Lucent Technologies
Bell Labs Innovations

DEFINITY®
Enterprise Communications Server

Release 6
System Description Pocket Reference

555-230-211
Comcode 108041914
Issue 1
August 1997

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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Toll fraud is the unauthorized use of your telecommunications system by an unauthorized party, for example, persons other than your company's employees, agents, subcontractors, or persons working on your company's behalf. Note that there may be a risk of toll fraud associated with your telecommunications system and, if toll fraud occurs, it can result in substantial additional charges for your telecommunications services.

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Federal Communications Commission Statement
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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. Refer to "Federal Communications Commission Statement" in "About This Book" for more information regarding Part 68.

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This digital apparatus does not exceed Class A limits for radio noise emission set out in the radio interference regulation of the Canadian Department of Communications.

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The "CE" mark affixed to the DEFINITY® equipment described in this book indicates that the equipment conforms to the following European Union (EU) Directives:

- Electromagnetic Compatibility (89/336/EEC)
- Low Voltage (73/23/EEC)
- Telecommunications Terminal Equipment (TTE)
  i-CTR3 BRI and i-CTR4 PRI
- CTR12

For more information on standards compliance, contact your local distributor.

Comments

To comment on this book, return the comment card at the front of the book.

Acknowledgment

This document was prepared by the BCS Product Documentation Development group, Lucent Technologies, Denver, CO and Columbus, OH.

Contents

About This Book

Purpose

This book describes the DEFINITY® Enterprise Communications Server (ECS) Release 6, and the DEFINITY Wireless Business System. It is not intended to replace or modify instructions provided in other task-specific documentation.

Intended Audience

This book is for customers, Lucent Technologies marketing and sales, and field technicians. It is also for educators and trainers who need to understand and teach basic DEFINITY information to field technicians and customers.

Systems Supported

Refer to the *DEFINITY Enterprise Communications Server Release 5 System Description Pocket Reference and the DEFINITY Communications System Generic 3 System Description and Specifications* for previous versions of DEFINITY.

Security Issues

Login security is an attribute of DEFINITY ECS software. To ensure the customer of the greatest security possible, Lucent Technologies offers services that can reduce toll-fraud liabilities. Contact your Lucent Technologies representative for more information.

Trademarks

This book provides references to the following Lucent Technologies trademarked products.

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

The following products are trademarked by their respective vendors:

- Audichron®, Audichron Company
- PagePac®, Harris Corporation, Dracon Division

How to Order Books

In addition to this book, installation and test, maintenance, and administration books are available. See *Business Communications System Publications Catalog*, 555-000-010 for a complete list of DEFINITY books.

You can order this book and any other DEFINITY books directly from the Lucent Technologies Business Communications System Publications Fulfillment Center at 1-317-361-5353 or toll free at 1-800-457-1235.

How to Comment on This Book

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

If the reader comment card is missing, fax your comments to 1-303-538-1741, and mention this book's name and number, *DEFINITY Enterprise Communications Server Release 6, System Description Pocket Reference,* 555-230-207.

Standards Compliance

The equipment described in this book complies with the following standards:

Australia AS3548 (AS/NZ3548)	FCC Part 15 and Part 68	ITU-T (Formerly CCITT)	CSA C222 Number 225
ANSI	EN55022	IEC 950	SO-9000
CISPR22	EN50081	IPNS	TS001
DEFINITY®	EN50082	National ISDN-1	National ISDN-2
DPNSS	ETSI	UL 1459	UL 1950I
ECMA	IEC 825		

Electromagnetic Compatibility Standards

This product complies with and conforms to the following:

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

NOTE:

The DEFINITY ECS conforms to Class A (industrial) equipment. Voice terminals conform to Class B equipment per the following standards.

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

The DEFINITY ECS conforms to the following standards:

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

European Union Standards

Lucent Technologies Business Communications Systems declares that the DEFINITY equipment specified in this book bearing the “CE” (Conformité Europeénne) mark conforms to the European Union Electromagnetic Compatibility Directives. The CE mark indicates conformance to the European Union Electromagnetic Compatibility Directive (89/336/EEC) Low Voltage Directive (73/23/EEC), Telecommunication Terminal Equipment (TTE) Directive (91/263/EEC). The CE mark indicates conformance to i-CTR3 Basic Rate Interface (BRI) and i-CTR4 Primary Rate Interface (PRI) as applicable, and with CTR12. The CE mark is applied to the following Release 6 products:

- Global AC-powered multicarrier cabinet (MCC) with 20 Hz, 25 Hz and 50 Hz ring generator
- DC-powered multicarrier cabinet (MCC) with 20 Hz, 25 Hz and 50 Hz ring generator
- AC-powered single-carrier cabinet (SCC) with 20 Hz, 25 Hz and 50 Hz ring generator
- AC-powered compact single-carrier cabinet (CSCC) with 20 Hz and 25 Hz ring generator
- AC-powered compact modular cabinet (CMC) with 20 Hz, 25 Hz and 50 Hz ring generator
- Enhanced DC-power system

LASER Product

The DEFINITY ECS may contain a Class 1 LASER device if single-mode fiber-optic cable is connected to a remote expansion port network (EPN). The LASER device operates within the following parameters:

- Maximum power output: –5 dBm
- Wavelength: 1310 nm
- Mode field diameter: 8.8 microns

CLASS 1 LASER PRODUCT IEC 825 1993

CAUTION:

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Contact your Lucent Technologies representative for more laser product information.

Federal Communications Commission Statement

Part 68: Statement

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

Lucent Technologies attests that this registered equipment is capable of providing users access to interstate providers of operator services through the use of access codes. Modification of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.

This equipment complies with Part 68 of the FCC Rules. On the rear of this equipment is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for this equipment. If requested, this information must be provided to the telephone company.

The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed 5.0. To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company.

NOTE:
REN is not required for some types of analog or digital facilities.

Means of Connection

Connection of this equipment to the telephone network is shown in the following table.

Manufacturer's Port Identifier	FIC Code	SOC/REN/ A.S. Code	Network Jacks
Off/On premises station	OL13C	9.0F	RJ2GX, RJ21X, RJ11C
DID trunk	02RV2-T	0.0B	RJ2GX, RJ21X
CO trunk	02GS2	0.3A	RJ21X
CO trunk	02LS2	0.3A	RJ21X
Tie trunk	TL31M	9.0F	RJ2GX
1.544 digital interface	04DU9-B,C	6.0P	RJ48C, RJ48M
1.544 digital interface	04DU9-BN,KN	6.0P	RJ48C, RJ48M
120A2 channel service unit	04DU9-DN	6.0P	RJ48C

If the terminal equipment (DEFINITY® System) causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment, for repair or warranty information, please contact the Technical Service Center at 1-800-242-2121. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

It is recommended that repairs be performed by Lucent Technologies certified technicians.

The equipment cannot be used on public coin phone service provided by the telephone company. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

This equipment, if it uses a telephone receiver, is hearing aid compatible.

1 — Overview of DEFINITY

This document provides a general overview of the DEFINITY ECS Release 6.

The DEFINITY Enterprise Communications Server

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

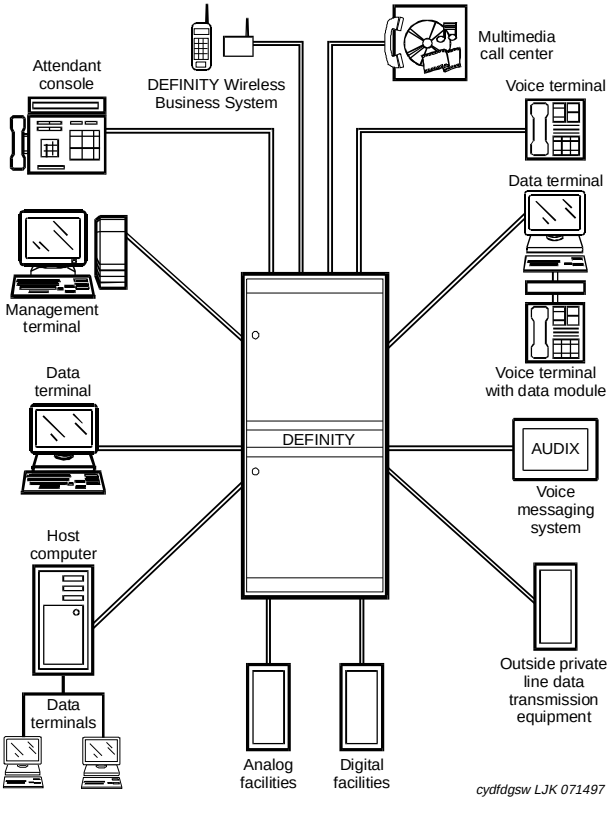

Figure 1. The System as a Digital Switch

All endpoints are external to the system. The voice and data signals going to the endpoints enter and leave the system through *port circuits*. 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 incoming (external source) analog signals to internal digital signals. Incoming (internal or external source) digital signals are not converted. Inside the system, voice is always coded digitally. Outgoing digital signals from the system are converted to analog signals for the analog lines and trunks

System Components

The basic system component is the port network (PN), consisting of port circuits connected to internal buses that allow the circuits to communicate with each other. See Figure 1.

Processor Port Network

The required processor port network (PPN) contains the switch processing element (SPE). The SPE is a computer that operates the system, processes calls, and controls the PN containing the port circuits.

Expansion Port Network

An expansion port network (EPN) (optional) contains additional ports that increase the number of connections to trunks and lines.

Center Stage Switch

A center stage switch (CSS) (optional for 3 PNs or less) in Release 6r is the central interface between the PPN and the EPNs. The CSS consists of 1, 2, or 3 switch nodes (SN). One SN can expand the system from 1 EPN to up to 15 EPNs. Two SNs can expand the system to up to 29 EPNs. Three SNs can expand the system to up to 43 EPNs.

NOTE:

The number of EPNs that can be connected with 2 or 3 SNs may be less than the numbers given depending on the internal SN traffic.

Main System Configurations

Figure 2 shows the following 5 main system configurations:

1. Basic system consisting of a processor port network (PPN) only.
2. Directly-connected system with 2 PNs (1 PPN and 1 EPN) connected directly together.
3. Directly-connected system with 3 PNs (1 PPN and 2 EPNs) connected directly together.
4. Center stage switch (CSS)-connected system with up to 15 EPNs interconnected by 1 SN to the PPN.
5. CSS-connected system with up to 29 EPNs connected by 2 SNs to the PPN, and up to 43 EPNs connected by 3 SNs to the PPN.

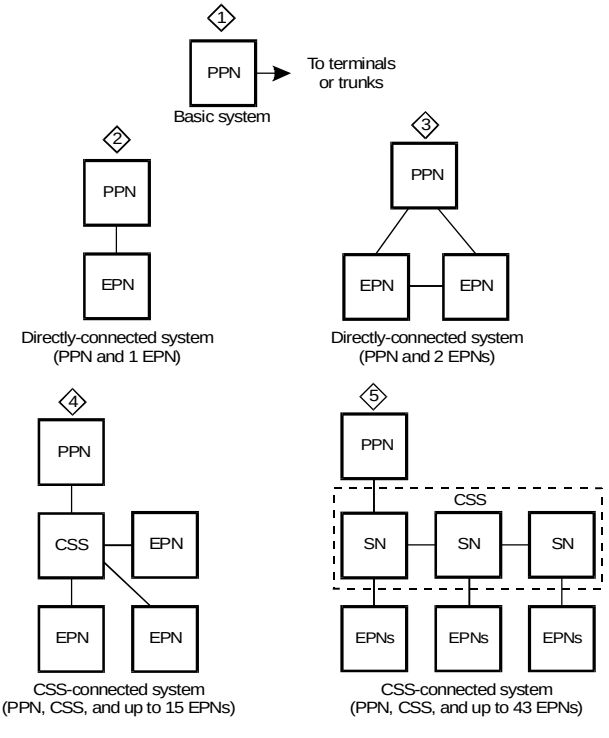

Figure 2. Main System Configurations

System Configurations

Figure 3 shows a directly-connected system with an SPE in the PPN. Buses route voice and data calls between external trunks and lines.

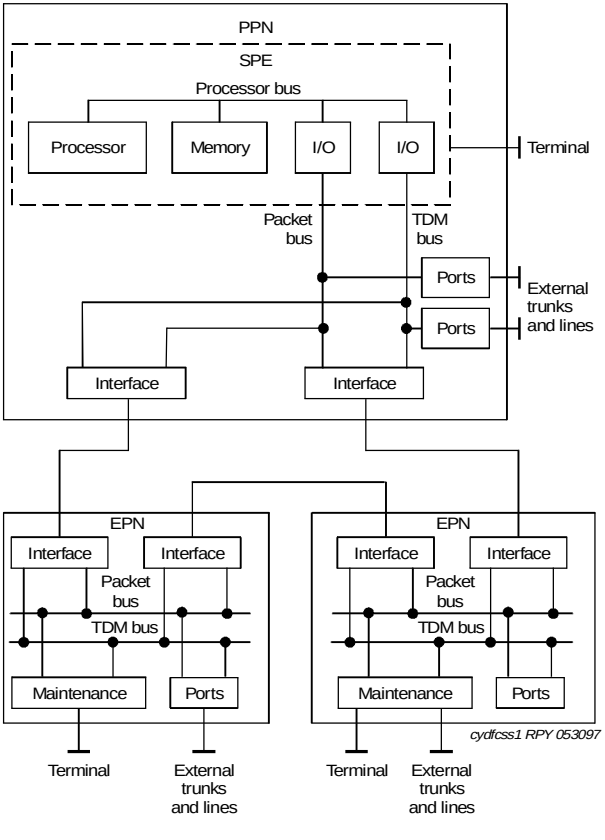

Figure 3. Components of a Directly-Connected System

Figure 4 shows a system with the added CSS to route voice and data calls between external trunks and lines.

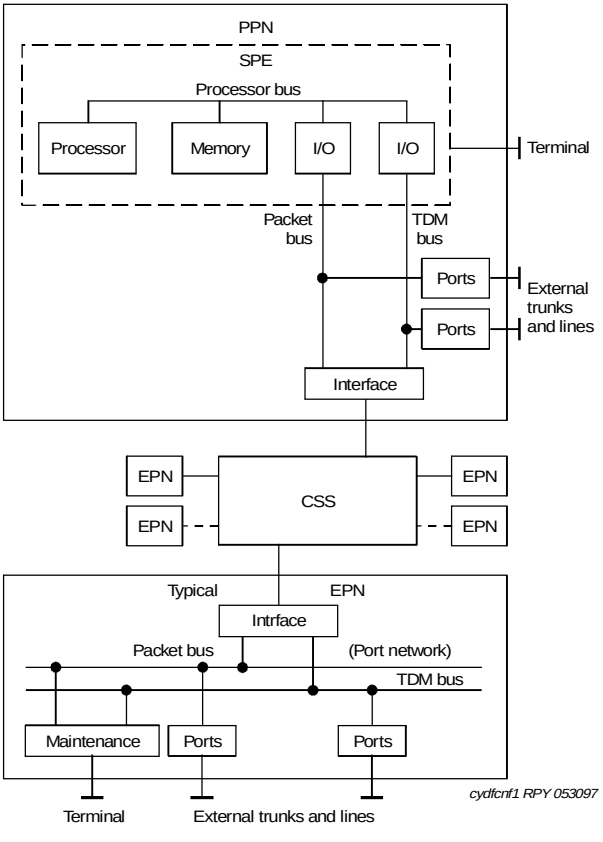

Figure 4. Components of a CSS-Connected System

Switch Processing Element

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

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

- *Processor:* All Release 6 systems use a reduced instruction set computer (RISC) processor. The TN790 processor circuit pack is used in Release 6vs and Release 6si systems. The TN798 is used in Release 6csi systems. The UN331B is used in Release 6r systems.
- *Memory:* Release 6vs, Release 6csi, and Release 6si systems use 16 Mbytes of flash read only Memory (ROM) and 16 Mbytes of dynamic random access memory (DRAM) resident on the processor circuit pack. Release 6r systems require 3 TN1650B memory circuit packs to provide a total of 96 Mbytes of DRAM.
- *Storage:* In all Release 6 systems except Release 6r, translations are stored in nonvolatile memory on a PCMCIA memory card. In Release 6r systems, the disk drive is a nonvolatile system bootstrap and translation storage device. A Release 6r system can use a tape drive as backup storage.
- *Input/output (I/O) circuits:* These act as interfaces between the SPE and the time division multiplexing bus and packet bus.
- *Maintenance interface:* connects the system to an administration terminal and monitors power failure, clock signals and temperature sensors.

Port Network (PN)

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

- *Time-division multiplexing (TDM) bus:* Runs internally throughout each PN and terminates on each end. Consists of two 8-bit parallel buses: bus A and bus B. These buses carry switched digitized voice and data signals and control signals among all port circuits and between port circuits and the SPE. The port circuits place digitized voice and data signals on a TDM bus. Bus A and bus B are normally active simultaneously.
- *Packet bus:* Runs internally throughout each PN and terminates on each end. It is an 18-bit parallel bus that carries many logical links. That carry 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 some specific port circuits in the system.

Table 1. Packet Bus Logical Links

Logical Link	Release 6vs	Release 6csi	Release 6si	Release 6r
X.25 links (including DCS)	TDM only	not available	TDM only	packet only
Switch node interfaces	not available	not available	not available	packet only
Remote management terminal	TDM only	TDM only	TDM only	packet only

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

  An expansion interface (EI) circuit pack also 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 a SN carrier.

  A switch node Interface (SNI) circuit pack terminates the SN carrier end of a cable connected between an SN carrier and a PN.
- *DS1 interface circuits*: Convert from fiber interface to DS1 interface between PNs for DS1 remoting.
- *Service circuits*: Connect to an external terminal to monitor, maintain, and troubleshoot the system. Also provide tone production and detection as well as call classification, modem pooling, recorded announcements, and speech synthesis.

CSS — Release 6r Only

Figure 5 shows the CSS linking the PPN to EPNs by the SNI circuit packs in a SN carrier. An SN reduces the amount of interconnect cabling between the PPN and the EPNs by acting as a *hub* to distribute cabling.

A system using a CSS can connect from 1 to 44 PNs. The CSS can consist of up to 3 SN carriers. The CSS can also consist of 2, 4, or 6 SN carriers (duplicated SNs) in a critical-reliability system.

Each SN contains from 1 to 16 SNI circuit packs. Each interface can connect to a PN or another SN using fiber-optic cable. One interface always connects to the PPN and 1 connects to each EPN.

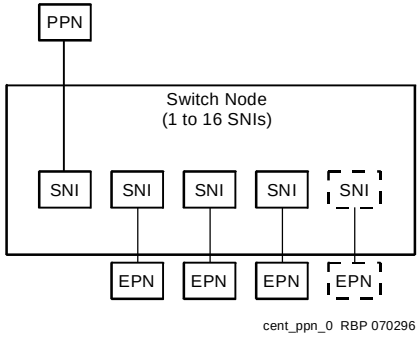

Figure 5. CSS with Switch Nodes (SNs)

In a high reliability system (with duplicated processor), 2 SNI circuit packs connect to the PPN, allowing up to 15 PNs to connect to 1 SN and up to 29 PNs to connect to 2 SNs, and up to 43 PNs to connect to 3 SNs. Heavy inter-SN traffic may require more SN-to-SN connections, reducing the number of EPNs that can be connected.

Architecture

The system consists of 2 main components:

- The Oryx/Pecos real-time, multiprocessing operating system. Oryx/Pecos supports the SPE
- Applications layer consisting of 3 major subsystems:
  - — Call processing: starts up and completes calls and manages voice and data in the system.
  - — Maintenance: detects faults, recovers operations, and performs tests in the system.

— System management: controls the internal processes necessary to install, administer, and maintain the system.

Logical interconnection between system components refers to the 2 kinds of logical links into the SPE:

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

Cabinets

The system cabinets house all components, including the power supply. A cabinet contains at least 1 carrier in an enclosed shelf with vertical slots to hold circuit packs. The circuit packs fit into connectors that attach to the rear of the slots. There are 4 cabinet types:

1. Compact single-carrier cabinet consisting of 1 carrier.
2. Compact modular cabinet consisting of up to 3 cabinets.
3. Single-carrier cabinet consisting of 1 carrier. Up to 4 single-carrier cabinets can be stacked to comprise 1 PN. This PN is sometimes referred to as a *cabinet* or a *cabinet stack*. Up to 3 cabinet stacks can be installed in a system.
4. Multicarrier cabinet containing 1 to 5 carriers and up to 44 cabinets.

Compact Single-Carrier Cabinet

The compact single-carrier cabinet (CSCC) is used only as a PPN and is standard reliability only (no duplication). This carrier is used in Release 6vs systems and can set on a tabletop or mount to a wall. See Figure 6. It contains dedicated and universal port slots and control circuit pack slots. The AUX connector on the rear of the carrier provides power for 1 attendant console and 1 emergency-transfer panel.

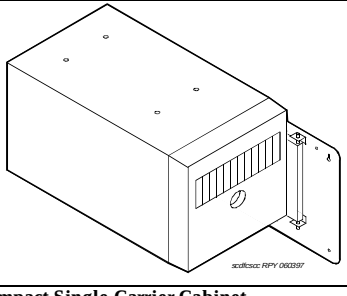

Figure 6. Compact Single-Carrier Cabinet

The CSCC cannot connect to additional cabinets because its TDM bus cannot be extended.

Compact Modular Cabinet

The compact modular cabinet (CMC) is used only as a PPN and is standard reliability only (no duplication). This carrier is used in Release 6 csi systems. It can set on the floor (with floor panel) or be wall mounted (preferred). See Figure 7 and Figure 8. The carrier contains universal port slots. The TN798 processor circuit pack is located in slot 1 and the tone-clock circuit pack is located in slot 2. The AUX connector on the side of the carrier provides power for 1 attendant console and 1 emergency transfer panel.

Three CMCs can be installed per system. Two types of TDM bus cables are used to interconnect the cabinets: vertical and horizontal. Use the vertical TDM cable when mounting cabinets vertically. Use the horizontal TDM bus cable when mounting the cabinets horizontally.

NOTE:

Only one horizontally mounted cabinet is permitted in any installation.

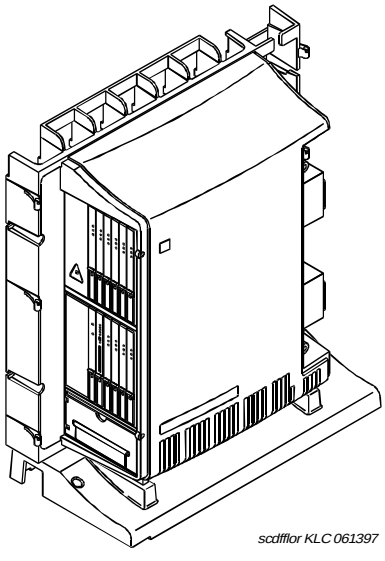

Figure 7. Compact Modular Cabinet (Floor Mount)

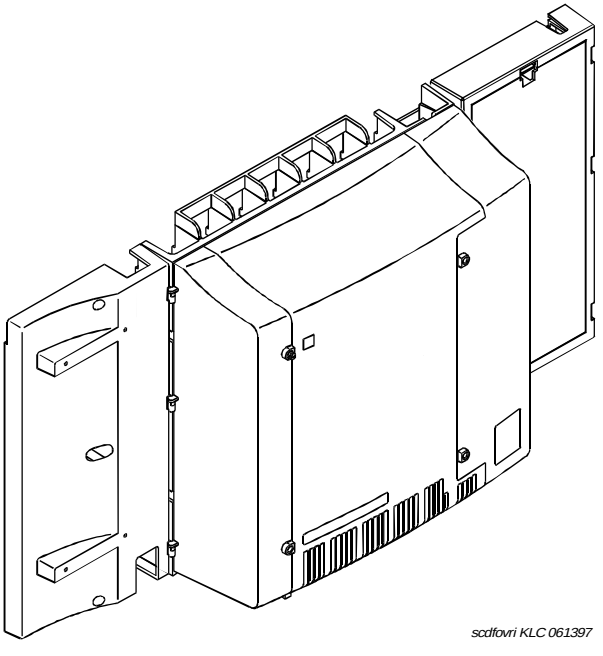

Figure 8. Compact Modular Cabinet (Wall Mount)

Single-Carrier Cabinets

A single-carrier cabinet, see Figure 9, can be 1 of 4 configurations:

- A basic control cabinet that contains a TN790 processor, tone clock, and a power converter
- An expansion control cabinet that contains additional port circuit packs, interfaces to the PPN, a maintenance interface and a power converter
- A duplicated control cabinet that contains the same equipment as the basic control cabinet
- A port cabinet that contains port circuit packs and a power converter

Single-carrier cabinets can be stacked to form 1 cabinet stack (maximum of 4 single-carrier cabinets) per PN. A maximum of 3 cabinet stacks (1 PPN and 2 EPN) can be installed per system.

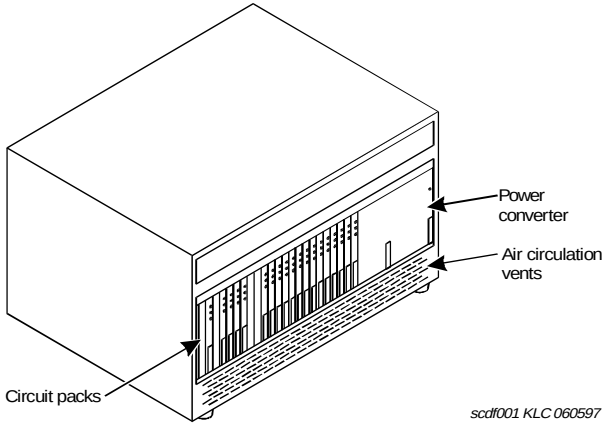

Figure 9. Typical Single-Carrier Cabinet

Multicarrier Cabinets

A multicarrier cabinet, see Figure 10, is a 70 in. (178 cm) cabinet that has up to 5 carriers. The 3 types of multicarrier cabinets are as follows:

- PPN cabinet contains the ports, SPE, an interface to an EPN cabinet (optional), and an SN in a CSS-connected system (optional).
- EPN cabinet contains additional ports, interfaces to the PPN and other EPN cabinets, the maintenance interface, and an SN in a CSS-connected system (optional).
- Auxiliary cabinet contains equipment used for optional system-related hardware, such as rack-mount equipment.

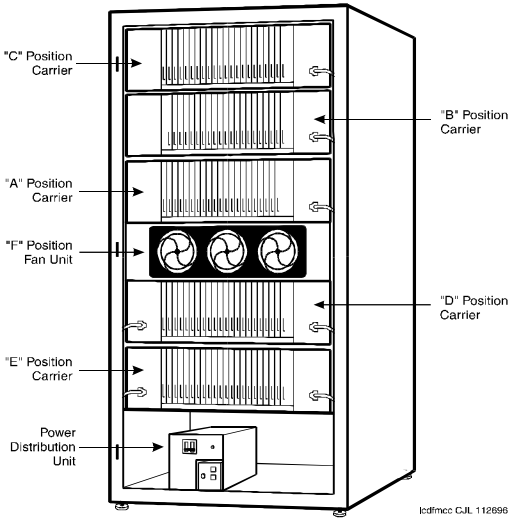

Figure 10. Typical Multicarrier Cabinet

The following carriers can install in multicarrier PPN and EPN cabinets:

- Control carrier is located only in the PPN cabinet
- Duplicated control carrier is optional and located only in the PPN cabinet
- Port carrier is optional and located in the PPN and EPN cabinets
- Expansion control carrier is optional and located only in the EPN cabinets
- SN carrier is optional and located in PPN and/or EPN cabinets

Connecting to the External Environment

Various system circuit packs connect to trunks. See Figure 11.

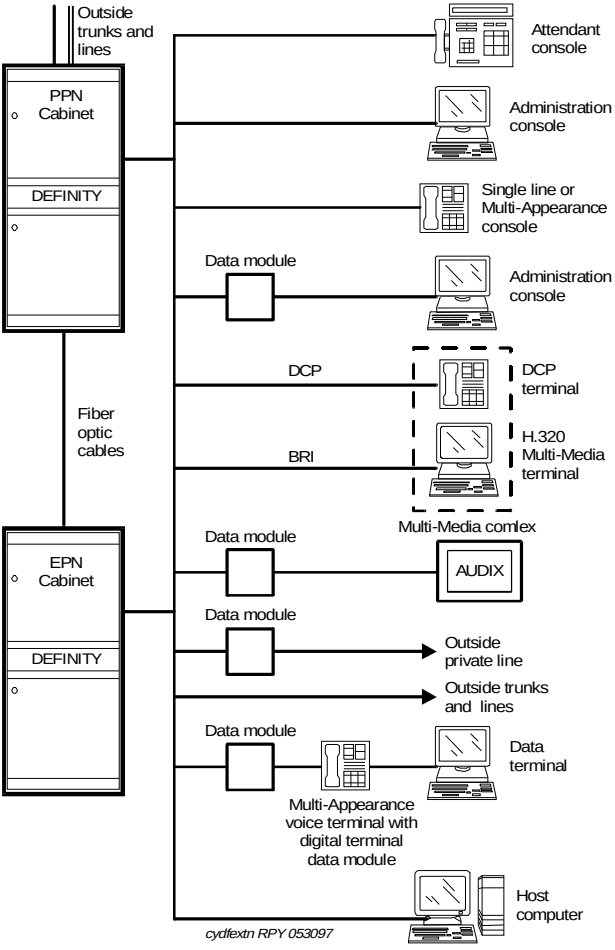

Figure 11. Typical Connections to the External Environment

Trunks are communications paths that transmit voice and data signals between the system and a central office (CO) and/or other switching systems. Circuit packs also connect to networks (public and private).

NOTE:

Actual equipment may appear different than that shown in Figure 11.

Peripherals, such as digital data lines connected to data endpoints, can also be connected. 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.

Terminals Supported

The DEFINITY System supports the following terminals:

- The 8400-series DCP voice terminals connect to a digital line circuit pack and can use both I-Channels for voice. The number of displayed characters for calls involving a single ID is 27. If more than one party's ID displays, the ID truncates to 15 characters.

  These terminals also display the full 8-bit OPTREX character set of graphical characters, including Eurofonts, and the Japanese katakana character alphabet.

- The 9400-series DCP terminals 9403B, 9410D, and 9434D display the full 8-bit OPTREX character set of graphical characters, including Eurofonts, and the Japanese katakana character alphabet. The number of non-United States displayed characters is 27 for calls involving a single ID. If more than one party's ID displays, the ID truncates to 15 characters.

- The 6400-series 2-wire DCP voice terminals connect to a digital line circuit pack and allow the use of both I-Channels for voice. The number of displayed characters is 27 for calls involving a single ID. If more than one party's ID displays, the ID truncates to 15 characters.

  These terminals also display the full 8-bit OPTREX character set of graphical characters, including Eurofonts, and the Japanese katakana character alphabet.

- The 8500-series BRI sets extend the existing ISDN-BRI to allow connection of terminals designed to a variety of BRI specifications.

- Analog 500, 2500, 7100-series, and 8100-series sets

- 9100-series analog terminals (9101, 9103, 9110)

- A PC console allows a desktop computer to be used as a PC-based attendant console (in conjunction with an 8400-series set).

- 300-series attendant consoles (302A, 302B, 302C)
- 602/603/606 Callmaster sets. The 603 and 606 terminals display the full 8-bit OPTREX character set of graphical characters, including Eurofonts, and the Japanese katakana character alphabet.
- 7300-series hybrid
- 9000-series cordless terminal (TransTalk 9000)
- 9601 DEFINITY Wireless Business System terminal

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

Duplication

Duplication is a strategy to create fully redundant systems. 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 port circuit packs per cabinet decreases.

International Requirements

The system circuit packs connect to lines and trunks and allow connection to analog and digital CO trunks specific to the regulations of many countries. Enhancements to the 24- and 32-channel ISDN-PRI and polarity-reversal signaling on loop-start CO trunks is provided. Internal switch operations allow English, Spanish, French, Italian, and a user-defined language for telephone displays. Visually impaired attendant service (VIAS) using American or United Kingdom English and Italian voice synthesis is also available.

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

Administrable selection of ISDN and non-ISDN bit-oriented digital protocols is provided. Administrable selection of analog line and trunk port impedances and gain and loss characteristics is provided. Protocol interfaces, such as T1 (at 1.544 Mbps) and European Conference of Postal and Telecommunications rate 1 (CEPT1) E1 (at 2.048 Mbps), are also provided. DS1 ports can be administered for DS1 framing, signaling, line coding, and companding on CEPT1 trunks.

Administration

A management terminal connects to the system for administration purposes. Enter commands at the terminal to display administration screens (forms). The forms list data and allow you access to add, change, and remove system and voice-terminal features.

For system administration information, consult the *DEFINITY Enterprise Communications Server Release 6 Administration and Feature Description.*

Comparisons Between Versions

To compare the differences between the system version and the cabinet version, see Table 2 and Table 3.

Table 2. Comparing System Versions

System	PPN	Maximum EPNs	Direct- or CSS-Connected
Release 6vs	1	0	Does not apply
Release 6csi	1	0	Does not apply
Release 6si	1	2	Direct (fibre only)
Release 6r	1	43	Direct or CSS

Table 3. Comparing Carriers in Single-Carrier Cabinets

Cabinet	Release 6vs	Release 6csi	Release 6si
Basic control	Does not apply	PPN	PPN
Duplicated control	Does not apply	Does not apply	PPN
Compact control	PPN	Does not apply	Does not apply
Port	Does not apply	PPN	PPN and EPN
Expansion control	Does not apply	Does not apply	EPN

2 — Site Requirements

This section describes the wall and floor area, and loading specifications for various DEFINITY ECS cabinets. It also describes the associated peripherals located in the equipment room.

Floor Area

Floor area requirements in the equipment room vary between cabinets. Dimensions and clearances for all cabinets are listed in Table 4.

Table 4. Cabinet Dimensions and Clearances

Cabinet Type	Height	Width	Depth	Clearance
Compact modular 1-cabinet	25.5 in. (64.8 cm)	24.5 in. (62.2 cm)	12 in. (30.5cm)	Left, Right, and Front 12 in. (30.5 cm)
2-cabinets	51 in. (129.6 cm)	24.5 in. (62.2 cm)	12 in. (30.5 cm)	
3-cabinets	76.5 in. (194.4 cm)	24.5 in. (62.2 cm)	12 in. (30.5 cm)	
Single-Carrier 1-cabinet	20 in. (51 cm)	27 in. (69 cm)	22 in. (56 cm)	38 in. (97 cm) between cabinet and wall
2-cabinets	39 in. (99 cm)	27 in. (69 cm)	22 in. (56 cm)	
3-cabinets	58 in. (1.5 m)	27 in. (69 cm)	22 in. (56 cm)	
4-cabinets	77 in. (2 m)	27 in. (69 cm)	22 in. (56 cm)	
Multicarrier[1]	70 in. (1.8 m)	32 in. (81 cm)	28 in. (71 cm)	Rear 38 in. (97 cm) Front 36 in. (91 cm)
Cable slack manager[2]	7 in. (18 cm)	32 in. (81 cm)	38 in. (97 cm)	38 in. (97 cm) between cabinet and wall
DC power cabinet[3]	20 in. (51 cm)	27 in. (69 cm)	22 in. (56 cm)	38 in. (97 cm) Front and Rear

Continued on next page

Table 4. Cabinet Dimensions and Clearances — *Continued*

Cabinet Type	Height	Width	Depth	Clearance
Large battery cabinet				38 in. (97 cm) Front and Rear
100 Amp	27 in. (69 cm)	55 in. (140 cm)	21 in. (53 cm)	
200 Amp	42 in. (107 cm)	55 in. (140 cm)	21 in. (53 cm)	
300 Amp	42 in. (107 cm)	55 in. (140 cm)	21 in. (53 cm)	
400 Amp	57 in. (145 cm)	55 in. (140 cm)	21 in. (53 cm)	

1. Includes the auxiliary cabinet, the global AC cabinet, and the global DC cabinet.
2. Used with Multicarrier and Single-Carrier cabinets.
3. Requires a floor area of 8 square feet (0.74 square m). Also requires 38 in. (97 cm) between cabinet and wall.

Floor Load

The equipment room floor must meet the commercial floor loading code of at least 50 lbs. per square foot (242 kg per square meter). Floor plans typically allocate space around the front, ends, and rear (if necessary) of the cabinets, for maintenance access.

NOTE:

Additional equipment room floor support may be required if the floor load is greater than 50 lbs. per square foot (242 kg per square meter).

NOTE:

Compact modular cabinets are typically wall mounted.

The average weight of a compact modular cabinet is 50 lbs. (22.7 kg).

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

The average weight for multicarrier and large battery cabinets are shown in Table 5 and Table 6.

Table 5. Multicarrier Cabinet Weights

Cabinet Type	Weight
PPN and EPN	800 lbs. (363 kg)
Auxiliary Cabinet	200 lbs. (90 kg) minimum 800 lbs. (363 kg) maximum

Table 6. Large Battery Cabinet Weights

Cabinet Type	Weight	Floor Loading
100 Amp	400 lbs. (181 kg) maximum	180 lbs. per square foot (871.2 kg per square meter)
200 Amp	815lbs. (370 kg) maximum	328 lbs. per square foot (1587.5 kg per square meter)
300 Amp	1480 lbs. (671 kg) maximum	476 lbs. per square foot (2303.8 kg per square meter)
400 Amp	1580 lbs. (717 kg) maximum	625 lbs. per square foot (3025 kg per square meter)

Floor Plans

DEFINITY ECS floor plans vary with the size and shape of the equipment room and the extent of future growth. Future growth includes a new or upgraded system, adjuncts and peripherals, and the MDF. See "Main Distribution Frame" on page 28.

For floor standing cabinets, reserve the area behind a cabinet for the MDF and the cable slack manager. For wall mounted cabinets, reserve the area beside the cabinets for the MDF. Figure 13 through Figure 16 show typical floor plans. All dimensions are shown in inches. Refer to Table 12 to Table 14 for power requirements.

Recommended floor plans, power planning procedures, and pre-installation ground requirements are provided in *DEFINITY Communications System Generic 2 and System 85 Equipment Room Floor Plans and Specifications*, 555-104-603.

Compact Modular Cabinet Configuration Guidelines

The MDF (cross-connect) is either to the rear or right of the cabinet. To allow service access, the table for the management terminal and optional printer is away from the equipment area. See Figure 12 and "Table Area" on page 28 for requirements. In an installation where no MDF is present, an MDF can be installed in the CMC right panel.

The following steps are pre-installation guidelines:

1. Locate the power outlets outside the MDF area. The outlets must not be controlled by a wall switch or be shared with other equipment.
2. Locate the trunk/auxiliary field inside the MDF, if desired.
3. Ground the system. See "Approved Grounds" on page 46 section.
4. Install earthquake protection (if required). See "Earthquake Protection" on page 53.
5. Each cabinet requires either: NEMA 5-15R receptacle (or equivalent) for United States installations or local IEC 320 cord set (or equivalent) for non-United States installations.

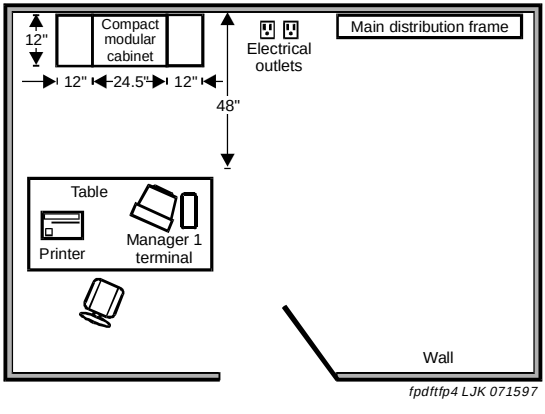

Figure 12. Typical Compact Modular Cabinet Floor Plan

Single-Carrier Cabinet Configuration Guidelines

The MDF can be directly behind the cable slack manager. To allow service access, the table for the management terminal and optional printer is away from the equipment area. See Figure 13 and "Table Area" on page 28 for requirements.

The following steps are pre-installation guidelines:

1. Locate the power outlets outside the MDF area. The outlets must not be controlled by a wall switch or be shared with other equipment.
2. Locate the trunk/auxiliary field inside the MDF, if desired.
3. Ground the system according to the "Approved Grounds" on page 46 section.
4. For fiber connections between PNs, use a 20-foot (6.1 m) multimode fiber optic cable.
5. Install earthquake protection (if required). See "Earthquake Protection" on page 53.
6. Each cabinet requires either: NEMA 5-15R receptacle (or equivalent) for United States installations or local IEC 320 cord set (or equivalent) for non-United States installations.

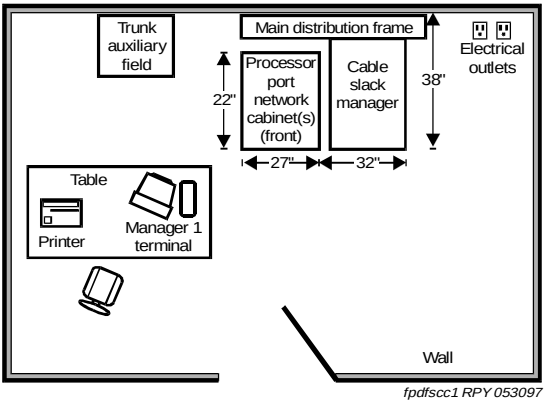

Figure 13. Typical Single-Carrier Cabinet Floor Plan

Multicarrier Cabinet Configuration Guidelines

The MDF is directly behind the cable slack manager. To allow service access, the table for the management terminal and optional printer is away from the equipment area. See Figure 14 and "Table Area" on page 28 for requirements. The following steps are pre-installation guidelines:

1. Locate the power outlets outside the MDF area. The outlets must not be controlled by a wall switch or be shared with other equipment.
2. For the PPN cabinets, use either a NEMA 5-50R receptacle (or equivalent) or a NEMA L14-30R receptacle (or equivalent) power outlet or: 220 VAC, 50-60 Hz power outlet for the Global AC Cabinet.
3. For the Auxiliary Cabinet, use a NEMA 5-20R receptacle (or equivalent).
4. Allow at least 3 feet (91.4cm) of space in front of the cabinet to permit the door to open.
5. Ground the system. See "Approved Grounds" on page 46.
6. Install earthquake protection (if required). See "Earthquake Protection" on page 53.
7. Locate the trunk/auxiliary field inside the MDF, if desired.
8. Fiber connections between PNs use a 20-foot (6.1 m) multimode fiber optic cable.

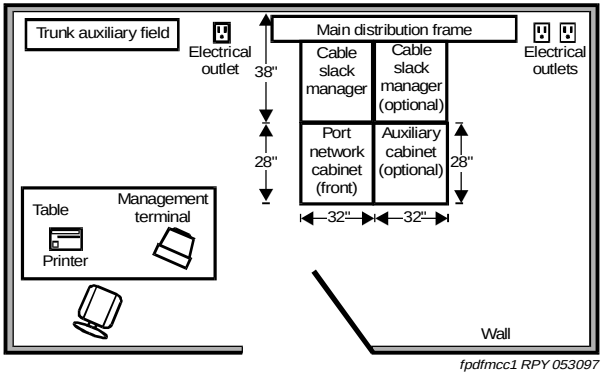

Figure 14. Typical Multicarrier Cabinet Floorplan

Additional Floor Plans

The following floor plans illustrate recommendations for other possible installations. See Figure 15, Figure 16, and Figure 17.

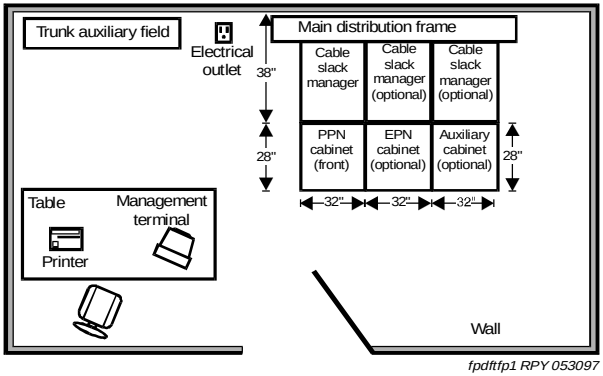

Figure 15. Typical Floor Plan with EPN and Auxiliary Cabinet

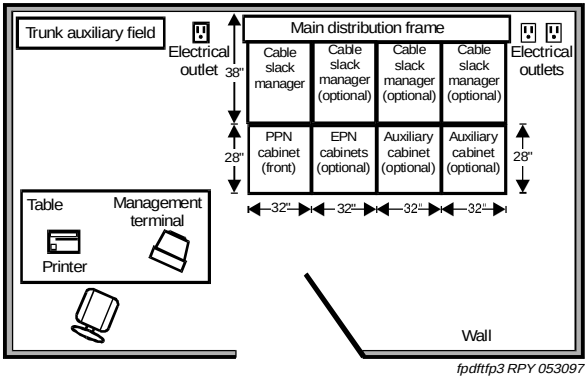

Figure 16. Typical Floor Plan with an additional EPN and Auxiliary Cabinets

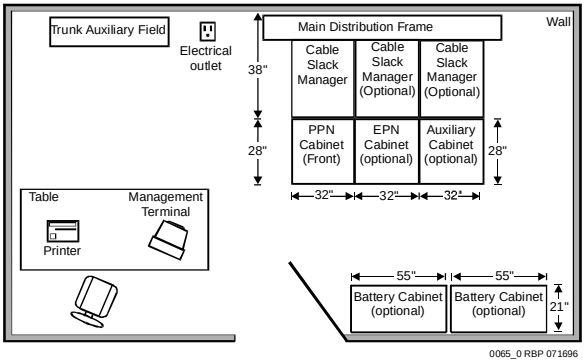

Figure 17. Typical Floor Plan with Battery Cabinets

Table Area

Reserve the table area in the equipment room for the management terminal and optional printer. Use a 510A or 510D personal terminal, or a 715, 2900/715, or 715 BCS-2 terminal. The terminals each require approximately 3.2 square feet (0.3 square m) of area. The 510A or 510D with optional keyboard require approximately 2.1 square feet (0.2 square m) of area.

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

Main Distribution Frame

The Main Distribution Frame (MDF) equipment is located a specified distance from the DEFINITY cabinets and must meet specific requirements. An optional MDF can be installed in the CMC right panel.

For new installations, Lucent Technologies personnel may install the MDF. For more details about the MDF and other site requirements, refer to the following documents:

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

NOTE:

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

Environmental Considerations

This section details the environmental considerations for the multicarrier and single-carrier cabinets. For information about the DEFINITY Wireless Business System, refer to "A—Wireless Business Solutions".

Heat Dissipation

Compact Modular Cabinets

The typical heat dissipation of a fully loaded (3 carriers) Compact Modular Cabinet is shown in Table 7.

Table 7. Typical Heat Dissipation of Compact Modular Cabinets

BTUs Per Hour	Gram-Calories Per Hour	Watts
810 (excluding telephones)	201.6	234
1500 (including telephones)	378	439

Multicarrier Cabinets

The typical heat dissipation of a fully loaded (5 carriers) Multicarrier Cabinet is shown in Table 8.

Table 8. Typical Heat Dissipation of Multicarrier Cabinets

BTUs Per Hour	Gram-Calories Per Hour	Watts
4200 (excluding terminals)	1058	1232
6600 (including terminals)	1662	1935

Single-Carrier Cabinets

The typical heat dissipation of Single-Carrier Cabinets is shown in Table 9.

Table 9. Typical Heat Dissipation of Single-Carrier Cabinets

BTUs Per Hour	Gram-Calories Per Hour	Watts
1700 (one cabinet including terminals)	438	499
5700 (cabinet stack including terminals)	1436	1672

Altitude and Air Pressure

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

The normal operating air pressure range is: 9.4 to 15.2 psi (lbs. per sq. in.) (648 to 1,048 millibars).

Temperature and Humidity

Install the equipment in a well-ventilated area. Maximum equipment performance is achieved at an ambient room temperature between 40 and 120^{o} F (4^{o} and 49^{o} C) for short term operation (not more than 72 consecutive hours or 15 days in a year) and up to 110^{o} F (43^{o} C) for continuous operation.

The relative humidity range is 10 to 95% at up to 84^{o} F (29^{o} C). Above this, maximum relative humidity decreases from 95% down to 32% at 120^{o} F (49^{o} C). Installations outside these limits may reduce system life or affect operation. The recommended temperature and humidity range is 65^{o} to 85^{o} F (18^{o} to 29^{o} C) at 20 to 60% relative humidity.
See Table 10.

Table 10. Temperature and Relative Humidity

Room Temperature (Degrees Fahrenheit)	Room Temperature (Degrees Celsius)	Relative Humidity (%)
40 to 84	4.4 to 28.8	10 to 95
86	30.0	10 to 89
88	31.1	10 to 83
90	32.2	10 to 78
92	33.3	10 to 73
94	34.4	10 to 69
96	35.6	10 to 65
98	36.7	10 to 61
100	37.8	10 to 58
102	38.9	10 to 54
104	40.0	10 to 51

Continued on next page

Table 10. Temperature and Relative Humidity — *Continued*

Room Temperature (Degrees Fahrenheit)	Room Temperature (Degrees Celsius)	Relative Humidity (%)
106	41.1	10 to 48
108	42.2	10 to 45
110	43.3	10 to 43
112	44.4	10 to 40
114	45.6	10 to 38
116	46.7	10 to 36
118	47.8	10 to 34
120	48.9	10 to 32

Air Purity

Do not install the cabinet 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 11 must be avoided.

Table 11. Corrosive Gas Concentrations

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

NOTE:

The compact modular cabinet, single-carrier and multicarrier cabinets contain an air filter to reduce particulates flowing through the equipment. The compact single-carrier cabinet does not contain an air filter.

Lighting

Lighting must be bright enough to allow personnel to perform their tasks. The recommended light intensity is 50 to 70 footcandles (538 to 753 lumens/m^2) to meet the Occupational Safety and Health Act (OSHA) standards.

Radio Frequency Noise

Noise is introduced into the system through trunk or station cables, or both. Electromagnetic fields near the system control equipment may cause system noise. Place the system and cable runs in areas where high electromagnetic field strengths do not exist. 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.

Measure weak fields with a tunable meter. Measure field strengths greater than 1.0 volt per meter with a broadband meter.

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

Acoustic Noise Levels

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

Multicarrier Cabinets

At a distance of 5 feet (1.5 m), the noise produced by a 5-carrier cabinet varies from 51 dBA at low-fan speeds to 56 dBA at high-fan speeds. If the tape drive is fast-winding, there is an additional 2-dBA of noise. When a tape drive is reading data, there is an additional 1-dBA of noise.

Single-Carrier Cabinets

The noise produced by the system at a distance of 5 feet (1.5 meters) is:

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

Cabinet Power Sources

This section describes cabinet AC- and DC-power source requirements.

AC Power

Power feeders from a dedicated AC-power source (usually located outside the building) connect to an AC-load center. These feeders do not power other equipment. The AC-load center distributes the power to receptacles. The power cord from the AC-power distribution unit in each multicarrier cabinet and AC-power supply in each single-carrier cabinet plugs into a receptacle.

Either of the following power sources can supply 60-Hz power to the AC load in Release 6 systems:

- Single-phase, 4-wire, 120/240 VAC supplying 240 VAC. See Figure 18. This source has 3 hot wires plus 1 ground wire.
- Three-phase, 4-wire, 120/208 VAC supplying 208 VAC. See Figure 19. This source has 2 hot wires and 1 ground wire.

Either of the following power sources can supply 50-Hz power to the AC-load in Release 6 systems:

- International 4-wire, Y, 220/380 VAC. See Figure 20. This source has 3 hot wires, 1 neutral wire, and 1 ground wire.
- International Delta, 3-wire, 220 or 240 VAC. See Figure 21. This source has 3 wires.

NOTE:

The type of power for a multicarrier cabinet is shown on the cabinet's rear door, a single-carrier cabinet is shown on the cabinet's rear cover, and a compact modular cabinet is shown on the right door.

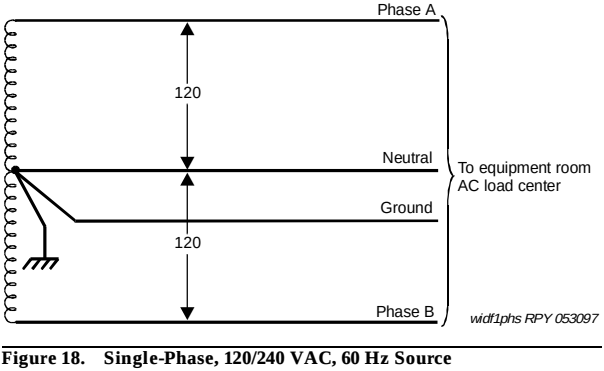

Figure 18. Single-Phase, 120/240 VAC, 60 Hz Source

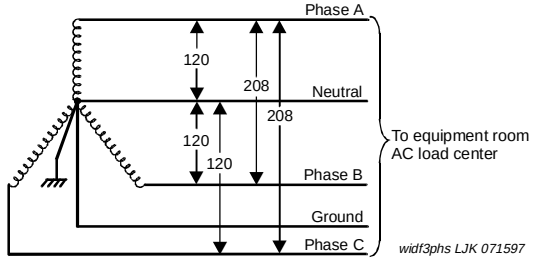

Figure 19. Three Phase, 4-Wire, 120/208 VAC, 60 -Source

50 Hz Power Sources in Release 6 Systems

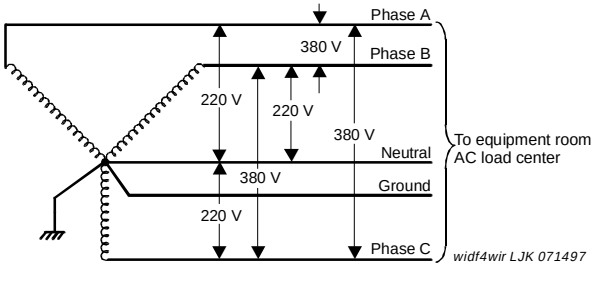

Figure 20. International 4-Wire, 220/380 VAC, 50-Hz Source

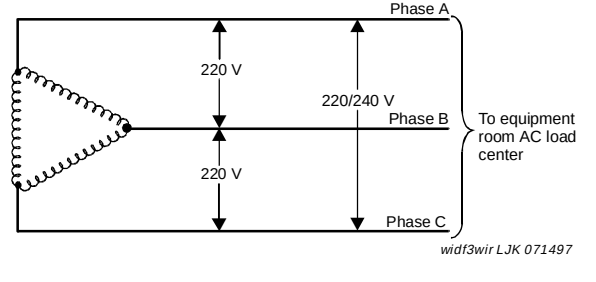

Figure 21. International Delta, 3-Wire, 220 or 240 VAC, 50-Hz Source

Table 12 lists the AC-power sources that can supply power to an AC-load in a cabinet. A NEMA receptacle (or equivalent) connects to the wires from the unit. The AC power cord from the power input of each unit plugs into a receptacle.

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

Table 12. Cabinet AC Power Sources

Power Sources	Power Distribution Unit	Power Input
Single phase 120 VAC with neutral Single phase 240 VAC with neutral	AC power supply (650A) compact modular cabinet	120 VAC, 60 Hz NEMA 5-15P 240 VAC, 50 Hz IEC 320 Japan installs use country specific receptacles for 100 and 200 VAC, 50/60 Hz
Single phase 120 VAC with neutral Single phase 240 VAC with neutral, or single phase of 3-phase, 208 VAC with neutral	AC power distribution (J58890CE-1 and J58890CE-2) multicarrier cabinet	120 VAC, 60 Hz NEMA 5-50R 208/240 VAC, 60 Hz NEMA L14-30R
Single Phase 176-264 VAC	AC Power distribution (J58890CH-1) multicarrier cabinet	200-240 Volts, 50-60 Hz NEMA L6-30R. Installations outside the United States require a receptacle suitable for use in the country of installation.
Single phase 120 VAC with neutral Single phase of 220 VAC or Single phase of 240 VAC	AC power supply (WP-91153) single-carrier cabinet	120 VAC, 60 Hz NEMA 5-20R or 5-15R 220/240 VAC at country-specific receptacle
Single phase 120 VAC with neutral Single phase of 220 VAC or Single phase of 240 VAC	AC power supply WP-90510) compact single-carrier cabinet	120 VAC 60 Hz NEMA 5-20R or 5-15R 220/240 VAC at country-specific receptacle

DC Power

DC-powered cabinets containing a J58890CF power distribution unit require a -42.5 to -56 VDC source at up to 75 A. Refer to "Multicarrier Cabinet Power System" on page 37.

Refer to "Single-Carrier Cabinet Power Systems" on page 48 for DC-power information.

For DEFINITY Wireless Business System power requirements, refer to "A—Wireless Business Solutions".

AC and DC Load Center Circuit Breakers

The circuit breaker sizes for all AC- and DC-powered cabinets are listed in Table 13 and Table 14.

Table 13. Circuit Breakers for AC-Powered Cabinets

Cabinet Type	Circuit Breaker Size
Compact modular cabinet (120 VAC) 60 Hz Compact modular cabinet (240 VAC) 50 Hz	15 A 10 A
Multicarrier cabinet (120 VAC) 60 Hz	50 A
Multicarrier cabinet (208 VAC) 60 Hz	30 A
Multicarrier cabinet (240 VAC) 60 Hz	30 A
Multicarrier cabinet (200-240 VAC) 50-60 Hz	30 A
Single-carrier cabinet (120 VAC)	15 or 20 A
Compact single-carrier cabinet (120 VAC)	15 A
Compact single-carrier cabinet (240 VAC)	7 A
Auxiliary cabinet (120 VAC)	20 A

.

Table 14. Circuit Breakers for DC-Powered Cabinets

Cabinet Type (–48 VDC)	Circuit Breaker Size
Multicarrier cabinet	75 A
Single-carrier cabinet	25 A
Auxiliary cabinet	20 A

Multicarrier Cabinet Power System

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

Table 15 lists the input and output voltages of power unit circuit packs in the carriers of multicarrier cabinets.

Table 15. Power Units in Multicarrier Cabinets

Unit Type	AC power input 120 VAC	DC power inputs 144 VDC	DC power inputs -48 VDC	DC power outputs +5 VDC 60 A	DC power outputs –5 VDC 6 A	DC power outputs –48 VDC 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
DC 649A	no	no	yes	yes	yes	10 A

AC and DC Power Distribution

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

DC-powered cabinets require a -42.5 to -56 VDC source at up to 75 A.

AC Power Distribution

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

Figure 22 shows an AC-power distribution unit (List 9 or List 10). This unit sits at the bottom of some multicarrier cabinets.

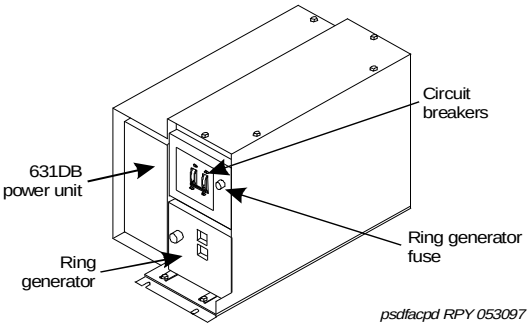

Figure 22. AC Power Distribution Unit (J58890CE-2) (Front)

The AC-power distribution unit contains the following additional components not shown in the figure:

- Electromagnetic Interference (EMI) filter
- AC input fuse
- 20 A fuses
- Signal connector
- –48 VDC fan power

The optional battery charger (List 11) sits at the bottom of some multicarrier cabinets. See Figure 23.

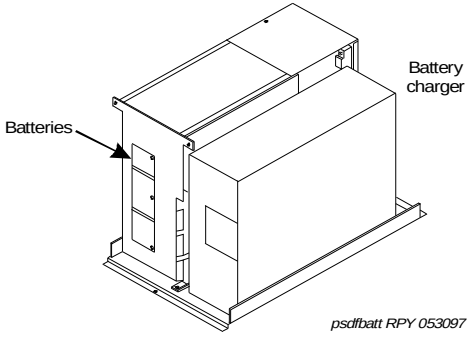

Figure 23. Battery Charger (Optional Part of J58890CE-2) (Front)

The battery charger is used only without an uninterruptible power supply (UPS). The charger contains:

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

Circuit Breaker

The circuit breaker protects the AC input power to the cabinet and serves as the main AC input disconnect switch. The circuit breaker has 2 poles for 120 VAC or 3 poles for 208/240 VAC. If a problem develops, the circuit breaker automatically trips (opens) and removes the AC power input.

48-VDC Batteries

The 3 series-connected 48 VDC batteries produce a nominal 144 VDC, fused at 20 A. The batteries trickle-charge from the battery charger.

Battery Charger

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

DC Power Relay

This relay disconnects the batteries from a system when using AC power. The relay also disconnects the batteries if power fails for more than 10 minutes in a standard reliability system, 5 minutes in high and critical reliability systems, and 10 minutes in an expansion port network (EPN). This protects the batteries from over-discharging.

Electromagnetic Interference (EMI) Filters

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

Ring Generator

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

Fuses

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

Figure 24 shows AC power distribution in some multicarrier cabinets. The DC-power distribution cables are on both sides of the cabinet. These cables supply power to each of the carriers. The optional battery charger is at the right side of the power distribution unit.

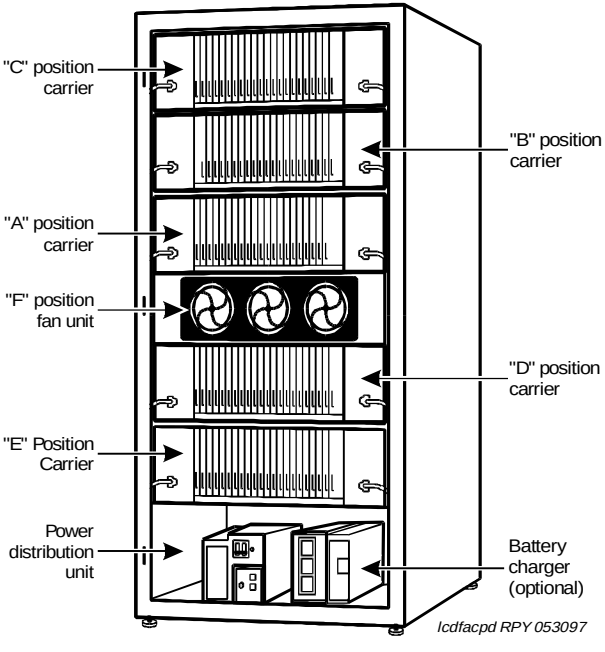

Figure 24. AC Power Distribution in Multicarrier Cabinets

Power Backup

If AC power fails, three 48 VDC batteries power the system for 10 seconds in a PPN cabinet, for 15 seconds in an EPN cabinet, and for 10 minutes in the control carrier in a standard reliability system. The batteries also supply system power for 5 minutes in the control carrier in high and critical reliability systems, and for 10 minutes in the expansion control carrier in the **A** position of an EPN cabinet (Release 6r only).

Uninterruptible Power Supply

An external uninterruptible power supply (UPS) provides a longer backup time than holdover batteries and can replace the batteries and battery charger. The unit connects from the AC-power source to a cabinet's AC-power cord. If AC power fails, the unit supplies its own AC power to the cabinet

AC Power Distribution Unit (J58890CH-1)

Figure 25 shows a typical ac power distribution unit used in some multicarrier cabinets. The unit sits at the bottom of the cabinet.

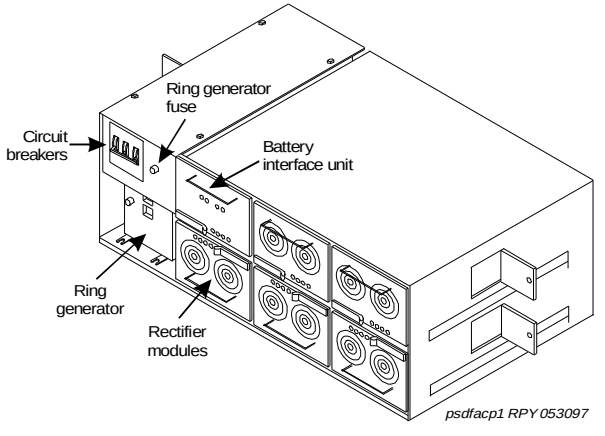

Figure 25. AC Power Distribution Unit (J58890CH-1) (Front)

Power Backup

There are 2 types of battery assemblies used for power backup: small and large. The small batteries are typically located at the center rear of a multicarrier cabinet. The large batteries are typically located inside the battery cabinet.

Small Batteries

The small battery is an 8 AH battery fused for short circuit protection and is charged by the J58890CH-1. The batteries also contain a thermal sensor that changes the charging voltage depending on battery temperature. See Figure 26.

The small batteries provide short-term battery holdover. If AC-power fails, 48 VDC batteries power the system for 10 seconds in a PPN cabinet, for 15 seconds in an EPN cabinet, and for 10 minutes in the control carrier in a standard reliability system. The batteries also provide system power for 5 minutes in the control carrier in high and critical reliability systems, and for 10 minutes in the expansion control carrier in the **A** position of an EPN cabinet (Release 6r only).

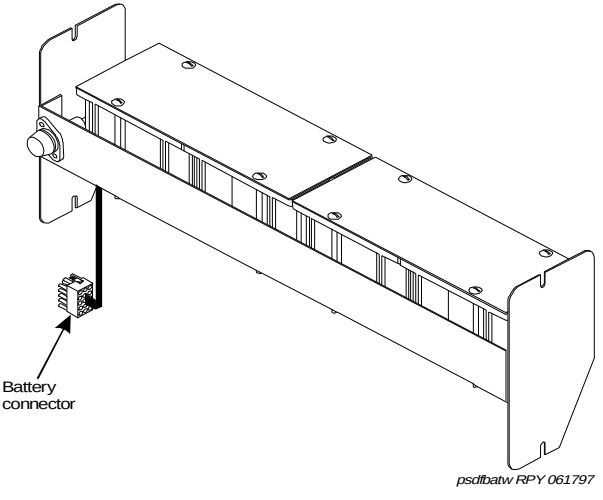

Figure 26. Small Battery Assembly

Large Batteries

The large batteries can supply holdover times of 2 to 8 hours depending on the number of the batteries. When using large battery holdover, 1 battery cabinet is required per system. The 24-cell battery cabinet must have float voltage of 54.2 VDC. The 23-cell battery cabinet must have a float voltage of 51.75 VDC. The batteries are circuit breaker protected and are charged by the J58890CH-1.

The batteries also contain a thermal sensor that change the charging voltage depending on the battery temperature. The batteries provide extended holdover. Battery holdover and recharge times for a typical 2500 Watt load are shown in Table 16. A typical large battery cabinet, (200 A) is shown Figure 27.

Table 16. Battery Holdover and Recharge Times

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

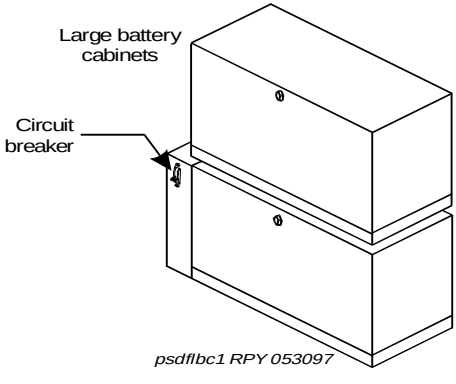

Figure 27. Typical Large Battery Cabinets

DC Power Distribution

The typical distribution system has a DC power converter and cables to provide the power to the system circuit packs.

DC Power Distribution Unit (J58890CF-2)

Figure 28 shows a power distribution unit in some DC-powered multicarrier cabinets. The unit sits at the bottom of the cabinet and contains the ring generator, 20 amp circuit breakers, terminal blocks, and system fan power.

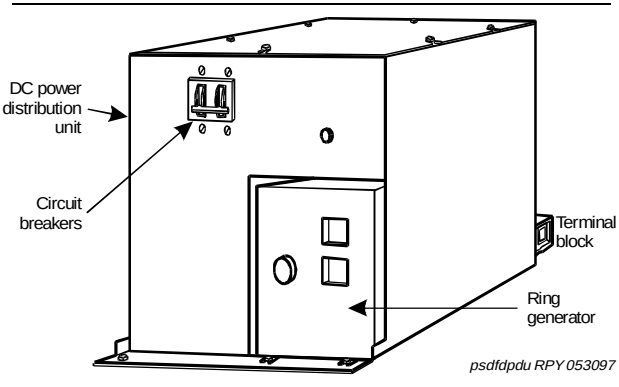

Figure 28. DC Power Distribution Unit (J58890CF-2) (Front)

Ground Isolation

Each peripheral connecting to a DEFINITY System, via the asynchronous electronic industries association (EIA) RS-232 interface, requires either a 105C or a 116A Isolator Interface. The interface isolates ground between the system and external adjuncts.

The isolator interface is behind a PPN control carrier or behind an EPN expansion control carrier. The 105C or the 116A installs at the RS-232 interface between the peripheral equipment and the interface connector.

Figure 29 shows the power distribution in some multicarrier cabinets with short term battery holdover (small battery). In Release 6r systems, the power distribution cables are on the right hand side of the cabinet only. This is because the 649A DC power converter circuit pack replaces 2 power converters at either end of each carrier. Switch node (SN) carriers require two 649As and 2 cables.

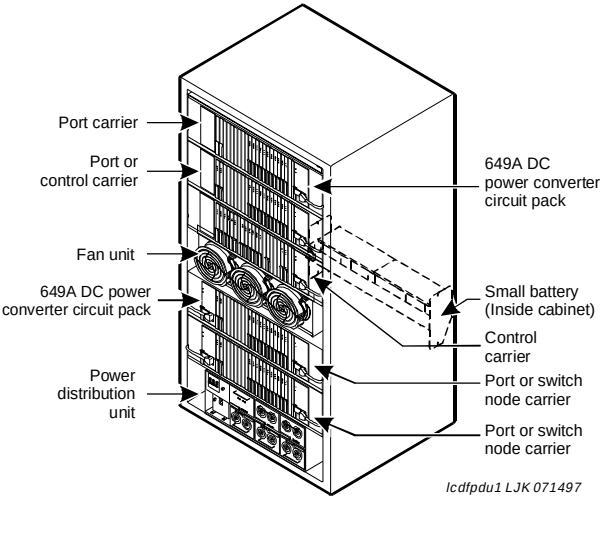

Figure 29. Power Distribution in Multicarrier Cabinets

Figure 30 shows the DC-power distribution in some multicarrier cabinets with extended battery backup (large batteries). In Release 6r systems, the power distribution cables are on the right side of the cabinet only. This is because the 649A DC power converter circuit pack replaces 2 power converters at either end of each carrier. Switch node (SN) carriers require two 649As and two cables.

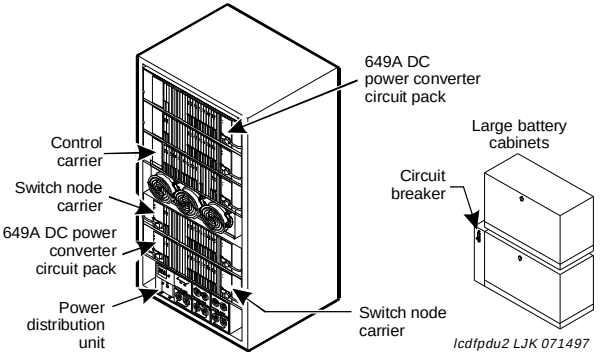

Figure 30. DC Power Distribution in Multicarrier Cabinets

DC Power Converter (649A)

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

AC and DC Grounding

Approved Grounds

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

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

Protective Grounds

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

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

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

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

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

Concrete Encased Ground — An electrode encased by at least 2 in. (5 cm) of concrete and located within and near the bottom of a concrete foundation or footing in direct contact with the earth. The electrode must be at least 20 feet (6 meters) of one or more steel reinforcing bars or rods 1/2 inch (1.3 cm) in diameter, or at least 20 feet (6 meters) of bare, solid copper, 4 AWG (26 mm^2) wire.

Ground Ring — A buried ground that encircles a building or structure at a depth of at least 2.5 feet (0.8 meter) below the earth's surface. The ground ring must be at least 20 feet (6 meters) of 2AWG (3.5 mm^2), bare, copper wire.

Approved Floor Grounds

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

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

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

NOTE:

Electrically connect all protective grounds together to form a single grounding electrode system.

Coupled Bonding Conductor

When using coupled bonding conductor (CBC) grounding in an AC-powered cabinet, maintain a minimum 1 ft. (0.3 m) spacing between the CBC and other power and ground leads.

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

Single-Carrier Cabinet Power Systems

Each single-carrier cabinet has 1 AC or 1 DC power supply that distributes DC-power and AC ringing voltage to the circuit pack slots in the cabinet.

AC Power Supply (WP-91153)

In an AC-powered cabinet, a single, plug-in, multi-output AC power supply is in the power supply slot. A power cord, with a 3-prong plug on one end and an appliance connector on the other end, connects the supply to a dedicated AC power source.

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

- 120 VAC, 60 Hz, 15 Amp to 20 Amp; 3 wires in the power cord: 1 hot wire, 1 neutral wire, and 1 ground wire
- 220 VAC or 240 VAC, 50 Hz, 10 Amp; 3 wires in the power cord: 1 hot wire, 1 neutral wire, and 1 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 distribute power on the cabinet backplane to the circuit pack slots.

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

A holdover circuit in the power supply allows a system to operate normally during AC power interruptions. If AC input power fails, reserve batteries supply power to the memory and processor circuit packs and fans for 2 minutes. All port circuit packs are inactive during this time. The power supply contains a battery charger to charge the holdover batteries.

DC Power Supply (676B)

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

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

DC Power Distribution Unit (J58890CG)

The J58890CG is used with Single-Carrier Cabinets. Individual DC output connectors can power up to 4 Single-Carrier Cabinets. Each output connector is separately fused at 25 A (fuses are inside the unit). The input to the DC distribution unit is from the DC Power Cabinet.

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

Enhanced DC Rectifier Cabinet (J58890R)

The J58890R is used with Single-Carrier Cabinets. Each rectifier assembly in the DC rectifier cabinet can supply up to 50 A of DC current. A minimum of two rectifiers install in each DC cabinet to supply a total of 100 A. A third rectifier assembly is used as a backup only.

Each Single-Carrier Cabinet can draw up to 15 A. Up to 3 DC cabinets can be stacked to supply power to Single-Carrier Cabinets stacks.

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

NOTE:

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

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

A power cord, with a 3-prong plug on one end and an appliance connector on the other end, connects the supply to a dedicated AC power source. In the Compact Single-Carrier Cabinet, a plug-in, multi-output, auto-ranging, AC power supply is above the carrier at the top of the cabinet.

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

- 120 VAC, 50-Hz to 60-Hz, 6 Amp; 3 wires in the power cord: 1 hot wire, 1 neutral wire, and 1 ground wire
- 220 VAC or 240 VAC, 50-Hz to 60-Hz, 3 Amp; 3 wires in the power cord: 1 hot wire, 1 neutral wire, and 1 ground wire

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

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

AC Power Supply in a Compact Modular Cabinet (650A)

In the compact modular cabinet, a power cord, with a 3-prong plug on one end and an appliance connector on the other end, connects the supply to a dedicated AC power source. The power supply is a auto ranging 85 to 264 VAC, global power factor corrected AC/DC converter providing multiple DC outputs and AC ring outputs.

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

- 120 VAC, 50-Hz to 60-Hz, 6 Amp; 3 wires in the power cord: 1 hot wire, 1 neutral wire, and 1 ground wire
- 220 VAC or 240 VAC, 50-Hz to 60-Hz, 3 Amp; 3 wires in the power cord: 1 hot wire, 1 neutral wire, and 1 ground wire

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

Cabinet Cooling Fans

Compact Modular Cabinet Fan Unit

Two variable-speed fans are at the bottom of the cabinet. They receive +8 to +14 VDC from the power supply. An air filter, which can be removed and cleaned or replaced, is located above the fans. Air flows from the outside, into the bottom of the cabinet, around the circuit packs, and out through the top rear of the cabinet.

If the cabinet temperature reaches 158^{o} F (70^{o} C), the temperature sensor in the power supply shuts the system down and invokes the Emergency Transfer.

Multicarrier Cabinet Fans

A fan unit mounts near the center of the cabinet. It consists of 6 fans, 3 in the front and 3 in the rear. The front fans blow up and the rear fans blow down. A removable air filter is provided above and below each fan unit. Four sensors monitor the cabinet temperature; 3 sensors are inside the cabinet top and 1 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 sensors. When a sensor indicates a change in cabinet temperature, the circuit in a fan changes that fan's speed accordingly.

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

A minor alarm is sent to the processor circuit pack in the PPN cabinet and the maintenance circuit pack in an EPN cabinet if any fan's speed drops below minimum. A minor alarm occurs 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 ^{o}F (65 ^{o}C).

Another cabinet top sensor senses if the exhaust temperature reaches 158 ^{o}F (70 ^{o}C). If so, the system shuts down and the Emergency Transfer is invoked.

Single-Carrier Cabinet Fan Unit

Four constant-speed fans at the top rear of the cabinet receive -48 VDC from the backplane. An air filter is located below the fan unit. Air flows down through the filter over the circuit packs. The filter is removable and is cleaned or replaced when necessary.

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

Compact Single-Carrier Cabinet Fan Unit

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

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

System Protection

Protections are established to keep the DEFINITY System active and on line. The following 4 types of system protection are provided:

- Overvoltage
- Sneak current
- Lighting
- Earthquake

Overvoltage Protection

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

- Analog trunks use the 507B Sneak Protector. Over-voltage protection is normally provided by the local telephone company.
- Analog voice terminals can use 1 of the following types of combined over-voltage and sneak current protection:
  - Carbon block with heat coil for UL code 4B1C
  - Gas tube with heat coil for UL code 4B1E-W

  - — Solid state with heat coil for UL code 4C1S
- DCP and ISDN-BRI terminals use the solid state 4C3S-75 with heat coil protector

Sneak Current Protection

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

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

Lightning Protection

A coupled bonding conductor (CBC) in the cabinet ground wiring protects the system from lightning. The CBC runs adjacent to wires in a cable and causes mutual coupling between itself and the wires. The mutual coupling reduces the potential differences resulting from lightning surges. The conductor can be a
10 AWG (2.5mm) ground wire, a continuous cable sheath surrounding wires within a cable, or 6 unused pairs of wire within a cable, twisted and soldered together.

The CBC connects from the cabinet single-point ground bar in an AC-powered cabinet or the ground discharge bar in a DC-powered cabinet to the terminal bar at the MDF.

When an auxiliary cabinet is provided, a 6 AWG (4.1 mm) wire connects the system cabinet single-point ground block to the Auxiliary cabinet ground block. The ground wire routes as close as possible to the cables connecting the system cabinet to the Auxiliary cabinet.

If equipment is not present in the auxiliary cabinet, the power supply for this equipment plugs into 1 of the 2 convenience outlets on the rear of the multicarrier cabinet to preserve ground integrity. The convenience outlet is fused at 5 A. A dedicated maintenance terminal plugs into the other convenience outlet.

Earthquake Protection

For earthquake or disaster bracing, the cabinets bolt to the floor. Other areas may require additional bracing. Contact your Lucent Technologies representative for earthquake requirements at the location of the system installation.

3 — Cabinets, Carriers, and Circuit Packs

This section describes the cabinets, carriers, and circuit packs, their functions, physical specifications, and interconnections. It also describes minimum cabinet and carrier configurations. The configurations are relative to combinations of cabinet interconnection options and system duplication options.

NOTE:

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

Multicarrier Cabinets

This section describes the processor port network (PPN), expansion port network (EPN), auxiliary cabinet, and AC-power cabinets.

A DC-powered multicarrier cabinet (MCC) can be used as a PPN cabinet and/or an EPN cabinet. Figure 28.

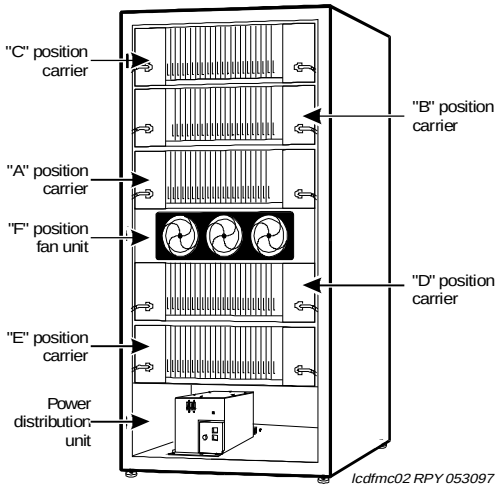

Figure 28. Typical DC-Powered MCC Layout

Cabinets

Doors on the front and rear of the MCC protect the internal equipment and allow easy access to the circuit packs.

Each cabinet contains casters. Leveling feet keep the cabinet from rolling. Each corner of a cabinet can bolt to the floor, if required.

AUX Connector Capacity

The AUX (auxiliary) connector is on the rear of the control carrier. Up to 3 attendant consoles can be powered by the AUX connector in the **A** position in Release 6 cabinets. Only 1 attendant console connects to Release 6vs and 6csi cabinets.

Up to 7 emergency transfer panels can be powered by the AUX connector in the **A** position in Release 6 cabinets. Only 1 Emergency Transfer Panel connects to Release 6vs and 6csi cabinets.

Auxiliary Cabinet (J58886N)

The auxiliary cabinet contains the hardware to install optional equipment. The cabinet allows carrier, rack (width: 23 in.; 58.4 cm), and panel types of mounting. An auxiliary cabinet contains the following:

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

Processor Port Network Cabinet (J58890A)

A processor port network (PPN) cabinet, see Figure 29, contains the following carriers:

- Port carrier (J58890BB) — 1 to 4
- Control carrier (J58890AH) in Release 6si — 1 in all configurations
- Duplicated control carrier (J58890AJ) Release 6si — 1 in high or critical reliability configurations
- Processor carrier (J58890AP) in Release 6r — 1 in all systems, 2 in high reliability and critical reliability systems
- Switch node (SN) 4carrier (J58890SA) in Release 6r with a center stage switch (CSS) — 1 in standard and high reliability systems or 2 in critical reliability systems

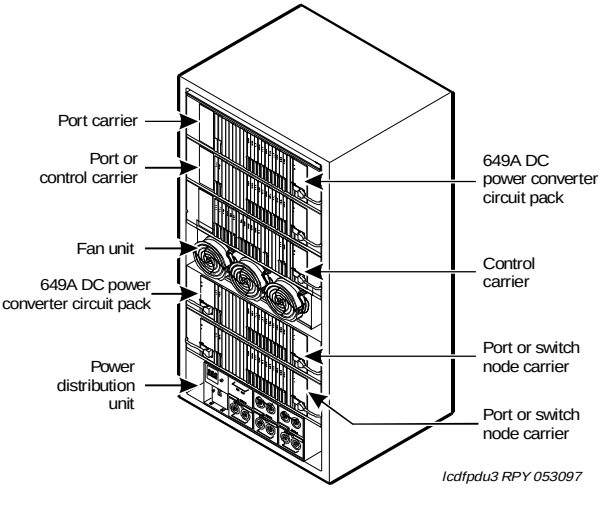

Figure 29. Typical Multicarrier PPN Cabinet (J58890A)

Expansion Port Network Cabinet (J58890A)

An expansion port network (EPN) cabinet, see Figure 30) contains the following carriers:

- Port carrier (J58890BB) — 1 to 4
- Expansion control carrier (J58890AF) — 1
- SN Carrier (J58890SA) in CSS-connected Release 6r systems only: 0, 1, or 2 when required

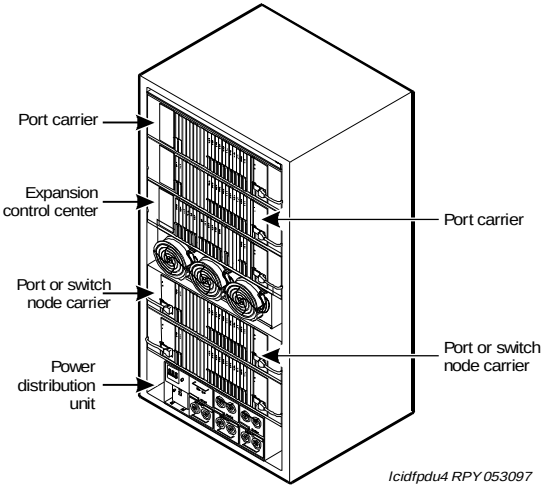

Figure 30. Typical Multicarrier EPN Cabinet (J58890A)

Carriers in MCCs

The following types of carriers can install in MCCs:

- Control carrier (J58890AH) located only in the Release 6si PPN cabinet. Contains SPE circuit packs to perform call processing, maintenance, and administration. These carriers also contain port circuit pack slots.
- Duplicated control carrier (J58890AJ) (optional) located only in Release 6si PPN configuration. Contains duplicate SPE circuit packs to perform call processing, maintenance, and administration identical to the control carrier. The duplicated

control carriers also contain port circuit pack slots. Only Release 6si and Release 6r support duplication (the Release 6r control carriers are used for duplication).

- Port Carrier (J58890AP) located only in the Release 6r PPN cabinets. Contains SPE circuit packs to perform call processing, maintenance, and administration. These carriers do not contain port circuit pack slots. Two J58890AP carriers are in the PPN for high and critical reliability (duplicate processor) systems.
- Port Carrier (J58890BB) (optional) located in the PPN and EPN cabinets. Contains port, service, and tone/clock circuit packs.
- Expansion control carrier (J58890AF) located only in the EPN cabinets. Contains extra port circuit packs, tone-clock, maintenance interface, and EI circuit packs.
- SN carrier (J58890SA) in Release 6r (optional) located in the PPN cabinet and/or EPN cabinets. Contains SNI circuit packs composing the CSS.

Carrier Circuit Pack Slots

There are 2 primary types of circuit pack slots in the carriers:

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

Each port slot attaches to a 50-pin (25-pair) connector on the carrier's rear panel. A cable attaches to each connector and routes to the MDF.

Each slot containing a fiber optic interface circuit pack (EI or SNI) attaches to a 25-pair connector on the carrier's rear panel. A fiber optic transceiver attaches directly to this connector without connecting to the MDF.

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

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

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

NOTE:

Throughout this section, the power units shown in the front views of the carriers are only for example. See Table 37 for a list of power units.

NOTE:

In the following illustrations, a broadband ring generator (BRG) is shown below the power unit slot in certain carriers. This means the power unit slot can include a 50 Hz BRG when optioned for France.

Control Carrier (J58890AH)

The J58890AH is used in Release 6si configurations.

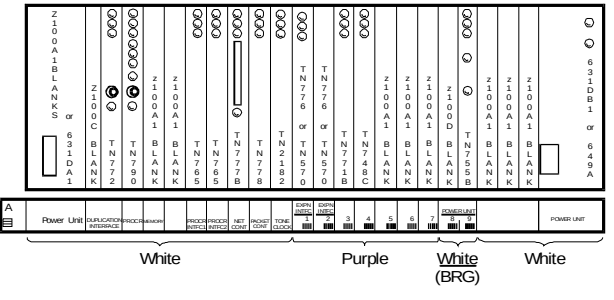

Figure 31. Control Carrier (J58890AH) (Front)

This carrier has dedicated white-colored circuit pack slots that always contain specific control circuit packs. Purple slots contain any port circuit packs. Dual-color slots may contain any port circuit pack or the designated white circuit packs (such as an EI or power unit). AC or DC power units supply power to the carrier. Table 17 describes the connectors on the rear of the control carrier

.

Table 17. Control Carrier (J58890AH) Connectors

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

Duplicated Control Carrier (J58890AJ)

The duplicated control carrier (J58890AJ) is used in the Release 6si configurations. It has dedicated white circuit pack slots that always contain specific control circuit packs. It also has purple circuit pack slots that can be populated with port circuit packs and dual-colored slots that may be populated with port circuit packs or designated white circuit packs (such as an expansion Interface or power unit).

AC or DC power units located at each end of the duplicated control carrier, supply power to the carrier. See Figure 32. See Table 18 for the duplicated control carrier rear connector descriptions.

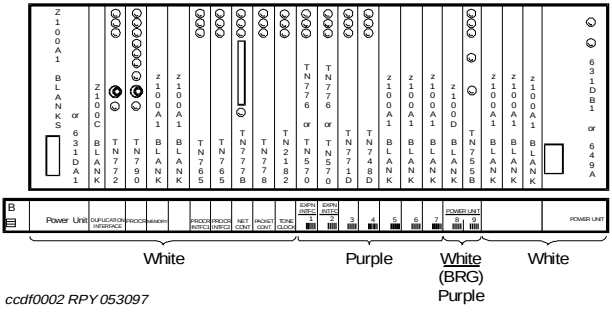

Figure 32. Duplicated Control Carrier (J58890AJ) (Front)

Table 18. Duplicated Control Carrier (J58890AJ) Connectors

Connector	Function
1 to 9 (B1 to B9)	25-pair connectors provide interfaces between port circuit packs and the MDF or fiber transceiver
Terminal	Connects a management terminal to the processor in its duplicated control carrier
P1	Provides position indicator of the carrier and access to alarm and control circuits

Processor Carrier (J58890AP)

The processor carrier is used in Release 6r. It contains only dedicated slots for control circuit packs composing the switch processing element (SPE). It does *not* contain port circuit pack slots. See Figure 33.

AC or DC power units located at each end of the processor carrier, supply the power to the carrier. The processor carrier always contains 3 memory circuit packs and 1 packet interface circuit pack. See Table 19 for the processor carrier rear connector descriptions

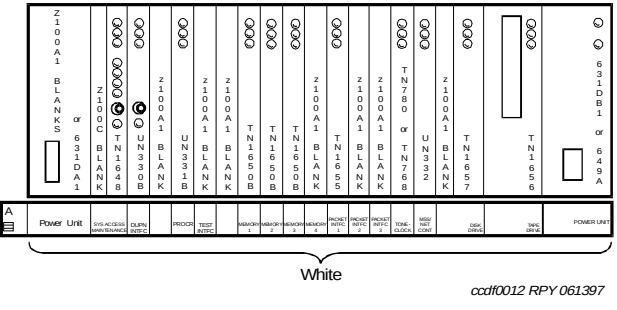

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Figure 33. Processor Carrier (J58890AP) (Front)

Table 19. Processor Carrier (J58890AP) Connectors

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

Port Carrier (J58890BB)

A port carrier, see Figure 34, contains the following circuit packs:

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

See Table 20 for the port carriers rear connector descriptions.

Table 20. Port Carrier (J58890BB) Connectors

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

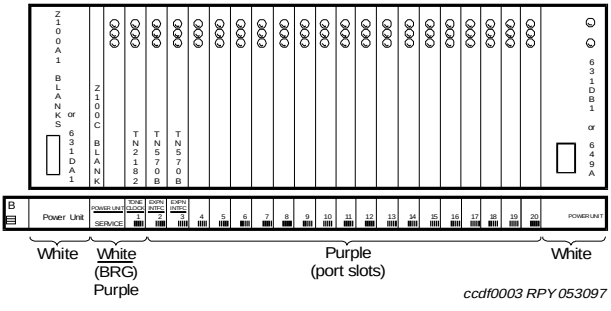

Figure 34. Port Carrier (J58890BB) — Front

Expansion Control Carrier (JC8890AF)

The expansion control carrier contains an EI circuit pack in port slots 1 and 2. It is used in a fiber optic cabling path to another cabinet or the CSS in the same cabinet. These slots may contain optional port circuit packs. See Figure 35.

The expansion control carrier also contains port slots 3 to 19 and the AC or DC power units. The maintenance and tone-clock circuit packs are also shown. An optional neon power unit can be in slots 18 and 19. See Table 21 for the expansion control carrier rear connector descriptions.

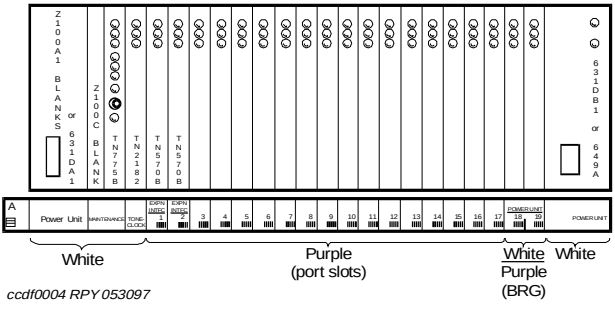

Figure 35. Expansion Control Carrier (J58890AF) (Front)

Table 21. Expansion Control Carrier (J58890AF) Connectors

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

Switch Node Carrier (J58890SA)

The switch node carrier (SN) (J58890SA) is used in Release 6r only. See Figure 36. The SN contains the switch node clock and the SNI circuit packs that compose the CSS. It can contain up to 16 SNI circuit packs; 1 or 2 TN1654 DS1 converter circuit packs and/or an EI circuit pack; and 2 AC or DC power unit circuit packs

The AC or DC power units are located at each end of the SN. TheSN always contains 3 memory circuit packs and 1 packet interface circuit pack. See Table 22 for the SN rear connector descriptions.

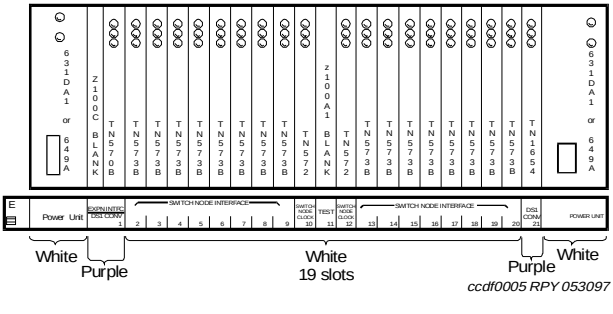

Figure 36. Switch Node Carrier (J58890SA) (Front)

Table 22. Switch Node Carrier (J58890SA) Connectors

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

Single-Carrier Cabinets

This section describes the following types of single-carrier cabinet (SCC)s:

- Basic control cabinet (J58890L) — Release 6si
- Duplicated control cabinet (J58890M) — Release 6si
- Expansion control cabinet (J58890N) — Release 6si and R6r
- Port cabinet (J58890H) — Release 6si and Release 6r
- Compact modular cabinet (CMC) (J58890T) Release 6csi
- Compact control cabinet (J58890S) — Release 6vs
- DC power distribution cabinet

Figure 37 shows a typical SCC. Each SCC has vertical slots that hold circuit packs. A blank faceplate covers each unused slot.

NOTE:

Throughout this section, the power units shown in the front views of the carriers are examples only. See Table 37 for a list of power units.

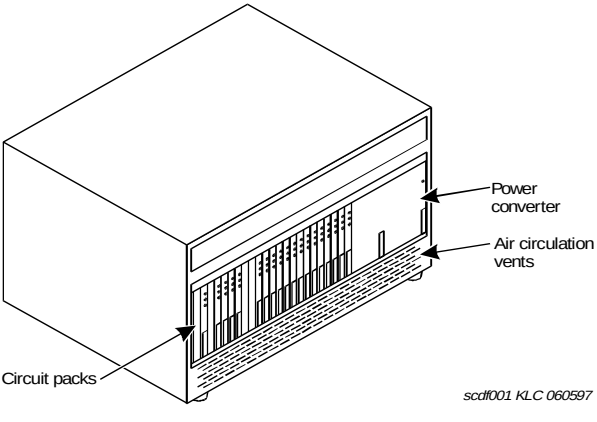

Figure 37. Typical SCC

A maximum of 4 SCCs can stack on top of each other. The cabinet positions 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. The duplicated control cabinet is labeled **B**. See Figure 38.

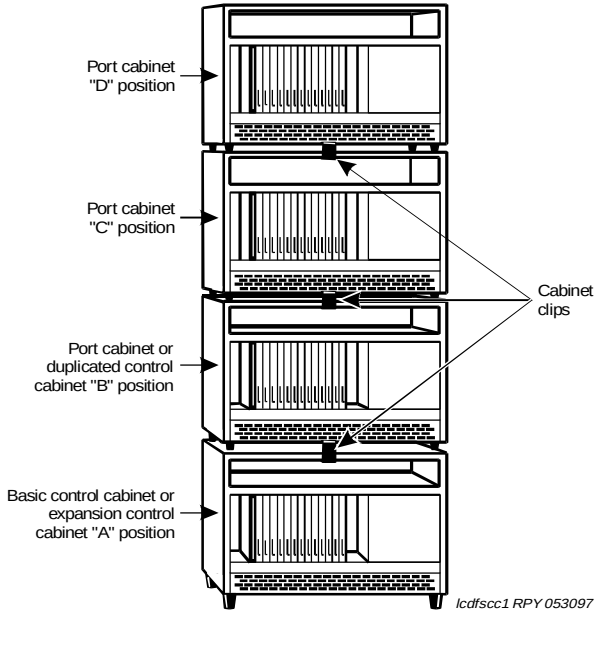

Figure 38. Typical SCC Stack

Each stack of SCCs requires at least 1 basic control cabinet on the bottom of the stack. Three is the maximum number of port cabinets per stack.

Cabinet clips connect the cabinets together. At the rear of the cabinets, a ground plate connects between cabinets for ground integrity. Chapter 2 describes the power and ground requirements for SCCs.

Carrier Circuit Pack Slots

There are 2 types of circuit pack slots in the carriers:

- The Port slots are purple and can accept any purple-labeled circuit pack
- The Control slots are 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 Release 6si attaches to a 25-pair connector on the carrier's rear panel. A cable attaches to each connector and routes to the MDF.

The following apparatus blank faceplates are used:

- 158J (4 inches) (9.2 cm) covers area to left of slot 1 in port cabinets
- 158P (0.75 inches) (1.9 cm) covers any unused slot.
- 158N (0.50 inches) (1.27 cm) used in DEFINITY AUDIX R3 and CallVisor ASAI over the DEFINITY local area network (LAN) gateway R1
- 158G (0.25 inches) (0.63 cm) used with TN755B or TN2202

NOTE:
In the following illustrations, a broadband ringing generator (BRG) is shown below the power unit slot in certain carriers. This means the power unit slot can include a 50 Hz BRG when optioned for France.

Carriers in SCCs

Basic Control Cabinet (J58890L)

The basic control cabinet is in the PPN only. It contains ports, a control complex to perform call processing, and an interface to an optional duplicated control cabinet. It also interfaces to the optional STRATUM 3 Clock. See Figure 39.

The basic control cabinet has dedicated white circuit pack slots that house specific control circuit packs. Purple slots can contain any port circuit packs. Also see Table 23. Dual-colored slots may contain any port circuit pack or the designated white circuit packs (such as an expansion interface or power unit). AC or DC power units supply power to the carrier.

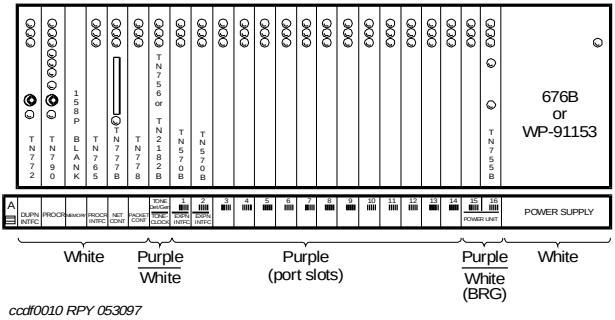

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Figure 39. Basic Control Cabinet (J58890L) (Front)

Table 23. Basic Control Cabinet (J58890L) Connectors

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

Duplicated Control Cabinet (J58890M)

The duplicated control cabinet is optional and is only in the PPN in Release 6si. See Figure 40. This cabinet contains ports, a duplicated control complex, and an interface to a designated expansion control cabinet

The duplicated control cabinet has dedicated white circuit pack slots for designated control circuit packs. The purple circuit pack slots can contain any port circuit packs.

An AC or DC power supply, at the right side of the cabinet, supplies power to the cabinet. The cabinet contains a duplication interface circuit pack in slot DUPN INTFC. See Table 24 for the duplicated control cabinet rear connector descriptions.

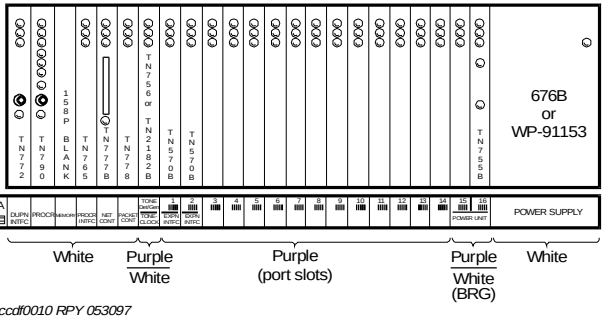

Figure 40. Duplicated Control Cabinet (J58890M) (Front)

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Table 24. Duplicated Control Cabinet (J58890M) Connectors

Connector	Function
01 to 16 (A01 to A16)	25-pair connectors provide interfaces between port circuit packs and the MDF or a cable access panel (if provided)
TERM (Terminal)	Connects an administration terminal to the processor circuit pack in the duplicated control cabinet (in its own cabinet) if the duplication interface circuit pack fails in the control carrier

Expansion Control Cabinet (J58890N)

The expansion control cabinet contains ports, a tone-clock, an interface to a port cabinet, and an optional maintenance interface. It is only in an EPN. See Figure 41.

The expansion control cabinet is the first in an EPN stack of SCCs. It has optional port circuit packs in port slots 2 to 17. The AC or DC power supply, located at the right side of the cabinet, supplies power. See Table 25 for the expansion control cabinet rear connector descriptions

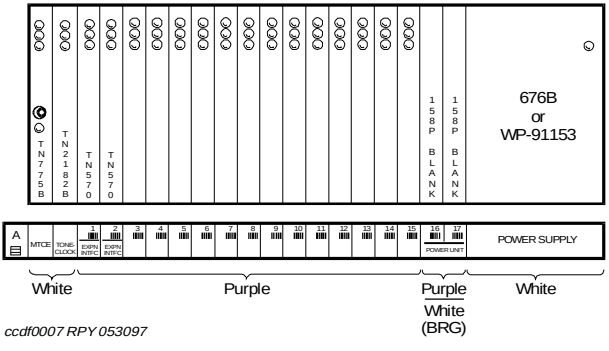

Figure 41. Expansion Control Cabinet (J58890N) (Front)

Table 25. Expansion Control Cabinet (J58890N) Connectors

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

Port Cabinet (J58890H)

The port cabinet is located in the PPN and in EPNs. It contains ports and an interface to an expansion control cabinet. The port cabinet has optional port circuit packs in port slots 1 to 18. Those circuits packs include a tone-clock circuit pack in slot 1, an expansion interface circuit pack in slot 2, and a neon power unit in slots 17 and 18. See Figure 42.

The AC or DC power supply, located at the right side of the cabinet, supplies power to the cabinet. See Table 26 for the port cabinet rear connector descriptions.

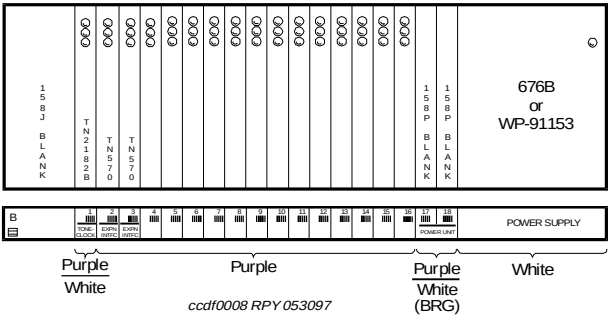

Figure 42. Port Cabinet (J58890H) (Front)

Table 26. Port Cabinet (J58890H) Connectors

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

Compact Single-Carrier Cabinet (J58890S)

The compact single-carrier cabinet (CSCC) (J58890S L8) has a TN778 packet control circuit pack slot. The CSCC can contain optional port circuit packs in slots 1 to 10. See Figure 43.

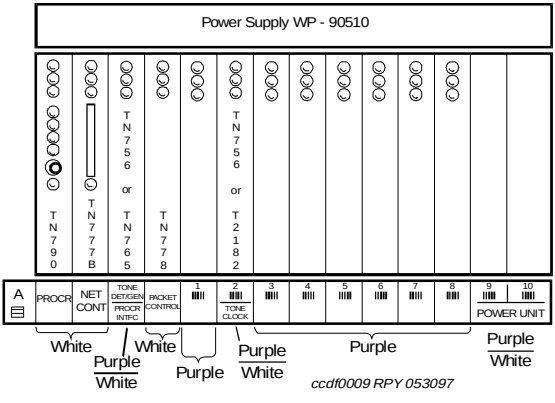

Figure 43. CSCC (J58890S L8) (Front)

The cabinet has 3 dedicated white circuit pack slots equipped with the following designated control circuit packs:

- PROCR slot contains the TN790, the TN796B, or the TN786B processor circuit pack. The J58890S L8 cabinet uses the TN790 or TN796B processor circuit pack. Older versions of cabinets use the TN790, TN796B, or TN786B processor circuit pack.
- NET CONT slot contains the TN777B network control circuit pack
- TONE DET/GEN PROC INTFC slot contains the TN765 processor interface circuit pack or the TN756 tone generator/detector circuit pack or TN2182 tone-clock circuit pack. When the TN765 and the TN756 or the TN765 and TN2182 are used, the TN765 or TN2182 is placed in port slot 2.
- PACKET CONTROL slot containing the TN778 PACCON circuit pack. This slot is on the J58890S L8 cabinets. Older versions do not have this slot. G4V4 Issue 5.0 (and later) or Release 5.2 (and later) software is required to use the TN778 circuit pack and all associated functionality that requires the packet bus (BRI lines, ASAI over BRI, ASAI over the DEFINITY LAN gateway, or PRI over PACCON).
- DEFINITY AUDIX R3 is installed in port slots 7-10

An AC power supply, at the top of the cabinet, supplies power to the cabinet. See Table 27 for the CSCC rear connector descriptions.

Table 27. CSCC (J58890S) Connectors

Connector	Function
1 to 10	25-pair connectors interface between port circuit packs and the MDF or a cable access panel
AUX (auxiliary)	Provides interface for customer alarms, attendant console power, or emergency power transfer panels, and internal modem for remote maintenance
PI (processor interface)	Connects directly to the processor interface circuit pack. Provides a BX.25 protocol interface for communication between the circuit pack and external DCE equipment.
DCE	Connects the processor to CDR equipment, system printer, or an external modem for remote maintenance
TERM (terminal)	Connects to a management terminal

Compact Modular Cabinet (J58890T)

A single site installation can be configured for 1 to 3 compact modular cabinet (CMC)s. A maximum configuration is shown in Figure 44.

NOTE:

The first cabinet installs in the middle position, the second cabinet installs on the bottom, and the third cabinet installs on the top.

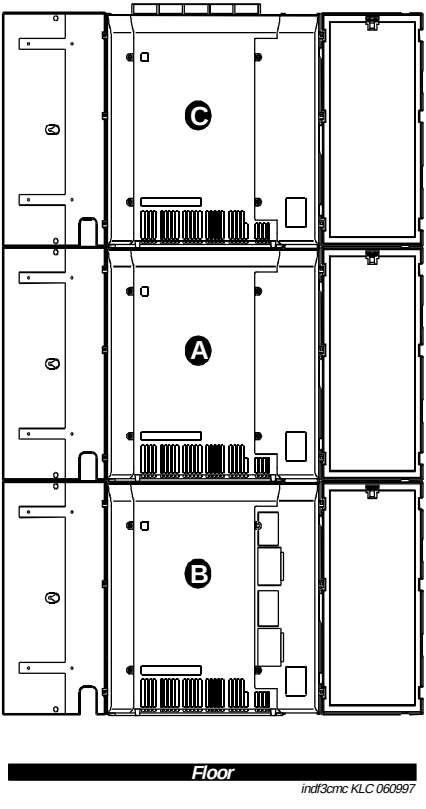

Figure 44. Typical CMC Installation (Front)

The control carrier in the CMC contains 2 dedicated circuit pack slots equipped with designated control circuit packs. The processor is in slot 1 and the tone-clock is in slot 2. Slots 3 to 10 can contain optional port and service circuit packs. See Figure 45.

The second and third cabinets use all 10 slots for optional port and service circuit packs. Power is supplied by an AC power supply at the bottom left of the cabinet.

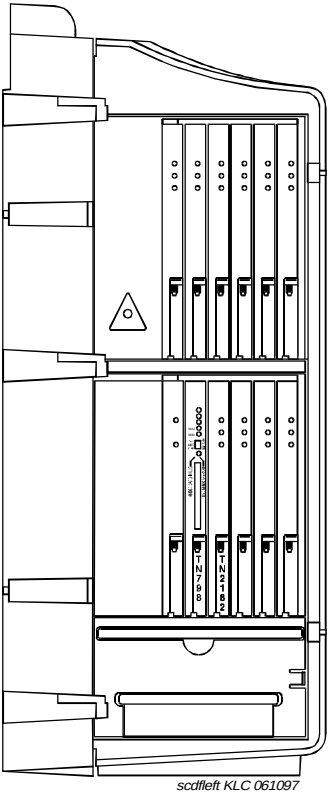

Figure 45. CMC (J58890T) (Left Side)

The connectors on the right side of the cabinet are shown in Figure 46. 1 to 10 25-pair connectors interface between port circuit packs and the MDF or a cable access panel.

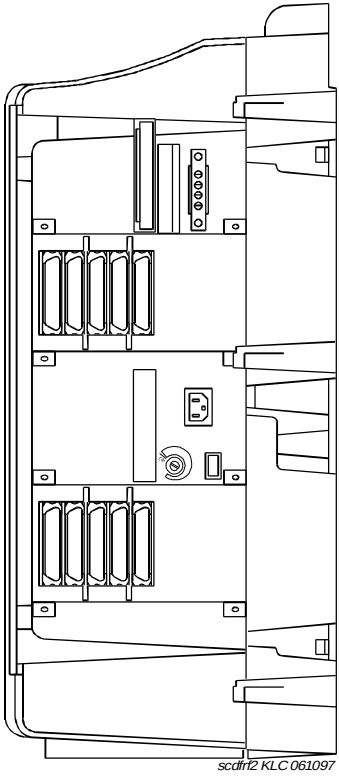

Figure 46. CMC (J58890T) (Right Side)

Minimum Cabinet Configurations

Minimum cabinet configurations in MCCs 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.

NOTE:

The compact modular cabinet and the CSCC cannot be duplicated; but the CMC may be connected to other CMC cabinets.

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

- Tone-clock
- Expansion interface (EI)
- Expansion port network (EPN) maintenance

The following criteria describes a minimum cabinet configuration:

- Cabinet interconnection options (directly connected and CSS-connected)
- System duplication options (standard reliability, high reliability, and critical reliability)
- Traffic engineering to determine the number of port networks

Table 28, Table 29 and Table 30 list the minimum required carriers and circuit packs in PPN and EPN cabinets or cabinet stacks.

Table 28. Minimum Requirements for PPN Cabinet

Duplication Option	Connection Option	Control Carriers	Switch Node Carriers	Tone Clocks
Standard reliability	direct	1	0	1
	CSS (Release 6r Only)	1	0 or 1[1]	1
High reliability	direct	2	0	2
	CSS (Release 6r Only)	2	0 or 1[1]	2
Critical reliability	direct	2	0	2
	CSS (Release 6r Only)	2	0 or 2[1]	2

1. The1st SN is located in the PPN (normal) or EPN. The 2nd and 3rd are located in an EPN to support up to 44 PNs.

Table 29. Minimum Requirements for an EPN Cabinet

Duplication Option	Connection Option	Expansion Control Carriers	Switch Node Carriers	Tone-Clocks	Expansion Interfaces In EPN
Standard reliability	direct	1	0	1	Equals number of PNs
	CSS (release 6r only)	1	0 or 1[1]	1	1
High Reliability	direct	1	0	1	Equals number of PNs
	CSS (release 6r only)	1	0 or 1[1]	1	1
Critical reliability	direct	1	0	2	Twice number of PNs
	CSS (release 6r only)	1	0 or 2[1]	2	2

1. The1st SN is located in the PPN (normal) or EPN. The 2nd and 3rd are located in an EPN to support up to 44 PNs. Up to 3 EPNs can be directly-connected.

Table 30. Minimum Requirements for a Two-PN Multicarrier Cabinet EPN (Release 6r Only)

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

Standard Reliability Systems

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

- One control carrier
- One tone-clock circuit pack per PN
- Port networks interconnected by single cables

Optional carriers in the MCCs are port carriers that can be added as required. In Release 6r, an SN carrier can be added to Position *E* as required. Optional port carriers are determined by traffic engineering.

High Reliability Systems

High reliability is available in Release 6si and Release 6r. These systems require:

- Duplicate control carriers in the PPN cabinet
- Duplicate tone-clock circuit packs in the PPN cabinet
- One tone-clock circuit pack per EPN
- Port networks interconnected by single cables
  - — The PPN requires duplicate connectivity to the switch node
  - — The switch node requires duplicates switch node clocks. The switch node carrier is provided in the PPN cabinet for a CSS-connected Release 6r.

Critical Reliability Systems

Critical reliability systems are available in Release 6si and Release 6r. These systems require:

- Duplicate control Carriers in the PPN cabinet and EPN cabinet
- Duplicate tone-clock circuit packs in the PPN cabinet and EPN cabinets
- Port networks interconnected by duplicated cables
- Duplicate switch node carriers in the CSS (Release 6r only)

NOTE:

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

Directly-Connected Cabinet Configurations

A directly-connected system is connects to another cabinet by metallic or fiber cables and does not connect through a CSS. Each directly-connected system has a maximum of 3 cabinets. In the first cabinet, the EI circuit pack is not required in a single PN (PPN only) system because no connection to another cabinet is required.

NOTE:

Release 6si accommodates up to 3 single-carrier cabinet stacks (1 PPN and 2 EPNs) or 3 MCCs (1 PPN and 2 EPNs).

Standard Reliability Systems

Table 31 lists the required EI circuit pack slots, tone-clock circuit pack slots, maintenance circuit pack slots, and remaining port circuit pack slots in a standard reliability directly-connected system.

Table 31. Standard Reliability Directly-Connected MCC

Port Networks	EIs	Tone-Clocks	Remaining Port Slots	Service Slots (Release 6r and Release 6si
1 PPN only	0	1	89 (Release 6si) 80 (Release 6r)	4 (Depends on traffic)
2 1 PPN and 1 EPN	2	2	186 (Release 6si) 176 (Release 6r)	8 (Depends on traffic)
3 1 PPN and 2 EPNs	6	3	281 (Release 6si) 271 (Release 6r)	12 (Depends on traffic)

High Reliability Systems

High reliability is available on Release 6si and Release 6r only. Table 32 lists the required EI circuit pack, tone-clock circuit pack slots, maintenance circuit pack slots, and remaining port circuit pack slots in a high reliability, directly-connected system. In the first cabinet, the EI circuit pack is not required in a single PN (PPN only) system because no connection to another cabinet is required.

Table 32. High Reliability Directly-Connected MCC

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

Critical Reliability Systems

Critical reliability is available on Release 6si and Release 6r only. Table 33 lists the required EI circuit pack slots, tone-clock circuit pack slots, and remaining port circuit pack slots in critical reliability, directly connected systems. The port carrier in cabinet 1 is optional in systems with only 1 PN, but is required in systems with 2 or 3 PNs.

No EI circuit packs are required for systems with only a PPN because no connection is required to another cabinet. The EI circuit packs shown in cabinet 1 are shown in their Release 6r positions. These are installed in the control carriers in cabinet 1 of Release 6si.

Table 33. Critical Reliability Direct-Connected MCC

Port Networks	EIs	Tone-Clocks	Remaining Port Slots	Service Slots
1 PPN only	0	2	78/59 (Release 6r)	3
1 PPN and 1 EPN	4	4	172/152 (Release 6r)	7
1 PPN and 2 EPNs	12	6	262 (Release 6si) 241 (Release 6r)	11

Cabinet Configurations in a CSS-Connected System

A CSS-connected Release 6r supports up to 44 port networks (PNs).

Standard Reliability Systems

Table 34 lists up to 44 Port Networks (PNs) for a low-traffic, standard reliability CSS-connected system with up to 3 switch nodes (SNs). Standard reliability systems with 1 SN can contain up to 2 DS1 converter circuit packs in the SN. Standard reliability systems can only contain 1 maintenance circuit pack.

In most cases, the maximum number of PNs with 2 and 3 switch nodes may be less than the number given in the tables because traffic considerations will require more than 1 inter-switch node link.

Table 34. Standard Reliability CSS-Connected Systems

Port Networks	Switch Nodes	Port Slots	Service Slots	Expansion Interfaces	Tone-Clocks	Unused Port Slots	Remaining Port Slots
3	1	218	9	3	3	4	214
4	1	317	13	4	4	5	312
5	1	416	17	5	5	6	410
6	1	515	21	6	6	7	508
7	1	614	25	7	7	8	606
8	1	713	29	8	8	9	704
9	1	812	33	9	9	10	802
10	1	911	37	10	10	11	900
11	1	1010	41	11	11	12	998
12	1	1109	45	12	12	13	1096
13	1	1208	49	13	13	14	1194
14	1	1307	53	14	14	15	1292
15	1	1406	57	15	15	16	1390
16	1	1505	61	16	16	17	1488
17	2	1604	65	17	17	18	1586
18	2	1703	69	18	18	19	1684
19	2	1802	73	19	19	20	1782
20	2	1901	77	20	20	21	1880

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Table 34. Standard Reliability CSS-Connected Systems — *Continued*

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

High Reliability Systems

Table 35 lists up to 43 Port Networks (PNs) for a low-traffic, high reliability CSS-connected system. High reliability systems with 1 SN can contain up to 2 DS1 Converter circuit packs in the SN. High reliability systems can only contain 1 maintenance circuit pack.

Table 35. High Reliability CSS-Connected Systems

Port Networks	Switch Nodes	Port Slots	Service Slots	Expansion Interfaces	Tone-Clocks	Unused Port Slots	Remaining Port Slots
3	1	198	10	4	4	5	193
4	1	297	14	5	5	6	291
5	1	396	18	6	6	7	389
6	1	495	22	7	7	8	487
7	1	594	26	8	8	9	585
8	1	693	30	9	9	10	683
9	1	792	34	10	10	11	781
10	1	891	38	11	11	12	879
11	1	990	42	12	12	13	977
12	1	1089	46	13	13	14	1075
13	1	1188	50	14	14	15	1173
14	1	1287	54	15	15	16	1271
15	1	1386	58	16	16	17	1369
16	2	1485	62	17	17	18	1467
17	2	1584	66	18	18	19	1565
18	2	1683	70	19	19	20	1663
19	2	1782	74	20	20	21	1761
20	2	1881	78	21	21	22	1859
21	2	1980	82	22	22	23	1957
22	2	2079	86	23	23	24	2055
23	2	2178	90	24	24	25	2153
24	2	2277	94	25	25	26	2251
25	2	2376	98	26	26	27	2349
26	2	2475	102	27	27	28	2447
27	2	2574	106	28	28	29	2545
28	2	2673	110	29	29	30	2643

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Table 35. High Reliability CSS-Connected Systems — *Continued*

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

In most cases, the maximum number of PNs with 2 and 3 switch nodes may be less than the number given in the tables because traffic considerations will require more than 1 inter-switch node link.

Critical Reliability Systems

Table 36 lists up to 44 port networks (PNs) for a low traffic, critical reliability CSS-connected system. Critical reliability systems with 1 SN can contain up to 4 DS1 converter circuit packs in the SN. Critical reliability systems can contain up to 42 maintenance circuit packs.

Table 36. Critical Reliability CSS-Connected Systems

Port Networks	Switch Nodes	Port Slots	Service Slots	Expansion Interfaces	Tone-Clocks	Unused Port Slots	Remaining Port Slots
3	1	138	9	6	6	9	209
4	1	237	13	8	8	13	304
5	1	336	17	10	10	17	399
6	1	435	21	12	12	21	494
7	1	534	25	14	14	25	589
8	1	633	29	16	16	29	684
9	1	732	33	18	18	33	779
10	1	831	37	20	20	37	874
11	1	930	41	22	22	41	969
12	1	1029	45	24	24	45	1064
13	1	1128	49	26	26	49	1159
14	1	1227	53	28	28	53	1254
15	1	1326	57	30	30	57	1349
16	1	1425	61	32	32	61	1444
17	2	1524	65	34	34	65	1539
18	2	1623	69	36	36	69	1634
19	2	1722	73	38	38	73	1729
20	2	1821	77	40	40	77	1824
21	2	1920	81	42	42	81	1919
22	2	2019	85	44	44	85	2014
23	2	2118	89	46	46	89	2109
24	2	2217	93	48	48	93	2204
25	2	2316	97	50	50	97	2299
26	2	2415	101	52	52	101	2394
27	2	2514	105	54	54	105	2489
28	2	2613	109	56	56	109	2504
29	2	2712	113	58	58	113	2599
30	2	2811	117	60	60	117	2694
31	3	2910	121	62	62	121	2789
32	3	3009	125	64	64	125	2884
33	3	3108	129	66	66	129	2979

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Table 36. Critical Reliability CSS-Connected Systems — *Continued*

Port Networks	Switch Nodes	Port Slots	Service Slots	Expansion Interfaces	Tone-Clocks	Unused Port Slots	Remaining Port Slots
34	3	3207	133	68	68	133	3074
35	3	3306	137	70	70	137	3169
36	3	3405	141	72	72	141	3264
37	3	3504	145	74	74	145	3359
38	3	3603	149	76	76	149	3454
39	3	3702	153	78	78	153	3549
40	3	3801	157	80	80	157	3544
41	3	3900	161	82	82	161	3739
42	3	3999	165	84	84	165	3834
43	3	4098	165	86	86	169	3929
44	3	4197	169	88	88	173	4024

In most cases, the maximum number of PNs with 2 and 3 switch nodes may be less than the number given in the tables because traffic considerations will require more than 1 inter-switch node link.

Cabling to On- and Off-Premises Systems

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

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

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

- The *Main Distribution Frame (MDF)* is the field on which terminations and cross-connections for CO trunks, equipment cabling, and distribution cabling are made.

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

Circuit Packs and Related Hardware

This section describes the circuit packs and related hardware in DEFINITY Systems. The circuit packs are listed by apparatus code in Table 37. After the table, the circuit packs and their functions are provided.

All circuit packs are approximately 8 in. (20 cm) by 13 in. (33 cm). The following connectors attach to 1 end of a circuit pack: 200-pin connector to a *TN*-labeled circuit pack and a 300-pin connector to a *UN*-labeled circuit pack.

Faceplates on the circuit packs are sized to fill the width of a slot, typically 0.75 inches (1.9 cm). A color code on each faceplate identifies the circuit type. Each circuit pack faceplate has a standard pattern of 3 LEDs and indicate the following conditions:

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

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

⚠ CAUTION:

A wrist strap must be worn when handling any circuit pack. A ground jack is provided on each cabinet for this purpose.

Types of Circuit Packs

Four types of circuit packs are 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 install in any purple port slot
2. *Control circuit packs* include processor, memory, network control, disk control, tape control, protocol interfaces, duplication, and maintenance. These circuit packs install in dedicated white slots in the control carrier and do not operate in any other slots.

3. *Service circuit packs* produce and detect tones, synthesize speech, classify calls, record announcements, and allow system access for administration and troubleshooting. These circuit packs install in any purple or white port slot
4. *Power Converter circuit packs* supply DC voltages to port, control, and service circuit packs. Install in dedicated white slots only.

Port Circuit Packs

The components common to all port circuit packs are:

- Bus buffers
- Sanity and control interface (SAKI)
- Microprocessor with external random access memory (RAM)
- Network processing elements (NPEs) or switch conferencing for time division multiplexing in concentration highway (SCOTCH NPE)

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 bus and sends the information to the microprocessor. Conversely, the microprocessor sends control channel information to the SAKI, which sends it to the TDM bus.

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

Microprocessor with External RAM

The microprocessor performs all low-level functions such as scanning for changes and relay operations. In general, the microprocessor carries out commands received from the SPE and reports status changes to the SPE. Some port circuit packs contain more than 1 microprocessor. The external RAM stores control channel information and port-related information.

Network Processing Elements (NPEs)

The NPEs, or a high-density SCOTCH, perform conference and gain-adjustment functions. An NPE (under control from the microprocessor) can connect a port circuit to any TDM bus time slot. Each port circuit pack has from 1 to 6 NPEs or a SCOTCH NPE.

Circuit Packs in DEFINITY

Table 37 lists the circuit packs by apparatus code. After the table, circuit pack functions are detailed.

Table 38 lists the available adjuncts. After the table, adjunct descriptions are detailed.

Table 37. Circuit Packs and Circuit Modules

Apparatus Code	Name	Type
631DA1	AC power unit	Power
631DB1	AC power unit	Power
644A1	DC power unit	Power
645B1	DC power unit	Power
649A	DC power unit	Power
650A	AC power unit	Power
676B	DC power supply	Power
982LS	Current limiter	Power
CFY1B	Current limiter	Power
CPP1	Memory expansion	Control
ED-1E546 (TN2169) (TN2170) (TN566) (TN567)	DEFINITY AUDIX R3 system	Port assembly
ED-1E546 (TN2208) (TN2170)	Call Visor ASAI over the DEFINITY (LAN) Gateway R1	Port assembly
J58890MA-1 (TN800)	CallVisor over the DEFINITY LAN Gateway R2	Port assembly
TN417	Auxiliary trunk	Port
TN419B	Tone-clock	Control
TN420B/C	Tone detector	Service
TN433	Speech synthesizer	Service

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Table 37. Circuit Packs and Circuit Modules — *Continued*

Apparatus Code	Name	Type
TN436B	Direct inward dialing trunk	Port
TN437	Tie trunk	Port
TN438B	Central office trunk	Port
TN439	Tie trunk	Port
TN447	Central office trunk	Port
TN457	Speech synthesizer	Service
TN458	Tie trunk	Port
TN459B	Direct inward dialing trunk	Port
TN464C/D/E/F	DS1 interface - T1, 24 channel - E1, 32 channel	Port
TN465/B/C	Central office trunk	Port
TN467	Analog line	Port
TN468B	Analog line	Port
TN479	Analog line	Port
TN497	Tie trunk	Port
TN553	Packet data line	Port
TN570/B/C	Expansion interface	Port
TN572	Switch node clock	Control
TN573/B	Switch node interface	Control
TN574	DS1 converter - T1, 24 channel	Port
TN577	Packet gateway	Port
TN722B	DS1 tie trunk	Port
TN725B	Speech synthesizer	Service
TN726/B	Data line	Port
TN735	MET line	Port
TN742	Analog line	Port
TN744/B	Call classifier	Service
TN744/C/D	Call classifier - detector	Service
TN746/B	Analog line	Port
TN747B	Central office trunk	Port
TN748/B/C/D	Tone detector	Service
TN750/B/C	Announcement	Service
TN753	Direct inward dialing trunk	Port

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Table 37. Circuit Packs and Circuit Modules — *Continued*

Apparatus Code	Name	Type
TN754/B	Digital line 4-wire DCP	Port
TN755B	Neon power unit	Power
TN756	Tone detector	Service
TN758	Pooled modem	Port
TN760B/C/D	Tie trunk	Port
TN762B	Hybrid line	Port
TN763B/C/D	Auxiliary trunk	Port
TN765	Processor interface	Control
TN767B/C/D/E	DS1 interface - T1, 24 channel	Port
TN768	Tone-clock	Control
TN769	Analog line	Port
TN771D	Maintenance/test	Service
TN772	Duplication interface	Control
TN773	Processor	Control
TN775/B	Maintenance	Service
TN776	Expansion interface	Port
TN777/B	Network control	Control
TN778	Packet control	Control
TN780	Tone-Clock	Control
TN786	Processor	Control
TN786B	Processor (G3V4)	Control
TN787F/G	Multimedia interface	Service
TN788B	Multimedia voice conditioner	Service
TN789	Radio controller	Control
TN790	Processor	Control
TN796B	Processor (G3V4)	Control
TN798	Processor	Control
TN1648	System access/maintenance	Control
TN1650B	Memory	Control
TN1654	DS1 converter - T1, 24 channel/E1, 32 channel	Port
TN1655	Packet interface	Control
TN1656	Tape drive	Control

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Table 37. Circuit Packs and Circuit Modules — *Continued*

Apparatus Code	Name	Type
TN1657	Disk drive	Control
TN2135	Analog line	Port
TN2136	Digital Line 2-wire DCP	Port
TN2138	Central office trunk	Port
TN2139	Direct inward dialing trunk	Port
TN2140/B	Tie trunk	Port
TN2144	Analog line	Port
TN2146	Direct inward dialing trunk	Port
TN2147/C	Central office trunk	Port
TN2149	Analog line	Port
TN2180	Analog line	Port
TN2181	Digital line 2-wire DCP	Port
TN2182/B	Tone-clock -tone detector and call classifier	Control
TN2183	Analog line	Port
TN2184	DIOD trunk	Port
TN2185	ISDN-BRI 4-wire S/T-TE interface	Port
TN2198	ISDN-BRI 2-wire U-LT interface	Port
TN2199	Central office trunk	Port
TN2202	Ring generator	Power
TN2224	Digital line, 24-port, 2-wire DCP	Port
TN-PRI/BRI	PRI to BRI converter	Port
UN330B	Duplication interface	Control
UN331B	Processor	Control
UN332	Mass storage/network control	Control
WP-90510	AC power supply (CSS)	Power
WP-91153	AC power supply (single-carrier cabinet)	Power
TNCCSC-1	CCSC-1 PRI to DASS converter	Port
TNCCSC-2	CCSC-2 ISDN PRI to DPNSS converter	Port

631DA1 AC Power Unit

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

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

631DB1 AC Power Unit

The 631D B1 accepts 120 VAC 60 Hz and produces –48 VDC at 8 A and –5 VDC at 6 A available on the carrier backplanes. The –48 VDC also supplies power to the cabinet fans.

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

644A1 DC Power Unit

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

645B1 DC Power Unit

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

649A DC Power Unit

The 649A power converter converts a –48 VDC input into outputs of –48 VDC at 10 A, +5 VDC, and –5 VDC at 6 A. The outputs are distributed to circuit pack slots in the carriers. Only one 649A converter is required per carrier except for SN carriers. SN carriers require 2 converters; 1 on each end. The use of the 649A also allows an increase in the number of terminals supported per carrier.

The 649A is not compatible with the 644A or the 645B power converters and is used in Release 6 systems.

650A AC Power Unit

The 650 A is a global power-factor-corrected AC/DC converter providing multiple DC outputs and AC ring outputs. The unit is autoranging and accepts 85-264 VAC, 47-63 Hz AC input, and provides 270 Watts total output. The unit contains multiple DC outputs as follows:

- +5.1 VDC, 28 A
- –5.1 VDC, 1.0 A
- –48 VDC, 4.5 A
- +8 to +14 VDC, 1.6 A (fan speed control)
- –150/–115 VDC, 200 mA (neon bus)

The power unit has 3 switch-selectable ring outputs:

- 85 VAC RMS, 80 mA, 20 Hz, centered about –48 VDC, 180 mA
- 72 VAC RMS, 8 to 80 mA, 25 Hz, centered about –48 VDC, 180 mA
- Two 28 VAC RMS (56 V eff), 220 mA, 50 Hz biased about –48 VDC and 0 VDC, 70 mA balanced

The fan speed is controlled by the +8 to +14 VDC (+12 VDC nominal). The output voltage is a function of the ambient inlet air temperature at the bottom of the power supply. The fan output voltage is +14 VDC if the FANALM signal is active.

676B DC Power Supply

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

982LS Current Limiter

The 982LS connects to the rear of the processor circuit pack slot only in the PPN in Release 6si. The 982LS provides current-limited accessory 48 VDC, emergency transfer logic, current-limited 5 VDC to trip main circuit breaker if high temperature is detected, and duplicated 48 VDC to fans in the PPN cabinet.

CFY1B Current Limiter

The CFY1 is only in: Release 6r PPNs, MCC EPNs, and single-carrier cabinet EPNs. 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.

CPP1 Memory Expansion

The CPP1 memory expansion circuit pack is not used in Release 6 systems.

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

The DEFINITY AUDIX R3 system allows a person to record and exchange voice messages over the telephone when direct communication is inconvenient or unnecessary. The unit installs in 5 adjacent slots in a carrier and contains 8 ports (2 ports are used for each voice terminal).

The TN566/B Alarm and TN567 multifunction circuit pack holds the CPU, controllers, memory devices, and signal processors. TN566/B circuit pack operates with the TN2169 alarm circuit pack to provide monitoring for system power and environmental status, –48 VDC to +12 VDC power conversion for the disk drive and tape drive, and remote terminal access. The TN2170 alarm circuit pack provides a connection to an external LAN in addition to all of the functions provided by the TN2169.

The 160 Mbyte or 600 Mbyte tape drive data cassette recorder distributes software onto a disk, stores periodic backups of data, installs software releases, and removes core dumps and other maintenance information. A 148, 248, 456, 800 Mbyte, or 1 Gbyte disk drive stores customer data, boots the system, and logs system error information. Depending on the disk drive sizes, the unit can handle from 300 to 2000 local and remotely administered subscribers.

Refer to the *DEFINITY AUDIX System, System Description*, 585-300-205, for more information.

ED-1E546 —CallVisor ASAI Over the DEFINITY LAN Gateway R1 (TN2208 and TN2170)—All Except Release 6csi

Provides a direct connection between a DEFINITY LAN gateway R1 system and an ethernet LAN for transport of ASAI links. This unit installs in 5 adjacent slots in a carrier; preferably, the 5 rightmost slots.

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

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

Refer to the *DEFINITY ECS Release 6—Installation, Administration, and Maintenance of CallVisor ASAI Over the DEFINITY LAN Gateway Issue 2* 555-230-223, for more information

J58890MA-1 CallVisor ASAI Over the DEFINITY LAN Gateway R2—All Except Release 6csi

The J58890MA-1 platform is a processor carrier connected to a DEFINITY circuit pack that allows direct integration of PC-based applications into DEFINITY port slots. The J58890MA-1 provides connection between the applications and 10 base-T Ethernet LANs. The platform is based on industry-standard interfaces and busses and accommodates industry-standard PC subsystems such as pentium processors and peripheral devices such as ISA/PCI expansion boards.

The platform also connects industry-standard and peripheral devices with DEFINITY busses and system interfaces. Embedded applications on the platform can run in either native or non-native mode, depending on application.

The J58890MA-1 provides a direct connection between a DEFINITY LAN gateway R2 system and an ethernet LAN for transport of ASAI links.

The unit installs in 2 adjacent slots in a carrier.

TN417 Auxiliary Trunk — Non-United States

The TN417 is replaced by the TN763D auxiliary trunk circuit pack.

TN419B Tone-Clock — Italy, Australia, United Kingdom

The TN419B is replaced by the TN2182 tone clock - tone detector and call classifier circuit pack.

TN420C Tone Detector

The TN420C is replaced by the TN2182 tone clock - tone detector and call classifier or the TN744D call classifier - Detector circuit pack.

TN429/B DIOD Trunk — Japan

The TN429/B provides 8 ports for direct inward/outward dialing (DIOD) trunks. Each port provides a 2-wire interface to the central office (CO) public exchange for incoming and outgoing calls. This circuit pack is required for the Japan ANI feature where the calling number passes through to the DEFINITY System. An in-band detector/converter may be required. Contact your Lucent Technologies representative.

The TN429B is used with service circuit packs providing tone generation and tone detection. Upon seizing out, dial tone from the CO passes through the TN429B to a tone detector. The TN429B provides the required CO disconnect functions.

TN433 Speech Synthesizer — Italy

The TN433 provides 4 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 µ-Law and A-Law companding.

TN436B Direct Inward Dialing Trunk — Australia

The TN436B provides 8 ports for direct inward Dialing (DID) independently connected to a public network. Each port is an interface between a 2-wire analog line from a CO and the 4-wire TDM network in the system. The TN436B has administrable timers.

TN437 Tie Trunk — Australia

The TN437 is replaced by the TN760D tie trunk circuit pack.

TN438B Central Office Trunk

The TN438B provides 8 ports for loop-start CO trunks. Each port has tip and ring signal leads. The TN438B can detect 12 kHz and 50 Hz periodic metering pulses from the CO. Additional features include call still held timing and automatic guard fault detection circuitry.

TN439 Tie Trunk — Australia and Japan

The TN439 provides 4 ports for 2-wire tie trunks with loop disconnect signaling. The TN439 has administrable A-Law and μ-Law companding and administrable timers.

TN447 Central Office Trunk — United Kingdom

The TN447 is replaced by the TN2147 central office trunk circuit pack.

TN457 Speech Synthesizer — United Kingdom

The TN457 provides 4 ports that retrieve fixed United Kingdom-accent spoken messages for leave word calling, automatic wakeup, and visually impaired attendant console features. Examples of messages are: good morning, time-of-day, and extension number. Each of the ports has touch-tone detection. The TN457 has administrable A-Law and μ-Law companding.

TN458 Tie Trunk — United Kingdom

The TN458 is replaced by the TN760D tie trunk circuit pack.

TN459B Direct Inward Dialing Trunk — United Kingdom

The TN459B provides 8 ports for immediate-start or wink-start direct inward dialing (DID) trunks. Each port has tip and ring signal leads. Each port is an interface between a 2-wire analog line from a CO and the 4-wire TDM network in the system. The TN459B has administrable timers and a backward busy circuit that complies with signaling requirements.

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

The TN464C and later suffix circuit packs support Digital Signal Level 1 (DS1) rate (24 channel) and E1 rate (32 channel) digital facility connectivity. All TN464 suffixes support CO, Tie, DID, and Off Premises Station (OPS) port types using the robbed-bit signaling protocol, the

proprietary Bit-Oriented Signaling (BOS) 24th channel signaling protocol, and the DMI-BOS 24th channel signaling protocol. The circuit packs also support ISDN-PRI connectivity T1 or E1. For ISDN-PRI applications, the signaling (D) channel is connected from the TN464 to the TN778 packet control and the TN765 processor interface (Release 6si and Release 6vs) or TN1655 packet interface (Release 6r) via the LAN bus.

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

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

The TN464F and later suffix can communicate with CONVERSANT®. The TN464F and later uses the enhanced maintenance capabilities of the enhanced Integrated channel service unit (ICSU) feature.

Protocols for channel associated signaling for multiple countries are available. For more information, contact your Lucent Technologies representative.

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

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

The TN465 provides 8 analog CO trunk ports and uses loop-start trunk signaling, 12 kHz and 16 kHz periodic pulse metering (PPM) detection and counting, and administrable timers. The TN465B provides battery reversed signaling. The TN465C provides multi-country selectable signaling. For more information, contact your Lucent Technologies representative.

TN467 Analog Line — United Kingdom and Australia

The TN467 is replaced by the TN2183 analog line circuit pack.

TN468B Analog Line — United Kingdom and Australia

The TN468B is replaced by the TN2183 analog line circuit pack.

TN479 Analog Line

The TN479 has 16 ports and supports 3 ringer loads and 3 simultaneous ringing ports. Only 1 voice terminal can have an LED message waiting indicator (neon message waiting indicators are not supported). The TN479 also supports μ-Law companding.

Terminal types supported include: 500-Type, 2500-Type, 7100 Series, 8102- Type, 8110-Type, and 9100 Series. The maximum range (using 24 AWG wire) (0.5 mm) with the 500-Type, 2500-Type, and 7102A terminals is 3,000 feet (914 m). The maximum range with the 8100-Series and 9100-Series terminals is 2,500 feet (762 m).

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

TN497 Tie Trunk — Italy

The TN497 provides 4 ports for 2-wire tie trunks with loop disconnect signaling. Each port can be administered for A-Law and μ-Law companding, timers, Translatore Giunzione Uscente (TGU) (outgoing tie), Translatore Giunzione Entrante (TGE) (incoming tie), and Translatore Giunzione Interno (TGI) (internal tie).

TN553 Packet Data Line — Release 6r Only

The TN553 has 12 ports that can connect through an MDF to a TN726B circuit pack and provides software-administrable connections between the switch processing element (SPE) and system access ports. Inside the system, the TN553 connects to the packet bus and converts mode-2 protocol to mode-3 protocol connecting the TN726B to the TDM bus for asynchronous Electronic Industries Association (EIA) connections to adjuncts.

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

The TN556 has 12 ports connecting to ISDN-BRI terminals. Each port on a TN556 has TXT, TXR, PXT, and PXR signal leads. Up to 8 ports can be used for adjunct switch application interface (ASAI) links. Each port operates at 192 kbps per second and has 2 B-channels and 1 D-channel (not used to carry data).

The TN556 requires a packet control circuit pack (TN778) when used in Release 6si systems or packet bus-equipped Release 6vs systems.

The TN556 has a range of up to 3300 feet (1005 m) maximum from the system to the voice terminal (22 AWG wire 0.643 mm) and uses standard protocol ANSI T1.605. The TN556 also has multipoint support;

24 terminals can be connected, where each terminal uses 1 B-channel and shares the D-channel. In multi-support applications, 2 voice terminals, or 1 voice terminal and 1 data terminal, or 2 data terminals can connect to each port.

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

The TN556C is required by Release 6csi.

TN570/B Expansion Interface

The TN570 expansion interface (EI) is used in Release 6si and Release 6r systems. This circuit pack is an interface between the TDM bus and packet bus, and fiber optic links interconnecting cabinets. It is used in a port network (PN) between a PN and another PN in a directly-connected system, and between a PN and an SNI in a switch node carrier in a CSS-connected system.

The TN570 provides control channel applications and time-slot interchanging between the PPN and EPNs. It is used when ISDN-BRI and/or ASAI is connected in an EPN, and is always used in Release 6r.

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

TN572 Switch Node Clock

The TN572 distributes the timing signals that synchronize the SN carrier in Release 6r. The TN572 also receives maintenance data.

TN573/B Switch Node Interface

The TN573 switch node interface (SNI) routes circuit, packet, and control messages in Release 6r. The TN573 is an interface (installed in an SN carrier in a CSS that terminates a fiber optic link from a SNI in an SN carrier to an SNI in another SN carrier, an EI in a PPN, and an EI in an EPN. One TN573 is used per PN and supports the TN574 DS1 converter circuit pack.

The TN573B and higher provides an interface to the single-mode fiber optic transceiver and supports the TN1654 and TN574 DS1 converter circuit pack.

TN574 DS1 Converter — T1, 24 Channel (Release G3rV4 only)

The TN574 is replaced by TN1654 in R5 and later.

TN577 Packet Gateway — Release 6r Only

The TN577 packet gateway (PGATE) provides 4 RS-423 physical ports for X.25 protocol interfaces between the system and adjuncts. In this application, PGATE functions as the data communications interface unit providing protocol conversion between the X.25 protocol and the mode 3 protocol carried across the LAN Bus.

The X.25 protocol (Levels 1 and 2) are terminated and the data reformatted into the ISDN packet mode protocol for transport across the LAN bus. Supported adjuncts include AUDIX, CMS, and message server adjunct (MSA).

The TN577 also supports the distributed communications system (DCS) environment by providing X.25 signaling through 1 of the RS-423 physical ports, or back through the system using the TDM Bus to the appropriate DS1 or tie trunk circuit pack.

TN722B DS1 Tie Trunk

This circuit pack is replaced by the TN767 DS1 Interface circuit pack.

TN725B Speech Synthesizer — United States

The TN725B has 4 ports that send voice message information to voice terminals to activate leave word calling, automatic wakeup, voice message retrieval, and Do Not Disturb features. The ports can detect tones.

TN726/B Data Line

The TN726B has 8 serial asynchronous EIA ports with modem interfaces connected through asynchronous data units (ADUs) to EIA ports (such as RS-232) on 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, a TN726B connects through an MDF to a TN553 packet data Line circuit pack. The TN553 then converts mode 2 protocol to mode 3 protocol transferring the TN726B from the packet bus to the TDM bus for EIA connections.

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

TN735 MET Line

The TN735 has 4 ports that connect to multi-button electronic telephone (MET) sets. Each port has tip and ring (analog voice) and BT, BR, LT and LR (digital signals to control terminals) signal leads.

TN742 Analog Line

The TN742 is replaced by the TN746B analog line circuit pack.

TN744/B Call Classifier

The TN744 has 8 tone detectors used in vector prompting, outgoing call management (OCM), and call prompting applications in the United States and Canada. The TN744 detects special intercept tones used in network intercept tone detection in OCM. The TN744 also detects tones when a CO answers a call. The TN744 does not classify data calls. Instead, a tone detector circuit pack classifies the calls. If the TN744 does not classify the call within 60 seconds, it is removed from the call and timed far-end supervision classifies the call.

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

TN744C Call Classifier — Detector

The TN744/B/C circuit pack has 8 ports of tone detection on the TDM bus. The TN744/B/C does not support call progress tone generation or clocking.

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

TN744D Call Classifier — Detector — Multi-Country

The TN744D circuit pack has 8 ports of tone detection on the TDM bus. The TN744D does not support call progress tone generation or clocking.

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

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

TN746/B Analog Line

The TN746/B has 16 ports. Each port supports 1 voice terminal, such as 500 (rotary dial) and 2500 terminals (DTMF dial). LED message waiting indicators are not supported off premises. The TN746 does not support neon message waiting indicators. Auxiliary equipment, such as answering machines, modems, and amplifier handsets, is not supported.

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

The TN746/B, along with a TN755B neon power unit per carrier or per single-carrier cabinet, supports voice terminals equipped with neon message waiting indicators (on-premises use only). The TN746/B supports 3 ringer loads, only 1 voice terminal can have an LED or neon message waiting indicator. The TN746/B is an interface between analog voice terminal lines and the TDM/packet bus and consists of a ringing application circuit and port I/O circuits. The TN746B allows a maximum of 8 simultaneous ports ringing.

The TN746 supports μ-Law companding but not administrable timers. TN746C and later supports A-Law and μ-Law companding and administrable timers. The TN746 supports queue warning level lights associated with the DDC and UCD features, recorded announcements associated with the Intercept Treatment feature, and PagePac paging system for the Loudspeaker Paging feature. Additional support is provided for external alerting devices associated with the TAAS feature, neon message waiting indicators, and modems. Secondary lightning protection is provided on the TN746B only. The TN746B supports up to 8 simultaneous ports ringing.

Terminals supported by the TN746 include: 500-Type, 2500-Type, 7102A Series (not 7101A or 7103A), 8102-Type, and 8110-Type terminals. Terminals supported by the TN746B include: 500-Type, 2500-Type, 7100 Series, 8102-Type, 8110-Type, and 9100 Series terminals.

For TN746, the maximum range (using 24 AWG wire) (0.5 mm) with 500-Type, 2500-Type, and 7102A terminals is 3100 feet (945 m). The maximum range with 8100-series terminals is 2500 feet (762 m). For TN746B, the maximum range with 500-Type, 2500-Type, and 7100 Series terminals is 20,000 feet (6096 m). The maximum range with 7101A/7103A terminals is 15,200 feet (4633 m). The maximum range with 8100-series and 9100-series terminals is 12,000 feet (3657 m).

TN747B Central Office Trunk

The TN747B has 8 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 connect to a PagePac paging system. The TN747B supports the abandoned call search feature in automatic call distribution (ACD) applications (if the CO has this feature). Vintage 12 or greater of the TN747B also provides battery reversed signaling.

TN748/B/C/D Tone Detector

The TN748/B/C/D is replaced by the TN2182 tone clock - tone detector and call classifier and the TN744C call classifier circuit pack.

TN750/B Announcement

The TN750 and TN750B record and store announcements to be played back on demand as part of a calling feature. The TN750 has sampling rates of 16, 32, or 64 kbps. The TN750 records announcement times of up to 2 minutes and 8 seconds at 8kbps, 4 minutes and 16 seconds at 32 kbps, and 8 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 8

maximum minutes total. The TN750B has 16 channels and each can play any announcement. Up to 25 call connections can listen to each channel. This means a total simultaneous call capacity of 400 calls in Release 6si. 256 callers can connect to each channel in Release 6r.

TN750C Announcement

The TN750C Announcement circuit pack records and stores announcements that can be played back on demand as part of a calling feature. Equipping 10 circuit packs in a system provides a total capacity of 42.6 minutes (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 85.3 minutes. Use of multiple circuit packs allows a more efficient method of providing many kinds of announcements and provides improved management of integrated announcements.

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 supports all the features of the TN750B and contains non-volatile memory to provide internal backup of announcements on the circuit pack. This eliminates the need for a 30-40 minute restore/download process after a power failure or system reload.

TN753 Direct Inward Dialing Trunk

The TN753 has 8 ports used for immediate-start and wink-start direct inward dialing (DID) trunks. Each port has tip and ring signal leads. For the Czech Republic of Slovakia and the Commonwealth of Independent States, vintage 17 (or greater) is required. The TN753 supports A-Law and μ-Law companding with vintage 17 (or greater).

TN754/B — Digital Line — 4-Wire DCP

The TN754/B has 8 asynchronous 4-wire DCP ports that can connect to 7400-series and 8400-series digital voice terminals, attendant consoles, or data modules. The TN754B has administrable A-Law and μ-Law companding. The TN754B supports the 8400-series terminal types. The maximum range of the 7400-series terminals using 24 AWG wire (0.5 mm) is 3,500 feet (1067 m).

A TN755B neon power unit is required for each carrier where neon message waiting indicators are connected.

TN755B Neon Power Unit

The TN755B produces 150 VDC to operate neon message waiting lights on terminals connected to TN746B analog line circuit packs.

This circuit pack and the neon message waiting function are not available on systems using the TN2202 ring generator circuit pack for France balanced-ringing.

TN756 Tone Detector

The TN756 is replaced by the TN2182 tone clock - tone detector and call classifier circuit pack.

TN758 Pooled Modem

The TN758 has 2 conversion resources ports (such as a trunk data module) for switched connections between digital data endpoints (data modules) and analog data endpoints (modems). The TN758 supports μ-Law companding only.

TN760B/C/D Tie Trunk

The TN760D has 4 ports used for Type 1 or Type 5 four-wire E & M lead signaling tie trunks, that can be automatic, immediate-start, wink-start, and delay-dial. Each port on a TN760D has T, R, T1, R1, E, and M signal leads. The TN760D provides release link trunks required for the CAS feature and has administrable A-Law and μ-Law companding.

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

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

TN762B Hybrid Line

The TN762B has 8 ports connecting to multi-appearance hybrid analog and digital voice terminals. It can connect to 7300-series telephones, an MDC-9000 (cordless telephone), and an MDW-9000 (cordless telephone with separate base station and charging stations).

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

TN763B/C/D Auxiliary Trunk

The TN763B/C/D has 4 ports. Each port has T, R, SZ, SZ1, S, and S1 signal leads. The circuit pack is used for on-premises applications such as music-on- hold, loudspeaker paging, code calling, and recorded telephone dictation access. The TN763C supports external recorded announcement equipment.

The TN763D is administrable to select A-Law or μ-Law companding.

TN765 Processor Interface — All Except Release 6r and Release 6csi

The TN765 has 4 data links to the TDM bus and a link through the memory bus to the processor. The TN765 is an interface to the DCS, ISDN, and AUDIX interface service. The TN765 allows direct access to 1 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 TN754 circuit and a 7400D data module to access a message service adjunct (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 link access procedure on the D-Channel (LAPD) protocols. The MCC supports 2 TN765 circuit packs using a total of 8 data links. Single-carrier cabinets and CSSs support only 1 TN765 circuit pack using 4 data links. The CMC does not support the TN765 circuit pack.

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

The TN767B and later suffix circuit packs support DS1 rate digital facility connectivity. The circuit packs support CO, Tie, DID, and off-premises stations (OPS) port types using the robbed-bit signaling protocol. These circuit packs also support ISDN-PRI connectivity in Release 6. For these applications, the signaling *D* channel can connect from the TN767 to the TN765 processor interface by a permanent switched call over the TDM bus.

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

The TN767E and later is required to communicate with CONVERSANT and for the enhanced maintenance capabilities of the 120A enhanced integrated channel service unit (ICSU) feature.

DS1 tests include loopback tests at the DS1 board edge or the 120A (if used), bit error rate (BER) loopback tests at the far-end CSU, and BER 1-way DS1 facility tests. Other tests include loopback testing specifically designed to locate DS1 facility faults.

TN768 Tone-Clock—All Except Release 6csi

The TN768 is replaced by the TN2182 tone clock - tone detector and call classifier circuit pack.

TN769 Analog Line

The TN769 has 8 ports, each with tip and ring signal leads. The TN769 supports on-premises or off-premises wiring (with certified protection equipment) with either touch-tone or rotary dialing and with or without LED or neon message waiting indicators. The message waiting indicators are not supported off premises. The TN769, along with a TN755B neon power unit per carrier or per single-carrier cabinet, is required to support neon message waiting indicators.

The TN769 supports 3 ringer loads, such as 3 voice terminals with 1 ringer load each. Only 1 voice terminal can have an LED or neon message waiting indicator. The TN769 supports up to 4 simultaneous ports ringing, provides secondary lightning protection, and supports μ-Law companding. The TN769 supports queue warning level lights associated with the DDC and UCD features.

These circuit packs support recorded announcements associated with the intercept treatment feature, dictation machines associated with the recorded telephone dictation access feature, and the PagePac paging system for the loudspeaker paging feature. Additional support is

provided for external alerting devices associated with the trunk answer any station (TAAS) feature and modems.

The TN769 supports 500-Type, 2500-Type, 7100 Series, 8102-Type, 8110-Type, and 9100-Series terminals. The maximum range (using 24 AWG wire) (0.5 mm) with 500-Type, 2500-Type, and 7102A terminals is 20,000 feet (6096 m). The maximum range with 7101A and 7103A terminals is 15,200 feet (4633 m). The maximum range with 8100-series and 9100 Series terminals is 10,000 feet (3048 m).

TN771D Maintenance/Test

The TN771D performs maintenance functions. These functions include packet bus reconfiguration that allows diagnosis and correction of recoverable packet bus failures before the link access procedure on the D-channel (LAPD) links fail. LAPD is a link-layer protocol on the ISDN-BRI and ISDN-PRI data link layer (level 2). LAPD provides data transfer between 2 devices and error and flow control on multiple logical links. It recovers packet bus failures involving up to 3 malfunctioning leads (1 or 2 data or parity leads and 1 control lead) by swapping spare leads with the malfunctioning leads.

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

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

TN772 Duplication Interface

The TN772 selects the active switch processing element (SPE) (control complex) in high reliability and critical reliability systems in Release 6si. The TN772 also coordinates the interchange of SPEs.

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

TN775/B Maintenance

The TN775 and TN775B are used in maintenance and monitor power failure signals in an EPN cabinet in Release 6si and Release 6r. These circuit packs also monitor the clock, monitor and control the power supplies and battery charger, and monitor air flow and high temperature sensors. These circuit packs provide 2 serial links to communicate with Expansion Interface (EI) circuit packs, and provide an RS-232 interface for connection to an administration terminal. Each circuit pack contains a 3-position switch to control emergency power transfer.

TN776 Expansion Interface — Release 6si

The TN776 installs in the expansion interface slot in a duplicated control carrier or in an expansion control carrier. The TN776 connects to the TDM bus in 1 PN and is an interface between that PN and the TDM bus extending to another PN. The TN776 packages the TDM control channel with Link Access Procedure on the D-Channel (LAPD) for transmission over the fiber link between cabinets. The TN776 provides the time-slot interchange between cabinets.

A system with ASAI/BRI or with PRI signaling from the packet bus (PACCON) requires a TN570 EI circuit pack in place of a TN776 circuit pack.

TN777B Network Control — Release 6vs and R6si

The TN777B communicates control channel messages between the processor circuit pack and the distributed network of port circuit packs on the TDM bus. The circuit pack also controls the 4 data channels that process and route information directly from the processor circuit pack to customer-connected equipment. Some equipment connections are data services facilities, CDR devices, an on-premises remote pooled modem or administration terminal, or an off-premises administration terminal. Some of these connections require data modules.

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

TN778 Packet Control —Release 6vs and R6si

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

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

Use of this circuit pack in Release 6vs requires the J588905 L8 version cabinet of the CSCC.

TN780 Tone-Clock—All Except Release 6csi

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

The TN780 is administrable to produce 5 tone plans (for countries outside the United States) other than the United States tone plan. Six tones can be customized in each plan. The TN780 supports μ-Law or A-Law companding.

TN787F/G Multimedia Interface

The TN787F/G multimedia interface circuit pack is used in conjunction with the TN788B multimedia voice conditioner circuit pack to provide service circuit functionality for the multimedia call handling (MMCH) feature. This feature provides both voice and multimedia data service between multimedia complexes (endpoints). Up to 6 endpoints can conference to a single multimedia call occurrence.

The TN787F/G provides a TDM bus interface and a DS1 adjunct cable interface. The TN787F/G routes the H.221 multimedia information to the DS1 interface to free more TDM bus timeslots. This allows the system to carry more audio, video, and data bit streams between multimedia complexes (endpoints).

TN788B Multimedia Voice Conditioner

The TN788B multimedia voice conditioner circuit pack is used in conjunction with the TN787F/G multimedia interface circuit pack to provide service circuit functionality for the MMCH feature. This feature provides both voice and multimedia data service between multimedia complexes (endpoints).

NOTE:
The TN788B vintage1 is μ-Law only. The TN788B vintage 2 or later is A-Law and μ–Law.

The TN788B is the audio processor for the Px64 multimedia conference bridge. The TN788B contains 8 digital signal processors; 4 for encoding and 4 for decoding. Each encoder/decoder pair is assigned to a Px64 endpoint to process its audio channel. Connection to and from the endpoint's audio is by way of a TN787F/G multimedia interface port. This connection is through the TDM bus timeslots.

Each of the 8 digital signal processors communicate with the main on-board processor through 8 individual dual port random access memory (DPRAMs). No read only memory (ROM) is available on this circuit pack; the DPRAM is used for program download.

TN789 Radio Controller

The TN789 circuit pack is an interface between a DEFINITY system and 2 wireless fixed base (WFB) radio units for the DEFINITY wireless business system. The TN789 contains a main processor to handle data line circuit (DLC) and upper medium access (MAC) layers of firmware. The TN789 also contains 2 lower MAC processors; 1 for each radio interface. Each radio interface is referred to as an I2 interface.

The I2 link is the connection between the radio controller (RC) and the WFB. The RC supports up to two I2 links, each link consisting of 4 pairs of twisted-pair cable: the transmit pair, the receive pair, and the local power pair. The transmit pair transfers WFB control and frame information from the RC to the WFB. The receive pair transfers status and frame information from the WFB to the RC. If the RC cannot provide power to the WFB, a third pair (to the WFB) can supply local power. When possible, the transmit pair and the receive pair provide phantom power from the RC to the WFB.

Each circuit pack includes a standard TDM bus interface from a system, 2 radio interfaces to 2 separate radio units, and 2 synchronization ports. In addition, 2 RS-232 interfaces provide for a debug terminal and for setting up the wireless terminal.

TN790 Processor — Release 6vs and R6si

The TN790 processor circuit pack is a circuit pack level replacement for the TN786B/CPP1 combination. The TN790 does not support a mezzanine board for memory expansion (no CPP1 circuit pack is used). The TN790 provides a performance increase over the TN786B/CPP1 combination.

The reduced instruction set computer (RISC) processor platform runs at 40 MHz and includes all of the functions of the TN786B processor circuit pack as well as providing an operating system base more common with Release 6r. Diagnostics for the TN790 are enhanced over earlier systems. The TN790 is compatible with the processor interface circuit pack (TN765), the PACCON circuit pack (TN778), the NETCON circuit pack (TN777B), and the duplication interface circuit pack (TN772).

The TN790 is available in Release 5.5 and later systems. The TN790 provides 16 MBytes of Flash PROM (programmable read only memory). The PROM is compatible with the NETCON Flash cards and is programmed using the +12 VDC supplied by the NETCON circuit pack.

The TN790 is factory-populated with a minimum of 16 MBytes of dynamic random access memory (DRAM).

NOTE:

Existing Release 5 TN790 circuit packs with 8 or 12 MBytes or DRAM must be upgraded to 16 MBytes of DRAM for Release 6.

The DRAM can be *seen* remotely by field technicians to determine the memory configurations at each site. The amount of DRAM can increase depending on customer requirements. Contact your Lucent Technologies representative.

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

TN798 Processor — Release 6csi Only

The TN798 processor platform runs at 25 MHz and integrates many functions of the TN790 processor and the TN777B NETCON circuit packs onto a single circuit pack. These functions include a 32-bit RISC CPU complex and a maintenance processor complex providing serial communications and maintenance functions. In addition, the TN798 terminates ISDN LAPD signaling over the DEFINITY TDM bus from PRI and BRI trunk circuit packs.

The RISC CPU complex provides 4 to 32 MBytes of Flash PROM. The DRAM is provided via 1 SIMM. The TN798 contains 16 MBytes of DRAM. The flash is not interleaved.

The TN798 processor does not provide X.25 communications nor does it provide a duplication option. The TN798 does not contain an on-board modem. Instead, an external modem must be connected to the RS-232E port previously used for the internal modem.

TN1648 System Access/Maintenance — Release 6r

The TN1648 is an SPE component used for maintenance. A processor in the TN1648 runs control routines that connect to maintenance software. The TN1648 has a 5-LED alarm panel and a toggle switch to manually inhibit automatic emergency transfer of PPN analog lines.

The TN1648 provides 2 RS-232 interfaces for connection to an administration terminal and, with duplication, connection to a standby maintenance terminal. The TN1648 also provides a tip and ring port with a built-in modem allowing a remote administration terminal to access the system.

The circuit pack allows connection to the management terminal and connection to and termination of 1 end of the processor bus. Other maintenance items include:

- PPN alarm monitors and outputs including auxiliary alarms for auxiliary equipment and environmental monitoring for over-temperature conditions
- Power supply sense and control for the carriers
- Emergency transfer control for catastrophic failure. The circuit consists of a 3-position toggle switch. The switch may be moved into the manual on position, manual off position, or automatic position.
- Non-volatile memory containing the time-of-day clock, the initialization and administration system (INADS) telephone number, login password, and product identification
- Alarm panel information with major, minor, and warning LEDs, an ACKnowledge LED, and an emergency transfer LED

TN1650B Memory — Release 6r Only

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

TN1654 DS1 Converter — T1, 24 Channel and E1, 32 Channel — Release 6r Only

The TN1654 DS1 converter circuit pack is a replacement for the TN574 DS1 converter circuit pack in Release 6r systems. The TN1654 converter complex installs in place of the conventional fiber and supports from 1 to 4 T1 or E1 facilities, providing a total of 92 T1 channels (or 120 E1 channels) in each direction between the PPN and the EPN. This capacity is enough for an EPN to easily support several hundred stations.

Release 6r architecture provides for EPNs that are remotely located from the PPN. EPNs within 5 miles (8 km) of the PPN may be coupled using multimode fiber optic cable or within 22 miles (35.4 km) using single-mode fiber optic cable. When the distance between the PPN and the EPN exceeds 5 miles (8 km) (multimode), or 22 miles (35.4 km), single-mode, or private right-of-way is not available, connect using a DS1 converter complex. A DS1 converter complex consists of a pair, 1 at each end, of DS1 converter circuit packs and the associated T1/E1 facilities.

A new set of Y-cables is required by the TN1654 to connect to a TN570/B Expansion Interface circuit pack for system communication.

TN1655 Packet Interface — Release 6r Only

The TN1655 provides the communication path between the SPE and the packet bus in the PPN. This path is used by the EPNs and the CSS, from EI circuit packs in the PPN, to communicate with the processor circuit pack. The TN1655 provides the link access procedure on the D-channel (LAPD) (digital multiplexed interface (DMI)) mode-3 terminations of communication links across the packet bus that link to the processor circuit pack.

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

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

TN1656 Tape Drive — Release 6r Only

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

TN1657 Disk Drive — Release 6r Only

The TN1657 contains a 180 Mbyte small computer system interface (SCSI) disk drive. The TN1657 reduces the boot time of the system.

TN2135 Analog Line — Italy

The TN2135 is replaced by the TN2183 analog line circuit pack.

TN2136 Digital Line — 2-Wire DCP

The TN2136 is replaced by the TN2181 Digital Line circuit pack.

TN2138 Central Office Trunk — Italy

The TN2138 provides 8 analog loop start 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).

TN2139 Direct Inward Dialing Trunk — Italy

The TN2139 provides 8 analog direct inward dialing (DID) trunk ports for analog DID signaling. Each port has tip and ring signal leads.

TN2140/B Tie Trunk — Italy and Hungary

The TN2140 provides 4 ports for 4-wire E & M lead signaling tie trunks. The TN2140 provides continuous E & M signaling and discontinuous E & M signaling. Administrable A-Law and μ-Law companding and standard Type 1 and Type 5 signaling is also provided. The TN2140/B is required for Hungary.

TN2144 Analog Line — Netherlands

The TN2144 is replaced by the TN2183 analog line circuit pack.

TN2146 direct inward dialing Trunk — Belgium

The TN2146 provides 8 analog DID trunk ports. Each port has tip and ring signal leads. The TN2146 uses 4 (1 for each pair of ports) dual subscriber line audio processing circuits (DSLACs) administered to meet trunk transmission characteristics. The DSLACs can be set to either a resistive or complex balance impedance in the voice or AC talk path on the trunk interfaces. The DSLACs convert analog signals to digital signals and vice-versa to match the analog DID trunks to the system's digital TDM bus.

Companding can be set to either A-Law or μ-Law companding.

TN2147/C Central Office Trunk — Multicountry

The TN2147 has 8 analog CO trunk ports. Each port has tip and ring signal leads. The TN2147 uses 4 (1 for each pair of ports) dual subscriber line audio processing circuits (DSLACs) to be administered to meet a given transmission and impedance requirement. The DSLACs convert analog signals to digital signals and digital signals to analog signals to interface the analog CO trunks to the system's digital TDM bus.

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

TN2149 Analog Line — Belgium

The TN2149 is replaced by the TN2183 analog line circuit pack.

TN2180 Analog Line — Spain and Germany

The TN2180 is replaced by the TN2183 analog line circuit pack.

TN2181 Digital Line — 2-Wire DCP

The TN2181 has 16 DCP ports that can connect to 2-wire terminals such as the 6400, 8400 and 9400 Series digital voice terminals and the 302C attendant console. The maximum range of the 8400 and 9400 Series terminals using 24 AWG (0.5 mm) wire is 3,500 feet (1067 m).

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

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

The TN2182/B tone-clock integrates the tone generator, tone detection-call classifier, system clock, and synchronization functions onto 1 circuit pack for all system reliability configurations. The TN2182/B supports 8 ports for tone detection and allows gain or loss applied to PCM signals received from the bus. The TN2182/B provides Stratum 4 enhanced clock accuracy, supports MFC signaling (such as Russia MF), supports Russia MFR (Multi-Frequency shuttle Register signaling) and supports A-Law and μ-Law companding.

The TN2182/B provides continuous, cadenced, and mixed tones, allows administrable setting of tone frequency and level, detects 2025 Hz, 2100

Hz, or 2225 Hz modem answerback tones, and provides normal and wide broadband dial tone detection.

In most configurations, the 2- or 3-circuit pack combination of tone generator, tone detector, and/or call classifier can be replaced with this 1 circuit pack, freeing 1 or 2 port slots.

The TN2182/B includes all the functionality found on the TN744D.

TN2183 Analog Line — Multi-Country

The TN2183 provides 16 analog line port interfaces. Each port provides a voice channel to the system from a Tip/Ring pair. Each port also sends or receives signaling to and from a station; such as an analog telephone, answering machine, facsimile, and loop-start CO port AUDIX.

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

TN2184 DIOD Trunk — Germany

The TN2184 direct inward/outward dialing (DIOD) trunk contains 4 port circuits, each interfacing a 2-wire analog CO trunk with the TDM switching network of the system. Each port allows incoming and outgoing calls to include addressing information being received from the CO for incoming calls and addressing information being sent to the CO for outgoing calls. It detects periodic pulse metering (PPM) signals for call charge accounting on outgoing calls.

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

TN2185 ISDN-BRI — 4-Wire S/T-TE Interface

The TN2185 supports eight 4-wire ISDN BRI line S interfaces, each operating at 192 Kbps, with 2 B-channels (64 Kbps) and 1 D-channel (16 Kbps). The TN2185 interfaces to the DEFINITY LAN bus and the TDM bus to provide the TE side of the BRI interface.

The TN2185 is similar to the TN2198 except the TN2185 is a 4-wire S interface instead of a 2-wire U interface. Another difference is the function of the SCOTCH/NPE and SAKI are replaced by the network control element (NCE).

For each port, information communicates over two 64 Kbps bearer channels called B1 and B2, and over a 16 Kbps channel called the demand channel, or D channel. The D channel is used for signaling. Channels B1 and B2 can be circuit switched simultaneously, or either of them may be packet switched, but not both at once. The D channel is always packet switched. The circuit switched connections have a µ-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 packet switched channels support the LAPD protocol, however, the TN2185 does not terminate on LAPD protocol. The S interface does not support switching of both B channels together as a 128 Kb/s wideband channel.

The TN2185 has a long range up to 18,000 feet (5486 m) maximum from the system to the NT1 device. In a multiple terminal environment, the B channels are shared only on a per-call basis. For example, if the B2 channel is for data, then the B2 by 1 terminal excludes the others from having access to it. When a used 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.

TN2198 ISDN-BRI — 2-Wire U Interface

The TN2198 allows connection to the ANSI standard 2-wire U-Interface. The 2-wire interface from the TN2198 connects to an NT1 network interface. The 4-wire interface on the other side of the NT1 may connect to 1 or 2 telephones. The TN2198 does not provide a trunk-side interface as does the TN2185 circuit pack.

The TN2198 contains 12 ports that interface at the ISDN U reference point. For each port, information communicates over two 64 Kbps bearer channels called B1 and B2, and over a 16 Kbps channel called the demand channel, or D channel. The D channel is used for signaling. Channels B1 and B2 can be circuit switched simultaneously. The D channel is always packet switched. The TN2198 requires a packet control circuit pack (TN778) on Release 6si and packet bus equipped Release 6vs systems. The circuit switched connections have a µ-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.

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 1 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 (no party on line). The D channel is always shared among the terminals. The TN2198 interfaces with the TDM bus and packet bus in the DEFINITY backplane and terminates with 12 ISDN basic access ports.

The TN2198 has a long range to 18,000 feet (5486 m) maximum from the system to the NT1 device and uses standard protocol ANSI T1.601. The TN2198 has a 160 Kbps line rate, consisting of 2 bearer channels at 64 Kbps channels each, the D channel at 16 Kbps, framing at 12 Kbps, and maintenance at 4 Kbps. The circuit pack uses demand channel (ringing, tone, and so forth), 16 Kbps channel, and supports up to 24 telephones or data modules per circuit pack.

TN2199 Central Office Trunk — Russia

The TN2199 is a 4-port, 3-wire, loop-start trunk circuit pack that can be used as a DID trunk, CO trunk (2-way, 1-way incoming, or 1-way outgoing CO). The TN2199 combines the functionality of the DID trunk and the 1-way outgoing CO trunk (DIOD trunk). This circuit pack is used with the call classifier circuit pack (TN744D or later) or the tone-clock/ tone detector (TN2182B or later) to accomplish MF shuttle signaling (similar to R2-MFC signaling).

TN2202 Ring Generator — France

The TN2202 ring generator circuit pack supplies 50 Hz ringing power. The TN2202 supplies balanced ringing, by a modified backplane, to terminals connecting to the TN2183 multi-country analog line circuit pack when administered for France analog transmission.

The TN2202 plugs into the power unit slot and is required for each carrier containing analog lines (1 in an single-carrier cabinet or 1 in each port carrier of a MCC). A 1-lead modification is required in each backplane using TN2202. This is true for all products made for France. The TN2202 produces 2 symmetrical voltages (typically 28V rms) with respect to ground, and takes –48 VDC, –5 VDC, and ground from the backplane and generates 2 x 28V rms with added –48 VDC.

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

The TN2224 has 24 DCP ports that can connect to 2-wire terminals such as the 6400, 8400 or 9400 Series digital voice terminals and the 302C Attendant Console. The maximum range of the 8400 or 9400 Series terminals using 24 AWG wire (0.5 mm) is 3,500 feet (1066 m).

The TN2224 installs in Release 6 systems and supports either A-Law or µ-Law companding (software selectable).

TN-CCSC-1 PRI to DASS Converter

The TNCCSC-1 circuit pack converts ISDN-PRI to a DASS interface. DASS is a 2 Mbit per second interface using a 75 Ohm coaxial transmission facility. One TNCCSC-1 circuit pack can support up to 2 TN464F DS1 Interface circuit packs. A *Y* cable and an 888B 75 Ohm coaxial adapter connect to the public network facility.

TN-CCSC-2 PRI to DPNSS Converter

The TNCCSC-2 circuit pack converts ISDN-PRI to a DPNSS interface. DPNSS is a 2 Mbit per second interface using a 75 Ohm coaxial transmission facility. One TNCCSC-2 circuit pack can support up to 2 TN464F DS1 interface circuit packs. A *Y* cable connects to the public network facility.

TN-PRI/BRI PRI to BRI Converter (ETSI BRI)

The TNPRI/BRI circuit pack converts ISDN-PRI to a BRI trunk side interface. A single PRI ITU-T I.421 interface from the TN464F DS1 interface circuit pack is converted to up to 8 BRI CCITT I.420 interfaces plus a proprietary 2 Mbps *expansion interface*. This additional interface connects to a second TNPRI/BRI circuit pack to provide up to 7 additional BRI interfaces (for a total of 15 BRI interfaces). Administration and maintenance is performed using an RS-232 port on the circuit pack connecting to a local ASCII-based management terminal.

UN330B Duplication Interface — Release 6r Only

In high- and critical-reliability systems with 2 SPEs, 1 UN330B resides in each SPE and connects to the other UN330B. The UN330Bs provide control and communication paths between the SPEs to keep the standby SPE ready to assume control if the active SPE fails. The UN330Bs select active/ standby mode for the 2 SPEs, shadow (copy) the active SPE memory writes into the standby SPE memory, and support inter-SPE communications.

The duplication channel is a bi-directional high-speed path between the 2 SPEs. When memory shadowing is active, all shadowed memory writes on the active processor's bus are sent across the link and written into the standby processor's memory. Standby memory writes are not sent to the active processor.

UN331B Processor — Release 6r Only

The UN331B controls the system and executes stored programs that perform call processing activity and maintenance. The UN331B is a RISC designed around a MIPS R3000A CPU operating at 33 MHz. It employs 32-bit address and data buses to obtain and execute instructions at a rate approaching 1 instruction per clock cycle. The 256

kbyte instruction cache with burst-mode refill and 256 kbyte data cache are key to the performance of the processor. A read/write buffer chip tailors the UN331B to the call processing environment.

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

The UN331B interfaces to the 32-bit multiplexed address/data processor bus (PM-Bus) and the 32-bit processor expansion bus (PX-Bus). The PM-Bus is for all processor write operations and single-word (4-byte) read operations. Multiple-word or burst reads are performed using the PM-Bus to transfer the address to main memory, then the words of the burst are returned using both the PM-Bus and PX-Bus.

UN332 Mass Storage/Network Control — Release 5r Only

The UN332 provides an interface between the UN331B processor and the small computer system interface (SCSI) bus for access to the mass storage system (MSS) such as a disk drive. The UN332 also provides TDM network control for the PPN, and terminates 1 end of the processor-multiplexed bus.

WP-90510 AC Power Supply

The WP-90510 AC power supply is in a CSCC. The plug-in, multi-output, auto-ranging, AC power supply is above the carrier at the top of the cabinet. A power cord with a 3-prong plug on 1 end and a single connector on the other end connects the supply to a dedicated AC power source.

WP-91153 AC Power Supply

The WP-91153 is used in a single-carrier cabinets powered from an AC source. The single, plug-in, multi-output AC power supply is in the power supply slot. A power cord with a 3-prong plug on 1 end and a single connector on the other end connects the supply to a dedicated AC power source.

DEFINITY Adjuncts

Table 38 lists the adjuncts for Release 6 systems. After the table, detailed descriptions of each adjunct are provided.

Table 38. DEFINITY Adjuncts

Apparatus Code	Name	Type
120A	Integrated channel service module	Adjunct
122A	Music-on-hold interface	Port
300A	Single-mode fiber optic transceiver	Network
315x Series	Channel service unit	Adjunct
700A	DS1 CPE loopback jack	Adjunct
9823A or 9823B	Multi-mode fiber optic transceiver	Network
BU3200A/B	Battery interface unit	Power
BTD08	Busy tone disconnect	Port
Customer-provided	European standard paging access (ESPA)	Adjunct
Customer-provided	External alarm	Port
DEFINITY nET90	Asynchronous transfer mode interface	Port
J58907AA-1	Forum personal communications manager (COMMUNICORE)	Adjunct
RM0850HA100	Rectifier/power module	Power

120A Channel Service Unit Module

The 120A channel service unit (CSU) module connects to either a TN464E/F or a TN767D/E DS1 circuit pack on 1 end. The other end connects 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 of external CSUs. The TN464/767 and switch administration support all framing and line coding options.

The 120A is small, a little larger than a wallet, is easier to install than an external CSU, and does not require any option switch settings or DS1 cable.

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

122A Music-on-Hold Interface — France

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

300A Single-Mode Fiber Optic Transceiver

The 300A is a single-mode lightwave transceiver that transmits and receives light up to 115,000 feet (22 miles or 35 km). Single-mode fiber optic cable connects from the lightwave transceiver on 1 EPN carrier to the lightwave transceiver on another PPN or EPN carrier. The cable consists of 2 separate 8-10-micron core diameter fiber optic cables. The fiber optic connection allows full duplex (simultaneous bi-directional) transmission.

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

315x/316x-Series Channel Service Unit

The 315x/316x-series of the Channel Service Unit (CSU) is an interface between the T1 digital network and the customer premises equipment. A CSU provides an interface between the DSX1 levels of a DS1 Interface circuit pack and the levels of a DS1 transmission facility. It also:

- Isolates the DS1 interface circuit pack from DC voltages that may be on the facility
- Provides jacks to test access to receive and transmit signals between the DS1 circuit pack and the CSU
- Provides secondary surge protection between the DS1 facility and the DS1 circuit pack
- Provides loopbacks for the signals from the DS1 circuit pack and from the facility for fault isolation purposes
- Allows software configuration menus to display for quick and easy operation

The 3150/3160 units can set on a desktop or a shelf. The Model 3151 is a circuit card and installs in a COMSPHERE® 3000-series carrier.

700A DS1 CPE Loopback Jack

The 700A is a loopback device intended for permanent installation in DS1 house wiring at the network interface (NI) point when ICSUs are used. The 700A allows all customer wiring between the system and the NI to be looped and tested, either locally or remotely, via the management terminal. Using the 700A, DS1 problems can be quickly isolated to either the customer premises or to the external DS1 span.

The 700A operates with any vintage of TN767E (or later) or TN464F (or later) DS1 circuit packs and with G3V3 release 3 (or later) software. The unit operates with the 120A2 (or later) integrated channel service unit (ICSU); *not* the 31xx series of CSUs or other external CSUs or earlier ICSUs.

The 700A is required when DC power appears at the interface to the ICSU. The 700A isolates the ICSU from the DC power and properly loops the DC span power. The 700A is also used when no smart jack is installed by the local phone company.

9823A or 9823B Multi-Mode Fiber Transceiver

The 9823A-type lightwave transceiver transmits light up to 4,900 feet (0.93 miles or 1.5 km). The 9823B lightwave transceiver transmits light up to 25,000 feet (4.73 miles or 7.6 km). Multi-mode fiber optic cable connects from the lightwave transceiver on 1 carrier to the lightwave transceiver on another carrier. The cable consists of 2 separate 62.5-micron diameter fiber optic cables or 50-micron diameter fiber optic cables. The fiber optic connection allows full duplex (simultaneous bi-directional) transmission.

BU3200A/B Battery Interface Unit

The battery interface unit (BIU) controls the RM0850HA100 rectifier modules, manages the batteries, and reports the status of system power. The BIU provides the emergency power off option and provides all battery alarm interfaces for internal and external alarms.

BTD08 Busy Tone Disconnect — Non-United States

This adjunct provides the method to detect disconnect of incoming calls connected by loop start 2-wire analog trunks used in some countries. In these cases, the public switched telephone network (PSTN) sends voice band tones instead of line disconnect, to indicate the caller has disconnected; while the called end remains connected.

This adjunct prevents connecting abandoned calls to the answering call center agent, locking up trunk-to-trunk connections, or locking up connections to repetitive announcements.

DEFINITY nET90 Asynchronous Transfer Mode Interface

The asynchronous transfer mode (ATM) Interface is a high speed access concentrator for data networking in local area network (LAN), campus, and wide area network (WAN) environments. Data rates can be as high as 155 Mbps (Mega bits per second).

The ATM access concentrator (AAC) is a small external adapter with a built-in channel service unit (CSU). The AAC takes a DEFINITY DS1 interface and maps it into a T1 ATM cell stream that can interface ATM switches or provide direct access to ATM network services. The ATM interface allows proper operation of the MMCH feature and can carry voice, video, data, and image information. The AAC adapter uses ATM circuit emulation to provide constant bit rate service and divides up to 20 DEFINITY DS0s into up to 20 different locations.

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

Each ATM multiplexer can be configured for ATM, frame relay, switched megabit data service (SMDS), T1, and E1. Up to 4 ports are supported by the AAC. An AAC-3 is used for T3 and E3.

ESPA Radio Paging

The european standard paging access (ESPA) radio paging interface is the western european standard paging protocol. The interface to the DEFINITY system is via an ASAI link.

External Alarm

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

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

Forum Personal Communications Manager (J58907AA-1)

The forum personal communications manager (FPCM) is available outside the United States. The PCM uses a Comminicore^{tm} mobility manager which serves as an adjunct to DEFINITY ECS, to manage mobility. The system uses cordless telephone generation 2 (CT2) technology, which is a global standard for wireless telephone service. This standard defines the radio interface between the Forum pocket telephones and the base stations in the system.

The Forum's system manager provides superior system administration capabilities. The Forum personal communications manager can accommodate even the largest businesses. It has the following maximum capacities:

- 500 wireless telephones
- 126 base stations
- 6 PRI interfaces to DEFINITY
- 1 Sun workstation
- 14.4 (minimum Baud rate) modem for remote maintenance
- 2 maintenance telephones
- 4 million square foot (371,000 square meter) coverage area

The Forum PCM communicates to the DEFINITY ECS via a DS1 interface (ISDN-PRI).

DEFINITY Wireless Business System-Adjunct DECT

The DEFINITY wireless business system (DWBS)-adjunct digital enhanced cordless telecommunications (DECT) is available outside the United States. It provides mobility management with an adjunct processor. The system uses the DECT ETSI standard, which defines the interface between the wireless phones and the base stations.

The DWBS has the following capacities:

- 360 wireless telephones
- 24 base stations
- 12 E1 CAS links to DEFINITY
- 1 administration PC
- 1 modem for remote maintenance

The DWBS-DECT adjunct communicates to the DEFINITY ECS via a DS1 interface (providing E1 CAS).

RM0850HA100 Rectifier Module

The rectifier module operates as an integral part of a complete power system with battery backup. The modules operate in a redundant, high reliability mode to provide –48 VDC at 850 Watts to a common power bus. The rectifier module is used in the J588980CH power distribution unit in Release 6 systems.

4—Technical Specifications

This section includes the following technical specifications on the capabilities, performance, and feature capacities:

- Representative Number of Lines
- Call Performance
- Additional Hardware to Use Features
- Allocation of Buttons
- Cabling Distances
- Initialization and Recovery
- Call Progress Tones
- Indicator Lamp Signals

Representative Number of Lines/Trunks

Table 39 lists the representative number of lines/trunks for each configuration of PPNs, EPNs, and CSSs in Release 6. The actual number of lines depends on the features and characteristics of the configuration.

Table 39. Representative Number of Lines/Trunks

Configuration	Release 6vs	Release 6csi	Release si	Release 6r
1 processor port network (PPN)	100	400	400	800
Direct connect with 1 PPN and 2 EPNs	Does not apply	Does not apply	400/2400	2400/400
1 switch node (SN) in the CSS with 1 PPN and 15 EPNs	Does not apply	Does not apply	Does not apply	12,500/ 2000
3 SNs in the CSS with 1 PPN and 43 EPNs	Does not apply	Does not apply	Does not apply	25,000/ 4000

Call Performance

Table 40 lists call processing performance for Release 6.

NOTE:
Call performance can vary with different customer applications. A processor occupancy evaluation (POE) may be required.

Table 40. Call Processing Performance (Calls Per Hour)

System Type	Release 6vs and R6si	Release csi	Release 6r
General business	40,000	20,000	100,000
ISDN	16,000	8000	40,000
Automatic call distribution	28,000	14,000	70,000
Inbound call management	12,000	6000	30,000
Outbound call management	16,000	8000	44,000
ASAI desk top	28,000	14,000	70,000

Table 41 lists response times for Release 6.

Table 41. Response Times

Attribute	Response Time
Call processing	General voice path cut-through: 750 ms Attendant ring tip: 260 ms Direct extension selection (DXS) lamp update: 1 second Announcement circuit pack upload (no call processing load): 40 minutes
System management	4 to 6 seconds mean response time
Maintenance	High-priority periodic tests must be completed within 1 hour. High-priority scheduled tests must be completed once each day, but not during busy hours.
Booting and recovery	11 minutes (not including announcements)

Additional Hardware to Use Features

Table 42 describes all features and any additional hardware required to use features. The hardware consists of circuit packs installed in carriers, devices in an auxiliary cabinet, and external devices. Not all feature applications require additional hardware.

Table 42. Additional Hardware to Use Features

Feature	Hardware
Abandoned call search	Central office (CO) trunk circuit pack.
Abbreviated dialing	Additional call progress tone detector ports on a tone detector circuit pack if the special *wait* character is used frequently.
Abbreviated dialing (enhanced)	No additional hardware required except as required for abbreviated Dialing, above.
ACCUNET service	Data module and printer.
Adjunct switch application interface (ASAI)	Port on BRI line circuit pack and a terminating resistor for each interface to be provided. Supports up to 8 interfaces. Release 6vs, R6si: a packet control circuit pack is required for ASAI applications. An EI circuit pack is also required for system connectivity in multiple PN systems. Release 6vs require J58890S L8 packet bus equipped compact single-carrier cabinet. Release 6r: BRI line circuit pack is required. Release 6vs, R6si, R6r: packet applications, such as ASAI, require maintenance/test circuit pack in PPN. In a critical reliability system, a maintenance/ test circuit pack is required in each additional EPN. A port on a BRI line circuit pack or DEFINITY LAN Gateway connected to the CallVisor Adjunct. See ISDN-BRI.
Administrable language displays	No additional hardware required.
Administration without hardware	No additional hardware required.
Administered connection	Circuit packs: data line, digital line, BRI line, pooled modem, or DS1 Interface. Data modules: 7400 series voice terminals; 7500 series BRI voice terminals with ADM.
Agent call handling	No additional hardware required. CallMaster voice terminals are recommended for ACD agents.
Alphanumeric dialing	No additional hardware required.
Alternate facility restriction levels	No additional hardware required.

Continued on next page

Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Alternate operations support system alarm number	No additional hardware required.
Announcement	See recorded announcement.
Announcements — intercept treatment	Hardware to support recorded announcement, if equipped. See recorded announcement.
Answer machine detection	Call classifier circuit pack (TN2182 or TN744B or later).
Attendant auto-manual splitting	No additional hardware required other than an attendant console.
Attendant automatic start	No additional hardware required other than an attendant console.
attendant backup Alerting	No additional hardware required other than an attendant console.
Attendant call waiting	No additional hardware required other than an attendant console.
Attendant calling of inward restricted stations	No additional hardware required other than an attendant console.
Attendant console	This feature requires a port on a TN722B, TN767, or TN464D circuit pack for each trunk to be assigned in the Trunk Group. A TN722B or TN767 provides 24 ports, and a TN464D provides 24 or 32 ports.
Attendant control of trunk group access	This feature requires a port on a TN754B, TN2181, or TN2224 digital line circuit pack for each attendant console to be assigned. For reliability, the attendant consoles should not be assigned to ports on the same TN754B circuit pack. For example, if 3 attendant consoles are to be provided, assign each console to a port on 3 different TN754Bs. If required, all attendant consoles may be assigned to ports on the same TN754B circuit pack.
Attendant crisis alert and other hospitality enhancements	No additional hardware required.
Attendant direct extension selection with Busy lamp field	Selector console.
Attendant direct trunk group selection	No additional hardware required other than an attendant console.
Attendant display	No additional hardware required other than an attendant console.

Continued on next page

Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Attendant intrusion (call offer)	No additional hardware required.
Attendant override of diversion features	No additional hardware required.
Attendant priority queue	No additional hardware required.
Attendant recall	No additional hardware required.
Attendant room status	A DXS module is required.
Attendant serial calling	No additional hardware required.
Audible message waiting	No additional hardware required.
Audio information exchange (AUDIX) adjunct voice mail system	Voice: AUDIX machine and appropriate ports on analog line circuit packs. Data control link: Release 6vs and R6si use the processor interface (PI) RS-232 connector on the rear panel of the PPN control carrier and a data module. If the PI connector is not available, a port on a TN754 digital line circuit pack and a 7500 data module are required in addition to a PI link. Release 6r: port on packet gateway circuit pack. AUDIX networking requires ports on 1 or more digital line circuit packs.
AUDIX (audio information exchange) embedded voice mail system	DEFINITY AUDIX assembly resides in 5 consecutive port slots in all except Release 6vs; and resides in 4 port slots on the far right in Release 6vs. Digital port mode does not require additional hardware for a data control link and supports only 16 AUDIX ports. Control link mode requires the same additional data control link hardware as an AUDIX adjunct listed above. The administration terminal can connect via: direct connection, modems, ADU, G3-MA, and G3-MT. Control link mode is not available with Release 6csi.
Authorization codes	No additional hardware required.
Auto start and don't split	No additional hardware required.
Automatic callback	No additional hardware required other than an available feature button.
Automatic alternate routing (AAR) and Automatic route selection (ARS)	No additional hardware is required for a stand-alone system. For a private network, additional tie trunks and tone detector circuit packs may be required. For a private network, additional tie trunks and tone detector circuit packs may be required.

Continued on next page

Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Automatic call distribution (ACD) Does not require added hardware.	If needed: 1 port on an analog line circuit pack per auxiliary queue warning level lamp. Hardware to support recorded announcement or music-on-hold. See Recorded announcement and music-on-hold. Voice terminals (not 2500-type sets) are required for agents. If CMS is used, CMS hardware is required (see CMS).
Automatic circuit assurance	Voice terminal with display or a speech synthesis circuit pack.
Automatic incoming call display	715 BCS management terminal, display-equipped voice terminal, or voice terminal that can display information through an attached data terminal. The terminals require a PRI or DCS link; otherwise, they are station-to-station only.
Automatic transmission measurement system (ATMS)	TN771C maintenance/test circuit pack or later.
Automatic wake-up	If voice prompting is used, a voice synthesizer circuit pack is needed. Each circuit pack has 4 ports to provide voice prompting. If voice synthesis announcements are used, 2 ports are reserved for announcements. AUDICHRON is used for customized recorded announcements. Journal printer and interface. For automatic wake-up with integrated announcement, the integrated announcement circuit pack is needed.
Barrier code aging	System printer and cable if a printed report is desired.
Basic call management system (BCMS) reports	System printer and cable if a printed report or a print schedule is desired.
Brazil block collect call	TN753B analog DID circuit pack vintage 1 or later, TN465B CO circuit pack vintage 1 or later, and TN464F digital line circuit pack vintage 9 or later.
Bridged call appearance — multi-appearance voice terminal	Multi-appearance voice terminal with available 2 light (red and green) buttons. A Call Coverage module or expansion module can provide up to 20 bridged call appearances.
Bridged call appearance — single-line voice terminal	Multi-button set with available 2 light (red and green) buttons. A Call Coverage module or expansion module can provide up to 20 bridged call appearances.
Busy tone disconnect	A busy tone disconnect adjunct and cables are required.
Busy verification of terminals and trunks	No additional hardware required. Need feature buttons on multi-button set.

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Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Call-by-call service selection (PRI) feature)	Release 6si and R6vs: DS1 Interface and PI or PACCON circuit packs. Release 6r: DS1 interface circuit pack. Release 6csi:The processor supplies the function and PI or PACCON are not required.
Call charge information	Same hardware as ISDN and CDR. See ISDN-PRI and Call Detail Recording (CDR).
Call coverage	No additional hardware is required.
Call coverage of calls redirected off-net	TN2182 vintage 4 or later tone-clock-tone detector and call classifier circuit pack and/or TN744C vintage 3 or later call classifier-detector circuit pack required.
Call detail recording (CDR) Hardware depends on the type of CDR used	All except Release 6r: a CDR output device can connect to the RS-232 port on the processor circuit pack to eliminate the need for data modules for the output devices below. Release 6r: a CDR output device connects to either: 1. Packet data circuit pack cross-connected to a port on a digital line circuit pack connected to a second data line circuit pack port and then to an ADU, or 2. Packet data circuit pack cross-connected to a port on a digital line circuit pack connected to a BRI line circuit pack connected to a 7500 Data Module or a digital line connected to a data module. Reused equipment: printer, PC, or tape unit. 94A LSU — data module connected to a digital line circuit pack port, or a modem connected to a port on an analog line circuit pack with a pooled modem. Host computer — Private line terminated at the system with a data module. A private line modem is used if off-premises (out-of- building).
Call forwarding all calls	No additional hardware is required.
Call forward busy/ don't answer	No additional hardware is required.
Call management system (CMS)	CMS adjunct; Release 6vs and R6si: port on a digital line circuit pack and a PI. Release 6r: port on a packet gateway circuit pack and, depending on distance, a 105B IDI or DSU. Alternately, a port on a packet gateway is connected to a data module. The data module is connected to an administered connection through a port on each of a pair of digital line circuit packs and terminates at the CMS. Release 6csi not available.
Call park	No additional hardware required.

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Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Call prompting	Each call prompting announcement requires a port on an integrated announcement circuit pack or an external announcement facility. If an external announcement facility is used, each announcement requires a port on an analog line circuit pack. The call-classifier or tone-clock circuit pack is required for touch-tone receivers to collect digits input by callers.
Call vectoring	Announcement hardware is required. See Call Prompting.
CallVisor ASAI	A port on a BRI line circuit pack or DEFINITY LAN gateway connected to the CallVisor adjunct. See ISDN-BRI.
Calling party number/billing number (CPN/BN)	Release 6vs and R6si: an interface link (requires a PI or PACCON circuit pack) and a data module are assigned. Alternately, a port is used on a digital line circuit pack instead of a data module. The link is administered on the system's processor channel assignments form. The link is used as an interface to an ISDN Gateway adjunct to support CPN/BN. Optional ASAI Link (see ASAI for more information). Display terminals also require ACD related hardware. See the ACD feature. G3V4 and later systems do not support ISDN Gateway.
Call pickup (includes call pickup alerting)	No additional hardware required.
Call waiting termination	No additional hardware required.
CAS (branch or main)	A tie trunk circuit pack for the release link trunk. Alternately, the PRI DS1 interface circuit pack can be used for the release link trunks of the CAS network.
Class of restriction	No additional hardware required.
Class of service	No additional hardware required.
CDR call splitting, CDR privacy	Terminal and data module.
CDR multimedia applications server interface (MASI)	No additional hardware required.
Code calling access	Loudspeaker paging equipment and 1 port on an auxiliary trunk circuit pack per zone, can be shared with the loudspeaker paging access feature.
Conference - attendant	No additional hardware required.
Conference - terminal	No additional hardware required.
Conference/intrusion tones	No additional hardware required.

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Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Constellation voice/ data terminal support	A 6544 cluster controller is required to provide data connection to the host. One of the following adjunct voice terminals is required: 7401D, 7406D, 602A1, or 603D1. The adjunct voice terminal can function as a stand-alone station even if the Constellation is powered down.
Consult	No additional hardware required.
Cordless telephone support	An appropriate analog line or hybrid (MFAT) line circuit pack is used for the cordless set.
Coverage callback	No additional hardware required.
Coverage incoming call Identification	No additional hardware required other than available feature button on a multi-button set.
Customer provided equipment (CPE) alarm	A customer-provided alarm such as a lamp, bell, or other device.
Czech Republic of Slovakia Digital MFC	Digital tie (DS1 interface 24/32) and call classifier circuit packs.
D-channel backup	PRI DS1 interface circuit pack and PRI facilities. See ISDN-PRI.
Data call setup	Each DCP data module requires 1 port on a digital line circuit pack. A data module shares the port with the associated voice terminal. Reused equipment: each personal terminal 510D or 515 BCT requires 1 port on a digital line circuit pack for shared use of voice and data. Each 7400, 7401D, 7404D, 7406D, 7407D or 64xx/84xx/94xx voice terminal requires 1 port on a digital line circuit pack for shared use of voice and data. Each BRI data module requires 1 port on a BRI line circuit pack. Each 7505D w/ADM, 7506D with ADM, 7507D with ADM, 8510D with ADM, or 8520D with ADM terminal requires 1 port on a BRI line circuit pack for shared use of voice and data. Each 7500 or 8500 data module requires 1 port on a BRI line circuit pack for data. Each modem requires 1 port on an analog line circuit pack. Modem pooling requires either a modem pool circuit pack or a port on a digital line circuit pack with a data module, and 1 port on an analog line circuit pack with analog modem for each conversion resource. Keyboard dialing to off-premises (out of building) data endpoints requires call progress tone detector ports on a tone detector circuit pack.
Data hot line	No additional hardware required.
Data only off-premises extensions	Data module and 1 port on a TN754B, TN2181, or TN2224 digital line circuit pack.
Data privacy	No additional hardware required.
Data restriction	No additional hardware required.

Continued on next page

Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
DCS features (All)	All except Release 6csi which uses DCS + and Release 6r: a port on a packet gateway circuit pack and a data module or DSU are required. A tie trunk circuit pack or DS1 circuit pack for the tie trunks between switches.
DCS plus	PRI D-channel link: a PRI DS1 interface circuit pack is required and, if required by the network provider, 1 CSU per span.
DCS over BX.25	Release 6vs, R6si, R6r: A tie trunk circuit pack for the tie trunks between switches. Release 6vs, R6si: A port on a TN765 PI circuit pack. Release 6r: A port on a TN577 packet gateway circuit pack and a data module or DSU. Release 6csi: Not available.
DCS under ISDN	Release 6vs, R6si, R6r: A port on a DS1 interface. A tie trunk circuit pack for the tie trunks between switches. Release 6 csi: Not available.
DCS+ (DCS over ISDN)	Release 6vs, R6si, R6r: A port on a DS1 interface. A tie trunk circuit pack for the tie trunks between switches. Release 6 csi: Not available. Release 6vs, R6si: TN778 PACCON circuit pack. Release 6vs requires J58890S L8 version of cabinet.
Default dialing	No additional hardware required.
DEFINITY extender	DEFINITY DCP extender and external data module required to connect to DCP display stations such as the 8400-series DCP terminals (2-wire mode only).
DEFINITY wireless business system DEFINITY forum personal communications manager	TN789 radio controller and DS1 interface circuit packs.
Demand print	A message server adjunct (MSA) equipped with appropriate messaging server software and associated printers.
Dial access to attendant	No additional hardware required.
Dial plan	No additional hardware required.
Dialed number identification service (DNIS)	For non-ISDN type calls, a port on a DID Trunk or DS1 interface circuit pack to support MEGACOM 800 DNIS. Also requires the answering voice terminals be equipped with a display if display of trunk information is desired.
Digital multiplexed interface (DMI)	One PRI DS1 interface circuit pack per 24 or 32 DMI trunks (depends on the circuit pack).

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Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Direct agent announcement	Except for integrated announcements, each announcement requires announcement equipment plus a port on an analog line circuit pack. For music on delay announcement, a music source and a port on an auxiliary trunk circuit pack are required.
Direct department calling and uniform call distribution (no added hardware required)	If needed: 1 port on an analog line circuit pack per queue warning level lamp. Hardware for support of recorded announcement, or music-on-hold if there is to be a delay announcement or music. See Recorded Announcement and Music-on-Hold.
Distinctive ringing	No additional hardware required.
Do not disturb	If voice prompting is used, 1 or more ports on a voice synthesizer circuit pack.
DS1 integrated CSU	DS1 interface circuit pack (TN767D or TN464E and later) and integrated CSU module.
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. E1-32 channel is not supported in the United States and Canada.
Dual DCP I-channels	Refer to AUDIX for hardware requirements.
DXS button enhancements	Attendant console with DXS console addition.
ECMA conformance in ISDN-PRI	DS1 Interface (24/32) circuit pack.
EIA Interface	One data line circuit pack per 8 EIA interfaces, and 1 data module per port on the circuit pack are required.
Emergency access to the attendant	Requires a 301A Basic or 302A enhanced attendant console if a unique emergency tone is required at the console; otherwise, normal ringing is heard for an emergency call and the attendant display flashes.
Enhanced voice terminal display	8400-series DCP terminal, 603E1 CallMaster III, or 9400-series DCP terminals are required. The 9400-series terminals are for European use only. 6400-series DCP terminals are available for Release 6 and later.
ESPA radio -paging	European standard paging access equipment required.
Extended user administration of redirected calls	No additional hardware required.
External device alarming	No additional hardware required.
Facility busy indication	No additional hardware required other than a feature button with a light.

Continued on next page

Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Facility test calls	No additional hardware required.
Fiber link administration	For a public network, a CSU. For a campus network, a digital data module+ or similar device.
Go to cover	No additional hardware required.
Hold	No additional hardware required.
Hold - automatic	No additional hardware required.
Hot line service	No additional hardware required.
Hunt group	No additional hardware required.
Facility and non-facility associated signaling	See ISDN-BRI.
Flexible billing	An ASAI adjunct processor is required.
Generalized MFC	DS1 interface 24/32 and call classifier circuit packs.
German — digital	DS1 interface 24/32 for German digital trunks (such as PRI).
Greece MFC	DS1 interface 24/32 and call classifier circuit packs.
Inbound call management (ICM)	ASAI hardware (See ASAI feature). Use of ACD feature required (see ACD feature).
Individual attendant access	No additional hardware required.
Integrated announcement	See Recorded Announcement.
Integrated directory	If the terminal is connected to an associated data terminal, the 7404D voice terminal requires an optional Messaging Cartridge.
Intercept treatment	Requires announcement equipment and 1 port on an analog line circuit pack for each announcement and for each external analog announcement device, or an AUX trunk port for each external AUX trunk device. See Recorded Announcements. A TN750C Announcement circuit pack can provide up to 256 announcements. Intercept treatment can be administered to the attendant console.
Intercom - automatic	No additional hardware required.
Intercom — dial	No additional hardware is required.
Internal automatic answer (IAA)	All multi-function voice terminals with speakerphone or headset may be used except ISDN-BRI voice terminals plus a port interface on a Hybrid Line circuit pack.
Inter-PBX attendant calls	Tie trunk group between the branch and main locations.

Continued on next page

Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
ISDN-BRI line	One BRI Line circuit pack for up to 12 endpoints using the point-to-point 4-wire T interface or 12 endpoints using the 2-wire U interface. 1 BRI line circuit pack for up to 24 endpoints using passive bus. Release 6vs, R6si: packet control circuit pack for BRI applications. A TN570 Expansion Interface circuit pack is also required for system connectivity in multiple port network systems. Release 6vs requires J58890S L8 packet bus equipped CSCC. Release 6 csi: not available. Release 6r: no additional hardware beyond BRI line. All systems: in packet applications, a maintenance/test circuit pack is required in the PPN for all systems. In a critical reliability system a maintenance/test circuit pack is also required in each additional EPN.
ISDN-BRI trunk	One BRI trunk circuit pack for up to eight 2B+D interfaces. Release 6 vs, R6si: TN778 PACCON. Release 6vs requires J58890 L8 packet bus equipped CSCC.
ISDN-PRI	One PRI DS1 (T1/E1) interface circuit pack provides a signaling link and up to 23 ISDN-PRI trunk group members and up to 30 for E1 channels. Release 6vs, R6si: a processor interface circuit pack for PRI over PI, a packet control circuit pack for PRI via the LAN bus and PACCON. Release 6vs requires J58890S L8 packet bus equipped CSCC. Release 6r, R6csi: no additional hardware beyond DS1 interface.
Last number dialed	No additional hardware required.
Leave word calling	Display terminal to store and retrieve the LWC message.
Line lockout	No additional hardware required.
Listed directory numbers	No additional hardware required.
Look ahead interflow	No additional hardware is required. Interconnecting facilities must be ISDN-PRI with no interworking. Calls that interwork may interflow successfully but the ability to do so on an intelligent basis is lost, as is the look ahead interflow DNIS information.

Continued on next page

Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Loudspeaker paging access	Requires loudspeaker paging equipment and 1 port on an auxiliary trunk circuit pack for each individual paging zone port (9 maximum). 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, 1 port on a CO trunk circuit pack, or 1 port on an analog line circuit pack, or 1 port on an auxiliary trunk circuit is used, depending on the PagePac arrangement.
Loudspeaker paging access - deluxe	Loudspeaker paging equipment and 1 port on an auxiliary trunk circuit pack per zone. Paging interface equipment consisting of a 909-type voice coupler adapter (only if equipment is not FCC- registered) and a 24-volt power supply, per zone. This hardware can be shared with the code calling access feature.
Malicious call trace	A display set and optional CPE recording device.
Manual message waiting	No additional hardware required.
Manual originating line service	No additional hardware required.
Manual signaling	No additional hardware required.
MERLIN/system 25 - voice terminal support (731xH Series)	No additional hardware required.
Messaging server interface	Release 6vs and R6si requires a processor interface circuit pack. A port on a digital line circuit pack is required to provide the MS interface This application also requires an ADU and a port on a data line circuit pack or a modem and an analog line circuit pack. Release 6r: The BX.25 connection requires a PGATE circuit pack. Release 6csi: Not available.
Mexico 2-way	DS1 interface 24/32 and call classifier circuit packs.
MFC enhancements	DS1 interface 24/32 and call classifier circuit packs.
MF shuttle	DS1 interface 24/32 and call classifier circuit packs.
MF signaling	No additional hardware required.
Misoperations handling	No additional hardware required.
Modem pooling	One pooled modem circuit pack per 2 integrated conversion resources provided. Each combined conversion resource requires 1 port on the digital line circuit pack, 1 port on an analog line circuit pack, and an analog modem and data module or 7400 terminal.

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Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Multi-appearance preselection and preference	Multi-button electronic telephone (MET).
Multimedia applications server interface (MASI)	DS1 interface 24/32 and call classifier circuit packs.
Multimedia call handling (MMCH)	Multimedia interface circuit pack and multimedia voice conditioner circuit pack to provide multimedia call processing. A digital line port and BRI data port per multimedia complex.
Multiple call handling on request or forced	A multi-appearance set is required.
Music-on-hold access	Music source and 1 port on an auxiliary trunk or analog line circuit pack are required. A 909-type voice coupler is required if the system is not FCC-registered (United States only). A music source and 1 port on a TN746B or TN468B or later Analog Line circuit pack. A KS23395, L4 Music-on-Hold interface to convert a loop start port into a Music-on-Hold port. The port must be administered for this purpose. Also, a 909-type voice coupler is required if the music source is not FCC-registered (United States only). France: a port on the TN2183 Analog Line circuit pack and the 122A Music-on-Hold interface unit (wall-mounted).
Names registration	A PMS can connect through a data module and a port on a digital line circuit pack, or through an ADU and a port on a data line circuit pack. A journal printer requires a data module and a port on a digital line circuit pack, or an ADU and a port on a data line circuit pack.
National ISDN-1	DS1 Interface circuit pack.
Network access — public	One port on a CO or DIOD trunk circuit pack or 1 port on a DS1/E1 interface circuit pack or tie trunk circuit pack.
Night Service - hunt group, night console service and night station service	No additional hardware required other than a button to activate and deactivate the feature.
Night service — trunk answer from any station	Ringing device and 1 port on an analog line circuit pack.
Night service - trunk group	No additional hardware required other than a button to activate and deactivate the feature.
Off-premises data extensions	Trunk data module or DCP extender and 1 port on a digital line circuit pack or DS1 circuit pack.
Off-premises station	Cross-connecting capabilities and 1 port on an analog line circuit pack or DS1 circuit pack.

Continued on next page

Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
PC application software translation exchange (PASTE)	A port on a digital line or BRI line circuit pack connected through a Personal Computer configured with the PC/PBX, PC/ISDN, or PassageWay circuit pack and application software to an appropriate voice terminal.
PC interface (hardware varies depending on the configuration group used)	Group 1: 7404D voice data station, 31815 PC cartridge, standard EIA RS-232 connecting cables, an IBM-compatible PC (6300 with DOS 2.11 or later, 6300 Plus with DOS 3.1 or later, PC/XT with PC-DOS 2.0 or later, or PC/AT with PC-DOS 3.1 or later). 384K or more of RAM is recommended on PCs running integrated software applications. Group 2: 7400-series DCP terminals, PC/PBX interface card, an IBM-compatible PC (6300 or 6300 Plus with DOS 3.1 or later, or PC/XT with PC-DOS 3.1 or later. 448K or more of RAM is recommended on PCs running integrated software applications. Group 3: 7500-series ISDN-BRI Voice Terminal, up to 4 PC/ISDN expansion cards, an IBM-compatible PC (6300, 6300 Plus, PC/XT, PC/AT, PS/2, or Compaq), and DOS 3.1 or later.
PC/PBX connection	A port on a digital line circuit pack for each PC/PBX connected.
Personal central office line (PCOL)	A port on a central office trunk circuit pack for each trunk assigned as a PCOL.
Personal station access	Digital line ports and a digital voice terminal.
Personalized ringing	No additional hardware required.
PMS (property management system)	.
Power Failure Transfer	One emergency transfer panel per 5 or 6 trunks assigned to Power Failure Transfer, depending on panel used. The following panels are available: ■ 808A Panel — Serves up to 5 failure transfer terminals. The unit provides automatic ground start or loop start ■ Z1A Panel — Serves up to 6 power failure transfer terminals. A ground-start key is required at each preselected voice terminal when ground-start trunks are used
PRI Converter	DASS - 1 TN464F DS1/E1 circuit pack and 1 TNCCSC-1 circuit pack. DPNSS - 1 TN464F DS1/E1 circuit pack and 1 TNCCSC-2 circuit pack. BRI - 1 TN464F DS1/E1 circuit pack and 1 TNPRI/BRI circuit pack.

Continued on next page

Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Priority Calling	No additional hardware required.
Privacy - Attendant Lockout	No additional hardware required.
Privacy - Manual Exclusion	No additional hardware required.
Property Management System (PMS)	For all except Release 6r, either: 1. Using a digital line port and a data module, or 2. Using a digital line port and an ADU For Release 6r, either: 1. A packet data circuit pack cross-connected to a port on a data line circuit pack, connected to a second data line circuit pack port and then to an ADU, or 2. A packet data circuit pack cross-connected to a port on a data line circuit pack connected to either a BRI line circuit pack connected to a 7500 Data Module or to a digital line connected to a data module. Data line circuit pack with an ADU or a data module and port on a digital line circuit pack.
Public Network Call Priority	No additional hardware required.
Pull Transfer	No additional hardware is required in a stand-alone configuration. In a network environment, the TGU/TGE tie trunks (TN497) are the only trunks that support the flash signaling necessary to complete the pull transfer operation between systems.
QSIG Global Networking	Same as ISDN-PRI. See ISDN-PRI.
Queue Status or Queue Status Indication	One port on an analog line circuit pack for each auxiliary queue warning lamp.
Reason Codes	No additional hardware is required.
Recall Signaling	No additional hardware required.

Continued on next page

Table 42. Additional Hardware to Use Features — *Continued*

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)	All except Release 6r: each analog announcement has announcement equipment, such as a unit configured with an analog interface, and 1 port on an analog line circuit pack. These systems can also use an announcement unit configured with an auxiliary trunk interface and port on an auxiliary trunk circuit pack. Each integrated announcement, accessed by a call, requires 1 port on an integrated announcement circuit pack. Up to 128 announcements can be recorded on the integrated announcement circuit pack. A network control circuit pack restores messages after a power failure. Release 6r: each analog announcement has announcement equipment, such as a unit configured with an analog interface, and 1 port on an analog line circuit pack. Can also use a unit configured with an auxiliary trunk interface and 1 port on an auxiliary trunk circuit pack. Each integrated announcement, accessed by a call, has 1 port on an integrated announcement circuit pack. Up to 256 announcements can be recorded. Requires a system access port resource (packet data and data line combination) to save and restore announcements to the integrated announcement circuit pack(s).
Recorded Telephone Dictation Access	Telephone dictation machines and, depending on type of machine, 1 port on an analog line circuit pack or 1 port on a auxiliary trunk circuit pack for each machine assigned.
Release Link Trunk Group	Requires a port in a TN722B, TN767, or TN464D circuit pack for each trunk to be assigned in the trunk group. A TN722B or TN767 provides 24 ports, and a TN464D provides 24 or 32 ports.
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	For on-premises remote: A data module and associated ADU and system access protocol or data module and a terminal. For off-premises remote: A pooled modem circuit pack on site, or access to the RMATS modem. For off site, a data terminal modem and communication emulation software in a PC.
Remote call coverage	No additional hardware required.
Restricted/unrestricted call lists	No additional hardware required.
Restriction - controlled	No additional hardware required.

Continued on next page

Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Restriction - fully restricted service	No additional hardware required.
Restriction - miscellaneous terminal	No additional hardware required.
Restriction - toll	No additional hardware required.
Restriction -voice terminal: inward, manual terminating line, origination, outward, public and termination	No additional hardware required.
Ringback queuing	No additional hardware required.
Ringing _abbreviated and delayed	No additional hardware required.
Ringer cutoff	No additional hardware required other than available feature buttons.
Rotary dialing	No additional hardware required.
Russia MFR for ANI	DS1 interface 24/32 and call classifier circuit packs.
R2-MFC	Analog or digital trunk and call classifier, such as a TN2182 or a TN744B or greater suffix circuit pack.
Security violation notification	Voice terminal with a display. Security violation notification via announcements requires the integrated announcement circuit packs.
Send all calls	No additional hardware required.
Software defined data network	No additional hardware required unless a tie trunk is used. If so, 1 tie trunk circuit pack or 1 DS1 circuit pack.
Spain MFE	DS1 Interface 24/32 and call classifier circuit packs.
Station hunting	No additional hardware required.
Station security code	No additional hardware required.
Subnet Trunking	Additional call progress tone detector ports on tone detector circuit packs, if routing patterns containing “wait” symbols are used heavily and if dial tone detection is preferable to waiting for interval time-out.
SVN Refer Call with Announcements	Integrated announcement circuit pack.
Switch Based Bulletin Board	No additional hardware required.
System Administration Report Scheduler	See report scheduler and system printer.

Continued on next page

Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Telecommuting Access	Requires a DEFINITY Extender at both the home site and the office location (the location of the DEFINITY ECS).
Temporary Bridged Appearance	No additional hardware required.
Tenant Partitioning	No additional hardware required.
Terminal Translation Initiation	Display/voice terminal and associated data module required to dial into the system to activate the extension.
Terminating Extension Group	No additional hardware required.
Timed Reminder and Attendant Timers	No additional hardware required.
Transfer	No additional hardware required.
Transfer — Outgoing Trunk to Outgoing Trunk (with Security)	Feature can be activated for trunk groups with trunks assigned to the following trunk circuit packs: TN747B Central Office Trunk, TN760C Analog Tie Trunk, and TN722B, TN767, or TN464C DS1 circuit pack.
Trunk Flash	No additional hardware required.
Trunk Group Busy/Warning Indicators to Attendant	No additional hardware required other than available feature buttons.
Trunk Identification by attendant	No additional hardware required other than available feature buttons.
Trunk to Trunk Transfer	No additional hardware required.
Uniform Call Distribution	Requires an analog line circuit pack for each auxiliary queue warning lamp. An announcement circuit pack is recommended if calls will be sent to a call queue.
Uniform dial plan	No additional hardware is required except as needed for DCS. See DCS feature. Tie lines are required if system-to-system communication via DCS is not over the Public Switched Telephone Network (PSTN).
United Kingdom (UK) Networking (Name/Number)	DS1 Interface - T1, 24 Channel - E1, 32 Channel circuit pack.
VDN of origin announcement	Integrated announcement circuit pack.
Visually impaired attendant service (VIAS)	At least 1 TN433 (Italy) or TN457 (United Kingdom) speech processor circuit pack is required. The TN725B (United States) speech processor circuit pack does not support VIAS.

Continued on next page

Table 42. Additional Hardware to Use Features — *Continued*

Feature	Hardware
Voice mail system via mode code	A port on an existing analog circuit pack.
Voice message retrieval	Speech synthesizer circuit pack, which has 4 ports to provide voice message retrieval. Traffic engineering is required to determine the number of circuit packs.
Voice response integration (VRI)	An analog line or DS1 interface circuit pack (line side T1/E1). The TN744 call classifier circuit pack is not required by call prompting for the returning of digits in-band from CONVERSANT to the DEFINITY system; a TN748 tone detector is used. Basic call vectoring must be enabled to use **converse-on** vector step. Call prompting must be enabled.
Voice terminal alerting options	No additional hardware required.
Voice terminal display	Display-equipped voice terminal that can be a: ■ Digital terminal requiring 1 port on a digital line circuit pack ■ BRI terminal requiring 1 port on a BRI circuit pack ■ Hybrid terminal requiring 1 port on a hybrid line circuit pack
VuStats	Terminal with display
Wideband switching	One DS1 interface circuit pack (TN464C or later) for line-side and another for network facilities. Same as ISDN-PRI. See ISDN-PRI. Also requires wideband data modules.
World class BRI	Same as ISDN-BRI. See ISDN-BRI.
World class Tone detection	Tone Detection Modes 1, 2, and 3 are meaningful only if the tone detectors are TN420B or greater or TN2182B, or TN744D. Modes 4 and 5, the tone validation timer, and the interdigit pause are meaningful only if the tone detectors are TN744C, TN420C, or TN2182. Tone detection for countries using the same tone plan as the United States is also available using an alternate tone detector. The TN420B only recognizes tone detection modes 1, 2, and 3. TN420C, TN744, and TN2182B recognize modes 1, 2, 3, 4, and 5, and tone validation and interdigit pause. TN2182 and TN744C recognize mode 6. TN748C provides precise tone detection for the United States tone plan.
World class gone Generation	Any tone generator circuit pack can be used. Many circuit packs are capable of producing all North American and international tones including 440 Hz at 17.25 dB.

Allocation of Buttons

The allocation of buttons in Table 43 is by station type. The minimum button capacity was calculated by administering each terminal with the default number of call appearances and adding a non-call appearance/bridged-appearance button to the highest allowed button for every possible screen.

The maximum button capacity was calculated by administering each terminal with the default number of call appearances, then adding additional call appearances as the highest allowed button number for each SAT screen which contained buttons.

Table 43. Allocation of Buttons by Station Type

Station Type	Typical Button Units R6vs, csi, si Minimum	Maximum	Typical Button Units R6r
Analog sets: 500, 2500, 7101A, 7103A, 7104A, 8110, DS1SA, and DS1FD	76	76	76
Other Analog Ports[1], Wired Spare Ports, and Non-wired Spare Ports	76	76	76
10MET set — 10 buttons 20MET set — 20 buttons 30MET set — 30 buttons	64 184 304	64 184 304	64 184 304
Terminal — 510 BCT Terminal — 515 BCT	388 280	400 364	388
602A1 Callmaster I 603A1 Callmaster II 603D1 Callmaster III 603E1 Callmaster III 606A1 Callmaster IV	412 412 412 412 952	496 448 448 448 1552	412 412 412 674

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Table 43. Allocation of Buttons by Station Type — *Continued*

Station Type	Typical Button Units R6vs, csi, si Minimum	Maximum	Typical Button Units R6r
Digital set — 6402	184	184	—
Digital set — 6408	112	112	—
Digital set — 6408D	448	508	—
Digital set — 6408D+	448	508	—
Digital set — 6416D+	544	700	—
Digital set — 6416D+w/XM24B expansion module	832	1276	—
Digital set — 6424D+	640	892	—
Digital set — 6424D+w/XM24B expansion module	928	1468	—
Voice/data — 6538	112	112	—
Hybrid set — 7303S	124	124	124
Hybrid set — 7305S	412	412	412
Hybrid set — 7309H	124	124	124
Hybrid set — 7313H	124	124	—
Hybrid set — 7314H	268	268	—
Hybrid set — 7315H	364	448	—
Hybrid set — 7316H	412	412	—
Hybrid set — 7317H	508	592	—
Digital set — 7401D/7401+	112	112	112
Digital set — 7403D	124	124	124
Digital set — 7404D	76	76	76
Digital set — 7404D w/display	232	268	232
Digital set — 7405D	412	412	412
Digital set — 7405D w/display	568	652	—
Digital set — 7405D w/cov	652	652	—
Digital set — 7406D	340	340	340
Digital set — 7406D w/display	412	436	412
Digital set — 7406+	340	340	340
Digital set — 7406+ w/display	412	436	412
Digital set — 7407D	568	652	568
Digital set — 7407+	568	652	568
Digital set — 7410D	124	124	102
Digital set — 7410+	124	124	124
Digital set — 7434D	412	412	412
Digital set — 7434D w/display	568	940	—
Digital set — 7434D w/call coverage module	652	652	652
Digital set — 7444D	568	940	568

Continued on next page

Table 43. Allocation of Buttons by Station Type — *Continued*

Station Type	Typical Button Units R6vs, csi, si Minimum	Maximum	Typical Button Units R6r
Digital set — 8403B	184	184	204
Digital set — 8405B/B+	64	64	124
Digital set — 8405D/D+	352	376	352
Digital set — 8410B	124	124	124
Digital set — 8410D	352	436	124
Digital set — 8411B	124	124	124
Digital set — 8411D	352	436	352
Digital set — 8434 D	676	1048	676
Digital set — 8434 with XM24B Expansion Module	964	1552	—
Digital set — 9403B	184	184	184
Digital set — 9410D	352	436	124
Digital set — 9434D	676	1048	676
Basic attendant console (302A, 302B)	412	—	—
Enhanced attendant console (302C)	—	—	—
Attendant selector console (26B1)	—	—	—
ISDN-BRI			
— 7505D	232	288	232
— 7506D	304	444	304
— 7507D	532	107	532
— 8503D	64	64	64
— 8510T w/display	232	372	232
— 8520T w/display	352	692	352
Wireless 9601A[2]	—	—	—
ADJLK[3]	4	4	4
ADX8D	568	652	568
ADX16A	76	76	76
ADX16D	568	652	568
ASAI	4	4	—
CP9530	76	—	—
DIG800	568	652	—
K2500	76	76	—
MDC9000	52	64	—
MDW9000	52	64	—
PC	482	580	—

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Table 43. Allocation of Buttons by Station Type — *Continued*

Station Type	Typical Button Units R6vs, csi, si Minimum	Maximum	Typical Button Units R6r
VRU[4]	76	76	—
VRUFD	62	76	—
VRUSA	62	76	—
WCBRI	24	24	—
105TL	28	28	—

1. Includes music-on-hold, recorded announcement, and loudspeaker paging.
2. The radio controller supports 24 simultaneous calls and 2 wireless fixed bases.
3. Needs ASAI interface and ASAI prop adjunct links turned on in "sys-param customer options."
4. Needs DTFMF turned on in "sys-param customer options."

The following notes apply to the button and data module records in Table 43:

- Any DCP station (except 8400-series) can add a 7400B, requiring 1 data module record.
- A data module can be added to a 7403D or 7405D, requiring 1 data module record.
- A data module (ADM-T) can be added to a 7505D, 7506D, or 7507D, requiring 1 data module record.
- An ISDN-BRI endpoint record is required for each distinct ISDN-BRI endpoint. Thus each voice-only, data-only, or voice-data endpoint uses 1 of these records.

Cabling Distances

When the system layout is being determined, consider the maximum cabling distances to the system cabinet. Table 44 lists the allowable intra-premises cabling distances. If using mixed wire sizes, use the table columns for 26 AWG (#4) (0.14 mm^2) wire. These distances are based on a minimum of -42.5 VDC at the equipment connecting to the system.

Table 44. Allowable Intra-premises Cabling Distances

	24 AWG Wire (0.26 mm^2)		26 AWG Wire (0.14 mm^2)	
Equipment	**Feet**	**Meters**	**Feet**	**Meters**
Enhanced attendant console (302C1)				
With selector console				
Phantom powered	800	244	500	152
Locally powered	5000	1524	3400	1037
Without selector console				
Phantom powered	1400	427	900	274
Locally powered	5000	1524	3400	1037
510D or 515 terminals	3000	914	2200	670
513, 610 BCT, 615 MT, 715, 2900/715, 715 BCS-2, 4410 or 4425 terminals (see also “data modules” or “EIA interface”). Maximum distance from terminal to data module or ADU	50	15.2	50	15.2
Data modules:				
Z702AL1-DSU data module base	5000	1524	4000	1219
Z703AL1-DSU data module base	5000	1524	4000	1219
7404D data module	5000	1524	4000	1219
DTDM	3400	1037	2200	670
High-speed data link	5000	1524	4000	1219
MTDM	5000	1524	4000	1219
3270 data module	5000	1524	4000	1219
7400A/B data module	5000	1524	4000	1219
8400B Plus data module	5000	1524	4000	1219
EIA interface (data line circuit pack and ADU):	2000	610	2000	610
19.2 kbps	5000	1524	4000	1219
9.6 kbps	7000	2130	6000	1827
4.8 kbps	12000	3654	10000	3050
2.4 kbps	20000	6100	16000	4875
1.2 kbps	40000	12200	30000	9150
0.3 kbps				

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Table 44. Allowable Intra-premises Cabling Distances — *Continued*

Equipment	24 AWG Wire (0.26 mm²) Feet	24 AWG Wire (0.26 mm²) Meters	26 AWG Wire (0.14 mm²) Feet	26 AWG Wire (0.14 mm²) Meters
Voice terminals:				
Analog				
8-port circuit pack (TN742 or 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 on/off premises and out of building	15200	4633	10000	3050
16-port circuit pack (TN746/B or TN2183), on-premises only				
no out-of-building or bridging (note 1)				
500 or 2500 type terminals without adjuncts	3100	945	2000	610
	3000	914	2000	610
8100 series	3000	914	2000	610
16-port circuit pack (TN746B or 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	15200	4633	10000	3050
Hybrid (TN762)				
7300 series (Phantom powered)	1000	305	750	229
7300 series (with Local power)	2000	610	2000	610
Digital (TN754B, TN2181, or TN2224)				
7400D, 8400, or 9400 Series				
Phantom powered	3500	1066	2200	670
Locally powered (no Digital Line Protectors)	5000	1524	4000	1219
Digital (TN754)				
7400D series				
On-premises-only terminals	3500	1066	2200	670
Out-of-building, same premises terminals	3500	1066	2200	670
Out-of-building, with Digital Line Protectors	5000	1524	4000	1219
ISDN-BRI (TN556) 7500 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 requires a carbon block, gas tube, or equivalent solid state device at each end of the interbuilding cable.
2. Use only 500- or 2500-type terminals off-premises to a CO.
3. Point-to-point connections and terminals are within 33 feet (10 m) of the jack.
4. If using 22 AWG (0.34 mm^2) #6 wire, contact your Lucent Technologies representative.

ISDN-BRI Two-Wire Line Cabling Distances

The TN2198 BRI 2-Wire line circuit pack supports various cabling configurations using 22, 24, and 26 AWG (0.34 mm^2, 0.26 mm^2, 0.14 mm^2, respectively) wire. Up to 18,000 feet (5486 m) (maximum) may be used between the TN2198 and the NT1 network interface. Refer to Table 45 for the cabling distances from the NT1 network interface to the 7500- and 8500-series voice terminals using 24 AWG (0.26 mm^2 and 26 AWG (0.14 mm^2) wire. If 22 AWG (0.34 mm^2) wire is used, contact your Lucent Technologies representative. Distances from the power closet to the voice terminal are typically less than 250 feet (75 m).

Table 45. Cabling Distances from the NT1 to the ISDN-BRI Voice Terminal

Equipment		24 AWG (0.26 mm^2)		26 AWG (0.14 mm^2)	
		Feet	Meters	Feet	Meters
NT1 to ISDN-BRI Four-Wire Voice Terminal (7500 and 8500 Series)	Termination resistor (3 feet) (0.9 m)	1900	579	1600	488
	Termination resistor (250 feet) (75 m)	1600	488	1300	396

Fiber Optic Cabling Distances

The DEFINITY ECS may contain a Class 1 LASER device if single-mode fiber optic cable is connected to a remote EPN. The LASER device operates within the following parameters:

- Maximum Power Output: -5 dBm
- Wavelength: 1310 nm
- Mode Field Diameter: 8.8 microns

CLASS 1 LASER PRODUCT
IEC 825 1993

CAUTION:

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Contact your Lucent Technologies representative for more information.

For the maximum fiber optic cabling distances for a system, determine:

- The mean loss and the length of the outside plant fiber cable
- The mean loss and the length of fiber cable shipped with the cabinet (including any fiber riser cable)
- The mean loss of an ST connector and the number of ST connections
- The mean loss due to the total number of splices
- Higher-order mode loss

NOTE:

If estimated fiber limits such as loss, length, excessive splices, and so forth are expected, OTDR (Optical Time Domain Reflectometer) tests should be made to ensure a successful installation of a remote EPN fiber link.

For multi-mode fiber: The 9823A lightwave transceiver transmits up to 4,900 feet or 0.93 miles (1.5 km). The 9823B lightwave transceiver transmits up to 25,000 feet or 4.73 miles (7.6 km). Multi-mode fiber optic cable consists of 2 separate 62.5-micron diameter or 50-micron diameter fiber optic cables. The transmission speed across a fiber link between the PPN and an EPN is 32.768 Mbps.

For single-mode fiber: The 300A lightwave transceivers transmits light up to 115,000 feet or 22 miles (35 km). Fiber loss must be less than 17dB. Saturation may occur if distances are short; attenuators may be required if the total loss on the fiber link is less than 10dBm. Single-mode fiber optic cable consists of 2 separate 8- to 10-micron core cables. The transmission speed across a fiber link between the PPN and an EPN is 32.768 Mbps.

DS1 Remoting Transmission Distance

When the distance between cabinets is greater than 115,000 feet or 22 miles (35 km), or if fiber optic cabling right-of-way is not available, use DS1 remoting for greater distances. Contact your Lucent Technologies representative for network engineering guidelines.

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, active features, trunks, and adjuncts connecting to the system. The system needs several minutes to initialize or recover automatically from being reset.

Call Progress Tones

This section details the tones generated by the systems for the United States. See Table 46 for the default call progress tones generated country code 1.

Table 46. Default Call Progress Tones

Tone	Frequency	Pattern (ms)
Answerback 3 tone	2225 Hz	3000 on, followed by silence; no repeat
Answerback 5 tone	2225 Hz	5000 on, followed by silence; no repeat
Bridging warning tone[1]	440 Hz	1750 on, 12000 off, 650 on; repeated
Busy tone	480 Hz + 620 Hz	500 on, 500 off; repeated
Call waiting tones:		
Internal	440 Hz	200 on, followed by silence; no repeat
External or handled by attendant	440 Hz	200 on, 200 off, 200 on followed by silence; no repeat
Priority call	440 Hz	200 on, 200 off, 200 on, 200 off, 200 on followed by silence; no repeat
Call waiting ringback tone	440 Hz + 480 Hz; 440 Hz	900 on (440 Hz + 480 Hz), 200 on (400 Hz), 2900 off; repeated
Centralized attendant call: incoming call identification	480 Hz & 440 Hz & 480 Hz	100 on (480 Hz), 100 on (440 Hz), 100 on (480 Hz), followed by silence; no repeat
Coverage tone	440 Hz	600 on, followed by silence; no repeat
Confirmation tone	350 Hz + 440 Hz	100 on, 100 off, 100 on, 100 off, 100 on followed by silence; no repeat

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Table 46. Default Call Progress Tones — *Continued*

Tone	Frequency	Pattern (ms)
Continuous confirmation tone	350 Hz + 440 Hz	100 on, 100 off; repeated
Dial tone	350 Hz + 440 Hz	continuous
Dial zero, attendant transfer, and test calls	440 Hz	100 on, 100 off, 100 on followed by silence; no repeat
Recall on don't answer, audible ringing	440 Hz	300 on, followed by silence; no repeat
Hold recall, hold confirmation	440 Hz	50 on, 50 off, 50 on, 50 off, 50 on, 50 off, 50 on, 50 off, 50 on followed by silence; no repeat
Camp-on recall, camp-on confirmation	440 Hz	100 on, followed by silence; no repeat
Executive override tone	440 Hz	3000 on, followed by silence; no repeat
Intercept tone	440 Hz & 620 Hz	250 on (440 Hz), 250 on (620 Hz); repeated
Precedence audible alert tone	440 Hz + 480 Hz	1600 on, 300 off; repeated
Recall dial tone	350 Hz + 440 Hz	100 on, 100 off, 100 on, 100 off, 100 on, 100 off, followed by continuous dial tone
Reorder tone	480 Hz + 620 Hz	250 on, 250 off; repeated
Remote hold tone	440 Hz	50 on, 50 off; repeated
Ringback tone	440 Hz + 480 Hz	1000 on, 3000 off; repeated
Voice signaling tone	440 Hz	1000 on, followed by silence; no repeat
Zip tone	480 Hz	500 on, followed by silence; no repeat

1. Used with the Busy Verification and Executive Override features, and Service Observing feature when the warning tone is enabled.

Table 47 lists the call progress tones available for customizing the tones. The tones in the list can be generated only when using a TN780 or TN2182 Tone-Clock circuit pack and the tone customizing feature is used. Tag tones are available only on the TN2182. The tones are used to customize from 1 to 20 tones in the 5 administrable tone plans.

In Table 47, **Level** is the tone amplitude in decibels (dBm). **0** dBm is referenced to 1 milliwatt. To customize these tones, refer to *DEFINITY Enterprise Communications Server Release 6 Administration and Feature Description*.

Table 47. Customizable Call Progress Tones

Frequency	Level (dBm)
Null	None
330 Hz	-8.0 [1]
330 Hz + 440 Hz	-5.0 + 8.5 [1]
330 Hz + 440 Hz	-8 + -11 [1]
350 Hz	-17.25
350 Hz + 425 Hz	-4.0 [1]
350 Hz + 425 Hz	- 4.0
350 Hz + 440 Hz	-13.75
350 Hz + 440 Hz	-13.0 [1]
350 Hz + 440 Hz	-13.75 [1]
375 Hz + 425 Hz	-15.0
404 Hz	-11.0
404 Hz	-16.0
404 Hz + 425 Hz	-11.0
404 Hz + 450 Hz	-11.0
425 Hz	-4.0 [1]
425 Hz	-5.0 [1]
425 Hz	-8.0 [1]
425 Hz	-11.0 [1]
425 Hz	-17.25 [1]
440 Hz	-11.0 [1]
440 Hz	-13.0 [1]
440 Hz	-17.25
440 Hz + 350 Hz	-13.0 [1]
440 Hz + 480 Hz	-13.0 [1]
440 Hz + 480 Hz	-19.0
480 Hz + 620 Hz	-13.0 [1]
480 Hz + 620 Hz	-24.0
525 Hz	-11.0

Continued on next page

Table 47. **Customizable Call Progress Tones — *Continued***

Frequency	Level (dBm)
620 Hz	-17.25
697 Hz or 700 Hz	-8.5/-8.0
770 Hz or 900 Hz	-8.5/-8.0
852 Hz or 1100 Hz	-8.5/-8.0
950 Hz	-5.0 [1]
950 Hz	-10.0 [1]
Chimes (860 Hz)	- 3.0
941 Hz or 1300 Hz	-8.5/-8.0
DMW (1000 Hz)	0.0
Square (1000 Hz)	+ 3.0
1004 Hz	0.0
1004 Hz	-16.0
1209 Hz or 1500 Hz	-7.5/-8.0
1336 Hz or 1700 Hz	-7.5/-8.0
1400 Hz	-5.0 [1]
1400 Hz	-10.0 [1]
1400 Hz	-11.0
1477 Hz or 2600 Hz	-7.5/-8.0
1633 Hz or 1004 Hz	-7.5/ 0.0
1700 Hz	-16.0 [1]
1800 Hz	-5.0 [1]
1800 Hz	-10.0 [1]
2025 Hz	-12.1
2100 Hz	-12.1
2225 Hz	-12.1
2804 Hz	-16.0
Count	None

1. Available only with TN2182 Tone-Clock circuit pack.

Audible Ringing Patterns

Table 48 lists the administrable audible ringing patterns that can appear on analog line circuit pack ports. The times under the columns "0 - 5" are in milliseconds. *DEFINITY Enterprise Communications Server Release 6 Administration and Feature Description*, contains ringing pattern administration.

Table 48. Ringing Patterns

Bursts	Set Number	0	1	2	3	4	5
One	on	900	1000	1000	1000	1000	1000
	off	4100	2150	4000	4000	4000	2150
Two	on	400	300	600	400	300	400
	off	200	300	200	200	300	200
	on	300	400	200	400	300	400
	off	4100	2150	4000	4000	4100	2150
Three	on	200	100	200	200	200	200
	off	100	200	200	200	100	200
	on	200	100	200	200	200	200
	off	100	200	200	200	100	200
	on	300	400	200	200	300	200
	off	4100	2150	4000	4000	4100	2150

The following circuit packs default to the associated ringing pattern sets:

- TN2180 — Set 1
- TN2135 — Set 2
- TN2144 — Set 3
- TN468B — Set 4
- TN2149 — Set 4
- TN2181, TN2183, and TN2224 — Set 0 (administrable ringing cadence)

The following list shows the intended use for administered ringing pattern sets:

- Set 0 — United States
- Set 1 — Japan and Spain
- Set 2 — Italy

- Set 3 — Netherlands and Sweden
- Set 4 — Australia, Belgium, and United Kingdom
- Set 5 — India, Malaysia, New Zealand, and Singapore

Multi-Frequency Compelled Tones

With multi-frequency compelled (MFC) signaling used on direct inward dialing (DID) and direct outward dialing (DOD) trunks in countries outside the United States, a system responds to the frequencies generated by the CO with answering frequencies.

The MFC tones and signaling sequence follows the International Telecommunications Union (ITU-T) recommendations for MFC signaling defined in *Volume VI, Fascicle VI.4* of the 1989 CCITT *blue books*.

Refer to *DEFINITY Enterprise Communications Server Release 6 Administration and Feature Description*, for more details.

Indicator Lamp Signals

Table 49 lists the light signals generated by the system for the attendant console and multi-appearance voice terminals.

Table 49. Light Signals Generated

Light Signal	Pattern in Milliseconds (ms)
Dark	Off
Lighted	On
Flashing	500 on, 500 off; repeated
Fluttering	50 on, 50 off; repeated
Broken flutter	5 cycles of 50 on, 50 off, followed by 500 off; repeated
Wink	350 on, 50 off; repeated

A—Wireless Business Solutions

Overview

This appendix briefly describes the DEFINITY wireless business (WBS) system and the Forum™ personal communications manager (PCM).

FreeWorks™ Wireless Telecommunications

FreeWorks provides a complete global wireless system. The DEFINITY WBS product provides wireless applications within the United States. The Forum™ PCM product provides cordless telephone generation 2 (CT2) technology for countries outside the United States.

Any of the above mentioned products provide greater mobility to business customers by integrating wireless capabilities into the DEFINITY ECS.

Each of the 3 systems is ideally suited to personnel associated with building security, maintenance, and sales and may be added to an existing system while retaining the same features and quality of service.

DEFINITY Wireless Business System Components

The DEFINITY wireless business system (WBS) consists of the following main components:

- Mobility manager software
- Radio controllers
- Wireless fixed bases
- Cell antenna units
- Pocket telephones
- Battery chargers

The following sections describe each of the above main components. Contact your Lucent Technologies representative to help in determining the types and numbers of components required at each site.

Mobility Manager Software

The mobility manager software provides maintenance and administration functions for the wireless network. This software also provides the common control and tracking of the pocket telephones as they change location inside the business premises. The mobility manager also directs all control and voice information to the appropriate radio controller for each pocket telephone.

Radio Controllers

The radio controllers are circuit packs inside the DEFINITY ECS. Each radio controller connects and controls up to 2 wireless fixed bases (WFBs). Radio controllers provide the interface between the system and the network of WFBs. The controllers connect to the WFBs by an I2 proprietary interface. The radio controller is responsible for much of the intelligence needed to maintain the quality of the radio links established between elements.

The radio controller circuit pack operates in all applicable DEFINITY cabinets over the full range of temperature and humidity specifications:

- 40 to 120 ^{o}F (4.4 to 48.9 ^{o}C)
- 10% to 95% relative humidity at 84 ^{o}F (28.8 ^{o}C)
- 10% to 45% relative humidity at 110 degrees ^{o}F (43.3 ^{o}C)

Wireless Fixed Bases (WFBs)

The WFBs are the radio base stations that change incoming calls from the system into radio signals used for transmission through the air to the appropriate pocket telephones. The bases also change the incoming radio signals from the pocket telephones into binary data before they are sent to the system.

Each base can support up to 12 simultaneous conversations. The base can also support one internal cell antenna unit (CAU) or up to 4 remote external CAUs. Each base connects to a radio controller by an I2 interface. Each base connects to 1 to 4 CAUs via an I3 proprietary interface. Table 50 details the WFB dimensions and weight.

Table 50. Dimensions and Weight

Height	Width	Depth	Weight	Heat Dissipation (Per Hour)
5 inches (12.7 cm)	7 inches (17.8 cm)	2 inches (5.08 cm)	2 Pounds (0.9 kg)	6.82 to 34.1 BTUs (1.8 to 8.9 gram-calories)

The WFB meets the requirements for “Equipment not Normally Customer Carried” and is intended for use indoors.

- 0 to 120 ^{o}F (-17.8 to 48.9 ^{o}C)
- 0% to 95% relative humidity

Each WFB can be phantom-powered by the I2 interface on the TN789 radio controller circuit pack or powered from an auxiliary AC power supply (WP-92464).

The TN789 can supply 250 mA of load current if no CAUs are installed. The auxiliary AC power supply supplies 400 mA of load current.

Each WFB can dissipate from 1.8 Watts to 10 Watts of power (depending on number of simultaneous calls).

NOTE:

The auxiliary power supply is required if one or more CAUs connect to the WFB.

Cell Antenna Unit (Optional)

The cell antenna unit (CAU) is an optional remote antenna connecting to a WFB. The antenna expands a coverage area and can be located as far as 100 cable feet (30.5 m) from its associated base. Each antenna connects to and is powered from the base by an RG59, 75 Ohm coaxial cable. The CAUs use an I3 interface. The frequency bandwidth of the antenna is 1910 MHz to 1930 MHz.

The CAU meets the requirements for “Equipment not Normally Customer Carried” and is intended for use indoors.

- 0 degrees to 120 ^{o}F (-17.8 to 48.9 ^{o}C)
- 0% to 95% relative humidity

Each CAU weighs 0.5 pound (0.22 kg) and can dissipate up to 2 Watts of power. The average heat dissipation is 6.82 BTUs (1.7 gram-calories) per hour.

Wireless Terminals

Wireless terminals (9601-type) are pocket-sized portable telephones designed to operate indoors. The telephones provide 2 call appearances, a display that supports basic business communications needs, and a 12-button dial pad. The telephone may be used as a supplement to a wired desk telephone or may be used in place of a desk telephone.

Up to 260 telephones can be used throughout the entire coverage area of 3 million square feet (914,400 square meters). The telephone does not physically connect to the system or to any system component. Instead, the telephone uses wireless communications to a network of WFB. Only the bases physically connect to the system.

Battery Chargers

The Battery Charger can be either wall or desk mounted and can charge a fully discharged battery in less than 1.5 hours. The charger can simultaneously charge a pocket telephone battery and a spare battery pack. The Battery Charger meets the requirements for “Equipment not Normally Customer Carried” and is intended for use indoors.

- 32 to 120 ^{o}F (0 to 48.9 ^{o}C)
- 0% to 95% relative humidity

DEFINITY Wireless Business System Books

For more information about installing the DEFINITY wireless business system, refer to *DEFINITY Wireless Business System Installation and Test*, 555-232-102.

For information about connecting the wireless fixed base to the DEFINITY system, refer to *DEFINITY ECS Interface Wireless Business System*, 555-232-108.

For more information on how to use the wireless telephone handsets, refer to the *DEFINITY Wireless Business System Pocket Phone User Guide*, 555-232-105.

Forum Personal Communications Manager Books

For more information about planning, installing, and maintaining the Forum personal communications manager, refer to *Forum Personal Communications Manager Release 1.1 Support Guide*.

For information about the personal communicator, refer to *Personal Communicator - 2055 User Guide*.

For more information on how to use the system, refer to *Getting Started with Forum Manager*.

Wireless Terminals Feature Access

The class of restriction (COR) and class of service (COS) features can be used to limit unauthorized access to features or services for a specific handset. Any telephone not administered on a system displays a “service denied” indication.

A pocket telephone previously administered on a system may be removed from service because it has been returned to customer inventory or reported as lost or stolen. The mobility manager provides a “marking” option. If a “marked” telephone attempts to access the system, a specified referral point is notified. Marked telephones are identified by their serial numbers so a user’s extension number can be assigned to a different telephone.

A — System Capacity Limits

Overview

This appendix provides information on the overall characteristics and capacities of the DEFINITY Systems.

System Capacity Limits

The maximum parameters for the DEFINITY hardware and software items are listed on the following pages. These parameters apply to compact single-carrier cabinets, compact modular cabinets, single-carrier cabinets, and multi-carrier cabinet systems.

Terminal and digital station capacities are reduced by such administered items as: attendant consoles, number of EAS login IDs, and number of ACD agents.

NOTE:

Not all maximum capacities listed in Table 51 can be reached simultaneously with all versions or all configurations of the system. See Station Button Capacity for the system button limitations.

Table 51. Maximum System Parameters

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Abbreviated Dialing (AD)				
AD lists per system	2400	2400	2400	5000
AD list entry size	24	24	24	24
AD entries per system	12,000	12,000	12,000	100,000
Auto dialing button				
Entries per system[1]	7	7	7	7
Enhanced list (system list)	1	1	1	1
Maximum entries	10,000	10,000	10,000	10,000
Group lists	100	100	100	1000
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

Continued on next page

Table 51. Maximum System Parameters — ***Continued***

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Personal lists	2400	2400	2400	5000
Maximum entries	100	100	100	100
Personal lists per extension	3	3	3	3
Applications Adjuncts				
CallVisor ASAI adjuncts	4	NA	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	NA	8	16
Application processors	1	NA	1	7
Voice processing adjuncts				
Traditional AUDIX	1	NA	1	8
DEFINITY AUDIX DCP emulation	1	1	1	1
DEFINITY AUDIX control link	1	NA	1	1
INTUITY AUDIX				
INTUITY AUDIX (Via mode code)	1	1	1	1
INTUITY AUDIX (Via BX.25)	1	NA	1	8
INTUITY AUDIX (MAPD)	1	1	1	1
Mode code voice mail systems	1	1	1	1
Other adjuncts				
CMS adjuncts	1	NA	1	1
ICM adjuncts (ISDN gateway)	NA	NA	NA	NA
BX.25 processor channels	64	NA	64	128
Hop channels	64	NA	64	128
Automatic Call Distribution (ACD)				
Announcements per split	2	2	2	2
Announcements per system	128	128	128	256
Splits	99	99	99	600
ACD members per split	200	200	200	999
Split members per system [3]	1000	1000	1000	10,000
Logged-In ACD agents	500	500	500	5,200

Continued on next page

Table 51. Maximum System Parameters — *Continued*

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Logged-In splits per agent[4]				
No CMS	4	4[5]	4	4
R2 CMS	3	NA[5]	3	3
R3 CMS	3	NA[5]	3	3
R3V2 CMS	4	NA[5]	4	4
R3V4 CMS[6]	4	NA[5]	4	4
R3V5 CMS	4	NA[5]	4	4
Queue slots per group	200	200	200	999
Queue slots per system	1500	1500	1500	15,000
ARS/AAR				
AAR/ARS patterns (shared)	254	254	254	640
ARS/AAR analysis tables	2000	2000	2000	2000
Choices per RHNPA table	12	12	12	12
Digit conversion entries	400	400	400	400
AAR/ARS digit conversion				
Digits deleted for ARS/AAR	28	28	28	28
Digits inserted for ARS/AAR	18	18	18	18
AAR/ARS sub-net trunking				
Digits deleted for ARS/AAR[7]	28	28	28	28
Digits inserted for ARS/AAR	36	36	36	36
Entries in each RHNPA table	1000	1000	1000	1000
FRLs	8	8	8	8
Inserted digit strings[8]	1200	1200	1200	3000
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 ARS/AAR pattern	6	6	6	16
UDP (entries)	10000	10000	10,000	50,000
TOD charts	8	8	8	8

Continued on next page

Table 51. Maximum System Parameters — *Continued*

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Toll analysis table entries	1000	1000	1000	1000
Attendant Service				
Attendant consoles (day:night)[9]	6:1	15:1	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	99	99	99	255
Release link trunk groups at branch	1	1	1	1
Release link trunks at main	400	400	400	4000
Release link trunk groups at main[10]	99	99	99	666
Other access queues				
Maximum number of queues	12	12	12	12
Maximum number of queue slots[11]	80	80	80	80
Size range of reserved queue	2-75	2-75	2-75	2-75
Reserved queue default size	5	5	5	5
Queue length	80	80	80	300
Switched loops per console	6	6	6	6
Authorization				
Authorization codes	5000	5000	5000	90,000
Station security code length	7	7	7	7
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	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	1	1	1	1
Toll call list	1	1	1	1
Unrestricted/allowed call lists	10	10	10	10

Continued on next page

Table 51. Maximum System Parameters — *Continued*

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Total call list entries	1000	1000	1000	1000
Automatic Callback Calls	240	240	240	1500
Automatic Wakeup				
Simultaneous display requests	10	10	10	30
Wakeup requests per system	2400	2400	2400	15,000
Wakeup request per extension	1	1	1	1
Wakeup requests per 15-minute interval	450	450	450	950
Basic CMS (BCMS)				
Measured agents orlLogin IDs	400	400	400	2,000
Measured agents per split	200	200	200	999
Measured splits	99	99	99	600
Measured trunk groups	32	32	32	32
Measured VDNs	99	99	99	512
Reporting periods				
Intervals	25	25	25	25
Days	7	7	7	7
Cabinets				
Expansion port network (EPN)				
Multicarrier cabinet[12]	NA	NA	2	43
Single-carrier cabinet	NA	NA	8	164
Small (upgrades only)	NA	NA	2	41
Inter-port network connectivity				
Port networks	1	1	3	44
Maximum number of PNs 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				
Multicarrier cabinet[13]	NA	NA	1	1
Single-carrier cabinet	NA	NA	4	NA

Continued on next page

Table 51. Maximum System Parameters — ***Continued***

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Compact Single-Carrier Cabinet	1	NA	NA	NA
Compact Modular Cabinet	NA	4	NA	NA
Call Appearances				
Bridged images per appearance	26	26	26	26
Call appearances per station[14]	54	54	54	54
Maximum appearances per extension	10	10	10	10
Minimum appearances per extension	0	0	0	0
Total bridged appearances	2400	2400	2400	25,000
Maximum simultaneous off-hook per call[15]	5	5	5	5
Call Coverage				
Coverage answer groups (CAG)	200	200	200	750
Coverage paths	999	999	999	9999
Coverage paths including in call coverage report	100	100	100	100
Coverage path per station	4	4	4	4
Coverage points in a path	6	6	6	6
Remote coverage points	999	999	999	999
Maximum users per coverage path[16]	3500	3500	3500	36,065
Members per coverage answer group	8	8	8	8
Time of day coverage tables	999	999	999	999
Time of day changes per table	5	5	5	5
Remote cdministration Coverage paths	2	2	2	2
Call Detail Recording				
Intra-switch call trackable extensions	1000	1000	1000	5000
Maximum number of CDR records buffered in switch	300	300	300	1900
Number of records buffered for the primary output device to cause secondary device to be busied out for 2 minutes	200	200	200	1800

Continued on next page

Table 51. Maximum System Parameters — *Continued*

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Call Forwarding				
Call forwarded digits (off-net)	16	16	16	16
Call forwarded numbers	2400	2400	2400	25,000
Call Park				
Attendant group common shared extension numbers per system[17]	80	80	80	80
Number of Parked Calls	723	723	723	10,604
Call Pickup Groups				
Call pickup members per group	50	50	50	50
Call pickup members per system	2400	2400	2400	25,000
Number of groups	800	800	800	5000
Call Vectoring				
Maximum skills a call can simultaneously queue to	3	3	3	3
Priority levels	4	4	4	4
Recorded announcements/analog sources for vector delay	128	128	128	256
Steps per vector	32	32	32	32
Vector directory numbers[18]	512	512	512	20,000
CMS measured VDNs[19]	512	512	512	2000
Vectors per system	256	256	256	512
Number of collected digits for call prompting or CINFO	16	16	16	16
Number of dial-ahead digits for call prompting	24	24	24	24
Vector routing tables	10	10	10	100
CallVisor ASAI				
Active station control associations	2000	NA	2000	6000
Call controllers per call	1[20]	NA	1	1
Call monitors per call	14[20]	NA	14	14
Station controllers per station	2[20]	NA	2	2
Maximum simultaneous call classifications	40[20]	NA	40	400
Number of CallVisor ASAI links (open & proprietary)	8[20]	NA	8	8

Continued on next page

Table 51. Maximum System Parameters — *Continued*

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Notification requests (monitors)	300[20]	NA	300	10,000
Simultaneous active call controlled calls	300[20]	NA	300	3000
Switch to adjunct associations (routing)	127[20]	NA	127	127
Number of open multiquest billing requests	100[20]	NA	100	1000
Maximum calls with send DTMF active	16[20]	NA	16	32
Selected listen - disconnect paths	75[20]	NA	75	300
LAN gateway circuit pack maximum links	4[20]	NA	4	4
Conference Parties	6	6	6	6
Simultaneous 3-way conference calls[20]	483	483	483	7084
Simultaneous 6-way conference calls[21]	240	240	240	3520
Data Parameters				
Administered connections	128	128	128	128
Alphanumeric dialing				
Maximum entries	200	200	200	1250
Characters per entry	22	22	22	22
PRI endpoints (PE)	25	8	25	50
Access endpoints (number of trunks)	400	400	400	4000
Multimedia Parameters				
TN787D MMI boards	4[20]	NA	4	4
TN788B VC boards	32[20]	NA	32	32
Multimedia conferences per system	50[20]	NA	800	2000
Maximum Number of BRI Connections	50[20]	NA	1000	7000
MASI				
MASI nodes	15	15	15	15
MASI links	15	15	15	15
MASI trunk groups	96	96	96	120

Continued on next page

Table 51. Maximum System Parameters — *Continued*

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Digital Data Endpoints	800	800	800	7500
Dial Plan				
Direct inward dialing listed directory numbers	8	8	8	20
Expert agent selection (EAS) agent login IDs[22]	1500	1500	1500	10,000
Extensions	3500	3500	3500	36,065
Extension number portability[23]	10,000	10,000	10,000	50,000
Feature dial access codes	77	77	77	77
Number of digits	1-4	1-4	1-4	1-4
Integrated directory entries[24]	2416	2416	2416	25,028
Maximum extension size	5	5	5	5
Minimum extension size	1	1	1	1
Miscellaneous extensions[25]	900	900	900	3317
Names				
Number of names[26]	4215	4215	4215	36,511
Number of characters in a name	27	27	27	27
Non-DID LDNs	50	50	50	666
Prefix extensions	Yes	Yes	Yes	Yes
Trunk dial access codes				
Number of access codes	317	317	317	884
Number of digits	1-4	1-4	1-4	1-4
Do Not Disturb (DND)				
Do not disturb requests per system	2400	2400	2400	25,000
Simultaneous display requests	10	10	10	30
External Device Alarming)	32	32	32	90
Expert Agent Selection (EAS)				
Skill groups	99	99	99	600
VDN skill preferences	3	3	3	3
Maximum skills a call can simultaneously queue to	3	3	3	3
Maximum agent login IDs administered	1500	1500	1500	10,000
Maximum agent login IDs staffed	500	500	500	5200

Continued on next page

Table 51. Maximum System Parameters — *Continued*

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Maximum agent/skill pairs administered	6000	6000	6000	40,000
Maximum agent/skill Pairs staffed	1000	1000	1000	10,000
Maximum skills per agent				
No CMS	20	20[5]	20	20
R3V2 CMS	4	NA[5]	4	4
R3V4 CMS	4	NA[5]	4	4
R3V5 CMS	20	NA[5]	20	20
Maximum skill levels	16	16[5]	16	16
Maximum agents logged-in				
When each has 20 skills assigned	50	50	50	500
When each has 4 skills assigned	250	250	250	2500
When each has 1 skill assigned	500	500	500	5200
Facility Busy Indicators				
Buttons per tracked resource	100	100	100	500
Number of indicators (station and trunk groups)	3600	3600	3600	10,000
Hunt Groups (Non-ACD)				
Announcements per group	1	1	1	1
Announcements per system	128	128	128	256
Groups	99	99	99	600
Group members per group	200	200	200	999
Group members per system[27]	1000	1000	1000	10,000
Queue slots per group	200	200	200	999
Queue slots per system	1500	1500	1500	15,000
Intercom Translation Table (ICOM)				
Automatic/manual and dial				
ICOM groups per system	32	32	32	256
Auto/manual	32	32	32	256
Dial	32	32	32	256
Members per ICOM group				
Auto	32	32	32	32
Dial	32	32	32	32

Continued on next page

Table 51. Maximum System Parameters — *Continued*

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Members per system	1024	1024	1024	8,192
Last Number Dialed				
Entries per system[28]	3216	3216	3216	32,528
Number of digits	24	24	24	24
Leave Word Calling (Switch-Based)				
Messages stored	2000	2000	2000	6,000
Messages per user	125	125	125	125
Remote message waiting indicators				
Per extension	80	80	80	80
Per system	240	240	240	1250
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 Central Office	99	99	99	666
Modem Pool Groups				
Mode 2/analog				
Group members per system	160	160	160	2016
Number of groups	5	5	5	63
Members per group	32	32	32	32
Multimedia Call Handling (MMCH)				
Maximum voice conditioner circuit packs[29]	32	NA	32	32
Maximum multimedia interface circuit packs	4	NA	4	4
Maximum multimedia conferences per system	50	NA	800	2000
Maximum number of BRI connections	50	NA	1000	7000

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Table 51. Maximum System Parameters — *Continued*

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Networking				
Centralized attendantsService (CAS) nodes	99	99	99	99
Distributed communications system (DCS) nodes[30]				
BX.25	20	NA	20	20
ISDN PRI	20	20	20	20
Hybrid	20	20	20	20
EN nodes[31]	999	999	999	999
Paging				
Code calling IDs	125	125	125	125
Loudspeaker zones	9	9	9	9
Partitions				
Attendant groups	15	15	15	27
Extension partition groups	8	8	8	8
Extension partition	8	8	8	8
Tenant partition	20	20	20	100
Multiple music-on-hold sources	20	20	20	100
Personal CO Lines (PCOL)				
PCOL appearances	16	16	16	16
PCOL lines (trunk groups)	200	200	200	200
PCOL trunks per trunk group	1	1	1	1
Port Circuit Pack Slots[32]				
Per expansion port network				
Multicarrier cabinet standard reliability	NA	NA	99	99
Single-carrier cabinet standard reliability	NA	NA	71	71
Small cabinet standard reliability (upgrade only)	NA	NA	39	39
Per processor port network				
Multicarrier cabinet standard reliability	NA	NA	89	80
Single-carrier cabinet standard reliability	NA	NA	64	NA

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Table 51. Maximum System Parameters — *Continued*

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Enhanced single-carrier cabinet standard reliability	NA	NA	70	NA
Compact single-carrier cabinet	10	NA	NA	NA
Compact modular cabinet	NA	38[37]	NA	NA
Recorded Announcements/Audio Sources				
Analog and auxiliary trunk announcements				
Analog and auxiliary trunk queue slots per Announcement	150	150	150	1000
Analog and auxiliary trunk queue slots per System	150	150	150	1000
Calls connected per announcement	50	150	150	1000
Integrated announcements				
Integrated announcement circuit packs	5	5	5	10
Channels connected per integrated Announcement circuit pack	16	16	16	16
Calls connected per integrated announcement	50	50	50	1000
Integrated announcement recording time (minutes: seconds) per circuit pack				
16 kB recording	8:32	8:32	8:32	8:32
32 kB recording	4:16	4:16	4:16	4:16
64 kB recording	2:08	2:08	2:08	2:08
Integrated queue slots per system	200	200	200	4000
Total recorded announcements	128	128	128	256
System Administration				
Number of logins	15	15	15	15
Administrable history file entries	500	500	500	1250
Simultaneous administration command	1	1	1	5
Simultaneous maintenance command	1	1	1	5

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Table 51. Maximum System Parameters — *Continued*

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Simultaneous system maintenance sessions	5	5	5	8
Number of scheduled reports	50	50	50	50
Speech Synthesis Circuit Packs	6	6	6	40
Channels per speech circuit pack	4	4	4	4
Terminating Extension Groups (TEG)				
TEGs	32	32	32	32
Users that may share a TEG	4	4	4	4
Time Slots				
Simultaneous circuit-switched calls[33]	241	241	723	7712
Total slots	512	512	1536	22,528
Time slots for voice and data[34]	483	483	1449	21,208
Time slots per port network	512	512	512	512
Tone Classifiers				
Tone receivers (general)[35]	200	200	200	840
TTR queue size	4	4	4	4
Prompting TTR queue size	80	80	80	80
Trunks				
DS1 circuit packs	30	30	30	166
Queue slots for trunks	198	198	198	1332
PRI interfaces	30	8	30	166
PRI interfaces via processor interface[36]	4	NA	8	NA
PRI interfaces via PACCON[37] (packet controller)	30 [20]	NA	30	NA
PRI interfaces via TN1655 PKTINT	NA	NA	NA	166
BRI trunks				
BRI interfaces via PACCON[38] (packet controller)	240[20]	NA	240	NA
BRI trunks via TN1655 PKTINT	NA	NA	NA	1328
BRI via time division multiplexing (TDM) bus	NA	64	NA	NA
BRI trunks total	240[20]	64	240	1328

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Table 51. Maximum System Parameters — ***Continued***

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
PRI temporary signaling connections (TSCs)				
TSCs in system	656	656	656	4256
Call associated TSCs	400	400	400	4000
Non call associated TSCs	256	256	256	256
Administered TSCs	128	128	128	128
Ringback queue slots	198	198	198	1332
Trunk groups				
Trunk groups hourly measurements	25	25	25	75
Trunk groups in the system	99	99	99	666
Trunk members in a trunk group	99	99	99	255
Trunks in system (including remote access)	400	400	400	4000
Measured Trunks in system	400	400	400	4000
ISDN services				
Incoming call handling treatment (per trunk group)	18	18	18	54
Incoming call handling treatment (per trunk system)	288	288	288	576
User defined services	24	24	24	60
Usage allocation entries (per plan)	15	15	15	15
ISDN PRI Usage				
ICHT entries/trunk grp	18	18	18	54
ICHT entries/system	288	288	288	576
User defined services	24	24	24	60
Usage allocation entries/plan	15	15	15	15
Voice Terminals[39]				
Associated data modules (such as DTDMs)	800	800	800	7500
BRI stations[40]	1000[20]	NA	1000	7000
Digital stations[41]	2400	2400	2400	25,000
Display stations	2400	2400	2400	10,000
Stations[42]	2400	2400	2400	25,000

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Table 51. Maximum System Parameters — *Continued*

ITEM	Release 6 R6vs (16 MB)	R6csi (16 MB)	R6si (16 MB)	R6r
Station button capacity (K Units)[43]	700.8	700.8	700.8	5260
Station button feature capacity	15,900	15,900	15,900	15,900
VuStats				
Measured agents or login IDs	400	400	400	2,000
Measured splits	99	99	99	600
Measured trunk groups	32	32	32	32
Measured VDNs	99	99	99	512
Reporting periods				
Intervals	25	25	25	25
Days	1	1	1	1
Displays				
Display formats	50	50	50	50
Simultaneous updating displays	100	100	100	500
DEFINITY Wireless Business System				
Maximum number of terminals (9601)	250	250	250	250
Radio controller circuit packs	8	30	30	30
Wireless fixed bases	16	60	60	60
Cell antenna units (CAU)	64	240	240	240
Coverage (million square feet)	1	3	3	3
Button capacity for wireless	700.8	700.8	700.8	5260

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1. In Release 6si, 4 NETCON channels plus 1 direct connect. In Release 6r, 10 system ports through the packet data circuit pack.
2. In SCC/ESCC/CSCC, only 4 BX.25 physical links are supported in the configuration.
3. ACD split or skill members are hunt group members and share hunt group capacities with AAS and non-ACD uses of hunt groups.
4. When going from 4 to 3 login maximums, a change to the hunt group form is required. This requires all agents to be logged-out. In one extreme case, this is potentially avoided and R2 & R3 CMS handles the fourth login as UNSTAFFED appropriately.
5. The Release 6csi platform does not support CMS.
6. R3V3 CMS was renamed to R3V4 CMS to match the DEFINITY System numbering.
7. Plus up to 7 inter-exchange carrier (IXC) digits.
8. Number a of available 12 character inserted-digit-strings available for AAR/ARS preferences.

9. For Release 6vs, 4 is the recommended number of consoles supported due to power limitations. Of these, 1 may be used as a night console. The software supports 6:1 day/night attendant consoles.
10. This is the same as the number of trunk groups in the system.
11. Referred to as "emergency access queue length" in Release 6si.
12. Only EPNs in Release 6r can be DS1-remote EPNs.
13. Multicarrier cabinet includes the medium Cabinet.
14. The number of call appearances is the sum of primary and bridged appearances; at most 10 can be primary. A maximum of 54 administrable buttons are supported for the 8434D terminal with expansion module — 34 buttons in the basic terminal and 20 more buttons in the expansion module.
15. Does not apply to conferencing.
16. The maximum number of users per coverage path equals the number of extensions.
17. Shared extensions must be shared among all attendant groups in the system including tenant partition scenarios.
18. The total number of VDN stations and login ID extensions cannot exceed 25,000.
19. Measured limits depend on the CMS release used.
20. Simultaneous 3-way conference call = (483 / 3)* number PNs.
21. Simultaneous 6-way conference call = (483 / 6)* number PNs.
22. Login IDs count against the "extensions" switch capacity.
23. These are uniform dialing plan (UDP) entries.
24. The integrated directory entries = stations + attendant consoles.
25. Used for PCOL groups, common shared extensions, access endpoints, administered TSCs, code calling IDs, LDNs, hunt groups, announcements, and TEGs (phantom extensions).
26. The number of names = number of stations + attendant consoles + trunk groups + digital data endpoints + miscellaneous extensions.
27. Hunt group members include non-ACD (hunting, message center service, AUDIX, and so forth) and ACD uses (splits or skills including auto-available split or skills).
28. The last number dialed entries = stations + digital data endpoints + attendant consoles.
29. The MMCH circuit packs can only install in 1 port network per system (PPN or EPN, not both).
30. The actual software limit is 63, but due to performance considerations the recommended number of DCS nodes is 20.
31. These are node number addresses.
32. Only port slots are included in this count. For example, there are 100 port slots per MCC EPN cabinet with 99 port slots and one slot dedicated to the Tone/Clock board. Other service circuits may further reduce the number of port slots available. In Release 6r and Release 6si, the service slot may be equipped with service boards that do not require tip and ring connections.
33. 241 simultaneous circuit-switched calls per port network, except for Release 6si with 180 simultaneous circuit switched calls and Release 6r with 7,712 (limited by the number of call records supported).
34. 483 time slots for voice and data per port network.
35. G3V4 and Release 6 use TN744C 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 TN744C circuit packs 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, TN744C 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.

36. Only 1 processor interface (PI) circuit pack is supported in Release 6vs and Release 6si 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 France, Germany, and Italy. PRI interface via the packet controller is used.
37. Other countries must use the PI when they have the Release 6vs configuration without packet bus capability.
38. Other countries must use the PI when they have the Release 6vs configuration without packet bus capability.
39. The following items detract from the total number of available “stations:”

    Analog music-on-hold

    Attendants

    Modem pool conversion resources

    TAAS port

    Stations (digital, display, BRI, and so forth.)

    Analog announcements

    Analog external alarm port

    Agent login IDs

    ACD agents
40. All BRI stations can be display stations. Release 6vs can have up to 50 BRI stations if the unit is configured for packet interface.
41. The software limit for digital stations in Release 6vs is 400. Due to power limitations, 120 is the recommended limit.
42. Including extensions administered without associated hardware (Release 6si and Release 6r). The station capacity for Release 6vs is a software limit because of the physical capacity (10 port slots).
43. The station button capacity can support all stations equipped as 8410D digital sets with display. For example, a total of (292 x 2400) = 700.8K units. The table below shows approximate unit values for various station types. The term “default” means with no non-default buttons administered. The term “loaded” means all possible buttons - including the indicated number of call/bridged appearances (CA) - administered.

    8403B (default): 32

    8403B (loaded with 3 CA): 152

    8410B (default): 32

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