



# **DEFINITY® Communications System**

Generic 3 V2

Wideband Technical Reference

555-230-230  
Issue 1

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## About this Document

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This reference manual provides detailed information regarding the wideband switching feature for DEFINITY® G3V2.

The DEFINITY wideband switching feature provides high-speed end-to-end connectivity between customer endpoints where dedicated facilities are not economic or appropriate.

Wideband's primary function is to support high-speed video conferencing and data applications.

### **Intended Audience**

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This document is written for users and technical support personnel involved with the installation, administration, and operation of the wideband switching feature.

### **Terminology**

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Definitions of terms relating to wideband can be found in the glossary at the end of this document.

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\* In the interest of brevity, the terms wideband switching feature and wideband will be synonymous with each other.

## Section Summary

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- **Chapter 1—Introduction**  
This chapter provides a high-level view of wideband, its capabilities and environment.
- **Chapter 2—Wideband Feature Description**  
This chapter provides a detailed look at both the hardware and software capabilities of the wideband switching feature. It also presents customer application scenarios.
- **Chapter 3—Wideband Installation and Administration.**  
This chapter provides installation and administration forms.
- **Chapter 4—Traffic**  
This chapter provides traffic reports specific to wideband calls.
- **Chapter 5—Protocol Information**  
This chapter provides protocol information for the wideband switching feature.
- **Chapter 6—Troubleshooting and Error Recovery**  
This chapter provides troubleshooting information, error recovery procedures, and escalation paths for the wideband switching feature and its environment.
- **Appendix A—Maximum System Parameters For Hardware and Software Items**  
This appendix provides a table of capacities for all versions of Generic 3.
- **Glossary**  
This section provides definition of terms used in this document.

## Related Documents

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*AT&T DEFINITY Communications System Generic 1 and Generic 3 Feature Description, 555-230-204.*

The Feature Description serves as an overall reference for the planning, operation, and administration stages of the Generic 1 and Generic 3 switches.

*AT&T DEFINITY Communications System Generic 1 and Generic 3 System Description, 555-230-205.*

This manual provides a technical description of hardware, environmental, and space requirements and parameters.

*AT&T DEFINITY Communications System Generic 3 System Reports, 555-230-511.*

This manual provides a description of various measurement and status reports for the Generic 3 switch.

*AT&T DEFINITY Communications System Generic 3 Implementation*,  
555-230-653.

This manual documents the implementation of the Generic 3 switch.

*AT&T DEFINITY Line-Side ISDN Primary Rate Interface Technical Reference*,  
555-025-107

This technical reference provides a complete specification of the AT&T DEFINITY Line-Side ISDN Primary Rate Interface and is intended to guide the design and development of ISDN-PRI application and terminal interfaces for connection to DEFINITY systems.

*AT&T Acculink Bandwidth Controller Operator's Guide*, 314-620-301.

This guide provides operating instructions for the Acculink Bandwidth Controller, also known as a terminal adapter.



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# Introduction to Wideband

# 1

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# Introduction to Wideband

# 1

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This chapter provides an overview of the wideband switching feature. It covers the basics, describes the feature itself, available data services, and presents a sample configuration.

The primary function of the wideband switching feature is to provide support for services that require large bandwidth, such as high-speed video conferencing. These services have traditionally been handled by dedicated facilities. With the wideband switching feature, dedicated facilities are no longer a requirement for these large bandwidth services.

The wideband switching feature has been designed to support the following applications:

- High-speed video conferencing
- Data backup
- Scheduled batch processing
- Primary data interfaces

In addition, DEFINITY supports wideband connectivity over private networks and offerings from other interexchange carriers, RBOCs, and in other countries. Wideband is also fully supported by DEFINITY private networking, including tandem switching.

## Data Services

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The wideband switching feature supports end-to-end connectivity between customer endpoints at data rates ranging from 128 to 1536 kbps over T1 facilities\* and 128 to 1984 kbps over E1 facilities.\* Standard data services for use by wideband are H0 (384 kbps), H11 (1536 kbps), H12 (1920 kbps), and N x DS0.

N x DS0 is the multirate data service that can handle the entire range of wideband data rates.

A DS0 has a value of 64 kbps. All available data services for wideband are multiples of 64 kbps. See Table 1-1 for a breakdown of available data services.

**Table 1-1. Wideband and Associated Data Services**

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| <b>Data Service</b> | <b>Data Rate (kbps)</b> | <b>No. of DS0s</b> |
|---------------------|-------------------------|--------------------|
| H0                  | 384                     | 6                  |
| H11                 | 1536                    | 24                 |
| H12                 | 1920                    | 30                 |
| N x DS0             | 128 to 1984             | 2 to 31            |

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**⇒ NOTES:**

Any value below 128 kbps is considered narrowband.

The H0 data service provides backward compatibility for older configurations that do not support N x DS0.

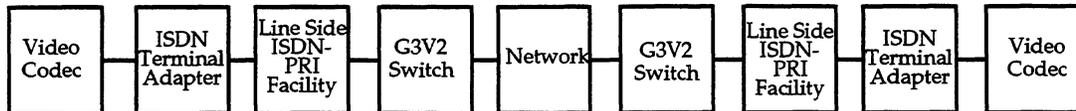
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\* According to current CCITT and ANSI standards.

## Configuration Overview

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Figure 1-1 provides a high-level look at the principal components of the wideband switching feature as used in one type of application. It is an example of a “typical” scenario for high-speed video conferencing using the wideband switching feature.



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**Figure 1-1. High-Speed Video Conferencing Using Wideband**

Wideband is designed to communicate with application equipment that conforms to the ISDN-PRI standard. Wideband also provides for non-ISDN-PRI application equipment necessitating the addition of an ISDN-PRI terminal adapter.

In Figure 1-1, endpoint application equipment (in this case, a video codec) can initiate (by dialing) and receive wideband calls. The actual data service used for a particular high-speed video conference is based on the manner in which the line-side (T1 or E1) ISDN-PRI facility has been administered.

Calls over the line-side ISDN-PRI facility are made up of B-channels (DS0s). On calls to the endpoint application equipment, the ISDN-PRI terminal adapter picks the data-containing B-channels from the facility and passes them to their destination. On calls from the endpoint application equipment, the ISDN-PRI terminal adapter determines the B-channels needed for the call and passes the data to them.

The wideband switching feature can support many other configurations. See Chapter 2, “Wideband Feature Description” of this manual for more details.



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# Wideband Feature Description

# 2

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## Wideband Feature Description

# 2

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This chapter provides detailed information and background about the operation of the wideband switching feature.

Specifically, it presents the foundation for installation and administration of the wideband switching feature, and covers the following topics:

- The components that make up a wideband configuration
- Sample customer usage scenarios
- Channel allocation on the ISDN-PRI trunk group
- Glare and blocking
- Wideband impact and interaction with available G3V2 features

### Wideband Switching Feature Components

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The previous chapter discussed a “typical” or generic wideband configuration. Continuing that thread, let us examine this configuration in greater detail by breaking it down into its-component parts. Use Figure 2-1 as a guide.

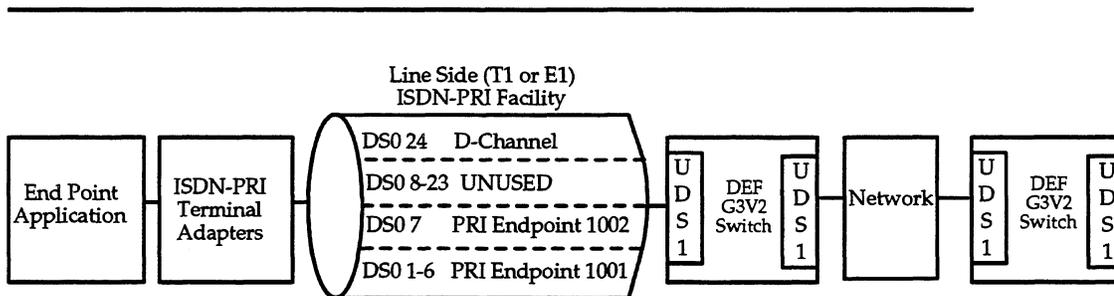


Figure 2-1. Wideband Components

## Endpoint Applications

An endpoint application is the origination or destination point of a wideband call. In Figure 1-1, the endpoint application was a video codec. The application in Figure 2-1 could also be for high-speed video conferencing, but endpoint applications in general are not limited to video equipment. In fact, endpoint applications can be any number of data applications based on the customer's particular needs.

## ISDN-PRI Terminal Adapters

ISDN-PRI terminal adapters<sup>1</sup> translate standard ISDN signaling into a form that can be used by the endpoint application and vice versa.

The terminal adapter must also adhere to the PRI-endpoint boundaries as administered on the DEFINITY G3V2 switch when handling both incoming (to the endpoint) applications and outgoing calls.

The terminal adapter passes calls to and receives calls from the line-side ISDN-PRI (T1 or E1) facility via ISDN-SETUP messages indicating the data rate and specific B-channels (DS0s) to be used and communicates all other call status information via standard ISDN messages. See the *AT&T DEFINITY Line-Side ISDN Primary Rate Interface Technical Reference* for more information.

1. Currently, the ISDN-PRI terminal adapter of choice is the AT&T Acculink bandwidth controller terminal. Other vendor equipment can be used but it must conform to the wideband switching feature requirements. See the *AT&T DEFINITY Line-Side ISDN Primary Rate Interface Technical Reference* for more information.

Certain video equipment, video codecs, contain an internal terminal adapter and can connect directly to the line-side ISDN-PRI facility.

### Line-Side (T1 or E1) ISDN-PRI Facility

A line-side ISDN-PRI (T1 or E1) facility is comprised of a group DS0s (24 for a T1 facility and 32 for an E1 facility).

In this context, these DS0s are also called channels. There are 23 B-channels and a single D-channel for a T1 facility and 30 B-channels and a single D-channel for an E1 facility<sup>2</sup>.

**⇒ NOTE:**

For an E1 facility, channel 0 is used for framing and an additional channel, usually channel 16, is a D-channel used for signaling.

The B-channels carry data and the D-channels are for signaling.

Data flows bi-directionally across the facility between the switch and the ISDN-PRI terminal adapter.

### PRI-Endpoints

A PRI-endpoint (PE) consists of one or more contiguous DS0 (B-channels) on a line-side T1 or E1 ISDN-PRI facility that have been assigned an extension number.

A PRI-endpoint can support calls of lower bandwidth. In other words, a PE having a width 6 (six DS0s) can handle a call on one channel (64 kbps) up to and including six channels (384 kbps). Also, a PE can support calls on non-adjacent channels. For example, an endpoint application connected to a PE defined as using B-channels 1 through 6 of an ISDN-PRI facility could originate a call using B-channels 1, 3, and 5 successfully. If the PE has been administered to use flexible channel allocation<sup>3</sup> the algorithm for offering a call to the PE will start from the first DS0 administered to the PE. Since only one active call is permitted on a PE, contiguous B-channels will always be selected unless one or more B-channels are not in service.

A PE will remain in service unless all of its B-channels are out of service. In other words, if B-channel 1 is out of service and the PE is five B-channels wide, a wideband call of up to four B-channels in width could still be handled by the PE. A PE can only be active on a single call at any given time, that is, it is either considered idle, active (busy), or out of service.

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2. Non-Facility Associated Signaling (NFAS) increases this channel limitation. See the glossary for a full definition.

3. See the "Wideband and Channel Allocation" section for more information.

One facility can support multiple separate and distinct PRI-endpoints (several extensions) within a single facility. Non-overlapping contiguous sets of DS0s (B-channels) are associated with each PE.

### Universal Digital Signal Level 1 Board

The UDS1 board is the interface for line-side and network facilities carrying wideband calls. The board is a TN464C or later circuit pack.

### Non-signaling Configuration

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Wideband can also support configurations using non-signaling (non-ISDN-PRI) line-side T1 or E1 facilities as illustrated in Figure 2-2. The endpoint applications for this example are the same as those defined for configurations with signaling.

### Data Service Unit/Channel Service Unit

This unit simply passes the call to the endpoint application. Unlike terminal adapters, the DSU/CSU has no signaling capability.

**⇒ NOTE:**

No DSU/CSU is needed if the endpoint application has a fractional T1 interface.

### Line-Side (T1 or E1) Facility

This facility, like the ISDN-PRI facility, is composed of a group of DS0s (24 for a T1 facility and 31 for an E1 facility). Line-side facilities are controlled solely from the switch. Through the access-endpoint command, a specific DS0 or group of DS0s is assigned an extension. This individual DS0 or group, along with the extension, is known as a wideband access endpoint (WAE).

### Wideband Access Endpoint

WAEs have no signaling interface to the switch. These endpoints simply transmit and receive wideband data when the connection is active.

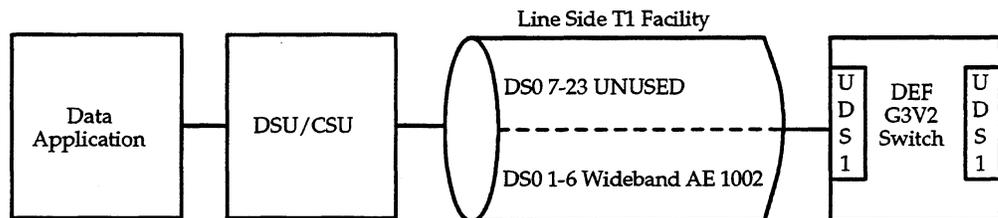
**⇒ NOTE:**

The switch can only ascertain if the connection is active but this does not necessarily mean that data is actually coming across the connection.

A wideband access endpoint is treated as a single endpoint and can support only one call. If all DS0s comprising a wideband access endpoint are in service, then the wideband access endpoint is considered in service. Otherwise, the wideband access endpoint is considered out of service. If an in-service wideband access endpoint has no active calls on its DS0s then it will be considered idle. Otherwise, the wideband access endpoint will be considered busy.

Multiple wideband access endpoints are separate and distinct within the facility and endpoint applications must be administered to send and receive the correct

data rate over the correct DS0s. An incoming call at the incorrect data rate will be blocked.



**Figure 2-2. Wideband Access Endpoint Configuration**

## Customer Usage Scenarios

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This section examines wideband and its components in relation to the following specific customer usage scenarios:

- High-speed video conferencing (at various data rates)
- Data backup connection
- Scheduled batch processing
- Primary data connectivity
- Networking

### High-Speed Video Conferencing



**NOTE:**

All data rates are multiples of 64 kbps; from 128 kbps to 1,536 kbps (T1) and 1,984 kbps (E1) are supported. The key customer data rates are listed in Table 2-1. The scenarios in this section are described in terms of these data rates.

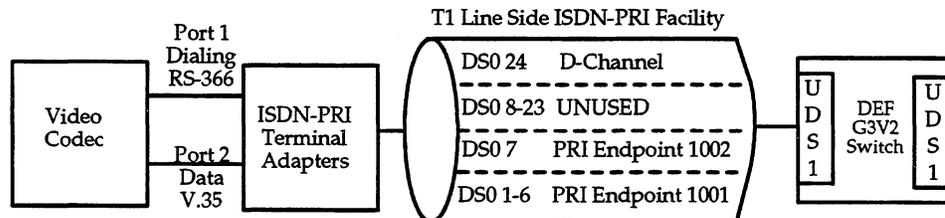
**Table 2-1. Key Wideband Customer Data Rates**

| <b>Data Rate (kbps)</b> | <b>ISDN Standard Rate</b> | <b>N x DS0 Standard Rate</b> | <b>Rationale</b>   |
|-------------------------|---------------------------|------------------------------|--|
| 256                     | -                         | N = 4                        | Frequently used in dedicated data networks, host processing.   |
| 384                     | H0                        | N = 6                        | Existing service; frequently used for high-grade video conferencing.                                 |
| 768                     | -                         | N = 12                       | Frequently used in dedicated video networks.   |
| 1,472                   | -                         | N = 23                       | Maximum usage of a T1 ISDN-PRI interface (FAS-only).   |
| 1,536                   | H11                       | N = 24                       | Existing service; full T1 for data backup.   |
| 1,920                   | H12                       | N = 30                       | Existing standard; maximum usage of a E1 ISDN-PRI interface. Excluding NFAS which supports 31 x DS0. |

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### 384-kbps Video Conferencing

Figure 2-3 shows a customer endpoint for on-demand 384-kbps (H0) video conferencing. An ISDN-PRI terminal adapter is included to adapt the codec data V.35 and dialing (RS-366) ports. The endpoint in this configuration is a video codec.



**Figure 2-3. 384-kbps Video Conferencing Configuration**

#### ⇒ NOTE:

The RS-366 allows you to establish (dial) a wideband connection from the video codec. Without it, wideband calls would have to be initiated from the ISDN-PRI Terminal Adapter or the switch itself.

The line-side ISDN-PRI facility is administered with a single PRI-endpoint. The endpoint is assigned an extension and corresponds to the video codec data/dialing port. In Figure 2-3, a 384-kbps call is initiated or received over PRI-endpoint 1001 which corresponds to the port of the video codec.

### 384/1,536/1,920-kbps Video Conferencing

Figure 2-4 shows a customer endpoint for on-demand 384-, 1,536-, or 1,920-kbps video conferencing. In this example, the E1 ISDN-PRI facility is being used on the line-side to provide 1,536 kbps (24 DS0s) and 1,920 kbps (30 DS0s) over a single interface. The DEFINITY network also provides the option of using T1s with Non-Facility Associated Switching (NFAS). This would allow a T1 facility to support 1,536-kbps calls. End user operation is identical to the previous scenario.

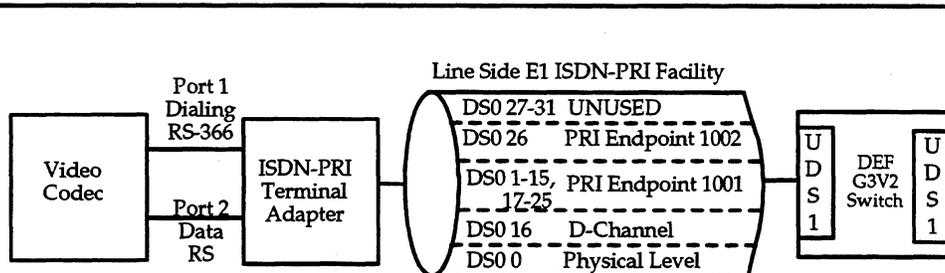


Figure 2-4. 384/1,536/1,920-kbps Video Conferencing

### N x DS0 Video Conferencing

Figure 2-5 shows a customer endpoint for on-demand N x DS0 video conferencing. This scenario functions identically to the previous two except that the wideband video call over PRI-endpoint 1001 (DS0 1 to 23) can be any N x DS0 data rate where  $2 < N < 23$ . This configuration provides a data rate range from 128 to 1,472 kbps.

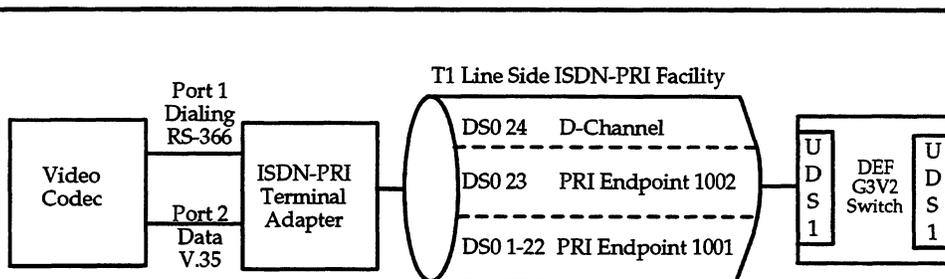
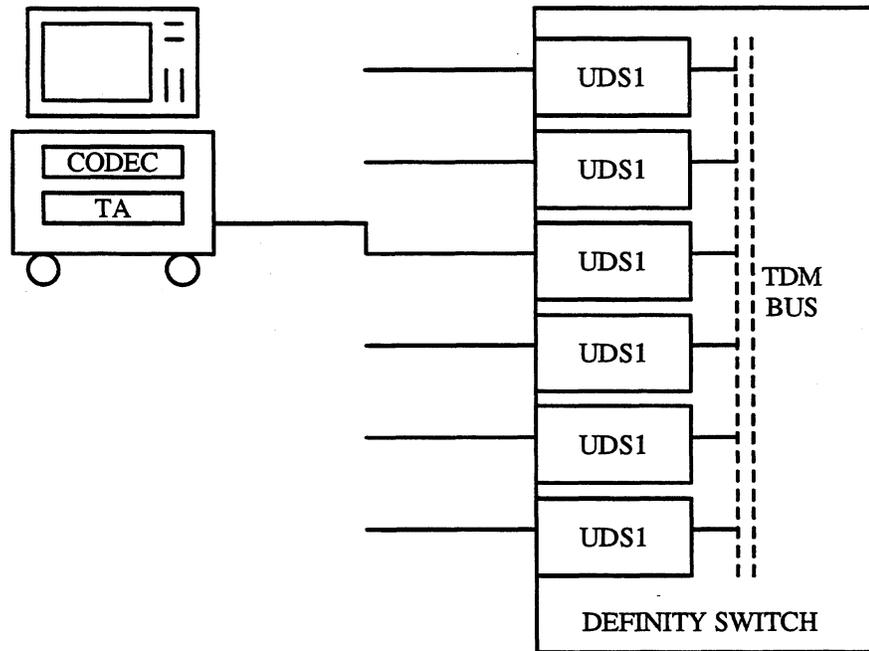


Figure 2-5. N x DS0 Video Usage Scenario

### Rollabout Video

Rollabout or portable video codecs, as the name implies, enable customers using wideband video rates to share equipment. Two or more rooms (for example, executive offices) are provisioned for video connectivity to DEFINITY but do not have video equipment. The shared, portable video cart (with codec, monitor, and ISDN-PRI terminal adapter) is simply rolled into any of these rooms and plugged into the wall jack to become operational.

Each room equipped for rollabout video will have identically provisioned PRI-endpoints (except extension numbers). Each line-side ISDN-PRI facility is wired to a separate Universal DS1 (UDS1) board on DEFINITY. A separate UDS1 board is required for each video room equipped for rollabout video. See Figure 2-6.



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Figure 2-6. Rollabout Video

## Data Backup Connection

Using wideband for data transmission backup provides customers with alternate transmission paths for critical data in the event of primary transmission path failure.

### NOTE:

The following two scenarios assume that each application has a primary data connectivity over separate connections through DEFINITY G3V2 or the customer's multiplexer network.

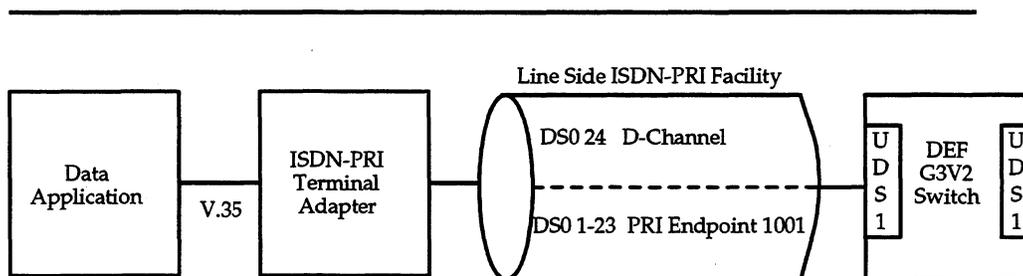


Figure 2-7. Data Backup Scenario

In Figure 2-7 the endpoint has a V.35 data interface connection to an ISDN-PRI terminal adapter that connects to DEFINITY over a line-side ISDN-PRI facility. A single PRI-endpoint is administered as 23 DS0s (or 30 for an E1 line-side ISDN-PRI facility). When the primary data connection fails, the application raises the Data Terminal Ready (DTR) lead on its V.35 interface, and the ISDN-PRI terminal adapter initiates a wideband call through DEFINITY G3V2. Both the called number and data rate (up to 23/30 DS0s) must have previously been administered on the ISDN terminal adapter.

In the reverse direction, the ISDN-PRI terminal adapter raises interface leads upon receiving a data call and completes the backup connection.

The second data application in the figure is connected as a wideband access endpoint over a non-signaling line-side T1 interface. No DSU/CSU is needed if the data endpoint has a fractional T1 interface. Backup data connections are initiated by the system administrator using the Administered Connections (AC) feature. Since the wideband access endpoint is administered to be six DS0s wide, all administered connections originating from this endpoint will be 384 kbps. An administered connection would most likely be previously administered but disabled until needed. This allows the system administrator to quickly establish the backup connection by enabling the administered connection.

In the opposite direction, an incoming data call is connected to the wideband access endpoint, but there is no signaling to indicate this connection to either the DSU/CSU or data endpoint. The data endpoint must detect the presence of data on the backup interface in this scenario.

### **Scheduled Batch Processing**

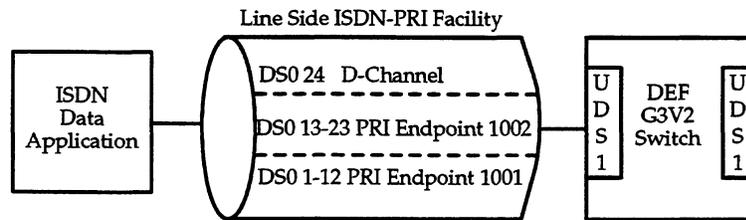
Scheduled batch processing applications are used for periodic database updates (for example, retail inventory) or distributions (for example, airline fare schedules). These updates are primarily done after business hours and are often referred to as nightly file transfers. Wideband meets the high bandwidth requirements at low cost for scheduled batch processing. In addition wideband allows the dedicated access bandwidth for busy-hour PBX traffic to be used for these applications after business hours; no additional access bandwidth costs are incurred.

The non-ISDN backup data connection in Figure 2-7 is also appropriate for scheduled batch processing applications. The administered connections feature is used to schedule daily or weekly sessions originating from this application.

### **Primary Data Connectivity**

Permanent data connections (those always active during business hours), such as interconnections between LANs, are well suited for DEFINITY when ISDN-PRI endpoints are used. The ISDN end-to-end monitoring and the endpoint's ability to react to failures provide for critical data availability needs. With ISDN, endpoints can detect network failures and initiate backup connections through the switch; ISDN endpoints can also establish additional calls when extra bandwidth is needed.

Figure 2-8 illustrates an endpoint application, such as a LAN bridge/router. The application initiates or receives its primary 768-kbps data connection over PRI-endpoint 1001 and is most likely routed over a private line DEFINITY PRI facility for end-to-end ISDN monitoring. For peak traffic demands, the application can initiate or receive a second data connection, for example, 384 kbps, over PRI-endpoint 1002. Larger bandwidths are possible with a line-side ISDN-PRI E1 facility.



**Figure 2-8. Primary Data Connectivity**

Any failures not automatically restored by DEFINITY will be signaled to the endpoint application which can initiate backup data connections over the same PRI endpoint. DEFINITY will route the backup data connections over alternate facilities if necessary, for example AT&T Switched Services.

## Networking

All the wideband networking is over ISDN-PRI facilities but may connect to a variety of networks: AT&T Switched Services (SDDN 384, 1526; ACCUNET SW384, SW1536; SDN SW384, SW1536), other domestic interexchange carriers' services, private line, RBOC services, and services in other countries.

## ISDN-PRI Trunk Groups and Channel Allocation

Only ISDN-PRI trunks support wideband calls to the network. Wideband's bandwidth requirements have necessitated modification of the algorithms by which trunks look for clear channels. The following section describes the search methods and their relationship to the available wideband data services.

## Facility Lists

A wideband call accessing the network must reside on a single ISDN-PRI facility. Trunks within a trunk group must be organized based on the facility on which they reside. This is accomplished by compiling a facility list as trunks are administered to a trunk group; if a trunk is added to a trunk group from a facility not already on that trunk group's list, that facility is added to the list in an order based on the facility's signaling group number and interface identifier. In other words, the facility list is compiled in an ascending order based first on signaling group number and second on the interface identifier assigned to the facility within the signaling group. For example, if three facilities having signaling group/interface identifier combinations of 1/1, 1/2, and 2/1 were associated with a trunk group, then a call offered to that trunk group would search those facilities in

the order as they were just listed. Also note that since trunks within a given facility can span several trunk groups, a single facility can be associated with several different trunk groups.

Given this facility list concept, the algorithms have the ability to search for trunks, by facility, in an attempt to satisfy the bandwidth requirements of a given wideband call. If one facility does not have enough available bandwidth to support a given call, or it will not be used for a given call due to the constraints presented in the following section, then the algorithm searches the next facility in the trunk group for the required bandwidth (if there is more than one facility in the trunk group).

In addition to searching for channels based on facilities and required bandwidth, Port Network (PN) preferential trunk routing is also employed. This PN routing applies within each algorithm at a higher priority than the constraints put on the algorithm by the parameters listed later in this section. In short, all facilities that reside on the same PN as the originating endpoint are searched in an attempt to satisfy the bandwidth of a given call, prior to searching any facilities on another PN.

### **Direction of Trunk/Hunt and Linear Hunting within Facilities**

---

The algorithms have the ability to select trunks from low B-channel to high B-channel or from high B-channel to low B-channel within an ISDN-PRI facility. This is per ISDN-PRI trunk group option but will infer the direction of search within all ISDN-PRI facilities (or portions of those facilities) administered within that trunk group. This is necessary so the selection of trunks will not be prone to as much glare as they otherwise would be if trunks were chosen in the same direction by both user and network sides of the ISDN-PRI interface.\* Note that in previous DEFINITY releases, the order in which trunks were selected, whether through linear or circular hunting, would always be with respect to the order in which trunks were administered within the trunk group. Now, with the support of wideband services, all trunks within an ISDN-PRI trunk group optioned for wideband are ordered based on this new “direction of trunk/hunt within facilities” parameter, and without regard to the order in which trunks are administered within the trunk group. If an ISDN-PRI trunk group is not optioned for wideband, then a cyclical trunk hunt based on the administration of trunks within the trunk group will still be available.†

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\* For more information regarding glare, see the “Glare Prevention” section later on in this chapter.

† This capability is necessary in order for DEFINITY G3V2 to properly work with previous DEFINITY releases.

## H11

---

When a trunk group is administered to support H11, the algorithm to satisfy a call requiring 1,536 kbps of bandwidth uses a fixed allocation scheme. That is, the algorithm searches for an available facility using the following facility-specific channel definitions.

- T1: H11 can only be carried on a facility without a D-channel being signaled in an NFAS arrangement (B-channels 1 to 24 are used).
- E1: Although the 1,536-kbps bandwidth could be satisfied using a number of fixed starting points (for example, 1, 2, 3, etc.) the only fixed starting point being supported is 1. Hence, B-channels 1 to 15 and 17 to 25 will always be used to carry an H11 call on an E1 facility.

If the algorithm cannot find an available facility within the trunk group that meets these constraints, then the call is blocked from using this trunk group. In this case, the call may be routed to a different trunk group preference via Generalized Route Selection (GRS), at which time, based on the wideband options administered on that trunk group, the call would be subject to another hunt algorithm (that is, either the same H11 algorithm or perhaps an N x DS0 algorithm described in a later paragraph).

This same hunt algorithm, when offered any other call (other than a 1,920-kbps call) attempts to preserve idle facilities by selecting trunk(s) in a partially contaminated facility if one exists. If the bandwidth required by this call cannot be satisfied by any partially contaminated facility, then the call is placed on available trunk(s) within an idle facility, thus contaminating the facility. Again, facilities will be selected via the trunk group's facility list and with PN preference, and trunk(s) within a facility will be selected based on the direction of channel search administered. Note that on a T1 facility, a D-channel is considered a busy trunk and results in a facility with a D-channel always being partially contaminated. On an E1 facility, however, a D-channel is not considered a busy trunk because H11 and H12 calls may still be placed on that facility; an E1 facility with a D-channel and idle B-channels is considered an idle facility.

## H12

---

Since H12 is 1,920 kbps which is composed of 30 B-channels, a 1,920-kbps call can only be carried on an E1 facility. As with H11, the hunt algorithm uses a fixed allocation scheme with channel 1 being the fixed starting point. Hence, an H12 call always is carried on B-channels 1 to 15 and 17 to 31 on an E1 facility (as illustrated in the following table). When offered any other call (other than a 1,536-kbps call) the algorithm will behave as it does when H11 is optioned.

| Facility | ISDN Interface | DS0s Comprising Each Channel |             |
|----------|----------------|------------------------------|-------------|
|          |                | H11                          | H12         |
| T1       | 23B + D        | -                            | -           |
| T1       | 24B (NFAS)     | 1-24                         | -           |
| E1       | 30B + D        | 1-15, 17-25                  | 1-15, 17-31 |
| E1       | 31B (NFAS)     | 1-15, 17-25                  | 1-15, 17-31 |

## H0

When a trunk group is administered to support H0, the algorithm to satisfy a call requiring 384 kbps of bandwidth also uses a fixed allocation scheme. Unlike the H11 fixed scheme which only supports a single fixed starting point, the H0 fixed scheme supports four (T1) or five (E1) fixed starting points. The H0 algorithm searches for an available quadrant within a facility based on the direction of trunk/hunt administered. If the algorithm cannot find an available quadrant (see the glossary for a definition of quadrant) within any facility allocated to this trunk group, then the call is blocked from using this trunk group. Again, based on GRS administration, the call may route to a different trunk group preference and be subject to another algorithm based on the wideband options administered.

This same trunk/hunt algorithm, when offered any narrowband or N x DS0 call, will attempt to preserve idle quadrants by choosing a trunk(s) in a partially contaminated quadrant if one exists. If a partially contaminated quadrant capable of carrying the call does not exist, then the call is placed on available trunk(s) within an idle quadrant, thus contaminating the quadrant. Again, facilities are selected via the trunk group's facility list and with PN preference, and a trunk(s) within a facility is selected based on the direction administered. Note that a D-channel is considered a busy trunk and results in the top most quadrant of a T1, B-channels 19 to 24, always being partially contaminated. This is *not true* for NFAS.

If this H0 optioned trunk group is also administered to support H11, H12, or N x DS0, then this algorithm also attempts to preserve idle facilities. In other words, when offered a narrowband, H0, or N x DS0 call the algorithm will search partially contaminated facilities before it searches to idle facilities.

## N x DS0

For the N x DS0 multirate service, a trunk group parameter determines whether a floating or a flexible trunk allocation scheme is to be used. The algorithm to satisfy an N x DS0 call<sup>4</sup> is either floating or flexible.

4. An N x DS0 call includes a 384-kbps call if H0 is not optioned, a 1,536-kbps call if H11 is not optioned, and a 1,920-kbps call if H12 is not optioned on the N x DS0 optioned trunk group.

### **Floating (Contiguous)**

In the floating scheme, an N x DS0 call will be placed on a contiguous group of B-channels large enough to satisfy the requested bandwidth without any constraint being put on the starting channel (that is, no fixed starting point trunk).

#### **⇒ NOTE:**

Floating appears as “contiguous” on the ISDN-PRI trunk group form. See Chapter 3, “Wideband Installation and Administration” for the form.

### **Flexible**

In the flexible scheme, an N x DS0 call will be placed on any set of B-channels as long as the requested bandwidth is satisfied. There is absolutely no constraint such as contiguity of B-channels or fixed starting points. Of course, as with all wideband calls, all the B-channels comprising the wideband call must reside on the same ISDN-PRI facility.

Regardless of the allocation scheme employed, the N x DS0 algorithm, like the H11 and H12 algorithms, attempts to preserve idle facilities when offered B, H0, and N x DS0 calls. This is important so that N x DS0 calls, for large values of N, have a better chance of being satisfied by a given trunk group. However, if one of these calls cannot be satisfied by a partially contaminated facility and an idle facility exists, a trunk(s) on that idle facility will be selected, thus contaminating that facility.

There are additional factors to note regarding specific values of N and the N x DS0 service:

- N = 1: this will be considered a narrowband call and will be treated as any other voice or narrowband data (B-channel) call.
- N = 6: if a trunk group is optioned for both H0 and N x DS0 service, a 384-kbps call offered to that trunk group will be treated as an H0 call and the H0 constraints apply. If the H0 constraints cannot be met, then the call is blocked.
- N = 24: if a trunk group is optioned for both H11 and N x DS0 service, a 1,536-kbps call offered to that trunk group is treated as an H11 call and the H11 trunk allocation constraints will apply.
- N = 30: if a trunk group is optioned for both H12 and N x DS0 service, a 1,920-kbps call offered to that trunk group will be treated as an H12 call and the H12 trunk allocation constraints apply.

## **Glare and Blocking**

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### **Glare Prevention**

---

Glare occurs when both sides of an ISDN-PRI interface select the same B-channel for call initiation. For example, a user side of an interface selects the B-channel for an outgoing call and, before the switch receives and processes the SETUP message, the switch selects the same B-channel for call origination. Since wideband uses more channels, the chances of glare are greater. Glare conditions can be limited with proper channel administration but may never be eliminated and some calls might still be dropped.

Some glare situations might not be resolvable. In one case, the network and the user side may send SETUP messages simultaneously or nearly simultaneously. Another glare scenario can occur in the brief window after the SETUP message has been sent but before the first response is received from the switch at the other side of the interface. If an incoming SETUP arrives during this window, the incoming SETUP message is allowed to proceed and the outgoing call is dropped. Various glare situations and their resolution are described in Table 2-2.

The switch does not negotiate channels for wideband calls.

Table 2-2. Handling Glare

| <b>GLARE RESOLUTION</b>   |                           |   |  |
|---------------------------|---------------------------|---|--|
| <b>Outgoing Call Type</b> | <b>Incoming Call Type</b> | <b>PBX Supporting User Protocol</b>   | <b>PBX Supporting Network Protocol</b>   |
| B-channel                 | B-channel                 | No negotiation<br>Incoming call (from network) wins   | Negotiation is attempted<br>Incoming call (from user) dropped if negotiation is unsuccessful   |
|                           |                           | Outgoing call (to network) retried on another trunk   | Outgoing call (to user) stays up   |
| B-channel(s)              | Wide                      | No negotiation  | No negotiation   |
|                           |                           | Incoming call (from network) dropped  | Incoming call (from user) dropped  |
|                           |                           | Outgoing calls (to network) stay up but will likely be dropped by network because channels are in use, although there is a possibility some switches might negotiate these calls. | Outgoing calls (to user) stay up and will possibly stay up if other side lets the network call win.  |
| Wide                      | B-channel(s)              | No negotiation  | Negotiation is attempted   |
|                           |                           | Incoming call (from network) wins   | Incoming call (from user) dropped if negotiation is unsuccessful   |
|                           |                           | Outgoing call (to network) retried on another trunk   | Outgoing call (to user) stays up   |
| Wide                      | Wide                      | No negotiation  | No negotiation   |
|                           |                           | Incoming call (from network) dropped  | Incoming call (from user) dropped  |
|                           |                           | Outgoing call (to network) stays up but will likely be dropped by network because channels are in use.  | Outgoing call (to user) stays up and may not be dropped by other side because other side, if it is not a DEFINITY, may let the network call win. |

To reduce glare probability, the network needs to be administered so both sides of the interface select channels from opposite ends of facilities. For example, on a 23B+D trunk group, the user side could be administered to select B-channels starting at channel 23 while the network side would be administered to start selecting at channel 1. Using the same example, if channel 22 is active but channel 23 is idle, the user side should select channel 23 for re-use. This is known as linear trunk hunt and is the trunk hunt option used by DEFINITY for wideband.\*

### **Blocking Prevention**

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Blocking occurs when insufficient B-channels required to make a call are available. Narrowband calls require only one channel so blocking is less likely than with wideband calls which require multiple B-channels. Blocking also occurs for wideband calls when bandwidth is not available in the appropriate format (that is, fixed, floating, or flexible).

As a worst-case scenario (Figure 2-9), consider a T1 facility trunk group consisting of 23 B-channels and one D-channel where at least one DS0 is active in each quadrant. In this scenario, there is not an entire contiguous quadrant for an H0 call to use even though there are as many as 20 idle channels. This would also block  $N \times$  DS0 384-kbps ( $N=6$ ) calls that require floating trunk allocation because an idle set of six contiguous B-channels is not available. Similarly, Figure 2-10 shows a 47 B-channel and one D-channel trunk group with one active call that, with the D-channel, contaminates both facilities and will block an H11 call attempt.

These scenarios would not block  $N \times$  DS0 384-kbps calls with flexible trunk allocation since the calls require only that the six B-channels be within the same physical facility.

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\* Round-robin (cyclical) trunk hunting is available for non-wideband PRI trunk groups.

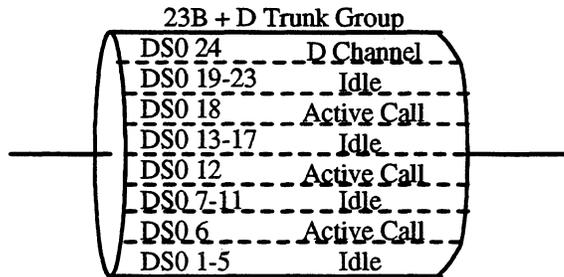


Figure 2-9.

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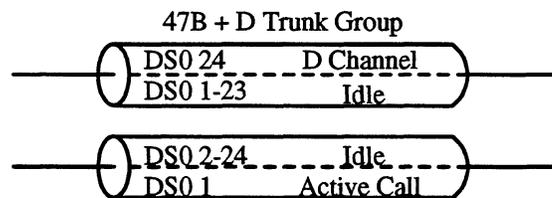


Figure 2-10.

---

To avoid scenarios like these, DEFINITY selects trunks for both wideband and narrowband calls to maximize availability of idle fixed channels for H0, H11, and H12 calls and idle floating channels for N x DS0 calls that require a contiguous bandwidth. The strategy for preserving idle channels to minimize blocking depends on the channel type.

The following table summarizes the strategies used for each channel type.

| Channel Type   | Blocking Minimization Strategy             |
|----------------|--|
| H0             | Preserve idle quadrants                    |
| H11            | Preserve idle facilities                   |
| H12            | Preserve idle facilities                   |
| Flexible NxDS0 | Preserve idle facilities                   |
| Floating NxDS0 | Preserve idle facilities as first priority |

## Feature Interactions

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This section examines the impact of wideband on DEFINITY G3V2 features. Features are listed in alphabetical order and only those features that are affected by wideband are present.



**NOTE:**

For a complete discussion of DEFINITY features see *DEFINITY Feature Description G3V2*.

### Account Codes

- DEFINITY G3V2 will not support the dialing of an account code via a wideband endpoint.
- Wideband endpoints should have a Class of Restriction (COR) designated such that account codes are not required.

### ACCUNET® Switched 56 Interface

ACCUNET Switched 56 service, although not a wideband service, will be supported via PRI-endpoints for dual 56/64-kbps calls.

### Authorization Codes

The dialing of an authorization code is not being supported for wideband calls since it requires inband signaling for collection of the code. Therefore:

- Incoming wideband trunks must not be administered as requiring an authorization code.
- If authorization codes are enabled within a given DEFINITY system, then routing on that DEFINITY system should be administered such that a wideband endpoint will never be denied access to a wideband trunk preference because of an insufficient Facility Restriction Level (FRL). If this were to occur, then an authorization code would not be prompted for and the call would not complete successfully.

### Busy Verification (BV)

- Wideband endpoints cannot signal busy verification.
- A narrowband endpoint cannot busy verify a wideband endpoint due to bandwidth incompatibility.
- A narrowband endpoint should not busy verify a B-channel involved in a wideband call.

### Call Coverage

A wideband endpoint extension cannot be administered as a coverage point in a call coverage path.

### Call Detail Recording (CDR)

#### Wideband Calls Flagged as Data

All wideband calls are marked as data calls with respect to the feature flag of a Call Detail Recording (CDR) record. The feature flag contains information regarding whether a given call received answer supervision as well as whether the call is a voice or data call. For wideband calls, this field outputs a 1 if no answer supervision was received or a 5 if answer supervision was received.

#### Recording of Wideband Bearer Capability Class (BCC)

Wideband calls that trigger enhanced 24-word unformatted, enhanced 24-word expanded, and variable format CDR records contain the wideband BCC value *W* in the BCC field of the record.

#### Recording the Bandwidth of a Call

The enhanced 24-word unformatted and the enhanced 24-word expanded CDR record formats include a two-digit field to record the bandwidth of a given call. This field will thus display a one or two decimal digit right-justified field denoting the *N*,  $1 \leq N \leq 31$ , DS0s, or B-channels comprising a call. ASCII character positions 122 and 123 are reserved and currently available to store the two digits within the 24-word ASCII expanded record. For both CDR record formats, the bandwidth, expressed as the number of DS0s or 64 kbps channels comprising a call, will be stored in the two digit bandwidth field.

#### Wideband Endpoints and Intra-switch CDR

Access endpoints (AEs) (narrowband), WAE, and PE extensions are valid extensions for triggering Intra-switch CDR records. However, it is worth noting the intra-switch CDR capability is automatically disabled as soon as a trunk becomes involved with the call, at which point standard trunk CDR takes precedence.

### Call Forwarding All (CFA)

- Wideband endpoints cannot signal CFA.
- Wideband endpoints should have a COS designated to block the activation of CFA via a third party (attendant or station with console permissions).

Since wideband endpoints cannot have call forwarding active, wideband calls are not subject to call forwarding.

### Call Management System Basic Call Management System

- Wideband calls can be carried over trunks that are measured by CMS/BCMS.
- Wideband endpoints are not measured by CMS/BCMS.

### Class of Restriction

As with other DEFINITY endpoints, wideband endpoints are administered with a Class of Restriction (COR) to determine calling and called party privileges.

- Care should be taken when administering a wideband endpoint's Facility Restriction Level (FRL) so as not to cause unexpected blocking or failure of wideband calls. Similar care should be taken if *Calling Party Restrictions* and/or *Called Party Restrictions* are administered.
- *Forced Entry of Account Codes* should be turned off on wideband endpoint CORs (see Account Codes).

### Class of Service

As with other DEFINITY endpoints, wideband endpoints are administered with a Class of Service (COS) to determine a certain class of features that can be activated by the endpoint. For wideband calls these features either do not apply (for example, *Data Privacy*) or are not being supported (for example, *Call Fwd-All CIs*) and therefore the COS designated for wideband endpoints should reflect this.

### Conference

- Wideband endpoints cannot signal conference to DEFINITY.
- DEFINITY G3V2 wideband switching only supports point-to-point wideband calling and will not provide for the conferencing of wideband calls (that is, multipoint).

### **Data Hotline**

A feature like Data Hotline may be provided by some endpoint equipment, for example, via assertion of the Data Terminal Ready (DTR) V.35 lead.

### **Distributed Communication System**

Although trunk groups supporting wideband services can be optioned for DCS, wideband calls placed over these trunks will not be DCS calls and will not provide DCS transparency.

### **Facility Busy Indication**

Although it is possible to administer a busy indicator button with a wideband endpoint extension, the button will not track the accurate status of the endpoint.

### **Hold**

- PEs and WAEs cannot signal hold.
- Wideband calls should not be held via CallVISOR ASA1 third-party hold.

### **Leave Word Calling**

The dialing of a wideband endpoint extension as part of the Leave Word Calling (LWC) feature activation will result in intercept being applied to the activator.

### **Message Sequence Tracer**

The Message Sequence Tracer (MST) capability will be enhanced to handle the changes to the Bearer Capability and channel identification IEs (see Chapter 5, "Wideband Protocol Information"). No new capabilities have been added to trigger on or filter for wideband calls. All existing MST capabilities properly interwork with wideband switching.

### **Outgoing Trunk Queuing**

Outgoing Trunk Queuing (OTQ) will not apply to wideband trunk calls.

OTQ utilizes an Automatic Callback (ACB) button on a voice terminal and since wideband endpoints do not support voice terminal buttons, OTQ cannot be accomplished in the same manner as is done for voice calls (narrowband).

### **Ringling**

Any audible alerting/ringing is the responsibility of the endpoint equipment.

### **Service Observing Features**

- Wideband endpoints should have a COS designated to block from being service observed.
- Service Observing of a wideband endpoint should not be attempted as it may cause a failure when the endpoint is involved with a wideband call.

### **Remote Port Network**

A wideband call cannot be switched to or from a remote port network. A wideband call entirely within a remote port network does work.

### **Subnet Trunking**

As with narrowband calls, subnet trunking can be accomplished via GRS and routing pattern administration. In addition, the Incoming Call Handling Treatment (ICHT) capability of ISDN-PRI trunk groups can also perform subnet trunking.



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# Wideband Installation and Administration

# 3

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# Wideband Installation and Administration

# 3

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This chapter provides software and hardware information for the installation and administration of the wideband switching feature.

This chapter is divided into two sections. The first section provides the DEFINITY G3V2 implementation forms required to support the wideband switching feature. The second section describes the basic hardware necessary for the wideband switching feature.

## Software Implementation of Wideband

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Software implementation of wideband covers the following:

- DS1 circuit pack administration
- D-channel administration
- ISDN-PRI trunk groups
- PRI-endpoints (PEs)
- Wideband access endpoints (WAEs)
- Administered connections (ACs)
- Routing patterns

 **NOTE:**

Endpoint applications and ISDN-PRI administration are beyond the scope of this document. For information regarding the administration of these components, see the manufacturer's documentation and *DEFINITY Line-Side ISDN Primary Rate Interface Technical Reference*.

For additional information regarding the following forms, see *DEFINITY Implementation*.

### DS1 Circuit Pack Form

Defining the UDS1 circuit pack is a prerequisite for the administration of WAEs and PEs.

The UDS1 circuit pack needed for wideband is the TN464C or later.

**⇒ NOTE:**

All screen fields and command verbs have not been provided. Only those that relate to defining a DS1 circuit pack for wideband are shown. For a complete discussion of this form see *DEFINITY Implementation*.

### Administration Commands

| Action | Object | Qualifier*            |
|--------|--------|-----------------------|
| add    | ds1    | [P]C <sub>ss</sub> ** |

\* Brackets [ ] indicate the qualifier is optional.

\*\* [P] — part of qualifier representing pnn  
C — part of qualifier representing carrier (A-F)  
ss — part of qualifier representing slot number.

Page 1 of 1

DS1 CIRCUIT PACK

|                             |                     |
|-----------------------------|---------------------|
| Location: 1b01              | Name:               |
| Bit Rate: 2.048             | Line Coding: b8zs   |
| Line Compensation: 1        | Framing Mode: esf   |
| Signaling Mode: common-chan | Interface: user     |
| Connect: pbx                | Country Protocol: 1 |
| Interconnect: CO            | Peer Protocol: ecma |
|                             | Side: a             |
| Interface Companding: mulaw | CRC: n              |
| Idle Code: 11111111         |                     |
| DMI BOS?: y                 |                     |

MAINTENANCE PARAMETERS

|                                     |                            |
|-------------------------------------|----------------------------|
| Slip Detection? n                   | Remote Loop-Around Test? n |
| Alarm When PRI Endpoint Detached? _ |                            |

## Field Descriptions

- **Location** — This is a display-only field when the form is accessed using an administrative command such as *add* or *change*.
- **Name** — Enter the name of the DS1 link (limit 15 characters). Typically, this is the destination of the link.



### WARNING:

*Once administered it may not be possible to change this field without removing associated translations.*

- **Bit Rate** — Enter “1.544” for the 24-channel DS1 rate. Enter “2.048” for the 32-channel DS1 rate.
- **Line Coding** — Enter “b8zs” (bipolar eight zero substitution), “hdb3” (high density bipolar 3) or “none.” This method must match the method used on the other end of the link. This entry indicates which line coding format will be used to ensure that the data meets T1-carrier requirements. When the DS1 circuit pack is used for ISDN, the ISDN D-Channel data is entered and not inverted when “b8zs” is used.

Bipolar eight zero code suppression, a line coding technique, uses a bipolar violation to ensure adequate “ones” density in a bit sequence. Eight zeros in an 8-bit sequence triggers the bipolar violation.

High density bipolar 3 and “none” are only applicable when the Bit Rate field is “2.048”.

- **Line Compensation** — Enter a number from 1 to 5 as follows (default is “1”):
  - For 22-gauge ABAM cable terminated on a DSX-1 cross-connect:

| <u>Compensation</u> | <u>Length (feet)</u> |
|---------------------|----------------------|
| 1                   | 000 - 133            |
| 2                   | 133 - 266            |
| 3                   | 266 - 399            |
| 4                   | 399 - 533            |
| 5                   | 533 - 655            |

- For 22-gauge ABAM cable terminated on DS1 terminal equipment such as a D4 channel bank or another system:

| <u>Compensation</u> | <u>Length (feet)</u> |
|---------------------|----------------------|
| 1                   | 0000 - 0266          |
| 2                   | 0266 - 0532          |
| 3                   | 0532 - 0798          |
| 4                   | 0798 - 1066          |
| 5                   | 1066 - 1310          |

- **Framing Mode** — Enter “d4” or “esf” (default). This mode must match the method used on the other end of the link. D4 is a framing format of 12 frames for analog representation on T1 carriers using DS1 signals.
- **Signaling Mode** — Enter “isdn-pri” or “isdn-ext” (default is “common-chan”). This mode must match the method used on the other end of the link.

The choice of “isdn-ext” enables the TN464C or later to use ISDN signaling, but the 24th channel is not used as a D-channel. When the System is configured for NFAS, all channels on a DS1 facility may be used for voice and/or data. The signaling for these channels is provided by the 16th channel (for 32-channel facilities E1) or the 24th channel (for 24-channel facilities T1) on another DS1 facility. The system may be configured for FAS and NFAS at the same time. Refer to the “Facility and Non-Facility Associated Signaling” feature in Chapter 3 of *DEFINITY Implementation* for additional information.

- **Connect** — Only displayed when the Signaling Mode field is “isdn-pri.” Specify what is on the far end of the PBX in order to control Layer 3 protocol properly. If “pbx” is entered, the Interface field is displayed. When “line-side” is entered, this implies that the switch is acting as the network side of the ISDN-PRI interface. This is required to support the rollabout video capability. Valid entries are “network” (system default), “host,” “line-side,” and “pbx.”
- **Interconnect** — Enter “pbx” or “CO.” If pbx is selected, the trunk will operate as a tie trunk. If CO is selected, the trunk will operate as a CO or DID trunk.
- **Country Protocol** — Enter 1 to 11 to indicate the type of protocol and signaling that must be used on the line. These are determined by the country where the trunk terminates.
- **Interface Companding** — Enter “alaw” or “mulaw”.
- **CRC** — Enter “y” to indicate that a cyclic redundancy check is to be performed on transmissions that the board receives.
- **Idle Code** — Enter the 8-digit string to be sent out on idle DS0 channels. The string to be entered depends upon the country where the trunk terminates. Refer to the individual country coverage in Appendix B of *DEFINITY Implementation* for valid entries in this field.
- **Slip Detection** — Enter “y” to enable the slip-rate status of this circuit pack to be used by maintenance software to determine whether an excessive frame slip rate exists. Enter “n” (default) when testing is not required.



**NOTE:**

Those DS1/T1 facilities that are used to provide the primary and secondary synchronization references should be administered for slip detection “y.” Typically, those other DS1/T1 spans that are used for data applications and which are used as synchronization service should also be administered for slip detection. This

excludes all T1 spans connecting channel banks, unless the channel bank is externally timed.

The digital switch maintains a slip count record for each DS1 interface. The slip count is used to determine if the T1 span is experiencing errors and, if so, the severity of the errors (type alarm). Option "y" enables switching between the primary, secondary, or internal high-accuracy clock.

**⇒ NOTE:**

If as many as 50 percent of those spans administered for slip detection are experiencing slips (with respect to the primary), then a decision is made to switch to the secondary.

- **Remote Loop-Around Test** — Enter "y" to allow testing or "n" to deny testing. This test is not possible unless the DS1 is connected to appropriate equipment such as a DSX-1 cross-connect or a DMI interface. The response should be "n" (default) unless the testing is extremely important.
- **Alarm When PRI Endpoint Detached** — Displayed only when the Connect field is "line-side." Enter "y" if the UDS1 circuit pack is connected to rollabout video equipment. Normally if the video equipment is disconnected, off-board alarms are raised to indicate the loss of connectivity from the system. By entering "y" in this field, when the UDS1 circuit pack detects a loss of signal, it is assumed the equipment was disconnected by the user and no alarms will be raised.

Valid entries are "y" (default), and "n."

## D-channel Administration

Adding a signaling group for G3i requires the execution of the change link and change processor channel commands before the signal group can be added (add signal group). In G3r only the add signal group command is necessary. See *DEFINITY Implementation* for more information.

## ISDN-PRI Trunk Groups

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Central to any wideband configuration (except for intraswitch wideband configurations), whether using PEs or WAEs, is the ISDN-PRI trunk group. As previously stated, ISDN-PRI trunks are the only type that can carry wideband calls.

This section provides the form and field definitions for administration of an ISDN-PRI trunk group. Prior to administering an ISDN-PRI trunk group, the signaling group must be defined and DS1 circuit pack administration completed. See *DEFINITY Implementation* for specific information.

**⇒ NOTE:**

All pages and fields for trunk group administration are present. Many of the fields are not directly related to wideband but have been provided for convenience. Wideband-specific fields can be found on pages 1, 2, and 5 (page 3 if usage allocation is not used on the trunk group).

The ISDN-PRI trunk group may also be used to support the wideband switching feature.

**⇒ NOTE:**

When an ISDN-PRI trunk connects two PBXs, the trunk options should be set identically at both ends of the connection with the exception of trunk hunt. For trunk hunt, one end should be "ascend" and the other "descend". "Cyclical" is also an option if a non-G3V2 PRI PBX is present.

### Administration Commands

| Action  | Object      | Qualifier*                               |
|---------|-------------|--|
| add     | trunk-group | 1-max** (or 'next')                      |
| change  | trunk-group | 1-max or TAC X...                        |
| display | trunk-group | 1-max or TAC X...['print' or 'schedule'] |
| list    | trunk-group | ['print' or 'schedule']                  |
| remove  | trunk-group | 1-max or TAC X...                        |

\* Brackets [ ] indicate the qualifier is optional. Single quotes ( ' ' ) indicate the text inside the quote must be entered exactly as shown or an abbreviated form of the word may be entered.

\*\* The maximum allowable value is based on the specific configuration. See Appendix A, "Maximum System Parameters For Hardware and Software Items."

## Page 1 of the Form

|                                |                                   |                         |
|--------------------------------|-----------------------------------|-------------------------|
| TRUNK GROUP                    |                                   | Page 1 of 6             |
| Group Number: 1                | Group Type: isdn-pri              | CDR Reports? y          |
| Group Name: OUTSIDE_CALL_____  | COR: 1_                           | TAC: _____              |
| Direction: two-way_            | Outgoing Display? n               |                         |
| Dial Access? n                 | Busy Threshold: 99                | Night Service: _____    |
| Queue Length: 0__              |                                   |                         |
| Service Type: _____            | Auth Code? n                      | Test Call ITC: rest     |
|                                | Far End Test Line No: _____       |                         |
| Test Call BCC: 4               |                                   |                         |
| TRUNK PARAMETERS               |                                   |                         |
| Codeset to Send Display: 6     | Codeset to Send TCM, Lookahead: 6 |                         |
| Max Message size to Send: 260_ |                                   |                         |
|                                | Overlap Receiving? n              |                         |
| Trunk Hunt: descend            |                                   |                         |
| Connected to Toll? n           | STT Loss: normal                  | DTT to DCO Loss: normal |
|                                |                                   |                         |
|                                | Bit Rate: 1200_                   | Synchronization: async  |
|                                |                                   | Duplex: full            |
| Disconnect Supervision - In? y | Out? n                            |                         |

Screen 3-1. ISDN-PRI Trunk Group Form (Page 1 of 6)

**⇒ NOTES:**

**Queue Length** is displayed when **Direction** is outgoing OR two-way.

**Usage Alloc** and **Testcall Service** are displayed when **Service Type** is cbc.

**STT loss** is displayed only if **Connected to Toll** is n.

**Field Descriptions**

- **Group Number** — Enter a group number when completing a paper form. This is a display-only field when the form is accessed using an administration command such as *add* or *change*.

**⇒ NOTE:**

When supporting DCS with BX.25 signaling, it is suggested that the far-end node trunk group be assigned the same "Group Number."

- **Group Type** — Enter *isdn* to identify the type of trunk group. This type can only be entered if the ISDN-PRI field on the System-Parameters Customer-Options form has been enabled.

- **CDR Reports** — Enter *y* (default) to provide a detailed record of both incoming and outgoing calls made on all trunks in the trunk group.
- **Group Name** — Enter a unique name that identifies the trunk group. Up to 15 characters can be used; default is OUTSIDE CALL.
- **COR** — Enter a class of restriction (COR) number from 0 to 95 that reflects the desired restriction; default is 1.
- **TAC** — Enter the trunk access code (TAC) that must be dialed to access the trunk group. A different TAC must be assigned to each trunk group. CDR also uses the TAC to identify the trunk group on associated CDR reports. Valid entries are TACs compatible with the System Dial Plan (one to four digits; one to three digits for DCS or to remotely control the trunk).
- **Direction** — Identifies whether the Direction is “incoming,” “outgoing,” or “two-way” (default). Note that the Direction administered will affect which timers will appear on the Administrable Timer page.
- **Outgoing Display** — Specifies whether or not the trunk group name is displayed on outgoing calls. Valid entries are “y” or “n” (default).
- **Dial Access** — Enter “y” to allow the trunk group to be accessed via a TAC. Access via the ARS feature is allowed regardless of this entry. A “y” may be entered if Service Type is “access,” “tie,” “tandem,” or “dmi-mos.”
- **Busy Threshold** — Enter the number of trunk group members that must be busy before the attendant is alerted by the warning lamp on the attendant console.
- **Night Service** — Enter the extension number assigned to Night Service. The extension number entered will receive all incoming calls when Night Service is activated. Valid entries are an extension number, the attendant group access code (“attd”), or leave blank. Leave blank for a Service Type field entry of “sddn.” This entry can be overridden by the Night Service entry on pages 2 or 5 through 11 of the form.
- **Queue Length** — Enter the number of outgoing calls that can be held waiting. A “0” (default) indicates no calls will be held in queue. Enter “0” for DCS trunks or a Service Type field entry of “sddn.”
- **Service Type** — Indicates the service for which this trunk group will be dedicated. Table 3-1 provides a listing of predefined entries. In addition to the Services/Features listed on this table, “sddn,” “tie,” “tandem,” and “wats” all constitute valid entries. An entry of “cbc” is also allowed which indicates that this trunk group is used by the Call by Call Service Selection feature.

Up to ten ISDN-PRI trunk groups can have the Service Type field administered as “cbc.”

Table 3-1. Predefined Services/Features — ISDN-PRI

| Administration Mnemonic | Description   |
|-------------------------|---|
| accunet                 | ACCUNET Switched Digital Service — part of ACI (AT&T Communications ISDN) phase 2.  |
| megacom                 | MEGACOM Service — an AT&T communications service that provides unbanded long-distance services using special access (PBX to 4ESS™ switch) from an AT&T communications node.   |
| megacom-800             | MEGACOM 800 Service — an AT&T communications service that provides unbanded 800 service using special access (4ESS switch to PBX) from an AT&T communications node.   |
| multiquest              | AT&T MULTIQUEST® Telecommunications Service — dial 700 service. A terminating user's service supporting interactive voice service between callers at switched access locations and service providers directly connected to the AT&T Switched Network (ASN). |
| outwats-bnd             | OUTWATS Band — WATS is a voice-grade service providing both voice and low-speed data transmission capabilities from the user's location to defined service areas commonly referred to as bands. Currently, the widest band is 5.                            |
| sdn                     | Software Defined Network (SDN) — an AT&T communications offering that provides a virtual private network using the public switched network. SDN can carry voice and data between customer locations as well as off-net locations.                           |
| sddn                    | Software Defined Data Network — provides a virtual private line connectivity via the AT&T switched network (4ESS switch). Services include voice, data, and video applications. These services complement the SDN service.                                  |

- **1Auth Code** — Enter “n”. Wideband calls *must not* use authorization codes. See the feature interactions section of Chapter 2, “Wideband Feature Description” for additional information if necessary.
- **Test Call ITC** — Controls the encoding of the Information Transfer Capability (ITC) codepoint of the Bearer Capability IE in the SETUP message when generation an ISDN Test Call. Allowed values are “rest”(ricted) and “unre”(stricted); default is “rest.”

⇒ **NOTE:**

ISDN test call feature does not go through routing so a test call is never blocked due to an incompatible ITC.

- **Usage Alloc** — Displayed when Service Type is “cbc.” Specifies whether or not the user wishes to allocate the usage of the services provided by the trunk group. Valid entries are “y” and “n” (default). If “y” is entered, two additional CBC-related forms are displayed.
- **Far End Test Line No.** — Specifies the number that will be sent to the far end's ISDN test line extension. When the *test trunk long* command is

issued, this exact number is sent to the far end to establish a call that tests the integrity of the trunk member under test. The number does not pass through routing or undergo digit manipulation. The digits entered here must be what the far end expects. For example, for an ISDN tandem trunk, the far-end test number should be a seven-digit ETN (Electronic Tandem Network) number. Up to 15 digits may be entered in this field.

- **Test Call BCC** — Indicates the Bearer Capability Code (BCC) used for the ISDN-PRI test call. Valid entries and their definitions are as follows:

| Entry | Definition          |
|-------|---------------------|
| 0     | Voice               |
| 1     | Mode 1              |
| 2     | Mode 2 Asynchronous |
| 3     | Mode 3 Circuit      |
| 4     | Mode 0 (default)    |

- **Test Call Service** — Specifies the call-by-call selection for an ISDN-PRI test call. This field only appears if the Service Type field is "cbc." Valid entries are all the services listed in Table 3-1 excluding "sddn."
- **Codeset to Send Display** — This field defines the codeset for sending the information element for display. The value depends on what type of switch the user is connected to as follows:

| Value | Switch Type  |
|-------|--|
| 0     | CCITT  |
| 6     | Any other than CCITT or System 85 R2V4, 4E11 (default) |
| 7     | System 85 R2V4, 4E11                                   |

- **Codeset to Send TCM, Lookahead** — This field defines the codeset for sending the information element for Traveling Class Marks and Lookahead Interflow. The value depends on what type of switch the user is connected to. Valid entries are "7" for System 85 R2V4, E11 or newer switch types or "6" (default) for any other types.

⇒ **NOTE:**

A Traveling Class Mark (that is, the user's FRL or the user's trunk group FRL) is passed between tandem nodes in an ETN in the SETUP message. It is then used by the distant tandem switch to permit access to facilities consistent with the originating user's privileges.

- **Max Message Size to Send** — Defines the maximum size of ISDN-PRI messages sent by the switch. Currently, the system can receive 260-byte messages. Valid entries are "128," "244," "256," and "260" (default). The following table indicates the expected message size from several AT&T products.

| Products                   | Message Length (octets) Received |
|----------------------------|----------------------------------|
| 4ESS (4E11)                | 256                              |
| 4ESS (4E13)                | 256                              |
| 4ESS (4E14)                | 256                              |
| 5ESS (5E4)                 | 244                              |
| 5ESS (5E5)                 | 244                              |
| 5ESS (5E6)                 | 244                              |
| System 75 (all), G1 and G3 | 260                              |
| System 85 (R2V4)           | 128                              |
| System 85 (R2V5)           | 260                              |
| System 85 (R2V6)           | 260                              |

- Overlap Receiving** — Indicates if it is possible to accept digits using overlap receiving. If this field is administered as “n” (default), then the current enbloc procedures will be applied to incoming calls on that trunk group.

If the far-end switch sends digits using overlap sending and the trunk group is not administered to be able to accept overlap receiving, there is a good chance calls will not complete due to an incomplete called party number. If, however, the trunk group is administered for overlap receiving and the far end only uses enbloc sending, an additional call delay (of up to 15 seconds) may be placed on each call.

- Trunk Hunt** — The switch performs a linear trunk hunt when searching for available channels within a facility in an ISDN-PRI trunk group. Enter “ascend” to enable a linear trunk hunt search from the lowest to highest numbered channels, or “descend” for linear trunk hunt search from the highest to lowest. Enter “cyclical” (default) for a round-robin search of trunks. This is provided for backward compatibility with earlier versions of DEFINITY. If wideband is optioned then a linear search must be chosen.

The search is administrable per ISDN-PRI trunk group, but it infers the direction of search within all ISDN-PRI facilities (or portions of those facilities) administered within the trunk group.

**(Linear only)** All trunks within an ISDN-PRI trunk group are ordered based on this field and without regard to the order in which trunks are administered within the trunk group.

For cyclical, it is based on administered order.

- Connected to Toll** — Enter “y” if connected to a CO toll office.

- **STT Loss** (Satellite PBX Tie Trunk Loss) — Displayed when Connected to Toll field is “n.” Specifies the loss plan to be used. Valid entries are “normal” (default) or “low.” This option affects the transmission performance of a private PBX network.

Although the use of this option has wider applications, Network Engineering should be consulted to administer this field for all but the simplest network arrangements. The “low” option (described as the ISL digital low loss plan in *DEFINITY Communications System Generic 1 and System 75 and System 85 DS1/DMI/ISDN-PRI Reference*, 555-025-101) should be used when:

- Stations on the satellite PBX complain of too much loss on calls to the public network.
- The PBX network consists of **no more** than three PBXs; one main and one or two satellite PBXs.
- All PBXs have the “low” option available.
- The total DS1 trunk connection is shorter than 100 miles.

If these conditions are not met, obtain Network Engineering assistance. The field entry is based on the following:

- **normal** — Applies to AIU-TT (Analog Interface Unit at Customer Switching System for Tie Trunk — 4-wire E&M interface), and DIU-TT (Digital Interface Unit at Customer Switching System for Tie Trunk — voice or AVD DS1 interface) loss plans.
- **low** — Applies to AIU-TTS (same as AIU-TT, but suitable for private network connections that can be connected in tandem with public network connections) and DIU-TTS (same as DIU-TT, but suitable for private network connections that can be connected in tandem with public network connections). These interfaces were formerly referred to as DIU DTT ISL.
- **DTT to DCO Loss** (Digital Tie to Digital CO Trunk Loss) — Specifies the loss plan used for the trunk group that connects a DIU-CO (Digital Interface Unit at a Central Office) to a DIU-DTT (Digital Interface Unit for a Digital Tie Trunk Interface).

This option affects the transmission performance of public network access via a private PBX network. Choose the “low” option if private network users complain about too much loss on calls to the public network; otherwise, the “normal” option should be used. Valid entries are “normal” (default) and “low.” The entry is based on the following:

- **normal** — Corresponds to a (0, -6) dB gain pair and is used as the default option. (This corresponds to the DTT/EIA DCO port-to-port configuration as described in *DEFINITY Communications System Generic 1 and System 75 and System 85 DS1/DMI/ISDN-PRI Reference*, 555-025-101.)
- **low** — Corresponds to (+3, -3) dB gain pair. Low is used for internetwork applications in which no significant configuration will

encounter echo, stability, or overload problems because of reduced loss. With the low-gain pair, subscriber station DTMF signals transmitted through the digital class 5 office into the customer network may experience non-recoverable digit mutilation in secondary signaling applications (that is, DTMF signaling after the connection has been established). (This corresponds to the DTT/ISL DCO port to port configuration as described in *DEFINITY Communications System Generic 1 and System 75 and System 85 DS1/DMI/ISDN-PRI Reference*, 555-025-101.)

- **Bit Rate** — Specifies the baud rate used for pooled modems. Valid entries are 300, 1200 (default), 2400, 4800, 9600, and 19200.
- **Synchronization** — Specifies if the trunk group will use synchronous or asynchronous communications. Valid entries are “async” (default) and “sync.”
- **Duplex** — Specifies if the trunk will operate full or half duplex. Valid entries are “full” (default) and “half.”
- **Disconnect Supervision-In?** — This field appears when the `Direction` is either “incoming” or “two-way.” Internally, the field is set to “n” if the `Direction` is “outgoing.” Enter “y” (default) to indicate that the far end has the ability to release a trunk when the calling party releases from a call and the system can recognize the release signal.
- **Disconnect Supervision-Out** — This field appears when the `Direction` is either “outgoing” or “two-way.” Internally, the field is set to “n” (default) if the `Direction` is “incoming”. If the field is set to “y” a warning message appears to alert the user of possible trunk lockups. This field specifies whether trunks in this trunk group provide disconnect supervision when seized outgoing, (that is, whether these trunks should be allowed to participate in outgoing trunk to outgoing trunk calls). This field is set independently of the trunk-to-trunk transfer system parameter, although both options must be set appropriately if outgoing trunk to outgoing trunk transfers are desired.



- **Long Holding Time (hours)** — Only displayed when ACA Assignment is “y.” The length in hours that the system defines as a long holding time. If “0” is entered, the system will not consider long holding calls. Valid entries are 0 to 10; default is 1. Field must be “0” for a Service Type field entry of “sddn.”
- **Short Holding Time (secs.)** — Only displayed when ACA Assignment is “y”. The length in seconds that the system defines as a short holding time. If “0” is entered, the system will not consider short holding calls. Valid entries are 0 to 160; default is 10.
- **Short Holding Threshold** — Only displayed when ACA Assignment is “y”. The number of times that the system will record a short holding call before an attendant or display-equipped voice terminal user is alerted to the possibility of a faulty trunk. Valid entries are 0 to 30; default is 15.
- **Measured** — Indicates if the system will transmit data for this trunk group to the Call Management System. Valid entries are “internal,” “external,” “both,” “none” (default). Enter “internal” if the data is to be sent to the Basic Call Management System (internal to the switch) for subsequent measurement reports; enter “external” to send the data to the Call Management System Adjunct. Enter “both” to send the data to both systems for measurement reports. Enter “none” if trunk group measurements are not required.
- **Wideband Support?** — Specifies whether or not wideband switching is supported by this trunk group. Valid entries are “y” or “n” (default). This field is only administrable if the wideband switching feature is enabled on the System-Parameters Customer-Options form. If set to “y,” the Wideband Support Options page is displayed.
- **Internal Alert** — This field only appears if the Service Type on page 1 is “tie.” Specifies if internal ringing and coverage are used for incoming calls. Valid entries are “y” or “n” (default).
- **Data Restriction** — Used to prevent system features from generating tones on a data call that would cause erroneous data transmission. Valid entries are “y” or “n” (default).
- **NCA-TSC Signaling Group** — Displayed when Default NCA TSC Routing is “n”. Used to identify which signaling group an NCA TSC will be routed out on. Enter the appropriate signaling group numbers (1 to 166). The signaling groups entered are chosen by “round-robin” method. To balance the load of sending TSCs on every signaling group, a signaling group number can be entered twice to increase its probability of being used as an outgoing route for NCS TSCs.

A signaling group is a group of B-channels for which a given D-channel (or D-channel pair) will carry the signaling information.

- **Send CPN** — Specifies if the calling party’s number is sent to the network on incoming and/or outgoing ISDN calls. Valid entries are “y” or “n” (default). If “y” is entered, the CPN Prefix Table is accessed to construct the actual number to be sent over the network.

⇒ **NOTE:**

The CPN Prefix Table can override the Send CPN field entry for any administrable block of extensions.

- **Send Name** — Specifies if the calling/connected party's administered name is sent to the network on incoming and/or outgoing calls. Valid entries are "y" or "n" (default).
- **Used for DCS** — Specifies whether the trunk group will send and receive messages on a DCS signaling link. This field does not appear if the Service Type on page 1 is "dmi-mos" or "sddn." Valid entries are "y" or "n" (default). If "y" is entered, complete the DCS Signaling field entry as well.

⇒ **NOTE:**

This field cannot be activated if the tie trunk group number is greater than 255, if there are more than 255 members in the trunk group, or if the trunk access code is longer than three digits.

- **PBX ID** — Only displayed when the Used for DCS field is "y." Enter the ID of the PBX at the other end of this trunk.
- **DCS Signaling** — This field is only displayed if the Used for DCS field entry is "y." Specifies the means used to send the DCS message. Valid entries are "bx.25" for the traditional DCS feature or "d-chan" for the DCS over ISDN-PRI D-channel feature.
- **Maintenance Tests** — Indicates whether or not hourly maintenance tests will be made on this trunk group. Valid entries are "y" (default) or "n."

The remaining fields on Page 2 form an incoming call handling table. The table can (optionally) be used to provide unique call treatment for different incoming calls on any ISDN-PRI trunk group. Twelve unique treatment specifications are possible, corresponding to the 12 rows (lines) on the table. Unique digit manipulation capabilities, CPN/BN requests, and night service destinations are possible for different types of incoming calls. The unique digit manipulation capabilities can be particularly useful to accommodate different dial plans for different services on an ISDN-PRI trunk type with a Service Type (field entry) of "cbc" (call-by-call). The table can also be used for ISDN-PRI trunk groups that are not call-by-call. For example, an ISDN-PRI group with service type "megacom-800" could use the Incoming Call Handling Table to distinguish treatment of calls to different 800 numbers based on the Dialed Number Identification Service (DNIS) number that is incoming to the PBX.

Each row in the table consists of seven columns. The first three columns (Service/Feature, Called Len, and Called Number) constitute a key that together select which row or unique treatment should apply for an incoming call on the group. The remaining four columns specify the treatment to be provided for a call that matches the key.

If an incoming call is for a service listed in a row on the table, then that row may specify the treatment for the call, depending on the other two columns of the key. The Called Len field is used to continue the row determination. If the number of

digits received with the incoming call matches the number of digits in the Called Len field for calls to the matched service, then this row may apply. If no other row also contains a matching service and called length, then this row does apply. If another row does exist with the same service and number length, then the Called Number field will be used to continue the row determination. If the leading digits received with the incoming call match the digits specified in the Called Number field, then this row applies to the call. Therefore, with this table, a unique treatment can be given to any incoming call, even if these calls are to the same service or have the same length of digits.

The remaining four fields specify the unique treatment for the call once the row has been determined. Together, the Del and Insert fields can be used to manipulate the incoming number that will be used to route the call. The Per Call CPN/BN field can be used to request CPN/BN for specific calls incoming on the group. The Night Serv field is used to have calls of different types routed to different night destinations when night service is in effect.

**⇒ NOTE:**

DCS features that use the remote-tgs button (on the remote switch) do not work when the local trunk group deletes or inserts digits on the incoming call. These buttons try to dial a local TAC. Adding or deleting digits defeats this operation and renders the remote feature inoperable. If digit manipulation is needed, use it on the outgoing side, based on the routing pattern. One reason for digit manipulation is insertion of the AAR feature access code (FAC).

The specific fields comprising the table are:

- **Service/Feature** — Specifies the ISDN-PRI Services/Features for an incoming call type. See the Service Type field description (Table 3-1) for a list of predefined Services/Features that can be received. The identifier “other” can be used for any Services/Features not explicitly specified.
- **Called Len** — Specifies the number of digits received for an incoming call. No number here is considered as a “wild card” entry and means that any length of digits associated with the specified Service/Feature can match in this field. Valid entries are 0 to 21, or leave blank.
- **Called Number** — Specifies the leading digits received for an incoming call. No number here is considered a “wild card” entry and means that any number associated with the specified Service/Feature can match in this field. Valid entries are 1 to 16 digits, or leave blank.
- **Del** — Specifies the number of leading digits to be deleted from the incoming called party number. Calls of a particular type may be administered to be routed to a single destination by deleting all incoming digits and then administering the Insert field with the desired extension. Valid entries are 1 to 21, “all,” or leave blank.
- **Insert** — Specifies the digits to be prepended to the front of the remaining digits after any (optional) digit deletion has been performed. The resultant number formed from digit deletion/insertion is used to route the call, provided night service is not in effect. Valid entries are up to 16

characters consisting of a combination from the following: 0 through 9, \*, #, or leave blank.

- **Per Call CPN/BN** — Specifies if and how to request Calling Party Number (CPN) or Billing Number (BN) for calls of this type. An entry of “none” indicates that the switch will not request either CPN or BN for any incoming calls of this type. Valid entries are “cpn-only,” “bn-only,” “bn-pref” (prefer BN, but will accept CPN), “cpn-pref” (prefer CPN, but will accept BN), “none,” or leave blank; default is blank. Leave blank when connected to another PBX.

**⇒ NOTE:**

A 4-second delay will occur in terminating the call to the far-end station if the connecting switch does not respond to the request.

- **Night Serv** — Specifies a night service extension (can be a VDN extension) per Service/Feature. An entry other than blank overrides the Night Service field entry on page 1 of the form. This entry can be overridden by the Trunk/Member Night Service entry when provided. Valid entries are an assigned extension, the attendant group access code (“attd”), or leave blank.

| CBC TRUNK GROUP USAGE ALLOCATION |      |      |                         |      |      | Page 3 of 6             |      |      |
|----------------------------------|------|------|-------------------------|------|------|-------------------------|------|------|
| Usage Allocation Plan 1          |      |      | Usage Allocation Plan 2 |      |      | Usage Allocation Plan 3 |      |      |
|                                  | Min# | Max# |                         | Min# | Max# |                         | Min# | Max# |
| Service/Feature                  | Chan | Chan | Service/Feature         | Chan | Chan | Service/Feature         | Chan | Chan |
| _____                            | --   | --   | _____                   | --   | --   | _____                   | --   | --   |
| _____                            | --   | --   | _____                   | --   | --   | _____                   | --   | --   |
| _____                            | --   | --   | _____                   | --   | --   | _____                   | --   | --   |
| _____                            | --   | --   | _____                   | --   | --   | _____                   | --   | --   |
| _____                            | --   | --   | _____                   | --   | --   | _____                   | --   | --   |
| _____                            | --   | --   | _____                   | --   | --   | _____                   | --   | --   |
| _____                            | --   | --   | _____                   | --   | --   | _____                   | --   | --   |
| _____                            | --   | --   | _____                   | --   | --   | _____                   | --   | --   |
| _____                            | --   | --   | _____                   | --   | --   | _____                   | --   | --   |
| _____                            | --   | --   | _____                   | --   | --   | _____                   | --   | --   |

Screen 3-3. ISDN-PRI Trunk Group Form (Page 3 of 6)

**⇒ NOTE:**

This page is displayed when Service Type on page 1 is “cbc” and Usage Alloc is “y.”

Page 3 is used to set a minimum and maximum number of members for up to ten different Services/Features for up to three different Usage Allocation Plans.



**NOTE:**

Refer to "Call By Call Service Selection" in *DEFINITY Communications System Generic 3V2 Feature Description*, 555-230-204, for a detailed description of Usage Allocation Plans.

**Field Descriptions**

- **Service/Feature** — Specifies the ISDN-PRI Services/Features that can be requested at call setup time when using this trunk group. See the Service Type field description (Table 3-1) for a list of predefined services/features that can be received on a call-by-call basis. The identifier "other" is used for all Services/Features not explicitly specified.
- **Min# Chan** — Indicates the minimum number of members of an ISDN-PRI trunk group with a Service Type of "cbc" that a particular service/feature can use at any given time. The sum of the minimum number of members for all Service/Features must not exceed the total number of members of the trunk group. Valid entries are 0 to 99, or blank.
- **Max# Chan** — Indicates the maximum number of members of a ISDN-PRI trunk group with a Service Type of cbc that a particular Service/Feature can use at any given time. This field must be completed if a Service/Feature has been entered on Page 2 of the form. Valid entries are 1 to 99, or leave blank.

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CBC SERVICE TRUNK GROUP ALLOCATION PLAN ASSIGNMENT SCHEDULE

Usage Method:

Fixed? y            Allocation Plan Number: 1

Scheduled? n

Usage Allocation Plan Activation Schedule:

|     | Act Pln   |
|-----|-----------|-----------|-----------|-----------|-----------|-----------|
|     | Time #    |
| Sun | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ |
| Mon | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ |
| Tue | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ |
| Wed | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ |
| Thu | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ |
| Fri | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ |
| Sat | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ | __: __ __ |

Screen 3-4. ISDN-PRI Trunk Group Form (Page 4 of 6)



**NOTES:**

This page is displayed when Service Type on Page 1 is "cbc" and the Usage Alloc field is "y."

The Allocation Plan Number field is only displayed if the Fixed field is set to "y."

Page 4 provides for administering either a fixed schedule or a schedule that can change up to six times a day for each day of the week.

### Field Descriptions

- **Fixed** — Indicates whether the allocation plan will be fixed. If "y" (default) is entered in this field, the plan number entered in the Allocation Plan Number field will be enabled. This field must be completed if a Service/Feature has been entered on Page 2 of the form.
- **Allocation Plan Number** — Specifies the CBC Trunk Allocation Plan (1 through 3) that is in effect if a fixed usage method has been selected. This field must be assigned if the Fixed field is "y." Valid entries are 1 through 3 or blank (default).
- **Scheduled** — Indicates whether the allocation plans will be in effect according to the schedule found on this page. If "y" is entered in this field then there must be at least one entry in the schedule.
- **Act Time** — Indicates the time that the usage allocation plan administered in the next field (Pln #) will become effective. The time is entered in 24-hour time. There must be at least one entry per day. Valid entries are 00:00 through 23:59.
- **Pln #** — Specifies the number of the usage allocation plan which will be in effect from the activation time until the activation time of the next scheduled plan change. Valid entries are 1 to 3.

Page 5 of 6

Wideband Support Options

H0? n  
H11? n  
H12? n  
N x DS0? y      Contiguous? n

Screen 3-5. ISDN-PRI Trunk Group Form (Wideband Support Options)



#### NOTES:

The Contiguous field is only displayed if N x DS0 is "y."

This page is displayed if Wideband Support field is "y."

This page appears immediately before the trunk member pages. The actual page number will vary. If the Service Type is "cbc" and the Usage Allocation field is "y," the Wideband Support Options page is page 5; otherwise it is page 3.

All B-channels that comprise the wideband call must reside on the same ISDN-PRI facility.

Contiguous N x DS0 cannot be activated along with the H0 service. They are mutually exclusive.

### Field Descriptions

- **H0** — Enter “y” to specify the ISDN information transfer rate for 384-kbps data, which is comprised of six B-channels. When a trunk group is administered to support H0, the trunk/hunt algorithm to satisfy a call requiring 384 kbps of bandwidth uses a fixed allocation scheme. Default is “n” and is used with AT&T switched 384 service and SDN 384 service.
- **H11** — Enter “y” to specify the ISDN information transfer rate for 1,536-kbps data, which is comprised of 24 B-channels. When a trunk group is administered to support H11, the trunk/hunt algorithm to satisfy a call requiring 1,536-kbps bandwidth uses a fixed allocation scheme. Default is “n” and is used with AT&T switched 1,536 and SDN 1,536 service.
- **H12** — Enter “y” to specify the ISDN information transfer rate for 1,920-kbps data, which is comprised of 30 B-channels. When a trunk group is administered to support H12, the trunk/hunt algorithm to satisfy a call requiring 1,920-kbps bandwidth uses a fixed allocation scheme. Default is “n.”
- **N x DS0** — Enter “y” to specify the N x DS0 ( $2 \leq N \leq 31$ ) multirate service. Default is “n.”
- **Contiguous?** — Specifies whether to hunt contiguous N x DS0 channels. This field only appears if “y” is entered in the N x DS0 field.

The trunk/hunt algorithm to satisfy an N x DS0 call is as follows:

- ▶ Enter “y” to specify the “floating” scheme. N x DS0 calls are placed on a contiguous group of B-channels large enough to satisfy the requested bandwidth without constraint on the starting channel (no fixed starting point trunk).
- ▶ Enter “n” to specify the “flexible” scheme. N x DS0 calls are placed on any set of B-channels on the same facility as long as the requested bandwidth is satisfied. There are no constraints such as contiguity of B-channels or fixed starting points.

#### NOTE:

Between two private DEFINITY G3V2 switches, flexible is the preferred option.

| TRUNK GROUP                            |       |       |      |       |         |       |
|--|-------|-------|------|-------|---------|-------|
| Page 6 of 6                            |       |       |      |       |         |       |
| Administered Members(min/max): xxx/yyy |       |       |      |       |         |       |
| Total Administered Members: xxx        |       |       |      |       |         |       |
| GROUP MEMBER ASSIGNMENTS               |       |       |      |       |         |       |
| Port                                   | Code  | Sfx   | Name | Night | Sig Grp |       |
| 1:                                     | _____ | _____ | -    | _____ | _____   | _____ |
| 2:                                     | _____ | _____ | -    | _____ | _____   | _____ |
| 3:                                     | _____ | _____ | -    | _____ | _____   | _____ |
| 4:                                     | _____ | _____ | -    | _____ | _____   | _____ |
| 5:                                     | _____ | _____ | -    | _____ | _____   | _____ |
| 6:                                     | _____ | _____ | -    | _____ | _____   | _____ |
| 7:                                     | _____ | _____ | -    | _____ | _____   | _____ |
| 8:                                     | _____ | _____ | -    | _____ | _____   | _____ |
| 9:                                     | _____ | _____ | -    | _____ | _____   | _____ |
| 10:                                    | _____ | _____ | -    | _____ | _____   | _____ |
| 11:                                    | _____ | _____ | -    | _____ | _____   | _____ |
| 12:                                    | _____ | _____ | -    | _____ | _____   | _____ |
| 13:                                    | _____ | _____ | -    | _____ | _____   | _____ |
| 14:                                    | _____ | _____ | -    | _____ | _____   | _____ |
| 15:                                    | _____ | _____ | -    | _____ | _____   | _____ |

Screen 3-6. ISDN-PRI Trunk Group Form (Trunk Group Member Assignments Page)

**⇒ NOTE:**

When supporting DCS, Trunk group member number assignments must be the same between nodes (member #1 must be member #1 at the far-end trunk group).

For BX.25 signaling, trunk group numbers must be the same between nodes (trunk group 1 must be trunk group 1 at the far-end).

The Trunk Access Code (TAC) must be shorter than four digits.

The total number of pages, and the first page of Group Member Assignments, will vary depending on whether the CBC and Wideband Support pages are displayed.

**Field Descriptions**

- **Administered Members (min/max)** — Display-only field. Indicates the minimum and maximum member number that has been administered for the particular trunk group. This field is displayed on all member pages.
- **Total Administered Members** — Display-only field. Indicates the total number of members administered in the trunk group. This field will appear on all trunk group member pages.

- **Port** — Enter seven characters. The first two characters identify the cabinet (01 to 22 [G3rV2], 1 to 3 [G3sV2, G3iV2]); the third character identifies the carrier (A through E); the fourth and fifth identify the slot number in the carrier (01 to 20 for multi-carrier cabinets or 01 to 18 for single-carrier cabinets); the last two characters identify the circuit number (01 to 31).
- **Code** — Display-only field. Displays the type of circuit pack physically installed or logically administered at the location to which this member has been assigned. If a circuit pack is neither installed nor administered at the member's location, the field is blank.
- **Sfx** — Displays the type of circuit pack (suffix only) physically installed at the location to which this member has been assigned. Field is blank if a circuit pack has not been physically installed.
- **Name** — Enter up to ten characters to identify the member of the trunk group. The name can be a 7-digit telephone number or a 10-digit trunk circuit identification number (provided by trunk supplier).
- **Night** — Specifies a night destination for an individual trunk. This entry overrides the group Night Service entry on Page 1 of the form. Valid entries are an extension (can be a VDN extension), the attendant group access code ("attd"), or leave blank.
- **Sig Grp** — Enter the appropriate signaling group number. See Signaling Group in this chapter for more information. If a DS1 interface appears in one signaling group, then the number of that signaling group will appear as a default in the Sig Grp column for any trunk on that interface after the form is submitted. This value cannot be altered without adding a circuit pack TN code for DS1 interface to another signaling group. If a DS1 circuit pack appears in more than one signaling group, then no default will appear in the Sig Grp column.

## PRI-Endpoints

The PRI-endpoint form is used for administration of PRI-endpoints. Prior to administering a PRI-endpoint, the Signaling group must be defined and DS1 circuit pack administration completed. See *DEFINITY Implementation* for specific information.

### Administration Commands

| Action  | Object       | Qualifier*   |
|---------|--------------|--|
| add     | pri-endpoint | <extension> or 'next'                                  |
| change  | trunk-group  | <extension>  |
| display | trunk-group  | <extension>...['print' or 'schedule']                  |
| list    | trunk-group  | [<extension>]['count'<number>] ['print' or 'schedule'] |
| remove  | trunk-group  | <extension>  |

\* Brackets [ ] indicate the qualifier is optional. Single quotes ( ' ) indicate the text inside the quote must be entered exactly as shown or an abbreviated form of the work may be entered.

```

add pri-endpoint 2003                                     Page 1 of 1

                                PRI ENDPOINT

                Extension: 2000                            Name: PE-2000
      (Starting) Port: 1B2001                               Width: 6
Originating Auto Restoration? n                          Signaling Group: 3
                        COR: 1                               COS: 1
      Maintenance Tests: y                                Simultaneous Calls?: y

                Wideband Support Options

                        H0? n
                        H11? n
                        H12? n
                        N x DS0? y      Contiguous? n
    
```



### NOTES:

In the case where the qualifier *next* is supplied, the system assigns the next available extension to the PRI-endpoint and enters the form's entry mode. The Contiguous field is only displayed if N x DS0 is "y."

All B-channels that comprise the wideband call must reside on the same ISDN-PRI facility.

Contiguous N x DS0 cannot be activated along with the H0 service. They are mutually exclusive.

### Field Descriptions

- **Extension** — A numeric address ranging from one to five digits that is assigned to a PRI-endpoint. The value of the extension is either specified explicitly by the user or supplied by the system when the *next* qualifier is entered on the command line.
- **Name** — An optional alphanumeric string that identifies the PRI-endpoint. The field length is from 1 to 15 characters inclusive.
- **(Starting) Port** — Associates a physical location with the extension, and specifies the starting port of the PRI-endpoint. The field length is from 1 to 7 alphanumeric characters.
- **Width** — Defines the number of contiguous/adjacent B-channels (DS0 ports), beginning with the *(Starting) Port* specified, within the DS1/PRI facility that defines the PRI-endpoint. A width of 6 defines a 384-kbps PRI-endpoint.

On an E1 facility, channel 0 is reserved for framing and synchronization. In an FAS arrangement on an E1 facility, channel 16 contains the D-channel. Hence, channel 16 is skipped when channels are allocated. For example, if a PRI-endpoint is administered with six channels with starting port 12, B-channels 12 through 15 and 17 through 18 are allocated to the PRI-endpoint.

In an NFAS arrangement (both E1 and T1 facilities), if the D-channel is present, it should be skipped when channels are allocated. Otherwise, channel 16 can be used. In the latter case, B-channels 12 through 17 are allocated to the PRI-endpoint.

Valid values are from 1 to 31 inclusive.

If the width is set to a value other than 1, the *Wideband Switching* option must be enabled on the System-Parameters Customer-Options form.

- **Originating Auto Restoration** — Defines whether calls originating from this PRI-endpoint should be restored (while maintaining endpoint call status) in the case of network failure. Auto restoration of a PRI-endpoint is only available for calls that have been established over an ISDN-PRI SDDN trunk group. Valid entries are "y" or "n" (default).
- **Signaling Group** — Defines the D-channel or D-channel pair that will provide the signaling information for the set of B-channels making up the PRI-endpoint.

Valid values are:

- 1 to 166 (large configuration)
- 1 to 8 (medium configurations)
- 1 to 4 (small configurations)

- **COR** — Determines calling and called party privileges. Valid values are from 0 to 95 inclusive. The default value is 1.
- **COS** — Determines a certain class of features that can be activated by, or on behalf of, the endpoint. Valid values are from 0 to 15 inclusive. The default value is 1.
- **Maintenance Tests** — Determines if hourly maintenance tests will be run or suppressed on this PRI-endpoint. Valid entries are “y” (default) and “n”.
- **Simultaneous Calls?** — When this field is set to “yes”, multiple simultaneous call are allowed on a PRI endpoint.
- **Wideband Support Options**
  - **H0** — Enter “y” to specify the ISDN information transfer rate for 384-kbps data, which is composed of six B-channels. When a PE is administered to support H0, the algorithm to satisfy a call requiring 384 kbps of bandwidth uses a fixed allocation scheme. Default is “n” and is used with AT&T switched 384 service and SDN 384 service.
  - **H11** — Enter “y” to specify the ISDN information transfer rate for 1,536-kbps data, which is composed of 24 B-channels. When a PE is administered to support H11, the algorithm to satisfy a call requiring 1,536 kbps of bandwidth uses a fixed allocation scheme. Default is “n” and is used with AT&T switched 1536 and SDN 1536 service.
  - **H12** — Enter “y” to specify the ISDN information transfer rate for 1,920-kbps data, which is composed of 30 B-channels. When a PE is administered to support H12, the algorithm to satisfy a call requiring 1,920 kbps of bandwidth uses a fixed allocation scheme. Default is “n.”
  - **N x DS0** — Enter “y” to specify the N x DS0 ( $2 \leq N \leq 31$ ) multirate service. Default is “n.”
  - **Contiguous?** — Specifies whether to hunt contiguous N x DS0 channels. This field only appears if “y” is entered in the N x DS0 field.

The algorithm to satisfy an N x DS0 call is as follows:

- ▶ Enter “y” to specify the “floating” scheme. N x DS0 calls are placed on a contiguous group of B-channels large enough to satisfy the requested bandwidth without constraint on the starting channel (no fixed starting point trunk).

- ▶ Enter "n" to specify the "flexible" scheme. N x DS0 calls are placed on any set of B-channels on the same facility as long as the requested bandwidth is satisfied. There are no constraints such as contiguity of B-channels or fixed starting points.

⇒ **NOTE:**  
Between two private DEFINITY G3V2 switches, flexible is the preferred option.

## Access-endpoint Form

Wideband access endpoints are administered using the Access Endpoint Form.

⇒ **NOTE:**  
The DS1 circuit pack form must be completed before a wideband access endpoint can be added. See the form earlier in this chapter.

## Administration Commands

| Action  | Object          | Qualifier*  |
|---------|-----------------|---|
| add     | pri-endpoint    | <extension> or 'next'                                   |
| change  | access-endpoint | <extension>   |
| display | access-endpoint | <extension>...['print' or 'schedule']                   |
| list    | access-endpoint | [<extension>]['count' <number>] ['print' or 'schedule'] |
| remove  | access-endpoint | <extension>   |

\* Brackets [ ] indicate the qualifier is optional. Single quotes ( ' ' ) indicate the text inside the quote must be entered exactly as shown or an abbreviated form of the word may be entered.

```
add access-endpoint 2000
```

Page 1 of 1

ACCESS ENDPOINT

```
      Extension: 2000      (Starting) Port: 1b0101
Communication Type: wideband      Name: WAE-2000
      Width: 6
      COR: 1      COS: 1
      ITC: unrestricted
```

### Field Descriptions

- **Extension** — A numeric address ranging from one to five digits assigned to a wideband access endpoint.
- **(Starting) Port** — Defines the starting port number of the wideband access endpoint.

When adding and/or changing an access endpoint to or from a T1 facility with bit rate of 1.544 Mbps, port 24 is valid only if the signaling mode on the DS1 interface is *isdn-ext* or *robbed-bit*. If the signaling mode is *isdn-pri* or *common-chan*, and port 24 is the starting port, an error message is returned.

When adding and/or changing a wideband access endpoint to or from an E1 facility with bit rate of 2.048 Mbps, port 16 is valid only if the signaling mode on the DS1 interface is *isdn-ext*. If the signaling mode is *isdn-pri* or *CAS (Channel Associated Signaling)*, and port 16 is the starting port, an error message is returned.

- **Communication Type** — Specifies the valid voice and data communication types supported for access endpoints. Valid communication type entries for access endpoints include: *56k-data*, *64k-data*, *voice-grade-data* and *wideband (128 kbps to 1536 kbps T1 and 128 kbps to 1984 E1)*.

Though the *wideband* option always appears on the help message it will only accept input if the wideband switching feature has been optioned on the System-Parameters Customer-Options form.

- **Width** — Defines the number of contiguous/adjacent DS0 ports, beginning with the `(starting) Port` specified that make up the wideband access endpoint. A width of 6 defines a 384-kbps wideband access endpoint.

On a T1 facility, if the signaling mode is `isdn-pri` or `common-channel`, channel 24 is reserved for signaling. If the signaling mode is `isdn-ext` or `robbed-bit`, channel 24 is not used for signaling. In this case, for example, an access endpoint administered with starting port 19 and a width of 6 will have channels 19 to 24 allocated to it.

On an E1 facility, channel 0 is reserved for framing and synchronization. If the signaling mode is `isdn-pri` or `CAS` (Channel Associated Signaling), channel 16 is reserved for signaling. For example, if an access endpoint is administered with 6 channels and starting port 12, channels 12 to 15 and 17 to 18 are allocated to the wideband access endpoint. Channel 16 is skipped because it is reserved for signaling. If the signaling mode is `isdn-ext`, channel 16 is not used for signaling. In this case, channels 12 to 17 are allocated to the wideband access endpoint.

Valid entries must be with the range of 2 to 31. The default value is 6.

This field is displayed and administrable only if the `communication type` field is set to `wideband`.

- **COR** — Enter the appropriate class of restriction (COR) number in the range from 0 to 95. The COR is administered (see COR form instructions) so that only an AC endpoint can be connected to another AC endpoint. Default is "1".
- **COS** — Enter the appropriate COS number in the range from 0 to 15. The COS is administered (see COS form instructions) so that the use of the call forwarding all calls feature for access endpoints is prohibited. Default is "1".
- **Information Transfer Capability (ITC)** — Specifies the transfer capability, restricted or unrestricted, of the originating endpoint. This transfer capability is used to route the call to the desired facility, restricted or unrestricted, based on the originator's Information Transfer Capability (ITC).

The ITC field is displayed only if the *Communication Type* field is set to *56k-data*, *64k-data*, or *wideband*. The field does not get displayed if the *Communication Type* field is set to *voice-grade-data*.

The default value of the *ITC* field is set to *restricted* if the *Communication Type* field is set to *56k-data* or *64k-data*, and the default value is set to *unrestricted* if the *Communication Type* field is set to *wideband*.

## Administered Connections

This command is used to assign an end-to-end administered connection (AC) between two wideband access endpoints or between a WAE and a PE. The AC is automatically established by the system whenever the system is restarted or the AC is due to be active. Refer to *DEFINITY Implementation* for additional information.

### Administration Commands

| Action    | Object                  | Qualifier*                                   |
|-----------|-------------------------|--|
| add       | administered-connection | 1-max** (or 'next')                          |
| change    | administered-connection | 1-max (or 'next')                            |
| display   | administered-connection | 1-max (or 'next') ['print' or 'schedule']    |
| duplicate | administered-connection | 1-max (or 'next')                            |
| remove    | administered-connection | 1-max (or 'next')                            |
| list      | administered-connection | 1-max ['count' 1-max ['print' or 'schedule'] |

\* Brackets [ ] indicate the qualifier is optional. Single quotes ( ' ) indicate the text inside the quote must be entered exactly as shown or an abbreviated form of the word may be entered.

\*\* The maximum allowable value is based on the specific configuration. See Appendix A, "Maximum System Parameters For Hardware and Software Items" for the allowable value for your configuration.

Page 1 of 1

ADMINISTERED CONNECTION

Connection Number: 1 Enable? y

Originator: \_\_\_\_\_

Destination: \_\_\_\_\_

Name: \_\_\_\_\_

AUTHORIZED TIME OF DAY

Continuous? n

Sun? n Mon? n Tue? n Wed? n Thu? n Fri? n Sat? n

Start Time: 00:00

Duration: 000:00

MISCELLANEOUS PARAMETERS

Alarm Type: warning Alarm Threshold: 5

Retry Interval: 2 Auto Restoration? y

Priority: 5

Screen 3-7. Administered Connection Form (Page 1 of 1)

## Field Descriptions

- **Connection Number** — A display-only field when the form is accessed using an administration command such as *change* or *display*. Enter an unassigned AC number.
- **Enable** — Enter “y” to indicate that an attempt will be made to establish the AC when the AC is due to be active. Default is “y.”
- **Originator** — Enter the assigned extension of the originating wideband access endpoint. The wideband access endpoint must be local to the switch on which the AC is administered. Default is blank.  
PRI-endpoints cannot be originators for administered connections.
- **Destination** — Used to route the AC to a desired wideband access endpoint. Enter the address of the destination WAE or PE. This endpoint is the terminating party of the AC and need not be local to the switch on which the AC is assigned. Valid entries are the digits 0 through 9, \*, #, and special characters “m” (mark), “s” (suppress), “p” (pause), “w” (wait), “W” (wait forever). The entry must be consistent with the local switch’s dial plan (that is, the first digits are assigned as an extension, feature access code, trunk access code, or DDD number). If a local extension is entered, it must be assigned to a WAE or access endpoint (narrowband). Up to 36 characters may be entered. Special characters count as two characters. Abbreviated dialing entries may be used in this field. Default is blank.

### ⇒ NOTE:

If W is used, the switch waits indefinitely for dial tone. This should be used only where network response time is more than 30 seconds.

While the system is waiting, a call progress tone receiver is tied up and, since there are only two receivers per tone decoder, outgoing calling capability may be impaired.

- **Name** — Enter a short identification of the AC. This entry is optional. Up to 15 printable alphanumeric characters may be entered. Default is blank.
- **Continuous** — Enter “y” to indicate that the AC is continuous (that is, not scheduled to be active at a certain time). If “y” is entered, the seven Start Days and associated Duration fields **are not** displayed. Default is “y”.
- **Start Days (Sun through Sat)** — Only displayed if the Continuous field entry is “n.” Enter a “y” in each of the required days of the week fields to indicate that an attempt will be made to establish the AC. Default is “n.”

### ⇒ NOTE:

These fields indicate only the days on which an attempt will be made to establish the AC and not necessarily the days on which the AC is active. A scheduled AC may be active over a number of days and, in this situation, these fields should be used only to specify the days on which the AC starts and not other days on which the AC may be active.

- **Start Time** — Only displayed if the Continuous field entry is “n”. Enter the time of the day when an attempt should begin to establish a scheduled AC. The time is specified in two fields separated by a colon. Valid entries are in the range 00:00 through 23:59. Default is “00:00.”
- **Duration** — Only displayed if the Continuous field entry is “n.” Enter the period of time that the scheduled AC should remain active. This period is specified in two fields separated by a colon. The maximum duration is 167 hours and 59 minutes (that is, 1 minute less than 1 week). Valid entries are 000 through 167 for the hour field and 00 through 59 for the minute field. Default is “000:00.”
- **Alarm Type** — Enter the type of alarm to be generated if the AC cannot be initially established, or fails and cannot be reestablished, and the number of consecutive failures equals the alarm threshold. The alarm notification may be disabled for this AC by entering “none” in this field. Valid entries are “major,” “minor,” “warning,” or “none.” Default is “warning.”

 **NOTE:**

All AC alarms and the errors that caused the alarms are recorded in the system’s alarm and error log. In addition, a status lamp associated with an attendant console or voice terminal feature button (ac-alarm) may be used to indicate the AC alarm.

- **Alarm Threshold** — Only displayed if an entry of other than “none” is entered in the Alarm Type field. Enter the number of times an attempt to establish or reestablish an AC must fail consecutively before an AC alarm will be generated. An alarm will be generated on the first failure if a “1” is entered in this field. Valid entries are 1 through 10. Default is 5 (an alarm will be generated after the fourth retry has failed, thus, with the default retry interval of 2 minutes, an alarm will be generated approximately 8 minutes after the first failure occurred).
- **Retry Interval** — Enter the number of minutes between attempts to establish or reestablish the AC. Valid entries are 1 through 60. Default is 2.
- **Auto Restoration** — Enter “y” to indicate that an attempt is to be made to reestablish an AC that has failed. Auto Restoration is only available for an AC that is established over an ISDN-PRI Software Defined Data Network (SDDN) trunk group. A “y” entered in this field is ignored in all other situations. Default is “y.”
- **Priority** — Enter a number in the range from 1 through 8 that is to be used to determine the order in which ACs are to be established (1 is the highest and 8 the lowest priority). Default is “5.”

**Implementation Note:**

Sun-Sat, Start Time, and Duration fields only displayed when the Continuous field entry is “n.”

Alarm Threshold field only displayed if the Alarm Type field entry is other than “none.”

## Routing Patterns

Routing pattern administration provides the capability for GRS to allow wideband traffic to choose specific trunk preferences, namely those supporting wideband network services.

### Administration Commands

| Action  | Object        | Qualifier*  |
|---------|---------------|---|
| change  | route-pattern | 1-254   |
| display | route-pattern | 1-254 [print]   |
| list    | route-pattern | Enter ['trunk' (1-254)]['service/feature name string] |

\* Brackets [ ] indicate the qualifier is optional. Single quotes ( ' ) indicate the text inside the quote must be entered exactly as shown or an abbreviated form of the word may be entered.

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Pattern Number: 2

| Grp. No. | FRL | NPA | Prefix Mark | Toll List | No. Digits | Del | Inserted Digits | IXC  |
|----------|-----|-----|-------------|-----------|------------|-----|-----------------|------|
| 1:       | 1   |     | 0           |           |            |     |                 | user |
| 2:       | 3   |     | 0           |           |            |     |                 | user |
| 3:       |     |     |             |           |            |     |                 | user |
| 4:       |     |     |             |           |            |     |                 | user |
| 5:       |     |     |             |           |            |     |                 | user |
| 6:       |     |     |             |           |            |     |                 | user |

|    | BCC VALUE |   |   |   |   | TSC | CA-TSC Request | ITC | BCIE | Service/Feature |
|----|-----------|---|---|---|---|-----|----------------|-----|------|-----------------|
|    | 0         | 1 | 2 | 3 | 4 |     |                |     |      |                 |
| 1: | n         | n | n | n | n | y   | n              |     |      | unre            |
| 2: | n         | n | n | n | n | y   | n              |     |      | unre            |
| 4: | y         | y | y | y | y | n   | n              |     |      | rest            |
| 5: | y         | y | y | y | y | n   | n              |     |      | rest            |
| 6: | y         | y | y | y | y | n   | n              |     |      | rest            |

### Field Descriptions

- **Pattern Number** — This is a display-only field when the form is accessed using an administration command such as **change** or **display**.
- **Grp No.** — Enter the desired trunk group number from 1 through 99 to specify which trunk group will be associated with the entries on this line of the form.
- **FRL** — Enter the Facility Restriction Level (FRL) 0 through 7 (0 being the least restrictive and 7 being the most restrictive) to be assigned this routing preference (that is, this line of parameters on the form). Trunk group FRLs are changeable from pattern to pattern. The calling party's FRL must be greater than or equal to this FRL to access the associated trunk group. Valid entries are 0 through 7, or leave blank.



**NOTE:**

For wideband only the preference would be "0." For preferences that route both narrowband and wideband calls, you may want to restrict voice calls from using this preference via FRLs. In this case the wideband endpoints using this preference would have a higher FRL to allow access to this preference.

- **NPA** — For ARS applications, enter the NPA of the distant end (the terminating end). Valid entries are three digits in the form: first digit (2 through 9), second digit (0 through 9), third digit (0 through 9).
- **Prefix Mark** — Not required for AAR. For ARS, enter a number from 0 to 4 as indicated below. This specifies when the 4 prefix digit 1 is outpulsed. Valid entries are 0 to 4 or blank; default is 0.

For tie trunks, the Prefix Mark field is left blank.



**NOTE:**

Prefix Mark operations only apply to fnpa or hnpa call types (ARS).

- |   |   |
|---|---|
| 0 | Indicates the prefix digit 1 is never outpulsed for 10-digit user-dialed FNPA calls, but leaves a user-dialed prefix digit 1 for 7-digit HNPA calls. Prefix mark 0 also leaves ones on 10-digit calls that are not administered as FNPS or HNPA types. (FNPA and HNPA are North American Numbering Plan terms.) |
| 1 | Indicates the prefix digit 1 is outpulsed if and <b>only</b> if the call is a 10-digit call. Prefix mark 1 should be selected for those HNPAs that requires users to dial 1 to indicate a toll call.  |
| 2 | Indicates the prefix digit 1 is outpulsed for <b>all</b> toll calls, 7 and 10 digit.  |
| 3 | Indicates the prefix digit 1 is outpulsed for <b>all</b> toll calls. These calls are always outpulsed as 10-digit numbers, even those within the HNPA.  |

- 4 Indicates that the user-dialed prefix digit 1 is always suppressed.

⇒ **NOTES:**

Digit suppression is required, for example, when routing ISDN-PRI calls to an AT&T 4ESS. If the prefix digit 1 were not suppressed, then the 4ESS would reject such calls.

Prefix Marks 2 and 3 must refer to a toll table (see "Toll List" below).

- **Toll List** — Enter a number (1 through 32) that references the ARS Toll Table associated with the terminating NPA of the trunk group. Valid entries are 1 through 18, or leave blank. Default is blank.
- **No. Del Digits** — Enter the total number of digits (0 through 18) to be deleted from the dialed string when this trunk group is selected for call routing. Valid entries are 0 through 18, or leave blank. Default is blank.
- **Inserted Digits** — Enter the actual digits (and special characters) to be inserted into the dialed string, up to 36 digits. Characters 0 through 9, "\*", "#," "+," "%," and "," may be inserted. Each special character (for example, "\*", "%," etc.) uses two of the 36 available inserted character positions. The digits may be divided into for groups separated by a wait-for-dial-control character ("."). The "." is used for pause, "+" is used to wait for second dial tone, "#" is used for end of dialing, and "%" is used for end-to-end signaling. A digit group is limited to a maximum of 32 characters. Up to 52 digits may be outputted. This includes 34 digits inserted (32 digits maximum per group plus one special character) plus maximum of 18 digits originally dialed. Valid entries are 0 through 9, "\*", "+," "%," "," and "#."

Note that the special character "p" (pause) should not be used as the first character in the string, unless absolutely necessary. Typical misuse can keep calls such as AD or LND calls from completing to the far end.

- **IXC** — Only displayed if the ISDN-PRI option is enabled on the System-Parameters Customer-Options form. Enter the last three digits to represent an equal access interexchange carrier code (for example, 10XXX). This field is used by calls that route via an IXC, and is also used for CDR. If an IXC is not specified, a call will be transmitted by the presubscribed common carrier.
- **BCC Value** — This value is provided in GRS routing tables to indicate support of wideband calls with data rates from 128 to 1984 kbps. Routing preferences supporting wideband calls as indicated by this BCC may also be administered to support existing BCCs.

The GRS feature allows routing to correctly route restricted and unrestricted calls to the proper trunk facilities. Since wideband calls require unrestricted facilities, the routing preferences that are used for wideband must route to a trunk group that contains unrestricted facilities only.

This field appears only if the *isdn-pri* option is set to “y” on the System-Parameters Customer-Options form. Valid entries are “y” or “n” (default).

If the *BCC W* field is set to “y”, the *wideband switching* option must be enabled on the System-Parameters Customer-Options form. When changing the routing pattern, if the *bcc w* field is set to “y”, the *ITC* field must be set to *unre* or *both* (*ept/unr*).

- **TSC** — Allowable entries are “y” or “n” (default). When a *y* is *CA-TSC* field becomes writable. For an *NCA-TSC*, the *n* option means the *NCA-TSC* will be blocked if it is routed through this pattern in a tandem switch.
- **CA-TSC Request** — This field becomes writable when a *y* is entered in the *tsc* field. You must specify when a *CA-TSC* will be established if the call is routed through a particular preference of a routing pattern. Allowable entries are then *as-needed*, *at-setup*, and *none*. The first two entries, “as-needed” and “at-setup” are meaningful only for *CA-TSCs*. If the “as-needed” option is entered, a *CA-TSC* will be established only when it is requested during a call. If the “at-setup” option is requested, the the *CA-TSC* will be established when the call is set up. Selection of the “none” (default) option means that no *CA-TSC* will be associated with this call.
- **Band** (required by the call-by-call service selection feature) — Enter a number (0 to 255) that represents the *OUTWATS* band number. This field is displayed when the *Services/Features* field has a value of “outwats-bnd.” Default is blank.
- **ITC** (**I**nformation **T**ransfer **C**apability) — Used to administer the type of traffic (restricted, unrestricted, or both) allowed to be carried by this routing preference. Since the *bcc value* field is set to *w* this field must be set to *unrestricted* or *both*. If the *ITC* field is administered as *unrestricted*, then only calls that originate from *unrestricted* endpoints may access this routing preference. If the *ITC* field is administered as *both* then calls originating from both *restricted* and *unrestricted* endpoints may access the facility.
- **BCIE** (**B**earer **C**apability **I**nformation **E**lement) — Used to determine how to create the information transfer capability codepoint in the bearer capability IE of the *SETUP* message. The *BCIE* field is only displayed and administrable if the *ITC* field is administered as “both.” Allowable entries are “ept” (endpoint) (default) and “unre” (unrestricted).
- **Service/Feature** (required by the call-by-call service selection feature) — Enter up to 15 characters that represent the *Service/Feature* carried by a call in this routing pattern. Default is blank.

## Wideband Hardware

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The hardware requirements for wideband are, for the most part, dictated by the particular configurations. For example, high-speed video conferencing requires application endpoint video equipment such as the AT&T PictureTel®.

Many of the configurations require ISDN-PRI terminal adapters. Currently, the terminal adapter of choice is the Paradyne Acculink Bandwidth Controller terminal.

With both video equipment and terminal adapters, other vendor equipment can be used but must conform to the wideband switching feature requirements. As for DEFINITY the only requirement is the presence of the Universal DS1 board, TN464C or later.

Wideband uses standard wiring at between 320 and 400 meters. See *DEFINITY Generic 1 and Generic 3 Installation and Test* for a detailed discussion of wiring.



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# Wideband Traffic

# 4

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## Contents

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This chapter describes the traffic reports and selection screen for wideband trunk group data. It also provides guidelines for validating and analyzing this data.

### Wideband Trunk Group Summary Report

---

The Wideband Trunk Group Summary Report gives traffic measurements for all trunk groups administered to support wideband switching. By using this report, you can determine the trunk group total wideband usage (in CCS), the total number of wideband calls, the percentage of wideband calls that were blocked, and other measurement data.

#### Command

To display the Wideband Trunk Group Summary report, enter:

```
list measurements wideband-trunk-group summary [option]
[print/schedule]
```

Options are `yesterday-peak` for a report of yesterday's peak wideband call activity, `today-peak` for a report of today's peak wideband call activity, or `last-hour` for a report of the wideband call activity of the most recently completed hour. A peak hour is the hour within a 24-hour period that had the greatest wideband usage.

Screen

The following is a typical Wideband Trunk Group Summary Report screen. Table 4-1 describes the data fields presented in the report.

```
list measurements wideband-trunk-group summary last-hour
Switch Name: Cust_Switch_Name           Date: 1:58 pm MON SEP 16, 1991
                WIDEBAND TRUNK GROUP SUMMARY REPORT
                Peak Hour For Wideband Usage For All Trunk Groups: 1000
Grp Grp  Grp Service Meas Total Total Inc.  Grp Out  %  %Out
No. Size Dir Type   Hour Usage Seize Seize Ovfl Serv ATB Blk
37  22  two access 1200 598  5  0  0  0  0  0  0
38  23  two cbc   1200 171  2  0  0  0  0  0  0
39  22  two sdn   1200 270  3  0  0  0  0  0  0
```

Table 4-1. Wideband Trunk Group Summary Report

| Field  | Description  |
|--|--|
| Peak Hour for Wideband Usage for All Trunk Groups: | <p>The hour during the specified day that has the highest total wideband call usage, when summed over all trunk groups.</p> <p>Peak hour and busy hour are synonymous. With conventional traffic theory data analysis, there are two methods for determining the peak hour. One is the time-consistent peak hour, meaning that hourly usage values are averaged across days for each hour of the day. The other is the bouncing peak hour, meaning that the highest usage is selected for each day without regard to the average across days. For the bouncing peak hour the highest load on a given day may or may not occur during the time-consistent busy hour. These traffic reports and accompanying trunk group data worksheet only use the bouncing peak hour method.</p> <p>Note that if the total usage for the current hour equals the total usage for the previous peak hour, then the peak hour is the hour with the greatest number of total seizures.</p> |
| Grp No.  | <p><i>Group Number.</i> A number that identifies each trunk group associated with the displayed data. Group numbers are displayed in numerical order, beginning with the lowest administered number and continuing to the highest administered number.</p>   |
| Grp Size   | <p><i>Group Size.</i> The number of administered trunks in the trunk group.</p>  |

Continued on next page

Table 4-1. Wideband Trunk Group Summary Report (*continued*)

| Field        | Description  |
|--------------|--|
| Grp Dir      | <i>Trunk Group Direction.</i> Identifies whether the trunk group is incoming (inc), outgoing (out), or two-way (two).  |
| Service Type | <i>Service Type.</i> The administered service type for the trunk group. Valid entries are accunet, i800, inwats, lds, mega800, megacom, multiquest, operator, other, outwats-bnd, public-ntwrk, sdn, sub-operator, and wats-max-bnd.   |
| Meas Hour    | <i>Measurement Hour.</i> The hour (using 24-hour clock) in which the measurements are taken. For the <b>last-hour</b> report, it is the last hour of measurement (each trunk group's measurement hour is identical; but not necessarily the same as the indicated peak hour for the day). For the <b>today-peak</b> report, the measurement hour is the peak hour for each trunk group thus far today (each trunk group's measurement hour could be different). For the <b>yesterday-peak</b> report, the measurement hour is the peak hour for each trunk group yesterday (each trunk group's measurement hour could be different). |
| Total Usage  | Total wideband call usage (in CCS) for all trunks in the trunk group. Represents the total time the trunks are busy processing wideband calls.   |
| Total Seize* | <i>Total Seizures.</i> The number of wideband call attempts. This measurement includes completed calls, false starts, don't answers, and busies.   |
| Inc. Seize*  | <i>Incoming Seizures.</i> The number of wideband incoming call attempts. This measurement includes completed calls, false starts, don't answers, and busies.<br><br><i>Out Seize = Total Seize - Inc Seize</i>   |
| Grp Ovfl     | <i>Group Overflow.</i> The number of outgoing wideband calls that were attempted when the remaining trunk group capacity was insufficient to accommodate the call or the trunk group's remaining bandwidth was in the wrong configuration. This measurement does not include unauthorized calls that are denied service on the trunk group (due to restrictions).  |

\* The number of wideband calls equals the number of actual calls, regardless of the number of trunks involved in the call.

*Continued on next page*

Table 4-1. Wideband Trunk Group Summary Report (*continued*)

| Field    | Description   |
|----------|---|
| Out Serv | <p><i>Out of Service.</i> The number of trunks in the trunk group that are out of service (listed as maintenance busy) at the time the data is collected.</p> <p><b>Suggested Action:</b> If the trunks were removed from service by the switch, then the appropriate maintenance personnel should be notified. The objective is to keep all members of a trunk group "in service." Generally, you should not make adjustments to the trunk group because of "Out of Service" trunks, but should get those trunks returned to service.</p> <p>Refer to the Trunk Outage Measurements Report for specific details.</p>   |
| % ATB    | <p><i>Percentage all trunks busy.</i> The percentage of time that all trunks in the trunk group were simultaneously in use during the measurement interval.</p> <p><b>⇒ NOTE:</b><br/>In use means that the trunks were busy—either serving calls or busied-out by maintenance.</p> <p><b>Suggested Actions:</b></p> <ol style="list-style-type: none"> <li>1. If the group direction is outgoing or two-way, then a high number in the % ATB field and nothing in the GRP OVF1 field would indicate that everything is functioning normally. However, a more typical scenario would be a high number in the % ATB field and also a high number in the GRP OVF1 field. This would indicate a possible problem that necessitates further analysis. Unless this trunk group is the last preference in the pattern, overflow is to the next choice trunk group, and the number in the GRP OVF1 field is of no great significance. Otherwise, the obvious choice is to add more trunks to the trunk group.</li> <li>2. If the group direction is incoming, then a high number in the % ATB field is bad. It indicates that some incoming calls are probably being blocked. Generally, you will want to add more trunks, thus lowering the % ATB and decreasing the number of calls that are being blocked.</li> </ol> |

*Continued on next page*

Table 4-1. Wideband Trunk Group Summary Report (*continued*)

| Field     | Description  |
|-----------|--|
| % Out Blk | <p data-bbox="548 373 1411 531"><i>Percentage Outgoing Blocking.</i> The percentage of offered wideband calls that are not carried on the trunk group. It does not include unauthorized wideband calls that are denied service on the trunk group (due to restrictions) or calls that are carried on the trunk group but do not successfully complete at the far end (that is, where there is no answer).</p> <p data-bbox="548 548 1390 642">The calls not carried are calls that are made when the remaining trunk group capacity is insufficient to serve them. The Percentage Outgoing Blocking is calculated as follows:</p> $\% \text{ OutBlk} = \left[ \frac{\text{Group Overflow}}{\text{Outgoing Calls Offered}} \right] \times 100$ <p data-bbox="548 758 1243 789">The number of Outgoing Seizures is calculated as follows:</p> $\text{Outgoing Seizures} = \text{Total Seizures} - \text{Incoming Seizures}$ <p data-bbox="548 856 1333 915">Similarly, the equation for calculating Outgoing Calls Offered is as follows:</p> $\text{Outgoing Calls Offered} = \text{Group Overflow} + \text{Outgoing Seizures}$ |

## Wideband Trunk Group Hourly Report

For the trunk groups chosen at the Wideband Trunk Group Selection screen, the Wideband Trunk Group Hourly Report lists the wideband call activity for all hours of switch activity. This information helps you validate the information in the Wideband Trunk Group Summary Report.

### Command

To display the Trunk Group Hourly Report, enter:

```
list measurements wideband-trunk-group hourly <trunk group no.>
[print/schedule]
```

### Screen

The following is a typical screen for the Wideband Trunk Group Hourly Report. Table 4-2 describes the data fields presented in the Wideband Trunk Group Hourly Report. The report contains two sections: a header section that provides the report ending time and trunk group administrative information; and a data section that provides the measurement data for 24 hours.

```
list measurements wideband-trunk-group hourly 40
Switch Name: Cust_Switch_Name          Date: 1:58 pm MON SEP 16, 1991
                WIDEBAND TRUNK GROUP HOURLY REPORT
Grp No: 40      Grp Size: 23      Grp Dir: two  Service Type: sdn
Meas  Total  Maint  Total  Inc.  Tandem  Grp  Out  %  %Out
Hour  Usage  Usage  Seize  Seize  Seize  Ovfl  Serv  ATB  Blk
1200  262    0      3      0     0      6    0    6  15
1100  312    0      3      0     0      0    0    0  0
1000  169    0      1      0     0      4    0    3  5
900   26     0      0      0     0      0    0    0  0
800   1      1      4      0     0      0    0    0  0
```

Table 4-2. Wideband Trunk Group Hourly Report (Header)

| Field         | Description   |
|---------------|---|
| Grp No:       | <i>Group Number.</i> A number that identifies the trunk group associated with the displayed data.   |
| Grp Size:     | <i>Group Size.</i> Number of trunks in the trunk group.   |
| Grp Dir:      | <i>Group Direction.</i> Incoming (inc), outgoing (out), or two-way (two).   |
| Service Type: | <i>Service Type.</i> The administered Service Type for the trunk group. Valid entries are accunet, i800, inwats, lds, mega800, megacom, multiquest, operator, other, outwats-bnd, public-ntwrk, sdn, sub-operator, and wats-max-bnd.  |
| Total Usage   | Total wideband call usage (in CCS) for all trunks in the trunk group. Represents the total time the trunks are busy processing wideband calls.  |
| Maint Usage   | <i>Maintenance Usage.</i> The total usage of trunks in this trunk group for maintenance busy or any other non-call situation where trunks are unavailable to carry a call.  |
| Total Seize*  | <i>Total Seizures.</i> The number of wideband call attempts. This measurement includes completed calls, false starts, don't answers, and busies.  |
| Inc. Seize*   | <i>Incoming Seizures.</i> The number of wideband incoming call attempts. This measurement includes completed calls, false starts, don't answers, and busies.<br><br><i>Out Seize = Total Seize - Inc Seize</i>  |
| Tandem Seize* | <i>Tandem Seizures.</i> The number of trunk-to-trunk wideband call seizures. This count is incremented on the outgoing-trunk side of the connection.  |
| Grp Ovfl      | <i>Group Overflow.</i> The number of outgoing wideband calls that were attempted when the remaining trunk group capacity was insufficient to accommodate the call or the trunk group's remaining bandwidth was in the wrong configuration. This measurement does not include unauthorized calls that are denied service on the trunk group (due to restrictions). |

\* The number of logical calls equals the number of actual calls, regardless of the bandwidth.

*Continued on next page*

| Field     | Description   |
|-----------|---|
| Out Serv  | <i>Out of Service.</i> The number of trunks in the trunk group that were out of service during the measurement hour.  |
| % ATB     | <i>Percent All Trunks Busy.</i> The percentage of time during the measurement interval that all trunks in the group are unavailable to carry a new call (All Trunks Busy).  |
| % Out Blk | <i>Percent Outgoing Blocking.</i> The percent of the outgoing wideband call seizures, including tandem wideband call seizures, offered to that trunk group that are not carried on that trunk group. The value is calculated as follows:<br>$\% \text{ Out Blk} = \{ \text{Grp Ovfl} / [\text{Total Seize} - \text{Inc Seize} + \text{Grp Ovfl}] \} \times 100$ |

## Wideband Trunk Group Measurement Selection Form

---

The Wideband Trunk Group Measurement Selection Form is used at administration time to specify trunk groups to list on the Wideband Trunk Group Hourly Reports. It permits the user to administer which trunk groups are to be reported for the hourly report. (Measurements on administered trunk groups are collected to list them on the wideband summary and hourly reports.) If no selections are made, no trunk groups will be studied hourly.

### Command

To display the Wideband Trunk Group Measurement Selection Form, enter:

```
change/display meas-selection wideband-trunk-group  
[print/schedule]
```

The print and schedule options are available for the display command only.

### Screen

The following is a typical screen for the Wideband Trunk Group Measurement Selection Form. Note that this is a large DEFINITY G3V2 configuration. For small and medium configurations only ten trunk groups can be selected. There is just one data field in the Wideband Trunk Group Measurement Selection Form, the **Trunk Group Numbers** field. This field defines the trunk group(s) to be studied hourly for wideband activity.

```
display meas-selection wideband-trunk-group  
                               WIDEBAND TRUNK GROUP MEASUREMENT SELECTION  
                               Trunk Group Numbers  
1: 78           7: 15           13: 96           19: 333          25: 580  
2: 80           8: 16           14: 97           20: 444          26: 590  
3: 666          9: 17           15: 98           21: 555          27: 591  
4: 1            10: 18          16: 100          22: 101          28: 592  
5: 2            11: 81          17: 120          23: 102          29: 10  
6: 3            12: 82          18: 200          24: 103          30: 99
```

## Data Analysis Guidelines

---

The wideband summary and hourly reports closely parallel the other trunk group summary and hourly reports. That is, visually they contain similar fields, except there is no queuing for wideband calls, so queuing fields are eliminated. Logically, the difference is that only the wideband reports isolate wideband call usage. If the trunk group processes ordinary narrowband calls during the measurement period, the narrowband measurements are **not** included in the wideband traffic measurements.

With the overall trunk group measurements and the wideband trunk group measurements, the customer has data for all usage and can calculate the narrowband call usage and counts by subtracting the wideband measurement from the overall measurements.

## Wideband Trunk Group Summary Report

---

The Wideband Trunk Group Summary Report provides data essential for monitoring trunk groups supporting wideband service to assure that they are providing the expected level of service. The report is modeled after the Trunk Group Summary Report but only trunk groups administered to provide wideband service are reported. Other trunk groups do not appear on the report. If a trunk group is administered to provide wideband service but had no wideband traffic during the measurement period, then zeros are shown on the report.

The yesterday-peak and today-peak reports list the wideband call activity for the peak wideband traffic hour. That is, the measurements shown are those that occurred during the hour in which the total usage for wideband service for that trunk group was highest. This is not necessarily the same peak hour as the peak hour for total usage as shown on the overall Trunk Group Summary Report. Note that on the Wideband Trunk Group Summary Report, the measurements for different trunk groups will not necessarily be time-coincident with each other.



### CAUTION:

*The yesterday-peak and today-peak reports cannot be used to determine narrowband usage except in cases where the peak traffic hour for total usage (shown on the overall report) is the same as the peak hour for wideband usage (shown on this report) for a particular trunk group in the same measurement period. In this case alone, narrowband measurements for that trunk group may be determined by subtracting the wideband measurements from the measurements shown on the overall report for the same trunk group.*

*For trunk groups where the peak hour is different on the overall summary report from that shown on the wideband summary report, the narrowband usage must be determined by using the measurements on the Wideband Trunk Group Hourly Report. In addition, if calls were blocked at that time, the group should be studied using both the the overall and wideband hourly reports to determine whether wideband calls were blocked.*

## Wideband Trunk Group Hourly Report

The Wideband Trunk Group Hourly Report shows the wideband call activity for each hour in the current 24-hour period. A separate report is generated for each measured wideband trunk group.

For trunk groups having mixed wideband and narrowband traffic, it is best to administer the trunk group to appear on both the overall and wideband hourly trunk group reports. In this way a complete picture of usage and blockages is possible. For these trunk groups, direct comparisons can be made between measurements for the same hour on the overall and wideband reports. For example, if the hour beginning at 1:00 p.m. is examined for the same trunk group on both the overall hourly report and on the wideband hourly report, the narrowband usage measurements may be determined by subtracting the wideband data from the overall data. This can be done for each hour in the 24-hour period.

Note that some measurements, such as trunks-out-service and all-trunks-busy, will be identical for the same hour on the wideband and overall reports for the same trunk group.

## Performance Considerations

Although version 2 of the various G3 switches supports wideband transmission for from 2 to 31 channels, the most common transmissions are at the H-channel rates:

| H-Rate | Speed      | # 64-kbps Channels |
|--------|------------|--------------------|
| H0     | 384 kbps   | 6                  |
| H11    | 1.536 Mbps | 24                 |
| H12    | 1.920 Mbps | 30                 |

When considering how many trunks to put in a trunk group that supports wideband call activity, remember that:

- Every wideband call must be carried on a single DS1 interface. That is, when the bandwidth on one interface is insufficient for the call, another interface must be found that can accommodate the entire call. The bandwidth for the call *cannot* be spread over two or more interfaces. The chances for finding enough bandwidth on a single interface are far lower than finding the bandwidth on several interfaces.
- Some far-end switches (for example, the 4ESS) require that the bandwidth for a call be contiguous. That is, not only must the call be carried over a single interface, but the channels over which the call is carried must be consecutively numbered. The chances for finding contiguous bandwidth are far lower than for finding the bandwidth on a single interface alone (for example, H0 fixed requires an idle quadrant).

To increase the chances of providing the bandwidth that a wideband call requires, either put as many trunks as possible in the trunk groups you have designated for wideband call usage or put as many trunk groups as possible in the wideband routing pattern.

### **Wideband and Current Traffic Reports**

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In addition to the new reports for wideband traffic, a number of existing traffic reports have been affected.

The following reports carry a "W" in the right-most position to identify the line of data as wideband.

- Route Pattern Measurements Report (AAR/ARS)
- Automatic Circuit Assurance Report
- Trunk Lightly Used Report
- Trunk Group Measurement Summary Report

The Trunk Group Measurements Hourly Report identifies trunk groups supporting wideband facilities by printing the word "WIDEBAND Support" on the right side of the main title line.

See *DEFINITY System Reports* for more information.

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# Wideband Protocol Information

# 5

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## Contents

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This chapter provides protocol information for the wideband switching feature.

In general, the call establishment procedure for wideband is similar to that for current narrowband (64 kbps) Q.931 ISDN circuit mode calls. Modifications have been made to some information elements and messages. This chapter discusses the ISDN Q.931 signaling modification for wideband switching.

The functions of the ISDN entities and the information flows between entities for the setup and release of calls are the same for both wideband switching and narrowband calls.

Although wideband calls require modifications to several information elements and messages, they do not affect Q.931 information flows. Wideband standards provide a new transfer rate specification in the Bearer Capability Information Element and the Low Layer Compatibility Information Element that has been added to the current Q.931 specification (H0, H11, and H12) as required by the multirate bearer service (N x DS0).

## **RESTART Messages**

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RESTART is sent by the user or the network to request the recipient to restart, that is, return to idle, the indicated channel(s) or interface. RESTART messages may be sent per channel or for an entire facility. RESTART ACKNOWLEDGE is sent to acknowledge the receipt of a RESTART message and to indicate that the requested restart is complete.

## **Standards**

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### **DEFINITY Receipt of RESTART**

If DEFINITY receives a RESTART on any B-channel associated with a wideband call, the entire call will be cleared.

### **DEFINITY Sending of RESTART**

DEFINITY only sends a RESTART message for an active B-channel when the switch needs to take that channel out of service; an example is when that B-channel is busied out from the SAT. DEFINITY initiates these restarts for any B-channel that is active in a wideband call and work with other switches. Although most equipment will clear the entire wideband call on receiving the B-channel RESTART message, the 4ESS will ignore this message if it is not for the lowest numbered B-channel active in the wideband call as described in Chapter 3.

Accordingly, DEFINITY will clear a wideband call when a restart is initiated for any B-channel involved in the call. While this call clearing is not necessary to work with the 5ESS® and other switches, it will not cause errors with those switches and is necessary to work with the 4ESS. For example, if an H0 call is active on B-channels 1 through 6 between DEFINITY and a 4ESS, and a switch-initiated RESTART message is sent on B-channel 4, the 4ESS will ignore this message without acknowledgment. Therefore, DEFINITY will clear the wideband call before the 4ESS will respond to RESTART messages for that B-channel. If a RESTART is to be sent on a B-channel currently active on a wideband call, DEFINITY will clear the wideband call with a RELEase COMplete message.

## **Information Elements**

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### **Bearer Capability Information Element For Wideband**

In Q.931, the rate requested by a call is specified in the information transfer rate field (octet 4, bits 1 to 5) of the Bearer Capability Information Element. See Figure 5-1.

|   |                          |   |                                 |   |   |   |     |         |
|---|--------------------------|---|---------------------------------|---|---|---|-----|---------|
| 8   | 7                        | 6 | 5                               | 4 | 3 | 2 | 1   |         |
| Bearer Capability Information<br>Element Identifier |                          |   |                                 |   |   |   |     | Octet 1 |
| Length of contents                                  |                          |   |                                 |   |   |   |     | 2       |
| 1<br>ext  | coding<br>standard       |   | information transfer capability |   |   |   |     | 3       |
| 1<br>ext  | transfer mode            |   | information transfer rate       |   |   |   |     | 4       |
| 1<br>ext  | transfer rate multiplier |   |                                 |   |   |   | 4.1 |         |

Figure 5-1. Bearer Capability Information Element For Wideband



**NOTE:**

Octet 4.1 is only present if the information transfer rate in octet 4 specifies multirate.

The coding of the information transfer rate consists of two parameters: a *base rate* and *transfer rate multiplier*. The actual rate is obtained by multiplying the base rate by the transfer rate multiplier. The base rate of 64 kbps will be used for the multirate circuit mode bearer service. Note that this multiplication only takes for multirate (N X DS0) service.

The codepoint for the multirate information transfer rate (octet 4, bits 5 to 1) is:

5 4 3 2 1  
1 1 0 0 0 multirate (64 kbps base rate)

DEFINITY supports the following circuit mode information transfer rates:

| Octet 4<br>Bits<br>5 4 3 2 1 | Information Transfer Rate     |
|------------------------------|-------------------------------|
| 1 0 0 0 0                    | 64 kbps                       |
| 1 0 0 1 1                    | 384 kbps (H0)                 |
| 1 0 1 0 1                    | 1,536 kbps (H11)              |
| 1 0 1 1 1                    | 1,920 kbps (H12)              |
| 1 1 0 0 0                    | Multirate (64 kbps base rate) |

The *coding standard* field in octet 3 must be encoded as *CCITT*. Note that rates 64, 384, 1,536, and 1,920 kbps can be specified with the base rate and transfer rate multiplier approach or with their current codepoint assignments in the information transfer rate field.

To encode the transfer rate multiplier, a new octet (illustrated in a later paragraph) has been added to the Bearer Capability Information Element. This octet is required if octet 4 indicates multirate (64 kbps base rate) and must not be present otherwise. For  $N \times 64$  kbps, the seven bits of the transfer rate multiplier field are used, along with the information transfer rate, to identify the rate of the call. The transfer rate multiplier is the binary coding of "N" for the multirate (64 kbps base rate) codepoint.

Other than the multirate codepoint, all other codings for the Bearer Capability Information Element are Q.931 standards. For all wideband calls, the bearer must be encoded as circuit mode, point-to-point, bidirectional symmetric, unrestricted digital information with 8-kHz integrity.

## Channel Identification Information Element

| 8  | 7                    | 6           | 5             | 4                                | 3                 | 2                         | 1   |         |
|--|----------------------|-------------|---------------|----------------------------------|-------------------|---------------------------|-----|---------|
| Channel Identification Information<br>Element Identifier |                      |             |               |                                  |                   |                           |     | Octet 1 |
| length of channel identification contents                |                      |             |               |                                  |                   |                           |     | 2       |
| 1<br>ext   | Int. id<br>present   | Int<br>type | 0<br>spare    | Pref.<br>Excl.                   | D-channel<br>Ind. | Info channel<br>selection |     | 3       |
| 0/1<br>ext   | Interface Identifier |             |               |                                  |                   |                           | 3.1 |         |
| 1<br>ext   | Coding<br>standard   |             | Number<br>Map | Channel type<br>Map element type |                   |                           | 3.2 |         |
| Channel number/slot map<br>(Up to 4 octets long)         |                      |             |               |                                  |                   |                           |     | 3.3     |

Figure 5-2. Channel Identification Information Element

No explicit changes are required of the Channel Identification Information Element for this service. However, for compatibility reasons, it is desirable to minimize options available in the use of this information element. Therefore, B-channel slot maps must be used when wideband bearer service is indicated.

The following alternative codings will not be sent by DEFINITY:

- ▶ The use of B-channel numbers for anything other than 64-kbps calls.
- ▶ The use of slot maps for 64-kbps calls.
- ▶ The use of an H0 channel number in the Channel Identification IE does not offer sufficient flexibility to justify its use in multirate (64-kbps base rate \* N) service.

DEFINITY encodes B-channel slot maps in the Channel Identification Information Element for H0 and N x DS0 calls. A number of older switches and terminal adapters incorrectly encode the Channel Identification Information Element when sending calls using an H0 channel. They specify `H0-channel units` in the `channel type/map element type` field of octet 3.2 yet use a B-channel unit bit map in octet 3.3. Therefore, DEFINITY assumes that a slot map specified within a Channel Identification Information Element received from an old switch or terminal adapter for an H0 call specifies B-channel units. The use of slot maps for the multirate (64 kbps base rate) bearer service does not preclude the use of the existing channel identification options for the existing services. DEFINITY does not send a B-channel slot map or channel number for 1,536 kbps on a T1 interface. Octets 3.2 and 3.3 of the Channel Identification IE (see Figure 5-2) will be omitted and the interface ID in octet 3.1 will specify the T1 that contains the H11 or N x DS0 (N = 24) channel.

DEFINITY does not send a B-channel slot map or channel number for 1,920 kbps on a FAS E1 interface. Octets 3.2 and 3.3 of the Channel Identification IE (see Figure 5-2) will be omitted and the interface ID in octet 3.1 will specify the E1 that contains the H12 channel.

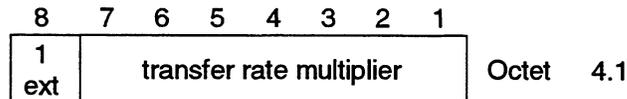
Note that multirate with an N of 30 is not always implicit in DEFINITY networks (because of DEFINITY NFAS support on E1 facilities), and DEFINITY will therefore encode this channel with a B-channel slot map. Also note that multirate with an N of 31 is not an H12 channel thus it will utilize the B-channel slot map as specified previously for multirate.

DEFINITY supports receipt of B-channel slot map for all rates, 64 through 1,984 kbps.

### Low Layer Compatibility Information Element

Existing DEFINITY functionality causes it to tandem any Low Layer Compatibility (LLC) Information Elements received from ISDN-PRI facilities.

The LLC information element has a similar structure to the bearer capability information element. Thus, the information transfer capability of the LLC is modified similarly to the bearer capability information element in the following way:



The following information transfer rate is supported in octet 4:

|       |                               |
|-------|-------------------------------|
| 54321 | Circuit Mode                  |
| 11000 | Multirate (64-kbps base rate) |

For N x 64 kbps, the seven bits of the transfer multiplier field are used, along with the information transfer rate, to identify the rate of the call. The transfer rate multiplier will be the binary coding of "N" for the multirate (64-kbps base rate) codepoint.

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# Wideband Troubleshooting and Error Recovery

# 6

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## Contents

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# Wideband Troubleshooting and Error Recovery

# 6

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This chapter provides troubleshooting and error recovery information for the wideband switching feature.

Wideband troubleshooting procedures can be found in *DEFINITY Maintenance*, which covers troubleshooting for:

- ISDN-PRI trunk groups
- ISDN-PRI endpoints
- Wideband access endpoints
- UDS1 circuit pack

## **DEFINITY, Network, and Acculink Administration Troubleshooting**

An effective way to debug DEFINITY, Network and Acculink administration problems is to note the Cause Value in the ISDN-PRI Messages passed from the Acculink Bandwidth Controller (ABC) Endpoint to DEFINITY, and from DEFINITY to the public network.

To trace the ABC PRI Messages access the ABC System Status -> Message Log Status Menu (see the *AT&T Acculink Bandwidth Controller Operator's Guide* for detail). To monitor the DEFINITY's ISDN PRI Messages set up message sequence trace (MST) on the appropriate D-channel. The CAUSE VALUE IE is returned in the first call clearing message from the network (DISCONNECT, RELEASE or RELEASE COMPLETE). It is the last octet in the message. To decode the Cause Value delete the high order bit and convert hexadecimal to decimal. The following table provides the Cause Values and their definitions.

Table 6-1. Cause Values

| Cause Value | Definition   |
|-------------|--|
| 0           | No cause value present                                     |
| 1           | Unallocated (unassigned) number                            |
| 2           | No route to specific transit network                       |
| 3           | No route to destination                                    |
| 6           | Channel unacceptable                                       |
| 7           | Call awarded and being delivered in an established channel |
| 16          | Normal call clearing                                       |
| 17          | User busy  |
| 18          | No user responding   |
| 19          | User alerting, no answer                                   |
| 21          | Call rejected  |
| 22          | Number changed   |
| 26          | Non-selected user clearing                                 |
| 27          | Destination out of order                                   |
| 28          | Invalid number format (incomplete number)                  |
| 29          | Facility rejected  |
| 30          | Response to status enquiry                                 |
| 31          | Normal, unspecified  |
| 34          | No circuit or channel available                            |
| 38          | Network out of order                                       |
| 41          | Temporary failure  |
| 42          | Switching equipment congestion                             |
| 43          | Access information discarded                               |
| 44          | Requested circuit/channel not available                    |
| 47          | Resource unavailable, unspecified                          |
| 50          | Requested facility no subscribed                           |
| 52          | Outgoing calls barred                                      |
| 54          | Incoming calls barred                                      |
| 57          | Bearer capability not authorized                           |
| 58          | Bearer capability not presently available                  |
| 63          | Service/option not available, unspecified                  |
| 65          | Bearer capability not implemented                          |
| 66          | Channel type not implemented                               |
| 69          | Requested facility not implemented                         |
| 70          | Only restricted digital bearer capability is available     |
| 79          | Service/option not implemented, unspecified                |
| 81          | Invalid call reference                                     |
| 82          | Identified channel does not exist                          |
| 83          | A suspended call exists, but this call identity does not   |
| 84          | Call identity in use                                       |
| 85          | No call suspended  |
| 86          | Call having the requested call identity has been cleared   |
| 88          | Incompatible destination                                   |

**Table 6-1. Cause Values (continued)**

| Cause Value | Definition                                   |
|-------------|--|
| 91          | Invalid transit network selection            |
| 95          | Invalid Message, unspecified                 |
| 96          | Mandatory IE is missing                      |
| 97          | Message type non existent or not implemented |
| 98          | Message not compatible with call state       |
| 99          | Nonexistent IE                               |
| 100         | Invalid information element contents         |
| 101         | Message not compatible with call state       |
| 102         | Recovery on timer expiry                     |
| 111         | Protocol Error Unspecified                   |
| 127         | Interworking or cause unknown                |

The table below provides a list of possible problems that may be encountered during the installation of video teleconferencing. The first column lists the Cause Value and the second column provides possible reasons for the problem and recovery steps that may be taken.

**Outgoing Calls:**

**Table 6-2. Cause Values and Possible Recovery Steps**

| Cause Value (decimal)                            | Procedure   |
|--|---|
| 01 - Dialed Number Not Valid (Unassigned Number) | Confirm that DEFINITY is sending the correct digits to the network and that the TA is sending the correct digits to the PBX. Verify the proper service/feature has been administered on the routing pattern form.   |
| 17 - User Busy                                   | DEFINITY will disconnect a call with this cause value (17) for the following reasons: <ul style="list-style-type: none"> <li>■ The call is dropped locally because the TA is placing the second call on a PRI endpoint that does not allow simultaneous calls.</li> </ul> |

**Table 6-2. Cause Values and Possible Recovery Steps (continued)**

---

|   |
|---|
| <ul style="list-style-type: none"><li>■ The call to another PRI endpoint is dropped because it is the second call on a PRI endpoint that does not allow simultaneous calls.</li><li>■ The call to another PRI endpoint has a bandwidth greater than the currently available bandwidth on the destination PRI endpoint. If the bandwidth of the call is greater than the translated bandwidth of the PRI endpoint, the call will be dropped with cause value 34.</li><li>■ The call is placed to another PRI endpoint that does not have any of the <i>WIDEBAND SUPPORT OPTIONS</i> set to "y".</li><li>■ The call is to another PRI endpoint that is out of service.</li><li>■ The far end PRI endpoint or Access endpoint is legitimately busy. A PRI endpoint is considered busy in scenario 2 above. An Access Endpoint is always considered busy if one call on it is active.</li></ul> |
|---|

**Table 6-2. Cause Values and Possible Recovery Steps (continued)**

|   |   |
|---|---|
| <p>19 - User Alerting - No Answer</p>         | <p>A Network Timeout has occurred because the far end did not answer within the timeout period.</p>   |
| <p>28 - Invalid Number Format</p>             | <p>Misdialed, or missing digit.</p> <ul style="list-style-type: none"> <li>■ Check that the ABC is sending the correct digits to the PBX.</li> <li>■ Confirm that the AAR/ARS analysis is translated correctly and maps the received digits to a routing pattern.</li> </ul>  |
| <p>34 - No Circuit or Channel Available</p>   | <p>Typically caused by a situation with the destination wideband endpoint.</p> <p>An Access endpoint or a PRI endpoint that is translated with a width less than the bandwidth of the call being presented to it results in the call dropping with cause value 34. See the description of Cause value 17 for addition scenario information.</p> |
| <p>50 - Requested Facility Not Subscribed</p> | <p>Returned from the network and indicates that the service or feature requested in the BCC IE is not subscribed to. For example;SDN is specified and only ACCUNET is subscribed or you are trying to send a 384 Kbps call and only 56/64 Kbps is subscribed.</p>   |

Table 6-2. Cause Values and Possible Recovery Steps (continued)

---

|   |   |
|---|---|
| 58 - Bearer Capability not Presently available    | DEFINITY sends this cause value if WHAT routing pattern is selected and a preference can be found with a matching BCC, but the trunk groups in the matching preference cannot satisfy the bandwidth required for the call.  |
|   | Check the following items on the trunk group:   |
|   | <ul style="list-style-type: none"><li>■ there are enough members translated in the trunk group</li><li>■ <i>Wideband Support</i> is set to "yes" on the trunk group</li><li>■ <i>WIDEBAND SUPPORT OPTIONS</i> are set correctly.</li></ul>  |
| 63 - Service Option not available or unspecified. | The NSF IE is not administered; check the routing pattern form. The far side may be rejecting the call because the service is not administered.   |
| 65 - Bearer Capability not Implemented            | This error occurs if the new Nx DS0 (multirate) encoding of the bearer capability IE is sent to a TA or another switch that does not recognize it. Most likely the call is a 384 kbps call and the PRI endpoint or trunk group should have the <i>H0? Wideband Support Option</i> set to "yes". |

**Table 6-2. Cause Values and Possible Recovery Steps (continued)**

---

|  |   |
|--|---|
| 82 - Identified Channel does not exist | The number of channels administered between DEFINITY and the ABC is not consistent. The width administered for the DEFINITY PRI endpoint is less than the width required to carry the call. |
| 88 - Invalid Destination               | A possible problem here is the routing pattern selected for the wideband call does not have any preferences with a "yes" under the wideband BCC "W".  |

**Incoming Calls:**

| Cause Value                  | Procedure   |
|------------------------------|---|
| 01 - Dialed Number Not Valid | Check and make sure DEFINITY is routing the call correctly. Verify the proper service/feature and number is administered on the trunk group form. |

---

## Loopback Testing

Loopback testing is an effective method of verifying the video capabilities between the endpoint and the DEFINITY Switch is to run local loopback tests.

To administer a Loopback Extension:

On the ISDN Maintenance section (Page 2) of the System-Parameters Maintenance form administer an ISDN-PRI Test Call Extension.

Dial the ISDN-PRI loopback test call extension number from the ABC, verify that the the monitor and camera WHAT transmitting and receiving video signals. Dialing from the CODEC to verify its dialing capabilities can also be done.

Loopback tests can be used to verify calls to the local 4ESS Network switch.

To run loopback tests to the network:

Administer the Incoming Called Number on page 2 of the trunk group form and map the call to the ISDN-PRI test call extension number by deleting the incoming dialed digits and inserting the test call extension number.

Dial the number administered on the trunk group form from the ABC, verify that you are transmitting and receiving video signals from the monitor and camera. You can also dial from the CODEC to verify the dialing capabilities from the CODEC.

## Link Administration

The status link (G3iV2) or sys-link (G3rV2) command can be used to verify the signaling link between the access endpoint and the DEFINITY is in-service. If the link is not in-service verify link administration. Verify the DS-1 framing is administered correctly on the far-side, typically B8ZS/ESF. Follow maintenance procedures described in the Maintenance Manual.

### **Symptom: Dropped Calls**

If during setup an incoming or outgoing wideband call drops, check the DS1 boards for "bursty" noise by doing a *list measurements DS1 log PCSS*. If there is bursty noise at the times the calls are made or received, it means there is a bad physical connection or bad equipment anywhere in the Network - locally or external. Run measurements on both line side and network side DS1's. Then have the Network stress test the link from the #4ESS to the CSU. When these calls drop, the system will "Reset" the pipe, since it has lost synchronization, dropping all voice and video calls on the pipe. This action may be seen by doing an MST trace of the call.

**Symptom:** Every other or every third or fourth wideband call to a specific location fails, all other times it succeeds.

All wideband calls route through switch hubs. The call will fail depending on the route chosen and the trunk group selected. If the call fails it may mean that the trunk group selected is not administered in the network correctly (it is probably AMI and not B8ZS). This is a network problem. Contact your network troubleshooter and have them trace the routes your calls are taking.

The following MST information is intended for AT&T technical support personnel.

**MST Reference information:**

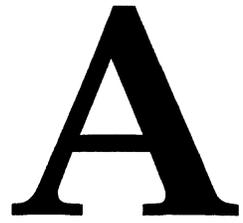
ISDN PRI Messages:

|           |    |                              |
|-----------|----|------------------------------|
| ALERT     | 01 | alerting                     |
| CALL_PROC | 02 | call proceeding              |
| PROG      | 03 | progress                     |
| CONN      | 07 | connect                      |
| CONN_ACK  | 0f | connect acknowledge          |
| SETUP     | 05 | setup                        |
| SETUP_ACK | 0d | setup acknowledge            |
| USER_INFO | 20 | user information             |
| DISC      | 45 | disconnect                   |
| RES       | 46 | restart a PRI interface      |
| RES_ACK   | 4e | restart acknowledge          |
| REL       | 4d | release                      |
| REL_COMP  | 5a | release complete             |
| STAT_ENQ  | 75 | call status enquiry          |
| CON_CON   | 79 | congestion control           |
| INFO      | 7b | information                  |
| STAT      | 7d | call status                  |
| FAC       | 62 | facility message             |
| FAC_ACK   | 6a | facility acknowledge message |
| FAC_REJ   | 72 | facility reject message      |



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**Appendix A: Maximum System Parameters  
and Software Items**



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**Contents**



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## Appendix A: Maximum System Parameters and Software Items

# A

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**Table A-1. Maximum System Parameters For Hardware and Software Items**

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**⇒ NOTE:**

Not all features are available for G3V1.1. In cases where a feature is not available for V1.1, capacity number reflects V2 capacity only. G3V2 is not available on the 286 platform.

Table A-1. Maximum System Parameters For Hardware and Software Items (continued)

| ITEM                            | G3 V1             |                  |                      |        | G3 V1.1 or V2   |                   |                  |               |        |
|---------------------------------|-------------------|------------------|----------------------|--------|-----------------|-------------------|------------------|---------------|--------|
|                                 | G3vsV1<br>ABP/PBP | G3sV1<br>ABP/PBP | G3IV1/<br>G3I-Global | G3rV1  | G3IV1.1-<br>286 | G3vsV2<br>ABP/PBP | G3sV2<br>ABP/PBP | G3IV2-<br>386 | G3rV2  |
| <b>Abbreviated Dialing (AD)</b> |                   |                  |                      |        |                 |                   |                  |               |        |
| AD Lists Per System             | 200               | 200              | 1,600/2,400          | 5,000  | 1,600           | 200               | 200              | 2,400         | 5,000  |
| AD List Entry Size              | 24                | 24               | 24                   | 24     | 24              | 24                | 24               | 24            | 24     |
| AD Entries Per System           | 2,000             | 2,000            | 10,000/12,000        | 50,000 | 10,000          | 2,000             | 2,000            | 12,000        | 50,000 |
| Enhanced List (System List)     | NA/1              | NA/1             | 1                    | 1      | 1               | NA/1              | NA/1             | 1             | 1      |
| Max. entries                    | NA/1,000          | NA/1,000         | 1,000                | 1,000  | 1,000           | NA/1,000          | NA/1,000         | 1,000         | 1,000  |
| Group Lists                     | 100               | 100              | 100                  | 100    | 100             | 100               | 100              | 100           | 1,000  |
| Max. entries                    | 90                | 90               | 90                   | 90     | 90              | 90                | 90               | 90            | 90     |
| Group lists/extension           | 3                 | 3                | 3                    | 3      | 3               | 3                 | 3                | 3             | 3      |
| System List                     | 1                 | 1                | 1                    | 1      | 1               | 1                 | 1                | 1             | 1      |
| Max. entries                    | 90                | 90               | 90                   | 90     | 90              | 90                | 90               | 90            | 90     |
| Personal Lists                  | 200               | 200              | 1,600/2,400          | 5,000  | 1,600           | 200               | 200              | 2,400         | 5,000  |
| Max. entries                    | 10                | 10               | 10                   | 10     | 10              | 10                | 10               | 10            | 10     |
| Personal lists/extension        | 3                 | 3                | 3                    | 3      | 3               | 3                 | 3                | 3             | 3      |
| <b>Applications Adjuncts</b>    |                   |                  |                      |        |                 |                   |                  |               |        |
| CallVisor ASAI Adjuncts         | NA/NA             | NA/4             | 8                    | 8      | 8               | NA/NA             | NA/4             | 8             | 8      |
| Asynchronous Links (RS232)      | 5                 | 5                | 5                    | 10     | 5               | 5                 | 5                | 5             | 10     |
| CDR Output Devices              | 2                 | 2                | 2                    | 2      | 2               | 2                 | 2                | 2             | 2      |
| Journal: System Printer         | 2:1               | 2:1              | 2:1                  | 2:1    | 2:1             | 2:1               | 2:1              | 2:1           | 2:1    |
| Property Mgt Systems            | 1                 | 1                | 1                    | 1      | 1               | 1                 | 1                | 1             | 1      |
| BX.25 Physical Links(1)         | 4                 | 4                | 8                    | 16     | 8               | 4                 | 4                | 8             | 16     |
| App. Processors(i.e.,3B2-MCS)   | 1                 | 1                | 1                    | 7      | 1               | 1                 | 1                | 1             | 7      |
| AUDIX Adjuncts                  | 1                 | 1                | 1                    | 8      | 1               | 1                 | 1                | 1             | 8      |
| CMS Adjuncts                    | 1                 | 1                | 1                    | 1      | 1               | 1                 | 1                | 1             | 1      |
| ICM Adjuncts                    |                   |                  |                      |        |                 |                   |                  |               |        |
| ISDN Gateway                    | NA/1              | NA/1             | 1                    | 1      | 1               | NA/1              | NA/1             | 1             | 1      |
| BX.25 Processor Channels        | 64                | 64               | 64                   | 128    | 64              | 64                | 64               | 64            | 128    |
| Hop Channels                    | 64                | 64               | 64                   | 128    | 64              | 64                | 64               | 64            | 128    |

1. In the case of SCC, only four BX.25 physical links are supported in G3sV2 and G3IV2.

Table A-1. Maximum System Parameters For Hardware and Software Items (continued)

| ITEM   | G3 V1             |                  |                      |        | G3V1.1 or V2    |                   |                  |               |        |
|--|-------------------|------------------|----------------------|--------|-----------------|-------------------|------------------|---------------|--------|
|  | G3vsV1<br>ABP/PBP | G3sV1<br>ABP/PBP | G3IV1/<br>G3I-Global | G3rV1  | G3IV1.1-<br>286 | G3vsV2<br>ABP/PBP | G3sV2<br>ABP/PBP | G3IV2-<br>386 | G3rV2  |
| <b>ARS/AAR (2) (3)</b>                           |                   |                  |                      |        |                 |                   |                  |               |        |
| AAR/ARS Patterns (Shared)                        | NA/40             | NA/40            | 254                  | 640    | 254             | 20/40             | 20/40            | 254           | 640    |
| ARS/AAR Table Entries<br>(NPA,NXX,RXX,HNPA,FNPA) | 2,000             | 2,000            | 2,000                | 2,000  | 2,000           | 2,000             | 2,000            | 2,000         | 2,000  |
| Choices per RHNPA Table                          | 12                | 12               | 12                   | 12     | 12              | 12                | 12               | 12            | 12     |
| Digit Conversion Entries                         | 300               | 300              | 300                  | 400    | 400             | 400               | 400              | 400           | 400    |
| AAR/ARS Digit Conversion                         |                   |                  |                      |        |                 |                   |                  |               |        |
| Digits Deleted for ARS/AAR                       | 23                | 23               | 23                   | 23     | 23              | 23                | 23               | 23            | 23     |
| Digits Inserted for ARS/AAR                      | 18                | 18               | 18                   | 18     | 18              | 18                | 18               | 18            | 18     |
| AAR/ARS Sub-Net Trunking                         |                   |                  |                      |        |                 |                   |                  |               |        |
| Digits Deleted for ARS/AAR                       | 23                | 23               | 23                   | 23     | 23              | 23                | 23               | 23            | 23     |
| Digits Inserted for ARS/AAR                      | 36                | 36               | 36                   | 36     | 36              | 36                | 36               | 36            | 36     |
| Entries in HNPA & RHNPA Tables                   | 1,000             | 1,000            | 1,000                | 1,000  | 1,000           | 1,000             | 1,000            | 1,000         | 1,000  |
| FRLs   | 8                 | 8                | 8                    | 8      | 8               | 8                 | 8                | 8             | 8      |
| Inserted Digit Strings (4)                       | 450               | 450              | 1,200                | 3,000  | 1,200           | 450               | 450              | 1,200         | 3,000  |
| Patterns for Measurement                         |                   |                  |                      |        |                 |                   |                  |               |        |
| Shared Patterns for Measurement                  | 20                | 20               | 20                   | 25     | 20              | 20                | 20               | 20            | 25     |
| RHNPA Tables                                     | 32                | 32               | 32                   | 32     | 32              | 32                | 32               | 32            | 32     |
| Routing Plans                                    | 8                 | 8                | 8                    | 8      | 8               | 8                 | 8                | 8             | 8      |
| Toll Tables                                      | 32                | 32               | 32                   | 32     | 32              | 32                | 32               | 32            | 32     |
| Entries per Toll Table                           | 800               | 800              | 800                  | 800    | 800             | 800               | 800              | 800           | 800    |
| Trunk Groups in an ARS/AAR Pattern               | 6                 | 6                | 6                    | 16     | 6               | 6                 | 6                | 6             | 16     |
| UDP (Entries)                                    | NA/240            | NA/240           | 240                  | 50,000 | 240             | NA/240            | NA/240           | 10,000        | 50,000 |
| TOD Charts                                       | 8                 | 8                | 8                    | 8      | 8               | 8                 | 8                | 8             | 8      |

2. AAR is not an optional feature in G3sV2 ABP.

3. ARS is available in G3s if the Automatic Route Selection Option is selected.

4. This is the number of 12 character inserted-digit-strings available for AAR/ARS preferences.

Table A-1. Maximum System Parameters For Hardware and Software Items (continued)

| ITEM                                    | G3 V1             |                  |                      |        | G3 V1.1 or V2   |                   |                  |               |        |
|---|-------------------|------------------|----------------------|--------|-----------------|-------------------|------------------|---------------|--------|
|   | G3vsV1<br>ABP/PBP | G3sV1<br>ABP/PBP | G3IV1/<br>G3I-Global | G3rV1  | G3IV1.1-<br>286 | G3vsV2<br>ABP/PBP | G3sV2<br>ABP/PBP | G3IV2-<br>386 | G3rV2  |
| <b>Attendant Service</b>                |                   |                  |                      |        |                 |                   |                  |               |        |
| Attendant Consoles(day:night)(5)        | 4:1               | 6:1              | 6:1/15:1             | 27:1   | 15:1            | 4:1               | 6:1              | 15:1          | 27:1   |
| Attendant Console 100s Groups/Attendant | 20                | 20               | 20                   | 20     | 20              | 20                | 20               | 20            | 20     |
| Attendant Control Restriction Groups    | 64                | 64               | 64                   | 96     | 96              | 96                | 96               | 96            | 96     |
| <b>Centralized Attendant Service</b>    |                   |                  |                      |        |                 |                   |                  |               |        |
| Release Link Trunks at Branch           | NA/99             | NA/99            | 99                   | 99     | 99              | NA/99             | NA/99            | 99            | 255    |
| Release Link Trk Grp at Branch          | NA/1              | NA/1             | 1                    | 1      | 1               | NA/1              | NA/1             | 1             | 1      |
| Release Link Trunks at Main             | NA/100            | NA/100           | 400                  | 4,000  | 400             | NA/100            | NA/100           | 400           | 4,000  |
| Release Link Trk Grp at Main (6)        | NA/32             | NA/32            | 99                   | 666    | 99              | NA/32             | NA/32            | 99            | 666    |
| <b>Other Access Queues</b>              |                   |                  |                      |        |                 |                   |                  |               |        |
| Max. Number of Queues                   | 1                 | 1                | 1 (12)               | 12     | 12              | 12                | 12               | 12            | 12     |
| Max. Number of Queue Slots (7)          | 30                | 30               | 50/80                | 80     | 80              | 30                | 30               | 80            | 80     |
| Size range of Reserved Queue            | NA                | NA               | NA (2-75)            | 2-75   | 2-75            | 2-25              | 2-25             | 2-75          | 2-75   |
| Reserved Queue Default Size             | NA                | NA               | NA (5)               | 5      | 5               | 5                 | 5                | 5             | 5      |
| Queue Length                            | 30                | 30               | 30/80                | 300    | 80              | 30                | 30               | 80            | 300    |
| Switched Loops/Console                  | 6                 | 6                | 6                    | 6      | 6               | 6                 | 6                | 6             | 6      |
| <b>Authorization</b>                    |                   |                  |                      |        |                 |                   |                  |               |        |
| Authorization Codes                     | 1,500             | 1,500            | 5,000                | 90,000 | 5,000           | 1,500             | 1,500            | 5,000         | 90,000 |
| Classes of Restriction                  | 64                | 64               | 64/96                | 96     | 96              | 96                | 96               | 96            | 96     |
| Classes of Service                      | 16                | 16               | 16                   | 16     | 16              | 16                | 16               | 16            | 16     |
| Length of Authorization Code            | 4-7               | 4-7              | 4-7                  | 4-7    | 4-7             | 4-7               | 4-7              | 4-7           | 4-7    |
| Length of Barrier Code                  | 4-7               | 4-7              | 4-7                  | 4-7    | 4-7             | 4-7               | 4-7              | 4-7           | 4-7    |
| Length of Forced Entry Account Codes    | NA/1-15           | NA/1-15          | 1-15                 | 1-15   | 1-15            | NA/1-15           | NA/1-15          | 1-15          | 1-15   |
| Restricted Call List                    | 1                 | 1                | 1                    | 1      | 1               | 1                 | 1                | 1             | 1      |
| Remote Access Barrier Codes             | 10                | 10               | 10                   | 10     | 10              | 10                | 10               | 10            | 10     |
| CDR Forced Entry Account Code List      | NA/1              | NA/1             | 1                    | 1      | 1               | NA/1              | NA/1             | 1             | 1      |
| Toll Call List                          | 1                 | 1                | 1                    | 1      | 1               | 1                 | 1                | 1             | 1      |
| Unrestricted/Allowed Call Lists         | 10                | 10               | 10                   | 10     | 10              | 10                | 10               | 10            | 10     |
| Total Call List Entries                 | 1,000             | 1,000            | 1,000                | 1,000  | 1,000           | 1,000             | 1,000            | 1,000         | 1,000  |
| <b>Automatic Callback Calls</b>         | 20                | 20               | 160/240              | 1,000  | 160             | 20                | 20               | 240           | 1,500  |
| <b>Automatic Wakeup</b>                 |                   |                  |                      |        |                 |                   |                  |               |        |
| Simultaneous Display Requests           | 10                | 10               | 10                   | 10     | 10              | 10                | 10               | 10            | 30     |
| Wakeup Requests per System              | 200               | 200              | 1,600/2,400          | 10,000 | 1,200           | 200               | 200              | 2,400         | 15,000 |
| Wakeup Request per Extension            | 1                 | 1                | 1                    | 1      | 1               | 1                 | 1                | 1             | 1      |
| Wakeup Requests per 15 min Interval     | 150               | 150              | 300                  | 950    | 300             | 150               | 150              | 450           | 950    |

5. For G3vs, there can be four day consoles if there are no night consoles. Three of the four must be powered by auxiliary power.

6. The number of "Release Link Trunk Groups at Main" is the same as the number of trunk groups in the system.

7. The "Maximum number of queue slots" is referred to as "emergency access queue length" in G1.

Table A-1. Maximum System Parameters For Hardware and Software Items (continued)

| ITEM                                   | G3 V1             |                  |                      |        | G3 V1.1 or V2   |                   |                  |               |        |
|--|-------------------|------------------|----------------------|--------|-----------------|-------------------|------------------|---------------|--------|
|  | G3vsV1<br>ABP/PBP | G3sV1<br>ABP/PBP | G3IV1/<br>G3I-Global | G3rV1  | G3IV1.1-<br>286 | G3vsV2<br>ABP/PBP | G3sV2<br>ABP/PBP | G3IV2-<br>386 | G3rV2  |
| <b>Basic CMS</b>                       |                   |                  |                      |        |                 |                   |                  |               |        |
| Daily Summary Reports                  | 7                 | 7                | 7                    | 7      | 7               | 7                 | 7                | 7             | 7      |
| Measured Agents                        | 75                | 75               | 200                  | 200    | 200             | 75                | 75               | 200           | 200    |
| Measured Splits                        | 12/24             | 12/24            | 99                   | 99     | 99              | 12/24             | 12/24            | 99            | 99     |
| Measured Trunk Groups                  | 16/32             | 16/32            | 99                   | 32     | 32              | 16/32             | 16/32            | 32            | 32     |
| Measured VDNs                          | NA/24             | NA/24            | 99                   | 512    | 99              | NA/24             | NA/24            | 99            | 512    |
| Reporting Periods (30 or 60 min)       | 25                | 25               | 25                   | 25     | 25              | 25                | 25               | 25            | 25     |
| Number of Terminal User IDs            | 5                 | 5                | 5                    | 8      | 5               | 5                 | 5                | 5             | 8      |
| <b>Cabinets</b>                        |                   |                  |                      |        |                 |                   |                  |               |        |
| <b>EPN</b>                             |                   |                  |                      |        |                 |                   |                  |               |        |
| MCC(8)                                 | NA                | NA               | 2                    | 21     | 2               | NA                | NA               | 2             | 21     |
| SCC(8)                                 | NA                | NA               | 8                    | 80     | 8               | NA                | NA               | 8             | 80     |
| Small (Upgrades only)(9)               | NA                | NA               | 2                    | 20     | 2               | NA                | NA               | 2             | 20     |
| <b>Inter-Port Network Connectivity</b> |                   |                  |                      |        |                 |                   |                  |               |        |
| Port Networks                          | 1                 | 1                | 3                    | 22     | 3               | 1                 | 1                | 3             | 22     |
| Max No. of Port Networks/Cabinet       | 1                 | 1                | 1                    | 2      | 1               | 1                 | 1                | 1             | 2      |
| Switch Node Carriers (Simplex)         | NA                | NA               | NA                   | 2      | NA              | NA                | NA               | NA            | 2      |
| Switch Node Carriers (Duplex)          | NA                | NA               | NA                   | 4      | NA              | NA                | NA               | NA            | 4      |
| DS1 Converter Complex (Simplex)        | NA                | NA               | NA                   | 20     | NA              | NA                | NA               | NA            | 20     |
| DS1 Converter Complex (Duplex)         | NA                | NA               | NA                   | 40     | NA              | NA                | NA               | NA            | 40     |
| <b>PPN</b>                             |                   |                  |                      |        |                 |                   |                  |               |        |
| MCC (10)                               | NA                | NA               | 1                    | 1      | 1               | NA                | NA               | 1             | 1      |
| SCC/ESCC                               | NA                | 4                | 4                    | NA     | 4               | NA                | 4                | 4             | NA     |
| CSCC                                   | 1                 | NA               | NA                   | NA     | NA              | 1                 | NA               | NA            | NA     |
| <b>Remote Modules</b>                  |                   |                  |                      |        |                 |                   |                  |               |        |
| Remote Port Network                    | NA                | NA               | 2/1                  | 21     | 2               | NA                | NA               | 2             | 21     |
| <b>Call Appearances</b>                |                   |                  |                      |        |                 |                   |                  |               |        |
| Bridged Images/Appearance              | 7                 | 7                | 7                    | 15     | 7               | 7                 | 7                | 7             | 15     |
| Call Appearances/Station(11)           | 54                | 54               | 54                   | 54     | 54              | 54                | 54               | 54            | 54     |
| Max. Appearances per Ext.              | 10                | 10               | 10                   | 10     | 10              | 10                | 10               | 10            | 10     |
| Min. Appearances per Ext.              | 2                 | 2                | 2                    | 2      | 2               | 2                 | 2                | 2             | 2      |
| Total Bridged Appearances              | 200               | 200              | 1600/2,400           | 10,000 | 1,600           | 200               | 200              | 2,400         | 25,000 |
| Max.Simultaneous Off-Hook per Call(12) | 5                 | 5                | 5                    | 5      | 5               | 5                 | 5                | 5             | 5      |

8. The EPNs in G3r can be DS1-remote EPNs.

9. Small systems refer to the two-carrier cabinet systems that are no longer sold to new customers.

10. MCC includes Medium Cabinet.

11. The number of call appearances is the sum of primary and bridged appearances; at most ten can be primary. A maximum of 54 administrable buttons are supported for the 7434D terminal—34 buttons in the basic terminal and an additional 20 buttons in the coverage module.

12. Does not apply to conferencing.

Table A-1. Maximum System Parameters For Hardware and Software Items (continued)

| ITEM                                     | G3 V1             |                  |                      |        | G3 V1.1 or V2   |                   |                  |               |        |
|--|-------------------|------------------|----------------------|--------|-----------------|-------------------|------------------|---------------|--------|
|  | G3vsV1<br>ABP/PBP | G3sV1<br>ABP/PBP | G3IV1/<br>G3I-Global | G3rV1  | G3IV1.1-<br>286 | G3vsV2<br>ABP/PBP | G3sV2<br>ABP/PBP | G3IV2-<br>386 | G3rV2  |
| <b>Call Coverage</b>                     |                   |                  |                      |        |                 |                   |                  |               |        |
| Coverage Answer Groups (CAG)             | 30                | 30               | 200                  | 500    | 200             | 30                | 30               | 200           | 750    |
| Coverage Paths                           | 150               | 150              | 600                  | 5,000  | 600             | 150               | 150              | 600           | 7,500  |
| With Hospitality Parameter Reduction     | NA/5              | NA/5             | 5                    | 5      | 5               | NA/5              | NA/5             | 5             | 5      |
| Coverage Paths Incl. in Call Covg.Report | 100               | 100              | 100                  | 100    | 100             | 100               | 100              | 100           | 100    |
| Coverage Path per Station (13)           | 4                 | 4                | 4                    | 4      | 4               | 4                 | 4                | 4             | 4      |
| Coverage Points in a Path                | 3                 | 3                | 3                    | 3      | 3               | 3                 | 3                | 3             | 3      |
| Max Users/Coverage Path(14)              | 500               | 500              | 2900<br>(3500)       | 21,875 | 2900            | 500               | 500              | 3,500         | 36,065 |
| Members per CAG                          | 8                 | 8                | 8                    | 8      | 8               | 8                 | 8                | 8             | 8      |
| <b>Call Detail Recording</b>             |                   |                  |                      |        |                 |                   |                  |               |        |
| CDRU Trackable Extensions                | 200               | 200              | 1,600,<br>2400       | 10,000 | 1,600           | 200               | 200              | 2,400         | 25,000 |
| Intra-switch Call Trackable Extensions   | 100               | 100              | 100                  | 500    | 100             | 100               | 100              | 100           | 500    |
| No. of CDRUs/System (15)                 | 1                 | 1                | 1                    | 1      | 1               | 1                 | 1                | 1             | 1      |
| <b>Call Forwarding (Follow-me)</b>       |                   |                  |                      |        |                 |                   |                  |               |        |
| Call Forwarded Digits (off-net)          | 16                | 16               | 16                   | 16     | 16              | 16                | 16               | 16            | 16     |
| Call Forwarded Numbers                   | 200               | 200              | 1,600/2,400          | 10,000 | 1,600           | 200               | 200              | 2,400         | 25,000 |
| <b>Call Park</b>                         |                   |                  |                      |        |                 |                   |                  |               |        |
| Attnd.Grp. Common Shared Exten.Nos.      | 10                | 10               | 10                   | 40     | 10              | 10                | 10               | 10            | 80     |
| No. of Parked Calls                      | 180               | 180              | 723                  | 5,302  | 723             | 180               | 180              | 723           | 5,302  |
| <b>Call Pickup Groups</b>                |                   |                  |                      |        |                 |                   |                  |               |        |
| Call Pickup Members/Group                | 50                | 50               | 50                   | 50     | 50              | 50                | 50               | 50            | 50     |
| Call Pickup Members/System               | 200               | 200              | 1600/<br>2400        | 10,000 | 1,600           | 200               | 200              | 2,400         | 25,000 |
| No. of Groups                            | 100               | 100              | 800                  | 5,000  | 800             | 100               | 100              | 800           | 5,000  |
| With Hospitality Parameter Reduction     | NA/5              | NA/5             | 5                    | 5      | 5               | NA/5              | NA/5             | 5             | 5      |

13. Only available with ABP when AT&T Voice Power adjunct (AUDIX, AUDIX Voice Power, AUDIX Voice Power Lodging, and DEFINITY AUDIX) are used.

14. The maximum number of users per coverage path equals the number of dial plan extensions (including hunt groups, TEGs, etc.).

15. The CDRU adjunct capacity is 40,000 calls per hour, and exceeds the system call capacity for all systems except for G3r.

Table A-1. Maximum System Parameters For Hardware and Software Items (continued)

| ITEM                                      | G3 V1             |                  |                      |       | G3 V1.1 or V2   |                   |                  |               |        |
|---|-------------------|------------------|----------------------|-------|-----------------|-------------------|------------------|---------------|--------|
|   | G3vsV1<br>ABP/PBP | G3sV1<br>ABP/PBP | G3IV1/<br>G3I-Global | G3rV1 | G3IV1.1-<br>286 | G3vsV2<br>ABP/PBP | G3sV2<br>ABP/PBP | G3IV2-<br>386 | G3rV2  |
| <b>Call Vectoring/Call Prompting</b>      |                   |                  |                      |       |                 |                   |                  |               |        |
| Expert Agent Selection                    |                   |                  |                      |       |                 |                   |                  |               |        |
| Skill Groups                              | NA                | NA               | NA                   | NA    | NA              | NA/24             | NA/24            | 99            | 255    |
| VDN Skill Preferences                     | NA                | NA               | NA                   | NA    | NA              | NA/3              | NA/3             | 3             | 3      |
| Multiple Skills per Call                  | NA                | NA               | NA                   | NA    | NA              | NA/3              | NA/3             | 3             | 3      |
| Multiple Skills per Agent                 | NA                | NA               | NA                   | NA    | 4               | NA/4              | NA/4             | 4             | 4      |
| Agent Login IDs                           | NA                | NA               | NA                   | NA    | NA              | NA/450            | NA/450           | 1,500         | 10,000 |
| Multiple Splits per Call                  | NA/3              | NA/3             | 3                    | 3     | 3               | NA/3              | NA/3             | 3             | 3      |
| Priority Levels                           | NA/4              | NA/4             | 4                    | 4     | 4               | NA/4              | NA/4             | 4             | 4      |
| Recorded Announcement                     | NA/128            | NA/128           | 128                  | 256   | 128             | NA/128            | NA/128           | 128           | 256    |
| Steps per Vector                          | NA/15             | NA/15            | 15                   | 15    | 32              | NA/32             | NA/32            | 32            | 32     |
| Vector Directory Numbers                  | NA/100            | NA/100           | 500                  | 3,000 | 500             | NA/100            | NA/100           | 512           | 20,000 |
| Measured VDNs                             | NA/100            | NA/100           | 500                  | 2,000 | 500             | NA/100            | NA/100           | 512           | 2,000  |
| Vectors per System                        | NA/48             | NA/48            | 256                  | 512   | 256             | NA/48             | NA/48            | 256           | 512    |
| <b>Call/visor ASAI</b>                    |                   |                  |                      |       |                 |                   |                  |               |        |
| Active Station Controlling Assoc.         | NA                | NA/250           | 2,000/NA             | 6,000 | 2,000           | NA                | NA/250           | 2,000         | 6,000  |
| Call Controllers per Call                 | NA                | NA/1             | 1/NA                 | 1     | 1               | NA                | NA/1             | 1             | 1      |
| Call Monitors per Call                    | NA                | NA/14            | 14/NA                | 14    | 1               | NA                | NA/1             | 1             | 1      |
| Extension Controllers per Station Domain  | NA                | NA/2             | 2/NA                 | 2     | 2               | NA                | NA/2             | 2             | 2      |
| Max. Simultaneous Call Classif.           | NA                | NA/40            | 40/NA                | 100   | 40              | NA                | NA/40            | 40            | 400    |
| No. of ASAI Links                         | NA                | NA/4             | 8/NA                 | 8     | 8               | NA                | NA/4             | 8             | 8      |
| Notification Requests                     | NA                | NA/50            | 170/NA               | 460   | 170             | NA                | NA/50            | 170           | 460    |
| Simultaneous Active Adj. Controlled Calls | NA                | NA/75            | 300/NA               | 3,000 | 300             | NA                | NA/75            | 300           | 3,000  |
| Switch to Adjunct Associations            | NA                | NA/127           | 127/NA               | 127   | 127             | NA                | NA/127           | 127           | 127    |
| <b>Conference Parties</b>                 | 6                 | 6                | 6                    | 6     | 6               | 6                 | 6                | 6             | 6      |
| Simultaneous three-way Conf. Calls (16)   | 161               | 161              | 483                  | 3,542 | 483             | 161               | 161              | 483           | 3,542  |
| Simultaneous six-way Conf. Calls (17)     | 80                | 80               | 240                  | 1,760 | 240             | 80                | 80               | 240           | 1,760  |
| <b>Data Parameters</b>                    |                   |                  |                      |       |                 |                   |                  |               |        |
| Administered Connections                  | NA/24             | NA/24            | 128                  | 128   | 128             | NA/24             | NA/24            | 128           | 128    |
| Permanent Switched Call                   | NA                | NA               | NA                   | NA    | NA              | NA                | NA               | NA            | NA     |
| Alphanumeric Dialing                      |                   |                  |                      |       |                 |                   |                  |               |        |
| Max. entries                              | 50                | 50               | 200                  | 1,250 | 200             | 50                | 50               | 200           | 1,250  |
| Characters/Entry                          | 22                | 22               | 22                   | 22    | 22              | 22                | 22               | 22            | 22     |
| <b>Digital Data Endpoints</b>             | 75                | 75               | 800                  | 5,000 | 800             | 75                | 75               | 800           | 7,500  |

16. Simultaneous three-way Conference Call=(483 / 3)\* number PNs. Simultaneous three-way Conference Call is limited by the number of Simultaneous Circuit-Switched Calls of 180 in G3sV2.

17. Simultaneous six-way Conference Call=(483 / 6)\* number PNs.

Table A-1. Maximum System Parameters For Hardware and Software Items (continued)

| ITEM                             | G3 V1             |                  |                      |        | G3 V1.1 or V2   |                   |                  |               |        |
|----------------------------------|-------------------|------------------|----------------------|--------|-----------------|-------------------|------------------|---------------|--------|
|                                  | G3vsV1<br>ABP/PBP | G3sV1<br>ABP/PBP | G3IV1/<br>G3I-Global | G3rV1  | G3IV1.1-<br>286 | G3vsV2<br>ABP/PBP | G3sV2<br>ABP/PBP | G3IV2-<br>386 | G3rV2  |
| <b>Dial Plan</b>                 |                   |                  |                      |        |                 |                   |                  |               |        |
| DID LDNs                         | 8                 | 8                | 8                    | 20     | 8               | 8                 | 8                | 8             | 20     |
| Extensions (18)                  | 500               | 500              | 2900/<br>3500        | 21,875 | 2900            | 500               | 500              | 3,500         | 36,065 |
| Extension No. Portability (19)   | NA/240            | NA/240           | 240                  | 50,000 | 240             | NA/240            | NA/240           | 10,000        | 50,000 |
| <b>Feature Dial Access Codes</b> |                   |                  |                      |        |                 |                   |                  |               |        |
| No. of Access Codes              | 70                | 70               | 70                   | 70     | 70              | 70                | 70               | 70            | 70     |
| No. of Digits                    | 1-3               | 1-3              | 1-3                  | 1-4    | 1-4             | 1-4               | 1-4              | 1-4           | 1-4    |
| Integrated Directory Entries     | 204               | 207              | 1607/<br>2407        | 10,000 | 1,616           | 207               | 207              | 2,416         | 25,028 |
| Max Extension Size               | 5                 | 5                | 5                    | 5      | 5               | 5                 | 5                | 5             | 5      |
| Min Extension Size               | 1                 | 1                | 1                    | 1      | 1               | 1                 | 1                | 1             | 1      |
| Miscellaneous Extensions (20)    | 150               | 150              | 900                  | 3317   | 900             | 150               | 150              | 900           | 3317   |
| <b>Names</b>                     |                   |                  |                      |        |                 |                   |                  |               |        |
| No. of names (21)                | 448/464           | 448/464          | 3,406/4,215          | 22,569 | 3,615           | 448/464           | 448/464          | 4,215         | 36,511 |
| No. of characters in a name      | 15                | 15               | 15                   | 15     | 15              | 15                | 15               | 15            | 15     |
| Non-DID LDNs                     | 50                | 50               | 50                   | 666    | 50              | 50                | 50               | 50            | 666    |
| Prefix Extensions                | Yes               | Yes              | Yes                  | Yes    | Yes             | Yes               | Yes              | Yes           | Yes    |
| <b>Trunk Dial Access Codes</b>   |                   |                  |                      |        |                 |                   |                  |               |        |
| No. of Access Codes              | 105               | 105              | 197                  | 884    | 157             | 49/65             | 49/65            | 317           | 884    |
| No. of digits                    | 1-3               | 1-3              | 1-3/1-4              | 1-4    | 1-4             | 1-4               | 1-4              | 1-4           | 1-4    |
| <b>Do Not Disturb (DND)</b>      |                   |                  |                      |        |                 |                   |                  |               |        |
| DND Requests per System          | 200               | 200              | 1600/<br>2400        | 10,000 | 1,600           | 200               | 200              | 2,400         | 25,000 |
| Simultaneous Display Requests    | 10                | 10               | 10                   | 10     | 30              | 10                | 10               | 10            | 30     |

18. Extensions include stations, data endpoints, hunt groups, announcements, TEGs, VDNs, common shared extensions, and code calling IDs.

19. The numbers shown in "Extension Number Portability" are Uniform Dialing Plan (UDP) entries.

20. Used for PCOL groups, common shared extensions, access endpoints, administered TSCs, code calling IDs, VDNs, LDNs, hunt groups, announcements,

21. The Number of Names = number of stations + attendant consoles + trunk groups + digital data endpoints + miscellaneous extensions.

Table A-1. Maximum System Parameters For Hardware and Software Items (continued)

| ITEM                                       | G3 V1             |                  |                      |        | G3 V1.1 or V2   |                   |                  |               |        |
|--|-------------------|------------------|----------------------|--------|-----------------|-------------------|------------------|---------------|--------|
|  | G3vsV1<br>ABP/PBP | G3sV1<br>ABP/PBP | G3IV1/<br>G3I-Global | G3rV1  | G3IV1.1-<br>286 | G3vsV2<br>ABP/PBP | G3sV2<br>ABP/PBP | G3IV2-<br>386 | G3rV2  |
| <b>Facility Busy Indicators</b>            |                   |                  |                      |        |                 |                   |                  |               |        |
| Buttons per Tracked Resource               | 100               | 100              | 100                  | 100    | 100             | 100               | 100              | 100           | 100    |
| No. of Indicators (Station & Trk Grps)     | 450               | 450              | 2400/3600            | 2400   | 2400            | 450               | 450              | 3,600         | 5,000  |
| <b>Hunt Groups or Splits</b>               |                   |                  |                      |        |                 |                   |                  |               |        |
| Announcements per Group                    | 2                 | 2                | 2                    | 2      | 2               | 2                 | 2                | 2             | 2      |
| Announcements per System                   | 128               | 128              | 128                  | 256    | 128             | 128               | 128              | 128           | 256    |
| Groups and/or Splits                       | 12/24             | 12/24            | 99                   | 255    | 99              | 12/24             | 12/24            | 99            | 255    |
| With Hospitality Parameter Reduction       | NA/5              | NA/5             | 5                    | 5      | 5               | NA/5              | NA/5             | 5             | 5      |
| Group Members per Group/Split              | 150               | 150              | 200                  | 999    | 200             | 150               | 150              | 200           | 999    |
| Group Members per System                   | 150               | 150              | 500                  | 3,000  | 500             | 150               | 150              | 500           | 5200   |
| <b>Measured ACD Agents (Switch Limits)</b> |                   |                  |                      |        |                 |                   |                  |               |        |
| Agents Logged In per System                | 75                | 75               | 400                  | 1023   | 400             | 150               | 150              | 500           | 5200   |
| Logged-In Splits per Agent                 | 3                 | 3                | 3                    | 3      | 4               | 4                 | 4                | 4             | 4      |
| ACD Supervisor Assist Per System (22)      | 12/24             | 12/24            | 99                   | 255    | 99              | 12/24             | 12/24            | 99            | 255    |
| Queue Slots per Group                      | 200               | 200              | 200                  | 999    | 200             | 200               | 200              | 200           | 999    |
| Queue Slots per System                     | 200               | 200              | 1,000                | 10,000 | 1000            | 200               | 200              | 1,000         | 10,500 |
| <b>Intercom Translation Table (ICOM)</b>   |                   |                  |                      |        |                 |                   |                  |               |        |
| <b>Automatic/Manual and Dial</b>           |                   |                  |                      |        |                 |                   |                  |               |        |
| ICOM groups per system                     | 10                | 10               | 32                   | 256    | 32              | 10                | 10               | 32            | 256    |
| Auto/Manual                                | 16                | 16               | 32                   | 256    | 32              | 10                | 10               | 32            | 256    |
| Dial                                       | 16                | 16               | 32                   | 256    | 32              | 10                | 10               | 32            | 256    |
| <b>Members per ICOM group</b>              |                   |                  |                      |        |                 |                   |                  |               |        |
| Auto                                       | 32                | 32               | 32                   | 32     | 32              | 32                | 32               | 32            | 32     |
| Dial                                       | 32                | 32               | 32                   | 32     | 32              | 32                | 32               | 32            | 32     |
| Members per System                         | 320               | 320              | 1,024                | 8,192  | 1,024           | 320               | 320              | 1,024         | 8,192  |

22. One supervisor assist per split.

Table A-1. Maximum System Parameters For Hardware and Software Items (continued)

| ITEM  | G3 V1             |                  |                      |        | G3 V1.1 or V2   |                   |                  |               |        |
|---|-------------------|------------------|----------------------|--------|-----------------|-------------------|------------------|---------------|--------|
|   | G3vsV1<br>ABP/PBP | G3sV1<br>ABP/PBP | G3IV1/<br>G3I-Global | G3rV1  | G3IV1.1-<br>286 | G3vsV2<br>ABP/PBP | G3sV2<br>ABP/PBP | G3IV2-<br>386 | G3rV2  |
| <b>Last Number Dialed</b>                     |                   |                  |                      |        |                 |                   |                  |               |        |
| Entries/System (23)                           | 275               | 275              | 2,400/<br>3,200      | 15,000 | 2,416           | 282               | 282              | 3,216         | 32,528 |
| Number of Digits                              | 16                | 16               | 16                   | 24     | 24              | 24                | 24               | 24            | 24     |
| <b>Leave Word Calling (Switch-Based) (24)</b> |                   |                  |                      |        |                 |                   |                  |               |        |
| Messages Stored                               | 450               | 450              | 2,000                | 2,000  | 2,000           | 450               | 450              | 2,000         | 2,000  |
| Messages per User                             | 10                | 10               | 10                   | 16     | 10              | 10                | 10               | 10            | 16     |
| Remote Message Waiting Indicators             |                   |                  |                      |        |                 |                   |                  |               |        |
| Per Extension                                 | 80                | 80               | 80                   | 80     | 80              | 80                | 80               | 80            | 80     |
| Per System                                    | 80                | 80               | 80                   | 500    | 80              | 80                | 80               | 80            | 500    |
| Simultaneous Message Retrievers               | 60                | 60               | 60                   | 400    | 60              | 60                | 60               | 60            | 400    |
| System-wide Message Retrievers                | 10                | 10               | 10                   | 10     | 10              | 10                | 10               | 10            | 10     |
| <b>Malicious Call Trace</b>                   |                   |                  |                      |        |                 |                   |                  |               |        |
| Max.Simultaneous Traces                       | NA                | NA               | NA                   | 16     | 16              | 16                | 16               | 16            | 16     |
| <b>MLDN</b>                                   |                   |                  |                      |        |                 |                   |                  |               |        |
| Via DID                                       | 8                 | 8                | 8                    | 20     | 8               | 8                 | 8                | 8             | 20     |
| Via CO  | 50                | 50               | 50                   | 50     | 50              | 50                | 50               | 50            | 50     |
| <b>Modem Pool Groups</b>                      |                   |                  |                      |        |                 |                   |                  |               |        |
| Mode 2/Analog                                 |                   |                  |                      |        |                 |                   |                  |               |        |
| Group members per system                      | 64                | 64               | 160                  | 2,016  | 160             | 64                | 64               | 160           | 2,016  |
| Number of groups                              | 2                 | 2                | 5                    | 63     | 5               | 2                 | 2                | 5             | 63     |
| Members per group                             | 32                | 32               | 32                   | 32     | 32              | 32                | 32               | 32            | 32     |
| <b>Networking</b>                             |                   |                  |                      |        |                 |                   |                  |               |        |
| CAS Nodes                                     | NA/99             | NA/99            | 99                   | 99     | 99              | NA/99             | NA/99            | 99            | 99     |
| DCS Nodes                                     |                   |                  |                      |        |                 |                   |                  |               |        |
| BX.25   | NA/20             | NA/20            | 20                   | 63     | 20              | NA/20             | NA/20            | 20            | 20     |
| ISDN PRI                                      | NA/63             | NA/63            | 63                   | 63     | 63              | NA/63             | NA/63            | 63            | 63     |
| Hybrid  | NA/63             | NA/63            | 63                   | 63     | 63              | NA/63             | NA/63            | 63            | 63     |
| UDP Nodes                                     | NA/240            | NA/240           | 240                  | 999    | 240             | NA/240            | NA/240           | 240           | 999    |

23. Last Number Dialed Entries = Stations + Digital Data Endpoints.

24. Leave Word Calling is available with G3s ABP only if the Voice Mail Application Support Option is purchased.

Table A-1. Maximum System Parameters For Hardware and Software Items (continued)

| ITEM                                | G3 V1             |                  |                      |       | G3 V1.1 or V2   |                   |                  |               |       |
|-------------------------------------|-------------------|------------------|----------------------|-------|-----------------|-------------------|------------------|---------------|-------|
|                                     | G3vsV1<br>ABP/PBP | G3sV1<br>ABP/PBP | G3IV1/<br>G3I-Global | G3rV1 | G3IV1.1-<br>286 | G3vsV2<br>ABP/PBP | G3sV2<br>ABP/PBP | G3IV2-<br>386 | G3rV2 |
| <b>Partitions</b>                   |                   |                  |                      |       |                 |                   |                  |               |       |
| Attendant Partition                 | 1                 | 1                | 1                    | 1     | 1               | 1                 | 1                | 1             | 1     |
| Ext.Partition Group                 | 8                 | 8                | 8                    | 8     | 8               | 8                 | 8                | 8             | 8     |
| Extension Partition                 | 8                 | 8                | 8                    | 8     | 8               | 8                 | 8                | 8             | 8     |
| <b>Paging</b>                       |                   |                  |                      |       |                 |                   |                  |               |       |
| Code Calling IDs                    | 125               | 125              | 125                  | 125   | 125             | 125               | 125              | 125           | 125   |
| Loudspeaker Zones                   | 9                 | 9                | 9                    | 9     | 9               | 9                 | 9                | 9             | 9     |
| <b>Personal CO Lines (PCOL)</b>     |                   |                  |                      |       |                 |                   |                  |               |       |
| PCOL Appearances                    | 4                 | 4                | 4                    | 16    | 4               | 4                 | 4                | 4             | 16    |
| PCOL Lines (Trunk Groups)           | 15                | 15               | 40/200               | 100   | 40              | 15                | 15               | 200           | 200   |
| PCOL Trunks Per Trunk Group         | 1                 | 1                | 1                    | 1     | 1               | 1                 | 1                | 1             | 1     |
| <b>Port Circuit Pack Slots (25)</b> |                   |                  |                      |       |                 |                   |                  |               |       |
| <b>Per EPN</b>                      |                   |                  |                      |       |                 |                   |                  |               |       |
| MCC Simplex                         | NA                | NA               | 99                   | 99    | 99              | NA                | NA               | 99            | 99    |
| MCC Duplex                          | NA                | NA               | 98                   | 98    | 98              | NA                | NA               | 98            | 98    |
| SCC Simplex                         | NA                | NA               | 71                   | 71    | 71              | NA                | NA               | 71            | 71    |
| SCC Duplex                          | NA                | NA               | 70                   | 70    | 70              | NA                | NA               | 70            | 70    |
| Small Cabinet Simplex(Upgrade only) | NA                | NA               | 39                   | 39    | 39              | NA                | NA               | 39            | 39    |
| Small Cabinet Duplex(Upgrade only)  | NA                | NA               | 38                   | 38    | 38              | NA                | NA               | 38            | 38    |
| <b>Per PPN</b>                      |                   |                  |                      |       |                 |                   |                  |               |       |
| MCC Simplex                         | NA                | NA               | 89                   | 80    | 89              | NA                | NA               | 89            | 80    |
| MCC Duplex                          | NA                | NA               | 78                   | 60    | 78              | NA                | NA               | 78            | 60    |
| SCC Simplex                         | NA                | NA               | 64                   | NA    | 64              | NA                | NA               | 64            | NA    |
| SCC Duplex                          | NA                | NA               | 56                   | NA    | 56              | NA                | NA               | 56            | NA    |
| ESCC Simplex                        | NA                | 70               | NA                   | NA    | NA              | 70                | 70               | 70            | NA    |
| ESCC Duplex                         | NA                | NA               | NA                   | NA    | NA              | NA                | NA               | 68            | NA    |
| CSCC Simplex                        | 10                | NA               | NA                   | NA    | NA              | 10                | NA               | NA            | NA    |

25. Only port slots are included in this count. For example, there are 99 port slots per MCC EPN cabinet. One slot in the cabinet is already dedicated for the Tone/Clock board. Other service circuits may be required which would further reduce the number of port slots available. In G3 carriers, a 21st slot of MCC port carriers may be equipped with service boards that do not require tip and ring connections.

Table A-1. Maximum System Parameters For Hardware and Software Items (continued)

| ITEM                                       | G3 V1             |                  |                      |        | G3 V1.1 or V2   |                   |                  |               |        |
|--|-------------------|------------------|----------------------|--------|-----------------|-------------------|------------------|---------------|--------|
|  | G3vsV1<br>ABP/PBP | G3sV1<br>ABP/PBP | G3IV1/<br>G3I-Global | G3rV1  | G3IV1.1-<br>286 | G3vsV2<br>ABP/PBP | G3sV2<br>ABP/PBP | G3IV2-<br>386 | G3rV2  |
| <b>Recorded Announcements</b>              |                   |                  |                      |        |                 |                   |                  |               |        |
| Analog Queue Slots per Annc.               | 50                | 50               | 150                  | 300    | 150             | 50                | 50               | 150           | 1,000  |
| Analog Queue Slots per System              | 50                | 50               | 150                  | 300    | 150             | 50                | 50               | 150           | 1,000  |
| Calls Connected per Annc.                  |                   |                  |                      |        |                 |                   |                  |               |        |
| Integrated Annc. or Aux. Trunk             | 5                 | 5                | 5                    | 255    | 5               | 5                 | 5                | 25            | 255    |
| Analog Ports                               | 5                 | 5                | 5                    | 128    | 5               | 5                 | 5                | 25            | 128    |
| Channels per Integrated Annc. Circuit Pack | 16                | 16               | 16                   | 16     | 16              | 16                | 16               | 16            | 16     |
| Integrated Annc. Circuit Pack              | 1                 | 1                | 1                    | 1      | 1               | 1                 | 1                | 1             | 1      |
| Integrated Annc. Recording Time(Min:Sec)   |                   |                  |                      |        |                 |                   |                  |               |        |
| 16 KB recording                            | 8:32              | 8:32             | 8:32                 | 8:32   | 8:32            | 8:32              | 8:32             | 8:32          | 8:32   |
| 32KB                                       | 4:16              | 4:16             | 4:16                 | 4:16   | 4:16            | 4:16              | 4:16             | 4:16          | 4:16   |
| Integrated Queue Slots per System          | 50                | 50               | 50                   | 300    | 50              | 50                | 50               | 50            | 1,000  |
| Recorded Announcements                     | 128               | 128              | 128                  | 256    | 128             | 128               | 128              | 128           | 256    |
| <b>System Administration</b>               |                   |                  |                      |        |                 |                   |                  |               |        |
| Admin History File Entries                 | 50                | 50               | 250                  | 1,250  | 250             | 50                | 50               | 250           | 1,250  |
| Simultaneous Administration Command        | 1                 | 1                | 1                    | 5      | 1               | 1                 | 1                | 1             | 5      |
| Simultaneous Maintenance Command           | 1                 | 1                | 1                    | 3      | 1               | 1                 | 1                | 1             | 5      |
| Simultaneous SM Sessions                   | 3                 | 3                | 5                    | 8      | 5               | 3                 | 3                | 5             | 8      |
| Printer Queue Size                         | 50                | 50               | 50                   | 50     | 50              | 50                | 50               | 50            | 50     |
| <b>Speech Synthesis Circuit Packs</b>      |                   |                  |                      |        |                 |                   |                  |               |        |
| Channels per Speech Circuit Pack           | 6                 | 6                | 6                    | 6      | 6               | 6                 | 6                | 6             | 40     |
|  | 4                 | 4                | 4                    | 4      | 4               | 4                 | 4                | 4             | 4      |
| <b>Terminating Extension Groups (TEG)</b>  |                   |                  |                      |        |                 |                   |                  |               |        |
| TEGs                                       | 32                | 32               | 32                   | 32     | 32              | 32                | 32               | 32            | 32     |
| Users That May Share a TEG                 | 4                 | 4                | 4                    | 4      | 4               | 4                 | 4                | 4             | 4      |
| <b>Time Slots</b>                          |                   |                  |                      |        |                 |                   |                  |               |        |
| Simultaneous Ckt Switched Calls (26)       | 180               | 180              | 723                  | 5,302  | 723             | 180               | 180              | 723           | 5,302  |
| Total Slots (27)                           | 512               | 512              | 1536                 | 11,264 | 1536            | 512               | 512              | 1,536         | 11,264 |
| Time Slots for Voice & Data (28)           | 483               | 483              | 1449                 | 10,604 | 1449            | 483               | 483              | 1,449         | 10,604 |
| Time Slots per Port Network                | 512               | 512              | 512                  | 512    | 512             | 512               | 512              | 512           | 512    |

26. 241 Simultaneous Circuit-Switched Calls per port network, except for G3s, where the maximum is 180.

27. 512 time slots per port network.

28. 483 time slots for Voice and Data per port network. Even though an EPN is supported in G3sV2, giving a total of two port networks, G3sV2 is engineered to support only 180 Simultaneous Circuit-Switched Calls.

Table A-1. Maximum System Parameters For Hardware and Software Items (continued)

| ITEM  | G3 V1             |                  |                      |       | G3 V1.1 or V2   |                   |                  |               |       |
|---|-------------------|------------------|----------------------|-------|-----------------|-------------------|------------------|---------------|-------|
|   | G3vsV1<br>ABP/PBP | G3sV1<br>ABP/PBP | G3IV1/<br>G3I-Global | G3rV1 | G3IV1.1-<br>286 | G3vsV2<br>ABP/PBP | G3sV2<br>ABP/PBP | G3IV2-<br>386 | G3rV2 |
| <b>Tone Classifiers</b>                               |                   |                  |                      |       |                 |                   |                  |               |       |
| Call Classifier Boards                                | NA/10             | NA/10            | 10                   | 50    | 10              | NA/10             | NA/10            | 10            | 50    |
| Call Progress/Touch Tone Receivers                    | NA/80             | NA/80            | 80                   | 400   | 80              | NA/80             | NA/80            | 80            | 400   |
| <b>Tone Detector Boards</b>                           |                   |                  |                      |       |                 |                   |                  |               |       |
| General Purpose Tone Detectors                        | 20                | 40               | 40                   | 100   | 40              | 20                | 40               | 40            | 100   |
| Touch-Tone Receivers                                  | 40                | 80               | 80                   | 200   | 80              | 80                | 80               | 80            | 200   |
| Prompting TTR Queue Size                              | NA                | NA               | 80                   | 80    | 80              | NA/80             | NA/80            | 80            | 80    |
| TTR Queue Size  | 4                 | 4                | 4                    | 4     | 4               | 4                 | 4                | 4             | 4     |
| <b>Trunks</b>   |                   |                  |                      |       |                 |                   |                  |               |       |
| DS1 Circuit Packs                                     | 8                 | 8                | 30                   | 166   | 30              | 8                 | 8                | 30            | 166   |
| Queue Slots for Trunks                                | 32/64             | 32/64            | 198                  | 1,332 | 198             | 32/64             | 32/64            | 198           | 1,332 |
| PRI Interfaces via PI (29)                            | NA/4              | NA/4             | 8                    | NA    | 8               | NA/4              | NA/4             | 8             | NA    |
| PRI Interfaces via PKTINT                             | NA/4              | NA/4             | NA/8                 | 166   | NA              | NA                | NA               | NA            | 166   |
| PRI Temporary Signaling Connections<br>TSCs in System | NA/164            | NA/164           | 656                  | 4,256 | 656             | NA/164            | NA/164           | 656           | 4,256 |
| Call Associated TSCs                                  | NA/100            | NA/100           | 400                  | 4,000 | 400             | NA/100            | NA/100           | 400           | 4,000 |
| Non Call Associated TSCs                              | NA/64             | NA/64            | 256                  | 256   | 256             | NA/64             | NA/64            | 256           | 256   |
| Administered TSCs                                     | NA/32             | NA/32            | 128                  | 128   | 128             | NA/32             | NA/32            | 128           | 128   |
| Ringback Queue Slots                                  | 120               | 120              | 120                  | 1,332 | 198             | 32/64             | 32/64            | 198           | 1,332 |
| Total PRI Interfaces (30)                             | NA/4              | NA/4             | 8                    | 166   | 8               | NA/4              | NA/4             | 8             | 166   |
| Trunk Groups Hourly Measurements                      | NA                | NA               | NA                   | 75    | 25              | 25                | 25               | 25            | 75    |
| Trunk Groups in the System                            | 16/32             | 16/32            | 99                   | 666   | 99              | 16/32             | 16/32            | 99            | 666   |
| Trunk Members in a Trunk Group                        | 50/99             | 50/99            | 99                   | 255   | 99              | 50/99             | 50/99            | 99            | 255   |
| Trunks in System (incl Rem Access)(32)                | 50/100            | 50/100           | 400                  | 4,000 | 400             | 50/100            | 50/100           | 400           | 4,000 |
| With Hospitality Parameter Reduction                  | NA/NA             | NA/NA            | 50                   | 50    | 50              | NA/50             | NA/50            | 50            | 50    |
| Measured Trunks in System                             | 50/100            | 50/100           | 400                  | 2000  | 400             | 50/100            | 50/100           | 400           | 4000  |

29. Only one PI board is supported in G3vs/G3s (both MCC and SCC), and therefore a total of four physical links, used for BX.25 or PRI, are available.

In G3i, two PI boards can be supported in the MCC, and therefore a total of eight physical links (used for BX.25 or PRI) are available. Since the SCC can only support one PI board, a total of four physical links (used for BX.25 or PRI) are available in the SCC 286 and Medium configurations.

30. All digital stations can be display stations.

Table A-1. Maximum System Parameters For Hardware and Software Items (continued)

| ITEM                                 | G3 V1             |                  |                      |        | G3 V1.1 or V2   |                   |                  |               |        |
|--------------------------------------|-------------------|------------------|----------------------|--------|-----------------|-------------------|------------------|---------------|--------|
|                                      | G3vsV1<br>ABP/PBP | G3sV1<br>ABP/PBP | G3IV1/<br>G3I-Global | G3rV1  | G3IV1.1-<br>286 | G3vsV2<br>ABP/PBP | G3sV2<br>ABP/PBP | G3IV2-<br>386 | G3rV2  |
| <b>Voice Terminals</b>               |                   |                  |                      |        |                 |                   |                  |               |        |
| Associated Data Modules (e.g.,DTDMs) | 75                | 75               | 800                  | 5,000  | 800             | 75                | 75               | 800           | 7,500  |
| BRI Stations (31)                    | NA                | 50               | 1,000                | 5,000  | 1,000           | NA                | 50               | 1,000         | 7,000  |
| Digital Stations (32)                | 200               | 200              | 1,600                | 10,000 | 1,600           | 200               | 200              | 2,400         | 25,000 |
| Stations (32)                        | 200               | 200              | 1,600                | 10,000 | 1,600           | 200               | 200              | 2,400         | 25,000 |
| Station Button Capacity(K Units)(33) | 102.6             | 102.6            | 547.2                | 4120   | 410.4           | 68.4              | 68.4             | 547.2         | 5,260  |

- 31. All BRI stations can be display stations.
- 32. G3vs has the same software capacities for stations and trunks as does G3s. However, these software capacities are limited by the cabinet hardware. A typical switch would probably have 20 to 50 stations with 10 to 20 trunks. Station capacities can be reached only by administration without hardware (AWOH). This includes extensions administered without associated hardware.
- 33. In G3, "Station Button Capacity (units) replaces' Maximum Button Modules."

The following examples show how these units can be used. The assumption is that only three call appearances are assigned to the sets (except analog sets which have no call appearances).

- ▶ Analog sets (for example, 7104A): G3r, 76 units; all other releases, 62 units.
- ▶ Digital sets with 10 buttons (for example, 7403D): G3r, 124 units; all other releases, 102 units.
- ▶ Digital sets with 34 buttons, without display (for example, 7405D): G3r, 412 units; all other releases, 342 units.
- ▶ Digital sets with 34 buttons, with display (for example, 7405D): G3r, 568 units; all other releases, 472 units.
- ▶ 7406D Digital sets with display: G3r, 412 units; all other releases, 342 units.
- ▶ BRI sets with 17 buttons, with display (for example, 7506D): G3r, 304 units; all other releases, 250 units.

The station button capacity can support all stations equipped as 7406D digital sets with display. For example, a total of  $342 \times 1200 = 410.4K$  units for the G3IV1.1-286.

---

# Glossary

---

## A

### Administered Connection (AC)

The Administered Connection is a feature in DEFINITY G3V2 that allows the switch to automatically establish and maintain end-to-end connections between access endpoints (trunks) and/or data endpoints (data modules).

---

## B

### BCC

The Bearer Capability Class (BCC) identifies the type of a call, for example, voice and different types of data. Determination of BCC is based on the call originator's characteristics for non-ISDN endpoints and on the Bearer Capability and Low-Layer Compatibility Information Elements of an ISDN endpoint.

Current BCCs are:

- 0: Voice-grade data and voice
- 1: DMI Mode 1, 56-kbps data transmission
- 2: DMI Mode 2, synchronous/asynchronous data transmission up to 19.2 kbps
- 3: DMI Mode 3, 64-kbps circuit/packet data transmission
- 4: DMI Mode 0, 64-kbps synchronous data
- 5: Temporary Signaling Connection
- 6: Wideband Call, 128- to 1,984-kbps synchronous data

---

## C

### Channel

The term channel is non-specific and must be taken in context. Two definitions are presented below.

Channel may refer to an entire circuit-switched call. In this context, a channel refers to all of the time slots necessary to support a call. For example, an H0-channel uses six 64-kbps time slots as shown in the table. This definition of channel is the same whether the time slots necessary to support the call are contiguous or non-contiguous.

Channel may also refer to a DS0 on a T1 or E1 facility not specifically associated with a logical circuit switched call. In this context, a channel is analogous to a single trunk.

### Channel Negotiation

Channel negotiation is the process by which the channel offered in the Channel Identification Information Element (CIIE) in the SETUP message is "negotiated" to be another channel acceptable to the switch receiving the SETUP message and ultimately to the switch that sent the SETUP. Negotiation will only be attempted if the CIIE is encoded as *Preferred*. Channel negotiation will not be attempted for wideband calls.

### Contiguous

Contiguous refers to adjacent DS0s within one T1 or E1 facility or adjacent TDM or fiber time slots. Note that the first and last TDM bus, DS0, or fiber time slots are not considered contiguous (no wraparound). For an E1 facility with a D-channel, DS0s 15 and 17 are considered contiguous.

---

## D

### **D-channel Backup**

D-channel backup is used with Non-Facility Associated Signaling (NFAS). With D-channel backup, a primary D-channel provides signaling for an NFAS D-channel group (two or more PRI facilities). A second (redundant) D-channel, located on a separate PRI facility of the NFAS D-channel group is designated as backup for the D-channel. The failure of the primary D-channel causes an automatic transfer of call-control signaling to the backup D-channel. When this happens, the backup becomes the primary D-channel, and when the previous primary is returned to service it becomes the backup D-channel.

### **Digital Signal Level 0 (DS0)**

A single 64-kbps voice channel.

A DS0 is a single 64 kbps channel in a T1 or E1 facility and consists of eight bits in a T1 or E1 frame every 125 microseconds.

---

## E

### **E1**

A digital transmission standard that carries traffic at the rate of 2.048 Mbps.

The E1 facility is divided into 32 channels (DS0s) of 64-kbps information numbered from 0 to 31. Channel 0 is reserved for framing and synchronization information. When a D-channel is present, it occupies channel 16.

---

## F

### **Facility Associated Signaling (FAS)**

Signaling in which a D-channel carries the signaling only for those channels on the same physical interface.

### **Fixed**

Fixed is a trunk allocation term. In the fixed allocation scheme, the time slots necessary to support a wideband call are contiguous, and the first time slot is constrained to certain starting points.

### **Flexible**

Flexible is a trunk allocation term. The flexible allocation scheme allows the time slots of a wideband call to occupy non-contiguous positions within a single T1 or E1 facility.

### **Floating**

Floating is a trunk allocation term. In the floating allocation scheme, the time slots necessary to support a wideband call are contiguous, but the position of the first time slot is not fixed.

---

## G

### **Generalized Route Selection (GRS)**

An enhancement to Automatic Alternate Routing/Automatic Route Selection (AAR/ARS) that performs routing based on call attributes, such as Bearer Capability Classes (BCCs), in addition to the address and facilities restriction level (FRL), thus facilitating a Uniform Dial Plan (UDP) that is independent of the type of call being placed.

### **Glare**

The simultaneous seizure of a two-way trunk by two communications systems, resulting in a standoff.

---

## H

### **H0**

An ISDN information transfer rate for 384-kbps data defined by CCITT and ANSI standards.

### **H11**

An ISDN information transfer rate for 1,536-kbps data defined by CCITT and ANSI standards.

**H12**

An ISDN information transfer rate for 1,920-kbps data defined by CCITT and ANSI standards.

---

**I**

**ISDN-PRI Terminal Adapter**

A terminal adapter acts as interface between endpoint applications and an ISDN PRI facility. ISDN-PRI terminal adapters are currently available from other vendors and are primarily designed for video conferencing applications. Accordingly, currently available terminal adapters adapt the two pairs of video codec data (V.35) and dialing (RS-366) ports to an ISDN PRI facility.

---

**M**

GT "Multirate" Multirate refers to the new N x DS0 service (see N x DS0).

---

**N**

**N x DS0**

N x DS0, equivalently referred to as N x 64 kbps, is an emerging standard for wideband calls separate from H0, H11, and H12 ISDN channels. The emerging N x DS0 ISDN multirate circuit mode bearer service will provide circuit-switched calls with data rate multiples of 64 kbps up to 1,536 kbps on a T1 facility or up to 1,920 kbps on an E1 facility; DEFINITY N x DS0 channels will range up to 1,984 kbps using NFAS E1 interfaces.

**Narrowband**

Circuit-switched call at any data rate up to and including 64 kbps. All non-wideband DEFINITY calls are considered narrowband.

**Non-Facility Associated Signaling (NFAS)**

A method that allows multiple T1 and/or E1 facilities to share a single D-channel to form an ISDN primary rate interface (ISDN PRI). If D-

channel Backup is not used, one facility is configured with a D-channel, while the other facilities that share the D-channel are configured without D-channels. If D-channel Backup is used, two facilities are configured to have D-channels (one D-channel on each facility), while the other facilities that share the D-channels are configured without D-channels.

On every facility, all DS0s that are not D-channels are available as B-channels. Therefore, a T1 facility without a D-channel has 24 B-channels, and an E1 facility without a D-channel has 31 B-channels.

---

**P**

**PRI-Endpoint (PE)**

The wideband switching capability introduces PRI-endpoints on DEFINITY line-side interfaces. A PRI-endpoint consists of one or more contiguous B-channels on a line-side T1 or E1 ISDN PRI facility and has an extension number. Endpoint applications have call control capabilities over PRI-endpoints.

---

**Q**

"Quadrant" A quadrant is a group of six contiguous DS0s in fixed locations on an ISDN PRI facility. Note that this term comes from T1 terminology (one-fourth of a T1), but there are five quadrants on an E1 ISDN PRI facility (30B + D). Table G-2 lists the quadrants and DS0s for T1 and E1 ISDN PRI facilities with and without NFAS.<sup>1</sup>

A quadrant is considered available or idle when all six contiguous DS0s are idle. Otherwise, the quadrant is considered contaminated or partially contaminated. This is a dynamic condition;

---

1. E1 ISDN PRI with NFAS is non-standard and only supported in a DEFINITY private networking environment with country protocol 1 (which is the U.S. protocol). The DS0s for each quadrant on an E1 facility with NFAS, therefore, are also non-standard.

quadrants become idle and contaminated as calls are placed and dropped. Note that a T1 facility containing the primary or backup D-channel (23B + D) has a maximum of three idle quadrants. The fourth quadrant (DS0s 19-24) never has six contiguous idle DS0s because one is always allocated to the D-channel. On an E1 facility, channel 0 is reserved for framing and synchronization, and channel 16 contains the D-channel when present, but five quadrants are potentially available as shown in Table G-2.

---

## T

### T1

A digital transmission standard that in North America carries traffic at the digital signal level-1 (DS1) rate of 1.544 Mbps.

T1 facilities are also used in Japan and some Middle-Eastern countries.

The T1 facility is divided into 24 channels (DS0s) of 64-kbps information numbered from 1 to 24. These 24 channels, with an overall digital rate of 1.536 Mbps, and an 8-kbps framing and synchronization channel make up the 1.544-Mbps transmission. When a D-channel is present, it occupies channel 24.

### Time Slot

A time slot refers to 64 kbps of digital information structured as eight bits every 125 microseconds. Taken in context, a time slot will refer to either a DS0 on a T1 or E1 facility or a 64-kbps unit on the TDM bus or fiber connection between DEFINITY port networks.

### Time Slot Sequence Integrity

Time slot sequence integrity means that the "N" octets of a wideband call that are transmitted in one T1 or E1 frame arrive at the output in the same order that they were introduced.

### Trunk Allocation

The manner in which trunks are selected to form wideband channels.

---

## W

### Wideband

A circuit-switched call on a single T1 or E1 facility with bandwidth between 128 and 1,536 (T1) or 1,984 (E1) kbps in multiples of 64 kbps. H0, H11, H12, and N x DS0 calls are all wideband.

### Wideband Access Endpoint

The wideband switching capability extends access endpoints to include wideband access endpoints. A wideband access endpoint consists of one or more contiguous DS0s on a line-side T1 or E1 facility and has an extension number. The administered connections feature provides call control for calls originating from wideband access endpoints.

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