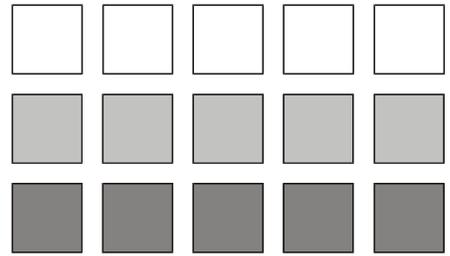


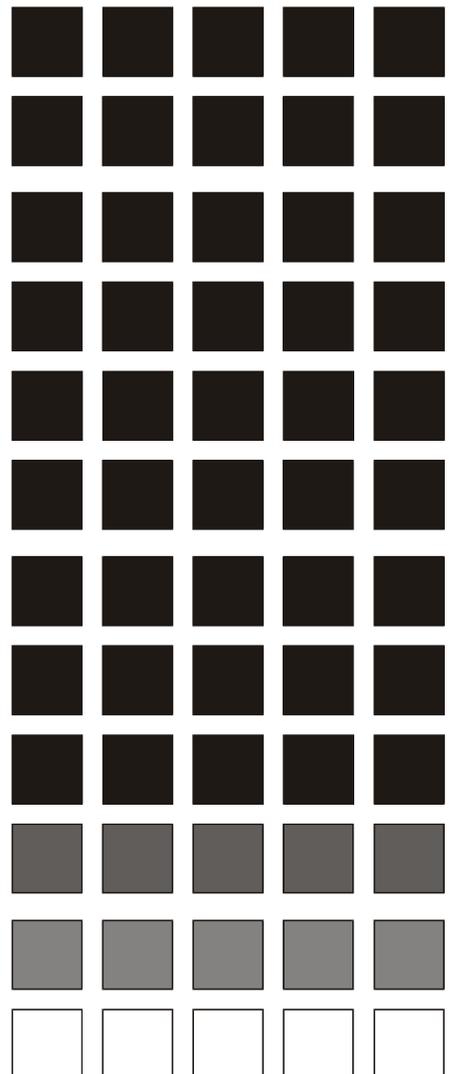
Panasonic®

DBS Digital Business System



Section 540

T1 Networking Reference Manual



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Chapter 1. Introduction to DBS T1 Networking

This chapter provides an overview of DBS T1 Networking.

The following table summarizes the topics contained in this chapter.

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Overview

Description of T1 Networking

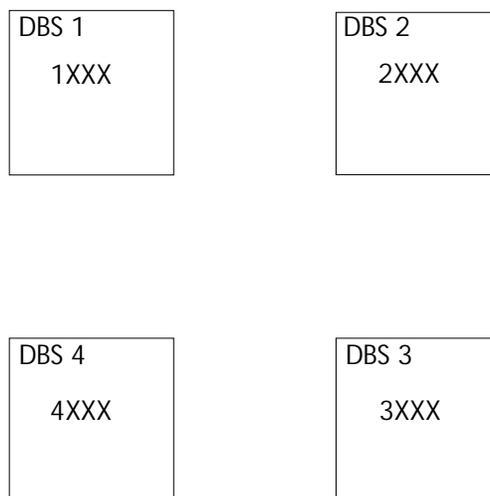
Two to four DBS systems may be interconnected using T1 connections to create a DBS telephone network. The DBS systems may be located in the same building, separate buildings, across the city or across the country.

DBS T1 Networking provides the following features:

- Network Extension to Extension Calling
- Call forwarding to Network Extensions
- Paging to Network DBS
- Network Route Selection
- Remote DBS CO Access
- SMDR Network Support
- Common Network Attendant Calling (calls that *revert* to the attendant will go to the local attendant)

The T1 Network consists of two to four DBS systems that use 4-digit numbering. The first digit (1 to 4) specifies the network DBS location (or node) to receive the call. The remaining digits follow the conventional three-digit DBS numbering plan. For instance, dialing **2105** selects extension **105** on Network DBS node **2**.

Figure 1-1. DBS Network Numbering Plan



Pre-Installation Requirements

Use the following guidelines to prepare your site for T1 installation.

Ordering T1 Services

The following guidelines describe T1 options that must be ordered from your central office or interexchange carrier (if used). These guidelines are designed to cover almost all T1 installations. However, special requirements should be discussed with your provider.

Table 1-1. Guidelines for ordering T1 services

Item to be Ordered	Options
Line Type	E&M with wink start for both incoming and outgoing calls.
Trunk Signaling	Wink start
Signaling Code	DS-1
Line Code	AMI
Framing Format	D4 (Superframe) or ESF (Extended Superframe). D4 is used in most cases.
Signaling Method	In-band
Tones	Coordinate with T1 Service Provider. Note: If the CO does not provide dial tone, program the DBS to generate its own dial tone.

What You Must Purchase

Each DBS system in the network must have the appropriate T1 equipment as described in the DBS T1 Reference Manual and the DBS Installation Manual. Please refer to these manuals for a description of what must be purchased.

Note: The DBS T1 Trunk Card (VB-43561) must contain COP Version 2.0 or later.

System Requirements

- A CPC-EX is required in every networked DBS system.
- Each DBS must contain one or two T1 interfaces with at least a portion of the trunks dedicated to network traffic.
- Some DBS configurations limit the number of T1 interfaces that may be used. See Section 500 - *T1 Supplement* for more information.

Maximums

- Depending on the DBS cabinet configuration, each DBS in the network may have up to 48 T1 trunks dedicated to T1 Networking.

Note: Any T1 trunks not dedicated to T1 networking may be used for outside CO trunks. However each trunk used in the network diminishes the number of T1 trunks available for outside CO connections. Trunk ports not used by T1 (either with network or non-network) are available for CO trunks.

- Up to four DBS systems may be included in the DBS Network.

Chapter 2. System Planning

This section provides system planning guidelines and procedures required for a DBS T1 Network and provides an example DBS Network Setup. Once this planning is performed, see Chapter 3 - “*Installation and Quick Start Programming*” and Chapter 4 - “*Programming Reference*” for programming instructions.

This chapter covers the following topics.

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System Planning Forms and Guidelines

Note: This manual assumes that the T1 card has been successfully installed in the DBS Cabinets. See Section 500 - *T1 Reference Manual* for T1 Installation Instructions.

About the Example

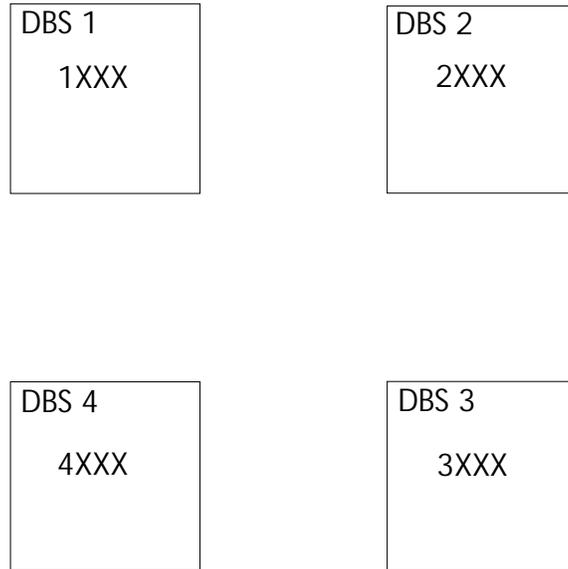
Most forms in the following pages are followed by an example. For these example forms, it is determined there are four locations across the country to be networked together as follows:

- The sites are named after their locations -- Northwest (area code 202), Northeast (area code 303), Southeast (area code 404) and Southwest (area code 505)
- Each site contains dual-cabinet DBS 96 systems and contain two T1 interfaces
- The calling traffic between DBS systems is balanced (an even amount of traffic is expected between systems). The maximum number of simultaneous calls between any two DBS systems is expected to be 8 calls or less.
- Every station is allowed to page anywhere on the network
- A network attendant is located at DBS 1
- Node Route Selection (routing calls to another node for outbound processing) is to be used for calls in a remote DBS' area code
- TRS is to be used to restrict long distance calls originating from a distant DBS for some extensions.

Basic Site Layout and Numbering Plan

Determine the DBS systems to be included in the DBS network and assign a DBS Network Number to each DBS. Use Figure 2-1 to make a basic diagram of the DBS network. Cross out any DBS not present in the network.

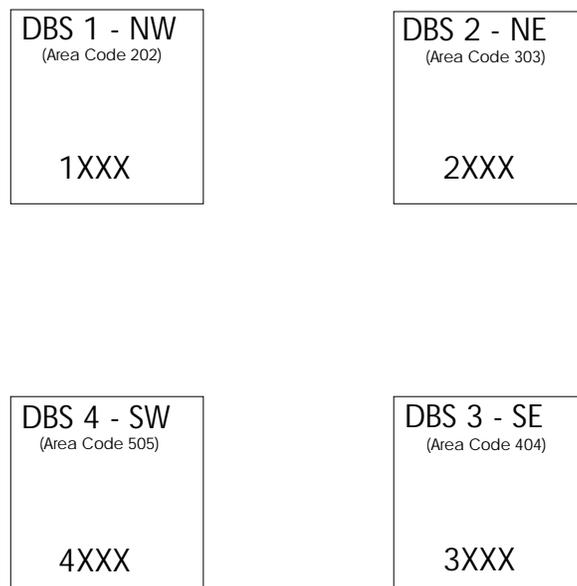
Figure 2-1. Network Site Layout and Numbering



Example

Using the basic information provided, the layout and numbering for the network are determined as shown in Figure 2-2.

Figure 2-2. Example Network Site Layout and Numbering

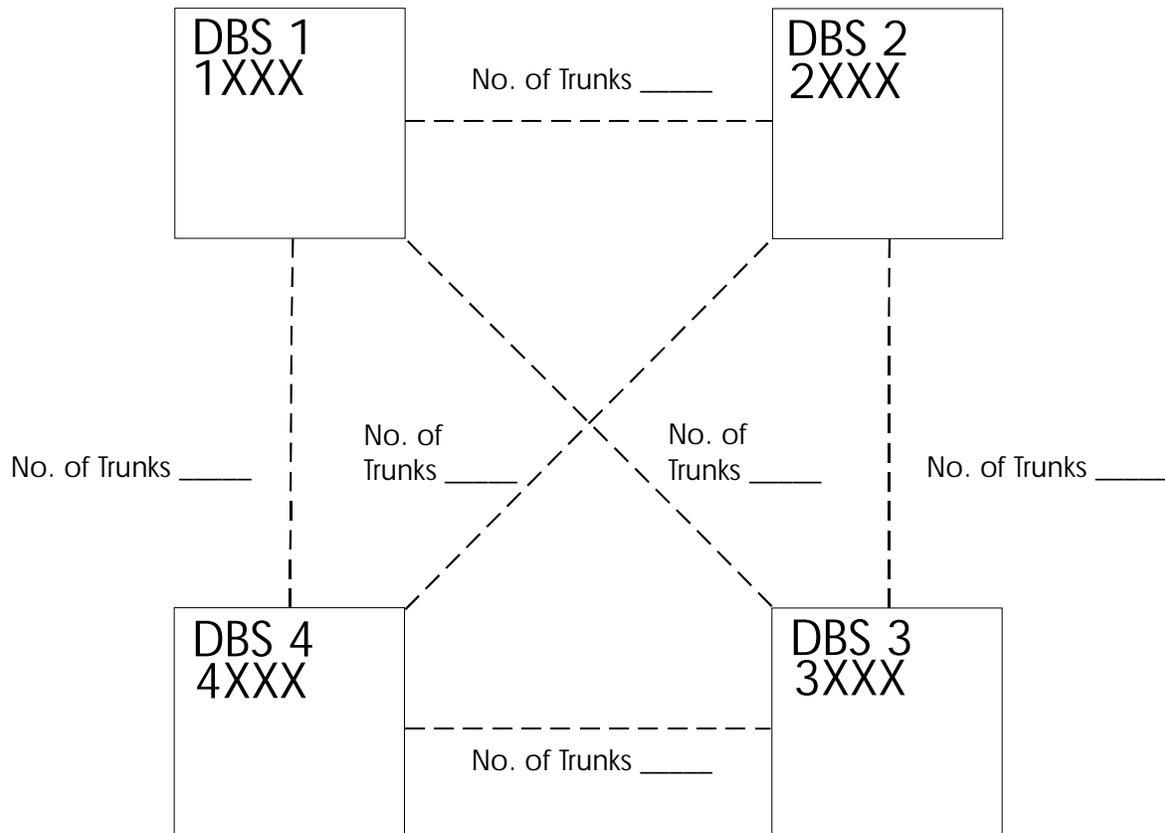


Network Trunk Configuration and Trunk Routing

Determine the network call traffic between the DBS nodes and the number of trunks required to handle this traffic. Note that calls can be relayed through another network DBS to reduce cost or simplify connections.

Diagram the trunking on the following diagram by **filling in the dashed lines** for actual trunk connections with a solid line.

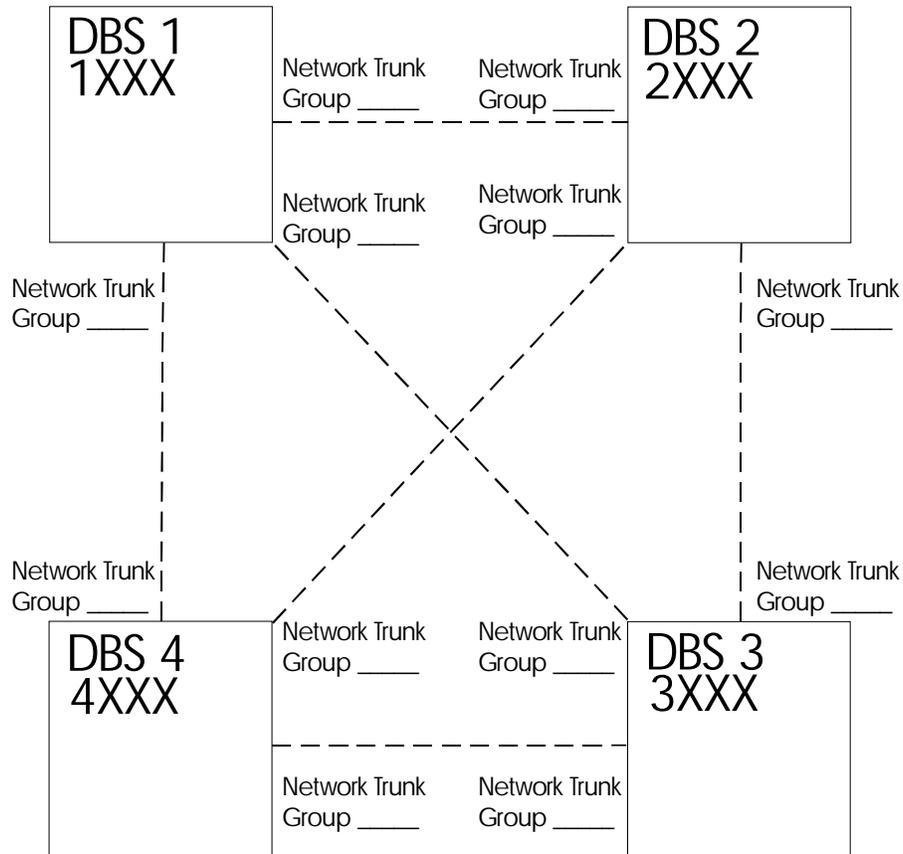
Figure 2-3. Network Trunking Configuration



Each set of network trunks connecting to another DBS must be placed into a Network Trunk Group that will be used for network call routing purposes. Up

to 3 Network Trunk Groups are possible for each DBS. Label the Network Trunk Groups **1**, **2**, or **3** in Figure 2-4.

Figure 2-4. Network Trunk Group Configuration



Allocate the Network Trunks to Network Trunk Groups in Table 2-1 through Table 2-4.

Table 2-1. DBS 1 Network Trunk Assignments

Network Trunk Group 1 Trunks	Network Trunk Group 2 Trunks	Network Trunk Group 3 Trunks

Table 2-2. DBS 2 Network Trunk Assignments

Network Trunk Group 1 Trunks	Network Trunk Group 2 Trunks	Network Trunk Group 3 Trunks

Table 2-3. DBS 3 Network Trunk Assignments

Network Trunk Group 1 Trunks	Network Trunk Group 2 Trunks	Network Trunk Group 3 Trunks

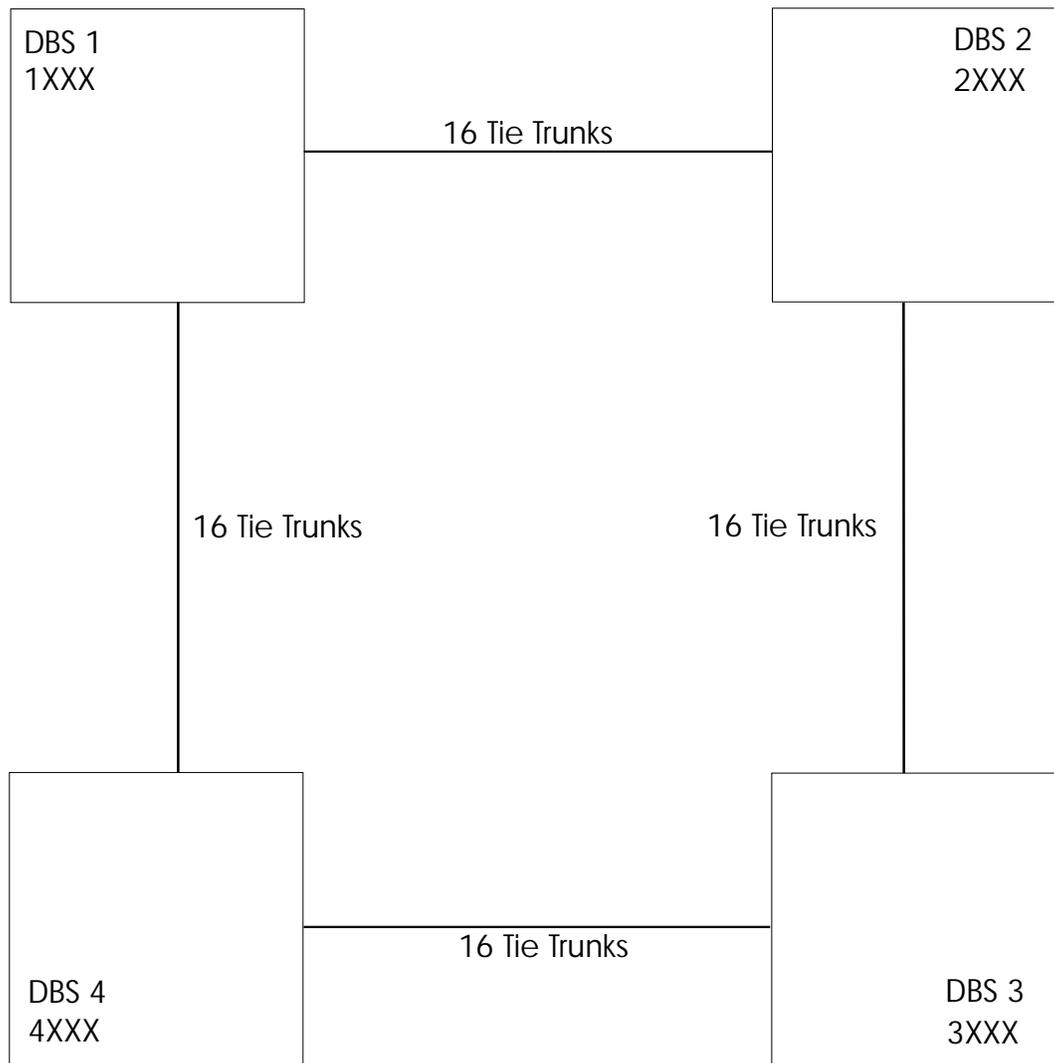
Table 2-4. DBS 4 Network Trunk Assignments

Network Trunk Group 1 Trunks	Network Trunk Group 2 Trunks	Network Trunk Group 3 Trunks

Example

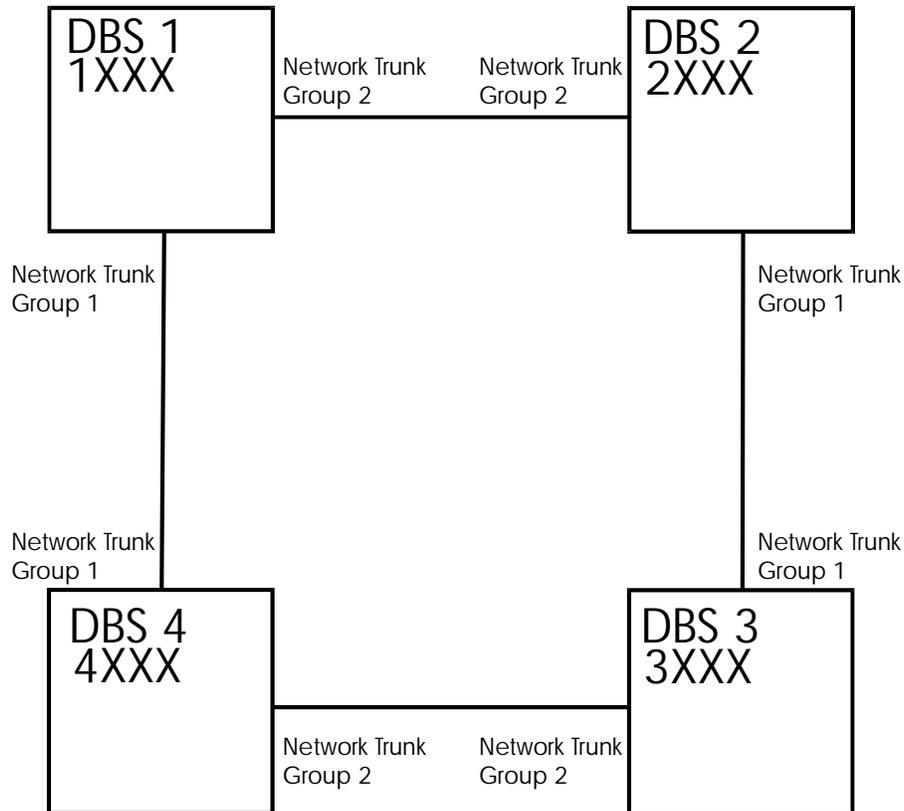
In this example call traffic is not expected to exceed 8 simultaneous calls. Eight trunks for calls between any two DBS systems should be adequate. However, under the T1 configuration being considered, a call can be relayed by an intermediary DBS. In this case, a call will pass through one DBS to get to another. Therefore a maximum of 16 network trunks between any two systems should be enough. All remaining T1 trunks may be split off to handle CO calls. Figure 2-5 illustrates the determined network trunk configuration.

Figure 2-5. Example Networking Trunking Configuration



The actual trunk numbers used and the Network Trunk Group Numbers must be determined for each DBS. In this example, each DBS has two sets of trunks for network calls. These paths are assigned a Network Trunk Group number (either Network Trunk Group 1 or Network Trunk Group 2) as shown in Figure 2-6 below:

Figure 2-6. Example Network Trunk Group Configuration



Each Network Trunk Group contains 16 trunks. The example Network Trunks to Network Trunk Groups configurations are listed in Table 2-5 through Table 2-8.

Table 2-5. Example DBS 1 Network Trunk Assignments

Network Trunk Group 1 Trunks	Network Trunk Group 2 Trunks	Network Trunk Group 3 Trunks
17-32	49-64	N/A

Table 2-6. Example DBS 2 Network Trunk Assignments

Network Trunk Group 1 Trunks	Network Trunk Group 2 Trunks	Network Trunk Group 3 Trunks
17-32	49-64	N/A

Table 2-7. Example DBS 3 Network Trunk Assignments

Network Trunk Group 1 Trunks	Network Trunk Group 2 Trunks	Network Trunk Group 3 Trunks
17-32	49-64	N/A

Table 2-8. Example DBS 4 Network Trunk Assignments

Network Trunk Group 1 Trunks	Network Trunk Group 2 Trunks	Network Trunk Group 3 Trunks
17-32	49-64	N/A

Network Trunk Group Selection

Each DBS system determines how to route a network call by selecting a Network Trunk Group based upon the leading digit dialed. When a network call is dialed, the system will try to route the call via an available trunk in the Network Trunk Group with first priority. If no trunk in this Network Trunk Group is available, the DBS will then try to route the call via a trunk in the group with second priority then third priority. For each DBS, assign the network trunk routing for each node number dialed using Table 2-9 through Table 2-12:

Table 2-9. Network Trunk Group Selection for DBS 1

Network Node (Leading Digit Dialed)	1st Priority Network Trunk Group	2nd Priority Network Trunk Group	3rd Priority Network Trunk Group
2			
3			
4			

Table 2-10. Network Trunk Group Selection for DBS 2

Network Node (Leading Digit Dialed)	1st Priority Network Trunk Group	2nd Priority Network Trunk Group	3rd Priority Network Trunk Group
1			
3			
4			

Table 2-11. Network Trunk Group Selection for DBS 3

Network Node (Leading Digit Dialed)	1st Priority Network Trunk Group	2nd Priority Network Trunk Group	3rd Priority Network Trunk Group
1			
2			
4			

Table 2-12. Network Trunk Group Selection for DBS 4

Network Node (Leading Digit Dialed)	1st Priority Network Trunk Group	2nd Priority Network Trunk Group	3rd Priority Network Trunk Group
1			
2			
3			

Example

From Figure 2-6 we determine the best choices for routing network calls to the other DBS nodes. These routes are listed in Table 2-13 through Table 2-16.

Table 2-13. Example Network Trunk Group Selection for DBS 1

Network Node (Leading Digit Dialed)	1st Priority Network Trunk Group	2nd Priority Network Trunk Group	3rd Priority Network Trunk Group
2	2	1	N/A
3	2	1	N/A
4	1	2	N/A

Table 2-14. Example Network Trunk Group Selection for DBS 2

Network Node (Leading Digit Dialed)	1st Priority Network Trunk Group	2nd Priority Network Trunk Group	3rd Priority Network Trunk Group
1	2	1	N/A
3	1	2	N/A
4	1	2	N/A

Table 2-15. Example Network Trunk Group Selection for DBS 3

Network Node (Leading Digit Dialed)	1st Priority Network Trunk Group	2nd Priority Network Trunk Group	3rd Priority Network Trunk Group
1	2	1	N/A
2	1	2	N/A
4	2	1	N/A

Table 2-16. Example Network Trunk Group Selection for DBS 4

Network Node (Leading Digit Dialed)	1st Priority Network Trunk Group	2nd Priority Network Trunk Group	3rd Priority Network Trunk Group
1	1	2	N/A
2	1	2	N/A
3	2	1	N/A

Network Page Group Operation

DBS Networking allows paging across the network. An extension may originate a page on a distant networked DBS by dialing the DBS node number (1-4) followed by the Paging Access code. For example, to page DBS node 3 Paging Group 01, dial **3#01**.

A Network Paging Class of Service Parameter has been added to enable or disable network paging. This Class of Service (COS) is then checked when a network page is dialed to allow or deny the extension paging access.

The network DBS that receives a page request may also choose to allow or deny a network page. A Class of Service may be assigned to each incoming Network Trunk Group. If a page request is received on a Network Trunk Group, its Class of Service is checked to determine if the page is to be allowed or denied.

Assign network paging restrictions (enable or disable) to each Class of Service.

Table 2-17. DBS 1 Network Paging Class of Service Assignments

Class of Service	Enable Network Paging?
0	Yes (predefined, cannot be changed)
1	Yes ___ or No ___
2	Yes ___ or No ___
3	Yes ___ or No ___
4	Yes ___ or No ___
5	Yes ___ or No ___
6	Yes ___ or No ___
7	Yes ___ or No ___
8	Yes ___ or No ___

Table 2-18. DBS 2 Network Paging Class of Service Assignments

Class of Service	Enable Network Paging?
0	Yes (predefined, cannot be changed)
1	Yes ___ or No ___
2	Yes ___ or No ___
3	Yes ___ or No ___
4	Yes ___ or No ___
5	Yes ___ or No ___
6	Yes ___ or No ___
7	Yes ___ or No ___
8	Yes ___ or No ___

Table 2-19. DBS 3 Network Paging Class of Service Assignments

Class of Service	Enable Network Paging?
0	Yes (predefined, cannot be changed)
1	Yes ___ or No ___
2	Yes ___ or No ___
3	Yes ___ or No ___
4	Yes ___ or No ___
5	Yes ___ or No ___
6	Yes ___ or No ___
7	Yes ___ or No ___
8	Yes ___ or No ___

Table 2-20. DBS 4 Network Paging Class of Service Assignments

Class of Service	Enable Network Paging
0	Yes (predefined, cannot be changed)
1	Yes ___ or No ___
2	Yes ___ or No ___
3	Yes ___ or No ___
4	Yes ___ or No ___
5	Yes ___ or No ___
6	Yes ___ or No ___
7	Yes ___ or No ___
8	Yes ___ or No ___

In order for an extension to perform network paging, it must be assigned a Class of Service that allows network paging.

Assign all extensions in the network an appropriate class of service to allow or deny network paging. The receiving DBS may allow or deny network pages by assigning a Class of Service to the incoming Network Trunk Group. List the Network Trunk Group COS assignments in Table 2-21 through Table 2-24 below.

Table 2-21. DBS 1 Network Trunk Group Paging Class of Service Assignments

Incoming Network Trunk Group	Network Paging COS (0-8)
1	
2	
3	

Table 2-22. DBS 2 Network Trunk Group Paging Class of Service Assignments

Incoming Network Trunk Group	Network Paging COS (0-8)
1	
2	
3	

Table 2-23. DBS 3 Network Trunk Group Paging Class of Service Assignments

Incoming Network Trunk Group	Network Paging COS (0-8)
1	
2	
3	

Table 2-24. DBS 4 Network Trunk Group Paging Class of Service Assignments

Incoming Network Trunk Group	Network Paging COS (0-8)
1	
2	
3	

Note: Remember to assign the extensions at the receiving DBS node to an appropriate paging group.

Example

In our example, any extension may originate a page to any node. We therefore allow network paging on every COS.

Table 2-25. DBS 1 Network Paging Class of Service Assignments

Class of Service	Enable Network Paging?
0	Yes (predefined, cannot be changed)
1	Yes <input checked="" type="checkbox"/> or No <input type="checkbox"/>
2	Yes <input checked="" type="checkbox"/> or No <input type="checkbox"/>
3	Yes <input checked="" type="checkbox"/> or No <input type="checkbox"/>
4	Yes <input checked="" type="checkbox"/> or No <input type="checkbox"/>
5	Yes <input checked="" type="checkbox"/> or No <input type="checkbox"/>
6	Yes <input checked="" type="checkbox"/> or No <input type="checkbox"/>
7	Yes <input checked="" type="checkbox"/> or No <input type="checkbox"/>
8	Yes <input checked="" type="checkbox"/> or No <input type="checkbox"/>

Table 2-26. DBS 2 Network Paging Class of Service Assignments

Class of Service	Enable Network Paging?
0	Yes (predefined, cannot be changed)
1	Yes <u>X</u> or No ___
2	Yes <u>X</u> or No ___
3	Yes <u>X</u> or No ___
4	Yes <u>X</u> or No ___
5	Yes <u>X</u> or No ___
6	Yes <u>X</u> or No ___
7	Yes <u>X</u> or No ___
8	Yes <u>X</u> or No ___

Table 2-27. DBS 3 Network Paging Class of Service Assignments

Class of Service	Enable Network Paging?
0	Yes (predefined, cannot be changed)
1	Yes <u>X</u> or No ___
2	Yes <u>X</u> or No ___
3	Yes <u>X</u> or No ___
4	Yes <u>X</u> or No ___
5	Yes <u>X</u> or No ___
6	Yes <u>X</u> or No ___
7	Yes <u>X</u> or No ___
8	Yes <u>X</u> or No ___

Table 2-28. DBS 4 Network Paging Class of Service Assignments

Class of Service	Enable Network Paging
0	Yes (predefined, cannot be changed)
1	Yes <u>X</u> or No ___
2	Yes <u>X</u> or No ___
3	Yes <u>X</u> or No ___
4	Yes <u>X</u> or No ___
5	Yes <u>X</u> or No ___
6	Yes <u>X</u> or No ___
7	Yes <u>X</u> or No ___
8	Yes <u>X</u> or No ___

In order for an extension to perform network paging, it must be assigned a Class of Service that allows network paging. In our example, we are assigning all extensions to COS 1 that allows network paging.

The receiving DBS may allow or deny network pages by assigning a Class of Service to the incoming Network Trunk Group. In our example, all network trunk groups are assigned to COS 1 to allow network paging as shown in Table 2-29 through Table 2-32 below.

Table 2-29. Example DBS 1 Network Trunk Group Paging Class of Service Assignments

Incoming Network Trunk Group	Network Paging COS (0-8)
1	1
2	1
3	1

Table 2-30. Example DBS 2 Network Trunk Group Paging Class of Service Assignments

Incoming Network Trunk Group	Network Paging COS (0-8)
1	1
2	1
3	1

Table 2-31. Example DBS 3 Network Trunk Group Paging Class of Service Assignments

Incoming Network Trunk Group	Network Paging COS (0-8)
1	1
2	1
3	1

Table 2-32. Example DBS 4 Network Trunk Group Paging Class of Service Assignments

Incoming Network Trunk Group	Network Paging COS (0-8)
1	1
2	1
3	1

All extensions in the example DBS are assigned to paging groups.

Network Attendant Calling

DBS networking allows for calling a network attendant. This attendant may be any DBS attendant in the network. If a user dials 0, the call is routed to this system attendant.

Note: Calls that revert to the attendant will revert to the local attendant, not the network attendant.

Table 2-33. Network Attendant Calling

Dial "0" Calls Originating From User on	Calls Attendant at				
	Same DBS	DBS 1	DBS 2	DBS 3	DBS 4
DBS 1					
DBS 2					
DBS 3					
DBS 4					

Example

In our example, a network attendant is located at DBS 1. If a user dials 0 at any DBS, the call is routed to the attendant on DBS 1

Table 2-34. Example Network Attendant Calling

Dial "0" Calls Originating From User on	Calls Attendant at				
	Same DBS	DBS 1	DBS 2	DBS 3	DBS 4
DBS 1	X				
DBS 2		X			
DBS 3		X			
DBS 4		X			

Node Route Selection (NRS)

Outside calls made on a DBS may be routed through another DBS before outdialing to the public network. This is called Node Route Selection. Typically, this is used to reduce long distance charges by routing calls based on the area code(s) where the remote DBS is located.

Each DBS NRS table contains up to 50 NRS entries. Each entry contains the dialed number to match (up to 6 digits), the minimum number of digits to be dialed, and which network DBS (1-4) should receive the call. List any dialed numbers to be included in NRS in Table 2-35 through Table 2-38.

If more than one NRS match is possible, then NRS will process the call using the NRS entry with the most complete match possible. For instance if one

NRS entry is 1201 and another is 12013, then if 12013333333 is dialed, then the 12013 NRS entry is used. If 12014444444 is dialed, then the 1201 NRS entry is used.

Note: If a call is routed to a remote DBS, LCR processing at the remote DBS may need to delete digits. For instance, if 1201XXXXXXX is routed by NRS to a DBS in area code 201, the 1201 will need to be deleted by LCR when dialed out by the remote DBS. (For information on LCR programming, see the DBS Section 400 - *Programming*.)

Table 2-35. NRS for DBS 1

Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call	Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call
1				26			
2				27			
3				28			
4				29			
5				30			
6				31			
7				32			
8				33			
9				34			
10				35			
11				36			
12				37			
13				38			
14				39			
15				40			
16				41			
17				42			
18				43			
19				44			
20				45			
21				46			
22				47			
23				48			
24				49			
25				50			

Table 2-36. NRS for DBS 2

Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call	Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call
1				26			
2				27			
3				28			
4				29			
5				30			
6				31			
7				32			
8				33			
9				34			
10				35			
11				36			
12				37			
13				38			
14				39			
15				40			
16				41			
17				42			
18				43			
19				44			
20				45			
21				46			
22				47			
23				48			
24				49			
25				50			

Table 2-37. NRS for DBS 3

Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call	Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call
1				26			
2				27			
3				28			
4				29			
5				30			
6				31			
7				32			
8				33			
9				34			
10				35			
11				36			
12				37			
13				38			
14				39			
15				40			
16				41			
17				42			
18				43			
19				44			
20				45			
21				46			
22				47			
23				48			
24				49			
25				50			

Table 2-38. NRS for DBS 4

Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call	Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call
1				26			
2				27			
3				28			
4				29			
5				30			
6				31			
7				32			
8				33			
9				34			
10				35			
11				36			
12				37			
13				38			
14				39			
15				40			
16				41			
17				42			
18				43			
19				44			
20				45			
21				46			
22				47			
23				48			
24				49			
25				50			

Example

In our example we want to use NRS to route calls to a remote Network DBS node when the node is located in the area code dialed. From the area codes listed in Figure 2-2 we can determine the NRS routing and list them in NRS Table 2-39 through Table 2-42.

Table 2-39. Example NRS for DBS 1

Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call	Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call
1	1303	11	2	26			
2	1404	11	3	27			
3	1505	11	4	28			
4				29			
5				30			
6				31			
7				32			
8				33			
9				34			
10				35			
11				36			
12				37			
13				38			
14				39			
15				40			
16				41			
17				42			
18				43			
19				44			
20				45			
21				46			
22				47			
23				48			
24				49			
25				50			

Table 2-40. Example NRS for DBS 2

Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call	Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call
1	1202	11	1	26			
2	1404	11	3	27			
3	1505	11	4	28			
4				29			
5				30			
6				31			
7				32			
8				33			
9				34			
10				35			
11				36			
12				37			
13				38			
14				39			
15				40			
16				41			
17				42			
18				43			
19				44			
20				45			
21				46			
22				47			
23				48			
24				49			
25				50			

Table 2-41. Example NRS for DBS 3

Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call	Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call
1	1202	11	1	26			
2	1303	11	2	27			
3	1505	11	4	28			
4				29			
5				30			
6				31			
7				32			
8				33			
9				34			
10				35			
11				36			
12				37			
13				38			
14				39			
15				40			
16				41			
17				42			
18				43			
19				44			
20				45			
21				46			
22				47			
23				48			
24				49			
25				50			

Table 2-42. Example NRS for DBS 4

Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call	Item #	Dialed Number (Up to 6 digits)	Min. # of Digits	Network Node to Outdial the Call
1	1202	11	1	26			
2	1303	11	2	27			
3	1404	11	3	28			
4				29			
5				30			
6				31			
7				32			
8				33			
9				34			
10				35			
11				36			
12				37			
13				38			
14				39			
15				40			
16				41			
17				42			
18				43			
19				44			
20				45			
21				46			
22				47			
23				48			
24				49			
25				50			

Example

In our example, extensions 1100-1105, 2100-2105, 3100-3105 and 4100-4105 can make unrestricted day network calls and are therefore assigned a TRS 7. Extensions 1106 and above, 2106 and above, 3106 and above, and 4106 and above are limited to making local calls via a remote network node. These extensions are assigned to Day TRS type 3. Only local calls via network nodes are allowed at night.

Table 2-51 through Table 2-54 lists our example TRS Restrictions for Extensions Calls to *Outgoing* Network Trunk Groups.

Table 2-51. Example DBS 1 Extension to Outgoing Network Trunk Group TRS Assignments

Ext. No.	Network Trunk Group # (1-3)	Day TRS Type (0-7)	Night TRS Type (0-7)
1100	1	7	3
1100	2	7	3
1101	1	7	3
1101	2	7	3
1102	1	7	3
1102	2	7	3
1103	1	7	3
1103	2	7	3
1104	1	7	3
1104	2	7	3
1105	1	7	3
1105	2	7	3
1106	1	3	3
1106	2	3	3
1107	1	3	3
1107	2	3	3
1108	1	3	3
1108	2	3	3
1109	1	3	3
1109	2	3	3
1110	1	3	3
1110	2	3	3
1111	1	3	3
1111	1	3	3

Table 2-52. Example DBS 2 Extension to Outgoing Network Trunk Group TRS Assignments

Ext. No.	Network Trunk Group # (1-3)	Day TRS Type (0-7)	Night TRS Type (0-7)
2100	1	7	3
2100	2	7	3
2101	1	7	3
2101	2	7	3
2102	1	7	3
2102	2	7	3
2103	1	7	3
2103	2	7	3
2104	1	7	3
2104	2	7	3
2105	1	7	3
2105	2	7	3
2106	1	3	3
2106	2	3	3
2107	1	3	3
2107	2	3	3
2108	1	3	3
2108	2	3	3
2109	1	3	3
2109	2	3	3
2110	1	3	3
2110	2	3	3
2111	1	3	3
2111	2	3	3

Table 2-53. Example DBS 3 Extension to Outgoing Network Trunk Group TRS Assignments

Ext. No.	Network Trunk Group # (1-3)	Day TRS Type (0-7)	Night TRS Type (0-7)
3100	1	7	3
3100	2	7	3
3101	1	7	3
3101	2	7	3
3102	1	7	3
3102	2	7	3
3103	1	7	3
3103	2	7	3
3104	1	7	3
3104	2	7	3
3105	1	7	3
3105	2	7	3
3106	1	3	3
3106	2	3	3
3107	1	3	3
3107	2	3	3
3108	1	3	3
3108	2	3	3
3109	1	3	3
3109	2	3	3
3110	1	3	3
3110	2	3	3
3111	1	3	3
3111	2	3	3

Table 2-54. Example DBS 4 Extension to Outgoing Network Trunk Group TRS Assignments

Ext. No.	Network Trunk Group # (1-3)	Day TRS Type (0-7)	Night TRS Type (0-7)
4100	1	7	3
4100	2	7	3
4101	1	7	3
4101	2	7	3
4102	1	7	3
4102	2	7	3
4103	1	7	3
4103	2	7	3
4104	1	7	3
4104	2	7	3
4105	1	7	3
4105	2	7	3
4106	1	3	3
4106	2	3	3
4107	1	3	3
4107	2	3	3
4108	1	3	3
4108	2	3	3
4109	1	3	3
4109	2	3	3
4110	1	3	3
4110	2	3	3
4111	1	3	3
4111	2	3	3

Example

Calls in on DBS 1 CO 1-4 are to be forwarded to extension 2100 when in night mode.

COs 1-4 night ringing assignments are set to ring immediately at virtual port 159. Port 159 is then set to forward to 2100.

Table 2-67. Example CO to Virtual Port Ringing Assignments

Incoming CO Trunk	Trunk Ringing Assignments for Virtual Ports (159-162, leave blank if no forwarding)					
	Day	Day Delayed	Night	Night Delayed	Night 2	Night 2 Delayed
1			159			
2			159			
3			159			
4			159			

Table 2-68. Example Network Extension to Ring from Virtual Port

Virtual Port	Extension to Receive Forwarded Calls
159	2100
160	
161	
162	

SMDR Settings

Determine the call types to be included in the SMDR data. The three choices are **Outgoing Only**, **Incoming and Outgoing**, or **Incoming, Outgoing, and Network**.

Table 2-69. Call Types included in SMDR

DBS 1	DBS 2	DBS 3	DBS 4

In our example, all Incoming, Outgoing and Network Calls are recorded.

Table 2-70. Example Call Types included in SMDR

DBS 1	DBS 2	DBS 3	DBS 4
Incoming, Outgoing and Network Calls	Incoming, Outgoing and Network Calls	Incoming, Outgoing and Network Calls	Incoming, Outgoing and Network Calls

Chapter 3. Quick-Start Programming

The T1 Interface used with T1 Networking includes many programming options, which allow you to customize how your T1 is used.

In most cases, however, you only need to set a few of the programs to get your T1 Network online. This chapter summarizes the programs that are essential to a T1 Network installation.

The following table shows the topics that are described in this chapter. For detailed descriptions of all the T1 programs, see Chapter 4, "Programming."

Topic	Page
Before You Begin	63
Hardware Setup	63
Programming Initial T1 Network Options	65

Before You Begin

Before you begin programming, you should be familiar with resetting the DBS and performing the “New Function Reset” command. The following paragraphs explain when these two procedures are used.

The New Function Reset command. If you are installing T1 while you’re upgrading to a new DBS release, perform the “New Function Reset” before you begin T1 programming.

You must perform the reset command if you’re upgrading to a completely new release, but not if you’re upgrading to a point release. For example, if you’re upgrading from Version 3.10 to Version 4.00, you need to perform the reset. However, if you’re upgrading to a point release (4.06 to 4.07), you do not need to perform the reset.

Manually Resetting the DBS. Many of the T1 programs require a manual reset to take effect. Program all of the quick-start items first, then reset the system by powering it off then back on. (**DO NOT RAM CLEAR!**)

Hardware Setup

1. Install the T1 interface in each DBS using the Installation Procedures described in Section 500 - *T1 Reference Manual*.

Note: The DBS T1 Trunk Card (VB-43561) must contain COP Version 2.0 or later.

2. If no networked DBS has a T1 that connects to the public network, choose one networked DBS as the clock source and strap its Sync Unit CN4 connector to **Free Run**. Strap all other DBS systems to **Net**. If an external sync source clock is available, strap all DBS systems to **Net**.

For example, if two networked DBS systems are directly connected and no other T1 is present, one of the systems must supply the sync clock and be strapped for Free Run. However, if at least one of the systems has a T1 connection to the public network, this should be used to supply the sync source clock.

Note: See “Sync Source Examples” on page 129 for more information.

3. For every direct connection between two networked DBS systems (i.e. located in the same building), configure a direct connection cable as listed in the following table.

<i>1st T1 Interface</i>		<i>2nd T1 Interface</i>	
<i>Signal</i>	<i>RJ-41 Pinout</i>	<i>RJ-41 Pinout</i>	<i>Signal</i>
Tip Receive	1	4	Tip1 Transmit
Ring Receive	2	5	Ring 1 Transmit
Not Used	3	3	Not Used
Tip1 Transmit	4	1	Tip Receive
Ring1 Transmit	5	2	Ring Receive
Not Used	6	6	Not Used
Not Used	7	7	Not Used
Not Used	8	8	Not Used

Programming Initial T1 Network Options

The following instructions explain the minimum programming required to make the T1 Network operational. Default settings appear in bold.

Before attempting to program the network, fill out copies of the planning forms supplied in Chapter 2 - *System Planning*.

The following procedures include several *Recommended Check Points*. It is advised that the described checks be performed to test the network setup to that point. Although it is possible to skip these checks, if these checks are not performed it is difficult to isolate setup problems.

The following commands must be performed **at each DBS** in the network. Also, many of the following commands require each DBS system to be reset to take effect. After all quick start programming is completed (or as directed at the Recommended Check Point) power the system off for at least 5 seconds and then back on. It will take at least 1 minute for the T1 to synchronize after the DBS systems are powered on.

Note: The T1 circuit card contains several status LEDs that may be checked as the T1/T1 network is configured. The LED indicators on the front of the T1 card are as follows:

T1 LED	INDICATION
CN3	After the T1 card has been initialized this light should begin blinking. If this light does not blink the T1 card has not been properly initialized. Check the cabinet program settings.
CFA	Carrier Failure Alarm. This LED lights when the DBS is unable to synchronize to another T1 signal. The most common problem when this LED illuminates is a RJ-41 wiring problem.
OOF	Out of Frame. This LED will light when the DBS is unable to sync to the T1 signal. The most common problem when this LED is illuminated is a wiring problem.
SLIP	This alarm lights when the T1 senses a frame error. This LED toggles off and on to indicate that slips have occurred. If the LED light is on, this does not necessarily indicate that a slip has occurred.
YEL	Yellow Alarm. If a Red Alarm occurs at the far end, the far end sends a yellow alarm to the DBS. (A red alarm is when a loss of signal or out-of-frame conditions lasts for more than 2.5 seconds.)
AIS	Alarm Indication Signal. This light is used for testing. It indicates that all ones are being received.
LOOP	Indicates the DBS T1 card is in loopback mode.

1. If you are installing the T1 while upgrading to a new DBS release, perform the “New Function Reset” command.

Note: You must perform the reset command if you’re upgrading to a completely new release, but not if you’re upgrading to a point release. For example, if you’re upgrading from Version 3.10 to Version 4.00, you need to perform the reset. However, if you’re upgrading to a point release (4.06 to 4.07), you do not need to perform the reset.

Address	FF1 8# 1# (0-1)#
Options	0=Do not perform new function reset 1=Perform new function reset

2. Enter the system configuration.

Address	FF1 8# 4# 1# 1# (0-8)#
Options	0=DBS 40 1=DBS 72 2=DBS 96 3=DBS 40 + DBS 40 (T1 must be in the slave cabinet.) 4=DBS 72 + DBS 40 (T1 is not supported.) 5=DBS 72 + DBS 72 (T1 must be in the slave cabinet.) 6=DBS 96 + DBS 40 7=DBS 96 + DBS 72 8=DBS 96 + DBS 96

Note: The above command requires a system restart to take effect.

3. Assign the sync sources.

Addresses	Sync Source 1: FF1 8# 4# 1# 2# (1-3)# Sync Source 2: FF1 8# 4# 1# 3# (0-3)# Sync Source 3: FF1 8# 4# 1# 4# (0-3)#
Options	Sync Source 1: 1=T1 of the master cabinet 2=T1 of the slave cabinet 3=Free run (internal clocking) Sync Source 2: 0=None 1=T1 of the master cabinet 2=T1 of the slave cabinet 3=Free run (internal clocking) Sync Source 3: 0=None 1=T1 of the master cabinet 2=T1 of the slave cabinet 3=Free run (internal clocking)
Examples	In most cases, set the sync sources as follows: T1 in a single cabinet or T1 in a master cabinet: Source 1=1 (T1 of the master cabinet) Source 2=3 (Free run) Source 3=0 (None) T1 in a slave cabinet Source 1=2 (T1 of the slave cabinet) Source 2=3 (Free run) Source 3=0 (None) T1s in the master and slave Source 1=1 (T1 of the master cabinet) Source 2=2 (T1 of the slave cabinet) Source 3=3 (Free run)
Note	See "Sync Source Examples" on page 129 for sync source clocking examples.

Note: The above command requires a system restart to take effect.

4. Set the Resync timer.

If one clock source fails, the system will switch to another clock source. The re-sync timer determines how often the system attempts to return to the original clock source.

Address	FF1 8# 4# 2# 1# (0-25)#
Options	0-25 0=Immediate (DBS returns to the first clock immediately.) 1-24=hours (Determines how often the DBS attempts to return to the first clock.) 25=No retries (DBS does not attempt to go back to the first clock.)
Parameter	Network Re-sync Timer
Note	When the system attempts to go back to the first clock source, existing calls will be disconnected.

5. Specify the number of T1 channels.

Be sure to set this to include all T1 channels used including both network channels and non-network channels.

Addresses	Master cabinet: FF1 8# 4# 4# 1# 2# (0-24)# Slave cabinet: FF1 8# 4# 5# 1# 2# (0-24)#
Options	0-24 (0)

6. Specify the framing format.

Be sure to match the framing format ordered from the CO or from the far end. In most cases, SF (D4) is used.

Addresses	Master cabinet: FF1 8# 4# 4# 1# 3# (0-1)# Slave cabinet: FF1 8# 4# 5# 1# 3# (0-1)#
Options	0=SF (SF stands for super frame, which is also known as D4.) 1=ESF (ESF stands for extended super frame.)

Note: The above command requires a system restart to take effect.

7. Specify the line coding format.

Be sure to match the line coding format ordered from the CO or far end. In most cases, AMI is used.

Addresses	Master cabinet: FF1 8# 4# 4# 1# 4# (0-1)# Slave cabinet: FF1 8# 4# 5# 1# 4# (0-1)#
Options	0=AMI (AMI stands for alternate mark inversion.) 1=B8ZS (B8ZS stands for binary 8-zeros suppression.)

Note: The above command requires a system restart to take effect.

8. Specify which trunk channels are used for T1.

Address	FF2 (1-64)# 21# (0-3)#
Options	0= Loop start 1=Ground start 2=DID 3=T1

Note: The above command requires a system restart to take effect.

Note: *RECOMMENDED CHECK POINT.* Power off the network cabinets for 30 seconds and power back on. After waiting approximately 1 minute for the T1 to initialize, check the CN3 LED on the top front of the T1 card. If it continuously flashes on and off, the T1 has been properly initialized. If it does not flash, there is a problem and you should repeat steps 1-8.

9. Specify trunk emulation for the T1 channels. (See Table 2-1 on page 17.)

Be sure to match the signaling ordered from the CO.

Address	FF1 8# 4# 6# (1-64)# 1# (0-4)#
Options	0=Loop start 1=Not used 2=Ground start 3=E&M 4=E&M T1 Network
Note:	Select only E&M T1 Network for network trunks.

Note: The above command requires a system restart to take effect.

10. Specify the outgoing signaling type used by the T1.

Any trunks used for T-1 Networking require wink start.

Address	FF1 8# 4# 6# (1-64)# 3# (0-2)#
Options	0=Immediate start 1=Wink start 2=Dial-tone start
Note:	Select only Wink Start for network trunks.

Note: The above command requires a system restart to take effect.

11. Specify the incoming signaling type used by the T1.

Any trunks used for T-1 Networking require wink start.

Address	FF1 8# 4# 6# (1-64)# 4# (0-1)#
Options	0=Immediate start/ringdown 1=Wink start
Note:	Select only Wink Start for network trunks.

Note: The above command requires a system restart to take effect.

12. Make certain that the inbound ring pattern is set to a value other than **0**.
Network trunks must supply their own ringing pattern.

Address	FF2 (1-64)# 17# (0-9)#
Options	0=Synchronize (ring pattern determined by CO) 1=3 sec. on/1 sec. off 2=2 sec. on/2 sec. off 3=1 sec. on/1 sec. off 4=1 sec. on/2 sec. off 5=1 sec. on/3 sec. off 6=.5 sec. on/.5 sec. off 7=.5 sec. on/.5 sec. off/.5 sec. on/2.5 sec. off. 8=.5 sec. on/3.5 sec. off 9=1 sec. on/7 sec. off
Note:	Do not select 0 for a network trunk.

13. Specify the DBS network node number. See Figure 2-1 on page 14.

Every DBS system (node) in the network must be assigned a unique number.

Address	FF1 8# 4# 8# 1# 1# (0-4)#
Options	0=Stand Alone 1=Network Node 1 2=Network Node 2 3=Network Node 3 4=Network Node 4
Notes:	This node number becomes the first digit in the four digit dialing plan. Every DBS system (node) in the network must be assigned a unique number.

14. Select the Network Trunk Group selection priority for a network call.
(See Table 2-9 on page 21 and following tables.)

Address	FF1 8# 4# 8# 1# 2# (0-3)# - leading digit of "1" 1st priority FF1 8# 4# 8# 1# 3# (0-3)# - leading digit of "1" 2nd priority FF1 8# 4# 8# 1# 4# (0-3)# - leading digit of "1" 3rd priority
	FF1 8# 4# 8# 1# 5# (0-3)# - leading digit of "2" 1st priority FF1 8# 4# 8# 1# 6# (0-3)# - leading digit of "2" 2nd priority FF1 8# 4# 8# 1# 7# (0-3)# - leading digit of "2" 3rd priority
	FF1 8# 4# 8# 1# 8# (0-3)# - leading digit of "3" 1st priority FF1 8# 4# 8# 1# 9# (0-3)# - leading digit of "3" 2nd priority FF1 8# 4# 8# 1# 10# (0-3)# - leading digit of "3" 3rd priority
	FF1 8# 4# 8# 1# 11# (0-3)# - leading digit of "4" 1st priority FF1 8# 4# 8# 1# 12# (0-3)# - leading digit of "4" 2nd priority FF1 8# 4# 8# 1# 13# (0-3)# - leading digit of "4" 3rd priority
Options	0=local call 1=Network Trunk Group 1 2=Network Trunk Group 2 3=Network Trunk Group 3
Note:	If all 1st priority Network Trunk Group trunks are busy, the 2nd priority Network Trunk Group trunks are tried. If all 2nd priority trunks are busy, the 3rd priority Network Trunk Group trunks are tried. If all trunks are busy, the call is denied.

15. Assign each network trunk at the DBS to a Network Trunk Group. (See Table 2-1 on page 17 and following tables.)

Address	FF1 8# 4# 8# 4# (TRK#) (0-3)#
Options	0=Not Assigned to a Network Trunk Group 1=Network Trunk Group 1 2=Network Trunk Group 2 3=Network Trunk Group 3

16. Set the DBS to four-digit numbering. After entering a **2** to select 4-digit numbering, you will be asked to confirm the change. Press **#** to confirm.

Address	FF1 2# 1# 12# (0-2)#
Options	0=2 digit number plan 1=3 digit numbering plan 2=4 digit numbering plan
Notes:	The network node number must be defined (step 13 above) before 4-digit numbering can be enabled.

Note: *RECOMMENDED CHECK POINT.* Power off the network cabinets for 30 seconds and power back on. After waiting approximately 1 minute for the T1 to initialize, attempt to make a network call from each node to each node. For instance if extension 1100 goes offhook and dials 2100, extension 2100 should ring and display **NET CALL GN** (where N = Network Trunk Group Number) until extension 2100 is answered. When 2100 answers, both extensions should display **NET TALK GN**. If not, recheck programming steps 9 through 16.

Network Paging Assignments

(If not using Network Paging, skip steps 17-22. However, please read the note with step 18.)

17. Enable Network Paging for one or more Class of Service. (See Table 2-17 on page 24 and following tables.)

Address	FF1 2# 5# (COS No.)# 22# (0-1)#
Options	0=Network paging not allowed 1=Network paging allowed

18. Assign an appropriate Class of Service to each extension to allow or deny the origination of a network page.

Address	FF3 (Ext. Port No.)# 35# (0-8)#
Options	0 - 8 Class of Service Number (0 default)
Note	COS 0 enables all features including network paging. To prevent network paging, assign the extension a COS other than 0 that denies network paging.

19. Assign an appropriate Class of Service to the Network Trunk Group to allow or deny the receiving of a network page. (See Table 2-21 on page 25 and following tables.)

Address	FF1 8# 4# 8# 3# (NWG)# 22# (COS)#
Options	0 - 8 Class of Service Number (0 default)
Note	This assigns a class of service to the Network Trunk Group. The only class of service item considered is incoming network paging allow or deny.

20. Set the outgoing dial type to DTMF. DTMF is required for Network Paging.

Address	FF1 8# 4# 8# 3# (NWG)# 1# (0/1)#
Options	0=Rotary Dial (Pulse Dial) 1=DTMF
Note	DTMF must be enabled for Network Paging operation. The DBS must be equipped with one or more MFR cards.

Note: The above command requires a system restart to take effect.

21. Set the incoming dial type to DTMF. DTMF is required for Network Paging.

Address	FF1 8# 4# 8# 3# (NWG)# 2# (0/1)#
Options	0= Rotary Dial (Pulse Dial) 1=DTMF
Note	DTMF must be enabled for Network Paging operation. The DBS must be equipped with one or more MFR cards.

Note: The above command requires a system restart to take effect.

22. Place extensions in desired paging groups.

Address	FF3 (1-144)# 18# (0/1)# - Page Group 0 . . FF3 (1-144)# 25# (0/1)# - Page Group 7
Options	0= Not a member of the Page Group 1=A member of the Page Group

Note: *RECOMMENDED CHECK POINT.* Test network paging to all nodes. For instance, to page group 00 on network node 1, dial **1#00**. If paging does not function, recheck steps 17 through 22.

Network Attendant Assignments

(If not using a Network Attendant, skip this step)

23. Specify the location of a network attendant. Whenever a user dials **0**, the attendant at this DBS receives the call. If the user dials the network number (**1-4**) then **0**, the specified DBS attendant is selected. (See Table 2-33 on page 29.)

Address	FF1 8# 4# 8# 1# 17# (0-4)#
Options	0= local operator only, no network attendant 1=network attendant at DBS 1 2=network attendant at DBS 2 3=network attendant at DBS 3 4=network attendant at DBS 4

Note: *RECOMMENDED CHECK POINT.* Test network attendant calling at each node. To call the network attendant, dial **0**. The network attendant should receive a call. If you are dialing from the same node, the call should proceed as a normal intercom call. If you are dialing from another network node, the attendant phone should ring and when the call is answered, the both phones should display **NET TALK GN**.

Node Route Selection (NRS) Assignments

(If not using NRS, skip steps 24 to 29)

24. Enable Least Cost Routing (LCR) for the system.

Address	FF1 2# 1# 3# (0/1)#
Options	0=Disable LCR 1=Enable LCR
Note	This parameter enables LCR. LCR must be enabled for NRS to operate.

25. Enable forced NRS/LCR for each extension to use forced NRS/LCR.

Address	FF3 (1-144)# 4# (0/1)#
Options	0=Disable forced NRS/LCR 1=Enable forced NRS/LCR
Note	This parameter requires the user to dial "9" to dial out of the system.

26. Enable NRS.

Address	FF1 8# 4# 8# 1# 16# (0/1)#
Options	0=Disable NRS 1=Enable NRS
Note	LCR must be enabled (step 24 above) for NRS to operate.

27. Assign the dialed digits that receive NRS processing.

When the system finds an exact match of these digits, NRS processing is triggered. (See Table 2-35 on page 30 and following tables.)

Address	FF1 8# 4# 8# 2# (1-50)# 1# (XXXXXX)#
Options	1-50=The NRS Entry Number. Up to 50 NRS entries are available for each system XXXXXX=The dialed digits that must be matched to use NRS. Up to 6 digits may be entered. All trailing digit positions not entered are assumed null. For instance, if 4 digits are entered, the 2 possible remaining trailing digits positions are disregarded. Any digits entered require an exact match. (Default = null (*****))

28. Assign the NRS length. (See Table 2-35 on page 30 and following tables.)

Address	FF1 8# 4# 8# 2# (1-50)# 2# (1-99)#
Options	1-99=The minimum number of digits to collect before NRS processing. The default value is 11 digits.

29. Assign the NRS Route Access.

Select the DBS to outdial the call to the public network. (See Table 2-35 on page 30 and following tables.)

Address	FF1 8# 4# 8# 2# (1-50)# 3# (0-4)#
Options	0=No network routing. 1=Route call through DBS 1 2=Route call through DBS 2 3=Route call through DBS 3 4=Route call through DBS 4

Note: *RECOMMENDED CHECK POINT.* Test Network Route Selection. Dial a number to be processed by NRS. The call should be sent out over a network trunk to the designated remote node and dialed out. The dialing phone should display **NET TALK GN** when the call is answered. Dial a number not processed by NRS. It should dial out over a trunk from the local node. If NRS is not operating properly, recheck steps 24 to 29.

TRS Assignments

(If not using TRS, skip steps 30 and 31)

30. Assign a TRS Type for extension to Network Trunk Group for outgoing network calls originating at this DBS. (See Table 2-43 on page 38 and following tables.)

Any calls originating from the extension that use the Network Trunk Group are subject to the TRS restrictions before they are sent out over the network.

Address	FF1 8# 4# 8# 5# 1# (1-144)# (Network Trunk Group)# (TRS #)# - Day Mode FF1 8# 4# 8# 5# 2# (1-144)# (Network Trunk Group)# (TRS #)# - Night Mode
Options	Network Trunk Group = 1-3 0-7 = TRS number (7 default)

31. Assign a TRS Type for Network Trunk Group to Outgoing Trunk for outgoing trunk calls received at this DBS.

Any calls received via the Network Trunk Group are subject to the TRS restrictions before they are sent out over the trunk. (See Table 2-43 on page 38 and following tables.)

Address	FF1 8# 4# 8# 6# 1# (Network Trunk Group)# (1-64)# (TRS #)# - Day Mode FF1 8# 4# 8# 6# 2# (Network Trunk Group)# (1-64)# (TRS #)# - Night Mode
Options	Network Trunk Group = 1-3 TRS Number = 0-7 (7 default)

Note: *RECOMMENDED CHECK POINT.* Test TRS. Make a call that will be allowed by your system setup. Make another call that will not be allowed by your setup. RESTRICTED should appear on the display. If TRS does not work properly, recheck steps 30 and 31.

Forwarding Incoming CO Calls to Network Extensions

(If not Forwarding Incoming CO Calls, skip steps 32 and 33)

32. Assign the CO Trunk(s) to ring at ports 159, 160, 161, 162 (Virtual Port). (See Table 2-59 on page 54 and following tables.)

Address	FF4 1# (159-162)# (1-144)# (0/1)# - Day FF4 2# (159-162)# (1-144)# (0/1)# - Night FF4 5# (159-162)# (1-144)# (0/1)# - Day Delayed FF4 6# (159-162)# (1-144)# (0/1)# - Night Delayed FF4 9# 1# (159-162)# (1-144)# (0/1)# - Night2 FF4 9# 2# (159-162)# (1-144)# (0/1)# - Night 2 Delayed
Options	0 - No ring 1 - Ring
Note	A call cannot ring at a virtual port and another extension at the same time. Once a virtual port receives a call, it is forwarded.

33. Assign a remote network node extension to receive the forwarded call from the Virtual Port. (See Table 2-60 on page 54 and following tables.)

Address	FF1 8# 4# 8# 7# (Virtual Port 1-4)# (NXXX)#
Options	Virtual Port = 1 (159) to 4 (162) NXXX= 1100-1699, 2100-2699, 3100-3699, 4100-4699 Default=null (*****)

Note: *RECOMMENDED CHECK POINT.* Test CO Call Forwarding. If it does not work properly, recheck steps 32 and 33.

SMDR

34. Specify the call types to be included in SMDR. (See Table 2-69 on page 59.)

Address	FF1 2# 2# 6# (0-2)#
Options	0=Outgoing Only 1=Incoming and Outgoing 2=Incoming, Outgoing, and Network

DBS Reset

35. When all assignments are complete, reset the DBS by turning it off then on again.

Chapter 4. Programming

This chapter describes the parameters that were modified or added to support T1 Networking. These parameters are only available with CPC-EX. For information on the other T1 parameters, see the *T1 Reference Manual*, Section 500 or the *DBS Programming Manual*, Section 400.

The descriptions of each parameter include a list of available options and the associated programming address. Default options appear in bold.

This chapter is intended for readers who are familiar with DBS programming. For an introduction to DBS programming, see the *DBS Programming Manual*, Section 400.

The following table lists the topics described in this chapter.

Topic	Page
Settings Modified for Networking	81
System Settings	81
Trunk Settings	82
Extension Settings	82
Other Changes	83
T1 Settings Added for Networking	84

Settings Modified for Networking

System Settings

Parameter	Extension Number Digits
Description	<p>(4-digit number added to support network operation) Determines whether the DBS will use 2-digit, 3 digit, or 4-digit extension numbers.</p> <p>If 2-digit numbers are used, a maximum of 60 numbers are available for assignment. Number Range: 10 through 69.</p> <p>If 3-digit numbers are used (default setting), a maximum of 600 extensions numbers are available. Number Range: 100-699.</p> <p>If 4-digit numbers are used, the DBS must be configured as part of a DBS network. A maximum of 600 extension numbers are available on this DBS. The first digit is determined by the network node number for the DBS (1, 2, 3, or 4). The remaining three digits are the same as 3-digit extension numbering. Number Range: N100-N699 where N=1, 2, 3, or 4.</p>
Programming	FF1 2# 1# 12# (0-2)# (# or *)
Options	<p>0=2-digit numbers 1=3-digit numbers 2=4-digit numbers #=Confirm entry *=Cancel entry</p>
Notes	<p><i>Interaction With System Size/Networking.</i> If you have a non-networked system and more than 60 phones are installed in your system, use 3-digit extension numbers. If you have a non-networked site with fewer than 60 phones use 2-digit or 3-digit extension numbers. If you have a networked system, use 4-digit extension numbers. Non-networked systems cannot use 4-digit extension numbers.</p> <p><i>Interaction With Voice Mail.</i> If your system uses Voice Mail, use 3-digit or 4-digit numbers in order to match extensions with Voice Mail boxes.</p> <p><i>Precaution for Changing Extension Number Digits.</i> Changing this setting can adversely affect other DBS settings that are based on extension numbers, such as entries for DSS/BLF keys and Call Forwarding.</p> <p><i>Interaction with T1 Network Type.</i> The T1 Network Type must be set before 4-digit numbers can be selected.</p>

Parameter	SMDR Printing Mode 1: Outbound and Inbound
Description	(Modified to add a setting to include Network Calls) Specifies the call types to be included in SMDR.
Address	FF1 2# 2# 6# (0-2)#
Options	0=Outgoing Only 1=Incoming and Outgoing 2=Incoming, Outgoing, and Network

Trunk Settings

Parameter	T1 Trunk Type
Description	(Type 4 - E&M Network trunk type added) Determines the type of trunk signaling that each T1 channel emulates. Note: For changes to this parameter to take effect, the system must be powered down, then back up again.
Programming	FF1 8# 4# 6# (1-64)# 1# (0-4)#
Options	0=Loop start 1=Not used 2=Ground start 3=E&M 4=E&M Network

Extension Settings

Parameter	Extension Numbers
Description	(Modified to allow for 4-digit numbers) This program assigns an extension number to an extension port.
Programming	FF3 (1-144)# 1# (10-69, 100-699, N100-N699)#
Options	N=DBS network node number 1-4

Parameter	Forced LCR/NRS
Description	<p>(Modified to add NRS)</p> <p>Use this address to set individual extension(s) for forced Least Cost Routing (LCR) and Network Node Route Selection (NRS) (when NRS is enabled).</p> <p>If an extension is set for forced LCR/NRS:</p> <ul style="list-style-type: none"> • every pooled key “9” is now an LCR key • stations cannot dial 81-86 to place an outside call • the caller will hear a dial tone generated by the DBS - - but the system will not access an outside line until the caller dials an area code and/or office code, after which the system selects the least expensive trunk based on time of day, carrier, and/or dialed number.
Programming	FF3 (1-144)# 4# (0/1)#
Options	<p>0=Disable Forced LCR/NRS</p> <p>1=Enable Forced LCR/NRS</p>

Other Changes

Flexible Function Screen Soft-Key Assignments (FF1 2# 7# 25-39# (1-10)# (xxxxxxx)#) and FF Key Assignments have been modified to allow up to 8-digit entries.

T1 Settings Added for Networking

Parameter	T1 Network Type
Description	Determines the node number for the DBS. A DBS network may contain up to four DBS systems. Each DBS in the network must have a unique node number from 1 to 4. This node number is the leading digit in 4-digit numbers and is used to select the individual DBS in a network.
Programming	FF1 8# 4# 8# 1# 1# (0-4)#
Options	0=Stand Alone 1=Network Node 1 2=Network Node 2 3=Network Node 3 4=Network Node 4
Notes	This node number becomes the first digit in the 4-digit dialing plan. Every DBS system (node) in the network must be assigned a unique number. The T1 Network Type must be set before 4-digit numbers can be selected.

Parameter	Network Trunk Group Selection Priority
Description	Determines the Network Trunk Group selection order for network calls. When a network call is originated, the system looks at the first digit dialed and searches for an available network trunk in the first priority network trunk group specified. If no trunk is available in the first priority network trunk group, the system looks at the second priority network trunk group. If no trunk is available, the system looks at the third priority trunk group.
Address	FF1 8# 4# 8# 1# 2# (0-3)# - leading digit of "1" 1st priority FF1 8# 4# 8# 1# 3# (0-3)# - leading digit of "1" 2nd priority FF1 8# 4# 8# 1# 4# (0-3)# - leading digit of "1" 3rd priority
	FF1 8# 4# 8# 1# 5# (0-3)# - leading digit of "2" 1st priority FF1 8# 4# 8# 1# 6# (0-3)# - leading digit of "2" 2nd priority FF1 8# 4# 8# 1# 7# (0-3)# - leading digit of "2" 3rd priority
	FF1 8# 4# 8# 1# 8# (0-3)# - leading digit of "3" 1st priority FF1 8# 4# 8# 1# 9# (0-3)# - leading digit of "3" 2nd priority FF1 8# 4# 8# 1# 10# (0-3)# - leading digit of "3" 3rd priority
	FF1 8# 4# 8# 1# 11# (0-3)# - leading digit of "4" 1st priority FF1 8# 4# 8# 1# 12# (0-3)# - leading digit of "4" 2nd priority FF1 8# 4# 8# 1# 13# (0-3)# - leading digit of "4" 3rd priority
Options	0=local call 1=Network Trunk Group 1 2=Network Trunk Group 2 3=Network Trunk Group 3

Parameter	Called Party No Answer Disconnect Timer
Description	FUTURE USE
Address	FF1 8# 4# 8# 1# 14# (0-5)#

Parameter	Network MCO Call Talk Timer
Description	Determines the maximum talk time for a network MCO call before disconnection.
Address	FF1 8# 4# 8# 1# 15# (0-9)#
Options	0=no disconnect 1=5 minutes 2=10 minutes 3=15 minutes 4=20 minutes 5=40 minutes 6=60 minutes 7=80 minutes 8=100 minutes 9=120 minutes

Parameter	Node Route Selection (NRS) Setting
Description	Enables or disables NRS on this DBS.
Address	FF1 8# 4# 8# 1# 16# (0/1)#
Options	0=Disable NRS 1=Enable NRS

Parameter	Network Attendant
Description	Specifies the location of a network attendant. Whenever a user dials 0 , the attendant at this DBS receives the call. If the user dials the network number (1-4) then 0 , the specified DBS attendant is selected
Address	FF1 8# 4# 8# 1# 17# (0-4)#
Options	0=local operator only, no network attendant 1=network attendant at node 1 2=network attendant at node 2 3=network attendant at node 3 4=network attendant at node 4

Parameter	NRS Dial
Description	Assigns the dialed digits that receive NRS processing. When the system finds an exact match of these digits, NRS processing is triggered
Address	FF1 8# 4# 8# 2# (1-50)# 1# (XXXXXX)#
Options	1-50=The NRS Entry Number. Up to 50 NRS entries are available for each system XXXXXX=The dialed digits that must be matched to use NRS. Up to 6 digits may be entered. All trailing digit positions are assumed null. The default = null (*****)

Parameter	NRS Length
Description	Assigns the number of digits to collect for this dialed number before routing the call.
Address	FF1 8# 4# 8# 2# (1-50)# 2# (1-99)#
Options	1-99=The minimum number of digits to collect before NRS processing. The default value is 11 digits.

Parameter	NRS Route Access Code
Description	Selects the DBS node to outdial the call to the public network.
Address	FF1 8# 4# 8# 2# (1-50)# 3# (0-4)#
Options	0=No network call routing 1=Route call through DBS 1 2=Route call through DBS 2 3=Route call through DBS 3 4=Route call through DBS 4

Parameter	Outgoing Dial Type
Description	Specifies the outdialing dial type for calls on the Network Group; either rotary (dial pulse) or DTMF.
Address	FF1 8# 4# 8# 3# (NWG)# 1# (0/1)#
Options	0=Rotary Dial (Pulse Dial) 1=DTMF
Notes	DTMF must be enabled for Network Paging operation. This command requires a system restart to take effect.

Parameter	Incoming Dial Type
Description	Specifies the incoming dial type for the network trunk group; either rotary (dial pulse) or DTMF.
Address	FF1 8# 4# 8# 3# (NWG)# 2# (0/1)#
Options	0= Rotary Dial (Pulse Dial) 1=DTMF
Notes	DTMF must be enabled for Network Paging operation. The DBS must be equipped with one or more MFR cards for DTMF operation. This command requires a system restart to take effect.

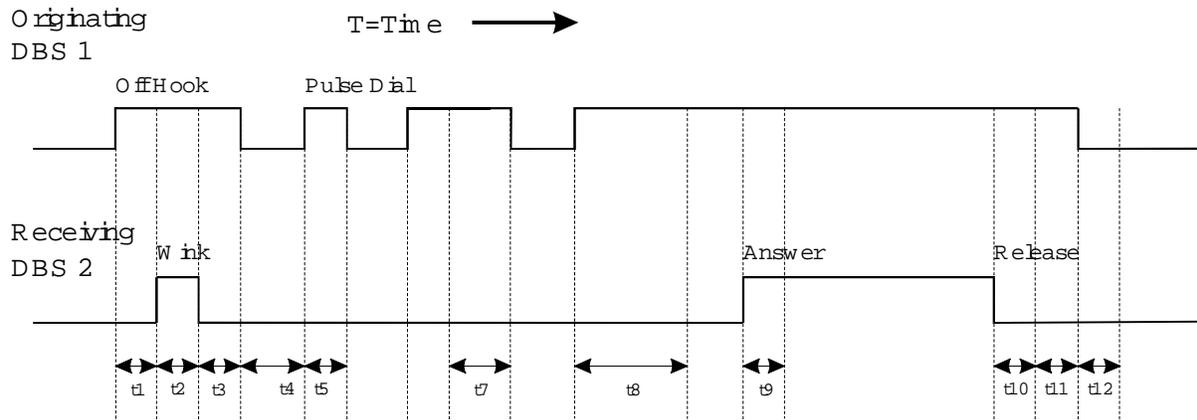
Parameter	Dial Tone Output
Description	Determines if Dial Tone is returned to a incoming network trunk group call upon trunk seizure.
Address	FF1 8# 4# 8# 3# (NWG)# 3# (0/1)#
Options	0= No Dial Tone Output 1=Dial Tone

Parameter	Delete Access Code (Future Use)
Description	Removes the access code (network node number) from the number outdialed on a network trunk group trunk. This is used when connecting to a non-DBS PBX.
Address	FF1 8# 4# 8# 3# (NWG)# 4# (0/1)#
Options	0= Dial access code (node number) 1=Delete access code (node number)
Notes	When dialing a non-DBS node, the user dials the node number followed by the appropriate PBX number. The DBS removes the node number and outdials the remaining digits.

Parameter	Add One Digit (Future Use)
Description	Add the leading node number to a call received over a network trunk group trunk. This is used when connecting to a non-DBS PBX.
Address	FF1 8# 4# 8# 3# (NWG)# 5# (0/1)#
Options	0= No node number added 1=Add the node number to beginning of the digits received.
Notes	It is preferable that the non-DBS PBX dial the node number if possible. This allows calls throughout the network.

Parameter	T1 Networking Flash Key Operation
Description	Determines if a flash key press during a network call results in a hookflash or release and reseizeT1 line.
Address	FF1 8# 4# 8# 3# (NWG)# 6# (0/1)#
Options	0=Release and Reseize 1=Hookflash

Figure 4-1. Example E+M Networking Dial Pulse Timing Relationships



- t1=T (DBS2) Wink Signal Delay Answer Timer
- T1<t1<T2 (DBS1) Wink Signal Wait Timer
- t2=T (DBS2) Wink Signal Output Timer
- t2>T (DBS1) Wink Signal Detect Timer
- t3=T (DBS1) Outputpulse Delay Timer (after Wink Finish Detect)
- t3>T ((DBS2) Dial Ready Receive Timer
- t4 + t5 (DBS1) Dial Pulse Make/Break
- t4>T (DBS2) Flash Detect Timer
- t7>T (DBS2) Dial Pulse Interdigit Timeout Timer
- t8>T (DBS2) Dial Watch Timer
- t9>T (DBS1) Answer Detect Timer
- t10>T (DBS1) Inuse Disconnect Timer
- t11=T (DBS1) Disconnect Detect Timer
- t10+t11<T (DBS2) Release Acknowledgement Timer
- t12=T (DBS1 and 2) Conversation End Guard Timer

Parameter	Disconnect Output Wait Time	
Description	Determines the time to wait after detecting on-hook before disconnecting.	
Address	FF1 8# 4# 8# 3# (NWG)# 7# (0-12)#	
Options	0=150 ms 1=200 ms 2=250 ms 3=300 ms 4=400 ms 5=500 ms 6=1000 ms	7=1500 ms 8=2000 ms 9=2500 ms 10=3000 ms 11=3500 ms 12=off

Parameter	Disconnect Detect	
Description	Sets the time threshold for determining if a disconnect has occurred.	
Address	FF1 8# 4# 8# 3# (NWG)# 8# (0-15)#	
Options	0=no disconnect 1=50 ms 2=100 ms 3=150 ms 4=200 ms 5=250 ms 6=300 ms 7=350 ms	8=400 ms 9=450 ms 10=500 ms 11=550 ms 12=600 ms 13=650 ms 14=700 ms 15=750 ms

Parameter	Conversation End Guard Timer	
Description	Determines the time after a hang-up that the trunk is unavailable for another call.	
Address	FF1 8# 4# 8# 3# (NWG)# 9# (0-15)#	
Options	0=200 ms 1=300 ms 2=400 ms 3=500 ms 4=800 ms 5=1000 ms 6=1200 ms 7=1400 ms	8=1600 ms 9=1800 ms 10=2000 ms 11=2200 ms 12=2400 ms 13=2600 ms 14=2800 ms 15=3000 ms

Parameter	Release Acknowledgment Timer	
Description	Sets the time to wait for acknowledgement of a release.	
Address	FF1 8# 4# 8# 3# (NWG)# 10# (0-15)#	
Options	0=1 sec 1=2 sec 2=5 sec 3=10 sec 4=20 sec 5=30 sec 6=60 sec 7=90 sec	8=120 sec 9=240 sec 10=480 sec 11=960 sec 12=1080 sec 13=1420 sec 14=1920 sec 15=No limit

Parameter	Output Delay Timer										
Description	Sets the time after receiving a wink before outputting digits.										
Address	FF1 8# 4# 8# 3# (NWG)# 11# (0-8)#										
Options	<table> <tr> <td>0=1200 ms min</td> <td>5=1400 ms</td> </tr> <tr> <td>1=1200 ms min</td> <td>6=1700 ms</td> </tr> <tr> <td>2=1200 ms min</td> <td>7=1900 ms</td> </tr> <tr> <td>3=1200 ms min</td> <td>8=2200 ms</td> </tr> <tr> <td>4=1200 ms min</td> <td></td> </tr> </table>	0=1200 ms min	5=1400 ms	1=1200 ms min	6=1700 ms	2=1200 ms min	7=1900 ms	3=1200 ms min	8=2200 ms	4=1200 ms min	
0=1200 ms min	5=1400 ms										
1=1200 ms min	6=1700 ms										
2=1200 ms min	7=1900 ms										
3=1200 ms min	8=2200 ms										
4=1200 ms min											

Parameter	Wink Signal Wait Timer																
Description	Sets the time to wait for a wink to be received.																
Address	FF1 8# 4# 8# 3# (NWG)# 12# (0-15)#																
Options	<table> <tr> <td>0=150 ms</td> <td>8=2000 ms</td> </tr> <tr> <td>1=250 ms</td> <td>9=2500 ms</td> </tr> <tr> <td>2=500 ms</td> <td>10=3000 ms</td> </tr> <tr> <td>3=750 ms</td> <td>11=3500 ms</td> </tr> <tr> <td>4=1000 ms</td> <td>12=4000 ms</td> </tr> <tr> <td>5=1250 ms</td> <td>13=4500 ms</td> </tr> <tr> <td>6=1500 ms</td> <td>14=5000 ms</td> </tr> <tr> <td>7=1750 ms</td> <td>15=5500 ms</td> </tr> </table>	0=150 ms	8=2000 ms	1=250 ms	9=2500 ms	2=500 ms	10=3000 ms	3=750 ms	11=3500 ms	4=1000 ms	12=4000 ms	5=1250 ms	13=4500 ms	6=1500 ms	14=5000 ms	7=1750 ms	15=5500 ms
0=150 ms	8=2000 ms																
1=250 ms	9=2500 ms																
2=500 ms	10=3000 ms																
3=750 ms	11=3500 ms																
4=1000 ms	12=4000 ms																
5=1250 ms	13=4500 ms																
6=1500 ms	14=5000 ms																
7=1750 ms	15=5500 ms																

Parameter	Wink Signal Delay Answer Timer																
Description	Sets the time to wait before sending a wink.																
Address	FF1 8# 4# 8# 3# (NWG)# 13# (0-15)#																
Options	<p>(See Note Below)</p> <table> <tr> <td>0=80 ms</td> <td>8=170 ms</td> </tr> <tr> <td>1=90 ms</td> <td>9=180 ms</td> </tr> <tr> <td>2=100 ms</td> <td>10=190 ms</td> </tr> <tr> <td>3=120 ms</td> <td>11= 200 ms</td> </tr> <tr> <td>4=130 ms</td> <td>12=210 ms</td> </tr> <tr> <td>5=140 ms</td> <td>13=220 ms</td> </tr> <tr> <td>6=150 ms</td> <td>14=230 ms</td> </tr> <tr> <td>7=160 ms</td> <td>15=240 ms</td> </tr> </table>	0=80 ms	8=170 ms	1=90 ms	9=180 ms	2=100 ms	10=190 ms	3=120 ms	11= 200 ms	4=130 ms	12=210 ms	5=140 ms	13=220 ms	6=150 ms	14=230 ms	7=160 ms	15=240 ms
0=80 ms	8=170 ms																
1=90 ms	9=180 ms																
2=100 ms	10=190 ms																
3=120 ms	11= 200 ms																
4=130 ms	12=210 ms																
5=140 ms	13=220 ms																
6=150 ms	14=230 ms																
7=160 ms	15=240 ms																
Note	An incoming call detection and processing time must be added to determine the actual time before a wink signal is sent back. Typically this time is from 110-120 ms. For instance, if the Wink Signal Delay Answer Timer is set to 100 ms, the actual wink will occur after approx. 210 ms.																

Parameter	Wink Signal Output Timer	
Description	Sets the duration for a Wink signal.	
Address	FF1 8# 4# 8# 3# (NWG)# 14# (0-8)#	
Options	0=140 ms 1=160 ms 2=180 ms 3=200 ms 4=220 ms	5=240 ms 6=260 ms 7=280 ms 8=300 ms

Parameter	Wink Signal Detect Timer	
Description	Sets the minimum time for determining a wink.	
Address	FF1 8# 4# 8# 3# (NWG)# 15# (0-10)#	
Options	0=40 ms 1=60 ms 2= 80 ms 3=100 ms 4=120 ms 5=140 ms	6=160 ms 7=180 ms 8=200 ms 9=220 ms 10=240 ms

Parameter	Wink Glare Timer (Outpulse Delay)	
Description	Sets the time to wait after a wink before signalling on a trunk.	
Address	FF1 8# 4# 8# 3# (NWG)# 16# (0-15)#	
Options	0=no wait 1=20 ms 2= 40 ms 3=60 ms 4=80 ms 5=100 ms 6=120 ms 7=140 ms	8=160 ms 9=180 ms 10=200 ms 11=250 ms 12=300 ms 13=350 ms 14=400 ms 15=450 ms

Parameter	Answer Detect Timer	
Description	Sets the minimum time of other end off-hook signal (or wink) to be interpreted as answer.	
Address	FF1 8# 4# 8# 3# (NWG)# 17# (0-8)#	
Options	0=50 ms 1=100 ms 2= 200 ms 3=600 ms 4=1000 ms	5=2000 ms 6=3000 ms 7=4000 ms 8=10000 ms

Parameter	Flash Output Timer	
Description	Sets the duration of a flash output.	
Address	FF1 8# 4# 8# 3# (NWG)# 18# (0-15)#	
Options	0=no flash 1=200 ms 2=300 ms 3=400 ms 4=500 ms 5=600 ms 6=700 ms 7=800 ms	8=900 ms 9=1000 ms 10=1100 ms 11=1500 ms 12=2000 ms 13=2500 ms 14=3000 ms 15=3500 ms

Parameter	Flash Detect Timer (Future Use)	
Description	Sets the minimum time for a determining a flash.	
Address	FF1 8# 4# 8# 3# (NWG)# 19# (0-12)#	
Options	0=no flash 1=100 ms 2= 150 ms 3=200 ms 4= 250 ms 5=300 ms 6=350 ms	7=400 ms 8=450 ms 9=500 ms 10=550 ms 11=600 ms 12=650 ms

Parameter	Dial Pulse Interdigit Timeout Timer																
Description	Defines the amount of time after a pulse is received to determine if a digit is complete.																
Address	FF1 8# 4# 8# 3# (NWG)# 20# (0-12)#																
Options	<table> <tr> <td>0=30 ms</td> <td>8=110 ms</td> </tr> <tr> <td>1=40 ms</td> <td>9=120 ms</td> </tr> <tr> <td>2=50 ms</td> <td>10=130 ms</td> </tr> <tr> <td>3=60 ms</td> <td>11=140 ms</td> </tr> <tr> <td>4=70 ms</td> <td>12=150 ms</td> </tr> <tr> <td>5=80 ms</td> <td>13=160 ms</td> </tr> <tr> <td>6=90 ms</td> <td>14=170 ms</td> </tr> <tr> <td>7=100 ms</td> <td>15=180 ms</td> </tr> </table>	0=30 ms	8=110 ms	1=40 ms	9=120 ms	2=50 ms	10=130 ms	3=60 ms	11=140 ms	4=70 ms	12=150 ms	5=80 ms	13=160 ms	6=90 ms	14=170 ms	7=100 ms	15=180 ms
0=30 ms	8=110 ms																
1=40 ms	9=120 ms																
2=50 ms	10=130 ms																
3=60 ms	11=140 ms																
4=70 ms	12=150 ms																
5=80 ms	13=160 ms																
6=90 ms	14=170 ms																
7=100 ms	15=180 ms																

Parameter	Dial Watch Timer																
Description	Time to wait for a digit t to be sent before determining that dialing has ceased.																
Address	FF1 8# 4# 8# 3# (NWG)# 21# (0-15)#																
Options	<table> <tr> <td>0= No monitoring</td> <td>8=22 sec</td> </tr> <tr> <td>1=15 sec</td> <td>9=23 sec</td> </tr> <tr> <td>2=16 sec</td> <td>10=24 sec</td> </tr> <tr> <td>3=17 sec</td> <td>11=25 sec</td> </tr> <tr> <td>4=18 sec</td> <td>12=26 sec</td> </tr> <tr> <td>5=19 sec</td> <td>13=27 sec</td> </tr> <tr> <td>6=20 sec</td> <td>14=28 sec</td> </tr> <tr> <td>7=21 sec</td> <td>15=29 sec</td> </tr> </table>	0= No monitoring	8=22 sec	1=15 sec	9=23 sec	2=16 sec	10=24 sec	3=17 sec	11=25 sec	4=18 sec	12=26 sec	5=19 sec	13=27 sec	6=20 sec	14=28 sec	7=21 sec	15=29 sec
0= No monitoring	8=22 sec																
1=15 sec	9=23 sec																
2=16 sec	10=24 sec																
3=17 sec	11=25 sec																
4=18 sec	12=26 sec																
5=19 sec	13=27 sec																
6=20 sec	14=28 sec																
7=21 sec	15=29 sec																

Parameter	Network Trunk Group Class of Service
Description	Assigns a Class of Service to a Network Trunk Group. This Class of Service is only checked to allow or deny the receiving of a network page.
Address	FF1 8# 4# 8# 3# (NWG)# 22# (0-8)#
Options	0-8=Class of Service (0=default)

Parameter	Operator Calls Over Network
Description	Use this address to block incoming Network Trunk Group caller from being able to access a trunk and dialing "0", "00", "10XXX0", or "101XXXX0" to reach an operator. This prevents a user from being able to make a restricted phone call by asking the operator to place the call for him
Address	FF1 8# 4# 8# 3# (NWG)# 23# (0-3)#
Options	<p>0=Deny "0/00-only", "10XXX0-only", and "101XXXX0"-only calls, but allow "0+NXX" calls if permitted by TRS tables</p> <p>1=Allow "0/00-only", "10XXX0-only", and "101XXXX0-only" calls, and also allow "0+NXX" calls if permitted by TRS tables</p> <p>2=Deny "0/00-only", "10XXX0-only", and "101XXXX0-only" calls, but allow "0+NXX" calls regardless of TRS tables</p> <p>3=Allow "0/00-only", "10XXX0-only", and "101XXXX0-only" calls, and also allow "0+NXX" calls regardless of TRS tables</p>
Note	<p>The Operator Access address still applies only to DBS systems using the new (1995) NANP dialing plan (FF7 1# 17# 1#), and to TRS types 2-6 (TRS types 0 and 1 do not allow outbound dialing; TRS type 7 allows all dialing).</p> <p>If "0/00-only" calls are denied (settings 0 or 2), the system will wait 6 seconds before automatically disconnecting the call. However, if the user dials additional digits within 6 seconds, the DBS will check other TRS switches to determine whether to allow or deny the call.</p> <p>For all settings (0-3), the system will check the CIC Format switch (FF7 1# 21#...) if an interchange carrier code is dialed.</p> <p>For all settings (0-3), the system will check the international calls switches (FF7 1# 1# and FF7 1# 19#) if "01" or "011" is dialed.</p> <p>For settings 0 and 1, the system will additionally check TRS tables for the TRS type assigned to the trunk and the FF7 settings for that TRS type (such as allowed/denied area codes, office codes, and 7-digit dialing).</p>

Parameter	Overseas Call
Description	<p>Use this address to allow or deny international calling on incoming network trunk group calls as follows:</p> <ul style="list-style-type: none"> • When a network caller attempts an overseas call (trunk access + 01 or 011) on a trunk assigned TRS type 3-6, the system checks the setting in this address (default=deny call). • However, if this address is set to “1”, the system checks the “International Calling For TRS Types 3-6” (FF7 1# 1#) to see if the dialed country code should be checked against the Country Code Table (FF7 1# 20#) before allowing the call. If so, and if the dialed country code is included in the table, the call is allowed.
Address	FF1 8# 4# 8# 3# (NWG)# 24# (0/1)#
Options	<p>0=Deny call 1=Check the International Calls Switch (FF7 1# 1#)</p>

Parameter	Network Trunk Group Settings
Description	Assigns a network trunk to network trunk group.
Address	FF1 8# 4# 8# 4# (TRK#) (0-3)#
Options	<p>0=Not Assigned to a Network Trunk Group 1=Network Trunk Group 1 2=Network Trunk Group 2 3=Network Trunk Group 3</p>

Parameter	Extension to Network Trunk Group TRS Assignment
Description	Assigns a TRS Type for extension to Network Trunk Group for outgoing network calls originating at this DBS. Any calls originating from the extension that use the Network Trunk Group are subject to the TRS restrictions before they are sent out over the network trunk group.
Address	FF1 8# 4# 8# 5# 1# (1-144)# (Network Trunk Group)# (TRS No.)# - Day Mode FF1 8# 4# 8# 5# 2# (1-144)# (Network Trunk Group)# (TRS No.)# - Night Mode
Options	Network Trunk Group= 1-3 TRS No. = 0-7 (7 default)

Parameter	Network Trunk Group to CO Trunk TRS Assignment
Description	Assigns a TRS Type for Network Trunk Group to an outgoing trunk for outgoing trunk calls received from another network DBS. Any calls received via the Network Trunk Group are subject to the TRS restrictions before they are sent out over the trunk.
Address	FF1 8# 4# 8# 6# 1# (Network Trunk Group)# (1-64)# (TRS No.)# - Day Mode FF1 8# 4# 8# 6# 2# (Network Trunk Group)# (1-64)# (TRS No.)# - Night Mode
Options	Network Trunk Group = 1-3 TRS No. = 0-7 (7=default)

Parameter	Network Paging
Description	Enables or disables network paging for a Class of Service
Address	FF1 2# 5# (COS No.)# 22# (0-1)#
Options	0=Network paging not allowed 1=Network paging allowed

Parameter	Ring Programming for Virtual Ports
Description	Assigns CO Trunk(s) to ring at ports 159, 160, 161, 162 (Virtual Ports). These calls can then be forwarded to an network extension on another DBS node (see <i>Transfer Network Extension Number</i> below).
Address	FF4 1# (159-162)# (1-144)# (0/1)# - Day FF4 2# (159-162)# (1-144)# (0/1)# - Night FF4 5# (159-162)# (1-144)# (0/1)# - Day Delayed FF4 6# (159-162)# (1-144)# (0/1)# - Night Delayed FF4 9# 1# (159-162)# (1-144)# (0/1)# - Night2 FF4 9# 2# (159-162)# (1-144)# (0/1)# - Night 2 Delayed
Options	0 - No ring 1 - Ring
Note	A call cannot ring at a virtual port and another extension at the same time. Once a virtual port receives a call, it is forwarded.

Parameter	Transfer Network Extension Number
Description	Assigns a remote network node extension to receive calls forwarded from a Virtual Port
Address	FF1 8# 4# 8# 7# (Virtual Port #)# (NXXX)#
Options	Virtual Port # = 1 (Port 159) to 4 (Port 162) NXXX= 1100-1699, 2100-2699, 3100-3699, or 4100-4699

Chapter 5. Network Feature Operation

This section describes the feature operation for DBS networks and covers the following topics:

Topic	Page
Call Forwarding to Extensions on Another Node	102
Extension to Network Extension Calling	104
Forwarding CO Calls to Network Extensions	106
Network Attendant Call	107
Network Call Transfer	110
Network Conference Calls	115
Network DISA Calling	118
Network Paging	121
Node Route Selection (NRS)	123
Remote Network DBS CO Access	124
SMDR	125

Call Forwarding to Extensions on Another Node

(CPC-EX)

Descriptions

Any call can be forward to an extension on another network node by assigning the destination extension to a Speed Dial bin and assigning Call Forward Outside to that Speed Dial.

Note: You may assign the personal speed dial number using the procedure below. System speed dial numbers must be assigned by the operator or system administrator.

To assign Personal Speed Dials (for forwarding to an extension on another node):

1. Press **ON/OFF**.
2. Press **PROG**.
3. Press a One-Touch key or press **AUTO** followed by the personal speed dial bin number (900-909).
4. Dial the extension number.
5. Press **HOLD**.
6. Press **ON/OFF**.

To activate Call Forwarding to an extension on another node:

Note: To forward to an extension on another node, the forwarding number must first be programmed into personal or system speed dialing. You can forward to any speed dial bin number (system or personal).

1. Press the **ON/OFF** key.
 - The phone issues intercom dial tone.
 - The **ON/OFF** LED lights.
2. Dial “72.”

“ENTER FWD CODE” appears on the display.

3. Dial the appropriate call forwarding code.

Call Forward Type	Code
All	0
Busy/no answer	1
Busy	2
No answer	4

“ENTER FWD EXT#” appears on the display.

4. Press **AUTO** plus the appropriate speed dial number.
5. Press the **ON/OFF** key.
 - The **DND/CF** LED lights.
 - “FWD OS AXXX” appears on the 2nd line of the display where XXX is the Speed Dial bin number.

To cancel Call Forwarding

1. Press **ON/OFF**.
2. Dial “72.”
3. Hang up.

Related Programming

- FF1 (System): Call Forward No Answer Timer
- FF1 (System): Extension Class of Service Setting
- FF3 (Extension): Extension Class of Service Assignment
- FF3 (Extension): Permanent Call Forward Type
- FF3 (Extension): Permanent Call Forward Extension
- FF10 (Speed Dial): System Speed Dial Numbers
- FF10 (Speed Dial): Personal Speed Dial Numbers

Considerations

See also “Forwarding CO Calls to Network Extensions” on page 106.

Extension to Network Extension Calling

(CPC-EX)

Descriptions

An extension user on one Networked DBS may call an extension on another Network DBS by simply dialing the four digit extension number.

The actual mechanism used to connect to the other network DBS is through T-1 trunks. Calling between network nodes therefore resembles trunk calling as follows:

- The display operates similar to CO trunk calling; no called party absence messages are displayed.
- The DBS provides one method of network extension calling: tone calling. With tone calls, a ringing tone is sent to the called extension.
- No features such as call waiting, camp-on, message waiting, offhook voice announce, barge-in, etc. are available for network calls between nodes.

Note: Any calls to extensions on the same node retain the full compliment of extension calling features.

Operation

To make a Call to an Extension on another Networked DBS:

1. Pick up the handset.

The phone issues intercom dial tone.

Note: If you are calling from an extension programmed for prime line preference, press the FF key programmed for intercom operation.

2. Dial the four digit extension number.
 - The number dialed appears on your display.
 - “NET TALK GN” (where “N” is the network trunk group number) appears on the *called* phone display.
 - An FF key LED lights if assigned to the network trunk or the **EXT** LED lights.
 - If the called extension is busy, busy tone is returned.

- If no trunks are available “NET BUSY GN” displays on your phone.
3. Complete the call and replace the handset.

The FF key LED or **EXT** LED goes off.

Related Programming

- FF1 (System): Extension Class of Service Setting
- FF3 (Extension): Extension Class of Service Assignment

Forwarding CO Calls to Network Extensions

(CPC-EX)

Descriptions

Incoming CO calls can be forwarded to extensions on another network node based on Day, Night and Night 2 modes. Set the CO ring assignments to ring on ports 159 (virtual port 1) to 162 (virtual port 4) and then assign the virtual ports to transfer to a network extension number.

Related Programming

- FF1 (System): Virtual Port Transfer Destination
- FF1 (System): CO Day Ring Assignments
- FF1 (System): CO Night Ring Assignments
- FF1 (System): CO Delayed Day Ring Assignments
- FF1 (System): CO Delayed Night Ring Assignments
- FF1 (System): CO Night 2 Ring Assignments
- FF1 (System): CO Delayed Night 2 Ring Assignments

Considerations

- Calls forwarded using virtual ports appear as normal network calls to the receiving extension or hunt group.
- A call cannot ring at an extension and a virtual port at the same time. Once a call is sent to a virtual port, it is immediately forwarded. However, you can have the CO ring one or more extensions and then delay ring to the virtual port.

Network Attendant Call

(CPC-EX)

Description

The attendant at one DBS node may be selected as a network attendant. The network attendant can be called from any extension by simply pressing “0.”

Note: If calls revert to the attendant, the calls will always revert to the local attendant even if a network attendant is assigned.

If multiple attendants are assigned at the Network Attendant DBS, a dial “0” call goes to the first attendant first. If the first attendant is busy, the call goes to the second attendant. The call will continue to transfer to the next attendant in the attendant group if necessary.

Operation

To dial the network attendant (located at another DBS):

1. Pick up the handset.
2. Press “0.”
 - The DBS “NET TALK GN” (where “N” is the network trunk group number) appears on the display.
 - An FF key LED lights if assigned to the network trunk or the **EXT** LED lights.
3. Complete the call and replace the handset.

The FF key LED or **EXT** LED goes off.

To dial the network attendant (located at the same DBS):

1. Pick up the handset or press **ON/OFF**.

The phone issues intercom dial tone.
2. Press “0.”
 - “Talk-EXT XXXX” (where “XXXX” is the extension) appears on the display if your extension is set for Voice Calling.

- “Call-EXT XXXX” (where “XXXX” is the extension) appears on the display if your extension is set for Tone Calling.
3. Complete the call and replace the handset.
The **EXT** LED goes off.

To dial the local attendant (when the network attendant is located at another DBS):

1. Pick up the handset or press **ON/OFF**.
The phone issues intercom dial tone.
2. Enter the local DBS access code (1-4) followed by “0.”
 - “Talk-EXT XXXX” (where “XXXX” is the extension) appears on the display if your extension is set for Voice Calling.
 - “Call-EXT XXXX” (where “XXXX” is the extension) appears
“XXXX” appears on the display
3. Complete the call and replace the handset.

To dial an attendant located at another DBS:

1. Pick up the handset or press **ON/OFF**.
The phone issues intercom dial tone.
2. Enter the DBS access code (1-4) followed by “0.”
 - The DBS “NET TALK GN” (where “N” is the network trunk group number) appears on the display.
 - An FF key LED lights if assigned to the network trunk or the **EXT** LED lights.
3. Complete the call and replace the handset.

Related Programming

- FF1 (System) Network Attendant
- FF1 (System): Second Attendant Position
- FF1 (System): Third Attendant Position

- FF1 (System): Fourth Attendant Position
- FF1 (System): Attendant Transfer Extension
- FF6 (Names and Messages): Extension Name

Considerations

- If accessing an attendant on the same DBS and the Attendant's name has been stored, it appears on the display instead of the extension number.
- Calls to a network attendant across nodes do not support extension display features. The display operates similar to CO trunk calling. No called party absence messages or names are displayed.
- No features such as call waiting, camp-on, message waiting, Offhook Voice Announce, barge-in, etc. are available for calls across network nodes (including attendant calls).
- The DBS provides only tone calling to the network calls including attendant calls. With tone calls, a ringing tone is sent to the called attendant.
- Calls on a DBS will revert to the local attendant even if a network attendant is assigned.

Network Call Transfer

(CPC-EX)

A DBS Network provides two call transfer methods: blind transfer and screened transfer.

Blind Transfer

Description

Blind transfer allows the transfer of a call directly to an extension on another DBS, without waiting for the called extension to answer.

Operation

1. Press the **HOLD** key to place the outside call on hold.
 - The line LED for the outside line on hold flashes green.
 - The phone issues intercom dial tone.
 - “Hold #XX” (where “XX” is the line number) appears on the display.
2. Dial the extension number to which the call is to be transferred.

If the dialed extension is on the same DBS, “Call-EXT XXXX” (where “XXXX” is the calling extension number) appears on your phone’s display.

If the dialed extension is on another DBS, the dialed extension number appears on the display. When the call is answered, “Net Talk GN” (where N is the network trunk group number) appears on your display.

3. Replace the handset before the other party answers.
 - You can also replace the handset after the third party answers.
 - The LED for the original outside line turns red when the call has been transferred.
 - If the call is transferred to an extension on the same DBS, “TRF. NXXX #YY” (where “XXXX” is the extension and “YY” is the line) appears on the called phone’s display.
 - The third party need only pick up the handset to speak to the outside line.

Related Programming

- FF1 (System): Onhook (Automatic) Transfer
- FF1 (System): Recall Timer for Extension-Transferred CO Calls
- FF1 (System): Recall Timer for Extension-Transferred Intercom Calls
- FF1 (System): Recall Timer for Attendant-Transferred CO Calls
- FF1 (System): Recall Timer for Attendant-Transferred Intercom Calls

Considerations

- For users to transfer calls by pressing **HOLD**, dialing the extension, and going onhook, the Onhook Transfer feature must be enabled in system programming.
- If Onhook Transfer is disabled, blind transfer is performed by pressing **HOLD**, dialing the extension number, pressing **PROG**, and then going onhook.
- If Onhook Transfer is enabled, users can transfer calls by pressing **PROG** before going onhook.
- The Attendant can transfer calls while the handset is still in place, even if the system is not set for Onhook Transfer.
- You cannot transfer a call to an extension that has Do Not Disturb or Absence Message activated.
- You can transfer a call to an extension that has Call Forwarding activated. The transferred call will follow the call forwarding path of the extension it is transferred to.

For example, if extension “A” is forwarded to extension “B,” calls that are transferred to extension “A” will be forwarded to extension “B.”

- When you transfer a call to an extension that is busy or does not answer and does not have Call Forwarding activated, the transfer will recall to your extension after the Transfer Recall Timer expires. The other extension’s number and the number of the transferred CO line or extension will appear on your display.

(For example, if you transfer an outside call on line 1 to extension 1135 and that extension does not answer, the call will return to your extension and “Recall 135 #01” (same DBS) or “TRF RECALL G1” (Network DBS) will appear on the display.)

Screened Transfer

Description

Using the Screened Transfer feature, you can contact a third party and announce the call before the transfer.

Operation

To use Screened Transfer when your system is set for Onhook Transfer:

1. Press the **HOLD** key to place the call on hold.
 - The line LED for the outside line on hold flashes green.
 - The phone issues intercom dial tone.
 - “Hold TRK #XX” (where “XX” is the line number) appears on the display.
2. Dial the extension number to which the call is to be transferred.
3. When your call is answered, inform the third party of the transfer.
 - If the third party is on the same DBS, “Talk-EXT NXXX” (where “NXXX” is the extension) appears on the display.
 - If the third party is on the another network DBS, “NET Talk GN” (where “N” is the network trunk group number) appears on the display.
4. Hang up the handset.
 - The line LED for the original outside line turns red.
 - The third party need only pick up the handset to speak to the outside line.

To use Screened Transfer when Onhook Transfer is disabled:

1. Press the **HOLD** key to place the outside call on hold.
 - The line LED for the outside line on hold flashes green.
 - The phone issues intercom dial tone.

- “Hold TRK #XX” (where “XX” is the line number) appears on the display.
2. Dial the extension number to which the call is to be transferred.
3. When your call is answered, inform the third party of the transfer.
 - If the third party is on the same DBS, “Talk-EXT NXXX” (where “NXXX” is the extension) appears on the display.
 - If the third party is on the another network DBS, “NET Talk GN” (where “N” is the network access code) appears on the display.
4. Press the **PROG** key.
 - The line LED for the original outside line turns red.
 - If the third party is on the same DBS, “TRF. NXXX TRK #YY” (where “NXXX” is the extension and “YY” is the line) appears on the display.
 - The third party need only pick up the handset to speak to the outside line.
5. Hang up to complete the transfer.

Related Programming

- FF1 (System): Onhook (Automatic) Transfer
- FF1 (System): Recall Timer for Extension-Transferred CO Calls
- FF1 (System): Recall Timer for Extension-Transferred Intercom Calls
- FF1 (System): Recall Timer for Attendant-Transferred CO Calls
- FF1 (System): Recall Timer for Attendant-Transferred Intercom Calls

Considerations

- The Attendant can transfer calls even if the system is not set for Onhook Transfer.
- You cannot transfer a call to an extension that has Do Not Disturb or Absence Message activated.
- You can transfer a call to an extension that has Call Forwarding activated. The transferred call will follow the call forwarding path of the extension it is transferred to.

For example, if phone “A” is covered to phone “B,” calls that are

transferred to phone “A” will be forwarded to phone “B.”

- When you transfer a call to an extension that is busy or does not answer and does not have Call Forwarding activated, a call tone is issued at your extension after the Transfer Recall Timer expires. The other extension’s number and the number of the transferred CO line or extension then appear on your display and the call is returned to your extension.

(For example, if you transfer an outside call on line 1 to extension 1135 and that extension is busy or does not answer, the call will return to your extension and “Recall 1135 #01” (same DBS) or “TRF RECALL GN” (other network DBS) will appear on the display.)

Network Conference Calls

(CPC-EX)

Description

Network Conference Calls allow an extension user to add a party to an existing conversation even when the extension is on another DBS.

Any one conference call can contain up to 4 parties (including up to 2 CO/network trunks).

Operation

To establish a Conference Call:

1. Press **HOLD** or the line key of your current call to place it on hold.

The extension number, outside line number, network access number, or name of the party on hold appears on the display.

2. Press any unlit line key or dial the number of the extension you wish to add to the call.

With an outside call:

- The line LED lights green.
 - The phone issues outside dial tone.
 - “CO TALK #XX” (where “XX” is the line number) appears on the display.
3. If you pressed an unlit line key in step 2, dial the number of the party you wish to add to the call.

The number appears on the display.

4. Press the **CONF** key when your call is answered.

If you are now conducting a three-way Conference Call involving two outside lines, “CONF #XX #YY” (where “XX” is the first line and “YY” is the second line) appears on the display.

5. Repeat steps 1-4 to add a fourth party to a three-party Conference Call.

To add an extension to an outside call:

1. Press the **HOLD** key during the outside call.
2. Dial the additional party.
3. After the extension answers, press **CONF**.

The three parties can now speak to one another.

4. Repeat steps 1-3 to add another extension to a three-party Conference Call.

To establish an Unsupervised Conference Call:

1. Press **HOLD** or the line key of your current call to place it on hold.

The outside line number or name of the party on hold appears on the display.

2. Press an unlit line key.
 - The line LED lights green.
 - The phone issues outside dial tone.
 - “CO TALK #XX” (where “XX” is the line number) appears on the display.

3. Dial the number of the party you wish to add to the call.

4. Press the **CONF** key when your call is answered.

“CONF #XX #YY” (where “XX” is the first line and “YY” is the second line) appears on the display.

5. To drop out of the conference and establish the Unsupervised Conference Call, press **HOLD**.
6. To return to the call, press one of the conference line keys.

Related Programming

- FF1 (System): Unsupervised Conference Timer
- FF2 (Trunk): Unsupervised CO Conference
- FF3 (Extension): Unsupervised Conference

Considerations

- The SCC-A card provides 3 four-party conference circuits. The SCC-B provides 8 four-party conference circuits
- Press **FLASH** or hang up to exit a Conference Call.
- The Call Hold feature cannot be used during a four-party Conference Call.

Network DISA Calling

(CPC-EX)

Description

Direct Inward Station Access (DISA) callers have access to network extension calling, network paging, and remote DBS COs.

Operation

To make a DISA call to an extension on the local DBS:

1. Dial the DISA trunk number.
2. Once you hear DISA dial tone from the DBS, enter the 4-digit DISA code (if an incoming DISA code is assigned). If the incoming DISA code is not programmed, you can proceed to the next step.
3. Dial the four digit extension number.

To make a DISA call to an extension on another DBS node:

1. Dial the DISA trunk number.
2. Once you hear DISA dial tone from the DBS, enter the 4-digit DISA code (if an incoming DISA code is assigned). If the incoming DISA code is not programmed, you can proceed to the next step.
3. Dial **#8** and the outgoing Trunk DISA Code.
4. Dial the four digit extension number.

To make a DISA call to the paging system on another DBS node:

1. Dial the DISA trunk number.
2. Once you hear DISA dial tone from the DBS, enter the 4-digit DISA code (if an incoming DISA code is assigned). If the incoming DISA code is not programmed, you can proceed to the next step.
3. Dial **#8** and the outgoing Trunk DISA Code.
4. Dial the network access code (1-4), #, and the page zone number (00-07).

To make a DISA call to an outside number via the local DBS:

1. Dial the DISA trunk number.
2. Once you hear DISA dial tone from the DBS, enter the 4-digit DISA code (if an incoming DISA code is assigned). If the incoming DISA code is not programmed, you can proceed to the next step.
3. Dial **#7** plus the 4-digit Outgoing DISA Code.

Two outgoing DISA codes are assigned. Either may be used after the #7.

4. Dial the trunk group number you want to use (81-86 or 9).
5. Dial the desired telephone number.

To make a DISA call to an outside number via a remote DBS:

1. Dial the DISA trunk number.
2. Once you hear DISA dial tone from the DBS, enter the 4-digit DISA code (if an incoming DISA code is assigned). If the incoming DISA code is not programmed, you can proceed to the next step.
3. Dial **#8** plus the 4-digit Outgoing DISA Code.

Two outgoing DISA codes are assigned at the DBS. Either may be used after the #8.

4. Dial the network access code (1-4) for the remote DBS.
5. Dial “9” followed by the desired telephone number.

Related Programming

- FF1 (System): Direct Inward System Access (DISA) ID Code
- FF1 (System): DISA Outbound Call ID Code 1
- FF1 (System): DISA Outbound Call ID Code 2
- FF2 (Trunk): DISA Auto Answer
- FF2 (Trunk): DISA Start Time
- FF2 (Trunk): DISA End Time

To program an incoming code from an attendant phone:

In addition to the DISA ID Setting in FF1, the following procedure can be used to program an incoming code.

1. Press the **ON/OFF** key.
 - The phone issues intercom dial tone.
 - The **ON/OFF** LED lights.
2. Press the **CONF** key.
3. Dial “#7.”
4. Enter the DISA code.
5. Press the **HOLD** key.
6. Press the **ON/OFF** key.

The **ON/OFF** LED goes off.

Hardware Requirements

- An MFR card is required for DISA. The MFR card is required to detect DTMF tones entered via the DISA connection.

Considerations

- Once an incoming DISA code is entered, you cannot blank it out without entering the programming mode.
- Busy override cannot be used for a DISA line.

Network Paging

(CPC-EX)

Description

DBS Networking supports the standard paging feature on the local DBS as well as paging on a distant networked DBS.

Paging on the local DBS operates the same as for a non-networked DBS. To page on the local DBS, dial # followed by the number of the desired paging group (00-07).

Network paging requires that a leading DBS Network Route Access Number (1-4) be dialed preceding the page code. For instance, to page on DBS 2 Paging Group 03, dial 2#03.

Operation

To use the Paging feature on the local DBS:

1. Pick up the handset.
2. Press “#,” then enter the number of the desired Paging Group (00-07).

The **EXT** LED lights.

3. Make your announcement.
4. Replace the handset.

To use the Paging feature to page on a Network DBS:

1. Pick up the handset.
2. Dial the Network DBS Access Code (1-4). This selects the DBS.
3. Press “#,” then enter the number of the desired Paging Group (00-07).

The FF key LED lights if assigned to the network trunk or the **EXT** LED lights.

4. Make your announcement.
5. Replace the handset.

Related Programming

- FF1 (System): Extension Class of Service (Assignment for Network Paging)
- FF1 (System): Paging Group Assignments for Network Trunk Groups
- FF1 (System): Page Duration
- FF1 (System): External Page Interface Control for Paging Groups
- FF3 (Extension): Extension Page Group

Hardware Requirements

- External relays and an amplifier are required for external paging.

Considerations

- If an external paging system has been connected to Paging Groups 00-07, pages can be made through the external speakers. Voice Paging can also be heard over the extensions in groups 00-07.
- An extension can belong to more than one paging group.
- A maximum of eight Paging Groups can be assigned to a DBS system.
- Only one page may be performed at a time on a single DBS with one exception. Pages to group 00 always take priority. If you page group 00 while another extension is paging group 01-07, the other page terminates. The other pager receives busy and “Page Overridden” displays on the telephone (if a local DBS extension).
- Paging cannot be heard at busy extensions or at extensions for which the Do Not Disturb, Call Forwarding, or Absence Message feature is activated.

Node Route Selection (NRS)

(CPC-EX)

Descriptions

To reduce long distance charges, long distance calls made on a DBS (node) may be automatically routed through another DBS before outdialing to the public network. This is called Node Route Selection.

NRS is accessed by dialing “9” before placing a call.

Each DBS NRS table contains up to 50 NRS entries. Each entry contains the dialed number to match (up to 6 digits), the minimum number of digits to be dialed, and the network DBS (1-4) to receive the call.

NRS will process the call using the NRS entry with the most complete match possible. For instance if one NRS entry is 1201 and another is 12013, then if 12013333333 is dialed, then the 12013 NRS entry is used. If 12014444444 is dialed, then the 1201 NRS entry is used.

Related Programming

- FF1 (System): NRS Access
- FF1 (System): NRS Dialed Digits
- FF1 (System): NRS Minimum Number of Digits
- FF1 (System): NRS Receiving Node
- FF3 (Extension): Forced Least Cost Routing/Forced Node Route Selection

Considerations

- If LCR is enabled, NRS is processed first. If there is an NRS match, the call is sent out to the DBS node and there is no LCR processing at the originating DBS (the far end DBS may process the call using LCR). If there is no NRS match for a call, then LCR processing proceeds.
- Extensions may be programmed to use the NRS and LCR features for *all* outgoing calls. When NRS is used, the FF3 Extension command for Forced Least Cost Routing forces both NRS and LCR.
- The Trunk Queuing Callback Feature is not available for NRS calls.

Remote Network DBS CO Access

(CPC-EX)

Descriptions

An extension user on a networked DBS may access external CO lines at another Network DBS.

Operation

To make an external call via a selected Network DBS:

1. Pick up the handset.

The phone issues intercom dial tone.

Note: If you are calling from an extension programmed for prime line preference, press the FF key programmed for intercom operation.

2. Dial the Network DBS access code (1-4).
3. Dial 9 (for CO access) followed by the telephone number.
 - “NET TALK GN” (where “N” is the network access number) appears on the display.
 - An FF key LED lights if assigned to the network trunk or the **EXT** LED lights.
4. Complete the call and replace the handset.

The FF key LED or **EXT** LED goes off.

Related Programming

- FF1 (System): TRS Type for Extension to Network Group (at originating DBS)
- FF1 (System): TRS Type for Network Group to CO (at receiving DBS)
- FF7 (TRS): Toll Restriction Service

SMDR

(CPC-EX)

Description

Station Message Detail Recording (SMDR) provides detailed call records of outgoing calls. SMDR records can be output to a printer or an external call accounting system. Additional call record types have been added to the SMDR feature to support network calls and ISDN calls.

Figure 5-1 shows the SMDR format for CPC-EX.

Figure 5-1. SMDR Format for CPC-EX

0	1	2	3	4	5	6	7
01234567890123456789012345678901234567890123456789012345678901234567							
1	2	3	4	5	6	7	8 9
T MM/DD HH:MM:SS HH:MM:SS NNN DDDDDDDDDDDDDDDDDDDDDDDDDDDDD AAAAAAAAAA VVVVV NN							

<p>1=Call type</p> <p>S=Inbound DISA</p> <p>s=Outbound DISA</p> <p>I=Incoming</p> <p>O=Outgoing</p> <p>T=Transfer (See Note 1.)</p> <p>N=DNIS</p> <p>D=DID</p> <p>W=CO outgoing to Network</p> <p>w=CO incoming from network</p> <p>t=Network Transfer</p> <p>r=ISDN incoming call</p> <p>R=ISDN outgoing call</p> <p>2=Date</p> <p>MM=month</p> <p>DD=day</p> <p>3=Call start time</p> <p>HH=hours</p> <p>MM=minutes</p> <p>SS=seconds</p> <p>4=Call duration</p> <p>HH=hours</p> <p>MM=minutes</p> <p>SS=seconds</p>	<p>5=Extension number (or network trunk)</p> <p>10-69, 100-699=extensions</p> <p>CO number=DISA</p> <p>n01-n04=virtual port 1 to 4</p> <p>#01-#64=network trunk number</p> <p>6=Dialed digits, Caller ID or ANI</p> <p>DD=digits 0-9 or symbols * or #</p> <p>(See Note 2.)</p> <p>7=Account code</p> <p>A=0-9999999999</p> <p>8=Verified account code or walking COS code</p> <p>V0000-V9999=verified account codes</p> <p>W0000-W9999=walking COS codes</p> <p>9=Trunk Number</p> <p>NN=number (01-64)</p>
--	--

Notes:

1. Transferred calls include direct and group call pickups and conference calls. If a station call is transferred to an outside number, an SMDR record is also created for the station that is transferred.
2. The * symbol appears as a greater-than sign (>) on the SMDR printout; the # symbol appears as a less-than sign (<). Centrex and PBX codes, as well as LCR access codes, do not appear as dialed digits. If the Caller ID Feature is installed and enabled, "Private" appears with calls that have restricted Caller ID display and "Out of Area" with long distance calls that do not provide Caller ID information.

Related Programming

- FF1 (System): SMDR Print
- FF1 (System): Parity Check
- FF1 (System): Odd/Even Parity
- FF1 (System): Baud Rate
- FF1 (System): Stop Bit Length
- FF1 (System): Data Length
- FF1 (System): Serial Port Flow Control (X On/ X Off)
- FF1 (System): SMDR Display Start Timer for CO Calls
- FF1 (System): SMDR Printing Mode 1: Outbound, Inbound, Network
- FF1 (System): SMDR Printing Mode 2: Long Distance and Local Calls
- FF1 (System): SMDR Printing Mode 3: Header Title
- FF3 (Extension) Station Message Detail Recorder (SMDR) Report

Hardware Requirements

- A printer or external call accounting system is required to receive SMDR data.

Considerations

- Unlike other CPC circuit cards, the CPC-EX supports two serial ports. Serial Port 1 is labeled **CN4** and is located on the backplane. Serial Port 2 is labeled **CN5** and is located on the front of the CPC-EX card. Serial Port 2 requires a special interface cable.
- Be sure to select the correct port to output SMDR data. From the Attendant's phone:
 - dial **#90** to set Serial Port 1 (the backplane port) to output Bus Monitor/Maintenance and Serial Port 2 to no output.
 - dial **#92** to set Serial Port 1 to output SMDR and Serial Port 2 to output Bus Monitor/Maintenance data.
 - dial **#93** to set Serial Port 1 to output SMDR data and Serial Port 2 to no output.

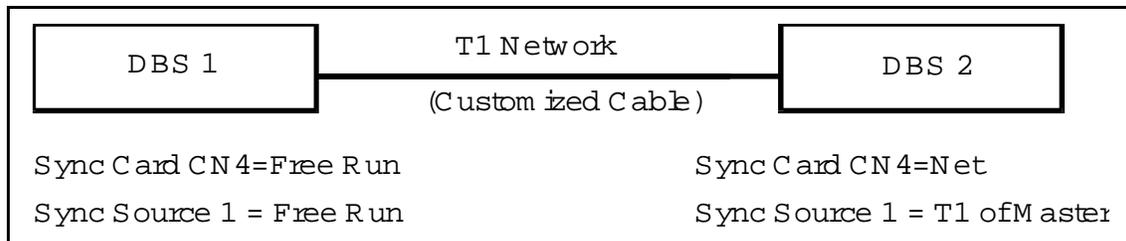
Chapter 6. Sync Source Examples

This section provides several examples of T1 sync source setup.

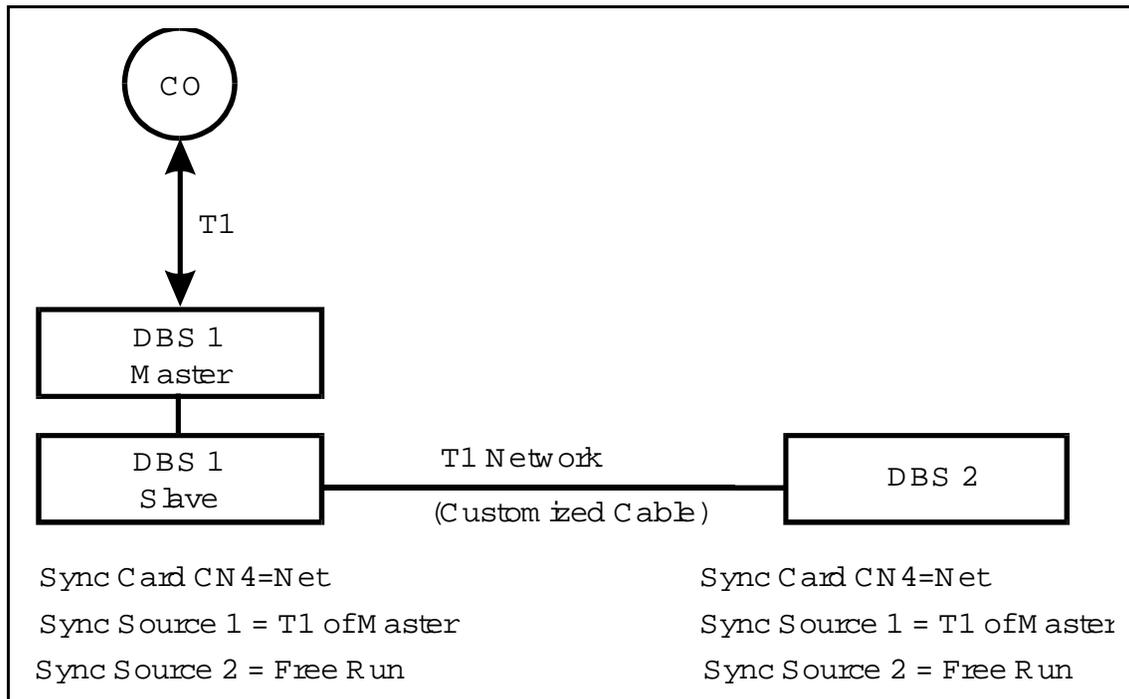
T1 Network - Two System Connections

Local Connections - Not Through CO

No Clock From CO:

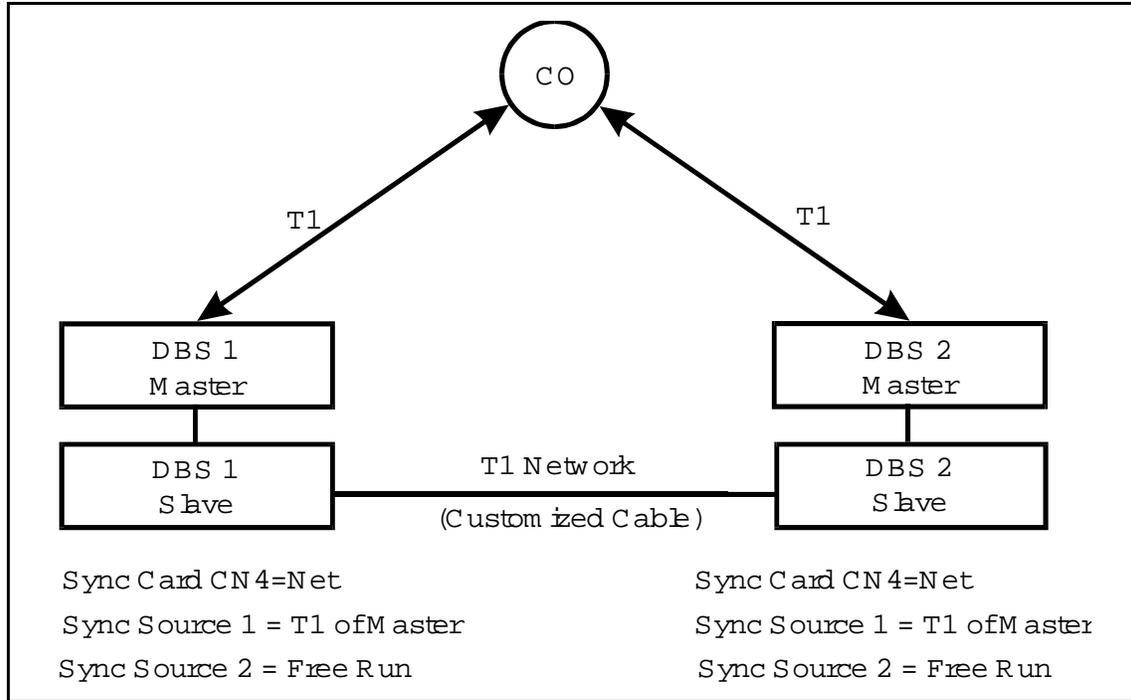


Clock From CO to One System:

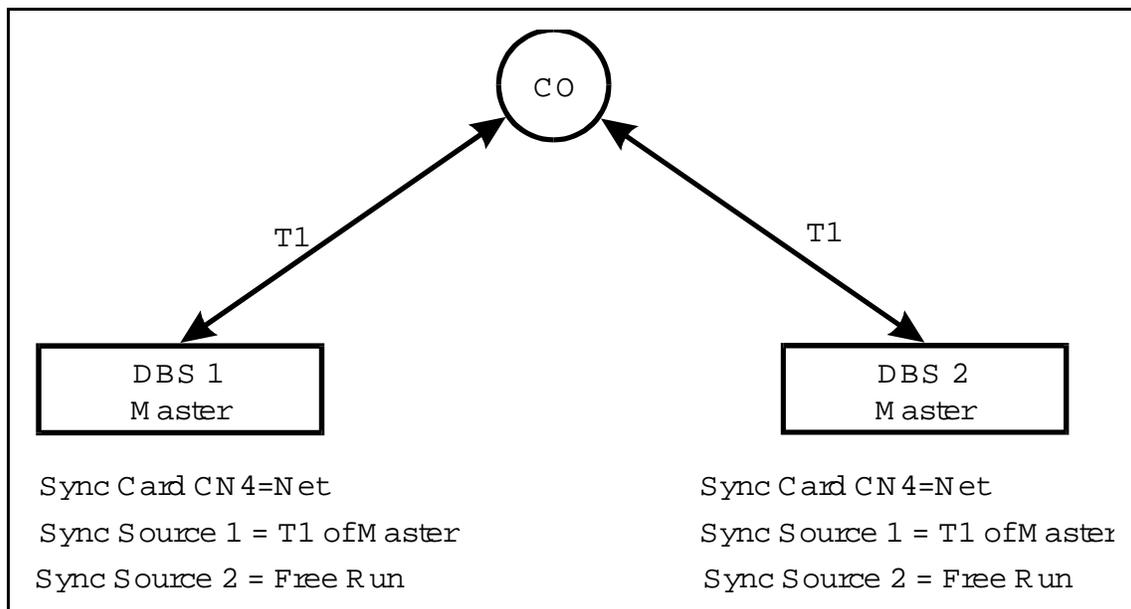


Remote Connection - Through CO

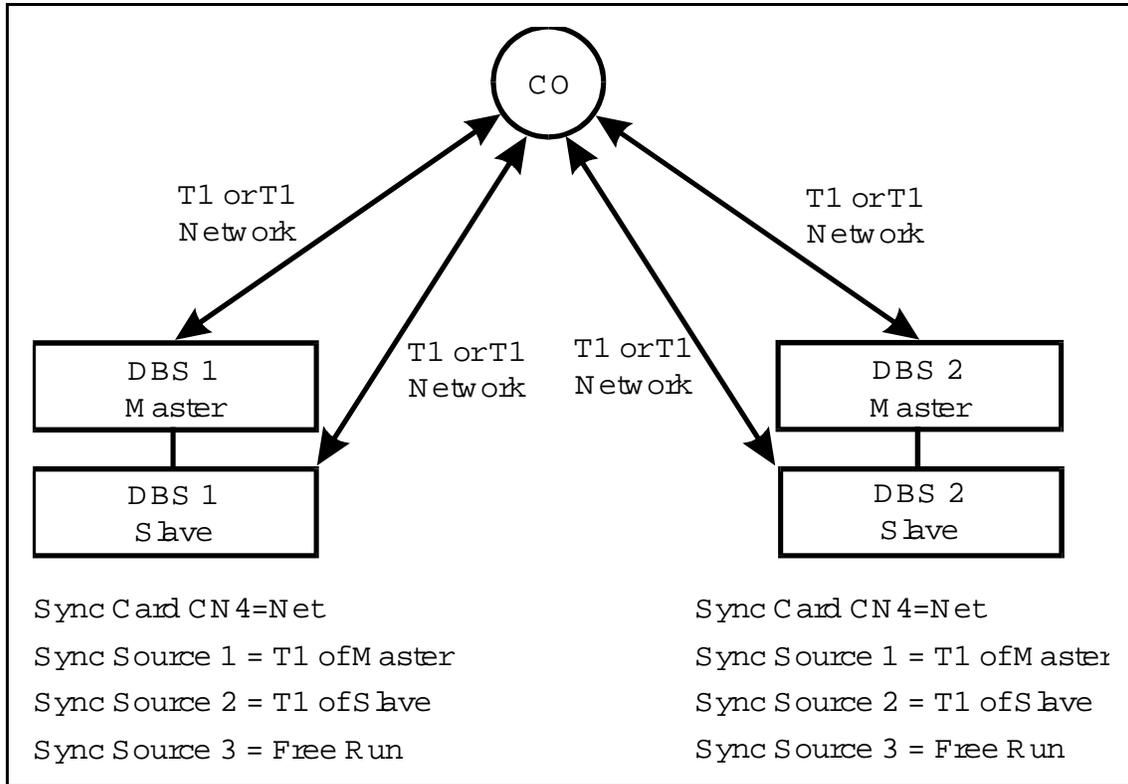
Clock From CO to Each System:



Clock From CO to Each System:



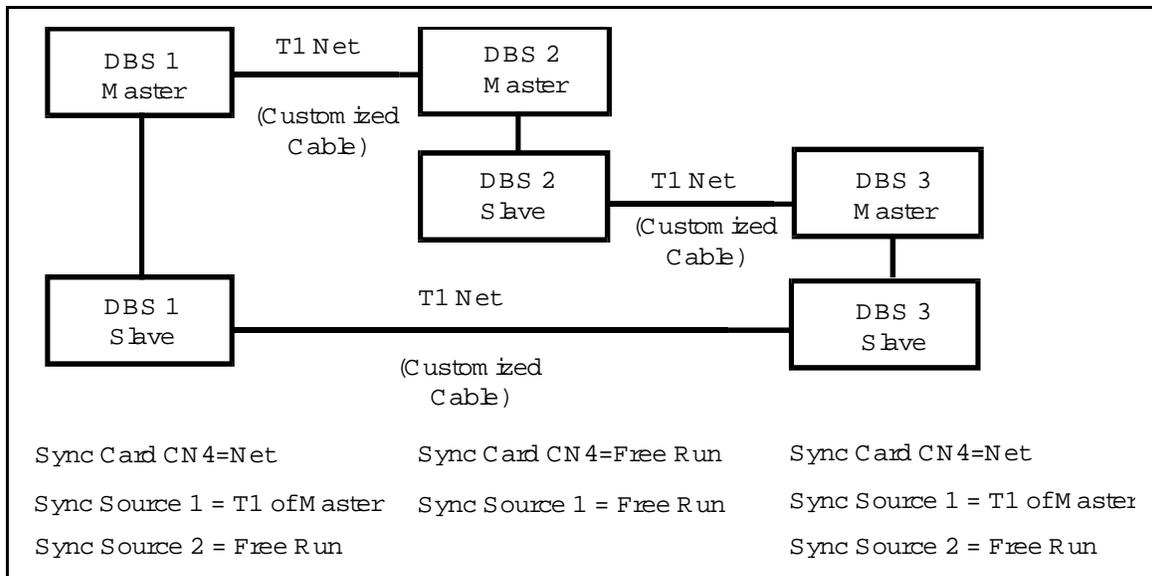
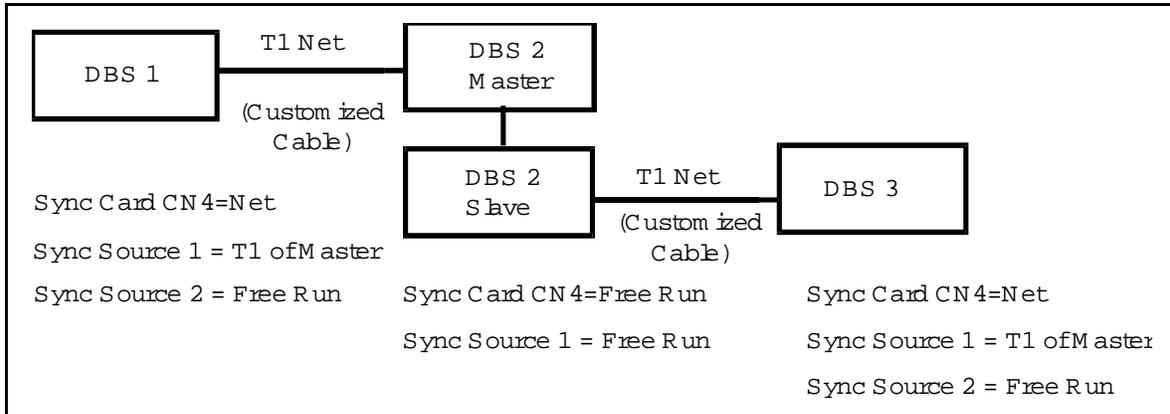
Clock From CO to Each System:



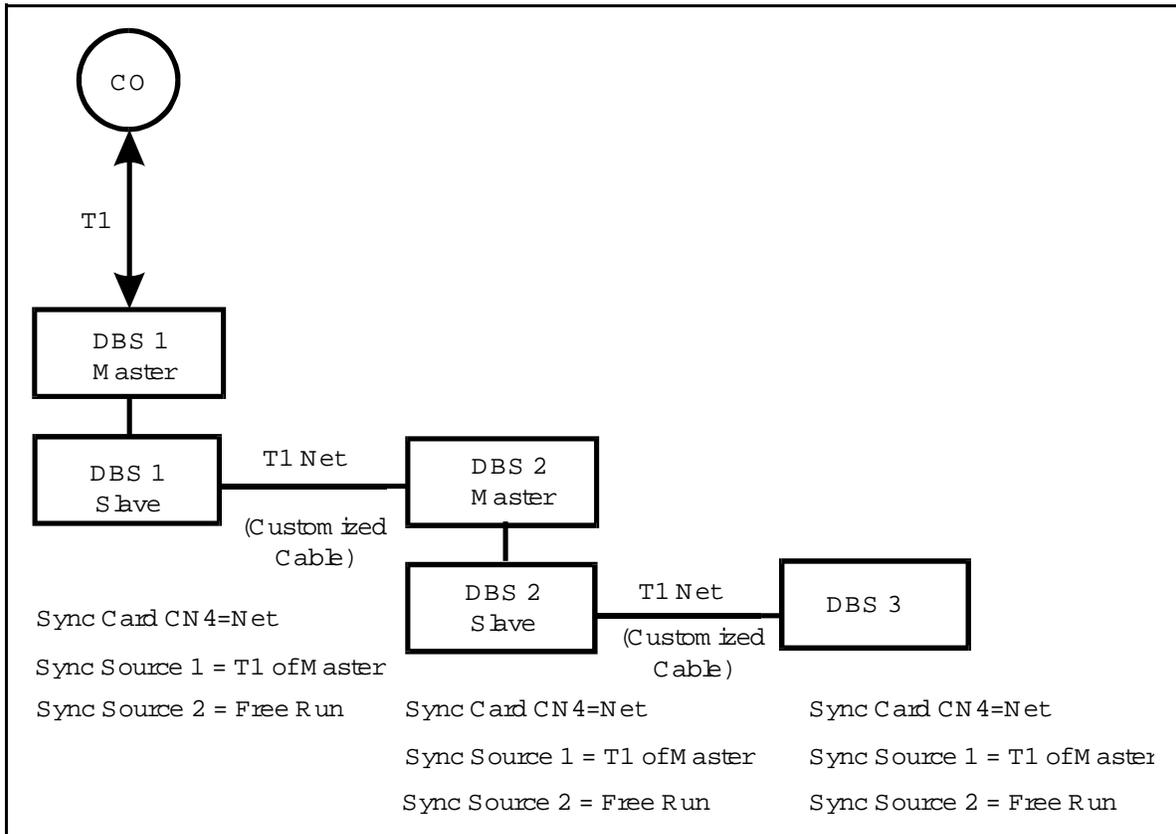
T1 Network - Three System Connections

Local Connection - Not Through CO

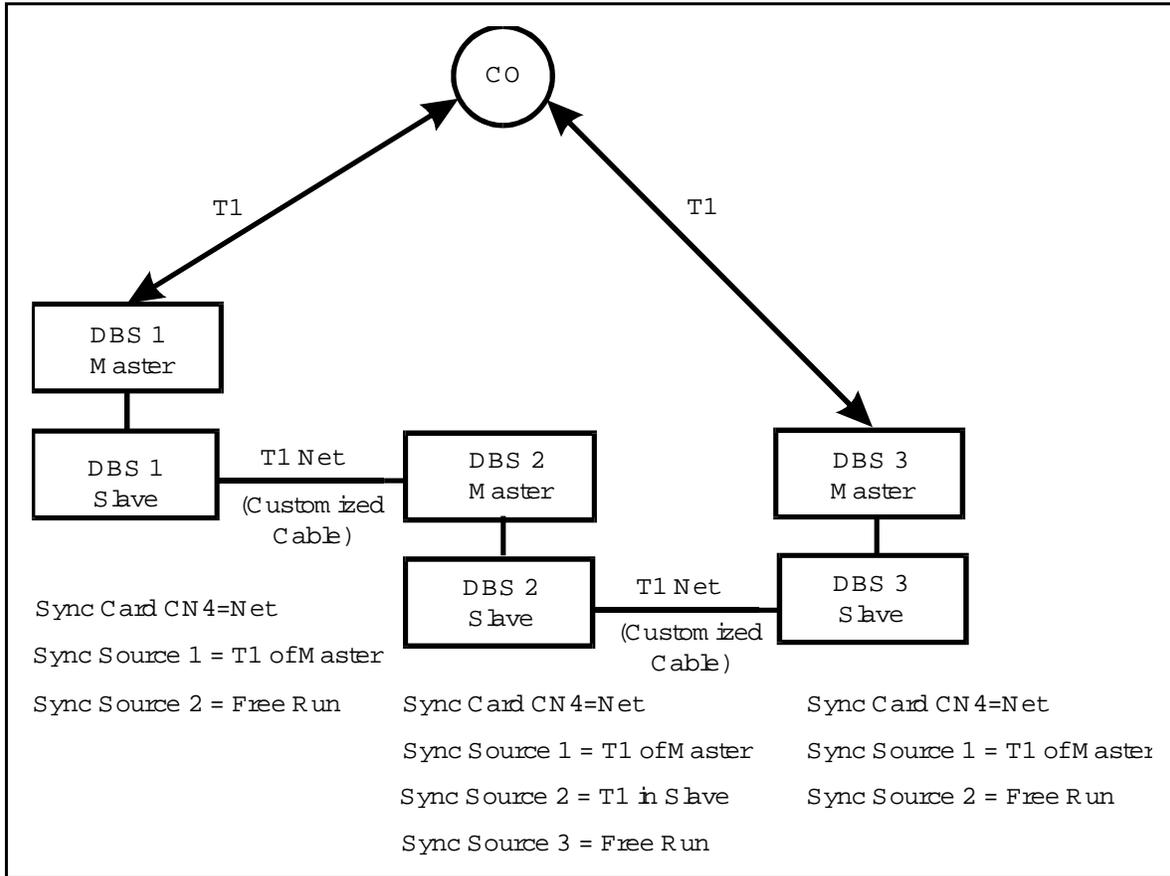
No Clock From CO



Clock From CO to One System

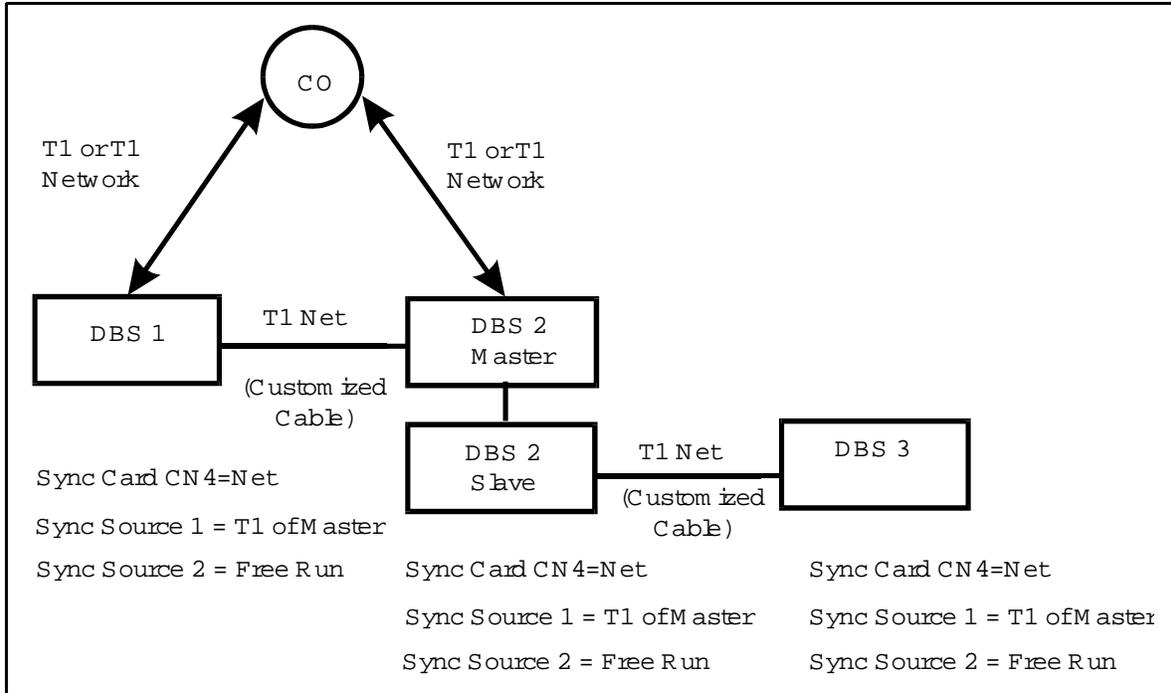


Clock From CO to Two Systems

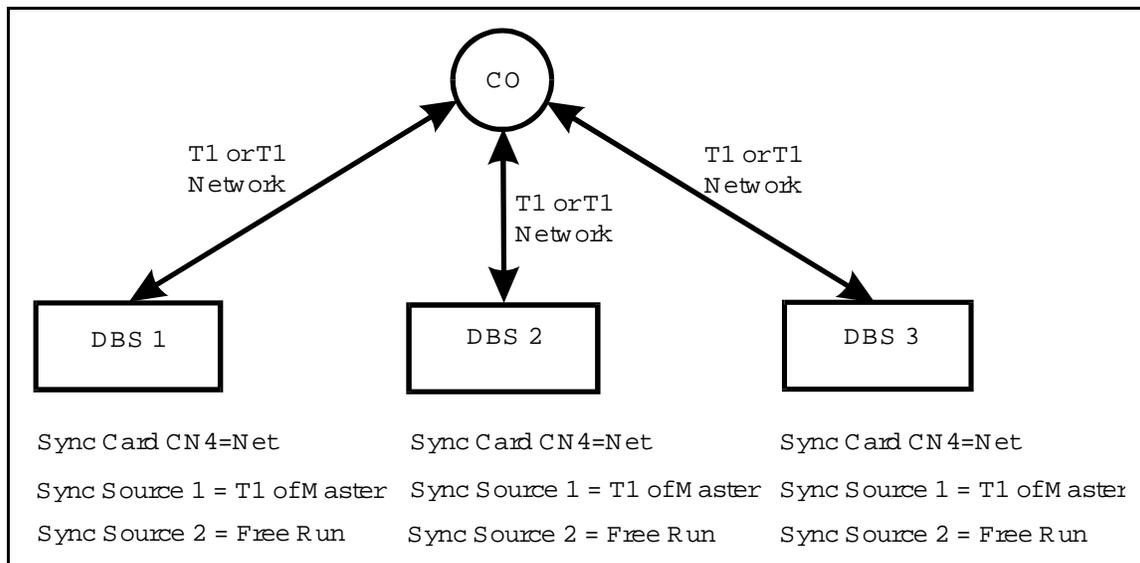


Remote Connections - Through CO

Clock From CO to Two Systems:



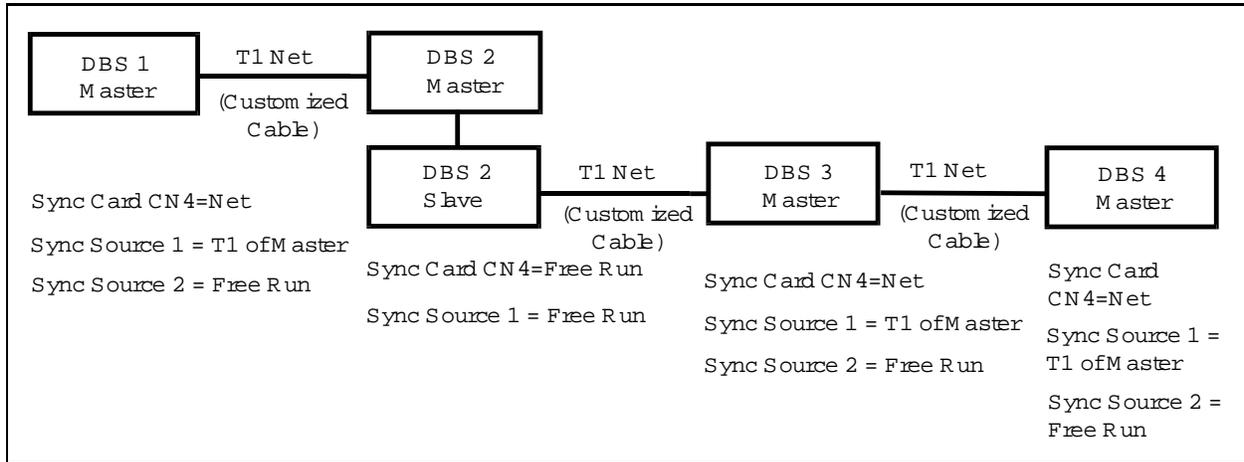
Clock From CO to All Systems:



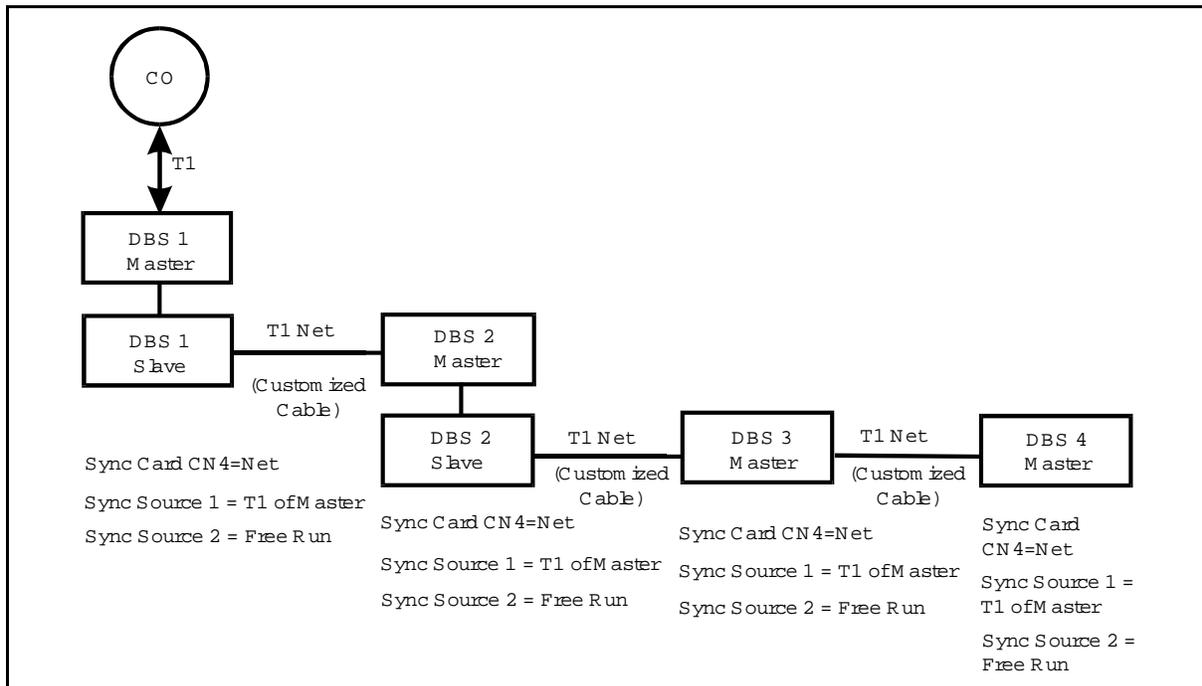
T1 Network - Four System Connection

Local Connection - Not Through CO

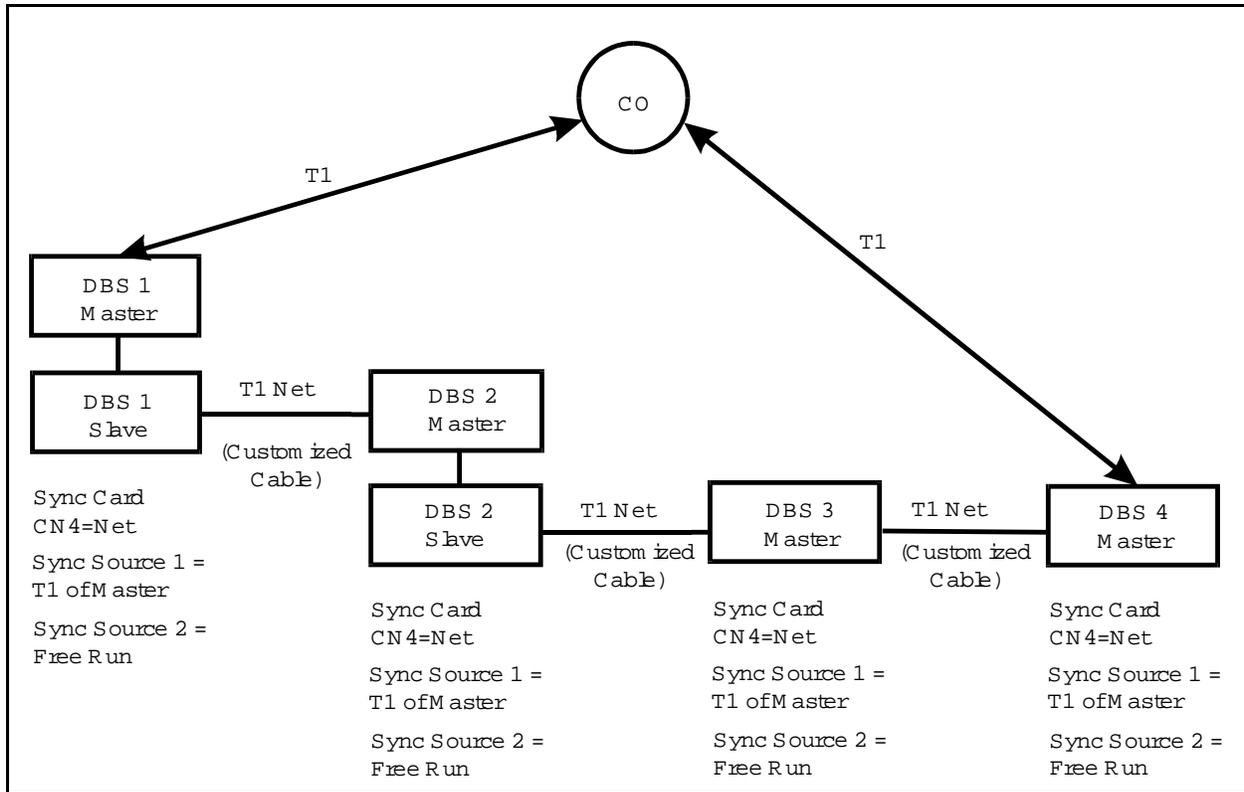
No Clock From CO:



Clock From CO to One System:

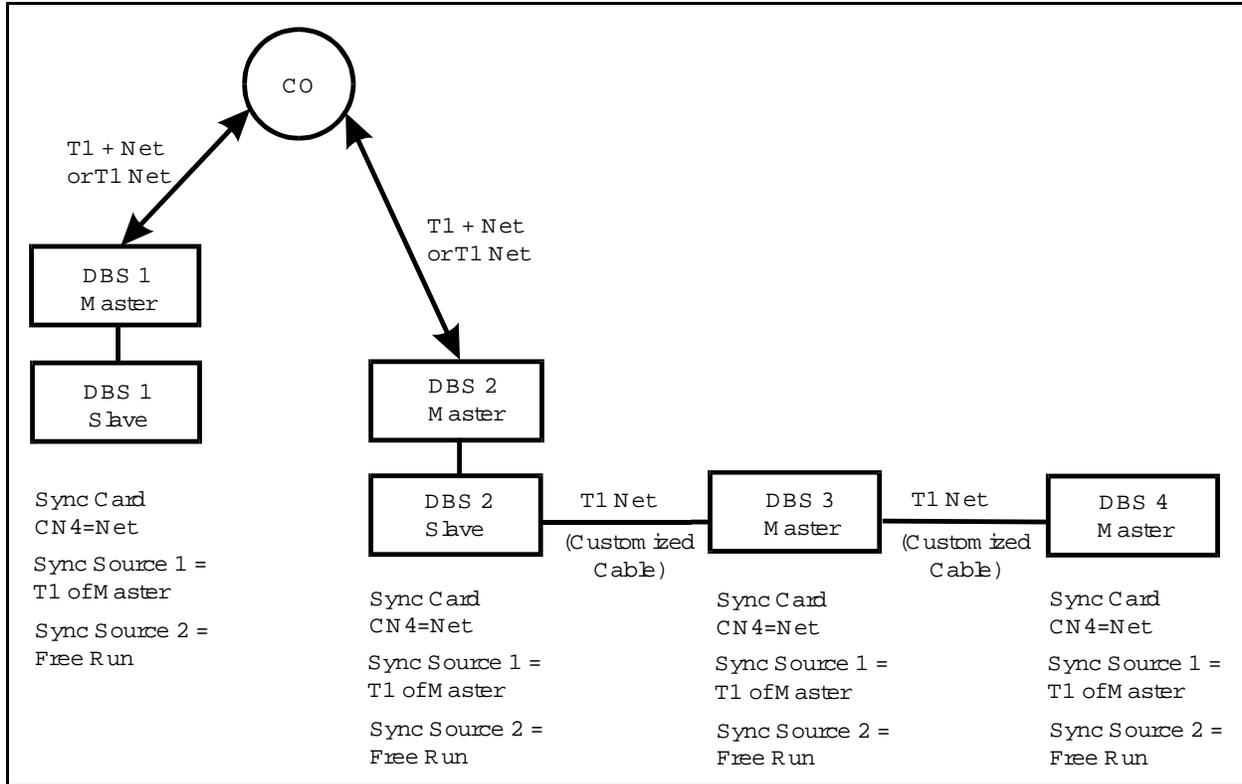


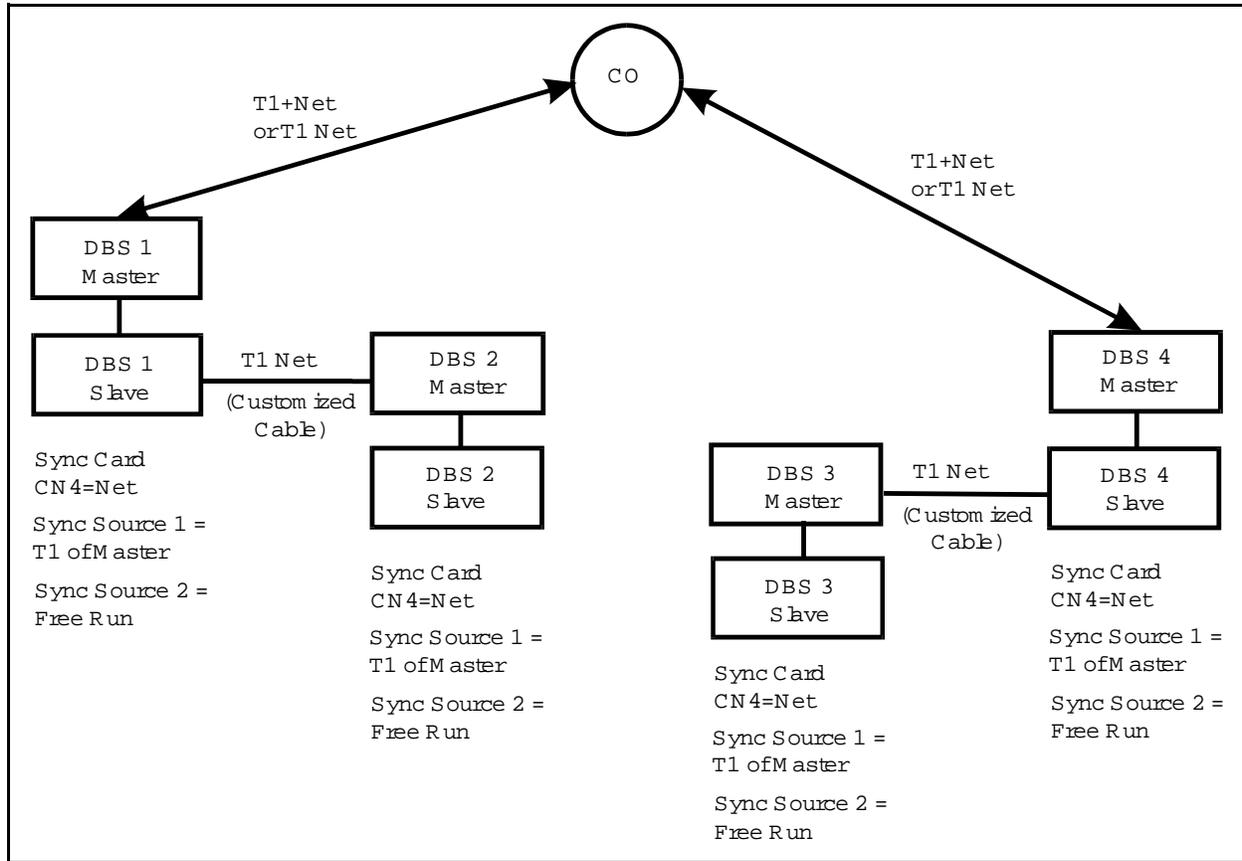
Clock From CO to Two Systems



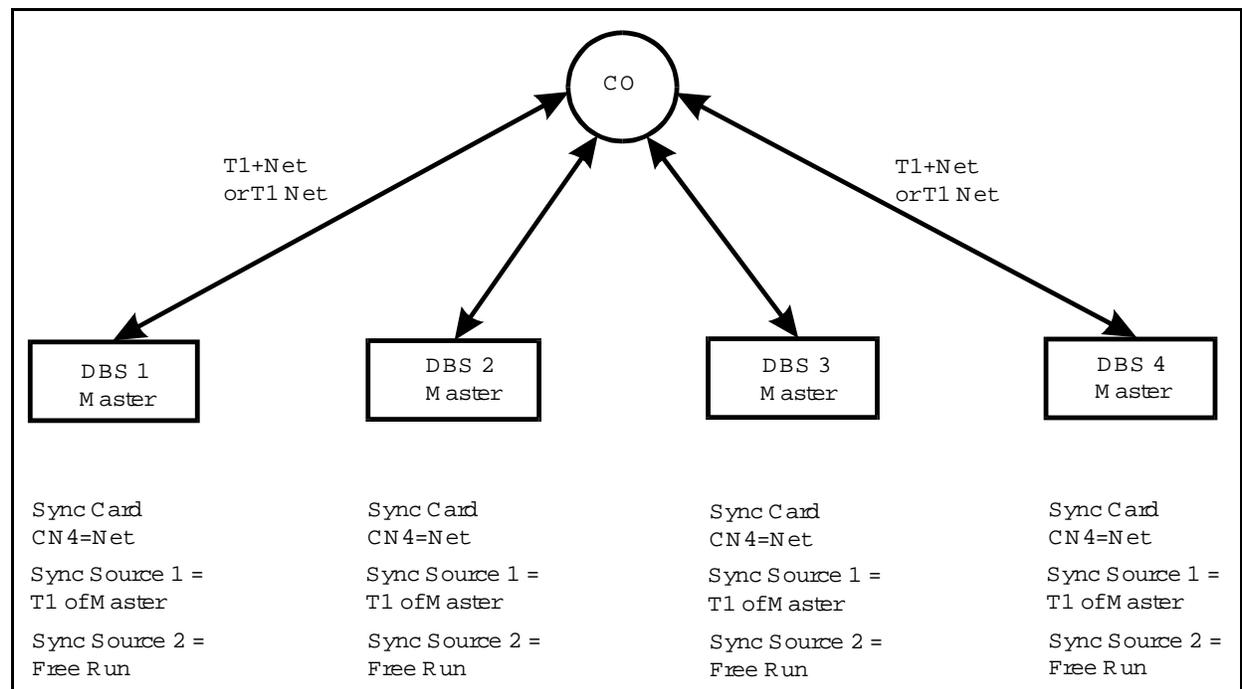
Remote Connection - Through CO

Clock From CO to Two Systems





Clock From CO to All Systems



DBS Network Telephone User Guide

This guide describes telephone operation related to network features. This guide may be copied and used in addition to the DBS Telephone User Guide.

Up to four DBS Systems may be interconnected in a DBS network. Calls may be made between systems (called network nodes) by dialing a route access code (1-4) that identifies the DBS node as the first digit of a four-digit number.

Note: Many of the networking features described below must be enabled before being used. For information on feature availability, contact your telephone system dealer or system administrator.

Calling a Network Extension

1. Pick up the handset.
2. Dial the four digit extension number.

Calling the Attendant

To dial the network attendant:

1. Pick up the handset.
2. Press "0."
3. Complete the call and replace the handset.

To dial the local attendant (when the network attendant is located at another DBS):

1. Pick up the handset or press **ON/OFF**.
2. Enter the local DBS access code (1-4) followed by "0."
3. Complete the call and replace the handset.

To dial an attendant located at another DBS:

1. Pick up the handset or press **ON/OFF**.
2. Enter the DBS access code (1-4) followed by "0."
3. Complete the call and replace the handset.

Call Forwarding to Extensions on Another Node

Any call can be forwarded to an extension on another network node by assigning the destination extension to a Speed Dial bin and assigning Call Forward Outside to that Speed Dial.

To assign Personal Speed Dials (for forwarding to an extension on another node):

1. Press **ON/OFF**.
2. Press **PROG**.
3. Press a One-Touch key or press **AUTO** followed by the personal speed dial bin number (900-909).
4. Dial the extension number.
5. Press **HOLD**.
6. Press **ON/OFF**.

To activate Call Forwarding to an extension on another node:

1. Press the **ON/OFF** key.
2. Dial "72."
3. Dial the appropriate call forwarding code.

Call Forward Type	Code
All	0
Busy/No Answer	1
Busy	2
No Answer	4

4. Press **AUTO** plus the appropriate speed dial number.
5. Press the **ON/OFF** key.

To cancel Call Forwarding

1. Press **ON/OFF**.
2. Dial "72."
3. Hang up.
4. Complete the call and replace the handset.

Network Paging

DBS Networking supports the standard paging feature on the local DBS as well as paging on a distant networked DBS.

Paging on the local DBS operates the same as for a non-networked DBS. To page on the local DBS, dial # followed by the number of the desired paging group (00-07).

Network paging requires that a leading DBS Network Route Access Number (1-4) be dialed preceding the page code. For instance, to page on DBS 2 Paging Group 03, dial 2#03.

To use the Paging feature on the local DBS:

1. Pick up the handset.
2. Press "#," then enter the number of the desired Paging Group (00-07).
3. Make your announcement.
4. Replace the handset.

To use the Paging feature to page on a Network DBS:

1. Pick up the handset.
2. Dial the Network DBS Access Code (1-4). This selects the DBS.
3. Press "#," then enter the number of the desired Paging Group (00-07).
4. Make your announcement.
5. Replace the handset.

Transferring Calls to the Network

A DBS Network provides two call transfer methods: blind transfer and screened transfer.

Blind Transfer

Blind transfer allows the transfer of a call directly to an extension on another DBS, without waiting for the called extension to answer.

1. Press the **HOLD** key to place the outside call on hold.
2. Dial the extension number to which the call is to be transferred.
3. Replace the handset.

Note: If Onhook Transfer is disabled, blind transfer is performed by pressing **HOLD**, dialing the extension number, pressing **PROG**, and then going onhook.

Screened Transfer

Using the Screened Transfer feature, you can contact a third party and announce the call before the transfer.

To use Screened Transfer when your system is set for Onhook Transfer:

1. Press the **HOLD** key to place the call on hold.
2. Dial the extension number to which the call is to be transferred.
3. When your call is answered, inform the third party of the transfer.
4. Hang up the handset.

To use Screened Transfer when Onhook Transfer is disabled:

1. Press the **HOLD** key to place the outside call on hold.
2. Dial the extension number to which the call is to be transferred.
3. When your call is answered, inform the third party of the transfer.
4. Press the **PROG** key.
5. Hang up to complete the transfer.

Conferencing Calls

You can add a party to an existing conversation even when the extension is on another DBS.

Any one conference call can contain up to four parties (including up to two trunks (outside/network)).

To establish a Conference Call:

1. Press **HOLD** or the line key of your current call to place it on hold.
2. Press any unlit line key or dial the number of the extension you wish to add to the call.
3. If you pressed an unlit line key in step 2, dial the number of the party you wish to add to the call. The number appears on the display.
4. Press the **CONF** key when your call is answered.
5. Repeat steps 1-4 to add a fourth party to a three-party Conference Call.

To add an extension to an outside call:

1. Press the **HOLD** key during the outside call.
2. Dial the additional party.
3. After the extension answers, press **CONF**. The three parties can now speak to one another.
4. Repeat steps 1-3 to add another extension to a three-party Conference Call.

To establish an Unsupervised Conference Call:

1. Press **HOLD** or the line key of your current call to place it on hold.
2. Press an unlit line key.
3. Dial the number of the party you wish to add to the call.
4. Press the **CONF** key when your call is answered.
5. To drop out of the conference and establish the Unsupervised Conference Call, press **HOLD**.
6. To return to the call, press one of the conference line keys.

Accessing Outside Lines on Another Node

To make an external call via a selected Network DBS:

1. Pick up the handset.
2. Dial the Network DBS access code (1-4).
3. Dial **9** (for outside line access) followed by the telephone number.
4. Complete the call and replace the handset.

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