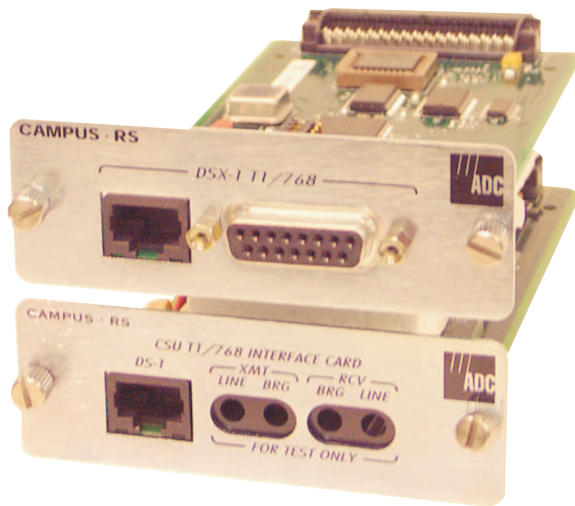


CAMPUS-RS CSU/DS-1 AND CSU/DSX-1 INTERFACE CARDS

USER MANUAL



Revision History of This User Manual

To acquire copies of this user manual, order document catalog number 500-931-150-03.

Issue	Release Date	Revisions Made
1	July 28, 1999	Initial release
2	October 7, 1999	Firmware updates
3	July, 1999	ADC rebrand

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July, 1999

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USING THIS MANUAL

This manual is organized as follows:

- Chapter 1 describes the product and discusses ADC® Campus-RS™ CSU architecture and compatibility.
- Chapter 2 tells how to install the Campus-RS CSU/DS-1 or CSU/DSX-1 Interface Card in either a Campus-RS Desktop Unit (150-1158-01 or 150-1158-02) or Campus-Star® chassis (Campus-RS Line Unit, 150-1220-01).
- Chapter 3 through 5 provide procedures on using the card to configure and monitor a Campus-RS system.
- Chapter 6 provides reference material on viewing information and status and testing.
- The appendices provide the following background information:
 - Technical reference on defaults, pinouts, and menus (Appendix A)
 - Abbreviations (Appendix B)
 - The documentation set (Appendix C)
 - Contacting ADC® (Appendix D)

DOCUMENT CONVENTIONS

Two types of messages, identified by icons, appear in the text:



Notes contain information about special circumstances.



Cautions indicate the possibility of equipment damage or the possibility of personal injury.

This manual uses the following conventions:

- This font indicates text that appears on the LCD or terminal.
- Keycaps, such as **ENTER**, indicate keys that you press on the terminal keyboard.
- Key names in **bold font** indicate buttons on the desktop unit or line unit that you press.

For a list of abbreviations used in this manual, see Appendix B.

UNPACK AND INSPECT THE SHIPMENT

Upon receipt of the shipment:

- 1 Unpack the card and inspect it for signs of damage. If it has been damaged in transit, report the extent of the damage to the transportation company and to ADC immediately. Order replacement equipment if necessary.
- 2 Compare the contents of the package against the packing list to ensure a complete and accurate shipment. If the shipment is incomplete or incorrect, contact ADC as described in Appendix D.

If you need to store the unit for several days or more before installing it, return it to the original packaging.

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ABOUT THE PRODUCT

1

The PairGain® Campus-HRS™ (HDSL Rate Selectable) CSU/DS-1 and CSU/DSX-1 interface cards provide a connection between a High-bit-rate Digital Subscriber Line (HDSL) and a network or other digital equipment. They enhance the interface cards for the Campus-Star® chassis and Campus-RS Desktop Units by providing a T1 or fractional T1 connection to a data network.

When installed in a Campus Desktop Unit or a Campus-Star chassis, the Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards allow the transmission of a T1 or fractional T1 data stream for up to eight miles over unconditioned twisted-pair copper wiring, using HDSL technology.

The Campus-RS CSU/DS-1 (Channel Service Unit/Digital Service, Level 1) Interface Card terminates a long-haul T1 line on the customer premises. It provides maintenance jacks for T1 line monitoring and signal insertion.

The Campus-RS CSU/DSX-1 (Channel Service Unit/Digital Service Crossover, Level 1) Interface Card provides a cross-connection for short-haul DS-1 lines into a Campus HDSL unit.

Both cards meet all ANSI requirements of Customer Installation (CI) equipment for direct connection to the Network Interface (NI). They provide line coding, line conditioning, and equalization functions. The cards respond to loopback commands sent from the Central Office (CO) as well as locally commanded loopback commands.

The HDSL line can operate at either a T1 (1.544 Mbps) or fractional T1 (768 Kbps) rate.

The Campus-RS CSU/DS-1 and CSU/DSX-1 install into one of the following to create a Campus-RS system:

- Campus-Star chassis, along with a Campus-RS Line Unit
- Campus-RS Desktop Unit

The front-panel LEDs on the chassis indicate the transmission status of the T1 (CSU/DS-1 card) or DSX-1 (CSU/DSX-1 card) line, the HDSL line, and alarm conditions.

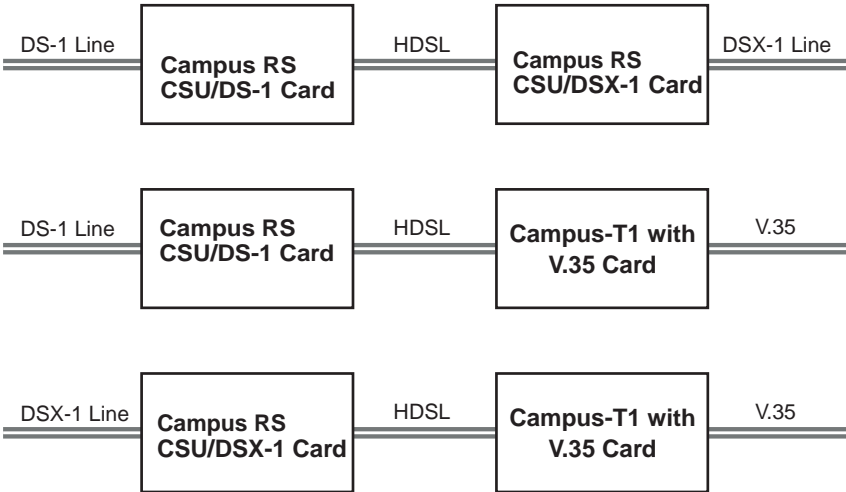
The interface card installed in the Campus-RS Desktop Unit or Campus-Star chassis comprises half of the HDSL transmission system. When connected to another Campus-RS or to a Campus-T1[®] Desktop Unit or Line Unit, the Campus-RS system can transport digitized voice, data, and video signals over existing copper wire at T1 rate.



The Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards must be installed in a Campus-RS Desktop Unit or with a Campus-RS Line Unit. They cannot be installed in an older Campus desktop unit or with an older Campus line unit.

APPLICATIONS

The Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards can be used in a number of configurations, as shown in the following figure.



DATA PORT CONFIGURATION

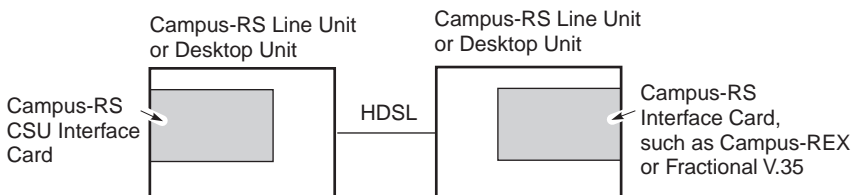
T1 transport provides for full-duplex transmission and reception of DS-1 signal over unconditioned twisted-pair copper wiring. The signal can be either long-haul DS-1 (up to 6 kft) using the Campus CSU/DS-1 card, or short-haul DSX-1 (<655 ft) using the Campus CSU/DSX-1 card. You can configure the following operating parameters for the data ports:

- DS0 channel time slot assignments
- equalization
- line code (AMI or B8ZS)
- line build-out per ANSI T1.403
- framing format
 - D4 Superframe
 - Extended SuperFrame (ESF)
- insert framing
- transmit-idle code

Both the Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards can act as a CI or NI device for the T1 line interface. See “CI and NI Configurations” on page A-4 for a description of CI and NI configuration.

COMPATIBILITY

When mated with a Campus-RS Line Unit installed in a Campus-Star chassis or Campus-RS Desktop Unit, the Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards are compatible over the HDSL link with another Campus-RS unit, as shown in the following illustration.

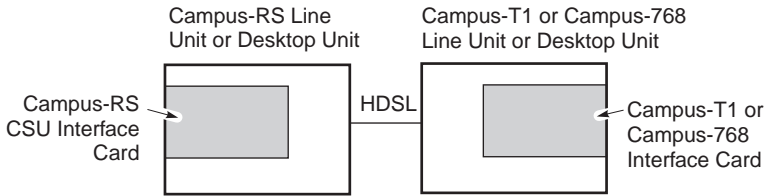


Unlike other Campus-RS products, the Campus-RS CSU/DS-1 and CSU/DSX-1 support only Standard Mode T1 and 768 (single pair) rates. To connect the Campus-RS CSU/DS-1 or CSU/DSX-1 to a different Campus-RS product, you must set the following configuration options on the remote interface card:

- Set the HDSL Operating Mode to Standard Mode
- Set the Standard Mode HDSL Rate to T1 or 768

See the remote interface card user manual to set these configuration options.

The Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards are also compatible, over the HDSL link, with both the Campus-T1 and Campus-768[®], as in the following illustration.



Since the Campus-T1 unit is already set to operate at a Standard Mode T1 rate, no adjustment to the HDSL rate is necessary for this application.

Similarly, the Campus-768 is already set to operate at a Standard Mode 768 rate.

INSTALLING THE INTERFACE CARD

2

You can install the Campus-RS CSU/DS-1 and CSU/DSX-1 into either the Campus-Star with a Campus-RS Line Unit, or Campus-RS Desktop Unit.



Make sure you install the Campus CSU/DS-1 or CSU/DSX-1 Interface Card into a Campus-Star chassis with a Campus-RS Line Unit or into a Campus-RS Desktop Unit. The card will not operate if installed in an earlier version of these Campus products. For details on compatibility, see “Compatibility” on page 1-3.

BEFORE INSTALLING THE CARD

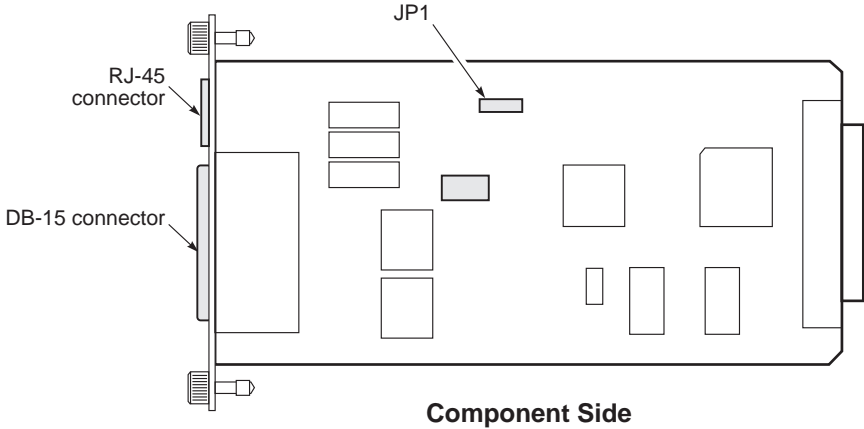
Depending on your network requirements, you may need to change a jumper setting on the card before installation:

- The Campus-RS CSU/DS-1 Interface Card is set to provide a DC current path between the transmit and receive pairs for a sealing current sourced from the CO.
- The Campus-RS CSU/DSX-1 Interface Card is set for straight-through cabling.

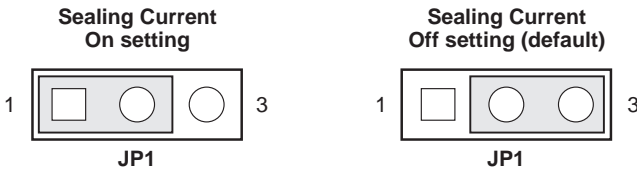
The following sections describe how to reverse these settings.

Campus-RS CSU/DS-1 Interface Card DC Sealing Current

The following figure shows the location of jumper JP1 on the Campus-RS CSU/DS-1 Interface Card.



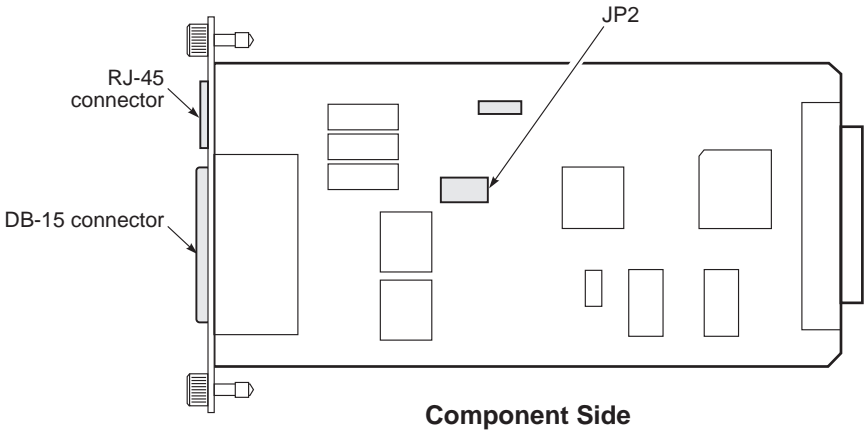
This jumper provides the means to turn on and off the DC sealing current feature. When set to ON, the CSU/DS-1 card provides a DC current path between the transmit and receive pairs for a sealing current sourced from the CO. The following figure shows the pin assignments for the sealing current settings.



The CSU/DS-1 card does not source the DC sealing current. It is sourced from the CO.

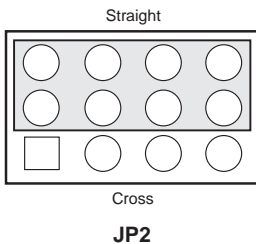
Campus-RS CSU/DSX-1 Interface Card Pin Reversal

The following figure shows the location of jumper JP2 on the Campus-RS CSU/DSX-1 Interface Card.

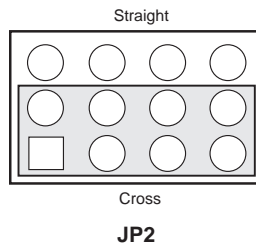


This jumper provides the means to reverse the transmit and receive pin assignments on the DSX-1 line. Use the cross setting when cross cabling is required. The cross setting eliminates the need to physically reverse the transmit/receive pairs within an interconnect cable. The straight setting is the factory default and is typically used to connect the DSX-1 unit to a Distribution Frame. The following figure shows the pin assignments for the straight and cross settings.

Pin Assignments Straight setting (default)



Pin Assignments Cross setting



CAMPUS-STAR INSTALLATION

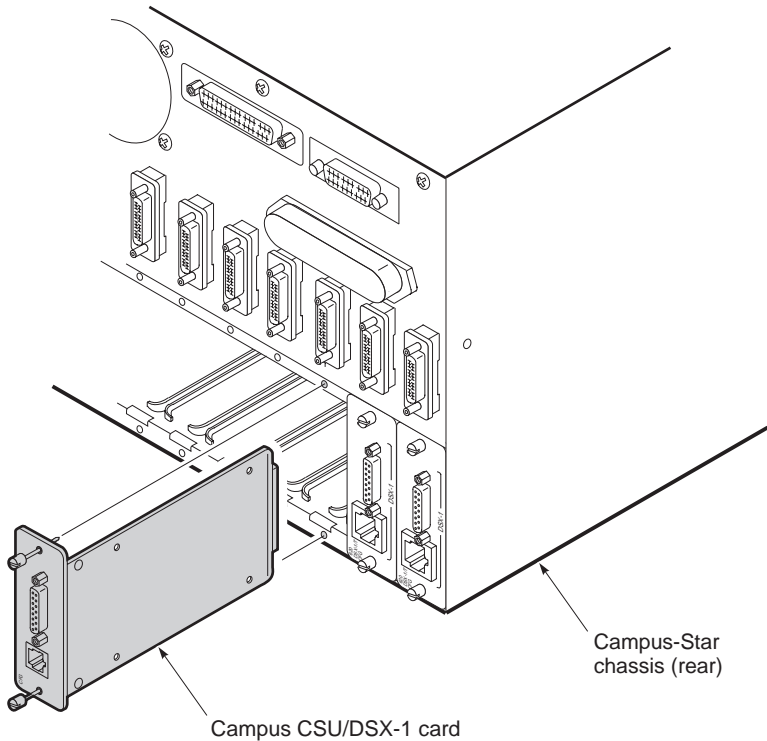
The following sections describe how to install the Campus-HRS CSU/DS-1 or CSU/DSX-1 and a Campus-RS Line Unit into a Campus-Star chassis.

Installing the Campus-RS CSU/DS-1 or CSU/DSX-1 Interface Card into a Campus-Star Chassis



Before installing the Campus-RS CSU/DS-1 or CSU/DSX-1 Interface Card, make sure there is no line unit installed in the corresponding slot on the front of the Campus-Star chassis. The card is not hot-swappable. Installing the card with a corresponding line unit installed may damage the card, the line unit, or both.

- 1 Slide the card into the guide rails in the desired slot on the rear of the Campus-Star chassis.



- 2 Gently press the card into place until it is seated firmly in the rear connector.
- 3 Use the two screws on the card to secure it into place.
- 4 Continue with “Installing a Campus-RS Line Unit into a Campus-Star Chassis.” The Campus-RS CSU/DS-1 or CSU/DSX-1 Interface Card will not operate without a Campus-RS Line Unit installed in the corresponding slot on the front of the Campus-Star chassis.

Installing a Campus-RS Line Unit into a Campus-Star Chassis



Install the Campus CSU/DS-1 or CSU/DSX-1 Interface Card before the Campus-RS Line Unit. Installing the card with the Campus-RS Line Unit already installed may damage the card, the line unit, or both.

- 1 If the HDSL cabling is not already connected, connect the HDSL, according to the instructions in the *Campus-Star User Manual*.
- 2 Make sure that the line unit retaining latch is pulled completely forward and down.
- 3 Slide the Campus-RS Line Unit into the front Campus-Star slot that corresponds to the slot into which you installed the Campus-RS CSU/DS-1 or CSU/DSX-1 Interface Card. Use the guide rails to align the card.
- 4 Gently press the card in until it is seated firmly in the rear connector.
- 5 Push the retaining latch in until it snaps into place.

With the Campus-Star power on, the Campus-RS Line Unit performs a power-on test and the HDSL LED flashes red.

- 6 To set up and configure the system, see Chapter 3 (to configure the system through the LCD menus) or Chapter 4 (to configure the system through an ASCII terminal).

CAMPUS-RS DESKTOP UNIT INSTALLATION

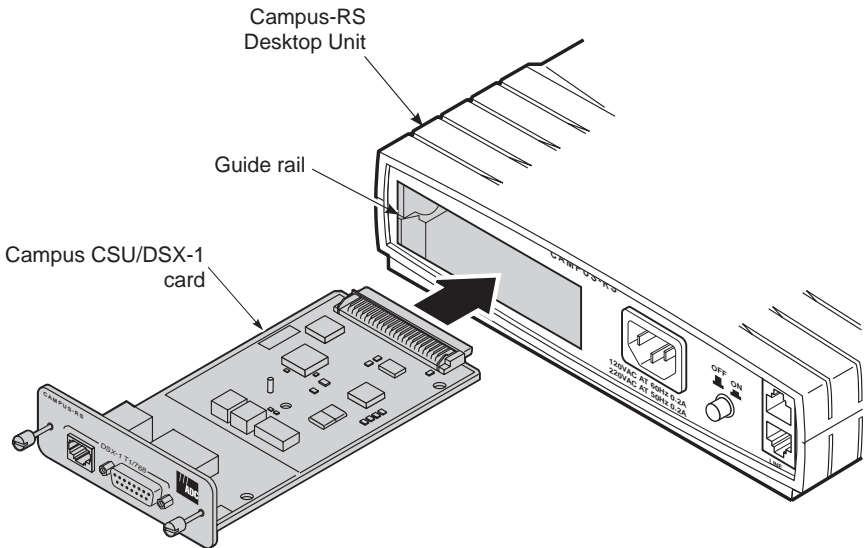
The following sections describe how to install the Campus-RS CSU/DS-1 or CSU/DSX-1 Interface Card into a Campus-RS Desktop Unit.

Installing a Campus-RS CSU/DS-1 or CSU/DSX-1 Interface Card into a Campus-RS Desktop Unit



Turn off the power to the desktop unit before you install the Campus CSU/DS-1 or CSU/DSX-1 Interface Card. Installing the card with the power on may cause damage to the desktop unit, the card, or both.

- 1 Slide the card into the guide rails at the rear of the desktop unit.



- 2 Gently press the card in until it is seated firmly in the rear connector.
- 3 Use the two screws on the card to secure it into place.
- 4 Continue with “Connecting a Campus-RS Desktop Unit to an HDSL Line.”

Connecting a Campus-RS Desktop Unit to an HDSL Line

To connect the Campus-RS Desktop Unit to an HDSL line:

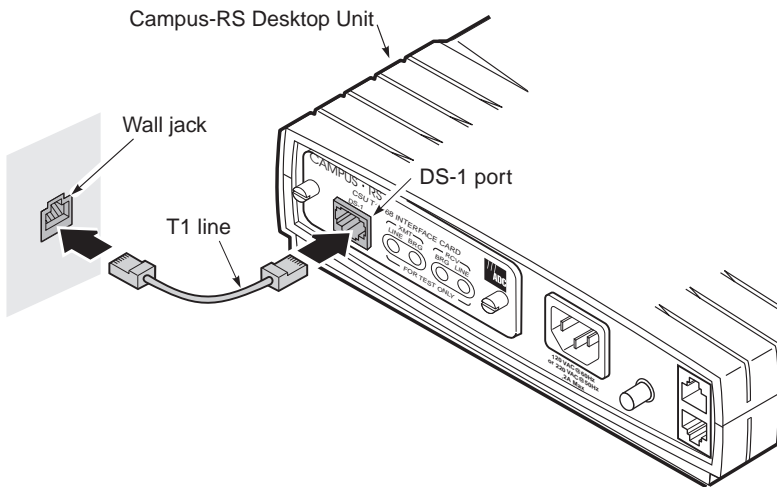
- 1 If you need to install and configure the Campus-RS Desktop Unit, see the Campus-RS Desktop Unit user manual.
- 2 Plug one end of the provided black HDSL cable into the RJ-45 jack.
- 3 Plug the other end of the HDSL cable into the Line port on the rear of the Campus-RS Desktop Unit.
- 4 Continue with “Connecting the Data Cables.”

CONNECTING THE DATA CABLES

The following sections describe how to connect the DSX-1 or DS-1 cable to the Campus-RS CSU/DS-1 or CSU/DSX-1 Interface Card.

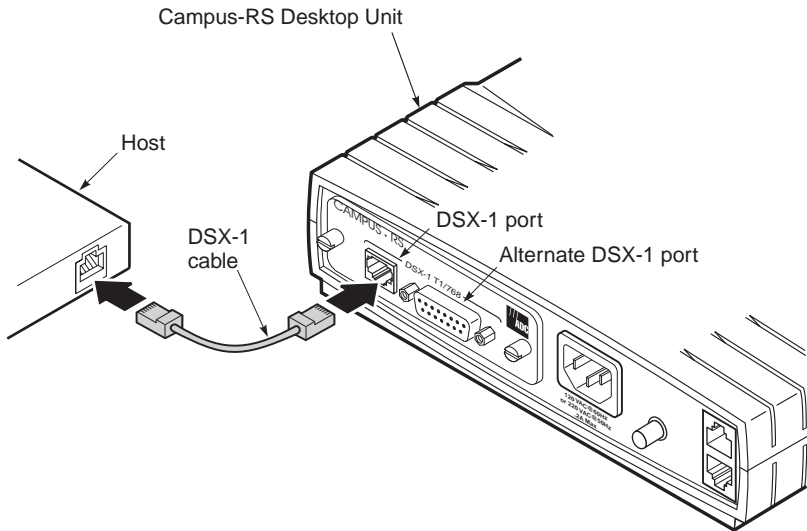
Cabling the Campus-RS CSU/DS-1 Interface Card

The Campus-RS CSU/DS-1 Interface Card connects to a T1 line, which is an outside line coming to the facility. To connect the T1 line, plug the RJ-45 connector on the T1 cable into the card’s DS-1 port and plug the other connector into your wall jack. See “CSU/DS-1 Pinouts” on page A-2 for DS-1 cable pinouts.



Cabling the Campus-RS CSU/DSX-1 Interface Card

The DSX-1 line connects the Campus-RS CSU/DSX-1 card to the customer's multiplexer/demultiplexer or switch. To connect the DSX-1 line, plug the RJ-45 connector on the DSX-1 cable into the card's DSX-1 port and plug the other connector into your DSX-1 host equipment. See "CSU/DSX-1 Pinouts" on page A-2 for DSX-1 cable pinouts.



CONFIGURING AND MONITORING USING LCD MENUS

3

You can configure the Campus-RS CSU/DS-1 and CSU/DSX-1 and view system information using the LCD panel and menu buttons located on the front of either the Campus Management Unit (CMU) installed in the Campus-Star chassis or the Campus-RS Desktop Unit. This chapter describes how to set and view the individual configuration options through the LCD menu.

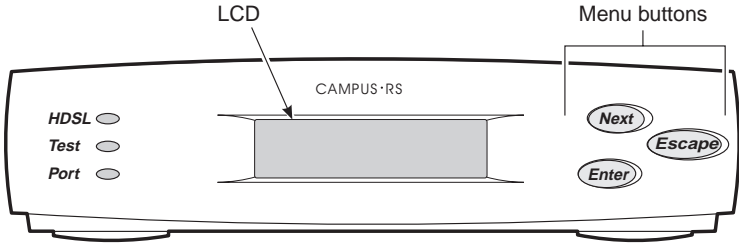
NAVIGATING THE LCD MENUS

Use the LCD display and menu buttons on the desktop unit or Campus Management Unit (CMU) to navigate and configure the Campus-RS system.



A Campus-RS system comprises a Campus-RS Interface Card, such as the Campus-HRS CSU/DS-1 or CSU/DSX-1, installed in a Campus-RS Desktop Unit or mated with a Campus-RS Line Unit in a Campus-Star chassis.

The following illustration shows the front panel of the desktop unit, including LCD display and menu buttons. See the *Campus-Star User Manual* for the location of the menu buttons on the CMU.



The following table describes how to use the menu buttons to maneuver the LCD menus and select items.

Press this button...	To...
Next	Scroll to the next menu or option at the same level of the menu structure
Enter	Select the displayed menu or option
Escape	Return to the previous menu selection

This manual provides instructions for selecting individual configuration options. The basic procedure is as follows:

- 1 Press **Escape** several times until `CAMPUS HRS I/F: FLEX` displays.
- 2 Press **Next** until the desired menu name displays, for example:
`DATA PORT CONFIG & STATUS`
- 3 Press **Enter** to access the menu options, for example:
`FRAMING MODE = ESF`
- 4 Press **Enter** to access the settings for the option, for example:
`= ESF`
- 5 Press **Next** until the desired setting displays, for example:
`= D4`

6 Do one of the following:

- Press **Enter** to save the desired option, for example:
FRAMING MODE = D4
- Press **Escape** if you do not want to save the change.

See “LCD Menu Reference” on page A-5 for a map of the LCD menu structure.

RESTORING THE SYSTEM TO DEFAULT VALUES

You can restore all configuration options to their factory default values. This is an easy way to remove undesired configurations and return to default settings.

To return the configuration options to their factory default values:

- 1** Press **Escape** until `CAMPUS HRS I/F: FLEX` displays.
- 2** Press **Enter**. The software revision and the software checksum display, as in the following example:

```
S/W REV: 4.3e  
S/W CKSUM: 08F8
```

- 3** Press **Next** until `Press ENTER to factory reset` displays, then press **Enter**.

The system configuration options return to the default values listed in “Default Settings” on page A-1. For example:

```
CI or NI selection = CI
```



Some options must be the same for both the local and the remote unit. Resetting the configuration values on only one unit may cause the HDSL link to go down.

CONFIGURING THE HDSL RATE

The Campus-RS CSU/DS-1 or CSU/DSX-1 Interface Card can be configured to operate in either Standard-T1 or Standard-768 HDSL rate. Standard-T1 is the default setting, and the HDSL link will transport all 24 channels plus the framing bits of the DS-1 (1.544 Mbps). In Standard-768, only one twisted pair is used for the HDSL link, which will transport channels 1-12 plus the framing bits; the DS-1 or DSX-1 interface still operates at 1.544 Mbps, but channels 13-24 will be automatically blocked and will transmit idle code.

To set the HDSL rate:

- 1 Press **Escape** several times until `CAMPUS HRS I/F: FLEX` displays.
- 2 Press **Next** until `HDSL LINK CONFIG & STATUS` displays,
- 3 Press **Enter**. `OPERATING MODE` displays.
- 4 Press **Next** until `HDSL RATE` displays.
- 5 Press **Enter**. The current HDSL rate displays.
- 6 Press **Enter**, then press **Next** until the desired setting displays (T1 or 768).
- 7 Press **Enter** to save the desired option.

CONFIGURING THE DATA PORT

You can set the following parameters for the data port:

- Framing Mode
- Insert Framing
- Performance Report Message (PRM)
- Channel Blocking
- Idle Code
- Customer Installation (CI) or Network Interface (NI)
- Line Code
- Line Build Out
- Equalizer Gain Limit (EQ_GAIN)

To set these options:

- 1 Press **Escape** until `CAMPUS HRS I/F: FLEX` displays.
- 2 Press **Next** until `DATA PORT CONFIG & STATUS` displays, then press **Enter**. `FRAMING MODE` displays.

Setting the Framing Mode

The Framing Mode determines the framing setting for all traffic, both received and transmitted, through the data port. Set this option to Extended Superframe or D4. `ESF` is the default for the DS-1 Framing Mode.

To set the Framing Mode:

- 1 At the Data Port Config and Status menu, press **Enter** to display `FRAMING MODE`.
- 2 At the `FRAMING MODE` display, press **Enter** to access the menu options.
- 3 Press **Next** until the desired setting displays (`ESF` or `D4`).
- 4 Do one of the following:
 - Press **Enter** to confirm the new setting and return to the `FRAMING MODE` menu.
 - Press **Escape** to reject the new setting and return to the `FRAMING MODE` menu.

Inserting Framing

When Insert Framing is on, the Campus-HRS CSU/DS-1 or CSU/DSX-1 Interface Card inserts framing on the data transmitted out the DS-1 or DSX-1 port. In this case, all framing bits, Performance Report Message (PRM) bits, and Cyclic Redundancy Check (CRC) bits are sourced from inside the unit.

When Insert Framing is off, all the framing bits, PRM bits, and CRC bits are passed through on the bit stream. `Off` is the default.

Insert Framing is typically not required if the remote device supports framed DS-1 signaling (for example, a Campus-RS CSU/DS-1, CSU/DSX-1, or Campus-Flex card). If the remote device does not support DS-1 signaling (for example, a Campus-RS Fractional or REX card), Insert Framing must be turned on.

To insert framing:

- 1 At the Data Port Config and Status menu, press **Enter** to enable configuration. `FRAMING MODE` displays.
- 2 Press **Next** until `INSERT FRAMING` displays.
- 3 Press **Enter** to access the menu options.
- 4 Press **Next** until the desired option displays (`On` or `Off`).
- 5 Do one of the following:
 - Press **Enter** to confirm the new setting and return to the `INSERT FRAMING` menu.
 - Press **Escape** to reject the new setting and return to the `INSERT FRAMING` menu.

Setting the Performance Report Message

You can enable or disable the Performance Report Message (PRM) option. This option can only be enabled when you select ESF as the framing mode and turn on Insert Framing. When enabled, the Campus CSU/DS-1 or CSU/DSX-1 Interface Card can insert or extract PRM messages and loopback codes to and from the Facilities Data Link. The default is `Disabled`.

To set the PRM option:

- 1 At the Data Port Config and Status menu, press **Enter** to enable configuration. `FRAMING MODE` displays.
- 2 Press **Next** until `PRM` displays.
- 3 Press **Enter** to access the menu options.
- 4 Press **Next** until the desired option displays (`Enabled` or `Disabled`).
- 5 Do one of the following:
 - Press **Enter** to confirm the new setting and return to the PRM menu.
 - Press **Escape** to reject the new setting and return to the PRM menu.

Setting Channel Blocking

You can independently control the channel blocking on each of the 24 channels. Blocking a channel blocks both the reception and transmission of data for that channel.

If the remote Campus device supports framed DS-1 signaling (for example, a Campus-RS CSU/DS-1, CSU/DSX-1, or Flex card), you can block or unblock any combination timeslots. However, if the remote unit is a Campus Fractional Interface card and is set to a fractional rate, it only supports transmission and reception on contiguous timeslots starting with timeslot 1. For example, if the remote unit is a Fractional V.35 card set to a port rate of 128 Kbps, the Campus-RS CSU/DS-1 card must have timeslots 1 and 2 unblocked and timeslots 3-24 blocked.

Blocked timeslots transmit the Idle Code.

You can block channels as follows.

- 1 At the Data Port Config and Status menu, press **Enter** to enable configuration. FRAMING MODE displays.
- 2 Press **Next** until CHANNEL BLOCKING displays.
- 3 Press **Enter** to allow you to block or unblock channels. The display shows four timeslots at a time. The letter B indicates a blocked channel and a hyphen (-) indicates an unblocked (active) channel. The default is 0 blocked (all channels active).

The following example for timeslots 1 - 4 shows channels 1 and 2 blocked and channels 3 and 4 unblocked:

```
1 | 2 | 3 | 4
```

```
B | B | - | -
```

- 4 At each channel, press **Enter** to change the option and press **Next** to advance to the next channel. When you have completed setting all 24 channels, press **Next** to return to channel 1.
- 5 Press **Escape** to return to the Channel Block menu and display the new number of active channels. The default appears as follows:

```
CHANNEL BLOCKING
ACTIVE DS-0s: 24
```

Setting the Idle Code

When you choose to enable channel blocking, set an 8-bit code for the Campus-HRS CSU/DS-1 or CSU/DSX-1 card to transmit through the data port on blocked DS0 channels. The idle code can be a value of 00 to FF with 7F as the default. This code displays as a hexadecimal value on the Channel Blocking menu, next to the channel for which you enabled channel blocking.

To set the Idle Code:

- 1 At the Data Port Config and Status menu, press **Enter** to enable configuration. `FRAMING MODE` displays.
- 2 Press **Next** until `IDLE CODE` displays.
- 3 Press **Enter** to enable changing the most significant four bits (MSB).
- 4 Press **Next** until the desired hexadecimal value displays: (0 - F).
- 5 Press **Enter** to enable changing the least significant four bits (LSB).
- 6 Press **Next** until the desired hexadecimal value displays: (0 - F).
- 7 Press **Escape** to confirm the new setting and return to the Idle Code menu.

Setting the PRM Header Format

The CI/NI option determines the format of the PRM (Performance Report Message) header. In installations that require the PRMs to be sourced from the network interface, change the setting to NI. Otherwise, the default setting of CI should be adequate for most installations. (For further information, see “CI and NI Configurations” on page A-4.)

To set this option:

- 1 At the Data Port Config and Status menu, press **Enter** to enable configuration. `FRAMING MODE` displays.
- 2 Press **Next** until `CI` or `NI` displays.
- 3 Press **Enter** to access the menu options.
- 4 Press **Next** until the desired setting displays (`CI` or `NI`).

- 5 Do one of the following:
 - Press **Enter** to confirm the new setting and return to the CI or NI menu.
 - Press **Escape** to reject the new setting and return to the CI or NI menu.

Setting the Line Code

Select AMI (Alternate Mark Inversion) or B8ZS (Binary 8 Zero Substitution) line coding to guarantee your T1 line density requirements. B8ZS is the default.

To set the Line Code:

- 1 At the Data Port Config and Status menu, press **Enter** to enable configuration. FRAMING MODE displays.
- 2 Press **Next** until LINE CODE displays.
- 3 Press **Enter** to access the menu options.
- 4 Press **Next** until the desired setting displays (B8ZS or AMI).
- 5 Do one of the following:
 - Press **Enter** to confirm the new setting and return to the LINE CODE menu.
 - Press **Escape** to reject the new setting and return to the LINE CODE menu.

Setting the Line Build Out

Set the Line Build Out option to control the attenuation of the transmitted signal.

To set the Line Build Out option:

- 1 At the Data Port Config and Status menu, press **Enter** to enable configuration. FRAMING MODE displays.
- 2 Press **Next** until LINE BUILD OUT displays.
- 3 Press **Enter** to access the menu options.

- 4 Press **Next** until the desired setting displays:
 - For the CSU/DS-1 interface card, the settings display as follows (the default is 0 dB): 0 dB, -7.5 dB, -15 dB, -22.5 dB
 - For the CSU/DSX-1 interface card, the settings display as follows (the default is 0-133 ft): 0-133 ft, 133-266 ft, 266-399 ft, 399-533 ft, 533-655 ft
- 5 Do one of the following:
 - Press **Enter** to confirm the new setting and return to the LINE BUILD OUT menu.
 - Press **Escape** to reject the new setting and return to the LINE BUILD OUT menu.

Setting the Equalizer (EQ) Gain Limit

Set the Equalizer (EQ) Gain Limit to normal or sensitive to limit the sensitivity of the receiver. The default is Normal.

To set this option:

- 1 At the Data Port Config and Status menu, press **Enter** to enable configuration. FRAMING MODE displays.
- 2 Press **Next** until EQ GAIN LIMIT displays.
- 3 Press **Enter** to access the menu options.
- 4 Press **Next** until the desired setting displays (Normal or Sensitive).
- 5 Do one of the following:
 - Press **Enter** to confirm the new setting and return to the EQ GAIN LIMIT menu.
 - Press **Escape** to reject the new setting and return to the EQ GAIN LIMIT menu.

CONFIGURING AS A MASTER OR SLAVE UNIT

The Transceiver Mode option determines the hierarchy of the two Campus-RS units when they are attempting to establish an HDSL link.

The Transceiver Mode option has three settings: *Auto*, *Master*, and *Slave*. The default is *Auto*.

- If the local unit is set to *Master*, it initiates the HDSL link. The remote unit must then be set to *Slave* or *Auto*.
- If the local unit is set to *Slave*, it waits for the remote unit to initiate the HDSL link. The remote unit must then be set to *Master* or *Auto*.
- If a unit is set to *Auto* (default), it automatically switches between *Master* and *Slave* until the HDSL link is established. The setting of the other Campus unit is irrelevant.



Unless you have an important reason for doing otherwise, ADC recommends leaving the Transceiver Mode option set to *Auto*.

If you must change the Transceiver Mode:



You cannot change this option when the HDSL link is up. Disable the link before performing this procedure.

- 1 Press **Escape** until *CAMPUS HRS I/F: FLEX* displays.
- 2 Press **Next** until *HDSL LINK CONFIG & STATUS* displays, then press **Enter**. *OPERATING MODE* displays.
- 3 Press **Next** until *XCVR MODE* displays, then press **Enter** to see the currently selected option.
- 4 Press **Next** to scroll through the Transceiver Mode options until the desired setting displays.
- 5 Press **Enter** to select the displayed setting. The LCD displays *XCVR MODE* and shows the new setting, for example, *XCVR MODE = AUTO*.

MONITORING DS-1 OR DSX-1 LINE STATUS

Seven parameters define the status of the DS-1 or DSX-1 line:

- **B8ZS DETECTION** indicates whether B8ZS line coding is enabled.
- **RCV SIGNAL LEVEL** indicates the received signal level on the DS-1 port, in dB (0 to -7.5 dB, -7.5 to -15 dB, -15 to -22.5 dB, or < -22.5 dB).
- **RCV LOOP CODES** indicate the status of received in-band loop codes (None, DS-1 Line, DS-1 Payload, Up, or Down).
- **RX PULSE DENSITY** indicates that the received signal includes at least one pattern of more than 15 consecutive zeros.
- **TX PULSE DENSITY** indicates that the transmitted signal includes at least one pattern of more than 15 consecutive zeros.
- **RX AIS OR YELLOW** indicates whether an Alarm Indication Signal (AIS) or yellow alarm condition (RAI) has been received.
- **TX AIS OR YELLOW** indicates whether an AIS or RAI has been transmitted.

To check the status of the DS-1 or DSX-1 line:

- 1 Press **Escape** until **CAMPUS HRS I/F: FLEX** displays.
- 2 Press **Next** until **DIAGNOSTICS** displays, then press **Enter**.
LOOPBACK MODE displays.
- 3 Press **Next** until **LINE STATUS** displays, then press **Enter**.
B8ZS DETECTION displays.
- 4 Press **Next** to scroll through the remaining line status parameters.

VIEWING AND CONFIGURING ALARMS

To determine if there is an active alarm condition:

- 1 Press **Escape** until **CAMPUS HRS I/F: FLEX** displays.
- 2 Press **Next** until **ALARM CONFIG & STATUS** displays.

3 Press **Enter** to display the current alarm status. Any of the following three indicators can appear under `CURRENT ALARMS`:

- `HDSL` indicates an HDSL alarm
- `LOC` indicates a local alarm
- `REM` indicates a remote alarm

If a specific indicator does not display, there is no alarm in that area of the system.

The following sections describe how to view specific alarm information for the HDSL, local and remote ports, and how to configure thresholds for the various alarms.

Viewing and Configuring HDSL Alarms

This section describes how to view and configure alarms on the HDSL line.

Viewing Current HDSL Alarms

If the `CURRENT ALARMS` display indicates an HDSL alarm, you can determine the alarm type:

- 1** At the `CURRENT ALARMS` display, press **Next**.
`HDSL LINK ALARMS CONFIG & STATUS` displays.
- 2** Press **Enter** to display the current status of the three alarms, as in the following example:

<code>LINK</code>	<code>ES</code>	<code>MARGIN</code>
<code>on</code>	<code>off</code>	<code>off</code>

- `LINK` shows whether the HDSL link alarm is on or off.
- `ES` shows whether the errored seconds threshold has been exceeded on the local unit, remote unit, or both.
- `MARGIN` shows whether the margin threshold has been exceeded on the local unit, remote unit, or both.

Configuring Alarm Thresholds

Alarm thresholds determine the level at which an alarm condition is reached. HDSL alarm thresholds have the following two types:

- Link ES threshold determines the number of errored seconds that must occur to trigger an alarm. This threshold can be set to 17 or 170 errored seconds. You can also disable this alarm.
- Margin threshold determines the margin, in dB, that triggers an alarm. This threshold can be set between 1 dB and 25 dB, in 1 dB increments. You can also disable this alarm.

To set the alarm thresholds:

- 1 At the **CURRENT ALARMS** display, press **Next**.
HDSL LINK ALARMS CONFIG & STATUS displays.
- 2 Press **Enter** to display the current HDSL alarm status, for example:

LINK	ES	MARGIN
on	off	off
- 3 Press **Next**. HDSL ES THRESHLD displays.
- 4 Press **Enter**, then press **Next** to scroll through the ES threshold settings until the desired setting displays.
- 5 Press **Enter** to select the desired setting. HDSL ES THRESHLD displays with the current setting.
- 6 Press **Next**. MARGIN THRESHOLD displays.
- 7 Press **Enter**, then press **Next** to scroll through the margin threshold settings until the desired setting displays.
- 8 Press **Enter** to select the desired setting. MARGIN THRESHLD displays.

Viewing 24-Hour HDSL Alarm History

You can view the number of HDSL alarm conditions that have occurred over the past 24 hours. The LCD menu displays 24-hour information for the following alarms:

- Local errored seconds (LOCAL ES)
- Remote errored seconds (REMOTE ES)
- Local unavailable seconds (LOCAL UAS)
- Remote unavailable seconds (REMOTE UAS)

You can view the time when the counter was last cleared and clear the counter.

To view the HDSL alarm history:

- 1 Press **Escape** until CAMPUS HRS I/F: FLEX displays.
- 2 Press **Next** until HDSL LINK CONFIG & STATUS displays, then press **Enter**.
- 3 Press **Next** until PERFORMANCE STATUS displays, then press **Enter**. The first alarm history option displays: LOCAL ES (24HR).
- 4 Press **Next** to scroll through the alarm history displays:

REMOTE ES (24HR)

LOCAL UAS (24HR)

REMOTE UAS (24HR)

LAST CLEARED

Press ENTER to clear error cnts

You cannot set the 24-Hour HDSL Alarm History options—they are read-only system alarm reports. You can clear the 24-Hour HDSL Alarm History counter at any time. In this way, you are setting a new baseline time from which to begin counting HDSL alarms by wiping out all previous history. To clear the 24-Hour HDSL Alarm History counter:

- 1 Press **Next** until the LCD displays:
Press ENTER to clear error cnts
- 2 Press **Enter**. The display returns to the previous menu:
PERFORMANCE STATUS
- 3 Press **Escape** to return to the Performance Status display.

Viewing and Configuring Local Alarms

Loss of Signal (LOS) alarms can occur on each port of the local unit. This section describes how to view and configure these alarms.

Viewing Current Local Alarms

If the CURRENT ALARMS display indicates a local alarm, you can determine the alarm type:

- 1 From the CURRENT ALARMS display, press **Next** until the following displays: LOCAL I/F ALARMS CONFIG & STATUS.
- 2 Press **Enter** to display the current status of the local interface alarm: CURRENT LOC ALM.

Configuring Local Loss of Signal Alarm

The Local Loss of Signal (LOS) alarm can be enabled or disabled:

- 1 Press **Escape** until CAMPUS HRS I/F: FLEX displays.
- 2 Press **Next** until ALARM CONFIG & STATUS displays, then press **Enter**. CURRENT ALARMS displays.
- 3 Press **Next** until the following displays, then press **Enter**: LOCAL I/F ALARMS CONFIG & STATUS.

The first option, Current Local Alarm, displays: CURRENT LOC ALM.

- 4 Press **Next** until the appropriate Local LOS alarm option displays (LOC LOSS OF SIG, RX PULSE DENSITY, TX PULSE DENSITY).
- 5 Press **Enter**. The current LOS setting for the selected port displays (Enabled, Disabled).
- 6 Press **Enter** to select the desired setting.

Viewing and Configuring Remote Alarms

Loss of Signal (LOS) alarms can occur on the remote unit. This section describes how to view and configure these alarms.

Viewing Current Remote Alarms

If the **CURRENT ALARMS** display indicates a remote alarm, you can view the alarm type:

- 1 From the **CURRENT ALARMS** display, press **Next** until the LCD displays the Remote Interface Alarms Configuration and Status menu: **RMT I/F ALARMS CONFIG & STATUS**.
- 2 Press **Enter**. **CURRENT RMT ALM** displays its current status (none or LOS).

Configuring Remote Loss of Signal Alarm

To enable or disable the Remote LOS alarm:

- 1 Press **Escape** until **CAMPUS HRS I/F: FLEX** displays.
- 2 Press **Next** until **ALARM CONFIG & STATUS** displays, then press **Enter**. **CURRENT ALARMS** displays.
- 3 Press **Next** until **RMT I/F ALARMS CONFIG & STATUS** displays, then press **Enter**. **CURRENT RMT ALM** displays.
- 4 Press **Next** to display **LOSS OF SIG** alarm, then press **Enter** to access the settings.
- 5 Press **Next** to scroll through the **Disabled** and **Enabled** settings.
- 6 When the desired setting displays, press **Enter** to select it.

CONFIGURING LOOPBACKS

Loopbacks provide a way to test the data communication path between the Campus unit, remote unit, and remote host equipment. The Campus-RS CSU/DS-1 and CSU/DSX-1 support loopbacks support six types of loopbacks:

- DS-1 Line Loopback
- DS-1 Payload Loopback (ESF framing mode only)
- Local Data Port toward Remote Data Port
- Remote Data Port toward Local Data Port
- Remote Data Port toward Remote Data Port
- DS-1 Far-end Loopback In-band
- DS-1 Far-end Loopback Data Link (ESF framing mode only)

See “Testing the System Using Loopback Tests” on page 6-1 for a description of each of these loopbacks.

Once a loopback condition has been initiated, it remains in effect until cleared. You may also set a loopback timeout to clear the loopback automatically after a set period of time has elapsed.

To manage loopbacks through the Diagnostics menu:

- 1 Press **Escape** until `CAMPUS HRS I/F: FLEX` displays.
- 2 Press **Next** until `DIAGNOSTICS` displays, then press **Enter**.
`LOOPBACK MODE` displays.

Initiating and Clearing Loopback Conditions

Use the `LOOPBACK MODE` menu in the Diagnostics menu to initiate or clear a loopback condition.

To initiate a loopback condition:

- 1 In the Diagnostics menu, press **Enter**. The `LOOPBACK MODE` menu displays.
- 2 Press **Enter**.

- 3 Press **Next** to scroll through the loopback options until the desired loopback mode displays (NONE ; DS-1 LINE ; DS-1 PAYLOAD ; LOCAL TO REMOTE ; REMOTE TO LOCAL ; REMOTE TO REMOTE ; DS-1 FAR-END IN-BAND ; DS-1 FAR-END DATA LINK).
- 4 Press **Enter** to select the displayed option and initiate the loopback condition. LOOPBACK MODE displays.

To clear a loopback condition:

- 1 In the Diagnostics menu, press **Enter**. The LOOPBACK MODE menu displays.
- 2 Scroll through the menu by pressing **Next** until NONE displays.
- 3 Press **Enter**. Any loopbacks are cleared and the LCD menu displays:

```
LOOPBACK MODE
NONE
```

Setting the Loopback Timeout

The loopback timeout determines the amount of time before a loopback clears automatically: 20 minutes (default), 60 minutes, 120 minutes, or None (which disables the loopback timeout).



If you set the loopback timeout to None, loopbacks run until you clear them manually or turn the unit off.

To set a loopback timeout:

- 1 From the LOOPBACK MODE display, press **Next**. LPBK TIMEOUT displays.
- 2 Press **Enter** to access the loopback timeout options in minutes.
- 3 Press **Next** to scroll through the options until the desired setting appears (20 ; 60 ; 120 ; None).
- 4 Press **Enter** to select the desired timeout option and return to the LPBK TIMEOUT display.

Configuring the Response to External Loopback Commands

The Campus-RS CSU/DS-1 and CSU/DSX-1 cards can be configured to respond to a variety of external loopback commands on the DS-1 or DSX-1 interface. The card can be configured to respond to either in-band loop codes, data link (out of band) loop codes, both types (default setting), or neither. See Chapter 6 for a description of these loopback commands.

Configuring this option will not affect the ability to initiate and clear loopbacks directly from the Campus unit as described above.

To configure the loopback command response:

- 1 In the Diagnostics menu, press **Enter**. The LOOPBACK MODE menu displays.
- 2 Scroll through the menu by pressing **Next** until EXT LPBK CMDS displays.
- 3 Press **Enter** to access the loopback command options.
- 4 Press **Next** to scroll through the configuration options until the desired setting appears (In-band & Data Link; In-band; Data Link; None).
- 5 Press **Enter** to select the desired option and return to the EXT LPBK CMDS display.

VIEWING SYSTEM INFORMATION

Using the LCD menu, you can view the following system information (with the option name in parentheses):

- Firmware version and PROM checksum (S/W REV and S/W CKSUM)
- Hardware configuration information (H/W CFG)
- Local unit identity (LOCAL UNIT ID)
- Remote unit identity (REMOTE UNIT ID)
- Remote interface card (REMOTE I/F)
- Circuit identity (CIRCUIT ID)

You cannot change this information through the LCD menu. Use an ASCII terminal to set these options. See “Entering System Information” on page 4-22.

To view the system information:

- 1 Press **Escape** until `CAMPUS HRS I/F: FLEX` displays.
- 2 Press **Enter** to view the software version and checksum information.
- 3 Press **Next** to scroll through the remaining options.

CONFIGURING THROUGH THE ASCII TERMINAL

4

You can use an ASCII terminal or computer with terminal emulation software to configure Campus-RS system options and generate system reports.

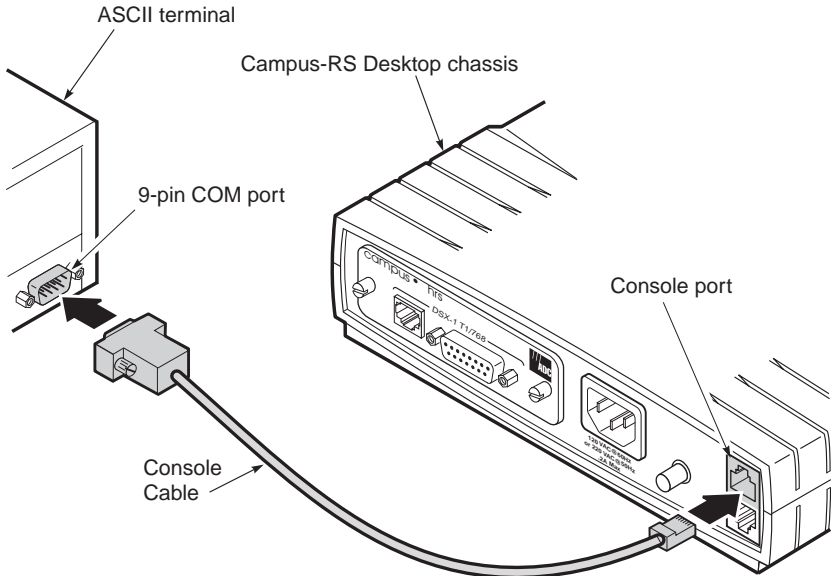
The ASCII terminal connects to the console port on either the Campus-RS Desktop Unit or on the Campus-RS Line Unit installed in the Campus-Star chassis.

This chapter describes how to set and view the individual configuration options through an ASCII terminal. To use an ASCII terminal to view system performance and other status information, see “Using an ASCII Terminal to View Information and Status” on page 5-1.

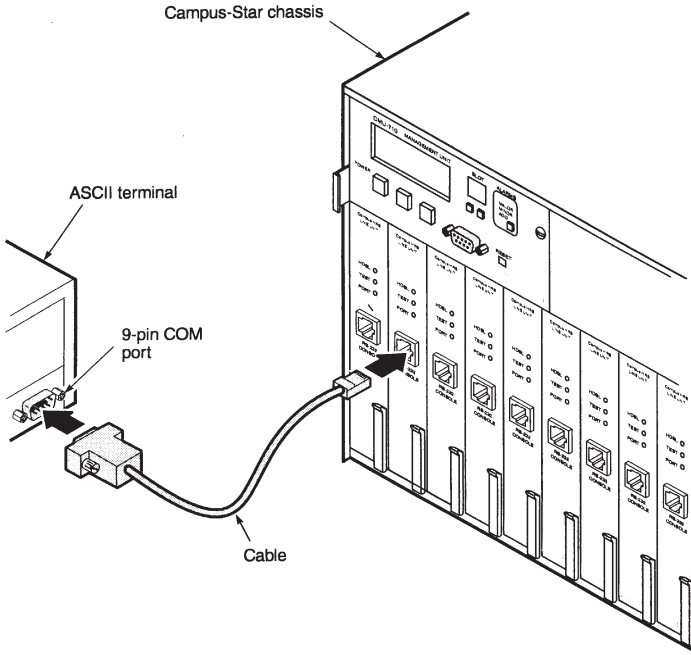
CONNECTING TO AN ASCII TERMINAL

To connect the Campus-RS Line Unit or Desktop Unit to an ASCII terminal:

- 1 Plug the console adapter into the standard 9-pin COM port on the ASCII terminal and tighten the attached screws until they are snug. Skip this step if the ASCII terminal provides an RJ48 jack.



- 2 Plug one end of the console cable into the console adapter, then do one of the following:
 - Plug the other end of the console cable into the console port on the desktop unit.
 - Plug the other end of the console cable into the RS-232 port on the front of the line unit, as in the following figure.



- 3 Configure the ASCII terminal to the following communications settings:
- 9600 baud
 - No parity
 - 8 data bits
 - 1 stop bit
 - No hardware flow control

LOGGING ON AND OFF

Through the terminal menus, you can:

- log on or off a local or remote Campus-RS System
- log on to a remote Campus unit that is not a Campus-RS unit. For configuration options, see the user manual for the interface card that is installed in the remote unit.

Logging On a Local Campus Unit

To log onto a local Campus unit:

- 1 Press the **SPACEBAR** on the ASCII terminal keyboard several times until baud rate is established and the Logon Password screen displays on the terminal monitor.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version 4.3C      01:17:54
Local Unit ID: #24                                             Local I/F: CAMPUS
Remote Unit ID: Inactive                                       Remote I/F: Inactive
Circuit ID:      Network #47

LOGIN PASSWORD >
```

- 2 Press **ENTER** to log on. If you have changed the password, type your password, then press **ENTER** to display the Main Menu.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version 4.3C      01:18:39
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: Inactive                 Remote I/F: Inactive
Circuit ID:      Network #47

                                MAIN MENU

1) SYSTEM STATUS
2) DATA PORT SETTINGS
3) SYSTEM SETTINGS
4) DIAGNOSTICS
5) REMOTE LOGON

                                (L)ogout

ENTER CHOICE>
```

Logging On a Remote Campus Unit

To log onto a remote Campus unit, use the following procedure:

- 1 Press the **SPACEBAR** on the ASCII terminal keyboard several times until the baud rate is established and the Login Password screen displays on the terminal monitor.
- 2 Press **ENTER** to log on. If you have changed the password, type your password, then press **ENTER** to display the Main Menu.

The Local Unit ID and I/F indicate the interface card to which you are directly attached. The Remote Unit ID and I/F indicate the interface card at the remote end.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version 4.3C      01:18:39
Local Unit ID: #24                                           Local I/F: CAMPUS
Remote Unit ID: #84                                           Remote I/F: CAMPUS
Circuit ID:      Network #47

                                MAIN MENU

1) SYSTEM STATUS
2) DATA PORT SETTINGS
3) SYSTEM SETTINGS
4) DIAGNOSTICS
5) REMOTE LOGON

                                (L)ogout

ENTER CHOICE>
```

3 Press **5** for Remote Logon, then press **ENTER**.

The Local Unit ID and I/F now indicate the interface card at the remote end. The Remote Unit ID and I/F indicate the interface card to which you are directly attached.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version 4.3C      01:18:39
Local Unit ID: #84                                           Local I/F: CAMPUS
Remote Unit ID: #24                                           Remote I/F: CAMPUS
Circuit ID:      Network #47

                                MAIN MENU

1) SYSTEM STATUS
2) DATA PORT SETTINGS
3) SYSTEM SETTINGS
4) DIAGNOSTICS
5) REMOTE LOGON

                                (L)ogout

ENTER CHOICE>
```

Although the ASCII terminal is physically connected to the local unit, the header displays as if connected to the remote unit. The prompt changes to `REMOTE LOGON PASSWORD`.

The screens and procedures on the Remote Main Menu are identical to those on the Local Main Menu, except that the `REMOTE LOGON` option is unavailable.

Logging Off a Campus Unit

To log off a Campus unit:

- 1 If the Main Menu is not the current menu, press **R** for Return to the higher-level menu and **ENTER**. Repeat this step until the display returns to the Main Menu.
- 2 At the Main Menu, type **L** for Logout, then press **ENTER** to log off the unit menus.

If you are logged into a remote Campus unit and you want to log off completely, type **L** for Logout, then press **ENTER** to log off the remote unit. Then repeat this procedure to log off the local unit.

USING THE TERMINAL MENUS

Each menu identifies the keys that you can use on that menu. The following keys operate identically on all the menus:

- To access menu items, type the number of the item, then press **ENTER**.
- To exit the current menu and return to the higher-level menu, type **R**, then press **ENTER**.
- At menus that are located more than one level below the Main Menu, you can type **M**, then press **ENTER** to return to the Main Menu.

There are two types of configuration options. One type lets you select the desired value from a list of predefined values. The other type prompts you to type in the required information.

To set an option from a list of predefined values, use the following procedure:

- 1 Type the number of the option, then press **ENTER**. The option setting changes to the next value in the list and the screen redraws.
- 2 Repeat Step 1 until the option is set to the desired value.

To set an option that requires you to enter information, use the following procedure:

- 1 Type the number of the option, then press **ENTER**. The screen prompts you for information.
- 2 Type the information in the format requested, then press **ENTER**.

See “ASCII Terminal Menu Reference” on page A-7 for a map of the terminal menu structure.

RESTORING THE SYSTEM TO DEFAULT VALUES

You can restore the configuration options to their factory default values. This is an easy way to remove undesired configurations that you may have set and want to return to their default settings.



Some options must be the same for both the local and the remote unit. Resetting the configuration values on only one unit may cause the HDSL link to go down.

- 1 At the Main Menu, type **3**, then press **ENTER** to display the System Settings Menu.

```

Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version 4.3C      01:24:36
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: #84                      Remote I/F: CAMPUS
Circuit ID:      Network #47

                                SYSTEM SETTINGS MENU

1) SYSTEM PARAMETERS
2) HDSL PARAMETERS

                                (R)return

ENTER CHOICE>
    
```

- 2 Type **1**, then press **ENTER** to display the System Parameters menu.

```

Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version 4.3C      01:26:03
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: #84                      Remote I/F: CAMPUS
Circuit ID:      Network #47

                                SYSTEM PARAMETERS

1) Change System Time
2) Change System Date
3) Change Unit ID
4) Change Circuit ID
5) Change Password
6) HDSL ES Alarm Threshold:      Disabled (Disabled, 17, 170)
7) HDSL Margin Alarm Threshold: Disabled
8) Local I/F LOS Alarm:         Enabled (Disabled, Enabled)
9) Remote I/F LOS Alarm:        Disabled (Disabled, Enabled)
10) Rcv Pulse Density Alarm:    Disabled (Disabled, Enabled)
11) Xmt Pulse Density Alarm:    Disabled (Disabled, Enabled)

12) RESET TO FACTORY DEFAULT

                                (R)return (M)ain Menu

ENTER CHOICE>
    
```

- 3 Type **1 2**, then press **ENTER** to restore the configuration options to their factory default values, as listed in “Default Settings” on page A-1. The display returns to the System Parameters menu.

CONFIGURING THE HDSL RATE

The Campus-RS CSU/DS-1 or CSU/DSX-1 Interface Card can be configured to operate in either Standard-T1 or Standard-768 HDSL rate. Standard-T1 is the default setting, and the HDSL link will transport all 24 channels plus the framing bits of the DS-1 (1.544 Mbps). In Standard-768, only one twisted pair is used for the HDSL link, which will transport channels 1-12 plus the framing bits; the DS-1 (or DSX-1) interface still operates at 1.544 Mbps, but channels 13-24 will be automatically blocked and will transmit idle code.

To set the HDSL rate:

- 1 At the Main Menu, type **3**, then press **ENTER** to display the System Settings Menu.
- 2 Type **2**, then press **ENTER** to display the Standard Mode HDSL Parameters menu.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version x.xx      00:04:25
Local Unit ID: #24                                           Local I/F: CAMPUS
Remote Unit ID: #84                                           Remote I/F: CAMPUS
Circuit ID:      Network #47

                                STANDARD MODE HDSL PARAMETERS

1) HDSL Operating Mode: Standard
2) Transceiver Mode:      Auto          (Auto, Master, Slave)
3) HDSL Rate:              T1           (T1, 768)

Changes will not be effective until this menu is exited!

                                (R)return (M)ain Menu

ENTER CHOICE>
```


- 3 Type **3**, then press **ENTER** to toggle between the two rate options (T1 or 768).
- 4 Repeat the previous step until the Standard Mode HDSL Parameters menu displays the desired rate setting.
- 5 Type **R** to exit the menu and cause the rate change to take effect.

CONFIGURING THE DATA PORT

You can set the following parameters for the Data port:

- Framing Options
 - Framing Mode
 - Insert Framing
 - PRM Enable
 - Channel Blocking
 - Idle Code
 - CI or NI
- Line Code Options
 - Line Code
 - Line Build Out
 - EQ Gain Limit

Set these options from the Data Port Settings menu. At the Main Menu type **2**, then press **ENTER**.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version x.xx      00:04:25
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: #84                      Remote I/F: CAMPUS
Circuit ID:      Network #47

                                DATA PORT SETTINGS

FRAMING OPTIONS

1) Framing mode:      ESF      (ESF, D4)
2) Insert Framing:   Off      (Off, On)
3) PRM Enable:       Disabled
4) Channel Blocking: 24 active DS0
5) Idle Code:        7f
6) CI or NI:         CI      (CI, NI)

LINE CONTROL

7) Line Code:        B8ZS     (B8ZS, AMI)
8) Line Build Out:   0-133     (0-133, 133-266, 266-399,
                               399-533, 533-655)
9) EQ Gain Limit:    Normal    (Normal, Sensitive)

                                (R)return (M)ain Menu

ENTER CHOICE>
```

Setting the Framing Mode

The Framing Mode determines the framing setting for all traffic both received and transmitted through the DSX-1 port. Set this option to Extended Superframe (ESF) or D4.

- 1 At the Data Port Settings menu, type **1**, then press **ENTER** to change the Framing Mode option to the next available setting: ESF (default) or D4.
- 2 Repeat the previous step until the Data Port Settings menu displays the desired framing mode setting.

Inserting Framing

When Insert Framing is on, the Campus-HRS CSU/DS-1 or CSU/DSX-1 RS Interface Card inserts framing on the data transmitted out the DS-1 or DSX-1 port. In this case, all framing bits, Performance Report Message (PRM) bits, and Cyclic Redundancy Check (CRC) bits are sourced from inside the unit.

When Insert Framing is off, all the framing bits, PRM bits, and CRC bits are passed through on the bit stream. Off is the default.

Insert Framing is typically not required if the remote device supports framed DS-1 signaling (for example, a Campus-RS CSU/DS-1, CSU/DSX-1, or Campus-Flex card). If the remote device does not support DS-1 signaling (for example, a Campus-RS Fractional or REX card), Insert Framing must be turned on.

- 1 At the Data Port Settings menu, type **2**, then press **ENTER** to change the Insert Framing option to the next available setting: OFF or ON.
- 2 Repeat the previous step until the Data Port Settings menu displays the desired Insert Framing setting.

Setting the Performance Report Message

You can enable or disable the Performance Report Message (PRM) option. This option can only be enabled when you select ESF as the framing mode and Insert Framing is On. When enabled, the Campus-RS CSU/DS-1 or CSU/DSX-1 Interface Card can insert or extract PRM messages and loopback codes to and from the Facilities Data Link. The default is Disabled.

- 1 At the Data Port Settings menu, type **3**, then press **ENTER** to change the PRM option to the next available setting: Enable or Disable.
- 2 Repeat the previous step until the Data Port Settings menu displays the PRM setting.

Setting Channel Blocking

You can independently control the channel blocking on each of the 24 channels. Blocking a channel blocks both the reception and transmission of data for that channel.

- 1 At the Data Port Settings menu, type **4**, then press **ENTER**. The Channel Blocking Menu displays. The letter B indicates a blocked or inactive channel. No letter B indicates an unblocked or active channel. The default is all channels active.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version x.xx      00:04:25
Local Unit ID: #24      Local I/F: CAMPUS
Remote Unit ID: #84     Remote I/F: CAMPUS
Circuit ID:      Network #47

                CHANNEL BLOCKING MENU

-----
Channel: | 1 2 3 4 | 5 6 7 8 | 9 0 1 2 | 3 4 5 6 | 7 8 9 0 | 1 2 3 4 |
-----
Status:  |         |         |         |         |         |         |
-----

      B: Blocked

      Active channel: 24 DS-0s
      Data rate:      1536 kbps

1) Change Channel Blocking
2) Clear Channel Blocking

(R) return

ENTER CHOICE>
```

- 2 To change the Channel Blocking, type **1**, then press **ENTER**. Type the channels to be changed. Separate the multiple channels with a comma or space. For example, 1, 2, 3, 4 or 1 2 3 4.
- 3 A range of numbers can be separated by a dash (-) or colon (:). For example, 1-4 or 1:4.
- 4 To clear all channel blocking, type **2**, then press **ENTER**. All blocked channels return to an unblocked state.

Setting the Idle Code

When you enable channel blocking, set an 8-bit idle code for the Campus-HRS CSU/DS-1 or CSU/DSX-1 card to transmit through the data port on blocked DS0 channels. The idle code can be a value of 00 to FF with 7F as the default. This code displays as a hexadecimal value on the Channel Blocking Menu, next to the channel for which you enabled channel blocking.

- 1 At the Data Port Settings menu, type **5**, then press **ENTER**.
- 2 Type the new Idle Code in two-character hexadecimal format.

Setting the PRM Header Format

The CI/NI option determines the format of the PRM (Performance Report Message) header. In installations that require the PRMs to be sourced from the network interface, change the setting to NI. Otherwise, the default setting of CI should be adequate for most installations. (For further information, see “CI and NI Configurations” on page A-4.)

To set this option:

- 1 At the Data Port Settings menu, type **6**, then press **ENTER**. The CI or NI option changes to the next available setting: CI (default) or NI.
- 2 Repeat the previous step until the Data Port Settings menu displays the desired CI/NI setting.

Setting the Line Code

Select AMI (Alternate Mark Inversion) or B8ZS (Binary 8 Zero Substitution) line coding to guarantee your T1 line density requirements. B8ZS is the default.

- 1 At the Data Port Settings menu, type **7**, then press **ENTER**. The Line Code option changes to the next available setting: B8ZS (default) or AMI.
- 2 Repeat the previous step until the Data Port Settings menu displays the desired Line Code setting.

Setting the Line Build Out

Set the Line Build Out option to control the attenuation of the transmitted signal.

- 1 At the Data Port Settings menu, type **8**, then press **ENTER** to change the Line Build Out option:
 - For the CSU/DS-1 interface card, the settings display as follows (the default is 0 dB): 0 dB, -7.5 dB, -15 dB, -22.5 dB
 - For the CSU/DSX-1 interface card, the settings display as follows (the default is 0-133 ft): 0-133 ft, 133-266 ft, 266-399 ft, 399-533 ft, 533-655 ft
- 2 Repeat the previous step until the Data Port Settings menu displays the desired Line Build Out setting.

Setting the Equalizer Gain Limit

Set the Equalizer (EQ) Gain Limit to normal or sensitive to limit the sensitivity of the receiver. The default is Normal.

- 1 At the Data Port Settings menu, type **9**, then press **ENTER** to change the EQ Gain Limit option to accept or reject the next available setting: Normal or Sensitive.
- 2 Repeat the previous step until the Data Port Settings menu displays the desired EQ Gain Limit setting.

CONFIGURING AS A MASTER OR SLAVE UNIT

The Transceiver Mode option determines the hierarchy of the two Campus-RS units when they are attempting to establish an HDSL link.

The Transceiver Mode option has three settings: Auto, Master, and Slave.

- If a unit is set to Auto (default), it automatically switches between Master and Slave until the HDSL link is established. The setting of the other Campus unit is irrelevant.



Unless you have an important reason for doing otherwise, ADC recommends leaving the Transceiver Mode option set to Auto.

- If a unit is set to Master, it initiates the HDSL link. The other Campus unit must be set to Slave or Auto.
- If a unit is set to Slave, it waits for the other Campus unit to initiate the HDSL link. The other unit must be set to Master or Auto.

If you must change the Transceiver Mode:



You cannot change this option when the HDSL link is up. Disable the link before performing this procedure.

- 1 Press **R** or **M**, then press **ENTER** until you return to the Main Menu.
- 2 At the Main Menu, type **3**, then press **ENTER** to display the System Settings Menu.

```

Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version x.xx      00:04:25
Local Unit ID: #24                                           Local I/F: CAMPUS
Remote Unit ID: #84                                           Remote I/F: CAMPUS
Circuit ID:      Network #47

                                SYSTEM SETTINGS MENU

1) SYSTEM PARAMETERS
2) HDSL PARAMETERS

                                (R)return

ENTER CHOICE>
    
```

- 3 Type **2**, then press **ENTER**. The Standard Mode HDSL Parameters menu displays, as follows.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version x.xx      00:04:25
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: #84                      Remote I/F: CAMPUS
Circuit ID:      Network #47

                STANDARD MODE HDSL PARAMETERS

1) HDSL Operating Mode: Standard
2) Transceiver Mode:   Auto              (Auto, Master, Slave)
3) HDSL Rate:         T1                  (T1, 768)

Changes will not be effective until this menu is exited!

                (R)return (M)ain Menu

ENTER CHOICE>
```

- 4 Type **2**, then press **ENTER**. The Transceiver Mode option changes to the next available setting.
- 5 Repeat the previous step until the Standard Mode HDSL Parameters menu displays the desired Transceiver Mode settings.

VIEWING AND CONFIGURING ALARMS

You can configure the following alarm options:

- HDSL Errored Seconds (ES) Alarm Threshold determines the number of errored seconds that must occur to trigger an alarm.
- HDSL Margin Alarm Threshold determines the margin in dB that triggers an alarm.
- Local I/F LOS Alarm allows you to enable or disable the local Loss of Alarm Signal alarm.
- Remote I/F LOS Alarm allows you to enable or disable the remote Loss of Alarm Signal alarm.

- Receiver (Rcv) Pulse Density Alarm is always set to Disabled unless directed by ADC Customer Service to set to Enabled for test.
- Transmitter (Xmt) Pulse Density Alarm is always set to Disabled unless directed by ADC Customer Service to set to Enabled for test.

Configure the alarm options from the System Parameters menu.

- 1 At the Main Menu, type **3**, then press **ENTER** to display the System Settings Menu.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version x.xx      00:04:25
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: #84                      Remote I/F: CAMPUS
Circuit ID:      Network #47

                                SYSTEM SETTINGS MENU

1) SYSTEM PARAMETERS
2) HDSL PARAMETERS

                                (R)return

ENTER CHOICE>
```

- 2 Type **1**, then press **ENTER** to display the System Parameters menu.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version x.xx      00:04:25
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: #84                      Remote I/F: CAMPUS
Circuit ID:      Network #47

                          SYSTEM PARAMETERS

1) Change System Time
2) Change System Date
3) Change Unit ID
4) Change Circuit ID
5) Change Password
6) HDSL ES Alarm Threshold:      Disabled (Disabled, 17, 170)
7) HDSL Margin Alarm Threshold: Disabled
8) Local I/F LOS Alarm:         Enabled (Disabled, Enabled)
9) Remote I/F LOS Alarm:        Disabled (Disabled, Enabled)
10) Rcv Pulse Density Alarm:    Disabled (Disabled, Enabled)
11) Xmt Pulse Density Alarm:    Disabled (Disabled, Enabled)

12) RESET TO FACTORY DEFAULT

(R)return (M)ain Menu

ENTER CHOICE>
```

Setting HDSL Errored Seconds (ES) Alarm Threshold

You can configure the HDSL Errored Seconds (ES) Alarm Threshold either to *Disabled* or to the number of errored seconds that must occur within a 15-minute period to trigger an alarm (17 or 170).

To configure the HDSL ES Alarm Threshold:

- 1 At the System Parameters menu, type **6**, then press **ENTER**. The System Parameters menu displays the next available HDSL ES Alarm Threshold setting, in errored seconds.
- 2 Repeat the previous step until the desired setting displays.

Configuring HDSL Margin Alarm Threshold

HDSL Margin Alarm Threshold determines the Signal-to-Noise Ratio (SNR) margin, in dB, that triggers an alarm. You can configure the HDSL Margin Alarm Threshold between 1 dB and 25 dB, in 1 dB increments, or you can disable this alarm.

To configure the HDSL Margin Alarm Threshold:

- 1 At the System Parameters menu, type **7**, then press **ENTER**.
- 2 When prompted, do one of the following:
 - Enter the desired margin threshold value (from 1 to 25 dB).
 - Type **D** to disable.
- 3 Press **ENTER**. The System Parameters menu shows the desired HDSL Margin Threshold setting.

Setting Local Interface Loss of Signal Alarm

Local Interface Loss of Signal (Local I/F LOS) Alarm allows you to enable or disable the alarm for local loss of signal or loss of sync on the T1 line. The Port LED on the Campus unit lights red for this alarm condition.

To change the local I/F Loss of Signal (LOS) alarm:

- 1 At the System Parameters menu, type **8**, then press **ENTER**. The Local I/F LOS alarm changes to the next available setting.
- 2 Repeat the previous step until the desired setting displays.

Setting Remote Interface Loss of Signal Alarm

Remote Interface Loss of Signal (Remote I/F LOS) Alarm allows you to enable or disable the remote alarm for loss of signal or loss of sync on the remote unit interface. The Port LED on the Campus unit lights red for this alarm condition.

- 1 At the System Parameters menu, type **9**, then press **ENTER**. The Remote I/F LOS alarm changes to the next available setting.
- 2 Repeat the previous step until the desired setting displays.

Setting Rcv Pulse Density Alarm

The Receive Pulse Density alarm indicates that the received signal includes at least one pattern of more than 15 consecutive zeros. You can enable or disable this alarm.

- 1 At the System Parameters menu, type **1 0**, then press **ENTER**. The Receive Pulse Density alarm changes to the next available setting.
- 2 Repeat the previous step until the desired setting displays.

Setting Xmt Pulse Density Alarm

The Transmit Pulse Density alarm indicates if the transmitted signal includes at least one pattern of more than 15 consecutive zeros. You can enable or disable this alarm.

- 1 At the System Parameters menu, type **1 1**, then press **ENTER**. The Transmit Pulse Density alarm changes to the next available setting.
- 2 Repeat the previous step until the desired setting displays.

ENTERING SYSTEM INFORMATION

System information is not required for system operation but can assist in the following maintenance and troubleshooting tasks.

This section describes how to enter the following information about the system:

- Setting the system time and date
 - Setting a password
 - Labeling the unit and circuit with unique identifiers
- 1 Press **R** or **M**, then press **ENTER** until you return to the Main Menu.
 - 2 At the Main Menu, type **3**, then press **ENTER** to display the System Settings Menu.

```

Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version x.xx      00:04:25
Local Unit ID: #24                                             Local I/F: CAMPUS
Remote Unit ID: #84                                           Remote I/F: CAMPUS
Circuit ID:      Network #47

                                SYSTEM SETTINGS MENU

1) SYSTEM PARAMETERS
2) HDSL PARAMETERS

                                (R)return

ENTER CHOICE>
    
```

3 Type **1**, then press **ENTER** to display the System Parameters menu.

```

Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version x.xx      00:04:25
Local Unit ID: #24                                             Local I/F: CAMPUS
Remote Unit ID: #84                                           Remote I/F: CAMPUS
Circuit ID:      Network #47

                                SYSTEM PARAMETERS

1) Change System Time
2) Change System Date
3) Change Unit ID
4) Change Circuit ID
5) Change Password
6) HDSL ES Alarm Threshold:      Disabled      (Disabled, 17, 170)
7) HDSL Margin Alarm Threshold:  Disabled
8) Local I/F LOS Alarm:         Enabled      (Disabled, Enabled)
9) Remote I/F LOS Alarm:        Disabled      (Disabled, Enabled)
10) Rcv Pulse Density Alarm:    Disabled      (Disabled, Enabled)
11) Xmt Pulse Density Alarm:    Disabled      (Disabled, Enabled)

12) RESET TO FACTORY DEFAULT

                                (R)return (M)ain Menu

ENTER CHOICE>
    
```

- 4 Continue with the following sections to set the desired system parameters:
 - Time and date
 - Password
 - Unit ID
 - Circuit ID

Setting Time and Date

The Campus-RS Line Unit or Desktop Unit uses the time and date to record system events, such as alarms.

To set the time and date:

- 1 At the System Parameters menu, type **1**, then press **ENTER**. The system prompts you to enter the time.

- 2 Type the time, in 24-hour format:

HH:MM:SS

For example, type 13:02:03 to set the time to three seconds after 1:02 P.M.

- 3 Press **ENTER**. The system displays the System Parameters menu with the time that you typed.
- 4 Type **2**, then press **ENTER**. The system prompts you to enter the date.
- 5 Type the date in the following format:

MM/DD/YYYY



Although the date is displayed in the alphanumeric format, for example, Jan 2, 1999, type it into the system in the format 01/02/1999.

- 6 Press **ENTER**. The system displays the System Parameters menu with the date that you typed.

Changing a Password

A password prevents unauthorized access to Campus configuration options. Once a password has been set, it must be entered to log on to the system.

Your password can be any combination of up to ten letters or numbers, but the first character must be a letter. Passwords are case-sensitive.

To change or set a password:

- 1 At the System Parameters menu, type **5**, then press **ENTER**.
- 2 Type the new password, up to ten characters, then press **ENTER**. The system prompts you to confirm the password.



If you forget your password and cannot log onto the Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards, use the LCD to restore the configuration settings to their default values. This removes the password. For details see “Restoring the System to Default Values” on page 4-8.

Changing the Unit ID and the Circuit ID

The Campus system supports two identifiers:

- The Unit ID identifies the individual Campus CSU/DS-1 or Campus CSU/DSX-1 Line Unit or Desktop Unit.
- The Circuit ID identifies the individual HDSL circuit. It is the same for both the local and remote units.

To set or change the Unit ID and Circuit ID:

- 1 At the System Parameters menu, type **3**, then press **ENTER**. The system prompts you to enter the Unit ID.
- 2 Type a unique identifier for the unit. There are no limits on which characters you use but the length of the unit identifier must not exceed 32 characters.
- 3 Press **ENTER**. The system displays the System Parameters menu with the unit ID that you typed.
- 4 Type **4**, then press **ENTER**. The system prompts you to enter the circuit ID.

- 5 Type a unique identifier for the circuit. There are no limits on which characters you use but the length of the circuit identifier must not exceed 64 characters.
- 6 Press **ENTER**. The system displays the System Parameters menu with the circuit ID that you typed

CONFIGURING LOOPBACKS

Loopbacks provide a way to test the data communication path between the Campus unit, the remote unit, and the remote host equipment. The Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards support loopbacks on each of its data ports on the local or remote unit.

The following types of loopbacks are supported:

- DS-1 Line Loopback
- DS-1 Payload Loopback
- Local Data Port toward Remote Data Port
- Remote Data Port toward Local Data Port
- Remote Data Port toward Remote Data Port
- DS-1 Far-end Loopback

See Chapter 6 for a description of these loopbacks.

Once a loopback condition has been initiated, it remains in effect until cleared. You may set a loopback timeout to clear the loopback automatically after a set period of time has elapsed. The default timeout is 20 minutes.

- 1 At the Main Menu, type **4**, then press **ENTER** to display the Diagnostics Menu.

```

Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version x.xx      09:10:00
Local Unit ID: #24                                           Local I/F: CAMPUS
Remote Unit ID: #84                                           Remote I/F: CAMPUS
Circuit ID: Network #47

                                DIAGNOSTICS MENU

1) LOOPBACK SETTINGS MENU
2) INTERFACE CARD STATUS
3) RECEIVE CHANNEL SIGNALING BITS
4) PERFORMANCE REPORT MESSAGES
5) DOWNLOAD MODE

                                (R)return

ENTER CHOICE>
    
```

- 2 Type **1**, then press **ENTER** to display the Loopback Settings Menu.

```

Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version x.xx      09:10:00
Local Unit ID: #24                                           Local I/F: CAMPUS
Remote Unit ID: #84                                           Remote I/F: CAMPUS
Circuit ID: Network #47

                                LOOPBACK SETTINGS MENU

ACTIVE LOOPBACK: None

1) DS-1 Line Loopback
2) DS-1 Payload Loopback
3) Remote Data Port toward Local Data Port
4) Local Data Port toward Remote Data Port
5) Remote Data Port toward Remote Data Port
6) DS-1 Far End Loopback
7) Terminate Loopback
8) Loopback Timeout (min):      None          (20, 60, 120, None)
9) External Loopback Commands:  In-band & Data Link

WARNING: Any loopback will remove data link from service.
                                (R)return (M)ain Menu

ENTER CHOICE>
    
```

Initiating a Loopback

- 1 At the Loopback Settings Menu (shown on page 4-27), type the number of the desired loopback that you wish to initiate. The options are:
 - 1) DS-1 Line Loopback
 - 2) DS-1 Payload Loopback
 - 3) Remote Data Port toward Local Data Port
 - 4) Local Data Port toward Remote Data Port
 - 5) Remote Data Port toward Remote Data Port
 - 6) DS-1 Far End Loopback
- 2 Type the number corresponding to the loopback that you are activating, then press **ENTER**.

If you selected **6** and the Framing Mode option is set to ESF (see page 4-12), then the available loopback commands display (In-band ; Data Link). Type the number of the desired option, then press **ENTER**.
- 3 The Loopback Settings Menu changes that loopback to the next available loopback status.

Terminating All Loopbacks

At the Loopback Settings Menu, type **7**, then press **ENTER**. The system disables any loopbacks that may be set.

Setting a Loopback Timeout

The loopback timeout determines the amount of time before a loopback clears automatically: 20 minutes (default), 60 minutes, 120 minutes, or None (disables the loopback timeout).



If you set the loopback timeout to None, loopbacks run until you clear them manually or turn the unit off.

- 1 At the Loopback Settings Menu, type **8**, then press **ENTER**. The Loopback Settings Menu shows the next available Loopback Timeout setting, in minutes.
- 2 Repeat the previous step until the desired setting displays.

Configuring the Response to External Loopback Commands

The Campus-RS CSU/DS-1 and CSU/DSX-1 cards can be configured to respond to a variety of external loopback commands on the DS-1 or DSX-1 interface. The card can be configured to respond to either in-band loop codes, data link (out of band) loop codes, both types (default setting), or neither. See Chapter 6 for a description of these loopback commands.

Configuring this option will not affect the ability to initiate and clear loopbacks directly from the Campus unit as described above.

To configure the loopback command response:

- 1 At the Main Menu, type **4**, then press **ENTER** to display the Diagnostics Menu.
- 2 Type **1**, then press **ENTER** to display the Loopback Settings Menu.

```

Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS RS, Version x.xx          09:10:00
Local Unit ID: #24                                           Local I/F: CAMPUS
Remote Unit ID: #84                                           Remote I/F: CAMPUS
Circuit ID: Network #47

                                LOOPBACK SETTINGS MENU

ACTIVE LOOPBACK: None

1) DS-1 Line Loopback
2) DS-1 Payload Loopback
3) Remote Data Port toward Local Data Port
4) Local Data Port toward Remote Data Port
5) Remote Data Port toward Remote Data Port
6) DS-1 Far End Loopback
7) Terminate Loopback
8) Loopback Timeout (min):      None          (20, 60, 120, None)
9) External Loopback Commands:  In-band & Data Link

WARNING: Any loopback will remove data link from service.
        (R)eturn (M)ain Menu

ENTER CHOICE>

```

- 3 Type **9**, then press **ENTER**. The available External Loopback Command settings display.
 - If the Framing Mode option is set to ESF (see page 4-12), then the available settings are In-band & Data Link; In-band; Data Link; None.
 - If the Framing Mode option is set to D4 (see page 4-12), then the available settings are In-band; None.
- 4 Type the number of the desired option, then press **ENTER** to return to the Loopback Settings Menu.

USING AN ASCII TERMINAL TO VIEW INFORMATION AND STATUS

5

This chapter describes how to use an ASCII terminal to view performance and product information.

To use an ASCII terminal to configure system options, you must first connect an ASCII terminal to the Campus-RS Desktop Unit or Campus-RS Line Unit in which the Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards is installed. Follow the instructions in “Connecting to an ASCII Terminal” on page 4-2 to connect to a terminal.

You may also use the LCD menus to view the information described in this chapter. See “Configuring and Monitoring Using LCD Menus” on page 3-1 for instructions on using the LCD panel.

MONITORING HDSL PERFORMANCE

The Current System Status menu provides a variety of information on the performance of the Campus system.

To open the Current System Status menu:

- 1 Press **R** or **M**, then press **ENTER** until you return to the Main Menu.
- 2 At the Main Menu, type **1**, then press **ENTER**. The System Status Menu displays, as follows:

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version 4.3C      05:04:26
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: Inactive                 Remote I/F: Inactive
Circuit ID:      Network #47

                                SYSTEM STATUS MENU

1) CURRENT SYSTEM STATUS
2) 24 HOUR HDSL PERFORMANCE HISTORY
3) 7 DAY HDSL PERFORMANCE HISTORY
4) LOCAL ALARM HISTORY
5) PRODUCT INFORMATION

                                (R)eturn

ENTER CHOICE>
```

- 3 Type **1**, then press **ENTER** to display the Current System Status, as in the following example:

```

Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version 4.3C      05:04:26
Local Unit ID: #24                                             Local I/F: CAMPUS
Remote Unit ID: #84                                           Remote I/F: CAMPUS
Circuit ID:      Network #47

                CURRENT SYSTEM STATUS
Local Alarms: HDSL-A, HDSL-B, LOS
Remote Alarms:
Loopback:      None

                HDSL-A                      HDSL-B
                LOCAL      REMOTE          LOCAL      REMOTE
                -----
                mn/cr/mx   mn/cr/mx       mn/cr/mx   mn/cr/mx
Margin (dB):    na/na/na   na/na/na   na/na/na   na/na/na
Pulse Attn (dB): 00        00           00         00
24 Hour ES:     00000     00000     00000     00000
24 Hour UAS:    15003     00000     15003     00000
Last Cleared:   None

                (U)pdate (C)lear
                (R)eturn (M)ain Menu

ENTER CHOICE>

```

The Current System Status screen provides the following information:

- HDSL-A and HDSL-B columns indicate alarms on Loop 1 or Loop 2, respectively.
- Local Alarms indicate the current local alarm status.
- Remote Alarms indicate the current remote alarm status.
- Margin (dB) indicates the minimum (mn), current (cr), and maximum (mx) HDSL Signal-to-Noise ratio (SNR) margin value, measured in dB, relative to the signal-to-noise ratio required for a Bit Error Rate (BER) of 10^{-7} .
- Pulse Attn (dB) indicates the attenuation in amplitude of the transmitted signal, as measured at the HDSL receiver.
- 24 Hour ES indicates the number of Errored Seconds over the last 24 hours.
- 24 Hour UAS indicates the number of Unavailable Seconds over the last 24 hours.
- Last Cleared indicates the date and time when the error counter was last cleared.

- 4 The information on the Current System Status menu does not update automatically. To update this information, type **U**, then press **ENTER**.
- 5 To clear the 24 Hour ES and 24 Hour UAS counters and reset the margin minimum and maximum values to the current value, type **C**, then press **ENTER**.

Viewing 24-Hour HDSL Performance History

To display HDSL performance history data for the last 24 hours in 15-minute increments:

- 1 At the Main Menu, type **1**, then press **ENTER** to display the System Status Menu:

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version 4.3C      05:04:26
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: #84                      Remote I/F: CAMPUS
Circuit ID:      Network #47

                                SYSTEM STATUS MENU

1) CURRENT SYSTEM STATUS
2) 24 HOUR HDSL PERFORMANCE HISTORY
3) 7 DAY HDSL PERFORMANCE HISTORY
4) LOCAL ALARM HISTORY
5) PRODUCT INFORMATION

                                (R)eturn

ENTER CHOICE>
```

- 2 Type **2**, then press **ENTER** to display the 24 Hour HDSL Performance History screen:


```

Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version 4.3C      05:04:26
Local Unit ID: #24                                             Local I/F: CAMPUS
Remote Unit ID: #84                                           Remote I/F: CAMPUS
Circuit ID:      Network #47

```

24 HOUR HDSL PERFORMANCE HISTORY

	HDSL-A		HDSL-B	
	LOCAL ES/UAS	REMOTE ES/UAS	LOCAL ES/UAS	REMOTE ES/UAS
03:15	000/900	000/000	000/900	000/000
03:30	000/900	000/000	000/900	000/000
03:45	000/900	000/000	000/900	000/000
04:00	000/900	000/000	000/900	000/000
04:15	000/900	000/000	000/900	000/000
04:30	000/900	000/000	000/900	000/000
04:45	000/900	000/000	000/900	000/000
05:00	000/900	000/000	000/900	000/000
Current	000/810	000/000	000/810	000/000

(P)revious (N)ext (U)pdate
(R)eturn (M)ain Menu

ENTER CHOICE>

The 24 Hour HDSL Performance History screen provides the following information:

- HDSL-A and HDSL-B columns indicate alarms on Loop 1 or Loop 2, respectively.
- Local ES/UAS alarms indicate the number of Errored Seconds/Unavailable Seconds over the last 24 hours on the local unit.
- Remote ES/UAS alarms indicate the number of Errored Seconds/Unavailable Seconds over the last 24 hours on the remote unit.

The information on the current screen does not update automatically. To update the information, type **U**, then press **ENTER**.

You can view the entire 24-hour history (twelve screens in all) as follows:

- To view the previous page, type **P**, then press **ENTER**.
- To view the next page of the report, type **N**, then press **ENTER**.



Performance history information is lost when power is removed from the Campus unit.

Viewing Seven-Day HDSL Performance History

To display HDSL performance history data for the last seven days plus the current day:

- 1 At the Main Menu, type **1**, then press **ENTER**. The System Status Menu displays.
- 2 Type **3**, then press **ENTER**. The 7 Day HDSL Performance History screen displays.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version 4.3C      05:04:26
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: #84                     Remote I/F: CAMPUS
Circuit ID:      Network #47

          7 DAY HDSL PERFORMANCE HISTORY

                HDSL-A                      HDSL-B
          LOCAL  REMOTE          LOCAL  REMOTE
          ES/UAS  ES/UAS          ES/UAS  ES/UAS
          -----  -----          -----  -----
Jun 26*          00000/15727  00000/00000    00000/15727  00000/00000

*Since Midnight

                                (U)pdate
                                (R)eturn (M)ain Menu

ENTER CHOICE>
```

The 7 Day HDSL Performance History screen provides the following information:

- HDSL-A and HDSL-B columns indicate alarms on Loop 1 or Loop 2, respectively.
- Local ES/UAS alarms indicate the number of Errored Seconds/Unavailable Seconds over the last 7 days on the local unit.
- Remote ES/UAS alarms indicate the number of Errored Seconds/Unavailable Seconds over the last 7 days on the remote unit.

The information on the current screen does not update automatically. To update the information, type **U**, then press **ENTER**.



Performance history information is lost when power is removed from the Campus unit.

MONITORING DATA PORT PERFORMANCE

The Interface Card Status screen displays data port status.



The following text and screens describe the screens for the Campus-RS CSU/DS-1 Interface Card. The screens and options are identical for the Campus-RS CSU/DSX-1 Interface Card, except that “DS-1” is replaced by DSX-1.”

- 1 At the Main Menu, type **4**, then press **ENTER**. The Diagnostics Menu displays.

```

Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version x.xx      09:10:00
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: #84                      Remote I/F: CAMPUS
Circuit ID: Network #47

                                DIAGNOSTICS MENU

1) LOOPBACK SETTINGS MENU
2) INTERFACE CARD STATUS
3) RECEIVE CHANNEL SIGNALING BITS
4) PERFORMANCE REPORT MESSAGES
5) DOWNLOAD MODE

                                (R)eturn

ENTER CHOICE>

```

2 Type **2**, then press **ENTER**. The Interface Card Status screen displays.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version x.xx      09:10:00
Local Unit ID: #24                      Local I/F:  CAMPUS
Remote Unit ID: #84                      Remote I/F:  CAMPUS
Circuit ID: Network #47

                                INTERFACE CARD STATUS

B8ZS Detection:                      No
Receive Signal Level:                 <-22.5dB
Receive Loop Codes:                   None
Received Pulse Density Violation:     No
Transmit Pulse Density Violation:     No
Receive AIS or Yellow Alarm:          None
Transmit AIS or Yellow Alarm:         None
ES Count:                             0
UAS Count:                             0
Frame Error Seconds:                  0
Last Cleared:                         None

1) 24-Hour DS-1 History
2) 7-Day DS-1 History

                                (U)pdate (C)lear
                                (R)eturn (M)ain Menu

ENTER CHOICE>
```

The following table describes the parameters on the Interface Card Status screen:

Parameter	Description
B8ZS Detection	Indicates whether B8ZS line coding is enabled.
Receive Signal Level	Indicates the received signal level on the DS-1/DSX-1 port, in dB. This level can be one of the following: 0 to -7.5 dB, -7.5 to -15 dB, -15 to -22.5 dB, or < -22.5 dB.
Receive Loop Codes	Indicates the status of received in-band loop codes. This status can be one of the following: None, DS-1 Line, DS-1 Payload, Up, Down.
Receive Pulse Density Violation	Indicates that the received signal includes at least one pattern of more than 15 consecutive zeros.
Transmit Pulse Density Violation	Indicates that the transmitted signal includes at least one pattern of more than 15 consecutive zeros.
Receive AIS or Yellow Alarm	Indicates whether an Alarm Indication Signal (AIS) or yellow alarm condition (RAI) has been received.
Transmit AIS or Yellow Alarm	Indicates whether an AIS or RAI has been transmitted.
ES Count	The number of errored seconds since this error count was reset.
UAS Count	The number of unavailable seconds since this error count was reset.
Frame Error Seconds	The number of frame error seconds since this error count was reset.
Last Cleared	The date and time the error counters were last cleared. To reset the counters, press C , then press ENTER .

Viewing 24-Hour Data Port Performance History

The 24-Hour DS-1/DSX-1 History screen displays performance history data for the last 24 hours in 15-minute increments. The screen displays 24-hour information for the following parameters:

- errored seconds (ES)
- unavailable seconds (UAS)
- frame error seconds (FES)

To display 24-hour performance history, from the Interface Card Status screen, type **1**, then press **ENTER**.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version x.xx      09:10:00
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: #84                     Remote I/F: CAMPUS
Circuit ID: Network #47

                24-HOUR DSX-1 History

                ES/UAS/FES
                -----
23:00                000/000/000
23:15                000/000/000
23:30                000/000/000
23:45                000/000/000
00:00                000/000/000
00:15                000/000/000
00:30                000/000/000
00:45                000/000/000
Current              000/000/000

                (P)revious (N)ext (U)pdate
                (R)eturn  (M)ain Menu

ENTER CHOICE>
```

The information on the current screen does not update automatically. To update the information, type **U**, then press **ENTER**.

You can view the entire 24-hour history (twelve screens in all) as follows:

- To view the previous page, type **P**, then press **ENTER**.
- To view the next page of the report, type **N**, then press **ENTER**.



Performance history information is lost when power is removed from the Campus unit.

Viewing 7-Day Data Port Performance History

The 7-Day DS-1/DSX-1 History screen displays port performance history data for the last seven days plus the current day. The screen displays seven-day information for the following parameters:

- errored seconds (ES)
- unavailable seconds (UAS)
- frame error seconds (FES)

From the Interface Card Status screen, type **2**, then press **ENTER**.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version x.xx      09:10:00
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: #84                      Remote I/F: CAMPUS
Circuit ID: Network #47

                          7-DAY DSX-1 History

                          ES / UAS / FES
                          -----
Jun 10                      000000/000000/000000
Jun 11                      000000/000000/000000
Jun 12                      000000/000000/000000
Jun 13                      000000/000000/000000
Jun 14                      000000/000000/000000
Jun 15                      000000/000000/000000
Jun 16                      000000/000000/000000
Current                    000000/000000/000000

                          (U)pdate
                          (R)eturn (M)ain Menu

ENTER CHOICE>
```

VIEWING RECEIVE CHANNEL SIGNALING BITS

The Receive Channel Signaling Bits screen shows the received signaling bit values for each channel. If the framing option is set to ESF, the ABCD bits display. The AB bits display if the framing option is set to D4.

- 1 At the Main Menu, type **4**, then press **ENTER** to display the Diagnostics Menu.

```
Jun 26, 1999  PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version x.xx      09:10:00
Local Unit ID: #24                      Local I/F:  CAMPUS
Remote Unit ID: #84                      Remote I/F: CAMPUS
Circuit ID: Network #47

                                DIAGNOSTICS MENU

1) LOOPBACK SETTINGS MENU
2) INTERFACE CARD STATUS
3) RECEIVE CHANNEL SIGNALING BITS
4) PERFORMANCE REPORT MESSAGES
5) DOWNLOAD MODE

                                (R)eturn

ENTER CHOICE>
```


- Type **3**, then press **ENTER** to display the Received Channel Signaling Bits screen.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version x.xx      09:10:00
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: #84                      Remote I/F: CAMPUS
Circuit ID: Network #47

                RECEIVE CHANNEL SIGNALING BITS

CHANNEL  ABCD                CHANNEL  ABCD
  1      1111                13      1111
  2      1111                14      1111
  3      1111                15      1111
  4      1111                16      1111
  5      1111                17      1111
  6      1111                18      1111
  7      1111                19      1111
  8      1111                20      1111
  9      1111                21      1111
 10      1111                22      1111
 11      1111                23      1111
 12      1111                24      1111

                (U)pdate
                (R)eturn (M)ain Menu

ENTER CHOICE>
```

VIEWING PERFORMANCE REPORT MESSAGES

The Performance Report Messages screen displays in-band status messages on the receive and transmit paths.

- 1 At the Main Menu, type **4**, then press **ENTER** to display the Diagnostics Menu.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version x.xx      09:10:00
Local Unit ID: #24                      Local I/F:  CAMPUS
Remote Unit ID: #84                      Remote I/F:  CAMPUS
Circuit ID: Network #47

                                DIAGNOSTICS MENU

1) LOOPBACK SETTINGS MENU
2) INTERFACE CARD STATUS
3) RECEIVE CHANNEL SIGNALING BITS
4) PERFORMANCE REPORT MESSAGES
5) DOWNLOAD MODE

                                (R)eturn

ENTER CHOICE>
```

- 2 Type **4**, then press **ENTER** to display the Performance Report Messages screen.

```

Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version x.xx      09:10:00
Local Unit ID: #24                                           Local I/F: CAMPUS
Remote Unit ID: #84                                           Remote I/F: CAMPUS
Circuit ID: Network #47

                                PERFORMANCE REPORT MESSAGES

CRC Error Event:          RECEIVED          TRANSMITTED
SE Framing Event:        No                 No
Frame Bit Error:         No                 No
Line Code Violation:     No                 No
Slip Event:              No                 No
Payload Loopback:        No                 No

                                (U)pdate
                                (R)eturn (M)ain Menu

ENTER CHOICE>

```

This screen displays the following information:

Parameter	Description
CRC Error Event	Shows the number of CRC error events in the previous second. The number is one of the following: 1, 2-5, 6-10, 11-100, 101-319, >319.
SE Framing Event	Indicates whether one or more severely errored second occurred in the previous second.
Frame Bit Error	Indicates whether a frame bit error occurred in the previous second.
Line Code Violation	Indicates whether a line code violation occurred in the previous second.
Slip Event	Indicates whether a frame slip event has occurred in the previous second.
Payload Loopback	Indicates that the unit has received a payload loopback command.

VIEWING LOCAL ALARM HISTORY

To view local alarm history information:

- 1 At the Main Menu, type **1**, then press **ENTER**. The System Status Menu displays.
- 2 Type **4**, then press **ENTER** to display the Local Alarm History.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version 4.3C      05:04:26
Local Unit ID: #24                      Local I/F: CAMPUS
Remote Unit ID: #84                      Remote I/F: CAMPUS
Circuit ID:      Network #47

                                LOCAL ALARM HISTORY

      Type      Current      First      Last      Count
-----
HDSL Link,     ACTIVE Jun 26, 1999-00:56:21  Jun 26, 1999-00:56:21  1
ES,            HDSL-A    OFF                0
ES,            HDSL-B    OFF                0
Margin,        HDSL-A    OFF                0
Margin,        HDSL-B    OFF                0
LOS,           ACTIVE Jun 26, 1999-00:56:22  Jun 26, 1999-00:56:22  1
RX Pulse Density OFF                0
TX Pulse Density OFF                0

Last Cleared: NONE

                                (S)witch to Remote Alarm History
                                (U)update (C)lear
                                (R)return (M)ain Menu

ENTER CHOICE>
```

The alarm history of the local unit displays information on the following alarms. If the HDSL line uses two loops, information displays for both loops.

- Errored seconds (ES)
- Margin
- Loss of Signal (LOS) for the data port
- Receive and Transmit Pulse Density

To switch to viewing remote alarm history, type **S**, then press **ENTER**.

To update the information, type **U**, then press **ENTER**.

To clear the information, type **C**, then press **ENTER**.



Alarm history information is lost when power is removed from the Campus unit.

VIEWING PRODUCT INFORMATION

To display product information:

- 1 At the Main Menu, type **1**, then press **ENTER** to display the System Status Menu.

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version 4.3C      05:04:26
Local Unit ID: #24                                           Local I/F: CAMPUS
Remote Unit ID: #84                                           Remote I/F: CAMPUS
Circuit ID:      Network #47

                                SYSTEM STATUS MENU

1) CURRENT SYSTEM STATUS
2) 24 HOUR HDLSL PERFORMANCE HISTORY
3) 7 DAY HDLSL PERFORMANCE HISTORY
4) LOCAL ALARM HISTORY
5) PRODUCT INFORMATION

                                (R)return

ENTER CHOICE>
```

- 2 Type **5**, then press **ENTER** to display the following product information:
 - Software version
 - PROM checksum
 - Hardware version
 - Hardware configuration

```
Jun 26, 1999 PAIRGAIN TECHNOLOGIES, CAMPUS HRS, Version 4.3C      05:04:26
Local Unit ID: #24          Local I/F: CAMPUS
Remote Unit ID: #84        Remote I/F: CAMPUS
Circuit ID:      Network #47
```

PRODUCT INFORMATION

```
Software Version:      4.3C
PROM Checksum:        05PB
Hardware Version:      FF06
                        Desktop
                        AC
                        RTC Not Installed
```

(R)return (M)ain Menu

ENTER CHOICE>

TESTING THE SYSTEM USING LOOPBACK TESTS

6

The Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards support a complete set of loopback functions that allow you to test the data communication path between the host equipment, the Campus unit, and the remote unit. You can use either the LCD menu or an ASCII terminal to initiate loopback tests directly from the Campus unit. The Campus unit can also be configured to respond to in-band or data link loopback commands transmitted on the DS-1 or DSX-1 interface.

To use the LCD menu to initiate a loopback, see “Configuring Loopbacks” on page 3-18. To use an ASCII terminal to initiate a loopback, see “Configuring Loopbacks” on page 4-26. For a description of the Campus unit’s response to external loopback commands, see “External Loopback Commands” on page 6-4.

Initiating a loopback test interrupts normal system operation and the Test LED on the desktop unit or line unit front panel turns on. When the loopback is cancelled, the system returns to normal operation automatically.

TYPES OF LOOPBACKS

There are six loopback tests you can use with the Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards. Each tests a different portion of the communications path, which lets you isolate communication problems. For each test, the terms “local” and “remote” are relative to the Campus unit from which you initiate the loopback test.

The following loopback tests are supported:

- DS-1/DSX-1 Line Loopback
- DS-1/DSX-1 Payload Loopback
- Local Data Port toward Remote Data Port
- Remote Data Port toward Local Data Port
- Remote Data Port toward Remote Data Port
- DS-1/DSX-1 Far-end Loopback

The following sections describe each type of loopback.

DS-1/DSX-1 Line Loopbacks

The DS-1/DSX-1 Line loopback tests the complete 1.544 Mbps signal of the DS-1/DSX-1 line, including channels that may be blocked. Use this loopback to test the integrity of the DS-1/DSX-1 signal.

DS-1/DSX-1 Payload Loopbacks

The DS-1/DSX-1 Payload loopback tests the DS-1/DSX-1 line by returning a signal to the source that consists of the payload of the received signal and newly-generated ESF framing. You can only use this loopback when the Framing Mode option is set to ESF.

Local to Remote Loopbacks

The Local to Remote loopback tests the remote data port, the entire data path inside the remote Campus unit, the HDSL line, the HDSL transceivers of both units, and most of the internal data path inside the local unit. This loopback does not test the local data port drivers and receivers.

Use this loopback to verify data communication from the remote host device to the internal data paths of the local interface card. The local host equipment is not involved in this type of loopback.

Remote to Local Loopback

The Remote to Local loopback tests the local data port, entire data path inside the local Campus unit, the HDSL line, and the HDSL transceivers of both units and most of the internal data path inside the remote unit.

Use this loopback to verify that the HDSL line is operational and that the HDSL transceiver of the remote unit is operational. This loopback also tests the same areas as the Local to Local and Local HDSL loopbacks. The remote host equipment is not involved in this type of loopback.

Remote to Remote Loopback

The Remote to Remote loopback tests the remote data port and a small portion of the remote interface card.

Use this loopback to verify that the remote equipment, remote data cable, and remote interface card are installed and configured properly. The local host equipment is not involved in this type of loopback.

DS-1/DSX-1 Far-end Loopbacks

The DS-1/DSX-1 Far-end loopback tests the entire data path from the remote host device to the host device connected to the Campus-HRS CSU/DS-1 or CSU/DSX-1 data port. This loopback commands the local DS-1/DSX-1 host device to perform a payload loopback toward the local Campus unit.

In ESF framing mode, two types of loopback commands may be transmitted—in-band or data link.

CLEARING LOOPBACKS

You can clear a loopback test in the following two ways:

- Cancel the loopback manually.
- Set the Loopback Timeout option to cancel the loopback automatically after a set period of time.

Clearing Loopbacks Manually

You can clear a loopback from either the LCD menu or an ASCII terminal. To use the LCD front panel, see “Initiating and Clearing Loopback Conditions” on page 3-18. To use an ASCII terminal, see “Terminating All Loopbacks” on page 4-28.

Setting Loopback Timeout

When using a loopback, there is a possibility that it will be forgotten. If this happens, the communication link remains down. To prevent this, you can set the Loopback Timeout configuration option. There are four different settings that determine how long a loopback remains active:

- None
- 20 Minutes
- 60 Minutes
- 120 Minutes

When the Loopback Timeout option is set to 20, 60, or 120 minutes, the loopback is cancelled and normal communication resumes when the set time has elapsed. When the option is set to None, the loopback remains in effect until you cancel it manually.

To set the Loopback Timeout through the LCD menu, see “Initiating and Clearing Loopback Conditions” on page 3-18. To set the Loopback Timeout through an ASCII terminal, refer to “Setting a Loopback Timeout” on page 4-28.

External Loopback Commands

Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards can be configured to respond to either in-band or data link loopback commands received on the DS-1 or DSX-1 interface.

In-band loop codes will be interpreted in either D4 or ESF framing modes, and can be used to activate and deactivate the DS-1 Line Loopback only.

Data link (out of band) loop codes are valid in ESF framing mode. The Campus unit will activate and deactivate the DS-1 Line Loopback or DS-1 Payload Loopback in response to standard ANSI T1.403 data link code words.

The card can be configured to respond to either in-band loop codes, data link loop codes, both types (default setting), or neither. If the external loopback response is enabled, the network equipment can remotely command the Campus unit to perform loopbacks. If an external loopback response is disabled, the Campus unit ignores the loopback commands and allows them to pass transparently through the HDSL circuit to the remote host equipment.

To configure the external loopback command response through the LCD menu, see “Configuring the Response to External Loopback Commands” on page 3-20. To configure the external loopback command response through an ASCII terminal, see “Configuring the Response to External Loopback Commands” on page 4-29.

TESTING THE SYSTEM (LOOPBACK TESTS)

7

The Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards supports a complete set of loopback functions that allow you to test the data communication path between the host equipment, the Campus unit, and the remote unit. You can use either the LCD and menu buttons or an ASCII terminal to initiate loopback tests.

To use an LCD to initiate a loopback, see page “Configuring Loopbacks” on page 4-26. To use an ASCII terminal to initiate a loopback, see page “Terminating All Loopbacks” on page 4-28.

Initiating a loopback test interrupts normal system operation, which causes the Test LED on the Campus RS Desktop Unit or Line Unit front panel to turn on. When the loopback is cancelled, the system automatically returns to normal operation.

TYPES OF LOOPBACKS

The Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards supports the following loopback tests:

- Local to Local on the DSX-1 Port, Data Port 1, or Data Port 2
- Remote to Local on the remote DSX-1 Port, Data Port 1, or Data Port 2

Each loopback tests a different portion of the communication path, which lets you isolate communication problems. For each test, the terms “local” and “remote” are relative to the Campus unit from which you initiate the loopback test.

Local to Local Loopbacks

The Local to Local loopback verifies that the local host equipment, local data cable, and local interface card are installed and configured properly. The remote host equipment is not involved in this type of loopback.

Remote to Local Loopbacks

The Remote to Local loopback tests the selected remote data port, the entire data path inside the local and remote Campus units, the HDSL line, and the HDSL transceiver of both units. Use this loopback to verify that the HDSL line is operational and that the HDSL transceiver of the remote unit is operational.



If the remote unit is not a Campus-RS CSU/DS-1 and CSU/DSX-1 RS unit, not all the remote loopback options are available. The remote loopbacks available are determined by the remote interface card.

CLEARING LOOPBACKS

You can clear a loopback test in the following two ways:

- cancel the loopback manually from either the LCD or an ASCII terminal
- set the Loopback Timeout option to cancel the loopback automatically after a set period of time

Clearing Loopbacks Manually

You can clear a loopback from either the LCD or an ASCII terminal. To use the LCD, see “Clearing Loopbacks Manually” on page 6-4. To use an ASCII terminal, see “Terminating All Loopbacks” on page 4-28.

Loopback Timeout

When a loopback is in use, there is a possibility that it will be forgotten. If a loopback is forgotten, the communication link remains down. To prevent this from happening, you can set the Loopback Timeout configuration option. The Loopback Timeout configuration option determines how long a loopback remains active.



If you set the loopback timeout to None, loopbacks run until you clear them manually or turn the unit off.

When the Loopback Timeout configuration option is set to 20, 60, or 120 minutes, the loopback is cancelled and normal communication resumes when the set time has elapsed. When the option is set to None, the loopback remains in effect until you cancel it manually.

To set the Loopback Timeout through the LCD, see “Setting Loopback Timeout” on page 6-4. To set the Loopback Timeout through an ASCII terminal, refer to “Setting a Loopback Timeout” on page 4-28.

V.54 LOOPBACK SUPPORT

The Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards supports V.54-compliant loopbacks. This lets you initiate loopback tests from a V.54-capable host device. Before you can use V.54 loopbacks, you must enable V.54 loopback support. To do so through the LCD menu, see “Setting Loopback Timeout” on page 6-4. To do so through an ASCII terminal, see “Setting a Loopback Timeout” on page 4-28.

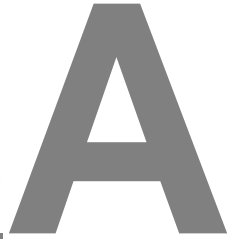
The V.54 support function is implemented through the following control signals on the data port:

- Local Loopback (LL) Signal (input)
- Remote Loopback (RL) Signal (input)
- Test Mode (TM) Signal (output), also called Line Test (LT)

Signal	Description
Local Loopback (LL)	When the host device activates the LL input, the Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards initiates a Local to Local loopback, as described on “Local to Local Loopbacks” on page 7-2. The card also turns on the TM output signal to provide confirmation of the loopback. The TM signal and Local to Local loopback remain active until the LL signal is turned off.
Remote Loopback (RL)	When the host device activates the RL input, the Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards initiates a Remote to Local loopback, as described on page 7-2. The card also turns on the TM output signal to provide confirmation of the loopback. The TM signal and Remote to Local loopback remain active until the RL signal is turned off.
Test Mode (TM)	The Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards activates the TM signal in response to activation of an LL or RL signal. The TM signal is also activated when any other loopback is initiated from the LCD, ASCII terminal, or V.54 control signal from the remote unit. The TM signal indicates to the local host device that a loopback test is active, regardless of how the test was initiated.

During normal operation, when no loopback is active, all three signals are off. When a V.54 loopback is in effect, the LL and RL input signals cannot be on at the same time. For example, when the RL signal is active, the LL signal is ignored.

TECHNICAL REFERENCE



This chapter includes technical reference information about the Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards.

DEFAULT SETTINGS

The following table lists default settings for Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards configuration options:

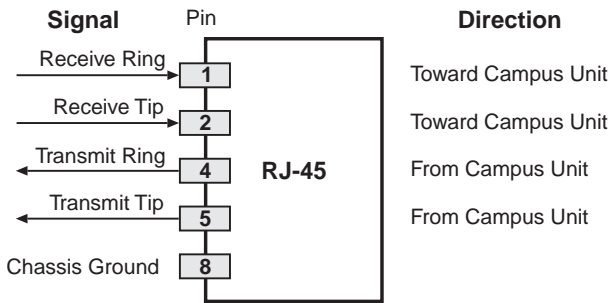
Parameter	Default
CI or NI Selection	CI
Equalizer Gain Limit	Normal
DS-1 Framing Mode	ESF
Idle Code Value	7F
Insert Framing Option	Off
DS-1 Line Build Out Setting	0 dB
DSX-1 Line Build Out Setting	0-133 ft
DS-1 Line Coding Modulation	B8ZS
Number of Blocked DS-0 Channels	0 (all unblocked)
PRM Enable	Disabled
Receive Pulse Density Alarm	Disabled
Transmit Pulse Density Alarm	Disabled
HDSL Rate	T1

PINOUTS

This section shows data port pinouts for the Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards.

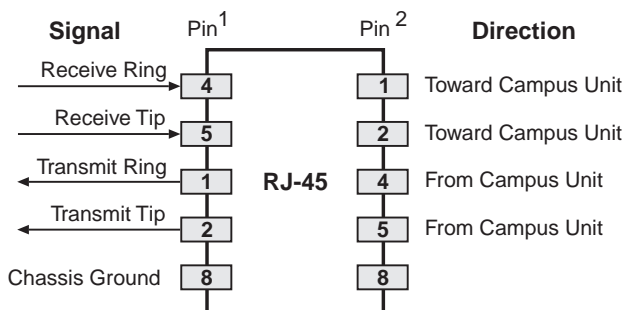
CSU/DS-1 Pinouts

The following figure shows the pinouts on the CSU/DS-1 card RJ-45 connector.



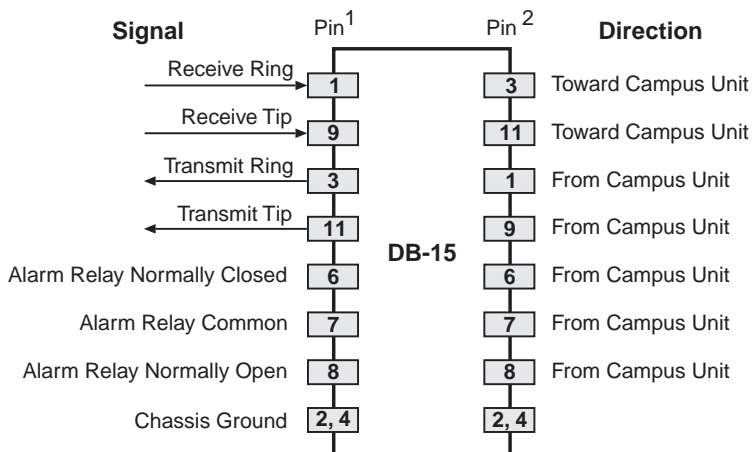
CSU/DSX-1 Pinouts

The following figure shows the pinouts on the CSU/DSX-1 card RJ-45 connector. The pin assignments for the transmit/receive pairs depend on whether jumper JP2 is in the straight or crossover position (see “Campus-RS CSU/DSX-1 Interface Card Pin Reversal” on page 2-3).



1. Pin assignment with JP2 in the straight position (factory default).
2. Pin assignment with JP2 in the crossover position.

The following figure shows the pinouts on the CSU/DSX-1 card DB-15 connector. The pin assignments for the transmit/receive pairs depend on whether jumper JP2 is in the straight or crossover position (see “Campus-RS CSU/DSX-1 Interface Card Pin Reversal” on page 2-3).



1. Pin assignment with JP2 in the straight position (factory default).
2. Pin assignment with JP2 in the crossover position.

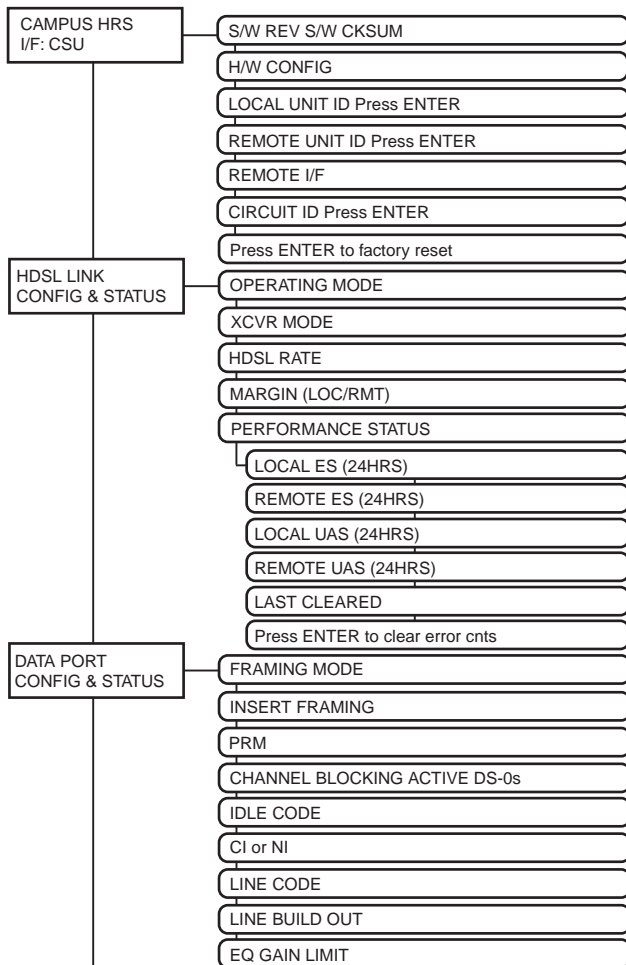
The Alarm Relay signals provide common, normally open, and normally closed contacts to the user. The Alarm Relay is activated whenever a major or minor alarm is active.

CI AND NI CONFIGURATIONS

ANSI standard T1.403 defines the requirements for a DS1 metallic interface, also called the network interface (NI), for a network-to-customer installation (CI). This standard defines the physical and electrical characteristics of a device that is configured either as NI or CI. For the Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards, the NI and CI settings do not affect the physical characteristics of the interface, such as input gain, transmit power, and so on. In particular the CSU/DSX-1, when set to NI, does not meet the NI network signal attenuation requirement specified in § 6.3.1 of T1.403. For the Campus-RS CSU/DS-1 and CSU/DSX-1 Interface Cards, the CI/NI option determines the format of the PRM (Performance Report Message) header. In installations that require the PRMs to be sourced from the network interface, change the setting to NI. Otherwise, the default setting of CI should be adequate for most installations.

LCD MENU REFERENCE

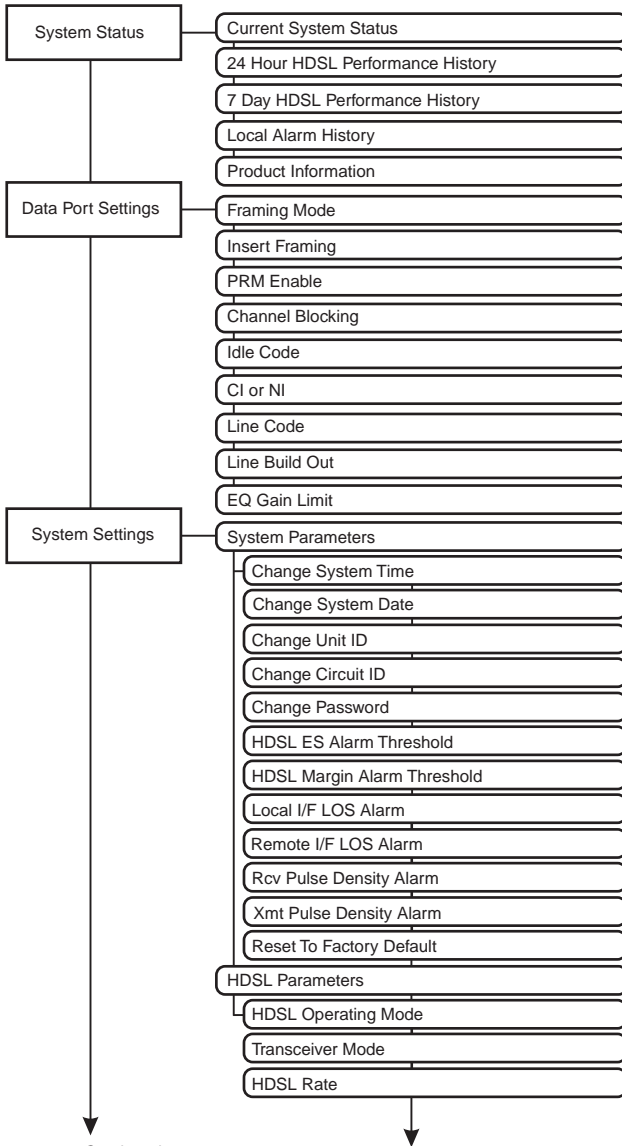
The following illustration diagrams the LCD menu structure.



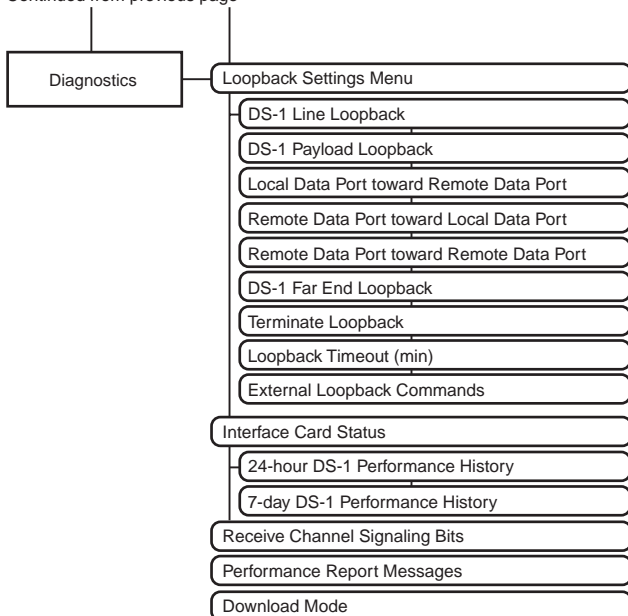
Continued on the next page

ASCII TERMINAL MENU REFERENCE

The following illustration diagrams the ASCII terminal menu structure.



Continued from previous page



ABBREVIATIONS

B

2B1Q	2 Binary, 1 Quarternary
AIS	Alarm Indication Signal (a pattern of all ones)
AMI	Alternate Mark Inversion
B8ZS	Binary 8 Zero Substitution
BER	Bit Error Rate
CI	customer installation
CMU	Campus Management Unit
CO	central office
CSU/DS-1	Channel Service Unit/Digital Service, Level 1
CSU/DSX-1	Channel Service Unit/Digital Service Crossover, Level 1
DS-0	Digital Signal, level zero
DS-1	Digital Signal, level one
DSX	Digital system cross-connect frame
DSX-1	DS1 cross-connect Frame
ES	Errored Seconds
ESF	Extended Superframe (a framing mode option)
HDSL	High-bit-rate Digital Subscriber Line
RS	HDSL Rate-Selectable
LOS	Loss of Signal
NI	network interface
PRM	Performance Report Message
SNR	Signal-to-Noise Ratio
UAS	Unavailable Seconds
UL	Underwriters Laboratory



THE DOCUMENTATION SET



This table describes all the manuals and guides in the Campus-RS documentation set.

Document	Description
<i>Campus-Star User Manual</i>	Contains instructions for setting up and using a Campus-Star. The manual includes instructions for installing interface cards into the Campus-Star chassis.
<i>Campus-RS Line Unit User Manual</i>	Describes the features of the Campus-RS Line Unit and provides installation instructions.
<i>Campus-RS Desktop Unit User Manual</i>	Describes the features of the Campus-RS Desktop Unit and provides instructions for installing interface cards and connecting the unit to an HDSL line.
Campus-RS interface card user manuals	Describes the features of the individual Campus interface cards, one card per manual, and contains instructions for configuring and monitoring the system through the cards.



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