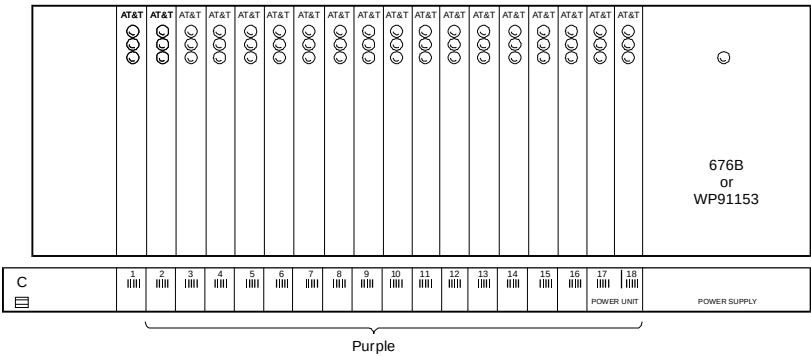


Figure 2-25. Port Cabinet (J58890H) — Front

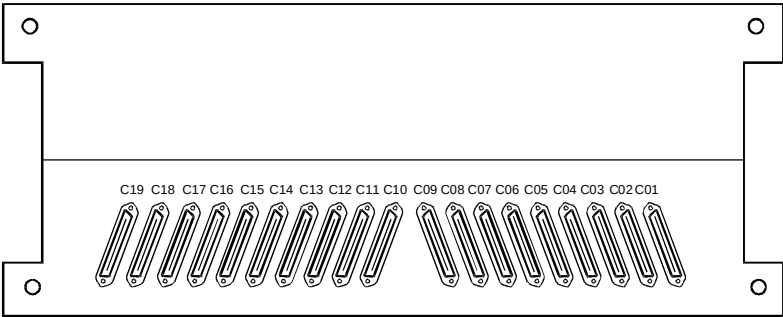


Figure 2-26. Port Cabinet (J58890H) — Rear

Table 2-11. Port Cabinet (J58890H) Rear Panel Connectors

Connector	Function
C02 or C03	Expansion Interface (EI) port that provides an interface for the fiber optic cable between the EI in Slot 2 or 3 and another PN
C01 to C18	Ports providing interfaces between circuit packs and the Main Distribution Frame

Compact Single-Carrier Cabinet (J58890S) — G3vs

Figure 2-27 shows the compact Single-Carrier Cabinet containing three dedicated white-colored circuit pack slots always equipped with specific control circuit packs:

- *PROCR* slot containing the TN786B processor
- *NET CONT* slot containing the TN777B network control
- *PROC INTFC* and *TONE DET/GEN* slot containing the TN765 Processor Interface or the TN756 Tone Generator/Detector or TN2182 Tone-Clock. When both TN765 and TN756 or TN2182 are used, the TN765 or TN2182 is placed in port Slot 2.

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.



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 2-12 on page 2-34. Following the table, the circuit packs are described in alphabetical order.

All circuit packs are approximately 8 x 13 inches (20 x 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 .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 to 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.



WARNING:

An electrostatic discharge 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, external communications equipment, and the 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 function in any other slots.
3. *Service Circuit Packs*: produce and detect tones, synthesize speech, classify calls, record announcements, and allow administration and troubleshooting access.
4. *Power Unit Circuit Packs*: supply DC voltages to the port, control, and service circuit packs in the carriers and single-carrier cabinets. These circuit packs are installed in indicated white-colored slots in all carriers and in Single-Carrier Cabinets.

Port Circuit Packs

Figure 2-28 shows that all port circuit packs have the following common components:

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

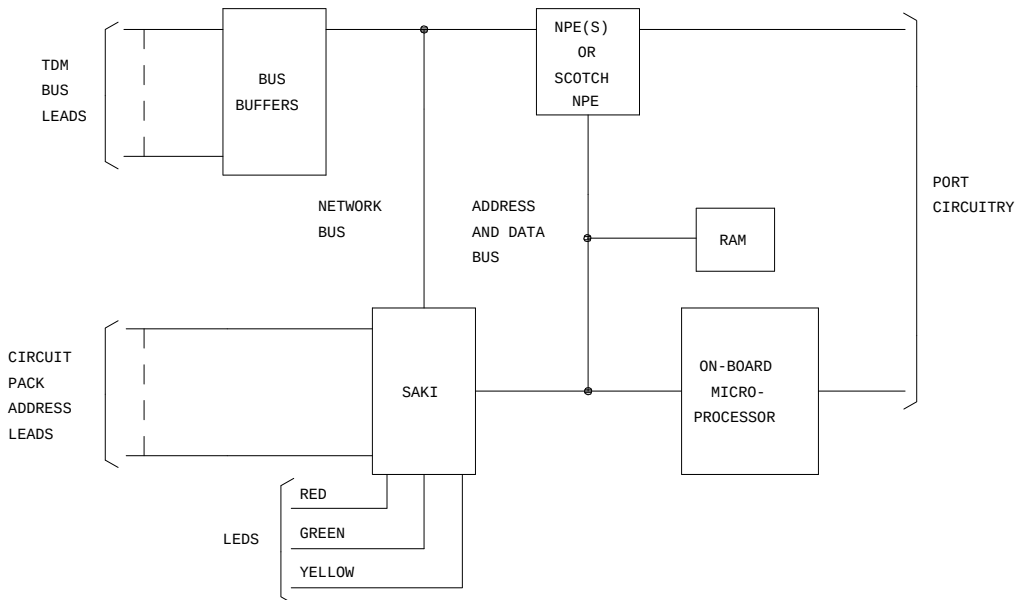


Figure 2-28. Common Components of Port Circuit Packs

Bus Buffers

The bus buffers are the digital interface between the 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 TDM 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 SPE or when the SAKI determines that interference is present in the 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 Element (NPE)

The Network Processing Element (NPE), or a high-density SCOTCH NPE, performs 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 high-density SCOTCH NPE.

Circuit Packs in DEFINITY

Table 2-12 lists the circuit packs sorted by apparatus code, including circuit packs used in non-US installations. After the table, detailed descriptions of each circuit pack function are provided (in alphabetical order).

Table 2-12. Circuit Packs in DEFINITY

Apparatus Code	Name	Type
120A	Integrated CSU Module	Adjunct
122A	Music-on-Hold Interface	Adjunct
631DA1	Power Unit (AC)	Power
631DB1	Power Unit (AC)	Power
644A1	Power Unit (DC)	Power
645B1	Power Unit (DC)	Power
676B	Power Supply (DC)	Power
982LS	Current Limiter	Power
CFY1B	Current Limiter	Power
CPP1	Memory (Expansion)	Control
ED-1E546 (TN2208), (TN2170), (TN566), (TN567)	CallVisor ASAI over the DEFINITY LAN Gateway R1	Port Assembly
ED-1E546 (TN2169), (TN2170)	DEFINITY AUDIX R3 System	Port Assembly
TN417	Auxiliary Trunk	Port
TN419B	Tone-Clock	Control
TN420B/C	Tone Detector	Service
TN429	DIOD Trunk	Port
TN433	Speech Synthesizer	Service
TN436B	DID Trunk	Port
TN437	Tie Trunk	Port
TN438B	CO Trunk	Port
TN439	Tie Trunk	Port
TN447	CO Trunk	Port
TN457	Speech Synthesizer	Service
TN458	Tie Trunk	Port

Table 2-12. Circuit Packs in DEFINITY

Apparatus Code	Name	Type
TN459B	DID Trunk	Port
TN464C/D/E/F	DS1 (T1/E1) Interface	Port
TN465/B/C	CO 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	Port
TN570/B	Expansion Interface (EI)	Port
TN572	SN Clock	Control
TN573	SN Interface	Control
TN574	DS1 Converter	Port
TN577	Packet Gateway	Port
TN722B	DS1 Tie Trunk	Port
TN725B	Speech Synthesizer	Service
TN726/B	Data Line	Port
TN735	MET Line	Port
TN742	Analog Line	Port
TN744/B/C	Call Classifier	Service
TN746/B	Analog Line	Port
TN747B	CO Trunk	Port
TN748/B/C/D	Tone Detector	Service
TN750/B/C	Announcement	Service
TN753	DID Trunk	Port
TN754/B	Digital Line (4-Wire)	Port
TN755B	Power Unit, Neon	Power
TN756	Tone Detector	Service
TN758	Pooled Modem	Port
TN760B/C/D	Tie Trunk	Port
TN762B	Hybrid Line	Port

Table 2-12. Circuit Packs in DEFINITY

Apparatus Code	Name	Type
TN763B/C/D	Auxiliary Trunk	Port
TN765	Processor Interface	Control
TN767B/C/D/E	DS1 Interface	Port
TN768	Tone-Clock	Control
TN769	Analog Line	Port
TN771D	Maintenance/Test	Service
TN772	Duplication Interface	Control
TN775/B	Maintenance	Service
TN776	Expansion Interface (EI)	Port
TN777/B	Network Control	Control
TN778	Packet Control	Control
TN780	Tone-Clock	Control
TN786B	Processor	Control
TN1648	System Access/Maintenance	Control
TN1650B	Memory	Control
TN1655	Packet Interface	Control
TN1656	Tape Drive	Control
TN1657	Disk Drive	Control
TN2135	Analog Line	Port
TN2136	Digital Line (2-Wire)	Port
TN2138	CO Trunk	Port
TN2139	DID Trunk	Port
TN2140/B	Tie Trunk	Port
TN2144	Analog Line	Port
TN2146	DID Trunk	Port
TN2147/C	CO Trunk	Port
TN2149	Analog Line	Port
TN2180	Analog Line	Port
TN2181	Digital Line (2-Wire)	Port
TN2182	Tone-Clock	Control
TN2183	Analog Line	Port

Table 2-12. Circuit Packs in DEFINITY

Apparatus Code	Name	Type
TN2184	DIOD Trunk	Port
TN2198	ISDN BRI 2-Wire U Interface	Port
TN2199	CO Trunk	Port
TN2202	Ring Generator	Service
UN330B	Duplication Interface	Control
UN331B	Processor	Control
UN332	Mass Storage/Network Control	Control
WP-90510	Power Supply (AC)	Power
WP-91153	Power Supply (AC)	Power

Analog Line (TN467) — U.K. and Australia

The TN467 provides eight ports to interface between analog voice terminals and the TDM bus. The TN467 has administrable A-Law and Mu-Law companding as well as complex input impedance. The TN467 provides secondary lightning protection.

Analog Line (TN468B) — U.K. 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.

Analog Line (TN479, TN742, TN746/B, and TN769)

The TN742 and TN769 have eight ports each. The TN479, TN746, and TN746B have 16 ports each. Each port has Tip and Ring signal leads.

The TN742 supports on-premises (in-building) or off-premises wiring (out-of-building only with AT&T-certified protection equipment) with either DTMF or rotary dialing and with or without LED message waiting indicators (message waiting indicators are not supported off-premises). The TN742 does not support neon message waiting indicators.

The TN746 (in-building only) meets the needs of most analog line applications requiring a single voice terminal. LED message waiting indicators are not supported off-premises. Each port supports one voice terminal with or without the LED message waiting indicators, such as AT&T 500 (rotary dial) and 2500 terminals (DTMF dial). The ringer load for this circuit pack is three (REN 3.0). The TN746 does not support voice terminals equipped with neon message waiting indicators. Auxiliary equipment, such as answering machines, modems, and amplifier handsets, is not supported.

The TN746B supports on-premises (in-building) wiring with either DTMF 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 AT&T-certified protection equipment) with either DTMF or rotary dialing, but LED or neon message waiting indicators are not supported off-premises. The TN746B, along with a TN755B Power Unit per carrier or per Single-Carrier Cabinet, supports voice terminals with neon message waiting indicators (on-premises use only). Vintage 6 and later circuit packs support A-Law and Mu-Law companding.

The TN769 supports on-premises (in-building) or off-premises wiring (out-of-building only with AT&T-certified protection equipment) with either DTMF or rotary dialing and with or without LED or neon message waiting indicators (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 TN479, TN742, TN746B, and TN769 support 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 TN742 and TN479 do not support neon message waiting indicators). Two voice terminals maximum per port (TN742) can be off-hook simultaneously. The TN479, TN742, TN746B, and TN769 also support 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 Page Pac Paging System for the Loudspeaker Paging feature. Additional support is provided for external alerting devices associated with the trunk. Additional support for the TN746B is provided for external alerting devices associated with the TAAS feature, neon message waiting indicators, and modems.

The TN746/B circuit packs interface between analog voice terminal lines and the TDM/packet bus. The TN746B consists of a ringing application circuit and port input/output (I/O) circuits. Table 2-13 lists the characteristics of each analog line circuit pack.

Table 2-13. Analog Line Circuit Pack Characteristics

Feature	Analog Line Circuit Packs				
	TN742	TN769	TN746	TN746B	TN479
Number of Ports	8	8	16	16	16
Neon Message Waiting Indicators	No	Yes	No	Yes	No
LED Terminals	Yes	Yes	Yes	Yes	Yes
Feed Voltage	-48V	-48V	-24V	-48V	-24V
Hard Bridging	Yes	Yes	No	Yes	No
Station Adjunct	Yes	Yes	No	Yes	No
Secondary Lightning Protection	Yes	Yes	No	Yes	No
Same Premises—Out-of-Building	Yes	Yes	No	Yes	No
Terminals	500-Type 2500-Type 7100 Series 8100-Series 9100-Series	500-Type 2500-Type 7100 Series 8100-Series 9100-Series	500-Type 2500-Type 7102A* 8100-Series 9100-Series	500-Type 2500-Type 7100 Series 8100-Series 9100-Series	500-Type 2500-Type 7100 Series 8100-Series 9100-Series
Range With 500-Type/ 2500-Type/ 7102A Terminals* (24 AWG Wire)	20,000 Feet	20,000 Feet	3,100 Feet	20,000 Feet	3,000 Feet
Range With 7101A/7103A Terminals (24 AWG Wire)	15,200 Feet	15,200 Feet	Not Supported	15,200 Feet	Not Supported
Range With 8100 series Terminals (24 AWG Wire)	10,000 Feet	10,000 Feet	2,500 Feet	12,000 Feet	2,500 Feet
Ringer Loads	3	3	3	3	3

Table 2-13. Analog Line Circuit Pack Characteristics

Feature	Analog Line Circuit Packs				
	TN742	TN769	TN746	TN746B	TN479
Simultaneous Ports Ringing	4	4	4	8**	3
Companding	Mu-Law	Mu-Law	Mu-Law	A-Law and Mu-Law	Mu-Law
Administrable Timers	No	No	No	vintage 6 or greater	No

NOTES:

- * 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.

Analog Line (TN2135) — 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 can be administered for Mu-Law companding. The TN2135 has secondary lightning protection.

Analog Line (TN2144) — 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.

Analog Line (TN2149) — 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.

Analog Line (TN2180) — 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.

Analog Line (TN2183) — Multi-Country

The TN2183 provides 16 analog line ports. Each port provides a voice channel to the switch from a Tip/Ring pair. Each port also sends or receives the necessary signaling to and from the connected station. Examples of stations are an analog telephone set, answering machine, G3 type facsimile, and loop-start PBX "CO port" (AUDIX application).

All communication between the PBX software control and the TN2183 port board occurs over the Network Control board's Switch Processing Element (SPE). The TN2183 is used with service circuit packs providing tone generation and tone detection. A telephone going off-hook has dial tone provided to it from a tone generator board, through a TN2183 port, to the user. The user may then press buttons to send DTMF digits into the TN2183 port. The port passes them through to a tone detector board which interprets the signals and report the digits received to software.

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 (AT&T protocol only), 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 AT&T representative.

Announcement (TN750 and TN750B)

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 and can store up to 128 recorded announcements of eight maximum minutes total.

The TN750B has 16 channels and each channel can play any announcement. Five call connections can listen to each channel. This means a total simultaneous call capacity of 80 calls in G3s and G3i and up to 255 callers can be connected to each channel in G3r.

Announcement (TN750C)

The TN750C 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 the announcements on the board. This eliminates the need for a 30-40 minute restore/download process after a power failure or system reload, and allows support for multiple boards.

Using multiple Integrated Announcement circuit packs allows a more efficient method of providing many kinds of announcements. Equipping a G3r with ten Integrated Announcement circuit packs 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, and improved management of integrated announcements.

Auxiliary Trunk (TN417) — Non-US Installations

The TN417 provides four ports for on-premises trunk applications such as Music-on-Hold, Loudspeaker Paging, Code Calling, and Recorded Telephone Dictation Access. The TN417 supports Audichron announcement equipment. TN417 hardware and firmware are identical to the TN763C, except the TN417 has A-Law companding on the Pulse Code Modulation (PCM) signal and the TN763C has Mu-Law companding on the PCM signal.

Each port has T, R, SZ, SZ1, S, S1 signal leads.

Auxiliary Trunk (TN763B/C/D)

The TN763B/C/D has four ports. Each port has T, R, SZ, SZ1, S, and S1 signal leads. The ports are used for on-premises applications such as Music-On-Hold, Loudspeaker Paging, and Recorded Telephone Dictation Access. The TN763C supports recorded announcement equipment and Code Calling. The interface between the PBX and the connected equipment varies with the type of equipment. The purpose of this circuit pack is to control the activity on this interface and to take necessary action when changes occur.

The TN763B/C supports A-Law companding only. The TN763D can be administered to select A-Law or Mu-Law companding.

Call Classifier (TN744/B)

The TN744/B has eight tone detectors used in Outgoing Call Management (OCM) and call prompting applications in the USA 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. In addition, if the TN744 has not classified the call by the end of 60 seconds, it is removed from the call and Timed Far End Supervision classifies the call.

The TN744 provides tone generation and detection for Release 2 Multi-Frequency Compelled (R2-MFC) DID signaling used in non-US installations.

The TN744 allows gain or loss to be applied to Pulse Code Modulated (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.



NOTE:

For MFC, the TN744 v7 or greater Call Classifier circuit pack is required.

Call Classifier — Detector (TN744C)

The TN744C contains eight ports of tone detection on the Time Division Multiplexing (TDM) bus that function the same as the TN2182. The difference is the TN744C does *not* support call progress, tone generation, or clocking.

The TN744C processor supports digital signal processing of Pulse Code Modulated (PCM) signals on each port to detect tones and other signals. Generation of tones is also supported for applications such as Release 2 Multi-Frequency Compelled (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.

CO Trunk (TN438B)

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 sent from the CO. Additional features include call still held timing and automatic guard fault detection circuitry.

CO Trunk (TN447) — 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.

CO Trunk (TN465/B/C) — Multi-Country

The TN465/B/C circuit packs provide eight analog CO trunk ports and uses loop-start trunk signaling, 12 kHz and 16 kHz PPM detection and counting, and administrable timers. The TN465B/C provides multi-country selectable signaling. Contact your AT&T representative for more information.

CO Trunk (TN747B)

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 Page Pac 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.

CO Trunk (TN2138) — Italy

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

CO Trunk (TN2147/C) — 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 loop-start signaling, and Earth-calling and loop-calling guarded clearing signaling. 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 Time Division Multiplexing (TDM) bus.

The TN2147C provides multi-country selectable signaling. For more information, contact your AT&T representative.

CO Trunk (TN2199) — Russia

The TN2199 is a 4-port, 3-wire, Russia loop-start trunk circuit pack that can be used as a Direct Inward Dialing (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 (Direct Inward/Outward Dialing).

CSU Module (120A)

The 120A Channel Service Unit (CSU) module connects to either a TN464E/F or a TN767D/E 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 provided by external CSUs such as the AT&T ESF T1 CSU and the AT&T 551 T1 CSU. These CSUs are externally-mounted and provide additional functionality not typically needed by TN464/767 to interface to the DS1 facility. The external CSUs support different framing and line coding options on the PBX and network sides of the CSU. Since the TN464/767 and switch administration support all framing and line coding options, this functionality is not required. However, this does not eliminate the need to manually set framing and line coding options via switches on the CSU as well as via administration on the TN464/767. These options were difficult to set.

The 120A CSU module incorporates the functions necessary to interface to the network Smart Jacks given the administration capabilities of the switches. Also, the 120A is small, a little larger than a wallet, and is simpler to install than an externally mounted CSU and does not require any option switch settings.

The following list describes the important characteristics of the 120A CSU:

- With circuit pack suffixes starting with TN767D and TN464E, a pair of 120As may be used to directly connect a TN767/464 board pair for range extension up to 3,000 feet over 22 gauge wire.
- With circuit pack suffixes starting with TN767E and TN464F and G3V3 and later software versions, maintenance and administration software (Enhanced ICSU Feature) provides 120A option administration and enhanced DS1 facility diagnostics. This option allows the 120A to connect to the network other than via a network interface Smart Jack.
- The CEPT1 (Conference of Postal and Telecommunications rate 1) interface is not supported by the 120A. CEPT1 is the 32-channel, 2.048 Mbps interface used in many countries other than the United States. The TN464F does support the CEPT1 rate.
- The integrated CSU module meets all applicable FCC Parts 15 and 68 requirements. It is also UL/CSA registered.

- For board suffixes TN767D and TN464E, the 120A operates only with default options (Basic ICSU Feature). Therefore, only network interface (NI) connections to a NI Smart Jack are supported. NI Smart Jacks are devices placed at the NI by the DS1 facility provider. They listen for in-band loop back control signals on the incoming DS1 line and loop the DS1 facility back to the network when the control signals are detected. The NI Smart Jack's customer equipment interface is an 8-pin modular jack. Not all network interfaces are via a Smart Jack. In these cases, the TN767E or TN464F may be used along with G3 software to allow administration of the 120A's LBO value for the installation.
- The 120A passes framing, either D4 or ESF, transparently between the network and the switch. The 120A also passes line coding, either AMI/ZCS or B8ZS, transparently between the network and the switch.
- The 120A contains two loop back circuits, one for testing wiring between the DS1 circuit pack and the CSU module, and another for testing the data path through the CSU module. The TN767/464 circuit packs automatically use these loop backs to test the 120A during initialization diagnostics. Loop back test failure indications are provided on the TN767/464 circuit pack faceplate LEDs.
- The 120A provides an in-band bit-oriented loop back detector that automatically responds to CSU line loop back requests from the network. The 120A automatically loops the network side DS1 signal back to itself, without regenerating it, upon loss of power to the 120A.
- The 120A can be connected to external alarm equipment. A separate jack and cable are provided. The 120A contains a relay contact closure that activates the alarm equipment during DS1 facility alarms and excessive bit error rates.
- The 120A protects and isolates the switch from secondary surges of up to 1500 Volts.

Vintage 2 of the 120A CSU Module (the 120A2 CSU) 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.

Current Limiter (982LS) — G3s and G3i

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

Current Limiter (CFY1B)

The CFY1B is used only in the G3r PPN, Multi-Carrier Cabinet Expansion Port Network (EPN), and Single-Carrier Cabinet EPN. The unit connects to the rear of the Maintenance circuit pack 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.

Data Line (TN726B)

The TN726B has eight serial asynchronous Electronic Industries Association (EIA) ports with modem interfaces connected through Asynchronous Data Units (ADUs) to EIA ports (such as RS-232) on Data Terminal Equipment (DTE). The TN726B uses Mode 2 or Mode 3 data transfer protocol. The DTE 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 in G3rV2, a TN726B is connected through a wall field 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 Time Division Multiplexing (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.

DEFINITY AUDIX R3 System (TN566/B, TN567, and TN2169, TN2170, ED-1E546)

The 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 contiguous slots in a carrier. Preferably, the five rightmost slots are used.

The TN566/B and TN567 multi-function circuit pack holds the CPU, controllers, memory devices, and signal processors.

TN2169 alarm circuit pack operates with the TN566/B 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 Ethernet 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 new software releases, and removes core dumps and other maintenance information.

A 148, 248, 456, or 800 Mbyte 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 2,000 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*, 585-300-205, for more information.

DEFINITY LAN Gateway (ED-1E546)

The ED-1E546 assembly provides an interface from the switch to the LAN Gateway. The TN2208 component of the LAN Gateway interfaces to the DEFINITY® switch. The interface also consists of a TN2170 Alarm Board/Ethernet Interface circuit pack that provides mounting for mass storage elements and interface to external connections (SAT terminal, and, optionally, Ethernet LANs).

The mass storage/cabling combination provides an interface to tape drive, disk drive, and cables. All application-specific labeling is provided, as required.

DID Trunk (TN436B) — Australia

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

DID Trunk (TN459B) — U.K.

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

DID Trunk (TN753)

The TN753 has eight ports used for immediate-start and wink-start DID trunks. Each port on a TN753 has Tip and Ring signal leads.

For Czechoslovakia and the Commonwealth of Independent States, TN753 Vintage 17 (or higher) is required. The TN753 supports Mu Law companding only.

DIOD Trunk (TN429) — Japan

The TN429 provides eight ports for Direct Inward/Outward Dialing (DIOD) trunks. Each port has Tip and Ring signal leads.

DID Trunk (TN2139) — Italy

The TN2139 provides eight analog DID trunk ports for analog DID signaling. Each port has Tip and Ring signal leads. The TN2139 has zero dB loss digital transmission.

DID Trunk (TN2146) — Belgium

The TN2146 provides eight analog 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 Time Division Multiplexing (TDM) bus. Companding in the TN2146 firmware is set to the default A-Law and can be administered to select Mu-Law companding.

Digital Line (TN754 and TN754B) — 4-Wire DCP

The TN754 and TN754B each have eight asynchronous Digital Communications Protocol (DCP) ports connected to 4-wire terminals such as the 7400 and 8400-series digital voice terminals, attendant consoles, or data modules.

The TN754B has administrable A-Law and Mu-Law companding. Each port has TXT, TXR, PXT, and PXR signal leads. The maximum range of the 8400-series (8410 and 8411) terminals using 24 gauge wire is 10,000 feet.

Digital Line (TN2181) — 2-Wire DCP

The TN2181 has 16 Digital Communications Protocol (DCP) ports that can be connected to 2-wire terminals such as the 8400-series digital voice terminals and the 302B1 attendant console.

The TN2181 supports either A-Law or Mu-Law companding (software selectable). The maximum range of the 8400-series (including 8410 and 8411) terminals using 24 gauge wire is 10,000 feet.

Digital Line (TN2136) — 2-Wire DCP

The TN2136 provides eight ports for connecting the system to the following Digital Communications Protocol (DCP) endpoints: data adapter modules and digital telephone models one and two.

Each port can be connected to a two-wire digital line. The TN2136 has administrable A-law and Mu-law companding.

DIOD Trunk (TN2184) — Germany

The TN2184 contains 4 port circuits, each interfacing a 2-wire analog CO trunk with the Time Division Multiplexing (TDM) switching network of DEFINITY[®]. Each port allows incoming and outgoing calls to be made with addressing information being received from the CO for incoming calls and addressing information being sent to the CO for outgoing calls. It detects PPM (Periodic Pulse Metering) signals for call charge accounting on outgoing calls.

This circuit pack 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.

Disk Drive (TN1657) — G3r

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

DS1 Converter (TN574) — G3r — T1, 24-Channel

When the coupling distance between the Processor Port Network and an Expansion Port Network 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. A DS1 Converter 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.

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

The TN767B and later suffix circuit packs support DS1 rate digital facility connectivity. The circuit packs support CO, TIE, DID, and OPS port types using the Robbed-Bit Signaling (RBS) protocol in G3s, G3i, and G3r.

These circuit packs also support ISDN-PRI connectivity in G3s and G3i. 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 Time Division Multiplexing (TDM) bus
or:
2. Terminated at the TN778 Packet Control (G3s/i) (PRI over PACCON feature)
or:
3. Terminated at the TN1655 Packet Interface (G3r).

The TN767 provides a 1 level physical interface to the DS1 facility and require a TN464C or greater DS1 interface. The TN767 has Line Out (LO), Line Out* (LO*), Line In (LI), Line In* (LI*) signal leads. The Line Out and Line In leads are unpolarized balanced pairs.

The TN767E or greater is required to communicate with CONVERSANT®. The TN767E or greater is also required to obtain the enhanced maintenance capabilities of the Enhanced Integrated Channel Service Unit (ICSU) feature provided by G3V3 and later software versions. These tests can be executed locally or remotely via the System Access Terminal (SAT). These tests include short duration loopback tests at the Digital Signal Level 1 (DS1) board edge or the 120A (if used), long duration Bit Error Rate (BER) loopback tests at the far-end Channel Service Unit (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.

In addition, other tests administer 120A options including transmit LBO, receive ALBO, TABS remote target address, and T1.403 one-second performance report messages. Enhanced ESF TABS performance reporting including ES, BES, SES, UAS, CSS, and LOFC counters for local, carrier-local, and remote end performance reporting is provided.

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

The TN464C and later suffix circuit packs support DS1 rate (24 channel) and E1 rate (32 channel) digital facility connectivity. All TN464 suffixes support CO, T1E, DID, and OPS port types using Robbed-Bit Signaling (RBS) protocol, proprietary Bit-Oriented Signaling (BOS) 24th channel signaling protocol, and DMI-BOS 24th channel signaling protocol. They also support ISDN-PRI connectivity. For ISDN-PRI, the signaling ("D") channel is connected from the TN464 to the TN778 Packet Control (G3s/i) or TN1655 Packet Interface (G3r) via the LAN bus. In DS1 (24 channel) mode, the DSX1 level interfaces to the DS1 facility.

The TN464 circuit packs provide board-level administrable A-Law and Mu-Law companding (on a per-board basis), CRC-4 generation and checking (E1 only), and Stratum 3 clock capability.



NOTE:

The Stratum 3 clock is not on-board the TN464 circuit pack.

The TN464E and later suffixes provide test jack access to the DS1 or E1 line and support the 120A Integrated 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 provided by G3V3 and later software versions. These tests can be executed locally or remotely via the G3-MT, and include the following:

- 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
- Long duration BER one-way DS1 facility tests.
- Single error injection capability provided for loopback testing.
- Loopback testing with stress patterns specifically designed to locate DS1 facility faults.
- The ability to administer 120A options including transmit LBO, receive ALBO, TABS remote target address, and T1.403 one-second performance report messages.
- Enhanced ESF TABS performance reporting including ES, BES, SES, UAS, CSS, and LOFC counters for local, carrier-local, and remote end performance reporting.

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

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

DS1 Tie Trunk (TN722B)

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 Signaling. 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, LI (high) signal leads.

⇒ NOTE:

LBACK does not apply to the 120A.

Duplication Interface (TN772) — G3i

The TN772 selects the active processing element (control complex) in high reliability and critical reliability systems and coordinates the interchange of processing elements.

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 Switch Processing Element (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.

Duplication Interface (UN330B) — G3r

In high reliability and critical reliability systems with two Switch Processing Elements (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's 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.

Expansion Interface (TN570/B) — G3i, G3r

The TN570 is an interface between the Time Division Multiplexing (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 a Switch Node Interface circuit pack in a Switch Node carrier in a Center Stage Connected (CSS)-connected system.

The TN570 provides control channel connectivity and time-slot interchanging between the PPN and EPNs. It is used in G3iV4 when ISDN-BRI and/or ASAI is connected in an EPN, and is always used in G3r.

The TN570 carries circuit-switched data, packet-switched data, network control, timing control, and DS1 control. The TN570 communicates with the TN775B Maintenance circuit pack in an EPN to send the EPN's environmental and alarm status to the SPE.

Expansion Interface (TN776) — G3i

The TN776 connected to the Time Division Multiplexing (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 requires TN570 Expansion Interface circuit packs in place of TN776 circuit packs.

External Alarm

The external alarm allows analog line ports to be used as additional external device alarm connections. This feature works with all supported analog line circuit packs and with all Maintenance circuit packs.

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. This interface does not include a relay contact closure.

Hybrid Line (TN762B)

The TN762B has eight ports connecting to multi-appearance hybrid analog and digital voice terminals. It can connect to AT&T 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.

ISDN BRI Line (TN556/B) — All G3 Except G3vs — 4-Wire S/T-N/T Interface

The TN556 has 12 ports connecting to ISDN-BRI terminals. Each port has TXT, TXR, PXT, and PXR signal leads. Up to eight ports can be used for 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) in G3s and G3i.

The TN556 has a range of up to 3,300 feet maximum from the PBX to the voice terminal (using 22 AWG wire) and uses standard protocol ANSI T1.605. The TN556 also has multipoint support, allowing 24 terminals to be connected, where each terminal uses one B-channel and shares the D-channel. In multi-support connectivity, two voice terminals, one voice terminal and one data terminal, or two data terminals can be connected to each port.

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

ISDN BRI Line (TN2198) — All G3 Except G3vs — 2-Wire U Interface

The TN2198 circuit pack allows connection to the ANSI standard 2-wire U-Interface. In line-side BRI applications, connect an NT1 at the other end of the U-Interface. The NT1, in turn, connects to ISDN-BRI terminals. 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 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 G3s and G3i. 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 LAPD protocol and is consistent with the CCITT Q.920 Recommendations for D channel signaling.

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. 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 circuit pack interfaces with the Time Division Multiplexing (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 (maximum) from the PBX to the NT1 interface and uses standard protocol ANSI T1.601. The TN2198 has a 160 kbps line rate, consisting of two bearer channels (data and voice, B1 and B2) 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, etc.), 16 kbps channel, and supports up to 24 telephones or data modules per circuit pack.

Maintenance (TN775) — EPN G3i and G3r

The TN775 and TN775B are used in maintenance and monitor power failure signals in an EPN cabinet, monitor the clock, monitor and control 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 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.

Maintenance/Test (TN771D) — G3

The TN771D performs maintenance functions. These functions include packet bus reconfiguration (allows diagnosis and correction of recoverable packet bus failures before the LAPD links fail) . 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 to originate and terminate loop-back tests on ISDN facilities. It provides bit and block error rate information indicating ISDN facility quality. A TN771D is required in all standard reliability G3rV2 PPNs and critical reliability G3rV2 EPNs, all standard reliability G3sV2 and G3iV2 PPNs when packet end points (BRI and/or ASAI) are supported, and in all critical reliability G3iV2 when packet endpoints are supported.

Mass Storage/Network Control (UN332) — G3r

The UN332 provides a Small Computer System Interface (SCSI) between the processing element and the mass storage system such as a disk drive. The UN332 also provides Time Division Multiplexing (TDM) network control for the PPN, and terminates one end of the processor-multiplexed bus.

Memory Expansion (CPP1) — G3i

The CPP1 is attached to the TN786B processor circuit pack. The CPP1 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.

Memory (TN1650B) — G3r

The TN1650B is a bus slave on the processor bus with 32 Mbytes of Dynamic Random Access Memory (DRAM) and error detection and correction circuitry. The Switch processing Element (SPE) design permits up to four TN1650B circuit packs to be present in the carrier.

The memory array on the TN1650B is partitioned into two parts: one part contains all even addressed word locations and the other part contains all odd addressed word locations. Each of these halves has its own EDC memory and EDC memory logic circuitry to allow two memory words to be processed concurrently during burst read operations.

The TN1650B is used for system software, customer translations, and call processing maintenance.

MET Line (TN735)

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

Music-on-Hold Interface (122A) — 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.

Network Control (TN777B) — G3s, G3i, and G3vs

The TN777B communicates control channel messages between the Processor circuit pack and the distributed network of port circuit packs on the Time Division Multiplexing (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 devices, an on-premises remote pooled modem or administration terminal, or an off-premises administration terminal. Some of these connections require modems such as a Modular Processor Data Module (MPDM) or a Modular Trunk Data Module (MTDM).

The TN777B has the time-of-day clock with battery backup for power failure or low voltage conditions. This circuit pack also 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. This circuit pack uses an AT&T Memory Card (flash card).

Packet Control (TN778) — G3s and G3i

The TN778 interfaces the packet bus with the Switch Processing Element (SPE) and terminates 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. Additional 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.

Packet Data Line (TN553) — G3r

The TN553 has 12 ports that are connected through a wall field to a TN726B circuit pack to provide 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 Time Division Multiplexing (TDM) bus for asynchronous EIA connections to adjuncts.

Packet Gateway (TN577) — G3r

The TN577 (PGATE) provides four RS-423 physical ports for X.25 protocol interfaces between the system and adjuncts. In this application, PGATE functions as the G3r 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).

TN577 also supports the DCS environment by providing X.25 signaling through one of the RS-423 physical ports, or back through the system using the Time Division Multiplexing (TDM) Bus to the appropriate DS1 or Tie Trunk board.

Packet Interface (TN1655) — G3r

The TN1655 provides the communication path between the Switch Processing Element (SPE) and the packet bus in the PPN. This path is used by the EPNs and Center Stage Switch (CSS), via Expansion Interface (EI) circuit packs in the PPN, to communicate with the RISC processor.

The TN1655 provides the LAPD (DMI mode-3) terminations of communication links across the packet bus that go to the RISC. The TN1655 also provides termination for ISDN-BRI and ISDN-PRI signaling links, expansion archangel links connecting the RISC to the expansion archangels on EI circuit packs in each PN, center stage control network links connecting the RISC with Switch Node interface circuit packs in the CSS, DCS links — CDR and adjuncts such as AUDIX™, and 8,192 LAPD links. The TN1655 supports firmware downloading.

Pooled Modem (TN758) — Mu-Law Only

The TN758 has two conversion resource ports (such as a trunk data module) for switched connections between digital data endpoints (data modules) and analog data endpoints (modems).

Power Supply — Compact Single-Carrier Cabinet

See description in Chapter 3, “Power and Fans.”

Power Supply (AC) — Single-Carrier Cabinet

See description in Chapter 3, “Power and Fans.”

Power Supply (DC) — Single-Carrier Cabinet

See description in Chapter 3, “Power and Fans.”

Power Converter (AC), +5V (631DA1) — Multi-Carrier Cabinet

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

During normal operation, the 631DA1 converts the 120 VAC input to +5 VDC. 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.

Power Converter (AC), -48V/-5V (631DB1) — Multi-Carrier Cabinet

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

During normal operation, the 631DB1 converts the 120 VAC input to -48 VDC and -5 VDC. 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.

Power Converter (DC), +5V (644A1) — Multi-Carrier Cabinet

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

Power Converter (DC), -48V/-5V (645B1) — Multi-Carrier Cabinet

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

Power Unit, Neon (TN755B)

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

Processor (TN786B) — G3vsV2, G3sV2, G3iV2

The TN786B 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 Mbyte of Flash ROM used for the system program, 4 Mbyte of DRAM used for customer translations, an interface to the MBUS, and logic to support the shadowing function in duplicated systems.

The Processor 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 level power supplies, manages alarm panel LEDs for system status, and provides direct access to a G3-MT.

Processor (TN786B) — G3i, G3s, and G3vs

The TN786B Processor circuit pack contains a 16 MHz 80386SX CPU, 7 Mbyte of Flash ROM, 4 Mbyte of RAM, and an 80188 Maintenance Processor (MTP). The TN786B is used in DEFINITY® G3i, G3s, and G3vs.

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 Mbyte, respectively. This expansion is achieved by the addition of a CPP1 or CPP2 memory circuit pack. The CPP1 contains 0 Mbyte of ROM and 4 Mbyte of RAM. A special inter-board bus allows memory devices on CPP1 or the CPP2 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 386SX to allow field upgrades.

The Maintenance Processor provides the same functionality as the MTP on TN773 except tape is not supported. The Maintenance Processor contains field upgradable 32 Kb of RAM, and 64 Kb of Flash ROM. It also contains a 1200/2400 Baud modem, three serial ports, and the emergency transfer and power management functions. The RAM is dual ported to the 386SX and is used for interprocessor communications.

Processor (UN331B) — G3r

The UN331B manages the G3r by controlling the system and executing 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 G3r 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.

Processor Interface (TN765) — G3s, G3vs, G3i

The TN765 has four data links to the Time Division Multiplexing (TDM) bus and a link through the memory bus to the processor. This circuit pack 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 PDM or TDM to access an MSA, DCS, 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 LAPD protocols. The Multi-Carrier Cabinet supports two TN765 circuit packs using a total of eight data links. Single-Carrier Cabinets, compact Single-Carrier Cabinets, and enhanced single-Carrier Cabinet systems support only one TN765 circuit pack using four data links.

Ring Generator (TN2202) — France

The TN2202 supplies 50 Hz ringing power. The TN2202 supplies balanced ringing, via a modified backplane, to terminals connected to the Multi-Country Analog Line circuit pack (TN2183) 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 and all products made for France.

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

SN Clock (TN572) — G3r

The TN572 distributes the timing signals that synchronize the Switch Node (SN) carrier in which it is installed. The TN572 also receives maintenance data.

SN Interface (TN573) — G3r

The TN573 is an interface (installed in a Switch Node (SN) carrier in a Center Stage Switch (CSS) that terminates a fiber optic link from an Switch Node Interface (SNI) circuit pack in an SN carrier to an SNI circuit pack in another SN carrier, an Expansion Interface (EI) circuit pack in a PPN, and an EI circuit pack in an EPN.

The TN573 routes circuit, packet, and control messages. One TN573 is used per PN.

Speech Synthesizer (TN433) — 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.

Speech Synthesizer (TN457) — U.K. English

The TN457 provides four ports that retrieve fixed UK-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 Mu-Law and A-Law companding.

Speech Synthesizer (TN725B) — U.S. English

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.

System Access and Maintenance (TN1648) — G3r

The TN1648 is a Switch processing Element (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 G3-MT terminal and connection to and termination of one end of the processor bus. The PPN alarm monitors and outputs including auxiliary alarms for auxiliary equipment and environmental monitoring for over-temperature conditions.

Other maintenance items include power supply sense and control for the A, B, C, D, and E carriers. The emergency transfer control activates if a catastrophic failure occurs. The emergency transfer control circuit consists of a three-position toggle switch that may be moved into manual forced-on, manual forced-off, or automatic position. Other maintenance items include:

- Time-of-day clock containing the Initialization and Administration System (INADS) telephone number, login password, and product identification in nonvolatile memory
- Connection to and termination of one end of the processor bus
- Alarm panel information with Major, Minor, and Warning LEDs, an ACKnowledge LED, and an Emergency Transfer LED

Tape Drive (TN1656) — G3rV2

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.

Tie Trunk (TN437) — Australia

The TN437 provides four ports for independent interface to another PBX four-wire E & M lead signaling tie trunk. This interface may be made via trunk-carrier frequency equipment or by direct connection. The TN437 provides selectable trunk type for outgoing calls and incoming calls — automatic (default), immediate, wink start, and delay dial. The TN437 supports administrable timers, A-Law companding, and selectable standard reliability type 5 signaling or E & M type 5 signaling.

Tie Trunk (TN439) — 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 timers.

Tie Trunk (TN458) — U.K.

The TN458 provides four ports for independent interface to another PBX four-wire E & M lead signaling tie trunks. This interface may be made via trunk-carrier frequency equipment or by direct connection. 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.

Tie Trunk (TN497) — Italy

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

Tie Trunk (TN760D)

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 the TN760D has T, R, T1, R1, E, and M signal leads. The TN760D provides release link trunks required for centralized attendant service 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 TN760D Vintage 11 or higher.

Tie Trunk (TN2140) — Italy and Hungary

The TN2140 provides four ports for independent interface to another PBX four-wire E & M lead signaling tie trunks. This interface may be made via trunk-carrier frequency equipment or by direct connection.

The TN2140 provides continuous and discontinuous E & M signaling, Administrable A-Law and Mu-Law companding, zero dB digital loss, and standard Type 1 and Type 5 signaling.

Tone-Clock (TN419B) — Italy, Australia, U.K.

The TN419B supplies call progress tones, 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 Time Division Multiplexing (TDM) bus A, TDM bus B, or both TDM bus A and TDM bus B. This circuit pack contains a ringing voltage alarm detection circuit.

Tone-Clock (TN768)

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 Time Division Multiplexing (TDM) bus A, TDM bus B, or both.

Tone-Clock (TN780)

The TN780 connects to and monitors an optional external Stratum 3 clock. It also couples the Stratum 3 clock output to local clocks. Only the control carrier, which supplies master timing to the system, uses this circuit pack. The TN780 produces the following tones: call progress, touch tones, answer-back, and trunk transmission test. It has 2 MHz, 160 kHz, and 8 kHz clocks. The TN780 can transmit the system clock and tones on either Time Division Multiplexing (TDM) bus A, TDM bus B, or both.

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

Tone-Clock (TN2182) — With A-Law and Mu-Law Tone Detector and Call Classifier

The TN2182 Tone-Clock integrates the tone generator, tone detection, system clock, and synchronization functions onto one circuit pack for use in standard, high, and critical reliability systems. The TN2182 supports eight ports for tone detection and allows gain or loss to be applied to Pulse Code Modulated (PCM) signals received from the bus. The TN2182 provides Stratum 4 enhanced clock accuracy, supports MFC signaling, and places a single tone on any of the 256 time slots of the system's Time Division Multiplexing (TDM) bus.

TN2182 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 supports A-Law and Mu-Law companding.

In most configurations, the two- or three-board combination of tone generator circuit pack, tone detector circuit pack, and/or call classifier circuit pack can be replaced with this one circuit pack, freeing up one or two port slots.

Tone Detector (TN420C)

The TN420C can be administered to detect and analyze tones on the Time Division Multiplexing (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.

Tone Detector (TN748C/D)

The TN748C/D has four Dual Tone Multi-Frequency (DTMF) 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 Automatic Route Selection (ARS), off-premises (out-of-building) keyboard dialing, and off-premises abbreviated dialing. Tones must be companded in Mu-Law code only.

TN756 Tone Detector

The TN756 has four Dual Tone Multi-Frequency (DTMF) 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.

The TN756 is used only in System 75 R1V3 XE and R1V4 applications where Multi-Frequency (MF) generation/detection is not required. The TN756 was replaced by the TN741 and TN748B.

This chapter describes power sources, power and ground wiring, and fan units, under the following topics:

- “Power Sources”
- “Multi-Carrier Cabinet Power System”
- “Single-Carrier Cabinet Power System”
- “Lightning Protection”
- “Sneak Current Protection”
- “Cabinet Fan Units”

Procedures used to plan a customer’s power and grounding requirements in a system before installation are given in *DEFINITY[®] Communications System Generic 3 Planning and Configuration*, 555-230-601.

Procedures used to connect a system to power and ground sources during installation are given in *DEFINITY[®] Communications System Generic 1 and Generic 3 Installation and Test*, 555-230-104.

Power Sources

This section describes AC power and DC power sources used for cabinets.

AC Power

Power feeders from a dedicated AC power source (usually located outside the building) are connected to an AC load center. The 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 types of AC power sources can supply 60 Hz power to the AC load:

- Single-phase 240 VAC supplying 120 VAC or 240 VAC. See Figure 3-1.
This source has three wires plus ground: two “hot” wires, one neutral wire, and one ground wire. A “hot” wire has a voltage with respect to the neutral wire.
- Three-phase, Y, 208 VAC supplying 120 VAC or 208 VAC. See Figure 3-2.
This source has four wires plus ground: three “hot” wires, one neutral wire, and one ground wire.

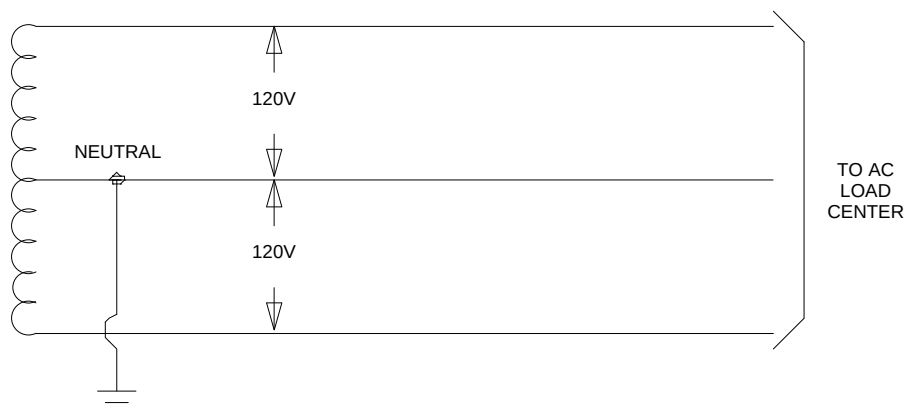


Figure 3-1. Single-Phase 240 VAC Source

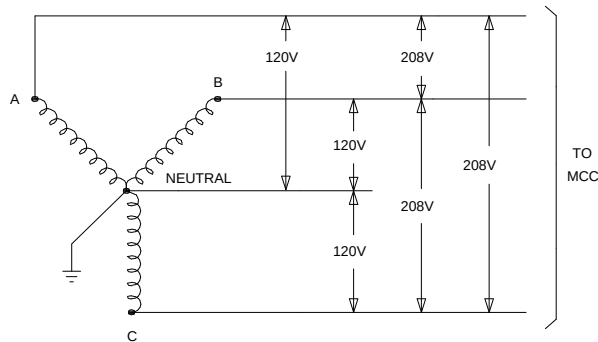


Figure 3-2. Three-Phase Y 208 VAC Source

Table 3-1 lists the 60 Hz AC power sources that can supply power to a cabinet AC load. A National Electrical Manufacturers Association (NEMA) receptacle (North America) is connected to the wires from the unit or supply. The AC power cord from the power input of the unit or supply is plugged into a receptacle.

Table 3-1. AC Power for Multi-Carrier and Single-Carrier Cabinets

Unit/Supply Type	Power Input	Power Sources
AC power distribution (J58890CE, List 3 or List 9)	120 VAC, 60 Hz NEMA 5-50R	One phase 240 VAC with neutral, or one phase of 3-phase, 208 VAC with neutral
AC power distribution (J58890CE, List 4 or List 10)	208/240 VAC, 60 Hz NEMA L14-30R	One phase 208 VAC, or single-phase, 240 VAC
AC power supply (WP-91153) in a Single-Carrier Cabinet	120 VAC, 60 Hz NEMA 5-20R 220/240 VAC at country-specific receptacle	One phase 240 VAC with neutral, or one phase of 3-phase, 208 VAC with neutral One phase of 220 VAC or One phase of 240 VAC
AC power supply (WP-90510) in a compact Single-Carrier Cabinet (G3vs)	120 VAC 60 Hz NEMA 5-20R 220/240 VAC at country-specific receptacle	One phase 240 VAC with neutral, or one phase of 3-phase, 208 VAC with neutral. One phase of 220 VAC or One phase of 240 VAC

DC Power

DC-powered cabinets require -42.5 VDC to -53.5 VDC source at up to 75 Amps. Most Multi-Carrier Cabinet installations require this DC source.

Fused Current Drains

Table 3-2 lists fused current drains of AC-powered cabinets.

Table 3-2. Fused Current Drains of AC-Powered Cabinets

Cabinet	Fused Current Drain (Amps)
Multi-Carrier Cabinet (120 VAC)	50
Multi-Carrier Cabinet (208 VAC)	30
Multi-Carrier Cabinet (240 VAC)	30
Single-Carrier Cabinet (120 VAC)	15 or 20
Auxiliary Cabinet (120 VAC)	20

Table 3-3 lists fused current drains of DC-powered cabinets.

Table 3-3. Fused Current Drains of DC-Powered Cabinets

Cabinet	Fused Current Drain (Amps)
Multi-Carrier Cabinet	75
Single-Carrier Cabinet	25
Auxiliary Cabinet	20

Multi-Carrier Cabinet Power System

A Multi-Carrier Cabinet power system consists 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. Locations with only a 240 VAC 50 Hz power source are limited to using the DC power distribution unit.

⇒ NOTE:

G3s is only available in Single-Carrier Cabinets. G3vs is available only in the compact Single-Carrier Cabinet.

A Multi-Carrier Cabinet power system also consists of power unit circuit packs in the carriers supplying DC power to the circuit pack slots. Chapter 2, "Cabinets, Carriers, and Circuit Packs" describes the AC and DC power supplies.

Table 3-4 lists the power inputs and outputs of each power distribution unit inside a Multi-Carrier Cabinet. A power cord with a NEMA plug is attached to each unit (AC units only). In Table 3-4, the AC power input voltage wires are in the power cord going to the unit.

Table 3-4. Power Distribution Unit Inputs and Outputs

Unit Type	Power Input	Power Outputs
AC power distribution (J58890CE, List 3 or List 9)	120 VAC, 60 Hz, 50 Amp, three wires: one hot, one neutral, one ground, and a NEMA 5-50P plug	120 VAC (normal), 144 VDC (optional, emergency), and 75 VAC to 100 VAC at 20 Hz from the ring generator
AC power distribution (J58890CE, List 4 or List 10)	208/240 VAC, 60 Hz, 20 Amp, four wires: two hot, one NEMA L14-30R plug	120 VAC (normal), 144 VDC (optional, emergency), and 75 VAC to 100 VAC at 20 Hz from the ring generator
DC power distribution (J58890CF, List 5 or List 9)	-48 VDC at up to 75 Amps	-48 VDC, and 67 VAC to 100 VAC at 20 Hz or 25 Hz from the ring generator

Table 3-5 lists the input and output voltages of power converter circuit packs in carriers of Multi-Carrier Cabinets.

Table 3-5. Carrier Power Unit Inputs and Outputs

Unit Type	AC Power Input 120 VAC	DC Power Inputs 144 VDC	DC Power Input -48 VDC	DC Power Outputs +5 VDC at 60 A	DC Power Outputs -5 VDC at 6 A	DC Power Outputs -48 VDC at 8 A
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

Power Distribution

Figure 3-3 shows AC power distribution in Multi-Carrier Cabinets. Five-conductor power distribution cables on each side of the cabinet connect the power distribution unit to the power converter circuit packs in each of the five carriers.

The power distribution cables carry 120 VAC during normal operation and 144 VDC from optional batteries during power backup operation when AC power fails. Another cable connects 120 VAC from the power distribution unit to the battery charger.



WARNING:

Power to the system MUST be turned OFF before a battery charger, fuse, or power distribution unit is removed. Failure to do so will result in damage to the equipment.

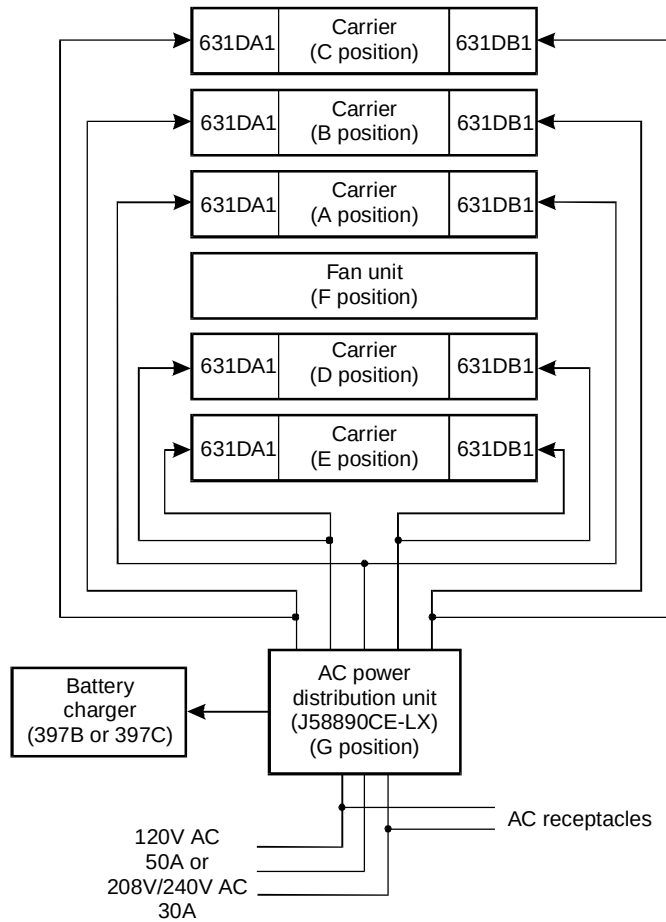


Figure 3-3. AC Power Distribution in Multi-Carrier Cabinets

The 631DA1 Power Converter is in the Port, Control, Switch Node, and Expansion Control Carriers. The 631DB1 AC Power Converter is in the Port, Control, and Expansion Carriers.

NOTE:

“LX” in the Figure refers to the L-number identifying a specific unit type.

Figure 3-4 shows DC power distribution in Multi-Carrier Cabinets. Three-conductor cables on each side connect the DC power distribution unit to the power converter circuit packs in the carriers.

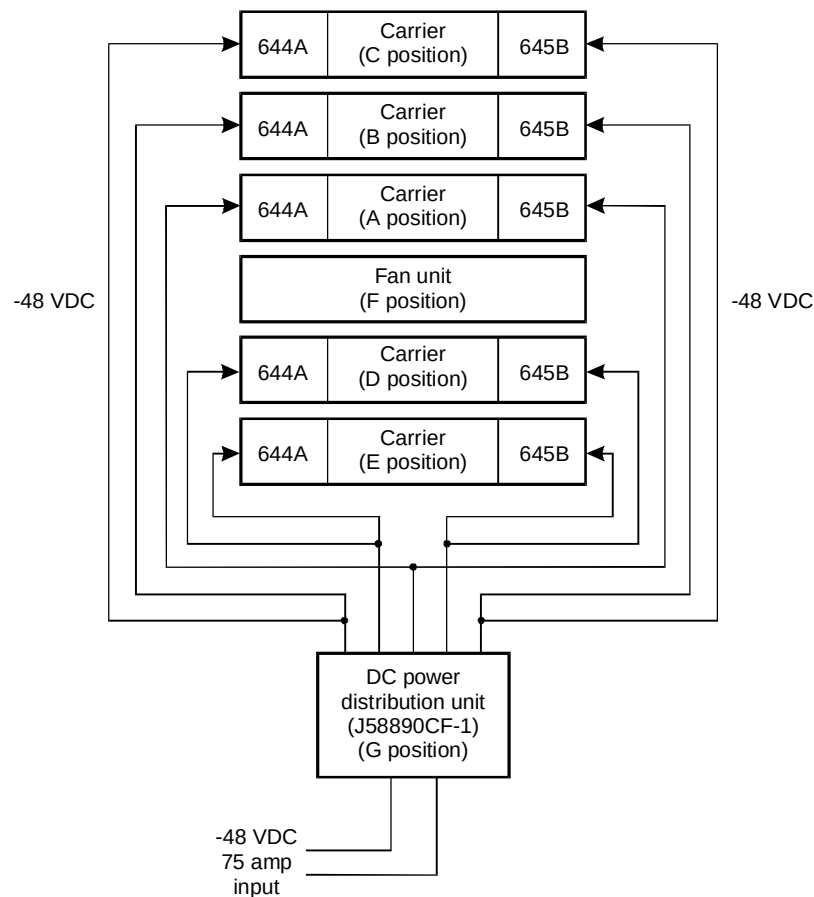


Figure 3-4. DC Power Distribution in Multi-Carrier Cabinets

The 644A DC Power converter is in the Port, Control, Switch Node, and Expansion Control Carriers. The 645B DC Power converter is in the Port, Control, and Expansion Carriers.

⚠ WARNING:

Power to the system MUST be turned OFF before a battery charger, fuse, or power distribution unit is removed. Failure to do so will result in damage to the equipment.

AC Power Distribution Unit (J58890CE)

Figure 3-5 shows the AC power distribution unit located at the bottom of each Multi-Carrier Cabinet. Five-conductor cables connect the unit to the power units in the carriers. These cables carry 120 VAC to the carriers during normal operation and optional 144 VDC during emergency operation if the AC input power has failed.

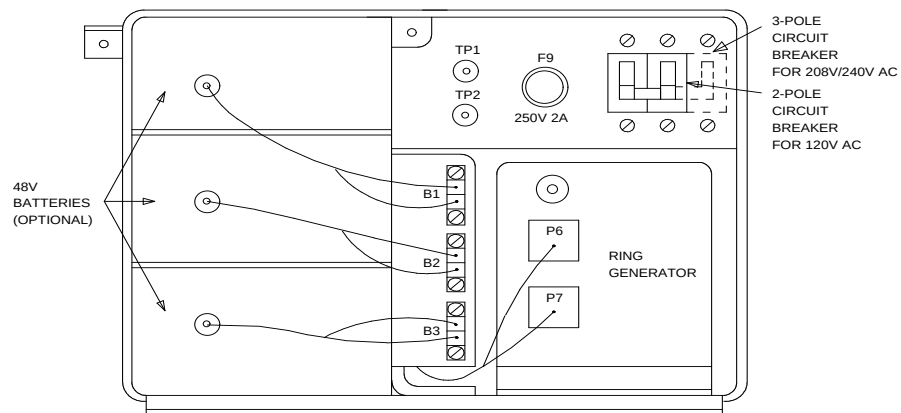


Figure 3-5. AC Power Distribution Unit (J58890CE)

The AC power distribution unit contains the following components:

- Circuit breaker
- Three optional 48 VDC batteries, used only without an Uninterruptible Power Supply (UPS) powered cabinet and provide power to the cabinet
- DC power relay (used only without a UPS)
- Electromagnetic interference (EMI) filter
- Optional battery charger used without UPS-powered cabinets
- Ring generator
- 20 Amp fuses

**WARNING:**

Power to the system MUST be turned OFF before a battery charger, fuse, or power distribution unit is removed. Failure to do so will result in damage to the equipment.

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. When the cabinet overheats, the circuit breaker automatically opens and removes the AC power input.

48 VDC Batteries

The three 48 VDC batteries (used only without a UPS) 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 (used only without a UPS) converts a 120 VAC input to DC voltage that recharges the batteries (usually within 30 hours).

DC Power Relay

This relay disconnects the batteries (used only without a UPS) from a system when AC power is being used. This 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 a G3 expansion port network (EPN). This protects the batteries from being discharged.

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 20 Hz ring generator has an apparatus number of 124D and the 25 Hz ring generator has an apparatus number of 130A.) 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 in G3i.

20 Amp Fuses

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

Backup Power

When AC power fails, the three 48 VDC batteries power the system for 10 seconds in a PPN cabinet. The batteries power the system 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 in G3r.

Uninterruptible Power Supply (UPS)

An external Uninterruptible Power Supply (UPS) (with a longer backup time than holdover batteries), can replace the batteries and battery charger. A UPS is connected from the AC power source to a cabinet's AC power cord. If AC power fails, the UPS senses the failure and supplies its own AC power to the cabinet.

DC Power Distribution Unit (J58890CF)

Figure 3-6 shows a typical DC power distribution unit located at the bottom of each Multi-Carrier Cabinet. The power distribution unit contains the ring generator, circuit breakers, terminal blocks, and fan power. Three-conductor cables connect the unit to the power units in the carriers. These cables carry -48 VDC to the carriers. 20 Amp circuit breakers protect the power on each cable.

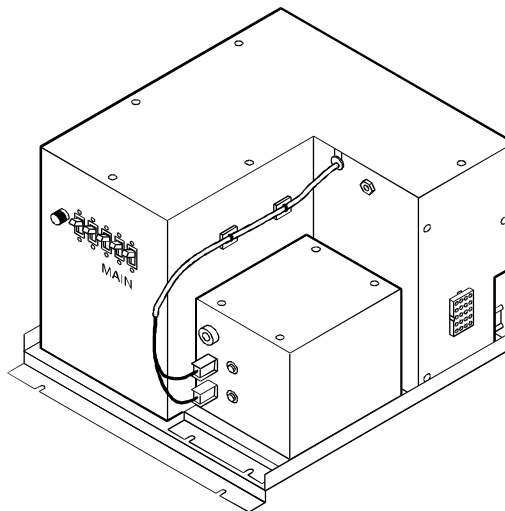


Figure 3-6. DC Power Distribution Unit (J58890CF)



WARNING:

Power to the system MUST be turned OFF before a battery charger, fuse, or power distribution unit is removed. Failure to do so will result in damage to the equipment.

Ring Generator

The ring generator converts the -48 VDC input to an AC output. The 130A1 Ring Generator creates a 75 VAC 25 Hz AC output. The 124D1 Ring Generator creates a 75 VAC to 100 VAC 20 Hz AC output.

The Analog Line circuit packs use this AC voltage output to ring voice terminals. The AC outputs are routed from the ring generator to the port and expansion interface carriers and the control carrier in G3i.

Circuit Breakers

The main circuit breaker is located on the front of the unit and serves as the main DC input disconnect switch. When the cabinet overheats, the circuit breaker automatically opens and removes the DC power input. The circuit breakers that control power to the carriers and filter circuits are located at the rear of the unit.

In the J58890CF list 1 and list 3 power unit, five circuit breakers control the power units in the carriers; one circuit breaker controls power to the fans and ring generator.

Terminal Blocks

-48 VDC from the DC source is connected to the Terminal blocks on the rear of the unit.

Multi-Carrier Cabinets

Expansion Port network cabinet

Front

Single-Point Ground block

Power Distribution unit

Rear

6 AWG

10 AWG coupled bonding conductor

Processor Port network cabinet

Front

Single-Point Ground block

Power Distribution unit

Rear

6 AWG to auxiliary cabinet ground block

6 AWG

10 AWG coupled bonding conductor

To approved ground

Power cord (10feet)

NEMA 5-50R or L14-30R receptacle (or equivalent)

115-Volt 60-Hz 50-Amp or 208-Volt 60-Hz 30-Amp

Customer provided power panel

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Figure 3-8 shows typical AC power and ground wiring in a remote EPN cabinet. A ground wire is connected from the cabinet ground block of both the PPN and EPN cabinets to an approved external ground.

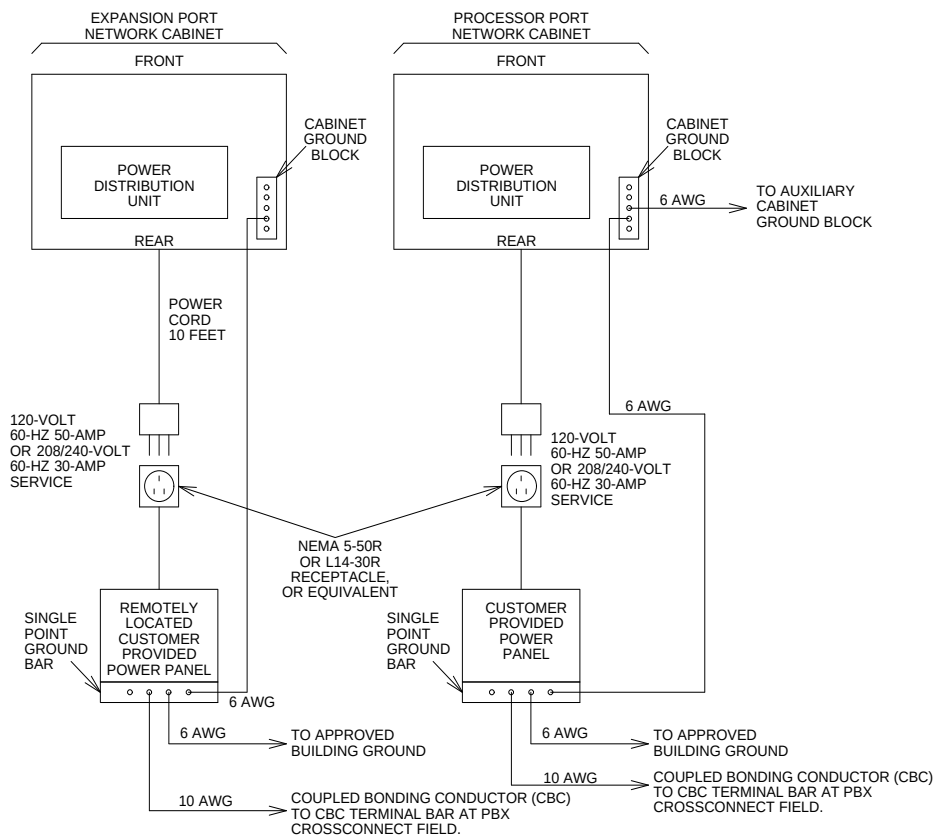


Figure 3-8. Typical Multi-Carrier Cabinet AC Power and Ground Wiring — Remote EPN

DC Power and Ground Wiring

This section describes DC power and ground wiring in Multi-Carrier Cabinets. Figure 3-9 shows a typical DC-powered Multi-Carrier Cabinet. The power and ground leads are routed through duct work or are routed underneath the cabinets.

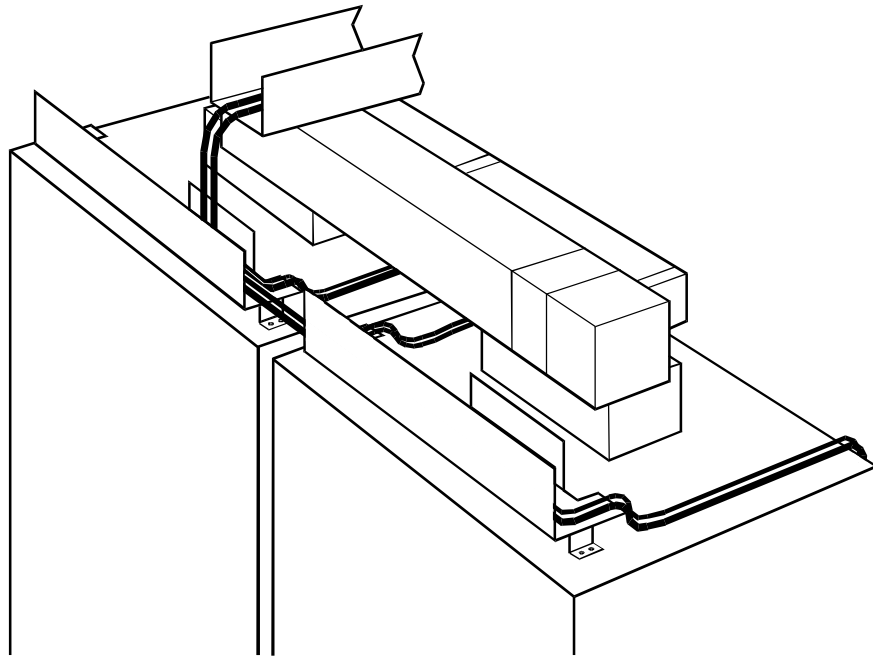


Figure 3-9. Typical Multi-Carrier Cabinet DC Power and Ground Wiring

Multi-Carrier Cabinets

A DC power plant can be used to power Multi-Carrier Cabinets. Figure 3-10 shows typical power and ground wiring in a DC-powered Multi-Carrier Cabinet.

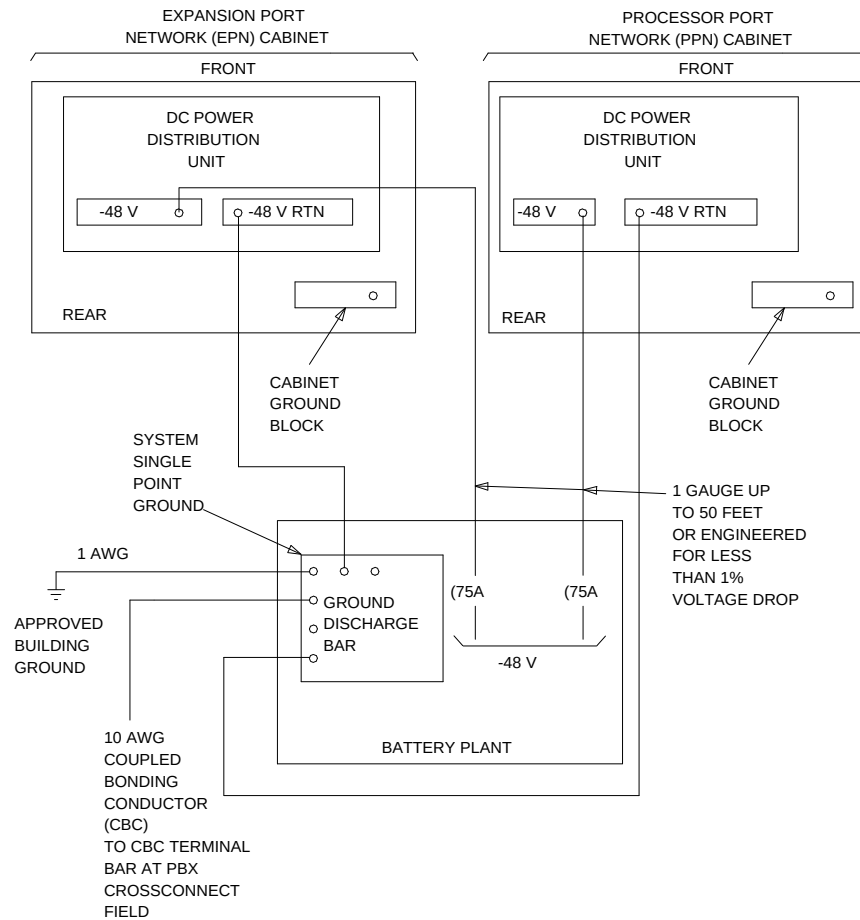


Figure 3-10. Typical Multi-Carrier Cabinet DC Power and Ground Wiring — Collocated EPN

AC- and DC-Powered Multi-Carrier Cabinets

This section describes combined AC power and DC power and ground wiring in Multi-Carrier Cabinets.



WARNING:

Power to the system MUST be turned OFF before a battery charger, fuse, or power distribution unit is removed. Failure to do so will result in damage to the equipment.

Multi-Carrier Cabinets

Figure 3-11 and Figure 3-12 show power and ground wiring for AC- and DC-powered Multi-Carrier Cabinets. A 6 AWG ground wire is connected to the ground block in the bottom of each EPN cabinet. The ground wire is routed out of the cabinet and terminated at the ground discharge bar on the battery plant.

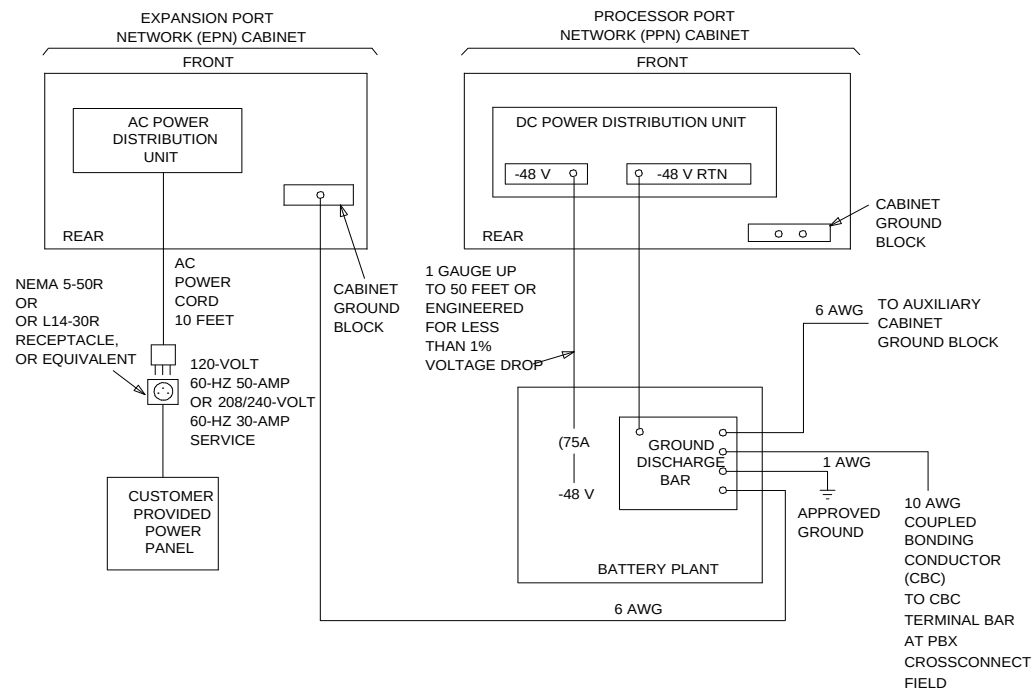


Figure 3-11. Typical Multi-Carrier Cabinet System AC and DC Power and Ground Wiring — Collocated EPN

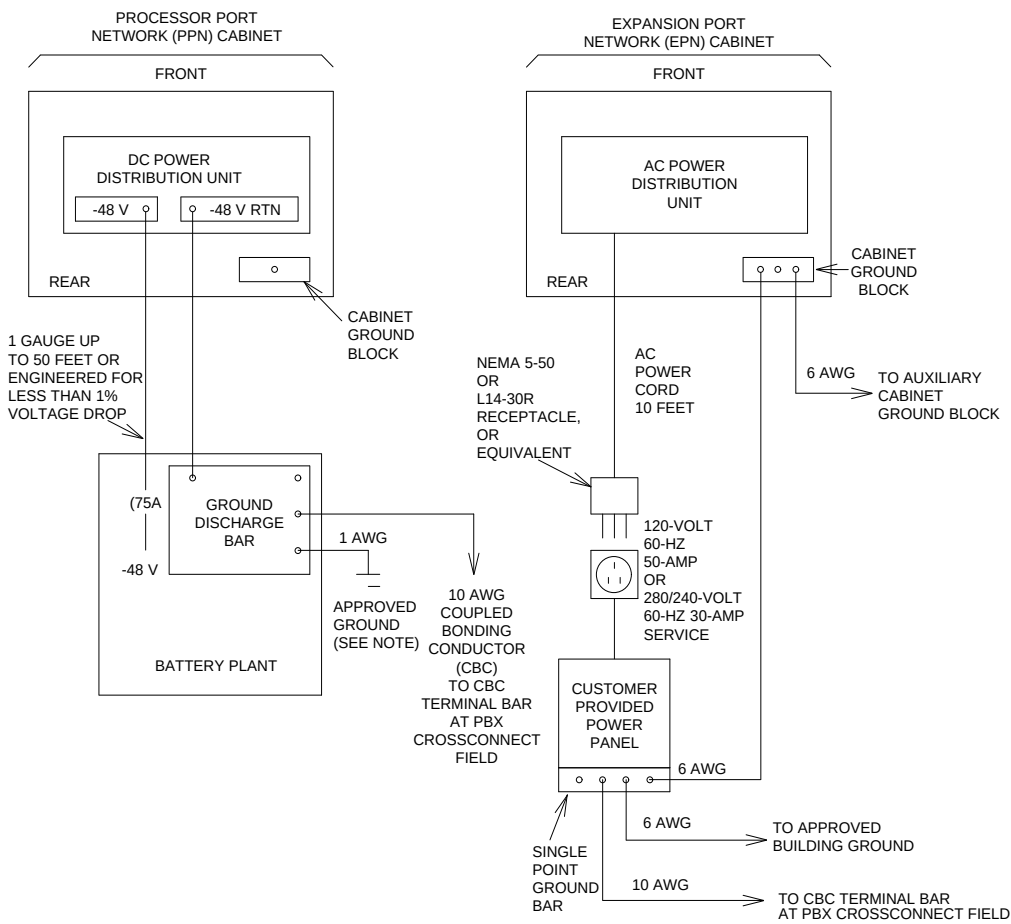


Figure 3-12. Typical Multi-Carrier Cabinet System AC and DC Power and Ground Wiring — Remote EPN

2. FGRD — Represents 14 AWG strapping used to interconnect each carrier backplane with the carrier frame. For AC-powered cabinets, the backplane carrier is connected to the cabinet frame with 14 AWG straps.
3. MODGRDU — Represents a 6 AWG circuit ground wire that interconnects the cabinet ground block of an AC-powered module to the system single point ground terminal bar. If a system has more than one cabinet, a 6 AWG wire is connected between the Multi-Carrier Cabinets. The wire is then connected from the PPN or cabinet closest to the AC protector cabinet or to the system single point ground terminal bar. DC-powered cabinets have no MODGRDU because the +DC return serves this function.
4. Cabinet Ground Block — A copper block located at the base of AC-powered cabinets connected directly to the cabinet frame. A copper block is mounted on the rear of the DC distribution unit of DC-powered cabinets. Only the DC ground block is insulated from the cabinet frame. These ground blocks serve as the cabinet's single point ground.
5. For systems featuring DC-powered cabinets, the gauge of the grounding conductor from the system single point ground (ground discharge bar) to the approved building ground must be the same gauge or larger than any conductor in the system and never smaller than 6 AWG.
6. The wire gauge is determined by the voltage drop of the wire. The voltage drop in the -48 VDC feeders between the power board (panel) and the system cabinet is specified not to exceed 0.5 VDC one way or 1.0 VDC round trip.

Single-Carrier Cabinet Power System

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

AC Power Supply (WP-91153)

In a cabinet powered from an AC source, 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 a single connector on the other end connects the supply to a dedicated AC power source. Figure 3-14 shows the supply.

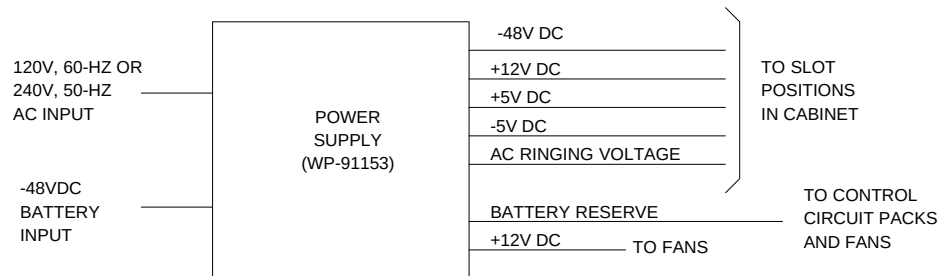


Figure 3-14. AC Power Supply in a Single-Carrier Cabinet

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 slots for the circuit packs. 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 cabinet powered from a DC source, a single, plug-in multi-output DC power supply is located in the power supply slots. Figure 3-15 shows the DC power supply.

A -48 VDC source supplies power to the DC power supply at up to 25 Amps. The 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 EMI filtering.

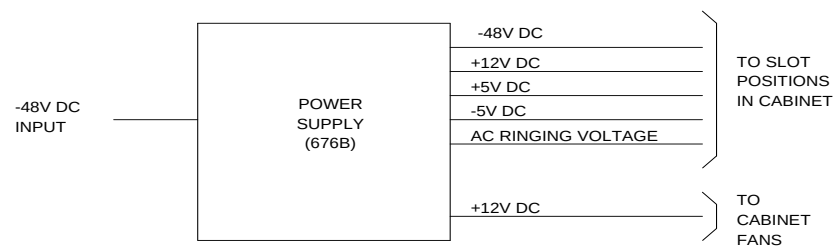


Figure 3-15. DC Power Supply (676B) — Single-Carrier Cabinet

116A Isolator

Each peripheral connected to a DC-powered system, via the asynchronous Electronic Industries Association (EIA) RS-232 interface, requires a 116A isolator. The isolator is inserted at the RS-232 interface between the peripheral and the interface connector to isolate ground between the system and external adjuncts.

AC Power and Ground Wiring

Figure 3-16 shows typical AC power and ground wiring in Single-Carrier Cabinets used in the United States. Only the EPN cabinet shown in the figure is used in G3r. A ground wire from the ground block on the bottom cabinet of the EPN connects to the single-point ground block on the bottom cabinet of the PPN. A 6 AWG ground wire connects the single-point ground block to an approved external ground.

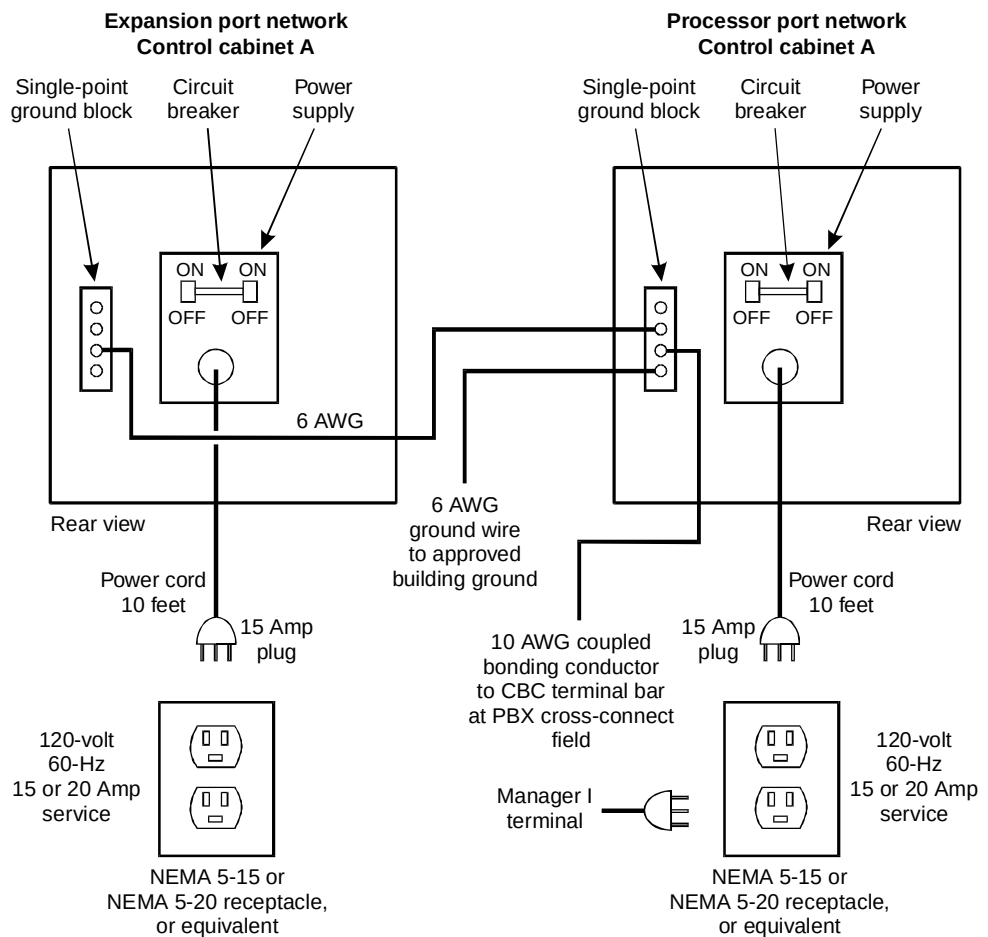


Figure 3-16. Typical Single-Carrier Cabinet Power and Ground Wiring — Collocated EPN

Figure 3-17 shows typical AC power and ground wiring in Single-Carrier Cabinets with a remote EPN cabinet. A ground wire is connected from the cabinet ground block of the PPN and EPN cabinets to an approved external ground.

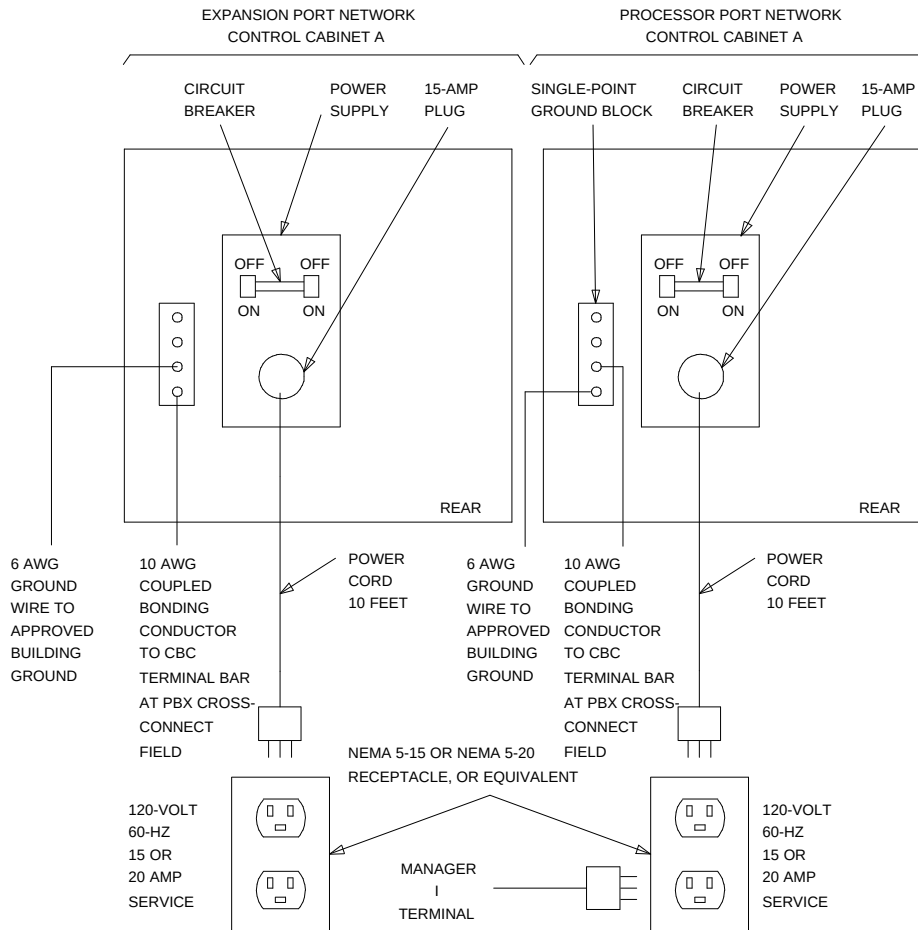
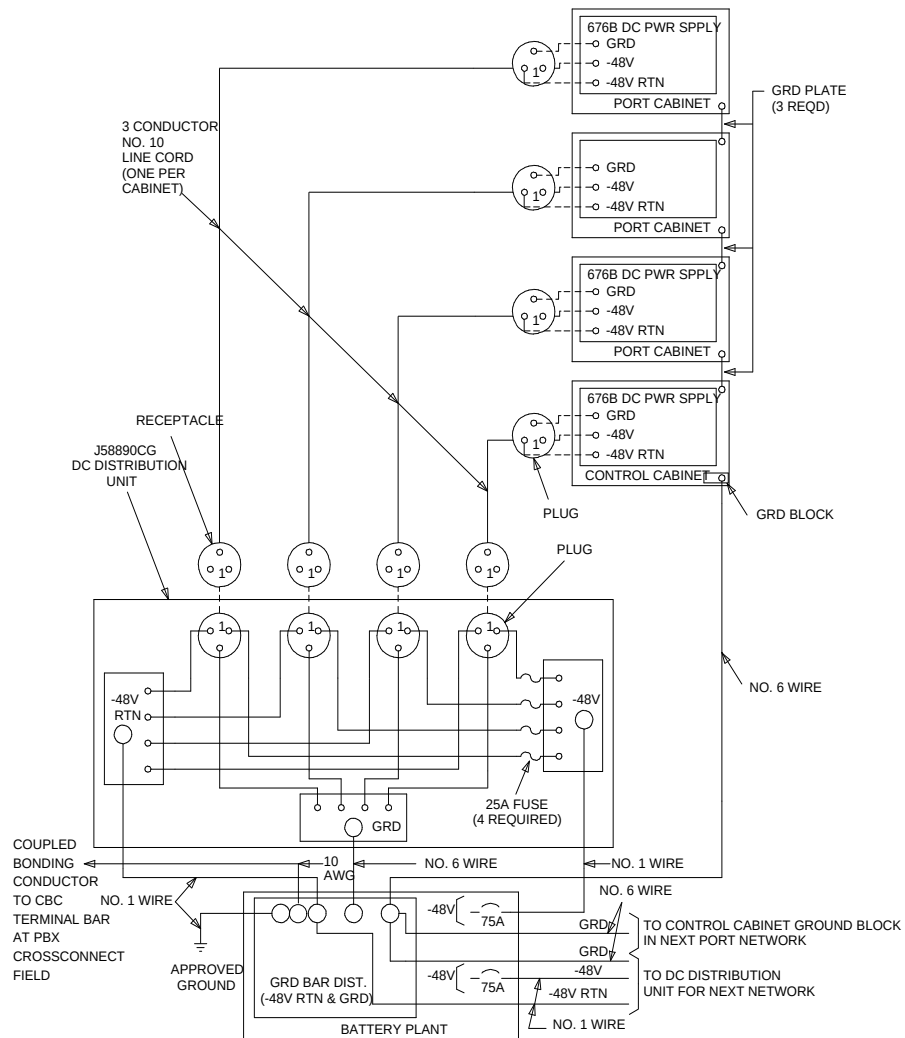


Figure 3-17. Typical Single-Carrier Cabinet AC Power and Ground Wiring — Remote EPN

Figure 3-18. Typical Single-Carrier Cabinet DC Power and Ground Wiring



AC Power Supply — Compact Single-Carrier Cabinet

In a G3vs compact Single-Carrier Cabinet, the plug-in, multi-output, auto-ranging, AC power supply (WP-90510) 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. Figure 3-19 shows the AC power supply.

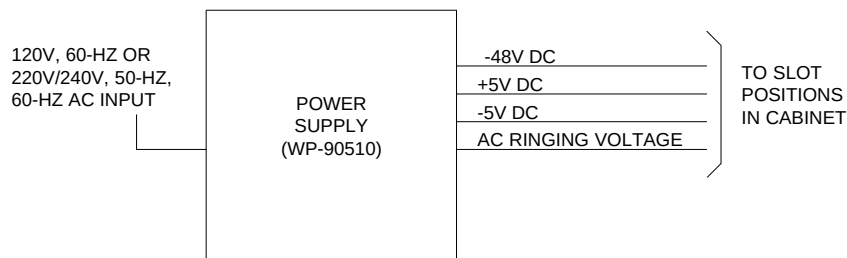


Figure 3-19. AC Power Supply in a G3vs Cabinet

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

- 120 VAC, 50 Hz or 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 or 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 DC outputs: +5 VDC, -5 VDC, and -48 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 EMI filtering.

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

Lightning Protection

A Coupled Bonding Conductor (CBC) in the cabinet ground wiring protects the system from lightning. A CBC runs adjacent to wires in a cable and causes mutual coupling between the CBC and the wires. The mutual coupling reduces the potential differences resulting from lightning surges.

When an auxiliary cabinet is provided with a Multi-Carrier Cabinet system, a 6 AWG ground wire connects the 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 auxiliary cabinet.

If equipment is not mounted in the auxiliary cabinet, the power supply must be plugged into one of the two convenience outlets located on the back of the Multi-Carrier Cabinet to preserve ground integrity. The convenience outlet is fused at 5 Amps. A dedicated G3-MT terminal is usually plugged into the other convenience outlet.

Figure 3-20 shows CBC grounding in an AC-powered cabinet. A minimum one-foot spacing is maintained between 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. In DC-powered systems, the system single-point ground is the ground discharge bar at the DC power cabinet.

NOTE:

A CBC can be a 10 AWG 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 CBC terminal bar at the PBX Main Distribution Frame (MDF).

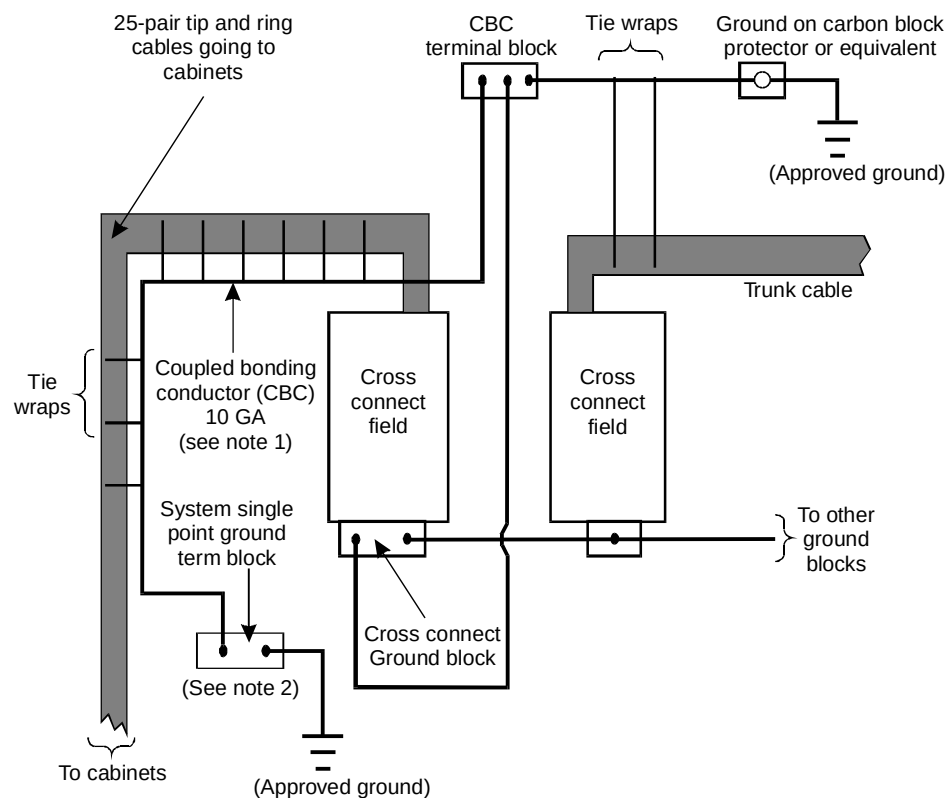


Figure 3-20. CBC Grounding in an AC-Powered Cabinet

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. Sneak fuse panels are installed on the switch-side of the network interface.

Cabinet Fan Units

This section describes the fan units in Multi-Carrier Cabinets, Single-Carrier Cabinets, and compact Single-Carrier Cabinets.

Multi-Carrier Cabinet Fan Unit

Figure 3-21 shows a cross-sectional side view of the fan unit in a Multi-Carrier Cabinet. The figure shows fan and air filter positions and air flow directions from the front and rear fans.

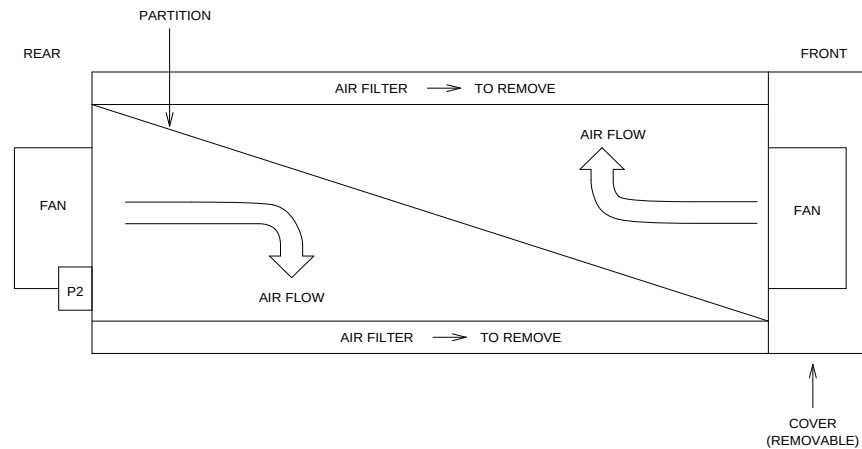


Figure 3-21. Fan Unit in Multi-Carrier Cabinet

The fan unit is mounted in Position "F" and consists of six fans (three in front and three in rear) that operate at continuously variable speeds. A removable air filter is provided above and below the 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.

The P2 connector on the lower right rear side of the fan unit connects the fans to a power cable supplying -48 VDC to each fan, +5 VDC to the speed control and thermal alarm circuit in each fan in G3, 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.

The fans receive -48 VDC from the 631DB1 AC power unit located on the bottom of the cabinet. In the DC-powered Processor Port Network (PPN) and Expansion Port Network (EPN) cabinets, the fans receive -48 VDC from the DC distribution unit located in Position "G" of the cabinets.

A minor alarm is sent to the processor circuit pack in the Processor Port Network (PPN) cabinet and the maintenance circuit pack in an Expansion Port Network (EPN) cabinet if a fault in 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 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.

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 back of the cabinet.

If the cabinet temperature reaches 158 degrees F (70 degrees Celsius), the temperature sensor in the power supply causes the system to shut down.

Cabinet and Carrier Configurations

4

This chapter describes various cabinet and carrier configurations that compose DEFINITY[®] Generic 3 (G3). The configurations are described relative to combinations of cabinet interconnection options and system duplication options in the following order:

- “Sequence of Installing Carriers in Cabinets”
- “Minimum Cabinet Configurations”
- “Cabinet Configurations in Directly — Connected Systems”
- “Cabinet Configurations in a CSS-Connected G3r”

Procedures used to configure cabinets and carriers in a system before installation are given in *DEFINITY[®] Communications System Generic 3 Planning and Configuration*, 555-230-601.

Sequence of Installing Carriers in Cabinets

The following tables list the sequential positions of carriers installed in the Processor Port Network (PPN) and Expansion Port Network (EPN) cabinets.

Table 4-1 lists the positions of the carriers installed sequentially in the PPN cabinet. The installation of Switch Node (SN) carriers displaces port carriers. SN carriers are used in G3r only.

Table 4-1. Carrier Positions in a PPN Cabinet

Carrier Type	Carrier Position
Port	First "B" if no control carrier duplication; "C" if control carrier duplication or no control carrier duplication; then "D," and then "E"
Control	"A" if no control carrier duplication; "A" and "B" if control carrier duplication
Switch Node (G3r only)	First "E" if no duplication; if duplication, "D" and "E." The "D" duplicate SN can also go in the "E" position of an EPN

Table 4-2 lists the positions of the carriers installed sequentially in an EPN cabinet.

Table 4-2. Carrier Positions in an EPN Cabinet

Carrier Type	Carrier Position
Port	First "B"; then "C," "D," and then "E." "B" is required for a critical reliability system.
Expansion control	"A" only
Switch Node (G3r only)	First "E" if no duplication; "D" and "E" if duplication

Table 4-3 lists the positions of the carriers installed sequentially in an EPN cabinet with two port networks (PNs).

Table 4-3. Carrier Positions in an EPN Cabinet with Two PNs (G3r Only)

Carrier Type	Carrier Position
Port	"B," then "C" for first PN; "E," then "D" for second PN
Expansion control	"A" for the first PN only

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

- Tone-clock)
- Expansion Interface (EI)
- DS1 Converter (DS1C)
- EPN Maintenance

A minimum cabinet configuration is determined by the following criteria: cabinet interconnection options (directly connected and CSS-connected); system duplication options (standard reliability, high reliability, and critical reliability); and traffic engineering, which determines the number of PNs.

Table 4-4 through Table 4-6 list the minimum required carriers and circuit packs in PPN and EPN cabinets.

Table 4-4. Minimum Requirements for PPN Cabinet

Duplication Option	Connection Option	Control Carriers	Switch Node Carriers	Tone-Clocks	Expansion Interfaces in EPN
Standard reliability	Direct	1	0	1	Equals Number of EPNs
	CSS (G3r Only)	1	0 or 1*	1	1
High reliability	Direct	2	0	2	Equals Number of EPNs
	CSS (G3r Only)	2	0 or 1*	2	2
Critical reliability	Direct	2	0	2	Twice Number of EPNs
	CSS (G3r Only)	2	0 or 2*	2	2

Table 4-5. Minimum Requirements for Each EPN Cabinet

Duplication Option	Connection Option	Control Carriers	Switch Node Carriers	Tone-Clocks	Expansion Interfaces in EPN
Standard reliability	Direct	1	0	1	Equals No. of EPNs
	CSS (G3r Only)	1	0 or 1*	1	1
High reliability	Direct	1	0	1	Equals No. of EPNs
	CSS (G3r Only)	1	0 or 1*	1	1
Critical reliability	Direct	1	0	2	Twice number of EPNs
	CSS (G3r Only)	1	0 or 2*	2	2

* The first Switch Node is normally located in the PPN. The second and third Switch Nodes are normally located in an EPN to support up to 44 PNs. The first Switch Node may be located in an EPN.

Table 4-6. Minimum Requirements for Two-Port Network Multi-Carrier Cabinet EPN Cabinets — G3r Only

Duplication Option	Connection Option	Control Carriers	Switch Node Carriers	Tone-Clocks	Expansion Interfaces in EPN
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

A standard reliability system has no duplicated hardware and includes:

- One Control carrier
- One Tone-Clock circuit pack per Port Network
- Port Networks interconnected by single cables
- One Switch Node carrier (G3r only), if required

Figure 4-1 shows a standard reliability directly connected system. It is shown in both the Single-Carrier Cabinet and the Multi-Carrier Cabinet configuration. The Expansion Interface (EI) circuit pack shown in the port carrier is used in G3r. In G3i, the EI circuit pack is installed in the control carrier.

G3s and G3vs do not support multiple PNs, and do not use the EI circuit pack. All G3 configurations support standard reliability.

The optional carriers shown in the Multi-Carrier Cabinets are port carriers that can be added as required. In G3r, a Switch Node carrier can be added to position "E" as required. Optional port carriers are determined by traffic engineering.

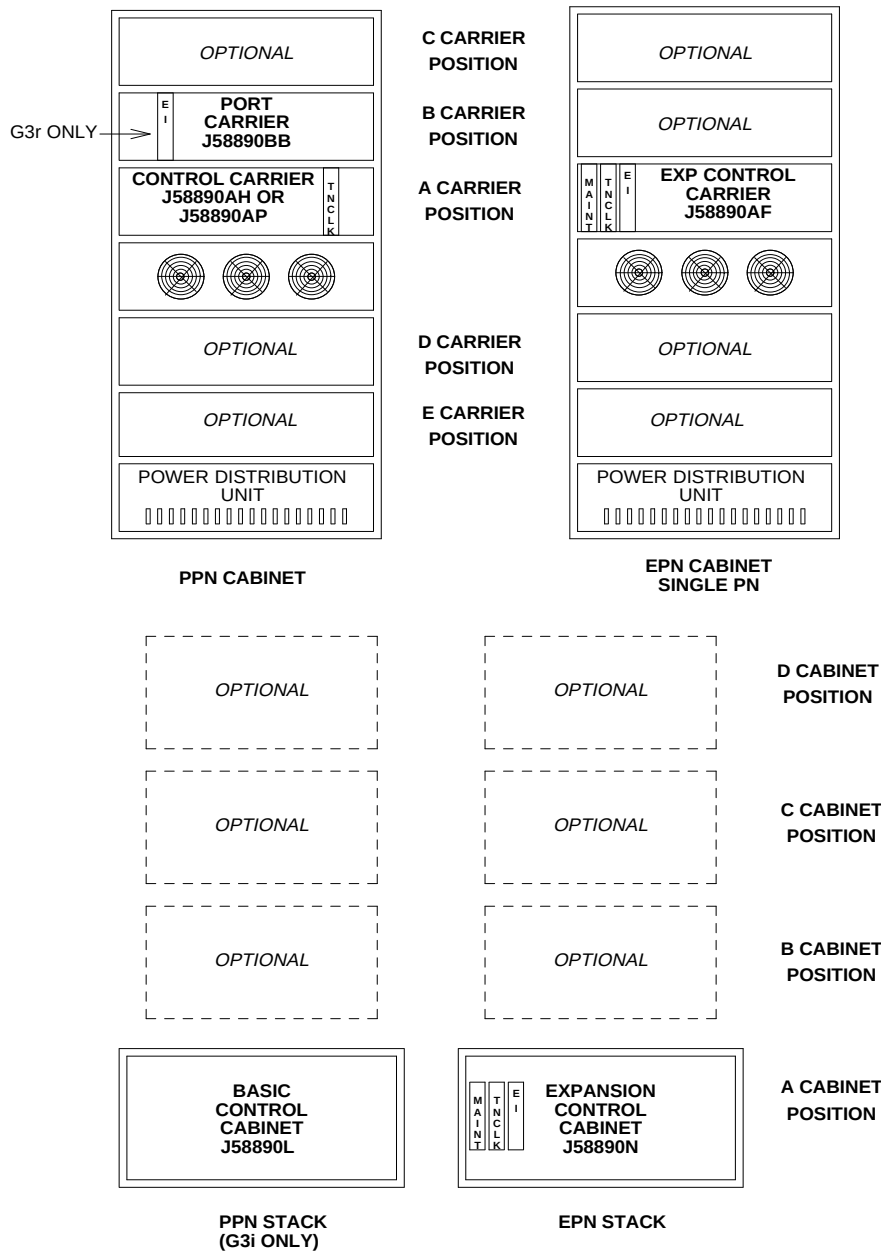


Figure 4-1. Minimum Single PN Cabinet Configurations
— Standard Reliability

Figure 4-2 shows the only two-PN cabinet configuration in G3. It is only used in G3r standard reliability systems.

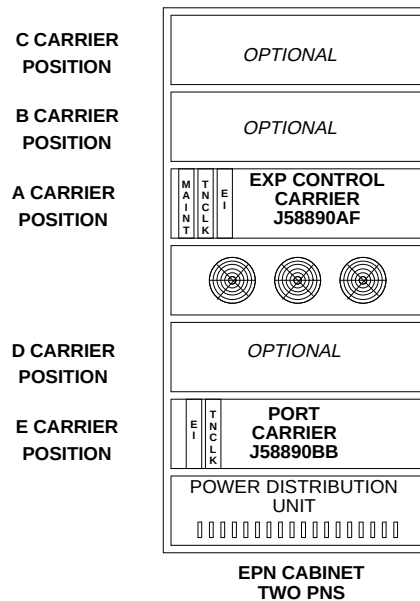


Figure 4-2. Minimum Two PN Cabinet Configuration — G3r Standard Reliability

High Reliability Systems — G3, G3i or G3r

High reliability systems include two control carriers located in the PPN cabinet containing duplicate SPEs and tone-clock circuit packs (one active and the other in standby), one Tone-Clock circuit pack per EPN, duplicate Expansion Interface circuit packs in the PPN (only G3r with CSS), PNs interconnected by single cables, and duplicate SN clock circuit packs (one is active and the other is in standby) in the Switch Node carrier (G3r only).

With duplicate processors, one SPE is active and the other is in standby (ready to be substituted). The memory in the standby SPE is constantly updated to reflect the memory in the active SPE by a process called “memory shadowing.”

If the standby SPE becomes active, its memory is then identical to the formally active SPE. The standby SPE becomes active when the active SPE fails or is reset by an external command. When the standby SPE becomes active, it can begin processing calls without interrupting the system.

High reliability systems require two control carriers in the PPN cabinet. The other cabinets used in high reliability systems are the same as the EPN cabinets or stacks shown in Figure 4-6.

Figure 4-3 shows a G3 high reliability system. Added optional port carriers result from PNs required by traffic engineering analysis. The switch node carrier is shown in the PPN cabinet for a high reliability CSS-connected G3r. Although G3iV1 did not offer high reliability, V2 and later releases provide this configuration.

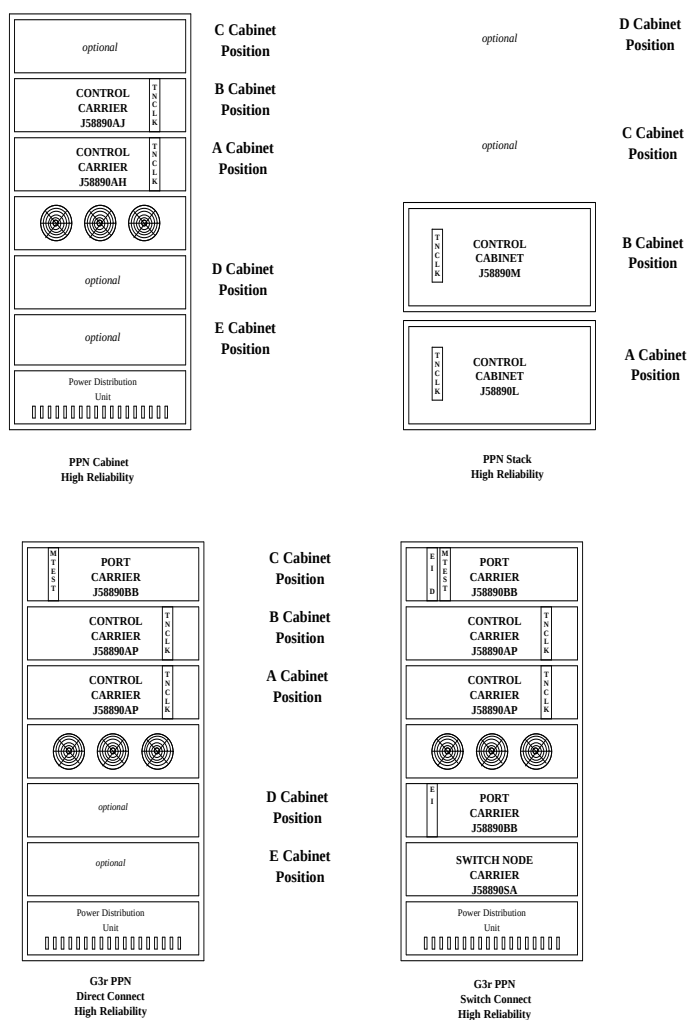


Figure 4-3. Minimum PPN Cabinet Configurations — High Reliability

Critical Reliability Systems — G3i

A critical reliability system includes the following duplicated components: control carrier, Tone-Clock circuit packs in each PN, Expansion Interface circuit packs in each PN, and cabling between PNs.

The duplicated processors use memory shadowing that functions exactly as described in the “High Reliability” section.

In a critical reliability system, all port network connectivity, including CSS, EI circuit packs, fiber optic cabling, and Digital Signal level-1 Converter (DS1C) facilities (if present) are fully duplicated. An active-standby method is used that sets up calls over the active PN connectivity and backs up the calls in the standby PN connectivity. If the active PN connectivity fails, the standby connectivity becomes active to continue the call service.

Each pair of Tone-Clock circuit packs in a PN is used in active-standby mode. The SN clock in each SN carrier is not duplicated, but each SN carrier is fully duplicated.

Critical reliability G3i systems require the duplication of the control carrier in the PPN cabinet. Figure 4-4 shows the minimum PPN cabinet configuration in critical reliability G3i systems.

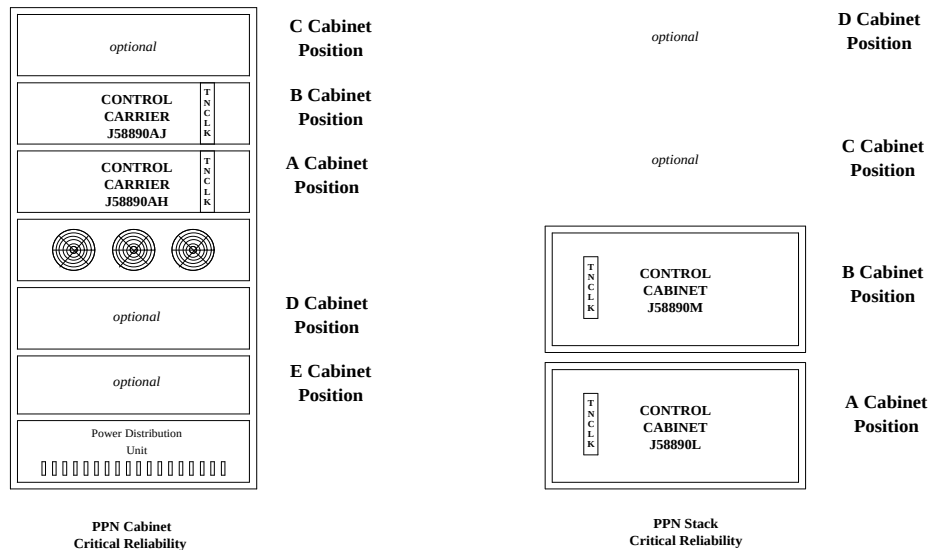


Figure 4-4. Minimum Configuration — Critical Reliability G3i

Critical Reliability Systems — G3r

Critical reliability G3r systems require the duplication of carriers in PPN and EPN cabinets, as well as EPN stacks.

Figure 4-5 shows the minimum PPN cabinet configurations in critical reliability, directly connected systems and CSS-connected G3r.

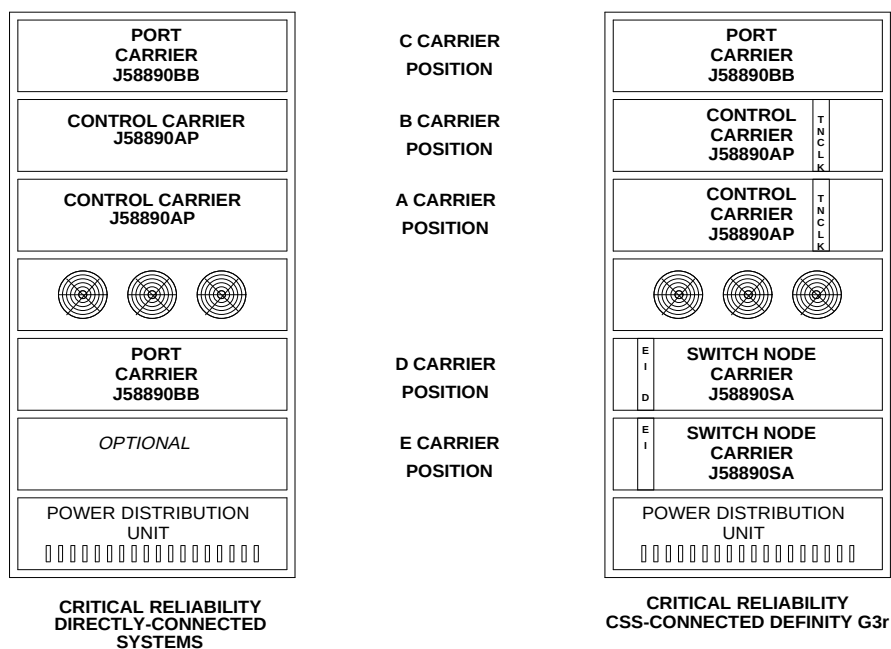


Figure 4-5. Minimum Configurations — Critical Reliability G3r

Single Port Network EPN Cabinets in Critical Reliability Systems

Figure 4-6 shows the minimum cabinet configurations in single Port Network (PN) EPN cabinets in a critical reliability system. Included is a Multi-Carrier EPN cabinet and a Single-Carrier Cabinet EPN stack.

In G3r, the multi-carrier EPN cabinet can have optional duplicate SN carriers in carrier positions D and E. Optional port carriers result from PNs required by traffic engineering analysis.

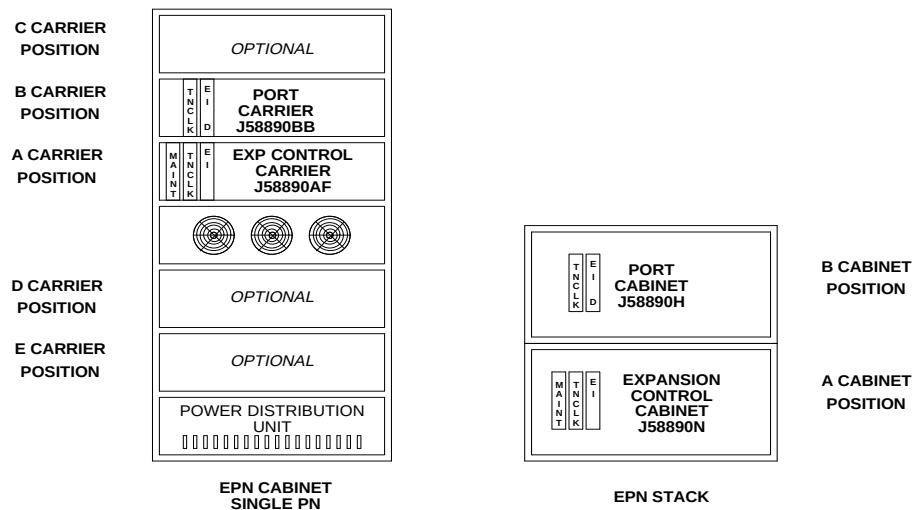


Figure 4-6. Minimum Configurations — Critical Reliability

Two Port Network EPN Cabinets in Critical Reliability Systems — G3r

Figure 4-7 shows the minimum cabinet configurations in an EPN cabinet with two separate PNs in a G3r critical reliability system.

In a G3r, only the Multi-Carrier Cabinet without an SN carrier is arranged as a two-PN cabinet.

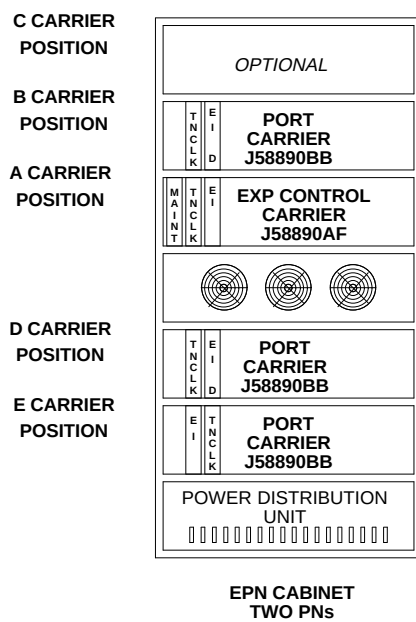


Figure 4-7. Minimum Configuration — Critical Reliability G3r

Cabinet Configurations in Directly — Connected Systems

Each directly-connected G3i has a maximum of three cabinets. The locations of Expansion Interface (EI) circuit packs are shown in Figure 4-8 through Figure 4-10.



NOTE:

G3s and G3vs support only one Single-Carrier Cabinet.

Standard Reliability

Table 4-7 lists the required Expansion Interface 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 4-7. Standard Reliability Directly Connected System

Port Networks	Expansion Interfaces	Tone-Clocks	Remaining Port Slots	Maintenance Slots (G3r and G3i)
1 (PPN only)	0	1	89 (G3i) 80 (G3r)	4
2 (One PPN and one EPN)	2	2	186 (G3i) 177 (G3r)	8
3 (One PPN and two EPNs)	6	3	281 (G3i) 272 (G3r)	12

Figure 4-8 shows the cabinet configurations in standard reliability directly connected systems. In cabinet 1, the Expansion Interface (EI) circuit pack is not required in a single PN (PPN only) system because no connection to another cabinet is required.

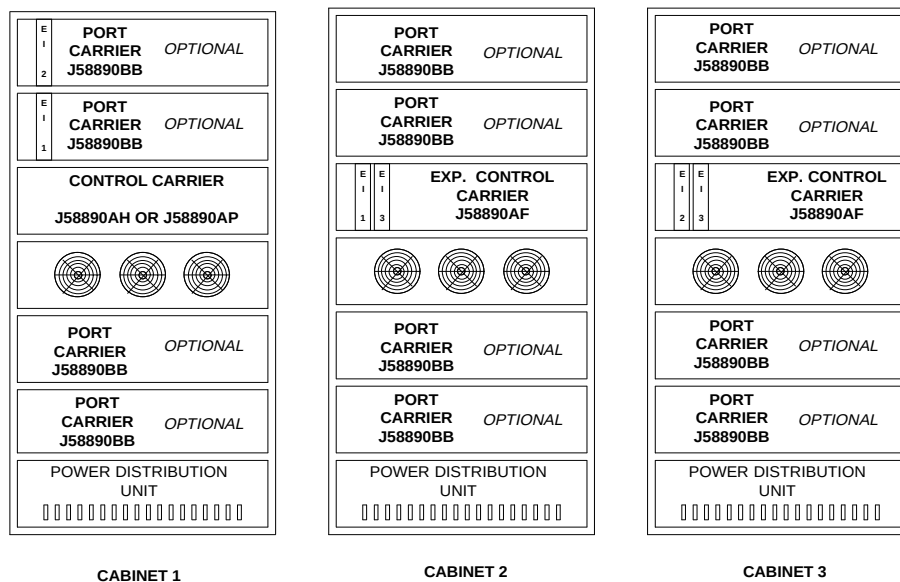


Figure 4-8. Standard Reliability Directly-Connected Systems

High Reliability

Table 4-8 lists the required Expansion Interface (EI) circuit pack slots, Tone-Clock circuit pack slots, Maintenance circuit pack slots, and remaining port circuit pack slots in a high reliability, directly connected system.

Table 4-8. High Reliability Directly-Connected System

PNs	EIs	Tone-Clocks	Remaining Port Slots	Maintenance Slots (G3r and G3i)
1 (PPN only)	0	2	78 (G3i) 60 (G3r)	2
2 (One PPN and one EPN)	2	3	175 (G3i) 157 (G3r)	3
3 (One PPN and two EPNs)	6	4	270 (G3i) 252 (G3r)	4

Figure 4-9 shows the cabinet configurations in high reliability, directly connected G3r systems. In cabinet 1, the Expansion Interface circuit pack is not required in a single PN (PPN only) system because no connection to another cabinet is required.

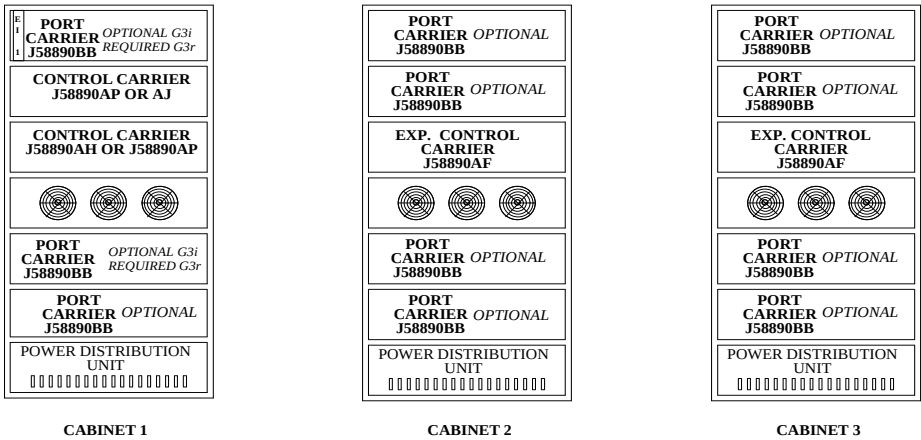


Figure 4-9. High Reliability, Directly-Connected Systems

Critical Reliability

Table 4-9 lists the required Expansion Interface (EI) circuit pack slots, Tone-Clock circuit pack slots, and remaining port circuit pack slots in critical reliability, directly-connected systems.

⇒ NOTE:

G3s and G3vs do not support multiple cabinets.

Table 4-9. Critical Reliability, Directly-Connected PNs and Circuit Pack Slots

Port Networks	Expansion Interfaces	Tone-Clocks	Remaining Port Slots
1 (PPN only)	0	2	78
PPN and EPN	4	4	172
PPN and two EPNs	12	6	262 (G3i) 244 (G3r)

Figure 4-10 shows the cabinet configurations in a critical reliability, directly connected system. The port carrier in cabinet 1 is optional in systems with only one PN (PPN only), but is required in systems with two or three PNs.

All Expansion Interface circuit packs are not required for systems with only a PPN, because no connection is required from the PPN to another cabinet. The EIs in cabinet 1 are shown in their G3r positions. These are moved to the control carriers in cabinet 1 of G3i.

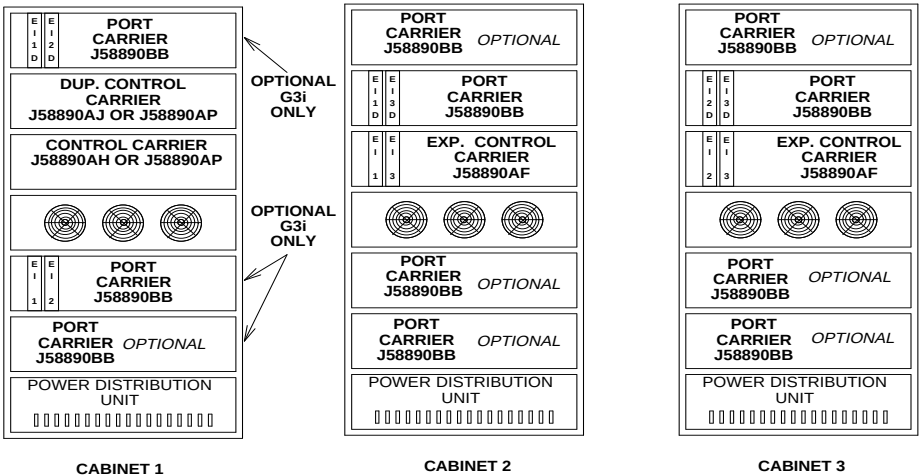


Figure 4-10. Critical Reliability, Directly-Connected Systems

Cabinet Configurations in a CSS-Connected G3r

A Center Stage Switch (CSS)-connected G3r supports from one to 44 Port Networks (PN). The locations of Expansion Interface circuit packs are shown in Figure 4-11 through Figure 4-16.

Standard Reliability

Table 4-10 lists from two to 22 Port Network (PN) cabinets for a standard reliability CSS-connected G3r. Also included is the required Expansion Interface (EI) circuit pack, Tone-Clock circuit pack, DS1 Converter circuit pack, Maintenance circuit pack slots, and remaining port circuit pack slots.

Table 4-10. Standard Reliability CSS-Connected Systems

Port Networks	Switch Nodes	Expansion Interfaces	Tone-Clocks	Remaining Port Slots	DS1C in SN	Maintenance Slots
2	1	2	2	157	2	2
3	1	3	3	255	2	3
4	1	4	4	353	2	4
5	1	5	5	451	2	5
6	1	6	6	549	2	6
7	1	7	7	647	2	7
8	1	8	8	745	2	8
9	1	9	9	843	2	9
10	1	10	10	941	2	10
11	1	11	11	1039	2	11
12	1	12	12	1137	2	12
13	1	13	13	1235	2	13
14	1	14	14	1333	2	14
15	1	15	15	1431	2	15
16	1	16	16	1529	2	16
17	2	17	17	1607	4	17
18	2	18	18	1705	4	18
19	2	19	19	1803	4	19
20	2	20	20	1901	4	20
21	2	21	21	1999	4	21
22	2	22	22	2097	4	22

Figure 4-11 and Figure 4-12 show the cabinet configurations in a standard reliability CSS-connected G3r.

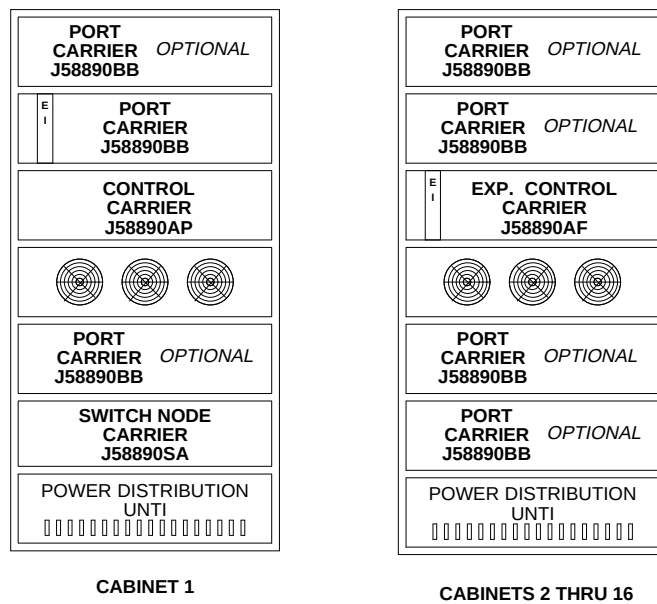


Figure 4-11. Standard Reliability CSS-Connected G3r — One SN

In Figure 4-12, the two-SN CSS can have one to seven inter-SN fiber optic links to support up to 22 maximum Port Networks (PNs). The following numbers of links are used with the associated maximum number of PNs:

- One to five links support 22 Port Networks
- Six links support 20 Port Networks
- Seven links support 18 Port Networks

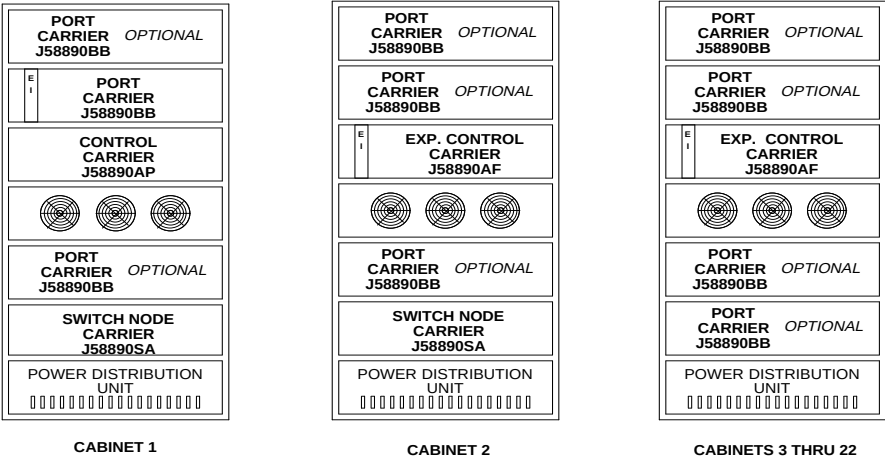


Figure 4-12. Standard Reliability CSS-Connected G3r — Two SNs

High Reliability

Table 4-11 lists from two to 22 PN cabinets for a high reliability CSS-connected G3r. Also included are the required Expansion Interface circuit packs, Tone-Clock circuit pack slots, DS1 Converter circuit pack slots, Maintenance circuit pack slots, and remaining port circuit pack slots.

Table 4-11. High Reliability, CSS-Connected Systems

Port Networks	Switch Nodes	Expansion Interfaces	Tone-Clocks	Port Slots	DS1C in SN	Maintenance Slots
2	1	3	3	136	2	3
3	1	4	4	234	2	4
4	1	5	5	332	2	5
5	1	6	6	430	2	6
6	1	7	7	528	2	7
7	1	8	8	626	2	8
8	1	9	9	724	2	9
9	1	10	10	822	2	10
10	1	11	11	920	2	11
11	1	12	12	1018	2	12
12	1	13	13	1116	2	13
13	1	14	14	1214	2	14
14	1	15	15	1312	2	15
15	1	16	16	1410	2	16
16	2	17	17	1488	4	17
17	2	18	18	1586	4	18
18	2	19	19	1684	4	19
19	2	20	20	1782	4	20
20	2	21	21	1880	4	21
21	2	22	22	1978	4	22
22	2	23	23	2056	6	23

Figure 4-13 and Figure 4-14 show the cabinet configurations in a high reliability, CSS-connected G3r.

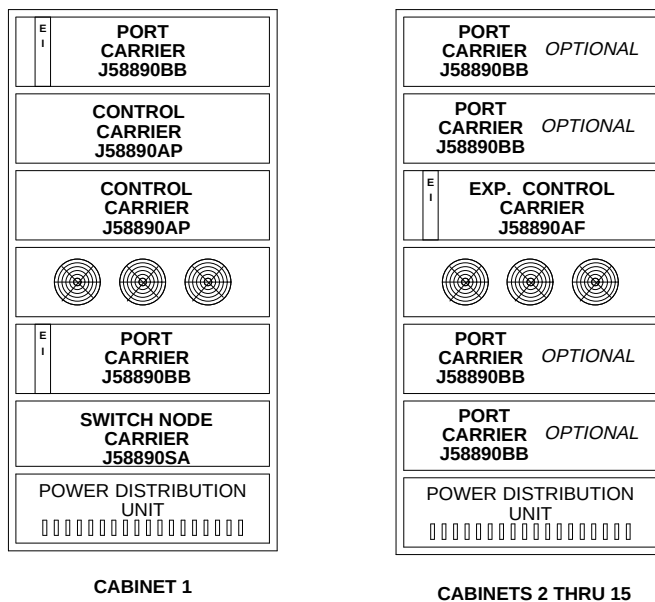


Figure 4-13. High Reliability, CSS-Connected G3r — One SN

In Figure 4-14, the two-Switch Node CSS is assumed to have five inter-SN fiber optic links to support 21 maximum PNs. The following numbers of links are used with the associated maximum number of PNs:

- One to four links support 22 Port Networks
- Five links support 21 Port Networks
- Six links support 19 Port Networks
- Seven links support 17 Port Networks

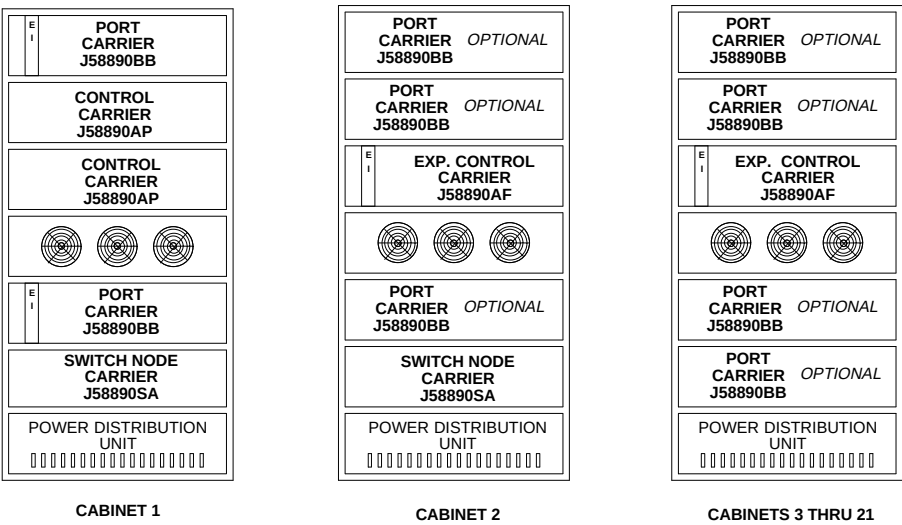


Figure 4-14. High Reliability, CSS-Connected G3r — Two SNs

Critical Reliability

Table 4-12 lists from two to 22 Port Network (PN) cabinets for a critical reliability, CSS-connected G3r. Also included are the required Expansion Interface (EI) circuit pack slots, Tone-Clock circuit pack slots, DS1 Converter circuit pack slots, Maintenance circuit pack slots, and remaining port circuit pack slots.

Table 4-12. Critical Reliability, CSS-Connected Systems

Port Networks	Switch Nodes	Expansion Interfaces	Tone-Clocks	Port Slots	DS1C in SN	Maintenance Slots
2	1	4	4	116	2	3
3	1	6	6	212	2	4
4	1	8	8	308	2	5
5	1	10	10	404	2	6
6	1	12	12	500	2	7
7	1	14	14	596	2	8
8	1	16	16	692	2	9
9	1	18	18	788	2	10
10	1	20	20	884	2	11
11	1	22	22	980	2	12
12	1	24	24	1076	2	13
13	1	26	26	1172	2	14
14	1	28	28	1268	2	15
15	1	30	30	1364	2	16
16	1	32	32	1460	2	17
17	2	34	34	1516	6	18
18	2	36	36	1612	6	19
19	2	38	38	1708	6	20
20	2	40	40	1804	6	21
21	2	42	42	1900	6	22
22	2	44	44	1996	6	23

Figure 4-15 and Figure 4-16 show the cabinet configurations in a critical reliability, CSS-connected G3r.

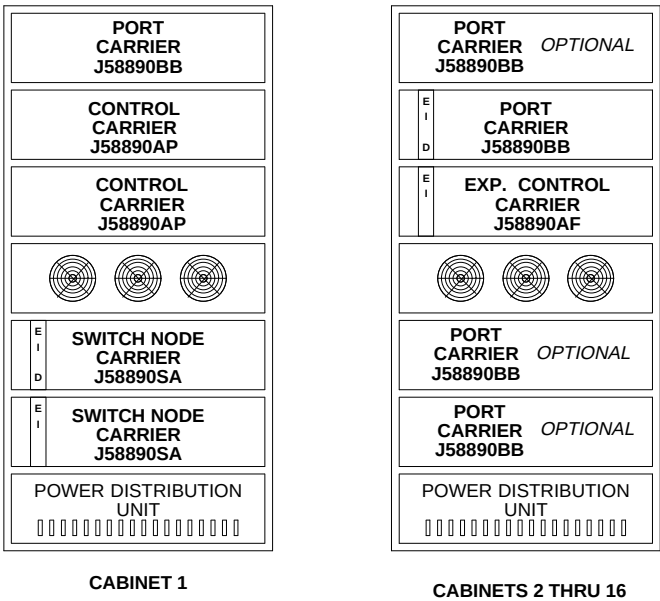


Figure 4-15. Critical Reliability, CCS-Connected G3r — One SN

In Figure 4-16, the two-Switch Node CSS can have one to seven inter-SN fiber optic links to support up to 22 maximum PNs. The following numbers of links are used with the associated maximum number of PNs:

- One to five links support 22 Port Networks
 - Six links support 20 Port Networks
 - Seven links support 18 Port Networks
-

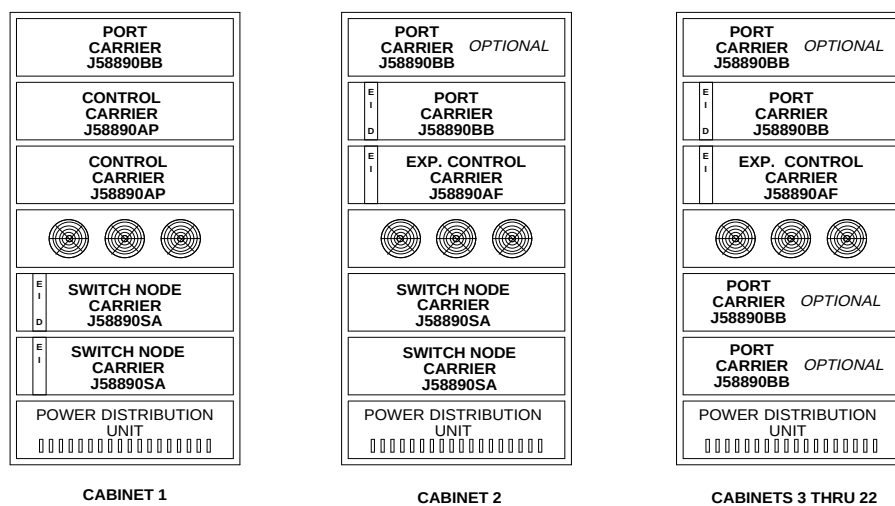


Figure 4-16. Critical Reliability, CSS-Connected G3r — Two SNs

This chapter describes the system cabling in the following order:

- “Types of Cabling”
- “Cabling Between Carriers in Multi-Carrier Cabinets”
- “Cabling Between Carriers in Multi-Carrier Cabinets”
- “Cabling Between Single-Carrier Cabinets”
- “Cabling Between Single-Carrier and Multi-Carrier Cabinets”
- “Cabling to On- and Off-Premises Systems”

All cabling between carriers and cabinets is connected to the backplanes and rear panels.

The descriptions and illustrations provided in this document are for reference purposes only. Detailed procedures used to connect cables between cabinets during installation are given in *DEFINITY® Communications System Generic 1 and Generic 3 Installation and Test*, 555-230-104.

Types of Cabling

Two types of cabling are used in the system:

- Metallic: traditional copper cable
- Fiber Optic: glass cable that transports light

Metallic Cabling

Metallic cabling is used within Multi-Carrier Cabinets and Single-Carrier Cabinets to connect the Time Division Multiplexing (TDM) bus and packet bus (also called "LAN bus") between carriers. Metallic cabling is also used to distribute AC and DC power to the carriers in Multi-Carrier Cabinets, and intraconnect carriers, such as duplicated control carriers.

Fiber Optic Cabling

Fiber optic cabling interconnects a Multi-Carrier Cabinet to another Multi-Carrier Cabinet, a Single-Carrier Cabinet to a Multi-Carrier Cabinet, and a Single-Carrier Cabinet to another Single-Carrier Cabinet.

Figure 5-1 shows a directly connected three-PN standard reliability system. Fiber optic cabling is connected from the PPN cabinet to both EPN cabinets and from one EPN cabinet to the other EPN cabinet.

In directly connected, critical reliability systems, fiber optic cabling is duplicated between the PPN and each EPN. Fiber optic cabling is also doubled between EPNs. One of the doubled fiber optic links is active while the other link is in standby.

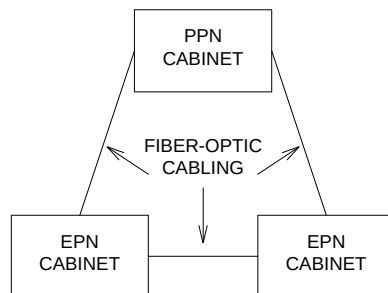


Figure 5-1. Fiber Optic Cabling in a Directly Connected System

In a Center Stage Switch (CSS)-connected standard reliability system, shown in Figure 5-2, fiber optic cabling is connected from the PPN to the CSS and from the CSS to the EPNs.

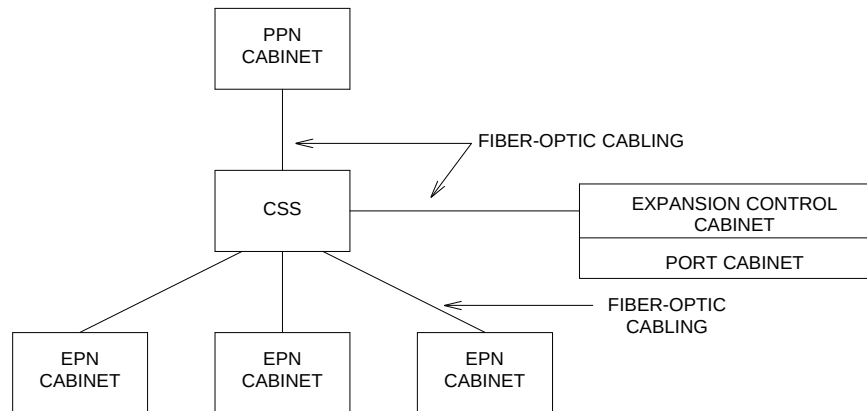


Figure 5-2. Fiber Optic Cabling in a CSS-Connected System

In CSS-connected, critical reliability systems, one fiber optic cable is connected from the PPN to the CSS, and one fiber optic cable is connected from the PPN to the duplicate CSS.

The TDM/LAN bus for the PPN in a critical reliability system is extended into the CSS and duplicate CSS, allowing the Expansion Interface (EI) circuit packs for the PPN to be installed in the Switch Node (SN) carriers. In this case, both ends of the fiber optic cable from the PPN to the CSS terminate in the same SN carrier.

Each one of the EPNs has one fiber optic cable connected to the CSS and another fiber optic cable connected to the duplicate CSS. Only one of the fiber optic links is active between the PPN and a CSS and between an EPN and a CSS, while the other link is in standby. Depending on the cabinet configuration, the following carriers in each cabinet can be interconnected by fiber optic cabling:

- Port
- Expansion Control
- Switch Node

Figure 5-3 shows an example of fiber optic cabling between carriers in separate cabinets. Using transceivers and interface circuit packs, each cable connects through one cabinet's TDM bus and packet bus to that in another cabinet.

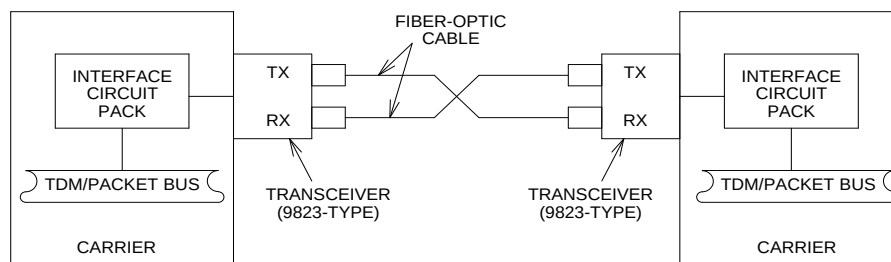


Figure 5-3. Example of Fiber Optic Cabling Between Cabinets

Cabinet Interconnections

Several methods are used to interconnect cabinets in a system. One method is to route a cable from each interface circuit pack to each port slot connector. Another method is to use fiber optic cable connected to lightwave transceivers. The transceivers can transmit light up to 4,900 feet (1.5 km) or 25,000 feet (7.6 km), respectively. Each transceiver is connected to a port slot connector in a carrier. The transceivers convert light signals to electric signals and vice-versa. The transmit (TX) output on one transceiver is connected to the receive (RX) input on the other transceiver (via the fiber optic cable) to allow full duplex (simultaneous bidirectional) transmission. Two separate 62.5-micron diameter fiber optic cables surrounded by a sheath compose the overall cable.

A third method to interconnect cabinets is to use Expansion Interface (EI) circuit packs that include the TN776 EI circuit pack in port and expansion control carriers in G3i, the TN570 EI circuit pack in port and expansion control carriers in G3i and G3r, and the TN573 Switch Node Interface (SNI) circuit pack in an SN carrier in G3r. The first EI in a carrier is always inserted in the port slot labeled EXPN INTFC. If a second EI is required, it is always inserted in the port slot (also labeled EXPN INTFC) adjacent to the first EI. In a G3r, according to a loading sequence, TN573 SNI circuit packs are inserted in slots labeled SWITCH NODE INTERFACE in an SN carrier.

Cabling Between Carriers in Multi-Carrier Cabinets

This section covers the following cabling:

- Cabinet Harness Cabling
- Control Carrier Cabling
- Switch Node (SN) Carrier Cabling
- Digital Signal Level-1 (DS1) Cabling
- TDM and Packet Bus (TDM/LAN) Cabling



NOTE:

The “LAN” portion of TDM/LAN bus cabling described in this section refers to the “packet bus.”

TDM/LAN Bus Cabling (Except G3r)



NOTE:

For G3r cabling, proceed to page 5-7.

TDM/LAN extension cables connect the carriers in each Multi-Carrier Cabinet. These cables are flat ribbon cables attached to connectors labeled TDM/LAN on each carrier backplane. See Figure 5-4 for a typical TDM/LAN bus cable installation. Note the cables are “daisy-chained” between the cabinets.

Each cable length is 15 feet (4.6m) across five carriers in a cabinet. The cable connected across the fans between the carrier in position “A” and the carrier in position “D” is longer than the other cables.

Each end of the TDM/LAN bus cable is terminated on a carrier backplane by a TDM/LAN bus terminator installed in a TDM/LAN connector. See Figure 5-4. Note the terminator is in the upper left in the top carrier and in the lower right in the bottom carrier. If a carrier is *not* in place, such as a port carrier in position “E” for example, the terminator is installed in the previous carrier (port carrier in position “D”).

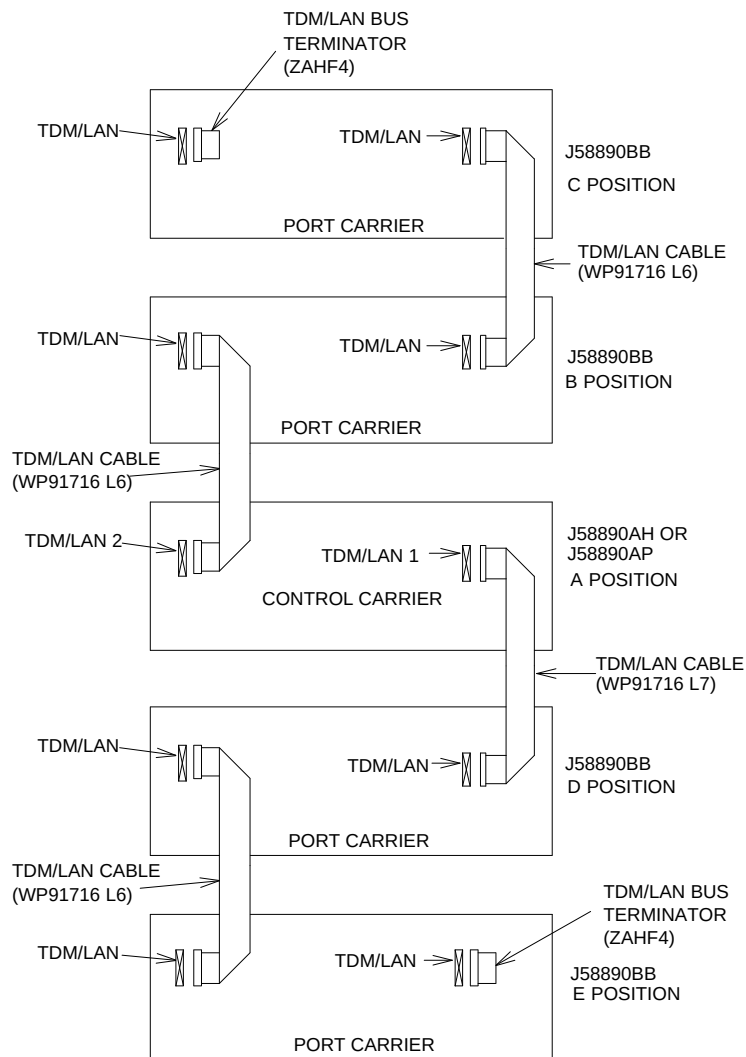


Figure 5-4. TDM/LAN Bus Cabling — Rear of Multi-Carrier Cabinet

TDM/LAN Bus Cabling (G3r)

TDM/LAN cabling is identical across carriers in PPN and EPN cabinets in all systems except CSS-connected systems. See Figure 5-5.

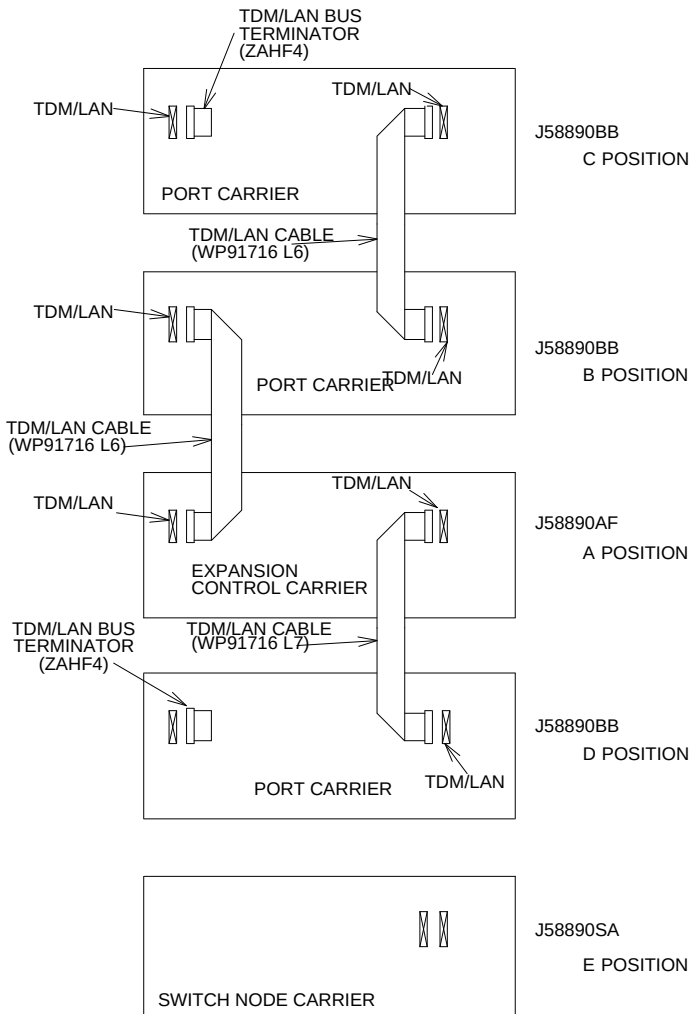


Figure 5-5. TDM/LAN Bus Cabling — Rear of EPN Cabinet with High Reliability CSS-Connected Multi-Carrier Cabinet (G3r)

Refer to Figure 5-6 through Figure 5-8 for typical TDM/LAN bus cabling and terminator installation in G3r Multi-Carrier Cabinet installations.

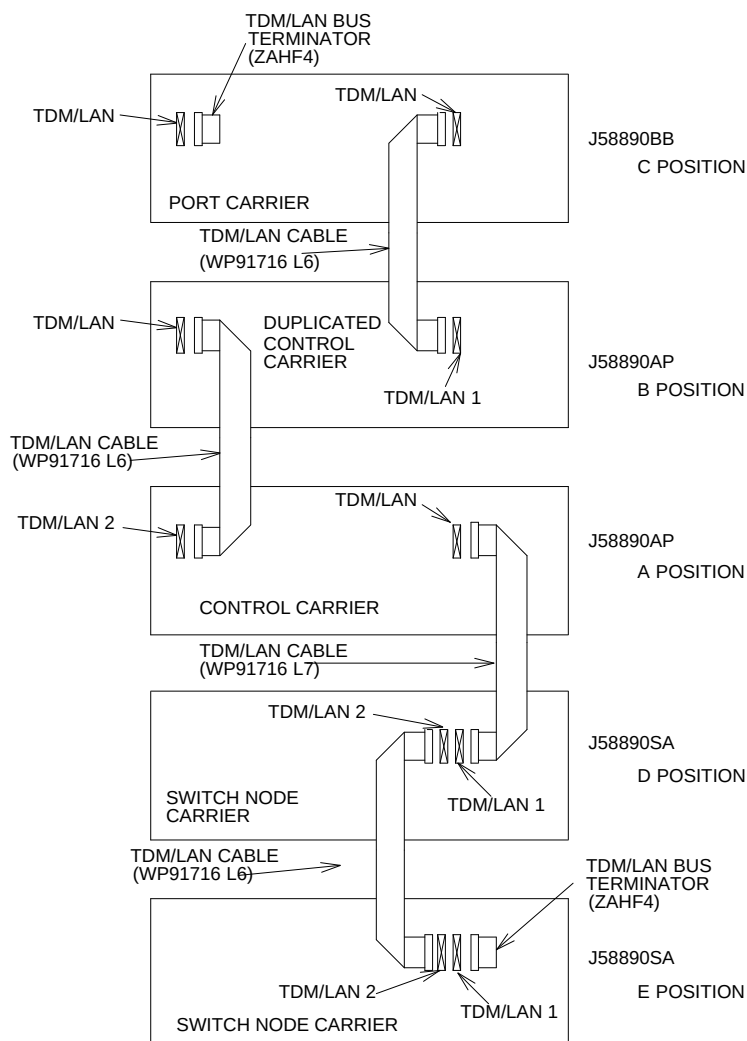


Figure 5-6. TDM/LAN Bus Cabling — Rear of PPN Cabinet in Critical Reliability, CSS-Connected Multi-Carrier Cabinet (G3r)

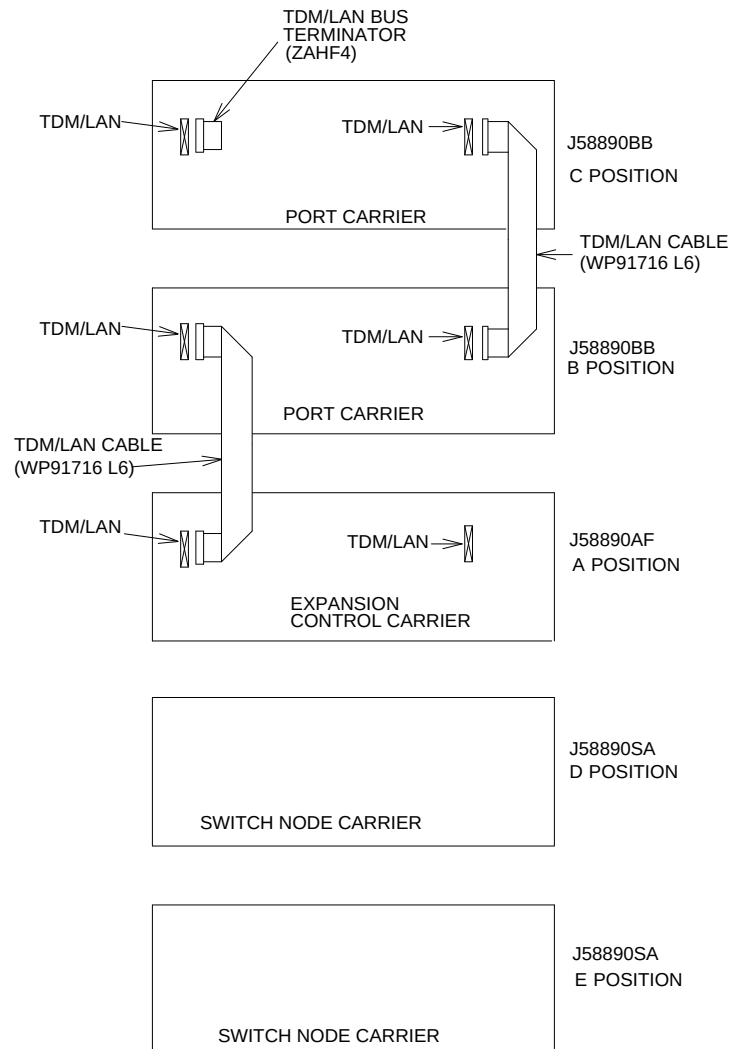


Figure 5-7. TDM/LAN Bus Cabling — Rear of EPN Cabinet in Critical Reliability, CSS-Connected Multi-Carrier Cabinet (G3r)

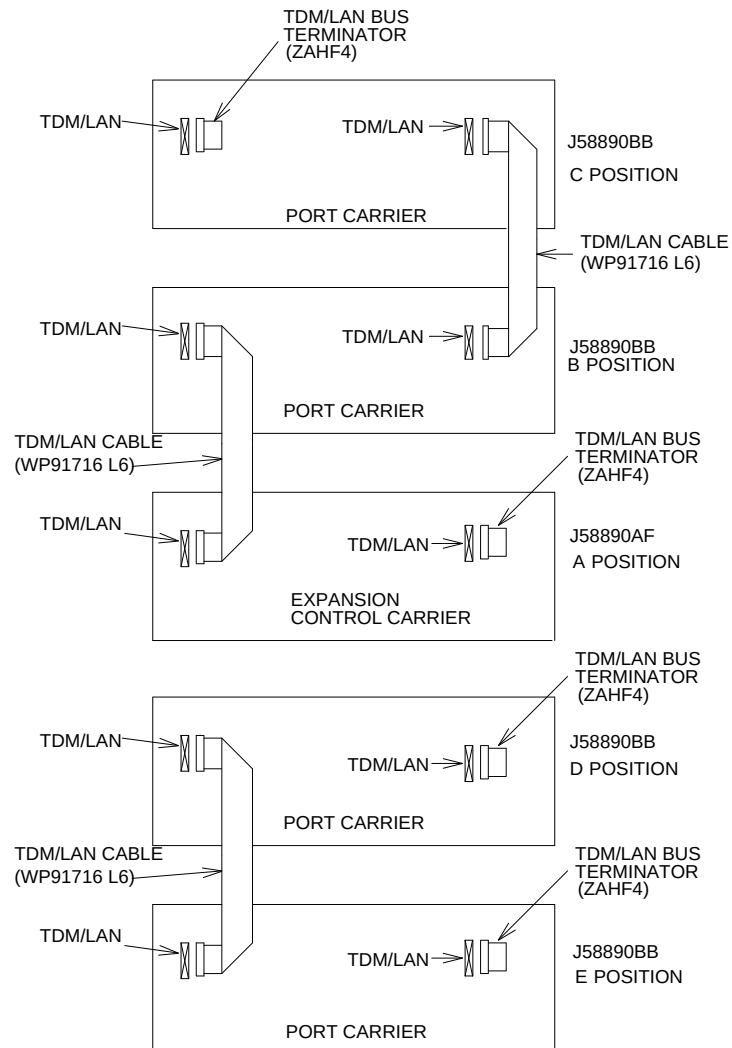


Figure 5-8. TDM/LAN Bus Cabling — Rear of Two-PN EPN Cabinet in a Multi-Carrier Cabinet (G3r)

Cabinet Harness

The cabinet harness shown in Figure 5-9 runs vertically on the right rear side of each cabinet. The lower end of the harness is connected to the P2 connector on the power distribution unit in the bottom of the cabinet. Branch cables run from the harness to the P1 connector on each carrier located in the “A” through “E” carrier positions.

A branch cable also runs from the harness to the processor carrier in the PPN cabinet and expansion control carrier in an EPN cabinet. Branch cables provide the following electrical functions to each cabinet carrier: carrier identification (addressing), cabinet alarms, power distribution control signals, and power supply control signals.

The branch cables provide the circuit ground connection from the “A” carrier position to the cabinet ground block in the bottom of the cabinet. The cables also provide -48 VDC to the fan unit to operate the fans, and +5 VDC to the fan unit to power the speed control and alarm circuit in each fan.

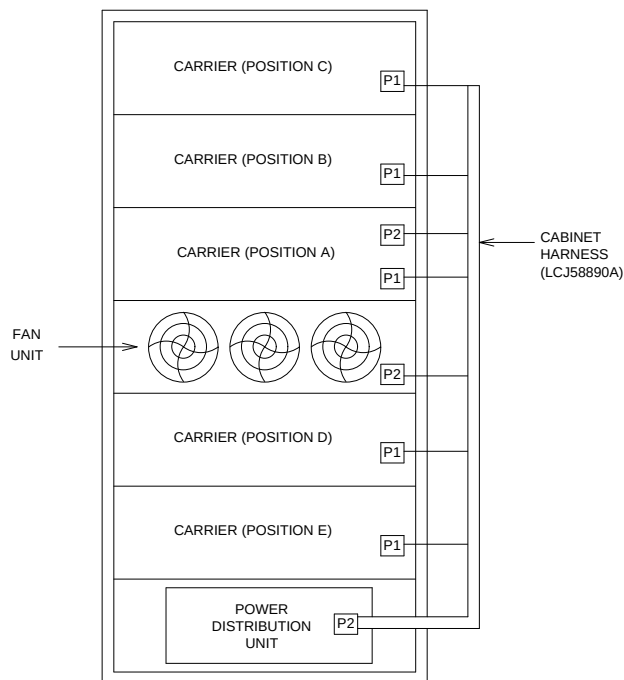


Figure 5-9. Cabinet Harness and Branch Cabling — Rear

Control Carrier Cabling in G3i

The following connectors are on the backplane of a control carrier:

- ICCA and ICCB connectors for the shadowing and data control leads between the control carrier and the duplicated control carrier
- Cabinet harness connector to allow connection to the ring generator and to the environmental and power supply signals
- -48 VDC connector for the fans

The following connectors are on the backplane of a duplicated control carrier:

- ICCA and ICCB connectors for the shadowing and data control leads between the duplicated control carrier and the control carrier
- Cabinet harness connector to allow connection to the ring generator and to the environmental and power supply signals

Figure 5-10 shows the control carrier and duplicated control carrier Intercabinet Cables A and B (ICCA and ICCB).

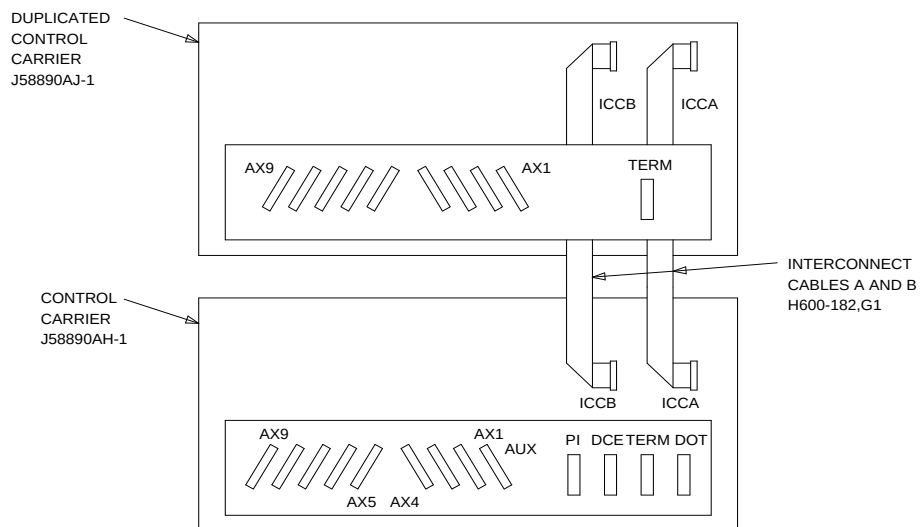


Figure 5-10. Control Carrier Backplane Interconnections in G3i

Control Carrier Cabling in G3r

Figure 5-11 shows the control carrier cabling in the PPN cabinet of a high reliability and critical reliability G3r and the PPN cabinet of a standard reliability G3r. The following Intercabinet Cables (ICCs) are connected between the backplane of control carrier "A" and the backplane of control carrier "B" in high reliability and critical reliability systems:

- ICCA connects -48 VDC, +5 VDC, and -5 VDC to either control carrier when DC power fails in the other control carrier
- ICCB connects all signals from the AUX connector and the TERMINAL connectors on the rear panel to control carrier "B" when control carrier "A" fails
- ICCD carries memory bus signals and data bus signals between the UN330B Duplication Interface circuit pack in control carrier "A" and the UN330B in control carrier "B" to allow the inactive processor to shadow the active processor

In a standard reliability G3r only, ICCB is connected between control carrier "A" and port carrier "B" to duplicate the power.

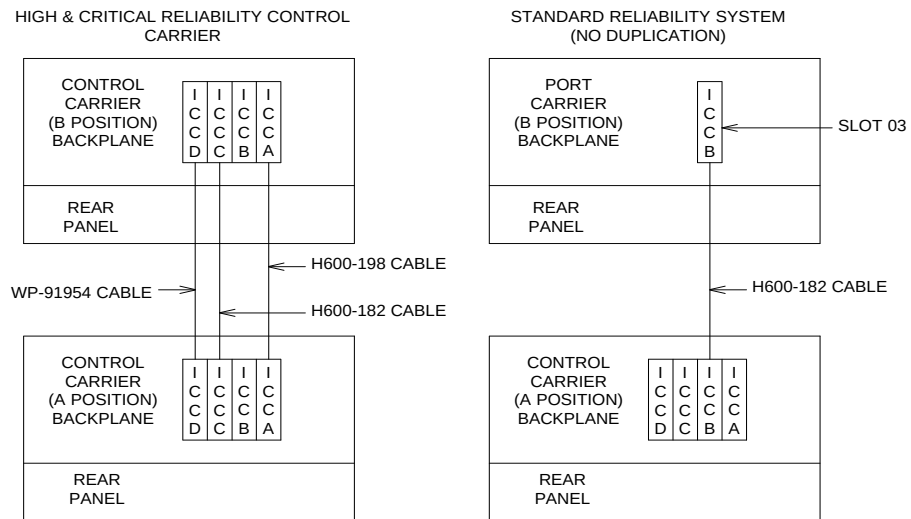


Figure 5-11. Control Carrier Backplane Interconnections (G3r)

Switch Node Carrier Cabling in G3r

In a CSS-connected G3r with one or two Switch Node (SN) carriers, the following shielded metallic cables (replaces fiber optic cabling) are used:

- Intraconnecting cable connects a TN570 EI circuit pack in Slot 1 of the SN carrier to a TN573 Switch Node Interface circuit pack in Slot 2 of the same carrier. The cable length is 13 inches (39cm).
- Cable connects a TN753 in Slot 2 of an SN carrier to a TN570 in Slot 2 of a port carrier in the same cabinet. The cable length is 5.5 feet (1.7m).

DS1 Remoting in G3r

DS1 remoting provides connectivity between two PNs to extend the distance beyond the 25,000-foot (7.6 km) limit of fiber optic cable. DS1 remoting can be used between two PNs up to 100 circuit miles (161 km) apart. DS1 remoting uses a dedicated DS1 circuit and proprietary non-truth-type signaling. DS1 remoting hardware is used in the CSS and in directly connected systems. A maximum of 20 EPNs can be connected to the PPN via DS1 remoting.

Standard metallic T1 transmission line cabling is assumed to exist between the PNs. This type of cabling produces a 2 ms echo delay across 100 circuit miles (worst case). Other transmission media, such as fiber optics, have less than a 2 ms delay across 100 miles. However, the 100-circuit mile limit is specified. As an example, suppose two EPNs use DS1, and one EPN is 75 circuit miles from the CSS. The other EPN can be a maximum of 25 circuit miles away from the CSS. A maximum of 20 EPNs can be connected remotely via DS1 to the PPN cabinet and EPN cabinet 2. This is because cabinet 2 contains one or two SN carriers that must be connected by fiber optic cable to the PPN cabinet.

A TN574 DS1 Converter (DS1C) circuit pack is used with the cabling. DS1C protection switching requires that any of the four DS1 facilities be capable of carrying wide-band packet data, circuit-switched data, or voice at any given time. The DS1C can reside in the port carrier (slot 3 to slot 20), the SN carrier (slot 1 or slot 21), and the expansion control carrier (port Slots 2 through 19).

Cabling on a Carrier for DS1C

As shown in a CSS-connected G3r in Figure 5-12, cabling on a carrier connects a DS1C to an appropriate EI or SNI and also provides a second connector to connect it to a public network. The DS1C to EI/SNI cable is a shielded cable held in place at the EI/SNI port connector by a 4B retainer and at the DS1C port connector by a 4C retainer. Table 5-1 lists the DS1 cables on a carrier.

Table 5-1. TN574 DS1 Cable Lengths on a Carrier

Connection Type	Length	Comcode Number
On same carrier	1 foot (.305 meters)	846448637
Between two carriers in same cabinet	5.5 feet (1.7 meters)	846448645
Between two adjacent cabinets	1 foot (.305 meters), used with two fiber optic transceivers, and one 20-foot (6.1 meters) fiber optic cable	846448652 and 1 846885259 bracket

Cabling to a Public Network for DS1C

Figure 5-12 shows cabling and the network between the remote PNs in a directly connected or CSS-connected G3r. TN574 DS1C circuit packs are plugged into the expansion control carrier in the EPN cabinet and into an SN carrier in the PPN cabinet. This connection is capable of maintaining timing (synchronism) from the PPN DS1 facility to the EPN DS1 facility.

A cable is connected from each DS1C port to a Channel Service Unit (CSU). The CSU is connected to a wall field, providing from one to four DS1 connections. The cable is plugged into the cable connected to the DS1C port connector. The other end of the cable has four 15-pin subminiature D-type connectors that plug into up to four CSUs. The PNs communicate across dedicated DS1 facilities in the public network between the wall fields.

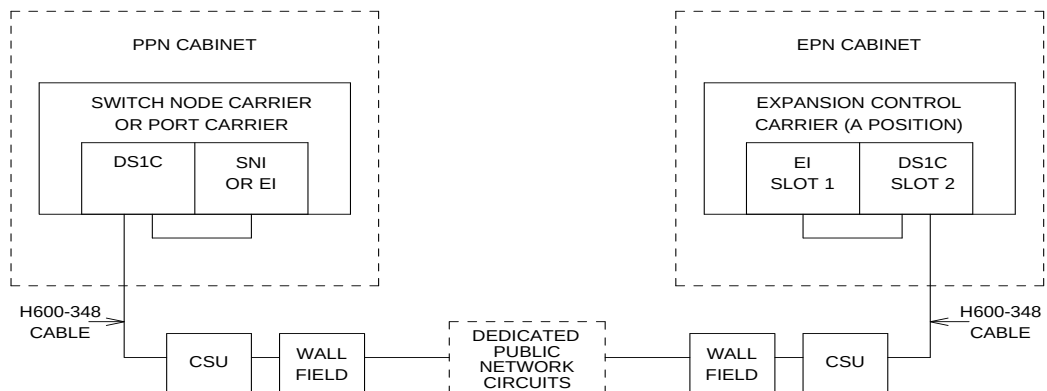


Figure 5-12. DS1 Connectivity Between Remote PNs (G3r)

Cabling Between Multi-Carrier Cabinets

Table 5-2 lists the figures showing fiber optic cabling between cabinets in different configurations. Included in the figures are carrier positions, types of carriers, and EI circuit pack port slots used to terminate cabling between cabinets. Intracabinet cabling in the figures listed in Table 5-2 is metallic.

Table 5-2. Fiber Optic Cabling Between Multi-Carrier Cabinets

Fiber Optic Cabling In:	See Figure
Standard reliability directly connected system	Figure 5-13, Figure 5-14
High reliability directly connected G3r	Figure 5-15, Figure 5-16
Critical reliability, directly connected systems	Figure 5-17, Figure 5-18
Two-port network cabinet G3r	Figure 5-19
Standard reliability DS1C remote directly connected G3r	Figure 5-20, Figure 5-21
Standard reliability CSS-connected G3r with one SN	Figure 5-22
Standard reliability CSS-connected G3r with two SNs	Figure 5-23, Figure 5-24
High reliability CSS-connected G3r with one SN	Figure 5-25
High reliability CSS-connected G3r with two SNs	Figure 5-26, Figure 5-27
Critical reliability CSS-connected G3r with one SN	Figure 5-28
Critical reliability CSS-connected G3r with two SNs	Figure 5-29, Figure 5-30
CSS-connected G3r with a two-PN cabinet	Figure 5-31
DS1C remote CSS-connected G3r	Figure 5-32

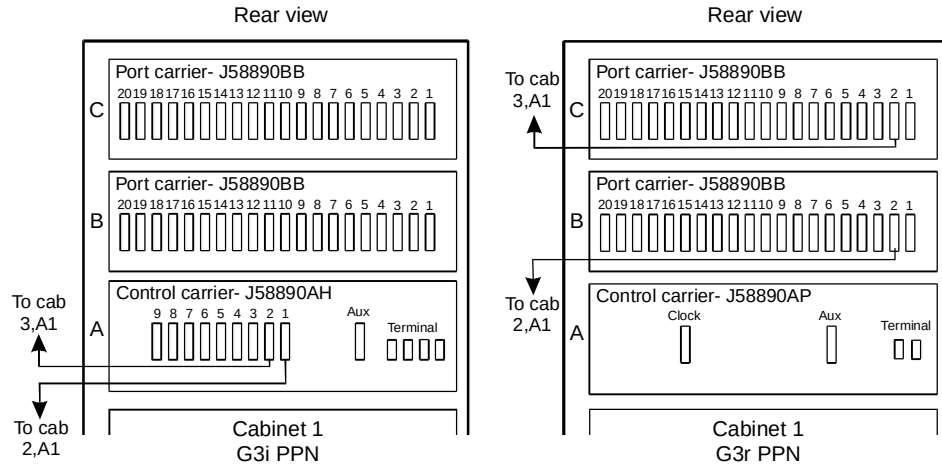


Figure 5-13. Fiber Optic Cabling — Standard Reliability Directly Connected (Part 1)

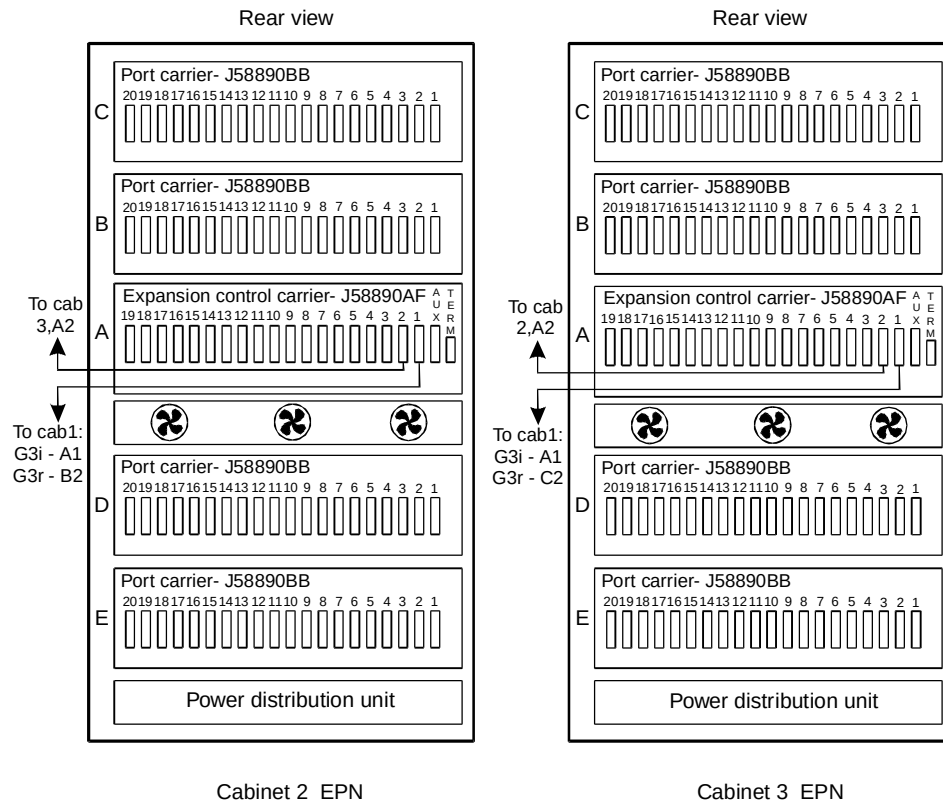


Figure 5-14. Fiber Optic Cabling — Standard Reliability Directly Connected (Part 2)

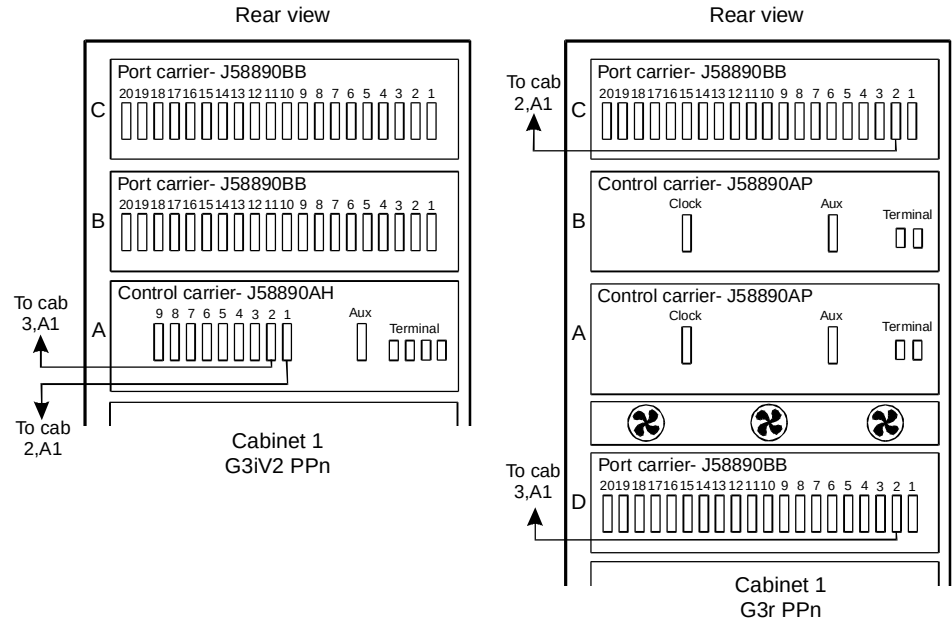


Figure 5-15. Fiber Optic Cabling — High Reliability, Directly Connected G3r (Part 1)



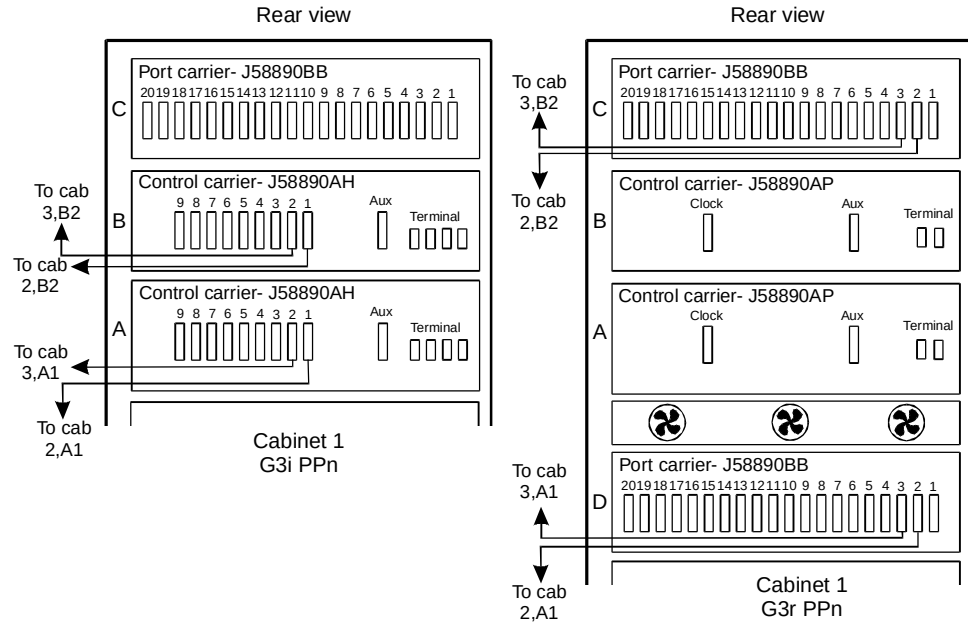


Figure 5-17. Fiber Optic Cabling — Critical Reliability, Directly Connected (Part 1)

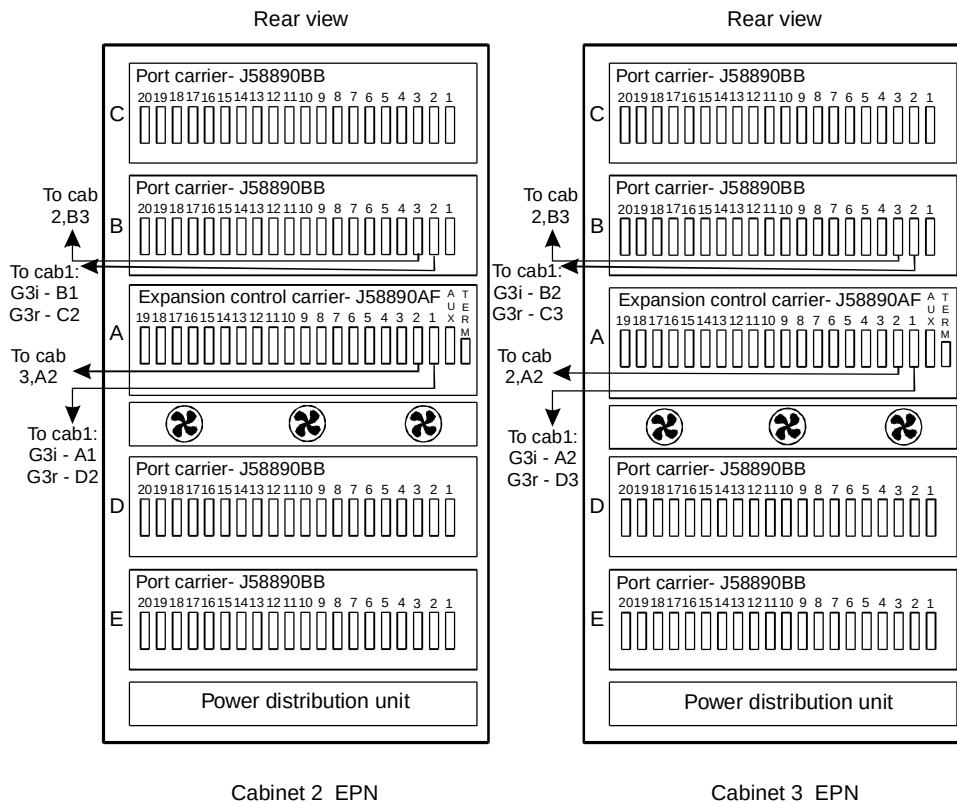


Figure 5-18. Fiber Optic Cabling — Critical Reliability, Directly Connected (Part 2)

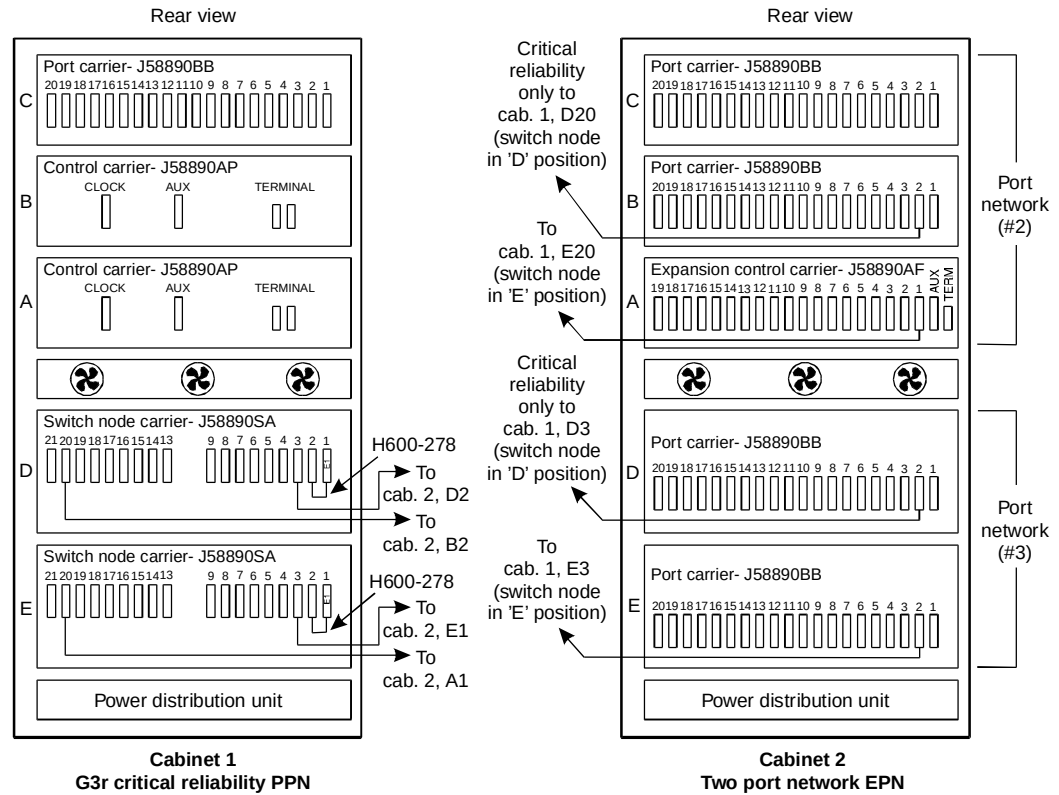


Figure 5-19. Fiber Optic Cabling — Two-Port Network Cabinet

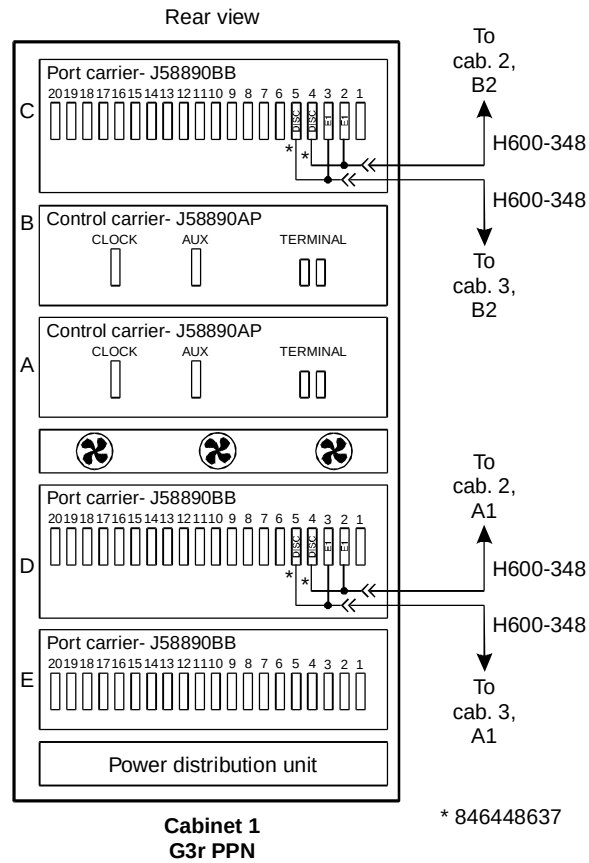


Figure 5-20. Fiber Optic Cabling — Standard Reliability DS1C Remote Directly Connected G3r (Part 1)

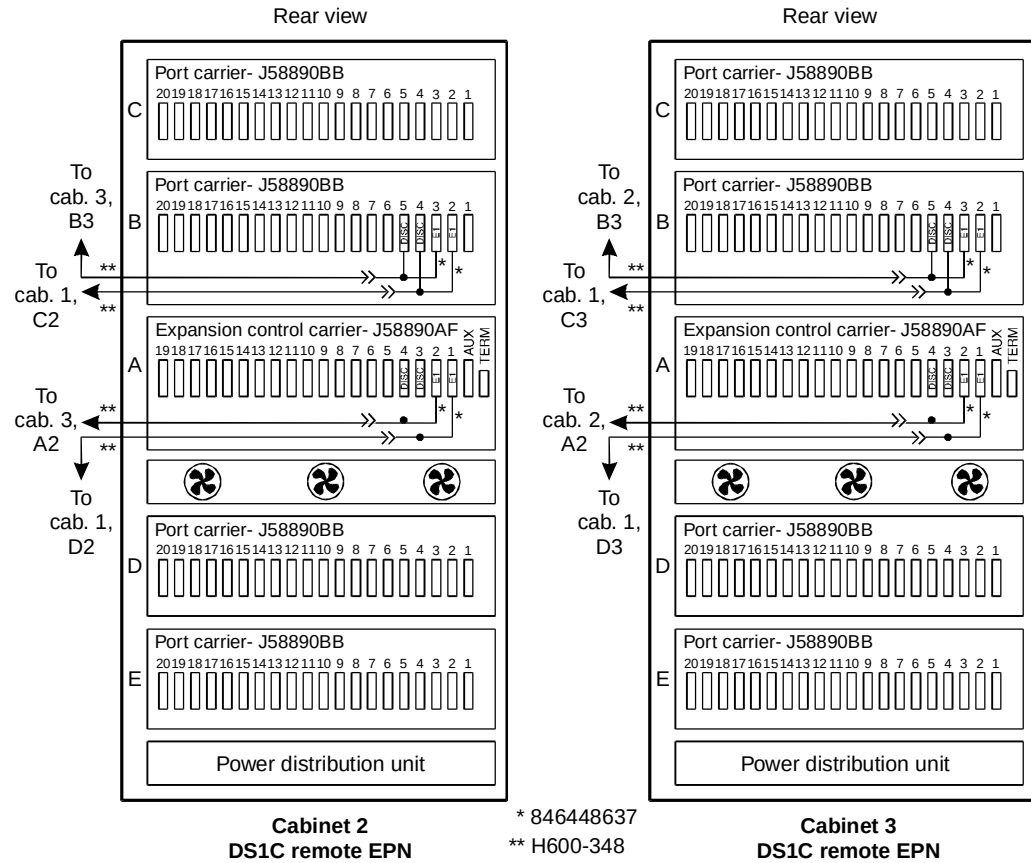


Figure 5-21. Fiber Optic Cabling — Standard Reliability DS1C Remote Directly Connected G3r (Part 2)

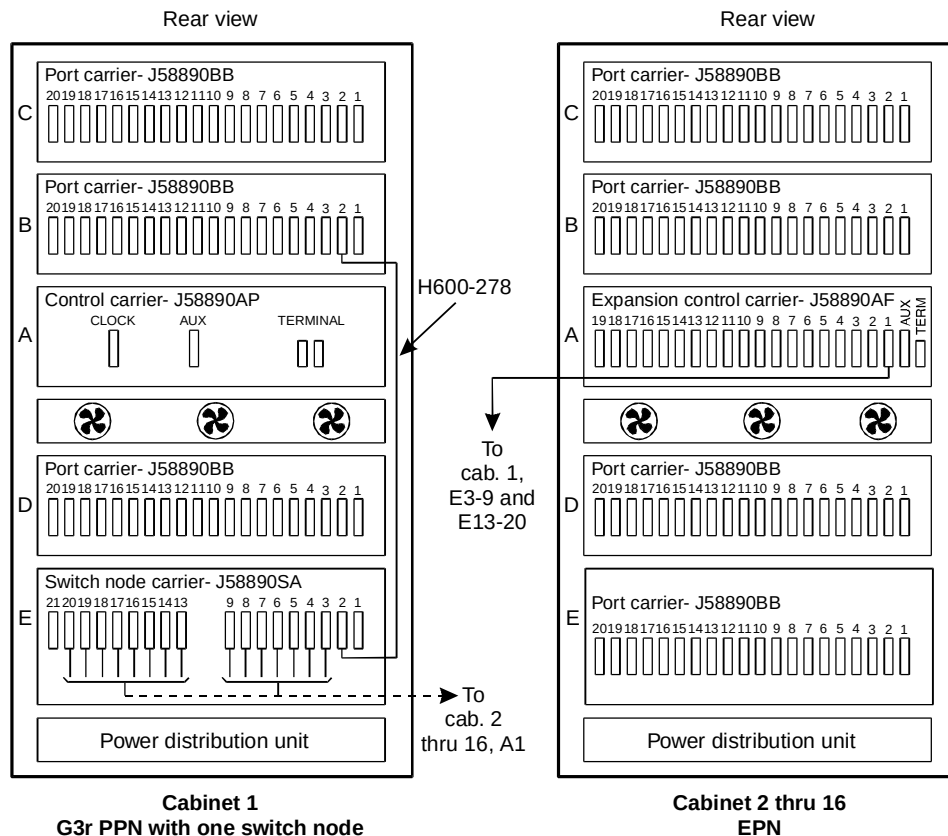


Figure 5-22. Fiber Optic Cabling — Standard Reliability CSS-Connected G3r with One SN

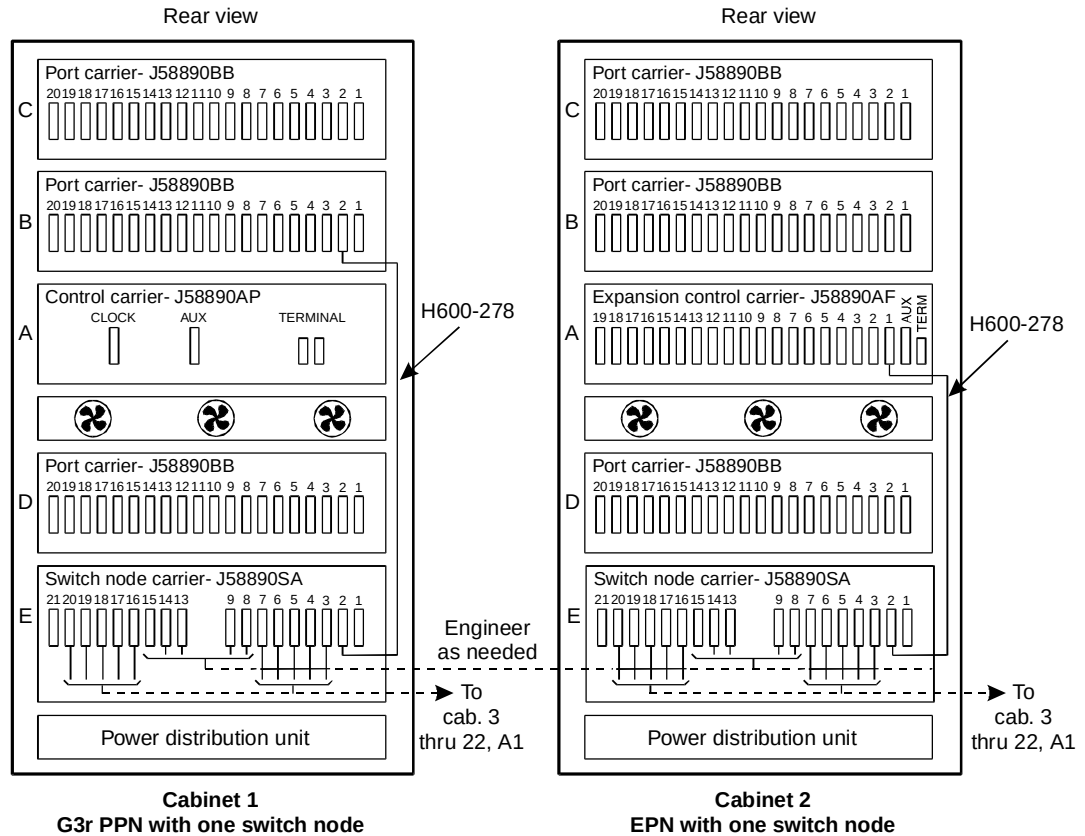


Figure 5-23. Fiber Optic Cabling — Standard Reliability CSS-Connected G3r with Two SNs (Part 1)

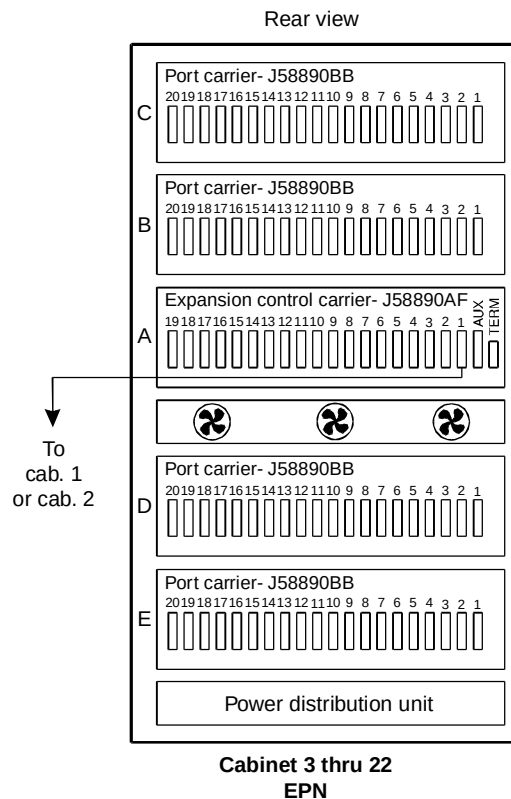


Figure 5-24. Fiber Optic Cabling — Standard Reliability CSS-Connected G3r with Two SNs (Part 2)

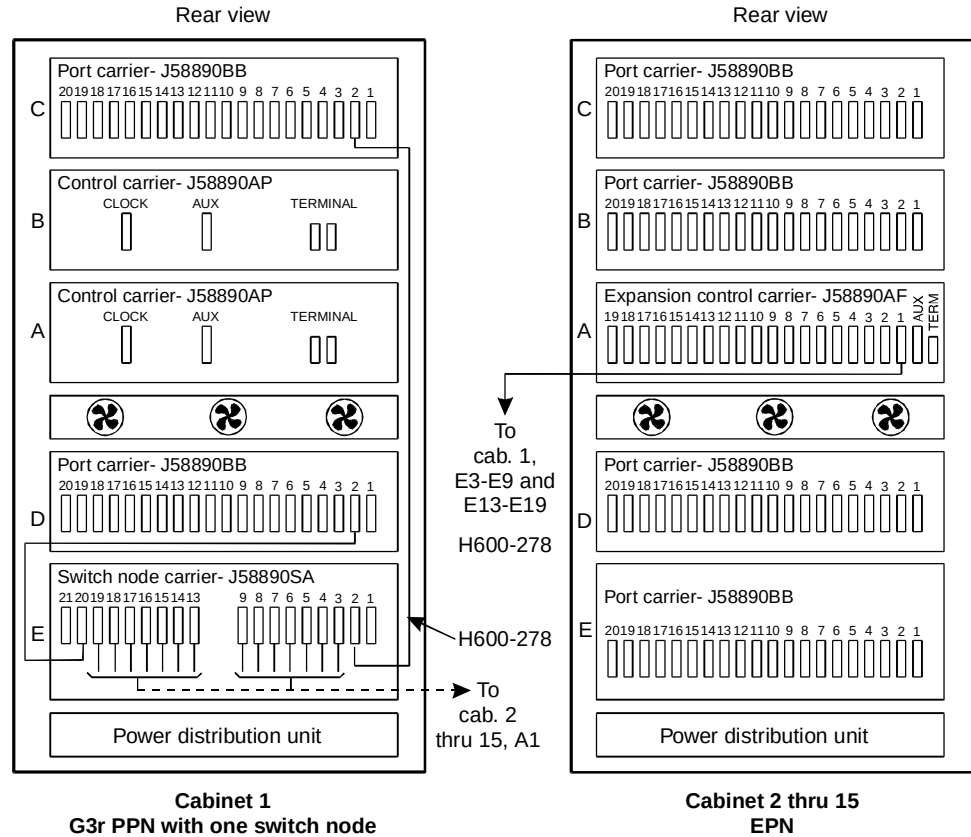


Figure 5-25. Fiber Optic Cabling — High Reliability CSS-Connected G3r with One SN

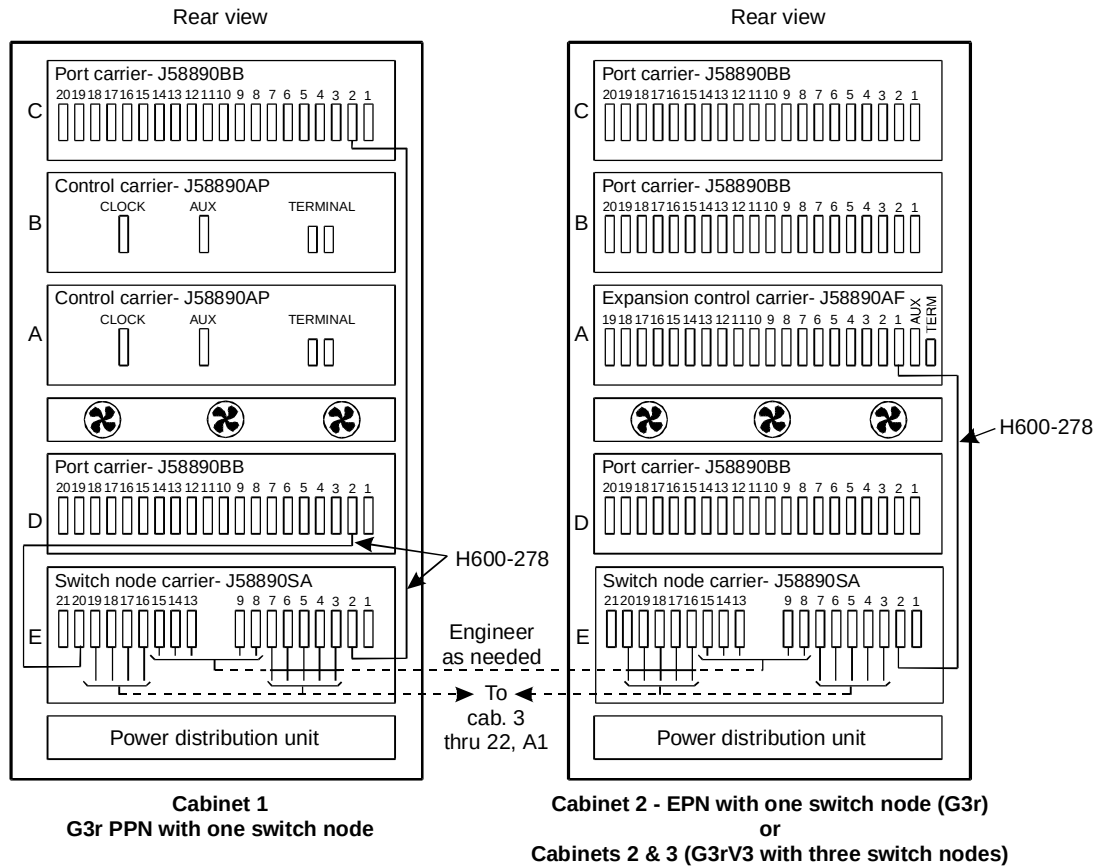


Figure 5-26. Fiber Optic Cabling — High Reliability CSS-Connected G3r with Two SNs (Part 1)

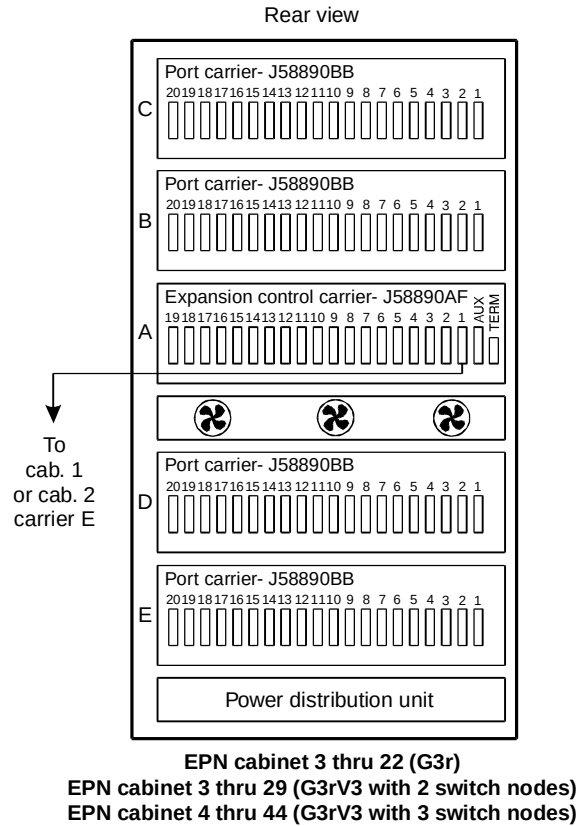


Figure 5-27. Fiber Optic Cabling — High Reliability CSS-Connected G3r with Two SNs (Part 2)

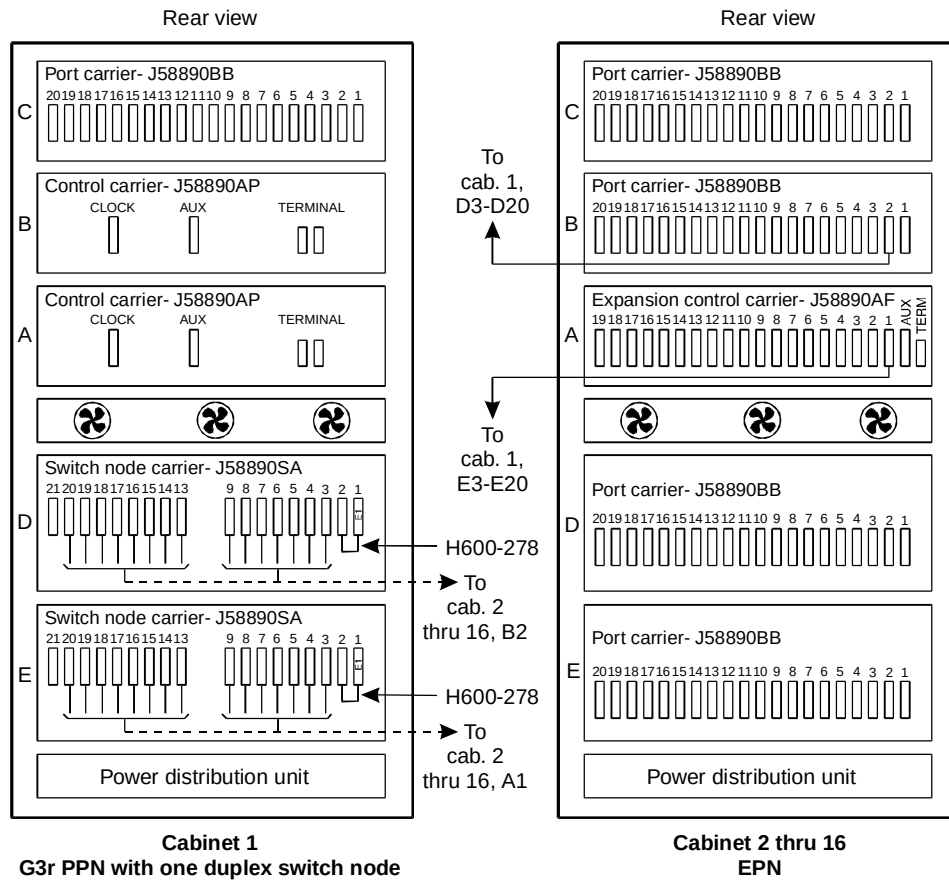


Figure 5-28. Fiber Optic Cabling — Critical Reliability CSS-Connected G3r with One SN

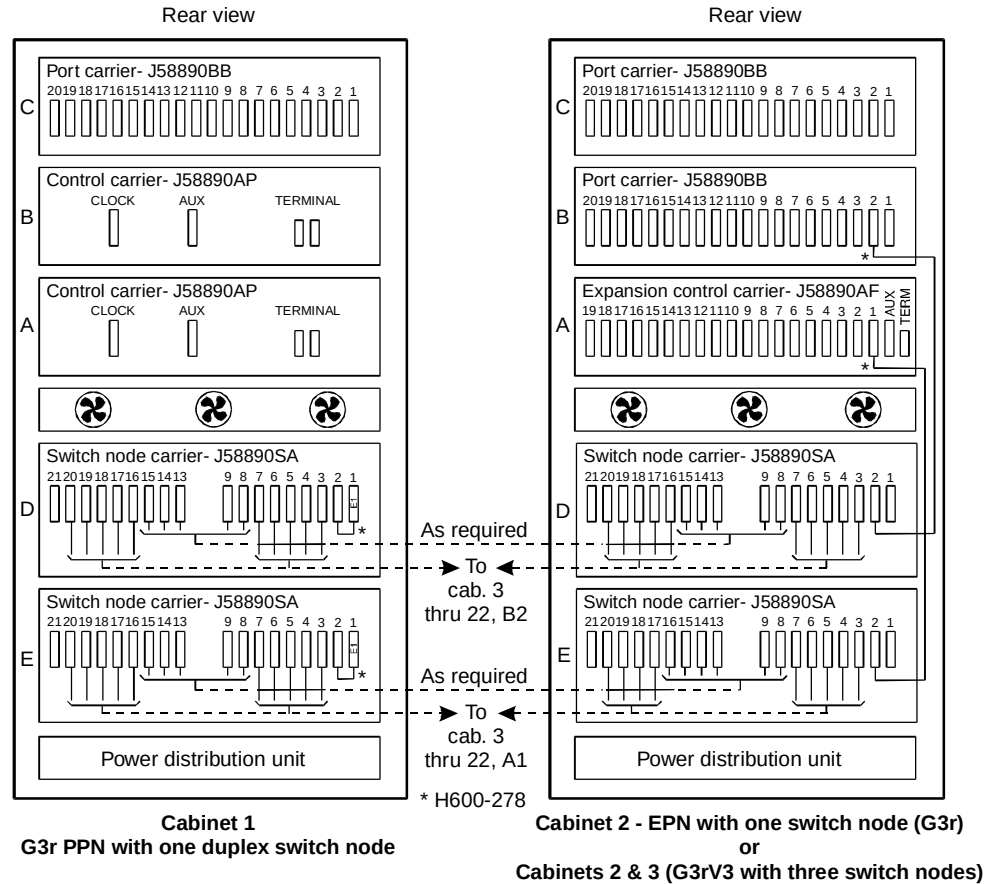


Figure 5-29. Fiber Optic Cabling — Critical Reliability CSS-Connected G3r with Two SNs

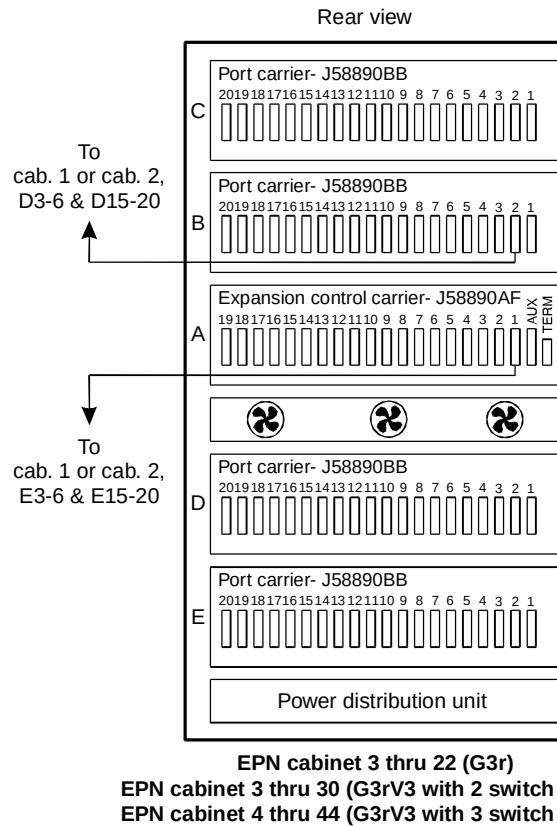


**Figure 5-30. Fiber Optic Cabling — Critical Reliability CSS-
 Connected G3r with Two SNs**

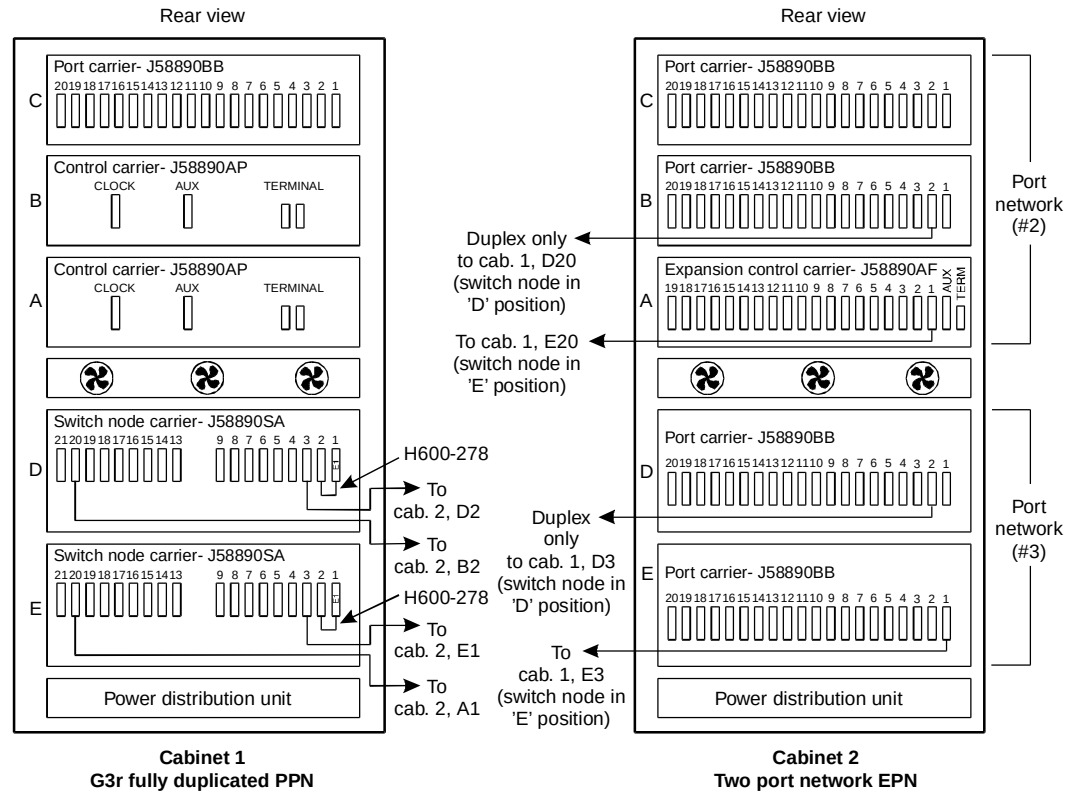


Figure 5-31. Fiber Optic Cabling — CSS-Connected G3r with a Two-PN Cabinet

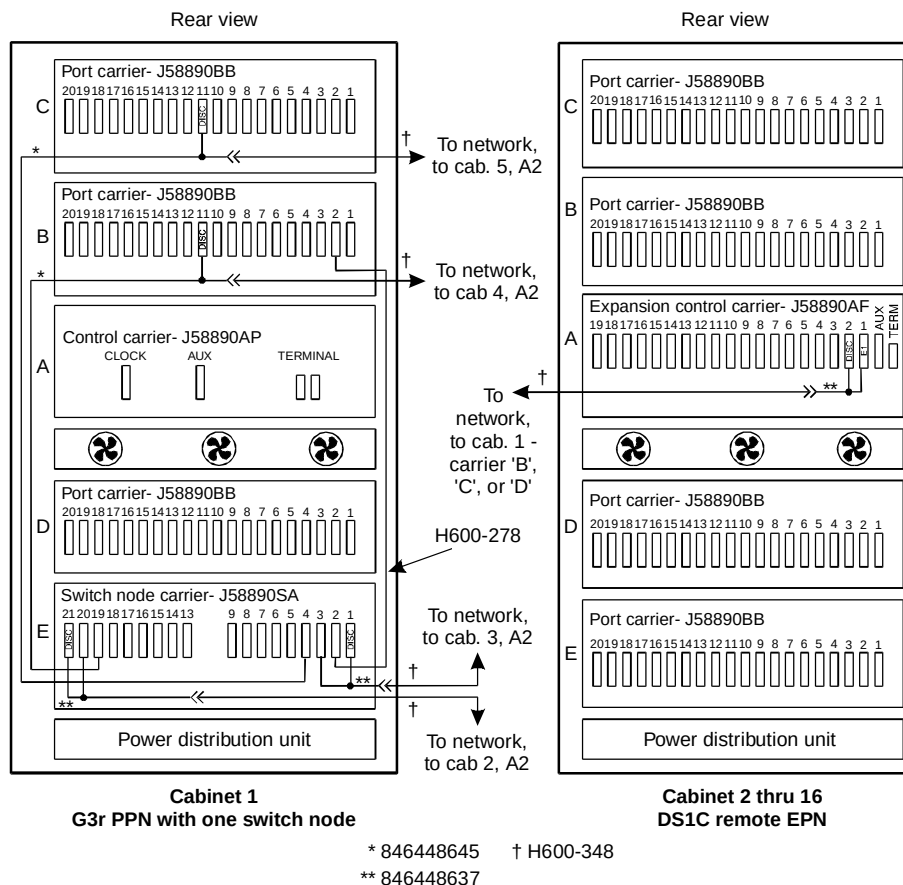


Figure 5-32. Fiber Optic Cabling — DS1C Remote CSS-Connected G3r

Figure Notes:

1. In a standard reliability PPN, the first two DS1 remote EPN links are placed in the "E" position SN carrier (Slots 1 and 21). A cable connects the SNI circuit pack to the DS1C. A cable is used from the DS1C slot to the network DS1 facilities (through a CSU).
2. For more than two DS1 remote EPNs, the third through fifteenth remote EPNs require placement of the DS1C in the port carrier of the same cabinet (in port carriers "B", "C", or "D"). Recommendations are 1E Slots 4-9 to port carrier "C" and 1E Slots 13-19 to port carrier "B" for separate power failure groups. If PPN port carrier "C" and "D" are not provided, place the DS1Cs in "B." Recommended placement order is 11, 10, 12, 9, 12, 8, etc.

3. For standard reliability systems requiring two switch nodes, the second SN is located in EPN cabinet 2, carrier "E." For the first two DS1C remote EPNs from this second SN, a DS1C can be located in the SN carrier Slots 1 and 21. Beyond this, the DS1Cs are placed in the second SN cabinet carrier "A", "B", "C", or "D" (as in the PPN shown). Recommended order of placement is 11, 10, 12, 9, 13, 8, etc. Recommendations are 2E Slots 4-9 to carrier "B" and 2E Slots 13-19 to carrier "A" for separate power failure groups.
4. In systems with a mixture of DS1 remote cabinets and fiber connections, only use the 846448645 cable in a port carrier. The 846448673 cable can be used between Switch Node carrier Slot 1 and Slots 2-9 or Slot 21 and Slots 13-20 as needed for the first two SNs, respectively.
5. Single-Carrier Cabinets can be used as DS1 remote EPNs using connections to the same slot as shown here.
6. Two port Multi-Carrier Cabinets can also be used as a DS1 remote cabinet. Place DS1C in upper PN (carriers "A", "B", and "C"). Place DS1C in lower PN (carriers "E" and "D") in Slot E3 and use the appropriate cables as needed.

Cabling Between Single-Carrier Cabinets

This section covers the TDM/LAN bus cabling and the expansion control cabinet to port cabinet cabling.

TDM/LAN Bus Cabling

TDM/LAN extension cables connect the carriers in each cabinet. These are flat ribbon cables going to connectors labeled TDM/LAN on each cabinet backplane. The cable length is 25 feet (7.6m) through four stacked cabinets.

Each end of the TDM/LAN bus running across the cabinets is terminated on a cabinet backplane by a TDM/LAN bus terminator installed in Slot 01 of the bottom expansion control cabinet and in Slot 17 of the top port cabinet.

Figure 5-33 through Figure 5-35 show how the TDM/LAN bus is connected between Single-Carrier Cabinets.

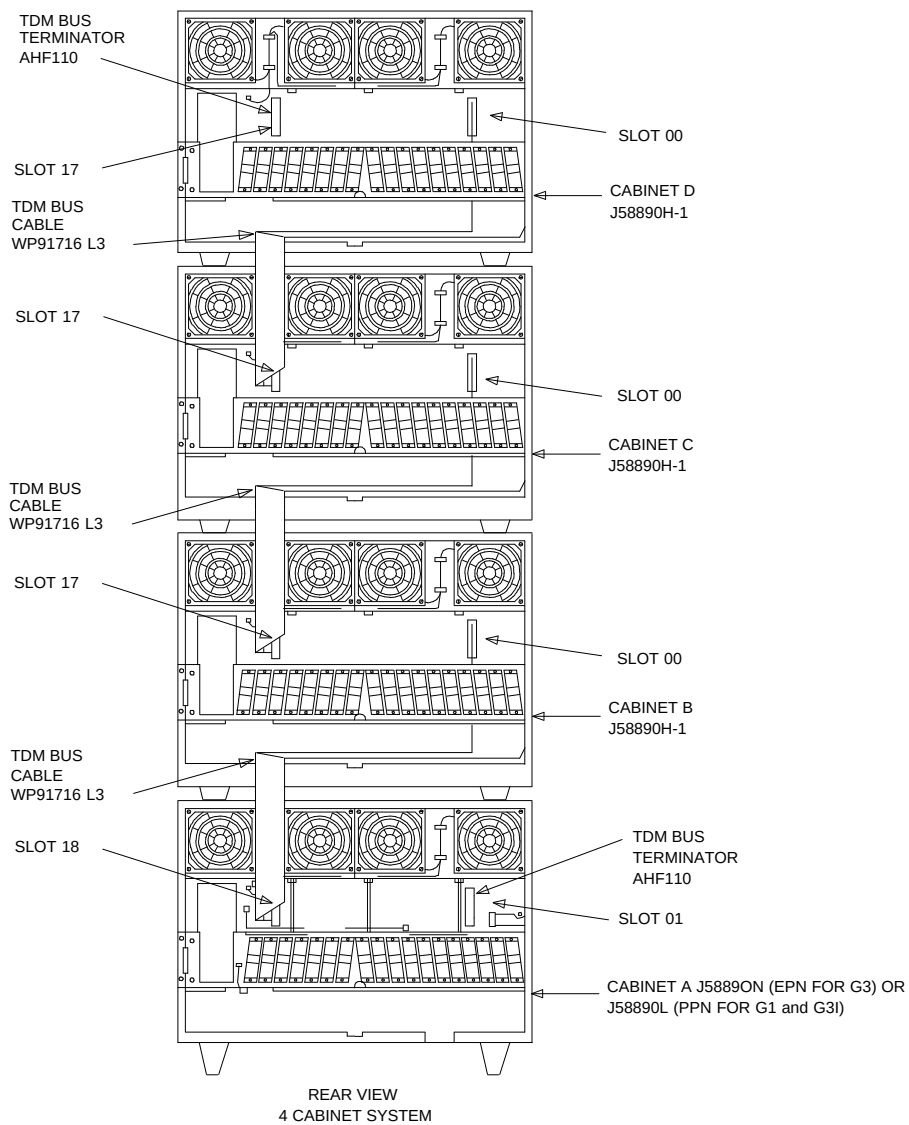


Figure 5-33. TDM/LAN Bus Cabling — EPN Cabinet in Single-Carrier Cabinet Systems

Basic Control Cabinet to Duplicated Control Cabinet Cabling in G3i

Control cabinet backplanes on Single-Carrier Cabinets have Intercabinet Cable connectors (ICCA, ICCB, and ICC) to connect shadowing and data control leads to the duplicated control cabinet.

Duplicated control cabinet backplanes have ICC connectors (ICCA, ICCB, and ICC) to connect shadowing and control data leads to the basic control cabinet.

Figure 5-34 shows the cabling between the basic control cabinet and the duplicated control cabinet in a critical reliability system. An interconnect cable is connected between the respective ICCA, ICCB, and ICC connectors on the basic control cabinet backplane and the duplicated control cabinet backplane.

➡ NOTE:

In a standard reliability system, there is no interconnect cable between the basic control and duplicated control cabinets because there is no duplicated control cabinet.

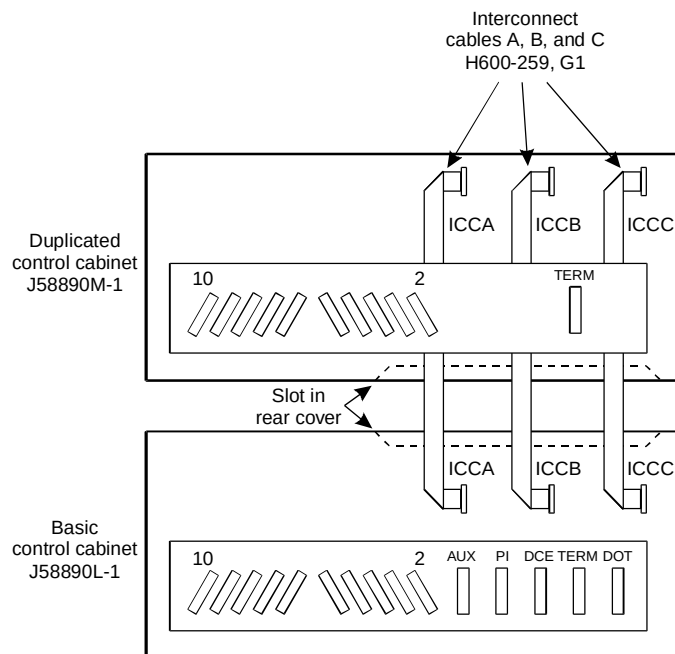


Figure 5-34. ICC Cabling Between Basic Control Cabinet and Duplicated Control Cabinet (G3i)

Cabling Between Single-Carrier Cabinets in Standard Reliability and Critical Reliability

Figure 5-35 and Figure 5-36 show fiber optic cabling between Single-Carrier Cabinets in standard reliability directly connected systems.

Figure 5-37 and Figure 5-38 show fiber optic cabling between Single-Carrier Cabinets in high reliability directly connected systems.

Figure 5-39 and Figure 5-40 show fiber optic cabling between Single-Carrier Cabinets in critical reliability directly connected systems.

Included in the figures are carrier positions, types of carriers, and Expansion Interface (EI) circuit pack port slots.

➡ NOTE:

Connections between Single-Carrier Cabinets are identical to connections between Multi-Carrier Cabinets. Single-Carrier Cabinets also have port slot locations identical to Multi-Carrier Cabinets.

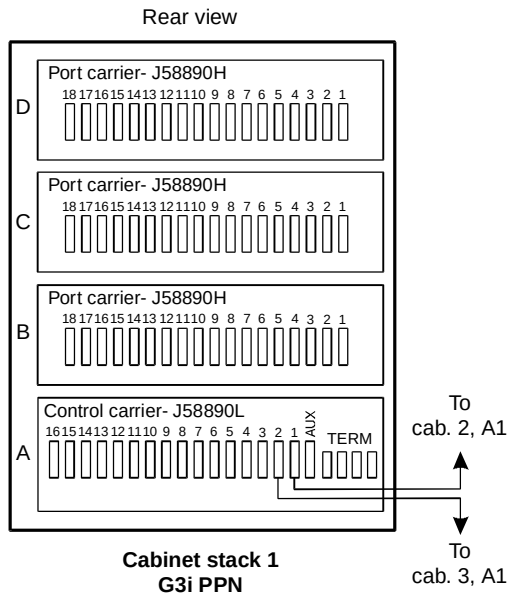


Figure 5-35. Fiber Optic Cabling in Standard and High-Reliability Cabinets (Part 1)

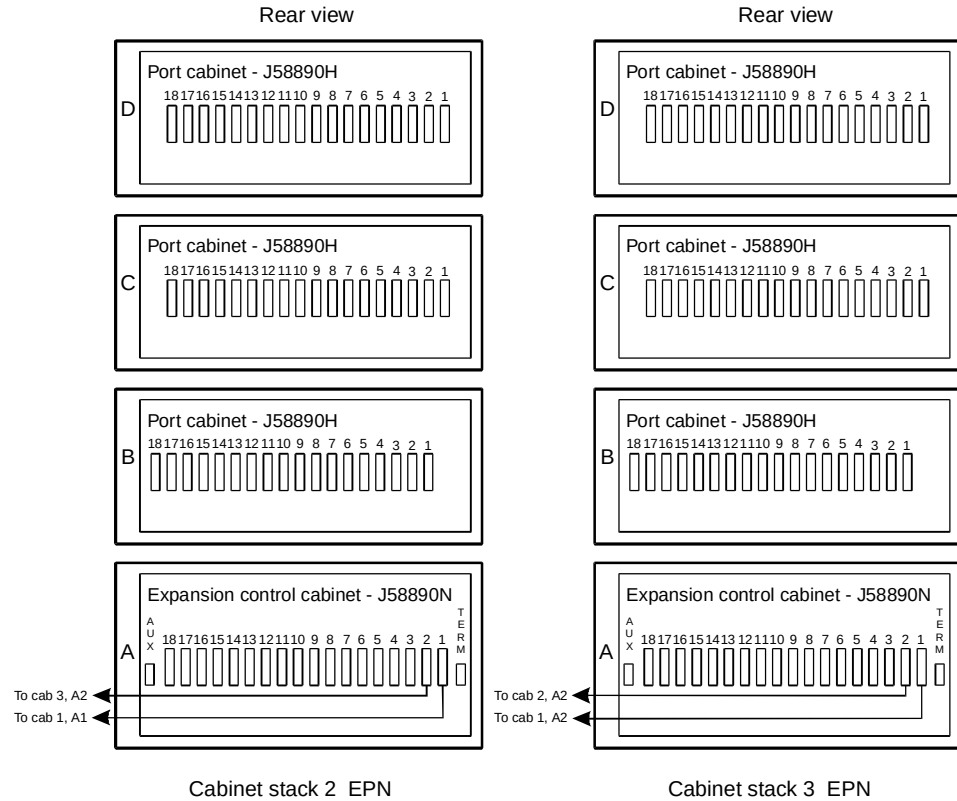


Figure 5-36. Fiber Optic Cabling in Standard and High-Reliability Cabinets (Part 2)

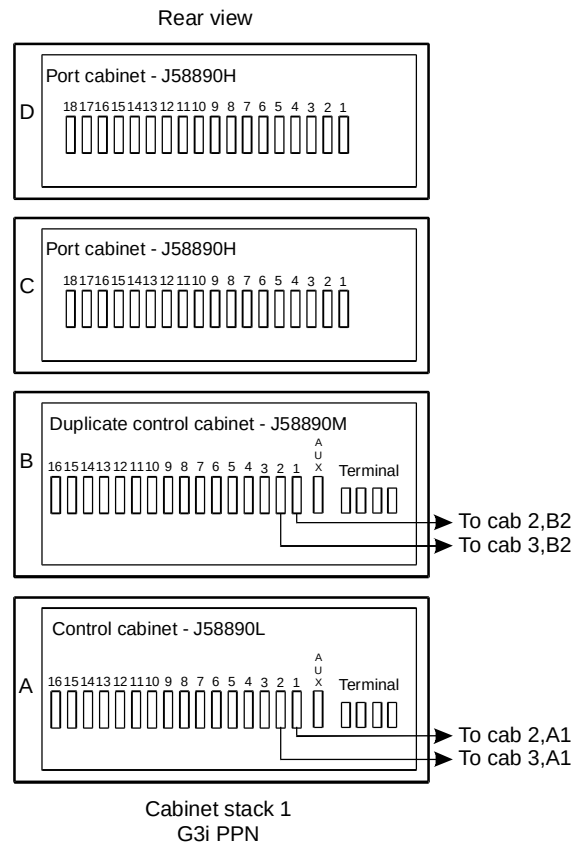


Figure 5-37. Fiber Optic Cabling in Critical Reliability Cabinets (Part 1)

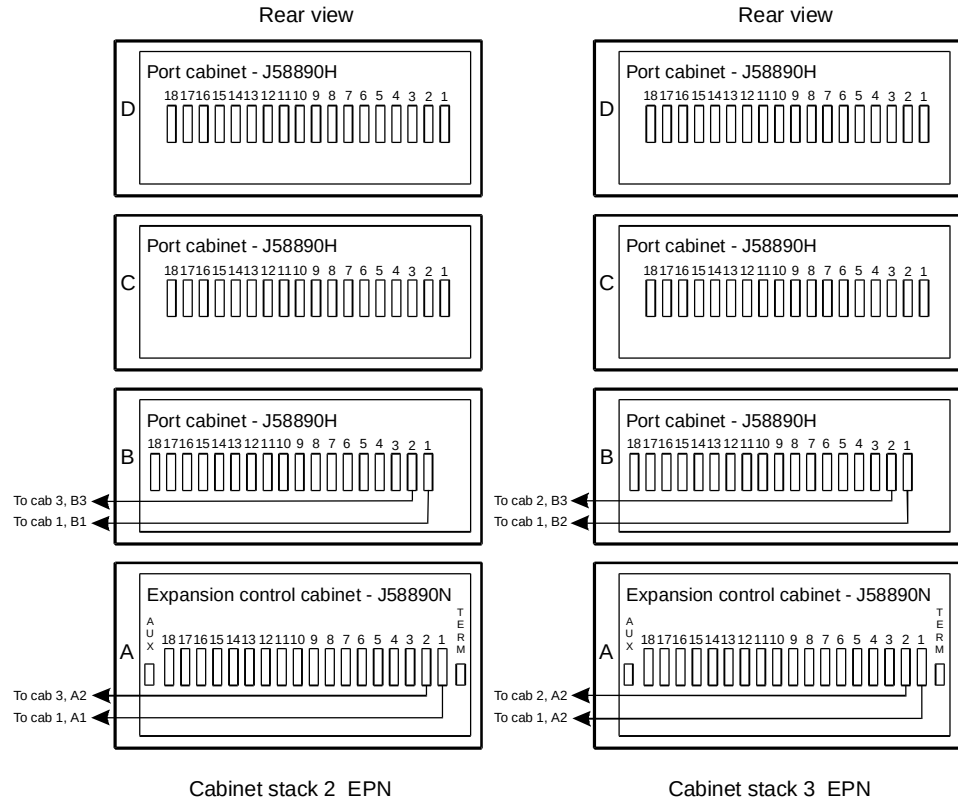


Figure 5-38. Fiber Optic Cabling in Critical Reliability Cabinets (Part 2)

Cabling Between Single-Carrier Cabinets in Remote Applications

Figure 5-39 shows fiber optic cabling between Single-Carrier Cabinets in remote applications. Included in the figures are carrier positions, types of carriers, and Expansion Interface (EI) circuit pack port slots.

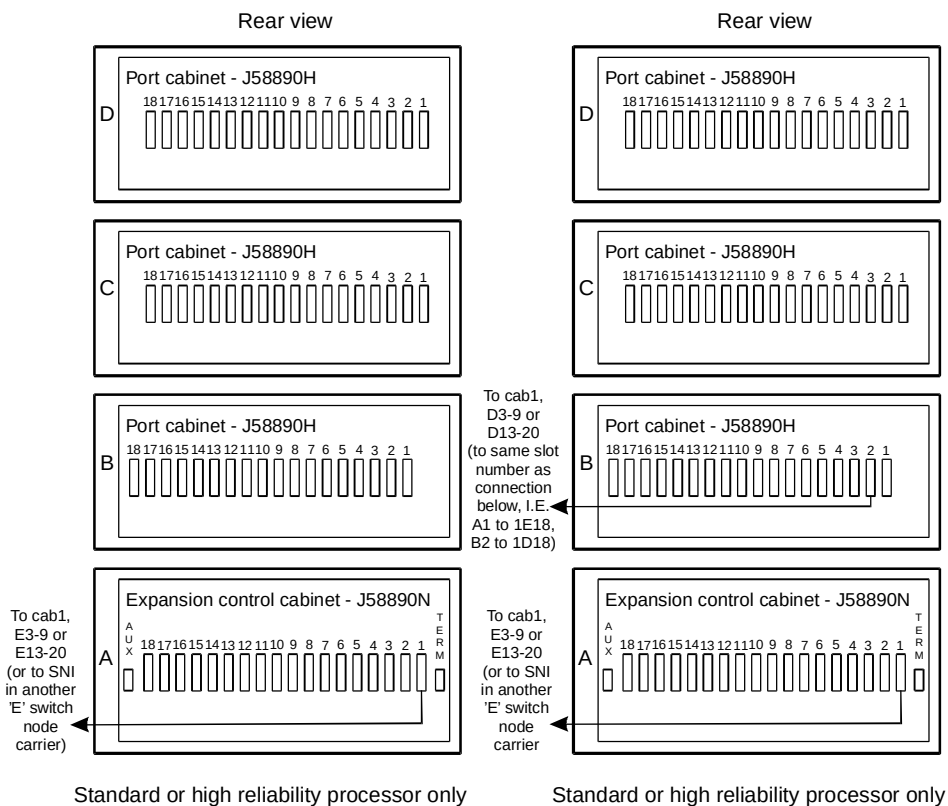


Figure 5-39. Fiber Optic Cabling Between Cabinets in Remote Applications

Cabling Between Single-Carrier and Multi-Carrier Cabinets

Fiber optic cables connect Single-Carrier Cabinets to Multi-Carrier Cabinets. This allows Single-Carrier Cabinets to use location numbering and port slot location numbering to be identical to Multi-Carrier Cabinets. Depending on the system configuration, the following fiber optic cables are connected between Single-Carrier Cabinets and Multi-Carrier Cabinets:

- Directly-connected system — Expansion control cabinet TN570 EI circuit pack in Slot 1 to TN570 EI circuit pack in a port carrier (position B or C) in the PPN cabinet in a two-PN G3r system, TN776 EI circuit pack in the control carrier in the PPN cabinet in a two-PN G3i system, and TN570 EI circuit pack in an expansion control carrier (position A) in an EPN cabinet in a three-PN system
- CSS-connected system with one SN carrier — Expansion control cabinet TN570 EI circuit pack in Slot 1 to a TN573 SNI in the SN carrier
- CSS-connected system with two SN carriers (critical reliability) expansion control cabinet TN570 EI circuit pack in Slot 1 to a TN573 SNI circuit pack in one SN carrier and port cabinet TN570 EI circuit pack in Slot 2 to a TN573 SNI circuit pack in the other SN carrier

The cables from EI Slot 1 in cabinet A and EI Slot 2 in cabinet B always go to identical slot numbers in the two SN carriers.

The cabling between Single-Carrier Cabinets and Multi-Carrier Cabinets is shown in the following figures:

- Standard reliability, two-PN directly connected system (cabinets 1 and 2). Standard reliability, three-PN directly connected system. See Figure 5-13 and Figure 5-14
- Standard reliability, CSS-connected system with Single-Carrier Cabinet and Multi-Carrier Cabinet. See Figure 5-22
- Critical reliability, CSS-Connected system with Single-Carrier Cabinets. See Figure 5-28
- Three-PN, critical reliability, directly connected system with Single-Carrier Cabinets (G3r PPN must be Multi-Carrier Cabinet). See Figure 5-18 and Figure 5-19.

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 line port circuits and trunk port circuits to external trunks, lines, and Data Terminal Equipment (DTE).

Figure 5-40 shows the cabling from the system through the network interface to off-premises trunks and lines going to the CO and remote equipment, and from the system to premises (house) wiring (data lines) going to information outlets (modular jacks) used for DTE equipment.

Main Distribution Frames (MDFs) are termination points for equipment cabling and distribution cabling. At an MDF, connections are made between those termination points to establish communications paths throughout the system.

Two major distribution frames are used:

- The *Main Distribution Frame (MDF)* is the field on which terminations and cross-connections for CO trunks, equipment cabling, and distribution cabling are made. See Figure 5-40. An MDF is the largest cross-connect field.
- The *Intermediate Distribution Frame (IDF)* is any cross-connect field other than an MDF. On an IDF, the terminations and cross-connections are made for the distribution cabling from the MDF, from other IDFs, and from the house wiring from information outlets.

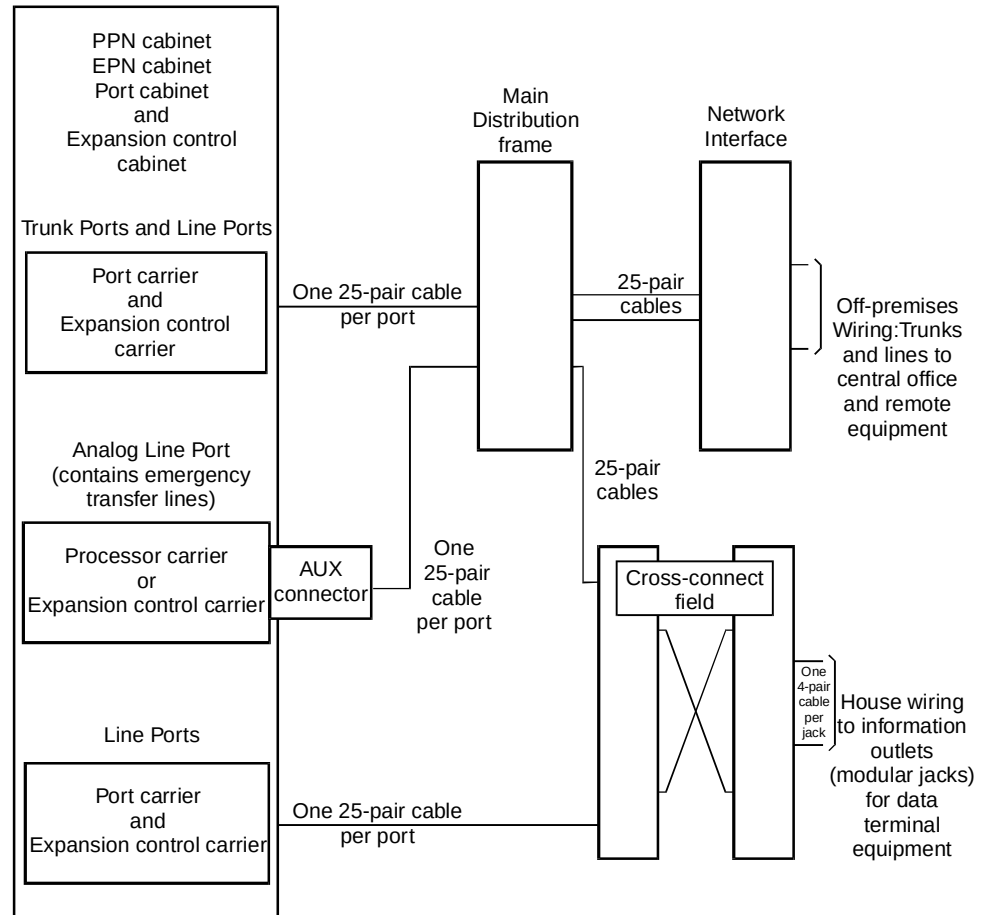


Figure 5-40. Cabling from System Cabinet to On- and Off-Premises Wiring

This chapter describes the following parts of the system architecture:

- Functional Overviews of Operating System Layer and Applications Layer
- Internal Connectivity — Logical Links Spanning Cables and Optical Fibers Between Components
- Protocols

The G3V4 architecture evolved from the previous versions of G3. Code in G3r supports a Center Stage Switch (CSS) (G3r only). Processor connectivity, multiple port networks per cabinet, integrated provisioning, and the World Class Core (WCC) features are also supported. Except for the logical links for system components, the architecture is the same in both G1 and G3V1, and G3V4 architecture is essentially the same as G3V1 architecture.

Operating System Layer

Oryx/Pecos, the operating system used in G3V4, is a proprietary real-time system supporting multi-processing 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 events needed to connect, disconnect, and manage voice and data calls in a communications system. Figure 6-1 shows the actions to connect a call.

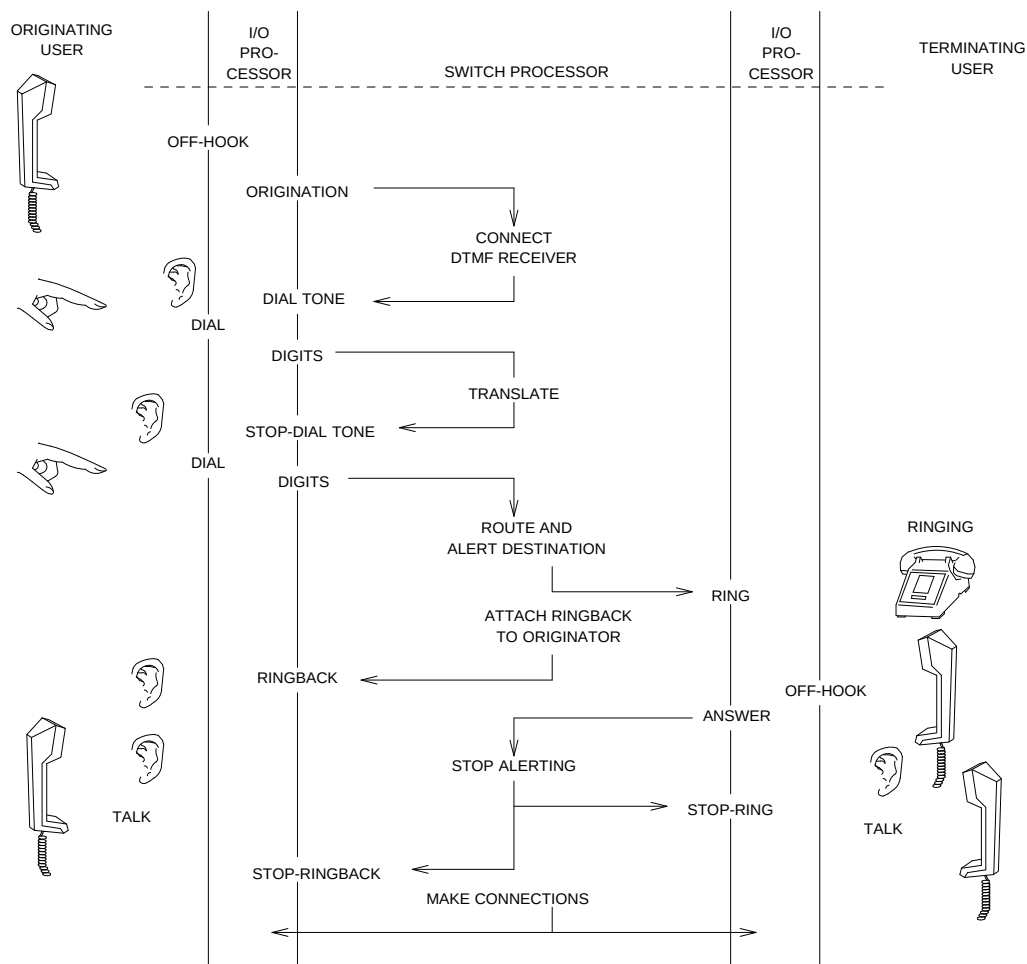


Figure 6-1. Example of Basic Call Set-up

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 Dual Tone Multi-Frequency (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 selection of a terminating endpoint or set of endpoints 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 parties of a connection together. It is defined by a record of these parties and the sequencing control logic that controls a call from origination to termination
- 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
- The *user* is one who uses a terminal or a set of terminals. The user is realized by the user manager described in the following layered software architecture

Layered Software Architecture

Processes that provide 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 6-2:

- 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, call process provides the control and sequencing logic for call setup and takedown, and for a variety of 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, 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, packet control driver, a timer driver, and maintenance circuit pack driver

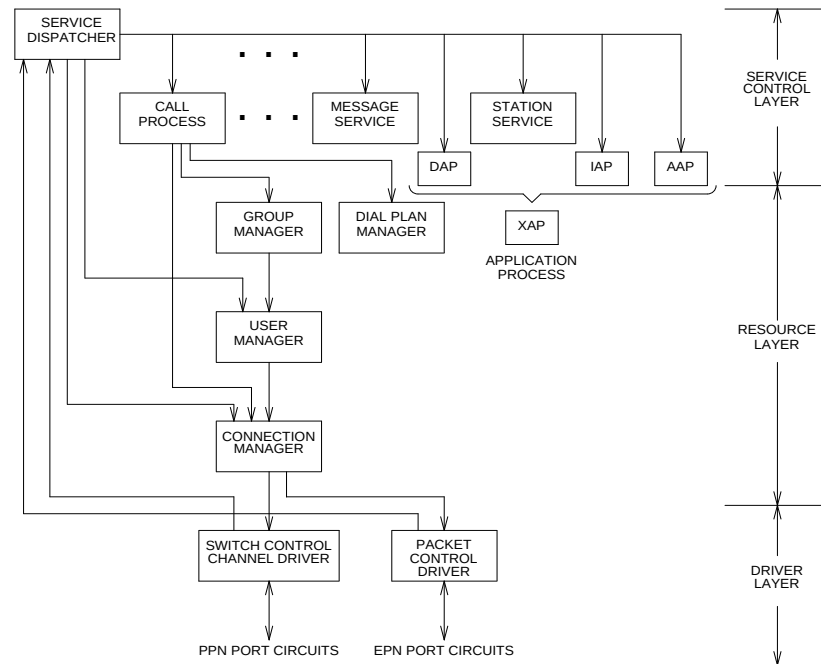


Figure 6-2. Switch Services Software Structure

Call processing features can be classified as

- Voice management: voice communications available with the system
- Data management: data communications and management capabilities available with the system. Data communications is the process of transferring data from one point to another; data management is the process of planning, controlling, and effectively using data
- Network services: capabilities to assure efficient interconnection of the private network (the trunks and switching facilities dedicated for use by a business or organization)
- System management: capabilities needed to administer, control, and maintain the system and to generate system usage reports
- Hospitality services: for the lodging and health industries. Hotels, motels, and hospitals use the features to better manage the property and provide services to their guests/patients
- Call management services: for industries that receive many similar calls to 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 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, re-arrange, and change equipment and services, and select user and system options.

Enhanced administration features are available through a personal computer (PC) or through terminals attached to other support systems, such as the Single Site Management and Network Management modules of Modular System Management.

System management software provides four functions through a terminal:

1. *Measurement collection and reporting* — Formatted reports of hourly traffic data on engineered resources such as trunk groups
2. *Maintenance testing and reporting* — Demand testing of circuit packs, terminal equipment, and the display of system error and alarm logs
3. *Translation data backup* — Translation data backup on tape
4. *Translation database management* — Provides *Data view mapping* to allow 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 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 are either accepted as valid or rejected as inconsistent. *Concurrency control* allows multiple terminal users and ensures switch services software does not use critical data being changed

System Management Layered Software consists of three layers. See Figure 6-3.

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 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 the processes that store translation data

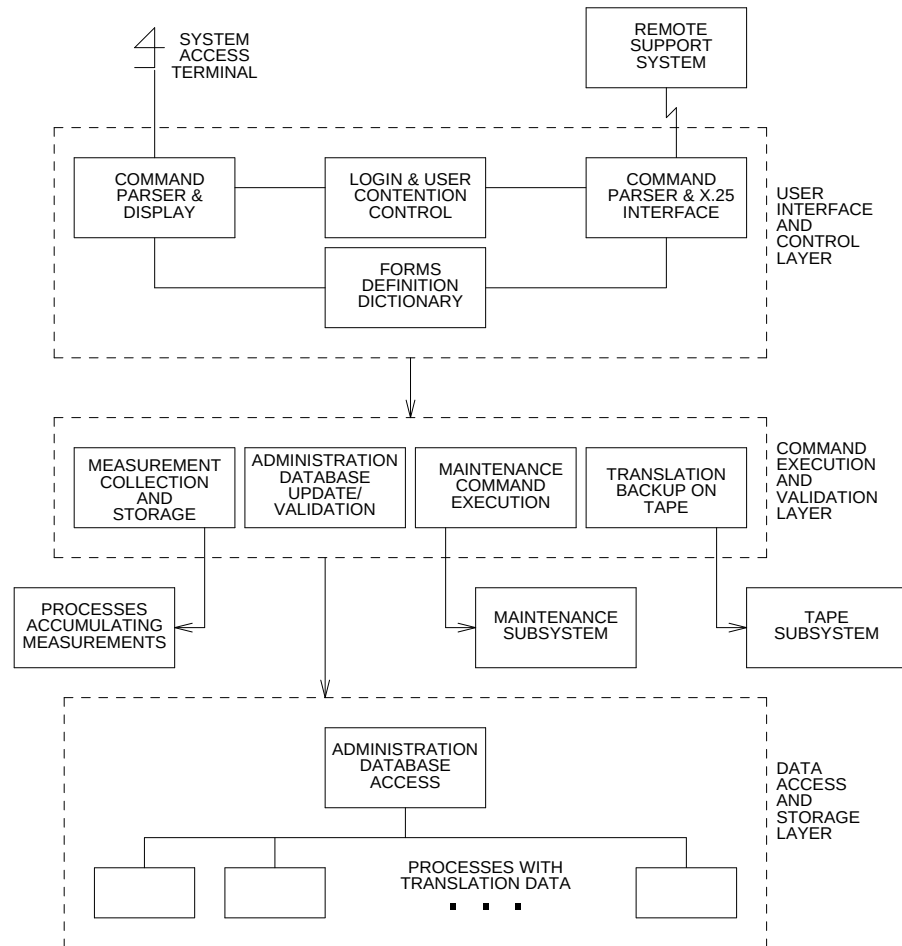


Figure 6-3. System Management Layered Software

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 provides support of multiple simultaneous administrators to allow high translation change activity associated with large switches. A protocol is available to ensure reliable data transfer for PC and Operations Support System Interfaces (OSSIs). OSSIs is a system that performs provisioning and maintenance functions on the switch.

OSSI supplies provisioning features to minimize services installation costs and support of a large line switch including administration without Hardware (AWOH), to allow 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, Basic Rate Interface (BRI) sets, analog queue warning ports, and announcement circuit packs. 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. Labor for system initialization, major additions, re-arrangements, and changes are greatly reduced.

The OSSI provides PC-based enhancements such as bulk station administration. This 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. OSSI is used to make rapid changes to large amounts of station data.

Maintenance

Maintenance software offers a high level of service availability 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 component faults for the system technician.

Because there is probably more equipment at a G3r site than at a G3s or G3i site, G3r maintenance software supports multiple concurrent administration and maintenance user sessions. This allows the connection of two or more terminals 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).

Each of the following areas contributes to the overall reliability of the system:

- Initialization — Each software or hardware component maintained must be “initialized” (processes started, stations supplied power, etc.). 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 SPE hardware or software errors. The SPE is the control complex that runs call processing, maintenance, and administration software
- Hardware background testing — Extensive background testing is performed by firmware and hardware on the circuit packs; if a problem is found, inline error messages are sent to maintenance software on the SPE

- Maintenance software periodic and scheduled testing — Periodic tests (nondestructive tests) are typically run once an hour. Scheduled tests (including destructive tests), defined by the customer, are run once a day. Maintenance software runs either periodic or scheduled tests to ensure 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 the following situations occur: 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
- When software error counters go over threshold, additional testing and/or recovery is performed
- Demand testing — Various demand tests can be run to check on the sanity of the system and individual maintenance objects. A “test long” command includes destructive tests and a “test short” command has only nondestructive tests
- Busyout and release— Allows system technician to remove components from normal service for testing and troubleshooting and to bring them back into normal service after testing
- Duplication — For system elements that require high reliability, the high reliability and critical reliability options provide a spontaneous interchange to a duplicate component if a serious failure occurs
- Other miscellaneous activity — Include control and manipulation of emergency transfer, power and environmental sensing, and treatment of the entire system as a maintained component

Internal Connectivity

This section describes the logical links that traverse the physical links of the system, including wires, cables, and fiber optic cables. The major differences in the software architecture between G3s and G3i and G3r are in the internal connectivity.

G3r Connectivity

In G3r 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

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 the 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. Connectivity is directly between the SPE and the endpoint; signals do not terminate at the EAL if they travel between the SPE and the EPN.

The following abbreviations are used for circuit packs shown in Figure 6-4 through Figure 6-12:

- *BRI* for Basic Rate Interface
- *DS1* for Digital Signal level-1
- *EI* for Expansion Interface
- *MAINT* for Maintenance
- *MEM* for Memory
- *MSSNET* for Mass Storage/Network control
- *PACCON* for Packet Control
- *PGATE* for Packet Gateway
- *PKTINT* for Packet Interface
- *PROCR* for Processor
- *SNI* for Switch Node Interface
- *SYSAM* for System Access and Administration

Refer to Figure 6-4 for the ISDN signaling connections.

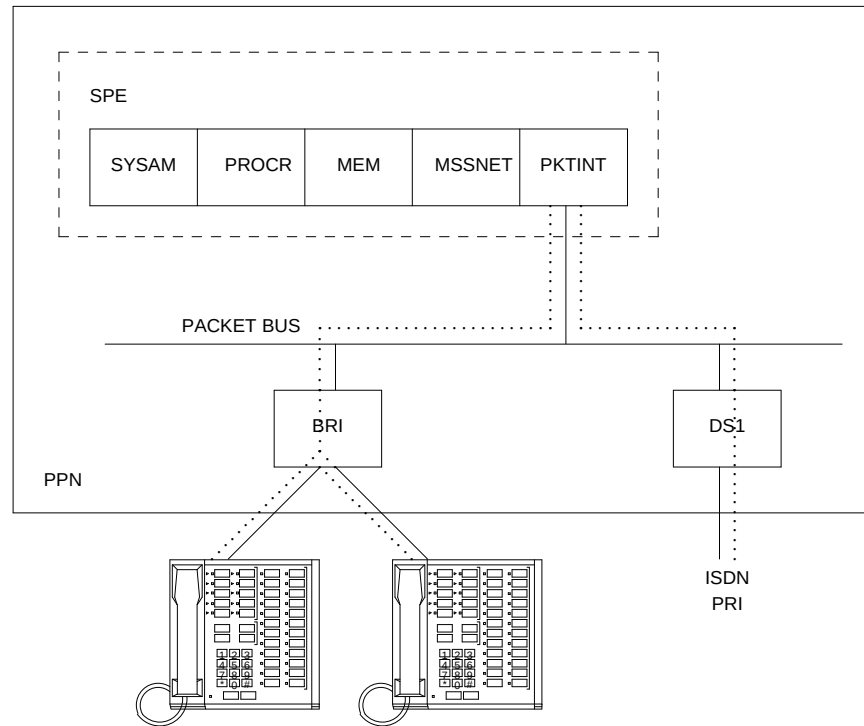


Figure 6-4. G3r ISDN Connectivity on a PPN

If the BRI or DS1 interface circuit packs are in an EPN, the link goes over the packet bus in the PPN, through the EI in the PPN and CSS, through the EI 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), as shown in Figure 6-5.

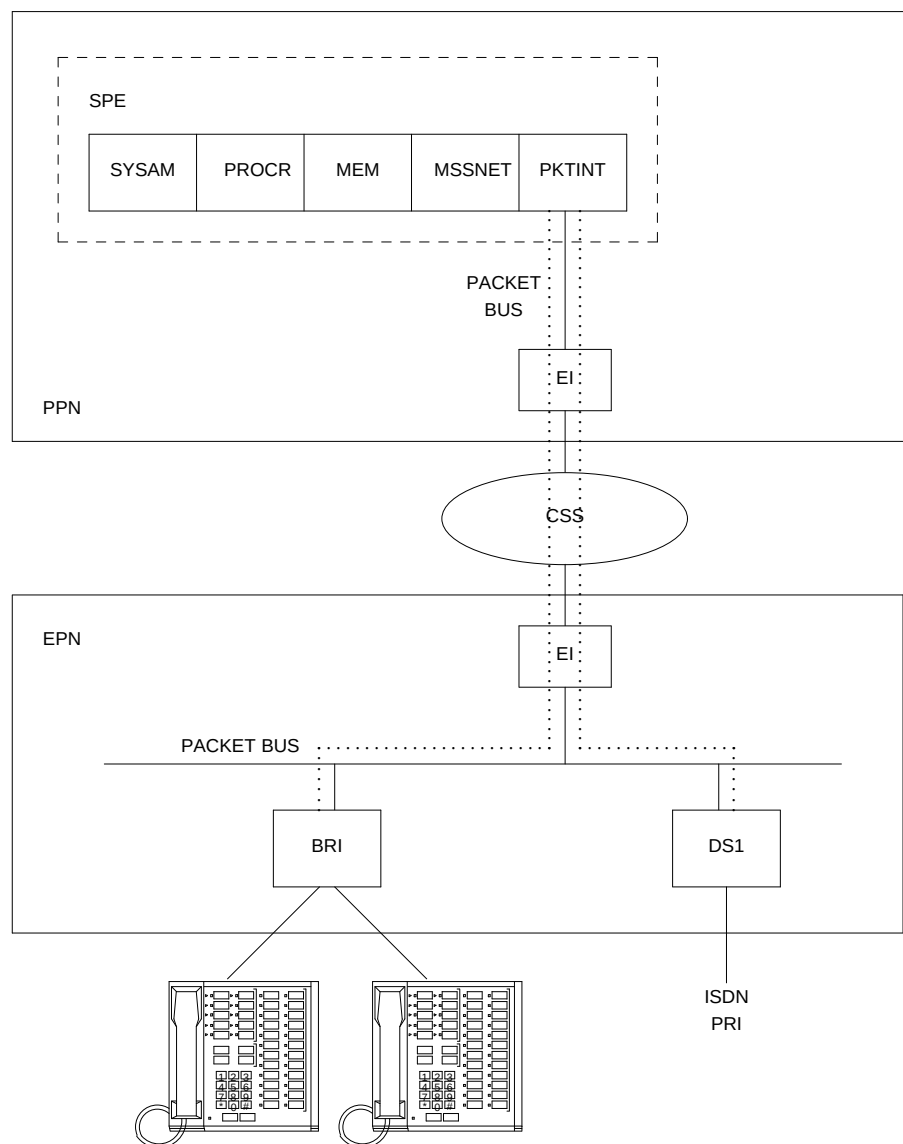


Figure 6-5. G3r ISDN Connectivity Between a PPN and an EPN

Expansion Archangel Links (EALs)

In the PPN, communication between the SPE and the ports takes place over a control channel in the Time Division Multiplexing (TDM) bus through a network control microprocessor called the archangel (AA). The AA communicates with microprocessors (called angels) 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), as shown in Figure 6-6. The EAA communicates with all the ports in the EPN in the same way that the AA does in the PPN.

EALs (Expansion Archangel Links) are links between an EI circuit pack serving as an AA to the SPE via the PKTINT. 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 and the CSS, and terminates in the EAA. Messages sent to ports on the EPN are first sent to the EAA which, in turn, sends them over the TDM bus control channel in the EPN to the ports.

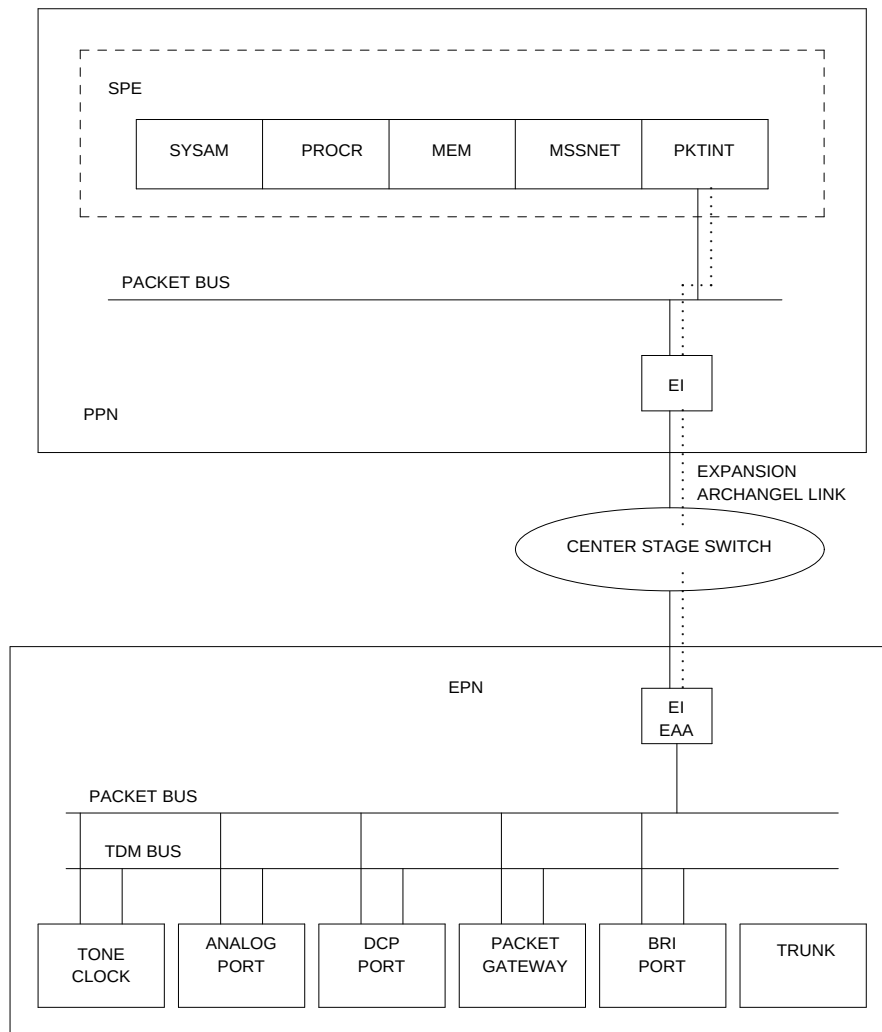


Figure 6-6. G3r Expansion Archangel Links

Center Stage Control Network (CSCN)

CSCN (Center Stage Control Network) links are packet bus connections between the SPE and a CSS Switch Node Interface (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 circuit pack with an EPN connected to it. See Figure 6-7.

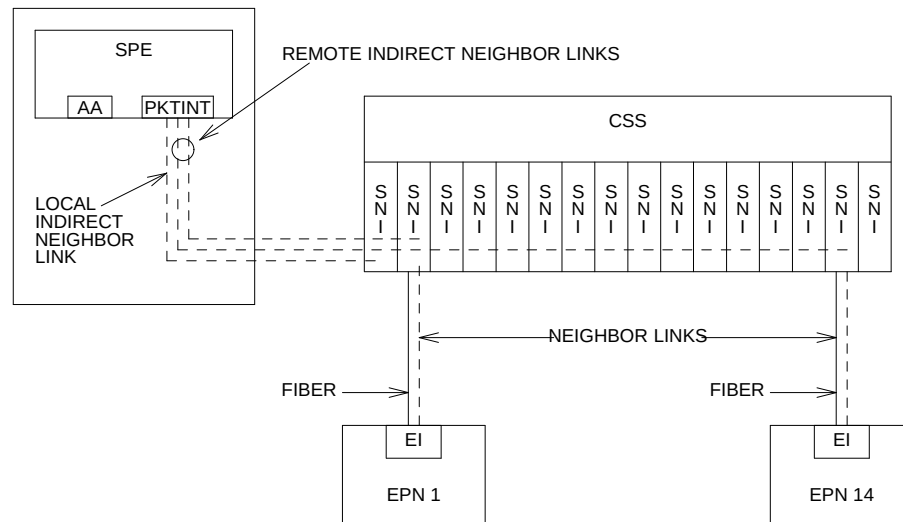


Figure 6-7. G3r Center Stage Control Network Links

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 CCS, 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 G3r, communication between the SPE and adjuncts such as AUDIX™, DCS, and 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 process 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, as shown in Figure 6-8.

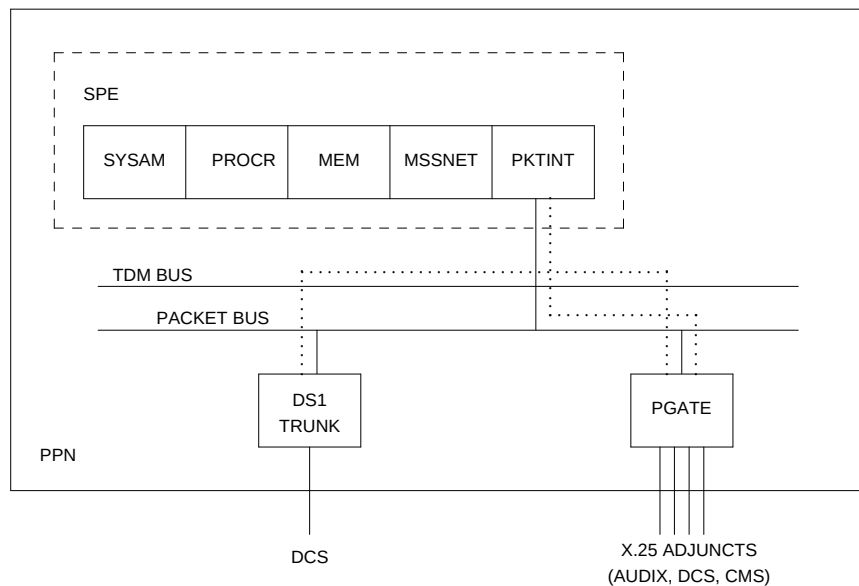


Figure 6-8. G3r Adjunct Links

In G3s, G3vs, and G3i, communication between the SPE and adjuncts occurs through a Digital Line circuit pack and a data module. DCS is also supported over and under ISDN-PRI through a DS1 circuit pack. Communications between the SPE and an Adjunct-Switch Application Interface (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 data module. See Figure 6-9. Both of these circuits are connected only to the TDM bus, while the SPE in G3r 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.

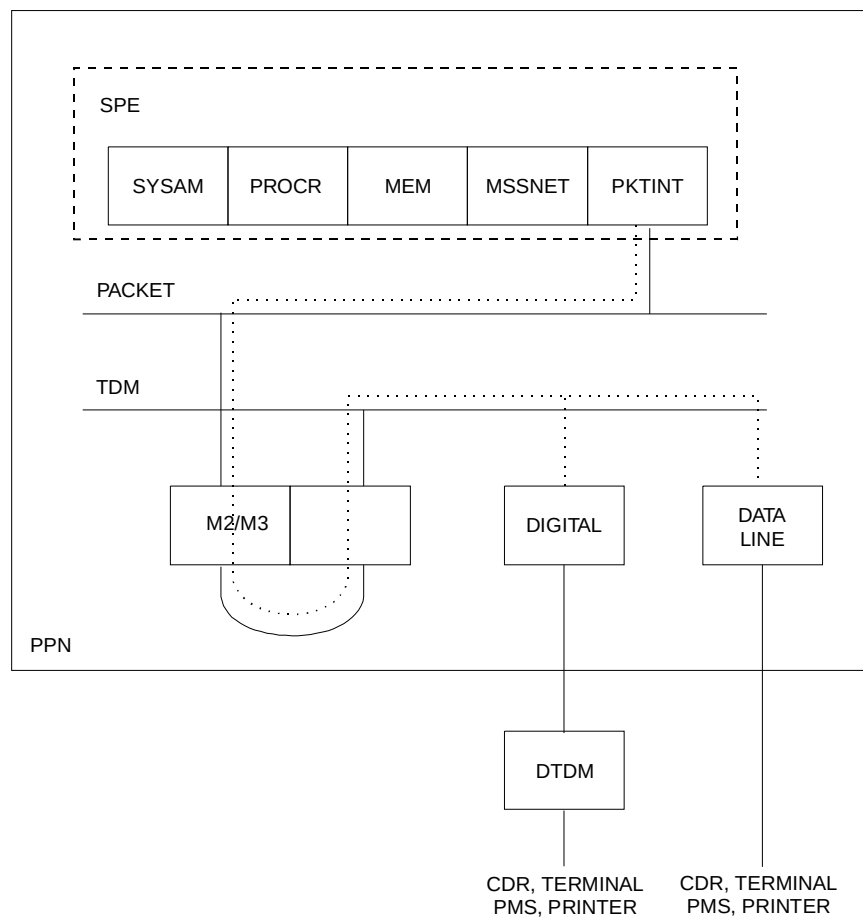


Figure 6-9. Application Adjuncts Connectivity

Internal G3s, G3vs, and G3i Connectivity

As in G3r, G3s, G3vs, and G3i 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 G3s, G3vs, and G3i system links to the SPE are ISDN signaling and expansion neighbor.

ISDN Signaling

For ISDN connectivity, the D-channel goes over the packet bus through BRI circuit packs to stations or through DS1 circuit packs to PRI trunks.



NOTE:

G3s and G3vs support only one single-carrier cabinet without duplication. There is no EI circuit pack with G3s or G3vs.

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.

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 6-10.

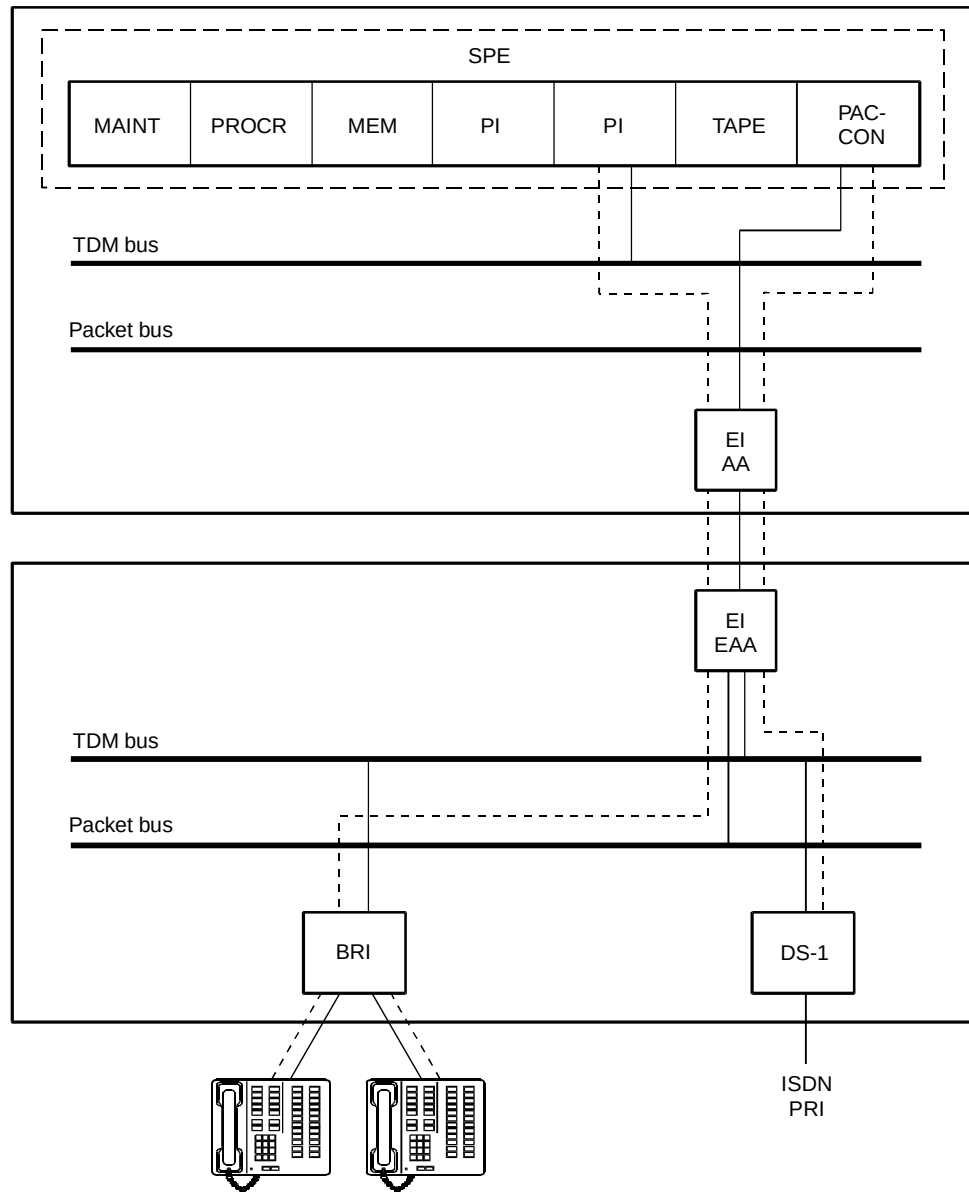


Figure 6-10. G3i ISDN Connectivity Between PPN and EPN

Expansion Neighbor

The archangel function in each EPN is provided by the EI circuit pack is 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 6-11.

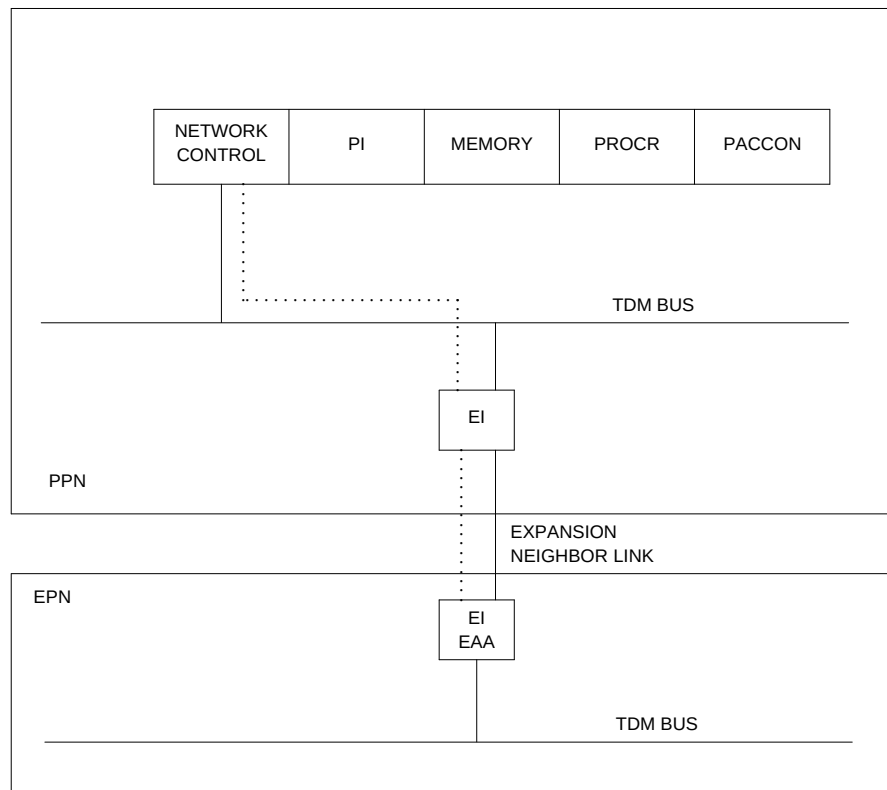
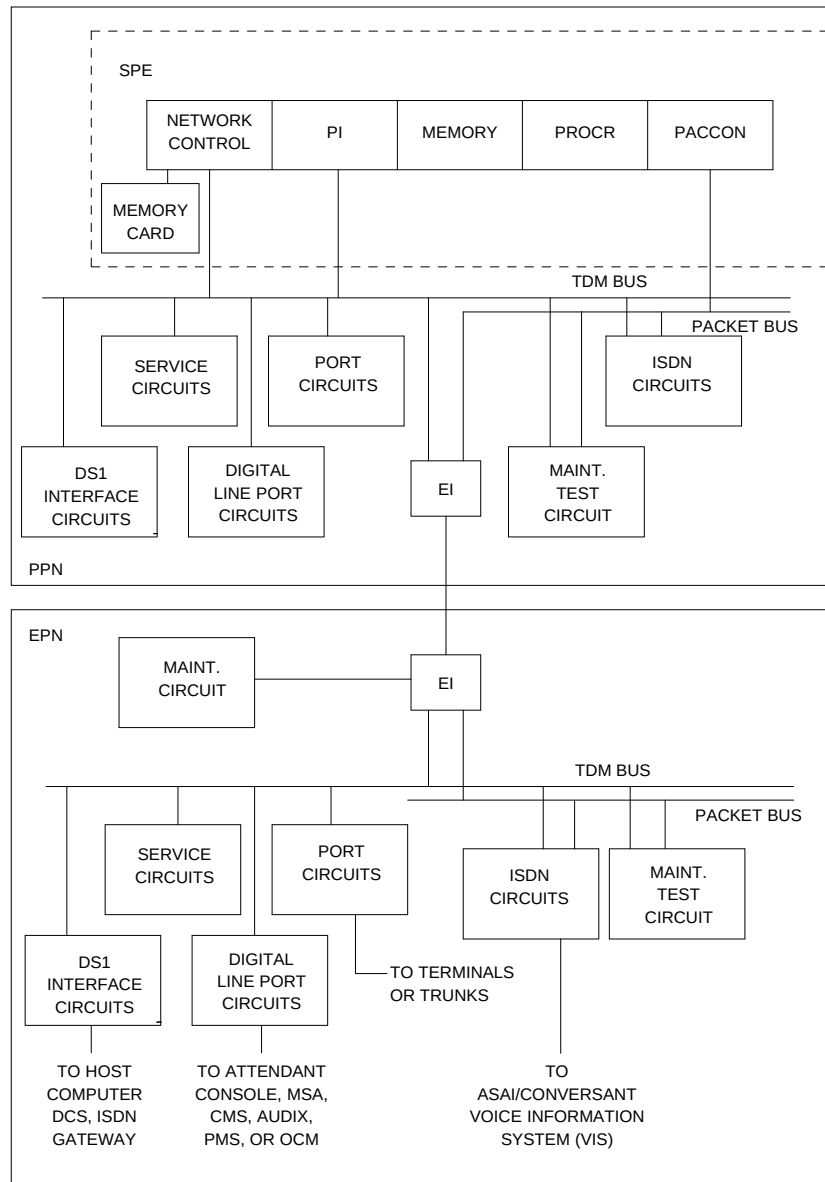


Figure 6-11. G3i Expansion Neighbor Link

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 channel. It travels across the optical fiber on a Link Access Procedure process on the D-Channel (LAPD) link to the EI circuit pack in the EPN where it is unbundled by the Archangel and sent to its destination over the EPN's CCMS channel.

Figure 6-12 shows a typical G3i PPN and EPN configuration.

**Figure 6-12. Typical G3i PPN and EPN Configuration**

Protocols

This section describes the protocols handled by the system and the points where these protocols change. Figure 6-13 shows the data transmission state changes. The figure illustrates the flow of data from Data Terminal Equipment (DTE), like a terminal or host, through Data Communications Equipment (DCE), 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 Figure 6-13 is the treatment of D-channels in ISDN PRI and BRI transmissions. PRI and BRI D-channels transport information elements containing 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 PRI, the elements are created by the system, which inserts them into the D-channel at the DS1 port. For ISDN transmissions, 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.

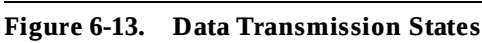
Layers

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 equipment. The originating DCE equipment can send blocks of data with the necessary codes for synchronization, error control, or flow control. With these codes, the destination DCE equipment checks the physical-link reliability, corrects any transmission errors, and maintains the link. When a transmission reaches the destination DCE equipment, the DCE equipment strips any layer-2 information that the originating DCE equipment may have inserted. The destination DCE equipment passes to the destination DTE equipment only 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 the figure as “user defined,” with no state changes until the transmission stream reaches its destination.



Usage

The following is a list of the protocols used when data is transmitted to and through the system. The list is organized by protocol layers. Follow the protocol changes through the transmission paths shown in Figure 6-13.

Layer-1 Protocols

Layer-1 protocols are used between the terminal or host DTE equipment and the DCE equipment, used between the DCE equipment and the system port, and used inside the system.

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.

The following layer-1 protocols are used between the DTE and the DCE:

- *RS-232* — A common physical interface used to connect a DTE to a DCE. This protocol is typically used for communicating up to 19.2 kbps
- *RS-449* — A replacement specification for RS-232. RS-449 was devised to overcome the RS-232 distance and speed restrictions and the lack of modem control offered by RS-232
- *V.35* — A physical interface used to connect a DTE to a DCE. This protocol is typically used for transmissions at 56 or 64 kbps

The following protocols constitute the conventions used at layer-1 to govern communication between the DCE 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.

- *DCP* — An AT&T proprietary standard for a 3-channel link. DCP sends digitized voice and digital data in frames at 160 kbps. Each frame consists of four channels. The DCP channel structure consists of two information channels and one signaling channel (2I+1S). 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. DCP is similar to ISDN BRI
- *BRI in G3* — An ISDN standard for a 3-channel link, consisting of two 64 kbps bearer (B) channels and one 16 kbps signaling (D) channel. For AT&T implementation of this standard, see *DEFINITY® Communications System and System 75 and System 85 ISDN BRI Reference*, 555-025-103

- *PRI* — An ISDN standard that sends digitized voice and digital data in T1 frames at 1.544 Mbps or, for countries outside the USA, in E1 frames at 2.048 Mbps. Layer 1 (physical layer), layer 2 (link layer), and layer 3 (network layer) ISDN PRI protocols are defined in *AT&T System 75 and 85 — DS1/DM1/ISDN-PRI — Reference Manual*, 555-025-101

At 1.544 Mbps, each frame consists of twenty four 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 thirty two 64 kbps channels.

- *Analog* — A modulated voice-frequency carrier signal
- *ADU Proprietary* — A signal generated by an Asynchronous Data Unit (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
- *DS1* — A protocol that dictates 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 (CEPT)* — A protocol that dictates the line coding, signaling, and framing used on a 32-channel line. Countries outside the USA use CEPT1 protocol

Inside the system, data transmission appears in one of two forms. It can be raw digital data, where the physical layer protocols, like DCP, are stripped at the incoming port and reinserted at the outgoing port. Or, it can be 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 and the DCE. Depending on the type of equipment used, the code can be ASCII, EBCDIC, or any proprietary code set. ASCII code can be sent asynchronously (one character at a time), or synchronously (one transmission unit, or frame, at a time). EBCDIC is transmitted synchronously
- *Digital multiplexed interface (DMI)* proprietary family of protocols between the originating DCE and the destination DCE for digital transmission. For a description of this protocol, see *DEFINITY® Communications System and System 75 and System 85 DS1/DM1/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

States

Table 6-1 summarizes the protocols used at various points in the data transmission stream shown in Figure 6-13.

Table 6-1. Protocol States for Data Communication

Transmission Type	Incoming DCE	OSI Layer	Protocols DTE to DCE	DCE to Switch Port	Inside Switch
Analog	Modem	1	RS-232, RS-449, or V.35	analog	PCM
		2	8- or 10-bit code	voice-grade data	voice-grade data
	ADU	1	RS-232	ADU proprietary	raw bits (digital data)
		2	asynchronous 8-bit code	asynch 8-bit code	DMI
Digital	Data Module	1	RS-232, RS-449, or V.35	DCP or BRI	raw bits (digital data)
		2	8-bit code	DMI	DMI
	DS1	1	any	DS1	PCM or raw bits (digital data)
		2	8-bit code	DMI or voice-grade data	DMI or voice-grade data

Both the physical-layer protocol and the DMI mode used in the connection depend on the type of 8-bit code used at layer 2 between the DTE and DCE, as listed in Table 6-2 and Table 6-3.

Table 6-2. 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 6-3. 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 6-13 implies the following connectivity rules:

- Only the DS1 port and the analog trunk port are trunking facilities (all other ports shown are line ports). For communication over these facilities, the destination DCE can be a hemisphere away from the system, and the signal can traverse any number of intervening switching systems before reaching the destination DCE
- 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, GPP, PRI, DS1, and so on — 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, digital data — at layer 1, and DMI at level 2), regardless of where it originated
- Voice-grade data can be carried over a DS1 facility as long as the destination DCE is a modem compatible with the originating modem

- Although data entering the system through an EIA port has not been processed through a data module, the EIA port itself has a built-in data module. Inside the system, EIA-port data is identical to digital-line or GPP data. Data entering the system at a DCP-line port (digital-line or GPP) can exit at an EIA port. Conversely, data entering the system at an EIA port can exit at any DCP-line port. The only caution is the destination data module must be set for Mode-2 DMI communication
- When a mismatch exists between the types of signals used by the endpoints in a connection (for example, the DCE at one end of the connection is an analog modem, and the DCE 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, the best place to insert the modem-pool member depends upon the transmission medium, but it is recommended the modem-pool member be put on the origination or destination switch. Note that 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 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 re-enters 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. There are trunks that use different signaling methods but use DS1 protocol at layer-1 (for example, PRI and 24th-channel signaling trunks). The "Trunks" section in Chapter 7, "Connections to Trunks, Lines, and Networks," describes the trunk types.

Disconnect Supervision

Disconnect supervision means the CO has the ability to release a trunk when the party at the CO disconnects, and the PBX is able to recognize the release signal. In general, a United States CO provides disconnect supervision for incoming calls but not for outgoing calls. COs in many other countries do not provide disconnect supervision on either incoming or outgoing calls.

Administration is provided for each trunk group to indicate whether it provides disconnect supervision for incoming calls and for outgoing calls. The switch needs to 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 switch. 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 because, through DCS 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.

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-Forward 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 switch 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
- CAS Attendant Transfer: if a CAS attempts to transfer two parties together by pressing the release key, the RLT 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

Connections to Trunks, Lines, and Networks

7

This chapter describes the following trunks, data lines, and networks, and how the system is connected to them:

- “Trunks”
- “Data Lines”
- “Private Networks”
- “Information System Network (ISN)”
- STAR-based Local Area Network (“STARLAN”)

Trunks

Trunks are the transmission medium that voice and data signals use to travel between switches. Calls needing a trunk are routed to the appropriate trunk group. An idle trunk, if available, is selected from the group. The system can be connected to:

- *Local exchange trunks*: carry transmissions between the system and the switch at a Central Office (CO)
- *Tie trunks*: carry transmissions between private communications systems
- *Special-access trunks*: carry transmissions between a system and the Point-Of-Presence (POP) of the Inter-exchange Carrier (IXC)
- *Auxiliary trunks*: link peripheral equipment (alarms and announcements) to the system
- *Miscellaneous trunks*: perform functions that do not neatly fit with the above applications. Included are Release Link Trunks (RLTs), remote-access trunks, and host-access trunks

Trunks are connected to the system via port circuit packs in port carriers and expansion control carriers in Multi-Carrier Cabinets, and in single-carrier port cabinets and expansion control cabinets.

Table 7-1 lists trunk circuit packs that can be installed in port slots of G3V4. Chapter 2, "Cabinets, Carriers, and Circuit Packs," describes the circuit packs.

Table 7-1. Trunk Circuit Packs in Port Slots

Name	Apparatus Code
Auxiliary trunk	TN763B/C/D, TN417
CO trunk	TN747B, TN438B, TN447, TN2138, TN2147, TN465
DID trunk	TN753, TN414, TN429, TN436B, TN459B, TN2139, TN2146
DS1/E1 interface	TN464C/D/E/F, TN767B (DS1 only)
DS1 tie trunk	TN722B, TN767B (DS1 only)
Tie trunk	TN760D, TN437B, TN439, TN449, TN458, TN497, TN2140

Local Exchange Trunks

Among local exchange trunks are the following varieties:

- *CO trunks*: one-way outgoing, one-way incoming attendant-completing, or two-way trunks connecting the switch to a CO
- *Foreign exchange (FX) trunks*: one-way outgoing, one-way incoming attendant-completing, or two-way trunks connecting a system to a CO outside the local exchange area. These trunks give a caller direct access to a CO outside the local exchange area without using the public network
- *Wide Area Telecommunications Service (WATS) trunks*: one-way outgoing trunks connecting a system to a CO equipped to handle WATS calls. The outgoing trunks allow a customer to place outgoing station-to-station calls to telephones in a defined service area. The service area has one or more geographic areas called WATS bands. Incoming trunk calls are completed by an attendant or Automatic Call Distribution (ACD) agents
- *800-service trunks*: one-way incoming trunks connecting the switch to a CO equipped to handle 800-service calls (also called INWATS). These trunks allow a customer to receive incoming station-to-station calls from telephones in a domestic or international service area without charge to the caller
- *Direct Inward Dialing (DID) trunks*: one-way incoming trunks connecting a system to a local CO. These trunks allow calls from the public network to complete to terminals (stations) assigned to a private network switch without attendant assistance

- *Direct Outward Dialing (DOD) trunks*: one-way outgoing trunks for outgoing calls connecting the switch to a CO. These trunks allow terminal (station) users to place calls to a public network CO directly without attendant assistance
- *Direct Inward/Outward Dialing (DIOD) trunks*: two-way trunks used to connect to a CO
- *Remote access trunks*: connect a PBX to a CO to provide off-premises PBX users with access to outgoing PBX trunks. Remote access trunks offer this service by providing off-premises users with PBX dial tone through the CO
- *Postal telephone and telegraph (PTT) trunks*: analog trunks used to connect to a CO for local loop (within a country) and long-distance communication (between countries) outside the United States

DS1/E1 Facilities

Digital Signal Level-1 (DS1) and E1 facilities are digital trunks that interconnect switches or connect switches to the public network. Port networks (PNs) up to 100 circuit miles apart can be connected by DS1/E1 facilities. DS1 multiplexes up to 24 digitized voice and/or data communications links onto a single T1 carrier (an industry standard used for interconnecting digital systems). E1 is a CCITT standard used in countries other than the United States, Canada, and Japan, and multiplexes up to 32 digitized voice and/or data communications links onto a single CEPT1 carrier. DS1/E1 facilities allow data calls to be transmitted at speeds up to 64 kbps.

DS1/E1 facilities may be used to provide TIE, DID, CO, OPS, and ISDN-PRI service. The type of signaling optioned for the DS1/E1 interface determines the type of calls the DS1/E1 interface can support. For DS1 interfaces, the options are:

- **Robbed-Bit Signaling (RBS)**: provides voice and voice-grade data support. It is an alternative to analog trunks and may be used to connect a system to other switches, a CO, or the network. It provides up to 24 channels on the DS1 facility
- **DMI-Bit Oriented Signaling (BOS) and Proprietary BOS**: support voice and DCP mode data. They are used to provide up to 23 Alternate Voice/Data (AVD) tie trunks to other DEFINITY[®], System 75, or System 85 switches. It is not used for connection to a CO or to the network
- **ISDN-PRI**: supports voice and data connections to other switches, to a CO, or to the network. It provides up to 23 bearer ("B") channels and uses the 24th channel for signaling ("D" channel). It supports call by call service selection for each channel

For E1 interfaces, the options are:

- Channel Associated Signaling (CAS): provides voice and data support and may be used to connect a system to other switches, to a CO, or to the network. It provides up to 30 channels on the E1 facility
- ISDN-PRI: supports voice and data connections to other switches, to a CO, or to the network. It provides up to 30 bearer (“B”) channels and one signaling (D) channel. It supports call by call service selection for each channel

D-channel backup with ISDN-PRI or DS1/E1 facilities provides a duplicated D-channel that takes over when the normal D-channel fails.

DS1 ISDN-PRI can be configured with both facility-associated signaling (FAS), administered as 23B + 1D, and nonfacility-associated signaling (NFAS). With FAS, the D-channel and associated B-channels are carried over the same facility. With NFAS, one D-channel can carry the signaling for up to 479 B-channels or 20 T1 trunks in a G3r. In G3s and G3i, a D-channel can carry the signaling for up to 400 trunks. E1 interfaces do not support NFAS arrangements and only provide 32B + 1D ISDN-PRI configurations.

A DS1/E1 connection is made from a system through a Channel Service Unit (CSU) to a DS1/E1 facility. The CSU terminates T1 transmission lines at the user's premises, ensures the signals entering the public network from DTE comply with the requirements of the T1 transmission system, and provide maintenance, diagnostics and testing. See Figure 7-1 for a simplified block diagram.

⇒ NOTE:

A C6C cable connects from the DS1 Tie Trunk circuit pack to a 551-type CSU. A C6D cable connects DS1 Tie Trunk circuit packs in collocated G1 systems. A C6E cable is an “extension” cable between the DS1 Tie Trunk circuit pack and other connector cables. Finally, a C6F cable connects the DS1 Tie Trunk circuit pack to channel multiplexers requiring hard wired connections. Refer to *DEFINITY® Communications System Generic 1 and Generic 3 Installation and Test*, 555-230-104, for detailed installation information.

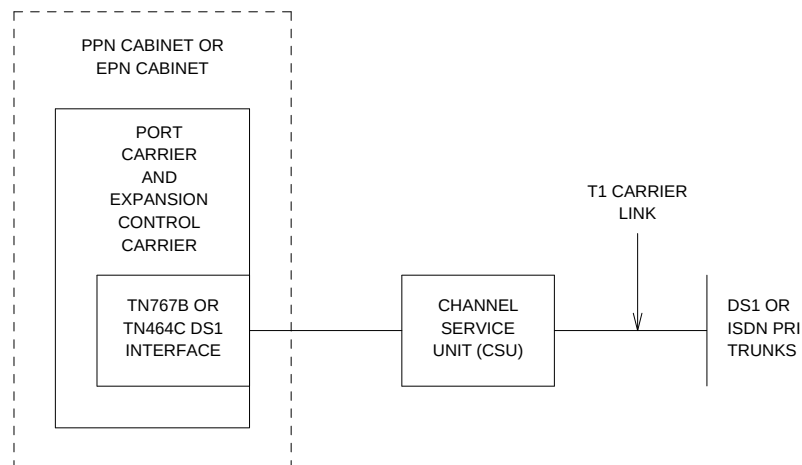


Figure 7-1. DS1/E1 Connection to a T1 Carrier Link

Tie Trunks

Tie trunks can be of the following types:

- *Tandem Tie Trunk Network (TTTN)*: a network of switches linked by dial-repeating trunks. Calls are not automatically routed to the final destination. To call a distant switch, the user steps the call through all the switches in the connection by repeatedly entering the dial access code of the trunk group to the next switch as soon dial tone is received from the newest switch along the path. When all switches in the connection have been traversed and a connection is made with the destination switch, the user dials the extension number
- *Main-Satellite/Tributary (MS/T) Network*: a network of switches in which one switch is designated as the main, while subtending switches are satellites or tributaries. The main switch is fully functional; each satellite uses the trunks and attendants at the main switch. Tributary switches differ from satellite switches in that they have their own Listed Directory Number (LDN) and may have their own attendant and public network facilities. MS/T users reach other users by dialing their extension numbers
- *Electronic Tandem Network (ETN)*: a network of switches where one switch at each location is designated as the tandem switch where all communications must travel to reach the tandem at another location. Switches that communicate with the tandem at the same location are

called main switches. ETN switches reach other nodes by sending a location code, followed by an extension number and, sometimes, a Traveling Class Mark (TCM)

- *Distributed Communications Systems (DCS)*: an information system that provides a messaging overlay for ETN or MS/T networks designed for DCS implementations. This overlay provides communication among the network nodes so the operation of a limited number of features is transparent across the network

The tie trunks between switches in these networks are in one or more of the following categories:

- *Inter-Machine Trunks (IMTs)*: one-way incoming, one-way outgoing, and two-way trunks connecting tandem switches of private communications systems with each other. TCMs can be sent only over IMTs.
- *Access trunks*: one-way outgoing and two-way trunks that connect main switches to tandem switches in an ETN. They can also connect satellite or tributary switches with a main switch. Typically, extension numbers (without their accompanying location code) are sent over access trunks to identify a call destination.
- *Bypass access trunks*: one-way outgoing trunks that connect a tandem switch to a main switch that is “homed on” another tandem.

Special-Access Trunks

Interexchange carriers (IXCs), both within and outside the United States, offer some services through special-access arrangements.

Outside the United States

Outside the United States, the country’s Postal Telephone and Telegraph (PTT) determines the special access services available through local and long distance telephone networks.

Inside the United States

Inside the United States and between the United States and other countries, these special access services are installed to bypass the Local Exchange Company (LEC) and directly access the IXC Point-Of-Presence (POP). “Nodal services” is the name AT&T has given the services it offers through special access trunks. AT&T nodal services include:

- *AT&T MEGACOM*: permits outward calling to diverse domestic and international geographical areas at reduced rates

- *AT&T MEGACOM 800*: permits inward 800-number calling from diverse domestic and international geographical areas. Dialed Number Identification Service (DNIS) is where the IXC switch sends the private switch the number of the destination extension. This allows MEGACOM callers to directly dial a station number
- *AT&T ACCUNET services*: provide high-capacity terrestrial digital transmission services, such as ACCUNET T 1.5, ACCUNET Spectrum of Digital Services, ACCUNET Switched Digital Services, ACCUNET Switched Digital International, and voice-grade private lines. These services can be used for data transmission, bulk data transmission, video teleconferencing, and others
- *AT&T Software-Defined Network (SDN)*: provides connections through the AT&T network so geographically dispersed user domestic (through SDN) and international (through Global SDN) locations can function like they were on the same private network
- *MultiQuest service*: provides Automatic Alternate Routing (AAR)-like services over SDN. Included in the service are features that route calls to different destinations based on the time of day, the area code or exchange dialed, predetermined traffic ratios, and dialer input

Special-access services can be arranged with the IXC over dedicated trunks. Also, switched services (including all services except ACCUNET T 1.5 and ACCUNET Spectrum of Digital Services) can share the ISDN PRI trunk linking the PBX with the IXC POP. MEGACOM and MEGACOM 800 services to and from the system are available only over a shared ISDN-PRI link. To share the link, the trunk must be administered for call-by-call selection. Note that at the switch end of the connection, special-access trunks are administered identically to private network tie trunks.

Auxiliary Trunks

Auxiliary trunks connect units in the auxiliary cabinet with the switch. Among the features used are Recorded Announcements, Telephone Dictation Service, Malicious Call Trace (MCT), and Loudspeaker Paging.

Miscellaneous Trunks

The following trunks are considered “miscellaneous:”

RLTs

Release Link Trunks (RLTs) are used between a main location and a satellite/tributary location to provide Centralized Attendant Service (CAS) or Automatic Call Distribution (ACD) group availability. Like tie trunks, RLTs connect communications systems. Unlike tie trunks that carry calls from their initiation to completion, RLTs provide only a temporary service for the call. That is, RLTs carry calls from their originating switches to the switch where the attendants or agents are located. Upon receiving the call, the attendant or agent identifies the call destination, returns the call to the switch of origin for routing and processing, and then disengages the RLT, readying it for another call.

APLT Trunks

Advanced Private Line Trunks (APLT) handle calls between private switches on a customer premises and private switches on a CO premises.

Remote-Access Trunks

Remote-access trunks connect a PBX to a CO to provide off-premises PBX users with access to outgoing PBX trunks. Remote access trunks offer this service by providing off-premises users with PBX dial tone through the CO.

Host-Access Trunks

Although a system's line ports can access a host computer's ports, one type of trunk can also provide host access: Digital Multiplexed Interface (DMI) trunks. These trunks connect remote or local hosts to a system. Signaling over these trunks is either message-oriented or bit-oriented signaling (BOS).

Data Lines

Data lines from the system can be connected through digital interfaces to Data Terminal Equipment (DTE). Figure 7-2 shows a digital data communications connection from the system through an Asynchronous Data Unit (ADU) to a DTE. A Data Line Enhancement circuit pack containing an ADU is the system's EIA interface.

Trunk type data should only be used in conjunction with facilities not routed through bit compression multiplexers and/or echo cancellers.

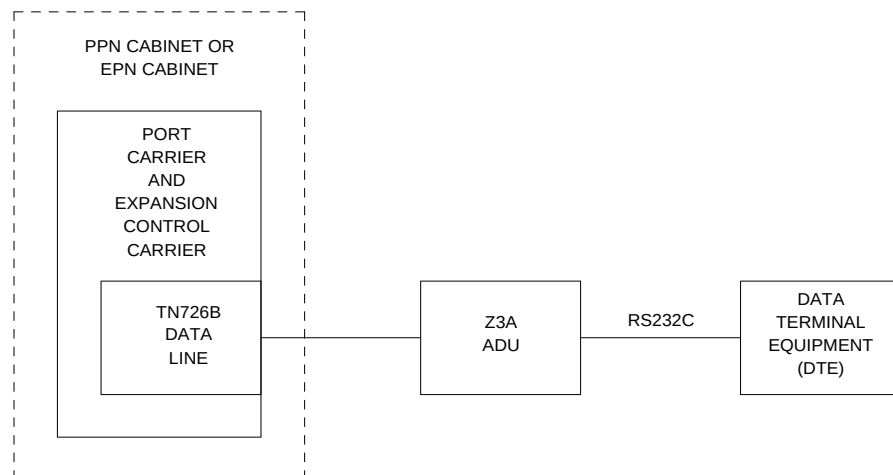


Figure 7-2. Digital Data Communications Connection to DTE

Wideband Switching

Wideband switching is the switching of data rates greater than 64 kbps between endpoints. G3 uses DS1/E1 to conduct wideband switching between endpoints at 128 kbps to 1536 kbps over T1 facilities and up to 1984 kbps over E1 facilities.

Wideband switching operates with AT&T H0 and H11 data services (384 kbps and 1536 kbps, respectively) and supports high-speed video conferencing and data applications. In addition to H0 and H11, G3 supports wideband switching with private networks, IXCs, local telephone companies, and countries outside the USA. The DS1/E1 interface circuit pack is used for wideband switching ports.

ACCUNET Packet Service

The system connects to the ACCUNET Packet Service (APS) through a Memotec X.25 Packet Assembler/Disassembler (PAD). APS is an X.25 Packet-Switched Public Data Network (PSPDN). The Memotec X.25 PAD SP-830 allows a system to access the APS, any X.25 PSPDN, or any X.25 hosts. The Memotec PAD can be connected directly to a system by a Data Line circuit pack and an ADU. APS delivers packetized data throughout the USA at digital speeds of 2.4 kbps to 56 kbps and analog speeds of 2.4 kbps, 4.8 kbps, and 9.6 kbps.

A system user can access remote X.25 hosts connected to the APS through the Memotec PAD as shown in Figure 7-3.

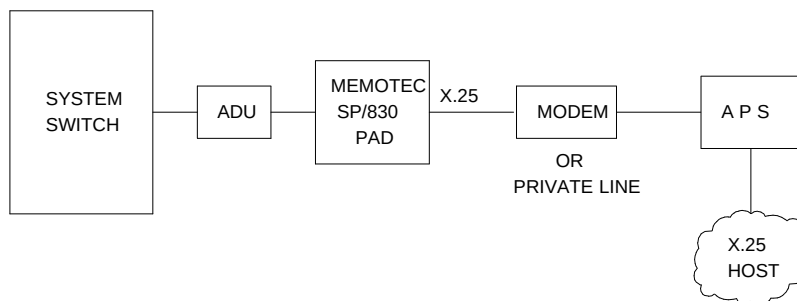


Figure 7-3. Connections to ACCUNET Packet Service

Figure 7-4 shows direct access to a X.25 host.

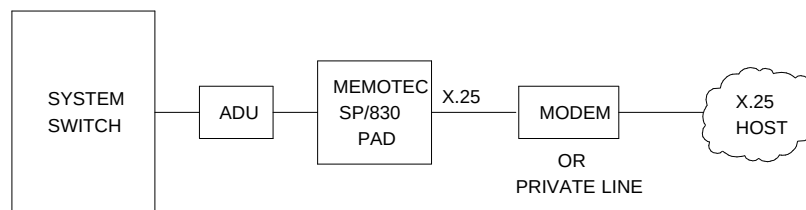


Figure 7-4. Connections to X.25 Host

Administered Connections

G3 provides data communication by means of “administered connection” and access endpoint features. An administered connection is between the system and a peripheral enabled by an entry from an administration terminal.

The administered connection feature automatically establishes an end-to-end connection between two access (data) endpoints. Access endpoints are either a nonsignaling channel on a DS1/E1 interface or a nonsignaling port on an analog tie trunk circuit pack assigned a unique extension.

An access endpoint supports devices, switches, or services that terminate on a trunk port without requiring any signaling capability on that port. These features enhance data networking and increase the effectiveness of the AT&T Network Service Software-Defined Data Network (SDDN).

For a detailed description of administered connections, refer to *AT&T Network and Data Connectivity*, 555-025-201.

Private Networks

A private network is a configuration of trunk and switching facilities dedicated to the use of a business or organization. The network can have as few as two switches or as many as hundreds of switches located throughout the world. This section describes connections between a system and the following private networks:

- MS/T
- Electronic Tandem Network (ETN)
- Software-Defined Network (SDN)
- ETN/SDN hybrid network
- Distributed Communications System (DCS)

MS/T

The Main Satellite/Tributary (MS/T) serves the needs of customers with a few locations in a small geographic area. This network normally serves moderate to heavy calling between locations. For a main/satellite configuration, attendant positions and public network trunk facilities are concentrated at the main, and calls to or from satellite locations pass through the main. To a caller outside the main/satellite complex, a system appears to be a single switch with one LDN.

A tributary location is similar to a satellite location except a tributary has one or more attendant positions and a tributary has its own LDN.

Figure 7-5 shows an MS/T configuration that can function independently or serve as an ETN access arrangement.

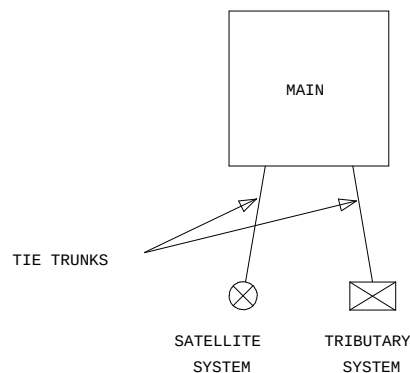


Figure 7-5. MS/T Configuration

ETN

An Electronic Tandem Network (ETN) serves customers with many locations in a large geographic area. This network normally serves moderate to heavy calling between locations without accessing toll facilities.

An ETN consists of tandem switches, intertandem tie trunks that interconnect them, access or bypass access tie trunks from a tandem switch to a main switch, and the capability to control call routing over these facilities.

Figure 7-6 shows a typical ETN configuration. As shown, an MS/T configuration can be served by an ETN. Although not shown in the figure, a DCS can also provide feature transparency for all or part of an ETN.

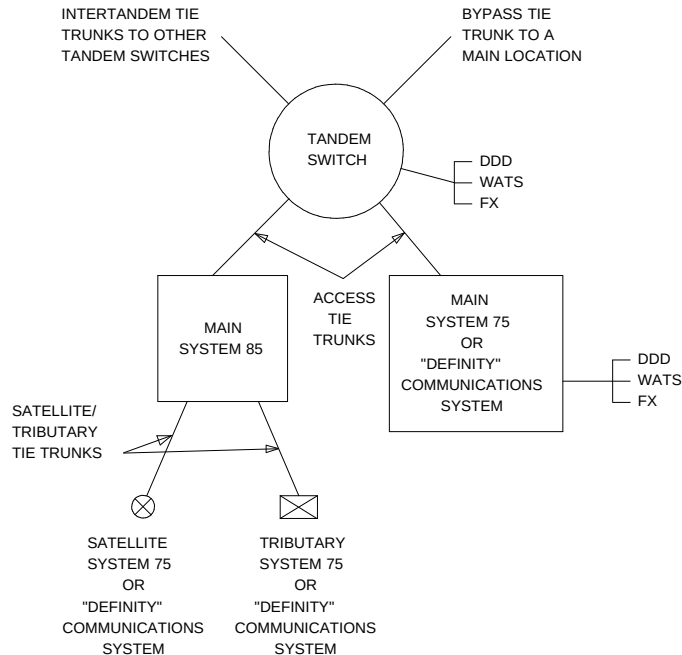


Figure 7-6. Typical ETN Configuration

Within an ETN, each location is identified by a unique private network office code (RNX). There are 1000 possible RNXs (R=0-9, N=0-9, X=0-9) available for each ETN. After accessing the ETN by dialing a feature access code, a user simply dials the RNX plus the desired extension number. At most, seven digits are required.

Public network office codes (NXXs) are unique within an area code, whereas RNXs are unique within an ETN. The RNXs are assigned when the ETN is established and may match NXXs (although this is not always possible). When DID is provided by the local CO, the extension numbers (last four or five digits of the number) will usually match. Network inward dialing (NID) is the ETN equivalent of DID and can be provided without DID.

Software Defined Network (SDN)

A Software-Defined Network (SDN) provides a virtual private network using the public-switched network. An SDN handles voice and data between customer locations and off-net locations.

ETN/SDN Hybrid Network

An Electronic tandem Network/Software-Defined Network (ETN/SDN) is a network in which users served by the public network are integrated into a private ETN. When users are scattered geographically, this may be a viable alternative to additional private network switches in dispersed locations or public network toll calls from remote locations.

DCS — G3V2 and Later

A Distributed Communications System (DCS) is a cluster of two to 63 maximum AT&T switches connected via ISDN PRI, or 20 maximum AT&T switches otherwise, that make it seem as if the cluster were a single switch in certain attendant and voice terminal features. A user at one switch can call or activate a feature toward a user at a different switch and notices no difference in operation.

A DCS allows uniform dialing so DCS users can dial a 4- or 5-digit extension to reach any extension in the cluster. The uniform dialing provides simplified dialing procedures between locations. DCS offers the convenience of using some features between locations. A DCS is suitable for frequent interlocation calling.

The DCS switches are interconnected by analog or digital tie trunks for voice communications and also by data links (also called DCS signaling links) for control and feature information. The voice network arrangement of the switches is either an ETN, a main/satellite network, or an ETN/SDN hybrid.

Some of the applications of DCS configurations are in a “campus environment” with two or more separate buildings and the switches are connected by local cable, and a larger area such as a city, several states, or even the entire country, where the switches are separated by distances too great for local cable and can be connected to different COs.

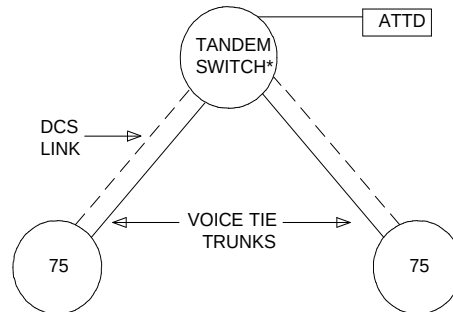
The following AT&T documents describe DCS:

- *DEFINITY® Communications System Generic 3 Feature Description*, 555-230-201
- *AT&T -- Network and Data Connectivity*, 555-025-201
- *DCS Application Note*, 555-209-003

DCS Plus sends signaling over ISDN PRI links on the D-channel. The signaling can be switched across a public network when temporary signaling connections are provided.

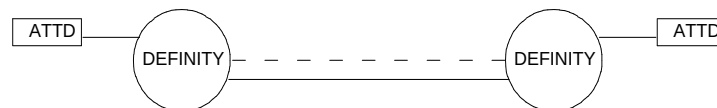
Figure 7-7 shows examples of DCS configurations.

SYSTEM 85, SYSTEM 75 (V3), OR "DEFINITY" COMMUNICATIONS SYSTEM TANDEM;
CENTRALIZED ATTENDANTS



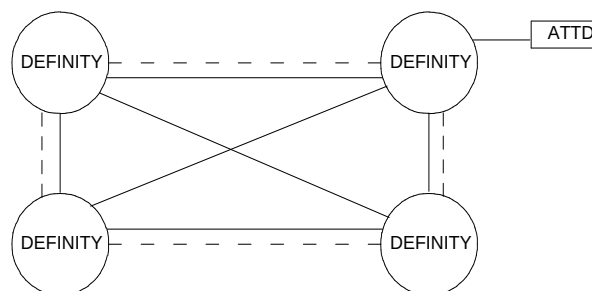
* The System 85, System 75 (V3), or "DEFINITY" communications is serving as a DCS tandem switch and as a centralized attendant service main; all other systems are endpoint nodes.

"DEFINITY" COMMUNICATIONS SYSTEM WITH NO TANDEM; SEPARATE ATTENDANTS



Each "DEFINITY" Communications System has its own attendant position(s).

"DEFINITY" COMMUNICATIONS SYSTEM WITH NO TANDEM;
CENTRALIZED (IAS) ATTENDANT



Note that each switch has a tie trunk group to every other switch, but not necessarily a DCS signaling link. Message hopping is being used to take advantage of existing facilities. The switch with the attendant is an inter-pbx attendant service (IAS) main; The others are ias branches.

Figure 7-7. Examples of DCS Configurations

Information System Network (ISN)

The AT&T information System Network (ISN) is a packet-switched Local Area Network (LAN) linking mainframe computers, minicomputers, word processors, storage devices, personal computers (PCs), printers, and terminals into a single system.

Connections between a system and an ISN provide the following:

- Users on an ISN, in addition to having access to other endpoints directly connected to ISN, can have access to any endpoint connected to the system or addressable from the system
- Users who either connect to or have access to the system can also access endpoints connected to an ISN

An ADU or MPDM interface connects to an asynchronous interface module on a packet controller or terminal concentrator, an example is shown in Figure 7-8. This interface allows the system and the ISN to share data capabilities.

The *DEFINITY[®] Communications System Generic 3 Feature Description*, 555-230-204, describes ISN.

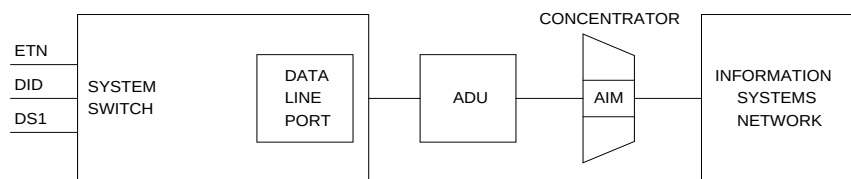
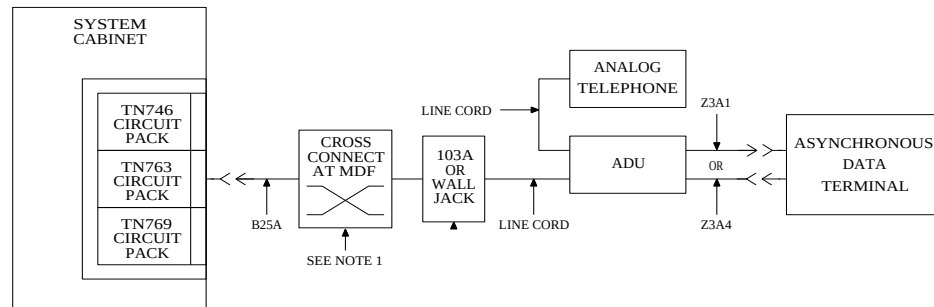


Figure 7-8. Example of Connections to an ISN

Figure 7-9 shows an ISN interface between a system and an asynchronous data terminal.



NOTES:

1. PAIR 1 (VOICE PAIR) CONNECTS TO THE TN746, TN763, AND TN769. PAIRS 2 AND 3 (DATA PAIRS) CONNECT TO AN 'AIM' LOCATED IN AN 'ISN' CONCENTRATOR OR THE 'ISN' PACKET CONTROLLER.

Figure 7-9. ISN Interface to an Asynchronous Data Terminal

STARLAN

A 1 Mbit or 10 Mbit AT&T STAR-based Local Area Network (STARLAN) interconnects small numbers of PCs, data terminals, resource units, and printers. When a STARLAN and a system are colocated, voice and data can be shared at the same information outlet. See Figure 7-10.

The voice pair connecting to an Analog Line circuit pack port occupies the first pair of the information outlet. The data pairs that connect to the STARLAN occupy the second and third pairs of the information outlet. The voice and data pairs must be separated at the blue or white field located in the equipment room or at the blue field located in a satellite location.

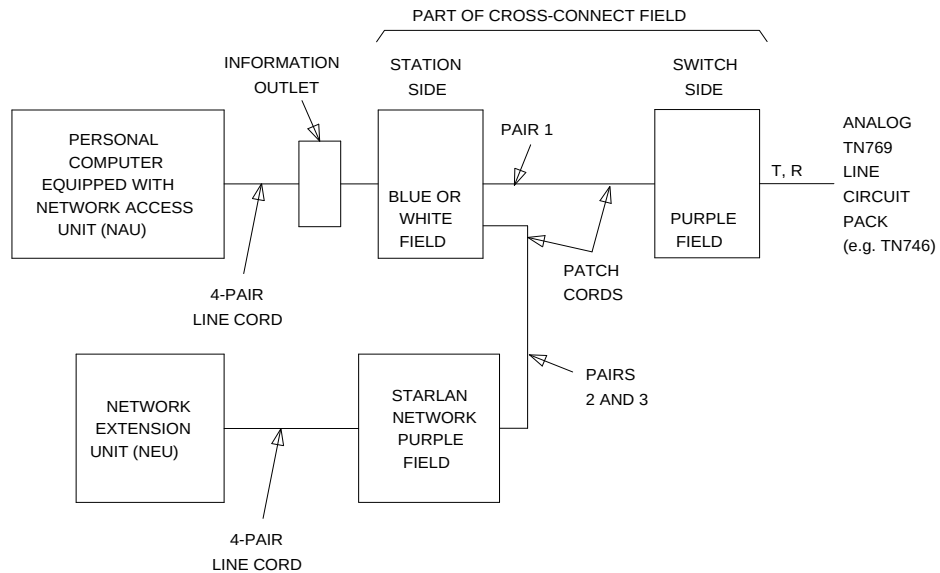


Figure 7-10. Connections to AT&T STARLAN

This chapter describes how the system is connected to peripheral devices, including adjuncts. Adjuncts are optional external components, not residing in a system, that provide administrative and application functions.

The following peripherals and adjuncts are covered:

- “Data Terminal Equipment (DTE)”
- “Data Communication Equipment (DCE)”
- Terminals
- Printers
- Messaging Adjuncts
- Telemarketing Adjuncts
- Administration Adjuncts
- Call Record Acquisition Adjuncts
- Miscellaneous Adjuncts (Music-On-Hold, Loudspeaker Paging, etc.)
- Distributed Communications System (DCS) links
- Digital Signal Level 1 Converter (DS1C) Connections
- Digital Signal Level 1 (DS1) Connections

Procedures used to connect a system to peripherals are given in *DEFINITY[®] Communications System Generic 1 and Generic 3 Installation and Test*, 555-230-104.

Data Terminal Equipment (DTE)

DTE (Data Terminal Equipment) described in this chapter has EIA (Electronic Industries Association) RS-232, RS-449, RS-366, V.35, Category A coaxial interfaces, and International Telecommunications Union (ITU) interfaces. DTE includes data terminals and consoles, printers, graphics and facsimile (FAX) equipment, and computers — hosts and personal computers (PCs).

Data Communication Equipment (DCE)

DCE (Data Communication Equipment) described in this chapter are devices such as data modules, ADUs, and modems connected between the system and DTE. DCE provides analog-to-digital and digital-to-digital interfaces between the system and DTE and converts protocols between the system and DTE, and isolates the system electrically from DTE.

Data Modules

Data modules link DTE with a system's Basic Rate Interface (BRI) and Digital Communications Protocol (DCP) digital ports. The system can be connected to the following types of data modules:

- Asynchronous Data Module (ADM) used with a 7505, 7506, 7507, 8510, or 8520 ISDN BRI voice terminal to support integrated voice and data
- Data stands (Z702A and Z703A) provide an RS-232 interface to a system for data terminals and PCs attached to a 7406D or 7407D digital voice terminal
- Digital Terminal Data Module (DTDM) transmit and receive serial data across a DCP interface; a DTDM has an RS-232 interface that connects to DTE
- Modular Processor Data Module (MPDM) and a high-speed data link provide serial data DCP interfaces between a system, DTE, host computers, and other switches
- 7400A and 7400B data modules provide full-duplex asynchronous voice and data connectivity in DCP applications
- 3270A, T, and C data modules convert DCP protocol to Category A coaxial protocol and allow PCs with the PC/PBX 3270 emulation package to communicate with an IBM 3270 cluster controller through a system

Figure 8-1 shows a G3 connected to a 3270C data module.

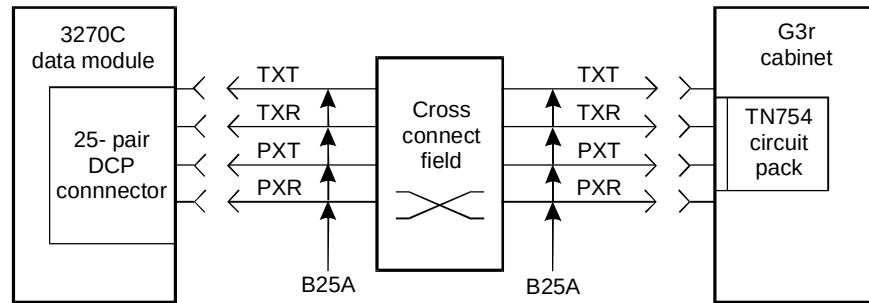


Figure 8-1. Connections to a 3270C Data Module

Figure 8-2 shows a G3 connected to a 3270A or 3270T data module.

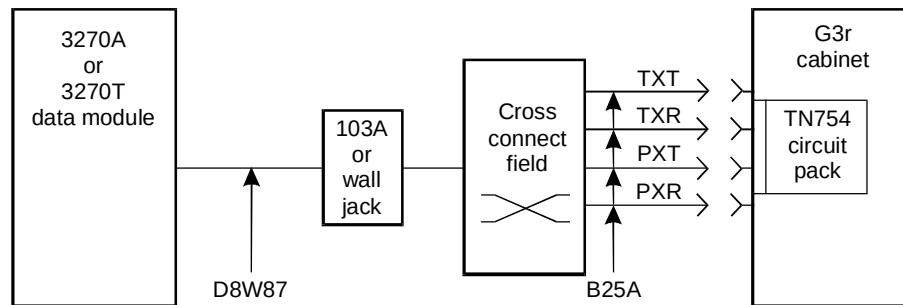


Figure 8-2. Connections to a 3270A or 3270T Data Module

ADUs

The system can be connected to an ADU that extends the 50-foot limit of an RS-232 cable up to 40,000 feet and provides full-duplex asynchronous operation, or to a Modular Asynchronous Data Unit (MADU) (an eight-port ADU).

Modems

Modems link DTE with the system analog ports. Many AT&T and customer-supplied modems operate with the system. A Data Service Unit (DSU) is used as a modem with the system.

Channel Service Unit (CSU)

A Channel Service Unit (CSU) is a device that provides an interface between the DSX1 levels of a DS1 interface circuit pack (TN464F, TN767E) and the DS1 levels of a DS1 transmission facility. It includes the following functions:

- Isolates the DS1 interface circuit pack from DC voltages that may be present on the DS1 facility
- Provides status lamps to indicate the state of the signal from the network and from the DS1 board
- Provides jacks to allow test access to the receive and transmit signals between the DS1 board and the CSU
- Provides secondary surge protection between the DS1 facility and the DS1 board
- Provides loopbacks for the signals from the DS1 board and from the DS1 facility for fault isolation purposes

A CSU may be external to the switch such as the AT&T ESF T1 CSU, or it may be integrated into the switch, such as the 120A CSU Module.

Terminals

The system can be connected to all DTE terminals and have RS-232 or DCP interfaces.

Voice and Data Terminals

Table 8-1 lists voice and data terminals that can be connected to the system.

Table 8-1. Voice and Data Terminals

Terminal	Type
Multi-button Electronic Telephone (MET) sets: 10, 20, 30 Button	Voice
Analog: 500, 2500/2554, 2500 DMGC, 2500YMGK, S203A Speakerphone	Analog voice
71XXX series: 7101A, 7102A, 7103A, 7104A	Analog voice
73XXX series: 7302H, 7303H, 7303S, 7305S, 7305H	Hybrid voice
74XXD series: 7401D, 7403D, 7404D, 7405D, 7406D, 7407D, 7410D, 7434D, 7444	Digital voice
84XX series: 8403B, 8410B/D, 8411B/D, 8434 94XX series: 9403, 9410, 9434	Digital voice
81XX series: 8102, 8110 91XX series:	Analog voice
BRI series (G3) (75XX series): 7505-, 7506-, 7507-VOM/T 85XX series: 8503, 8510, 8520	BRI voice
Workstation series: 510D BCT, 513 BCT, 515 BCT, 615 BCT, 715 BCT PC/PBX platform (digital): PC/ISDN platform (BRI)	Data
Consoles: 301A Attendant Console 302A1 Enhanced Generic 1 Console 602A1 ACD Console (CallMaster [®] digital communications terminal)	Data and voice

Table 8-2 lists additional terminals that can be connected to the system.

Table 8-2. Additional Voice and Data Terminals

Terminal	Type	Circuit Packs
ZE01A Expansion Module for 8434DX	Voice and Features	N/A
Cordless Hybrid: MDW 9000 (TransTalk 9000)	Voice	TN762B
Cordless Hybrid: MDC 9000	Voice	TN762B
DCP Data interface: Constellation ACD data terminal	Data and voice	TN754B
PassageWay interface: Consoles: 302B1 Attendant Console 603A/D ACD Console (CallMaster digital console) 603E ACD Console (CallMaster digital console)	Data and voice	TN754B TN2181, TN754 TN754B TN2181, TN754

Administration Terminals

Table 8-3 lists the administration terminals that can be connected to the system.

Table 8-3. Administration Terminals

Administration Terminal	Application
510D	Remote administration
513, 610, 610D, 615, 715* BCT (G3s, G3i) 4410, 4425, VT220	Generic 3 Management Terminal (G3-MT) (formerly System Access Terminal (SAT)) administration and general purpose
515 BCT	Remote administration, general purpose
615 MT (G3s, G3i)	Manager I system administration and maintenance terminal

*The keyboards and terminals are interchangeable when an adapter cable is used.

- The older version of the 715 BCT terminal (715 BCS) (406803148 and 406803155), has a 6-pin mini-DIN keyboard connector
 - The new version of 715 BCT terminal (715 GBCS) (4073113881 and 407313899), has a 6-pin RJ-11 keyboard jack located on the side of the terminal
-

Figure 8-3 shows typical connections from a system to data terminals.

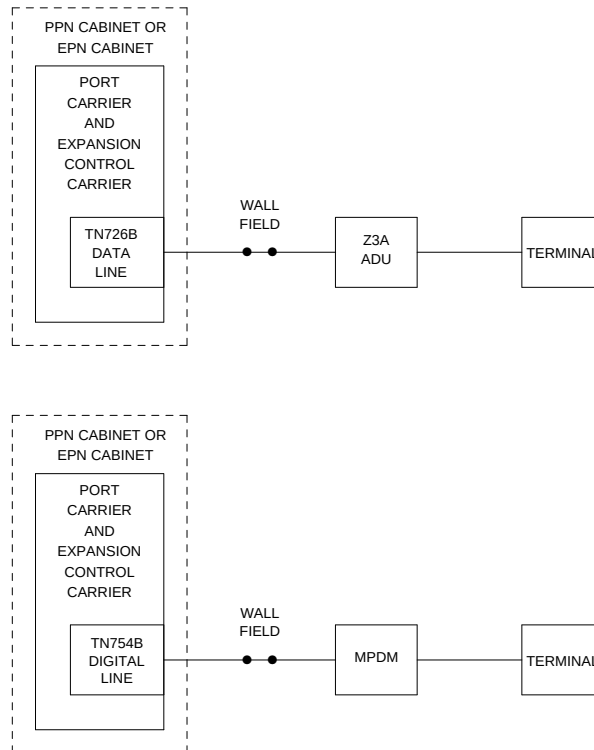


Figure 8-3. Typical Connections to Data Terminals

Printers

The following printers can be connected to a system: system printer: Models 443, 450, 460, 470, 475, 476, 477, 478, 479, 495, 5310, and 5320. Call Detail Recording (CDR) printer — Prints call records.

Figure 8-4 shows a G3r connected to a system printer and a CDR printer with EIA and DCP interfaces. The TN553s connected to the TN726Bs in the figure are used for system access ports. A TN553 converts Mode-2 protocol to Mode-3 protocol, connecting the TN726B to the TDM bus for the EIA interfaces.

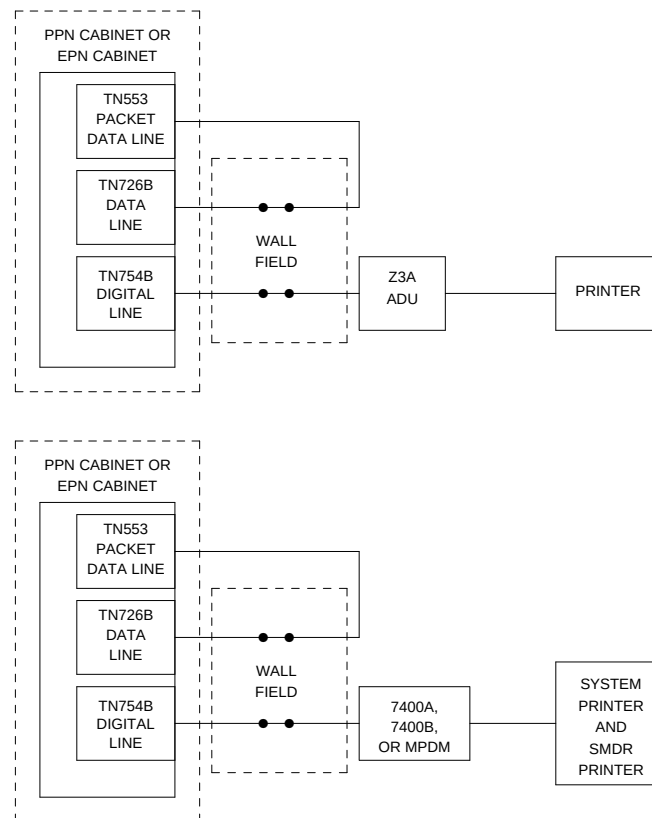


Figure 8-4. Connections to Printers

Messaging Adjuncts

The following list includes messaging adjuncts that can be used with a system:

- AUDIX™, allows subscribers to originate, send, receive, and store voice messages
- 3B2 Message Server Adjunct (MSA), provides a set of messaging for services allowing the creation, transmission, storage, and retrieval of messages among users

- Property Management System (PMS), provides a communications link between a system and a customer's computer used for services such as reservations, housekeeping, and billing
- Call Management System (CMS), collects and processes Automatic Call Distribution (ACD) information sent from a system
- ISDN Gateway, provides incoming call management telemarketing capabilities by monitoring and controlling system call-handling via a high-speed system-to-adjunct communications channel
- CONVERSANT™ Voice Information System, an interactive voice-response system that automates telephone-call transactions, such as routing data between departments, registering persons, and providing bank account records. CONVERSANT™ operates in a PC and communicates with users by digitally recorded speech

Figure 8-5 through Figure 8-11 show a G3r connected to AUDIX.

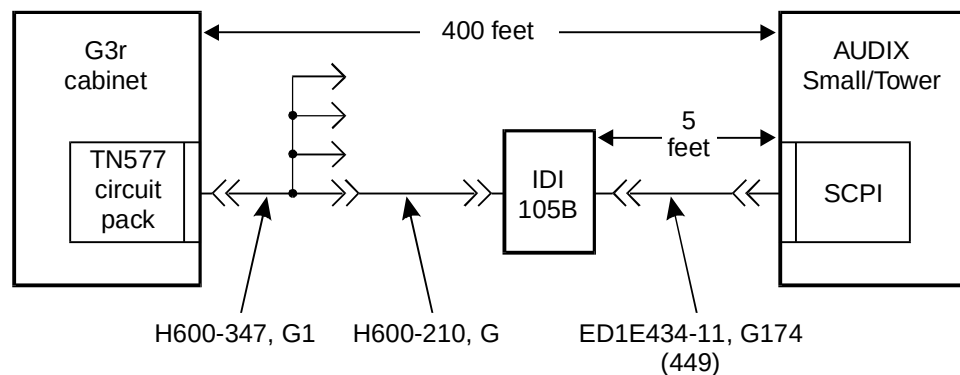


Figure 8-5. AUDIX Small/Tower — Direct Connection

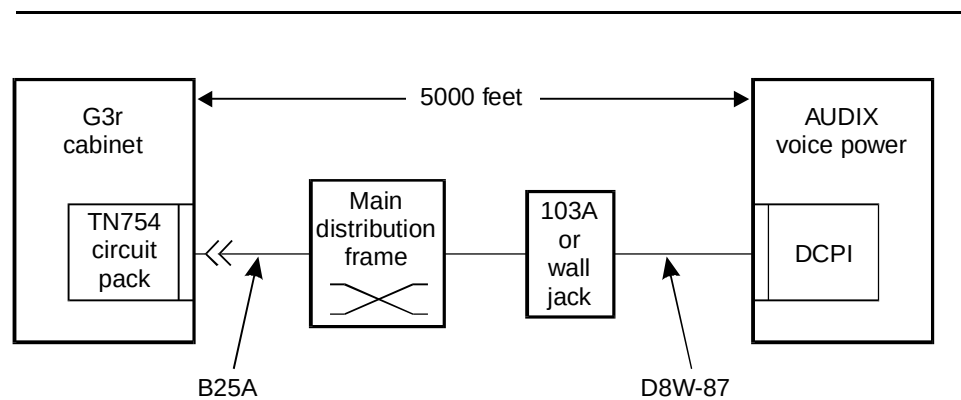


Figure 8-6. AUDIX Small/Tower — DSU Connection

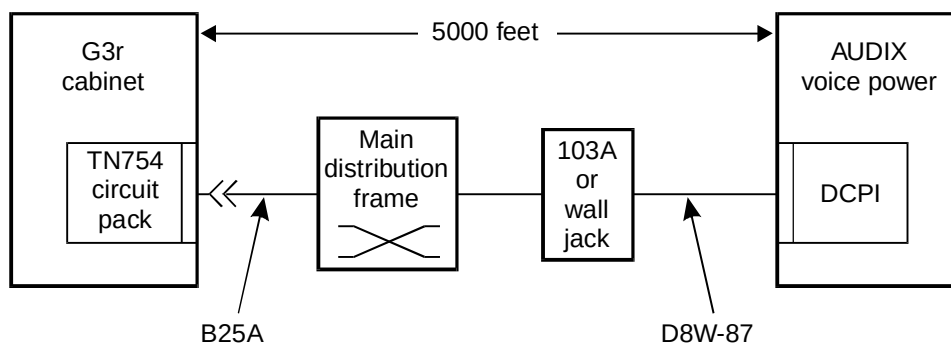


Figure 8-7. AUDIX Voice Power — Switch-Connected

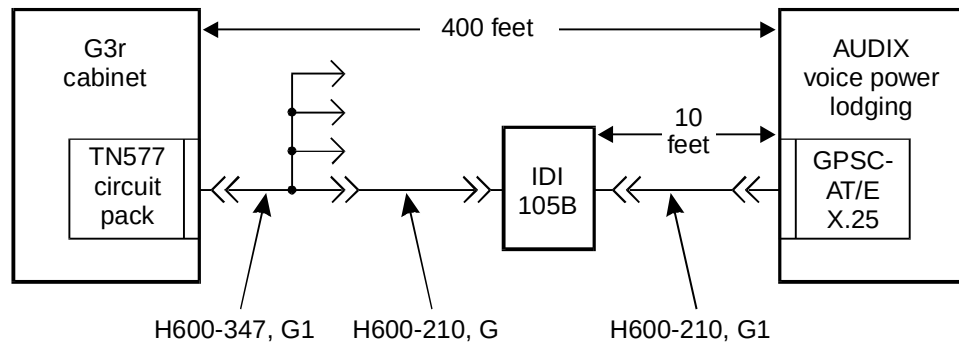


Figure 8-8. AUDIX Voice Power — Direct-Connected

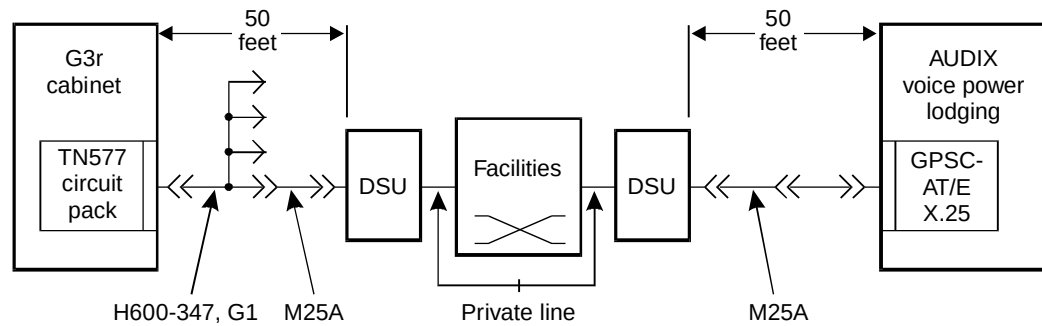


Figure 8-9. AUDIX Voice Power — DSU-Connected

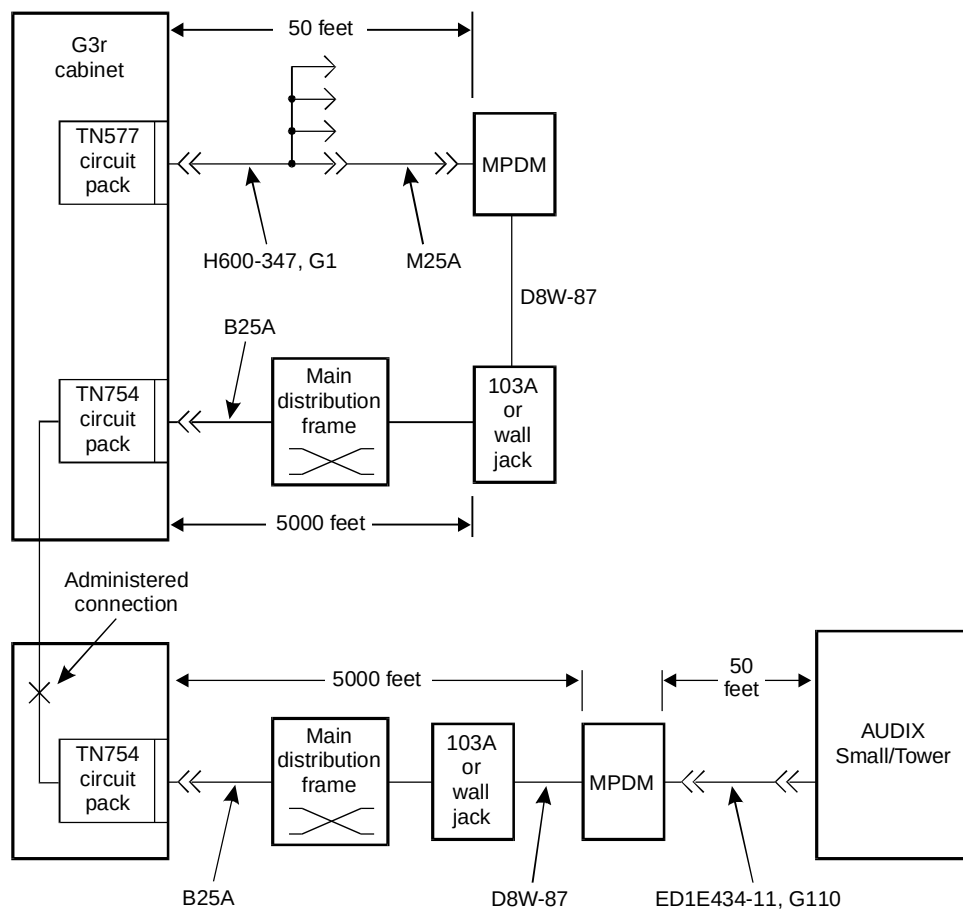


Figure 8-10. AUDIX Small/Tower — Switch-Connected

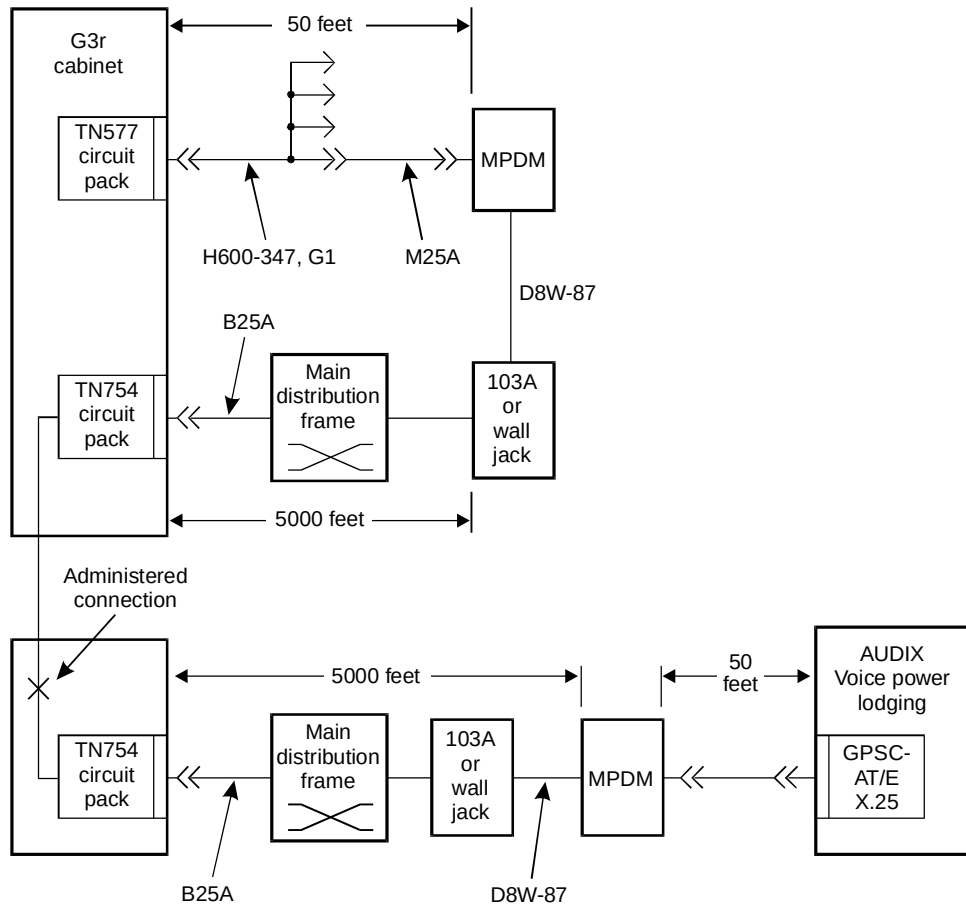


Figure 8-11. AUDIX Voice Power — Switch-Connected

Figure 8-12 through Figure 8-15 show AUDIX™ control link connections.

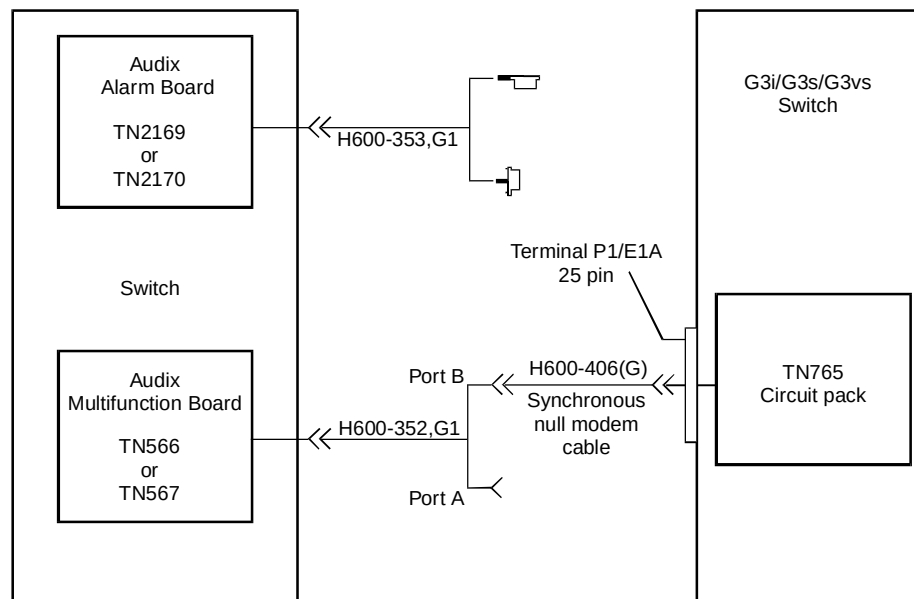


Figure 8-12. AUDIX Control Link Direct Connection to G3i/s/vs



CAUTION:

Electric shock and/or fire may result from a cabinet-to-cabinet connection of the H600-406 Control Link Cable.

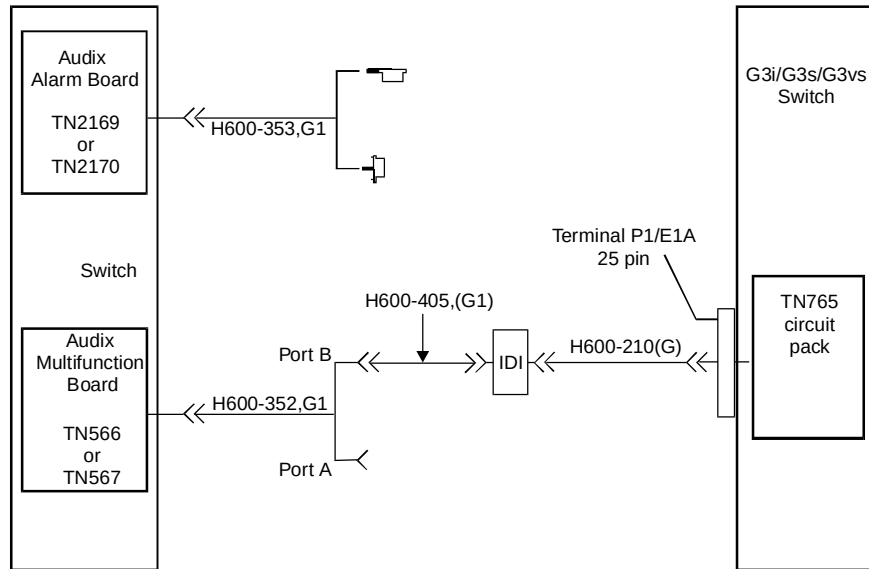


Figure 8-13. AUDIX Control Link IDI Connection to G3i/s/vs

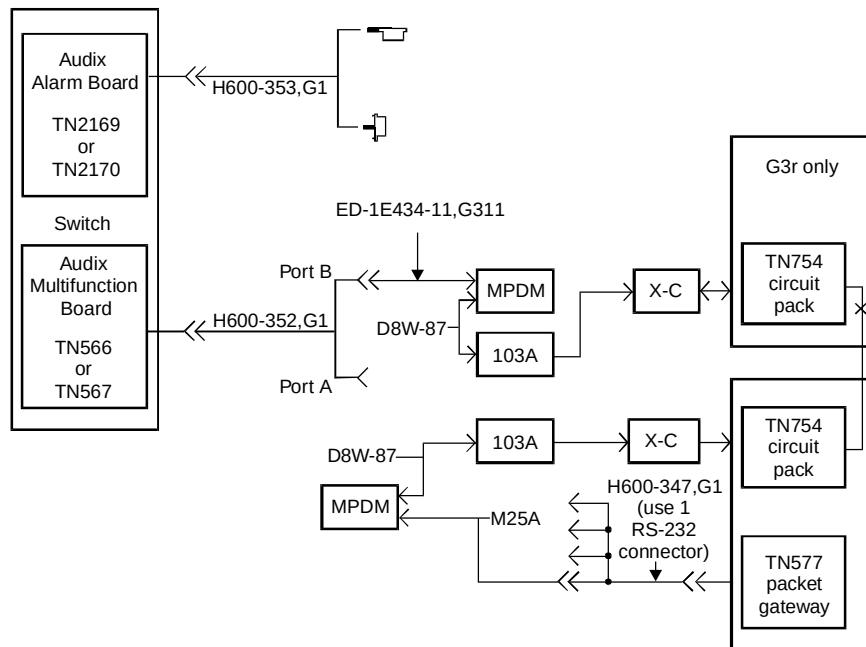


Figure 8-14. AUDIX Control Link MPDM Connection to G3r

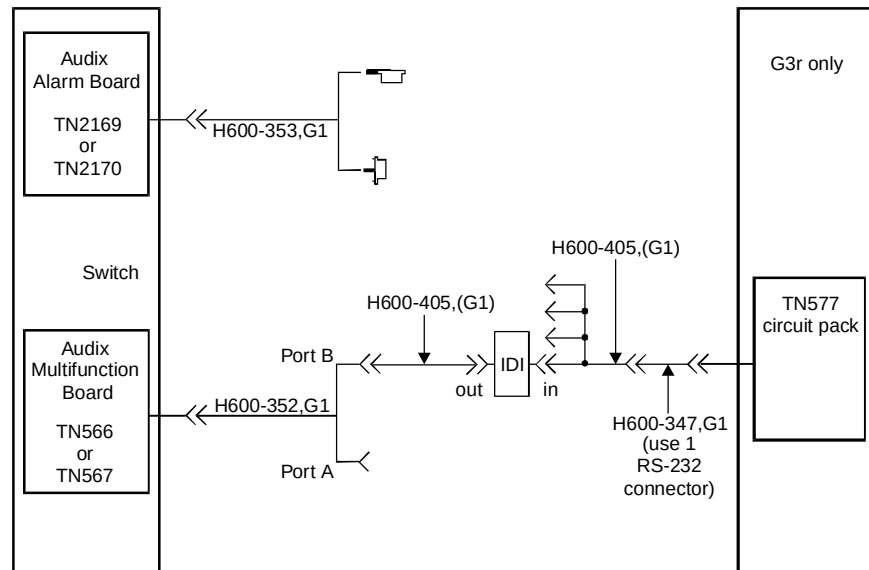


Figure 8-15. AUDIX Control Link IDI Connection to G3r

Figure 8-16 shows the AUDIX alarm connection.

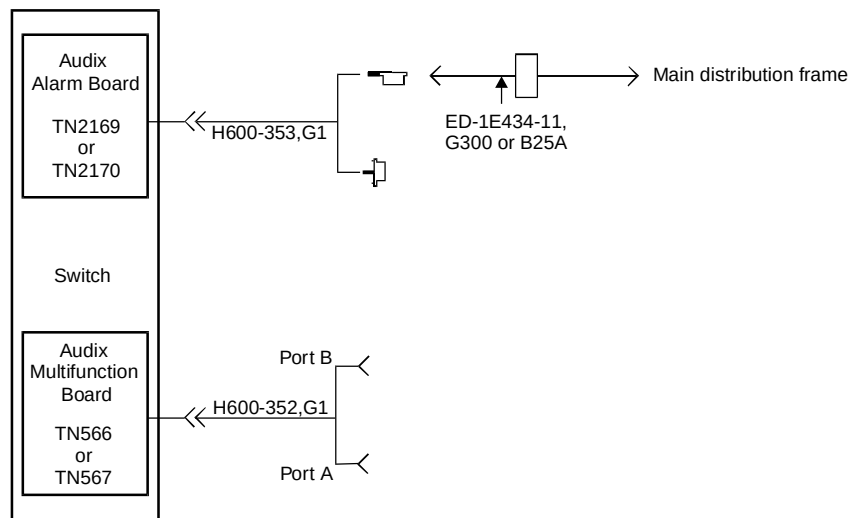


Figure 8-16. AUDIX Alarm Connection

Figure 8-17 through Figure 8-20 show a G3 connected to INTUITY™.

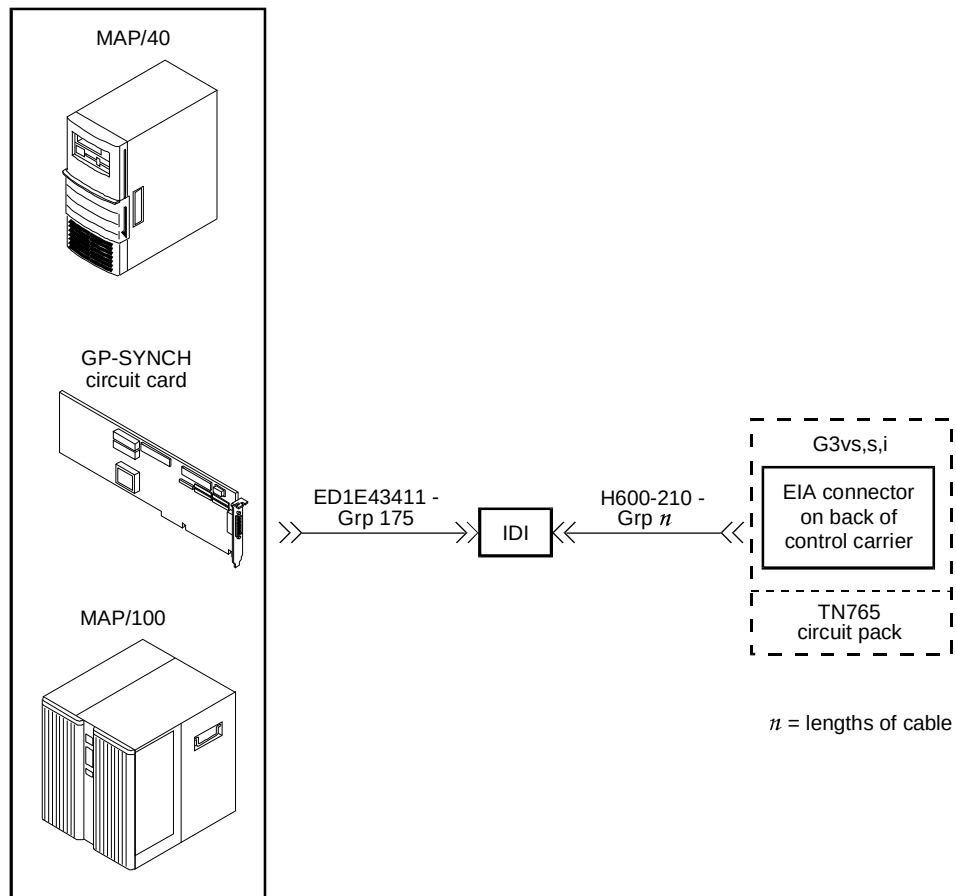


Figure 8-17. Direct Connection from G3vs, s, i to INTUITY

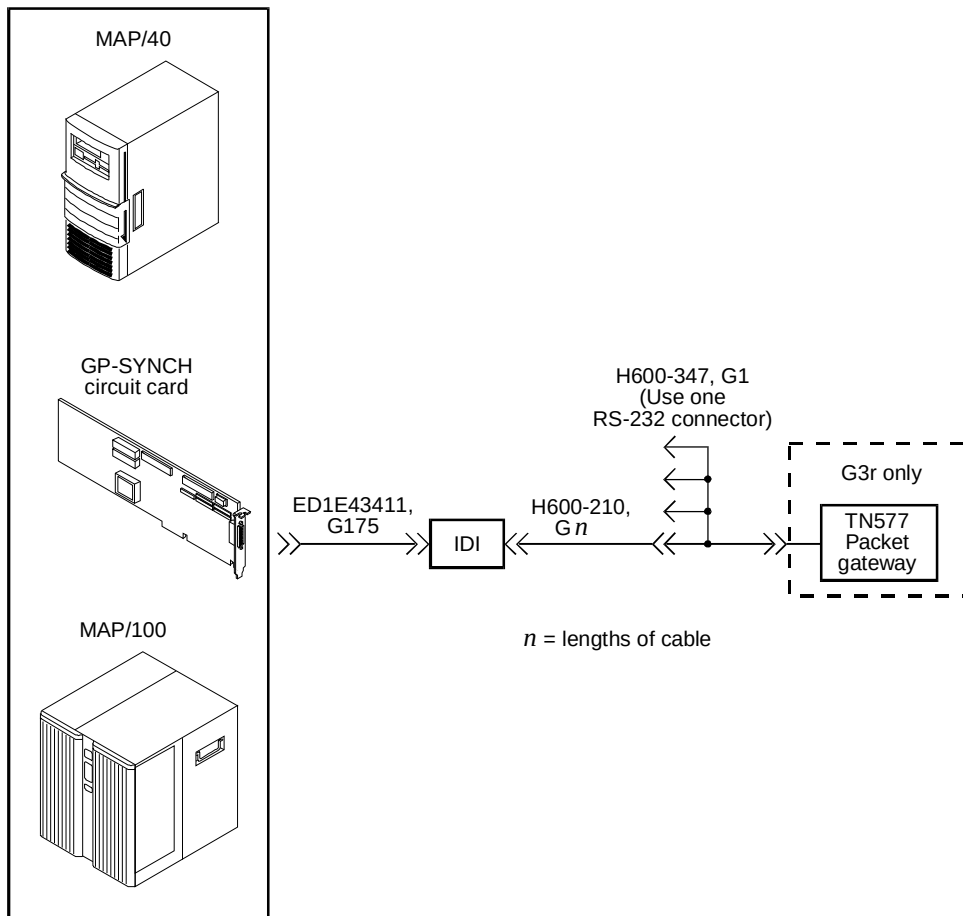


Figure 8-18. Direct Connection from G3r to INTUITY

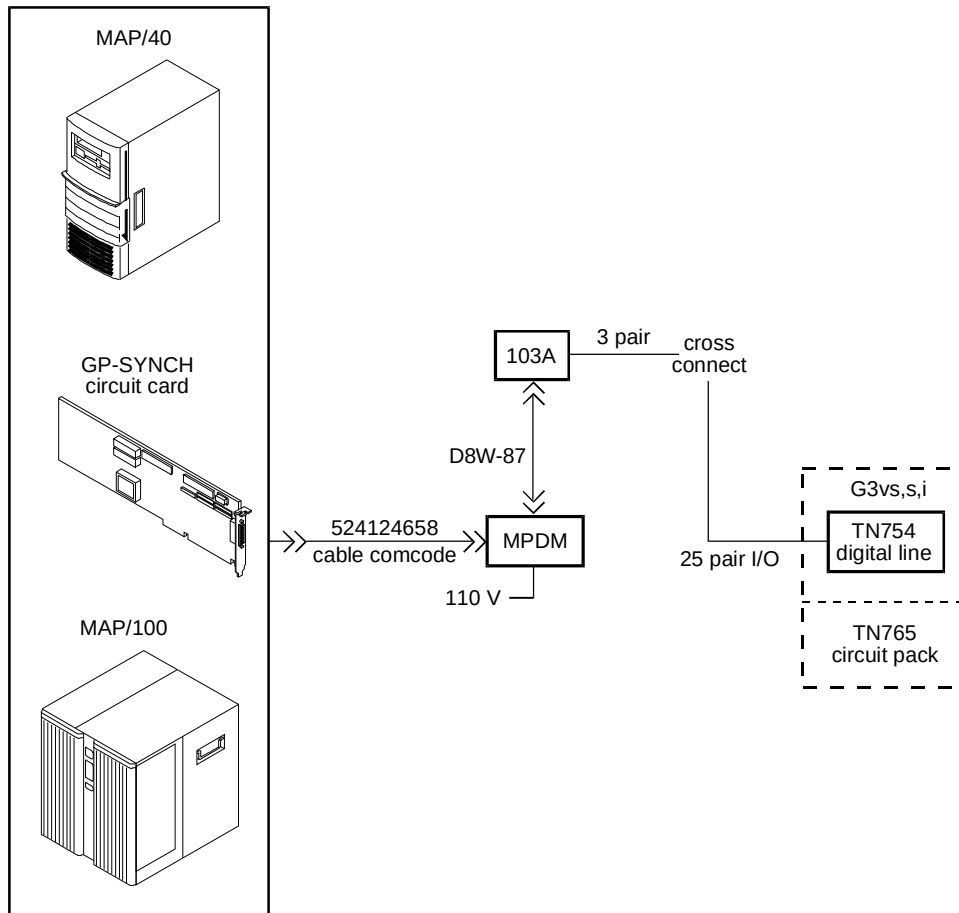


Figure 8-19. Connection to INTUITY via MPDM (Switch Connect)

Figure 8-21 through Figure 8-26 show a G3 connected to the CMS, MSA, and ISDN Gateway messaging adjuncts.

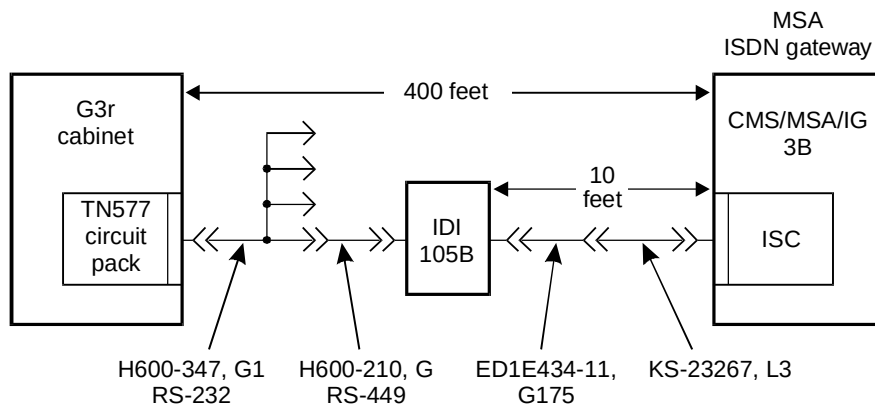


Figure 8-21. CMS/MSA/IG 3B — Direct Connection

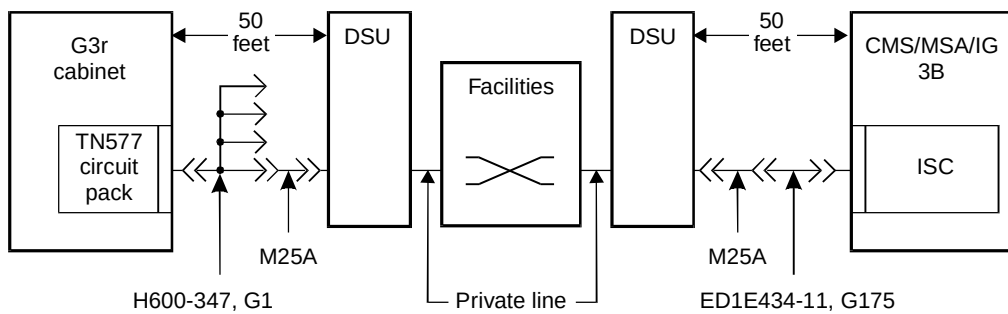


Figure 8-22. CMS/MSA/IG 3B — DSU Connection

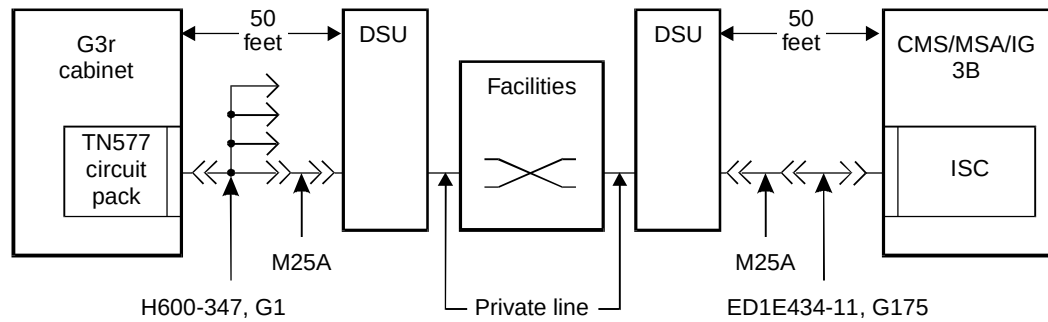


Figure 8-23. CMS/MSA/IG 6386 — Direct Connection

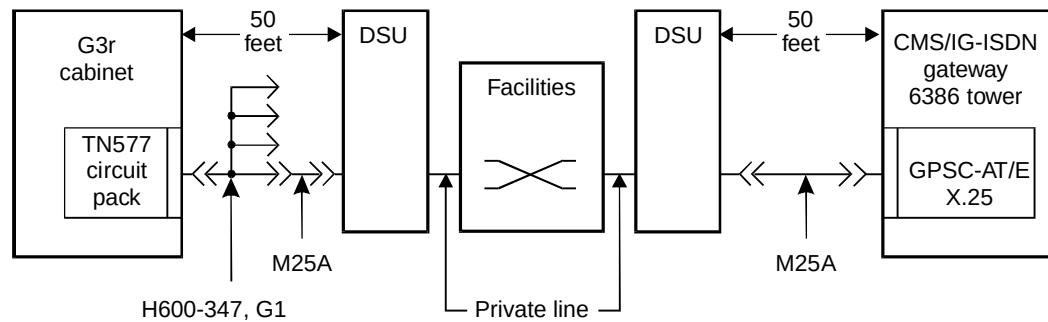


Figure 8-24. CMS/MSA/IG 6386 — DSU Connection

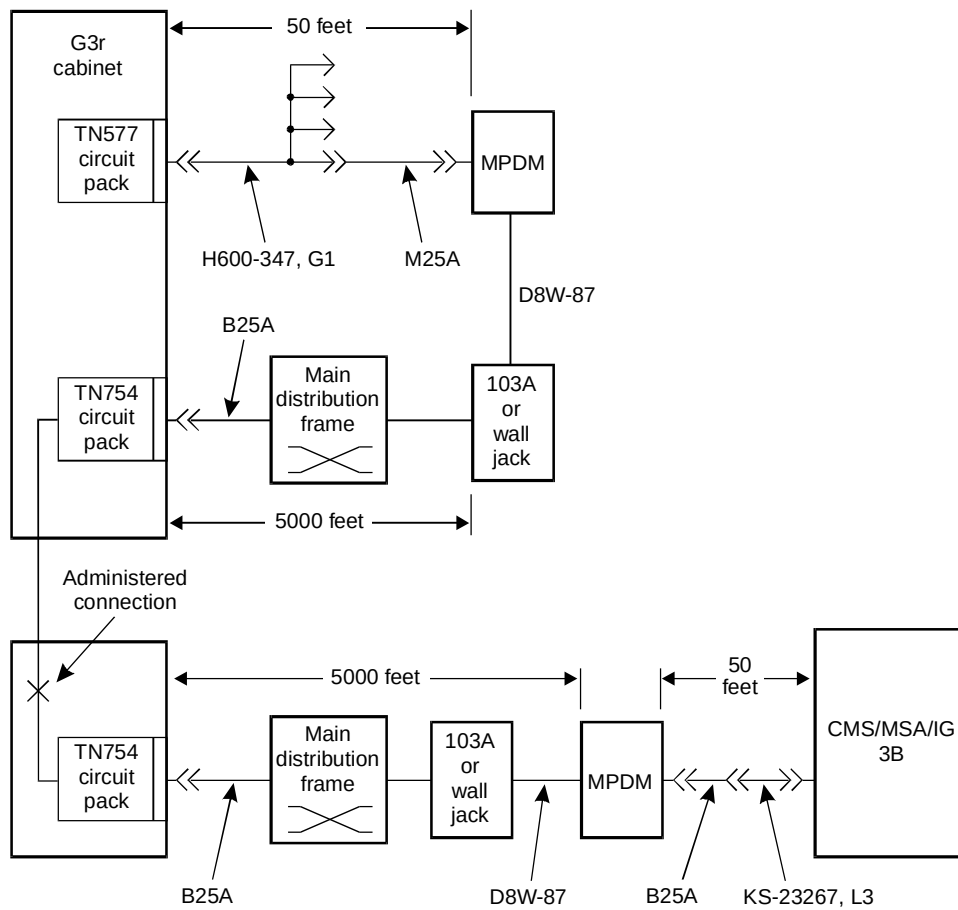


Figure 8-25. CMS/MSA/IG 3B — Switch Connection

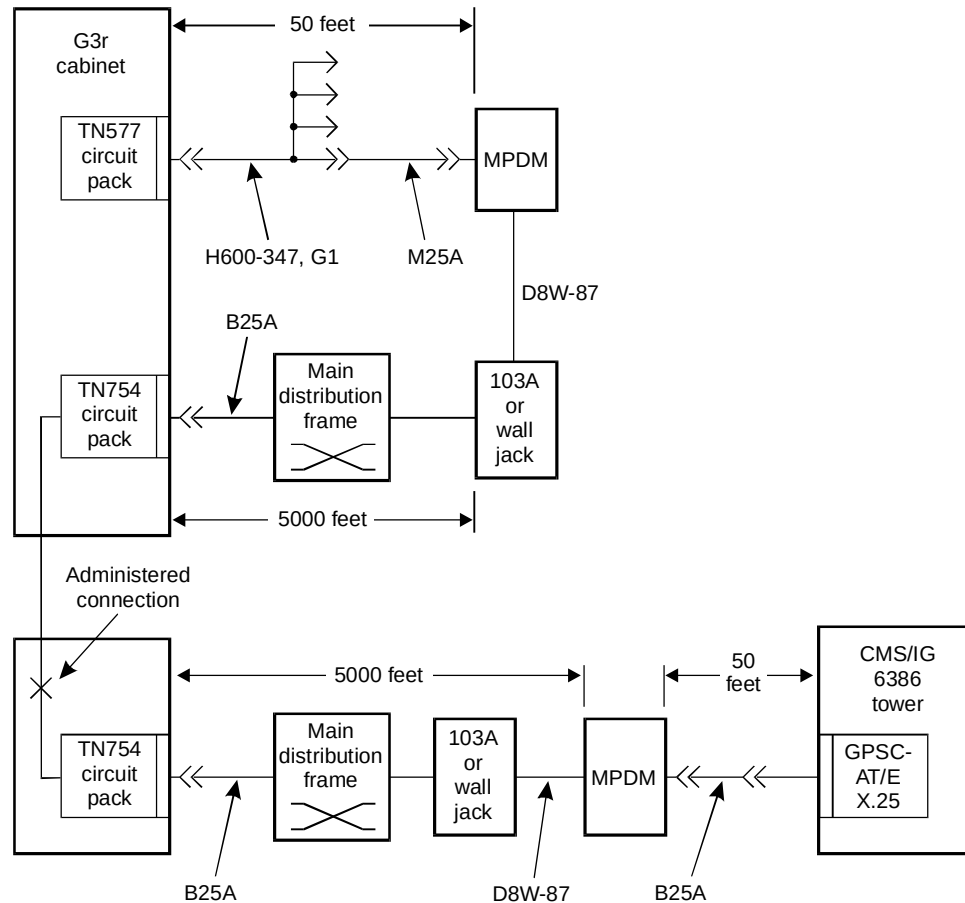


Figure 8-26. CMS/MSA/IG 6386 — Switch Connection

Telemarketing Adjuncts

Telemarketing adjuncts include an external queue-status indicator lamp to provide status information about the number of calls and the time of the oldest call in an ACD queue. Other adjuncts include CONVERSANT™ Voice Inquiry Service to provide ICM features such as Voice Messaging and Automated Attendant. The recorded announcement used with ACD and non-ACD hunt groups provide recorded announcements for incoming calls queued for a longer time than the administered “delay announcement” time (0 to 999 seconds) or for calls directed to an announcement.

G3r supports integrated, auxiliary, and analog announcement. G3s and G3i support integrated announcement and analog announcement.

Figure 8-27 shows a G3r connected to a queue-status indicator lamp.

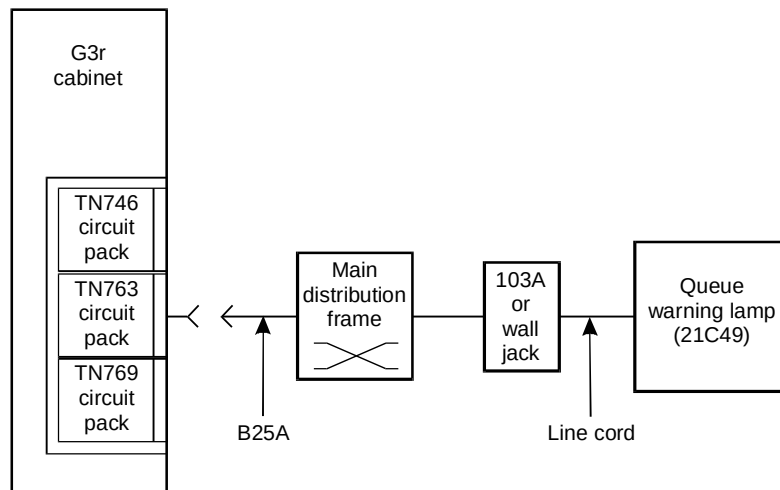


Figure 8-27. Connections to a Queue-Status Warning Lamp

Figure 8-28 and Figure 8-29 show a G3r connected to recorded announcement and dictation equipment.

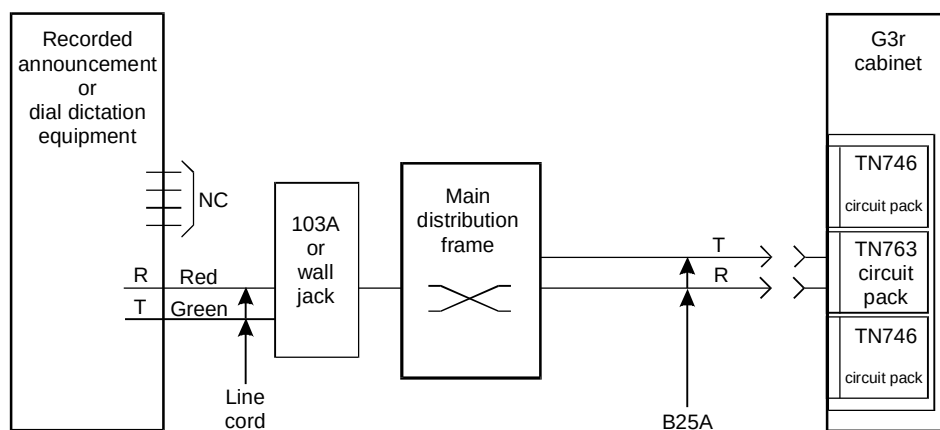


Figure 8-28. Recorded Announcement or Dictation Equipment Connection — FCC-Registered Equipment

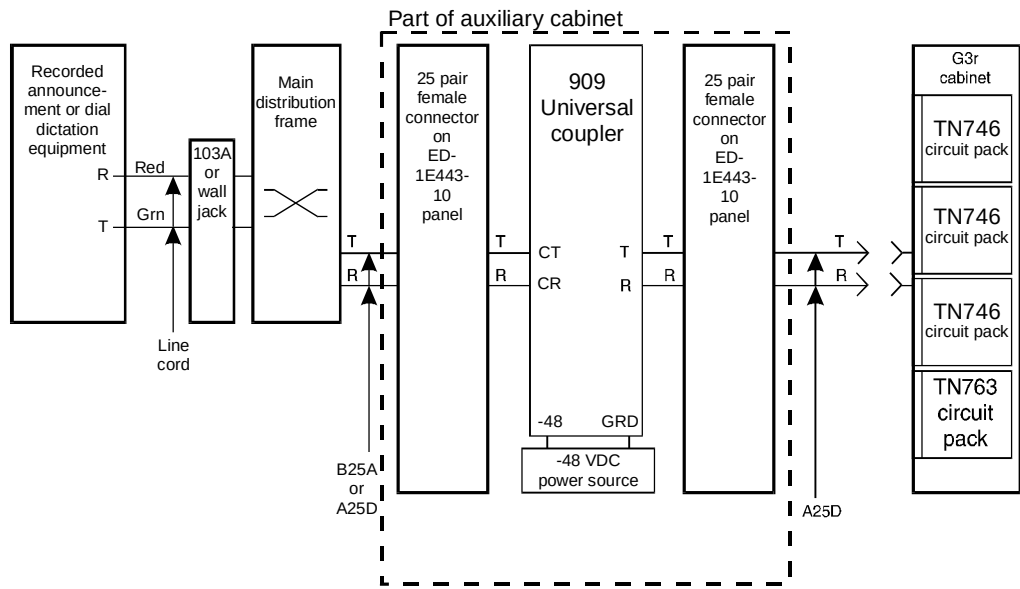


Figure 8-29. Recorded Announcement or Dictation Equipment Connection — Non-FCC Registered Equipment

Administration Adjuncts

Administration adjuncts include Operation Support Systems (OSSs). The adjuncts are used to administer and maintain a system. The following list includes administration adjuncts that can be used with a system:

- PC-based DEFINITY[®] Generic 3 Management Applications (G3-MA)
- DEFINITY Generic 3 Management Terminal (G3-MT)
- Facility Diagnostics
- Network Reconfigurator
- Modular System Management (MSM)

Figure 8-30 shows a system connected from a PPN cabinet to a G3-MT.

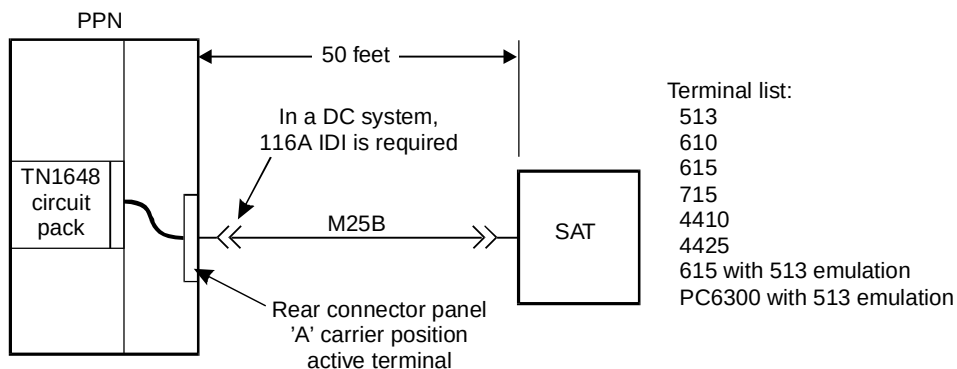


Figure 8-30. Connection from a PPN Cabinet to a G3-MT

Figure 8-31 shows a system connected from an EPN cabinet to a G3-MT. The G3-MT connected to the TN775 in the EPN is used only for maintenance.

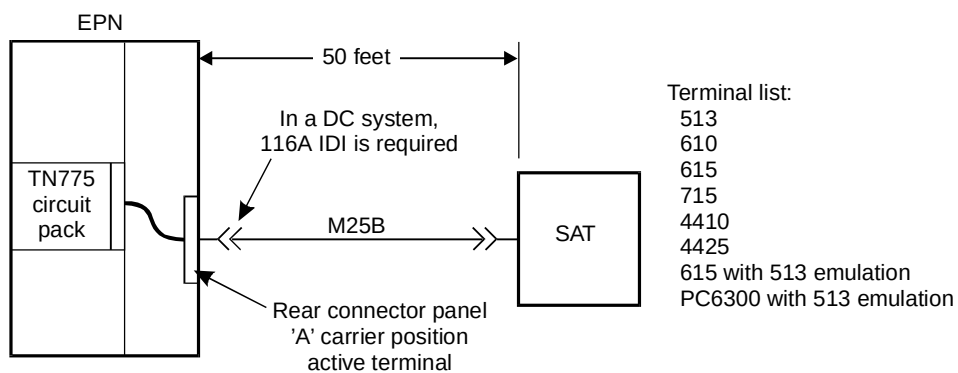


Figure 8-31. Connection from an EPN Cabinet to a G3-MT

Figure 8-32 and Figure 8-33 show a system connected to a remote G3-MT.

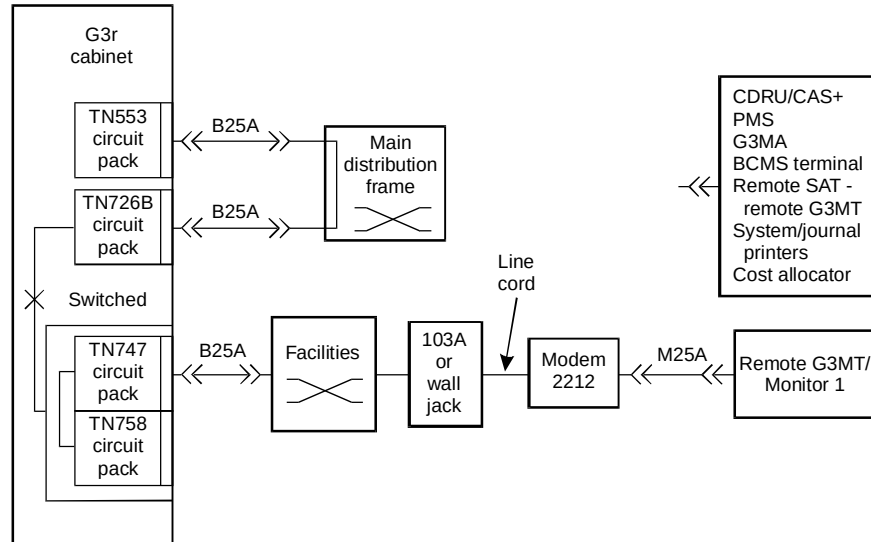


Figure 8-32. Remote G3-MT with Integrated Modem Pool

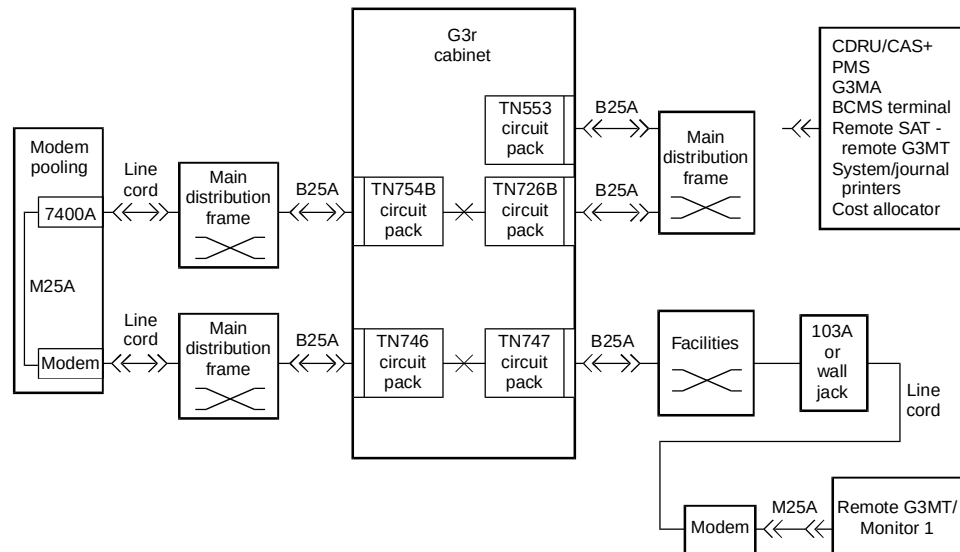


Figure 8-33. Remote G3-MT with Combined Modem Pool

Call Record Acquisition Adjuncts

Call record acquisition adjuncts collect call records produced by a system when calls are connected. These adjuncts store and process records and send them to other systems such as data processing equipment, tape drives, and printers. Call record acquisition adjuncts include Call Detail Recording Utility (CDRU), 3B2 CDRU, 6386 CDRU, CDRU/small (CDRU/S), and CDRU/SE which collects CDR records sent from G3. Other adjuncts include Call Accounting System (CAS) Plus, and Cost Allocator.

Figure 8-34 and Figure 8-35 show a G3r connected to a CDRU and a CDRU/S. The TN553s connected to the TN726Bs in the figure are used for system access ports. A TN553 converts Mode-2 protocol to Mode-3 protocol to allow the TN726B to communicate with the TDM bus for the EIA interfaces.

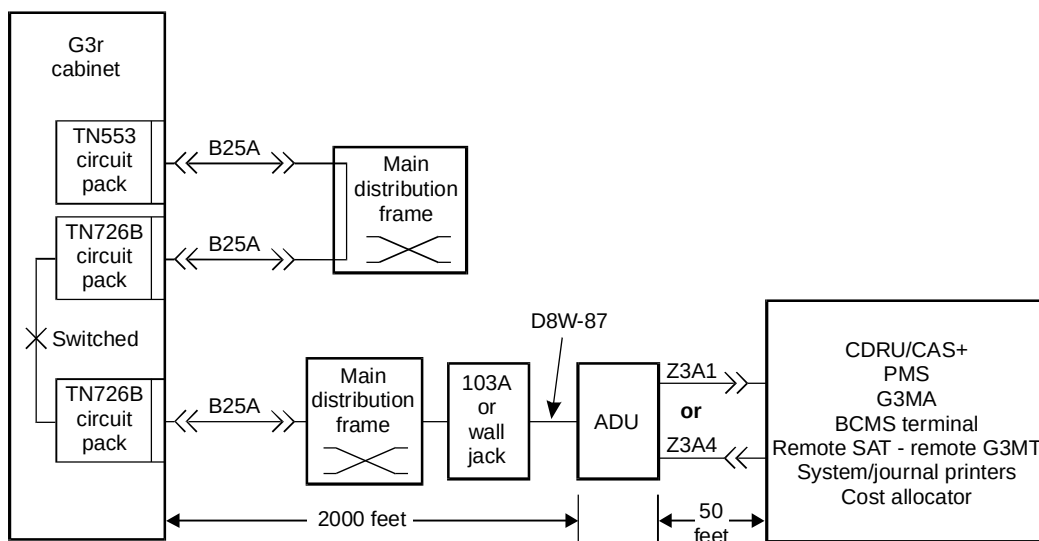


Figure 8-34. G3r to CDRU and CDRU/S — Using ADU

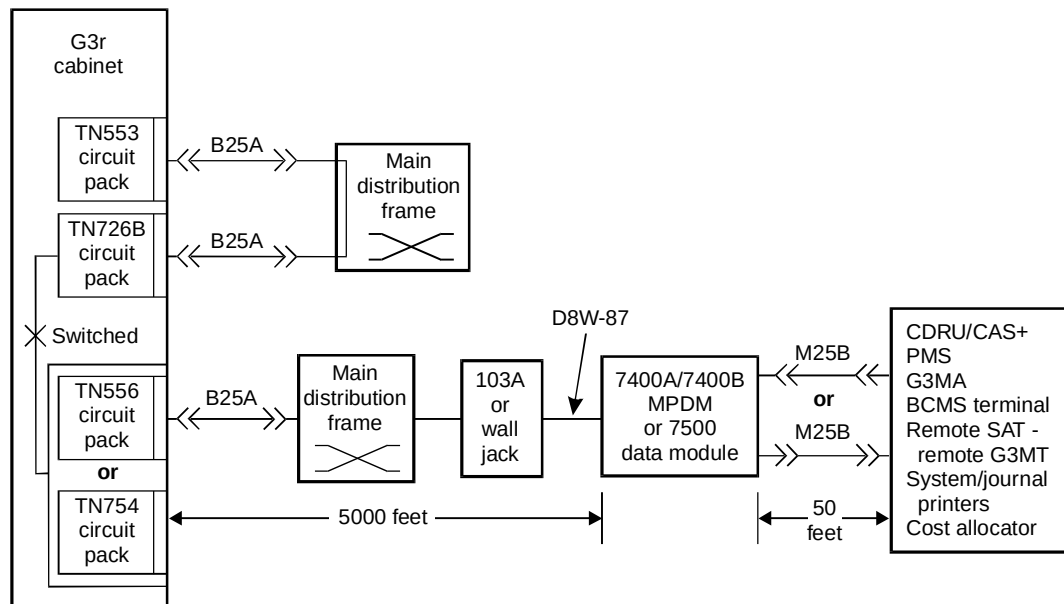


Figure 8-35. G3r to CDRU and CDRU/S — Using Data Module

Miscellaneous Adjuncts

A system can be connected to the following miscellaneous adjuncts: Incoming Call Management (ICM), office application servers, and industry-specific application servers. Other adjuncts include the Stratum 3 Clock (G3r) to provide system timing, and Music-on-Hold to provide customer-supplied music or other audible information to the held party when any single-party call is held by a station or an attendant. Miscellaneous adjuncts also include the following:

- Loudspeaker Paging
- Recorded Announcement
- Malicious Call Trace (MCT)
- Digital Announcement
- CallVisor® Host
- LAN/Gateway assembly platform (embedded). For more information, see:

DEFINITY® Communications System Generic 3 CallVisor ASAI Technical Reference, 555-230-220

DEFINITY® Communications System Generic 3 Installation, Administration, and Maintenance of CallVisor ASAI Over the DEFINITY® LAN Gateway, 555-230-223

Figure 8-36 shows a G3 connected to a Stratum 3 external synchronization clock.

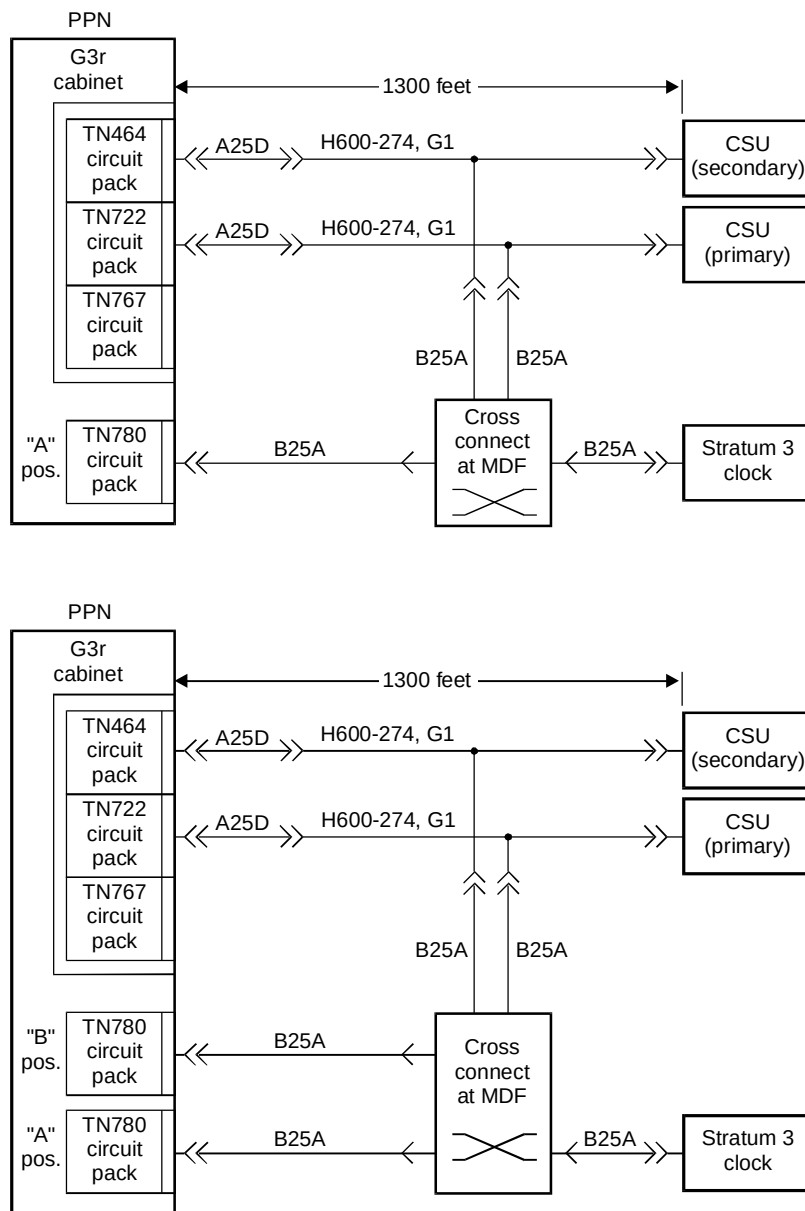


Figure 8-36. Connections to a Stratum 3 Clock

Figure 8-37 and Figure 8-38 show connections to Music-On-Hold equipment. If the equipment is not FCC-registered or is in a country outside the USA, an AT&T representative should be contacted about registration.

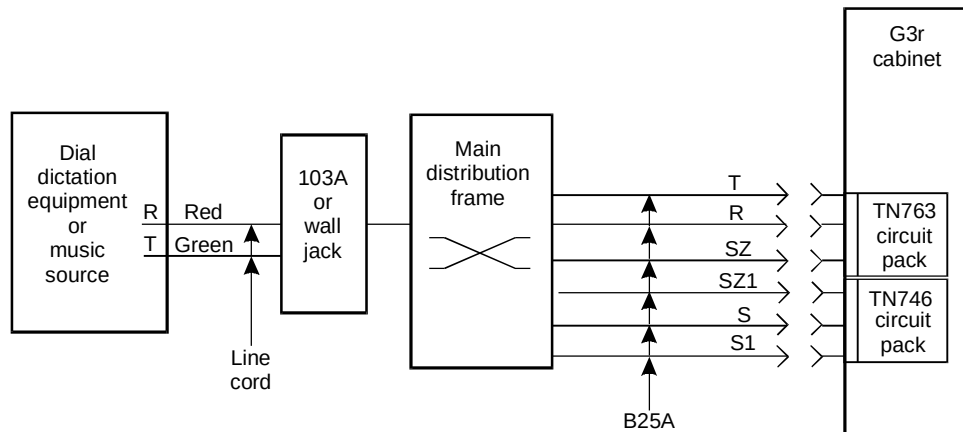


Figure 8-37. Connections to Music-On-Hold Equipment — FCC-Registered, via an Auxiliary Trunk

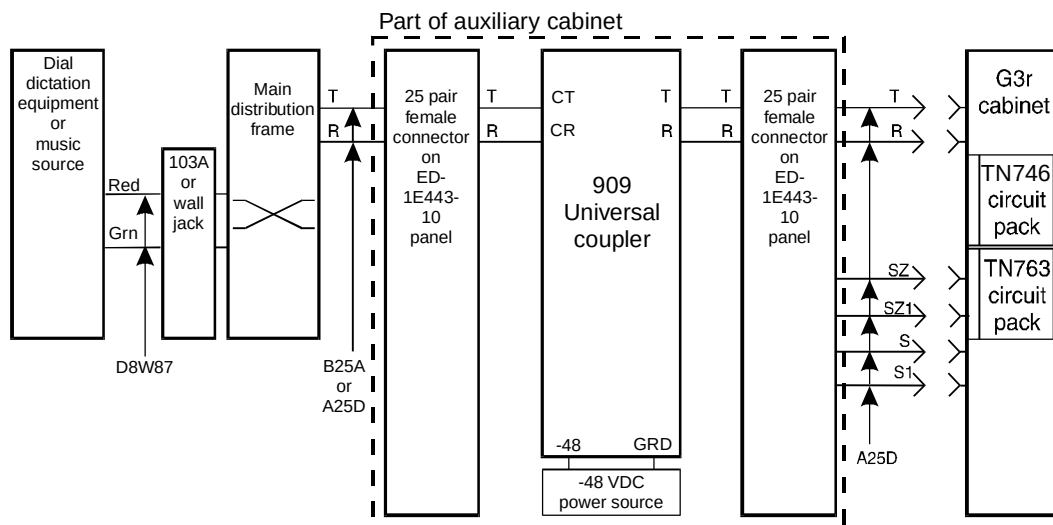


Figure 8-38. Connections to Music-On-Hold Equipment — Non-FCC Registered, via an Auxiliary Trunk

Figure 8-39 and Figure 8-40 show connections to an analog line using a KS23395 and a KS21906, respectively.

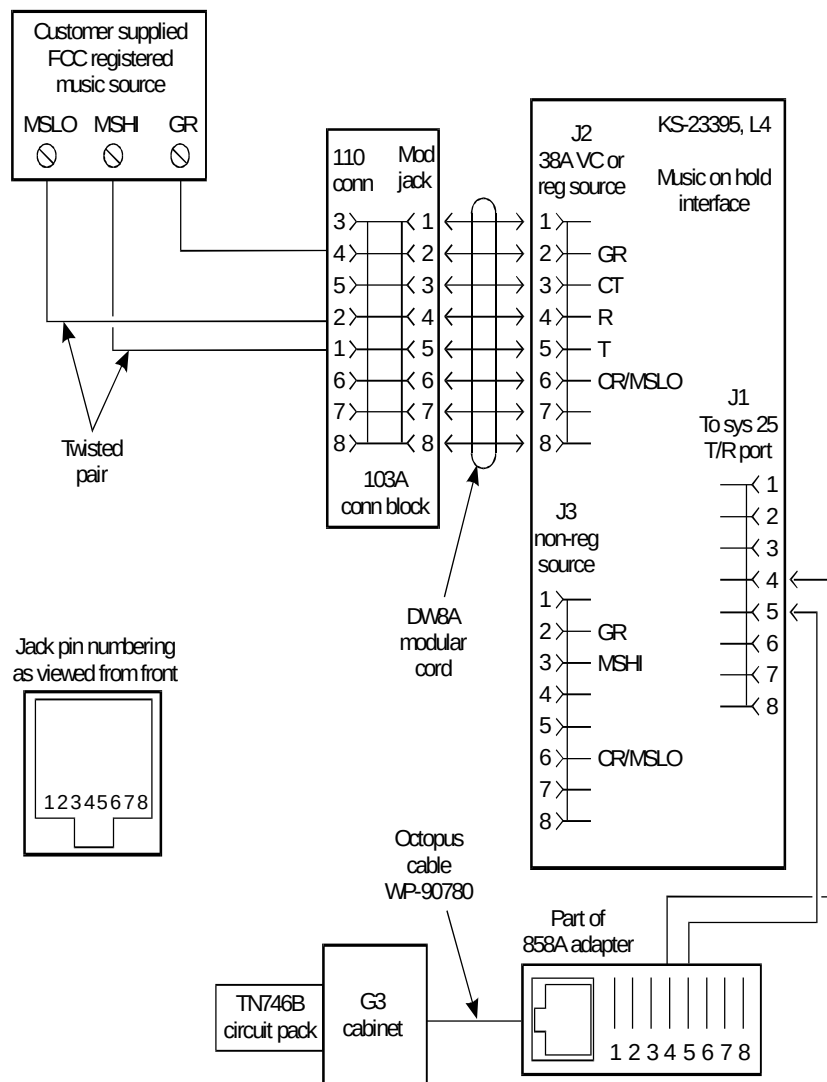


Figure 8-39. Music-on-Hold (FCC-registered) via Analog Line using KS23395

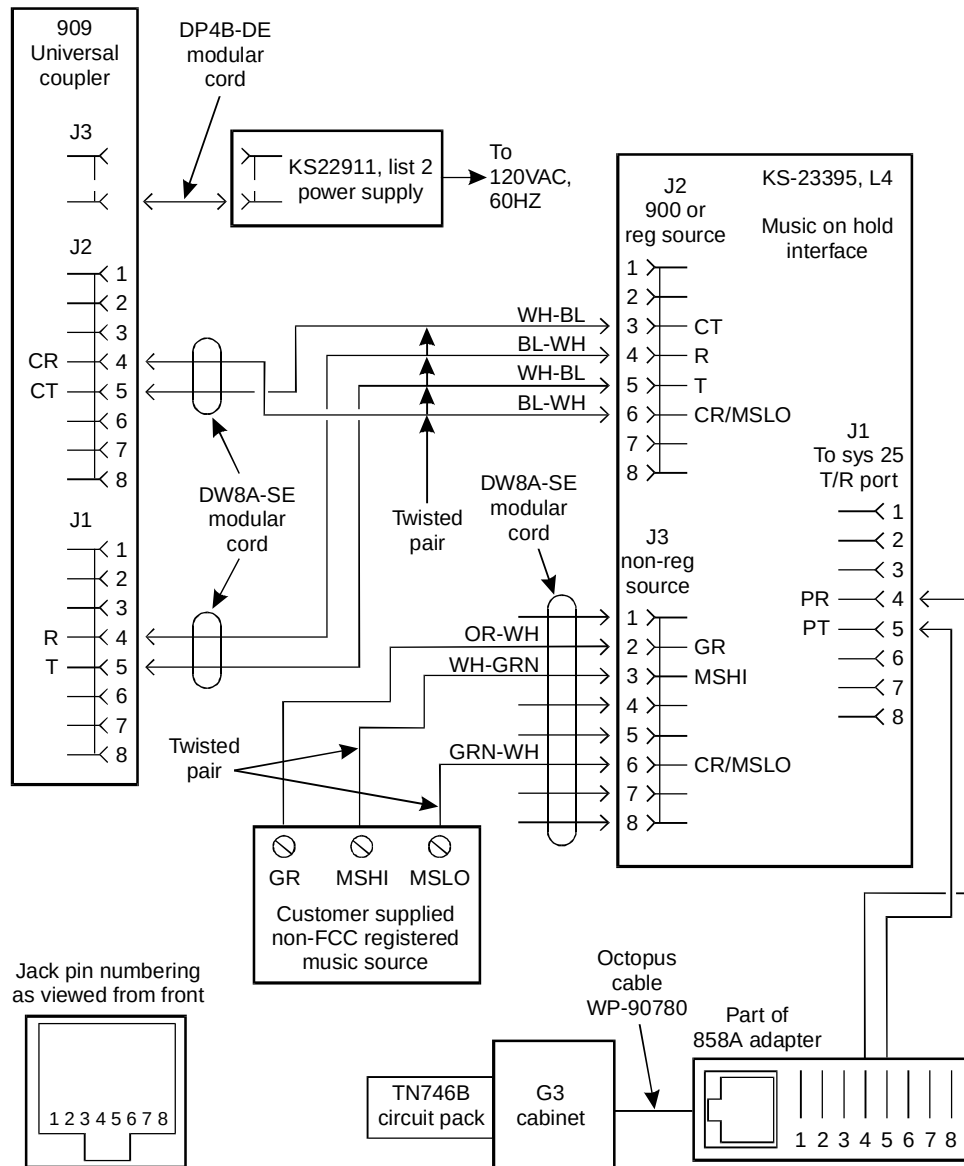


Figure 8-40. Music-on-Hold (non-FCC-registered) via Analog Line using KS21906

Figure 8-41 through Figure 8-47 show connections to Loudspeaker Paging equipment.

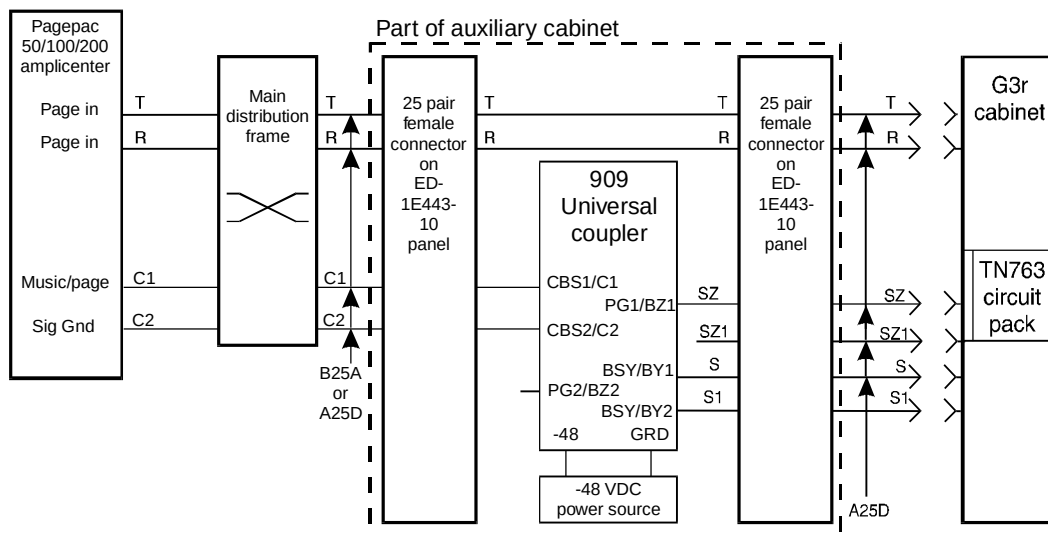


Figure 8-41. PagePac 50/100/200 Amplicenter for Loudspeaker Paging

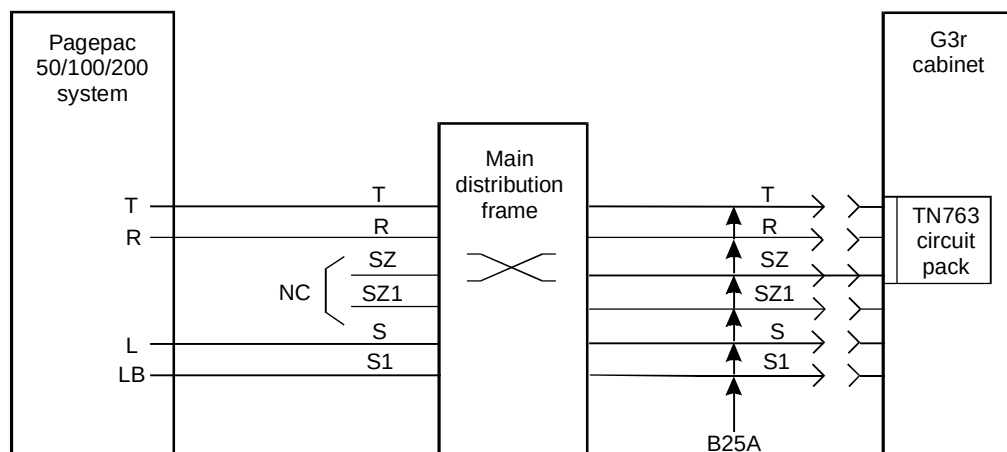


Figure 8-42. PagePac 50/100/200 for Loudspeaker Paging

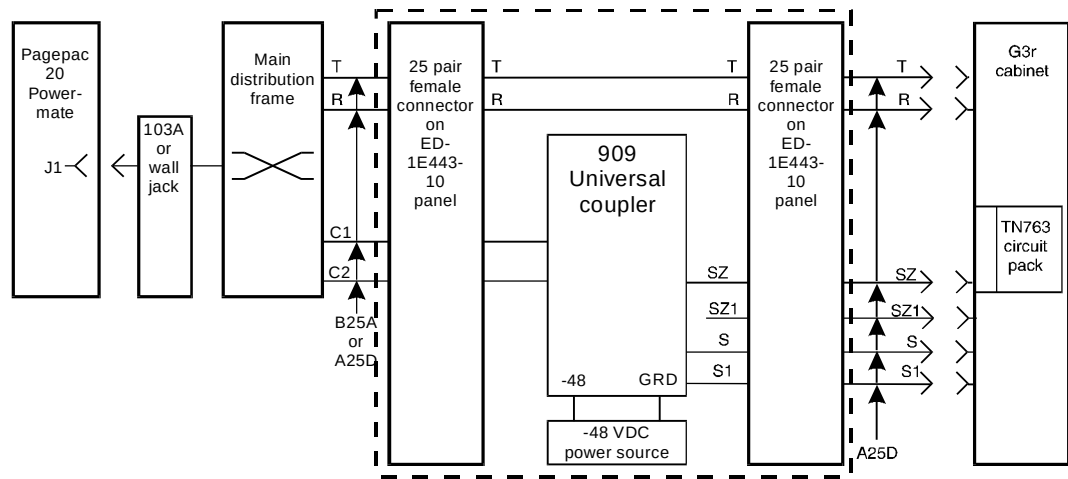


Figure 8-43. PagePac 20 without Zone-Mate for Loudspeaker Paging

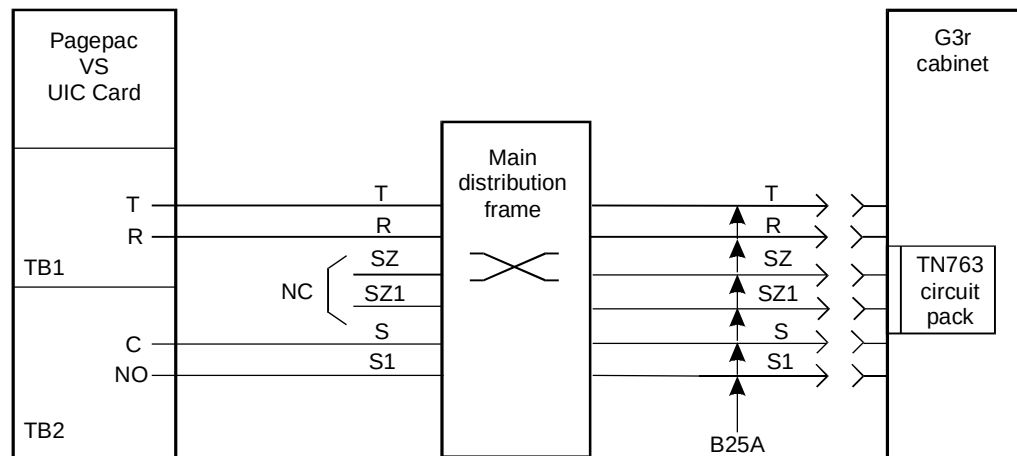


Figure 8-44. Connections to PagePac VS

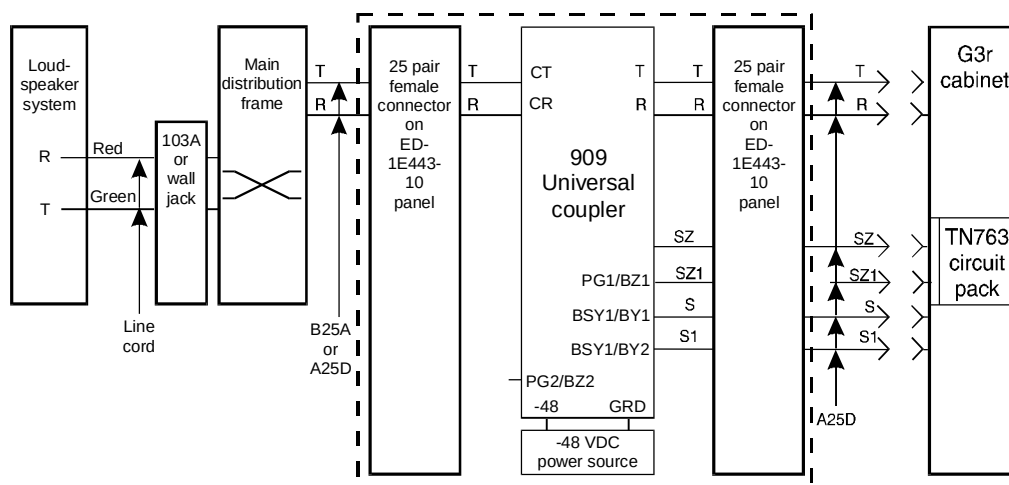


Figure 8-45. Loudspeaker Paging Equipment with 909 Coupler

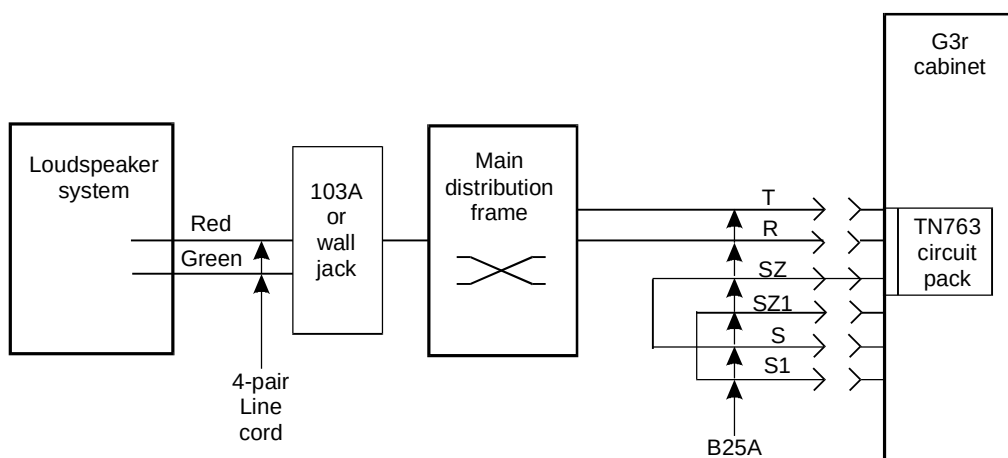


Figure 8-46. Loudspeaker Paging Equipment without 909 Coupler

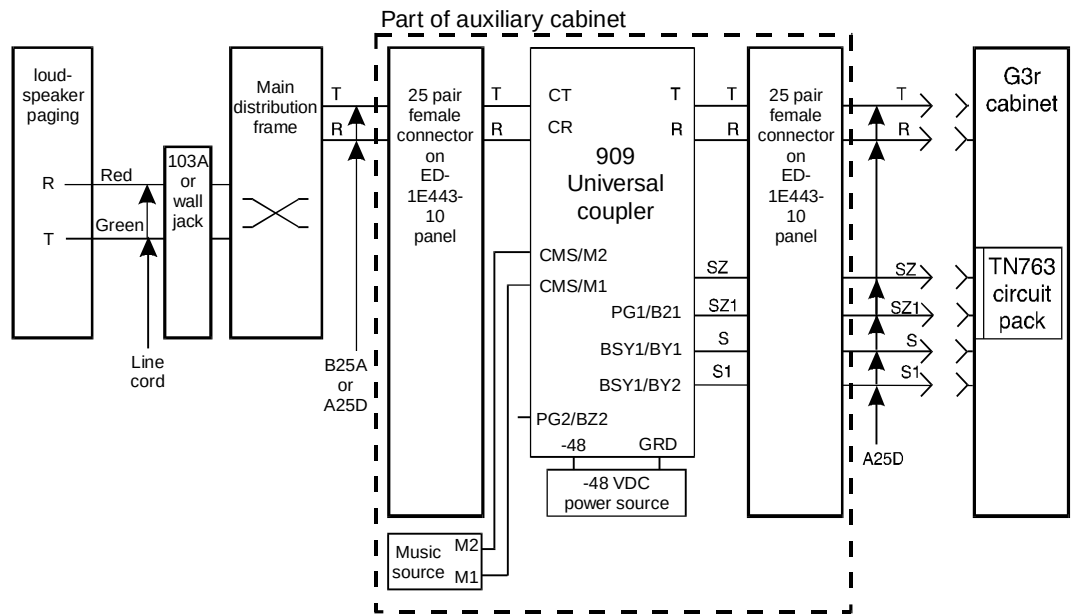


Figure 8-47. Loudspeaker Paging Equipment with Background Music

Figure 8-48 through Figure 8-50 show connections to recorded announcement equipment.

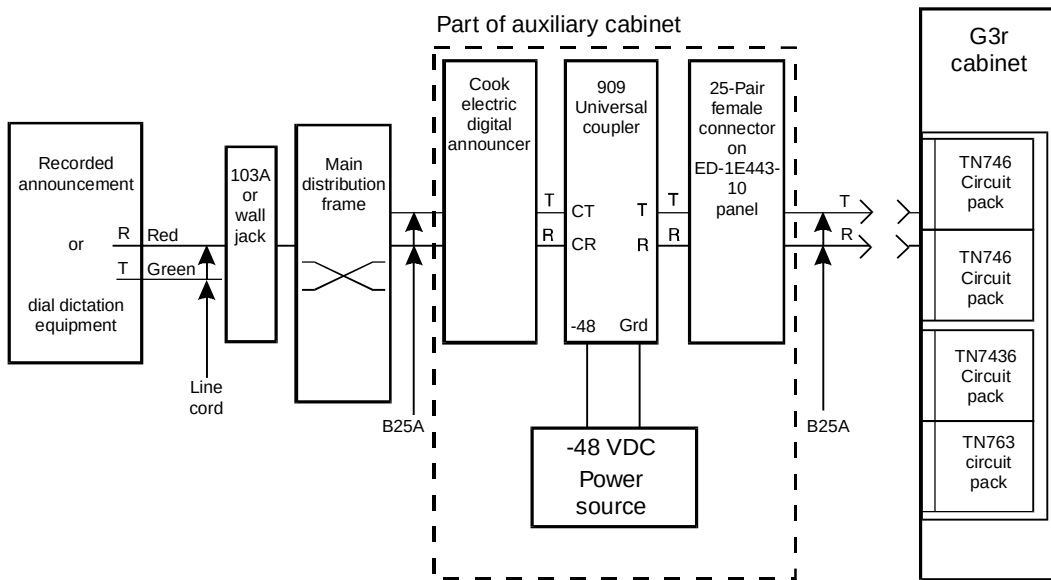


Figure 8-48. Recorded Announcement Equipment

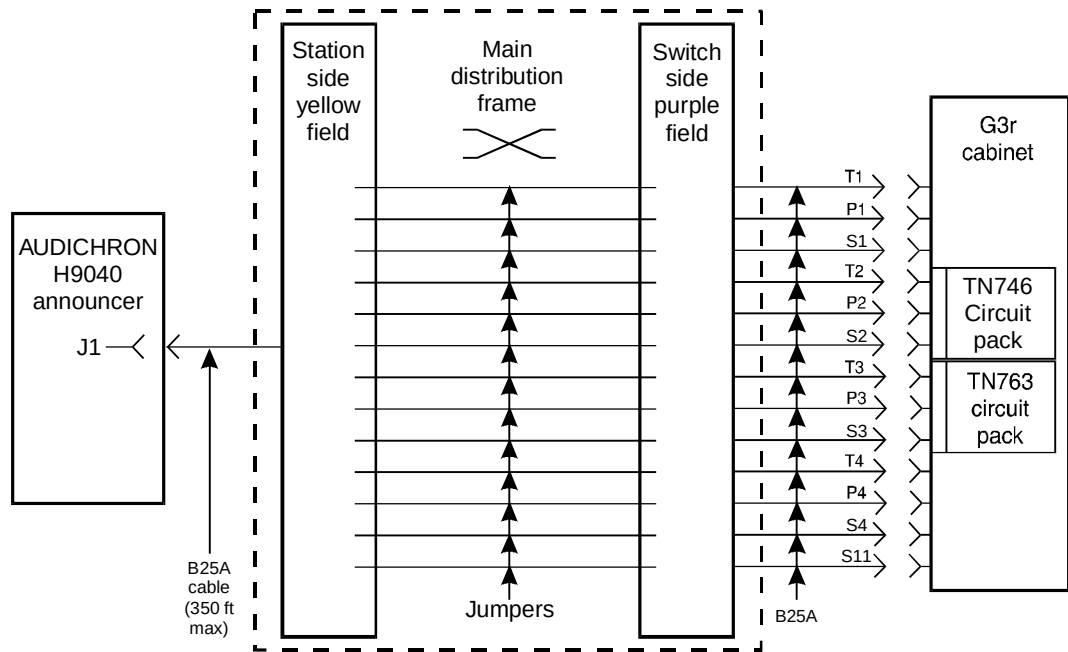


Figure 8-49. Recorded Announcement Equipment Using Two Circuit Packs

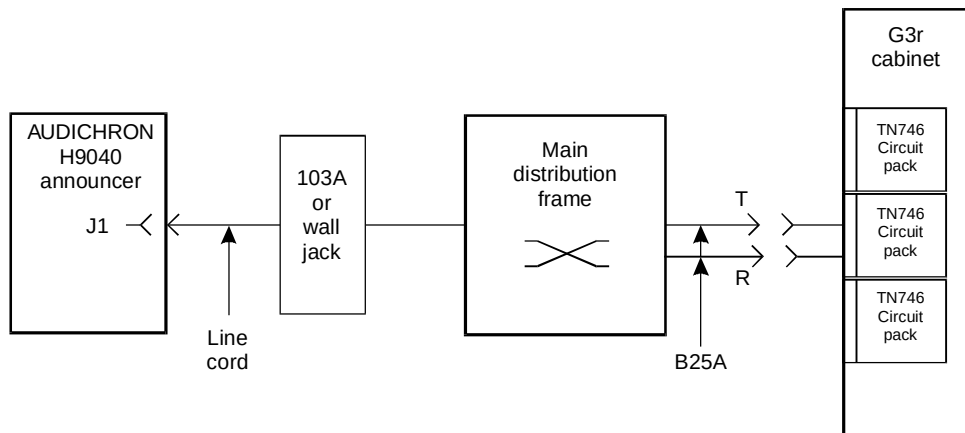


Figure 8-50. Recorded Announcement Equipment Using Three Circuit Packs

Figure 8-51 shows connections to Malicious Call Trace (MCT) equipment.

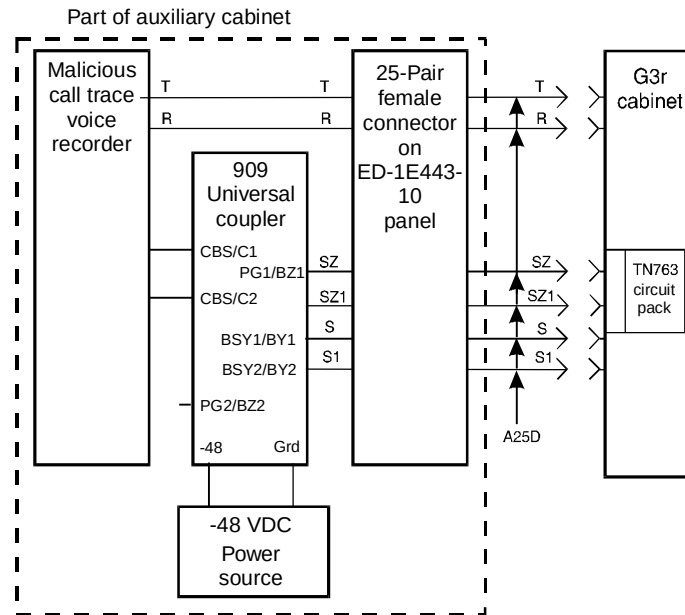


Figure 8-51. Connections to MCT Equipment

Figure 8-52 and Figure 8-53 show connections to digital announcement equipment.

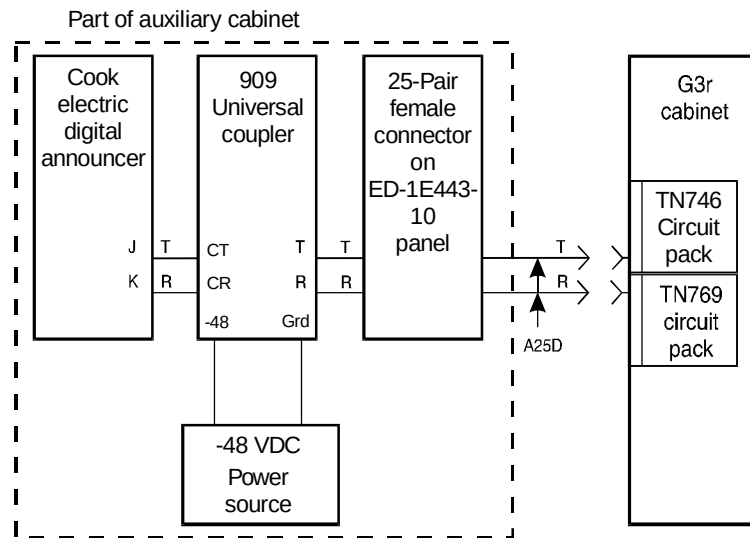


Figure 8-52. Digital Announcement Equipment with 909 Coupler

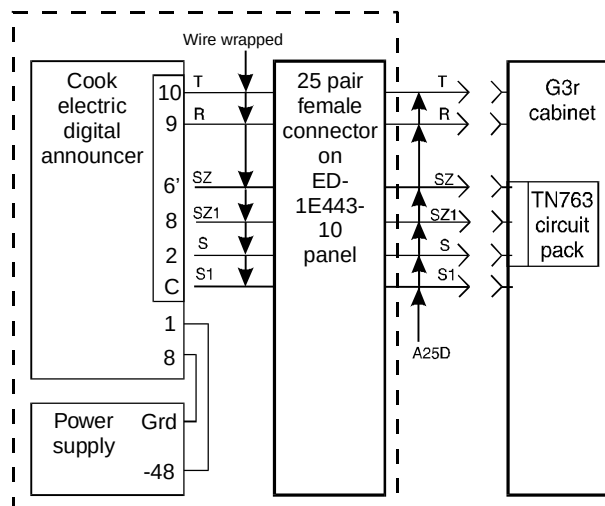


Figure 8-53. Digital Announcement Equipment without 909 Coupler

Figure 8-54 shows connections to a CallVisor ASAI host. As an alternate method of connection, the system can be connected to the CallVisor using the DEFINITY® LAN Gateway. See Figure 8-55.

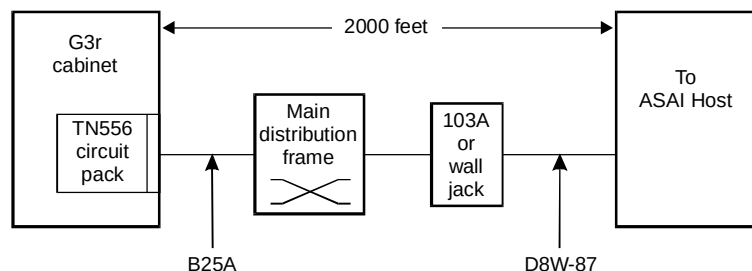


Figure 8-54. Connections to a CallVisor ASAI Host

Figure 8-55 shows a typical G3 cabinet connected to a CallVisor ASAI host via the DEFINITY® LAN Gateway. Refer to the AT&T document *DEFINITY® Communications System Generic 3 Installation, Administration, and Maintenance of CallVisor/ASAI Over the DEFINITY® LAN Gateway* 555-230-223.

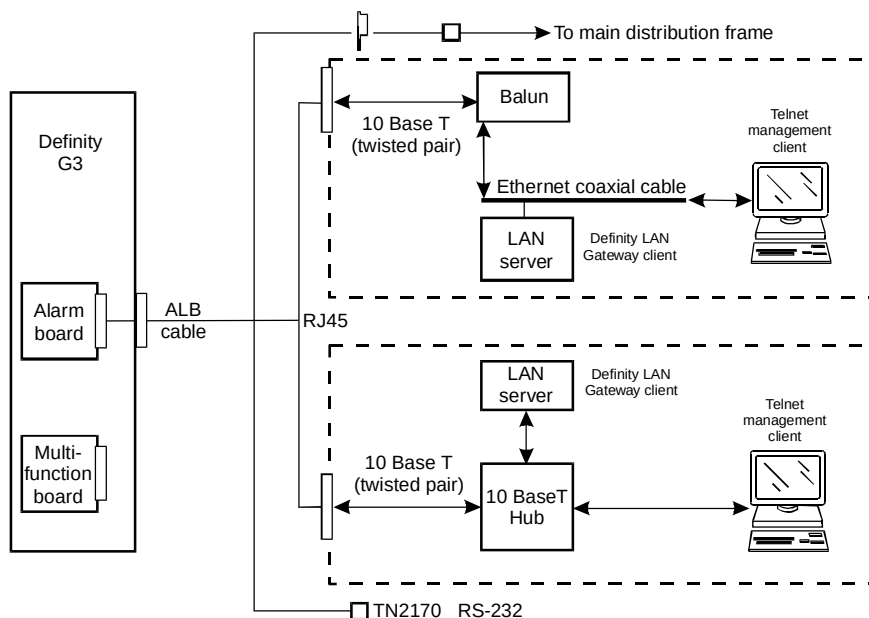


Figure 8-55. Connections to a CallVisor ASAI Host

DCS Links

Figure 8-56 through Figure 8-67 show a typical G3r cabinet connected through Distributed Communication System (DCS) links to other switches.

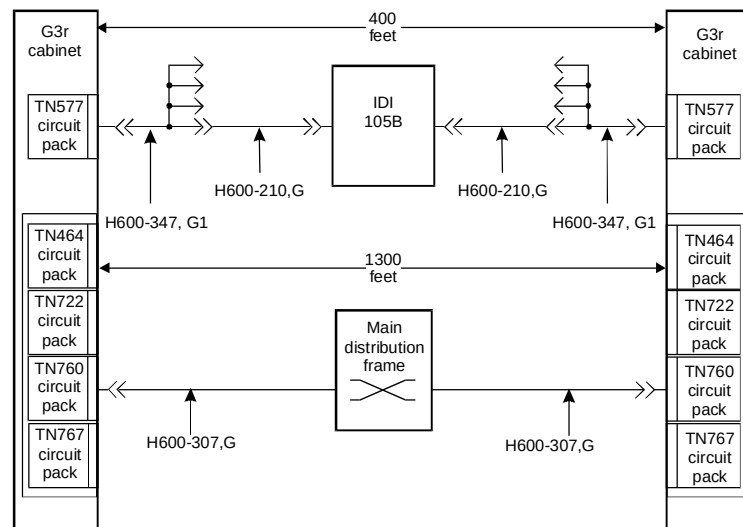


Figure 8-56. Connections Between Two G3r's, Using DCS Links via an IDI

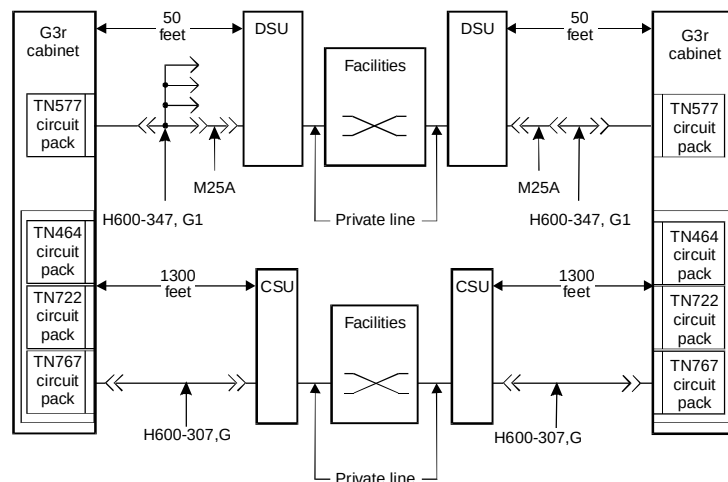


Figure 8-57. Connections Between Two G3r's, Using DCS Links via CSUs and DSUs

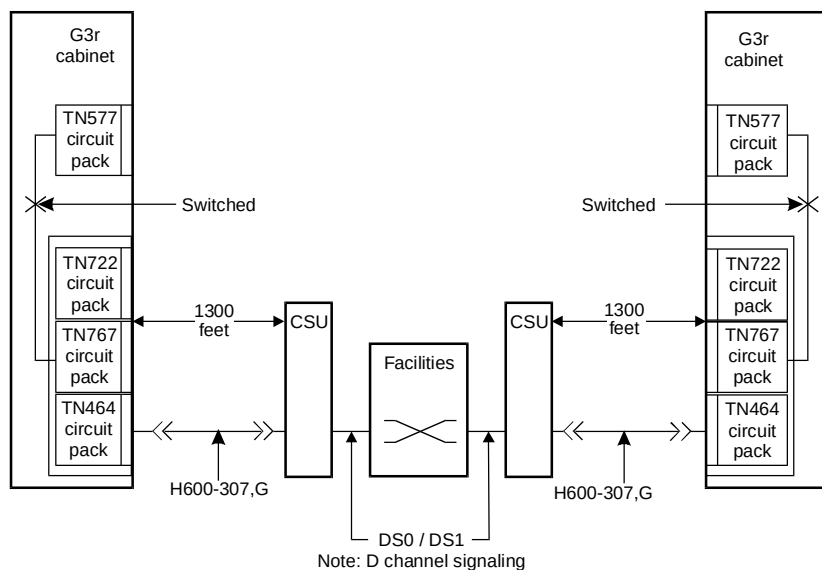


Figure 8-58. Two G3r's Connected Using DCS Links via CSUs

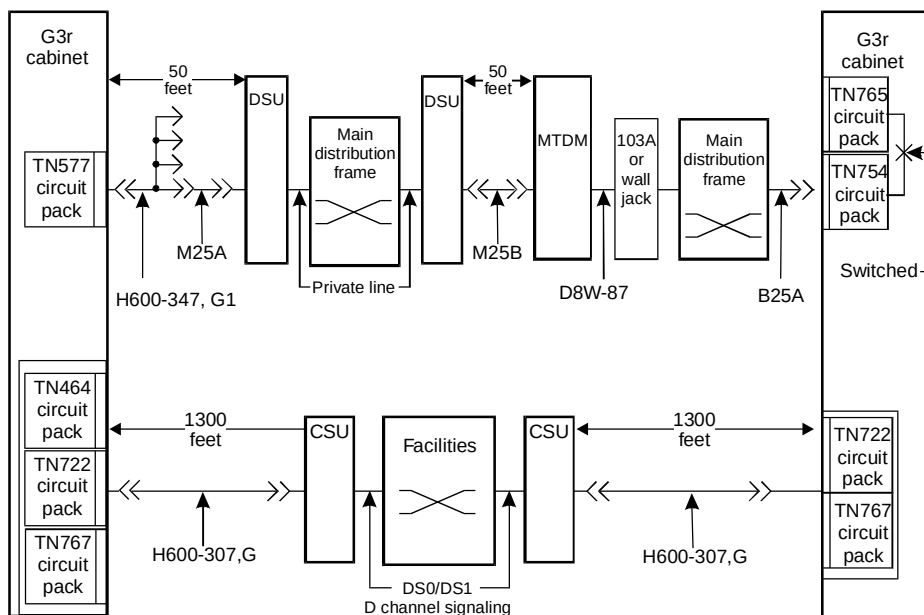


Figure 8-59. Two G3r's Connected Using DCS Links via MTDMs, DSUs, and CSUs

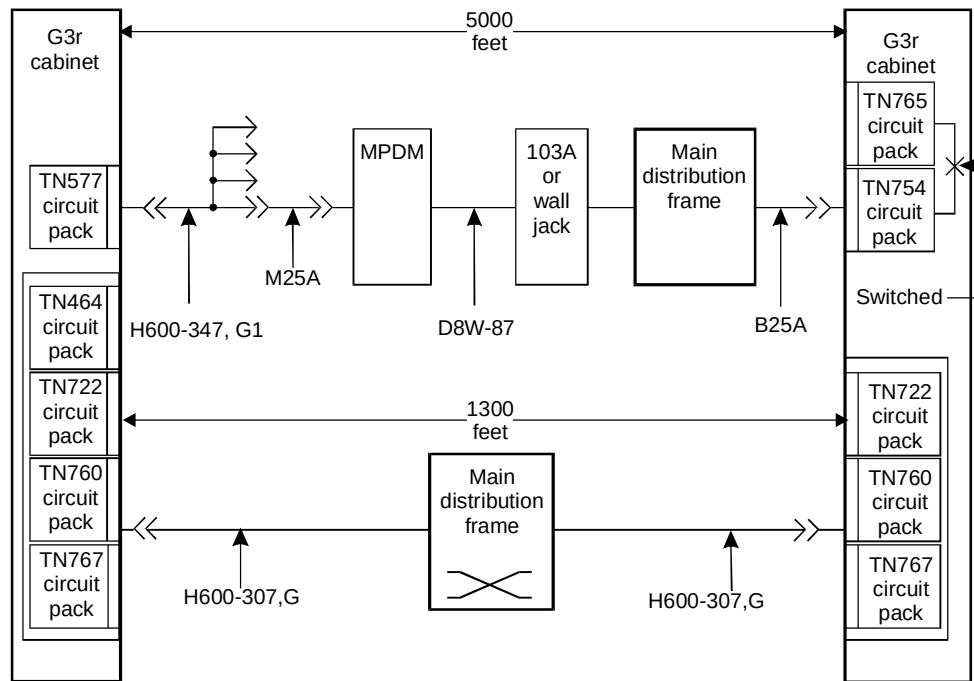


Figure 8-60. Two G3r's Connected Using DCS Links via MPDM

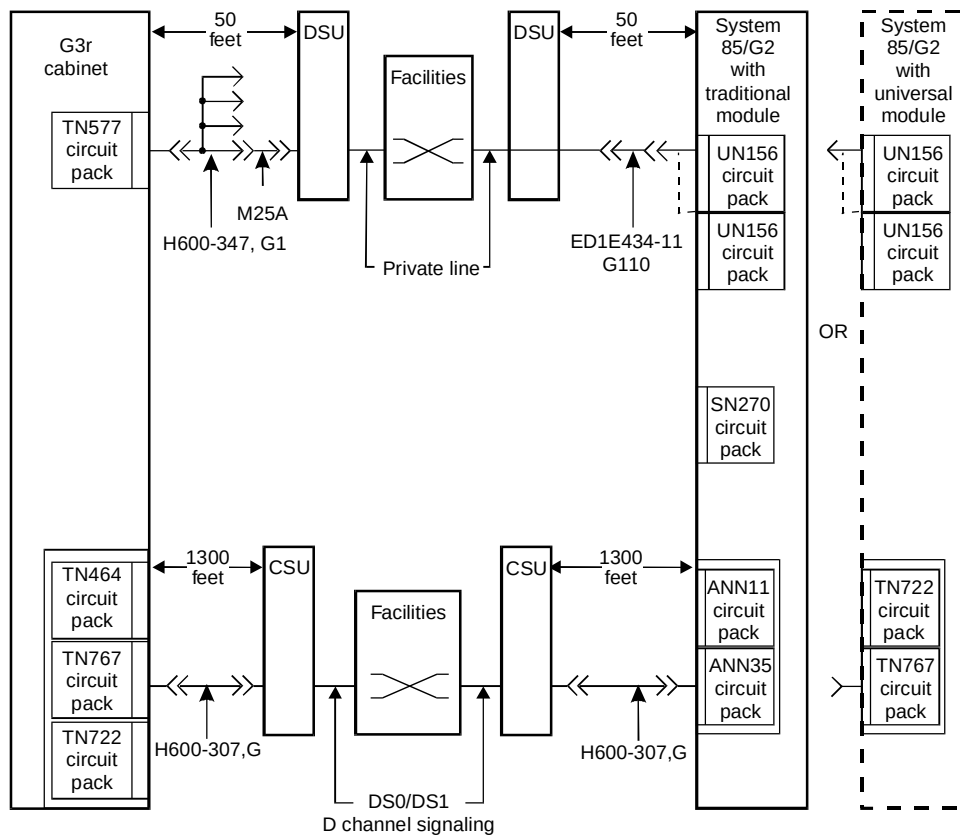


Figure 8-61. G3r and System 85/G2 Connected Using DCS Links via CSUs and DSUs

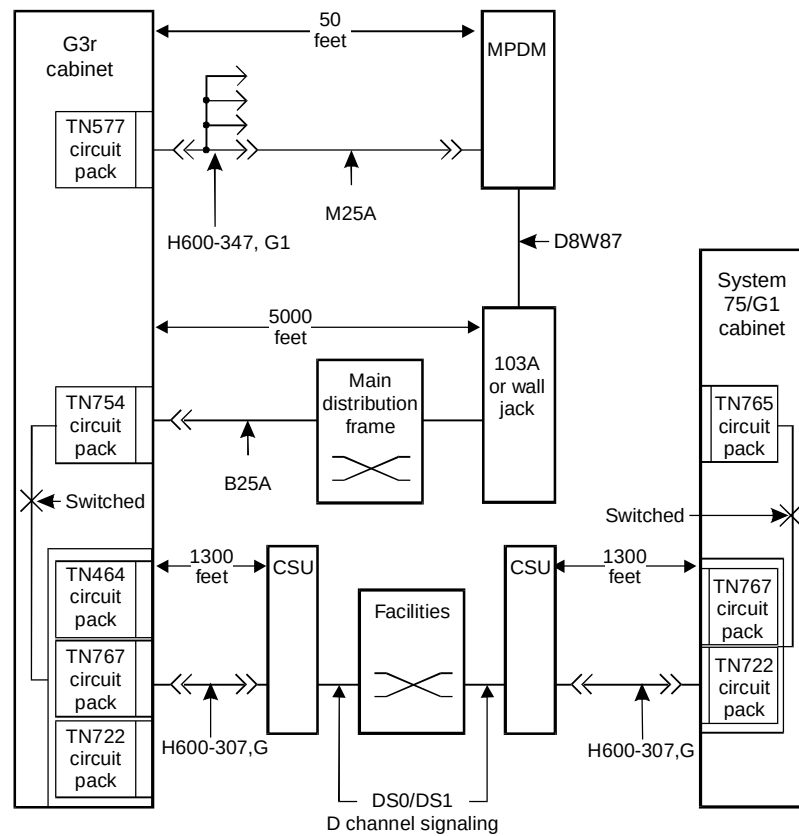


Figure 8-62. G3r and System 75/G1 Connected Using DCS Links via CSUs and MPDM

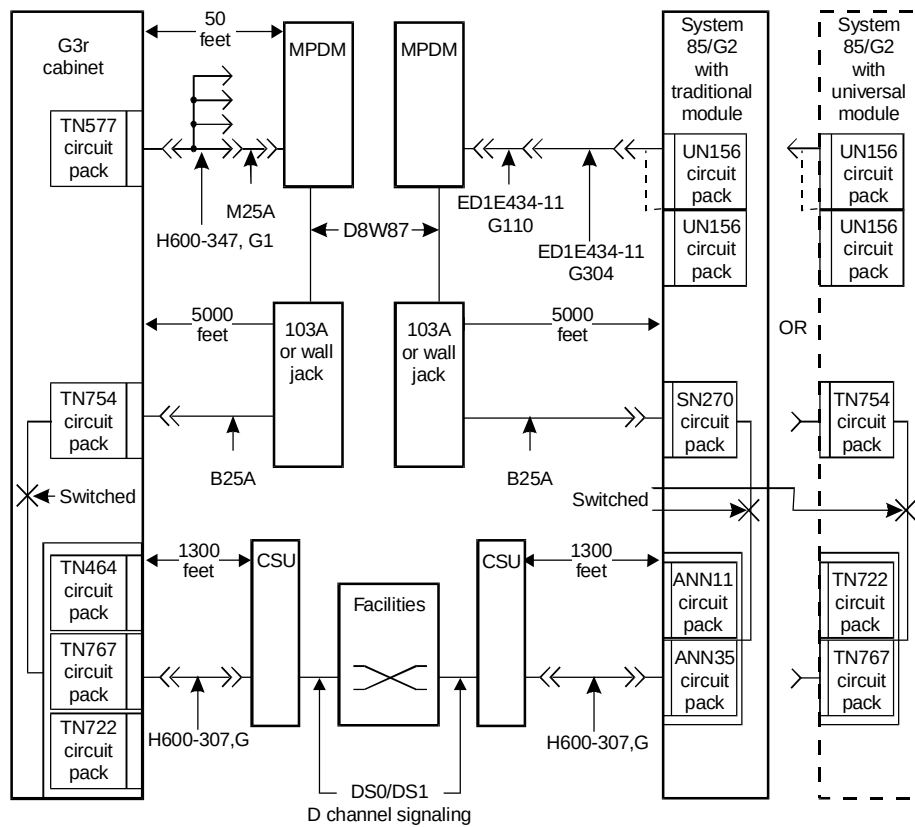


Figure 8-63. G3r and System 85/G2 Connected Using DCS Links via CSUs and MPDM

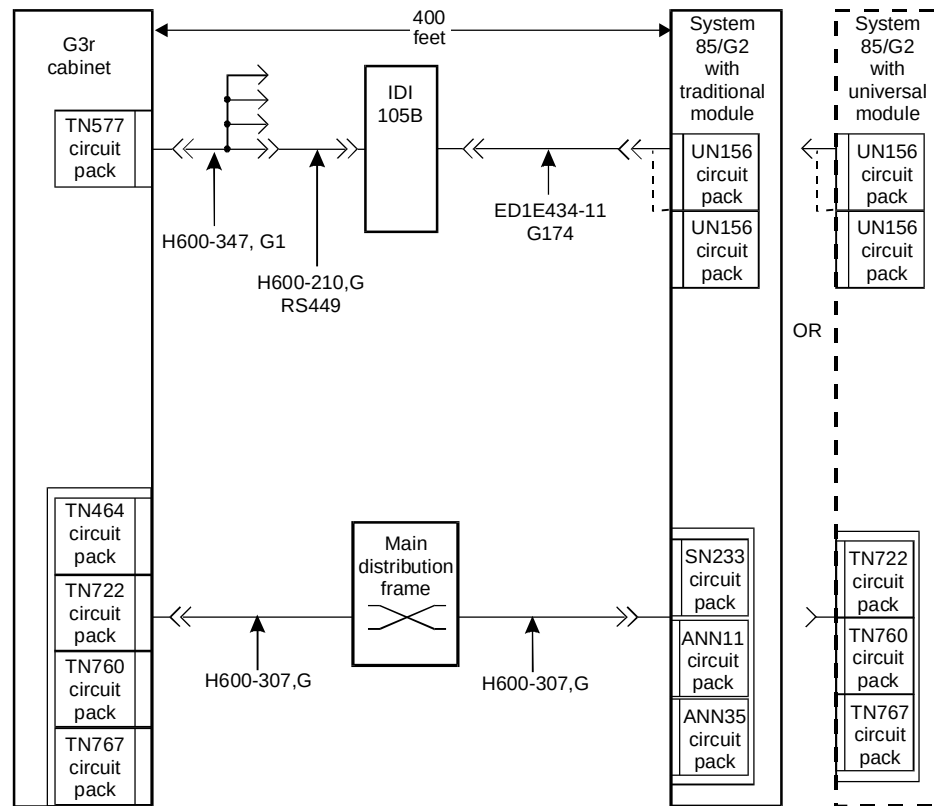


Figure 8-64. G3r and System 85/G2 Connected Using DCS Links via IDI

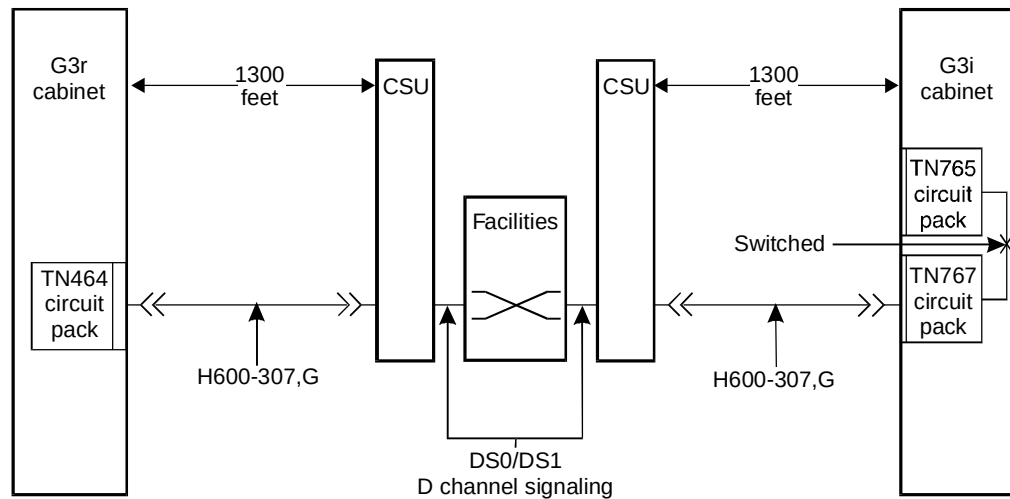


Figure 8-65. G3r and G3i Cabinet Connected Using DCS Links via CSUs

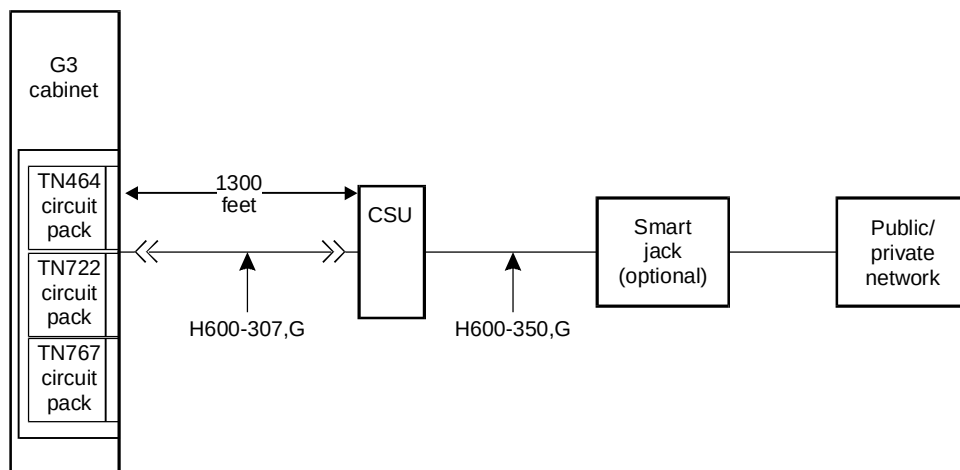


Figure 8-66. Two G3's Connected Using DCS Links Via CSUs

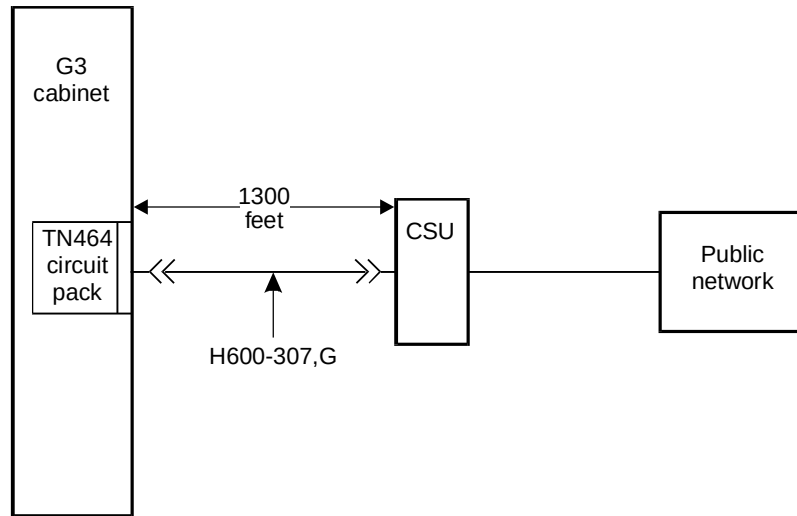


Figure 8-67. G3 and Public Network Connected Using DCS Links via CSU

DS1 Converter Connections

Figure 8-68 and Figure 8-69 show connections to a remote G3 using a DS1 Converter.

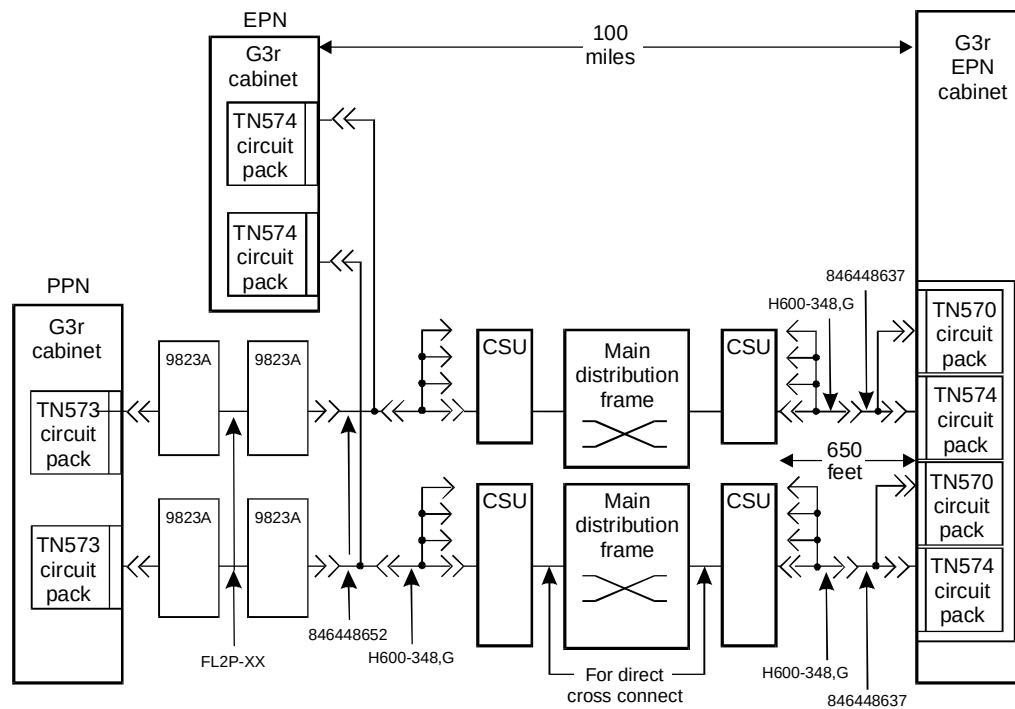


Figure 8-68. G3r to Remote G3r Connected Using DS1 Converter with Critical Reliability

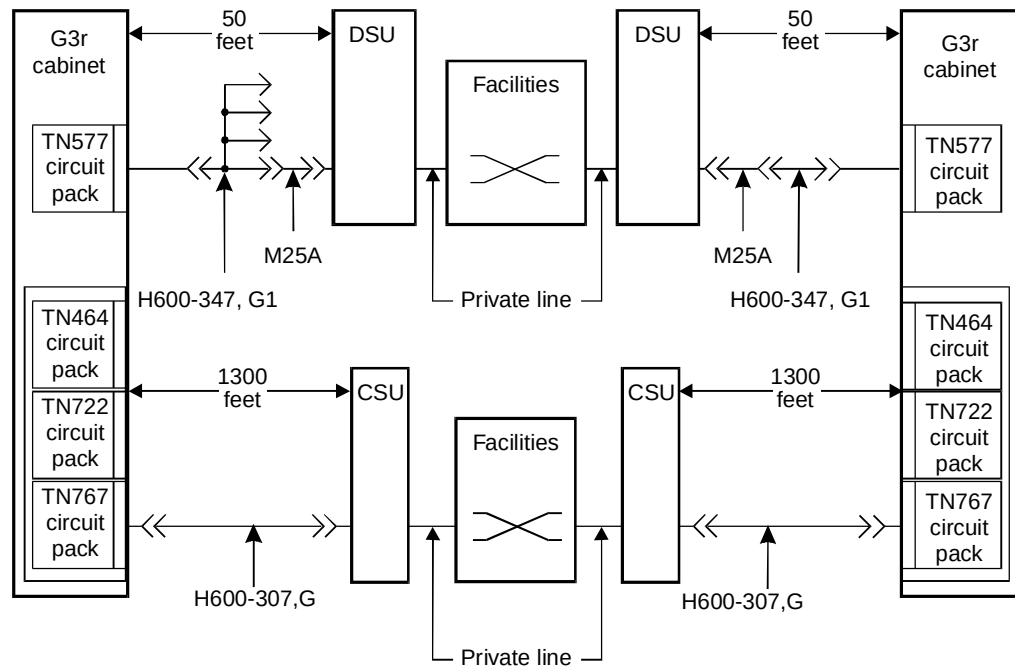


Figure 8-69. G3r to Remote G3r Connected Using DS1C

DS1 Connections

Figure 8-70 and Figure 8-71 show connections to a public or private network using DS1 connections.

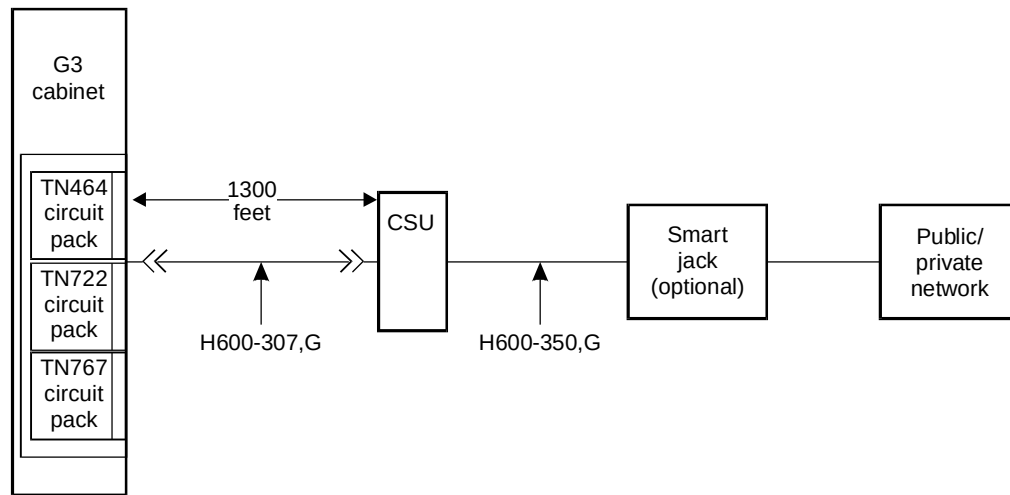


Figure 8-70. G3 to Public/Private Network Using DS1 and External CSU

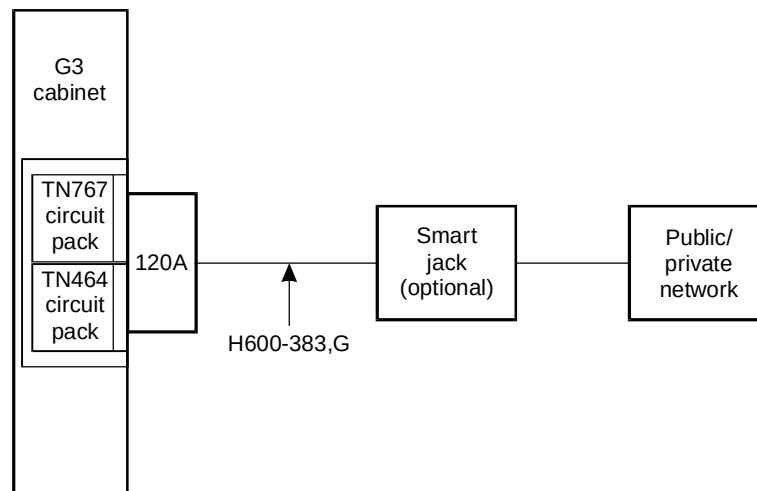


Figure 8-71. G3 to Public/Private Network Using DS1 and Integrated CSU

Connection from AUX Connector in PPN Cabinet

Figure 8-72 shows the connection from the AUX (auxiliary) connector in the PPN cabinet to the Main Distribution Frame.

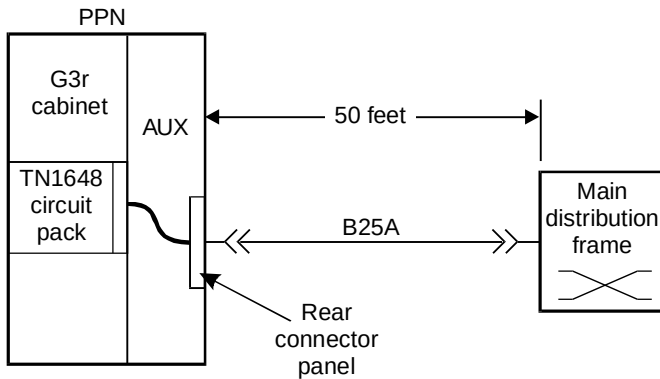


Figure 8-72. G3r Auxiliary Connector to Main Distribution Frame

AUX Connector Capacity

Up to three Attendant Consoles can be powered from the AUX connector in the "A" position in G3s, G3i, and G3r Control Carriers. Only one Attendant Console can be powered from the "A" position in G3vs Control Carriers. Refer to Chapter 11 "Technical Specifications" for other hardware requirements.

Up to seven Emergency Transfer Panels can be connected to the AUX connector in the "A" position in G3s, G3i, and G3r Control Carriers. Only one Emergency Transfer Panel can be connected in G3vs Control Carriers. Refer to Chapter 11 "Technical Specifications" for other hardware requirements.

Typical Connections to G3V3 and G3V4

The following circuit diagrams show connections to typical G3V3 and G3V4 systems.

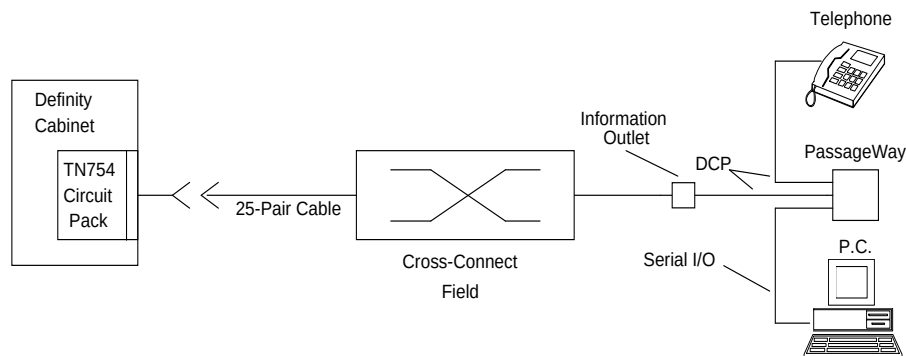
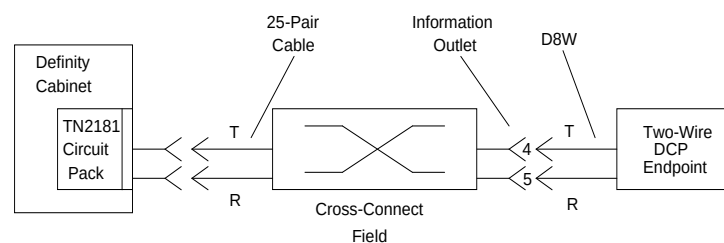


Figure 8-73. Typical Connections through PassageWay



NOTE: 8400-series voice terminals in 2-wire operation must be within 5500 feet of the TN2181 using 22-gauge wire, within 3500 feet using 24-gauge wire, and within 2200 feet using 26-gauge wire.

Figure 8-74. Typical Connections to a Two-Wire DCP Endpoint

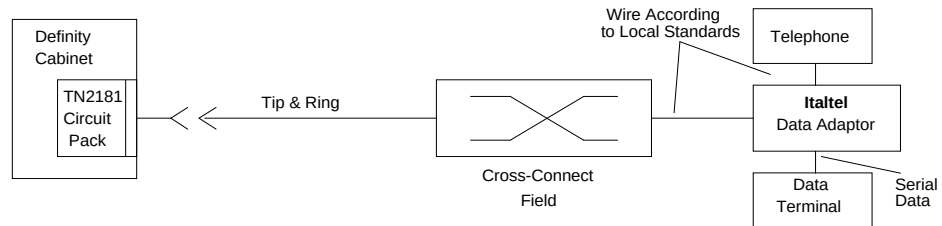
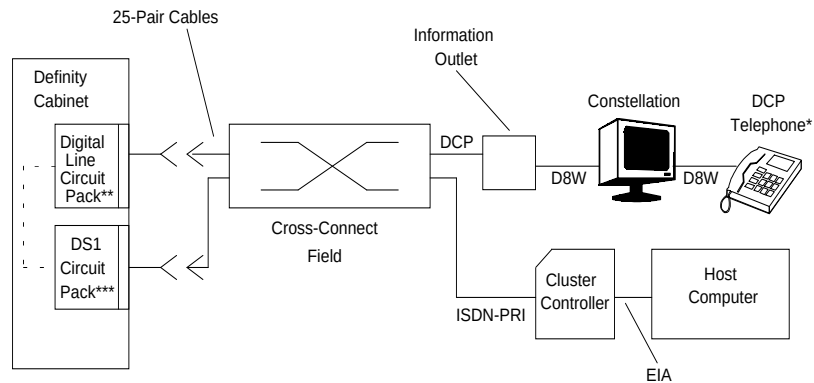


Figure 8-75. Typical Connections to Two-Wire DCP Workstation



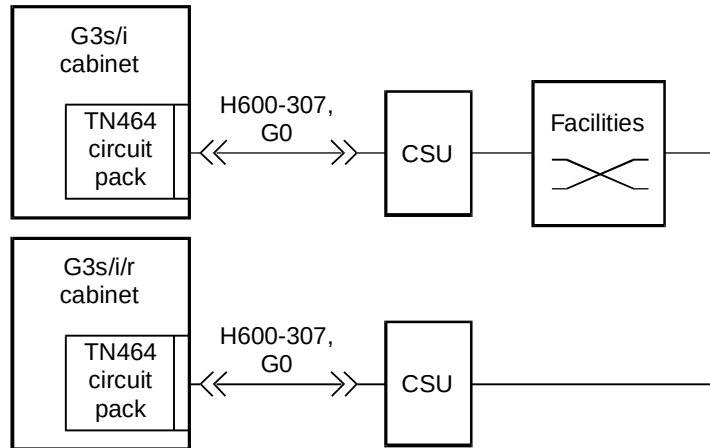
* Use with 7401D, 7406D, 602A1, 603A1 and 603D1 telephones

** Digital line pack can be a TN754 or TN413

*** DS1 circuit pack can be a TN464C (or later) or TN767C (or later)

Figure 8-76. Typical Connections Through Constellation

Long haul PRI signaling: G3s/iV3 to G3s/iV3 or G3r via ISDN-PRI



Long haul signaling: G3s/iV3 to public network (CO) via ISDN-PRI

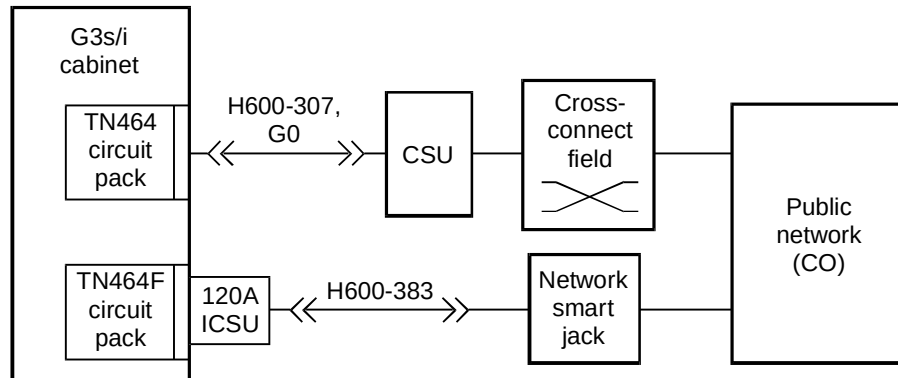
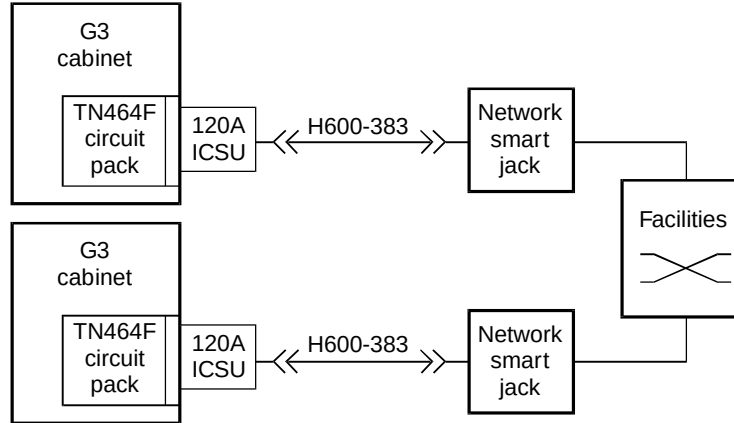


Figure 8-77. Typical Connections to Other Systems Using PRI over PACCON

Long haul PRI signaling: G3 to G3 via ISDN-PRI



Long haul signaling: G3 to public network (CO) via ISDN-PRI

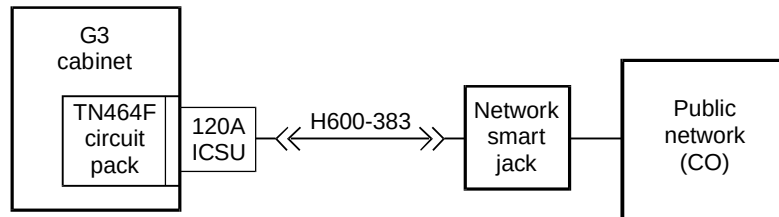


Figure 8-78. Typical Connections Using Integrated CSU

The primary objective of maintenance in the system is to detect, report, and clear troubles as quickly as possible and with minimum disruption of normal service. Periodic tests, automatic software diagnostic programs, and fault detection hardware allow most troubles to be traced to a circuit pack in the system.

The system hardware is maintained as a group of independent units separately replaceable. The units include circuit packs, power units, fans, tape drive, and voice terminals.

The two general categories within maintenance are: system-alarmed troubles and user-reported troubles. For alarmed troubles, both a remote maintenance facility (if provided), a local terminal, and any customer-premises equipment (CPE) alarm are automatically alerted. Most alarms are also reported by lights on the circuit packs in the system. 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 directed toward system-alarmed troubles. The system detects and reports most problems automatically. The system automatically retires alarms. After an alarmed trouble has been cleared, the system retests the previously faulty area. When the trouble is no longer detected, the alarm is removed. It is not necessary for personnel to retire alarms after a problem has been fixed. However, testing a fixed condition and manually retiring the alarm may be faster than allowing the system to automatically retire the alarm.

Hardware Used for Maintenance

The following hardware is used in fault detection diagnosis and repair:

- The TN773 or TN786B Maintenance circuit located on the Processor circuit pack in G3vs, G3s, and G3i in the 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 SPE, and monitoring and controlling the power units. The maintenance circuit also provides direct access to a terminal, provides an asynchronous modem that allows personnel to enter maintenance and administration commands at a remote terminal, and displays alarms remotely
- TN771D Maintenance/Test circuit pack in the PPN. This circuit pack provides ISDN-PRI trunk test calls and provides packet bus reconfiguration for systems with the critical reliability option and the CallVisor ASAI
- TN775 Maintenance circuit pack in an EPN. This circuit pack controls emergency transfer switch for EPN cabinet, monitors and controls the cabinet environment and power signals, provides two serial links for communication with EI circuit packs, and provides direct access from the EPN to a terminal
- G3-MT 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, which is a signal for the attendant to call the location and report the alarm. Both lights are off after the alarm is cleared or if there is no alarm
- TN772 in G3i and UN330B in G3vs Duplication interface circuit pack with the high reliability and critical reliability options. This circuit pack monitors the status of each processor, controls the state of the standby processor, and allows maintenance to be performed on the standby processor and the results recorded in the active processor. 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. Major, minor, and warning buttons can be administered
- Circuit pack lights indicate red (for alarm), the system has detected a fault in that circuit pack; green (for test), the system is running tests on that circuit pack; and yellow (for 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. The periodic tests run automatically at fixed intervals on a specific schedule. The short tests are run hourly and the long tests are run every 24 hours. Heavy call processing extends the interval of these tests.

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 of the 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 proceeding with any tests. When testing is completed, the active SPE places the standby SPE back in the standby mode.

Procedures

If part of the system fails some of the periodic tests a preset number of times, the system automatically generates an alarm to alert personnel. The system supports three levels of alarms:

1. Major alarms: failures causing critical degradation of service and require immediate attention
2. Minor alarms: failures causing 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: localized failures not causing 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, an automatic dialer, a bell, or other CPE device. The CPE 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 CPE device. Some alarm levels are adjustable by the Set Options feature.

Error and Alarm Logs

A record of system errors is recorded on 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 on another record called the alarm log. The alarm log can also be displayed on a terminal. If a number of alarms are active, the alarm log can be used to determine which alarms 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 after a major system failure or restart.

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 assumes a steady state. 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 by the time maintenance reschedules testing, the green (status) lamp resumes its steady state.

Each alarm type and its meaning is described below. The text of each button label appears in parenthesis:

- Administered Connection Alarm (ac-alarm) [G3i] — Lights if a locally administered connection (ADM-CONN) has a Major, Minor, or Warning alarm active
- Auto Wakeup Journal Printer Alarm (pr-awu-alm) — Lights if the automatic wakeup journal printer has a Major, Minor, or Warning alarm active
- DS1 Facility Alarm (ds1-alarm) — Lights if a DS1-BD has an off-board Major, Minor, or Warning alarm active
- Facility Access Alarm (trk-ac-alm) — Lights when the facility access trunk test feature is used
- Major Alarm (major-alm) — Lights if any Major system alarm is active.
- Major/Minor Alarm (mj/mn-alm) — Lights if any Major or Minor system alarm is active
- PI Link Alarm (link-alarm) — Lights if Processor Interface links 1 through 8 have a Major, Minor, or Warning alarm active

- PMS Printer (pr-pms-alm) — Lights if the PMS printer has a Major, Minor, or Warning alarm active
- RS-Alert (rs-alert) — Lights if a system **reset system 2 or 3** is performed
- SMDR1-Alarm (smdr1-alm) — Lights if the Primary Link has a Major, Minor, or Warning alarm active
- SMDR2-Alarm (smdr2-alm) — Lights if the Secondary Link has a Major, Minor, or Warning alarm active
- System Printer Alarm (pr-sys-alm) — Lights if the system printer (SYS-PRNT) has a Major, Minor, or Warning alarm active

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.

Documents

For maintenance information, see the following AT&T documents:

- *DEFINITY® Communications System Generic 3i/s/vs Maintenance*, 555-204-105
- *DEFINITY® Communications System Generic 3r Maintenance*, 555-230-105

This chapter describes the floor and wall area required for the system and associated peripheral equipment installed in the equipment room. Also included are room specifications for temperature, humidity, air purity, and lighting levels.

Floor Area

Floor area requirements in the equipment room vary between Multi-Carrier Cabinets and Single-Carrier Cabinets.

Multi-Carrier Cabinets

The following system equipment and optional peripheral equipment occupies the following floor area in the equipment room:

Table 10-1. System Equipment Dimensions

Height	Width	Depth	Clearance	Floor Area
70 inches (1.8 m)	32 inches (81 cm)	28 inches (71 cm)	N/A	22 square feet (2 square m)

Table 10-2. Cable Slack Manager Dimensions

Height	Width	Depth	Clearance	Floor Area
	32 inches (81 cm)		38 inches between cabinet and wall	22 square feet (2 square m)

Table 10-3. Auxiliary Cabinet Dimensions

Height	Width	Depth	Clearance	Floor Area
70 inches (1.8 m)	32 inches (81 cm)	28 inches (71 cm)	N/A	22 square feet (2 square m)

Single-Carrier Cabinets

The following system equipment and optional peripheral equipment occupies the following floor area in the equipment room:

Table 10-4. System Cabinet Dimensions

Height (1-4 Cabinet Stacks)	Width	Depth	Clearance	Floor Area
1-Cabinet 20 inches (51 cm)	27 inches (69 cm)	22 inches (56 cm)	38 inches between cabinet and wall	8 square feet (74 square m)
2-Cabinet 39 inches (99 cm)				
3-Cabinet 58 inches (1.5 m)				
4-Cabinet 77 inches (2 m)				

Table 10-5. Cable Slack Manager

Height	Width	Depth	Clearance	Floor Area
	32 inches (81 cm)		38 inches between cabinet and wall	8 square feet (74 square m)

Heat Dissipation

The average heat dissipation of a fully loaded (five carriers) Multi-Carrier Cabinet (disregarding terminals) is 4200 BTUs (1058 gram-calories) per hour. The average fully loaded Multi-Carrier PPN or EPN cabinet dissipates 6600 BTUs (2016 gram-calories) per hour (including terminals).

Main Distribution Frame

The Main Distribution Frame (MDF) must be installed and wired to the external environment before any AT&T equipment and installation personnel arrive on site. This allows a faster installation process.

The MDF must be a specified distance from the cable slack manager and must meet specific requirements. For more detailed information regarding the MDF and other site requirements, refer to the following AT&T documents:

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

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 growth planned for the system in the future (including the Main Distribution Frame). The wall behind a system cabinet must be clear of all objects (pictures, shelves, or windows) not required in the system installation. The entire area behind a cabinet must be reserved for the Main Distribution Frame and the cable access panel (when provided).

Figure 10-1 through Figure 10-4 show typical floor plans.

The following information applies to Figure 10-1:

- The power outlets should be located outside the MDF area and must not be controlled by a switch or be shared with other equipment
- The PPN cabinets require special 120 VAC, 60 Hz, 15 Amp or 20 Amp power outlet (NEMA 5-15 or NEMA 5-20 receptacle or equivalent)
- The system must be grounded by one of the approved methods. See Page 10-14 "Approved Grounds"
- Earthquake protection may be required, depending on the geographical location of the site. Refer to page 10-7
- The trunk/auxiliary field may be located inside the MDF
- Each Single-Carrier Cabinet uses 10-foot B25A cables from the "A" and "B" cabinet positions and 15-foot B25A cables from the "C" and "D" cabinet positions. Fiber connections between port networks use 20-foot (FL2P-P-20) cable

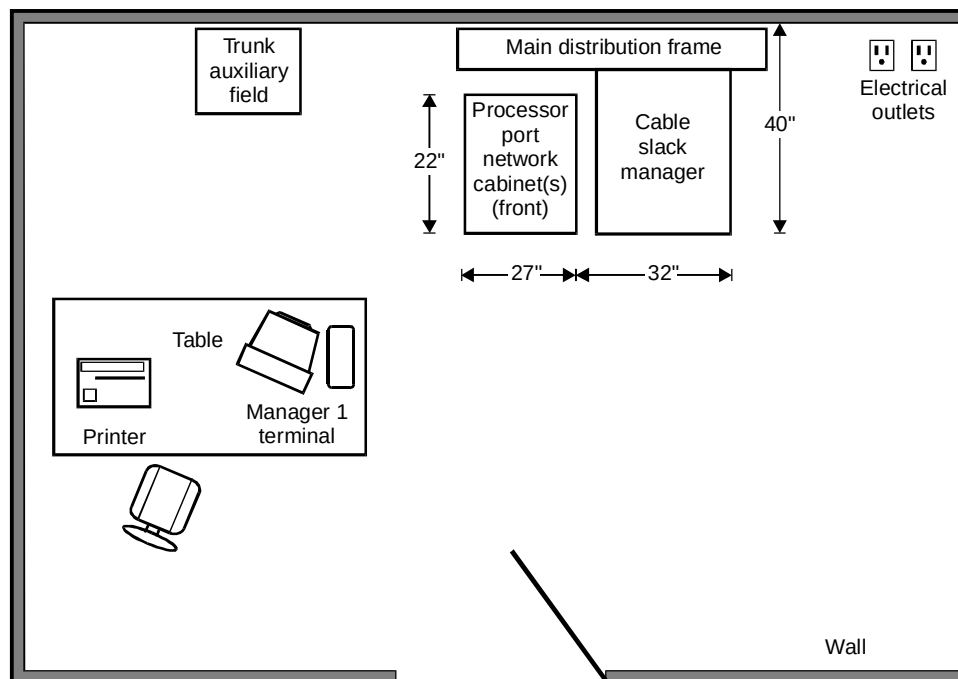


Figure 10-1. Typical Single-Carrier Cabinet Floor Plan

The following information applies to Figure 10-2 through Figure 10-4:

- The power outlets should be located outside the MDF area and must not be controlled by a switch or be shared with other equipment
- The PPN cabinets require a special 120 VAC, 60 Hz, 15 Amp or 20 Amp power outlet (NEMA 5-50R receptacle or equivalent) or a 208 VAC, 30 Amp (NEMA L14-30R receptacle or equivalent) power outlet
- The auxiliary cabinet requires a special 120 VAC, 60 Hz, 20 Amp power outlet (NEMA 5-20R receptacle or equivalent)
- Allow at least 36 inches (91.4cm) of space in front of the cabinet to allow door to open
- The system must be grounded by one of the approved methods listed in this section
- Earthquake protection may be required, depending on the geographical location of the site. Refer to page 10-7
- The trunk/auxiliary field may be located inside the MDF
- Each Multi-Carrier 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 port networks use 20-foot cable

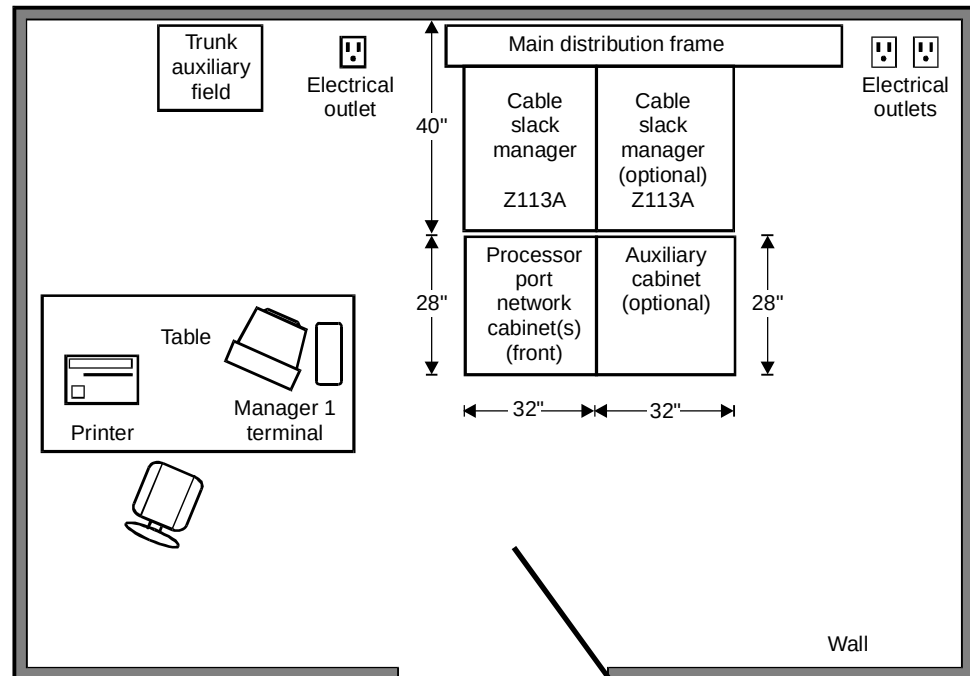


Figure 10-2. Typical Multi-Carrier PPN Cabinet and Auxiliary Cabinet Floor Plan

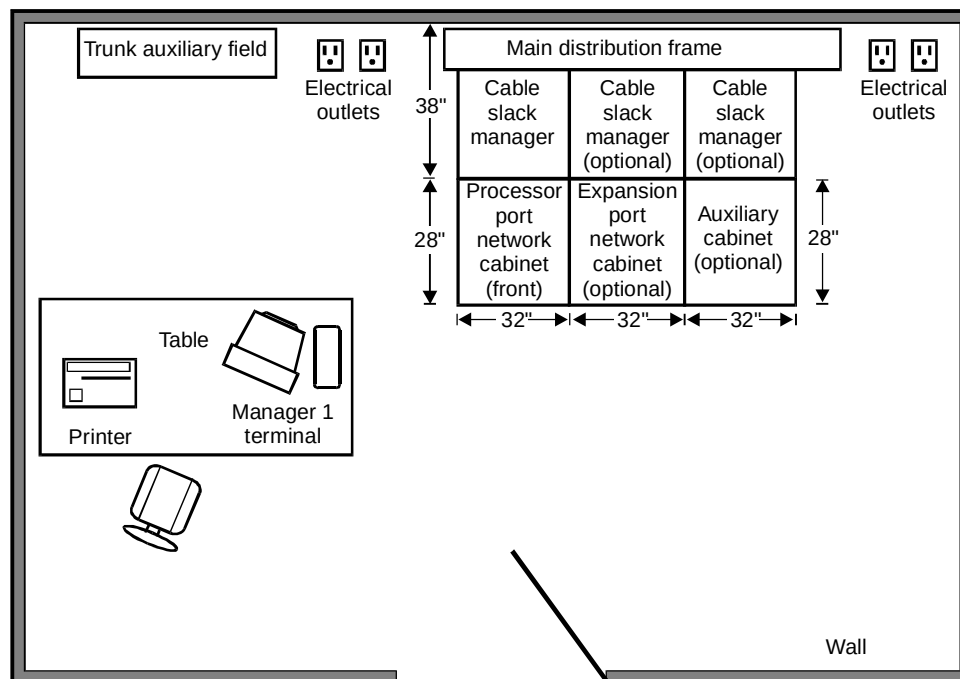


Figure 10-3. Typical Multi-Carrier PPN Cabinet, EPN Cabinet, and Auxiliary Cabinet Floor Plan

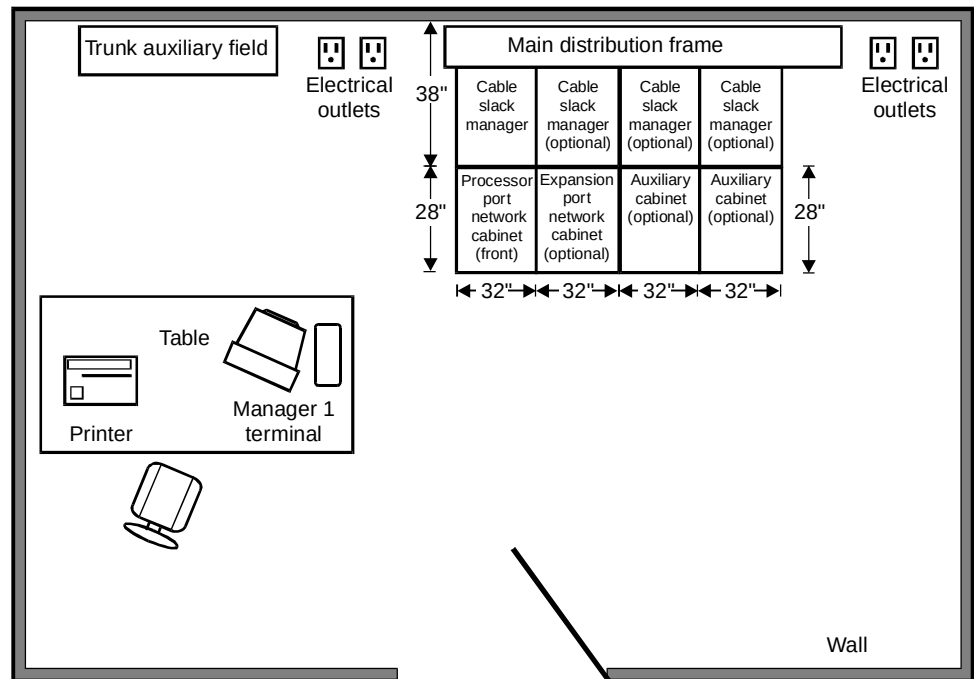


Figure 10-4. Typical G3r Multi-Carrier PPN Cabinet, EPN Cabinet, and Auxiliary Cabinets Floor Plan

Earthquake Protection

When earthquake or disaster protection is required, the cabinets can be bolted to the floor. Figure 10-5 shows USA and Canadian earthquake zones where bracing may be needed. A greater susceptibility of an area to earthquakes is indicated by a higher number in Figure 10-5. 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.

The following AT&T document includes earthquake protection installation procedures: *DEFINITY® Communications System Generic 1 and Generic 3 Installation and Test*, 555-230-104.



Figure 10-5. US and Canada Earthquake Environment

Table Area

The table area is reserved for the G3 management terminal (G3-MT) and an optional printer.

G3-MT

This section describes the areas needed by terminals that can be used as G3-MTs. The 510A or 510D personal terminal, and 513, 515, 610, 615, 715, 4410 and 4425 terminals can be located in the equipment room and require area on a table or desk.

The 513, 515, 610, 615, 715, 4410 and 4425 terminals each require approximately 3.2 square feet (0.3 square m) of area. The 510A or 510D with optional keyboard each requires approximately 2.1 square feet (0.2 square m) of area.

Optional Printers

The following AT&T printer documents include information on optional printers that require table or floor area:

- 445 Printer 999-700-023
- 443 Printer 999-700-024
- 450 Printer 999-700-025
- 460 Printer 999-700-022
- 470 Printer and 475 Printer 999-300-285IS
- 572 Printer and 573 Printer 999-300-562

Wall Area

Wall area required in the equipment room depends on the type of cross-connect hardware installed, such as Z100-type (modular) or 110-type. The area required also depends on the size of the system. The following AT&T documents provide details on cross-connect hardware:

- *DEFINITY® Communications System Generic 1 and Generic 3i Wiring*, 555-204-111
- *DEFINITY® Communications System Generic 1 and Generic 3 Main Distribution Field Design*, 555-230-630

If existing cross-connect hardware is re-used, refer to the space requirements and hardware requirements detailed in the system floor plans.

Floor Loading

This section presents the floor-loading requirements for Multi-Carrier and Single-Carrier Cabinet systems.

Multi-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 fully loaded Multi-Carrier Cabinet weighs about 800 pounds (360 kg). A maintenance area of at least 16 square feet (1.5 square m) is required for each cabinet.

Single-Carrier Cabinets

Table 10-6 details the floor loading weight of the single-carrier cabinets. Up to four cabinets may be stacked.

Table 10-6. Single-Carrier Cabinet Weight

Number of Cabinets	Weight (Fully Loaded)
One	130 pounds (59 kg)
Two	255 pounds (115 kg)
Three	380 pounds (171 kg)
Four	500 pounds (225 kg)

⇒ NOTE:

A maintenance area of at least 10 square feet (.93 square m) is required for a four-cabinet system.

Temperature and Humidity

The system equipment must be installed in a well-ventilated area. Maximum equipment performance is obtained at an ambient 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 up to 84 degrees Fahrenheit (29 degrees Celsius). Above 84 degrees Fahrenheit (29 degrees Celsius), 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 impede operation.

In addition to the maximum ranges, the recommended temperature and humidity range is: 65F to 85F (18C to 29C) at 20% to 60% relative humidity. Table 10-7 correlates room temperature with allowable relative humidity.

Table 10-7. Allowable Relative Humidity

Room Temperature (Degrees F)	Room Temperature (Degrees C)	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

Altitude and Air Pressure

The normal operating air pressure range is: 9.4 psi to 15.2 psi (648 millibars to 1,048 millibars). At altitudes above 5,000 feet (1,525m), the maximum short-term temperature limit is reduced by 1F for each 1,000 feet (305m) of elevation above 5,000 feet (1,525m). At 10,000 feet (3,050m), for example, the maximum short-term temperature limit is 115F.

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 10-8.

Table 10-8. 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
Sulphur dioxide	0.20 ppm
Oxides of nitrogen	0.30 ppm
Total oxidants equivalent to ozone	0.05 ppm
Hydrogen sulfide	0.10 ppm

 NOTE:

All cabinets contain a filter that reduces particulates flowing through the equipment. The filter in the Multi-Carrier Cabinet filters all particles equal to or greater than 5 microns in diameter.

Lighting

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

RF Noise

In most cases, 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. These 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 given for Multi-Carrier and Single-Carrier Cabinets.

Multi-Carrier Cabinets

The noise produced by a five-carrier cabinet is 51, 53, and 56 dBA at low, medium, and high fan speeds, respectively, at a distance of five feet (1.5 m). If the cabinet door is open, there is an additional 1 dBA of noise. The tape drive also causes additional noise. When the tape drive is reading data, there is an additional 1 dBA of noise. When the tape drive is fast winding, there is an additional 2 dBA of noise.

Single-Carrier Cabinets

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

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

If the system cabinet door is open, there is an additional 1 dBA of noise. The tape drive also causes additional noise. When the tape drive is reading data, there is an additional 2 dBA of noise. When the tape drive is fast winding, there is an additional 4 dBA of noise.

Overvoltage Protection

In the United States, Underwriters Laboratories (UL) codes protect the system against overvoltage, including lightning strikes. Loss of service caused by overvoltage can result in a loss of one or more terminals (voice and data), ports, and circuit packs.

The following devices protect the system from overvoltages:

- Analog trunks use the 79A sneak protector or the ITW equivalent.
- Analog voice terminals use one of the following types of 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 terminals use the solid state 4C3S-75 with heat coil protector

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 PBX.

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 in the country where the equipment is installed.

For more information, refer to the AT&T document *DEFINITY[®] Communications System Generic 3 Installation (for Single-Carrier Cabinets)* 555-230-894.

This chapter includes the following technical specifications on the capabilities, performance, and feature capacities of DEFINITY[®] Generic 3 (G3):

- Representative Number of Lines
- Performance
- System Hardware and Software Capacity Limits
- Maximum Port Slot Capacities
- Additional Hardware to Use Features
- Allocation of Station Buttons
- Initialization and Recovery
- Cabling Distances
- DS1 Remoting Transmission Distance
- Tones
- Indicator Lamp Signals
- Protocols
- Transmission Characteristics
- Service Codes
- Facility Interface Codes

Representative Number of Lines

Table 11-1 lists a representative number of lines for each configuration of Processor Port Networks (PPNs), Expansion Port Networks (EPNs), and Center Stage Switches (CSS) in G3. The actual number of lines depends on the features and characteristics of the configuration.

Table 11-1. Representative Number of Lines (G3)

Configuration	Representative Number of Lines		
	G3s/vs	G3i	G3r
1 PPN	200 (160 in G3vs)	800	800
Direct connect with 1 PPN and 2 EPNs	Not Applicable	2,400	2,400
1 SN in the CSS with 1 PPN and 15 EPNs	Not Applicable	Not Applicable	12,500
3 SNs in the CSS with 1 PPN and 43 EPNs	Not Applicable	Not Applicable	25,000

Performance

Table 11-2 lists G3V2 (and later) Busy Hour Call Capacity performance. The capacities can vary with customer application. These capacities may require a Processor Occupancy Evaluation (POE) to achieve.

Table 11-2. G3 Busy Hour Call Capacities

System Type	Busy Hour Call Capacity	
	G3/i/s/vs	G3r
Basic	20,000	100,000
Integrated Services Digital Network (ISDN)	8,000	40,000
Automatic Call Distribution (ACD)	14,000	70,000
Inbound Call Management (ICM)	6,000	30,000
Outbound Call Management (OCM)	8,000	44,000
Adjunct Switch Applications Interface (ASAI) desk top	14,000	70,000

Table 11-3 lists G3 response times.

Table 11-3. G3 Response Times

Attribute	Response Time
Call processing	General voice path cut-through: 750ms Attendant ring tip: 260ms 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 11-4 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 used for the features in Table 11-4 are described in Chapter 2, "Cabinets, Carriers, and Circuit Packs."

Not all feature applications require additional hardware; the conditions for additional required hardware are also described.

Table 11-4. Additional Hardware to Use Features

Feature	Hardware
Abandoned Call Search	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	Modular processor data module (MPDM) and printer
Adjunct Switch Application Interface (ASAI)	Port on a BRI Line circuit pack and a terminating resistor for each interface to be provided. Up to eight interfaces are supported. G3vs: BRI and ASAI are not supported. G3s and G3i: a Packet Control circuit pack is required for ASAI applications. A packet Expansion Interface circuit pack is also required for system connectivity in multiple port network systems. G3r: no additional hardware beyond BRI Line is required. G3: packet applications, such as ASAI, require a Maintenance/Test circuit pack in the PPN. In a critical reliability system, a Maintenance/Test circuit pack is also required in each additional expansion port network.
Administered Connection	Circuit packs: Data Line, Digital Line, BRI Line, Pooled Modem, or DS1 Interface Data Modules: 7400HS, MPDM, MTDM, 7400A, 7400B, 7500B, 7400D series voice terminals with DTDM; 7500 series BRI voice terminals with ADM
Advice of Charge	Same hardware as ISDN and CDR. See ISDN-PRI and CDR.
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
Attendant Direct Extension Selection With Busy Lamp Field	Selector console

Table 11-4. Additional Hardware to Use Features

Feature	Hardware
Audio Information Exchange (AUDIX) Adjunct Voice Mail System	Voice: AUDIX machine and appropriate ports on Analog Line circuit packs. Data Control Link: G3vs, G3s, and G3i use the Processor Interface (PI) RS-232 connector on the rear panel of the PPN control carrier and an MPDM. If the PI connector is not available, a port on a Digital Line circuit pack and an MPDM are required in addition to a PI link. G3r: port on a Packet Gateway circuit pack AUDIX networking requires ports on one or more Digital Line circuit packs.
DEFINITY® AUDIX Embedded Voice Mail System	DEFINITY® AUDIX assembly resides in five consecutive port slots in G3s, G3i and G3r; the assembly resides in four port slots on the far right in G3vs AUDIX in Digital Port (DP) Mode does not require additional hardware for a data control link and supports only 8 AUDIX ports. AUDIX in control link mode requires the same additional data control link hardware as an AUDIX adjunct listed above. The AUDIX administration terminal can be connected via: direct connection, modems, Asynchronous Data Unit (ADU), and G3MA.
Barrier Code Aging	Printer
BCMS Reports	Printer
Automatic Circuit Assurance	Voice terminal with display or a speech synthesis circuit pack
Automatic Call Distribution (ACD) ACD itself does not require any additional 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 hardware required for recorded announcement and music-on-hold. Voice terminals (not 2500-type sets) are required for agents.
Automatic Incoming Call Display	515 BCT, 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.

Table 11-4. Additional Hardware to Use Features

Feature	Hardware
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.
Call-By-Call Service Selection (PRI feature)	G3vs, G3s and G3i: DS1 Interface and Processor Interface circuit packs. G3r: DS1 Interface circuit pack
Call Detail Recording (CDR)	Hardware depends on the type of CDR collector. G3vs, G3s and G3i: CDR collector can be connected to the RS-232 port on the Processor circuit pack to eliminate the need for data modules described below. G3r: CDR collector is connected via either: 1. Packet Data circuit pack cross-connected to a port on a Data Line circuit pack that is switch-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 switch-connected to a BRI Line circuit pack connected to a 7500 Data Module or a Digital Line connected to an MPDM. Reused equipment: printer, PC, tape unit, or the TELESEER unit — MPDM 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 — MTDM 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 G3V2 with a Trunk Data Module. A private line modem is used if off-premises (out-of-building).
CDR Call Splitting, CDR Privacy	Terminal and DTDM

Table 11-4. Additional Hardware to Use Features

Feature	Hardware
Call Management System (CMS)	CMS adjunct G3vs, G3s, and G3i: port on a digital circuit pack and a Processor Interface G3r: port on a Packet Gateway circuit pack and, depending on distance, an 105B IDI or DSU. Alternately, a port on a Packet Gateway is connected to an MPDM. The MPDM 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-Classifer circuit pack is required for touch-tone receivers to collect digits input by callers.
Calling Party Number/Billing Number (CPN/BN)	G3vs, G3s, and G3i: an Interface Link (requires a Processor Interface 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. Refer to the ACD feature for hardware requirements. G3V4 does not support ISDN Gateway.
CallVisor Adjunct/Switch Application Interface (ASAI)	A port on a BRI line circuit pack connected to the CallVisor Adjunct. See ISDN-BRI.
Centralized Attendant Service (CAS) (Branch or Main)	A Tie Trunk circuit pack is used, which serves all other tie trunk applications. Alternately, the PRI DS1 Interface circuit pack can be used for the release link trunks of the CAS network.
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	International Tone-Clock used to generate tones — TN780
Cordless Telephone Support	An appropriate Analog Line or Hybrid (MFAT) Line circuit pack is used for the cordless set.

Table 11-4. Additional Hardware to Use Features

Feature	Hardware
Czechoslovakian Digital MFC	Czechoslovakian Digital Tie (DS1 Interface 24/32) and Call Classifier circuit packs
D-Channel Backup	PRI DS1 Interface circuit pack and PRI facilities. Refer to PRI for associated hardware requirements.
Data Call Setup	Each DCP data module requires one port on a Digital Line circuit pack. A Digital Terminal Data Module (DTDM) shares the port with the associated voice terminal. Reused equipment: each AT&T 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 w/ADM, 7507D w/ADM, 8510D w/ADM, or 8520D w/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 board or a port on a Digital Line circuit pack with a TDM or MTDM, and one port on a 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.
DCS Features (All DCS Features)	G3vs, G3s, and G3i: a Processor Interface circuit pack and an MPDM or DSU are required. G3r: a port on a Packet Gateway circuit pack is required.
DCS Plus	PRI D-channel link: a PRI DS1 Interface circuit pack is required and, if required by the network provider, a CSU per span.
Dialed Number Identification Service (DNIS)	For non-ISDN type calls, a port on a DS1 Interface circuit pack to support MEGACOM. 800 DNIS. The feature also requires that the answering voice terminals be equipped with a display.
DIOD International	DIOD circuit pack or DS1/E1 circuit pack
Digital Multiplexed Interface (DMI)	One PRI DS1 Interface circuit pack per 24 DMI trunks

Table 11-4. Additional Hardware to Use Features

Feature	Hardware
Direct Department Calling and Uniform Call Distribution (DDC/UCD itself does not require any additional hardware.)	If needed: one port on a 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 additional hardware required for 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 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 Tie Trunk Service	One DS1 Interface circuit pack is required per 24 Voice-Grade DS1 tie trunks or per 23 AVD DS1 tie trunks.
DS1 Integrated CSU	DS1 Interface circuit pack and Integrated CSU module (120A)
DXS Button Enhancements	Attendant Console with DXS Console addition
E1 — 32 Channel	DS1 Interface 24/32 circuit pack
ECMA Conformance in ISDN-PRI	DS1 Interface 24/32 circuit pack
EIA Interface	One Data Line circuit pack per eight EIA interfaces, and one Asynchronous Data Unit (ADU) per port on the circuit pack are required.
Generalized MFC	DS1 Interface 24/32 or appropriate analog CO and DID or DIOD, and Call Classifier circuit packs
German — Digital	DS1 Interface 24/32 for German digital trunks (e.g. PRI)
Greece MFC	DS1 Interface 24/32 and Call Classifier circuit packs
Inbound Call Management (ICM)	ASAI hardware (refer to ASAI feature for hardware requirements) Use of ACD feature (refer to ACD feature for hardware requirements)
Information System Network (ISN) Interface	One Data Line circuit pack per eight ISN interfaces

Table 11-4. Additional Hardware to Use Features

Feature	Hardware
Integrated Services Digital Network Basic Rate Interface (BRI)	One BRI Line circuit pack for up to 12 BRI endpoints using the point-to-point 4-wire T interface; one BRI Line circuit pack for up to 24 BRI endpoints using passive bus G3vs: BRI is not supported. G3s and G3i: Packet Control circuit pack for BRI applications. A packet Expansion Interface circuit pack is also required for system connectivity in multiple port network systems. G3r: no additional hardware beyond BRI Line All systems: in packet applications, such as BRI, 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 expansion port network.
Integrated Services Digital Network Primary Rate Interface (PRI)	One PRI DS1/E1 Interface circuit pack provides a signaling link and up to 23/30 ISDN-PRI trunk group members. G3vs, G3s, and G3i: a Processor Interface or packet control circuit pack is required. G3r: no additional hardware beyond PRI DS1 Interface
Inter-PBX Attendant Calls	Tie trunk group between the branch and main locations
Leave Word Calling	Display voice terminal, and speech synthesis circuit pack are used to store the LWC message in the system. Alternately, an AUDIX system (adjunct), and voice terminals are used to store the LWC message on the AUDIX.
Loudspeaker Paging Access with Answerback	Loudspeaker paging equipment and one port on a 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, one port on a Analog Line circuit pack, or one port on a Auxiliary Trunk circuit is used, depending on the PagePac arrangement.
Malicious Call Trace	None
Mexico 2-way	DS1 Interface 24/32 and Call Classifier circuit packs
MFC Enhancements	DS1 Interface 24/32 and Call Classifier circuit packs

Table 11-4. Additional Hardware to Use Features

Feature	Hardware
Modem Pooling	One Pooled Modem circuit pack per two integrated conversion resources are 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 MTDM or 7400 terminal.
Move Agents From CMS	CMS vehicle
Multiple Call Handling On Request	Multi-appearance set
Music-on-Hold Access	Music source and one port on a Auxiliary Trunk or Analog Line circuit pack are required. A 909-type voice coupler is required if the system is not FCC-registered (USA only).
National ISDN	PRI 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
Night Service — Trunk Answer From Any Station	Ringling device and one port on a Analog Line circuit pack
Off-Premises Data Extensions	Trunk Data Module and one port on a Digital Line circuit pack
Off-Premises Station	Cross-connecting capabilities and one port on a 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 card and application software to an appropriate voice terminal.
Personal Central Office Line	One port on a CO Trunk circuit pack for each CO, FX, or WATS trunk assigned as a PCOL

Table 11-4. Additional Hardware to Use Features

Feature	Hardware
Power Failure Transfer	One emergency transfer panel per five or six trunks assigned to Power Failure Transfer are required, depending on the panel used. The following panels are available: ■ 808A Panel — Each unit serves up to five failure transfer terminals. The unit provides automatic ground start or loop start. ■ Z1A Panel — Each unit 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 — Each unit serves up to five failure transfer terminals. The unit provides automatic ground start or loop start.
Property Management System	G3vs, G3s, and G3i, either: 1. Using a Digital Line port and a MPDM, or 2. Using a Digital Line port and a ADU G3r, either: 1. A Packet Data circuit pack cross-connected to a port on a Data Line circuit pack, which is switch 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, which is switch-connected to either a BRI Line circuit pack connected to a 7500 Data Module or to a Digital Line connected to a MPDM. Data Line circuit pack with an ADU or a data module and port on a Digital Line circuit pack.
Queue Status or Queue Status Indication	One port on a Analog Line circuit pack for each auxiliary queue warning lamp, such as a 21C-49.
QSIG Global Networking	Same as ISDN-PRI. See ISDN-PRI.

Table 11-4. Additional Hardware to Use Features

Feature	Hardware
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. G3vs, G3s, and G3i: each analog announcement has announcement equipment, such as an AT&T 15A announcement unit configured with an analog interface, and one port on a Analog Line circuit pack. G3vs, G3s, and G3i can also use announcement equipment 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 128 G3vs, G3s and G3i, and 256 G3r announcements can be recorded on the Integrated Announcement circuit pack. A Network Control circuit pack restores messages after a power failure. G3r: each analog announcement has announcement equipment, such as an AT&T 15A announcement unit configured with an analog interface, and one port on a Analog Line circuit pack. G3r can also use announcement equipment 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 128 G3vs, G3s and G3i, and 256 G3r announcements can be recorded on the Integrated Announcement circuit pack. The G3r has a System Access Port resource (Packet Data and Data Line combination) to save and restore announcements to the Integrated Announcement circuit pack.
Recorded Telephone Dictation Access	Telephone dictation machines and, depending on the type of machine, one port on a Analog Line circuit pack or one port on a Auxiliary Trunk circuit pack for each assigned machine
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

Table 11-4. Additional Hardware to Use Features

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 an AT&T model 470 or 570, which uses a serial interface, or it can be a compatible printer. A Personal Computer (PC) can be connected to the system printer port for collection of data. A serial interface on the PC is used for the connection.
Report Scheduler and System Printer (continued)	G3vs, G3s, and G3i: the system printer is connected via either of the following: ■ Using the Data Communication Equipment (DCE) jack on the back of the PPN control carrier, which provides an RS-232 interface to eliminate a data module ■ Using a Digital Line port and MPDM ■ Using a BRI Line port and a 7500 Data Module ■ Using a Data Line port and an ADU
R2-MFC	Analog or digital trunk and call classifier, e.g., TN744B or greater suffix circuit pack.
Russia MFR for ANI	DS1 Interface 24/32 and Call Classifier circuit packs
Security Violation Notification	Voice terminal with a display
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 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.
UK Networking (Name/Number)	DS1 Interface 24/32 circuit pack
VDN of Origin Announcement	Integrated Announcement circuit pack
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.

Table 11-4. Additional Hardware to Use Features

Feature	Hardware
Voice Terminal Display	Display-equipped voice terminal that can be either of the following: ■ 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	TN464C/D/E/F DS1 Interface circuit pack for line-side and network facilities. G3vs, G3s, and G3i: Processor Interface circuit pack and Wideband Data Modules
World Class Core BRI	Same as ISDN-BRI. See ISDN-BRI.

Allocation of Buttons

Table 11-5 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 station in system

The following legend defines the notation in Table 11-5:

Notation	Meaning	G3iV2/G3sV2	G3r
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 11-5. Allocation of Buttons by Station Type

Station Type	Required Records	Required Records and Button Units
Analog sets: 500, 2500, 7101A, 7103A, and 7104A	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
510BCT 515BCT	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

Table 11-5. Allocation of Buttons by Station Type

Station Type	Required Records	Required Records and Button Units
Digital set — 7401	S	S+92
Digital set — 7402		
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 — 7405D w/display	S + B + [B]	S+472
Digital set — 7406D	S + [B]	S+282
Digital set — 7406D w/display	S + B + [B]	S+342
Digital set — 7407D w/display	S + B + [B]	S+472
Digital set — 7410D	S	S+102
Digital set — 7434D	S + [B]	S+342
Digital set — 7434D w/call coverage mod.	S + B + [B]	S+542
Digital set — 7434D w/display	S + 2B + [B]	S+472
Digital set — 7444D		
602A1	S + B + [B]	S+342
Personal computer (PC)	S + B + [B]	S+472
Feature Module	[B]	240
Display	B	*
DTDM	M	M
MPDM/MTDM/7400A/7400B	M	M
Call Coverage Module	B	200
EIA (PI-Simplex)	M	M
CDR	M	M
Netcon Data Channel	2M	2M
Processor Interface Link	2M	2M
ISDN BRI UDM — 7500		M+I
ISDN BRI set — 7505D		S+I+190
ISDN BRI set — 7506D w/display		S+I+250
ISDN BRI set — 7507D w/display		S+I+480
ISDN BRI set — 8503D		S+I+50
ISDN BRI set — 8510D w/display		S+I+180
ISDN BRI set — 8520D w/display		S+I+280

The following notes apply to the button and data module records in Table 11-5:

- For G3rV1 and V2, [B] is equivalent to B. For G3iV1 and V2, [B] indicates large button modules allocated only when a button on that module is administered
- Any digital communications protocol (DCP) station can add a 7400B, requiring one data module record
- A digital terminal data module (DTDM) can be added to a 7403D or 7405D, requiring one data module record
- The 6504-T is administered as a 7505D and the 6508-T is administered as a 7507D in G3V2
- A data module (ADM-T) can be added to a 7505D, 7506D, or 7507D, requiring one data module record in G3V2
- The PC/ISDN is administered as a 7506D, 7507D, or 8510 with ADM in G3V2
- 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 11-6 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 11-6. Allowable Intra-premises Cabling Distances

Equipment	24 AWG Wire (0.5106 mm)		26 AWG Wire (0.4049 mm)	
	Feet	Meters	Feet	Meters
Enhanced attendant console (302A)				
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, or 615 MT, 4410 or 4425 terminals (see also "data module" or "EIA interface") 50-ft. maximum distance from terminal or BCT to module or ADU	-	-	-	-
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
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

Table 11-6. Allowable Intra-premises Cabling Distances

Equipment	24 AWG Wire (0.5106 mm)		26 AWG Wire (0.4049 mm)	
	Feet	Meters	Feet	Meters
Voice terminals:				
Analog				
8-port circuit pack (TN742, TN769), on-premises or out-of-building — same premises (notes 1 and 2)				
500- or 2500- type (note 3)	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 (note 1)				
AT&T 500 or 2500 type terminals without adjuncts	3100	945	2000	610
8100 series	2500	762	1500	457
16-port circuit pack (TN746B, TN2183), on-premises or out-of-building — same premises (notes 1 and 2)				
500- or 2500-type (note 3)	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)				
7400D series				
Phantom powered	3400	1037	2200	670
Locally powered	5000	1524	4000	1219

Table 11-6. Allowable Intra-premises Cabling Distances

Equipment	24 AWG Wire (0.5106 mm)		26 AWG Wire (0.4049 mm)	
	Feet	Meters	Feet	Meters
Digital (TN754) 7400D series				
On-premises-only terminals	3000	914	2200	670
Out-of-building, same premises terminals	2400	732	1300	396
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

NOTES:

1. 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.
 2. Only AT&T 500- or 2500-type terminals can be used off-premises to a CO.
 3. Point-to-point connections and terminals are within 33 feet of the jack.
 4. If 22 AWG wire is used, contact your AT&T representative.
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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 (AWG) wire. Up to 18,000 feet (maximum) may be used between the TN2198 and the NT1 network interface.

Refer to Table 11-7 for the cabling distances from the NT1 network interface to the 7500-series and 8500-series voice terminals using 24 AWG and 26 AWG wire. If 22 AWG wire is used, contact your AT&T representative for cabling distances. Distances from the power closet to the voice terminal are typically less than 250 feet (75 meters).

Table 11-7. Cabling Distances from NT1 to ISDN-BRI Terminal

Equipment		24 AWG		26 AWG	
		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 requirements for 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 of a rotary mechanical splice and the number of splices
- Higher-order mode loss

Fiber optic cable is terminated at 9823A lightwave transceivers when the distance between cabinets is equal to or less than 4,900 feet (1.5 km).

Fiber optic cable is terminated at 9823B lightwave transceivers when the distance between cabinets is greater than 4,900 feet (1.5 km) and less than 25,000 feet (7.6 km).

The transmission speed across a fiber optic cable link between the PPN and an EPN is 32.788 Mbps.

DS1 Remoting Transmission Distance

When the distance between cabinets is greater than 25,000 ft. (7.6 km), or if fiber optic cabling right-of-way is not available, DS1 remoting is used in place of fiber optic cabling for distances up to 100 circuit miles (160 km). Chapter 5, "Cabling," describes DS1 remoting and the reasons for the 100-mile limit.

Call Progress Tones

This section lists tones generated by the system. Table 11-8 lists the default call progress tones generated country code 1.

Table 11-8. 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*	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

Table 11-8. Default Call Progress Tones (Continued)

Tone	Frequency	Pattern (ms)
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
Executive override tone	440 Hz	3000 on followed by silence; not repeated
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

* Used with the Busy Verification and Executive Override features, and Service Observing feature when the warning tone is enabled.

Table 11-9 lists the call progress tones available for customizing the tones in G3. 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 circuit pack. The tones are used to customize from one to 20 tones in the five administrable tone plans.

In the table, "Level" is the tone amplitude in decibels (dBm). "0" dBm is referenced to 1 milliwatt. To customize these tones, see *DEFINITY® Communications System Generic 3 V3 Implementation*, 555-230-655.

Table 11-9. Customizable Call Progress Tones

Frequency	Level (dbm)
Null	None
330Hz	-8.0 *
330Hz + 440Hz	-5.0 + 8.5 *
330Hz + 440Hz	-8 + -11 *
350Hz	-17.25
350Hz + 425Hz	-4.0 *
350Hz + 425Hz	- 4.0
350Hz + 440Hz	-13.75
350Hz + 440Hz	-13.0 *
350Hz + 440Hz	-13.75 *
375Hz + 425Hz	-15.0
404Hz	-11.0
404Hz	-16.0
404Hz + 425Hz	-11.0
404Hz + 450Hz	-11.0
425Hz	-4.0 *
425Hz	-5.0 *
425Hz	-8.0 *
425Hz	-11.0 *
425Hz	-17.25 *
440Hz	-11.0 *
440Hz	-13.0 *
440Hz	-17.25
440Hz + 350Hz	-13.0 *

Table 11-9. Customizable Call Progress Tones

Frequency	Level (dbm)
440Hz + 480Hz	-13.0 *
440Hz + 480Hz	-19.0
480Hz + 620Hz	-13.0 *
480Hz + 620Hz	-24.0
525Hz	-11.0
620Hz	-17.25
697Hz or 700Hz	-8.5/-8.0
770Hz or 900Hz	-8.5/-8.0
852Hz or 1100Hz	-8.5/-8.0
950Hz	-5.0 *
950Hz	-10.0 *
Chimes (860Hz)	- 3.0
941Hz or 1300Hz	-8.5/-8.0
DMW (1000Hz)	0.0
Square (1000Hz)	+ 3.0
1004Hz	0.0
1004Hz	-16.0
1209Hz or 1500Hz	-7.5/-8.0
1336Hz or 1700Hz	-7.5/-8.0
1400Hz	-5.0 *
1400Hz	-10.0 *
1400Hz	-11.0
1477Hz or 2600Hz	-7.5/-8.0
1633Hz or 1004Hz	-7.5/ 0.0
1700Hz	-16.0 *
1800Hz	-5.0 *
1800Hz	-10.0 *
2025Hz	-12.1
2100Hz	-12.1

Table 11-9. Customizable Call Progress Tones

Frequency	Level (dbm)
2225Hz	-12.1
2804Hz	-16.0
Count	None

* Available only with TN2182 circuit pack

Audible Ringing Patterns

Table 11-10 lists the administrable audible ringing patterns that can appear on analog line circuit pack ports. The times under *Set Number* are in milliseconds. *DEFINITY® Communications System Generic 3 V3 Implementation*, 555-230-655, contains ringing pattern administration.

Table 11-10. 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
- TN2183 — 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

MFC Tones in G3

With Multi-Frequency Compelled signaling (MFC) used on DID and DOD trunks in countries outside the United States, a G3 responds to the frequencies generated by the CO with answering frequencies.

The MFC tones and signalling sequence in G3 follows the CCITT recommendations for MFC signalling defined in *Volume VI, Fascicle VI.4* of the 1989 CCITT *blue books*. CCITT is now the *International Telecommunications Union* (ITU). *DEFINITY[®] Communications System Generic 3 V3 Implementation*, 555-230-655, contains MFC administration.

Indicator Lamp Signals

Table 11-11 lists the lamp signals generated by the system for the attendant console and multi-appearance voice terminals.

Table 11-11. Lamp Signals Generated by G3

Lamp Signal	Pattern (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 11-12 lists the various protocols used in G3, with applications and maximum limitations.

Table 11-12. Protocols Used in G3

Protocol	Applications	Maximum Data Rate	Maximum Distance
DCP	Digital switch to data endpoints	64 kbps	5000 ft (1524 m) for data 3000 ft (915 m) for voice
RS-232	PDM to AP Switch to administration terminal. PDM to host computer. AP to data set (M)PDM to printer MPDM to AP MTDM for downloading and high-speed data transfer EIA interface (Data line to ADU)	19.2 kbps 64 kbps 64 kbps 19.2 kbps 9.6 kbps 4.8 kbps 2.4 kbps 1.2 kbps 0.3 kbps	50 ft (15.2 m) 17 ft (5.9 m) 17 ft (5.9 m) 2000 ft (610 m) 5000 ft (1524 m) 7000 ft (2130 m) 12000 ft (3654 m) 20000 ft (6100 m) 40000 ft (12200 m)
RS-449	AP to AP	19.2 kbps 9.6 kbps 4.8 kbps 2.4 kbps	200 ft (61 m) 400 ft (122 m) 800 ft (244 m) 1600 ft (488 m)
SSI	500 BCT to AP 400 series printers to AP	56 kbps	5000 ft (1524 m)
BISYNC	AP line controller to host computer for terminal Emulation (9.6 kbps)	2.4 kbps 4.8 kbps 9.6 kbps	

Table 11-12. Protocols Used in G3

Protocol	Applications	Maximum Data Rate	Maximum Distance
BX.25	Communication interface to MSA, DCS, ISDN, or AUDIX	9.6 kbps	
SDCPI	(M)PDM to AP	64 kbps	17 feet (5.9 m)
RS-366	Host computer to ACU MTDM to ACU	64 kbps	50 feet (15.2 m) 17 feet (5.9 m)
V.35	MPDM to data endpoints	56 kbps	50 feet (15.2 m)
Category A	3270 data modules to coaxial 3270-type terminals or cluster controller	64 kbps	500 feet (152 m)
	3270A data module in ASCII emulation mode	9.6 kbps	
ISDN BRI	Communication interface to ISDN BRI	64 kbps	655 feet (199.3 m) to network interface or repeater 1310 feet (399.3 m) PBX to PBX
	TN2198	160 kbps	18,000 feet from PBX to NT1, and then ~2000 feet to telephone
ISDN PRI	Communication interface to ISDN PRI	64 kbps	655 feet (199.3 m) to network interface or repeater 1310 feet (399.3 m) PBX to PBX

Transmission Characteristics

The system transmission characteristics comply with the American National Standards Institute/Electronic Industries Association (ANSI/EIA) PBX standard RS-464A (SP-1378A). The following tables list some general switch transmission characteristics.

Frequency Response

Table 11-13 lists the analog-to-analog frequency response of G3 for station-to-station or station-to-CO trunk, relative to loss at 1 kHz for the United States.

Table 11-13. Analog-to-Analog Frequency Response for the USA

Analog-to-Analog		
Frequency (Hz)	Max. Loss (dB)	Min. Loss (dB)
60	—	20
200	5	0
300 to 3000	1	-0.5
3200	1.5	-0.5
3400	3	0

Table 11-14 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 USA.

Table 11-14. Analog-to-Digital Frequency Response for the USA

Analog-to-Digital		
Frequency (Hz)	Max. Loss (dB)	Min. 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 Ports

Table 11-15 lists the insertion loss in the system for different connection types for the United States. Table 11-16 shows the overload and crosstalk characteristics.

Table 11-15. Insertion Loss for the USA

Typical Connections	Nominal Loss (dB) at 1 kHz
On-premises station to on-premises station	6
On-premises station to off-premises station	3
Off-premises station 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 11-16. Overload and Crosstalk

Overload level:	+3 dBm0
Crosstalk loss:	>70 dB

Intermodulation Distortion

Table 11-17 lists the intermodulation distortion in the system for analog-to-analog and analog-to-digital, up to 9.6 kbps data

Table 11-17. Intermodulation Distortion

Four-Tone Method	Distortion
Second-order tone products	>46 dB
Third-order tone products	>56 dB

Quantization Distortion Loss

Table 11-18 lists the quantization distortion loss in the system for analog port to analog port.

Table 11-18. Analog-to-Analog Port 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 11-19 lists the quantization distortion loss in the system for analog port to digital port and digital port to analog port.

Table 11-19. Analog-to-Digital Port 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 5 minutes at +55 dBnC (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 (decibels above reference noise with C-filter)

Digital to analog — 13 dBrnC (decibels above reference noise with C-filter)

Echo Path Delay

Analog port to analog port — ≤ 3 ms

Digital interface port to digital interface port — ≤ 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 G3 system 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 (FICs)

A Facility Interface Code (FIC) is a five-character code (for the USA 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 in the United States. Table 11-20 through Table 11-22 list the FICs used to order analog private line, digital line, and MTS and WATS port circuit packs. Included with the FICs 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 11-20. FICs for Analog Private Line, Port Circuit Packs

Circuit Pack	FIC	Service Order Code	Network Jack
TN742 and TN747B OPS port, and TN746B OPS or on-premises station (ONS) port	0L13C	9.0F	RJ21X
TN760, TN760B, and TN760D tie trunk	TL31M	9.0F	RJ2GX

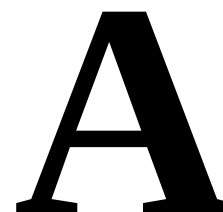
Table 11-21. FICs for Digital Line, Port Circuit Packs

Circuit Pack	FIC	Service Order Code	Network Jack
TN574 DS1 converter, TN722 and TN722B DS1 tie trunk, and TN767 DS1 interface	04DU9B,C	6.0P	RJ48C and RJ48M

Table 11-22. FICs for MTS and WATS, Port Circuit Packs

Circuit Pack	FIC	REN	Network Jack
TN742 and TN746B analog line	02LS2	None	RJ21X and RJ11C
TN747 and TN747B CO trunk	02GS2	1.0A	RJ21X
TN753 DID trunk	02RV2-T	0,0B	RJ21X
TN773 processor	02LS2	0.5A	RJ21X
TN1648 system access and maintenance	02LS2	0.5A	RJ21X

System Capacity Limits



Overview

This appendix provides information on the overall characteristics and capacities of the system.

System Hardware and Software Capacity Limits

The maximum parameters for the DEFINITY® Communications System Generic 1 and Generic 3 hardware and software items are listed on the following pages. Unless otherwise noted, these parameters apply to both the Single-Carrier Cabinet and Multi-Carrier Cabinet systems. Also:

- For G3sV1/G3sV2 and G3vsV1/G3vsV2, 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
- Most G3iV1 and G3i-Global capacity limits are the same. In the few cases where a G3i-Global capacity limit differs from the corresponding G3i capacity limit, the G3i limit is given followed by the G3i-Global limit in parenthesis.



NOTE:

Not all maximum capacities listed in the following tables can be reached simultaneously with all versions or all configurations of the system.

Table A-1. Maximum System Parameters for G3V1

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
Abbreviated Dialing (AD)				
AD Lists per System	200	200	1,600/2,400	5,000
AD List Entry Size	24	24	24	24
AD Entries per System ¹	2,000	2,000	10,000/12,000	50,000
Enhanced List (System List)	NA/1	NA/1	1	1
Maximum Entries	NA/1,000	NA/1,000	1,000	1,000
Group Lists	100	100	100	100
Maximum Entries	90	90	90	90
Group Lists per Extension	3	3	3	3
System List	1	1	1	1
Maximum Entries	90	90	90	90
Personal Lists	200	200	1,600/2,400	5,000
Maximum Entries	10	10	10	10
Personal Lists per Extension	3	3	3	3
Applications Adjuncts				
CallVisor ASAI Adjuncts	NA/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. 100,000 for G3rV3

2. For Single-Carrier Cabinets (SCC), only four BX.25 physical links are supported in G3sV2 and G3iV2.

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3sV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
ARS/AAR^{1, 2}				
AAR/ARS Patterns (Shared)	NA/40	NA/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	300	300	300	400
AAR/ARS Digit Conversion				
Digits Deleted for ARS/AAR	23	23	23	23
Digits Inserted for ARS/AAR	18	18	18	18
AAR/ARS Sub-Net Trunking				
Digits Deleted for ARS/AAR	23	23	23	23
Digits Inserted for ARS/AAR	36	36	36	36
Entries in HNPA & RHNPA Tables	1,000	1,000	1,000	1,000
FRLs	8	8	8	8
Inserted Digit Strings ³	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	240	50,000
TOD Charts	8	8	8	8

1. AAR is **not an optional feature** in G3sV2 ABP.

2. ARS is available in G3s if the Automatic Route Selection Option is selected.

3. This is the number of 12 character inserted-digit-strings available for AAR/ARS preferences.

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
Attendant Service				
Attendant Consoles (day:night) ¹	4:1	6:1	6:1/15:1	27:1
Attendant Console 100s Groups/Attendant	20	20	20	20
Attendant Control Restriction Groups	64	64	64	96
Centralized Attendant Service				
Release Link Trunks at Branch	NA/99	NA/99	99	99
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 Group at Main ²	NA/32	NA/32	99	666
Other Access Queues				
Maximum Number of Queues	1	1	1 (12)	12
Maximum Number of Queue Slots ³	30	30	50/80	80
Size range of Reserved Queue	NA	NA	NA (2-75)	2-75
Reserved Queue Default Size	NA	NA	NA (5)	5
Queue Length	30	30	30/80	300
Switched Loops/Console	6	6	6	6
Authorization				
Authorization Codes	1,500	1,500	5,000	90,000
Classes of Restriction	64	64	64/96	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

1. For G3vs, there can be four day consoles if there are no night consoles. Three of the four must be powered by auxiliary power.
2. This number is the same as the number of trunk groups in the system.
3. The "Maximum number of queue slots" is referred to as "emergency access queue length" in G1.

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
Authorization (Continued)				
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	160/240	1,000
Automatic Wakeup				
Simultaneous Display Requests	10	10	10	10
Wakeup Requests per System	200	200	1,600/2,400	10,000
Wakeup Request per Extension	1	1	1	1
Wakeup Requests per 15-minute Interval	150	150	300	950
Basic CMS				
Daily Summary Reports	7	7	7	7
Measured Agent Logins, 75 for G3vs and G3s, 200 for G3i, and 600 for G3r	75	75	200	200
Measured Splits	12/24	12/24	99	99
Measured Trunk Groups	16/32	16/32	99	32
Measured VDNs	NA/24	NA/24	99	512
Reporting Periods (30 or 60 min)	25	25	25	25
Number of Terminal User IDs	5	5	5	8

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
Cabinets				
Expansion Port Network (EPN)				
Multi-Carrier Cabinet (MCC) ^{1,2}	NA	NA	2	21
Single-Carrier Cabinet (SCC) ^{1,2}	NA	NA	8	80
Small ¹ (Upgrades only) ³	NA	NA	2	20
Inter-Port Network Connectivity				
Port Networks ¹	1	1	3	22
Maximum Number of Port Networks per Cabinet	1	1	1	2
Switch Node Carriers ¹ (Simplex)	NA	NA	NA	2
Switch Node Carriers ¹ (Duplex)	NA	NA	NA	4
DS1 Converter Complex ¹ (Simplex)	NA	NA	NA	20
DS1 Converter Complex ¹ (Duplex)	NA	NA	NA	40
Processor Port Network (PPN)				
Multi-Carrier Cabinet (MCC) ⁴	NA	NA	1	1
Single-Carrier Cabinet (SCC) or Enhanced Single-Carrier Cabinet (ESCC)	NA	4	4	NA
Compact Single-Carrier Cabinet (CSCC)	1	NA	NA	NA
Remote Modules				
Remote Port Network	NA	NA	2/1	21

- 43 for G3rV3 for MCC
164 for G3rV3 for SCC
41 for G3rV3 for Small
44 for G3rV3 for Port Networks
3 for G3rV3 for Switch Node Carriers (Simplex)
6 for G3rV3 for Switch Node Carriers (Duplex)
41 for G3rV3 for DS1 Converter Complex (Simplex)
- The EPNs in G3r can be DS1-remote EPNs.
- Small systems refer to the two-carrier cabinet systems that are no longer sold to new customers.
- MCC includes Medium Cabinet.

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
Call Appearances				
Bridged Images per Appearance	7	7	7	15
Call Appearances per Station ¹	54	54	54	54
Maximum Appearances per Extension	10	10	10	10
Minimum Appearances per Extension	2	2	2	2
Total Bridged Appearances	200	200	1600/2,400	10,000
Maximum Simultaneous Off-Hook per Call ²	5	5	5	5
Call Coverage				
Coverage Answer Groups (CAG)	30	30	200	500
Coverage Paths	150	150	600	5,000
With Hospitality Parameter Reduction	NA/5	NA/5	5	5
Coverage Paths Including in Call Coverage Report	100	100	100	100
Coverage Path per Station ³	4	4	4	4
Coverage Points in a Path	3	3	3	3
Maximum Users/Coverage Path ⁴	500	500	2900 (3500)	21,875
Members per CAG	8	8	8	8
Call Detail Recording				
CDRU Trackable Extensions	200	200	1,600/2,400	10,000
Intra-switch Call Trackable Extensions ⁵	100	100	100	500
Number of CDRUs per System ⁶	2	2	2	2

1. The number of call appearances is the sum of primary and bridged appearances; at most ten 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.
2. Does not apply to conferencing.
3. Only available with ABP when AT&T Voice Power adjunct (AUDIX, AUDIX Voice Power, AUDIX Voice Power Lodging, and DEFINITY AUDIX) are used.
4. The maximum number of users per coverage path equals the number of dial plan extensions (including hunt groups, TEGs, etc.).
5. 1,000 for G3iV3/5,000 for G3rV3
10,604 for G3V3
6. The CDRU adjunct capacity is 40,000 calls per hour, and exceeds the system call capacity for all systems except for G3r.

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
Call Forwarding (Follow-me)				
Call Forwarded Digits (off-net)	16	16	16	16
Call Forwarded Numbers	200	200	1,600/2,400	10,000
Call Park				
Attendant Group Common Shared Extension Numbers	10	10	10	40
Number of Parked Calls ⁵	180	180	723	5,302
Call Pickup Groups				
Call Pickup Members per Group	50	50	50	50
Call Pickup Members per System	200	200	1600/2400	10,000
Number of Groups	100	100	800	5,000
With Hospitality Parameter Reduction	NA/5	NA/5	5	5
Call Vectoring/Call Prompting				
Expert Agent Selection				
Skill Groups	NA	NA	NA	NA
VDN Skill Preferences	NA	NA	NA	NA
Multiple Skills per Call	NA	NA	NA	NA
Multiple Skills per Agent	NA	NA	NA	NA
Agent Login IDs	NA	NA	NA	NA
Multiple Splits per Call	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/15	NA/15	15	15
Vector Directory Numbers ¹	NA/100	NA/100	500	3,000
Measured VDNs	NA/100	NA/100	500	2,000
Vectors per System	NA/48	NA/48	256	512

1. The total of VDN, Station, and Login ID extensions cannot exceed 25,000.
2,000 for G3rV3
7,084 for G3rV3 for "Simultaneous three-way Conference Calls"
3,520 for G3rV3 for "Simultaneous six-way Conference Calls"

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
CallVisor ASAI				
Active Station Controlling Association	NA	NA/250	2,000/NA	6,000
Call Controllers per Call	NA	NA/1	1/NA	1
Call Monitors per Call	NA	NA/14	14/NA	14
Extension Controllers per Station Domain	NA	NA/2	2/NA	2
Maximum Simultaneous Call Classifications	NA	NA/40	40/NA	100
Number of ASAI Links	NA	NA/4	8/NA	8
Notification Requests ¹	NA	NA/50	170/NA	460
Simultaneous Active Adjunct Controlled Calls	NA	NA/75	300/NA	3,000
Switch to Adjunct Associations	NA	NA/127	127/NA	127
Conference Parties	6	6	6	6
Simultaneous 3-way Conference Calls ^{1,2}	161	161	483	3,542
Simultaneous 6-way Conference Calls ^{1,3}	80	80	240	1,760
Data Parameters				
Administered Connections	NA/24	NA/24	128	128
Permanent Switched Call	NA	NA	NA	NA
Alphanumeric Dialing				
Maximum Entries	50	50	200	1,250
Characters per Entry	22	22	22	22
Digital Data Endpoints	75	75	800	5,000

1. The total of VDN, Station, and Login ID extensions cannot exceed 25,000.

2,000 for G3rV3

7,084 for G3rV3 for "Simultaneous three-way Conf. Calls"

3,520 for G3rV3 for "Simultaneous six-way Conf. Calls"

2. Simultaneous 3-way Conference Call=(483 / 3)* number PNs. Simultaneous 3-way Conference Call is limited by the number of Simultaneous

3. Simultaneous 6-way Conference Call=(483 / 6)* number PNs.

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
Dial Plan				
DID LDNs	8	8	8	20
Extensions ¹	500	500	2900/ 3500	21,875
Extension Number Portability ²	NA/240	NA/240	240	50,000
Feature Dial Access Codes				
Number of Access Codes	70	70	70	70
Number of Digits	1-3	1-3	1-3	1-4
Integrated Directory Entries	204	207	1607/ 2407	10,000
Maximum Extension Size	5	5	5	5
Minimum Extension Size	1	1	1	1
Miscellaneous Extensions ³	150	150	900	3317
Names				
Number of Names ⁴	448/464	448/464	3,406/4,215	22,569
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	105	105	197	884
Number of Digits	1-3	1-3	1-3/1-4	1-4
Do Not Disturb (DND)				
DND Requests per System	200	200	1600/ 2400	10,000
Simultaneous Display Requests	10	10	10	10
Facility Busy Indicators				
Buttons per Tracked Resource	100	100	100	100
Number of Indicators (Station and Trunk Groups)	450	450	2400/3600	2400

1. Extensions include stations, data endpoints, hunt groups, announcements, TEGs, VDNs, common shared extensions, and code calling IDs.
2. The numbers shown in "Extension Number Portability" are Uniform Dialing Plan (UDP) entries.
3. Used for PCOL groups, common shared extensions, access endpoints, administered TSCs, code calling IDs, VDNs, LDNs, hunt groups, announcements, and TEGs.
4. The Number of Names = number of stations + attendant consoles + trunk groups + digital data endpoints + miscellaneous extensions.

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
Hunt Groups or Splits				
Announcements per Group	2	2	2	2
Announcements per System	128	128	128	256
Groups and/or Splits	12/24	12/24	99	255
With Hospitality Parameter Reduction	NA/5	NA/5	5	5
Group Members per Group/Split	150	150	200	999
Group Members per System	150	150	500	3,000
Measured ACD Agents (Switch Limits)				
Agents Logged in per System	75	75	400	1023
Logged-In Splits per Agent	3	3	3	3
ACD Supervisor Assist Per System ¹	12/24	12/24	99	255
Queue Slots per Group	200	200	200	999
Queue Slots per System	200	200	1,000	10,000
Intercom Translation Table (ICOM)				
Automatic/Manual and Dial ICOM Groups per System	10	10	32	256
Auto/Manual	16	16	32	256
Dial	16	16	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 ²	275	275	2,400/ 3,200	15,000
Number of Digits	16	16	16	24

1. One supervisor assist per split.

2. Last Number Dialed Entries = Stations + Digital Data Endpoints.

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
Leave Word Calling (Switch-Based) ¹				
Messages Stored	450	450	2,000	2,000
Messages per User	10	10	10	16
Remote Message Waiting Indicators				
Per Extension	80	80	80	80
Per System	80	80	80	500
Simultaneous Message Retrievers	60	60	60	400
System-Wide Message Retrievers	10	10	10	10
Malicious Call Trace				
Maximum Simultaneous Traces	NA	NA	NA	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
Networking				
CAS Nodes	NA/99	NA/99	99	99
DCS Nodes				
BX.25	NA/20	NA/20	20	63
ISDN PRI	NA/63	NA/63	63	63
Hybrid	NA/63	NA/63	63	63
UDP Nodes	NA/240	NA/240	240	999
Paging				
Code Calling IDs	125	125	125	125
Loudspeaker Zones	9	9	9	9

1. Leave Word Calling is available with G3s ABP only if the Voice Mail Application Support Option is purchased.

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
Partitions				
Attendant Partition	1	1	1	1
Extension Partition Group	8	8	8	8
Extension Partition	8	8	8	8
Personal CO Lines (PCOL)				
PCOL Appearances	4	4	4	16
PCOL Lines (Trunk Groups)	15	15	40/200	100
PCOL Trunks Per Trunk Group	1	1	1	1
Port Circuit Pack Slots¹				
Per Expansion Port Network (EPN)				
Multi-Carrier Cabinet (MCC) Simplex	NA	NA	99	99
Multi-Carrier Cabinet (MCC) Duplex	NA	NA	98	98
Single-Carrier Cabinet (SCC) Simplex	NA	NA	71	71
Single-Carrier Cabinet (SCC) Duplex	NA	NA	70	70
Small Cabinet Simplex (Upgrade only)	NA	NA	39	39
Small Cabinet Duplex (Upgrade only)	NA	NA	38	38
Per Processor Port Network (PPN)				
Multi-Carrier Cabinet (MCC) Simplex	NA	NA	89	80
Multi-Carrier Cabinet (MCC) Duplex	NA	NA	78	60
Single-Carrier Cabinet (SCC) Simplex	NA	NA	64	NA
Single-Carrier Cabinet (SCC) Duplex	NA	NA	56	NA
Enhanced Single-Carrier Cabinet (ESCC) Simplex	NA	70	NA	NA
Enhanced Single-Carrier Cabinet (ESCC) Duplex	NA	NA	NA	NA
Compact Single-Carrier Cabinet (CSCC) Simplex	10	NA	NA	NA

1. Only port slots are included in this count. For example, there are 99 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 which would further reduce the number of port slots available. In G3 carriers, the 21st slot of MCC port carriers may be equipped with service boards that do not require tip and ring connections.

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
Recorded Announcements				
Analog Queue Slots per Announcement	50	50	150	300
Analog Queue Slots per System	50	50	150	300
Calls Connected per Announcement				
Integrated Announcement or Auxiliary Trunk	5	5	5	255
Analog Ports	5	5	5	128
Channels per Integrated Announcement Circuit Pack	16	16	16	16
Integrated Announcement Circuit Pack	1	1	1	1
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
Integrated Queue Slots per System	50	50	50	300
Recorded Announcements	128	128	128	256
System Administration				
Administrable History File Entries	50	50	250	1,250
Simultaneous Administration Command	1	1	1	5
Simultaneous Maintenance Command	1	1	1	3
Simultaneous SM Sessions	3	3	5	8
Printer Queue Size	50	50	50	50
Speech Synthesis Circuit Packs	6	6	6	6
Channels per Speech Circuit Pack	4	4	4	4

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
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	5,302
Total Slots ²	512	512	1536	11,264
Time Slots for Voice and Data ³	483	483	1449	10,604
Time Slots per Port Network	512	512	512	512
Tone Classifiers				
Call Classifier Boards	NA/10	NA/10	10	50
Call Progress/Touch Tone Receivers	NA/80	NA/80	80	400
Tone Detector Boards	10	20	20	50
General Purpose Tone Detectors	20	40	40	100
Touch-Tone Receivers	40	80	80	200
Prompting TTR Queue Size	NA	NA	80	80
TTR Queue Size	4	4	4	4
Trunks				
DS1 Circuit Packs	8	8	30	166
Queue Slots for Trunks	32/64	32/64	198	1,332
PRI Interfaces via PI ⁴	NA/4	NA/4	8	NA
PRI Interfaces via PKTINT	NA/4	NA/4	NA/8	166

1. 241 Simultaneous Circuit-Switched Calls per port network, except for G3s, where the maximum is 180.

2. 512 time slots per port network.

3. 483 time slots for Voice and Data per port network. Even though an EPN is supported in G3sV2, giving a total of two port networks, G3sV2 is designed to support only 180 Simultaneous Circuit-Switched Calls.

4. Only one PI board is supported in G3vs/G3s (both MCC and SCC), and therefore a total of four physical links, used for BX.25 or PRI, are available.

In G3i, two PI boards can be supported in the MCC, and therefore a total of eight physical links (used for BX25 or PRI) are available. Since the SCC can only support one PI board, a total of four physical links (used for BX25 or PRI) are available in the SCC 286 and Medium configurations.

Table A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
Trunks (Continued)				
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/32	NA/32	128	128
Ringback Queue Slots	120	120	120	1,332
Total PRI Interfaces (30)	NA/4	NA/4	8	166
Trunk Groups Hourly Measurements	NA	NA	NA	75
Trunk Groups in the System	16/32	16/32	99	666
Trunk Members in a Trunk Group	50/99	50/99	99	255
Trunks in System (Including Remote Access) ¹	50/100	50/100	400	4,000
With Hospitality Parameter Reduction	NA/NA	NA/NA	50	50
Measured Trunks in System	50/100	50/100	400	2000

1. 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 may 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 A-1. Maximum System Parameters for G3V1 — *continued*

ITEM	G3vsV1 ABP/PBP	G3sV1 ABP/PBP	G3iV1/ G3i-Global	G3rV1
Voice Terminals				
Associated Data Modules (such as DTDMs)	75	75	800	5,000
BRI Stations ¹	NA	50	1,000	5,000
Digital Stations	200	200	1,600	10,000
Stations	200	200	1,600	10,000
Station Button Capacity (K Units) ²	102.6	102.6	547.2	4120

1. All BRI stations can be display stations.
2. In G3, "Station Button Capacity (units) 'replaces' Maximum Button Modules."

The following examples show how these units can be used. The assumption is that only three call appearances are assigned to the sets (except analog sets which have no call appearance).

- Analog sets (for example, 7104A): G3r, 76 units; all other releases, 62 units.
- Digital sets with 10 buttons (for example, 7403D): G3r, 124 units; all other releases, 102 units.
- Digital sets with 34 buttons, without display (for example, 7405D): G3r, 412 units; all other releases, 342 units.
- Digital sets with 34 buttons, with display (for example, 7405D): G3r, 568 units; all other releases, 472 units.
- 7406D Digital sets with display: G3r, 412 units; all other releases, 342 units.

BRI sets with 17 buttons, with display (for example, 7506D): G3r, 304 units; all other releases, 250 units. The station button capacity can support all stations equipped as 7406D digital sets with display. For example, a total of $342 \times 1200 + 410.4K$ units for the G3iV1.1-286.

Table A-2. Maximum System Parameters for G3V1.1 or V2

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
Abbreviated Dialing (AD)					
AD Lists Per System	1,600	200	200	2,400	5,000
AD List Entry Size	24	24	24	24	24
AD Entries Per System ¹	10,000	2,000	2,000	12,000	50,000
Enhanced List (System List)	1	NA/1	NA/1	1	1
Maximum Entries	1,000	NA/1,000	NA/1,000	1,000	1,000
Group Lists	100	100	100	100	1,000
Maximum Entries	90	90	90	90	90
Group Lists per Extension	3	3	3	3	3
System List	1	1	1	1	1
Maximum Entries	90	90	90	90	90
Personal Lists	1,600	200	200	2,400	5,000
Maximum Entries	10	10	10	10	10
Personal Lists per Extension	3	3	3	3	3
Applications Adjuncts					
CallVisor ASAI Adjuncts	8	NA/NA	NA/4	8	8
Asynchronous Links (RS-232)	5	5	5	5	10
CDR Output Devices	2	2	2	2	2
Journal:System Printer	2:1	2:1	2:1	2:1	2:1
Property Management Systems	1	1	1	1	1
BX.25 Physical Links ²	8	4	4	8	16
Application Processors (such as 3B2-MCS)	1	1	1	1	7
AUDIX Adjuncts	1	1	1	1	8
CMS Adjuncts	1	1	1	1	1
CM Adjuncts					
ISDN Gateway	1	NA/1	NA/1	1	1
BX.25 Processor Channels	64	64	64	64	128
Hop Channels	64	64	64	64	128

1. 100,000 for G3rV3

2. In the case of Single-Carrier Cabinets (SCC), only four BX.25 physical links are supported in G3sV2 and G3iV2.

Table A-2. Maximum System Parameters for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
ARS/AAR^{1, 2}					
AAR/ARS Patterns (Shared)	254	20/40	20/40	254	640
ARS/AAR Table Entries (NPA, NXX, RXX, HNPA, FNPA)	2,000	2,000	2,000	2,000	2,000
Choices per RHNPA Table	12	12	12	12	12
Digit Conversion Entries	400	400	400	400	400
AAR/ARS Digit Conversion					
Digits Deleted for ARS/AAR	23	23	23	23	23
Digits Inserted for ARS/AAR	18	18	18	18	18
AAR/ARS Sub-Net Trunking					
Digits Deleted for ARS/AAR	23	23	23	23	23
Digits Inserted for ARS/AAR	36	36	36	36	36
Entries in HNPA & RHNPA Tables	1,000	1,000	1,000	1,000	1,000
FRLs	8	8	8	8	8
Inserted Digit Strings ³	1,200	450	450	1,200	3,000
Patterns for Measurement					
Shared Patterns for Measurement	20	20	20	20	25
RHNPA Tables	32	32	32	32	32
Routing Plans	8	8	8	8	8
Toll Tables	32	32	32	32	32
Entries per Toll Table	800	800	800	800	800
Trunk Groups in an ARS/AAR Pattern	6	6	6	6	16
UDP (Entries)	240	NA/240	NA/240	10,000	50,000
TOD Charts	8	8	8	8	8

1. AAR is **not an optional feature** in G3sV2 ABP.
2. ARS is available in G3s if the Automatic Route Selection Option is selected.
3. This is the number of 12 character inserted-digit-strings available for AAR/ARS preferences.

Table A-2. Maximum System Parameters for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
Attendant Service					
Attendant Consoles (day:night) ¹	15:1	4:1	6:1	15:1	27:1
Attendant Console 100s Groups/Attendant	20	20	20	20	20
Attendant Control Restriction Groups	96	96	96	96	96
Centralized Attendant Service					
Release Link Trunks at Branch	99	NA/99	NA/99	99	255
Release Link Trunk Group at Branch	1	NA/1	NA/1	1	1
Release Link Trunks at Main	400	NA/100	NA/100	400	4,000
Release Link Trunk Groups at Main ²	99	NA/32	NA/32	99	666
Other Access Queues					
Maximum Number of Queues	12	12	12	12	
Maximum Queue Slots ³	80	30	30	80	80
Size Range of Reserved Queue	2-75	2-25	2-25	2-75	2-75
Reserved Queue Default Size	5	5	5	5	5
Queue Length	80	30	30	80	300
Switched Loops/Console	6	6	6	6	6
Authorization					
Authorization Codes	5,000	1,500	1,500	5,000	90,000
Classes of Restriction	96	96	96	96	96
Classes of Service	16	16	16	16	16
Length of Authorization Code	4-7	4-7	4-7	4-7	4-7
Length of Barrier Code	4-7	4-7	4-7	4-7	4-7
Length of Forced Entry Account Codes	1-15	NA/1-15	NA/1-15	1-15	1-15
Restricted Call List	1	1	1	1	1

1. For G3vs, there can be four day consoles if there are no night consoles. Three of the four must be powered by auxiliary power.
2. This is the same as the number of trunk groups in the system.
3. Referred to as "emergency access queue length" in G1.

Table A-2. Maximum System Parameters for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1- 286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2- 386	G3rV2
Authorization (con't)					
Remote Access Barrier Codes	10	10	10	10	10
CDR Forced Entry Account Code List	1	NA/1	NA/1	1	1
Toll Call List	1	1	1	1	1
Unrestricted/Allowed Call Lists	10	10	10	10	10
Total Call List Entries	1,000	1,000	1,000	1,000	1,000
Automatic Callback Calls	160	20	20	240	1,500
Automatic Wakeup					
Simultaneous Display Requests	10	10	10	10	30
Wakeup Requests per System	1,200	200	200	2,400	15,000
Wakeup Request per Extension	1	1	1	1	1
Wakeup Requests per 15-minute Interval	300	150	150	450	950
Basic CMS					
Daily Summary Reports	7	7	7	7	7
Measured Agent Logins, 75 for G3vs and G3s, 200 for G3i, and 600 for G3r	200	75	75	200	200
Measured Splits	99	12/24	12/24	99	99
Measured Trunk Groups	32	16/32	16/32	32	32
Measured VDNs	99	NA/24	NA/24	99	512
Reporting Periods (30 or 60 min)	25	25	25	25	25
Number of Terminal User IDs	5	5	5	5	8

Table A-2. Maximum System Parameters for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
Cabinets					
Expansion Port Network (EPN)					
MCC ^{1, 2}	2	NA	NA	2	21
SCC ^{1, 2}	8	NA	NA	8	80
Small ¹ (Upgrades only) ³	2	NA	NA	2	20
Inter-Port Network Connectivity					
Port Networks ¹	3	1	1	3	22
Maximum Number of Port Networks/Cabinet	1	1	1	1	2
Switch Node Carriers ¹ (Simplex)	NA	NA	NA	NA	2
Switch Node Carriers ¹ (Duplex)	NA	NA	NA	NA	4
DS1 Converter Complex ¹ (Simplex)	NA	NA	NA	NA	20
DS1 Converter Complex ¹ (Duplex)	NA	NA	NA	NA	40
Processor Port Network (PPN)					
MCC ⁴	1	NA	NA	1	1
SCC/ESCC	4	NA	4	4	NA
CSCC	NA	1	NA	NA	NA
Remote Modules					
Remote Port Network	2	NA	NA	2	21

1. 43 for G3rV3 for "MCC"
164 for G3rV3 for "SCC"
41 for G3rV3 for "Small"
2. The EPNs in G3r can be DS1-remote EPNs.
3. Small systems refer to the two-carrier cabinet systems that are no longer sold to new customers.
4. MCC includes Medium Cabinet.

Table A-2. Maximum System Parameters for Hardware and Software Items for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
Call Appearances					
Bridged Images per Appearance	7	7	7	7	15
Call Appearances per Station ¹	54	54	54	54	54
Maximum Appearances per Extension	10	10	10	10	10
Minimum Appearances per Extension	2	2	2	2	2
Total Bridged Appearances	1,600	200	200	2,400	25,000
Maximum Simultaneous Off-Hook per Call ²	5	5	5	5	5
Call Coverage					
Coverage Answer Groups (CAG)	200	30	30	200	750
Coverage Paths	600	150	150	600	7,500
With Hospitality Parameter Reduction	5	NA/5	NA/5	5	5
Coverage Paths Included in Call Coverage Report	100	100	100	100	100
Coverage Path per Station ³	4	4	4	4	4
Coverage Points in a Path	3	3	3	3	3
Maximum Users per Coverage Path ⁴	2900	500	500	3,500	36,065
Members per CAG	8	8	8	8	8
Call Detail Recording					
CDRU Trackable Extensions	1,600	200	200	2,400	25,000
Intra-switch Call Trackable Extensions ⁵	100	100	100	100	500
Number of CDRUs per System ⁶	1	1	1	1	1

1. The number of call appearances is the sum of primary and bridged appearances; at most ten 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.
2. Does not apply to conferencing.
3. Only available with ABP when AT&T Voice Power adjunct (AUDIX, AUDIX Voice Power, AUDIX Voice Power Lodging, and DEFINITY AUDIX) are used.
4. The maximum number of users per coverage path equals the number of dial plan extensions (including hunt groups, TEGs, etc.).
5. 1,000 for G3iV3/5,000 for G3rV3
10,604 for G3V3
6. The CDRU adjunct capacity is 40,000 calls per hour, and exceeds the system call capacity for all systems except for G3r.

Table A-2. Maximum System Parameters for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
Call Forwarding (Follow-me)					
Call Forwarded Digits (off-net)	16	16	16	16	16
Call Forwarded Numbers	1,600	200	200	2,400	25,000
Call Park					
Attendant Group Common Shared Extension Numbers	10	10	10	10	80
Number of Parked Calls	723	180	180	723	5,302
Call Pickup Groups					
Call Pickup Members per Group	50	50	50	50	50
Call Pickup Members per System	1,600	200	200	2,400	25,000
Number of Groups	800	100	100	800	5,000
With Hospitality Parameter Reduction	5	NA/5	NA/5	5	5
Call Vectoring/Call Prompting					
Expert Agent Selection					
Skill Groups	NA	NA/24	NA/24	99	255
VDN Skill Preferences	NA	NA/3	NA/3	3	3
Multiple Skills per Call	NA	NA/3	NA/3	3	3
Multiple Skills per Agent	4	NA/4	NA/4	4	4
Agent Login IDs	NA	NA/450	NA/450	1,500	10,000
Multiple Splits per Call	3	NA/3	NA/3	3	3
Priority Levels	4	NA/4	NA/4	4	4
Recorded Announcement	128	NA/128	NA/128	128	256
Steps per Vector	32	NA/32	NA/32	32	32
Vector Directory Numbers ¹	500	NA/100	NA/100	512	20,000
Measured VDNs	500	NA/100	NA/100	512	2,000
Vectors per System	256	NA/48	NA/48	256	512

1. The total of VDN, Station, and Login ID extensions cannot exceed 25,000.
2,000 for G3rV3
7,084 for G3rV3 for "Simultaneous 3-way Conference Calls"

Table A-2. Maximum System Parameters for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
CalVisor ASAI					
Active Station Controlling Association	2,000	NA	NA/250	2,000	6,000
Call Controllers per Call	1	NA	NA/1	1	1
Call Monitors per Call	1	NA	NA/1	1	1
Extension Controllers per Station Domain	2	NA	NA/2	2	2
Maximum Simultaneous Call Classifications	40	NA	NA/40	40	400
Number of ASAI Links	8	NA	NA/4	8	8
Notification Requests ¹	170	NA	NA/50	170	460
Simultaneous Active Adjunct Controlled Calls	300	NA	NA/75	300	3,000
Switch to Adjunct Associations	127	NA	NA/127	127	127
Conference Parties	6	6	6	6	6
Simultaneous 3-way Conference Calls ^{1,2}	483	161	161	483	3,542
Simultaneous 6-way Conference Calls ^{1,3}	240	80	80	240	1,760
Data Parameters					
Administered Connections	128	NA/24	NA/24	128	128
Permanent Switched Call	NA	NA	NA	NA	NA
Alphanumeric Dialing					
Maximum Entries	200	50	50	200	1,250
Characters per Entry	22	22	22	22	22
Digital Data Endpoints	800	75	75	800	7,500

1. The total of VDN, Station, and Login ID extensions cannot exceed 25,000.
2,000 for G3rV3
7,084 for G3rV3 for "Simultaneous 3-way Conference Calls"
3,520 for G3rV3 for "Simultaneous 6-way Conference Calls"
2. Simultaneous 3-way Conference Call = (483 / 3)* number PNs. Simultaneous 3-way Conference Call is limited by the number of Simultaneous
3. Simultaneous 6-way Conference Call = (483 / 6)* number PNs.

Table A-2. Maximum System Parameters for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
Dial Plan					
DID LDNs	8	8	8	8	20
Extensions ¹	2900	500	500	3,500	36,065
Extension Number Portability ²	240	NA/240	NA/240	10,000	50,000
Feature Dial Access Codes					
Number of Access Codes	70	70	70	70	70
Number of Digits	1-4	1-4	1-4	1-4	1-4
Integrated Directory Entries	1,616	207	207	2,416	25,028
Maximum Extension Size	5	5	5	5	5
Minimum Extension Size	1	1	1	1	1
Miscellaneous Extensions ³	900	150	150	900	3317
Names					
Number of names ⁴	3,615	448/464	448/464	4,215	36,511
Number of characters in name	15	15	15	15	15
Non-DID LDNs	50	50	50	50	666
Prefix Extensions	Yes	Yes	Yes	Yes	Yes
Trunk Dial Access Codes					
Number of Access Codes	157	49/65	49/65	317	884
Number of digits	1-4	1-4	1-4	1-4	1-4
Do Not Disturb (DND)					
DND Requests per System	1,600	200	200	2,400	25,000
Simultaneous Display Requests	30	10	10	10	30

1. Extensions include stations, data endpoints, hunt groups, announcements, TEGs, VDNs, common shared extensions, and code calling IDs.
2. The numbers shown in "Extension Number Portability" are Uniform Dialing Plan (UDP) entries.
3. Used for PCOL groups, common shared extensions, access endpoints, administered TSCs, code calling IDs, VDNs, LDNs, hunt groups, announcements, and TEGs.
4. The Number of Names = number of stations + attendant consoles + trunk groups + digital data endpoints + miscellaneous extensions.

Table A-2. Maximum System Parameters for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
Facility Busy Indicators					
Buttons per Tracked Resource	100	100	100	100	100
Number of Indicators (Station and Trunk Groups)	2400	450	450	3,600	5,000
Hunt Groups or Splits					
Announcements per Group	2	2	2	2	2
Announcements per System	128	128	128	128	256
Groups and/or Splits	99	12/24	12/24	99	255
With Hospitality Parameter Reduction	5	NA/5	NA/5	5	5
Group Members per Group/Split	200	150	150	200	999
Group Members per System	500	150	150	500	5200
Measured ACD Agents (Switch Limits)					
Agents Logged in per System	400	150	150	500	5200
Logged-In Splits per Agent	4	4	4	4	4
ACD Supervisor Assist Per System ¹	99	12/24	12/24	99	255
Queue Slots per Group	200	200	200	200	999
Queue Slots per System	1000	200	200	1,000	10,500
Intercom Translation Table (ICOM)					
Automatic/Manual and Dial ICOM Groups per System	32	10	10	32	256
Auto/Manual	32	10	10	32	256
Dial	32	10	10	32	256
Members per ICOM group					
Auto	32	32	32	32	32
Dial	32	32	32	32	32
Members per System	1,024	320	320	1,024	8,192

1. One supervisor assist per split.

Table A-2. Maximum System Parameters for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
Last Number Dialed					
Entries per System ¹	2,416	282	282	3,216	32,528
Number of Digits	24	24	24	24	24
Leave Word Calling (Switch-Based) ²					
Messages Stored	2,000	450	450	2,000	2,000
Messages per User	10	10	10	10	16
Remote Message Waiting Indicators					
Per Extension	80	80	80	80	80
Per System	80	80	80	80	500
Simultaneous Message Retrievers	60	60	60	60	400
System-Wide Message Retrievers	10	10	10	10	10
Malicious Call Trace					
Maximum Simultaneous Traces	16	16	16	16	16
MLDN					
Via DID	8	8	8	8	20
Via CO	50	50	50	50	50
Modem Pool Groups					
Mode 2/Analog					
Group Members per System	160	64	64	160	2,016
Number of Groups	5	2	2	5	63
Members per Group	32	32	32	32	32
Networking					
CAS Nodes	99	NA/99	NA/99	99	99
DCS Nodes					
BX.25	20	NA/20	NA/20	20	20
ISDN PRI	63	NA/63	NA/63	63	63
Hybrid	63	NA/63	NA/63	63	63
UDP Nodes	240	NA/240	NA/240	240	999

1. Last Number Dialed Entries = Stations + Digital Data Endpoints.

2. Available with G3s ABP only if the Voice Mail Application Support Option is purchased.

Table A-2. Maximum System Parameters for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
Paging					
Code Calling IDs	125	125	125	125	125
Loudspeaker Zones	9	9	9	9	9
Partitions					
Attendant Partition	1	1	1	1	1
Extension Partition Group	8	8	8	8	8
Extension Partition	8	8	8	8	8
Personal CO Lines (PCOL)					
PCOL Appearances	4	4	4	4	16
PCOL Lines (Trunk Groups)	40	15	15	200	200
PCOL Trunks Per Trunk Group	1	1	1	1	1
Port Circuit Pack Slots¹					
Per Expansion Port Network (EPN)					
MCC Simplex	99	NA	NA	99	99
MCC Duplex	98	NA	NA	98	98
SCC Simplex	71	NA	NA	71	71
SCC Duplex	70	NA	NA	70	70
Small Cabinet Simplex (Upgrade only)	39	NA	NA	39	39
Small Cabinet Duplex (Upgrade only)	38	NA	NA	38	38
Per Processor Port Network (PPN)					
MCC Simplex	89	NA	NA	89	80
MCC Duplex	78	NA	NA	78	60
SCC Simplex	64	NA	NA	64	NA
SCC Duplex	56	NA	NA	56	NA
ESCC Simplex	NA	70	70	70	NA
ESCC Duplex	NA	NA	NA	68	NA
CSCC Simplex	NA	10	NA	NA	NA

1. Only port slots are included in this count. For example, there are 99 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 which would further reduce the number of port slots available. In G3 carriers, the 21st slot of MCC port carriers may be equipped with service boards that do not require tip and ring connections.

Table A-2. Maximum System Parameters for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
Recorded Announcements					
Analog Queue Slots per Announcement	150	50	50	150	1,000
Analog Queue Slots per System	150	50	50	150	1,000
Calls Connected per Announcement					
Integrated Announcement or Auxiliary Trunk	5	5	5	25	255
Analog Ports	5	5	5	25	128
Channels per Integrated Announcement Circuit Pack	16	16	16	16	16
Integrated Announcement Circuit Packs	1	1	1	1	1
Integrated Announcement Recording Time (Minutes:Seconds)					
16 KB recording	8:32	8:32	8:32	8:32	8:32
32 KB recording	4:16	4:16	4:16	4:16	4:16
Integrated Queue Slots per System	50	50	50	50	1,000
Recorded Announcements	128	128	128	128	256
System Administration					
Administrable History File Entries	250	50	50	250	1,250
Simultaneous Administration Command	1	1	1	1	5
Simultaneous Maintenance Command	1	1	1	1	5
Simultaneous SM Sessions	5	3	3	5	8
Printer Queue Size	50	50	50	50	50
Speech Synthesis Circuit Packs	6	6	6	6	40
Channels per Speech Circuit Pack	4	4	4	4	4
Terminating Extension Groups (TEG)					
TEGs	32	32	32	32	32
Users That May Share a TEG	4	4	4	4	4

Table A-2. Maximum System Parameters for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
Time Slots					
Simultaneous Circuit Switched Calls ¹	723	180	180	723	5,302
Total Slots ²	1536	512	512	1,536	11,264
Time Slots for Voice & Data ³	1449	483	483	1,449	10,604
Time Slots per Port Network	512	512	512	512	512
Tone Classifiers					
Call Classifier Boards	10	NA/10	NA/10	10	50
Call Progress/Touch Tone Receivers	80	NA/80	NA/80	80	400
Tone Detector Boards	20	10	20	20	50
General Purpose Tone Detectors	40	20	40	40	100
Touch-Tone Receivers	80	80	80	80	200
Prompting TTR Queue Size	80	NA/80	NA/80	80	80
TTR Queue Size	4	4	4	4	4

-
1. 241 Simultaneous Circuit-Switched Calls per port network, except for G3s, where the maximum is 180.
 2. 512 time slots per port network.
 3. 483 time slots for Voice and Data per port network. Even though an EPN is supported in G3sV2, giving a total of two port networks, G3sV2 is engineered to support only 180 Simultaneous Circuit-Switched Calls.
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Table A-2. Maximum System Parameters for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
Trunks					
DS1 Circuit Packs	30	8	8	30	166
Queue Slots for Trunks	198	32/64	32/64	198	1,332
PRI Interfaces via PI ¹	8	NA/4	NA/4	8	NA
PRI Interfaces via PKTINT	NA	NA	NA	NA	166
PRI Temporary Signaling Connections					
TSCs in System	656	NA/164	NA/164	656	4,256
Call Associated TSCs	400	NA/100	NA/100	400	4,000
Non Call Associated TSCs	256	NA/64	NA/64	256	256
Administered TSCs	128	NA/32	NA/32	128	128
Ringback Queue Slots	198	32/64	32/64	198	1,332
Total PRI Interfaces ²	8	NA/4	NA/4	8	166
Trunk Groups Hourly Measurements	25	25	25	25	75
Trunk Groups in the System	99	16/32	16/32	99	666
Trunk Members in a Trunk Group	99	50/99	50/99	99	255
Trunks in System (Including Remote Access) ³	400	50/100	50/100	400	4,000
With Hospitality Parameter Reduction	50	NA/50	NA/50	50	50
Measured Trunks in System	400	50/100	50/100	400	4000

1. Only one PI board is supported in G3vs/G3s (both MCC and SCC), and therefore a total of four physical links, used for BX.25 or PRI, are available.
In G3i, two PI boards can be supported in the MCC, and therefore a total of eight physical links (used for BX25 or PRI) are available. Since the SCC can only support one PI board, a total of four physical links (used for BX25 or PRI) are available in the SCC 286 and Medium configurations.
2. All digital stations can be display stations.
3. G3vs has the same software capacities for stations and trunks as does G3s. However, these software capacities are limited by the cabinet hardware. A typical switch would probably have 20 to 50 stations with 10 to 20 trunks. Station capacities can be reached only by administration without hardware (AWCH). This includes extensions administered without hardware.

Table A-2. Maximum System Parameters for Hardware and Software Items for G3V1.1 or V2 — *continued*

ITEM	G3iV1.1-286	G3vsV2 ABP/PBP	G3sV2 ABP/PBP	G3iV2-386	G3rV2
Voice Terminals					
Associated Data Modules (such as DTDMs)	800	75	75	800	7,500
BRI Stations ¹	1,000	NA	50	1,000	7,000
Digital Stations	1,600	200	200	2,400	25,000
Stations	1,600	200	200	2,400	25,000
Station Button Capacity (K Units) ²	410.4	68.4	68.4	547.2	5,260

1. All BRI stations can be display stations.
2. In G3, "Station Button Capacity (units) 'replaces' Maximum Button Modules."

The following examples show how these units can be used. The assumption is that only three call appearances are assigned to the sets (except analog sets which have no call appearance).

- Analog sets (for example, 7104A): G3r, 76 units; all other releases, 62 units.
- Digital sets with 10 buttons (for example, 7403D): G3r, 124 units; all other releases, 102 units.
- Digital sets with 34 buttons, without display (for example, 7405D): G3r, 412 units; all other releases, 342 units.
- Digital sets with 34 buttons, with display (for example, 7405D): G3r, 568 units; all other releases, 472 units.
- 7406D Digital sets with display: G3r, 412 units; all other releases, 342 units.
- BRI sets with 17 buttons, with display (for example, 7506D): G3r, 304 units; all other releases, 250 units.

The station button capacity can support all stations equipped as 7406D digital sets with display. For example, a total of $342 \times 1200 + 410.4K$ units for the G3iV1.1-286.

Table A-3. Maximum System Parameters for G3V3

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
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/1,000	NA/1,000	1,000	1,000
Group Lists	100	100	100	1,000
Maximum Entries	90	90	90	90
Group Lists per Extension	3	3	3	3
System List	1	1	1	1
Maximum Entries	90	90	90	90
Personal Lists	200	200	2,400	5,000
Maximum Entries	10	10	10	10
Personal Lists/Extension	3	3	3	3
Applications Adjuncts				
CallVisor ASAI Adjuncts	NA	NA/4	8	8
Asynchronous Links (RS-232)	5	5	5	10
SMDR 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 A-3. Maximum System Parameters for G3V3 — *continued*

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
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/AAR⁴				
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 ⁵	23	23	23	23
Digits Inserted for ARS/AAR	18	18	18	18
AAR/ARS Sub-Net Trunking				
Digits Deleted for ARS/AAR	23	23	23	23
Digits Inserted for ARS/AAR	36	36	36	36

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 will also be required, which in turn would require all agents to be logged-out. In one extreme case, this is potentially avoided and R2 & R3 CMS will handle the fourth login as UNSTAFFED, appropriately.
3. R3V3 CMS was renamed to R3V4 CMS to match the DEFINITY switch numbering.
4. AAR is **not an optional feature** in the G3vs/G3s ABP.
5. + up to 7 inter-exchange carrier (IXC) digits.

Table A-3. Maximum System Parameters for G3V3 — *continued*

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
ARS/AAR (Continued)				
Entries in HNPA & 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 per 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

1. This is the number of 12 character inserted-digit-strings available for AAR/ARS preferences.
2. The number for G3vs V2/V3 (4) 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. The number of "Release Link Trunk Groups at Main" is the same as the number of trunk groups in the system.

Table A-3. Maximum System Parameters for G3V3 — continued

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
Attendant Service (Continued)				
Other Access Queues				
Maximum Number of Queues	12	12	12	12
Maximum Number of Queue Slots ¹	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/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
SMDR 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

1. Referred to as "emergency access queue length" in G3i.

Table A-3. Maximum System Parameters for G3V3 — *continued*

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
Basic CMS				
Measured Agents or Login IDs	75	75	200	600
Measured Splits	12/24	12/24	99	99
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
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 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) ³	NA	NA	1	1
Single-Carrier Cabinet (SCC) or Enhanced Single-Carrier Cabinet (ESCC)	NA	4	4	NA
Compact Single-Carrier Cabinet (CSCC)	1	NA	NA	NA

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.

Table A-3. Maximum System Parameters for G3V3 — *continued*

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
Call Appearances				
Bridged Images per Appearance	7	7	7	15
Call Appearances per Station ¹	54	54	54	54
Maximum Appearances per Extension	10	10	10	10
Minimum Appearances per Extension	2	2	2	2
Total Bridged Appearances	200	200	2,400	25,000
Maximum Simultaneous Off-Hook per Call ²	5	5	5	5
Call Coverage				
Coverage Answer Groups (CAG)	30	30	200	750
Coverage Paths	150	150	600	7,500
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 per Coverage Path ³	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	NA	NA	NA	NA
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 ⁴	1	1	1	1
Maximum Number of CDR Records that Can Be Buffered in the Switch	300	300	300	1,900
No. of Records Buffered for the Primary Output Device that will Cause Secondary Device to be Busied Out for 2 Minutes	200	200	200	1,800

1. 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.
2. Does not apply to conferencing.
3. The maximum number of users per coverage path is equal to the number of extensions.
4. The CDRU adjunct capacity is 40,000 calls per hour, and it exceeds the system call capacity for all systems except for G3r.

Table A-3. Maximum System Parameters for G3V3 — *continued*

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
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
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	NA	NA	NA
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 Classifications	NA	NA/40	40	400

1. Measured limits depend on the CMS release used.

Table A-3. Maximum System Parameters for G3V3 — continued

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
CallVisor ASAI (Continued)				
Number of CallVisor ASAI Links (Open & Proprietary) ¹	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	NA	NA	NA
Conference Parties	6	6	6	6
Simultaneous 3-way Conference Calls ²	161	161	483	7,084
Simultaneous 6-way Conference Calls ³	80	80	240	3,520
Data Parameters				
Administered Connections	NA/24	NA/24	128	128
Alphanumeric Dialing				
Maximum Entries	50	50	200	1,250
Characters/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 ⁴	NA/450	NA/450	1,500	10,000
Extensions	500	500	3,500	36,065
Extension Number Portability ⁵	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

1. Proprietary, exists in G3V3 only.

2. Simultaneous 3-way Conference Call = (483 / 3)* number PNs.

3. Simultaneous 6-way Conference Call = (483 / 6)* number PNs.

4. Login IDs count against the "Extensions" switch capacity.

5. These are Uniform Dialing Plan (UDP) entries.

Table A-3. Maximum System Parameters for G3V3 — *continued*

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
Dial Plan (Continued)				
Integrated Directory Entries ¹	207	207	2,416	25,028
Maximum Extension Size	5	5	5	5
Minimum Extension Size	1	1	1	1
Miscellaneous Extensions ²	150	150	900	3,317
Names				
Number of Names ³	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
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

1. The Integrated Directory Entries = Stations + Attendant Consoles.

2. Used for PCOL groups, common shared extensions, access endpoints, administered TSCs, code calling IDs, LDNs, hunt groups, announcements, and TEGs.

3. The Number of Names = number of stations + attendant consoles + trunk groups + digital data endpoints + miscellaneous extensions.

Table A-3. Maximum System Parameters for G3V3 — *continued*

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
Facility Busy Indicators				
Buttons per Tracked Resource	100	100	100	100
Number of Indicators (Station and Trunk Groups)	450	450	3,600	5,000
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
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	282	282	3,216	32,528
Number of Digits	24	24	24	24

1. The Last Number Dialed Entries = Stations + Digital Data Endpoints + Attendant Consoles.

Table A-3. Maximum System Parameters for G3V3 — *continued*

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
Leave Word Calling (Switch-Based)¹				
Messages Stored	450	450	2,000	6,000
Messages per User	10	10	10	16
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
Networking				
CAS Nodes	NA/99	NA/99	99	99
DCS Nodes ²				
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 ³	NA/999	NA/999	999	999
Paging				
Code Calling IDs	125	125	125	125
Loudspeaker Zones	9	9	9	9

1. Leave Word Calling is available in the ABP only if the Voice Mail Option is purchased.
2. The actual limit in the software is 63, but due to performance considerations the recommended number of DCS Nodes is 20.
3. The numbers here are node number addresses.

Table A-3. Maximum System Parameters for G3V3 — *continued*

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
Partitions¹				
Attendant Group	1	1	1	1
Extension Partition Group	8	8	8	8
Extension Partition	8	8	8	8
Tenant Partition	NA	NA	NA	NA
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 Slots²				
Per Expansion Port Network (EPN)				
Multi-Carrier Cabinet (MCC) Standard Reliability	NA	NA	99	99
Single-Carrier Cabinet (SCC) Standard Reliability	NA	NA	71	71
Small Cabinet Standard Reliability (Upgrade only)	NA	NA	39	39
Per Processor Port Network (PPN)				
Multi-Carrier Cabinet (MCC) Standard Reliability	NA	NA	89	80
Single-Carrier Cabinet (SCC) Standard Reliability	NA	NA	64	NA
Single-Carrier Cabinet (ESCC) Standard Reliability	NA	70	70	NA
Single-Carrier Cabinet (CSCC) Standard Reliability	10	NA	NA	NA

1. G3V2 AND G3V3 do not support Tenant Partitioning.
2. 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 which 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 A-3. Maximum System Parameters for G3V3 — *continued*

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
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	5	5	25	255
Analog Port	5	5	25	128
Integrated Announcements				
Integrated Announcement Circuit Pack	1	1	1	1
Channels Connected per Integrated Announcement Circuit Pack	16	16	16	16
Calls Connected per Integrated Announcement	5	5	25	255
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	50	50	50	1,000
Total Recorded Announcements	128	128	128	256
System Administration				
Number of Logins	15	15	15	15
Administrable History File Entries	50	50	250	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

1. The capacity for the G3vs and G3s was reduced to make the capacity proportional to that provided in the larger sizes (about 25% of the maximum number of system trunks for one board). G3i integrated queue slots should be increased to 100 for one board (200 for 5 boards) but can not be done in this release due to memory limitation (each queue slot requires 18 bytes). 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 A-3. Maximum System Parameters for G3V3 — *continued*

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
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 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 for G3vs and G3s which are 180 Simultaneous Circuit Switched Calls and G3r which has a total of 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 3.0 or later, or G3V4, use TN744C Call Classifier-Detector for basic TTR usage as well as call prompting/call classification/MFC. In addition, 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 3.0 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 A-3. Maximum System Parameters for G3V3 — *continued*

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
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 PACCON 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/32	NA/32	128	128
Ringback Queue Slots	32/64	32/64	198	1,332
Total PRI Interfaces ³	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) ⁴	50/100	50/100	400	4,000
Measured Trunks in System	50	50/100	400	4,000

1. Only one Processor Interface (PI) board is supported in G3vs (CSCC) and G3s (ESCC) configurations, and 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 Control must be used.
2. PRI interface via the Packet Control is not available on G3vs. Therefore, PRI is not available on G3vs in Germany. Other Countries must use the PI when they have the G3vs configuration.
3. In the 286 or the G3i configuration, 2 PI boards can be supported in the MCC, and therefore a total of 8 physical links (used for BX.25 or PRI) is available. Since the SCC/ESCC/CSCC can only support 1 PI board, a total of 4 physical links (used for BX.25 or PRI) is available in the G3vs and the G3s configurations. When using the Packet Control, the G3s and the G3i limit is bounded by the DS1 CP limit.
4. G3vs has the same software capacities for stations and trunks as does G3s. However, these software capacities are limited by the cabinet hardware. A typical switch would probably have 20 to 50 stations with 10 to 20 trunks. Station capacities can be reached only by administration without hardware (AWCH). This includes extensions administered without hardware.

Table A-3. Maximum System Parameters for G3V3 — *continued*

ITEM	G3vsV3 ABP/PBP	G3sV3 ABP/PBP	G3iV3	G3rV3
Voice Terminals¹				
Associated Data Modules (such as DTDMs)	75	75	800	7,500
BRI Stations ²	NA	50	1,000	7,000
Digital Stations ³	80	200	2,400	25,000
Display Stations	200	200	2,400	10,000
Stations ⁴	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	1	1	1	1
Days	NA	NA	NA	NA
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. The software limit for digital stations in G3vs is 200 stations, but due to power limitations the recommended limit is 80 digital stations.

4. Including extensions administered without associated hardware (for the G3s, G3i and G3r Configurations). The Station Capacity for G3vs (200) is a software limit. The physical capacity of the CSCC (10 port slots) limits the G3vs configuration from reaching the software limit.

Table A-4. Maximum System Parameters for G3V4 Release 1.0

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
SMDR 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 A-4. Maximum System Parameters for G3V4 Release 1.0 — 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/AAR⁴				
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 ⁵	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 switch numbering.
4. AAR is **not an optional feature** in the G3vs/G3s ABP.
5. + up to 7 inter-exchange carrier (IXC) digits.

Table A-4. Maximum System Parameters for G3V4 Release 1.0 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
ARS/AAR (continued)				
Entries in HNPA & 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 per 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 V2/V3 (4) 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 A-4. Maximum System Parameters for G3V4 Release 1.0 — *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
SMDR 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 A-4. Maximum System Parameters for G3V4 Release 1.0 — *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 A-4. Maximum System Parameters for G3V4 Release 1.0 — 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
No. 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 A-4. Maximum System Parameters for G3V4 Release 1.0 — *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 = $(483 / 3) \times$ number PNs.

4. Simultaneous 6-way Conference Call = $(483 / 6) \times$ number PNs.

Table A-4. Maximum System Parameters for G3V4 Release 1.0 — *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/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 A-4. Maximum System Parameters for G3V4 Release 1.0 — *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 A-4. Maximum System Parameters for G3V4 Release 1.0 — 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 A-4. Maximum System Parameters for G3V4 Release 1.0 — *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
Partitions³				
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 Slots⁴				
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 which would further reduce the number of port slots available. In G3r and G3si, the service slot may be equipped with service boards that do not require tip and ring connections

Table A-4. Maximum System Parameters for G3V4 Release 1.0 — *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 Aux. 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. This capacity for the G3vs and G3s was reduced to make the capacity proportional to that provided in the larger sizes (about 25% of the maximum number of system trunks for one board). G3i integrated queue slots should be increased to 100 for one board (200 for 5 boards) but can not be done in this release due to memory limitation (each queue slot requires 18 bytes). 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 A-4. Maximum System Parameters for G3V4 Release 1.0 — *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

1. 241 Simultaneous Circuit-Switched Calls per port network, except for 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 3.0 or later, or G3V4, 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. There is a single limit on the total number of tone receiver (classifier) ports for the system. For G3V3 Release 3.0 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 A-4. Maximum System Parameters for G3V4 Release 1.0 — continued

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Tone Classifiers (Continued)				
TTR Queue Size	4	4	4	4
Prompting TTR Queue Size	NA/80	NA/80	80	80
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 ³	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) ⁴	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. In the 286 or the G3i configuration, 2 PI boards can be supported in the MCC, a total of 8 physical links (used for BX.25 or PRI) is available. Since the SCC/ESCC/CSCC can only support 1 PI board, a total of 4 physical links (used for BX.25 or PRI) is available in the G3vs and the G3s configurations. When using the Packet Control, the G3s and G3i limit is bounded by the DS1 CP limit.
4. G3vs has the same software capacities for stations and trunks as does 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 A-4. Maximum System Parameters for G3V4 Release 1.0 — *continued*

ITEM	G3vsV4 ABP/PBP	G3sV4 ABP/PBP	G3iV4	G3rV4
Voice Terminals¹				
Associated Data Modules (DTDMs)	75	75	800	7,500
BRI Stations ²	NA	50	1,000	7,000
Digital Stations ³	80	200	2,400	25,000
Display Stations	200	200	2,400	10,000
Stations ⁴	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).

3. The software limit for digital stations in G3vs is 200 stations, but due to power limitations the recommended limit is 80 digital stations.

4. Including extensions administered without associated hardware (for the G3s, G3i and G3r Configurations). The Station Capacity for G3vs (200) is a software limit. The physical capacity of the CSCC (10 port slots) limits the G3vs configuration from reaching the software limit.

Table A-5. Maximum System Parameters for G3V4 Release 3.0

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	N/A	N/A	N/A
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	N/A	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 A-5. Maximum System Parameters for G3V4 Release 3.0 — 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 ¹	12/24	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/AAR⁴				
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 ⁵	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 from the Capacities Tables.
2. 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.
3. R3V3 CMS was renamed to R3V4 CMS to match the DEFINITY switch numbering.
4. AAR is **not an optional feature** in the G3vs ABP.
5. Plus up to seven inter-exchange carrier (IXC) digits.

Table A-5. Maximum System Parameters for G3V4 Release 3.0 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
ARS/AAR (Continued)				
Entries in each RHNPA Table	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
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. 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 G3s.

Table A-5. Maximum System Parameters for G3V4 Release 3.0 — *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 A-5. Maximum System Parameters for G3V4 Release 3.0 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Cabinets				
Expansion Port Network (EPN)				
Multi-Carrier Cabinet (MCC ¹)	N/A	N/A	2	43
Single-Carrier Cabinet (SCC ¹)	N/A	N/A	8	164
Small (Upgrades only) ²	N/A	N/A	2	41
Inter-Port Network Connectivity				
Port Networks	1	1	3	44
Maximum Number of Port Networks per Cabinet	1	1	1	2
Switch Nodes (Simplex)	N/A	N/A	NA	3
Switch Nodes (Duplex)	N/A	N/A	NA	6
DS1 Converter Complex (Simplex)	N/A	N/A	NA	41
DS1 Converter Complex (Duplex)	N/A	N/A	NA	82
Processor Port Network (PPN)				
Multi-Carrier Cabinet (MCC) ³	N/A	N/A	1	1
Single-Carrier Cabinet (SCC) or Enhanced Single-Carrier Cabinet (ESCC)	N/A	4	4	NA
CSCC	1	N/A	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	400	400	2,400	25,000
Maximum Simultaneous Off-Hook per Call ⁵	5	5	5	5

1. Only EPNs in G3r can be DS1-remote EPNs.

2. Small systems refer to the 2-carrier cabinet systems no longer sold to new customers.

3. MCC includes the Medium Cabinet.

4. 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 7434D terminal — 34 buttons in the basic terminal and 20 additional buttons in the coverage module.

5. Does not apply to conferencing.

Table A-5. Maximum System Parameters for G3V4 Release 3.0 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Call Coverage				
Coverage Answer Groups (CAG)	30	30	200	750
Coverage Paths ¹	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 ²	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	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. All references to Hospitality Parameter Reduction on the Customer Option form have been removed from the Capacities Tables.
2. The maximum number of users per coverage path is equal to the number of extensions.

Table A-5. Maximum System Parameters for G3V4 Release 3.0 — *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	NA/128	128	128	256
Steps per Vector	NA/32	32	32	32
Vector Directory Numbers	NA/100	100	512	20,000
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	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 Association	N/A	250	2,000	6,000
Call Controllers per Call	N/A	1	1	1
Call Monitors per Call	N/A	14	14	14
Station Controllers per Station	N/A	2	2	2
Maximum Simultaneous Call Classifications	N/A	40	40	400
Number of CallVisor ASAI Links (Open and Proprietary) ²	N/A	4	8	8
Notification Requests (Monitors)	N/A	50	170	2,000
Simultaneous Active Call Controlled Calls	N/A	75	300	3,000
Switch to Adjunct Associations (Routing)	N/A	127	127	127
Number of Open MultiQuest Billing Requests	N/A	25	100	1,000
Maximum Calls With Send DTMF Active	N/A	16	16	32
Selected Listen - Disconnect Paths	N/A	N/A	N/A	N/A
LAN Gateway Circuit Pack Maximum Links	N/A	4	4	4
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 A-5. Maximum System Parameters for G3V4 Release 3.0 — continued

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
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 ¹	NA/450	450	1,500	10,000
Extensions	700	700	3,500	36,065
Extension Number Portability ²	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 ³	407	407	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				
Number of Names ⁵	648/664	664	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

1. Login IDs count against the "Extensions" switch capacity.
2. These numbers 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 A-5. Maximum System Parameters for G3V4 Release 3.0 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Dial Plan (Continued)				
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
Agent Login IDs	NA/450	450	1,500	10,000
Maximum Skills per Agent	NA/4	4	4	4
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
Hunt Groups				
Announcements per Group	1	1	1	1
Announcements per System	128	128	128	256
Groups ¹	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

1. All references to Hospitality Parameter Reduction on the Customer Option form have been removed from the Capacities Tables.

Table A-5. Maximum System Parameters for G3V4 Release 3.0 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	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 per System ¹	482	482	3,216	32,518
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
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

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 A-5. Maximum System Parameters for G3V4 Release 3.0 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
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
ENP 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
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 Slots³				
Per Expansion Port Network (EPN)				
MCC Standard Reliability	N/A	N/A	99	99
SCC Standard Reliability	N/A	N/A	71	71
Small Cabinet Standard Reliability (Upgrade only)	N/A	N/A	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. 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. 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 G3si carriers, the service slot may be equipped with service boards that do not require tip and ring connections

Table A-5. Maximum System Parameters for G3V4 Release 3.0 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Port Circuit Pack Slots (Continued)				
Per Processor Port Network (PPN)				
MCC Standard Reliability	N/A	N/A	89	80
SCC Standard Reliability	NA	N/A	64	NA
ESCC Standard Reliability	N/A	70	70	NA
CSCC Standard Reliability	10	N/A	NA	NA
Recorded Announcements				
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
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 is needed for one board), since common pool architecture requires a greater number of total queue slots.

Table A-5. Maximum System Parameters for G3V4 Release 3.0 — *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 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	483	483	1,449	21,208
Time Slots per Port Network	512	512	512	512
Tone Classifiers				
Tone Receivers (General) ²	80	200	200	840
Call Classifier Boards	N/A	N/A	NA	NA
Classifiers / Prompting TTRs	N/A	N/A	NA	NA
Tone Detector Boards	N/A	N/A	NA	NA
General Purpose Tone Detectors	N/A	N/A	NA	NA
Touch-Tone Receivers	N/A	N/A	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 for G3vs and G3si with 180 and G3r with 7,712 (limited by number of call records supported).
2. G3V4 uses 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 A-5. Maximum System Parameters for G3V4 Release 3.0 — *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	N/A	8	30	NA
PRI Interfaces via PKTINT	N/A	N/A	NA	166
PRI Temporary Signaling Connections				
TSCs 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) ³	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 (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 Controller is used.
2. PRI interface via the Packet Controller is not available on G3vs. Therefore, PRI is not available on G3vs in Germany. Other Countries must use the PI when they have the G3vs configuration.
3. All references to Hospitality Parameter Reduction on the Customer Option form have been removed from the Capacities Tables.

Table A-5. Maximum System Parameters for G3V4 Release 3.0 — *continued*

ITEM	G3vsV4 ABP/PBP	G3siV4	G3siV4 +m	G3rV4
Voice Terminals¹				
Associated Data Modules (DTDMs)	75	75	800	7,500
BRI Stations ²	NA	50	1,000	7,000
Digital Stations	400	400	2,400	25,000
Display Stations	400	400	2,400	25,000
Stations	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).

References

B

The following is a list of DEFINITY[®] Communications System Generic 3 documents, including a brief description of each document.

To order copies, refer to the address and telephone number on the inside cover of this document. For additional DEFINITY[®] Communications System documents, refer to the *GBCS Publications Catalog*, 555-000-010, available from the AT&T Customer Information Center.

Basic

The following are basic documents for the DEFINITY[®] Communications System.

***DEFINITY Communications System Generic 3
Feature Description, Issue 2***

555-230-204

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 Communications System Generic 3
Version 4 Implementation, Issue 1*** **555-230-655**

***DEFINITY Communications System Generic 3
V2/V3 Implementation, Issue 1
Addendum 1 and Addendum 2*** **555-230-653**

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 Communications System Generic 3
Version 4 Implementation Blank Forms, Issue 1*** **555-230-655B**

***DEFINITY Communications System Generic 3
V2/V3 Implementation Blank Forms, Issue 1*** **555-230-653B**

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 Communications System Generic 3 Version 4 Implementation, Issue 1*, 555-230-655 or *DEFINITY Communications System Generic 3 V2/V3 Implementation, Issue 1*, 555-230-653. Use this order number to purchase additional forms.

***DEFINITY Communications System Generic 3
System Description and Specifications, Issue 3*** **555-230-206**

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 Communications System Generic 3
Version 4 Traffic Reports, Issue 2*** **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 *System Reports* for earlier systems. 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 complete details on system wiring. Provides both domestic and international information.

***DEFINITY Communications System Generic 3
Installation for Single-Carrier Cabinets, Issue 1*** **555-230-894 UK English
555-230-895 German
555-230-896 French
555-230-897 Spanish
555-230-900 Chinese**

Provides procedures and information for hardware installation and initial testing of the DEFINITY Communications System Generic 3 Single-Carrier Cabinets only. The UK version is shipped with all Single-Carrier Cabinet systems in the United States. Some languages may not be available until a future date.

***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 Generic 1, Generic 2, Generic 3 Version 1, Generic 3 Version 2, Generic 3 Version 3, or System 75 R1V3 to Generic 3 Version 4. 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 Communications System
Generic 3 vs/s/i Version 1.1 - Version 4 Upgrades
and Additions, Issue 1*** **555-230-108**

Provides procedures for an installation technician to convert an existing DEFINITY Communications System Generic 3 Version 1, Generic 3 Version 2, Generic 3 Version 3, to Generic 3 Version 4. 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 Communications System Generic 3r
Version 1.1 - Version 4 Upgrades and Additions,
Issue 1*** **555-230-109**

Provides procedures for an installation technician to convert an existing DEFINITY Communications System Generic 3r Version 1, Generic 3r Version 2, Generic 3r Version 3, to Generic 3r Version 4. 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 Communications System Generic 3r
Maintenance, Issue 4*** **555-230-105**

***DEFINITY Communications System Generic
3i/s/vs Maintenance, Issue 7*** **555-204-105**

Provide 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.

***An Introduction to DEFINITY Communications
System Generic 3, Issue 1*** **555-230-023**

Provides a detailed overview of the system including descriptions of many of the major features, applications, hardware, system capabilities, and the AT&T support provided with the system. This document reflects Generic 3 Version 2 software, but still contains relevant information.

***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.

GBCS Products Security Handbook, Issue 4 **555-025-600**

Provides information about the risks of telecommunications fraud and measures for addressing those risks and preventing unauthorized use of GBCS 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, and DEFINITY Communications System. This document is intended for customers and AT&T account teams for selecting the correct peripherals to accompany a system.

***DEFINITY Communications System Generic 1
and Generic 3 Voice Terminal Operations, Issue 1*** **555-230-701**

Provides detailed operating instructions for system features on each type of voice terminal. Included are definitions of voice features and user requirements.

***DEFINITY Communications System Generic 1,
Generic 3, and System 75 Voice Terminal Guide
Builder, Issue 1*** **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 6 Mbytes disk space, minimum of 4 Mbytes 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. Refer also to the basic DEFINITY Communications System documents.

DEFINITY Communications System Generic 3 **585-230-520**
Call Vectoring/Expert Agent Selection (EAS)
Guide, Issue 4

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 Communications System Generic 3 **555-230-704**
Basic Call Management System (BCMS)
Operations, Issue 4

Provides detailed instructions on how to generate reports and manage the system and is intended for telecommunications managers who wish to use BCMS reports and system managers responsible for maintaining the system. If Issue 4 is unavailable, use Issue 3.

Networks

The following list of documents are network-specific. Refer also to the basic DEFINITY Communications System documents.

***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

The following list of documents are application-specific. Refer also to the basic DEFINITY Communications System documents.

***DEFINITY Communications System Generic 2 to
Generic 3 Version 4 Transition Reference, Issue 1*** **555-230-636**

Provides detailed descriptions of the difference between features and administrative forms for systems Generic 2 to Generic 3 Version 4 and is intended for AT&T personnel and customers involved in planning upgrades and migrations from an older system. Includes descriptions of new administrative commands.

DEFINITY Communications System Generic 3 555-230-222
CallVisor ASAI Planning Guide, Issue 4

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 Communications System Generic 3 555-230-221
CallVisor ASAI Protocol Reference, Issue 4

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 Communications System Generic 3 555-230-220
CallVisor ASAI Technical Reference, Issue 4

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 Communications System Installation, 555-230-223
Administration, and Maintenance of CallVisor
ASAI Over the DEFINITY G3 LAN Gateway, Issue 1

Provides procedures for installation, administration, and maintenance of the CallVisor Adjunct/Switch Application Interface (ASAI) Ethernet application and is intended for system administrators, telecommunications managers, Management Information System (MIS) managers, LAN managers, and AT&T personnel. The ASAI-Ethernet application provides ASAI functionality using 10Base-T Ethernet rather than BRI as a transport media.

***DEFINITY Communications System Generic 3
Automatic Call Distribution Agent Instructions,
Issue 4***

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 Communications System Generic 3
Automatic Call Distribution Supervisor
Instructions, Issue 3***

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.

***DEFINITY Communications System Generic 1
and Generic 3 Console Operation, 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 Communications System Console
Operations Quick Reference, Issue 1***

**555-230-890 UK English
555-230-891 German
555-230-892 French
555-230-893 Spanish
555-230-920 Chinese**

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. Some languages may not be available until a future date.

***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 User's Guide 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

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

AIM

Asynchronous Interface Module

AIOD

Automatic Identification of Outward Dialing

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

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

BHCC

Busy Hour Call Completions

BLF

Busy Lamp Field

Abbreviations

BN
Billing Number

BOS
Bit Oriented Signaling

BPN
Billed Party Number

BPS
Bits Per Second

BRI
Basic Rate Interface

BTU
British Thermal Unit

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, Call Accounting System

CBC
Call-By-Call and Coupled Bonding Conductor

CC
Country Code

CCIS
Common Channel Interoffice Signaling

CCITT
Consultative Committee for International Telephone and Telegraph

CCMS
Common 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

CEPT
European Conference of Postal and Telecommunications Rate 1

CI
Clock Input

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

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

DC

Direct Current

DCE

Data Communications Equipment

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 Converter

DSI

Digital Signal Interface

DSU

Data Service Unit

DTDM

Digital Terminal Data Module

Abbreviations

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

EPF
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

ESF
Extended Superframe Format

ETA
Extended Trunk Access

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

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

kHz
Kilohertz

kbps
Kilobits Per Second

kbyte
Kilobyte

kg
Kilogram

L

LAP-D

Link Access Procedure on the D-channel

LAPD

Link Access Procedure Data

LATA

Local Access and Transport Area

lb

Pound

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

M-Bus

Memory Bus

MA-UII

Message Associated User-to-User Signaling

MADU

Modular Asynchronous Data Unit

MAP

Maintenance Action Process

Mbps

Megabits Per Second

MCC

Multi-Carrier Cabinet

MCS

Message Center Service

MDF

Main Distribution Frame

MDM

Modular Data Module

MDR

Message Detail Record

MEM

Memory

MET

Multibutton Electronic Telephone

MHz

Megahertz

MIM

Management Information Message

MIS

Management Information System

MISCID

Miscellaneous Identification

MMS

Material Management Services

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

Abbreviations

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

NFAS

Non-Facility Associated Signaling

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

OQT

Oldest Queued Time

OSHA

Occupational Safety and Health Act

OSI

Open Systems Interconnect

OSS

Operations Support System

OSSI

Operations Support System Interface

OTQ

Outgoing Trunk Queuing

P

PACCON

Packet Control

PAD

Packet Assembly/Disassembly

PBX

Private Branch Exchange

PC

Personal Computer

PCM

Pulse Code Modulated

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

POP

Point Of Presence

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

RCL

Restricted Call List

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

SAKI

Sanity and Control Interface

SAT

System Access Terminal

SCC

Single-Carrier Cabinet

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

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

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

Abbreviations

SVN
Security Violation Notification

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

Abbreviations

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

WSA

Waiting Session Accept

Z

ZCS

Zero Code Suppression

Glossary

Numerics

3B2 Message Server

An AT&T software application that combines voice and data messaging services for voice terminal users whose extensions are connected to a G3 switch.

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 USA.

ACD

See **Automatic Call Distribution**. ACD also refers to the "Work State" indicating that 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.

application

An 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.

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 who normally use Auto-In mode can enter the ACW state by depressing the ACW button while on a call.

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)

An AT&T 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.

agent (or ACD agent)

An answering position who receives calls that are 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."

applications processor

A minicomputer 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.

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.

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 (if there are no agents available) the 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:

- 0: Voice-grade data and voice
- 1: DMI Mode 1, 56 kbps data transmission
- 2: DMI Mode 2, synchronous/asynchronous data transmission up to 19.2 kbps
- 3: DMI Mode 3, 64 kbps circuit/packet data transmission

- 4: DMI Mode 0, 64 kbps synchronous data
- 5: Temporary Signaling Connection
- 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 digital terminal data module (DTDM) or a processor data module (PDM) as a special-purpose terminal for services provided by an applications processor (AP) or, as a terminal for data entry and retrieval.

BX.25

An AT&T 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 (em for example, cable from a data terminal to a modem (em or between a piece of equipment and a termination field (em 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 utilizes 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 the tone decreases in the last 0.2-second (in the United States). A call-waiting ringback tone notifies the attendant the Attendant Call Waiting

feature has been activated and the called user is aware of the waiting call. Tones in countries outside the United States 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 that is used to determine usage. In order 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 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 (Comite 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 is only attempted if the CIIE is encoded as *Preferred*. Channel negotiation is not 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 (emAll 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, which is a wideband term, 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-clock circuit packs, 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 (em usually a modem, data module, or packet assembler/disassembler (em 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 an applications processor (AP).

data terminal equipment (DTE)

Equipment consisting of the endpoints in a connection over a data circuit. For example, in a connection between a data terminal and a host, the terminal, the host, and their associated modems or data modules make up the DTE. DTE usually consists of the following functional units: control logic, buffer store, and one or more input or output devices or computers. DTE can contain error control, synchronization, and telephone-identification capabilities.

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 PRIs facilities). A second (redundant) 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. When this happens, 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 (em that is, 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 a facility information element 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)

An AT&T 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

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 23 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 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 capable of handling PBX station signaling information without attendant assistance.

direct agent

A switch feature accessed via Adjunct Switch Applications Interface (ASAI) that 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 and ensuring 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)

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 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 providing 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. When a D-channel is present, it 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.

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 within a communications system of a pre-defined set of central office (CO) lines to a group of answering telephones with at least one telephone 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)

Signaling in which 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 central office (CO) other than its local CO.

foreign numbering-plan area code (FNPAC)

An area code other than the local area code. The FNPAC 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

handshaking logic

A format used to initiate a data connection between two data module devices.

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.

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 (SCIs) whereby 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

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.

Integrated Services Digital Network (ISDN)

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 digi-

tal 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 nonfacility-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

An 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 central office (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 (RS232C, RS449, and V.35) to customer-provided data terminal equipment (DTE). See also **processor data module**.

modular trunk data module (MTDM)

A trunk data module (TDM) that can be configured to provide several kinds of interfaces (RS232C, RS449, 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 USA and countries outside the USA.

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**.

multirate

Multirate refers to the new N x DS0 service (see N x DS0).

N

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" (em they receive signals and pass them on (em or "terminal" (em 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 (em including a message element, which is the data, and a control information element (IE), which is the header (em 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 RS232C 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 (RHNPAC)

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 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 by AT&T Teletype Corporation for use with the 500 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 (em processor, memory, disk controller, and bus-interface cards (em 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 G3 Management Terminal (G3-MT). 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 reports.

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 the "N" octets of a wideband call transmitted in one T1 or E1 frame arrive at the output in the same order they were introduced.

to control

An application can invoke Third Party Call Control capabilities using either an adjunct-control or a domain-control association.

to monitor

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 RS232C 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

U

uniform dial plan

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

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 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 tele-communications service (WATS)

A service in the USA to allow calls to certain areas for flat-rate charges 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. An 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 would enter the ACW mode.

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, etc.). 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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