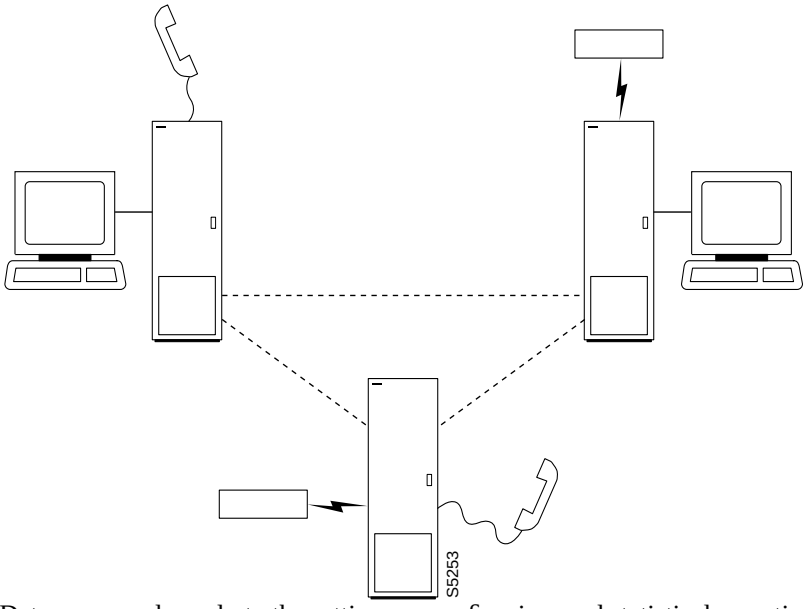
CHAPTER 8

Data Connections



Data commands apply to the setting up, configuring, and statistical reporting on data connections. For descriptions of the data commands on a FastPAD, refer to the *FastPAD User's Guide*. Examples of the tasks described in the chapter are:

- Setting up a circuit line and a data connection
- Configuring data channel redundancy
- Using interface control templates
- Enabling DFM and data channel utilization
- Enabling Embedded EIA operation
- Setting up DDS trunks

The nodes and card sets to which the commands in this chapter apply are:

- On an IPX, the card sets are the:
  - SDP/SDI
  - LDP/LDI
  - CDP/BC-T1, BC-E1, or BC-J1
- On an IGX, the card sets are the

— HDM/SDI,

— LDM/LDI

— CVM/BC-T1, BC-E1, or BC-J1

Setting Up a Data Connection

To set up a data connection:

Step 1 If necessary, configure the data channel at each end of the connection. Default configuration parameters exist, so using the following commands are optional. The designation of a data channel has the format *slot.port*. For example, 6.3 is port 3 on the card in slot 6. The items that need configuring depend on the type of data connection. The configuration commands and their associated parameters are as follows.

- cnfdclk — Specifies the clocking for the data channel
- cnfcldir — Sets the control leads for bidirectional pins 11 and 23 on an RS-232 data channel. The default is *input*
- tstport — Use sixth lead feature to provide test port loopback
- addyred — Enables optional card redundancy. This step requires extra hardware.
- cnfict — Configures an interface control template that determines output lead behavior for data channels. Output leads can be either configured as steady state (on or off) or programmed to follow an input lead. Five types of templates exist for channels in active, conditioned, looped, near, and far states.
- cpyict — Copies interface control template information from one channel to another. This step is optional.

Step 2 Add the connection with the **addcon** command. The above configuration must have been completed at each end before the connection can be added.

Configuring Data Channel Redundancy

You can configure redundant data channels by installing two identical card sets in adjacent slots and connecting the cards to the customer's line through a Y-cable. Applicable commands are"

- Use the **addyred** command to establish the redundant connection between the two card sets.
- Use the **delyred** command to remove redundancy from a redundant pair.
- Use the **dspyred** command to display Y-cable configurations.
- Use the **prtyred** command to print Y-cable configurations.

Using an Interface Control Template

Data channels have an associated default interface control template for each of the active (normal), conditioned, looped, near and far states. The templates define how the control leads at the data interface are to be configured (asserted, inhibited, follow a local source or follow a remote source).

You can change an interface control template by using the **cnfict** command. If you use **cnfict**, you must individually configure each template and each control lead. You can use **cpyict** to apply (copy) the settings of a template for one data channel to the template for another data channel.

Enabling DFM and Data Channel Utilization

DFM (Data Frame Multiplexing) is a feature on the IPX and IGX. With DFM enabled, repetitive data patterns (such as idle codes) are suppressed at the source and regenerated at the remote node. This feature has the effect of approximately doubling the bandwidth of the data channel. DFM is also known as Repetitive Pattern Suppression (RPS).

Note DFM operates on connections with maximum rate of 128 Kbps.

The command for changing the DFM enable-status for individual data channels is **cnfchdfm**. Before you execute this command, make sure the DFM feature has been activated on each applicable node by the WANSwitching Technical Response Team (TRT). You can check the DFM configuration for a channel by using the **dspchcnf** command. When the DFM feature is first activated at a node, it has the following default values:

- Percent of channel utilization is 100%
- Pattern length is 8 bits
- DFM status is enabled.

Enabling Embedded EIA Operation on the LDP or LDM

The EIA feature encodes the status of the CTS or RTS lead as the eighth bit in each data byte. The byte subsequently is processed in accordance with the DFM algorithm, which remains unchanged.

Any DCE and DTE combination at each end is valid. A typical configuration might have the LDP at one end of a connection as DCE (normal clocking) and an LDM at the other end as DTE (looped clocking). RTS is transmitted in encoded form from the remote end to the local end, and CTS is transmitted in the other direction. Other EIA leads use the non-interleaved format.

The EIA feature is allowed for all legal baud rates 19.2 kbps and below and is activated by typing encoding type 7/8E followed by an *Z when adding a connection using the **addcon** command. Different channels on the same card may be set up with or without the feature, but all ports on the card must be configured at or below 19.2 kbps for EIA to be active. Note that you do not have to enter *Z after 7/8E on the command line because the system automatically enters it.

Setting Up DDS Trunks

DDS Trunks normally operate at 56 Kbps. The IPX and IGX can provide a direct interface to a DDS line and provide limited distance access to Data Service Units (DSUs) by using the DDS format over private lines. The LDI4/DDS back card and LDP (Model B) or LDM front card support DDS. Each LDI/DDS supports four DDS trunks in DSU or OCU modes.

- Use the **cnfdchtp** command to configure the DDS port. Specify OCU or DSU for the port type.
- Add the connection using the **addcon** command. When prompted for the rate, enter 2.4 Kbps, 4.8 Kbps, 9.6 Kbps, 19.2 Kbps, or 56 Kbps.

Summary of Commands

The following list shows the full command name and starting page of each description:

Table 8-1 .

Mnemonic	Description	Page
addcon	Add connection	8-5
cnfchdfm	Configure Data Frame Multiplexing (DFM)	8-10
cnfcheia	Configure EIA	8-12
cnfcldir	Configure control lead direction	8-14
cnfdchtp	Configure data channel interface type	8-16
cnfdclk	Configure data clock	8-19
cnfict	Configure interface control template	8-23
cpyict	Copy interface control template	8-29
delcon	Delete connection	8-31
dspchcnf	Display channel configuration	8-33
dspcon	Display connection	8-35
dspcons	Display connections	8-37
dspict	Display interface control template	8-40
prtchcnf	Print channel configuration	8-42
prtcons	Print connections	8-43
prtict	Print interface control template	8-45

addcon

Establishes data channel connections between nodes in a network. After you add a connection using the **addcon** command, the node automatically routes the connection. The node where you execute **addcon** is the "owner" of the added connections. The concept of ownership is important because you must enter information about automatic rerouting and preferred routing at the node that owns the connection. See the **cnfpref** and **cnfcos** commands for more information on automatic rerouting. Before the node adds the connection, the proposed connection appears on the screen with a prompt for you to confirm the addition.

When applied to data connections, the **addcon** command adds a synchronous data connection to the network. You can add synchronous data connections to any node slot equipped with either an LDP or SDP card in an IPX or an LDM or HDM in an IGX. Before you add a connection, determine the desired data rate. To find the data rates that individual cards support, refer to the card descriptions in the *IGX Reference Manual* or the *IPX Reference Manual*.

When connecting sets of data channels, you do not have to specify the full channel set for the local end of the connection. You have to designate only the first channel in the range. For example, to add connects 27.1-4 at local node alpha to channels 9.1-4 at beta, you can enter "addcon 27.1-4 beta 9.1". If Y-cable redundancy has been specified, you can add data connections at only primary card slots (not at the secondary card slots). See the **addyred** description for more information. Table 8-2 lists the data rates. The following notations appear with some data rates:

- * Must be used with 8/8 or 8/8I coding.
- /n Specifies a partially filled packet type: the /n allows partial packets to be sent and so avoid the delay incurred by waiting to build a full packet
- f Entered after the data rate, an f specifies "fast EIA" (interleaved EIA) for the connection.
- t Indicates "transparent" (CDP or CVM subrate DS0A): if you include the t-option, the IPX or IGX does not check for supervisory or control information.

Table 8-2

Standard Data Connection Rates

1.2	3.6	8	16f	64f	230.4f
1.2/2	3.6/4	8/10	19.2	72	256f
1.2f/1	3.6f/2	8f	19.2f	76.8	288
1.2f/2	3.6f/5	9.6	24	84	336
1.8	4.8	9.6/10	24f	96	384f
1.8/2	4.8/4	9.6f	28.8	96f	448
1.8f/2	4.8/10	12	28.8f	112	448f
2.4	4.8f/5	12/10	32	112f	512
2.4/2	6.4	12.8	32f	115.	512f
2.4/4	6.4/4	12.8/10	38.4	128	672
2.4f/2	6.4/10	12f	48	128f	768
2.4f/5	6.4f/5	14.4	48f	144	2772
3.2	7.2	14.4/10	56	168	896
3.2/4	7.2/4	14f	56f	192	1024

Standard Data Connection Rates					
3.2f/2	7.2/10	16	57.6	224	1152
3.2f/5	7.2f/5	16.8	64	230.4	1344*
CDP or CVM super-rate types:(types indicate the number of 56 Kbps or 64 Kbps channels in the super-rate bundle—See Example 2)					
1x56	5x56		1x64	5x64	
2x56	6x56		2x64	6x64	
3x56	7x56		3x64	7x64	
4x56	8x56		4x64	8x64	
CDP or CVM subrate DS0A (transparent data rates)					
2.4t	4.8t	9.6t	56t		

In “fast EIA” signalling mode, an interleaved byte of EIA signalling information is associated with every byte of data in a packet. This format is appropriate for applications where EIA lead transitions must closely synchronize with user data. Fast EIA can apply to data rates up to 512 Kbps.

When user-data arrives with the 7/8 coding format, 7-bit bytes are used to build a packet. The user-data can have any format and can contain any pattern, including all “0”s. The single “1” inserted in the final bit position ensures that no more than seven consecutive “0”s occur in a byte. The 7/8 coding format is the safest mode to use when the data protocol is unknown.

When user-data arrives with the 8/8 coding format, 8-bit bytes are used to build a packet. The 8/8 coding format is more efficient than the 7/8 format, but the end-user equipment is responsible for meeting the T1 requirement of no more that 7 consecutive “0”s in a byte. If this requirement is not met, the IPX or IGX inserts a “1” to invalidate the data. This mode can be used if the data or line protocol avoids long strings of zeros. An example line is a T1 trunk that uses B8ZS encoding.

When the arriving user-data has the 8/8I coding format, all 8 bits are used to form the bytes in a packet. The data is inverted so that 1s are changed to 0s, and 1s are changed to 0s. The end-user equipment must guard against data that contains over 7 consecutive “1”s in a byte, which (when inverted) would violate the T1 transmission requirement. This violation of the T1 transmission requirement would cause the IPX or IGX to insert a “1” to invalidate the data. This format can be used for data protocols in which the idle codes are long strings of 0s, and the data bytes are scrambled.

If the data protocol requires an acknowledgment and is delay-sensitive avoid routing the connection over a satellite line (*s for avoid). If 8/8 or 8/8I coding is the selected format, Cisco suggests avoiding the use of trunks with zero code suppression (*z for avoid), because the zero code suppression could corrupt the last bit in the byte.

Full Name

Add a connection

Syntax

addcon <local channel> <remote node> <remote channel> <type> <coding> [avoid]

Related Commands

delcon, dncon, dspcon, dspcons, upcon

Attributes

Privilege	1–2
Jobs	Yes
Log	No
Node	IPX, IGX
Lock	Yes

1-2

Yes

Yes

IPX, IGX

Yes

Example 1

addcon 6.1 pubsipx2 11.1 56

Description

Add a low speed data connection of 56 Kbps at 6.1. The connections are highlighted on the screen. A prompt appears asking you to confirm these connections. Respond “y” for yes to add the connection. The connections screen then appears showing that data channel 11.1 on node pubsipx2 is connected to channel 6.1 on node pubsipx1. The “56” under the “type” category indicates that the data rate for the channel is 56 Kbps.

System Response

```
pubsipx1       TN    SuperUser       IPX 16    8.2    July 25 1996 06:23 PDT

 From           Remote      Remote
 6.1            NodeName    Channel         State  Type      Compress  Code COS
 6.1            pubsipx2    11.1            Ok     56                  7/8  0









Last Command: addcon 6.1 pubsipx2 11.1 56


Next Command:
```

Example 2

addcon 5.1 beta 6.1-4 4x64

Description (CDP super-rate connection)

Add a 256 Kbps (4x64) connection from an SDP at node alpha to the CDP circuit line at node beta. Data rates are taken from the Standard Data Rate Connections in the preceding pages.

addcon slot.port remote nodename slot.start channel-end channel rate

Example 3

addcon 5.4-7 beta 6.1-4 4x64

Description (CDP to CDP or CVm to CVM)

Add a 256 Kbps (4x64) data connection from a CDP (or CVM) at node alpha to the CDP (or CVM) circuit line at node beta. The syntax for this example requires that the start and end channel are entered for both ends of the connection and that the *data rate* is specified to be the same at both ends. The channel *numbers* can be different on each end if they are contiguous.

addcon slot.start channel -end channel remote nodename

slot.start channel -end channel rate

Table 8-3 addcon – Parameters

Parameter	Description	
local channel	Specifies the local channel or set of channels in the format slot.port [–port]. (The brackets indicate you can specify a range of channels.)	
node	Specifies the name of the node at the other end of the connection. For a DACS-type connection (where channels on a node are connected to channels on the same node), use the local node name.	
remote channel	Specifies the remote channel or set of channels in the format slot.port [–port]. (The brackets indicate you can specify a range of channels.)	
type	Specifies the data connection bit rate, EIA control lead mode, and in some cases, the number of data bytes in a data packet. Refer to the Standard Data Connection rates for allowable bit rates.	
coding	Specifies the data coding format for data transmissions. Valid formats are:	
	7/8	7 bits of user data plus a "1" inserted in the final bit position of each data byte in a data packet. This is the default coding.
	7/8e	Used with LDP or LDM application.
	8/8	8 bits of user data for each data byte in a data packet.
	8/8I	8 bits of user data for each data byte in a packet. The data is inverted

Table 8-4 addcon – Optional Parameters

Parameter	Description
avoid	Specifies the type of trunk for the connection to avoid. The default is no avoidance. The choices are: *s avoid satellite trunks. *t avoid terrestrial trunks. *z avoid trunks using zero code suppression techniques that modify any bit position to prevent long strings of 0s.

cnfchdfm

Enables or disables DFM for individual channels and sets the DFM parameters for the channels. The default state when the (purchased) DFM feature is activated on a card is enabled. Because DFM is a purchased option, the WANSwitching TRT must activate on the applicable nodes before you use the **cnfchdfm** command. The cards that support the use of **cnfchdfm** are the SDP and LDP on the IPX and the LDM and HDM on the IGX.

The DFM feature must be both *installed* and *enabled*. The DFM feature must be installed through software control at each node terminating the connection. If DFM is not installed for a pertinent node in the network, the **cnfchdfm** command has no effect at that node. Furthermore, you must use **cnfchdfm** at both ends of the connection to enable DFM.

Full Name

Configure channel DFM

Syntax

cnfchdfm <channel(s)> <7 | 8 | 16> [e | d]

Related Commands

dspchcnf

Attributes

Privilege	1–2
Jobs	Yes
Log	Yes
Node	IPX, IGX
Lock	Yes

Example 1

cnfchdfm 5.1 8

Description

Set the DFM pattern length to 8 bits for data channel 5.1

System Response

```
alpha          TRM   YourID:1        IPX 16    8.2    Mar. 15 1996  16:21 PST

           Maximum EIA     %    DFM Pattern      DFM
Channels   Update Rate   Util   Length          Status
5.1           15          100     8             Enabled
5.2-4          2          100     8             Enabled




Last Command: cnfchdfm 5.1 8


Next Command:
```

Table 8-5 cndchdfm – Parameters

Parameter	Description
channel	Specifies the channel or range of channels.
7/8/16	Specifies the pattern length in bits for the DFM algorithm. The default is 8 bits

Table 8-6 cndchdfm – Optional Parameters

Parameter	Description
e/d	Enables or disables DFM. The default is "e." Note that DFM works at rates no higher than 128 Kbps.

cnfcheia

Sets the sampling rate for the updating EIA control leads. This rate can be set from 0 (no sampling) to 20 updates per second and defaults to 2 seconds. This rate governs the polling interval and packet generation rate for the EIA leads associated with the channel.

At 20 updates/sec, the control leads are polled for changes every 50 msec. Therefore, changes occurring more rapidly than that may not be detected. If there is no change in EIA lead status, no packet is sent. A minimum of one update per second is sent if the maximum update rate chosen is from 1 to 20. If the connection is configured in such a way that an implied isochronous clock is detected, the update rate is always 20/sec in the same direction as that of the clock signal. For 1.544 Mbps data connections, this defaults to 0.

Full Name

Configure EIA update rate for channels

Syntax

cnfcheia <channel(s)> <update_rate>

Related Commands

dspchcnf

Attributes

Privilege	1–2
Jobs	Yes
Log	Yes
Node	IPX, IGX
Lock	Yes

Example 1

cnfcheia 5.1 15

Description

Set the EIA update rate to 15 sec. for data channel 5.1

System Response

```
alpha          TRM   YourID:1        IPX 16    8.2    Mar. 15 1996 16:20 PST

            Maximum EIA      %       DFM Pattern    DFM
Channels    Update Rate    Util      Length         Status
5.1             15         100          8           Enabled




Last Command: cnfcheia 5.1 15


Next Command:
```

Table 8-7 cnfcheia – Parameters

Parameter	Description
channel	Specifies the channel or range of channels to over which to configure the EIA update rate.
update rate	Specifies the maximum EIA update rate in updates per second.

cnfcldir

Sets the control lead direction for pins 11 and 23 on the RS-232 data channels of an SDP or HDM card set. This allows the control leads to carry “backward” channels. Pins 11 and 23 on an RS-232 interface are bi-directional. The signals on these pins can have various names, such as SI, SF, CH, CI, and QM. To display control lead information about pins 11 and 23, use the **dspbob** command. Use the **cnfict** command to configure the behavior of all output leads.

Full Name

Configure control lead direction.

Syntax

cnfcldir <channel> <lead> <direction>

Related Commands

cnfict, dspbob, dspict

Attributes

Privilege	1–2
Jobs	Yes
Log	Yes
Node	IPX, IGX
Lock	Yes

Example 1

cnfcldir 3.1 11 input

Description

Configure lead number 11 of channel 3.1 to be an input. The screen example shows the display after the system has accepted the input as valid.

System Response

```
pubsipx1       TN    SuperUser       IPX 16    8.2      Aug. 14 1996 00:30 GMT

Port:           3.1
Interface:      V35   DCE
Clocking:       Normal

      Inputs from User Equipment              Outputs to User Equipment
 Lead  Pin          Lead  Pin            Lead  Pin          Lead  Pin
 RTS   C                                 CTS   D
 DTR   H                                 DSR   E
 TxD   P/S                               DCD   F
 TT    U/W                               RI    J
                                         TM    K
                                         RxD   R/T
                                         RxC   V/X
                                         TxC   Y/a


Last Command: cnfcldir 3.1 11 input


Next Command:
```

Table 8-8 cnfcldir – Parameters

Parameter	Description
channel	Specifies the RS-232 data channel whose control lead direction to configure.
pin number	Specifies the pin number of the control lead. The valid pin numbers are 11 and 23.
direction	Specifies the direction of the control lead signal. Valid control lead directions are: Input: The control lead acts as an input to the IPX or IGX. This is the default. Output: The control lead acts as an output from the IPX or IGX.

cnfdchtp

Configures a CDP, CVM, or LDP or LDM DDS port interface type to OCU or DSU. When configuring DDS operations, this command returns an error if executed on a slot with an RS-232 back card. It forces a back card slot from RS-232 mode to DDS mode if a back card is not installed and there are no connections. Any Y-cable association is deleted in this case. The clocking tracks the DDS port interface type. OCU type interfaces are configured as “looped”, and DSU type interfaces are configured as “normal”. The default interface is “DSU”.

When configuring CDP or CVM operation, this command configures DCE types as “normal” clocking and DTE types as “looped” clocking. The default type is DCE. For T1 lines, DS0A on T1 unassigned signalling is configurable. When a connection is not present, voice channels are converted to data channels.

Full Name

Configure data channel interface type.

Syntax

cnfdchtp <channel> <interface type> [unassigned signaling]

Related Commands

none

Attributes

Privilege	1–2
Jobs	Yes
Log	Yes
Node	IPX, IGX
Lock	Yes

Example 1

cnfdchtp 31.1 oc

Description

Configure DDS channel 31.1 as OCU

System Response

```
beta           TRM   YourID:1        IPX 32    8.2    Mar. 15 1996 17:30 MST

Data Channel:      31.1
Interface:         DDS-4   OCU Config
Clocking:          Looped

            Interface Control Template for Connection while ACTIVE

 Lead    Output Value    Lead    Output     Value
 DSR      ON     CTS     ON
 DCD      ON




Last Command: cnfdchtp 31.1 oc


Next Command:
```

Example 2

cnfdchtp 22.1 dce

Description

Configure channel 22.1 as DCE with T1 unassigned signalling.

System Response

```
beta           TRM   YourID:1        IPX 32    8.2    Mar. 15 1996  17:30 MST

Data Channel: 22.1
Interface:MissingDDS0A DCE Configuration
Clocking:Normal

            Interface Control Template for Connection while ACTIVE

 LeadOutput ValueLeadOutput Value
 DSRONCTSON
 DCDON




Last Command: cnfdchtp 22.1 dce t


Next Command:
```

Table 8-9 cnfdchtp – Parameters

Parameter	Description
channel	Specifies the channel to configure in the format <slot>. <port>.
interface type	Specifies the interface type to configure. An LDP or LDM DDS port can be configured as DSU or OCU (enter ‘ds’ or ‘oc’). A CDP or CVM port can be configured as DCE or DTE (enter ‘dce’ or ‘dte’).

Table 8-10 cnfdchtp – Optional Parameters

Parameter	Description
channel	Specifies the channel to configure in the format slot. port
unassigned signalling	Specifies an optional parameter for T1 lines to indicate DS0A or T1 unassigned signalling. Enter ‘d’ for DS0A or ‘t’ for T1.

cnfdclk

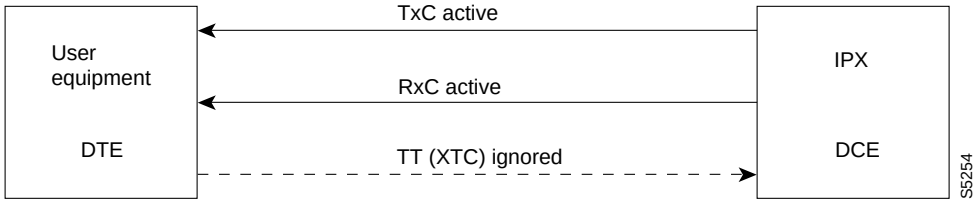
Configures the clocking for a data channel. In general, the clock configuration may be normal, split, or looped for an SDP or HDM (fewer options for an LDP or LDM). The clock configuration of each channel of a connection determines how the clock will be propagated through the network, and how external equipment should be synchronized.

If clocking is not set correctly, there may be no synchronization, and the connection will operate in a plesiochronous mode. Each data port can be configured independently to act as either DCE or DTE by adjusting the jumper (SDI card) or changing the adapter cable (LDI card) on the data interface card. The effect of the clocking type designated depends on whether each data port is configured as DTE or DCE. The following data clocking configurations are possible with the **cnfdclk** command:

DCE-Configured IPX/IGX Data Port: Normal Clocking

When the data port is configured as DCE, selecting a clocking type of "n" (for normal) results in clocking as illustrated below. The IPX or IGX, acting as DCE, provides both the transmit and receive data clocks to the user equipment.

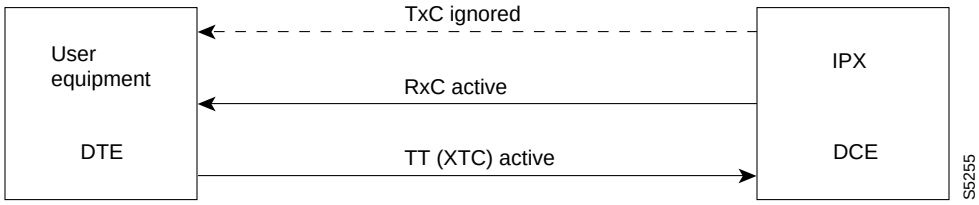
Figure 8-1



DCE-Configured IPX/IGX Data Port: Split Clocking

When the data port is configured as DCE, selecting a clocking type of "s" (for split) results in clocking as illustrated below. In "split" clocking, TT may be generated independently of RxC. The maximum data rate for split clocking is 112 kbps.

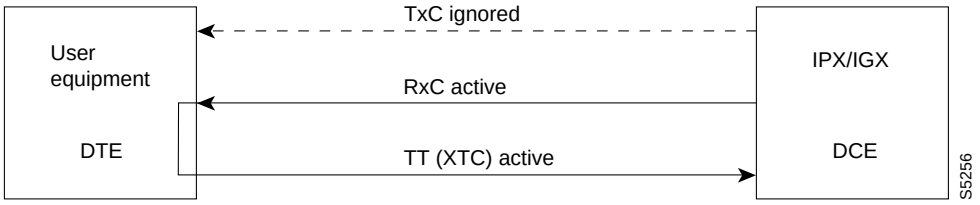
Figure 8-2



DCE-Configured IPX/IGX Data Port: Looped Clocking

When the data port is configured as DCE, selecting a clocking type of "l" (for looped) results in clocking as illustrated below. The "Terminal Timing" signal, called TT or XTC, is simply RxC looped back from the user equipment. In this configuration, it is important that the two clocks (RxC and TT) be frequency locked. This clocking configuration is supported for all data rates.

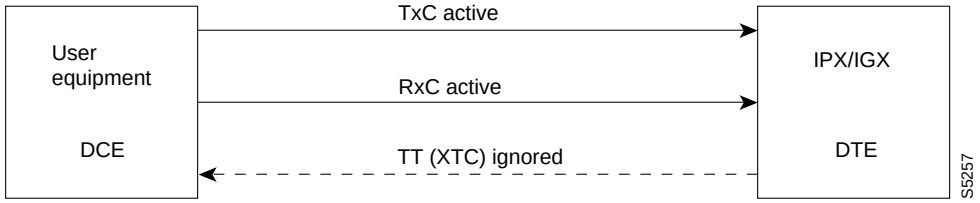
Figure 8-3



DTE-Configured IPX/IGX Data Port: Normal Clocking

When the data port is configured as DTE, selecting a clocking type of “n” (for normal) results in clocking as illustrated below. The IPX, acting as DTE, receives both the transmit and receive data clocks from the user equipment. When the user equipment is not referenced to the network clock, the maximum data rate for this configuration is 112 kbps. The two clocks must be frequency-locked for proper operation.

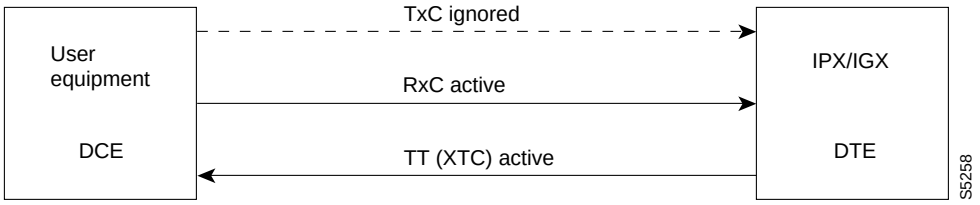
Figure 8-4



DTE-Configured IPX/IGX Data Port: Split Clocking

When the data port is configured as DTE, selecting a clocking type of “s” (for split) results in the clocking as illustrated below. When the user equipment is not referenced to the network clock, the maximum data rate for this configuration is 112 kbps. The two clocks must be frequency-locked for proper operation.

Figure 8-5



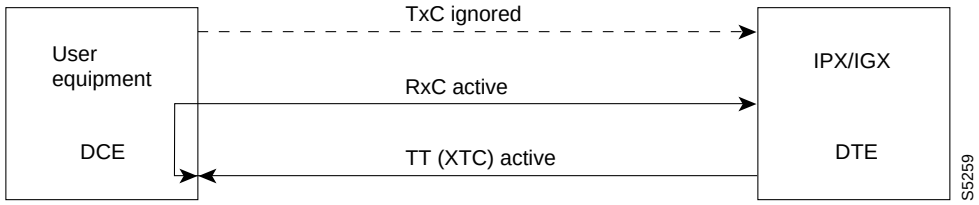
DTE Configured IPX Data Port: Looped Clocking

If you specify clocking type of “l” (looped) when the data port is in DTE mode, the result is the clocking arrangement shown in Figure 8-6. The RxC clock signal is the TT(XTC) signal looped back to the IPX or IGX by the user equipment. The network supports this clocking configuration for all data rates. The restrictions to the data clocking schemes are:

- Except for special cases, isochronous clocking is limited to data rates of 112 Kbps or less. For higher data rates, all clocks must be frequency-locked to the network.

- For any port there must be only one isochronous clock in a direction. Any situation where user equipment provides two clock signals that are not locked is subject to slippage.
- Slippage may also occur in any situation where there are opposing user clocks for a single direction of data.

Figure 8-6



Full Name

Configure data channel clocking type

Syntax

cnfdclk <channel> <normal/split/looped>

Related Commands

none

Attributes

Privilege	1–2
Jobs	Yes
Log	Yes
Node	IPX, IGX
Lock	Yes

Example 1

cnfdclk 5.1 n

Description

Configure the clocking for channel 5.1 to normal

System Response

```
alpha          TRM   YourID:1        IPX 16    8.2    Mar. 23 1996 10:41 PST

Data Channel:      5.1
Interface:         V35   DCE
Clocking:          Normal

            Interface Control Template for Connection while ACTIVE

 Lead    Output Value         Lead     Output     Value
 RI      (J)     OFF           DSR       (E)      ON
 CTS     (D)     ON            TM        (K)      OFF
 DCD     (F)     ON




Last Command: cnfdclk 5.1 n


Next Command:
```

Table 8-11 cnfdclk – Parameters

Parameter	Description
channel	Specifies the channel to configure in the format <slot>. <port>.
normal/split/looped	Specifies the clocking type to assign to the channel. Valid clocking types are: n Normal. s Split. l Looped.

cnfict

Sets the interface control template signals. The signals that can be set using cnfict depend on the type of back card used and whether the hardware is configured for DCE or DTE. On an IPX, the applicable front cards are the SDP, LDP, FRP, CDP (for data), and FTC (for data). On an IGX, the applicable front cards are the LDM, HDM, FRM, CVM (for data), and FTM (for data). Each data channel has a default interface control template for its active, conditioned, and looped near and far states. The cnfict command is used to change a control template. Each interface control lead in each template is individually configured.

When Y-cable redundancy is in effect, the control template configuration for the data channels terminating at the primary slot is also applied to the data channels of the secondary slot. Any configuration information for the secondary slot is ignored. The list below shows the configurable leads. The leads are configurable for each type of data interface supported by the IPX or IGX. The entries under the "IPX/IGX Name" column indicate the abbreviations to use when specifying input or output leads on the command line. The leads listed below show the equivalence between RS-232C, RS-232D, RS-449,V.35, and X.21 interfaces. The IPX treats leads impartially for non-interleaved connections. Any signal received on an EIA pin at one end may be transmitted to any pin at the other end, up to the maximum of 12 EIA leads on any interface type. For interleaved EIA connections, refer to the "Fast EIA" column. The column shows which leads are carried in the interleaved bytes in the data packets. All remaining leads are carried in traditional control lead packets.

Table 8-12

Configurable Leads

Source	IPX/IGX Name	RS-232C	RS-232D	RS-449	V.35	X.21	Fast EIA	Function
DTE	RTS	CA	CA	RS	C		F4	Request to Send
DCE	CTS	CB	CB	CS	D		F4	Clear to Send
DCE	DSR	CC	CC	DM	E		F3	Data Set Ready
DCE	DCD	CF	CF	RR	F		F7	Data Carrier Detect (RLSD)
DCE	QM	QM	QM					Equalizer Mode
DTE	pin 11	11	11					Sometimes used for Data
DCE	SDCD	SCF	SCF					Secondary Data Carrier Detect
DCE	SCTS	SCB	SCB					Secondary Clear to Send
DTE	STxD	SBA	SBA				F5	Secondary Transmit Data
DTE	NS			NS			F7	New Sync
DCE	SRxD	SBB	SBB				F5	Secondary Receive Data
DCE	DCR	DCR						Divided Receiver Clock
DTE	RL		RL	RL			F6	Remote Loopback
DTE	SRTS	SCA	SCA					Secondary Request to Send
DTE	DTR	CD	CD	TR	H		F3	Data Terminal Ready
DCE	SQ	CG	CG	SQ				Signal Quality Detect
DCE	RI	CE	CE	IC	J**			Ring Indicator
DTE	SF	CH	CH	SF				Signal Rate Select (to DCE)
DCE	SI	CI	CI	SI				Signaling Rate Select. (to DTE)

Configurable Leads								
Source	**IPX/IGX Name**	**RS-232C**	**RS-232D**	**RS-449**	**V.35**	**X.21**	**Fast EIA**	**Function**
DTE	BSY	BSY		IS			F1	Busy (In Service)
DCE	SB		TST	SB			F1	Test Indicator
DTE	LL			LL			F2	Local Loopback
DCE	TM			TM	K[1]		F6	Test Mode
DTE	SS			SS				Select Standby
DTE	C					C		Control
DCE	I					I		Indicator

1. Applicable to SDP cards only.

Note that pins 11 and 23 on an RS-232 port are bi-directional, and their default direction is input. See the **cnfcldir** command for information on changing the direction of these pins. The **cpyict** command can be used to copy an interface control template from one data channel to another. It can then be edited using the **cnfict** command. The **dspbob** command displays the state of leads at specified intervals.

Full Name

Configure interface control templates

Syntax

cnfict <port> <template> <output> <source>

Related Commands

addextp, dspict, tstport

Attributes

Privilege	1–2
Jobs	Yes
Log	Yes
Node	IPX, IGX
Lock	Yes

Example 1

cnfict 31.1 c SB on

Description

Configure the conditioned interface control template for channel 31.1 to SB on (DDS).

System Response

```
beta           TRM   YourID:1        IPX 32    8.2    Mar. 15 1996 17:30 MST

Data Channel:      31.1
Interface:         DDS-4   OCU Config
Clocking:          Looped

            Interface Control Template for Connection while CONDITIONED

LeadOutput ValueLeadOutput Value
SBON RIOFF
DSROFFCTSON
DCDOFF




Last Command: cnfict 31.1 c   sb on


Next Command:
```

Example 2

cnfict 25.1 a CTS on

Description

Configure the active interface control template for channel 25.1 to CTS on (RS-232).

System Response

```
beta           TRM   YourID:1        IPX 32    8.2    Mar. 15 1996 17:36 MST

Data Channel:      25.1
Interface:         RS232   DCE
Clocking:          Normal

            Interface Control Template for Connection while ACTIVE

 Lead    Output Value                  Lead    Output Value
 RI      OFF                            DSR     ON
 CTS     ON                             SRxD    ON
 DCR     OFF                            DCD     ON
 SCTS    ON                             SDCD    ON
 SQ      ON



Last Command: cnfict 25.1 a cts on


Next Command:
```

Example 3

cnfict 5.1 active CTS on

Description

Configure the active interface control template for channel 5.1 to CTS on (V.35).

System Response

```
lava          TRM   YourID:1        IPX 16    8.2    Mar. 23 1996 10:29 PST

Data Channel:      5.1
Interface:         V35   DCE
Clocking:          Normal

            Interface Control Template for Connection while ACTIVE

 Lead    Output Value                  Lead     Output Value
 RI  (J) OFF                            DSR (E) ON
 CTS (D) ON                             TM  (K) OFF
 DCD (F) ON




Last Command: cnfict 5.1 a cts on


Next Command:
```

Table 8-13 cnfict – Parameters

Parameter	Description		
port	Specifies the data channel or frame relay port whose interface control template is to be configured. Entered as <slot.port>. On an IPX, the applicable cards are the SDP, LDP, FRP, CDP, and FTC. On an IGX, the applicable cards are the LDM, HDM, FRM, CVM, and FTM.		
template	Specifies which interface control template to configure for the channel and has the format <a/c/l/n/f>. Valid entries are listed below: The only valid template for a frame relay port, X.21 or V.35, is the ACTIVE template. Also, all the output leads have steady state values and do not follow local or remote inputs		
	Entry	**Template**	**Description**
	a	Active	The "active" control template is in effect while the data channel is active (normal operation) i.e. when the connection is routed and not failed.
	c	Conditioned	The "conditioned" control template is in effect when conditioning is applied to the data channel. The conditioned template is used when the network detects that it cannot maintain the connection because of card failures or lack of bandwidth (The connection is failed.)
	l	Looped	The "looped" template is in effect when the data channel is being looped back in either direction. The looped template is used when **addloclp** or **addrmtlp** has been used to loop the connection within the network.

Parameter	Description		
	n	Near loopback	The "near" template is in effect when running a **tstport n** or an addextlp **n** on a port. The port is configured such that the external near modem is placed in a loopback.
	f	Far loopback	The "far" template is in effect when running a **tstport f** or an **addextlp f** on a port. The port is configured such that the external far-end modem is placed in a loopback.
output	Specifies the output lead to configure. Refer to the Configurable Lead information in the command description for valid abbreviations. Configurable output leads vary depending on the type of data interface: RS-232, V.35, X.21, or RS-449.		
source	Specifies how the lead is to be configured and has the format <on | off |local|remote> <input> [delay]. Valid source choices follow:		
	Source Options		
	on	The output lead is asserted.	
	off	The output lead is inhibited.	
	l	(for local) indicates that the output follows a local lead.	
	r	(for remote) indicates that the output follows a remote lead.	
	input	The name of the local or remote input lead that the output lead follows.	
	delay	The time in milliseconds that separates the "off" to "on" lead transitions. Delay is valid *only* when the output lead is CTS and the input lead is local RTS. "On" to "Off" lead transitions are not subject to this delay.	

cpyict

Copies all control template information associated with a given channel: the active template information, the conditioned template information, and the looped template information for near and far ends. Once copied, the control template information may be edited with the **cnfict** command. See the **cnfict** command for more information on interface control templates.

On an IPX, the applicable front cards are the SDP, LDP, FRP, CDP (for data), and FTC (for data). On an IGX, the applicable front cards are the LDM, HDM, FRM, CVM (for data), and FTM (for data).

Full Name

Copy interface control templates

Syntax

cpyict <source_port> <destination_port>

Related Commands

cnfict, dspict

Attributes

Privilege	1–2
Jobs	Yes
Log	Yes
Node	IPX, IGX
Lock	Yes

Example 1

cnfict 25.1 25.2

Description

Copy the interface control template for data channel 25.1 to channel 25.2

System Response

```
beta           TRM   YourID:1        IPX 32    8.2   Mar. 15 1996 17:40 MST

Data Channel:      25.2
Interface:         RS232   DCE
Clocking:          Normal

            Interface Control Template for Connection while ACTIVE

 Lead   Output Value Lead   Output Value
 RI OFF DSR ON
 CTS ON SRxDON
 DCR OFF DCD ON
 SCTS ON SDCDON
 SQ ON



Last Command: cpyict 25.1 25.2


Next Command:
```

Table 8-14 cpyict – Parameters

Parameter	Description
source channel	Specifies the data channel or frame relay port whose interface control template information to copy.
designating channel	Specifies the data channel or frame relay port that will receive the copied control template information.

delcon

Removes connections from the network. After entry of the channel or range of channels to delete, a prompt requests confirmation of the selection. Connections can be deleted from the node at either end of the connection. Do not delete a connection when the node at the other end of the connection is unreachable. The unreachable node does not recognize the deletion. It is especially important not to delete a connection to an unreachable node and then connect that channel to another node.

Full Name

Delete connections

Syntax

delcon <channel(s)>

Related Commands

addcon, dspcon, dspcons

Attributes

Privilege	1–2
Jobs	Yes
Log	Yes
Node	IPX, IGX
Lock	Yes

Example 1

delcon 3.1

Description

Delete connection 3.1.

System Response

```
pubsipx1       TN    SuperUser       IPX 16    8.2       Aug. 14 1996 00:53 GMT

 Local          Remote      Remote
 Channel        NodeName    Channel         State  Type      Compress  Code COS
 3.1            pubsipx1    3.2             Ok     64                  7/8
 3.2            pubsipx1    3.1             Ok     64                  7/8
 5.1.101        pubsipx1    5.1.102         Ok     fr
 5.1.102        pubsipx1    5.1.101         Ok     fr
 5.1.111        pubsipx1    8.5.1           Ok     atfr
 5.1.203        pubsipx1    5.1.204         Ok     fst
 5.1.204        pubsipx1    5.1.203         Ok     fst
 5.1.222        pubsipx1    8.5.2           Ok     atfst
 5.1.223        pubsipx1    8.5.3           Ok     atfst
 8.5.1          pubsipx1    5.1.111         Ok     atfr
 8.5.2          pubsipx1    5.1.222         Ok     atfst
 8.5.3          pubsipx1    5.1.223         Ok     atfst
 13.1           pubsipx1    13.2            Failed p

This Command: delcon 3.1


Delete these connections (y/n)?
```

Table 8-15 delcon – Parameters

Parameter	Description
channel	Specifies the data channel or channels to delete. The format is *slot.port*.

dspchcnf

Displays configuration details for data channels. This command provides information for voice, Frame Relay, ATM, and data channels. For data connections on the specified card and starting with the specified channel, the **dspchcnf** command displays the following information:

- Maximum EIA update rate
- Percentage of channel utilization
- DFM pattern length
- DFM status.(enabled or disabled)

The data cards that support this command are the SDP and LDP on the IPX and the HDM and LDM on the IGX.

Full Name

Display channel configurations

Syntax

dspchcnf <start_channel>

Related Commands

cnfchadv, cnfchdfm, cnfchdl, cnfcheia, cnfchgn, cnfchtp, cnfchutl, cnffrcon

Attributes

Privilege	1–6
Jobs	No
Log	No
Node	IPX, IGX
Lock	No

Example 1

dspchcnf 3.1

Description

Display the configuration values for data channels starting at 3.1.

System Response

```
pubsipx1       TN    SuperUser       IPX 16    8.2 Jan. 9 1997  00:04 GMT

            Maximum EIA     %      DFM Pattern     DFM
Channels    Update Rate    Util      Length       Status
3.1-4             2        100         8         Enabled




Last Command: dspchcnf 3.1


Next Command:
```

Table 8-16 dspchcnf – Parameters

Parameter	Description
start channel	Specifies the starting channel using the format *slot.port*

dspcon

Displays connection information for a specified channel. The information displayed includes:

- The channel numbers for both the local and remote ends of the connection.
- The node names at both ends of the connection.
- The routing restriction.
- The class of service (COS) of the connection.
- The connection route. listing the end nodes and any intermediate nodes.
- The preferred route for the connection (if configured).
- The status of the cards associated with the connection.
- Any Y-cable conflicts.
- The compression status (VAD on or off, ADPCM on or off, DFM on or off, frame relay compression on or off).
- The connection descriptor (if configured).

The status that may be displayed includes:

OK	Connection OK
FAILED	Connection failed

Full Name

Display connection

Syntax

dspcon <channel>

Related Commands

cnfchec

Attributes

Privilege	1–6
Jobs	No
Log	No
Node	IPX, IGX
Lock	No

Example 1

dspcon 13.1

Description

Display information for data channel 13.1. This connection is FAILED and “off hook.”

System Response

```
pubsipx1       TN    SuperUser       IPX 16    8.2       Aug. 14 1996 00:20 GMT

Conn:  13.1              pubsipx1    13.2              p
Desc: bogus                                                  Status:Failed



Path:   Route information not applicable for local connections



pubsipx1  Line 13: Failed        OFFHK pubsipx1 Line 13: Failed        OFFHK


Last Command: dspcon 13.1

Next Command:
```

Table 8-17 dspcon – Parameters

Parameter	Description
channel	Specifies the channel. The command displays connection information for one channel at a time. The format for channel specification is <*slot.channel*>.

dspcons

Displays a summary of the connections on an IPX or IGX node. Status that may be displayed includes:

OK	Connection OK
FAILED	Connection failed

The following fields appear in the **dspcons** screens:

Table 8-18

Fields	Description	
Local Channel	The connection's channel at this node.	
Remote Node Name	The name of the node at the other end of the connection.	
Remote Channel	The connection's channel at the remote node.	
State	The state of the connection(s) as follows:	
	OK	Routed
	Down	Downed
	OK Downed	Waiting for onhook to occur to allow courtesy down to take place for connection(s) that have been courtesy downed using the **dncon** command.
	Failed	Unrouted, but trying
Type	The type of connection (v = voice, d = data, fr = frame relay, atfr = ATM to frame relay interworking, atfst = ATM to frame relay interworking with ForeSight, -fail = failed connections; data rate in kbps for data)	
Route Avoid	The type of lines to avoid when routing (satellite lines, terrestrial lines, lines with zero code suppression).	
Compression	The type of compression applied to the connection (PCM, PCM and VAD, ADPCM, VAD and ADPCM for voice connections), (DFM for data connections).	
COS	The Class Of Service.	
Owner	The end of the connection in control of re-routing.	
Descriptor	The connection descriptor string (if +d option specified).	
Loopback	A connection with a local loopback is indicated by a right parenthesis symbol between the "Local Channel" and "Remote NodeName" columns. A frame relay connection with a port loopback is indicated by a right bracket symbol between the "Local Channel" and "Remote NodeName" columns. A connection with a remote loopback is indicated by a right parenthesis symbol before the channel number in the "Remote Channel" column.	

Full Name

Display connections

Syntax

dspcons [start_channel] [nodename] [connection type] [+d]

Related Commands

addcon, cnfchadv, chfchdfm

Attributes

Privilege	1–6
Jobs	No
Log	No
Node	IPX, IGX
Lock	No

Example 1

dspcons

Description

Display a summary of all connections.

System Response

```
alpha      TRM    YourID:1   IPX 16    Rev:8.2     Mar. 16 1996 09:42 PST

 Local      Remote      Remote                                    Route
 Channel    NodeName    Channel    State  Type    Compression  Code Avoid COS O
 5.1        beta         25.1       Ok     256         7/8       0     L
 9.1        gamma        8.1        Ok     v                     0     L
 9.2        beta         19.2       Ok     v                     0     L
14.1        gamma        15.1       Ok     v            VAD      2     L




Last Command: dspcons

Next Command:
```

Example 2

dspcons +d

Description

Display the connection with descriptors.

System Response

```
pubsipx1       TN    SuperUser       IPX 16    8.2    July 25 1996 06:40 PDT

 Local          Remote      Remote
 Channel        NodeName    Channel         State  Type      Descriptor
 5.1.100        pubsipx3    5.1.200         Ok     fr
 6.1            pubsipx2    11.1            Ok     56









Last Command: dspcons +d


Next Command:
```

Table 8-19 dspcons – Optional Parameters

Parameter	Description
start channel	Specifies the channel to begin the display. The start channel is specified as follows: slot.channel | slot.port.dlci | slot.vpi.vci
node name	Specifies that only connections to this remote node from the local note be displayed. If no "nodename" is designated, connections from the local node to all other nodes are displayed.
connection type	Specifies that only connections of this type be displayed. If no "connection type" is designated, all connections appear. When you enter the connection type on the command line, precede it with a hyphen (-). Valid connection types to display are: -v Displays only voice connections. -d Display only data connections. -f Displays frame relay connections. -abit Shows A-bit (nni) status. -fabit Shows connections with failed A-bit (nni) status.
+d	Specifies that the display should show the connection descriptor string in place of the usual compression and ownership fields.

dspict

Displays interface control template information for data channels and frame relay ports. Displayed information includes:

- The specified channel.
- The type of template: a, c, l, n, or f.
- The associated output leads and their status:

  ON.
  OFF.
  Following a local input.
  Following a remote input.

For frame relay ports, the entire port configuration screen is displayed (see **dspfrport** command). The input being followed, where applicable, is specified. Any RTS to CTS delay is also shown.

Full Name

Display interface control template

Syntax

dspict <port> <template>

Related Commands

cnfict, cpyict

Attributes

Privilege	1–2
Jobs	No
Log	No
Node	IPX, IGX
Lock	No

Example 1

dspict 25.1

Description

Display the active interface control template for 25.1.

System Response

```
beta           TRM   YourID:1        IPX 32    8.2    Mar. 15 1996 17:33 MST

Data Channel:      25.1
Interface:         RS232   DCE
Clocking:          Normal

            Interface Control Template for Connection while ACTIVE

 Lead    Output Value                  Lead    Output Value
 RI      OFF                            DSR     ON
 CTS     ON                             SRxD    ON
 DCR     OFF                            DCD     ON
 SCTS    ON                             SDCD    ON
 SQ      ON



Last Command: dspict 25.1


Next Command:
```

Table 8-20 dspict – Parameters

Parameter	Description	
channel	Specifies the channel. The format of the channel specification is *slot.port*.	
template	Specifies which control template to display for the channel. There are three templates available for data channels and one available (a only) for frame relay ports. You also specify which end of the circuit.	
	a	Active control template (normal operation). The only choice for a frame relay port.
	c	Conditioned control template (when connection fails).
	l	Looped control template (with local or remote loopback).
	n	Near.
	f	Far.

prtchcnf

Prints the configuration details for voice channels or data channels. This command uses the same syntax, and prints the same information as the **dspchcnf** command. See the **dspchcnf** description for syntax and output information.

Full Name

Print channel configurations

Syntax

prtchcnf <start_channel>

Related Commands

dspchcnf

Attributes

Privilege	1–6
Jobs	Yes
Log	No
Node	IPX, IGX
Lock	Yes

Example 1

prtchcnf 14.1

Description

Print the configuration values of circuit line 14.1.

System Response

None available as this command produces hardcopy.

Table 8-21 prtchcnf – Parameters

Parameter	Description
start channel	Specifies the channel at which the printout begins. The format is *slot.channel*.

prtcons

Prints a summary of connections terminated at the IPX or IGX node.

Full Name

Print connections

Syntax

prtcons [start_channel] [nodename] [type] [+d]

Related Commands

dspcons

Attributes

Privilege	1–6
Jobs	Yes
Log	No
Node	IPX, IGX
Lock	Yes

Example 1

prtcons

Description

Print a summary of all connections.

System Response

None available as this command produces hardcopy.

Table 8-22 prtcons – Optional Parameters

Parameter	Description
start channel	Specifies the channel to begin the display. The start channel is specified as follows: slot.channel
node name	Specifies that only connections to this remote node from the local note be displayed. If no "nodename" is designated, connections from the local node to all other nodes are displayed.

Parameter	Description
connection type	Specifies that only connections of this type be displayed. If no "connection type" is designated, all connections display. When you enter the connection type on the command line, it must be preceded with a hyphen (-). Valid connection types to display are: -v Displays only voice connections. -d Display only data connections. -f Displays frame relay connections. -nni Displays frame relay network to network connections for failed connections only.
+d	Specifies that the display should show the connection descriptor string in place of the usual compression and ownership fields.

prtict

Prints the configuration details for voice channels or data channels. This command uses the same syntax, and prints the same information as is displayed using the **dspchcnf** command. See the **dspchcnf** command for syntax and output information.

Full Name

Print interface control template

Syntax

prtict <port> <template>

Related Commands

cnfict, cpyict

Attributes

Privilege	1–2
Jobs	Yes
Log	No
Node	IPX, IGX
Lock	Yes

Example 1

prtict 25.1

Description

Print the active interface control template for 25.1.

System Response

None as this command produces hardcopy.

Table 8-23 prtict – Parameters

Parameter	Description	
channel	Specifies the channel containing the data card. The start channel is specified as follows: slot.port	
template	Specifies which control template to display for the channel. There are three templates available for data channels and one available (a only) for frame relay ports. You also specify which end of the circuit.	
	a	Active control template (normal operation). The only choice for a frame relay port.
	c	Conditioned control template (when connection fails).
	l	Looped control template (with local or remote loopback).
	n	Near.
	f	Far.