255-100-216 ISS 2
Issue 2

Data Networking Products
X.25 and X.25P Module Reference

Contents

Figures

Tables

Procedures

X.25 Overview

X.25 Overview

The X.25 module, which conforms to the 1988 CCITT X.25 Recommendation, supports two-way communication across a packet switched network. The module has an integrated Packet Assembler/Disassembler (PAD), uses CCITT X.121 International addressing, and supports Closed User Group (CUG) security. The X.25 module supports E.164 addressing, accommodates 100 virtual circuits that can be designated as Switched Virtual Circuits (SVCs) and/or Permanent Virtual Circuits (PVCs). The X.25 module can provide the following services:

- Asynchronous to/from X.25 Host Service

  This service provides asynchronous devices with switched access to and from multiple X.25 hosts on a network. An X.3 profile governs the form of the call between the terminal user and the host. This profile can be customized or it can be one of three system-supplied default profiles. (See the *Node Reference*.) The terminal user's device can be set up with a predefined destination (PDD) and CUG security.

- Asynchronous to/from X.25 Public Data Network (PDN) Service

  This service provides communication between Data Networking Products endpoints and PDNs. Originating, receiving, and two-way switched access between asynchronous devices on both networks is supported, along with a PDD and access to multiple PDNs and multiple destinations on a single PDN.

  This service also functions as a gateway that provides two-way communication between asynchronous devices and multiplexed hosts on a network and compatible endpoints on a *5ESS*® Switch. Calls over the interface are uniquely identifiable and conform to *5ESS* billing requirements.

- X.25 to/from X.25 or X.25P

  In this mode, call setup and tear-down is provided on a logical channel basis. Also, the Packet Layer Restart function (via Restart Packets) is provided. Packet Layer transmission in transparent to the user. Data Packets, Interrupt Packets, Reset Packets, Q-bit, M-bit, and D-bits are passed through the network; however, Diagnostic Packets are handled exclusively by the Packet Layer.

  The X.25 endpoint may be a PDN, in which case the numeric addressing scheme uses a node prefix and a gateway prefix to support international X.121 addressing. These prefixes allow X.25 hosts on a network to call or to be passed through a PDN that supports variable length addresses. Variable length addresses are used on PDNs that do not support the North American Numbering Plan (NANP).

- X.25-to-X.75 Service

  This service enables an X.25 host to communicate with a Packet Switched Public Data Network (PSPDN) via an X.75 Gateway. An X.75 Gateway allows the network to serve as a public national network that can route calls to an unlimited number of public national

networks and/or as an originating or destination network when connected to any international or national network. Up to 256 international X.75 gateways are supported.

Physical Description

The X.25 is a removable circuit pack (TN2094) that slides into the card guides of a supported data networking products node cabinet, or into a Multipurpose Concentrator 15-slot (MPC15) or a Multipurpose Concentrator 7-slot (MPC7) making contact with a pin field on the front side of the node backplane. The module provides four full duplex ports. It is used in conjunction with one of four input/output (I/O) distribution boards that plug into the rear of the backplane. These I/O distribution boards provide the wiring for the four ports.

The interconnecting wiring causes the X.25 interface leads to provide a physical RS-232-C and/or V.35 connection to data terminal equipment (DTE) or data communications equipment (DCE). **Appendix A** summarizes port connections, speeds, clocking, and services provided by each I/O distribution board.

Each module faceplate contains three LEDs, a reset push button, a three-state mode switch, and a latch. When pressed, the reset push button reinitializes the module and clears the connections. The mode switch states of ENABLE, DIAGNOSE, and DISABLE and the green, yellow, and red LEDs indicate the module's current mode of operation and its service state. The latch is used to remove or insert the module and to secure it in place.

Features

The X.25 is a downloadable module that provides asynchronous, block-mode transmission to the Control Computer and to other asynchronous port devices. Since most options are local to the module and its ports, the particular port type can support variable window sizes, packet sizes, and user channels along with packet and window size negotiation, clocking, speed conversion, and allocation of SVCs, PVCs, and PDDs. Diagnostics, measurements, and status reports are provided.

Integrated PAD

The X.25 module's integrated PAD complies with the 1988 CCITT Recommendation for X.25 and supports Recommendations X.3, X.28, and X.29. Devices that do not support the X.25 switching protocol—such as PCs, workstations, and dumb terminals—rely on the PAD to convert the device protocol to/from the X.25 protocol used by the packet switch network.

The PAD also provides the protocol conversion needed to support communication with, and the multiplexed access to, asynchronous devices on a network and X.25 hosts on the same network and devices on an X.25 PDN, and devices connected to a *5ESS* Switch via an X.25 Gateway.

Transmission Capabilities

The four ports of the X.25 module can be individually configured from 1200 to 19.2 Kbps, or one port can be configured for up to 64 Kbps and three ports can be configured up to 9.6 Kbps. Refer to **Appendix A**.

For the most accurate method of data transmission, the X.25 module offers Grade of Service 5 (GOS5), which supports flow control, error detection, and retransmission. The modules discard corrupt data and retransmit the original data. If data is lost because of a network failure, it cannot be recovered; an alarm is sent to the node console.

Diagnostic Capabilities

Diagnostic capabilities consist of off-line module tests and on-line port tests that are run from the node console. Off-line diagnostics consist of three tests—boot diagnostics, memory tests, and downloadable diagnostics. On-line diagnostics check the communications path for an out-of-service port and its connected device.

In addition, report output obtained from **dstat**, **dmeas**, and **verify** commands can be used as a troubleshooting tool.

Administration Options

The following options can be administered in the database through the **gateway**, **x25**, and **x28sig** command sets:

- Port options *host* or *pdn* that allow a module port to communicate with an X.25 host, an X.25 PDN, or a *5ESS* Switch.
- Using *pdn* service, a gateway identifier that contains the pertinent interconnection parameters such as the gateway address, the device furnishing PAD support, CUG security data, and mapping information that can then be given the PDN or *5ESS* Switch address to which it is to interconnect.
- Eight internal module baud rates ranging from *1200* to *64k* or an option to specify no (*none*) baud rate to indicate that external timing is being provided by the end device connected to the port.
- Up to 100 user channels that can be distributed among the ports for a contiguous range of PVC and/or SVC channels.
- Billing capabilities that include identifying a call that occurs between a single PDN and a single node, and logging billing data for a specified X.25 module PDN or host port.
- One variable length X.28 identification service signal (sig) that can be used to broadcast messages to terminal users accessing the module PAD.
- Standard and nonstandard default packet and window sizes for all logical channels on a module for both SVCs and PVCs. Also, packet size and window size negotiation to accept values other than the default packet and window sizes on a per-call basis for SVC calls over a

module, so ports can request lower packet and window size values than the value administered for the module. (For SVC calls between endpoints connected to different X.25 modules, packet and window size is negotiated to the same lower value for both modules for both directions of data transmission to resolve different packet and window size settings between the modules. For PVC calls between endpoints on different X.25 modules with different packet or window sizes, calls are not connected. For SVC calls between X.25 endpoints and X.75 endpoints, the X.25 packet size is negotiated to the lower value. The packet sizes for the SVC call between an X.25 and X.75 module must be the same. The window sizes do not have to be the same.)

- For calls between X.25P and X.25 endpoints, window size negptiation is performed across the network to ensure that both ends of the call have the same window size.

  For PVCs, both ends of the call must be configured with the same window size as there is no concept of window size negotiation with PVCs.

- PDDs that associate an originating device to a network destination so automatic call setup can occur when the device is powered up.

- 1988 CCITT-compliant parameters that permit configuration of the maximum number of I frames (information frames) a port can have unacknowledged at once (parameter K), the maximum number of attempts a port can make to complete a transmission (parameter N2), the maximum number of seconds the module must wait before acknowledging a time violation (parameter T1), the number of minutes that the PAD is to wait for a call to be placed (parameter T), and the number of times that an asynchronous end user can unsuccessfully attempt to establish a call before the PAD is taken down (parameter N).

- Barring of incoming/outgoing SVC calls on a per-port basis by configuring the direction of the port and allocating a range of logical channels for one-way incoming/outgoing SVC calls.

- CUG security and customized or default profile identifiers for ports designated to provide *host* service.

X.25 Installation

X.25 Installation

X.25 module installation consists of a few simple precautions and procedures, as follows:

- Ensure protection from electromagnetic interference (EMI, see inside front cover) and electrostatic discharge (ESD). Wear an ESD wrist strap to prevent module damage; see the *Node Reference* for grounding locations and other details.
- Verify that the I/O distribution board to be installed is the AWJ5, AWJ6, AWJ17, or AWJ18. Refer to **Appendix A** for board specifications.
- Ensure that the correct slot is designated for the module. See the *Planning Guide* and the *Node Reference* for module placement in the node.

  CAUTION: To prevent damage to module circuitry, always insert the I/O distribution board **before** inserting its corresponding module. **Never** remove the I/O distribution board before removing the module.

- Insert the appropriate I/O distribution board; see the section that follows.
- Insert the X.25 module board; see the section that follows.
- Cable the I/O distribution board ports to support external devices; see **X.25 Cabling**.
- Examine the LEDs on the I/O distribution board. If either are lit, refer to **X.25 Troubleshooting**.

The following sections give more detail on inserting the I/O distribution board and the X.25 module boards, and directions for removing the module boards and their I/O distribution boards.

I/O Distribution Board Connections and Switch Settings

The I/O distribution board to be used with the X.25 module depends on the interface standard being used (RS-232-C or V.35), the function of the connecting end device—Data Terminal Equipment (DTE) or Data Communications Equipment (DCE)—and the number of ports required. **Appendix A** explains these six I/O distribution boards and the connection options they support.

The AWJ5 and AWJ6 I/O distribution boards do not have any switches that must be set; the AWJ17 and AWJ18 I/O distribution boards do. These switches are labeled S1.2 and S1.3; their functions and settings are explained in **Table 2-1**. The directions for these switch settings are given from the perspective of holding the I/O distribution board with the backplane connector to your left, the interface connectors to your right, and the switches facing you. A slide switch is moved in the specified direction. A rocker switch is pushed to the specified side. In addition, "magic" is always *disabled* because the AWJ17 and AWJ18 I/O distribution boards are used only

with X.25 modules housed in the node. (Magic is a property that enables a module to send commands to the Switch.)

TABLE 2-1. AWJ17 and AWJ18 I/O Distribution Board Switch Settings

Switch	Function	Up	Down	Comments
S1.2	PERENA (permanently enabled)		•	U: Connects Pin 205 to ground (magic enabled) D: Open circuit (magic disabled)
S1.3	BRESET (backplane reset)		•	U: Connects Pin 106 to Pin 105 (magic enabled) D: Open circuit (magic disabled)
• indicates default settings.				

Inserting and Removing the I/O Distribution Board

The X.25 I/O distribution boards plug into the rear of the *Datakit* II VCS Control Computer or BNS-2000 Series M1 Shelf backplane or into an MPC15 or MPC7; they are held in place by shrouds on the backplane pin field and secured with two screws. Always insert the I/O distribution board before inserting its corresponding X.25 module board.

Remove the I/O distribution board **only** for relocation, replacement, or part number confirmation. Never remove it before removing its corresponding X.25 module board.

PROCEDURE 2-1. Inserting the I/O Distribution Board

1. Verify that a module board does not reside in the corresponding slot.
2. Align the I/O distribution board's backplane connector with the backplane pin field at the rear of the shelf, and align the screws with the screw holes. Slip the backplane connector onto the pins.

   The board should seat easily. If seating is difficult, the board might be canted or some pins might be bent.
3. Insert the screws, and tighten them securely.

PROCEDURE 2-2. Removing the I/O Distribution Board

1. Unseat the module board.
2. Disconnect all cabling to I/O distribution board ports, labeling the cable ends if appropriate.
3. Remove the screws holding the I/O distribution board in place.
4. Rock the board carefully as you pull it out.

Inserting and Removing the Module Board

The X.25 module board (TN2094) is inserted into a slot at the front of the cabinet. To prevent damage to module circuitry if the node is powered up, insert the I/O distribution board at the rear of the slot before the X.25 module board.

You can remove and replace the X.25 module board in an operating node without damaging the module itself or without disrupting calls on other modules. Only calls on the X.25 are disrupted when the module board is removed.

PROCEDURE 2-3. Inserting the Module Board

1. Confirm that the I/O distribution board is installed and is residing in the appropriate slot.
2. Set the mode switch on the module faceplate to DISABLE.
3. With the module latch extended, carefully push the module all the way into the slot. The backplane pins will slip into the module receptacle.
4. Close the latch to lock the module into position.
5. Move the mode switch on the module faceplate to ENABLE.

PROCEDURE 2-4. Removing the Module Board

1. If the mode switch is in the ENABLE position, move it to DISABLE to take down all calls in progress on the X.25 module board.
2. Open the latch on the module faceplate.
3. Pull the module straight out of the slot, using the latch as a handle.

X.25 Cabling

X.25 Cabling

This chapter furnishes cabling information for the X.25 module. The information in this chapter was taken from the *Data Networking Products Cabling Guide*.

Each cabling configuration represents the required connections between the modules and other equipment associated with the communications path such as terminals, modems, host computers, patch panels, and so forth.

Cabling from X.25 Directly to a Host Computer, PDN, DTE Device, or V.35 DTE Device

Cabling from an X.25 module in a *Datakit* II VCS node cabinet, BNS-1000 node cabinet, BNS-2000 Series M1 Shelf, MPC7, or MPC15 to a host computer, PDN, or other DTE device, or to a V.35 DTE device can be configured as follows:

- The X.25 module consists of a TN2094 main circuit pack and an AWJ5, AWJ6, or AWJ18 I/O distribution board. See **Appendix A** and the following related figure for more information on I/O distribution boards.
- When cabling RS-232-C connections to host computers, PDNs, or other DTE devices, a B25FS-1MOD cable connects to the upper 50-pin connector (J1) on the AWJ5 or AWJ18 I/O distribution board.

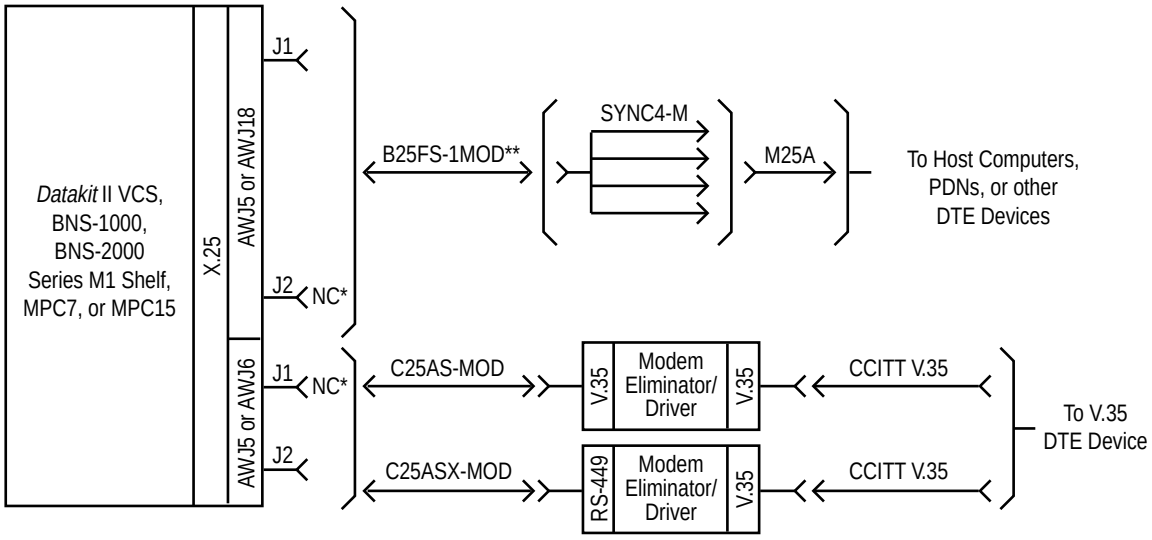
  A SYNC4-M cable connects to the B25FS-1MOD. The SYNC4-M has four male 25-pin connectors.

  Each 25-pin connector on the SYNC4-M cable connects directly to the end device, or each connector can be extended using an M25A cable.
- For limited distance cabling (in the same building) of V.35 connections to V.35 DTE devices, a C25AS-MOD cable connects to the lower 50-pin connector (J2) of the AWJ5 or AWJ6 I/O distribution board.

  A modem eliminator/driver connects directly to a V.35 DTE device. (A modem eliminator supplies the timing function necessary for synchronous operation.)
- When cabling RS-449 connections to V.35 DTE devices, a C25ASX-MOD 25-pair cable connects the I/O distribution board to an RS-449 connector at the modem eliminator.

  From the modem eliminator, a CCITT V.35 interface cable is direct-wired to a V.35 DTE device.

See the following figure for an illustration of these configurations.



**NC=no connection*

***After the first 25 feet, the B25FS-1MOD cable may be extended with a B25A cable.*

FIGURE 3-1. From X.25 Directly to a Host Computer, PDN, DTE Device, or V.35 DTE Device

TABLE 3-1. Ordering Information: From X.25 Directly to a Host Computer, PDN, DTE Device, or V.35 DTE Device

Cable/Adapter	Description	ED5P055-31 Group Number	Price Element Code (PEC)
B25A	50-pin 90-M 50-pin 90-F	G(106), G(F)	2752-106, 27514
B25FS-1MOD	50-pin 180-M 50-pin 90-M	G(200), G(C)	2752-200, 27512
SYNC4-M	50-pin 90-F 4 25-pin-M	G(160), G(R)	2752-160, 27523
M25A	25-pin-M 25-pin-F	G(107), G(P)	2752-107, 27521
C25AS-MOD	50-pin 180-M V.35-M	G(202), G(C)	2752-202, 27512
CCITT V.35	V.35 M V.35 F	G(121), G(Q)	2752-121, 27522
C25ASX-MOD	50-pin 180-M RS-449-M	G(203), G(C)	2752-203, 27512

For plenum cables, see the Ordering Quick Reference.

Cabling from X.25 to a Host Computer, PDN, or DTE Device via 110 Patch Panel

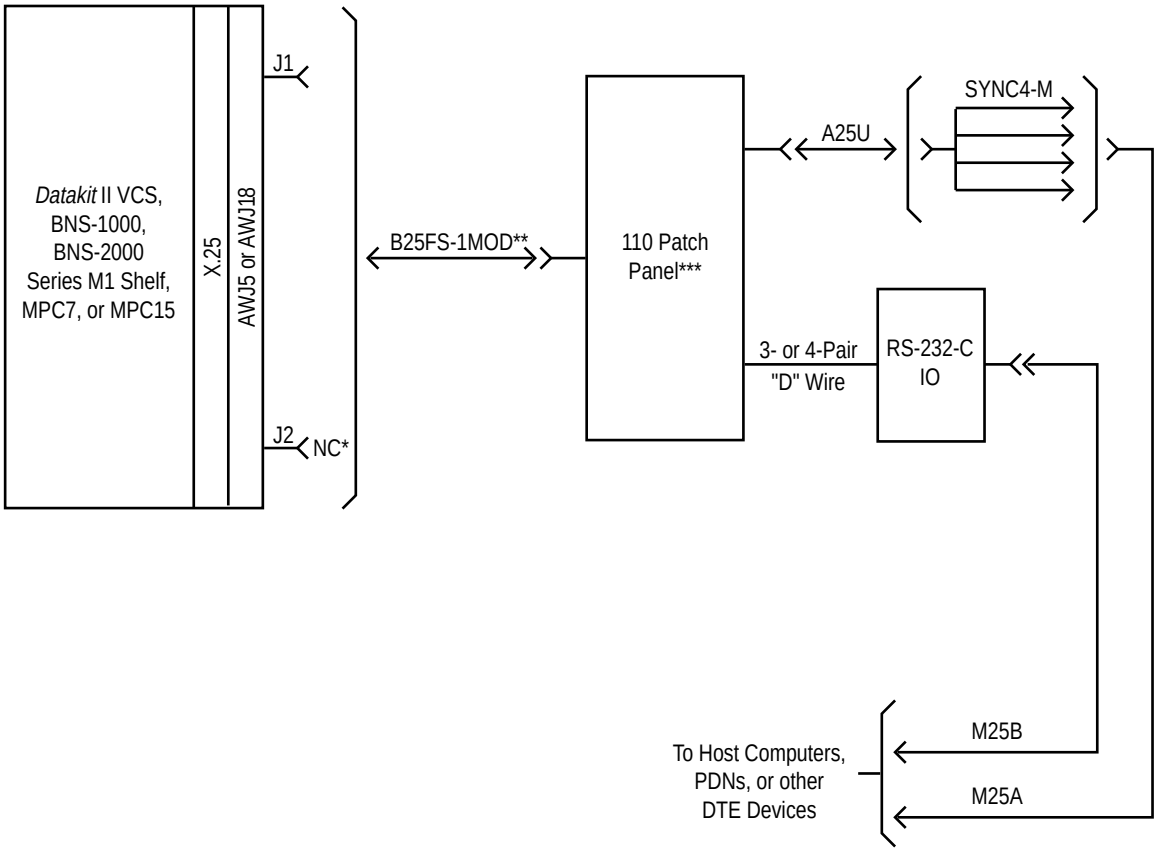
Cabling from an X.25 module in a *Datakit* II VCS node cabinet, BNS-1000 node cabinet, BNS-2000 Series M1 Shelf, MPC7, or MPC15 to host computer, PDN, or DTE device via a 110 patch panel can be configured as follows:

- The X.25 module consists of a TN2094 main circuit pack and an AWJ5 or AWJ18 I/O distribution board. See **Appendix A** and the following related figure for more information on I/O distribution boards.
- A B25FS-1MOD cable connects to the upper 50-pin connector (J1) on the I/O distribution board.
- The other end of the B25FS-1MOD cable connects to the 110 patch panel.
- An A25U cable extends from the 110 patch panel to the SYNC4-M cable at the other end.

  A SYNC4-M cable connects to the A25U.

  The SYNC4-M has four male 25-pin connectors. Each 25-pin connector on the SYNC4-M cable connects directly to the end device, or each can be extended using an M25A cable.
- If RS-232-C I/O ports are wired directly from the patch panel via a 3 or 4-pair "D" wire, an M25B cable connects to the DTE device.

See the following figure for an illustration of these configurations.



**NC=no connection*

***After the first 25 feet, the B25FS-1MOD cable may be extended with a B25A cable.*

****110 patch panels are available with different interconnects.*

Before selecting cables, determine which interconnects are provided by your 110 patch panel.

FIGURE 3-2. From X.25 to a Host Computer, PDN, or DTE Device via 110 Patch Panel

TABLE 3-2. Ordering Information: From X.25 to a Host Computer, PDN, or DTE Device via 110 Patch Panel

Cable/Adapter	Description	ED5P055-31 Group Number	Price Element Code (PEC)
B25A	50-pin 90-M 50-pin 90-F	G(106), G(F)	2752-106, 27514
B25FS-1MOD	50-pin 180-M 50-pin 90-M	G(200), G(C)	2752-200, 27512
A25U	50-pin 90-M 50-pin 90-M	G(114), G(F)	2752-114, 27514
SYNC4-M	50-pin 90-F 4 25-pin-M	G(160), G(R)	2752-160, 27523
M25A	25-pin-M 25-pin-F	G(107), G(P)	2752-107, 27521
M25B	25-pin-M 25-pin-M	G(108), G(P)	2752-108, 27521

For plenum cables, see the Ordering Quick Reference.

Cabling from X.25 to a Host Computer, PDN, or V.35 DTE Device via Modem, DSU, or FOM

Cabling from an X.25 module in a *Datakit* II VCS node cabinet, BNS-1000 node cabinet, BNS-2000 Series M1 Shelf, MPC7, or MPC15 to a host computer, PDN, or V.35 DTE device via a modem, DSU, or fiber optic multiplexer (FOM) can be configured as follows:

- The X.25 module consists of a TN2094 main circuit pack and an AWJ5, AWJ6, or AWJ17 I/O distribution board. See **Appendix A** and the following related figure for more information on I/O distribution boards.
- For RS-232-C connections, a B25FS-1MOD cable connects to the upper 50-pin connector (J1) on the AWJ6 or AWJ17 I/O distribution board.

  A SYNC4-M cable connects to the other end of the B25FS-1MOD cable to provide four RS-232-C male connections.

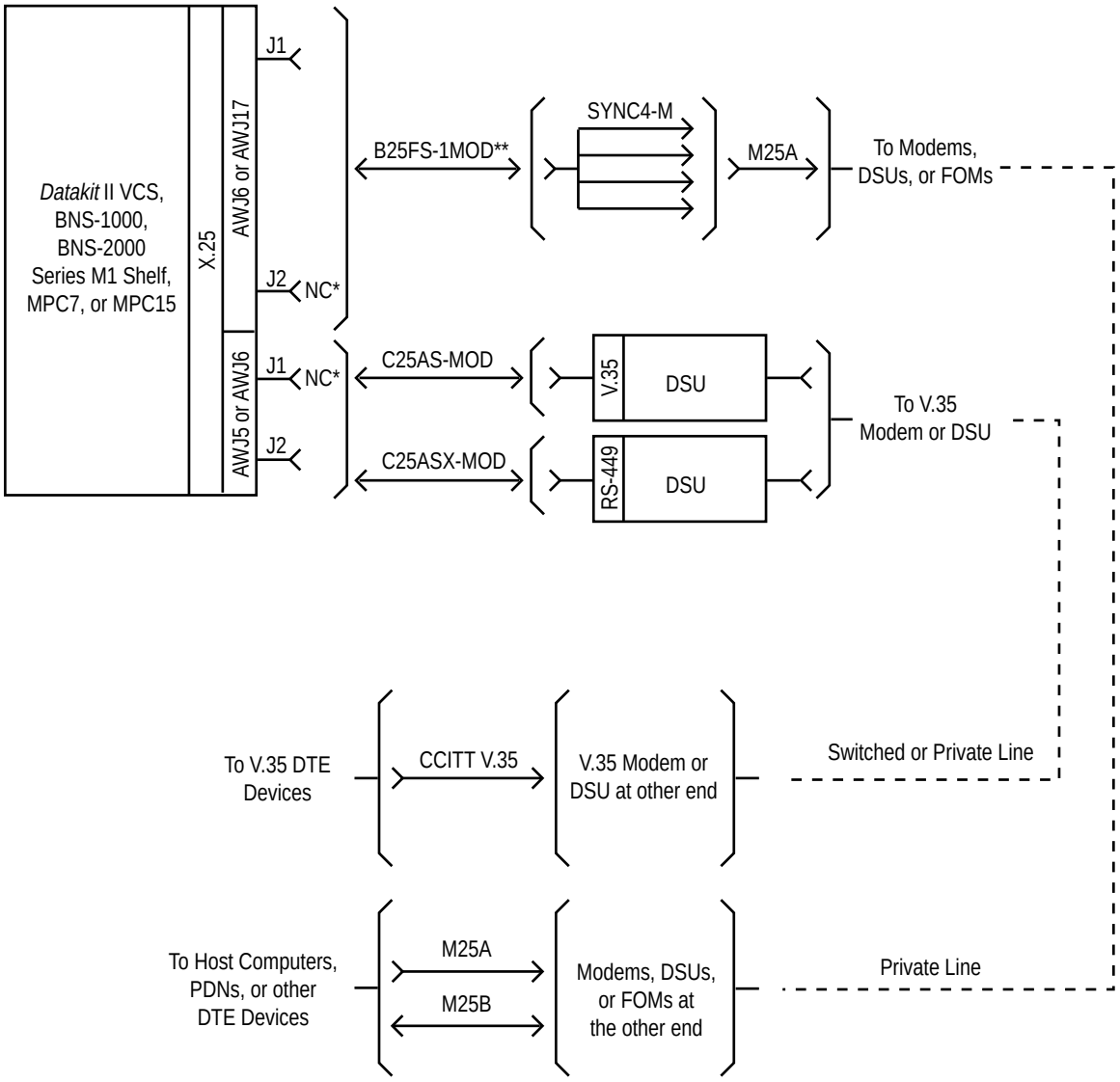
  The SYNC4-M cable then connects directly to the modem, subrate DSU (which operates at a speed of 19.2 Kbps or lower) or FOM. An M25A cable can be used to extend the RS-232-C connections, if necessary.

  At the remote location, the modem, subrate DSU, or FOM connects to the host computer, a PDN, or other DTE device with an M25A cable.
- For V.35 connections via a V.35 or RS-449 connector, a C25AS-MOD 25-pair shielded cable or a C25ASX-MOD 25-pair shielded cable connects to the lower 50-pin connector (J2) of the AWJ5 or AWJ6 I/O distribution board. Use the cable that is compatible with the available DSU. The C25AS-MOD cable provides a V.35 connector, while the C25ASX-MOD provides an RS-449 connector at the DSU end.

  From the DSU, a 4-wire private line connects to another DSU.

  At the remote DSU, the final connection to a V.35 DTE device is made with a CCITT V.35 cable.

See the following figure for an illustration of these configurations.



**NC=no connection*

***After the first 25 feet, the B25FS-1MOD cable may be extended with a B25A cable.*

FIGURE 3-3. From X.25 to a Host Computer, PDN, or V.35 DTE Device via Modem, DSU, or FOM

TABLE 3-3. Ordering Information: From X.25 to a Host Computer, PDN, or V.35 DTE Device via Modem, DSU, or FOM

Cable/Adapter	Description	ED5P055-31 Group Number	Price Element Code (PEC)
B25A	50-pin 90-M 50-pin 90-F	G(106), G(F)	2752-106, 27514
B25FS-1MOD	50-pin 180-M 50-pin 90-M	G(200), G(C)	2752-200, 27512
SYNC4-M	50-pin 90-F 4 25-pin-M	G(160), G(R)	2752-160, 27523
M25A	25-pin-M 25-pin-F	G(107), G(P)	2752-107, 27521
C25AS-MOD	50-pin 180-M V.35-M	G(202), G(C)	2752-202, 27512
C25ASX-MOD	50-pin 180-M RS-449-M	G(203), G(C)	2752-203, 27512
CCITT V.35	V.35 M V.35 F	G(121), G(Q)	2752-121, 27522

For plenum cables, see the Ordering Quick Reference.

X.25 Administration

X.25 Administration

Before X.25 module and port administration can begin, certain database elements must be administered for the X.25 host or X.25 Public Data Network (PDN) service to be provided:

- Originating, receiving, and two-way groups must be entered with the **group** command set.
- Closed user group (CUG) profiles must be entered with the **profile** command set.
- X.3 Packet Assembler/Disassembler (PAD) profiles must be entered with the **profile** command set. These include a terminal user profile used for calls coming from an asynchronous endpoint; a *local profile* used for calls coming into an asynchronous endpoint; and a *remote profile* that can be set via X.29 after call establishment.
- Predefined destinations (PDDs) and endpoint numbers must be entered with the **address** command set.
- An X.28 PAD identification service signal (sig) may be entered with the **x28sig** command set.
- If the service being provided is that of a PDN, a gateway identifier (ID) must be entered with the **gateway** command set.

This chapter details the administration of **gateway**, **x25**, and **x28sig**. For information on the administration of the **group**, **address**, and **profile** database elements, see the *Node Reference*.

StarKeeper II NMS Administration

X.25 administration via *StarKeeper* II NMS is accomplished by using the pass-through mode of *StarKeeper* II NMS. The X.25 command set can be entered and executed almost as it would be entered and executed on the direct console connection. *StarKeeper* II NMS does not allow all of the same abbreviations nor does it validate input information. Refer to the following sections on X.25 administration and to the appropriate *StarKeeper* II NMS documentation for information on accessing the pass-through mode.

Command Set

As noted above, information defining an X.28 identification service signal, a gateway ID, and an X.25 module and its ports is added to the database, and thereafter manipulated and checked, with the appropriate **enter**, **change**, **delete**, and **verify** commands. The **enter** and **change** commands for **gateway** and **x25** have an extensive parameter prompting sequence in which configurable options are specified in the database. Once specified, these options can be checked with the **verify** command and removed, in total, with the **delete** command.

The **restore** and **remove** commands control the service state of the X.25 module and its ports; these commands are often used with administration and maintenance procedures.

The **remove** and **restore** commands can be used with **verify oosmods**, which list all out-of-service modules.

The **enter**, **change**, **delete**, **remove**, and **restore** commands function on a per-module or per-port basis, unlike **verify**, which functions on a module basis. You can remove one port from service, make database changes to port information, and restore the port to service. When you verify the information, the system outputs information pertaining to every configured port on that module.

The **diagnose** command is used for module maintenance and troubleshooting, along with other status- and maintenance-related commands, such as **verify epn**, **verify oosmods**, **dmeas x25**, and **dstat x25**.

TABLE 4-1. X.25 Command Set

Object	Administration	Operation	Maintenance	Related Objects	
gateway	**change gateway** **delete gateway** **enter gateway** **verify gateway**			**address** **epn** **profile***	**node** **x25** **x75**
x25	**change x25** **delete x25** **enter x25** **verify x25**	**remove x25** **restore x25**	**diagnose x25** **dmeas x25** **dstat x25**	**address**** **comment** **concentrator** **epn** **gateway**** **group**** **host** **measurements**	**module** **oosmods** **profile**** **schedule** **x28sig** **X75** **x25p**
x28sig	**change x28sig** **delete x28sig** **enter x28sig** **verify x28sig**			**x25** **x25p**	**x75**

* This object should be entered before configuring a **gateway** in the database.

** This object should be entered before configuring an **x25** module port in the database.

Gateway Parameter Considerations

An X.25 gateway provides the functions necessary to interconnect dissimilar X.25 networks so the differences of each network are transparent to the end user. These functions include address translation, protocol conversion, data integrity, and security.

The parameter specifications made during an iteration of **enter gateway** or **change gateway** that affect other parameters or database elements entered, or the general performance of the network or node, are explained in this section. This section is supplemented by **X.25 Commands** and the database entry forms provided in **Appendix B**.

Gateway Protocol, Gateway ID, and Gateway Address

The X.25 protocol (*x25*) is specified at the **GATEWAY PROTOCOL** prompt. A gateway is created by specifying an eight-character name at the **GATEWAY ID** prompt. This name is then associated with interconnection parameters such as the gateway address, the device type furnishing PAD support, and CUG security data.

The X.25 gateway ID is subsequently given the address of the X.25 PDN to which it is to interconnect. This address, which is specified at the **GATEWAY ADDRESS** prompt, must be obtained from the administrator of the remote network.

Gateway PAD Support and Profile IDs

The device type providing PAD support is specified at the **PAD SUPPORT** parameter. If *terminal* is specified, control of the remote PAD is not allowed. If *host* is specified, X.29 protocol is used to initialize the X.3 PAD profile.

The name of the remote profile to be used can then be entered at the **REMOTE X.3 PROFILE ID** prompt. If a specific profile name is not furnished, one of three system-supplied profiles—*mbit, transparent,* and *simple*—can be specified.

If a remote profile is specified, the parameter set to be sent to the remote PAD is entered at the **REMOTE X.3 PARAMETER SET** prompt. This parameter set is selected from those parameters specified in the **REMOTE X.3 PROFILE ID.** The system default provided (parameters 1 to 8, 12, and 15) is designed to interwork with ISDN terminal adapter (TA) requirements.

Gateway Mapping Parameters

An X.25 gateway ID also contains a *mapping table* in which endpoints located within dissimilar networks are entered at the **GATEWAY ENDPOINT NUMBER OR RANGE** prompt and are mapped to endpoints within the network via X.121 addresses at the prompts following the **NODE X.121 ADDRESS** prompt. If an address is not entered during this prompting sequence, the system assumes that the dissimilar network uses the same address scheme as the network; therefore *all* addresses are automatically accepted and entered into the mapping table. If at least one address is entered during this prompting sequence, the system assumes that *any* address received from the dissimilar network configured to use this gateway must exist in the mapping table. Therefore all other calls from the dissimilar network are automatically rejected.

X.25 Parameter Considerations

Some parameter specifications made during an iteration of the **enter x25** or **change x25** commands do not affect other parameters or database elements entered, or the general performance of the network or node. Other parameters require special consideration.

For example, certain module and port-level parameters and their values affect one another. Available formulas help to calculate the availability of user channels depending on packet size and network window-size specifications. In turn, these module-level parameter values affect the port's ability to negotiate packet sizes and window sizes. These parameters are explained in this section, which is supplemented by **X.25 Commands** and the database entry forms provided in **Appendix B**.

Some X.25 features are administered through the command objects **gateway** and **profile**. Gateways are explained in the previous sections in this chapter; profiles are explained in the *Node Reference.*

Module Address

The **MODULE ADDRESS** parameter is used to identify the location of a hardware module. The address of the module depends on its physical placement in a slot in a node or supported concentrator. When a module is installed in a node slot, its address is typically represented as:

<*module*>

Where: *module* is the number of the node slot that the module occupies.

If the module is installed into a concentrator, the concentrator is then connected to the node by a link interface module (LIM) and to the link itself. When a module is installed in a concentrator slot, its address is represented as:

<*concentrator/module*>

Where: *concentrator* is the number of the node slot that the LIM occupies; and *module* is the number of the concentrator slot that the module occupies. (See the concentrator reference documentation.)

Depending on the particular command, module addresses can be identified with a *single address entry* or with *multiple address entries.*

If a single address entry is allowed, only one module address can be specified. For example:

diagnose x25 27/2

A slight variation of this addressing option is demonstrated with the **verify** command, which allows you to specify either **one** module address or, with the word *all*, every X.25 module address. For example:

verify x25 all

Multiple address entries can be specified for like-modules only if the modules reside in the same node or in the same concentrator; they cannot be specified for like-modules residing in both a

node and a concentrator.

For multiple, but not all address entries, you can enter the module address as a single number (x), a range of numbers (x-y), a series of numbers (x,y,z), or a combination of both (x-y,z). Some examples are:

restore x25 module 27-30 (module addresses for four X.25 modules installed in the same node)

restore x25 module 27/13,14 (module address for two X.25 modules installed in the same concentrator)

restore x25 module 27/2,12-14 (modules addresses for four X.25 modules installed in the same concentrator)

Port Number and Port Type

The **PORT NUMBER** parameter is a number from *1* to *4*. This number identifies a physical port on a module. A port number or port numbers can be entered as a single port number entry or as a multiple port number entry. For a single port number entry, enter only **one** port number:

```
PORT NUMBER [1-4: +(1-4)]: 1
```

For a multiple port number entry, enter a series of numbers (x,y,z), a range of numbers (x-z), or a combination of both (w,x-z):

```
PORT NUMBER [1-4: +(1-4)]: 2,3,4
PORT NUMBER [1-4: +(1-4)]: 1-4
PORT NUMBER [1-4: +(1-4)]: 1,3-4
```

When entering multiple port numbers, the parameter specifications made apply to all port numbers entered at the **PORT NUMBER** prompt.

X.25 module and port information is administered with separate iterations of the **enter x25** command. Module information must be added before port information.

Depending on the I/O distribution board used in the hardware configuration, each port can be separately administered for *host* or *pdn* service in order to provide RS-232-C and/or V.35 connections for DTE/DCE. Host or PDN service options are specified at the **PORT TYPE** prompt. Refer to **Appendix A** for additional details.

Window Size, Packet Size, and User Channels

To engineer the network for maximum throughput for each application, the X.25 module supports both standard and nonstandard *window sizes* and *packet sizes* on a per-module basis for each direction of data transmission.

A packet is a bundle of data represented in binary form for network transmission. A standard 128-byte packet or a nonstandard 256-byte packet, can be administered through the **DEFAULT PACKET SIZE** prompt. The window size represents the number of data packets (in *frames*) that can be transmitted without additional authorization from the receiver. The window size, which can be the standard *2* frames or the nonstandard *1, 3, 4,* or *5* frames, is administered through the

DEFAULT NETWORK LEVEL WINDOW SIZE prompt. To accommodate the nonstandard packet and/or window sizes, the number of available user channels (administered through the **NUMBER OF USER CHANNELS** prompt) becomes limited.

The number of user channels available depends on the values specified at the **DEFAULT NETWORK LEVEL WINDOW SIZE** and **DEFAULT PACKET SIZE** prompts according to the formula 25600/(WS x PS) where WS is the value for **DEFAULT NETWORK LEVEL WINDOW SIZE** and PS is the value for **DEFAULT PACKET SIZE.**

If the *change x25 module* command is used to modify module data, the values for **DEFAULT NETWORK LEVEL WINDOW SIZE** and **DEFAULT PACKET SIZE** may be limited based on the previously existing value for **NUMBER OF USER CHANNELS**. The value for **DEFAULT NETWORK LEVEL WINDOW** size is limited to 25600/(PS x UC) where PS is the existing value for **DEFAULT PACKET SIZE** and UC is the existing value for **NUMBER OF USER CHANNELS**. The value for **DEFAULT PACKET SIZE** is limited to 25600/(WS x UC) where WS is the modified value for **DEFAULT NETWORK LEVEL WINDOW SIZE** and UC is the existing value for **NUMBER OF USER CHANNELS**. The Window Size Negotiation facility is turned on if the new value for window size is not 2. The Packet Size Negotiation facility is turned on if the new value for packet size is not 128.

TABLE 4-2. Window Size, Packet Size, and User Channels

Module Packet Size	Window Size	Maximum Number User Channels
128	1, 2	100
	3	66
	4	50
	5	40
256	1	100
	2	50
	3	33
	4	25
	5	20

Local X.3 Profile ID

Specification of what type of **LOCAL X.3 PROFILE ID** is to be used is required during an iteration of the **enter** or **change** command for the objects **address**, **gateway**, and **x25**. This profile is used to identify host calls made to an asynchronous endpoint that must access a PAD. It can be a string of 1 to 20 characters that names a customized profile (which was created with the **profile** commands) or it can be one of three system supplied profiles:

- *simple*

  The *simple*, or common profile, was referred to as the *default* profile in releases prior to *Datakit* II VCS Release 2.1.

- *transparent*

  The *transparent* simple profile is one that is suitable for file transfers.

- *mbit*

  The *mbit* profile is needed to invoke the M-bit procedure between an asynchronous block device and an X.25 endpoint.

The following screen, which is available through an iteration of **verify profile x3 all**, shows the default parameter settings of the system supplied profiles.

```
    94-09-19 10:37:14 NODE=salt
M  verify profile x3 all

PROFILE ID:       simple              mbit                transparent

                  ------------------- ------------------- -------------------
 1 PAD RECALL:    dle                 none                none
 2 ECHO:          yes                 no                  no
 3 DATA F SIG:    126                 0                   0
 4 IDLE TIMER:    notimer             notimer             mintimer
 5 FC BY NWK:     no                  no                  no
 6 PAD SVCSIG:    prompt&pad          none                none
 7 OP ON BREAK:   2                   2                   2
 8 DISC OUTP:     no                  no                  no
 9 PAD AFT CR:    0                   0                   0
10 LINE FOLD:     0                   0                   0
11 BIN SPEED      9600                9600                9600
12 FC BY DEV:     yes                 yes                 yes
13 LF INSERT:     0                   0                   0
14 LF PADDING:    0                   0                   0
15 EDITING:       no                  no                  no
16 CHAR DEL       ^H                  ^H                  ^H
17 LINE DEL:      @                   @                   @
18 LINE DISP:     ^L                  ^L                  ^L
19 E PAD SVG:     display             no                  no
20 ECHO CR:       yes                 no                  no
20 ECHO LF:       yes                 no                  no
20 ECHO VT/HT/FF: yes                 no                  no
20 ECHO BEL/BS:   yes                 no                  no
20 ECHO ESC/ENQ:  yes                 no                  no
20 ECHO ACK ETC:  yes                 no                  no
20 ECHO EDT CHAR: yes                 no                  no
20 ECHO DEL/OTH:  yes                 no                  no
21 PARITY TREAT:  no                  no                  no
22 PAGE WAIT:     no                  no                  no

CC0>
```

Baud Rates and Clocking Type

If an **INTERNAL BAUD RATE** is specified during module administration, all subsequently administered ports receive their data transmission rates from the module. If an **INTERNAL BAUD RATE** is not specified (*none*) during module administration, the "clocking" or "timing" of data transmission speeds is presumed to be received from an *external* device attached to the module port. During the port prompting sequence, the **CLOCKING TYPE** and subsequent **EXTERNAL BAUD RATE** prompts enable you to specify whether clocking is *external* or *internal*; and if *external*, the transmission rate. Refer to **Appendix A** for the type of clocking provided by each I/O distribution board available to be used with the X.25 module boards.

SVCs, PVCs, and PDDs

The **NUMBER OF USER CHANNELS** for each X.25 port can be partitioned into a contiguous range of *permanent virtual circuits (PVCs)* followed by a contiguous range of *switched virtual circuits (SVCs)*.

An SVC forms a dynamic connection between two endpoints which is made during the call establishment and call termination phases of call processing. For host and PDN services, an SVC can be configured as a contiguous range of channels for each port at the **NUMBER OF SVC CHANNELS PER PORT** prompt. SVC channels can then be designated as *receive*, *originate*, or *2way* channels, via the **SVC DIRECTION** prompt. All SVC channels can be designated as one of these three types or any combination of the three.

To accommodate these three types of channels, corresponding originating, receiving, and two-way groups must be created with the **group** command and the group name must be specified at the **SVC GROUP** prompt. If **SVC DIRECTION** is *2way*, parameter options for the **NUMBER OF RECEIVE ONLY CHANNELS** and **NUMBER OF ORIGINATE ONLY CHANNELS** prompts may be designated.

If required, the destination address of an SVC can be defined as a PDD at the **PREDEFINED DESTINATION** prompt. A PDD is a string of *1* to *72* characters that enables a service address and an optional physical address or other secondary address to be specified so an originating device can automatically connect to its host and service when it is turned on.

For internodal connections, a PDD designates the receiving network, area, and exchange as well as the service address and physical address. The format of a PDD is:

[[[<network>/]<area>/]<exchange>/]<local>[.<module/concentrator>.<channel>]

A PDD can be established for the entire range of originate only or two-way SVC channels. All calls originated by a host or PDN are routed using this PDD. If the associated group is a two-way group, the host or PDN can receive switched calls.

A PVC is a dedicated connection between two specified endpoints that can be made only if the module channel allocation is not depleted by SVCs. Unlike an SVC, the call establishment and call termination phases of call processing do not exist with a PVC. A single channel range for host or PDN service can be specified at the **NUMBER OF PVC CHANNELS** prompts. This channel range must be associated with the name of an existing two-way group at the **PVC GROUP** prompt. For host service, you must define a range of endpoints at the **ENDPOINT NUMBER FOR PVC CHANNELS** prompt. These endpoint numbers are then associated with logical channel numbers and destination.

The **PVC DESTINATION** address can be in the form of a PDD or a single destination channel consisting of a service address, module address, and other component identifiers. The connection is established when both ports are put into service and remains in service until the ports are taken out of service or the PVC destination has changed. Although the destination address of a PVC can optionally assume the format of a PDD, differences between the two exist. A PDD can be specified for an entire SVC channel range because it does not require an exact destination channel. A PVC cannot be specified when a range of ports is being configured because the range cannot have an exact destination channel (more than one channel could connect to the same PVC

partner channel); therefore PVC administration requires one **PVC LOGICAL CHANNEL NUMBER** per **PVC DESTINATION.** The following table summarizes these and other distinctions:

TABLE 4-3. SVC, PDD, and PVC Distinctions

Criteria	SVC	PVC	PDD
Call establishment and connection occur dynamically.	√	–	√
Call connection is established when ports are put into service.	–	√	–
Call connection is terminated when ports are removed from service.	–	√	–
Call establishment and connection can occur via one or more than one channel.	√	–	√
Connection can only occur via one channel.	–	√	–
Destination address can be specified in PDD-type format.	√	√	√
Destination address can be specified as a single logical channel.	–	√	–

The SVC and PVC channel range can each be configured with an X.121 endpoint number (EPN) or range of EPNs, and X.25 closed user group (CUG) security. If CUG security is administered, a CUG profile must have already been administered in the database.

EPNs, CUGs, and Default Calling Addresses

The administration of EPNs, CUGs, and addresses for host and PDN services is split between the commands available for the X.25 module (**x25**) and the commands available for gateways (**gateway**). Providing the appropriate addresses and CUG profile IDs are added to the database with the **address** and **profile** commands, host service then uses the **ENDPOINT NUMBERS FOR SVC CHANNELS FOR PORT <n>, CLOSED USER GROUP PROFILE ID,** and the **DEFAULT CALLING ADDRESS** prompts in the **x25** commands to associate the address and the profile ID with the services. (For host ports partitioned into SVCs, CUG security is optional; EPN/EPNs are required.) Unlike host service, ports designated for PDN service rely on the **gateway** commands for part of the initial administration of their endpoint numbers and CUG security. Once appropriate addresses and profile IDs are added to the database with the **address** and **profile** commands, the **gateway** commands can be used to associate this data with a gateway ID. This identifier is first named at the **GATEWAY ID** prompt in the **gateway** commands. Additional data describing the gateway—such as the gateway address, local and remote X.3 profile IDs, gateway and network CUG profile IDs, and other applicable addressing information— are included. To associate this information with the X.25 PDN port, the gateway ID is then specified again with the same name at the **GATEWAY ID** prompt in the **x25** commands.

Billing

X.25 module billing can be activated for each port administered by specifying *on* at the **BILLING STATUS** prompt. Billing records are then generated for each call made.

The network node time stamps the billing records for each call and sends them to *StarKeeper* II NMS. *StarKeeper* II NMS also synchronizes the node clocks and accounts for any condition, such as time changes, node reboots, or power outages, that could affect billing.

K, N2, and T1 Parameters

The X.25 module supports CCITT X.25 Recommendation for the Link Access Procedure Balanced (LAPB) parameters for a Single Link Layer (level 2). These parameters, which are administered at the port level, manage and control the data link, guarantee the reliable and transparent transportation of packets between the DTE and DCE across the transmission media, and manage link setup, disconnect, and reset.

These link-level parameters are fully explained in the **enter x25** command section of the **X.25 Commands** chapter. The following table summarizes these parameters and their options:

TABLE 4-4. X.25 Link Level Parameters

Parameter	Prompt	Options	Default	Meaning
K	**MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K)**	1-7 frames	7 frames	Maximum sequentially numbered I-frames port can have unacknowledged simultaneously.
N2	**MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2)**	2-15 attempts	7 attempts	Maximum transmission attempts port can make before alarm is issued.
T1	**WAITING ACKNOWLEDGEMENT TIMER (T1)**	2-20 sec	3 sec	Maximum milliseconds port must wait before acknowledging a timer violation so an alarm is issued.

X.28 SIG Parameter Considerations

The **enter x28sig** command enables you to administer a message at the **`X.28 PAD ID SERVICE SIGNAL`** prompt that is sent to all terminal end users when they gain access to a node PAD. Only one signal can be administered per node.

When an end user calls a PDN, X.25 host, or X.75 gateway, a short message appears on the screen indicating that the user terminal is in the PAD waiting state.

Administrative Procedures

The initial administration of an X.25 module and its ports (**Procedure 4-3** and **Procedure 4-4**) is not hardware-dependent—that is, the module does not have to be physically installed before its information is entered in the database. For routine administration and operations procedures, such as removing and restoring module ports to service or displaying hardware status, module installation is required.

For minor database changes, such as modifications to only a few parameters, follow **Procedure 4-5**. For database changes involving extensive configuration adjustments, follow **Procedure 4-6**.

PROCEDURE 4-1. Entering an X.28 PAD Identification Service Signal

Applicability: One message per node; nodes administered for X.25 *host*, X.25 *pdn*, or X.75 service.

1. Use **enter x28sig** to add a message to the database. This message is entered at the **`X.28 PAD ID SERVICE SIGNAL`** prompt.
2. Use **verify x28sig** to check the message that you have just added to the database.
3. If you made any errors or have to change the message, use **change x28sig.** If you need to remove the message, use **delete x28sig.**

PROCEDURE 4-2. Entering a Gateway

Applicability: Only for X.25 module ports administered as **`PORT TYPE`** *pdn*.

1. Obtain the gateway address from the PDN administrator. Use this numeric string at the **`GATEWAY ADDRESS`** prompt.
2. Use **verify profile** to determine if the X.3 and CUG profiles to which the gateway is to refer are administered in the database. If they are not administered, refer to the *Node Reference* for information on entering these profiles.
3. Use **verify address** to determine if the appropriate address levels are entered so the data networking products node is properly mapped to the gateway endpoints for PDN service. Use these addresses after the **`NODE X.121 ADDRESS`** prompt.
4. Use **enter gateway** to commence administration. Have your completed database entry forms handy and remember that default values can be specified by pressing Return or + .
5. Use **verify gateway** to check your entries.

PROCEDURE 4-2. Entering a Gateway (continued)

6. If you made any errors or have to change parameter specifications, use **change gateway.** If you need to start over, use **delete gateway** to eliminate all entries made; then begin again with **enter gateway.**

PROCEDURE 4-3. Entering an X.25 Module

1. Use **enter x25 module** to commence administration. Have your completed database entry forms handy and remember that default values can be specified by pressing Return or + .
2. Use **verify x25** to check your entries.
3. If you made any errors or have to change parameter specifications, use **change x25 module.** If you need to start over, use **delete x25 module** to eliminate all entries made; then begin again with **enter x25 module.**
4. If the module was installed, use **restore x25 module.**

PROCEDURE 4-4. Entering X.25 Ports

1. For the X.25 module, use **verify address, verify epn, verify group, verify gateway,** and **verify profile** to determine if the appropriate PDDs, EPNs, group name, gateway ID (for X.25 *pdn* ports only), and CUG profile ID are entered. If they do not appear in the database as required (they were deleted; they have changed; they are misspelled), see the *Node Reference* for procedures on how to make the necessary changes.
2. Use **enter x25 port** to commence administration. Have your completed database entry forms handy and remember that default values can be specified by pressing Return or + .
3. Use **verify x25** to check your entries.
4. If you made any errors or have to change parameter specifications, use **change x25 port.** If you need to start over, use **delete x25 port** to eliminate all entries made; then begin again with **enter x25 port.**
5. If the module was installed, use **restore x25 port** to return ports to service.

PROCEDURE 4-5. Making Minor Database Changes

Applicability: A minor database change constitutes a change to a few parameter options.

1. If changes involve addresses (PDDs or EPNs), groups, or profiles, make the needed changes with iterations of the **address**, **group**, or **profile** commands. Use **verify** <**object**> to check additions/modifications. See the *Node Reference* for details.
2. When making changes, remove the module or its ports from service with **remove x25** <**component**>**.**
3. Make modifications with **change** <**object**>**.**
4. Check changes with **verify** <**object**>**.**
5. When making changes, return module or its ports to service with **restore x25** <**component**>**.**

PROCEDURE 4-6. Making Extensive Database Changes

Applicability: An extensive database change constitutes a change made to most of the parameter options for the entire database entity or for all configured ports on one or more modules, or for changing the number of channels on a port.

1. If changes involve addresses (PDDs or EPNs), groups, or profiles, make the needed changes with iterations of the **address**, **group**, or **profile** commands. Use **verify** <**object**> to check additions/modifications. See the *Node Reference* for details.
2. Use **verify** <**object**> for a report of the existing parameter options specified. If you feel the need to, complete the database entry forms furnished in **Appendix B.**
3. When changing information, remove the module or its ports from service with **remove x25** <**component**>**.**
4. Eliminate all database information with **delete** <**object**>**.**
5. Re-enter all information with **enter** <**object**>**.**
6. Verify changes with **verify** <**object**>**.**
7. When changing information, return the module or its ports to service with **restore x25** <**component**>**.**

PROCEDURE 4-7. Moving Database Information to Another Module Address

Module information can be moved to another module address within the same node with the **move module** command or with a combination of **delete** and **enter**.

Method 1:

1. Remove the module ports, then the module, from service with **remove x25 port** and **remove x25 module**.
2. Use **verify module** to ensure that a database entry was not made for the new module address. (If a database address does exist for the specified module address, **move module** fails.)
3. Use **move module** to transfer database information from one module address to another.
4. Physically move the hardware.
5. Using the new module address, put module back into service with **restore x25 module.** Then, put the module ports back into service with **restore x25 port.**

Method 2:

1. If **move module** is not appropriate for the situation, use **verify x25** for a report of the configuration data.
2. Use **remove x25 port** to remove the port from service and **remove x25 module** to remove the module from service.
3. Use **delete x25 port** and **delete x25 module** to eliminate all information at the existing module address.
4. Use **enter x25 module** followed by **enter x25 port** to add the information to the new address.
5. Check information entered at the new address with **verify x25.**
6. Physically move the hardware.
7. Restore the new X.25 module and its port to service with **restore x25 module** and **restore x25 port.**

PROCEDURE 4-8. Copying Database Information to Another Module Address

Module and port information cannot be duplicated from one module address to another module address with the **copy module** command because X.25 module ports require endpoint numbers. The **copy module** does not have the capability to generate unique endpoint numbers for each port for which information is duplicated. Therefore a combination of **verify x25** and **enter x25** must be used.

1. Use **verify x25** for a report of the existing parameter options specified. If you feel the need to, complete the database entry forms furnished in **Appendix B.**
2. Re-enter the information with **enter x25 module** followed by **enter x25 port.**
3. Check information entered with **verify x25.**

Reports

The following table explains the reports available to assist with analysis of module/network performance, system expansion, troubleshooting, and other routine tasks.

TABLE 4-5. Available Reports for X.25 modules

Report Topic	Command	Description
billing	**verify schedule**	Lists the billing schedule for ports administered as PDDs.
comment data	**verify comment**	Lists all comments entered for X.25 ports.
component data	**dstat x25**	Lists hardware/software data for the specified component. The module must be installed.
connection/traffic data	**display connections** **display traffic***	Lists established connections for modules, groups, or hosts. Group names are included. Lists established connections for modules, groups, or hosts. Segment counts are included. See the *Node Reference*.
database size	**dbaudit**	Shows where database space expenditures occur. If **dbresize** is used, the database tables are readjusted automatically. See the *Node Reference*.
end user messages	**verify x28sig**	Lists the current X.28 PAD ID signal that is administered for the node.
EPNs	**verify epn**	Lists all assigned endpoint numbers or ranges of endpoint numbers.
gateways	**verify gateway**	Lists all data pertaining to a specific gateway identifier.
measurements data	**dmeas x25**	Lists measurements/traffic data for the specified component. The module must be installed.
module/port data	**verify x25**	Lists hardware/software module/port data as it currently appears in the configuration database. Module does not have to be installed.
out-of-service modules	**verify oosmods**	Lists all configured modules that are currently out of service.
shelf data	**verify shelf***	Lists data for the specified shelf and the modules housed in the shelf.

*BNS-2000 only

X.25 Troubleshooting

X.25 Troubleshooting

For information about a general, systematic approach to troubleshooting, refer to the *Node Reference*. Using the method outlined there, you can diagnose problems affecting the entire node and isolate localized problems to a specific interface module.

Once the problem is isolated to the X.25 module, this chapter can help identify and further isolate X.25-related problems. It provides problem indicators that are X.25-specific, a checklist of problem areas, and detailed procedures or further references to remedy the problem. This chapter does not explain problem indicators that are common to all modules; these are explained in the *Node Reference.* In addition, this chapter does not provide problem isolation techniques or procedures for end users or their end devices. Refer to the *Node Reference* for this information.

Problem Indicators

Module faceplate indicators and the output of certain commands are often problem indicators that are specific to the X.25.

Faceplate Indicators. The lights associated with the faceplate are green, yellow, and red. They indicate on-line, off-line, and fault states. When the red light (fault light) is lit, the module circuitry and the database are inconsistent. When pressed, the reset push button clears the module buffers and registers, and restarts the module application program. Ports are taken out of service and connections are terminated.

Command Output. The output of operations commands—such as **diagnose x25**, **dstat x25**, and those listed in the following table—can indicate an existing or potential problem.

TABLE 5-1. Command Output

Command	Description	Further Reference
diagnose x25	Enables execution of module diagnostics and port loopback tests. Test patterns can be looped from the Control Computer to internal and external ports, and local and remote modems.	See X.25 diagnostic procedures in this chapter. See **diagnose x25** in **X.25 Commands**. See appropriate vendor documentation for connected end device.

TABLE 5-1. Command Output (continued)

Command	Description	Further Reference
display connections	Shows established connections for modules, groups, or hosts. Group names and segment counts are included.	See the *Node Reference*.
display traffic*	Shows established connections for modules, groups, or hosts. Segment counts are included.	See the *Node Reference*.
dmeas x25	Shows measurements data for a module and its ports.	See **X.25 Commands**.
dstat x25	Provides useful hardware and software troubleshooting information, such as the number of module resets, parity errors, and sanity errors that occurred during a five-minute interval; and module service state and mode state information as determined by status packet data. Output can be compared to that of **verify x25** and module faceplate indicators.	See **X.25 Commands**.
verify shelf*	Lists data for the specified shelf and the modules housed in the shelf.	See **X.25 Commands**.
verify x25	Shows all parameter options configured for the X.25 module and any configured port or ports; useful in determining if currently configured parameter options of X.25 module and connected end device options match.	See **X.25 Commands**.

*BNS-2000 only

Problem Areas

Once you have determined that the problem does not involve the node or its critical modules, or any connected end device, the problem can be isolated to the X.25 module. The following tables further isolate X.25-specific problems into download problems, link failures, call setup problems, and general performance issues.

TABLE 5-2. X.25 Problems Checklist

√	Symptoms/Indicators	Possible Causes	Actions
____	No calls in progress; or cannot make calls; or X.25 link problem (shown via alarms, or **dstat x25**, **display connections**, **display traffic** output, or call reject cause code).	Bad cabling connection. X.25 module faulty. Blown slot fuse. Module/ports not in service. X.25 link at capacity. Wrong I/O distribution board; I/O distribution board timing type mismatched with database entry. Incompatible L2, L3, or facility parameter. Configuration mismatch.	See **Procedure 5-1. Resolving Download Problems**, **Procedure 5-2. Resolving Link Failures**, and **Procedure 5-4. Monitoring Performance**. See the *Node Reference* for slot fuse and command information. See diagnostic procedures in this chapter.
____	Red LED lit on module.	X.25 module faulty.	

TABLE 5-2. X.25 Problems Checklist (continued)

√ Symptoms/Indicators	Possible Causes	Actions
____ End users cannot make calls through X.25 module. (They receive call reject error message.) ____ Cannot set up PVC; cannot complete call.	Wrong X.25 address or security violation. Incompatible X.3 PAD parameter. Two ends of PVC service have mismatched packet/window sizes.	See **Procedure 5-3. Call Setup Problems** and **Procedure 5-4. Monitoring Performance**. See the *Node Reference* for procedures regarding end user problems.
	Problem with connected end device.	See **Procedure 5-3. Call Setup Problems.** See diagnostic procedures in this chapter. See the *Node Reference* for procedures regarding connected end device (modem pool). See appropriate vendor documentation for connected end device.
____ Output of **diagnose x25** indicates problems.	Faulty connection. Faulty module. Problem with connected end device.	See **Procedure 5-4. Monitoring Performance**. See diagnostic procedures in this chapter. See the *Node Reference* for troubleshooting procedures regarding end user problems and connected end devices (modem pools). See appropriate vendor documentation for connected end device.

Procedures

The following sections explain the considerations that should be taken into account and the procedures that should be followed when troubleshooting an X.25 module.

- **Procedure 5-1. Resolving Download Problems** explains the areas that should be checked to resolve download problems.
- **Procedure 5-2. Resolving Link Failures** explains the steps that should be taken to resolve link failures.
- **Procedure 5-3. Resolving Call Setup Problems** lists the areas that should be checked when call setup problems are suspected.
- **Procedure 5-4. Monitoring Performance** gives an in-depth analysis of X.3 profiles, and X.25 module and port parameters that cause performance degradation.

The X.25 diagnostics section provides procedures that should be followed when running on-line loopback tests and off-line module tests. These procedures include the following:

- **Procedure 5-5. Starting On-line Loopback Tests**
- **Procedure 5-6. Running Internal Port Test**
- **Procedure 5-7. Running External Port Test**
- **Procedure 5-8. Running Local Modem Test**
- **Procedure 5-9. Running Remote Modem Test**
- **Procedure 5-10. Completing On-line Loopback Tests**
- **Procedure 5-11. Running Off-line Module Diagnostics**

PROCEDURE 5-1. Resolving Download Problems

1. Verify that the correct I/O distribution board is being used with the module. See **Appendix A**. If the AWJ17 or AWJ18 I/O distribution board is being used, make sure the switch settings are correct. Table 2-1 in **X.25 Installation** shows switch settings.
2. Use **verify x25** to determine if the I/O distribution board clocking type (DTE/external clocking or DCE/internal clocking) matches the administered database option for that port. **Appendix A** provides additional information about I/O distribution board specifications.
3. If the module's green LED is lit, verify that the module is actually in service with **verify x25**.

   If the module is installed in a concentrator and the concentrator is physically removed while the X.25 download is in progress, the restoration process stops. The green LED remains lit even though the module is not in service. Use **restore concentrator** and then **remove x25** and **restore x25**. Use **verify x25** to once again check the module service state.

PROCEDURE 5-1. Resolving Download Problems (continued)

4. Check and reconnect the cables; see **X.25 Cabling**.
5. Record any alarms. See the *Messages Reference* for a complete alarm description.
6. If the module resides in a concentrator, check the link for errors.
7. Use **verify x25** to determine if the download server and the software version are correct. If they are not the system defaults (which are *controller* and *standard*), determine if the filenames are correct and if the path to the host is functional.
8. Reseat the module and use **restore x25 module** to retry the download.
9. Run off-line module diagnostics. Refer to diagnostic procedures provided in the following section.
10. Replace the module and use **restore x25 module** to retry the download.
11. Check backplane voltages to determine if a power problem exists and verify that the voltages on the node power supplies are set correctly. (Refer to the *Node Reference* for voltage check procedures.)

PROCEDURE 5-2. Resolving Link Failures

When you restore an X.25 port to service, the message **`Link has come up`** appears on the system console (provided the attached device is asserting its EIA leads). When the attached device responds to the X.25 module's restart packet with **`Restart Confirmed`**, the **`Packet level restart`** message appears. In addition, the output of **dstat x25** shows the service state of the link as *in service*. If the link is not in service, perform the following steps:

1. Use **verify x25** to verify that the module and port are in service.
2. Check the I/O distribution board to determine if the appropriate I/O board is being used for the configuration. See **Appendix A**.

   If the AWJ17 or AWJ18 I/O distribution board is being used, check the switch settings on the board. Table 2-1 in **X.25 Installation** shows the proper switch settings.
3. Check the I/O distribution board cabling to determine if the correct cables are being used and if the cable connections are secure.

   The AWJ5 and AWJ6 I/O distribution boards use the bottom 50-pin connector for the V.35 connection, which is port 1 on the I/O distribution board. The top connector is then used as the RS-232-C connection for ports 2, 3, and 4.
4. Use **dstat x25** for the port in question and specify the *high* detail option. The Electronic Industries Association (EIA) control signals (DTR, DCD) should be *on*. If the I/O distribution board is a DCE type, the attached device should be asserting DTR. If the I/O distribution board is a DTE type, the attached device should be furnishing DCD and clocking. If the attached device is not furnishing this signal and the clocking, the link

PROCEDURE 5-2. Resolving Link Failures (continued)

remains down. Install a breakout box on the line to check these signals. Put the breakout box at the node side and then at the attached device side. Detach the cable, one end at a time, and verify that the signals are originating from the expected side and conflicts are not present.

5. If the link is still not in service, do the following:
   A. Use the **remove** and **restore** commands to remove and restore the module and port.
   B. Run diagnostics. (Refer to later sections in this chapter for procedures.) If on-line loopback diagnostics fail, the module is probably not faulty. Loopback diagnostics fail if the connected end device is not supplying the proper EIA leads. If the off-line module diagnostics fail, the module is probably faulty.
   C. Try a new module and I/O distribution board.
   D. Check the slot fuse.
   E. Change the slots.
   F. Check the backplane voltages.
6. Use **verify x25** to check the **TYPE** parameter. If **TYPE** is *pdn*, the port is designated to function as a logical (L2, L3) DTE. If **PORT TYPE** is an X.25 *host*, the port is designated to function as a logical DCE.
7. Use a protocol analyzer on the link to verify that valid clocking is present at the required rate.

   The establishment of the link level involves the exchange of level 2 link synchronization messages known as Set Asynchronous Balanced Mode (SABM) and Un-numbered Acknowledgement (UA) frames. If SABMs are being sent by both sides, they are both defined as logical DTEs (PDNs) or logical DCEs (X.25 hosts).
8. Check the protocol compatibility between the node and the external interface. If the node protocol is incompatible, correct any inconsistencies in the configuration.

   After the link comes up during normal operating conditions, a packet-level restart message appears on the system console. If this message does not appear, check the protocol analyzer for problems.

PROCEDURE 5-3. Resolving Call Setup Problems

1. Verify that the end user used the proper address and format when calling from the local node.
2. Check for invalid addresses or invalid facility parameters, including address, security, port, and X.3 PAD parameters. Ensure that the parameters are appropriate for the connections. (X.25 services use the North American Numbering Plan (NANP) which has the format:

PROCEDURE 5-3. Resolving Call Setup Problems (continued)

DNIC/SR/SA/EPN. This numbering scheme consists of a 4, 7, 10, or 14-digit address.) Do the following:

A. Verify the window size facility in the call setup packets is appropriate for the module level configured. The default is **`NETWORK LEVEL WINDOW SIZE`** .

B. Verify the packet size facility in the call setup packets is appropriate for the module level configured. The default is **`PACKET SIZE`** .

C. For PAD calls, if address checking is *on*, verify that the EPN address of the outgoing host call is within the preconfigured range of EPNs.

D. Verify the address of the PAD was configured with PAD support "yes."

3. For new installations, set up a new X.25 link with the PDN or host administrator. Consider the options these parameters afford:

   - number of SVC and PVC channels
   - expected facility parameters, such as packet and window size negotiation
   - X.29 usage for changing remote profiles and valid addresses
   - logical channel numbers (LCNs) for ports belonging to originating, receiving, or two-way groups

   NOTE: Incoming calls to the local node use originating or two-way group channels. PVC channels must have an administered predefined destination (PDD). Because the node reserves control channels, node channels do not map directly to X.25 logical channels. For instance, the first node user channel is 5, which maps to *lcn 1* on the X.25 link. Subtract 4 from the node channel for the X.25 LCN.

4. Review messages received at the originating terminal. If a call is cleared, a CLR message should be returned. This message gives the X.25 clearing and diagnostic codes and/or an X.28 PAD message.

5. If messages or codes are not available from the originating terminal, use a protocol analyzer and look at the CLR packet. Most protocol analyzers fully decode the packet and display the type of error (for example: *not obtainable, local procedure error*). Abnormal call termination codes **`(ABNORM TERMS)`** are also furnished in **dmeas** output.

6. Verify that the **`PACKET SIZE NEGOTIATION, WINDOW SIZE NEGOTIATION, THROUGHPUT CLASS NEGOTIATION,`** and **`FAST SELECT ACCEPTANCE`** parameters are administered as *on*, if these features are being used.

7. Verify that X.25 ports are administered correctly. If the X.25 port is administered as a *pdn*, verify that the gateway configuration is correct, including the gateway ID, gateway address, and gateway mapping tables.

PROCEDURE 5-3. Resolving Call Setup Problems (continued)

8. Verify that all service addresses are restored to service, and check all routing and critical trunks.
9. Verify link capacity.

PROCEDURE 5-4. Monitoring Performance

X.25 performance degradation can involve X.3 profiles, X.25 module throughput, and X.25 module and port configuration parameters.

1. Check X.3 local and remote profiles. These profiles are administered by the local node administrator.
   A. Verify that local and remote profiles are acceptable to end users.
   B. Go into PAD mode and determine if the user changed profiles.
   C. Use **dstat x25 logchnl** to determine the current status of local X.3 parameters for active calls **(X3PARAM NO/X3PARAM VAL)**. An asterisk indicates that the parameter was changed during the session.
   D. For best performance, adjust the X.3 profile parameters for each application. Three administrative default profiles are provided: simple, transparent, and m-bit. The common profile is *simple*; the profile suitable for file transfers is *transparent*; and the profile needed to invoke the m-bit procedure between an asynchronous block device and an X.25 endpoint is *mbit*. The end user can specify each profile using the **prof** command at the PAD prompt. The network administrator can customize 10 other profiles. For information on the **profile** commands, see the *Node Reference*.
2. The X.25 module has an 80 Kbps, full-duplex, throughput limit. To avoid module problems, do not administer several ports so the total bandwidth exceeds the throughput limit. Use **dmeas** to monitor port utilization.
3. Performance degradation can be caused by link errors generated by bad timing, bad transmission facilities, or faulty equipment. Use **dmeas x25** to check for cyclic redundancy check (CRC) errors. CRC errors also show up on the protocol analyzer as bad frames. When errors occur, run diagnostics on the facility.

   NOTE: Receiver not ready (RNR) frames seen at the packet level via a protocol analyzer might not be a problem. Flow control provided by the asynchronous device might slow transmission. Check the protocol analyzer for full X.25 packets to verify accurate transmission.

PROCEDURE 5-4. Monitoring Performance (continued)

4. Because the following module and port-level parameters are directly related to system performance, check their administered values with **verify x25**:

   - **MAXIMUM NUMBER OF OUTSTANDING I FRAMES** (port-level parameter)
   - **DEFAULT NETWORK LEVEL WINDOW SIZE** (module-level parameter)
   - **DEFAULT PACKET SIZE** (module-level parameter)
   - **MAXIMUM NUMBER OF ATTEMPTS TO COMPLETE A TRANSMISSION** (port-level parameter)

   Refer to **X.25 Administration** for details on these parameter values.

X.25 Diagnostics

The following procedures explain how to begin running X.25 on-line loopback tests, off-line module tests, and the cables and connectors needed. Testing begins with the internal, then external, port tests, and progresses to the local and remote modems. It concludes with the off-line module tests. This section is supplemented by information contained in **X.25 Commands**, which explains the nature of each test, the diagnostic prompting sequence, and the meaning of each parameter and its options. System responses are also included.

Some general testing guidelines include:

- If end user problems occur after database configuration changes have been made or after an end user has changed terminal options, verify port options with **verify x25** before running **diagnose x25**.
- When installing or changing an X.25 module, run **diagnose x25** on all ports.

Loopback Connectors

Loopback connectors are used with the **diagnose x25**> command to perform incremental loopback tests of the data circuit between the X.25 module and connected end device. When connectors are not available, loopback connectors for use with a modular jack or 110 patch panel can be built. The X.25 internal and external port tests, however, require the ED-5P056-30,G24 loopback connector for RS-232-C connections to X.25 hosts.

When running the *local_modem* and *remote_modem* tests, use the 845260439 (COMCODE) connector for V.35 connections to PDNs.

The following figures illustrate how to build loopback connectors. The top portion of the figure below shows how to modify one end of an 8-conductor modular plug. The bottom portion is a wiring schematic for the plug.

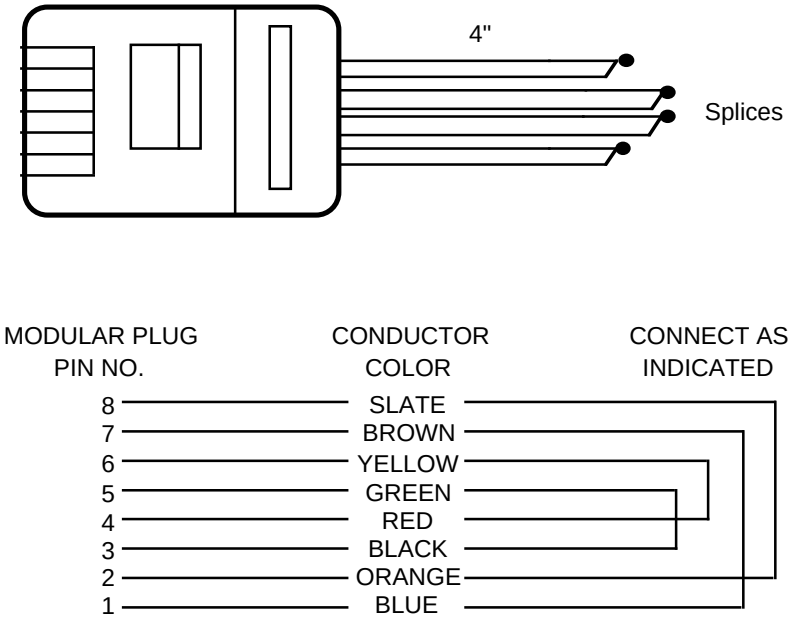


FIGURE 5-1. Loopback Connector for Use with a Modular Jack

The top portion of the figure below shows how to modify one end of a 4-pair 110 patch panel patchcord. The bottom portion is a wiring schematic for the plug.

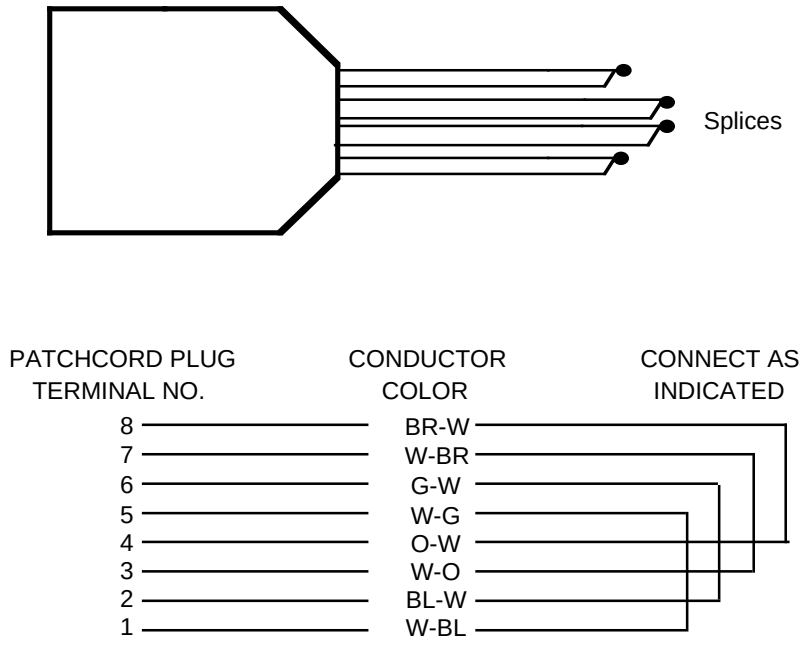


FIGURE 5-2. Loopback Connector for Use with a 110 Patch Panel

PROCEDURE 5-5. Starting On-line Loopback Tests

1. Remove the port to be tested from service: **remove x25 port** <**mod addr**> <**port num**>
2. Verify that port information is entered in the database and the port is out of service: **verify x25** <**mod addr**>
3. Put any modems in loopback mode, and attach appropriate loopback connectors and cables. If appropriate loopback connectors are unavailable, refer to preceding directions that explain how to build a suitable pair of connectors. The X.25 internal and external port tests require the ED-5P056-30,G24 loopback connector for RS-232-C connections to X.25 hosts.

   The *local_modem* and *remote_modem* tests require the 845260439 (COMCODE) connector for V.35 connections to PDNs. (When running these tests on this connection, a modem-eliminator is required with speeds set according to the module type. Or, the tests can be run using a loopback modem *without* the V.35 loopback connector.) When connecting loopback connectors for the *local_modem* or *remote_modem* test, it is not necessary to attach the loopback connector beyond the modem.

   NOTE: Improperly installed connectors and cables can produce diagnostic errors.

PROCEDURE 5-6. Running Internal Port Test

Applicability: Out-of-service DCE ports administered for host service. The internal port test puts the Universal Synchronous/Asynchronous Receiver/Transmitter (USART) within the module in loopback mode and sends a test message through the USART and back to the module.

NOTE: The USART requires certain RS-232-C signals to be active to run the test. If a DTE I/O distribution board is used, the port must be connected to a modem (for both clocking and clear-to-send signals). If a DCE I/O distribution board is used, the port must be connected to loopback connector ED-5P056-30,G24 or to a terminal to get a DTR signal.

1. Enter **diagnose x25 on-line** <**mod addr**> <**port num**> **internal_port**
2. If the test fails, the module might be faulty. Replace the module and repeat the test.
3. If the test passes, run the external port or local modem test, depending on whether a DCE or DTE I/O distribution board is being used.

PROCEDURE 5-7. Running External Port Test

Applicability: Out-of-service DCE ports administered for host service.

1. Enter **diagnose x25 on-line** <**mod addr**> <**port num**> **external_port**
2. If the test fails when the loopback connector is connected to the X.25 module, the X.25 I/O distribution board might be faulty. Check the switch settings on the I/O distribution board and repeat the test. (Table 2-1 in **X.25 Installation** gives switch settings.)
3. If the test passes, the problem is probably in the connection to the device or the end connection.

PROCEDURE 5-8. Running Local Modem Test

Applicability: Out-of-service DTE ports administered for PDN service.

1. Enter **diagnose x25 on-line** <**mod addr**> <**port num**> **local_modem**
2. Put the local modem in loopback mode when the system prompts you.
3. If the test fails, the trouble is probably in the I/O distribution board, the cables between the I/O distribution board and the modem, or the local modem. Replace each component, one at a time, until the problem is resolved.
4. If the test passes, remove the loopback connector from the modem and run the remote modem test next.

PROCEDURE 5-9. Running Remote Modem Test

Applicability: Out-of-service DTE ports administered for PDN service.

1. Ensure that the modem is attached and in service.
2. Enter **diagnose x25 on-line** <**mod addr**> <**port num**> **remote_modem**
3. Put the remote modem in loopback mode when the system prompts you.
4. If the test fails, the transmission facility between the two modems is faulty or the remote modem is faulty. Replace the faulty component and repeat the test.
5. If the test passes, the transmission path from the local Control Computer to the remote modem is working.
6. If the test passes, but a problem still exists with the remote end, the connection between the remote modem and the remote end might be faulty. Replace the faulty component and repeat the test.

PROCEDURE 5-10. Completing On-line Loopback Tests

1. Remove any loopback connectors and cables.
2. Restore the port to service: **restore x25 port** <**mod addr**> <**port num**>
3. Verify that the port has been restored to service: **verify x25** <**mod addr**>

PROCEDURE 5-11. Running Off-line Module Diagnostics

Applicability: Out-of-service X.25 module. The results are displayed at the end of each of the three tests. If any test fails, testing automatically stops at that point.

NOTE: The USART requires proper port terminations as noted in the *internal_port* test.

1. Use **remove x25 module** <**mod addr**> to remove the module from service.
2. Enter **diagnose x25 off-line** <**mod addr**>
3. The X.25 module is faulty if you receive any of the following system responses.

   ```
   Offline diagnostic boot test: FAIL
   Offline diagnostic memory test: FAIL
   Offline diagnostic download test: FAIL
     Inst. set:  FAIL
     Timer test:  FAIL
   ```

   A Timer test failure accompanied by the message **`Port <num>:  FAIL`** indicates that the numbered port (*1*, *2*, *3*, or *4*) is faulty. Replace the X.25 module and repeat the test. If a spare module is not available, the problem can be isolated by removing the indicated port from service.
4. If the module is not faulty, use **restore x25 module** <**mod addr**> to put the module back into service.

X.25 Commands

X.25 Commands

This chapter describes commands related to the administration, operation, and maintenance of an X.25 module: Commands that include the objects **gateway**, **x25**, and **x28sig** appear in alphabetical order by object by verb. System responses for all **gateway**, **x25**, and **x28sig** commands conclude this chapter. Command prompts and options can vary, depending on the module hardware installed and the type of node software.

The **enter** command shows the full prompting sequence and contains a list of parameter definitions. Additional information on the parameters used in the prompting sequence of **enter** and **change** is given in **X.25 Administration**. In addition, the database entry forms provided in **Appendix B** follow the prompting sequence for each service type entered.

Procedures for running diagnostics can be found in **X.25 Troubleshooting**.

Other command objects that are related to the administration, operation, and maintenance of an X.25 module are documented in the *Node Reference*.

change gateway

With the **change gateway** command you can modify all information that is common to the gateway. In addition, three gateway mapping operations enable you to *change*, *delete*, and *enter* information (at the **GATEWAY MAP OPERATION** prompt) about a gateway EPN that is mapped to a node X.121 address.

Syntax

You can input **change gateway** in prompted entry only. Except for the **CURRENT GATEWAY ID** and **NEW GATEWAY ID** parameters, the defaults for **change gateway** are those values, conditions, or states that currently exist in the database. They are displayed within parentheses in the parameter prompt.

```
CC0> change
OBJECTS [...gateway...]: gateway
GATEWAY PROTOCOL [x25, x75]
CURRENT GATEWAY ID [up to 8 chars]:
NEW GATEWAY ID [up to 8 chars: +(current entry)]:
GATEWAY ADDRESS [4 to 15 digits: +(current entry)]:
LOCAL X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent:
 +(current entry)]:
GATEWAY PDN PREFIX [0-9, none: +(current entry)]:
PAD SUPPORT [terminal, host: +(current entry)]:
```

If PAD SUPPORT is "host":

```
REMOTE X.3 PROFILE ID [up to 20 chars, mbit, transparent, simple, none:
 +(current entry)]:
REMOTE X.3 PARAMETER SET [comma-separated list of digits from 1 to 22:
 +(current entry)]:

GATEWAY CLOSED USER GROUP PROFILE ID [up to 8 chars, none:
 +(current entry)]:
NETWORK CLOSED USER GROUP PROFILE ID [up to 8 chars, none:
 +(current entry)]:

INFO: Modify mapping of Gateway Endpoints to Node X.121 Addresses
      using the following prompts. Hit <DEL> once when finished making changes.

  GATEWAY MAP OPERATION [change, delete, enter]:
```

If GATEWAY MAP OPERATION is "change":

```
  CURRENT GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999]:
  NEW GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999: +(current entry)]:
  NODE X.121 ADDRESS
    NEW DNIC [0000-9999, none: +(current entry)]:
    NEW SERVICE REGION [000-999: +(current entry)]:
    NEW SERVICE AREA [000-999: +(current entry)]:
```

If NEW GATEWAY ENDPOINT NUMBER OR RANGE is a single number and CURRENT GATEWAY ENDPOINT NUMBER OR RANGE is a single number:

```
    NEW ENDPOINT NUMBER [0000-9999: +(current entry)]:
```

Syntax *(continued)*

If NEW GATEWAY ENDPOINT NUMBER OR RANGE is a single number and CURRENT GATEWAY ENDPOINT NUMBER OR RANGE is a range:

```
INFO: The current X.121 EPN range entered is <range>.
    NEW ENDPOINT NUMBER [0000-9999]:
```

If NEW GATEWAY ENDPOINT NUMBER OR RANGE is a range and is equal in length to CURRENT GATEWAY ENDPOINT NUMBER OR RANGE:

```
    NEW ENDPOINT NUMBER OR RANGE [0000-9999: +(current entry)]:
```

If NEW GATEWAY ENDPOINT NUMBER OR RANGE is a range and is unequal in length to the CURRENT GATEWAY ENDPOINT NUMBER OR RANGE:

```
INFO: The current X.121 EPN or range entered is <epn or range>.
    NEW ENDPOINT NUMBER OR RANGE [0000-9999]:
```

If GATEWAY MAP OPERATION is "delete":

```
  GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999, all]:
```

If GATEWAY MAP OPERATION is "enter":

```
  GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999]:
  NODE X.121 ADDRESS
    DNIC [0000-9999, none: +(none)]:
    SERVICE REGION [000-999]:
    SERVICE AREA [000-999]:
```

If a single number is entered at GATEWAY ENDPOINT NUMBER OR RANGE:

```
    ENDPOINT NUMBER [0000-9999]:
```

If a range is entered at GATEWAY ENDPOINT NUMBER OR RANGE:

```
    ENDPOINT NUMBER OR RANGE [0000-9999]:
```

```
  GATEWAY MAP OPERATION [change, delete, enter]:  Delete
```

Command loops to CURRENT GATEWAY ID prompt.

Parameters

This section contains explanations of parameters used in the **change gateway** prompting sequence that differ from those used in **enter gateway**. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

CURRENT GATEWAY ENDPOINT NUMBER OR RANGE

A 4-digit address (*xxxx* or *xxxx-xxxx*) specifying an existing gateway EPN or range to be changed. This EPN or range can also be specified to modify the X.121 address to which it is mapped.

CURRENT GATEWAY ID

A string of 1 to 8 characters identifying the existing gateway identifier.

GATEWAY ENDPOINT NUMBER OR RANGE

If the **GATEWAY MAP OPERATION** is *enter*, a 4-digit address (*xxxx* or *xxxx-xxxx*) specifying a new EPN or range. If the **GATEWAY MAP OPERATION** is *delete*, an existing EPN is to be specified—that is, one single EPN, the low EPN (representing the whole range), the low and high EPNs in a range, or the word *all*, meaning delete the entire map. If one gateway EPN is deleted, the X.121 address to which it is mapped is also deleted.

Parameters *(continued)*

GATEWAY MAP OPERATION
Specifies the operation to be performed at the address map as: *enter* (add new entries), *change* (modify existing map information), or *delete* (eliminate a specific entry or the entire map).

NEW GATEWAY ENDPOINT NUMBER OR RANGE
A 4-digit address (*xxxx* or *xxxx-xxxx*) specifying a new or an existing gateway EPN or range.

NEW GATEWAY ID
A string of 1 to 8 characters used to modify the existing gateway and to specify the new gateway identifier. Entry of the words *all* or *none* is not allowed for a **NEW GATEWAY ID** .

NODE X.121 ADDRESS
A number consisting of an optional Data Network Identification Code (DNIC) and a Network Terminal Number (NTN).

If **GATEWAY MAP OPERATION** is *enter*, see **enter gateway**. If **GATEWAY MAP OPERATION** is *change*, specify appropriate information for a **NEW DNIC, NEW SERVICE REGION,** and **NEW SERVICE AREA.**

Depending on the response to **GATEWAY ENDPOINT NUMBER OR RANGE,** one of the following parameters is displayed:

- **NEW ENDPOINT NUMBER**
  If the previous or new gateway endpoint is a single number (*xxxx*), specify the current X.121 EPN or enter new information. If the gateway EPN was changed from a range (*xxxx-xxxx*) to a single number (*xxxx*), specify a new EPN.

- **NEW ENDPOINT NUMBER OR RANGE**
  If the previous or new gateway endpoint is a range (*xxxx-xxxx*) and the range length is not changed, specify the current X.121 EPN or enter new information. If the range length is changed, specify a new EPN or range.

NOTE: Although each component is changed separately, once the full X.121 address is changed, it is treated in its entirety and checked for uniqueness within the address map. If it conflicts with any other X.121 address in the address map, you are reprompted for the whole X.121 address starting with the DNIC.

Prompted Entry: Changing Gateway Information

```
CC0> change
OBJECTS [...gateway...]: gateway
GATEWAY PROTOCOL [x25, x75]: x25
CURRENT GATEWAY ID [up to 8 chars]: admin
NEW GATEWAY ID [up to 8 chars: +(admin)]: admn
GATEWAY ADDRESS [4 to 15 digits: +(2015417800)]: +
LOCAL X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent:
+(simple)]: +
GATEWAY PDN PREFIX [0-9, none: +(1)]: +
PAD SUPPORT [terminal, host: +(terminal)]: +
GATEWAY CLOSED USER GROUP PROFILE ID [up to 8 chars, none:
+(cugnprof)]: +
NETWORK CLOSED USER GROUP PROFILE ID [up to 8 chars, none:
+(cugprof)]: +

INFO: Modify mapping of Gateway Endpoints to Node X.121 Addresses
      using the following prompts. Hit <DEL> once when finished making changes.

  GATEWAY MAP OPERATION [change, delete, enter]: enter

  GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999]: 0003
  NODE X.121 ADDRESS
    DNIC [0000-9999, none: +(none)]: 0003
    SERVICE REGION [000-999]: 201
    SERVICE AREA [000-999]: 541
    ENDPOINT NUMBER [0000-9999]: 7803

  GATEWAY MAP OPERATION [change, delete, enter]: change

  CURRENT GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999]: 0002
  NEW GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999: +(0002)]: +
  NODE X.121 ADDRESS
    NEW DNIC [0000-9999, none: +(0002)]: +
    NEW SERVICE REGION [000-999: +(201)]: +
    NEW SERVICE AREA [000-999: +(541)]: +
    NEW ENDPOINT NUMBER [0000-9999: +(7802)]: 7805

  GATEWAY MAP OPERATION [change, delete, enter]: delete

  GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999, all]: 0004-0006

  GATEWAY MAP OPERATION [change, delete, enter]:    Delete

CURRENT GATEWAY ID [up to 8 chars]:    Delete
CC0>
```

delete gateway

The **delete gateway** command enables you to eliminate gateway information in the database.

Syntax

You can input **delete gateway** in prompted or one-line entry.

```
CC0> delete
OBJECTS [...gateway...]: gateway
GATEWAY PROTOCOL [x25, x75]:
GATEWAY ID [up to 8 chars]:
```

Parameters

Refer to the parameter definitions supplied in **enter gateway**.

Prompted Entry: Deleting Gateway Information

```
CC0> delete
OBJECTS [...gateway...]: gateway
GATEWAY PROTOCOL [x25, x75]: x25
GATEWAY ID: admn
CC0>
```

One-line Entry: Deleting Gateway Information

```
CC0> delete gateway x25 admn
```

enter gateway

The **enter gateway** command enables you to add information about a gateway.

Syntax

You can input **enter gateway** in prompted entry only. The prompting sequence of the gateway mapping operation parameters is repeated until you press Delete. You can then enter additional gateway information at the **GATEWAY ID** prompt or press Delete to terminate the command.

```
CC0> enter
OBJECTS [...gateway...]: gateway
GATEWAY PROTOCOL [x25, x75]:
GATEWAY ID [up to 8 chars]:
GATEWAY ADDRESS [4 to 15 digits]:
LOCAL X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent:
 +(simple)]:
GATEWAY PDN PREFIX [0-9, none: +(none)]:
PAD SUPPORT [terminal, host: +(terminal)]:
```

If PAD SUPPORT is "host":

```
REMOTE X.3 PROFILE ID [up to 20 chars, mbit, transparent, simple, none:
 +(transparent)]:
```

If REMOTE X.3 PROFILE ID is not "none":

```
REMOTE X.3 PARAMETER SET [comma-separated list of digits from 1 to 22:
 +(1-8, 12, 15):

GATEWAY CLOSED USER GROUP PROFILE ID [up to 8 chars, none: +(none)]:
NETWORK CLOSED USER GROUP PROFILE ID [up to 8 chars, none: +(none)]:

INFO: Map Gateway Endpoints to Node X.121 Addresses using
      the following prompts. Hit <DEL> once when finished with mapping.

  GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999]:
  NODE X.121 ADDRESS
    DNIC [0000-9999, none: +(none)]:
    SERVICE REGION [000-999]:
    SERVICE AREA [000-999]:
```

If a single number is entered at GATEWAY ENDPOINT NUMBER OR RANGE:

```
    ENDPOINT NUMBER [0000-9999]:
```

If a range is entered at GATEWAY ENDPOINT NUMBER OR RANGE:

```
    ENDPOINT NUMBER OR RANGE [0000-9999]:

  GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999]:  Delete
```

Command loops to GATEWAY ID prompt.

Parameters

This section contains explanations of parameters used in the **enter gateway** prompting sequence. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

GATEWAY ADDRESS

A string of 4 to 15 digits that specifies the gateway address as an X.121 or E.164 address. It is the PDN address to which the X.25 PDN port is to connect. It must be obtained from the PDN or administrator.

- Prefix
  An optional 1-digit number from 0 to 9 used *only* when different address formats within a PDN (a national data number versus an international data number) must be distinguished.

An X.121 address can consist of a:

- Data Network Identification Code (DNIC)
  An optional 4-digit number from 0000 to 9999 specifying the DNIC of the address entered. This number is used to route calls to other PDNs.
- Network Terminal Number (NTN)
  A required 4 to 10-digit number from 0 to 9 specifying the address of a NTN. The number of digits used for this part of the gateway address is significant; for example, *0000, 00000,* and *000000* are three unique addresses that do not imply the value *0*.

An E.164 gateway address can consist of a:

- Country Code (CC)
  A number consisting of 1 to 3 digits, ranging from 1 to 999, that specifies the destination country or geographical location. For a PDN-type gateway, the country code is a 1-digit number with the value of 1; the value 1 is the CC for the USA.
- National (Significant) Number (N(S)N)
  This variable length string consists of a national destination code (NDC) and a subscriber number (SN). The NDC specifies the address of the destination network that serves the destination subscriber; the SN, which is analogous to an EPN, specifies the address of the subscriber in the same local network or numbering area. Depending on the length of the CC, the NDC could be one of the following:
  - 5 to 14 digits if the CC is 1 digit
  - 4 to 13 digits if the CC is 2 digits
  - 4 to 12 digits if the CC is 3 digits

  For the North American Numbering Plan (NANP), the SN is a 10-digit address ranging from 0 to 9. The NDC, when combined with the SN, constitutes the N(S)N of the international ISDN number.

  The NDC must prefix the called SN when the calling and called parties are located in different number areas. (The USA does not have a NDC.)

Parameters *(continued)*

GATEWAY CLOSED USER GROUP PROFILE ID

A string of 1 to 8 characters that specifies the CUG profile ID used for the gateway; or the word *none*, meaning a profile ID is not to be specified. The CUG profile ID contains a set of CUG identifiers, incoming and outgoing access permissions, and the preferred CUG index.

GATEWAY ENDPOINT NUMBER OR RANGE

A 4-digit address from *0000* to *9999* specifying the last 4 digits of an X.121 network terminal number (that is, the EPN for the USA) or the last 4 digits of an E.164 national number. The gateway EPN can be entered as a single EPN (*xxxx*) or as a range of EPNs separated by a dash (*xxxx-xxxx*); where: the first 4 digits are the low end of the range and the second 4 digits are the high end.

GATEWAY ID

A string of 1 to 8 characters used to link an X.25 port administered for PDN service with a PDN. The words *all* and *none* are not acceptable entries.

GATEWAY PDN PREFIX

An optional string of 0 to 9 digits specifying the PDN prefix; or the word *none*, meaning a prefix is not required. (Some PDNs require a prefix that differs from the node prefix.)

GATEWAY PROTOCOL

Specifies if the protocol the gateway is to use is that protocol needed to communicate with an X.25 (*x25*) module or an X.75 (*x75*) module.

LOCAL X.3 PROFILE ID

A string of 1 to 20 characters specifying the profile ID to be used by all X.3 terminal users in the local node network that must access the gateway via the PAD; or one of three system-supplied profile IDs: *simple*, *transparent*, or *mbit*. The common profile is *simple*; the profile suitable for file transfers is *transparent*; and the profile needed to invoke the M-bit procedure (for message boundary signalling) between an asynchronous block device and an X.25 endpoint is *mbit*.

NETWORK CLOSED USER GROUP PROFILE ID

A string of 1 to 8 characters that specifies the CUG profile ID to be used for calls between a gateway and local node endpoints that have not subscribed to the CUG facility; or the word *none*, meaning a profile ID is not to be specified. The network CUG profile contains a set of CUG identifiers, incoming and outgoing access permissions, and the preferred CUG index. The network CUG profile specified must be entered (via **enter profile**) as a non-gateway CUG profile. If *none* is specified, the endpoints are in the "open" part of the local node network.

Parameters *(continued)*

NODE X.121 ADDRESS

A number consisting of an *optional* DNIC and a Network Terminal Number (NTN). Each component is entered separately; but once the full X.121 address is entered, it is treated in its entirety and checked for uniqueness in the address map. If it conflicts with any other X.121 address in the address map, the system reprompts you for the whole X.121 address starting with the DNIC.

The DNIC is a 4-digit number from *0000* to *9999* that is used to route calls to other PDNs. An NTN can consist of a:

- **SERVICE REGION**
  A 3-digit number from *000* to *999* specifying an area.
- **SERVICE AREA**
  A 3-digit number from *000* to *999* specifying an exchange.
- **ENDPOINT NUMBER**
  If **GATEWAY ENDPOINT NUMBER OR RANGE** is a single number, the EPN is a 4-digit number from *0000* to *9999* specifying a station.
- **ENDPOINT NUMBER OR RANGE**
  If **ENDPOINT NUMBER OR RANGE** is a range, a set of 4-digit numbers from *0000* to *9999* that equals the same range length in **GATEWAY ENDPOINT NUMBER OR RANGE.** The range length can be represented by only the low number within the range or by both the low and high numbers within the range. If only the low number is specified, the high number is automatically generated.

  For example: if the **GATEWAY ENDPOINT NUMBER OR RANGE** is 1001-1003, the X.121 endpoint range could be 5001-5003 or 6011-6013 because both sets of ranges span the same amount of numbers.

PAD SUPPORT

Specifies if the gateway provides *host* or *terminal* PAD support. With *host* support, the X.29 protocol is used and the X.3 profile for the remote PAD is initialized. With *terminal* support, control of the remote PAD is not allowed.

Parameters *(continued)*

REMOTE X.3 PARAMETER SET

If **PAD SUPPORT** is *host* and if **REMOTE X.3 PROFILE ID** is not *none*, a comma-separated list of digits from *1* to *22* (including ranges) specifying the X.3 parameter set (which is selected from the **REMOTE X.3 PROFILE ID)** that is to be sent to the remote PAD. (The default parameter set—which is *1-8*, *12*, and *15*—should be chosen when interworking with ISDN terminal adapters.) Refer to **profile** in the *Node Reference* to correspond X.3 parameter numbers to parameter descriptions.

REMOTE X.3 PROFILE ID

If **PAD SUPPORT** is *host*, a string of 1 to 20 characters specifying the profile ID to be used by all host users in the PDN that must access the gateway to communicate with the local node network; or one of three system-supplied profile IDs: *simple*, *transparent*, or *mbit*. The word *none*, meaning a profile ID is not required, can also be specified.

Prompted Entry: Entering Gateway Information

```
CC0> enter
OBJECTS [...gateway...]: gateway
GATEWAY PROTOCOL [x25, x75]: x25
GATEWAY ID [up to 8 chars]: admin
GATEWAY ADDRESS [4 to 15 digits]: 2015417800
LOCAL X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent:
+(simple)]: +
GATEWAY PDN PREFIX [0-9, none: +(none)]: 1
PAD SUPPORT [terminal, host: +(terminal)]: +
GATEWAY CLOSED USER GROUP PROFILE ID [up to 8 chars, none: +(none)]: cugnprof
NETWORK CLOSED USER GROUP PROFILE ID [up to 8 chars, none: +(none)]: cugprof

INFO: Map Gateway Endpoints to Node X.121 Addresses using
      the following prompts. Hit <DEL> once when finished with mapping.

  GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999]: 0001
  NODE X.121 ADDRESS
    DNIC [0000-9999, none: +(none)]: 0001
    SERVICE REGION [000-999]: 201
    SERVICE AREA [000-999]: 541
    ENDPOINT NUMBER [0000-9999]: 7800

  GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999]: 0002
  NODE X.121 ADDRESS
    DNIC [0000-9999, none: +(none)]: 0002
    SERVICE REGION [000-999]: 201
    SERVICE AREA [000-999]: 541
    ENDPOINT NUMBER [0000-9999]: 7802

  GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999]: 0004-0006
  NODE X.121 ADDRESS
    DNIC [0000-9999, none: +(none)]: 0004
    SERVICE REGION [000-999]: 201
    SERVICE AREA [000-999]: 541
    ENDPOINT NUMBER [0000-9999]: 7804-7806

  GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999]:    Delete

GATEWAY ID [up to 8 chars]:    Delete
CC0>
```

verify gateway

The output of the **verify gateway** command enables you to check the status of the database regarding a gateway, including the address, the X.3 profiles, the CUG profiles, and the gateway EPN to a node X.121 address map.

Syntax

You can input **verify gateway** in prompted or one-line entry.

```
CC0> verify
OBJECTS [...gateway...]: gateway
GATEWAY PROTOCOL [x25, x75, all: +(all)]:
```

If GATEWAY PROTOCOL is not "all":

```
GATEWAY ID [up to 8 chars, all: +(all)]:
```

Parameters

Except for allowing the specification of the word *all*, meaning every gateway, the **GATEWAY ID** parameter definition for **verify gateway** is the same as that for **enter gateway**.

Prompted Entry: Verifying Gateway Information

```
CC0> verify
OBJECTS [...gateway...]: gateway
GATEWAY PROTOCOL [x25, x75, all: +(all)]: x25
GATEWAY ID [up to 8 chars, all: +(all)]: admn
<report output>
```

One-line Entry/Output: Verifying Gateway Information

```
CC0> verify gateway x25 admn

   93-12-31 19:31:01 NODE=Redqueen
M  verify gateway admn

   GATEWAY ID: admn                    GATEWAY PROTOCOL: x25

   GATEWAY ADDRESS: 2015417800         GATEWAY PREFIX: 1

   PAD SUPPORT: terminal
   LOCAL X.3 PROFILE ID: simple

   GATEWAY CUG PROFILE ID: cugnprof
   NETWORK CUG PROFILE ID: cugprof
```

One-line Entry/Output *(continued)*

```
    GATEWAY ENDPOINT/NODE X.121 ADDRESS MAP

                          X.121 ADDRESS
    GATEWAY ENDPOINT      DNIC  SR  SA  EPN(S)
    0001                  0001  201 541 7800
    0002                  0002  201 541 7805
    0003                  0003  201 541 7803
CC0>
```

Report Fields

This table correlates each report field heading shown in the output of **verify gateway** with the parameter for which you are prompted in **enter gateway** or **change gateway**. The information beneath each report field heading reflects the parameter option specified in either command. An *N/A* indicates that the parameter is *not applicable* or *not used*.

Report Field Name	Corresponding Parameter Name
GATEWAY ADDRESS	GATEWAY ADDRESS
GATEWAY CUG PROFILE ID	GATEWAY CLOSED USER GROUP PROFILE ID
GATEWAY ENDPOINT/	GATEWAY ENDPOINT NUMBER OR RANGE
NODE X.121 ADDRESS MAP	NODE X.121 ADDRESS
DNIC	DNIC/NEW DNIC
EPN(S)	ENDPOINT NUMBER OR RANGE/ NEW ENDPOINT NUMBER OR RANGE
SA	SERVICE AREA/NEW SERVICE AREA
SR	SERVICE REGION/NEW SERVICE REGION
GATEWAY ID	GATEWAY ID/NEW GATEWAY ID
GATEWAY PREFIX	GATEWAY PDN PREFIX
GATEWAY PROTOCOL	GATEWAY PROTOCOL
LOCAL X.3 PROFILE ID	LOCAL X.3 PROFILE ID
NETWORK CUG PROFILE ID	NETWORK CLOSED USER GROUP PROFILE ID
PAD SUPPORT	PAD SUPPORT
*REMOTE X.3 PROFILE ID	REMOTE X.3 PROFILE ID

* Not shown in this report; applies to parameter option that can be specified for other type of PAD support.

change x25

The **change x25** command enables you to modify X.25 module and port information. These restrictions apply:

- For an out-of-service or ready-for-service port, **change x25** cannot be used to modify the **SERVICE TYPE.** To change the **SERVICE TYPE,** use **delete x25** to remove the existing information and **enter x25** to enter the new information.
- To change a range or list of ports, all ports must have been identically configured when they were initially input and they must be removed from service.
- When a module is in service and the port is out of service, **change x25** cannot be used to modify the **NUMBER OF SVC CHANNELS PER PORT, SVC DIRECTION,** and the **SVC GROUP** or **PVC GROUP** parameters.
- For an in-service port, only the **PVC LOGICAL CHANNEL NUMBER** and the **PVC DESTINATION** parameters can be changed providing they were previously configured. (The syntax for changing an in-service port is illustrated in the Syntax section that follows.)

Caution: If **change x25** is input when a port is still in service, a PVC can inadvertently be taken down and connected to a new destination. To abort such a request, press Delete at the first **PVC DESTINATION** prompt. Use **remove** to take the port out of service, then input **change** to modify any other information.

Syntax

You can input **change x25** in prompted entry only. If the components to be changed are an out-of-service module or port, the syntax for **change x25** is similar to that of **enter x25**. In both instances, the defaults for **change x25** are those values, conditions, or states that currently exist in the database. They are displayed within parentheses in the parameter prompt.

Besides the restrictions previously listed for out-of-service modules, numerous **INFO** messages, explaining existing system states—such as the current settings of window sizes, packet size, and number of user channels—appear. These **INFO** messages are listed and explained in System Responses. In addition, the value options furnished for **NUMBER OF USER CHANNELS** are those values explained in "Window Size, Packet Size, and User Channels" in **X.25 Administration.**

Similarly for out-of-service ports, numerous **INFO** messages appear explaining service state or PVC/SVC status. These messages are also listed and explained in System Responses.

Syntax *(continued)*

For an in-service port, only certain parameters can be changed. The prompting sequence for an in-service port is as follows:

```
CC0> change
OBJECTS [...x25...]: x25
COMPONENT [module, port]: port  <in service>
MODULE ADDRESS:
PORT NUMBER [1-4]:
```

If a PVC channel range has been entered for the port:

```
INFO: Changing a PVC DESTINATION for an in-service port will cause the PVC to
      be taken down.

INFO: Modify assignment of destinations to logical channels using the
      following prompts.  Hit <DEL> once when finished making changes.

   PVC LOGICAL CHANNEL NUMBER [1-<Y>]:
   PVC DESTINATION [up to 72 chars, none:
    +(current entry)]:
```

Command loops to PORT NUMBER prompt.

Parameters

Refer to the parameter definitions supplied in **enter x25**.

Prompted Entry: Changing X.25 PDN Port Information*

```
CC0> change
OBJECTS [...x25...] x25
COMPONENT [module, port]: port
MODULE ADDRESS: 51
PORT NUMBER [1-4]: 1
COMMENT [up to 60 chars double quoted, none:
 +("pdn port")]:
 +
CALL ID FOR PORT 1 [1-255, none: +(1)]: +
CLOCKING TYPE [internal, external: +(external)]: +
EXTERNAL BAUD RATE [1200, 2400, 4800, 9600, 19200, 48k, 56k, 64k:
  +(9600)]: +
MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K) [1-7: +(7)]: +
WAITING ACKNOWLEDGEMENT TIME (T1) [2-20: +(3)]: +
MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2) [2-15: +(7)]: +
ACTION WHEN N2 COUNT EXCEEDED [disconnect, reset: +(reset)]: +
ACTION WHEN DISC RECEIVED [disconnect, reset: +(reset)]: +
BILLING STATUS [on, off: +(off)]: on
GATEWAY ID [up to 8 chars: +(dklab)]: +
INFO: Reducing SVC channels assigned to port(s) may affect the entries
      to the number of receive-only and/or originate-only channels.
NUMBER OF SVC CHANNELS PER PORT [0-85: +(10)]: +
INFO: Changing SVC direction may affect the entries to the number of
      receive-only and/or originate-only channels.
SVC DIRECTION [originate, receive, 2way: +(2way)]: +
SVC GROUP [up to 8 chars: +(svcpdn)]: +
NUMBER OF RECEIVE ONLY CHANNELS [0-10: +(5)]: +
NUMBER OF ORIGINATE ONLY CHANNELS [0-5: +(2)]: +
WINDOW SIZE NEGOTIATION [on, off: +(off)]: +
PACKET SIZE NEGOTIATION [on, off: +(off)]: +
THROUGHPUT CLASS NEGOTIATION [on, off: +(off)]: on
FAST SELECT ACCEPTANCE [on, off: +(on)]: +
PREDEFINED DESTINATION [up to 72 chars, none:
  +(1200.12.1.1)]: +

PAD INACTIVITY TIMER (T) [2-20, off: +(off)]: +
PAD RETRY COUNTER (N) [2-20, off: +(off)]: +
NUMBER OF PVC CHANNELS [0-80: +(5)]: +
PVC GROUP [up to 8 chars: +(pvcpdn)]: +

INFO: Modify assignment of destinations to logical channels using the
      following prompts.  Hit <DEL> once when finished making changes.

  PVC LOGICAL CHANNEL NUMBER [1-5]:    Delete

PORT NUMBER [1-4]:  Delete
CC0>
```

* Module and port are out of service.

Prompted Entry: Changing X.25 Host Port Information*

```
CC0> change
OBJECTS [...x25...] x25
COMPONENT [module, port]: port
MODULE ADDRESS: 51
PORT NUMBER [1-4]: 2
COMMENT [up to 60 chars double quoted, none:
  +("host port")]:
  +
CLOCKING TYPE [internal, external: +(external)]: +
EXTERNAL BAUD RATE [1200, 2400, 4800, 9600, 19200, 48k, 56k, 64k:
  +(9600)]: +
MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K) [1-7: +(7)]: +
WAITING ACKNOWLEDGEMENT TIME (T1) [2-20: +(3)]: +
MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2) [2-15: +(7)]: +
ACTION WHEN N2 COUNT EXCEEDED [disconnect, reset: +(reset)]: +
ACTION WHEN DISC RECEIVED [disconnect, reset: +(reset)]: +
BILLING STATUS [on, off: +(off)]: on
DEFAULT CALLING ADDRESS [up to 15 digits, none:
  +(2015416796)]: +
LOCAL X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent:
  +(transparent)]: +
INFO: Reducing SVC channels assigned to port(s) may affect the entries
      to the number of receive-only and/or originate-only channels.
NUMBER OF SVC CHANNELS PER PORT [0-80: +(5)]: +
INFO: Changing SVC direction may affect the entries to the number of
      receive-only and/or originate-only channels.
SVC DIRECTION [originate, receive, 2way: +(2way)]: +
SVC GROUP [up to 8 chars: +(svchost)]: +
NUMBER OF RECEIVE ONLY CHANNELS [0-5: +(2)]: +
NUMBER OF ORIGINATE ONLY CHANNELS [0-3: +(3)]: +
ADDRESS CHECKING [on, off: +(on)]: +
ENDPOINT NUMBER FOR SVC CHANNELS FOR PORT 2 [0000-9999: +(0001)]: +
CLOSED USER GROUP PROFILE ID [up to 8 chars, none: +(techpubs)]: +
WINDOW SIZE NEGOTIATION [on, off: +(off)]: +
PACKET SIZE NEGOTIATION [on, off: +(off)]: +
THROUGHPUT CLASS NEGOTIATION [on, off: +(off)]: on
FAST SELECT ACCEPTANCE [on, off: +(on)]: ++
PREDEFINED DESTINATION [up to 72 chars, none:
  +(1200.12.1.1)]: +
```

* Module and port are out of service.

Prompted Entry: Changing X.25 Host Port Information *(continued)*

```
PAD INACTIVITY TIMER (T) [2-20, off: +(off)]: +
PAD RETRY COUNTER (N) [2-20, off: +(off)]: +

INFO: Modify assignment of destinations to logical channels using the
      following prompts.  Hit <DEL> once when finished making changes.

  PVC LOGICAL CHANNEL NUMBER [1-5]:  Delete

PORT NUMBER [1-4]:    Delete
CC0>
```

delete x25

The **delete x25** command enables you to eliminate X.25 module and port information.

Syntax

You can input **delete x25** in prompted or one-line entry.

```
CC0> delete
OBJECTS [...x25...]: x25
COMPONENT [module, port]:
MODULE ADDRESS:
```

If COMPONENT is "port":

```
PORT NUMBER [1-4]:
```

Parameters

Refer to the parameter definitions supplied in **enter x25**.

Prompted Entry: Deleting X.25 Port Information

```
CC0> delete
OBJECTS [...x25...] x25
COMPONENT [module, port]: port
MODULE ADDRESS:  51
PORT NUMBER [1-4]: 1
CC0>
```

Prompted Entry: Deleting X.25 Module Information

```
CC0> delete
OBJECTS [...x25...] x25
COMPONENT [module, port]: module
MODULE ADDRESS:  51
CC0>
```

One-line Entries: Deleting X.25 Component Information

```
CC0> delete x25 port 51 1
CC0> delete x25 module 51
```

diagnose x25

The **diagnose x25** command enables you to initiate on-line or off-line tests for an X.25 module or for one or more of its ports. The off-line module diagnostics check the hardware for an existing, out-of-service module. They consist of three tests—boot diagnostics, memory tests, and downloadable diagnostics—which are run consecutively. The on-line loopback* diagnostics check the communication path for an out-of-service port while the module remains in service. Before attempting on-line diagnostics, use **remove x25** to take the port to be tested out of service. The **diagnose x25** command tests one port at a time and affects service on that port only.

Syntax

You can input **diagnose x25** in prompted entry only.

```
CC0> diagnose
OBJECTS [...x25...]: x25
DIAGNOSTIC TYPE [off-line, on-line]:
MODULE ADDRESS:
```

If DIAGNOSTIC TYPE is "on-line":

```
PORT NUMBER [1-4]:
TEST TYPE [internal_port, external_port, local_modem, remote_modem:
          +(external_port)]:
```

If the loopback diagnostic requires placing a local or remote modem in loop-around mode for DTE ports:

```
INFO:  Place <local/remote> modem in loop-around mode.

CONTINUE TESTING [yes, no: +(yes)]:
```

If the loopback diagnostic requires hardware changes for the port external loop-around test:

```
INFO: Test requires a loop-around connector on port.
      Replace port cable with loop-around connector.

CONTINUE TESTING [yes, no: +(yes)]:
```

Parameters

This section contains explanations of parameters used in the **diagnose x25** prompting sequence that differ from those used in **enter x25**. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

CONTINUE TESTING

Specifies whether (*yes* or *no*) diagnostic testing should be continued.

DIAGNOSTIC TYPE

Specifies if the diagnostic test to be run is *off-line* or *on-line*.

---

* These tests are referred to as *loop-around* in the software and system responses.

Parameters *(continued)*

TEST TYPE

Specifies the type of diagnostic to be run. Each begins and ends at the Control Computer.

- *internal_port*
  This test extends to the universal synchronous/asynchronous receiver/transmitter (USART) within the DCE or DTE port being diagnosed. It does not check the integrity of the interface terminators and receivers.
- *external_port*
  This test, which is valid for DCE ports only, extends through the port to an external, 25-pin loop-around connector. It checks the integrity of the I/O board and the interface terminators and receivers.
- *local_modem*
  This test, which is valid for DTE ports only, extends to the port's local modem. The local modem must be in the loopback mode.
- *remote_modem*
  This test, which is valid for DTE ports only, extends to the port's remote modem. The remote modem must be in the loopback mode.

Prompted Entry: Running X.25 On-line Loopback Diagnostics

```
CC0> diagnose
OBJECTS [...x25...] x25
DIAGNOSTIC TYPE [on-line, off-line]: on-line
MODULE ADDRESS: 51
PORT NUMBER [1-4]: 2
TEST TYPE [internal_port, external_port, local_modem,
           remote_modem: +(external_port)]: local_modem

INFO: Place local modem in loop-around mode
CONTINUE TESTING [yes, no: +(yes)]: +

  93-12-31 10:55:00 NODE=Redqueen
M diagnose x25 on-line 51 2 local_modem
  Diagnose completed - test passed.

CONTINUE TESTING [yes, no: +(yes)]: no
CC0>
```

Prompted Entry: Running X.25 Off-line Module Diagnostics

```
CC0> diagnose
OBJECTS [...x25...] x25
DIAGNOSTIC TYPE [off-line, on-line]: off-line
MODULE ADDRESS: 51

   93-12-31 05:21:19 NODE=Redqueen
M  diagnose x25 off-line 51

   Boot tests in progress - .
   93-12-31 05:21:19 NODE=Redqueen

   Offline diagnostic boot test: PASS

   Extended RAM test in progress - . . .
   93-12-31 05:21:19 NODE=Redqueen

   Offline diagnostic memory test: PASS

   Diagnostic download in progress - . . .
   93-12-31 05:21:19 NODE=Redqueen

   Offline diagnostic downloaded test:
      Inst. set:  PASS
      Timer test: PASS
      Port 1:     FAIL
      Port 2:     PASS
      Port 3:     PASS
      Port 4:     PASS

   DIAGNOSTIC COMPLETED
CC0>
```

dmeas x25

The **dmeas x25** command enables you to display maintenance measurements reflecting the traffic, performance, and utilization of the X.25 module. These measurements, which are useful to diagnose network problems, are displayed for the module and its ports.

You can specify on-demand reports containing information accumulated either during the last report interval or since the last automatically generated report.

Syntax

You can input **dmeas x25** in prompted or one-line entry.

```
CC0> dmeas
OBJECTS [...x25...]: x25
COMPONENT [module, port]:
MODULE ADDRESS:
```

If COMPONENT is "port":

```
PORT NUMBER [1-4: +(1-4)]:

INTERVAL [current, previous: +(current)]:
```

Parameters

This section contains explanations of parameters used in the **dmeas x25** prompting sequence that differ from those used in **enter x25**. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

INTERVAL

Specifies if the on-demand report is to be printed for the *current* or *previous* reporting interval. The current interval includes those measurements accumulated since the previous scheduled report was generated; or if a report was not scheduled, those measurements accumulated since the module was last reset. Conversely, the previous interval includes those measurements accumulated prior to the current interval.

Prompted Entry: Displaying X.25 Module and Port Measurements

```
CC0> dmeas
OBJECTS [...x25...] x25
COMPONENT [module, port]: port
MODULE ADDRESS: 51
PORT NUMBER [1-4: +(1-4)]: 2
INTERVAL [current, previous: +(current)]: +
<report output>
```

One-line Entry/Output: Displaying X.25 Module and Port Measurements

```
CC0> dmeas x25 port 51 2 +
   93-12-31 12:00:05 NODE=Redqueen
M  dmeas x25 port 51 2 current

   MODULE ADDRESS: 51    93-12-31    11:55  ----->  12:00

PACKETS   PACKETS   HALF FULL     BUFFERS               MIN
FM NODE   TO NODE   FIFO INTRPS   NOT AVAIL     IDLE    IDLE
246       696       0             0             100%     99%

MODULE ADDRESS: 51     PORT:  2    SPEED:  9600

PORT  BUFFERS
UTIL  NOT AVAIL
  0%  0
<----------------RECEIVED-----------------> <-------TRANSMITTED------->
TOTAL    FRAME    USER      CRC ERROR        TOTAL    FRAME     USER
FRAMES   BYTES    BYTES     FRAMES           FRAMES   BYTES     BYTES
568      2366     0         0                567      2354      0

CALL DATA FOR PORT: 2

LOGICAL     CALL     CALL     ABNORM   AVERAGE   PEAK
CHLS INSVC  ACCEPTS  REJECTS  TERMS    CALLS     CALLS
25          0        4        4        3         0

ABNORMAL CALL TERMINATIONS FOR PORT: 2
<-------------------CLEARING------------------><--RESTARTING--> LINK
BUSY OOO RPE RCA IDES FSA IFR ACB LPE NTC OBT RPO  LPE  NTC  NTOP FAIL
0    0   0   0   0    0   0   0   0   0   0   0    0    0    0    4
CC0>
```

Report Fields

ABNORM TERMS

The number of incoming/outgoing SVC calls abnormally terminated, including rejected calls.

ACB

The number of calls aborted because of security violations (CUGs).

AVERAGE CALLS

The average number of incoming/outgoing SVC calls, plus active PVC channels recorded during the interval.

BUFFERS NOT AVAIL

The number of times a buffer was requested and none were available. This count is for the module or port.

BUSY

The number of calls terminated because the receiver was busy.

Report Fields *(continued)*

CALL ACCEPTS
The number of incoming/outgoing SVC calls accepted.

CALL REJECTS
The number of incoming/outgoing SVC calls rejected.

CRC ERROR FRAMES
The number of frames received with bad frame check sequences.

FRAME BYTES
The total number of frame bytes received or transmitted.

FSA
The number of calls terminated because the receiver did not accept fast select calls.

HALF FULL FIFO INTRPS
The number of half-full, first-in/first-out interrupts.

IDES
The number of calls terminated because the receiver did not support a function or a facility request.

IDLE
The percentage of time during which the module was idle.

IFR
The number of calls terminated because of invalid facility requests.

LINK FAIL
The number of calls terminated because the link went down.

LOGICAL CHLS INSVC
The number of active incoming/outgoing SVC calls, plus active PVC channels.

LPE
The number of calls terminated because of local procedure errors.

MIN IDLE
The minimal percentage of time during which the module was idle.

MODULE ADDRESS
The address of the module for which measurements have been displayed.

NTC
The number of calls terminated because of network congestion.

NTOP
The number of calls terminated because of network operational restarts.

Report Fields *(continued)*

OBT
The number of calls terminated because of invalid/unknown called addresses.

OOO
The number of calls terminated because the receiver was out of order.

PACKETS FM NODE
The number of packets received by the module from the node.

PACKETS TO NODE
The number of packets transmitted to the node by the module.

PEAK CALLS
The peak number of active incoming/outgoing SVC calls, plus active PVC channels, recorded during the interval.

PORT
The number of the port for which measurements have been displayed.

PORT UTIL
The port utilization percentage: the ratio of the total number of characters sent and received on the line to the capacity of the line for the measurements interval.

RCA
The number of calls terminated because the receiver did not accept reverse charging.

RPE
The number of calls terminated because of remote procedure errors.

RPO
The number of calls terminated because of transit network problems.

SPEED
The baud rate for which the port has been configured.

TOTAL FRAMES
The total number of frames received or transmitted.

USER BYTES
The number of information frame bytes received or transmitted.

dstat x25

The **dstat x25** command enables you to display the status of X.25 modules, ports, and logical channels. This command helps to evaluate actual or potential problems detected by the alarm system.

Command output is hierarchical—that is, logical channel output includes module and port information; port output includes module information. In addition, all hardware information output during an iteration of **dstat module** is displayed, as well as on-board software information.

Syntax

You can input **dstat x25** in prompted or one-line entry.

```
CC0> dstat
OBJECTS [...x25...]: x25
COMPONENT [module, port, logchnl: +(module)]:
MODULE ADDRESS:
```

If COMPONENT is "port":

```
PORT NUMBER [1-4: +(1-4)]:
```

For a logchnl:

```
LOGICAL CHANNEL [1-100: +(1-100)]:
DETAIL [low, high: (+low)]:
```

Parameters

This section contains explanations of parameters used in the **dstat x25** prompting sequence that differ from those used in **enter x25**. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

COMPONENT

Specifies whether the component for which a report is to be generated is a *module*, *port*, or logical channel (*logchnl*).

DETAIL

Specifies if the command output is to show a limited amount of information (*low* detail) or more information (*high* detail).

LOGICAL CHANNEL

Specifies the number of the logical channel (from *1* to *100*) for which information is to be displayed. Entries can be a single number or a range or list of up to 10 logical channel numbers.

Prompted Entry: Displaying High Detail X.25 Module Status

```
CC0> dstat
OBJECTS [...x25...] x25
COMPONENT [module, port, logchnl: +(module)]: +
MODULE ADDRESS: 51
DETAIL [low, high: (+low)]: high
<report output>
```

Prompted Entry: Displaying High Detail X.25 Port Status

```
CC0> dstat
OBJECTS [...x25...] x25
COMPONENT [module, port, logchnl: +(module)]: port
MODULE ADDRESS: 51
PORT NUMBER [1-4: +(1-4)]: 2
DETAIL [low, high: (+low)]: high
<report output>
```

Prompted Entry: Displaying High Detail X.25 Logical Channel Status

```
CC0> dstat
OBJECTS [...x25...] x25
COMPONENT [module, port, logchnl: +(module)]: logchnl
MODULE ADDRESS: 51
PORT NUMBER [1-4: +(1-4)]: 2
LOGICAL CHANNEL [20-29: +(20-29)]: 20-21
DETAIL [low, high: (+low)]: high
<report output>
```

One-line Entry/Output: Displaying High Detail X.25 Logical Channel Status

```
CC0> dstat x25 logchnl 51 2 20-21 high
   93-12-31 06:03:09 NODE=Redqueen
M  dstat x25 logchnl 51 2 20-21
******************************** MODULE 51 *********************************
MODULE TYPE     SERVICE STATE   HARDWARE ERROR COUNT  SERIAL NUMBER
x25             in service      3                     1536

LAST HARDWARE ALARM
Module was reset  93-12-07 05:53

LAST SOFTWARE ALARM
Packet Level Restart Complete  93-12-08 09:06

ONLINE  ENABLED
yes     yes
------------------------------ HIGH DETAIL -------------------------------
MODULE  FIFO    FM NODE FM NODE SANITY
RESET   RESET   PARITY  OVERFLO ERROR
3       0       0       0       0

EXPECT  FULL    EMPTY   ACTUAL  ACTUAL  EXPECT  EXPECT
TYPE    PACKETS PACKETS STAT1   STAT2   STAT1   STAT2
x25     956     0       1       0       1       0

MEMORY   STACK    END      END      END      MEMORY   START    TOTAL
END      SPACE    BSS      DATA     TEXT     LEFT     BUFS     BUFMEM
0x80000  0x2000   0x4c684  0x44f0c  0x35528  0xb7d0   0x67d98  0x14268

BILLREC SOFTWARE NUMBER  TIMEOUT TIMEOUT TRUNC   AVG RSP
DROPPED ALARMS   TRANS   MOD     SYNCM   TRANS   TIME (msec)
0       13       23      0       0       0       U/A

RANGE   BAD
ERRORS  PACKETS
3       2
************************** MODULE 51  PORT 2 ***************************
PORT              EXPECT            ACTUAL            OPERATING
TYPE              SRVC STATE        SRVC STATE        STATE
X.25 host         in service        in service        up

DCD               DTR               RTS               CTS               DSR
on                on                on                off               on

   93-12-31 06:03:09 NODE=Redqueen
M  dstat x25 logchnl 51 2 20-21
------------------------------ HIGH DETAIL -------------------------------
X25      LOST     HOST     SEND     RECV     INTERNL  NXT      LAST
STATE    INTER    DONE     STATE    STATE    RTS      ACK      NXT ACK
BX_S6    no       off      1        1        off      1        0

ACK      LAST     LAST     LAST     AVAIL    SETUP    XFER     CLEAR
IN PROG  FR CTL   X25 IN   RFM DATA CHNLS    CHNLS    CHNLS    CHNLS
no       0x31     RRRES    0xf27808 50       0        0        0
```

One-line Entry/Output *(continued)*

```
***************************** LOGICAL CHANNEL ******************************
LC        LC    EXPECT             ACTUAL          OPERATING
NO   PAD  TYPE  SRVC STATE         SRVC STATE      STATE
20   no   PVC   in service         in service      data transfer state

***************************** LOGICAL CHANNEL ******************************
LC        LC    EXPECT             ACTUAL          OPERATING
NO   PAD  TYPE  SRVC STATE         SRVC STATE      STATE
21   no   PVC   out of service     out of service  down

------------------------------ HIGH DETAIL -------------------------------
X3 PARAM NO   1    2    3    4    5    6    7    8    9    10   11
X3 PARAM VAL  0    0    0    1    0    0    2    0    0    0    14

X3 PARAM NO   12   13   14   15   16   17   18   19   20   21   22
X3 PARAM VAL  1    0    0    0    8    64   12   0    0    0    0
     MOD          CHL          X121 ADDR
     51           20-21        1112223456
CC0>
```

Report Fields

Alarms referred to in the following paragraphs are documented in the *Data Networking Products Messages Reference*.

ACK IN PROG
An X.25 link level acknowledgement in progress.

ACTUAL SRVC STATE
The actual current service state of the port or logical channel as indicated by the module itself.

ACTUAL STAT1
The actual value of the hardware status byte of the specified module's most currently received status packet. In some cases, the actual and expected values of **STAT1** differ.

ACTUAL STAT2
The actual value of the software status byte of the most currently received status packet for the specified module. In some cases, the actual and expected values of **STAT2** differ. The processor number changes in every status packet.

AVAIL CHNLS
The number of channels allocated.

AVG RSP TIME
The average response time obtained by dividing the total module response time by the total number of module transactions.

Report Fields *(continued)*

BAD PACKETS
The count of packets with envelope parity errors transmitted by the module and detected by the Eswitch. To determine if the module is defective, run diagnostics.

BILLREC DROPPED
The number of billing records dropped by **syncmaint**.

CHL
The number of the channel originating or receiving a call to or from the X.25 logical channel.

CLEAR CHNLS
The number of X.25 logical channels in the clearing state.

CTS
The status of clear to send is *on* or *off*.

DCD
The status of data carrier detect is *on* or *off*.

DSR
The status of data set ready is *on* or *off*.

DTR
The status of data terminal ready is *on* or *off*.

EMPTY PACKETS
The number of empty status packets received. (Empty packets are received when a module is not physically present in the specified shelf slot.) See **EMPTY SLOT** alarm.

ENABLED
Indicates whether or not (*yes* or *no*) the module mode switch is enabled. The value of this field is determined only from status information. See **MODE SWITCH NOT ENABLED** alarm.

END BSS
The end of BSS stack on the module.

END DATA
The end of data on the module.

END TEXT
The end of text on the module.

Report Fields *(continued)*

EXPECT SRVC STATE
The expected current service state of the port or logical channel can be *in*, meaning in service; *out*, meaning out of service; *rfs*, meaning ready for service; *ra*, meaning the port is in the restricted access state; or *rfra*, meaning the port is ready for restricted access.

EXPECT STAT1
The expected status byte of the module hardware.

EXPECT STAT2
The expected status byte of the module software.

EXPECT TYPE
The expected hardware type of the module in the shelf slot. For in-service modules, the value of this field is dependent only on information the administrator supplies. For out-of-service modules, this field is determined by status information.

FIFO RESET
The number of first-in, first-out synchronization problems (hardware problems) on the module. See **FIFO RESET** alarm.

FM NODE OVERFLO
The measure of any imbalance between the rate at which information arrives at a module and the rate at which the subscriber processes that information. (Overflow errors occur during typical operation and do not necessarily indicate a problem. See **FROM BUS OVERFLOW** alarm.)

FM NODE PARITY
The number of packets going to or coming from the node that had parity errors.

FULL PACKETS
The number of full status packets received when a module is physically present in the specified shelf slot.

HARDWARE ERROR COUNT
An approximate number summarizing module problems detected since its last reboot (that is, error counts in other fields). A count of *3* or *4* indicates a normal level of error. Higher counts usually indicate a problem.

HOST DONE
The X.25 host is finished monitoring.

INTERNL RTS
An X.25 link level internal request-to-send.

LAST HARDWARE ALARM
The module's last hardware alarm. This information, which is based on status packet data, is not stored across Control Computer reboots.

Report Fields *(continued)*

LAST FR CTL
The last received X.25 link level control frame.

LAST NXT ACK
The previous X.25 link level next acknowledgement.

LAST RFM DATA
The last received X.25 link level data frame.

LAST SOFTWARE ALARM
The module's last alarm that it issued by itself. This information is not stored across module or Control Computer reboots. See **MODULE WAS RESET** alarm.

LAST X25 IN
The last X.25 input link level stimulus.

LC NO
The logical channel number.

LC TYPE
Indicates whether the logical channel is a *pvc* or *svc*.

LOST INTER
Indicates an X.25 link level interrupt was lost.

MEMORY END
The end of memory on the interface module.

MEMORY LEFT
The amount of remaining memory on the module.

MOD
The module number originating/receiving a call to/from an X.25 logical channel.

MODULE RESET
The number of module resets. For some modules, resets occur during normal operation.

MODULE TYPE
Indicates what module type is actually present. The value is determined from status packets only and is independent of information supplied via **enter** and **delete**. This field is initialized to empty.

NUMBER TRANS
The number of transactions processed since reboot.

NXT ACK
The X.25 link level next acknowledgement.

Report Fields *(continued)*

ONLINE
Indicates whether (*yes* or *no*) the module is on-line. A status of *yes* is shown only if the green LED on the module is lit. The value of this field is determined from status information only.

OPERATING STATE
The current operating state of the port or logical channel.

PAD
Indicates whether (*yes* or *no*) the channel is operating as a PAD. If a channel is not operating as a PAD, the values of **X3 PARAM NO** and **X3 PARAM VAL** (high detail) are not valid.

PORT TYPE
The type of service the port is providing.

RANGE ERRORS
The count of packets transmitted by the module on a channel that is beyond the limit for which the module is configured. Bad packet counts might be attributed to a defective module that is corrupting the address field of the packet or to a channel configuration mismatch on the two sides of the trunks or CPM. To determine if the module is defective, run module diagnostics; to determine if a configuration mismatch has occurred, review the module configuration.

RECV STATE
The X.25 receive state variable.

RTS
The status of request-to-send is *on* or *off*.

SANITY ERROR
See **MODULE MALFUNCTION** and **WRONG MODULE TYPE** alarms.

SEND STATE
The X.25 link level send state variable.

SERIAL NUMBER
The unique factory-encoded number for all modules accessing the backplane. Maintaining records with these numbers can help track circuit pack vintages.

SERVICE STATE
The current module service state. When a module is put into service via **restore**, this field is set to in service. When a module is taken out of service via **remove**, this field is set to oos (manual). If the alarm system takes a module out of service when it detects a problem, this field is set to oos (auto,fault).

Report Fields *(continued)*

SETUP CHNLS
The number of X.25 logical channels in the call setup state.

SOFTWARE ALARMS
The number of alarms for the module since the last reboot.

STACK SPACE
The amount of stack space available on the module.

START BUFS
The start of buffer memory on the module.

TIMEOUT MOD
The number of timed-out transactions since the last reboot.

TIMEOUT SYNCM
The number of transactions returned from the module but timed out by **syncmaint** since reboot.

TOTAL BUFMEM
The amount of buffer memory on the module.

TRUNC TRANS
The number of truncated transactions since reboot.

XFER CHNLS
The number of X.25 logical channels in the data transfer state.

X121 ADDR
The X.121 address of the originator/receiver of the call to/from the X.25 logical channel.

X25 STATE
The X.25 link-level state number.

X3 PARAM NO
The X.3 parameter number. If it is marked with an asterisk (*), its value differs from the X.3 parameter value at call setup.

X3 PARAM VAL
The X.3 parameter value.

enter x25

The **enter x25** command enables you to add information for X.25 modules and ports.

Syntax

You can input **enter x25** in prompted entry only. If multiple host ports are being entered that require CUG security, the sequence of prompts is repeated for **ENDPOINT NUMBER FOR SVC CHANNELS FOR PORT <N>** and **CLOSED USER GROUP PROFILE ID** until all ports have been assigned EPNs/CUGs. The **PVC LOGICAL CHANNEL NUMBER** and **PVC DESTINATION** parameter form a similar loop so only one **PVC LOGICAL CHANNEL NUMBER** is entered per **PVC DESTINATION.** When all PVC destinations have been entered, press Delete to exit the loop. All defaults are shown in parentheses.

CC0> enter
OBJECTS [...x25...]: x25
COMPONENT [module, port]:
MODULE ADDRESS:

If COMPONENT is "module":
DOWNLOAD SERVER [+(controller)]:
If DOWNLOAD SERVER is "controller":
SOFTWARE VERSION [+(standard)]:
If DOWNLOAD SERVER is not "controller":
SOFTWARE VERSION:

DEFAULT NETWORK LEVEL WINDOW SIZE [1 - 5: +(2)]:
If DEFAULT NETWORK LEVEL WINDOW SIZE PACKET is not "2":
INFO: Window size negotiation is turned on based on the specified window size.

DEFAULT PACKET SIZE [128, 256: +(128)]:
If DEFAULT PACKET SIZE is "256":
INFO: Packet size negotiation is turned on based on the specified packet size.

NUMBER OF USER CHANNELS [1-<x>: +(x)]:

where <x> is determined by the minimum of 25,600/(<WS x <PS>)
or 100 where <WS> is
DEFAULT NETWORK LEVEL WINDOW SIZE
and <PS> is
DEFAULT PACKET SIZE .

INTERNAL BAUD RATE [1200, 2400, 4800, 9600, 19200, 48k, 56k, 64k, none: +(9600)]:

Command loops to MODULE ADDRESS prompt.

If COMPONENT is "port":
PORT NUMBER [1-4]:
COMMENT [up to 60 chars double quoted, none: +(none)]:

PORT TYPE [host, pdn: +(pdn)]:

Only if PORT TYPE is "pdn:"
CALL ID FOR PORT <N> [1-255, none: +(none)]:

Syntax *(continued)*

If INTERNAL BAUD RATE for the module is "none":

```
INFO: Clocking type is "external" since no internal baud rate was entered.
```

If INTERNAL BAUD RATE for the module is not "none":

```
CLOCKING TYPE [internal, external: +(external)]:
```

If CLOCKING TYPE is "external":

```
EXTERNAL BAUD RATE [1200, 2400, 4800, 9600, 19200, 48k, 56k, 64k:
  +(9600)]:

MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K) [1-7: +(7)]:
WAITING ACKNOWLEDGEMENT TIME (T1) [2-20: +(3)]:
MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2) [2-15: +(7)]:
```

If PORT TYPE is "host" or "pdn":

```
ACTION WHEN N2 COUNT EXCEEDED [disconnect, reset: +(reset)]:
ACTION WHEN DISC RECEIVED [disconnect, reset: +(reset)]:

BILLING STATUS [on, off: +(off)]:
```

Only if PORT TYPE is "pdn":

```
GATEWAY ID [up to 8 chars]:
```

Only if PORT TYPE is "host":

```
DEFAULT CALLING ADDRESS [up to 15 digits, none: +(none)]:
LOCAL X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent:
  +(transparent)]:

NUMBER OF SVC CHANNELS PER PORT [0-<X>: +(<X>)]:
```

If NUMBER OF SVC CHANNELS PER PORT is greater than 0:

```
SVC DIRECTION [originate, receive, 2way: +(2way)]:
SVC GROUP [up to 8 chars]:
```

If SVC DIRECTION is "2way":

```
NUMBER OF RECEIVE ONLY CHANNELS [0-<SVC_channels>: +(0)]:
```

If NUMBER OF SVC CHANNELS PER PORT minus NUMBER OF RECEIVE ONLY CHANNELS equals 0:

```
INFO: No channels left for originate only channels.
```

If NUMBER OF SVC CHANNELS PER PORT minus NUMBER OF RECEIVE ONLY CHANNELS does not equal 0:

```
NUMBER OF ORIGINATE ONLY CHANNELS [0-<remain_SVCs>: +(0)]:
```

Only if PORT TYPE is "host:"

```
ADDRESS CHECKING [on, off: +(on)]:
ENDPOINT NUMBERS FOR SVC CHANNELS FOR PORT <N> [0000-9999]:
CLOSED USER GROUP PROFILE ID [up to 8 chars, none: +(none)]:
```

If DEFAULT NETWORK LEVEL WINDOW SIZE is "2":

```
WINDOW SIZE NEGOTIATION [on, off: +(off)]:
```

If DEFAULT NETWORK LEVEL WINDOW SIZE is not "2":

```
INFO: Window size negotiation is turned on based on the specified window size.
```

If DEFAULT NETWORK LEVEL PACKET SIZE is "128":

```
PACKET SIZE NEGOTIATION [on, off: +(off)]:
```

If DEFAULT NETWORK LEVEL PACKET SIZE is "256":

```
INFO: Packet size negotiation is turned on based on the specified packet size.

THROUGHPUT CLASS NEGOTIATION [on, off: +(off)]:
FAST SELECT ACCEPTANCE [on, off: +(on)]:
```

Syntax *(continued)*

If SVC DIRECTION is "2way" and NUMBER OF RECEIVE ONLY CHANNELS is less than the SVC_channels; or if SVC DIRECTION is "originate:"

```
PREDEFINED DESTINATION [up to 72 chars, none: +(none)]:

PAD INACTIVITY TIMER (T) [2-20, off: +(off)]:
PAD RETRY COUNTER (N) [2-20, off: +(off)]:
```

For a single port:

If channels are not available on the module:

```
INFO: There are no more channels left to allocate to the PVC service.
```

If channels are available on the module:

```
NUMBER OF PVC CHANNELS [0-<X>: +(<X>)]:
```

If NUMBER OF PVC CHANNELS is greater than 0:

```
PVC GROUP [up to 8 chars]:
```

Only if PORT TYPE is "host:"

```
ENDPOINT NUMBERS FOR PVC CHANNELS [0000-9999]:

INFO: Enter assignment of destinations to logical channels using the
      following prompts.  Hit <DEL> once when finished making entries.
  PVC LOGICAL CHANNEL NUMBER [1-<Y>]:
  PVC DESTINATION [up to 72 chars, none: +(none)]:
```

Command loops to PVC Logical Channel Number prompt until <DEL> is pressed.

For multiple ports:

```
INFO: Cannot enter PVCs for a range or list of ports.
```

Command loops to PORT NUMBER prompt.

Parameters

This section contains explanations of parameters used in the **enter x25** prompting sequence. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

ACTION WHEN DISC RECEIVED

Specifies whether the action to be taken when the module receives a disconnect (*disc*) frame is *disconnect* or *reset*. If the action is *disconnect*, all existing calls are brought down. When the link comes back up, the module sends a packet level restart. Conversely, if the action is *reset*, all existing calls are kept up. When the link comes back up, the module does not send a packet level restart.

ACTION WHEN N2 COUNT EXCEEDED

Specifies whether the action to be taken when an N2 count is exceeded is *disconnect* or *reset*. If the action is *disconnect*, all existing calls are brought down. When the link comes back up, the module sends a packet level restart. Conversely, if the action is *reset*, all existing calls are kept up. When the link comes back up, the module does not send a packet level restart.

ADDRESS CHECKING

If **PORT TYPE** is *host*, specifies whether the address checking feature for X.25 ports should be turned *on* or *off*. When turned *on*, round robin service to other X.25 ports does not function. When turned *off*, round robin service functions. When turned *off*, any configured DNIC, SR, and SA is not inserted in the calling address. From 1 to 15 digits are acceptable.

BILLING STATUS

If **PORT TYPE** is *pdn* or *host*, specifies whether X.25 billing is to be enabled (*on*) or not enabled (*off*) for a particular port. If *on*, an X.25 billing record is generated each time an X.25 session to or from the indicated port is originated or terminated.

CALL ID FOR PORT <N>:

For PDN billing, a number from *1* to *255* that is used to identify outgoing node calls on one or more ports connected to the same PDN; or the word *none*, meaning this feature is not to be used. This number identifies a call that occurs between a single PDN and a single node network.

Two ports that refer to the same gateway ID cannot have the same identifier.

CLOCKING TYPE

Specifies if clocking for a port is provided by the module's *internal* clock, or if it is provided by an *external* device.

CLOSED USER GROUP PROFILE ID

If **PORT TYPE** is *host*, a string of 1 to 8 characters that identifies an existing CUG profile.

Parameters *(continued)*

COMMENT
An optional string of 1 to 60 characters, enclosed in double quotation marks, that contains needed administrative information.

COMPONENT
Specifies if the component to be entered is a *module* or *port*.

DEFAULT CALLING ADDRESS
If **PORT TYPE** is *host*, from 1 to 15 numeric characters specifying the calling address of packets originating from an asynchronous endpoint that does not have an assigned EPN; or the word *none*, meaning a default calling address is not to be assigned because the host does not have to communicate with such an endpoint. If **PORT TYPE** is *pdn* and the calling address is not specified, the gateway address is used as the default calling address.

DEFAULT NETWORK LEVEL WINDOW SIZE
If **COMPONENT** is *module*, specifies the network window size to be 1 to 5 frames. If a number other than *2* frames are specified, flow control parameter negotiation for all module ports is automatically turned on. (This parameter is the Packet Layer (W) parameter of the X.25 protocol.)

DEFAULT PACKET SIZE
If **COMPONENT** is *module*, specifies the packet size to be *128* or *256* bytes. If *256* bytes is specified, flow control parameter negotiation for all module ports is automatically turned on. All ports on the same module must have the same default packet size.

DOWNLOAD SERVER
If **COMPONENT** is *module*, specifies the software source to be downloaded to the module. It must be a valid service address or the local *controller*.

ENDPOINT NUMBERS FOR PVC CHANNELS
If **PORT TYPE** is *host*, a unique 4-digit address ranging from *0000* to *9999* used to address the PVC channel range. The EPN can be a single 4-digit address or two 4-digit addresses separated by a dash; where the first address is the low end of the range and the second address is the high end.

ENDPOINT NUMBERS FOR SVC CHANNELS FOR PORT <N>
If **PORT TYPE** is *host*, a unique 4-digit address ranging from *0000* to *9999* that can be a single 4-digit address or two 4-digit addresses separated by a dash; where the first address is the low end of the range and the second address is the high end. Each host port number entered at the **PORT NUMBER** prompt must be assigned an EPN.

EXTERNAL BAUD RATE
If **CLOCKING TYPE** is *external*, specifies the speed with which devices communicate with the module. See Syntax for speeds.

Parameters *(continued)*

FAST SELECT ACCEPTANCE

Specifies whether the port can or cannot (*on* or *off*) receive calls consisting of a maximum of 128 bytes of data packets for *host* ports or 12 bytes of data packets for *pdn* ports. This data can be included with a call request or call clear packet.

GATEWAY ID

If **PORT TYPE** is *pdn*, a string of 1 to 8 characters specifying the gateway identifier associated with the port. The gateway ID describes the attributes of a PDN; it includes a gateway address, local and remote X.3 profiles for incoming calls, terminal or host PAD support, gateway and network CUG profiles, and EPN mapping information. In addition, the **GATEWAY ADDRESS** is used as the **DEFAULT CALLING ADDRESS** for packets sent to the PDN from an originating endpoint without an assigned EPN.

INTERNAL BAUD RATE

Specifies the speed with which all ports with internal clocking communicate with the module. If all ports are externally clocked, *none* is specified. See Syntax for specific baud rates.

LOCAL X.3 PROFILE ID

If **PORT TYPE** is *host*, a string of 1 to 20 characters specifying the local X.3 profile used to identify calls made by this host port to an asynchronous endpoint or one of the three system-supplied profile IDs: *simple*, *transparent*, or *mbit*. The common profile is *simple*; the profile suitable for file transfers is *transparent*; and the profile needed to invoke the M-bit procedure between an asynchronous block device and an X.25 endpoint is *mbit*.

MAXIMUM NUMBER OF ATTEMPTS TO COMPLETE A TRANSMISSION (N2)

A number from *2* to *15* specifying the maximum number of attempts the port can make to complete a transmission before the module can issue an alarm. If a poor connection exists, a greater number of attempts is recommended.

MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K)

A number from *1* to *7* specifying the maximum number of sequentially numbered I frames that the port can have unacknowledged at once. The fewer frames acknowledged simultaneously, the more robust, but slower, the acknowledgement. (This parameter is the Link Level Window Size parameter for the Link Access Procedure Balanced (LAPB) X.25 protocol. It includes data frames only.)

MODULE ADDRESS

A set of numbers identifying the address of the X.25. If the X.25 is installed directly into the node, the address is <*module*>; where *module* is the node slot number the X.25 occupies.

If the X.25 is installed in a concentrator, the address is <*concentrator/module*>. Where: *concentrator* is the node slot number that the LIM, which connects the concentrator to the module, occupies; and *module* is a number indicating the MPC15 (*frs*) or MPC7 (*rrs*) slot number that the X.25 occupies. Multiple module address entries are allowed.

Parameters *(continued)*

NUMBER OF ORIGINATE ONLY CHANNELS

If **SVC DIRECTION** is *2way*, a number from *0* to the remainder of the number of receive-only channels from the maximum number of configured SVC channels. Specification of this parameter prevents blocking originating traffic from the host or PDN.

NUMBER OF PVC CHANNELS

A number from *0* to *X* specifying a contiguous number of channels in the PVC range. The number of available channels is **X.**

NUMBER OF RECEIVE ONLY CHANNELS

If **SVC DIRECTION** is *2way*, a number from *0* to the maximum number of configured SVC channels (*SVC_channels*). Specification of this parameter prevents blocking receiving traffic to the host or PDN.

NUMBER OF SVC CHANNELS PER PORT

A number from *1* to *X* specifying the number of channels per port to be used as switched virtual circuits; where *X* is the number of remaining unassigned logical channels.

NUMBER OF USER CHANNELS

Specifies the number of channels (*1* to *100*) that can be distributed among ports. The number of channels that can be configured on one module is dependent upon the values specified at the **DEFAULT NETWORK WINDOW SIZE** and **DEFAULT PACKET SIZE** prompts.

PACKET SIZE NEGOTIATION

Specifies whether the packet size negotiation feature, which is used to negotiate the maximum length of data packets on a specified logical channel, should be turned *on* or *off*.

PAD INACTIVITY TIMER (T)

Specifies the number of minutes from *2* to *20* that the PAD is to wait for a call to be placed. The PAD inactivity timer is activated when the asynchronous end user accesses the PAD, but does not place a call. If a call is not placed within the allocated time, the call/connection between the end user and the PAD is taken down.

PAD RETRY COUNTER (N)

A number from *2* to *20* that specifies how many times an asynchronous end user can unsuccessfully attempt to establish a call before the call/connection between the end user and the PAD is taken down. The PAD Retry Counter (N) is increased each time the PAD enters the PAD wait state.

PORT NUMBER

A number from *1* to *4* indicating the port or ports to be entered. Multiple port number entries are allowed.

Parameters *(continued)*

PORT TYPE

If the port is connected to an X.25 host, specifies that the port is acting like DCE and is to provide *host* service. If the port is connected to a PDN, specifies that the port is acting like DTE and is to provide *pdn* service. See **Appendix A** for additional port specifications.

PREDEFINED DESTINATION

A string of 1 to 72 characters consisting of the network, area, exchange, and local service address of a particular network service followed by optional parameters.

PVC DESTINATION

The address of the opposite end of the **PVC LOGICAL CHANNEL NUMBER.** The address can be a destination string that has the same format as a **PREDEFINED DESTINATION;** or depending on the destination module, it can specify a single channel. Any logical channel can be the destination for another PVC except an X.25 channel in the SVC channel range.

Data Networking Products Destination Module	Physical Port Destination Address Format
AIM/TY/MSM	*<address>.<module>.<port>*
CPM	*<address>.<module>.<channel>*
DKAP	*<address>.<module>.<channel set>.<lci>*
FRM	*<address>.<module>.<port>.<dlci>*
SAM/SAMML	*<address>.<samml module>.<samml port>/<board>.<port>*
SAM/SAMSL	*<address>.<samsl module>/<board>.<port>*
X.25	*<address>.<module>.<port>.<lci>*
X.75	*<address>.<module>.<port>.<lci>*

The physical port destination address fields are:

- *<address>*
  Refer to discussions of *predefined destination* (*PDD*) in the *Node Reference*.
- *<board>*
  The SAM board number.
- *<channel>*
  The module channel number of the destination.
- *<channel set>*
  The identifier of the DKAP channel set.
- *<dlci>*
  The *data link connection identifier* of the destination. A DLCI is relative to the port.

Parameters *(continued)*

- *<lci>*
  The *logical channel identifier* of the destination. (An LCI number is relative to the port or channel set. A channel number is relative to the module.)
- *<module>*
  A number identifying the node slot that the module occupies having the format: <module> or <concentrator/module>.
- *<port>*
  The port number of the destination.
- *<samml module>*
  The module number of the SAMML module connecting the SAM to the node.
- *<samml port>*
  The port number of the SAMML link connecting the SAM to the node. If a dual-link SAM is used, the SAMML port should be an odd number.
- *<samsl module>*
  The module number of the SAMSL link connecting the SAM to the node.

PVC GROUP

If **NUMBER OF PVC CHANNELS** is greater than *0*, a string of 1 to 8 characters specifying an existing two-way group assigned to the PVC range.

PVC LOGICAL CHANNEL NUMBER

If **NUMBER OF PVC CHANNELS** is greater than *1*, a number from *1* to *<Y>* indicating the logical channel for which a **PVC DESTINATION** is to be entered. *<Y>* is the maximum **NUMBER OF PVC CHANNELS** allocated.

SOFTWARE VERSION

A string of 1 to 14 characters specifying the software version filename to be downloaded to the module. If **DOWNLOAD SERVER** is *controller*, enter *standard* as the software version filename. If **DOWNLOAD SERVER** is not *controller*, enter a valid software release number or the name of the file to be downloaded from the server.

SVC DIRECTION

Specifies the direction of SVC calls on the port to be *originate, receive,* or *2way*.

SVC GROUP

A string of 1 to 8 characters specifying the existing originating, receiving, or two-way group assigned to the SVC channel range.

THROUGHPUT CLASS NEGOTIATION

Specifies whether throughput class negotiation is *on* or *off* for the port. If *off*, the module clears all calls with throughput class negotiation facility requests. If *on*, the module negotiates the throughput of the virtual circuit within the network. The data moves through the network as fast as possible (usually faster than 2400 bps). Throughput calls might affect the behavior or performance of the external X.25 equipment. Its affect depends on the implementation of the external equipment.

Parameters *(continued)*

WAITING FOR ACKNOWLEDGEMENT TIME (T1)

A number from *1* to *20* specifying the maximum number of seconds the module must wait before acknowledging a timer violation so it can issue an alarm. If multiple trunk segments exist between two endpoints, a greater amount of time is recommended.

WINDOW SIZE NEGOTIATION

If **COMPONENT** is *port*, specifies whether the window size negotiation feature should be turned *on* or *off* for the logical channel.

Prompted Entry: Entering X.25 Module Information

```
CC0> enter
OBJECTS [...x25...] x25
COMPONENT [module, port]: module
MODULE ADDRESS: 51
DOWNLOAD SERVER [+(controller)]: +
SOFTWARE VERSION [+(standard)]: +
DEFAULT NETWORK LEVEL WINDOW SIZE [2, 3: +(2)]: +
DEFAULT PACKET SIZE [128, 256: +(128)]: +
NUMBER OF USER CHANNELS [1-100: +(100)]: +
INTERNAL BAUD RATE [1200, 2400, 4800, 9600, 19200, 48k, 56k, 64k, none:
  +(9600)]: +
MODULE ADDRESS:    Delete
CC0>
```

Prompted Entry: Entering X.25 PDN Port Information

```
CC0> enter
OBJECTS [...x25...] x25
COMPONENT [module, port]: port
MODULE ADDRESS: 51
PORT NUMBER [1-4]: 1
COMMENT [up to 60 chars double quoted, none: +(none)]:
  "pdn port"
PORT TYPE [host, pdn: +(pdn)]: +
CALL ID FOR PORT 1 [1-255, none: +(none)]: 1
CLOCKING TYPE [internal, external: +(external)]: +
EXTERNAL BAUD RATE [1200, 2400, 4800, 9600, 19200, 48k, 56k, 64k:
  +(9600)]: +
MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K) [1-7: +(7)]: +
WAITING ACKNOWLEDGEMENT TIME (T1) [2-20: +(3)]: +
MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2) [2-15: +(7)]: +
ACTION WHEN N2 COUNT EXCEEDED [disconnect, reset: +(reset)]: +
ACTION WHEN DISC RECEIVED [disconnect, reset: +(reset)]: +
BILLING STATUS [on, off: +(off)]: +
GATEWAY ID [up to 8 chars]: dklab
NUMBER OF SVC CHANNELS PER PORT [0-100: +(100)]: 10
SVC DIRECTION [originate, receive, 2way: +(2way)]: 2
SVC GROUP [up to 8 chars]: svcpdn
NUMBER OF RECEIVE ONLY CHANNELS [0-10: +(0)]: 5
NUMBER OF ORIGINATE ONLY CHANNELS [0-5: +(0)]: 2
WINDOW SIZE NEGOTIATION [on, off: +(off)]: +
PACKET SIZE NEGOTIATION [on, off: +(off)]: +
THROUGHPUT CLASS NEGOTIATION [on, off: +(off)]: +
FAST SELECT ACCEPTANCE [on, off: +(on)]: +
PREDEFINED DESTINATION [up to 72 chars, none: +(none)]: +
  1200
PAD INACTIVITY TIMER (T) [2-20, off: +(off)]: +
PAD RETRY COUNTER (N) [2-20, off: +(off)]: +
NUMBER OF PVC CHANNELS [0-90: +(90)]: 5
PVC GROUP [up to 8 chars]: pvcpdn

INFO: Enter assignment of destinations to logical channels using the
      following prompts.  Hit <DEL> once when finished making entries.

  PVC LOGICAL CHANNEL NUMBER [1-5]: 1
  PVC DESTINATION [up to 72 chars, none: +(none)]:
    1200.12.1.1

  PVC LOGICAL CHANNEL NUMBER [1-5]: 2
  PVC DESTINATION [up to 72 chars, none: +(none)]:
    1200.12.1.2

  PVC LOGICAL CHANNEL NUMBER [1-5]:    Delete

PORT NUMBER [1-4]:    Delete
CC0>
```

Prompted Entry: Entering X.25 Host Port Information

```
CC0> enter
OBJECTS [...x25...] x25
COMPONENT [module, port]: port
MODULE ADDRESS: 51
PORT NUMBER [1-4]: 2
COMMENT [up to 60 chars double quoted, none: +(none)]:
  "host port"
PORT TYPE [host, pdn: +(pdn)]: host
CLOCKING TYPE [internal, external: +(external)]: +
EXTERNAL BAUD RATE [1200, 2400, 4800, 9600, 19200, 48k, 56k, 64k:
  +(9600)]: +
MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K) [1-7: +(7)]: +
WAITING ACKNOWLEDGEMENT TIME (T1) [2-20: +(3)]: +
MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2) [2-15: +(7)]: +
ACTION WHEN N2 COUNT EXCEEDED [disconnect, reset: +(reset)]: +
ACTION WHEN DISC RECEIVED [disconnect, reset: +(reset)]: +
BILLING STATUS [on, off: +(off)]: +
DEFAULT CALLING ADDRESS [up to 15 digits, none: +(none)]: 2015416796
LOCAL X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent:
  +(transparent)]: +
NUMBER OF SVC CHANNELS PER PORT [0-85: +(85)]: 5
SVC DIRECTION [originate, receive, 2way: +(2way)]: +
SVC GROUP [up to 8 chars]: svchost
NUMBER OF RECEIVE ONLY CHANNELS [0-5: +(0)]: 2
NUMBER OF ORIGINATE ONLY CHANNELS [0-3: +(0)]: 3
ADDRESS CHECKING [on, off: +(on)]: +
ENDPOINT NUMBER FOR SVC CHANNELS FOR PORT 2 [0000-9999]: 0001
CLOSED USER GROUP PROFILE ID [up to 8 chars, none: +(none)]: techpubs
WINDOW SIZE NEGOTIATION [on, off: +(off)]: +
PACKET SIZE NEGOTIATION [on, off: +(off)]: +
THROUGHPUT CLASS NEGOTIATION [on, off: +(off)]: +
FAST SELECT ACCEPTANCE [on, off: +(on)]: +
PREDEFINED DESTINATION [up to 72 chars, none: +(none)]:
  1200
PAD INACTIVITY TIMER (T) [2-20, off: +(off)]: +
PAD RETRY COUNTER (N) [2-20, off: +(off)]: +
NUMBER OF PVC CHANNELS [0-80: +(80)]: 5
PVC GROUP [up to 8 chars]: pvchost
ENDPOINT NUMBERS FOR PVC CHANNELS [0000-9999]: 0002
INFO: Enter assignment of destinations to logical channels using the
      following prompts.  Hit <DEL> once when finished making entries.
  PVC LOGICAL CHANNEL NUMBER [1-5]: 1
  PVC DESTINATION [up to 72 chars, none: +(none)]:
    1200.12.1.1
  PVC LOGICAL CHANNEL NUMBER [1-5]: 2
  PVC DESTINATION [up to 72 chars, none: +(none)]:
    1200.12.1.2
  PVC LOGICAL CHANNEL NUMBER [1-5]:    Delete
PORT NUMBER [1-4]:    Delete
CC0>
```

remove x25

The **remove x25** command enables you to take an X.25 module and ports out of service.

When a module is removed from service, its in-service ports are automatically taken out of service and remain in the ready-for-service (*rfs*) state. When module service is restored, the ready-for-service ports are automatically put back into service. If any module ports were previously taken out of service (either manually or because of a fault) these ports remain out of service and must be returned to the in-service state via **restore x25 <port>**.

The restricted access state, depicted in the software as *access*, enables existing calls over a given port to remain up, but access to be denied to new switched calls originating from any endpoint in the network. Calls originating on an X.25 port and a PVC logical channel are not denied access on the basis of the restricted *access* service state.

If a port belonging to a hunt group is put in the restricted access state, new calls are routed to the next available port in the hunt group.

If a module is removed, the module's leads or link layer are not dropped. If a port is removed, the leads and link layer are dropped. This will cause X.25 calls to go down.

Syntax

You can input **remove x25** in prompted or one-line entry.

```
CC0> remove
OBJECTS [...x25...]: x25
COMPONENT [module, port, access]:
MODULE ADDRESS:
```

If COMPONENT is "port":

```
PORT NUMBER [1-4]:
```

Parameters

This section contains an explanation of the parameter used in the **remove x25** prompting sequence that differs from that used in **enter x25**. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

COMPONENT

Specifies whether the component to be removed from service is a *module* or *port*; or whether the *access* to the port is to be removed from restricted access.

Prompted Entry: Removing X.25 Ports from Service

```
CC0> remove
OBJECTS [...x25...] x25
COMPONENT [module, port, access]: port
MODULE ADDRESS: 51
PORT NUMBER [1-4]: 1
CC0>
```

One-line Entry: Removing X.25 Ports from Service

```
CC0> remove x25 port 51 1
```

restore x25

The **restore x25** command puts an X.25 module or its ports into service for the first time or after either has been automatically or manually removed from service.

When a module is removed from service, its in-service ports are automatically taken out of service and remain in the ready-for-service (*rfs*) state. When module service is restored, the ready-for-service ports are automatically put back into service. If any module ports were previously taken out of service (either manually or because of a fault) these ports remain out of service and must be returned to the in-service state via **restore x25 <port>**.

The restricted access state, depicted in the software as *access*, enables existing calls over a given port to remain up, but access to be denied to new switched calls originating from any endpoint in the network. Calls originating on an X.25 port and a PVC logical channel are not denied access on the basis of the restricted *access* service state.

If a port belonging to a hunt group is put in the restricted access state, new calls are routed to the next available port in the hunt group.

Syntax

You can input **restore x25** in prompted or one-line entry.

```
CC0> restore
OBJECTS [...x25...]: x25
COMPONENT [module, port, access]:
MODULE ADDRESS:
```

If COMPONENT is "port":

```
PORT NUMBER [1-4]:
```

Parameters

This section contains an explanation of the parameter used in the **restore x25** prompting sequence that differs from that used in **enter x25**. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

COMPONENT

Specifies whether the component to be restored to service is a *module* or *port*; or whether the *access* to the port is to be restored to restricted access.

Prompted Entry: Restoring an X.25 Module to Service

```
CC0> restore
OBJECTS [...x25...] x25
COMPONENT [module, port, access]: module
MODULE ADDRESS: 51
<system output>
```

One-line Entry/Output: Restoring an X.25 Module to Service

```
CC0> restore x25 module 51
Download in progress. Hit <DEL> to put process in background.
Download proceeding > > > >    Delete
CC0>
```

verify x25

The output of the **verify x25** command enables you to check the contents of the database for a particular X.25 module or all X.25 modules.

Syntax

You can input **verify x25** in prompted or one-line entry.

```
CC0> verify
OBJECTS [...x25...]: x25
MODULE ADDRESS [+(all)]:
```

Parameters

Except for being able to specify the word *all*, meaning every X.25 module, the **MODULE ADDRESS** parameter definition for **verify x25** is the same as that for **enter x25**.

Prompted Entry: Verifying X.25 Module Information

```
CC0> verify
OBJECTS [...x25...] x25
MODULE ADDRESS [+(all)]: 51
<report output>
```

One-line Entry/Output: Verifying X.25 Module Information

```
CC0> verify x25 51
   93-12-31 19:21:50 NODE=Redqueen
M  verify x25 51
   MODULE ADDRESS: 51 (shelf 3)
   MODULE TYPE: x25                  NCHLS: 100
   SERVICE STATE: out (manual)
   PACKET SIZE: 128                  WINDOW SIZE: 2
   INTERNAL BAUD RATE: 9600
   DOWNLOAD SERVER: controller
   VERSION: standard
   PORT  TYPE  CALL ID  CLOCKING  BAUD   K  T1  N2  BILLING  GATEWAY ID  SRVC
     1   pdn   1        external  9600   7  3   7   on       dklab       out
     2   host  N/A      external  9600   7  3   7   on       N/A         out
     3   NO OPTIONS SPECIFIED
     4   NO OPTIONS SPECIFIED
   PORT  DEFAULT CALLING ADDRESS    X.3 PROFILE          N2_ACTION   DISC_ACTION
     1   N/A                        N/A                  reset       reset
     2   2015416796                 transparent          reset       reset
     3   NO OPTIONS SPECIFIED
     4   NO OPTIONS SPECIFIED
```

One-line Entry/Output *(continued)*

```
   93-12-31 19:21:50 NODE=Redqueen
M  verify x25 51
   PORT  CHNL_RANGE  PVC/SVC  DIRECT     GROUP     ADDCHK   EPN
     1   5-9         pvc      2way       pvcpdn    N/A      N/A
         10-19       svc      2way       svcpdn    N/A      N/A
     2   20-24       pvc      2way       pvchost   on       0002
         25-29       svc      2way       svchost   on       0001
     3   NO OPTIONS SPECIFIED
     4   NO OPTIONS SPECIFIED
   93-12-31 19:21:50 NODE=Redqueen
M  verify x25 51
   SWITCHED VIRTUAL CIRCUIT DATA:
         CUG      FAST SEL  -NEGOTIATION-  THROUGHPUT  RECEIVE  ORIGINATE  TWO-
   PORT  PROFILE  ACCEPT    WINDOW/PACKET  CLASS       ONLY     ONLY       _WAY
     1   N/A      on          off    off     on        15-19    10-11      12-14
     2   techpubs on          off    off     on        25-26    27-29      none
     3   NO OPTIONS SPECIFIED
     4   NO OPTIONS SPECIFIED
         INACTIVITY  RETRY
   PORT  TIMER       COUNTER   PDD
     1   off         off       1200.12.1.1
     2   off         off       1200.12.1.2
     3   NO OPTIONS SPECIFIED
     4   NO OPTIONS SPECIFIED
   93-12-31 19:21:50 NODE=Redqueen
M  verify x25 51
   PERMANENT VIRTUAL CIRCUIT DESTINATION DATA:
   PORT NUMBER 1
   CHNL PVC DESTINATION
    1   1200.12.1.1
    2   1200.12.1.2
    3-5   UNASSIGNED
   PORT NUMBER 2
   CHNL PVC DESTINATION
    1   1200.12.1.1
    2   1200.12.1.2
    3-5   UNASSIGNED
   PORT NUMBER 3   NO OPTIONS SPECIFIED
   PORT NUMBER 4   NO OPTIONS SPECIFIED
   93-12-31 19:21:50 NODE=Redqueen
M  verify x25 51
   PORT  COMMENT
     1   pdn port
     2   host port
     3
     4
CC0>
```

Report Fields

This table correlates each report field heading shown in the output of **verify x25** with the parameter for which you are prompted in **enter x25** or **change x25**. The information beneath each report field heading reflects the parameter option specified in either command. An *N/A* indicates that the parameter is *not applicable* or *not used*.

Report Field Name	Corresponding Parameter Name
ADDCHK	**ADDRESS CHECKING**
BAUD	**EXTERNAL BAUD RATE**
BILLING	**BILLING STATUS**
CALL ID	**CALL ID FOR PORT <N>**
CHNL	**PVC LOGICAL CHANNEL NUMBER**
CHNL_RANGE	None: range of SVC/PVC channels
CLOCKING	**CLOCKING TYPE**
COMMENT	**COMMENT**
CUG PROFILE	**CLOSED USER GROUP PROFILE ID**
DEFAULT CALLING ADDRESS	**DEFAULT CALLING ADDRESS**
DIRECT	**SVC DIRECTION**
DISC_ACTION	**ACTION WHEN DISC RECEIVED**
DOWNLOAD SERVER	**DOWNLOAD SERVER**
EPN	**ENDPOINT NUMBERS FOR SVC CHANNELS FOR PORT <N>** - *or* - **ENDPOINT NUMBERS FOR PVC CHANNELS**
FAST SEL ACCEPT	**FAST SELECT ACCEPTANCE**
GATEWAY ID	**GATEWAY ID**
GROUP	**SVC GROUP** - *or* - **PVC GROUP**
INACTIVITY TIMER	**PAD INACTIVITY TIMER (T)**
INTERNAL BAUD RATE	**INTERNAL BAUD RATE**
K	**MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K)**
MODULE ADDRESS	**MODULE ADDRESS** and shelf number
MODULE TYPE	None: type of hardware module
NCHLS	**NUMBER OF USER CHANNELS**
NEGOTIATION-WINDOW/PACKET	**WINDOW SIZE NEGOTIATION** **PACKET SIZE NEGOTIATION**
N2	**MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2)**
N2_ACTION	**ACTION WHEN N2 COUNT EXCEEDED**
ORIGINATE ONLY	**NUMBER OF ORIGINATE ONLY CHANNELS**
PACKET SIZE	**DEFAULT PACKET SIZE**
PDD	**PREDEFINED DESTINATION**
PORT	**PORT NUMBER**

Report Field Name	Corresponding Parameter Name
PVC DESTINATION	**PVC DESTINATION**
PVC/SVC	None: channel range assigned to a PVC or SVC service
RECEIVE ONLY	**NUMBER OF RECEIVE ONLY CHANNELS**
RETRY COUNTER	**PAD RETRY COUNTER (N)**
SERVICE STATE	None: service state of the module
SRVC	None: service state of the port
THROUGHPUT CLASS	**THROUGHPUT CLASS NEGOTIATION**
TWO_WAY	None: channels dedicated for two-way SVC service
TYPE	**PORT TYPE**
T1	**WAITING ACKNOWLEDGEMENT TIME (T1)**
VERSION	**SOFTWARE VERSION**
WINDOW SIZE	**DEFAULT NETWORK LEVEL WINDOW SIZE**
X.3 PROFILE	**LOCAL X.3 PROFILE ID**

change x28sig

The **change x28sig** command enables you to modify an existing X.28 PAD identification service signal.

Syntax

You can input **change x28sig** in prompted entry only. The command syntax for **enter x28sig** and **change x28sig** are similar. The defaults for **change x28sig** are those values, conditions, or states that currently exist in the database. They are displayed within parentheses in the parameter prompt.

Parameters

Refer to the definition supplied in **enter x28sig**.

Prompted Entry: Changing the PAD Identification Service Signal

```
CCO> change
OBJECTS [...x28sig...]: x28sig
X.28 PAD ID SERVICE SIGNAL [up to 72 chars double quoted, none:
 +(PAD CONNECTED)]:
  "PAD CONNECTION ESTABLISHED"
CCO>
```

delete x28sig

The **delete x28sig** command enables you to eliminate the X.28 PAD identification service signal.

Syntax

You can input **delete x28sig** in prompted entry or one-line entry.

```
CCO> delete
OBJECTS [...x28sig...]: x28sig
```

Parameters

None.

Prompted Entry: Deleting the Current PAD Identification Service Signal

```
CCO> delete
OBJECTS [...x28sig...]: x28sig
CCO>
```

One-line Entry: Deleting the Current PAD Identification Service Signal

```
CCO> delete x28sig
```

enter x28sig

The **enter x28sig** command enables you to add a new X.28 PAD identification service signal.

Syntax

You can input **enter x28sig** in prompted entry only.

```
CCO> enter
OBJECTS [...x28sig...]: x28sig
X.28 PAD ID SERVICE SIGNAL [up to 72 chars double quoted, none: +(none)]:
```

Parameters

X.28 PAD ID SERVICE SIGNAL

A string of 1 to 72 characters to be displayed to the terminal user upon access to the PAD server. Only one signal is allowed per node.

Prompted Entry: Entering a New PAD Identification Service Signal

```
CCO> enter
OBJECTS [...x28sig...]: x28sig
X.28 PAD ID SERVICE SIGNAL [up to 72 chars double quoted, none: +(none)]:
  "PAD CONNECTED"
CCO>
```

verify x28sig

The output of the **verify x28sig** command enables you to check the information currently in the database for the X.28 PAD identification service signal.

Syntax

You can input **verify x28sig** in prompted entry or one-line entry.

```
CCO> verify
OBJECTS [...x28sig...]: x28sig
```

Parameters

None.

Prompted Entry: Verifying the PAD Identification Service Signal

```
CCO> verify
OBJECTS [...x28sig...]: x28sig
<report output>
```

One-line Entry/Output: Verifying the PAD Identification Service Signal

```
CCO> verify x28sig
   92-12-31 11:01:30 NODE=Redqueen
M  verify x28sig
X.28 PAD ID SERVICE SIGNAL:
PAD CONNECTION ESTABLISHED

CCO>
```

Report Fields

This table correlates the report field heading shown in the output of **verify x28sig** with the parameter for which you are prompted in **enter x28sig** or **change x28sig**. The information beneath the report field heading reflects the parameter option specified in either command. An *N/A* indicates that the parameter is *not applicable* or *not used*.

Report Field Name	Corresponding Parameter Name
X.28 PAD ID SERVICE SIGNAL	X.28 PAD ID SERVICE SIGNAL

System Responses

This section contains system responses applicable to the **gateway**, **x25**, and **x28sig** commands. It is organized by the key phrase that prefaces the response.

COMMAND FAILED:

Cannot delete every port of module <addr> while the module is in service.

Use **remove** to take the module out of service before attempting to delete the last port.

Cannot expand mailbox size.

The command processor cannot expand its message queue to receive the request. If the problem persists, contact your support group.

Changing PVC destination reached timeout.
Remove and restore port <num> of module <addr> to maintain database integrity.

Changing the PVC destination reached a time-out. The module port must be removed and restored to service.

Could not <remove/send> <cug/gateway> data from XIM.

The command failed because CUG/gateway data could not be sent to/removed from the X.25 module.

Database Full - Entry Failed

Additions of or changes to X.28 identification service signal (sig) cannot be made because the database is full.

Encountered unknown baud rate while executing line <num>.

The command failed because the command processor encountered an invalid baud rate.

Error in configuration data. error code = <hex number>

Contact your support group.

Inconsistent CUG and GATEWAY encountered while executing line <num>.

The command failed because inconsistent information was entered for a CUG and a gateway.

No gateways are entered.

The database does not contain any gateways.

No more channels left for the module.

The command failed because available module channels were depleted.

No X.28 PAD id service signal currently entered.

The X.28 identification service signal (sig) cannot be deleted from the database because it is not administered.

The database gateway is full.
All map entries except the last one have been saved.

No additional gateway mapping entries can be made because the database is full. Only the last entry is not saved.

COMMAND FAILED:

Too many transactions.
Not enough storage space was allocated to request the measurements from the module. This response should only occur if duplicate measurements were requested in one report.

X.28 PAD identification service signal already entered.
An X.28 identification service signal (sig) is already administered. Use **change x28sig** for any modifications.

INFO:

Cannot change port channel allocation, direction, or group with module in service.
This response occurs during the prompting sequence of **change x25** to inform you that the module must be removed from service before the indicated information can be changed.

Cannot change PVC channel allocation or group with module in service.
This response occurs during the prompting sequence of **change x25** to inform you that the module must be removed from service before the indicated information can be changed.

Cannot <change/enter> PVCs for a range or list of ports.
This response occurs during the prompting sequence of **change x25** and **enter x25** to tell you that the indicated information can be changed or entered.

Changing a PVC DESTINATION for an in-service port will cause the PVC to be taken down.
This response occurs during the prompting sequence of **change x25** to inform you that if the port is still in service and the PVC destination is changed, the existing PVC destination is taken down and reconnected to newly specified destination.

Changing SVC direction may affect the entries to the number of receive-only and/or originate-only channels.
If the direction in which group members are to transmit and/or receive data is changed, then the number of channels allocated to each function are affected.

Clocking type is 'external' since no internal baud rate was entered.
This response, which occurs during the prompting sequence of **change x25** and **enter x25**, tells you that because you did not specify an internal baud rate, the clock type is "external".

Command terminated due to memory limitations. All data entered has been saved. Make more changes using 'change x25'.
Memory use is beyond the allocation. Any data entered is saved; add additional data with **change**.

INFO:

Database transaction limit reached. All data entered has been saved.

The limit for database transactions occurred during entry of the gateway mapping table. All data entered until this point is saved in the database. Pressing Delete does **not** cause any entries to be lost. Use **delete** or **change** to remove information entered.

Default packet size is set to 128 bytes based on the allocated user channels and specified window size. The current channels allocated (<num>) or window size (<num>) must be reduced to allow higher packet size value.

This response occurs during the prompting sequence of **change x25** to inform you that before the specified module-level paramenters can be changed, the **NUMBER OF USER CHANNELS** or the **DEFAULT NETWORK WINDOW SIZE** must be reduced.

Default window size is set to 2 and default packet size is set to 128 based on the user channels allocated. The current channels used (<num>) must be reduced to allow higher values for window size or packet size.

Because the current number of module channels administered is greater than 66, the window size and packet size prompts do not appear. The number of user channels must be reduced before the window size or packet size value can be increased.

<Enter/Modify> assignment of destinations to logical channels using the following prompts. Hit <DEL> once when finished making <changes/entries>.

This response occurs during the prompting sequence of **change x25** and **enter x25** to tell you that the indicated information can be changed or entered and to escape command looping, press Delete .

Map Gateway Endpoints to Node X.121 Addresses using the following prompts. Hit <DEL> once when finished with mapping.

This response appears during entry of a gateway ID.

Modify mapping of Gateway Endpoints to Node X.121 Addresses using the following prompts. Hit <DEL> once when finished making changes.

This response appears during modification of a gateway ID.

Module <addr> port <num> is in service. Only the comment field and PVC destinations can be changed on an in service module.

Only the comment and PVC destinations can be changed on an in-service port on an in-service module. If other changes are desired, remove the module from service.

No channels left for originate only channels.

This response occurs during the prompting sequence of **enter x25** and **change x25** to inform you that the channels allocated for originate-only channels were depleted.

Packet size negotiation is turned on based on the specified packet size.

This response occurs during the prompting sequence of **change x25** or **enter x25**. If the nonstandard default (higher) packet size is administered for the module, packet size negotiation for all ports is automatically turned on.

INFO:

Place <local/remote> modem in loop-around mode.
This response occurs while running the *local_modem* or *remote_modem* diagnostic.

Reducing SVC channels assigned to port(s) may affect the entries to the number of receive-only and/or originate-only channels.
Before you reduce the number of assigned SVC channels, check the number of receive-only and/or originate-only channels allocated.

Test requires a loop-around connector on port.
Replace port cable with loop-around connector.
This response occurs while running **diagnose x25** on a port that requires a loop-around connector.

The current X.121 EPN range entered is <range>.
This response appears during modification of a gateway ID.

This port currently has no PVC service.
There are no more channels left to allocate to the PVC service.
This response occurs during the prompting sequence of **enter x25** to inform you that all channels were allocated as SVC channels for this port.

This port currently has no <PVC/SVC> service.
This response occurs during the prompting sequence of **change x25** to inform you that the port was not originally administered for PVC or SVC service.

Window size negotiation is turned on based on the specified window size.
This response occurs during the prompting sequence of **change x25** or **enter x25**. If the nonstandard default (higher) window size is administered for the module, window size negotiation for all ports is automatically turned on.

INPUT ERROR:

A DNIC must be 4 digits.
A DNIC consists of four digits.

All <modules/ports> must be configured identically.
When modifying a range of components, all components must be identically administered in the database.

An EPN must be 4 digits.
Enter either a single 4-digit number or a range of two 4-digit numbers separated by a dash.

A PDN prefix must be 1 digit.
The digit used to specify a PDN prefix must be a number from *0* to *9*.

A service <area/region> must be 3 digits.
A service area or region must consist of three digits.

INPUT ERROR:

At least one address component exceeds the 8 character limit.
Make sure that the address you are entering is properly administered using **enter address**.

Both the low and high EPN in a range must be 4 digits.
An EPN range consists of two sets of 4 digits each, ranging from *0000* to *9999*. Enter the correct number of digits for each part of the range and retry the command.

Cannot change multiple ports with PVC service.
Multiple ports having PVC connections must be changed individually because each PVC logical channel is connected to only one PVC destination.

Cannot mix module types, and this group contains <type> modules.
The specified group was assigned to a different module type than that indicated. Different hardware types cannot be mixed within a group. Enter a group associated with the correct hardware type and continue the command.

Cannot re-assign channels for ports while module is in service.
Module and port information cannot be changed while the module is in service. Use **remove** to take the module out of service, then retry the command.

Cannot reduce user channels below total port allocation <number of current allocation>.
The total number of user channels cannot be reduced below the total number of channels allocated to the module ports.

CUG profile <id> is a <gateway/network> CUG profile.
The specified profile is not the correct type of CUG profile. Make sure you properly administered the profile ID using **enter profile**.

CUG profile <id> is not entered.
Information was not added to the database for the specified CUG profile ID.

Download server <name> is not a valid service address.
The address used for the **DOWNLOAD SERVER** prompt is not a valid service address on this node.

Gateway endpoint number <num/num-num> is not entered.
The database does not contain the specified gateway EPN/EPNs.

Gateway endpoint <num/num-num> is already entered.
The database already contains the specified gateway EPN/EPNs.

Gateway <id> is already entered.
The database already contains the specified gateway identifier.

Gateway <id> is not entered.
Information was not added to the database for the specified gateway ID.

Group <name> is already assigned to a <host/PDN> port.
Host and PDN port types cannot share a group.
The group specified was previously assigned to a different service type. Service types cannot be mixed within a group.

INPUT ERROR:

Group <name> is already assigned to <PVC/SVC> service.
PVC and SVC services cannot share a group.
The group specified was previously assigned to a different service type. Service types cannot be mixed within a group.

Group <name> is not entered.
No information was added to the database for the specified group.

Group <name> is not a <originating/receiving/2way> group, as required.
The group must be an originating, receiving, or two-way to correspond with the type of service selected.

Inconsistent configuration of port <num>.
All ports on the same module must be identically administered.

Inconsistent CUG and GATEWAY encountered while executing line <num>.
An error occurred in processing the cug or gateway data entered. Verify the module and correct any discrepancies.

Input string too long.
The X.28 identification service signal (sig) entered exceeds the maximum of 72 characters.

Internal database error for port <num>, while executing line <num>.
The specified port cannot be entered in the database.

Invalid concentrator type for an X.25 module.
An X.25 module can only reside in an MPC15 (*frs*) or MPC7 (*rrs*).

Invalid gateway protocol. X.25 expected.
The gateway protocol specified was for an X.75 module.

Lists must be entered as follows: item1, item2, item3,...
where an item may be a single digit or range of digits.
Lists must be entered using commas to separate each *item* or range of digits.

Maximum of 6 modules allowed.
Only six modules can be administered at any one given point.

Module address <addr> is not an X.25 module.
The specified module address (slot number) does not contain an X.25 module.

Module Does Not Exist: <addr>.
The specified module was not administered.

Module <addr> already configured.
You cannot enter the specified module because it is already administered in the database.

Module <addr> currently has configured ports. All ports must be deleted before deleting module.
Module information cannot be deleted until all port information is deleted.

INPUT ERROR:

Module <addr> is a <type> module, x25 expected.
The specified module address is a module other than an X.25.

Module <addr> is being downloaded.
The requested measurements cannot be compiled because the module is downloading software.

Module <addr> is downloading.
The specified module is currently downloading software.

Module <addr> is in service. Remove before retrying command.
The module must be out of service for the operation. Use **remove x25**.

Module <addr> is not an x.25 module.
The module at the specified address is a module other than an X.25.

Module <addr> is not in service.
The module must be in service for the operation. Use **restore x25**.

Module <addr> port <num> already configured.
The specified port is already administered in the database.

Module <addr>, Port <num> has no SVC service.
The specified module port does not have any logical channels configured as SVC channels.

Module <addr> port <num> is in service. Remove before retrying command.
The attempted changes cannot be made while the module is in service. Use **remove x25**.

Module <addr>, port <num> is not configured.
The specified module port is not administered in the database.

Module <addr> port <num> is not entered.
The specified module port is not administered in the database.

Module/port in service and range of ports entered. Remove from service to change port parameters or enter only one port to change comments or PVC destinations.
The only changes allowed on an in-service port on an in-service module is to change comments or PVC destinations. But these changes are only allowed on a single port at a time. Redo the command, for a single port to make these changes.

No module in slot <addr>.
The specified module address (slot number) is empty.

No more available channels at these packet size and window size.
The packet and window size values must be adjusted because the port allocation was consumed.

No more channels left for the module.
The module depleted its allocation of available channels.

INPUT ERROR:

Not a legal string: <string>
The specified string is not valid.

'none' conflicts with ports already using internal clocking.
You cannot specify *none* to the **INTERNAL BAUD RATE** prompt because it conflicts with ports using internal clocking.

Number of PVC channels or SVC channels must be greater than 0.
0 is not a valid entry for the **NUMBER OF PVC CHANNELS** prompt if SVCs were not previously entered.

Parameter out of range: <range>
The specified range exceeds the allowed minimum/maximum.

Port <num> has no PVC channels. Cannot change PVC destination.
If the specified port does not have any PVC channels allocated, the PVC destination cannot be modified.

Range must be in the form nnnn-nnnn; no spaces permitted.
The range entered must contain two 4-digit numbers, separated by a dash, without spaces.

Simcon access error. Module %s port %d has inconsistent data. Remove and restore module to synchronize control computer with module.
An error in communication with the module occurred while trying to enter/change/delete a port on an in-service module. Remove the module, verify whether the enter/change/delete occurred, and redo it while the module is out of service.

Slot is reserved: <addr>
The specified slot number (module address) is reserved for another module.

Specified gateway endpoint <num/num-num> conflicts with entered gateway endpoint <num/num-num>.
The specified gateway endpoint is already entered in the gateway address map. Enter a new gateway endpoint number.

Specified X.121 address <addr> conflicts with entered X.121 address <addr>.
The specified X.121 address is already entered in the gateway address map. Enter a new X.121 address.

The default calling address may not contain alphabetic characters.
The default calling address must contain numbers only.

The EPN <num> is not entered as a range.
The endpoint number specified is not the lowest endpoint number of a range or is not encompassed within a range; it is a single endpoint number. Use **verify gateway** to check gateway information.

INPUT ERROR:

The first EPN in a range must be less than the second EPN.
In a range of EPNs, such as *xxxx-yyyy*, xxxx (the first EPN) must be a lower number than yyyy (the second EPN).

The gateway address may not contain alphabetic characters.
Only the digits *0* through 9 can be used in a gateway address. The alphabetic characters *a* through *z* are not allowed.

The gateway address must be at least 4 digits.
The gateway address must minimally consist of four digits.

The predefined destination is not a valid service address.
The address given for this PDD is not a valid service address on this node.

The value must be an integer (2-20) or 'off'.
The valid responses for this command are integers between 2 and 20, or the string, "off".

There are too many slashes.
Your entry contains too many slashes.

The resulting high EPN is greater than 9999.
The high end of an EPN range cannot exceed *9999*.

The X.121 range length must be the same as the gateway range length.
The X.121 range length entered is greater or less than the gateway range length. Enter an X.121 range the length of which is equal to that of the gateway. For example, the gateway endpoint range 1001-1003 and the X.121 endpoint range 5442-5444 are both the same length, each range consisting of three numbers.

This EPN must match the low EPN of the entered range <num>.
The specified endpoint number is a number within an endpoint range. Either specify the lowest number of the range or the entire range.

This EPN range must match the entered EPN range <num-num>.
The endpoint number range entered is encompassed within an endpoint number range. Either specify the lowest number of the range or the entire range.

This EPN or range conflicts with existing <level> address <addr>.
The EPN/EPNs conflicts with the existing local, speedcall, or logical device address.

This port cannot be assigned to a trunk group.
The group entered was previously assigned to a group with a different hardware type. You cannot mix hardware types in a group.

Total number of channels specified for all ports exceeded the available limit: <limit>.
The total channels specified for all administered ports exceeds the allowed limit.

INPUT ERROR:

X.121 address <addr> is already entered.
You cannot specify an X.121 address that is already administered in the database.

X.25 module <addr> port <num> references this gateway.
You cannot delete the specified gateway because it is associated with an X.25 module. Use **change x25** to modify or remove the gateway reference before deleting gateway information.

X.3 Profile <id> is not entered.
No information for the specified X.3 profile ID is administered in the database.

REMOVE/RESTORE FAILED:

could not send message to module <addr>.
The remove/restore operation was unable to send a message to the specified module.

incorrect configuration of <port <num> on> module <addr>.
The specified module port was not administered properly.

Module address <addr> contains a <type> module.
The specified module is not an X.25 module.

Module address <addr> contains no module.
The restore operation failed because the specified module address is empty.

Module address <addr> is beyond CLOCK.
The specified module resides in a slot number that is higher than the Clock's.

module <addr> did not respond to command.
The specified module did not respond to the command processor.

module <addr> is being downloaded. Try again later.
The restore operation is already taking place for the module address specified.

module <addr> is in the diagnostic state. Try again later.
The remove/restore operation failed because diagnostics are currently being run on the module.

module <addr> to busy to process port <num>.
The remove/restore operation failed because the module does not have the resources to process the operation for the specified port.

must have at least one port configured before restoring module <addr>.
The restore process failed because a minimum of one port must be administered before the specified module can be restored to service.

reason for failure unknown (port <num>). Try again later.
The remove/restore operation failed for the specified port.

system too busy to process command. Try again later.
The remove/restore operation failed because the system is under a heavy load and could not accept the command.

unexpected acknowledgement from module <addr> (port <num>).
The remove/restore operation failed because it received an unexpected acknowledgement from the specified module port.

unexpected acknowledgement from syncmaint.
The remove/restore operation failed because it received an unexpected acknowledgement from the **syncmaint** function.

```
DIAGNOSTICS:

Boot tests in progress - . . .
Offline diagnostic boot test: <PASS/FAIL>

Extended RAM test in progress - . . .
Offline diagnostic memory test: <PASS/FAIL>

Diagnostic download in progress - . . .
Offline diagnostic downloaded test:
 Inst. Set:   <PASS/FAIL>
 Timer test:  <PASS/FAIL>
 Port 1:      <PASS/FAIL>
 Port 2:      <PASS/FAIL>
 Port 3:      <PASS/FAIL>
 Port 4:      <PASS/FAIL>
```

The previous responses indicate that the named diagnostic is in progress and whether it passed or failed.

```
Diagnose completed -
  test failed; mismatch of transmitted and received data.
  test passed.
```

The previous responses indicate that the diagnostic process completed and the test passed or failed with the condition noted.

```
Diagnose not completed -
  control computer did not respond.  Try again later.
  control computer error (error code: <num>).
  download failed (error code: <num>).
  download file not found.
  module <addr> did not respond to command.  Try again later.
  module <addr> did not respond to reinitialization.  Try again later.
  module <addr> has no resources to process command.  Try again later.
  module <addr> is being downloaded.
  module <addr> is too busy to process command.  Try again later.
  module <addr> must be in service for online diagnose.
  module <addr> must be out of service for offline diagnose.
  module <addr> unknown error code:  <num>.
  port <num> must be out of service for loop-around diagnose.
  system too busy to process command.  Try again later.
```

The previous responses indicate that the diagnostic process could not complete because of the reason stated.

WARNING:

CUG profile <id> has not been entered.
The specified CUG profile identifier is not administered.

Database updated, but new PVC was not established.
Remove and restore port to establish new PVC.
A new PVC cannot be established until you remove and restore the port.

Download server <addr> is not a valid service address.
The address entered is invalid. Enter the correct address and retry the command.

Module <addr> has invalid X.28 PAD identification service signal.
Remove and restore module to synchronize control computer module.
The specified module must be removed and restored so the currently entered X.28 identification service signal (sig) becomes valid.

Simcon access error. Module <addr> port <num> has inconsistent data.
Remove and restore module to synchronize control computer with module.
To synchronize module/port data with that of the database, use **remove** and **restore**.

The predefined destination is not a valid service address.
The specified PDD is invalid. To enter a valid PDD use **enter address**.

The PVC destination is not a valid service address.
The correct address must be administered in the database with **enter address**. Addresses that were already administered can be checked with **verify address**.

The sum of all the port baud rates exceeds the maximum module throughput.
The trunk speed value entered caused the sum of the port baud rates to exceed the total module throughput.

The <CUG/gateway> X.25 download failed. Remove and restore module <addr>.
Information regarding the CUG/gateway was not downloaded to the X.25 module. Remove and restore the module to cause the data to be redownloaded.

NO KEY PHRASE:

Cannot abort; <remove/restore> in progress.
You pressed Delete when the remove/restore operation could not be terminated.

Concentrator address <addr> is not a remote shelf.
The address specified must be that of an MPC15 (*frs*) or MPC7 (*rrs*). X.25 modules cannot reside in ISN (*isn*) concentrators.

Data from module <addr> truncated.
The module returned error information that exceeds the buffer size allocation. If the problem persists, contact your support group.

NO KEY PHRASE:

DATABASE BEING MODIFIED - TRY AGAIN LATER

The command process cannot continue because the database is being changed. Wait a while and retry the command.

Entries for port <num> <deleted/unchanged> and remaining entries not done.

Reconfiguration did not complete. Contact your support group.

Invalid data received for <component>.

The module or port returned invalid, incomplete, or unexpected data. If the problem persists, contact your support group.

Measurements not available for <component>.

The module or port is not in service.

Measurements not available yet for module <addr>; try again later.

Measurements were requested before the first five-minute interval collection completed. Wait until the module is in service for five minutes before retrying the command.

Measurement request for <component> returned error; report will be incomplete.

The module returned an error code instead of the requested measurements. Measurements for the module or port are missing from the report. If the problem persists, contact your support group.

Module address <addr> is empty.

The requested report cannot be generated because the specified module address (slot number) is unoccupied.

Module address <addr> is not an X25 module.

The requested report cannot be generated because the module address specified does not contain an X.25 module.

Module <addr> is already in service/ready for service/out of service.

The remove/restore operation cannot be executed because the module is currently in the specified state.

Module <addr> is not entered.

The requested report cannot be generated because the specified module is not administered.

Module <addr>, port <num> is not entered.

The requested report cannot be generated because the module port is not administered.

No measurements available.

A partial report was generated and all measurements for the specified component were unavailable. The values in the fields appear as *N/A*.

NO KEY PHRASE:

No reply to command.
The reconfiguration could not complete. Contact your support group.

No response from module <addr>.
The named module does not respond to requests for measurements. If the problem persists contact your support group.

Not all commands ack'd.
The reconfiguration could not complete. Contact your support group.

Partial changes made. Remove and restore module to synchronize control computer with module.
All changes were not downloaded to the module; thus, the module and Control Computer are not synchronized. Removing and restoring the module causes data to be redownloaded to the module.

Port <num> on module <addr> is already <in/ready for/out of> service.
The remove/restore operation cannot be executed because the module port is currently in the specified state.

Port <num> on module <addr> is already in the <ready for> restricted access state.
The remove/restore operation cannot be executed because the module port is currently in the specified state.

Port <num> on module <addr> is in the <ready for> restricted access state.
Use restore x25 access to restore this port to service.
Access to the port cannot be restricted because it already is restricted.

Port <num> on module <addr> is out of service.
Use restore x25module port to restore this port to service.
The remove operation cannot be executed because the module port is currently not in service.

Process terminated (DEL received); remaining modules will not be <downloaded/removed/restored>.
The Delete key was pressed at the system console; therefore, the specified operation cannot continue on the remaining modules.

SERIOUS DATABASE TRANSACTION PROBLEM - UPDATE NOT ACCEPTED
The command process cannot continue because of a critical problem in the database. (Possibly, a file was removed from the disk.) Contact your local support group.

NO KEY PHRASE:

System too busy to process command; Try again later.

The system is under a heavy load and could not accept the command. Wait a while before retrying the command.

Too many ports specified; report will be incomplete.

Not enough storage space was allocated for the measurements received from the module for the named component. Duplicate measurements might have been requested for one report.

Unable to retrieve data from module <addr>.

An error occurred in the interface between the command processor and the maintenance process. If the problem persists, contact your support group.

Appendix A. X.25 Module I/O Distribution Board and Port Specifications

I/O Distribution Board	Port Connections/ Speeds	Port Numbers	Connector Type and Remarks	Clocking	Port Diagnostics Available
AWJ5	3-RS-232-C DCE** at 1.2, 2.4, 4.8, 9.6, 19.2 Kbps	2,3,4	A: 50 pin shell Use top connector	internal	internal and external port
	1-V.35 DTE at 48, 56, 64 Kbps	1	B: 50 pin shell Use bottom connector	external	local and remote modem
AWJ6	3-RS-232-C DTE at 1.2, 2.4, 4.8, 9.6, 19.2 Kbps	2,3,4	A: 50 pin shell Use top connector	external	local and remote modem
	1-V.35 DTE at 48, 56, 64 Kbps	1	B: 50 pin shell Use bottom connector	external	local and remote modem
AWJ17*	4-RS-232-C DTE at 1.2, 2.4, 4.8, 9.6, 19.2 Kbps	1,2,3,4	J1: 50 pin shell Use top connector	external	local and remote modem
AWJ18*	4-RS-232-C DCE** at 1.2, 2.4, 4.8, 9.6, 19.2 Kbps	1,2,3,4	J1: 50 pin shell Use top connector	internal	internal and external port

* Switches must be set on this I/O distribution board. See **X.25 Installation.**

** Do not connect a modem to a port designated as a DCE connection.

Appendix B.
X.25 Database Entry Forms

This appendix contains sample database entry forms that should be used when initially entering a gateway, an X.25 or X.25P component, and an X.28 PAD ID service signal in the database or when making any extensive changes. They should be used in conjunction with similar forms completed for addresses (for billing, PDD, and EPN), groups, and profiles. These forms are provided in the *Node Reference*.

This appendix contains the following sample database entry forms:

The forms list prompts that appear when the **enter** command is used, and the possible values (or range of values) that can be entered in response to the prompts. Default values are shown in *italics*. The information contained in this appendix is supplemented by explanations furnished in **X.25 Administration** and **X.25 Commands**.

FORM B-1. Entering a Gateway for an X.25 PDN Port

GATEWAY PROTOCOL [x25, x75]	x25	x25	x25	x25
GATEWAY ID [up to 8 chars]				
GATEWAY ADDRESS [4 to 15 digits]				
LOCAL X.3 PROFILE ID [up to 20 chars, mbit, *simple*, transparent]				
GATEWAY PDN PREFIX [0-9, *none*]				
PAD SUPPORT [*terminal*, host]				
If PAD SUPPORT is *host:* **REMOTE X.3 PROFILE ID** [up to 20 chars, mbit, *transparent*, simple, none]				
For a REMOTE X.3 PROFILE ID: **REMOTE X.3 PARAMETER SET** [comma-separated list of digits 1-22]				
GATEWAY CLOSED USER GROUP PROFILE ID [up to 8 chars, *none*]				
NETWORK CLOSED USER GROUP PROFILE ID [up to 8 chars, *none*]				
GATEWAY ENDPOINT NUMBER OR RANGE [0000-9999]				
NODE X.121 ADDRESS:				
NODE PREFIX [0-9]				
DNIC [0000-9999]				
SERVICE REGION [000-999]				
SERVICE AREA [000-999]				
ENDPOINT NUMBER OR RANGE [0000-9999]				

FORM B-2. Entering an X.25 Module

COMPONENT [module, port]	module	module	module	module
MODULE ADDRESS				
DOWNLOAD SERVER [*controller*]				
If DOWNLOAD SERVER is *controller*: **SOFTWARE VERSION** [standard]				
DEFAULT NETWORK LEVEL WINDOW SIZE [1 - 5]				
DEFAULT PACKET SIZE [*128*, 256]				
If WINDOW SIZE is *2* and PACKET SIZE is *128*: **NUMBER OF USER CHANNELS** [1-*100*]				
If WINDOW SIZE is *3* and PACKET SIZE is *128*: **NUMBER OF USER CHANNELS** [1-*66*]				
If WINDOW SIZE is *2* and PACKET SIZE is *256*: **NUMBER OF USER CHANNELS** [1-*50*]				
If WINDOW SIZE is *3* and PACKET SIZE is *256*: **NUMBER OF USER CHANNELS** [1-*33*]				
INTERNAL BAUD RATE [1200, 2400, 4800, *9600*, 19200, 48k, 56k, 64k, none]				

FORM B-3. Entering an X.25 Host Port

COMPONENT [module, port]	port	port	port	port
MODULE ADDRESS				
PORT NUMBER [1-4]				
COMMENT [up to 60 chars double-quoted, *none*]				
PORT TYPE [host, *pdn*]	host	host	host	host
If INTERNAL BAUD RATE for module is *none*: **CLOCKING TYPE** [internal, *external*]				
If CLOCKING TYPE on module is *external*: **EXTERNAL BAUD RATE** [1200, 2400, 4800, *9600*, 19200, 48k, 56k, 64k]				
MAXIMUM NUMBER OF OUTSTANDING I-FRAMES [1-7]				
WAITING ACKNOWLEDGEMENT TIME (T1) [2-20]				
MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2) [2-15]				
ACTION WHEN N2 COUNT IS EXCEEDED [disconnect, *reset*]				
ACTION WHEN DISC RECEIVED [disconnect, *reset*]				
BILLING STATUS [on, *off*]				

FORM B-3. Entering an X.25 Host Port (continued)

DEFAULT CALLING ADDRESS [up to 15 digits, *none*]				
LOCAL X.3 PROFILE ID [up to 20 chars, mbit, simple, *transparent*]				
NUMBER OF SVC CHANNELS PER PORT [0-<*X*>]				
If NUMBER OF SVC CHANNELS PER PORT >0:] **SVC DIRECTION** [originate, receive, 2way]				
SVC GROUP [up to 8 chars]				
If SVC DIRECTION is *2way*: **NUMBER OF RECEIVE ONLY CHANNELS** [*0*-<SVC_channels>]				
If SVC DIRECTION is *2way*: **NUMBER OF ORIGINATE ONLY CHANNELS** [*0*-<remain_SVC>]				
ADDRESS CHECKING [*on*, off]				
ENDPOINT NUMBERS FOR SVC CHANNELS FOR PORT <N> [0000-9999]				
CLOSED USER GROUP PROFILE ID [up to 8 chars, *none*]				
WINDOW SIZE NEGOTIATION [on, *off*]				
PACKET SIZE NEGOTIATION [on, *off*]				
THROUGHPUT CLASS NEGOTIATION [on, off]				

FORM B-3. Entering an X.25 Host Port (continued)

FAST SELECT ACCEPTANCE [*on*, off]				
If SVC DIRECTION is *originating* or *2way*: **PREDEFINED DESTINATION** [up to 72 chars, none]				
PAD INACTIVITY TIMER (T) [2-20, *off*]				
PAD RETRY COUNTER (N) [2-20, *off*]				
If a single port is being entered, and channels are available on the module: **NUMBER OF PVC CHANNELS** [0-<*X*>]				
PVC GROUP [up to 8 chars]				
ENDPOINT NUMBERS FOR PVC CHANNELS [0000-9999]				
PVC LOGICAL CHANNEL NUMBER [1-<*Y*>]				
PVC DESTINATION [up to 72 chars, *none*]				

FORM B-4. Entering an X.25 PDN Port

COMPONENT [module, port]	port	port	port	port
MODULE ADDRESS				
PORT NUMBER [1-4]				
COMMENT [up to 60 chars double-quoted, *none*]				
PORT TYPE **[host,** *pdn*]	pdn	pdn	pdn	pdn
CALL ID FOR PORT<N> [1-255, *none*]				
If INTERNAL BAUD RATE for module is *none*: **CLOCKING TYPE** [internal, *external*]				
If CLOCKING TYPE is *external:* **EXTERNAL BAUD RATE** [1200, 2400, 4800, 9600, 19200, 48k, 56k, 64k]				
MAXIMUM NUMBER OF OUTSTANDING I-FRAMES [1-*7*]				
WAITING ACKNOWLEDGEMENT TIME (T1) [2-*20*]				
MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2) [2-*15*]				
ACTION WHEN N2 COUNT IS EXCEEDED [disconnect, *reset*]				
ACTION WHEN DISC RECEIVED [disconnect, *reset*]				

FORM B-4. Entering an X.25 PDN Port (continued)

BILLING STATUS [on, *off*]				
GATEWAY ID [up to 8 chars]				
NUMBER OF SVC CHANNELS PER PORT [0-<*X*>]				
If NUMBER OF SVC CHANNELS >0: **SVC DIRECTION** [originate, receive, *2way*:]				
SVC GROUP [up to 8 chars]				
If SVC DIRECTION is *2way*: **NUMBER OF RECEIVE ONLY CHANNELS** [*0*-<SVC_channels>]				
If SVC DIRECTION is *2way* and SVC CHANNELS PER PORT minus RECEIVE ONLY CHANNELS is not *0*: **NUMBER OF ORIGINATE ONLY CHANNELS** [*0*-<remain_SVCs>]				
WINDOW SIZE NEGOTIATION [on, *off*]				
PACKET SIZE NEGOTIATION [on, *off*]				
THROUGHPUT CLASS NEGOTIATION [on, *off*]				
FAST SELECT ACCEPTANCE [*on*, off]				
If SVC DIRECTION is *originate* or *2way*: **PREDEFINED DESTINATION** [up to 72 chars, *none*]				

FORM B-4. Entering an X.25 PDN Port (continued)

PAD INACTIVITY TIMER (T) [2-20, *off*]				
PAD RETRY COUNTER (N) [2-20, *off*]				
If a single port is being entered, and channels are available on the module: **NUMBER OF PVC CHANNELS** [0-<*X*>]				
If NUMBER OF PVC CHANNELS >0: **PVC GROUP** [up to 8 chars]				
PVC LOGICAL CHANNEL NUMBER [1-<*Y*>]				
PVC DESTINATION [up to 72 chars, *none*]				

FORM B-5. Entering an X.28 PAD ID Service Signal

X.28 PAD ID SERVICE SIGNAL [up to 72 chars double-quoted]	

Appendix C.
X.25 RS-232-C and V.35 Lead States

Depending on the I/O distribution board used, X.25 module ports can be configured for industry standard RS-232-C or V.35 connections for Data Terminal Equipment (DTE) or Data Communications Equipment (DCE).

This appendix furnishes tables that correlate supported RS-232-C/V.35 lead states, pin numbers, and actions to the equipment function (DTE/DCE).

TABLE C-1. RS-232-C Lead States for DTE

RS-232-C Lead	Pin Number	Action
DTR	20	Asserted during link initialization. Remains asserted while link is up.
DSR	6	Must be asserted for link to come up.
DCD	8	Half-duplex: only high while the port is receiving data. Full-duplex: always high while the link is in service.
RTS	4	Half-duplex: asserted when the port is sending data. Full-duplex: always asserted while the link is in service.
CTS	5	Half-duplex: must be high for the port to transmit; sensed by the DTE. Full-duplex: always high while the link is in service.
TD	2	Data transmitted from the local node to the DSU or modem.
RD	3	Data received by the local node from the DSU or modem.
TC	15	Clocking received from the DSU or modem.
RC	17	Clocking received from the DSU or modem.
FG	1	Ground.
SG	7	Ground.

TABLE C-2. RS-232-C Lead States for DCE

RS-232-C Lead	Pin Number	Action
DTR	20	Asserted during link initialization. Remains asserted while link is up.
DSR	6	Asserted during link initialization. Remains high while the link is in service.
DCD	8	Asserted during link initialization. Remains high while link is in service.
RTS	4	Half-duplex: low when the port is sending; sensed by the DCE. Full-duplex: always high while the link is in service.
CTS	5	Half-duplex: low when the port desires to transmit; driven by the DTE. Full-duplex: always high while the link is in service.
TD	2	Data received by the local node from the DSU or modem.
RD	3	Data transmitted to the DSU or modem.
TC	15	Clocking provided to the DTE by the DCE.
RC	17	Clocking provided to the DTE.
FG	1	Ground.
SG	7	Ground.

TABLE C-3. V.35 Lead States for DTE

V.35 Lead	Pin Number	Action
DTR	H	Asserted during link initialization. Remains asserted while link is in service.
DSR	E	Must be asserted for link to come up.
DCD	F	Half-duplex: only high while the port is receiving data. Full-duplex: always high while the link is in service.
RTS	C	Half-duplex: high when the port is sending data. Full-duplex: always high while the link is in service.
CTS	D	Half-duplex: must be high for the port to transmit; sensed by the DTE. Full-duplex: always high while the link is in service.
TD+	S	Data transmitted from the local node to the DSU or modem.
TD-	P	Data transmitted from the local node to the DSU or modem.
RD+	T	Data received by the local node from the DSU or modem.
RD-	R	Data received by the local node from the DSU or modem.
TC+	AA	Clocking received from the DSU or modem.
TC-	Y	Clocking received from the DSU or modem.
RC+	X	Clocking received from the DSU or modem.
RC-	V	Clocking received from the DSU or modem.
FG	A	Ground.
SG	B	Ground.

Index

D

E

F

G

H

I

L

M

N

O

P

R

S

T

U

V

W

X

X.25P Module

Contents

Figures

Tables

Procedures

X.25P Overview

X.25P Overview

The X.25P module, which conforms to the 1988 CCITT X.25 Recommendation, supports two-way communication across a packet-switched network. The module has an integrated packet assembler/disassembler (PAD), uses North American Numbering Plan (NANP) addressing, and supports closed user group (CUG) security. The X.25P module supports 507 virtual circuits that can be designated for either switched virtual circuits (SVCs) or permanent virtual circuits (PVCs). The X.25P module can provide the following services:

- Asynchronous to/from X.25P Host Service

  This service provides asynchronous devices with switched access to and from multiple X.25 hosts on a network. An X.3 profile governs the form of the call between the terminal user and the host. This profile can be customized or it can be one of three system-supplied default profiles. The terminal user's device can be set up with a predefined destination (PDD) and CUG security.

  The maximum packet size allowed in this mode is 256.

- X.25P to/from X.25

  In this mode, call setup and takedown is provided on a logical channel basis. Also, the packet layer restart function (via restart packets) is provided. Packet layer transmission is transparent to the user. Data packets, interrupt packets, reset packets, Q-bit, M-bit, and D-bits are passed through the network; however, diagnostic packets are handled exclusively by the packet layer.

  The maximum packet size allowed in this mode is 256.

- X.25P to X.25P or X.25P to/from X.75

  This mode, unlike the X.25P to/from X.25 mode, supports and terminates the packet layer (for example, interrupt packets, reset packets, data packets.) This mode also supports delivery confirmation (end to end acknowledgment) when the D-bit is used. For the X.75 calls, the service provides communication with a packet-switched public data network (PSPDN) via an X.75 Gateway. An X.75 Gateway allows the network to serve as a public national network that can route calls to an unlimited number of public national networks and/or as an originating or destination network when connected to any international or national network. Up to 256 international X.75 gateways are supported.

  The maximum packet size allowed in this mode is 1024.

Physical Description

The X.25P is a single-board interface module that consists of the MC1D153A-1 main circuit pack and an AWJ24 I/O distribution board (Comcode 107316937) and an RS-232-C CSD4 I/O distribution board (Comcode 107272494). The module and its I/O boards can reside in a supported data networking products node, Multipurpose Concentrator 7-slot (MPC7), or Multipurpose Concentrator 15-slot (MPC15).

The AWJ24 I/O board has up to four data terminal equipment (DTE) ports that can be configured for V.35 connections. The X.25P uses the same cabling as other modules using this I/O board. The RS-232-C CSD4 I/O board has eight ports that can be configured independently as DTE or DCE. The X.25P, with the CSD4, uses the same cabling as other modules using the AWJ17 and AWJ18 I/O boards.

Appendix A summarizes port connections and clocking provided by each I/O distribution board.

Each module faceplate contains three LEDs, a reset push button, a three-state mode switch, and a latch. When pressed, the reset push button reinitializes the module and clears the connections. The mode switch states of ENABLE, DIAGNOSE, and DISABLE and the green, yellow, and red LEDs indicate the module's current mode of operation and its service state. The latch is used to remove or insert the module and to secure it in place.

Features

The X.25P module provides more capabilities and is a higher performance module than the X.25 module. The X.25P provides more ports and logical channels than the X.25 module, extended I-frame numbering, larger network layer packet and window sizes which are unique on a port-by-port basis, and packet segmentation to support different packet sizes at the ends of the call. In addition, the X.25P is a downloadable and uploadable module. Both the software source to be downloaded to the module and the host to which memory dump information is to be uploaded can be specified through module-level parameter prompts.

Requirements for the physical, link, and packet layers of the X.25P protocol are fulfilled through specifications made at port-level parameter prompts. Diagnostics, measurements, and status reports are provided.

Another feature exclusive to the X.25P module is the ability of an X.25 SVC to call an X.25 PVC directly. An address can be entered at the destination prompt and a connection will be made to the PVC endpoint. The address must be associated with the X.25P PVC group. The X.3 profile specified in the address is the X.3 profile that governs the call; therefore, each asynchronous user can have a unique X.3 profile. To disconnect the asynchronous endpoint, the user must either use the terminal user command mode, or power down the asynchronous endpoint.

Integrated PAD

The X.25P module's integrated PAD complies with the 1988 CCITT Recommendation for X.25 and supports Recommendations X.3, X.28, and X.29. Devices that do not support the X.25 switching protocol—such as PCs, workstations, and dumb terminals—rely on the PAD to convert the device protocol to/from the X.25 protocol used by the packet-switched network.

Transmission Capabilities

The X.25P AWJ24 I/O board supports up to four V.35 ports; each port can be configured for transmission speeds of up to 2.048 Mbps. External clocking is required. The CSD4 I/O board supports up to eight RS-232-C ports, each of which can be configured for transmission speeds of up to 19.2 Kbps as a DTE or DCE. Refer to **Appendix A**.

With a window size of 2 and a packet size of 128, the X.25P module supports 512 channels, including 5 overhead channels for uploading/downloading, diagnostics, and signaling, and 507 remaining channels for data transfers. Thus, the maximum number of SVCs and PVCs per module and data link is 507.

For the most reliable method of data transmission, the X.25P module offers Grade of Service 5 (GOS5) between modules, which supports flow control, error detection, and retransmission. The modules discard corrupt data and retransmit the original data. If data is lost because of a network failure, it cannot be recovered; an alarm is sent to the node console.

Diagnostic Capabilities

Diagnostic capabilities consist of off-line module tests and on-line port tests that are run from the node console or *StarKeeper* II NMS®. Off-line diagnostics consist of three tests—boot diagnostics, memory tests, and downloadable diagnostics. On-line diagnostics check the communications path for an out-of-service port and its connected device.

An ISO-compliant test frame test is provided. When a test command frame is received, a test response frame, containing the same information field as the command frame, is returned to the module. The device connected to the X.25P port must support this feature in order for the diagnostic to work successfully.

In addition, report output obtained from **dstat**, **dmeas**, and **verify** commands can be used as a troubleshooting tool.

Administration Options

The following options can be administered in the database through the **x25p** command set.

- An upload and download server for software file handling.
- Internal and external clocking options for RS-232-C only.
- For V.35 connections, external baud rate options ranging from 1200 bps to 2.048 Mbps.

- Up to 507 user channels that can be distributed among 4 or 8 ports depending on the I/O board used.
- For RS-232-C connections with internal clocking, speeds of 1.2, 2.4, 4.8, 9.6, 14.4, and 19.2 Kbps are allowed, or connections with an external clocking baud rate ranging from 1.2 to 19.2 Kbps.
- Packet segmentation allowing two ends of an SVC or PVC to have different packet sizes.
- If the field **`BILLING STATUS`** is set to *on* for a particular port, an X.25P billing record is generated each time a call setup or a call takedown occurs through the port as well as when data duration and data thresholds are met.
- X.3 profiles can be configured on a per channel basis where the X.25P is the originating side of the PVC PAD call. This allows each PVC call, which may require its own specific PAD parameter settings, to use a specific X.3 profile.
- Incoming and outgoing access on the module can be controlled to either allow or block any more calls to the module. Call blocking is useful in preparing for maintenance or diagnostics work, during which call activity and data transfer on the module is disrupted. Calls can taper off naturally as users log off, and no additional calls are placed to the module.
- Numerous X.25 user facilities, listed below, are supported at the packet layer. These facilities are generally sent in call setup and/or clear packets and determine various parameters of the call. See the CCITT X.25 specification for details on these facilities.
  - — Packet size negotiation
  - — Window size negotiation
  - — Throughput class negotiation
  - — Closed user group and closed user group with outgoing access
  - — Fast select and fast select acceptance
  - — Reverse charging and reverse charging acceptance
  - — Recognized private operating agencies (RPOAs)
  - — Called line address modified notification
  - — Transit delay selection and indication
- One variable-length X.28 identification service signal (sig) that can be used to broadcast messages to terminal users accessing the module PAD.
- Both the standard 128 packet size and the non-standard CCITT recommended X.25-recognized packet sizes of 256, 512, and 1024 octets are supported. These are configured on a per port basis but can be negotiated down to a common packet size during call setup time via the packet size negotiation facility on a per channel basis.

- Address masking can be enabled (turned *on*) or disabled (turned *off*) for every X.25P module port. With address masking, the address that is to be placed in the incoming call packet to the attached X.25 device is masked with a prefix and/or a suffix of administrable digits. After all translations and substitutions are performed, these digits then mask the original incoming calling or called address; they form the calling or called address that is sent to the attached X.25 device.
- If packet-size negotiation is not to take place, packet segmentation may be administered to allow the ends of any call between two X.25P ports to use different packet sizes.
- Both the standard window size of 2 and the non-standard CCITT Rec. X.25-recognized window sizes of 1 and 3 through 7 are supported. The network-level window size is maintained on a per channel basis and specifies how many packets the X.25P is allowed to send on a given channel without having received an acknowledgement. The window size is configured on a per port basis.
- For calls between two X.25P endpoints, the window size can be negotiated locally between the X.25P port and its connected device up to the configured maximum window size at call setup time on a per channel basis. Because window size negotiation is only done locally and does not extend across the network to the remote X.25P port, different window sizes can be used at the ends of the call.

  For calls between X.25P and X.25 endpoints, window size negotiation is performed across the network to ensure both ends of the call have the same window size.

  For PVCs, both ends of the call must be configured with the same window size.
- PDDs that associate an originating device to a network destination so automatic call setup can occur when the device is powered up.
- 1988 CCITT-compliant parameters that permit configuration of the maximum number of I frames (information frames) a port can have unacknowledged at once (parameter K), the maximum number of attempts a port can make to complete a transmission (parameter N2), the maximum number of seconds the module must wait before acknowledging a time violation (parameter T1), the number of minutes that the PAD is to wait for a call to be placed (parameter T), and the number of times that an asynchronous end user can unsuccessfully attempt to establish a call before the PAD is taken down (parameter N).
- Barring of incoming/outgoing SVC calls on a per-port basis by configuring the direction of the port and allocating a range of logical channels for one-way incoming/outgoing SVC calls.
- CUG security and customized or default profile identifiers for ports designated to provide *host* service.

X.25P Installation

X.25P Installation

X.25P module installation consists of a few simple precautions and procedures, as follows:

- Ensure protection from electromagnetic interference (EMI, see inside front cover) and electrostatic discharge (ESD). Wear an ESD wrist strap to prevent module damage; see the appropriate *Node Reference* for grounding locations and other details.
- Verify that the I/O distribution board to be installed is the CSD4 or AWJ24. Refer to **Appendix A** for board specifications.
- Ensure that the correct slot is designated for the module. See the *Planning Guide* and the *Node Reference* for module placement in the node.

  CAUTION: To prevent damage to module circuitry, always insert the I/O distribution board **before** inserting its corresponding module. **Never** remove the I/O distribution board before removing the module.

- Insert the appropriate I/O distribution board; see the section that follows.
- Insert the X.25P module board; see the section that follows.
- Cable the I/O distribution board ports to support external devices; see **X.25P Cabling**.

The following sections give more detail on inserting the I/O distribution board and the X.25P module boards, and directions for removing the module boards and their I/O distribution boards.

I/O Distribution Board Connections and Switch Settings

The I/O distribution board to be used with the X.25P module depends on the interface standard being used (RS-232-C or V.35), the function of the connecting end device—Data Terminal Equipment (DTE) or Data Communications Equipment (DCE)—and the number of ports required. **Appendix A** explains these two I/O distribution boards and the connection options they support.

The AWJ24 and CSD4 I/O distribution boards do not have any switches that must be set.

Inserting and Removing the I/O Distribution Board

The X.25P I/O distribution boards plug into the rear of the *Datakit* II VCS Control Computer or BNS-2000 Series M1 Shelf backplane or into an MPC15 or MPC7; they are held in place by shrouds on the backplane pin field and secured with two screws. Always insert the I/O distribution board before inserting its corresponding X.25P module board. Remove the I/O distribution board **only** for relocation, replacement, or part number confirmation. Never remove it before removing its corresponding X.25P module board.

PROCEDURE 2-1. Inserting the I/O Distribution Board

1. Verify that a module board does not reside in the corresponding slot.
2. Align the I/O distribution board's backplane connector with the backplane pin field at the rear of the shelf, and align the screws with the screw holes. Slip the backplane connector onto the pins.

   The board should seat easily. If seating is difficult, the board might be canted or some pins might be bent.
3. Insert the screws, and tighten them securely.

PROCEDURE 2-2. Removing the I/O Distribution Board

1. Unseat the module board.
2. Disconnect all cabling to I/O distribution board ports, labeling the cable ends if appropriate.
3. Remove the screws holding the I/O distribution board in place.
4. Rock the board carefully as you pull it out.

Inserting and Removing the Module Board

The X.25P module board (MC1D153A1) is inserted into a slot at the front of the cabinet. To prevent damage to module circuitry if the node is powered up, insert the I/O distribution board at the rear of the slot before the X.25P module board.

You can remove and replace the X.25P module board in an operating node without damaging the module itself or without disrupting calls on other modules. Only calls on the X.25P are disrupted when the module board is removed.

PROCEDURE 2-3. Inserting the Module Board

1. Confirm that the I/O distribution board is installed and is residing in the appropriate slot.
2. Set the mode switch on the module faceplate to DISABLE.
3. With the module latch extended, carefully push the module all the way into the slot. The backplane pins will slip into the module receptacle.
4. Close the latch to lock the module into position.
5. Move the mode switch on the module faceplate to ENABLE.

PROCEDURE 2-4. Removing the Module Board

1. If the mode switch is in the ENABLE position, move it to DISABLE to take down all calls in progress on the X.25P module board.
2. Open the latch on the module faceplate.
3. Pull the module straight out of the slot, using the latch as a handle.

X.25P Cabling

X.25P Cabling

This chapter furnishes cabling information for the X.25P module.

Each cabling configuration represents the required connections between the modules and other equipment associated with the communications path such as terminals, modems, host computers, patch panels, and so forth.

This chapter explains cabling for the X.25P module in a node, MPC7, or MPC15. Specific steps are provided, along with an illustrated configuration and ordering information.

The X.25P module can be installed to support either V.35 or RS-232-C devices. The AWJ24 I/O distribution board supports only V.35 devices, while the CSD4 I/O distribution board supports only RS-232-C devices.

The X.25P module AWJ24 I/O distribution board has two 50-pin connectors, labeled J2 and J6. Each connector supports two ports, for a total of four V.35 ports for each module. Each port can be cabled to an external device. The X.25P module CSD4 I/O distribution board has two 50-pin connectors, labeled J2 and J3. Each connector supports four ports, for a total of eight RS-232-C ports for each module. Each port can be cabled to an external device.

General Procedure for Cabling X.25P Module to V.35 DTE Device

The following procedure gives the sequence of steps for cabling the module's V.35 ports. These steps can be adapted or expanded as appropriate. Cable and adapter ordering information follows the cabling illustrations.

PROCEDURE 3-1. Cabling AWJ24 Ports

Requirements: Installation of AWJ24 I/O board and X.25P module.

1. Determine the connections from each V.35 I/O board port to the terminating device, as follows:
   A. Identify the device type at the terminating end of the connection.
   B. Identify the connection path (directly wired or connected via modem or DSU).
   C. Select the correct cables and adapters for the device type and path identified above by referring to the following section, which gives a brief overview of cabling for the supported configuration, a figure showing interconnections, and a table containing cable/adapter identification and ordering information.
2. Verify that the AWJ24 I/O board and its X.25P module board are correctly installed.
3. Label connectors and cables appropriately for your configuration; for example, label each cable with the AWJ24 connector port number (1 to 4) to which it connects.
4. Make the connections.

Cabling an X.25P Module to a V.35 DTE Access Device

The cabling from an X.25P module in a node, MPC7, or MPC15 to an access device via a data service unit (DSU) uses the following:

- an X.25P module consisting of an MC1D153A-1 main circuit pack and an AWJ24 I/O board.
- an HD-2V.35M cable connected to the J2 or J6 on the AWJ24 I/O board, which determines the X.25P port used for this connection. Connector J2 (top) supports ports 1 and 2 (cable legs A and B, respectively); connector J6 (bottom) supports ports 3 and 4 (cable legs A and B, respectively).
- a V.35 cable connecting each leg of the HD-2V.35M cable to the appropriate V.35 connector on a DSU

  The maximum cable length that can be used to connect a X.25P module to a modem or DSU is one hundred feet.

  NOTE: The overall length of the HD-2V.35M cable cannot exceed 10 feet, and each of the two V.35 legs cannot exceed one foot. This cable length must be included as part of the maximum cable length.

- At the remote end, the DSU is connected to an access device.

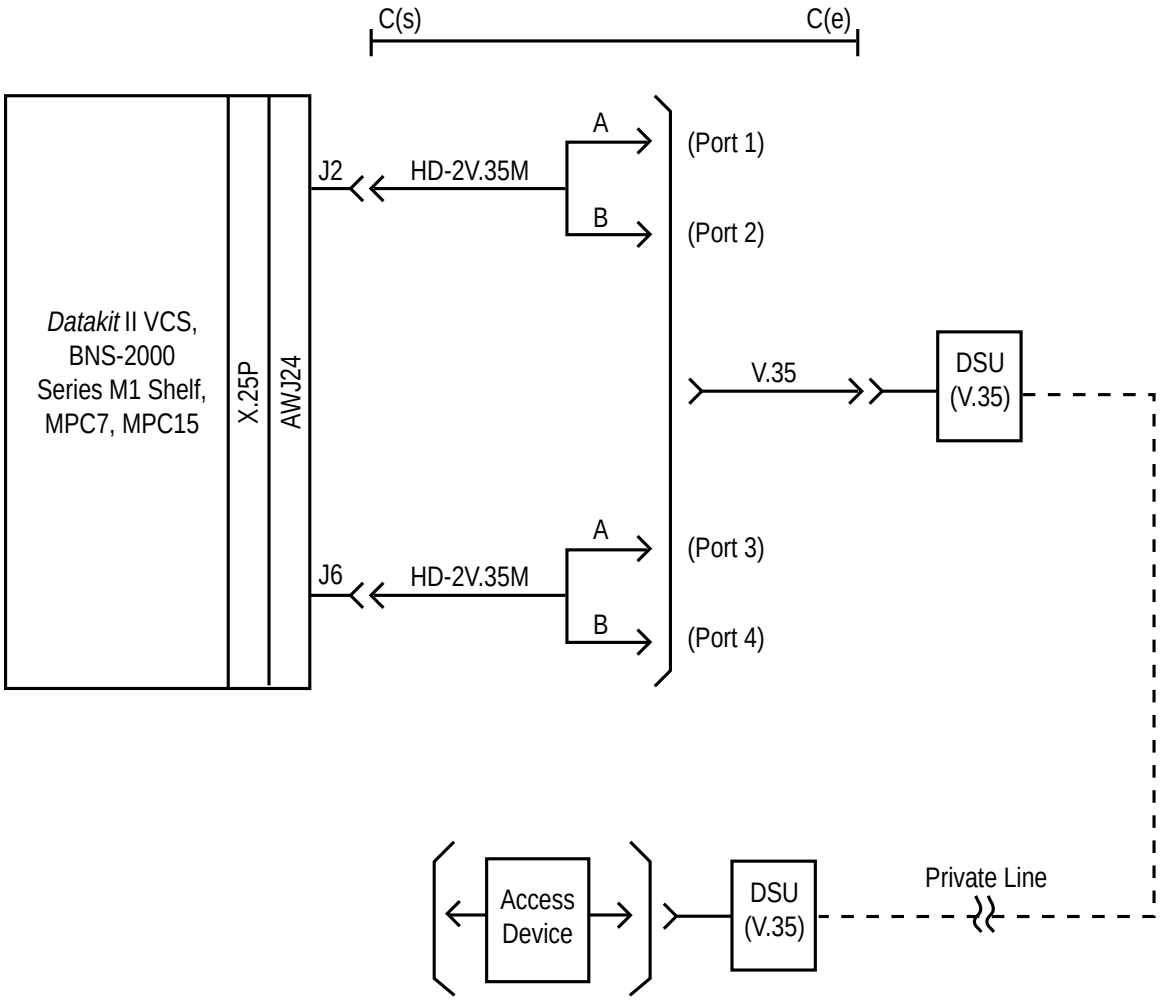


FIGURE 3-1. From X.25P Module via DSU to V.35 DTE Access Device

TABLE 3-1. Ordering Information

Cable or Adapter	Description	ED5P055-31 Group Number
HD-2V.35M	50-pin-M 2 V.35-M	G(222), G(AS)
V.35	34-pin-M 34-pin-F	G(170), G(T)

General Procedure for Cabling X.25P Module to RS-232-C Devices

The following procedure gives the sequence of steps for cabling the module's RS-232-C ports. These steps can be adapted or expanded as appropriate. Cable and adapter ordering information follows the cabling illustrations.

PROCEDURE 3-2. Cabling CSD4 Ports

Requirements: Installation of CSD4 I/O board and X.25P module.

1. Determine the connections from each RS-232-C I/O board port to the terminating device, as follows:
   A. Identify the device type at the terminating end of the connection.
   B. Identify the connection path (directly wired or connected via modem or DSU).
   C. Select the correct cables and adapters for the device type and path identified above by referring to the following section, which gives a brief overview of cabling for the supported configuration, a figure showing interconnections, and a table containing cable/adapter identification and ordering information.
2. Verify that the CSD4 I/O board and its X.25P module board are correctly installed.
3. Label connectors and cables appropriately for your configuration; for example, label each cable with the CSD4 connector port number (1 to 8) to which it connects.
4. Make the connections.

Cabling from X.25P Directly to a Host Computer, DTE Device, or RS-232-C DTE Device

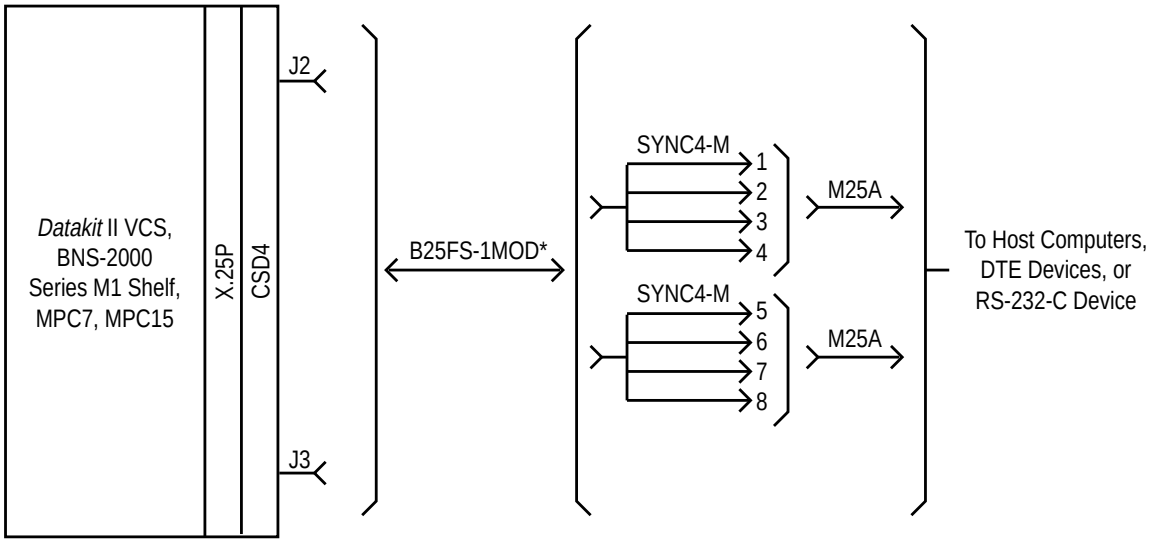
Cabling from an X.25P module in a *Datakit* II VCS node cabinet, BNS-2000 Series M1 Shelf, MPC7, or MPC15 to a host computer or other DTE device, can be configured as follows:

- The X.25P module consists of a MC1D153A-1 main circuit pack and a CSD4 I/O distribution board. See **Appendix A** and the following related figure for more information on I/O distribution boards.
- When cabling RS-232-C connections to host computers or other DTE devices, a B25FS-1MOD cable connects to the upper 50-pin connector (J2) on the CSD4 distribution board for ports 1 through 4 and connects to the lower 50-pin connector (J3) for ports 5 through 8.

  A SYNC4-M cable connects to the B25FS-1MOD. The SYNC4-M has four male 25-pin connectors.

  Each 25-pin connector on the SYNC4-M cable connects directly to the end device, or each connector can be extended using an M25A cable.

See the following figure for an illustration of these configurations.



**After the first 25 feet, the B25FS-1MOD cable may be extended with a B25A cable.*

FIGURE 3-2. From X.25P Directly to a Host Computer, DTE Device, or RS-232-C DTE Device

TABLE 3-2. Ordering Information: From X.25P Directly to a Host Computer, DTE Device, or RS-232-C DTE Device

Cable/Adapter	Description	ED5P055-31 Group Number	Price Element Code (PEC)
B25A	50-pin 90-M 50-pin 90-F	G(106), G(F)	2752-106, 27514
B25FS-1MOD	50-pin 180-M 50-pin 90-M	G(200), G(C)	2752-200, 27512
SYNC4-M	50-pin 90-F 4 25-pin-M	G(160), G(R)	2752-160, 27523
M25A	25-pin-M 25-pin-F	G(107), G(P)	2752-107, 27521

For plenum cables, see the Ordering Quick Reference.

Cabling from X.25P to a Host Computer or DTE Device via 110 Patch Panel

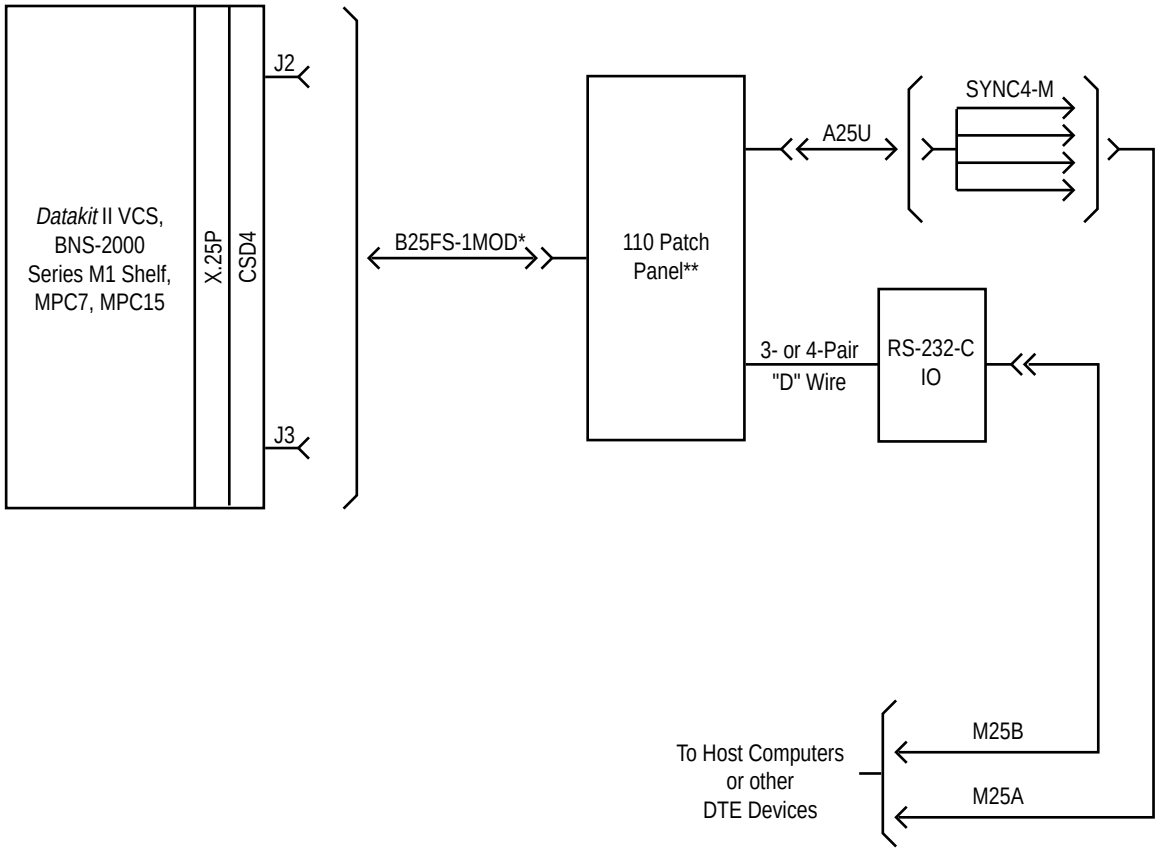
Cabling from an X.25P module in a *Datakit* II VCS node cabinet, BNS-2000 Series M1 Shelf, MPC7, or MPC15 to host computer or DTE device via a 110 patch panel can be configured as follows:

- The X.25P module consists of a MC1D153A-1 main circuit pack and a CSD4 I/O distribution board. See **Appendix A** and the following related figure for more information on I/O distribution boards.
- A B25FS-1MOD cable connects to the upper 50-pin connector (J2) on the I/O distribution board for ports 1 through 4 or to the lower 50-pin connector (J3) for ports 5 through 8.
- The other end of the B25FS-1MOD cable connects to the 110 patch panel.
- An A25U cable extends from the 110 patch panel to the SYNC4-M cable at the other end.

  A SYNC4-M cable connects to the A25U.

  The SYNC4-M has four male 25-pin connectors. Each 25-pin connector on the SYNC4-M cable connects directly to the end device, or each can be extended using an M25A cable.
- If RS-232-C I/O ports are wired directly from the patch panel via a 3 or 4-pair "D" wire, an M25B cable connects to the DTE device.

See the following figure for an illustration of these configurations.



**After the first 25 feet, the B25FS-1MOD cable may be extended with a B25A cable.*
***110 patch panels are available with different interconnects.*
Before selecting cables, determine which interconnects are provided by your 110 patch panel.

FIGURE 3-3. From X.25P to a Host Computer or DTE Device via 110 Patch Panel

TABLE 3-3. Ordering Information: From X.25P to a Host Computer or DTE Device via 110 Patch Panel

Cable/Adapter	Description	ED5P055-31 Group Number	Price Element Code (PEC)
B25A	50-pin 90-M 50-pin 90-F	G(106), G(F)	2752-106, 27514
B25FS-1MOD	50-pin 180-M 50-pin 90-M	G(200), G(C)	2752-200, 27512
A25U	50-pin 90-M 50-pin 90-M	G(114), G(F)	2752-114, 27514
SYNC4-M	50-pin 90-F 4 25-pin-M	G(160), G(R)	2752-160, 27523
M25A	25-pin-M 25-pin-F	G(107), G(P)	2752-107, 27521
M25B	25-pin-M 25-pin-M	G(108), G(P)	2752-108, 27521

For plenum cables, see the Ordering Quick Reference.

Cabling from X.25P to a Host Computer or RS-232-C DTE Device via Modem, DSU, or FOM

Cabling from an X.25P module in a *Datakit* II VCS node cabinet, BNS-2000 Series M1 Shelf, MPC7, or MPC15 to a host computer or RS-232-C DTE device via a modem, DSU, or fiber optic multiplexer (FOM) can be configured as follows:

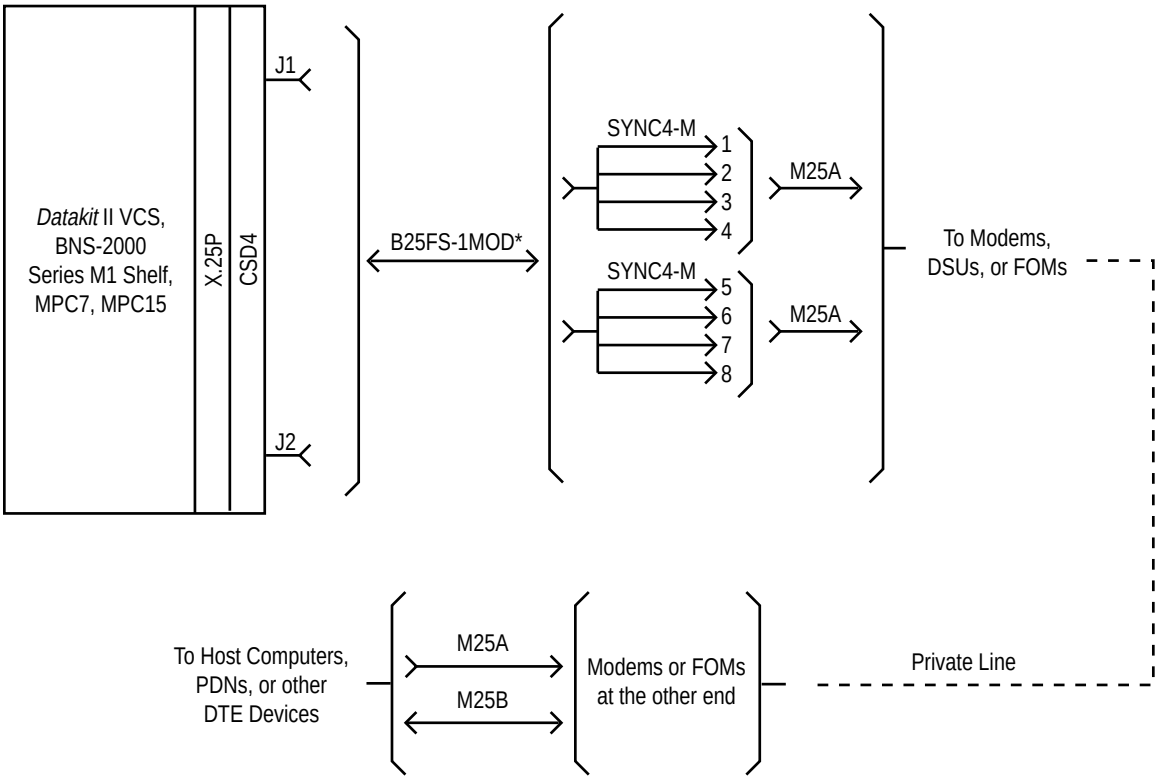
- The X.25P module consists of a MC1D153A-1 main circuit pack and a CSD4 I/O distribution board. See **Appendix A** and the following related figure for more information on I/O distribution boards.
- For RS-232-C connections, a B25FS-1MOD cable connects to the upper 50-pin connector (J2) on the CSD4 I/O distribution board for ports 1 through 4 and to the lower 50-pin connector (J3) for ports 5 through 8.

  A SYNC4-M cable connects to the other end of the B25FS-1MOD cable to provide four RS-232-C male connections.

  The SYNC4-M cable then connects directly to the modem, subrate DSU (which operates at a speed of 19.2 Kbps or lower) or FOM. An M25A cable can be used to extend the RS-232-C connections, if necessary.

  At the remote location, the modem, subrate DSU, or FOM connects to the host computer or other DTE device with an M25A cable.

See the following figure for an illustration of these configurations.



**After the first 25 feet, the B25FS-1MOD cable may be extended with a B25A cable.*

FIGURE 3-4. From X.25P to a Host Computer or RS-232-C Device via Modem, DSU, or FOM

TABLE 3-4. Ordering Information: From X.25P to a Host Computer or V.35 DTE Device via Modem, DSU, or FOM

Cable/Adapter	Description	ED5P055-31 Group Number	Price Element Code (PEC)
B25A	50-pin 90-M 50-pin 90-F	G(106), G(F)	2752-106, 27514
B25FS-1MOD	50-pin 180-M 50-pin 90-M	G(200), G(C)	2752-200, 27512
SYNC4-M	50-pin 90-F 4 25-pin-M	G(160), G(R)	2752-160, 27523
M25A	25-pin-M 25-pin-F	G(107), G(P)	2752-107, 27521

For plenum cables, see the Ordering Quick Reference.

X.25P Administration

X.25P Administration

Before X.25P module and port administration can begin, certain database elements must be administered for the X.25P host service to be provided:

- Originating, receiving, and two-way groups must be entered with the **group** command set.
- Closed user group (CUG) profiles must be entered with the **profile** command set.
- X.3 PAD profiles must be entered with the **profile** command set. These include a terminal user profile used for calls coming from an asynchronous endpoint and a *local profile* used for calls coming into an asynchronous endpoint.
- Predefined destinations (PDDs) and endpoint numbers must be entered with the **address** command set.
- An X.28 PAD service identification signal (sig) may be entered with the **x28sig** command set.

This chapter details the administration of **x25p**. For information on the administration of the **group**, **address**, and **profile** database elements, see the appropriate *Node Reference*.

StarKeeper II NMS Administration

X.25P administration via *StarKeeper* II NMS is accomplished by using the pass-through mode of *StarKeeper* II NMS. The X.25P command set can be entered and executed almost as it would be entered and executed on the direct console connection. *StarKeeper* II NMS does not allow all of the same abbreviations nor does it validate input information. Refer to the following sections on X.25P administration and to the appropriate *StarKeeper* II NMS documentation for information on accessing the pass-through mode.

Command Set

As noted above, information defining profiles, an X.28 service identification signal, or an X.25P module and its ports is added to the database, and thereafter manipulated and checked, with the appropriate **enter**, **change**, **delete**, and **verify** commands. The **enter** and **change** commands for **x25p** have an extensive parameter prompting sequence in which configurable options are specified in the database. Once specified, these options can be checked with the **verify** command and removed, in total, with the **delete** command.

The **restore** and **remove** commands control the service state of the X.25P module and its ports; these commands are often used with administration and maintenance procedures.

The **remove** and **restore** commands can be used with **verify oosmods**, which list all out-of-service modules.

The **enter**, **change**, **delete**, **remove**, and **restore** commands function on a per-module or per-port basis, unlike **verify**, which functions on a module basis. You can remove one port from service, make database changes to port information, and restore the port to service. When you verify the information, the system outputs information pertaining to every configured port on that module.

The **diagnose** command is used for module maintenance and troubleshooting, along with other status- and maintenance-related commands, such as **verify epn**, **verify oosmods**, and **dstat x25p**.

TABLE 4-1. Command Set

Object	Administration	Operation	Maintenance	Related Objects	
x25p	**change x25p** **delete x25p** **enter x25p** **verify x25p**	**remove x25p** **restore x25p**	**diagnose x25p** **dmeas x25p** **dstat x25p**	**address*** **comment** **concentrator** **epn** **group*** **host** **measurements**	**module** **oosmods** **profile*** **schedule** **x25** **x28sig** **x75**
x28sig	**change x28sig** **delete x28sig** **enter x28sig** **verify x28sig**			**x25** **x25p**	**x75**

* This object should be entered before configuring an **x25p** module port in the database.

X.25P Parameters

Some parameter specifications made during an iteration of the **enter x25p** or **change x25p** commands do not affect other parameters or database elements entered, or the general performance of the network or node. Other parameters require special consideration.

For example, certain module and port-level parameters and their values affect one another. Available formulas help to calculate the availability of user channels depending on packet size and network window-size specifications. In turn, these module-level parameter values affect the port's ability to negotiate packet sizes and window sizes. These parameters are explained in this section, which is supplemented by **X.25P Commands** and the database entry forms provided in **Appendix B**.

Local X.3 Profile ID

An X.3 profile is needed to provide service for asynchronous endpoints to call an X.25 endpoint via the PAD service. An X.3 profile specifies values for each of the 22 X.3 PAD parameters. An X.3 profile may be associated with an X.25P port, an address or hunt group that has PAD support, or with a PVC channel on an X.25P port. The profile on the address assigned to the X.25P port is used for calls from an asynchronous endpoint to the PAD. The X.3 profile on the port is used for calls coming into the network from the port. For PVC calls, the profile used is that of the PVC channel. The exception is the new SVC-to-PVC service; in that case, the profile used will be that of the address used in calling the PVC. Three default profiles exist; you can create up to 17 more unique profiles.

The local X.3 profile ID can be a string of 1 to 20 characters that names a customized profile (which was created with the **profile** commands) or it can be one of three system supplied profiles:

- *simple*

  The *simple*, or common profile, was referred to as the *default* profile in releases prior to *Datakit* II VCS Release 2.1.

- *transparent*

  The *transparent* profile is one that is suitable for file transfers.

- *mbit*

  The *mbit* profile is needed to invoke the M-bit procedure between an asynchronous block device (for example, a CPM-connected host) and an X.25P endpoint. No X.28 or X.29 commands are allowed with this profile. Also, the calls must be made using the quickcall address format.

The following screen, which is available through an iteration of **verify profile x3 all**, shows the default parameter settings of the system supplied profiles.

```
    95-12-31 10:37:14 NODE=Redqueen
M  verify profile x3 all

PROFILE ID:       simple              mbit                transparent

                  ------------------- ------------------- -------------------
 1 PAD RECALL:    dle                 none                none
 2 ECHO:          yes                 no                  no
 3 DATA F SIG:    126                 0                   0
 4 IDLE TIMER:    notimer             notimer             mintimer
 5 FC BY NWK:     no                  no                  no
 6 PAD SVCSIG:    prompt&pad          none                none
 7 OP ON BREAK:   2                   2                   2
 8 DISC OUTP:     no                  no                  no
 9 PAD AFT CR:    0                   0                   0
10 LINE FOLD:     0                   0                   0
11 BIN SPEED      9600                9600                9600
12 FC BY DEV:     yes                 yes                 yes
13 LF INSERT:     0                   0                   0
14 LF PADDING:    0                   0                   0
15 EDITING:       no                  no                  no
16 CHAR DEL       ^H                  ^H                  ^H
17 LINE DEL:      @                   @                   @
18 LINE DISP:     ^L                  ^L                  ^L
19 E PAD SVG:     display             no                  no
20 ECHO CR:       yes                 no                  no
20 ECHO LF:       yes                 no                  no
20 ECHO VT/HT/FF: yes                 no                  no
20 ECHO BEL/BS:   yes                 no                  no
20 ECHO ESC/ENQ:  yes                 no                  no
20 ECHO ACK ETC:  yes                 no                  no
20 ECHO EDT CHAR: yes                 no                  no
20 ECHO DEL/OTH:  yes                 no                  no
21 PARITY TREAT:  no                  no                  no
22 PAGE WAIT:     no                  no                  no

CC0>
```

Module Address

The **MODULE ADDRESS** parameter is used to identify the location of a hardware module. The address of the module depends on its physical placement in a slot in a node or supported concentrator. When a module is installed in a node slot, its address is typically represented as:

<*module*>

Where: *module* is the number of the node slot that the module occupies.

If the module is installed into a concentrator, the concentrator is then connected to the node by a link interface module (LIM), such as an SWT or SFT trunk, and to the link itself. When a module is installed in a concentrator slot, its address is represented as:

<*concentrator/module*>

Where: *concentrator* is the number of the node slot that the LIM occupies; and *module* is the number of the concentrator slot that the module occupies. (See the concentrator reference documentation.)

Depending on the particular command, module addresses can be identified with a *single address entry* or with *multiple address entries.*

If a single address entry is allowed, only one module address can be specified. For example:

diagnose x25p 27/2

A slight variation of this addressing option is demonstrated with the **verify** command, which allows you to specify either **one** module address or, with the word *all*, every X.25P module address. For example:

verify x25p all

Multiple address entries can be specified for like-modules only if the modules reside in the same node or in the same concentrator; they cannot be specified for like-modules residing in both a node and a concentrator.

For multiple, but not all address entries, you can enter the module address as a single number (x), a range of numbers (x-y), a series of numbers (x,y,z), or a combination of both (x-y,z). Some examples are:

restore x25p module 27-30 (module addresses for four X.25P modules installed in the same node)

restore x25p module 27/13,14 (module address for two X.25P modules installed in the same concentrator)

restore x25p module 27/2,12-14 (modules addresses for four X.25P modules installed in the same concentrator)

Port Number

The **PORT NUMBER** parameter is a number from *1* to *4* for V.35 or from *1* to *8* for RS-232-C. This number identifies a physical port on a module. A port number or port numbers can be entered as a single port number entry or as a multiple port number entry. For a single port number entry, enter only **one** port number:

```
PORT NUMBER [1-n: +(1-n)]: 1
```

For a multiple port number entry, enter a series of numbers (x,y,z), a range of numbers (x-z), or a combination of both (x-y,z):

```
PORT NUMBER [1-n: +(1-n)]: 2,3,4
PORT NUMBER [1-n: +(1-n)]: 1-4
PORT NUMBER [1-n: +(1-n)]: 1,3-4
```

When entering multiple port numbers, the parameter specifications made apply to all port numbers entered at the **PORT NUMBER** prompt.

X.25P module and port information is administered with separate iterations of the **enter x25p** command. Module information must be added before port information.

Baud Rates and Clocking Type

For V.35 modules, only external clocking is provided. The clocking or timing of data transmission speeds must be received from an external device attached to the module port. You will still be prompted for line speed; the number provided will be used in measurement calculations for the port.

For RS-232-C, you can select a clocking type of internal or external for each port. If the option of internal is selected, you are limited to the speeds supported by the module, which are shown in the prompt.

SVCs, PVCs, and PDDs

The **NUMBER OF USER CHANNELS** for each X.25P port can be partitioned into a contiguous range of PVCs followed by a contiguous range of SVCs.

An SVC forms a dynamic connection between two endpoints which is made during the call establishment and call termination phases of call processing. For host services, an SVC can be configured as a contiguous range of channels for each port at the **NUMBER OF SVC CHANNELS PER PORT** prompt. SVC channels can then be designated as *originate*, *receive*, or *2way* channels, via the **SVC DIRECTION** prompt. To accommodate these three types of channels, corresponding originating, receiving, and two-way groups must be created with the **group** command and the group name must be specified at the **SVC GROUP** prompt. If **SVC DIRECTION** is *2way*, parameter options for **NUMBER OF RECEIVE ONLY CHANNELS** and **NUMBER OF ORIGINATE ONLY CHANNELS** prompts may be designated in the form of a channel range.

If required, the destination address of an SVC can be defined as a PDD at the **PREDEFINED DESTINATION** prompt. A PDD is a string of *1* to *72* characters that enables a service address and an optional physical address or other secondary address to be specified so an originating device can automatically connect to its host and service when it is turned on.

For internodal connections, a PDD designates the receiving network, area, and exchange as well as the service address and physical address. The format of a PDD is:

[[[<network>/]<area>/]<exchange>/]<local>[.<module/concentrator>.<channel>]

A PDD can be established for the entire range of originate only or two-way SVC channels. All calls originated by a host are routed using this PDD. If the associated group is a two-way group, the host can receive switched calls.

A PVC is a dedicated connection between two specified endpoints that can be made only if the module channel allocation is not depleted by SVCs. Unlike an SVC, the call establishment and call termination phases of call processing do not exist with a PVC. A single channel range for host service can be specified at the **NUMBER OF PVC CHANNELS** prompts.

This channel range must be associated with the name of an existing two-way group at the **PVC GROUP** prompt. Each channel in the PVC group can have a PDD set up once the X.25 link and packet layers have been brought up. In the case that PDDs are not associated with any channels, they will be available for connections initiated from other PVC endpoints or from asynchronous endpoints. Also, you must define a range of endpoints at the **ENDPOINT NUMBER FOR PVC CHANNELS** prompt. These endpoint numbers are then associated with logical channel numbers and destination.

The **PVC DESTINATION** address can be in the form of a PDD or a single destination channel consisting of a service address, module address, and other component identifiers. The connection is established when both ports are put into service and remains in service until the ports are taken out of service or the PVC destination has changed. Although the destination address of a PVC can optionally assume the format of a PDD, differences between the two exist. A PDD can be specified for an entire SVC channel range because it does not require an exact destination channel. A PVC cannot be specified when a range of ports is being configured because the range cannot have an exact destination channel (more than one channel could connect to the same PVC partner channel); therefore PVC administration requires one **PVC LOGICAL CHANNEL NUMBER** per **PVC DESTINATION.** The following table summarizes these and other distinctions:

TABLE 4-2. SVC, PDD, and PVC Distinctions

Criteria	SVC	PVC	PDD
Call establishment and connection occur dynamically.	√	–	√
Call connection is established when ports are put into service.	–	√	–
Call connection is terminated when ports are removed from service.	–	√	–
Call establishment and connection can occur via one or more than one channel.	√	–	√
Connection can only occur via one channel.	–	√	–
Destination address can be specified in PDD-type format.	√	√	√
Destination address can be specified as a single logical channel.	–	√	–

The SVC and PVC channel range can each be configured with an X.121 endpoint number (EPN) or range of EPNs, and X.25P closed user group (CUG) security. If CUG security is administered, a CUG profile must have already been administered in the database.

The SVC to PVC feature allows a user to set up SVC calls to an X.25 PVC directly. The PVC group is associated with an address, which is used by the user when making the call. For this feature, **PVC DESTINATION** should be set to *none*, since the user will be initiating the call.

Billing

X.25P module billing can be activated for each port administered by specifying *on* at the **BILLING STATUS** prompt. An X.25P billing record is generated each time a call setup or a call take down occurs through the port as well as when data duration and data thresholds are met.

The network node time stamps the billing records for each range of SVCs and PVCs and sends them to *StarKeeper* II NMS. *StarKeeper* II NMS also synchronizes the node clocks and accounts for any condition, such as time changes, node reboots, or power outages, that could affect billing.

The billing data records a count of the number of 128-byte segments transmitted and/or received during the call.

K, N2, and T1 Parameters

The X.25P module supports CCITT X.25 Recommendation for the Link Access Procedure Balanced (LAPB) parameters for a Single Link Layer (level 2). These parameters, which are administered at the port level, manage and control the data link, guarantee the reliable and transparent transportation of packets between the DTE and DCE across the transmission media, and manage link setup, disconnect, and reset.

These link-level parameters are fully explained in the **enter x25p** command section of the **X.25P Commands** chapter. The following table summarizes these parameters and their options:

TABLE 4-3. X.25P Link Level Parameters

Parameter	Prompt	Options	Default	Meaning
K	**MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K)**	1-7 frames (basic) 1-32 frames (extended)	7 frames (basic) 20 frames (extended)	Maximum sequentially numbered I-frames port can have unacknowledged simultaneously.
N2	**MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2)**	1-255 attempts	7 attempts	Maximum transmission attempts port can make before alarm is issued.
T1	**WAITING ACKNOWLEDGEMENT TIMER (T1)**	50-60000 ms	3000 ms	Maximum milliseconds port must wait before acknowledging a timer violation so an alarm is issued.

Logical Port Type

This parameter specifies whether the port will be a DCE or DTE at the X.25P link and packet layers. For normal connection to an X.25P Host, this will be DCE. However, there may be cases where the X.25P port would be required to act like the DTE at this link and packet layer, so the option is configurable.

EPNs, CUGs, and Default Calling Addresses

Data Networking Products support NANP X.121 addressing with the network. A NANP X.121 address is a 4-level address. It starts with a 4-digit data network identification code (DNIC), followed by a 3-digit service region (SR), followed by a 4-digit service area (SA), followed by a 4-digit endpoint number (EPN). Each X.25P endpoint has a unique EPN or range of EPNs associated with it. This EPN address is associated with an X.25P port with the **enter x25p** or **change x25p** command at the **`ENDPOINT NUMBERS FOR SVC CHANNELS FOR PORT <n>`** prompt, or at the equivalent prompt for PVC channels.

The security feature of CUGs is provided, including CUG selection, CUG with outgoing access, and CUG with incoming access. CUGs are created with the **profile** command, then associated with the X.25P port at the **`CLOSED USER GROUP PROFILE ID`** prompt.

The **`DEFAULT CALLING ADDRESS`** field is prompted for when the **enter** or **change** command is used. It allows you to associate an address with the port to be used when a call is being made from the network to the X.25 host, and no originating calling address exists. This configured default calling address is inserted into the call request packet as the calling address. This address can be used, regardless of whether the originator provides an address, if default calling address substitution is enabled. Otherwise, the default calling address is inserted only when it is missing.

Packet Segmentation

Packet segmentation is the breaking up of larger packets into smaller packets and is supported for SVC and PVC calls between two X.25P endpoints. This allows the ends of the call to have different packet sizes. Packets from the larger size end are segmented into smaller packets while preserving M and D bit integrity before transmission to the endpoint with the smaller packet size. Conversely, smaller packets are combined into larger packets, again preserving M and D bit integrity before transmission to the endpoint with the larger packet size.

Packet segmentation is turned on and configured with the **`SEGMENTATION`** prompt parameter. The **`PACKET SIZE NEGOTIATION`** and **`MAXIMUM REMOTE PACKET SIZE`** prompts are related to this parameter.

The **`PACKET SIZE NEGOTIATION`** prompt, when used in conjunction with the segmentation feature, indicates whether the X.25P should put the packet size facility in the call setup packets. Negotiation down to a common packet size is not performed when segmentation is "on". The **`MAXIMUM REMOTE PACKET SIZE`** is used in order to prevent channel allocations that may exceed the capacity of the module. This parameter indicates the largest packet size expected from the remote end of any calls to or from the port in question. Hence, one port may support calls to different endpoints with different packet sizes, but the largest packet size must be known at configuration time.

The larger the remote packet size, the fewer the number of channels that can be supported. If, during call setup, a call is attempted with an endpoint whose a packet size is larger than **MAXIMUM REMOTE PACKET SIZE** , the call will be cleared with the cause code **network congestion** and the diagnostic code **no additional information** . Also, the alarm 9100, **Misconfiguration of packet sizes for segmentation** will be issued.

Hunt Groups, Called Line Address Modified Notification, and Hunt Group Address Substitution

Called Line Address Notification indicates the reasons that the called address in the packet are different from that specified in the call request packet. The use of this facility is configurable. If this facility is on, the X.25P module passes this facility (if it receives it) to the DTE which has originated the call.

Hunt Group may be set up for all modules by using **enter address** and **enter group**. For call types other than PAD, it is possible to do a hunt group address substitution. This feature can be turned on or off on a per port basis. If this feature is on, when an ingress call request is addressed to a hunt group, the actual address of the selected DTE (instead of the hunt group address) will be placed in the call request to the DTE.

Window Size, Packet Size, and User Channels

To engineer the network for maximum throughput for each application, the X.25P module supports both standard and nonstandard* *window sizes* and *packet sizes* on a per-port basis.

A packet is a bundle of data represented in binary form for network transmission. A standard 128-byte packet or a nonstandard 256, 512, or 1024-byte packet can be administered through the **DEFAULT NETWORK LEVEL PACKET SIZE** prompt.

The window size represents the number of data packets that can be transmitted without additional authorization from the receiver. The window size—which can be the standard *2* frames or the nonstandard *1, 3, 4, 5, 6,* or *7* frames—is administered through the **DEFAULT NETWORK LEVEL WINDOW SIZE** prompt. To accommodate the nonstandard packet and/or window sizes, the recommended number of user channels (administered through the **NUMBER OF USER CHANNELS PER PORT** prompt) is limited.

Although more channels can be configured, it is advised that the following equation be used to calculate the maximum number of channels depending on the values specified at the **DEFAULT NETWORK LEVEL WINDOW SIZE PACKET** (window size) and the **DEFAULT PACKET SIZE** (packet size) prompts during an iteration of **enter x25p**. See Table 4-4 for examples.

---

* Nonstandard packet and window sizes are those values other than the mandatory default values specified by international standards.

$$H=\sum_{i=1}^{N} C_i * \frac{PS_i * WS_i}{[(2)*(128)]}$$

$$V_j=\frac{(507-H)}{T} \frac{*[(2)*(128)]}{PS_j * WS_j}$$

$$UC_j \leq \min[V_j, \frac{1}{T} * (UCM-\sum_{i=1}^{N} C_i)]$$

Where:

T=number of port(s) being administered
H=normalized number of user channels already administered for the module
UC_j=number of user channels for port j; where: j is one of the T port(s)
PS_i=packet size for port i, as determined below
WS_i=window size for port i, as determined below
C_i=number of administered user channels for port i
UCM=number of administered user channels for the module
N=number of ports on this module

Determination of packet size used above is as follows:

- If negotiation is off and segmentation is off, use **DEFAULT NETWORK LEVEL PACKET SIZE** .
- If negotiation is off and segmentation is on, use either **MAXIMUM REMOTE PACKET SIZE** or **DEFAULT NETWORK LEVEL PACKET SIZE** , whichever is higher.
- If negotiation is on and segmentation is off, use **MAXIMUM PACKET SIZE.**
- If negotiation is on and segmentation is on, use either **MAXIMUM PACKET SIZE** or **MAXIMUM REMOTE PACKET SIZE** , whichever is higher.

Determination of window size used above is as follows:

- If negotiation is off, use **DEFAULT NETWORK LEVEL WINDOW SIZE** .
- If negotiation is on, use **MAXIMUM WINDOW SIZE** .

TABLE 4-4. Conditions Affecting Recommended Maximum Channel Allocations

Window Size	Packet Size	Number of Channels per Module	Number of Channels per Port (4)	Number of Channels per Port (8)
2	128	507	126	63
2	256	253	63	31
2	512	126	31	15
2	1024	63	15	7
3	128	338	84	42
3	256	169	42	21
3	512	84	21	10
3	1024	42	10	5
4	128	253	63	31
4	256	126	31	15
4	512	63	15	7
4	1024	31	7	3
5	128	202	50	25
5	256	101	25	12
5	512	50	12	6
5	1024	25	6	3
6	128	169	42	21
6	256	84	21	10
6	512	42	10	5
6	1024	21	5	2
7	128	144	36	18
7	256	72	18	9
7	512	36	9	4
7	1024	18	4	2

The calculation for the number of channels on a module is as follows (assume only one port):

(507*2*128)/(*PS***WS*)

The following equations give the formula needed to calculate window sizes and packet sizes when modifying parameter options with **change x25p**.

Window Size: the values for window sizes range between 1 and B, where B is equal to WS_j.

$$H=\sum_{i=1}^{N} C_i * \frac{PS_i * WS_i}{[(2)*(128)]}$$

$$WS_j=\frac{(507-H)}{T} \frac{*[(2)*(128)]}{PS_j * UC_j}$$

Packet Size: the value for packet sizes range between 1 and K, where K is equal to PS_j.

$$H=\sum_{i=1}^{N} C_i * \frac{PS_i * WS_i}{[(2)*(128)]}$$

$$PS_j=\frac{(507-H)}{T} \frac{*[(2)*(128)]}{WS_j * UC_j}$$

Address Masking

The address masking feature provides the capability to mask the calling or the called address in the **CALL REQUEST** packet. This occurs only after network routing, at the point of network egress. This feature applies to host-to-host calls only (not PAD calls).

Address masking can be enabled (turned *on*) or disabled (turned *off*) for either the called or the calling address for every X.25P module port. With address masking, the address that is to be placed in the incoming call packets to the attached X25 device is masked with a prefix and/or a suffix of administrable digits. After all the translations and substitutions are performed, these digits then mask the original incoming calling or called address. They form the calling or called address that is sent to the attached X.25 device.

The new address is formed by prepending a user supplied string to a specified number of digits taken from the end of the old calling/called address. For example:

Old Address	Mask String	Number of Masked Digits	New Address
9001614868	123456	3	123456868
9001614868	123456	6	123456614868
123456	999	1	9996
123456	999	3	999456

Facility Parameters for SVCs

Certain facility parameters can be specified for ports administered as SVCs. These parameters—which are specified in the call request, call connect, and clear packets—convey accounting, billing, and tariff data, and specify other options involved with data transfer.

Values for throughput rates must be specified in the **`DEFAULT NETWORK LEVEL THROUGHPUT CLASS`** prompt. The remaining facility parameters are activated by specifying the options *on* or *off*. These parameters are fully explained in the **enter x25p** commands section of **X.25P Commands** chapter:

- **`REVERSE CHARGING`**
- **`REVERSE CHARGING ACCEPTANCE`**
- **`FAST SELECT`**
- **`FAST SELECT ACCEPTANCE`**
- **`CALLED ADDRESS MODIFIED NOTIFICATION`**
- **`THROUGHPUT CLASS NEGOTIATION`**
- **`CLOSED USER GROUP`**
- **`CLOSED USER GROUP WITH OUTGOING ACCESS`**
- **`RPOAS`**
- **`TRANSIT DELAY SELECTION AND INDICATION`**

X.28 SIG Parameter Considerations

The **enter x28sig** command enables you to administer a message at the **`X.28 PAD ID SERVICE SIGNAL`** prompt that is sent to all terminal end users when they gain access to a node PAD. Only one signal can be administered per node.

When an asynchronous end user calls an X.25P host, a short message appears on the screen indicating that the user terminal is in the PAD waiting state.

Administrative Procedures

The initial administration of an X.25P module and its ports (**Procedure 4-2** and **Procedure 4-3**) is not hardware-dependent—that is, the module does not have to be physically installed before its information is entered in the database. For routine administration and operations procedures, such as removing and restoring module ports to service or displaying hardware status, module installation is required.

Use the database entry forms in Appendix B to facilitate gathering and entering information for the X.25P.

For minor database changes, such as modifications to only a few parameters, follow **Procedure 4-4**. For database changes involving extensive configuration adjustments, follow **Procedure 4-5**.

PROCEDURE 4-1. Entering an X.28 PAD Identification Service Signal

Applicability: One message per node; nodes administered for X.25P or X.75 service.

1. Use **enter x28sig** to add a message to the database. This message is entered at the **`X.28 PAD ID SERVICE SIGNAL`** prompt.
2. Use **verify x28sig** to check the message that you have just added to the database.
3. If you made any errors or have to change the message, use **change x28sig.** If you need to remove the message, use **delete x28sig.**

PROCEDURE 4-2. Entering an X.25P Module

1. Use **enter x25p module** to commence administration. Have your completed database entry forms handy and remember that default values can be specified by pressing Return or + .
2. Use **verify x25p** to check your entries.
3. If you made any errors or have to change parameter specifications, use **change x25p module.** If you need to start over, use **delete x25p module** to eliminate all entries made; then begin again with **enter x25p module.**
4. If the module was installed, use **restore x25p module.**

PROCEDURE 4-3. Entering X.25P Ports

1. Use **verify address, verify epn, verify group,** and **verify profile** to determine if the appropriate PDDs, EPNs, group name, and X.3 and CUG profile IDs have been entered. If they do not appear in the database as required (they were deleted; they have changed; they are misspelled), see the *Node Reference* for procedures on how to make the necessary changes.
2. Use **enter x25p port** to commence administration. Have your completed database entry forms handy and remember that default values can be specified by pressing Return or + .
3. Use **verify x25p** to check your entries.
4. If you made any errors or have to change parameter specifications, use **change x25p port.** If you need to start over, use **delete x25p port** to eliminate all entries made; then begin again with **enter x25p port.**
5. If the module was installed, use **restore x25p port** to place ports in service.

PROCEDURE 4-4. Making Minor Database Changes

Applicability: For the X.25P module, a minor database change constitutes a change to a few parameter options.

1. If changes involve addresses (PDDs or EPNs), groups, or profiles, make the needed changes with iterations of the **address**, **group**, or **profile** commands. Use **verify** <**object**> to check additions/modifications. See the *Node Reference* for details.
2. When making changes, remove the module or its ports from service with **remove x25p** <**component**>**.**
3. Make modifications with **change** <**object**>**.**
4. Check changes with **verify** <**object**>**.**
5. When making changes, return module or its ports to service with **restore x25p** <**component**>**.**

PROCEDURE 4-5. Making Extensive Database Changes

Applicability: For the X.25P module, an extensive database change constitutes a change made to most of the parameter options for the entire database entity or for all configured ports on one or more modules, or for changing the number of channels on a port.

1. If changes involve addresses (PDDs or EPNs), groups, or profiles, make the needed changes with iterations of the **address**, **group**, or **profile** commands. Use **verify** <**object**> to check additions/modifications. See the *Node Reference* for details.

PROCEDURE 4-5. Making Extensive Database Changes (continued)

2. Use **verify** <**object**> for a report of the existing parameter options specified. If you feel the need to, complete the database entry forms furnished in **Appendix B.**
3. When changing information, remove the module or its ports from service with **remove x25p** <**component**>**.**
4. Eliminate unused database information with **delete** <**object**>**.**
5. Re-enter all information with **enter** <**object**>**.**
6. Verify changes with **verify** <**object**>**.**
7. When changing information, return the module or its ports to service with **restore x25p** <**component**>**.**

PROCEDURE 4-6. Moving Database Information to Another Module Address

Module information can be moved to another module address within the same node with the **move module** command or with a combination of **delete** and **enter**.

Method 1:

1. Remove the module ports, then the module, from service with **remove x25p port** and **remove x25p module**.
2. Use **verify module** to ensure that a database entry was not made for the new module address. (If a database address does exist for the specified module address, **move module** fails.)
3. Use **move module** to transfer database information from one module address to another.
4. Physically move the hardware.
5. Using the new module address, put module back into service with **restore x25p module.** Then, put the module ports back into service with **restore x25p port.**

Method 2:

1. If **move module** is not appropriate for the situation, use **verify x25p** for a report of the configuration data.
2. Use **remove x25p port** to remove the port from service and **remove x25p module** to remove the module from service.
3. Use **delete x25p port** and **delete x25p module** to eliminate all information at the existing module address.
4. Use **enter x25p module** followed by **enter x25p port** to add the information to the new address.
5. Check information entered at the new address with **verify x25p.**

PROCEDURE 4-6. Moving Database Information to Another Module Address (continued)

6. Physically move the hardware.
7. Restore the new X.25P module and its port to service with **restore x25p module** and **restore x25p port.**

PROCEDURE 4-7. Copying Database Information to Another Module Address

Module and port information cannot be duplicated from one module address to another module address with the **copy module** command because X.25P module ports require endpoint numbers. The **copy module** does not have the capability to generate unique endpoint numbers for each port for which information is duplicated. Therefore a combination of **verify x25p** and **enter x25p** must be used.

1. Use **verify x25p** for a report of the existing parameter options specified. If you feel the need to, complete the database entry forms furnished in **Appendix B.**
2. Re-enter the information with **enter x25p module** followed by **enter x25p port.**
3. Check information entered with **verify x25p.**

Reports

The following table explains the reports available to assist with analysis of module/network performance, system expansion, troubleshooting, and other routine tasks.

TABLE 4-5. Available Reports for X.25P modules

Report Topic	Command	Description
billing	**verify schedule**	Lists the billing schedule for ports administered as PDDs.
comment data	**verify comment**	Lists all comments entered for X.25P ports.
component data	**dstat x25p**	Lists hardware/software data for the specified component. The module must be installed.
connection/traffic data	**display connections** **display traffic***	Lists established connections for modules, groups, or hosts. Group names are included. Lists traffic data for modules, groups, or hosts. Segment counts are included. See the *Node Reference*.
database size	**dbaudit**	Shows where database space expenditures occur. If **dbresize** is used, the database tables are readjusted automatically. See the *Node Reference*.
end user messages	**verify x28sig**	Lists the current X.28 PAD ID signal that is administered for the node.
EPNs	**verify epn**	Lists all assigned endpoint numbers or ranges of endpoint numbers.
measurements data	**dmeas x25p**	Lists measurements/traffic data for the specified component. The module must be installed.
module/port data	**verify x25p**	Lists hardware/software module/port data as it currently appears in the configuration database. Module does not have to be installed.
out-of-service modules	**verify oosmods**	Lists all configured modules that are currently out of service.
shelf data	**verify shelf***	Lists data for the specified shelf and the modules housed in the shelf.

*BNS-2000 only

X.25P Troubleshooting

X.25P Troubleshooting

For information about a general, systematic approach to troubleshooting, refer to the *Node Reference*. Using the method outlined there, you can diagnose problems affecting the entire node and isolate localized problems to a specific interface module.

Once the problem is isolated to the X.25P module, this chapter can help identify and further isolate X.25P-related problems. It provides problem indicators that are X.25P-specific, a checklist of problem areas, and detailed procedures or further references to remedy the problem. This chapter does not explain problem indicators that are common to all modules; these are explained in the *Node Reference.* In addition, this chapter does not provide problem isolation techniques or procedures for end users or their end devices. Refer to the *Node Reference* for this information.

Problem Indicators

Module faceplate indicators and the output of certain commands are often problem indicators that are specific to the X.25P.

Faceplate Indicators. The lights associated with the faceplate are green, yellow, and red. They indicate on-line, off-line, and fault states. When the red light (fault light) is lit, the module circuitry and the database are inconsistent. When pressed, the reset push button clears the module buffers and registers, and restarts the module application program. Ports are taken out of service and connections are terminated.

Command Output. The output of operations commands—such as **diagnose x25p**, **dstat x25p**, and those listed in the following table—can indicate an existing or potential problem.

TABLE 5-1. Command Output

Command	Description	Further Reference
diagnose x25p	Enables execution of module diagnostics and port loopback tests. Test patterns can be looped from the control computer to internal and external ports, and local and remote modems.	See X.25P diagnostic procedures in this chapter. See **diagnose x25p** in **X.25P Commands**. See appropriate vendor documentation for connected end device.

TABLE 5-1. Command Output (continued)

Command	Description	Further Reference
display connections	Shows established connections for modules, groups, or hosts. Group names and segment counts are included.	See the *Node Reference*.
display traffic*	Shows established connections for modules, groups, or hosts. Segment counts are included.	See the *Node Reference*.
dmeas x25p	Shows measurements data for a module and its ports.	See **X.25P Commands**.
dstat x25p	Provides useful hardware and software troubleshooting information, such as the number of module resets, parity errors, sanity errors that occurred during a five-minute interval, and link status; and module service state and mode state information as determined by status packet data. Output can be compared to that of **verify x25p** and module faceplate indicators.	See **X.25P Commands**.
verify shelf*	Lists data for the specified shelf and the modules housed in the shelf.	See **X.25P Commands**.
verify x25p	Shows all parameter options configured for the X.25P module and any configured port or ports; useful in determining if currently configured parameter options of X.25P module and connected end device options match.	See **X.25P Commands**.

*BNS-2000 only

Problem Areas

Once you have determined that the problem does not involve the node or its critical modules, or any connected end device, the problem can be isolated to the X.25P module. The following tables further isolate X.25P-specific problems into download problems, link failures, call setup problems, and general performance issues.

TABLE 5-2. X.25P Problems Checklist

√ Symptoms/Indicators	Possible Causes	Actions
____ No calls in progress; or cannot make calls; or X.25P link problem (shown via alarms, or **dstat x25p**, **display connections**, **display traffic** output, or call reject cause code).	Bad cabling connection. X.25P module faulty. Blown slot fuse. Module/ports not in service. X.25P link at capacity. X.25P will alarm this condition. Incompatible L2, L3, or facility parameter. Configuration mismatch.	See **Procedure 5-1. Resolving Download Problems**, **Procedure 5-2. Resolving Link Failures**, and **Procedure 5-4. Monitoring Performance**. See the *Node Reference* for slot fuse and command information. See diagnostic procedures in this chapter.
____ Red LED lit on module.	X.25P module faulty.	

TABLE 5-2. X.25P Problems Checklist (continued)

√ Symptoms/Indicators	Possible Causes	Actions
____ End users cannot make calls through X.25P module. (They receive call reject error message.) ____ Cannot set up PVC; cannot complete call.	Wrong X.25P address or security violation. Incompatible X.3 PAD parameter. Two ends of PVC service have mismatched packet/window sizes. Remove access was done. Two ends of X.25P call have mismatched segmentation parameters. Incompatible user facility. Incorrect starting SVC channel.	See **Procedure 5-3. Call Setup Problems** and **Procedure 5-4. Monitoring Performance**. See the *Node Reference* for procedures regarding end user problems.
	Problem with connected end device.	See **Procedure 5-3. Call Setup Problems.** See diagnostic procedures in this chapter. See the *Node Reference* for procedures regarding connected end device (modem pool). See appropriate vendor documentation for connected end device.
____ Output of **diagnose x25p** indicates problems.	Faulty connection. Faulty module. Problem with connected end device.	See **Procedure 5-4. Monitoring Performance**. See diagnostic procedures in this chapter. See the *Node Reference* for troubleshooting procedures regarding end user problems and connected end devices (modem pools). See appropriate vendor documentation for connected end device.

Procedures

The following sections explain the considerations that should be taken into account and the procedures that should be followed when troubleshooting an X.25P module.

- **Procedure 5-1. Resolving Download Problems** explains the areas that should be checked to resolve download problems.
- **Procedure 5-2. Resolving Link Failures** explains the steps that should be taken to resolve link failures.
- **Procedure 5-3. Resolving Call Setup Problems** lists the areas that should be checked when call setup problems are suspected.
- **Procedure 5-4. Monitoring Performance** gives an in-depth analysis of X.3 profiles, and X.25P module and port parameters that cause performance degradation.

The X.25P diagnostics section provides procedures that should be followed when running on-line loopback tests and off-line module tests. These procedures include the following:

- **Procedure 5-5. Starting On-line Loopback Tests**
- **Procedure 5-6. Running Internal Port Test**
- **Procedure 5-7. Running External Port Test**
- **Procedure 5-8. Running Local Modem Test**
- **Procedure 5-9. Running Remote Modem Test**
- **Procedure 5-10. Completing On-line Loopback Tests**
- **Procedure 5-11. Running Off-line Module Diagnostics**

PROCEDURE 5-1. Resolving Download Problems

1. Verify that the correct I/O distribution board is being used with the module. See **Appendix A**.
2. Use **verify x25p** to determine if the I/O distribution board clocking type (DTE/external clocking or DCE/internal clocking) matches the administered database option for that port. **Appendix A** provides additional information about I/O distribution board specifications.
3. If the module's green LED is lit, verify that the module is actually in service with **verify x25p**.

   If the module is installed in a concentrator and the concentrator is physically removed while the X.25P download is in progress, the restoration process stops. The green LED remains lit even though the module is not in service. Use **restore concentrator** and then **remove x25p** and **restore x25p**. Use **verify x25p** to once again check the module service state.

PROCEDURE 5-1. Resolving Download Problems (continued)

4. Check and reconnect the cables; see **X.25P Cabling**.
5. Record any alarms. See the *Messages Reference* for a complete alarm description.
6. If the module resides in a concentrator, check the link for errors.
7. Use **verify x25p** to determine if the download server and the software version are correct. If they are not the system defaults (which are *controller* and *standard*), determine if the filenames are correct and if the path to the host is functional.
8. Reseat the module and use **restore x25p module** to retry the download.
9. Run off-line module diagnostics. Refer to diagnostic procedures provided in the following section.
10. Replace the module and use **restore x25p module** to retry the download.
11. Check backplane voltages to determine if a power problem exists and verify that the voltages on the node power supplies are set correctly. (Refer to the *Node Reference* for voltage check procedures.)

PROCEDURE 5-2. Resolving Link Failures

When you restore an X.25P port to service, the message **`Link has come up`** appears on the system console (provided the attached device is asserting its EIA leads). When the attached device responds to the X.25P module's restart packet with **`Restart Confirmed`**, the **`Packet level restart`** message appears. In addition, the output of **dstat x25p** shows the service state of the link as *in service*. If the link is not in service, perform the following steps:

1. Use **verify x25p** to verify that the module and port are in service.
2. Check the I/O distribution board to determine if the appropriate I/O board is being used for the configuration. See **Appendix A**.
3. Check the I/O distribution board cabling to determine if the correct cables are being used and if the cable connections are secure.
4. Use **dstat x25p** for the port in question and specify the *high* detail option. The Electronic Industries Association (EIA) control signals (DTR, DCD) should be *on*. If the I/O distribution board is a DCE type, the attached device should be asserting DTR. If the I/O distribution board is a DTE type, the attached device should be furnishing DCD and clocking. If the attached device is not furnishing this signal and the clocking, the link remains down. Install a breakout box on the line to check these signals. Put the breakout box at the node side and then at the attached device side. Detach the cable, one end at a time, and verify that the signals are originating from the expected side and conflicts are not present.
5. If the link is still not in service, do the following:

PROCEDURE 5-2. Resolving Link Failures (continued)

A. Use the **remove** and **restore** commands to remove and restore the module and port.

B. Run diagnostics. (Refer to later sections in this chapter for procedures.) If on-line loopback diagnostics fail, the module is probably not faulty. Loopback diagnostics fail if the connected end device is not supplying the proper EIA leads. If the off-line module diagnostics fail, the module is probably faulty.

C. Try a new module and I/O distribution board.

D. Check the slot fuse.

E. Change the slots.

F. Check the backplane voltages.

6. Use **verify x25p** to check the **`LOGICAL PORT TYPE`** parameter with values of DCE and DTE. The normal value for connection to an X.25P host is DCE.

7. Use a protocol analyzer on the link to verify that valid clocking is present at the required rate.

   The establishment of the link level involves the exchange of level 2 link synchronization messages known as Set Asynchronous Balanced Mode (SABM) and Un-numbered Acknowledgement (UA) frames. If SABMs are being sent by both sides, they are both defined as logical DTEs (PDNs) or logical DCEs (X.25P hosts).

8. Check the protocol compatibility between the node and the external interface. If the node protocol is incompatible with the facility protocol, correct any inconsistencies in the configuration.

   After the link comes up during normal operating conditions, a packet-level restart message appears on the system console. If this message does not appear, check the protocol analyzer for problems.

PROCEDURE 5-3. Resolving Call Setup Problems

1. Verify that the end user used the proper address and format when calling from the local node.

2. Check for invalid addresses or invalid facility parameters, including address, security, port, and X.3 PAD parameters. Ensure that the parameters are appropriate for the connections. (X.25P services use the North American Numbering Plan (NANP) which has the format: DNIC/SR/SA/EPN. This numbering scheme consists of a 4, 7, 10, or 14-digit address.) Do the following:

   A. Verify that the window size facility in the call setup packet is appropriate for the configured **`NETWORK LEVEL WINDOW SIZE`** and **`MAXIMUM WINDOW SIZE`**.

PROCEDURE 5-3. Resolving Call Setup Problems (continued)

B. Verify that the packet size facility in the call setup packet is appropriate for the configured **NETWORK LEVEL PACKET SIZE** and **MAXIMUM PACKET SIZE**.

C. Verify that both ends of the call are either configured for segmentation *off* or both are configured for segmentation *on*.

D. For PAD calls, if address checking is *on*, verify that the EPN address of the outgoing host call is within the preconfigured range of EPNs.

E. Verify that the address of the PAD was configured with PAD support "yes."

3. For new installations, set up a new X.25P link with the host administrator. Consider the options these parameters afford:

   - number of SVC and PVC channels
   - expected facility parameters, such as packet and window size negotiation
   - X.29 usage for changing remote profiles and valid addresses
   - logical channel numbers (LCNs) for ports belonging to originating, receiving, or two-way groups
   - starting logical channel number for SVCs

   NOTE: Incoming calls to the local node use originating or two-way group channels. If an incoming call arrives at a receiving channel, it is cleared. PVC channels must have an administered PDD, unless the SVC to PVC feature is used. Because the node reserves control channels, node channels do not map directly to X.25P logical channels. For instance, the first node user channel is 5, which maps to *lcn 1* on the X.25P link. Subtract 4 from the node channel for the X.25P LCN.

4. Review messages received at the originating terminal. If a call is cleared, a CLR message should be returned. This message gives the X.25P clearing and diagnostic codes and/or an X.28 PAD message.

5. If messages or codes are not available from the originating terminal, use a protocol analyzer and look at the CLR packet. Most protocol analyzers fully decode the packet and display the type of error (for example: *not obtainable, local procedure error*). Abnormal call termination codes **(ABNORM TERMS)** are also furnished in **dmeas** output.

PROCEDURE 5-3. Resolving Call Setup Problems (continued)

6. Verify that the **PACKET SIZE NEGOTIATION, WINDOW SIZE NEGOTIATION, THROUGHPUT CLASS NEGOTIATION, FAST SELECT ACCEPTANCE,** and **REVERSE CHARGING ACCEPTANCE** parameters are administered as *on*, if these features are being used.
7. Verify that X.25P ports are administered correctly.
8. Verify that the value administered for the starting SVC channel number is correct. The default is for this to be the first number past the PVC channels, but any higher number may be selected. The attached device must be using the same number.
9. Verify that all service addresses are restored to service, and check all routing and critical trunks.
10. Verify link capacity.
11. Run **dmeas x25p mod** and examine the **CONGEST COUNT** and **CONGEST SECONDS** fields. If the module is congested, new calls will be rejected.

PROCEDURE 5-4. Monitoring Performance

X.25P performance degradation can involve X.3 profiles, X.25P module throughput, and X.25P module and port configuration parameters.

1. Check the X.3 local profiles assigned to the port, as well as the profile assigned to the address associated with the port. These profiles are administered by the local node administrator.
   A. Verify that the configured X.3 profiles are acceptable to end users.
   B. Go into PAD mode and determine if the user changed profiles.
   C. Use **dstat x25p logchnl** to determine the current status of local X.3 parameters for active calls **(X3PARAM NO/X3PARAM VAL)**. An asterisk indicates that the parameter was changed during the session.
   D. For best performance, adjust the X.3 profile parameters for each application. Three administrative default profiles are provided: simple, transparent, and m-bit. The common profile is *simple*; the profile suitable for file transfers is *transparent*; and the profile needed to invoke the m-bit procedure between an asynchronous block device and an X.25P endpoint is *mbit*. The end user can specify each profile using the **prof** command at the PAD prompt. The network administrator can customize 10 other profiles. For information on the **profile** commands, see the *Node Reference*.

PROCEDURE 5-4. Monitoring Performance (continued)

2. With an external clocking speed of 64 Kbps, the X.25P module has a bidirectional throughput limit of 460 Kbps per second on the V.35 I/O board. For higher speeds, the maximum bidirectional throughput is 1 Mbps.

   For the RS-232-C I/O board, the throughput limit is 276 Kbps, which is 90% of the maximum speed of each port. For more information on throughput rates, refer to the *Data Networking Products Planning Guide*.

   Use **dmeas x25p** to check if the module is overloaded and congested. The **CONGEST COUNT** and **CONGEST SECONDS** fields indicate the number of times the module has gone into congestion and the number of seconds during which the module was congested, respectively. Use **dmeas** to monitor port utilization.

   Performance or congestion problems might also arise from over configuring the number of channels. If the recommended maximum number of channels as determined by the formula provided in **X.25P Administration** is exceeded, a warning message appears during an iteration of the **enter x25p port** or **change x25p port** commands.

3. Performance degradation can be caused by link errors generated by bad timing, bad transmission facilities, or faulty equipment. Use **dmeas x25p** to check for cyclic redundancy check (CRC) errors. CRC errors also show up on the protocol analyzer as bad frames. When errors occur, run diagnostics on the facility.

   NOTE: Receiver not ready (RNR) frames seen at the packet level via a protocol analyzer might not be a problem. Flow control provided by the asynchronous device might slow transmission. Check the protocol analyzer for full X.25P packets to verify accurate transmission.

4. Because the following module and port-level parameters are directly related to system performance, check their administered values with **verify x25p**:

   - **MAXIMUM NUMBER OF OUTSTANDING I FRAMES** (K)
   - **DEFAULT NETWORK LEVEL WINDOW SIZE (port-level** parameter)
   - **DEFAULT PACKET SIZE (port-level parameter)**
   - **MAXIMUM NUMBER OF ATTEMPTS TO COMPLETE A TRANSMISSION** (N2) (port-level parameter)
   - **SEGMENTATION PACKET SIZES**
   - **WAITING ACKNOWLEDGMENT TIMER (T1)**

   Refer to **X.25P Administration** for details on these parameter values.

X.25P Diagnostics

The following procedures explain how to begin running X.25P on-line loopback tests, off-line module tests, and the cables and connectors needed. Testing begins with the internal, then external, port tests, and progresses to the local and remote modems. It concludes with the off-line module tests. This section is supplemented by information contained in **X.25P Commands**, which explains the nature of each test, the diagnostic prompting sequence, and the meaning of each parameter and its options. System responses are also included.

Some general testing guidelines include:

- If end user problems occur after database configuration changes have been made or after an end user has changed terminal options, verify port options with **verify x25p** before running **diagnose x25p**.
- When installing or changing an X.25P module, run **diagnose x25p** on all ports.

Loopback Connectors

Loopback connectors are used with the **diagnose x25p** command to perform incremental loopback tests of the data circuit between the X.25P module and connected end device. When connectors are not available, loopback connectors for use with a modular jack or 110 patch panel can be built. The X.25P internal and external port tests, however, require the ED-5P056-30,G24 loopback connector for RS-232-C connections to X.25P hosts.

The following figures illustrate how to build loopback connectors. The top portion of the figure below shows how to modify one end of an 8-conductor modular plug. The bottom portion is a wiring schematic for the plug.

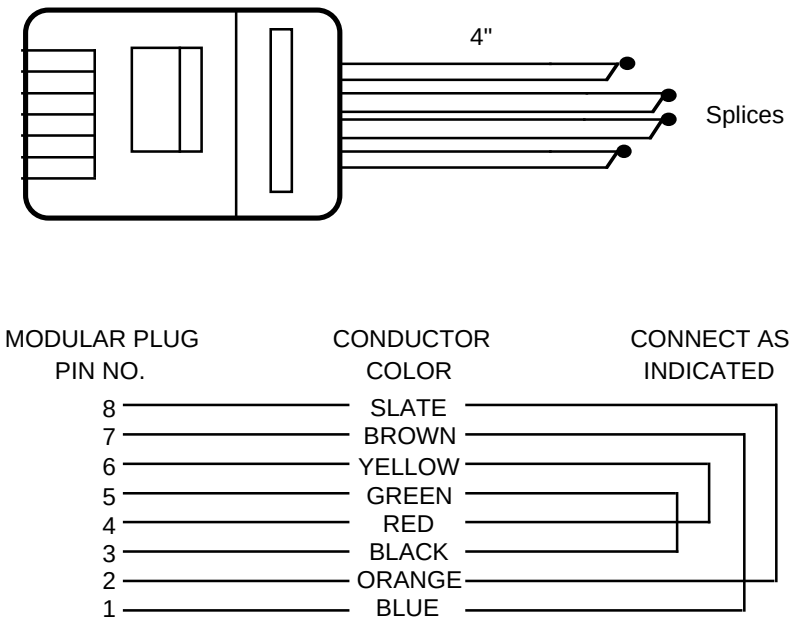


FIGURE 5-1. Loopback Connector for Use with a Modular Jack

The top portion of the figure below shows how to modify one end of a 4-pair 110 patch panel patchcord. The bottom portion is a wiring schematic for the plug.

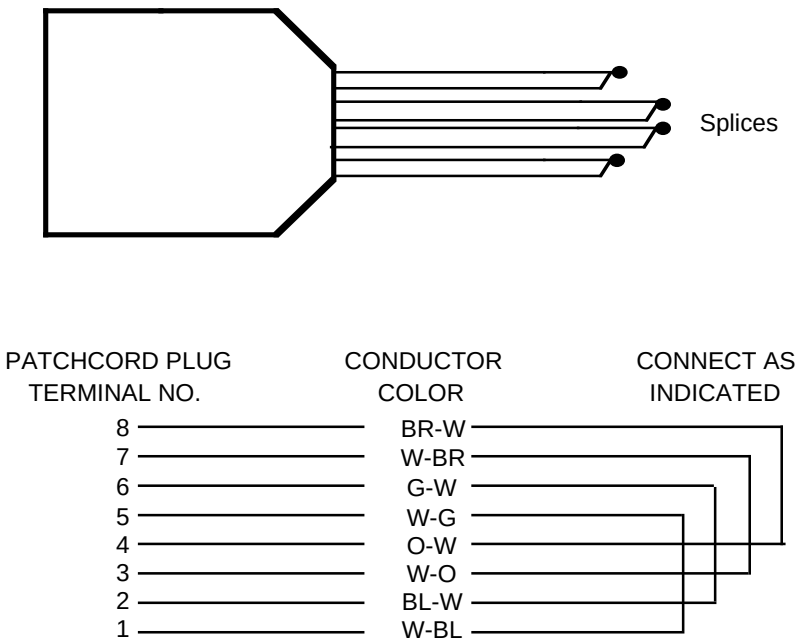


FIGURE 5-2. Loopback Connector for Use with a 110 Patch Panel

PROCEDURE 5-5. Starting On-line Loopback Tests

1. Remove the port to be tested from service: **remove x25p port** <**mod addr**> <**port num**>
2. Verify that port information is entered in the database and the port is out of service: **verify x25p** <**mod addr**>
3. Put any modems in loopback mode, and attach appropriate loopback connectors and cables. If appropriate loopback connectors are unavailable, refer to preceding directions that explain how to build a suitable pair of connectors. The X.25P internal and external port tests require the ED-5P056-30,G24 loopback connector for RS-232-C connections to X.25P hosts.

   When connecting loopback connectors for the *local_modem* or *remote_modem* test, it is not necessary to attach the loopback connector beyond the modem.

   NOTE: Improperly installed connectors and cables can produce diagnostic errors.

PROCEDURE 5-6. Running Internal Port Test

Applicability: Out-of-service ports. The internal port test puts the Universal Synchronous/Asynchronous Receiver/Transmitter (USART) within the module in loopback mode and sends a test message through the USART and back to the module.

1. Enter **diagnose x25p on-line** <**mod addr**> <**port num**> **internal_port**
2. If the test fails, the module might be faulty. Replace the module and repeat the test.
3. If the test passes, run the external port or local modem test, depending on whether a DCE or DTE I/O distribution board is being used.

PROCEDURE 5-7. Running External Port Test

Applicability: Out-of-service ports administered for internal clocking (RS-232-C only).

1. Enter **diagnose x25p on-line** <**mod addr**> <**port num**> **external_port**
2. If the test fails when the loopback connector is connected to the X.25P module, the X.25P I/O distribution board might be faulty.
3. If the test passes, the problem is probably in the connection to the device or the end connection.

PROCEDURE 5-8. Running Local Modem Test

Applicability: Out-of-service ports administered for external clocking (RS-232-C or V.35)

1. Enter **diagnose x25p on-line** <**mod addr**> <**port num**> **local_modem**

PROCEDURE 5-8. Running Local Modem Test (continued)

2. Put the local modem in loopback mode when the system prompts you.
3. If the test fails, the trouble is probably in the I/O distribution board, the cables between the I/O distribution board and the modem, or the local modem. Replace each component, one at a time, until the problem is resolved.
4. If the test passes, take the modem out of loopback mode and run the remote modem test next.

PROCEDURE 5-9. Running Remote Modem Test

Applicability: Out-of-service ports administered for external clocking (RS-232-C or V.35).

1. Ensure that the modem is attached and in service.
2. Enter **diagnose x25p on-line** <**mod addr**> <**port num**> **remote_modem**
3. Put the remote modem in loopback mode when the system prompts you.
4. If the test fails, the transmission facility between the two modems is faulty or the remote modem is faulty. Replace the faulty component or clear the faulty facility and repeat the test.
5. If the test passes, the transmission path from the local control computer to the remote modem is working.
6. If the test passes, but a problem still exists with the remote end, the connection between the remote modem and the remote end might be faulty. Replace the faulty component and repeat the test.
7. Take the remote modem out of loopback mode.

PROCEDURE 5-10. Completing On-line Loopback Tests

1. Remove any loopback connectors and cables.
2. Restore the port to service: **restore x25p port** <**mod addr**> <**port num**>
3. Verify that the port has been restored to service: **verify x25p** <**mod addr**>

PROCEDURE 5-11. Running Off-line Module Diagnostics

Applicability: Out-of-service X.25P module. The results are displayed at the end of each of the three tests. If any test fails, testing automatically stops at that point.

1. Use **remove x25p module** <**mod addr**> to remove the module from service.

PROCEDURE 5-11. Running Off-line Module Diagnostics (continued)

2. Enter **diagnose x25p off-line** <**mod addr**>
3. The X.25P module is faulty if you receive any of the following system responses.

```
Offline diagnostic boot test: FAIL
Offline diagnostic memory test: FAIL
Offline diagnostic download test: FAIL
  Inst. set:  FAIL
  Timer test:  FAIL
```

   The message **`Port <num>:  FAIL`** indicates that the numbered port (*1*, *2*, *3*, or *4*) is faulty. Replace the X.25P module and repeat the test. If a spare module is not available, the problem can be isolated by removing the indicated port from service.

4. If the module is not faulty, use **restore x25p module** <**mod addr**> to put the module back into service.

PROCEDURE 5-12. Running On-line Test Frame Tests

Applicability: In-service X.25P module port. A test frame is sent to the remote host. Test completion occurs when the test frame is received back from the remote host or when a timer expires without receiving an answer. The remote host must support this in order for the test to be successful.

1. Enter **diagnose x25p on-line**.
2. you will be prompted for a module address, port number, and test type. Only a test type of "test_frame" is allowed while the port and module are in service.
3. If the test succeeds, you will get the following response: **`HDLC test passed`**

   The X.25P may be faulty if you receive any of the following system responses:

```
Answer to HDLC test not received on time - HDLC test failed
No acknowledge received from remote STE - HDLC test failed
Unexpected response from the module - HDLC test failed
Local DCE/DTE has Level 1 down - HDLC test failed
Local DCE/DTE has Level 1 busy - HDLC test failed
Local DCE/DTE is in busy condition - HDLC test failed
Remote DCE/DTE is in busy condition - HDLC test failed
Local DCE/DTE has no buffers available - HDLC test failed
No acknowledge received from remote DCE/DTE - HDLC test failed
```

X.25P Commands

X.25P Commands

This chapter describes commands related to the administration, operation, and maintenance of an X.25P module: Commands that include the object **x25p** appear in alphabetical order by object by verb. System responses for all **x25p** commands conclude this chapter. Command prompts and options can vary, depending on the module hardware installed and the type of node software.

The **enter** command shows the full prompting sequence and contains a list of parameter definitions. Additional information on the parameters used in the prompting sequence of **enter** and **change** is given in **X.25P Administration**. In addition, the database entry forms provided in **Appendix B** follow the prompting sequence for each service type entered.

Procedures for running diagnostics can be found in **X.25P Troubleshooting**.

Other command objects that are related to the administration, operation, and maintenance of an X.25P module are documented in the *Node Reference*.

change x25p

The **change x25p** command enables you to modify X.25P module and port information. These restrictions apply:

- The **PADDLEBOARD TYPE** for a module may not be changed using the **change x25p** command. To make this change, use **delete x25p** to remove the existing information and **enter x25p** to enter the new information.
- To change a range or list of ports, all ports must have been identically configured when they were initially input and they must be removed from service.
- When a module is in service and the port is out of service, **change x25p** cannot be used to modify the **NUMBER OF SVC CHANNELS PER PORT, SVC DIRECTION,** and the **SVC GROUP** or **PVC GROUP** parameters. To accomplish this type of change, delete and re-enter the port.
- For an in-service port, only the **COMMENT** , the **PVC LOGICAL CHANNEL NUMBER** , and the **PVC DESTINATION** parameters can be changed providing they were previously configured. (The syntax for changing an in-service port is illustrated in the Syntax section that follows.)

Caution: If **change x25p** is input when a port is still in service, a PVC can inadvertently be taken down and connected to a new destination. To abort such a request, press Delete at the first **PVC DESTINATION** prompt. Use **remove** to take the port out of service, then input **change** to modify any other information.

Syntax

You can input **change x25p** in prompted entry only. If the components to be changed are an out-of-service module or port, the syntax for **change x25p** is similar to that of **enter x25p**. In both instances, the defaults for **change x25p** are those values, conditions, or states that currently exist in the database. They are displayed within parentheses in the parameter prompt.

Besides the restrictions previously listed for out-of-service modules, numerous **INFO** messages, explaining existing system states—such as the current settings of window sizes, packet size, and number of user channels—appear. These **INFO** messages are listed and explained in the System Responses section of this chapter. In addition, the value options furnished for **NUMBER OF USER CHANNELS** are those values explained in "Window Size, Packet Size, and User Channels" in **X.25P Administration.**

Similarly for out-of-service ports, numerous **INFO** messages appear explaining service state or PVC/SVC status. These messages are also listed and explained in System Responses.

Syntax *(continued)*

For an in-service port, only certain parameters can be changed. The prompting sequence for an in-service port is as follows:

```
CC0> change
OBJECTS [...x25p...]: x25p
COMPONENT [module, port]: port   <in service>
MODULE ADDRESS:
PORT NUMBER [1-4]:
```

If a PVC channel range has been entered for the port:

```
INFO: Module <mod> port <port> is in service.  Only the comment field and
      PVC destinations can be changed on an in-service port.
```

If only a SVC channel range has been entered for the port:

```
INFO: Module <mod> port <port> is in service.  Only the comment field can
      be changed on an in-service port.
COMMENT[up to 60 chars double quoted, none: +(none)]:
```

If a PVC channel range has been entered for the port:

```
INFO: Changing a PVC DESTINATION for an in-service port will cause the PVC to
      be taken down.

INFO: Modify assignment of destinations to logical channels using the
      following prompts.  Hit <DEL> once when finished making changes.

   PVC LOGICAL CHANNEL NUMBER [1-<Y>]:
   PVC DESTINATION [up to 72 chars, none:
    +(current entry)]:
```

Command loops to PORT NUMBER prompt.

Parameters

Refer to the parameter definitions supplied in **enter x25p**.

Prompted Entry: Changing X.25P Port Information*

```
CC0> change
OBJECTS [...x25p...]: x25p
COMPONENT [module, port]: port
MODULE ADDRESS: 22
PORT NUMBER [1-4]: 1
COMMENT [up to 60 chars double quoted, none:
  +("in Room 202")]: +
EXTERNAL BAUD RATE [1200-2.048M: +(64k)]: +
I-FRAME NUMBERING [basic, extended: +(basic)]: +
MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K) [1-7: +(7)]: +

INFO: The values for the T1 TIMER are expressed in milli-seconds
      and only multiples of 50 msec are allowed.

WAITING ACKNOWLEDGEMENT TIMER (T1) [50-60000: +(3000)]: +

MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2) [1-255: +(7)]: +
ACTION WHEN N2 COUNT EXCEEDED [disconnect, reset: +(reset)]: +
ACTION WHEN DISC RECEIVED [disconnect, reset: +(reset)]: +
LOGICAL PORT TYPE [dce, dte: +(dce)]: +
BILLING STATUS [on, off: +(off)]: +
WINDOW SIZE NEGOTIATION [on, off: +(on)]: +
DEFAULT NETWORK LEVEL WINDOW SIZE [1-7: +(2)]: +
MAXIMUM WINDOW SIZE [2-7: +(2)]: +
PACKET SIZE NEGOTIATION [on, off: +(on)]: +
DEFAULT NETWORK LEVEL PACKET SIZE [128, 256, 512, 1024: +(128)]: +
MAXIMUM PACKET SIZE [128, 256, 512, 1024: +(256)]: +
SEGMENTATION [on, off: +(off)]: on
MAXIMUM REMOTE PACKET SIZE [128, 256, 512, 1024: +(128)]: +
DEFAULT CALLING ADDRESS [up to 15 digits, none: +(none)]: +
CALLING ADDRESS MASKING [on, off: +(on)]: +
CALLING ADDRESS MASKING STRING [up to 15 digits, none: +(373)]:f4 +
CALLING ADDRESS MASKING DIGITS [0-12: +(4)]: +
CALLED ADDRESS MASKING [on, off: +(on)]: +
CALLED ADDRESS MASKING STRING [up to 15 digits, none: +(233444)]: +
CALLED ADDRESS MASKING DIGITS [0-9: +(2)]: +
LOCAL X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent:
  +(transparent)]: mbit
INFO: The maximum number of channels recommended given packet and window
      size constraints is nnn.
      Exceeding this number can exceed the module capacity.
NUMBER OF USER CHANNELS PER PORT [1-200: +(200)]: 12
INFO: Reducing SVC channels assigned to port(s) may affect the entries
      to the number of receive-only and/or originate-only channels.
```

* Module and port are out of service.

Prompted Entry: Changing X.25P Port Information *(continued)*

```
NUMBER OF SVC CHANNELS PER PORT [0-12: +(12)]: 7
NUMBER OF PVC CHANNELS PER PORT [0-5: +(5)]: 5
SVC STARTING LOGICAL CHANNEL NUMBER [6-4089: +(6)]: +
INFO: Changing SVC direction may affect the entries to the number of
      receive-only and/or originate-only channels.
SVC DIRECTION [originate, receive, 2way: +(2way)]: +
SVC GROUP [up to 8 chars: +(switched)]: +
NUMBER OF RECEIVE ONLY CHANNELS [0-7: +(0)]: +
NUMBER OF ORIGINATE ONLY CHANNELS [0-7: +(0)]: +
ADDRESS CHECKING [on, off: +(off)]: +
ENDPOINT NUMBERS FOR SVC CHANNELS FOR PORT <N> [0000-9999: +(1100)]: 1000
HUNT GROUP ADDRESS SUBSTITUTION [on, off: +(off)]: +
CLOSED USER GROUP PROFILE ID [up to 8 chrs, none: +(none)]: +
PREDEFINED DESTINATION [up to 72 chars, none: +(none)]: +
REVERSE CHARGING ACCEPTANCE [on, off: +(off)]: +
FAST SELECT ACCEPTANCE [on, off: +(on)]: +
CALLED ADDRESS MODIFIED NOTIFICATION [on, off: +(off)]: +
THROUGHPUT CLASS NEGOTIATION [on, off: +(off)]: +
DEFAULT NETWORK LEVEL THROUGHPUT CLASS [75, 150, 300, 600, 1200,
                    2400, 4800, 9600, 19.2k, 48k, 64k: +(2400)]: +
PAD INACTIVITY TIMER (T) [2-20, off: +(off)]: +
PAD RETRY COUNTER (N) [2-20, off: +(off)]: +
TRANSIT DELAY [10-500: +(50)]: +
PVC GROUP [up to 8 chars: +(perm)]: +
INFO: Modify assignment of destinations to logical channels using the
      following prompts.  Hit <DEL> once when finished making entries.

  PVC LOGICAL CHANNEL NUMBER [1-5]: 1
  PVC X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent:
    +(mbit): +
  PVC DESTINATION [up to 72 chars, none: +(none)]: home

  PVC LOGICAL CHANNEL NUMBER [1-5]:

PORT NUMBER [1-4]:

CC0>
```

delete x25p

The **delete x25p** command enables you to eliminate X.25P module and port information. You must take the module or port out of service. If you are deleting the module, you must delete all ports first.

Syntax

You can input **delete x25p** in prompted or one-line entry.

```
CC0> delete
OBJECTS [...x25p...]: x25p
COMPONENT [module, port]:
MODULE ADDRESS:
If COMPONENT is "port":
  If PADDLEBOARD TYPE is "rs232":
    PORT NUMBER [1-8]:
  If PADDLEBOARD TYPE is "v.35":
    PORT NUMBER [1-4]:
```

Parameters

Refer to the parameter definitions supplied in **enter x25p**.

Prompted Entry: Deleting X.25P Port Information

```
CC0> delete
OBJECTS [...x25p...]: x25p
COMPONENT [module, port]: port
MODULE ADDRESS:  51
PORT NUMBER [1-4]: 1
CC0>
```

Prompted Entry: Deleting X.25P Module Information

```
CC0> delete
OBJECTS [...x25p...]: x25p
COMPONENT [module, port]: module
MODULE ADDRESS:  51
CC0>
```

One-line Entries: Deleting X.25P Component Information

```
CC0> delete x25p port 51 1
CC0> delete x25p module 51
```

diagnose x25p

The **diagnose x25p** command enables you to initiate on-line or off-line tests for an X.25P module or for one or more of its ports. Off-line module tests check the hardware for an existing, out-of-service module. They consist of three subtests—boot diagnostics, memory tests, and downloadable diagnostics—which are run consecutively. On-line loopback* tests check the communications path for ports while the module is in-service. The full communications path to the end-device can be tested while the port is in-service if the connected host or terminal supports the X.25 test frame. Otherwise, portions of the communications path can be checked with the port out-of-service; use **remove x25p** to take the port to be tested out-of-service. The **diagnose x25p** command tests one port at a time and affects service on that port only.

Syntax

You can input **diagnose x25p** in prompted entry only.

```
CC0> diagnose
OBJECTS [...x25p...]: x25p
DIAGNOSTIC TYPE [on-line, off-line]:
MODULE ADDRESS:
```

If DIAGNOSTIC TYPE is "on-line":

If PADDLEBOARD TYPE is "rs232":

```
PORT NUMBER [1-8]:
```

If PADDLEBOARD TYPE is "v.35":

```
PORT NUMBER [1-4]:
```

If port to be tested is out of service and CLOCKING TYPE is "external":

```
TEST TYPE [internal_port, local_modem, remote_modem, test_frame:
          +(internal_port)]:
```

If port to be tested is out of service and CLOCKING TYPE is "internal":

```
TEST TYPE [internal_port, external_port, test_frame:
          +(internal_port)]:
```

If port to be tested is in service:

```
INFO:  Only the test frame can be performed with the port in service.
TEST TYPE [+(test_frame)]:
```

If the loopback diagnostic requires placing a loop-around connector on the port for ports with internal clocking:

```
INFO:  Place loop-around connector on port.
```

If the loopback diagnostic requires placing a local or remote modem in loop-around mode for ports with external clocking:

```
INFO:  Place <local/remote> modem in loop-around mode.

CONTINUE TESTING [yes, no: +(yes)]:
```

* These tests are referred to as *loop-around* in the software and system responses.

Parameters

This section contains explanations of parameters used in the **diagnose x25p** prompting sequence that differ from those used in **enter x25p**. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

CONTINUE TESTING

Specifies whether (*yes* or *no*) diagnostic testing should be continued.

DIAGNOSTIC TYPE

Specifies if the test to be run is *off-line* or *on-line*.

TEST TYPE

Specifies the type of test to be run. Each begins and ends at the control computer.

- *internal_port*
  This test extends to the universal synchronous/asynchronous receiver/transmitter (USART) within the port with external clocking. It does not check the integrity of the interface terminators and receivers.
- *external_port*
  This test, which is valid for ports with internal clocking only, extends through the port to an external 25-pin loop-around connector. It checks the integrity of the I/O distribution board and the interface terminators and receivers.
- *local_modem*
  This test, which is valid for ports with external clocking only, extends to the port's local modem. The local modem must be in loopback mode.
- *remote_modem*
  This test, which is valid for ports with external clocking only, extends to the port's remote modem. The remote modem must be in loopback mode.
- *test_frame*
  This test extends to the remote host. Test completion occurs when the X.25P module receives the test frame from the remote host or when a timer expires without receiving an answer. The remote host has to support this test or it will fail.

Prompted Entry: Running X.25P On-line Loopback Tests (AWJ24 I/O Board)

```
CC0> diagnose
OBJECTS [...x25p...]: x25p
DIAGNOSTIC TYPE [on-line, off-line]: on-line
MODULE ADDRESS: 22
PORT NUMBER [1-4]: 1
TEST TYPE [internal_port, local_modem, remote_modem, test_frame:
          +(internal_port)]: local_modem

INFO: Place local modem in loop-around mode
CONTINUE TESTING [yes, no: +(yes)]: +

  95-12-31 10:55:00 NODE=Redqueen
M diagnose x25p on-line 22 1 local_modem
  Diagnose completed - test passed.

CONTINUE TESTING [yes, no: +(yes)]: no
CC0>
```

Prompted Entry: Running X.25P On-line Loopback Tests (CSD4 I/O Board)

```
CC0> diagnose
OBJECTS [...x25p...] x25p
DIAGNOSTIC TYPE [on-line, off-line]: on-line
MODULE ADDRESS: 25
PORT NUMBER [1-8]: 1
TEST TYPE [internal_port, local_modem, remote_modem, test_frame:
          +(internal_port)]: local_modem

INFO: Place local modem in loop-around mode
CONTINUE TESTING [yes, no: +(yes)]: +

  95-12-31 10:55:00 NODE=Redqueen
M diagnose x25p on-line 25 1 local_modem
  Diagnose completed - test passed.

CONTINUE TESTING [yes, no: +(yes)]: no
CC0>
```

Prompted Entry: Running X.25P Off-line Module Tests (AWJ24 I/O Board)

```
CC0> diagnose
OBJECTS [...x25p...]: x25p
DIAGNOSTIC TYPE [off-line, on-line]: off-line
MODULE ADDRESS: 22

   95-12-31 05:21:19 NODE=Redqueen
M  diagnose x25p off-line 22

   Boot tests in progress - .
   95-12-31 05:21:19 NODE=Redqueen

   Offline diagnostic boot test: PASS

   Extended RAM test in progress - . . .
   95-12-31 05:21:19 NODE=Redqueen

   Offline diagnostic memory test: PASS

   Diagnostic download in progress - . . .
   95-12-31 05:21:19 NODE=Redqueen

   Offline diagnostic downloaded test:
      Aux. boot   PASS
      Inst. set:  PASS
      Timer test: PASS
      DKI test:   PASS
      IPC test:   PASS
      Port 1:     PASS
      Port 2:     PASS
      Port 3:     PASS
      Port 4:     PASS

   DIAGNOSTIC COMPLETED
CC0>
```

Prompted Entry: Running X.25P Off-line Module Tests (CSD4 I/O Board)

```
CC0> diagnose
OBJECTS [...x25p...]: x25p
DIAGNOSTIC TYPE [off-line, on-line]: off-line
MODULE ADDRESS: 25

   95-12-31 05:21:19 NODE=Redqueen
M  diagnose x25p off-line 25

   Boot tests in progress - .
   95-12-31 05:21:19 NODE=Redqueen

   Offline diagnostic boot test: PASS

   Extended RAM test in progress - . . .
   95-12-31 05:21:19 NODE=Redqueen

   Offline diagnostic memory test: PASS

   Diagnostic download in progress - . . .
   95-12-31 05:21:19 NODE=Redqueen

   Offline diagnostic downloaded test:
      Aux. boot   PASS
      Inst. set:  PASS
      Timer test: PASS
      DKI test:   PASS
      IPC test:   PASS
      Port 1:     PASS
      Port 2:     PASS
      Port 3:     PASS
      Port 4:     PASS
      Port 5:     PASS
      Port 6:     PASS
      Port 7:     PASS
      Port 8:     PASS

   DIAGNOSTIC COMPLETED
CC0>
```

dmeas x25p

The **dmeas x25p** command enables you to display maintenance measurements reflecting the traffic, performance, and utilization of the X.25P module. These measurements, which are useful to diagnose network problems, are displayed for the module and its ports.

You can specify on-demand reports containing information accumulated during the last report interval or since the last automatically generated report.

Syntax

You can input **dmeas x25p** in prompted or one-line entry.

```
CC0> dmeas
OBJECTS [...x25p...]: x25p
COMPONENT [module, port]:
MODULE ADDRESS:
```

If COMPONENT is "port" and PADDLEBOARD TYPE is "v.35":

```
PORT NUMBER [1-4: +(1-4)]:
```

If COMPONENT is "port" and PADDLEBOARD TYPE is "rs232":

```
PORT NUMBER [1-8: +(1-8)]:

INTERVAL [current, previous: +(current)]:
```

Parameters

This section contains explanations of parameters used in the **dmeas x25p** prompting sequence that differ from those used in **enter x25p**. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

INTERVAL

Specifies if the on-demand report is to be printed for the *current* or *previous* reporting interval. The current interval includes those measurements accumulated since the previous scheduled report was generated; or if a report was not scheduled, those measurements accumulated since the module was last reset. Conversely, the previous interval includes those measurements accumulated prior to the current interval.

Prompted Entry: Displaying X.25P Module (V.35) and Port Measurements

```
CC0> dmeas
OBJECTS [...x25p...]: x25p
COMPONENT [module, port]: port
MODULE ADDRESS: 5
PORT NUMBER [1-4: +(1-4)]: 2
INTERVAL [current, previous: +(current)]: current
```

One-line Entry/Output: Displaying X.25P Module (V.35) and Port Measurements

```
CC0> dmeas x25p port 5 2 current
   95-12-31 14:33:54 NODE=Redqueen
M  dmeas x25p port 5 2 current

MODULE ADDRESS:   5         95-12-31    13:59 -----> 14:33

                          AVERAGE  PEAK  CURRENT
   FROM NODE   TO NODE    MAIN     MAIN  MAIN
   PACKETS     PACKETS    UTIL     UTIL  UTIL
   906371      864526     19%      19%   19%

   CONGEST  CONGEST
   COUNT    SECONDS
   0        0


   95-12-31 14:33:54 NODE=Redqueen
M  dmeas x25p port 5 2 current

   MODULE ADDRESS:   5         PORT: 2     SPEED: 64000

------------------------------5 MINUTE PEAK DATA------------------------------

     <-----RECEIVED BY PORT FROM LINE-------><-TRANSMITTED FROM PORT TO LINE->

           PORT  FRAME       TOTAL              PORT  FRAME       TOTAL
           UTIL  BYTES       FRAMES             UTIL  BYTES       FRAMES
           65%   1562443     32465              68%   1636766     34682

--------------------------------------------------------------------------------

  LEVEL 1 DATA FOR PORT: 2

     <-----RECEIVED BY PORT FROM LINE-------><-TRANSMITTED FROM PORT TO LINE->
      PORT  FRAME       TOTAL      BAD          PORT  FRAME       TOTAL
      UTIL  BYTES       FRAMES     FRAMES       UTIL  BYTES       FRAMES
      60%   10167639    222822     0            60%   10027060    239006

      RCVR
      OVRNS
      0

  LEVEL 2 DATA FOR PORT: 2

          <-RECEIVED BY PORT FROM LINE-------><TRANSMITTED FROM PORT TO LINE>
     LINK   USER     INVALID  REJ      RNR       USER     REJ      RNR
     RESET  BYTES    FRAMES   FRAMES   FRAMES    BYTES    FRAMES   FRAMES
     0      9721977  0        0        0         9550613  0        0
```

One-line Entry/Output: Displaying X.25P Module (V.35) and Port Measurements *(continued)*

```
  LEVEL 3 DATA FOR PORT: 2

  LOGICAL       CALL      CALL       ABNORM    AVERAGE    PEAK
  CHLS INSVC    ACCEPTS   REJECTS    TERMS     CALLS      CALLS
  50            0         0          0         50         50

  RNR       RNR       FLOW CNTL
  SENT      RECEIVED  BY LEV 2
  0         0         0

  ABNORMAL CALL TERMINATIONS FOR PORT: 2

 <-------------------CLEARING------------><---RESTARTING----> LINK
  BUSY  OOO   RPE   RCA   DTE   FSA   IFR    LPE   NTC   NTOP   FAIL
  0     0     0     0     0     0     0      0     0     0      0
  ACB   LPE   NTC   OBT   IDC   RPOA
  0     0     0     0     0     0

CC0>
```

Report Fields

ABNORM TERMS
The number of incoming/outgoing SVC calls abnormally terminated, including rejected calls.

ACB
The number of calls aborted because of CUG security violations.

AVERAGE CALLS
The average number of incoming/outgoing SVC calls, plus active PVC channels, recorded during the interval.

AVERAGE MAIN UTIL
The percentage of measurements interval in which the main module processors were utilized. This number can help to determine if the module is being used to its capacity.

BAD FRAMES
The number of faulty frames that the module received. Faulty frames could be a frame with a non-integral number of octets, an aborted frame, or a frame with a bad frame check sequence (FCS). The module discards any bad frame received.

BUSY
The number of calls terminated because the receiver was busy.

Report Fields *(continued)*

CALL ACCEPTS
The number of incoming/outgoing SVC calls accepted.

CALL REJECTS
The number of incoming/outgoing SVC calls rejected.

CONGEST COUNT
The number of times the module went into buffer congestion.

CONGEST SECONDS
The number of seconds the module was in buffer congestion.

CURRENT MAIN UTIL
Percentage of main module processor utilization for the current five minute interval. This number is reset every five minutes to provide a more current measurement of module utilization.

DTE
The number of calls terminated because the DTE sent a clear.

FLOW CNTL BY LEV 2
The number of times level 2 flow controlled level 3.

FRAME BYTES
The total number of frame bytes received or transmitted.

FROM NODE PACKETS
The number of packets the module received from the node.

FSA
The number of calls terminated because the receiver did not accept fast select calls.

ICA
The number of calls terminated because of invalid/unknown called addresses.

IDC
The number of calls the other side terminated because of an incompatible destination.

IFR
The number of calls terminated because of invalid facility requests.

INVALID FRAMES
The number of faulty frames that the level 2 protocol received.

LINK FAIL
The number of calls terminated because the link went down.

Report Fields *(continued)*

LINK RESET
The number of link resets in the reporting interval.

LOGICAL CHLS INSVC
The number of active incoming/outgoing SVC calls, plus active PVC channels.

LPE
The number of calls terminated because of local procedure errors via a clear or restart packet.

MODULE ADDRESS
The address of the module for which measurements have been displayed.

NTC
The number of calls terminated via a clear or restart packet because of network congestion.

NTOP
The number of calls terminated because of network operational restarts.

OOO
The number of calls terminated because the receiver was out of order.

PEAK CALLS
The peak number of active incoming/outgoing SVC calls, plus active PVC channels, recorded during the interval.

PEAK MAIN UTIL
The utilization level for the five minutes in which the main module processors were most utilized. This number can help to determine whether the module is being used to its capacity.

PORT
The number of the port for which measurements have been displayed.

PORT UTIL
The port utilization percentage, which is the ratio of the total number of characters sent and/or received on the line to the capacity of the line for the measurements interval.

RCA
The number of calls terminated because the receiver did not accept reverse charging.

RCVR OVRNS
The number of receiver overruns that occurred on the port. A receiver overrun occurs when frames are being received faster than they can be stored and forwarded. Typically, the X.25P module processor is too busy to service the universal synchronous/asynchronous receiver/transmitter (USART). If this number is large, check processor utilization to determine if it is causing the overrun.

Report Fields *(continued)*

REJ FRAMES
The number of reject frames that the module received from the line or the module output to the line.

RNR FRAMES
The number of receiver-not-ready frames that the module received from the line or the module output to the line.

RNR RECEIVED
The number of receiver-not-ready packets that the module received from the line.

RNR SENT
The number of receiver-not-ready packets that the module output to the line.

RPE
The number of calls terminated because of remote procedure errors.

RPOA
The number of calls terminated because of the RPOA (Recognized Private Operating Agency) out of order.

SPEED
The baud rate for which the port is configured.

TO NODE PACKETS
The number of packets the module transmitted to the node.

TOTAL FRAMES
The total number of frames received or transmitted.

USER BYTES
The number of information frame bytes received or transmitted. This is equivalent to the number of bytes in all packets sent or received, including the overhead.

dstat x25p

The **dstat x25p** command enables you to display the status of X.25P modules, ports, and logical channels. This command helps to evaluate actual or potential problems detected by the alarm system.

Command output is hierarchical—that is, logical channel output includes module and port information; port output includes module information. In addition, all hardware information output during an iteration of **dstat module** is displayed, as well as on-board software information.

Syntax

You can input **dstat x25p** in prompted or one-line entry.

```
CC0> dstat
OBJECTS [...x25p...]: x25p
COMPONENT [module, port, logchnl: +(module)]:
MODULE ADDRESS:
```

If COMPONENT is "port" and PADDLEBOARD TYPE is "v.35":

```
PORT NUMBER [1-4: +(1-4)]:
```

If COMPONENT is "port" and PADDLEBOARD TYPE is "rs232":

```
PORT NUMBER [1-8: +(1-8)]:
```

If COMPONENT is "logchnl" and PADDLEBOARD TYPE is "v.35":

```
PORT NUMBER [1-4]:
LOGICAL CHANNEL [1-4095: +(1-4095)]:
```

If COMPONENT is "logchnl" and PADDLEBOARD TYPE is "rs232":

```
PORT NUMBER [1-8]:
LOGICAL CHANNEL [1-4095: +(1-4095)]:

DETAIL [low, high: (+low)]:
```

Parameters

This section contains explanations of parameters used in the **dstat x25p** prompting sequence that differ from those used in **enter x25p**. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

COMPONENT

Specifies whether the component for which a report is to be generated is a *module*, *port*, or logical channel (*logchnl*).

DETAIL

Specifies if the command output is to show a limited amount of information (*low* detail) or more information (*high* detail).

LOGICAL CHANNEL

Specifies the number of the logical channel (from *1* to *4095*) for which information is to be displayed. Entries can be a single logical channel or a range or list of up to 10 logical channel numbers.

Prompted Entry: Displaying High Detail X.25P Module Status

```
CC0> dstat
OBJECTS [...x25p...]: x25p
COMPONENT [module, port, logchnl: +(module)]: +
MODULE ADDRESS: 22
DETAIL [low, high: (+low)]: high
<report output>
```

Prompted Entry: Displaying High Detail X.25P (RS-232) Port Status

```
CC0> dstat
OBJECTS [...x25p...]: x25p
COMPONENT [module, port, logchnl: +(module)]: port
MODULE ADDRESS: 22
PORT NUMBER [1-8: +(1-8)]: 1
DETAIL [low, high: (+low)]: high
<report output>
```

Prompted Entry: Displaying High Detail X.25P (V.35) Logical Channel Status

```
CC0> dstat
OBJECTS [...x25p...]: x25p
COMPONENT [module, port, logchnl: +(module)]: logchnl
MODULE ADDRESS: 22
PORT NUMBER [1-4]: 1
LOGICAL CHANNEL [20-29: +(20-29)]: 20-21
DETAIL [low, high: (+low)]: high
<report output>
```

One-line Entry/Output: Displaying High Detail X.25P Logical Channel Status

```
CC0> dstat x25p log 22 1 204 high
M  dstat x25p log 22 1 204 high

******************************** MODULE 22 *********************************
MODULE TYPE     SERVICE STATE   HARDWARE ERROR COUNT  SERIAL NUMBER
x25p            in service      2                     2067
LAST HARDWARE ALARM
Module was reset  95-12-17 10:04
LAST SOFTWARE ALARM
Packet Level Restart Complete  95-12-17 11:21
ONLINE  ENABLED
yes     yes
-------------------------------- HIGH DETAIL --------------------------------
MODULE  FIFO    FM NODE FM NODE SANITY
RESET   RESET   PARITY  OVERFLO ERROR
2       0       0       0       0
EXPECT  FULL    EMPTY   ACTUAL  ACTUAL  EXPECT  EXPECT
TYPE    PACKETS PACKETS STAT1   STAT2   STAT1   STAT2
x25p    2620    0       1       0       1       0
RANGE    BAD
ERRORS   PACKETS
0        0
****************************** MODULE 22 PORT 1 ******************************
EXPECT            ACTUAL            OPERATING
SRVC STATE        SRVC STATE        STATE             RESETS
in service        in service        up                0
DCD               DTR               RTS               CTS               DSR
on                on                on                on                on
   95-12-31 11:31:51 NODE=Redqueen
M  dstat x25p log 22 1 204 high
-------------------------------- HIGH DETAIL --------------------------------
L2           LINK        LINK          LAST       SEND       RECV
P_STATE      STATE       SUBSTATE      NR         STATE      STATE
up           online      info transfer 3          4          3
AVAIL      SETUP      XFER       CLEAR
CHNLS      CHNLS      CHNLS      CHNLS
49         0          1          0
****************************** LOGICAL CHANNEL *******************************
LC          LC    OPERATING
NO    MODE  TYPE  STATE
204   fplp  SVC   data transfer state
```

Prompted Entry: Entering X.25P Module Port Information *(continued)*

```
-------------------------------- HIGH DETAIL --------------------------------
X3 PARAM NO   1    2    3    4    5 *  6    7    8    9    10   11
X3 PARAM VAL  0    0    0    1    2    0    2    0    0    0    14

X3 PARAM NO   12 * 13   14   15   16   17   18   19   20   21   22
X3 PARAM VAL  0    0    0    0    8    64   12   0    0    0    0
     MOD      CHL      NUMERIC ADDR
      22        7      33333014063010
CC0>
```

Report Fields

Alarms referred to in the following paragraphs are documented in the *Data Networking Products Messages Reference*.

ACTUAL SRVC STATE

The actual current service state of the port as indicated by the module itself.

- *in service*
  The port has been restored to service by the network administrator.
- *out of service*
  The port has been removed from service by the network administrator.
- *UA*
  The service state is unavailable, since it cannot be obtained from the module.
- *unknown*
  The module has indicated an unknown service state. Contact the local support organization.

ACTUAL STAT1

The actual value of the hardware status byte of the specified module's most currently received status packet. In some cases, the actual and expected values of **STAT1** differ.

ACTUAL STAT2

The actual value of the software status byte of the most currently received status packet for the specified module. In some cases, the actual and expected values of **STAT2** differ. The processor number changes in every status packet.

AVAIL CHNLS

The number of channels available for calls. This value is the number of channels configured for the port minus the number of channels that are in the clearing, setup, or data transfer state.

BAD PACKETS

The number of packets received with envelope parity errors that the module transmitted on the wrong channel and that the Eswitch detected.

Report Fields *(continued)*

CHL
The backplane number of the channel originating/receiving a call to/from the specified X.25P logical channel.

CLEAR CHNLS
The number of logical channels in the clearing state.

CTS
The status of clear to send is *on* or *off*.

DCD
The status of data carrier detect is *on* or *off*.

DSR
The status of data set ready is *on* or *off*.

DTR
The status of data terminal ready is *on* or *off*.

EMPTY PACKETS
The number of empty status packets received. (Empty packets are received when a module is not physically present in the specified slot.) See **EMPTY SLOT** alarm.

ENABLED
Indicates whether (*yes* or *no*) the module mode switch is enabled. The value of this field is determined only from status information. See **MODE SWITCH NOT ENABLED** alarm.

EXPECT SRVC STATE
The expected service state values of a port are:

- *in service*
  The port has been restored to service and all higher level components are in service.
- *out of service*
  The port has not been not been restored to service or has been removed from service.
- *ready for service*
  The port has been restored to service but a higher level component is out of service.
- *ra incoming*
  The port has restricted access for incoming calls.
- *ra outgoing*
  The port has restricted access for outgoing calls.
- *rfra out*
  Ready for restricted access for outgoing calls; the port has restricted access for outgoing calls and a higher level component is out of service.
- *rfra in*
  Ready for restricted access for incoming calls; the port has restricted access for incoming calls and a higher level component is out of service.

Report Fields *(continued)*

EXPECT STAT1
The expected status byte of the module hardware.

EXPECT STAT2
The expected status byte of the module software.

EXPECT TYPE
The expected hardware type of the module in the slot. For in-service modules, the value of this field depends on administrator-supplied information. For out-of-service modules, this field is determined by status information.

FIFO RESET
The number of first-in, first-out synchronization problems (hardware problems) on the module. See **FIFO RESET** alarm.

FM NODE OVERFLO
The measure of any imbalance between the rate at which information arrives at a module and the rate at which the subscriber processes that information. (Overflow errors occur during typical operation and do not necessarily indicate a problem. See **FROM BUS OVERFLOW** alarm.)

FM NODE PARITY
The number of packets going/coming to/from the node that had parity errors.

FULL PACKETS
The number of full status packets received when a module is physically present in the specified shelf slot.

HARDWARE ERROR COUNT
An approximate number summarizing module problems detected since its last reboot (that is, error counts in other fields). A count of *3* or *4* indicates a normal error level. Higher counts usually indicate a problem.

LAST HARDWARE ALARM
The module's last hardware alarm. This information, which is based on status packet data, is not stored across control computer reboots.

LAST NR
The last N(R) sequence number acknowledgement received. The possible values are *0* to *7* if the port configuration parameter I-Frame numbering is "basic", 0 to 127 if I-Frame numbering is "extended". This confirms that the connected device has received packets up through N(R) - 1.

LAST SOFTWARE ALARM
The module's last alarm that it issued by itself. This information is not stored across module or control computer reboots.

Report Fields *(continued)*

LC NO
The logical channel number, 1 - 4095.

LC TYPE
Indicates whether the logical channel is a *pvc* or *svc*.

LINK STATE
The state of the level 2 protocol can be *recovery1* (sending SABM), *recovery2* (sending DISC), or *online* (received UA and initiated packet restart).

LINK SUBSTATE
The substate of the level 2 protocol. Possible substates are the following:
- *not available*, the data is not currently available
- *send SABM*, the send Set Asynchronous Balanced Mode (SABM) substate in recovery1 state
- *send DISC*, the send DISC substate in recovery2 state
- *wait subs*, the wait substate in recovery2 state
- *info transfer*, the information transfer substate in online state
- *frame reject*, the frame reject substate in online state
- *reset*, the reset substate in online state

L2 P_STATE
If the state of the port is *up*, the port has been successfully restored to service; if it is *down*, the port has not been successfully restored to service.

MOD
The address of the module originating/receiving a call to/from the specified X.25P logical channel.

MODE
Indicates whether the channel is operating in PAD (*pad*), full packet layer protocol (*fplp*), or passthru (*pass*) mode. *fplp* mode indicates that the connection is to an X.25P or X.75 module; *pass* indicates that the connection is to an X.25 module. If a channel is not operating as a PAD, the values of **X3 PARAM NO** and **X3 PARAM VAL** (high detail) are not meaningful.

MODULE RESET
The number of module resets. For some modules, resets occur during normal operation.

MODULE TYPE
Indicates what module type is actually present. The value is determined from status packets only and is independent of information supplied via **enter** and **delete**. This field displays *empty* if no module is in the specified slot.

NUMBER TRANS
The number of transactions processed since reboot.

Report Fields *(continued)*

NUMERIC ADDR
The X.121 calling address which is sent out in the call request packet. This field is filled in only for outgoing calls.

ONLINE
Indicates whether (*yes* or *no*) the module is on-line. A status of *yes* is shown only if the green LED on the module is lit. The value of this field is determined from status information only.

OPERATING STATE
The current operating state of the port or logical channel.

For a port, the states are:
- *down*
  No data transfer can take place.
- *up*
  Data transfer can take place.
- *UA*
  The operating state unavailable, since it cannot be determined from the module.

For a logical channel, the states are:
- *data transfer state*
  A call is up.
- *down*
  The logical channel is not available for call setup.
- *channel not connected*
  There is no current connection set up for the logical channel.
- *pending down*
  A state change is occurring from a previous state to *down*.
- *pending idle*
  A state change is occurring from a previous state to the *channel not connected* state.
- *pending incoming call*
  A state change is occurring from the *channel not connected* to the *data transfer* state for an incoming call.
- *pending outcall for device*
  A state change is occurring from the *channel not connected* to the *data transfer state* state for an outgoing call.
- *pending suspended*
  A state change is occurring from a previous state to the *call suspended state*.

Report Fields *(continued)*

- *pending talking*
  A state change is occurring from a previous state to the *data transfer state*.
- *call suspended*
  The call is in the suspended state.
- *undefined state from module*
  The module indicated an unknown state. Contact your local support organization.

RANGE ERRORS

The number of packets the module transmitted on a channel that is beyond the limit for which the module is configured. Range errors might be attributed to a defective module that is corrupting the address field of the segment or a channel configuration mismatch on both sides of the trunk module or CPM. To determine if the module is defective, run module diagnostics; to determine if a configuration mismatch has occurred, review the module configuration.

RECV STATE

The receive state variable, N(R). This is the sequence number that the connected device expect to receive next, confirming receipt of packets with sequence numbers through N(R) - 1.

RESETS

Any sanity errors or exceptions that occurred on the I/O processor servicing the port since the module's last download.

RTS

The status of request-to-send is *on* or *off*.

SANITY ERROR

See **MODULE MALFUNCTION** and **WRONG MODULE TYPE** alarms.

SEND STATE

The link level send state variable, N(S). This is the sequence number of the next information packet to be sent out on the line.

SERIAL NUMBER

The unique factory-encoded number for all modules accessing the backplane. Maintaining records with these numbers can help track circuit pack vintages.

SERVICE STATE

The current module service state. When a module is put into service via **restore**, this field is set to in service. When a module is taken out of service via **remove**, this field is set to oos (manual). If the alarm system takes a module out of service when it detects a problem, this field is set to oos (auto,fault).

SETUP CHNLS

The number of logical channels in the call setup state.

Report Fields *(continued)*

SOFTWARE ALARMS
The number of alarms for the module since the last reboot.

XFER CHNLS
The number of logical channels in the packet level data transfer state. This includes PVC channels on in service ports, since such channels are always in this state.

X3 PARAM NO
The X.3 parameter number. If it is marked with an asterisk (*), its value differs from the X.3 parameter value at call setup.

X3 PARAM VAL
The X.3 parameter value.

enter x25p

The **enter x25p** command enables you to add information for X.25P modules and ports.

Syntax

You can input X.25P information in prompted entry only.

When entering X.25P port information, the system prompts for the **NUMBER OF USER CHANNELS PER PORT**. The number of user channels specified is then allocated to **NUMBER OF SVC CHANNELS PER PORT** followed by **NUMBER OF PVC CHANNELS PER PORT**. If multiple ports are being entered that require CUG security, the sequence of prompts is repeated for **ENDPOINT NUMBER FOR SVC CHANNELS FOR PORT <N>** and **CLOSED USER GROUP PROFILE ID** until all ports have been assigned EPNs/CUGs. The **PVC LOGICAL CHANNEL NUMBER** and **PVC DESTINATION** parameter form a similar loop so only one **PVC LOGICAL CHANNEL NUMBER** is entered per **PVC DESTINATION.** When all PVC destinations have been entered, press Delete to exit the loop. All defaults are shown in parentheses.

```
CC0> enter
OBJECTS [...x25p...]: x25p
COMPONENT [module, port]:
MODULE ADDRESS:
```

If COMPONENT is "module":

```
NUMBER OF USER CHANNELS [1-507: +(200)]:

DOWNLOAD SERVER [+(controller)]:
```

If DOWNLOAD SERVER is "controller":

```
SOFTWARE VERSION [+(standard)]:
```

If SOFTWARE VERSION is not "standard":

```
SOFTWARE VERSION:

UPLOAD SERVER [+(none)]:
```

If UPLOAD SERVER is not "none":

```
UPLOAD ALWAYS BEFORE DOWNLOAD [yes, no: +(no)]:
```

If UPLOAD ALWAYS BEFORE DOWNLOAD is "no":

```
UPLOAD ONLY AFTER FAULT [yes, no: +(no)]:

PADDLEBOARD TYPE [rs232, v.35]: +(v.35)]:
```

Command loops to MODULE ADDRESS prompt.

If COMPONENT is "port":

If PADDLEBOARD TYPE is "rs232":

```
PORT NUMBER [1-8]:
```

If PADDLEBOARD TYPE is "v.35":

```
PORT NUMBER [1-4]:

COMMENT [up to 60 chars double quoted, none: +(none)]:
```

If the module is out-of-service or ready-for-service:

```
INITIAL SERVICE STATE [in, out: +(out)]:
```

Syntax *(continued)*

If PADDLEBOARD TYPE is "rs232":

```
CLOCKING TYPE [internal, external:  +(external)]:
```

If CLOCKING TYPE is "internal":

```
INTERNAL BAUD RATE [1200, 2400, 4800, 9600, 14.4k, 19.2k: +(9600)]:
```

If CLOCKING TYPE is "external" and if PADDLEBOARD TYPE is "rs232":

```
EXTERNAL BAUD RATE [1200-19.2k: +(19.2k)]:
```

If PADDLEBOARD TYPE is "v.35":

```
EXTERNAL BAUD RATE [1200-2.048M: +(64k)]:
```

If EXTERNAL BAUD RATE is 256,000:

```
INFO:  With a Baud rate of 256000, no more than 2 ports are recommended with a
       DEFAULT NETWORK PACKET SIZE less than 512.
```

If EXTERNAL BAUD RATE is 512,000:

```
INFO:  With a Baud rate of 512000, no more than 1 port is recommended when the
       DEFAULT NETWORK PACKET SIZE is less than 512, and no more than 2 ports
       are recommended when the DEFAULT NETWORK PACKET SIZE is 512 or more.
```

If EXTERNAL BAUD RATE is greater than 512,000 (e.g. 1,024,000):

```
INFO:  With a Baud rate of 1024000, no more than 1 ports is recommended on a
       module.

I-FRAME NUMBERING [basic, extended: +(basic)]:
```

If I-FRAME NUMBERING is "basic":

```
MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K) [1-7: +(7)]:
```

If I-FRAME NUMBERING is "extended":

```
MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K) [1-32: +(20)]:

INFO: The values for the T1 TIMER are expressed in milli-seconds
      and only increments of 50 msec are allowed.

WAITING ACKNOWLEDGEMENT TIMER (T1) [50-60000: +(3000)]:
MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2) [1-255: +(7)]:
ACTION WHEN N2 COUNT EXCEEDED [disconnect, reset: +(reset)]:
ACTION WHEN DISC RECEIVED [disconnect, reset: +(disconnect)]:
LOGICAL PORT TYPE [dce, dte: +(dce)]:

BILLING STATUS [on, off: +(off)]:

WINDOW SIZE NEGOTIATION [on, off: +(on)]:
DEFAULT NETWORK LEVEL WINDOW SIZE [1-7: +(2)]:
```

If WINDOW SIZE NEGOTIATION is "on":

```
MAXIMUM WINDOW SIZE [<default>-7: +(<default>)]:
   where <default> is the value selected for "DEFAULT NETWORK LEVEL WINDOW SIZE".

PACKET SIZE NEGOTIATION [on, off: +(off)]:
DEFAULT NETWORK LEVEL PACKET SIZE [128, 256, 512, 1024: +(128)]:
```

If the configured combinations of EXTERNAL BAUD RATE and DEFAULT NETWORK LEVEL PACKET SIZE exceed the recommended limits on module configuration:

```
WARNING:  The sum of all the port baud rates exceeds the recommended maximum
          port configuration.
```

Syntax *(continued)*

If PACKET SIZE NEGOTIATION is "on" and DEFAULT NETWORK LEVEL PACKET SIZE is "128":

MAXIMUM PACKET SIZE [128, 256, 512, 1024: +(128)]:

If PACKET SIZE NEGOTIATION is "on" and DEFAULT NETWORK LEVEL PACKET SIZE is "256":

MAXIMUM PACKET SIZE [256, 512, 1024: +(256)]:

If PACKET SIZE NEGOTIATION is "on" and DEFAULT NETWORK LEVEL PACKET SIZE is "512":

MAXIMUM PACKET SIZE [512, 1024: +(512)]:

SEGMENTATION [on, off: +(off)]:

If SEGMENTATION is "on":

MAXIMUM REMOTE PACKET SIZE [128, 256, 512, 1024: +(128)]:

DEFAULT CALLING ADDRESS [up to 15 digits, none: +(none)]:

If DEFAULT CALLING ADDRESS is not "none":

DEFAULT CALLING ADDRESS SUBSTITUTION [on, off: +(off)]:

CALLING ADDRESS MASKING [on, off: +(off)]:

If CALLING ADDRESS MASKING is "on":

CALLING ADDRESS MASKING STRING [up to 15 digits, none: +(none)]:
CALLING ADDRESS MASKING DIGITS [0-<m>: +(0)]:

CALLED ADDRESS MASKING [on, off: +(off)]:

If CALLED ADDRESS MASKING is "on":

CALLED ADDRESS MASKING STRING [up to 15 digits, none: +(none)]:
CALLED ADDRESS MASKING DIGITS [0-<n>: +(0)]:

LOCAL X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent:
+(transparent)]:

INFO: The maximum number of channels recommended given packet and window size constraints is nnn.
Exceeding this number can exceed the module capacity.

NUMBER OF USER CHANNELS PER PORT [1-<X>: +(<X>)]:

NUMBER OF SVC CHANNELS PER PORT [0-<Z>: +(<Z>)]:
where <Z> is the value selected for "NUMBER OF USER CHANNELS PER PORT".

If a single port is entered and channels remain on the port:

NUMBER OF PVC CHANNELS PER PORT [0-<Y>: +(<Y>)]:

If NUMBER OF SVC CHANNELS > 0:

SVC STARTING LOGICAL CHANNEL NUMBER [(<Y+1>)-(4096-<W>): +(Y+1)]:
where Y is the number of PVC channels and W is the value selected for "NUMBER OF SVC CHANNELS PER PORT."
SVC DIRECTION [originate, receive, 2way: +(2way)]:
SVC GROUP [up to 8 chars]:

Syntax *(continued)*

If SVC DIRECTION is "2way":

```
NUMBER OF RECEIVE ONLY CHANNELS [0-<SVC_channels>: +(0)]:
```

If NUMBER OF SVC CHANNELS PER PORT minus NUMBER OF RECEIVE ONLY CHANNELS equals 0:

```
INFO: No channels left for originate only channels
```

If NUMBER OF SVC CHANNELS PER PORT minus NUMBER OF RECEIVE ONLY CHANNELS does not equal 0:

```
NUMBER OF ORIGINATE ONLY CHANNELS [0-<remain_SVCs>: +(0)]:

ADDRESS CHECKING [on, off: +(off)]:
ENDPOINT NUMBERS FOR SVC CHANNELS FOR PORT <N> [0000-9999]:
HUNT GROUP ADDRESS SUBSTITUTION [on, off: +(off)]:
CLOSED USER GROUP PROFILE ID [up to 8 chrs, none: +(none)]:
```

If SVC DIRECTION is "2way" and NUMBER OF RECEIVE ONLY CHANNELS is less than the SVC_channels; or if SVC DIRECTION is "originate:"

```
PREDEFINED DESTINATION [up to 72 chars, none: +(none)]:

REVERSE CHARGING ACCEPTANCE [on, off: +(off)]:
FAST SELECT ACCEPTANCE [on, off: +(on)]:
CALLED ADDRESS MODIFIED NOTIFICATION [on, off: +(off)]:
THROUGHPUT CLASS NEGOTIATION [on, off: +(off)]:
DEFAULT NETWORK LEVEL THROUGHPUT CLASS [75, 150, 300, 600, 1200,
                    2400, 4800, 9600, 19.2k, 48k, 64k: +(2400)]:
PAD INACTIVITY TIMER (T) [2-20, off: +(off)]:
PAD RETRY COUNTER (N) [2-20, off: +(off)]:
TRANSIT DELAY [10-500: +(50)]:
```

If NUMBER OF PVC CHANNELS > 0:

```
PVC GROUP [up to 8 chars]:
ENDPOINT NUMBERS FOR PVC CHANNELS [0000-9999]:

INFO: Enter assignment of destinations to logical channels using the
      following prompts.  Hit <DEL> once when finished making entries.

  PVC LOGICAL CHANNEL NUMBER [1-<Y>]:
  PVC X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent: +(LOCAL_X.3prof):
  PVC DESTINATION [up to 72 chars, none: +(none)]:

    ___

INFO: There are no more channels left to allocate to the PVC service.
```

Command loops to the PORT NUMBER prompt.

Parameters

This section contains explanations of parameters used in the **enter x25** for module type X25P prompting sequence. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

ACTION WHEN DISC RECEIVED

Specifies whether the action to be taken when the module receives a disconnect (*disc*) frame is *disconnect* or *reset*. If the action is *disconnect*, all existing calls are brought down. When the link comes back up, the module sends a packet level restart. Conversely, if the action is *reset*, all existing calls are kept up. When the link comes back up, the module does not send a packet level restart.

ACTION WHEN N2 COUNT EXCEEDED

Specifies whether the action to be taken when an N2 count is exceeded is *disconnect* or *reset*. If the action is *disconnect*, all existing calls are brought down. When the link comes back up, the module sends a packet level restart. Conversely, if the action is *reset,* all existing calls are kept up. When the link comes back up, the module does not send a packet level restart.

ADDRESS CHECKING

The address checking prompt applies only to outgoing host PAD calls. When enabled, the address must be within the range of configured EPNs for the port. If the address contains a DNIC, SR, or SA, they must match the DNIC, SR, and SA configured for the node. Address checking should be disabled when the called address differs from the above. Also, address checking should be disabled when the hunt group feature is to be used. This is only used in PAD mode.

BILLING STATUS

If **COMPONENT** is *port*, specifies whether X.25P billing is to be enabled (*on*) or disabled (*off*) for a port. If *on*, an X.25P billing record is generated whenever an X.25P session to/from the port is originated/terminated and whenever a timer overflows or the billing counter reaches a threshold.

CALLED ADDRESS MODIFIED NOTIFICATION

If **COMPONENT** is *port* and **NUMBER OF SVC CHANNELS PER PORT** is greater than *0*, specifies whether this facility will (*on*) or will not (*off*) be passed to the calling DTE if present in a call connected or clear indication packet.

CALLED ADDRESS MASKING

If **COMPONENT** is *port*, specifies whether called address masking is enabled (*on*) or disabled (*off*) for a port. Called address masking is applied to the called address placed in the incoming call packet attached to the X.25 device. The **CALLED ADDRESS MASKING STRING** is prepended to *N* characters from the tail of the unmasked called address (after all other translations and substitutions are performed) to form the called address included in the incoming call packet to the attached device. *N* is provided by the **CALLED ADDRESS MASKING DIGITS** prompt.

Parameters *(continued)*

CALLED ADDRESS MASKING DIGITS

If **COMPONENT** is *port*, specifies the number of digits from the tail of the unmasked called address that are used to form the masked called address. The maximum value, *n* is 15 minus the length of the **CALLED ADDRESS MASKING STRING** that is administered.

CALLED ADDRESS MASKING STRING

If **COMPONENT** is *port*, specifies the string of digits that are used to form the prefix of the masked called address.

CALLING ADDRESS MASKING

If **COMPONENT** is *port*, specifies whether calling address masking is enabled (*on*) or disabled (*off*) for a port. Calling address masking is applied to the calling address placed in the incoming call packet to the attached X.25 device. The **CALLING ADDRESS MASKING STRING** is prepended to *N* characters from the tail of the unmasked calling address (after all other translations and substitutions are performed) to form the calling address included in the incoming call packet to the attached device. *N* is provided by the **CALLING ADDRESS MASKING DIGITS** prompt.

CALLING ADDRESS MASKING DIGITS

If **COMPONENT** is *port*, specifies the number of digits from the tail of the unmasked calling address that are used to form the masked calling address. The maximum value, *m* is 15 minus the length of the **CALLING ADDRESS MASKING STRING** that is administered.

CALLING ADDRESS MASKING STRING

If **COMPONENT** is *port*, specifies the string of digits that are used to form the prefix of the masked calling address.

CLOCKING TYPE

Specifies if clocking for a port is provided by the module's *internal* clock, or if it is provided by an *external* device. Only the RS-232-C paddleboard type supports internal clocking.

CLOSED USER GROUP PROFILE ID

A string of 1 to 8 characters that identifies an existing CUG profile associated with this port.

COMMENT

If **COMPONENT** is *port*, an optional string of 1 to 60 characters, enclosed in double quotation marks, that contains needed administrative information.

Parameters *(continued)*

COMPONENT
Specifies if the component to be entered is a *module* or *port*.

DEFAULT CALLING ADDRESS
From 1 to 15 numeric characters specifying the calling address of packets originating from an asynchronous endpoint that does not have an assigned EPN; or the word *none*, meaning a default calling address is not to be assigned because the host does not have to communicate with such an endpoint.

DEFAULT CALLING ADDRESS SUBSTITUTION
If **DEFAULT CALLING ADDRESS** is not *none*, this may be set to *"on"* to indicate that the default calling address will be substituted in the outgoing call setup request, even if the call setup already had a calling address field specified. If the value is *"off"*, then the **DEFAULT CALLING ADDRESS** will only be used if no calling address is present in the call request packet.

DEFAULT NETWORK LEVEL PACKET SIZE
If **COMPONENT** is *port* and **PACKET SIZE NEGOTIATION** is *off*, specifies the packet size in bytes.

DEFAULT NETWORK LEVEL THROUGHPUT CLASS
If **COMPONENT** is *port* and **NUMBER OF SVC CHANNELS PER PORT** is greater than *0*, specifies the default throughput class value.

DEFAULT NETWORK LEVEL WINDOW SIZE
If **COMPONENT** is *port* and **WINDOW SIZE NEGOTIATION** is *off*, specifies the network window size to be from *1* to *7* frames.

DOWNLOAD SERVER
If **COMPONENT** is *module*, specifies the software source to be downloaded to the module. It must be a valid service address or the local *controller*.

ENDPOINT NUMBERS FOR PVC CHANNELS
A unique 4-digit address ranging from *0000* to *9999* used to address the PVC channel range. The EPN can be a single 4-digit address or a range specified by two 4-digit addresses separated by a dash.

ENDPOINT NUMBERS FOR SVC CHANNELS FOR PORT <N>
A unique 4-digit address ranging from *0000* to *9999* that can be a single 4-digit address or a range specified by two 4-digit addresses separated by a dash. Each port entered at the **PORT NUMBER** prompt must be assigned an EPN.

EXTERNAL BAUD RATE
If **COMPONENT** is *port*, specifies the speed with which devices communicate with the port.

Parameters *(continued)*

FAST SELECT ACCEPTANCE

If **COMPONENT** is *port* and **NUMBER OF SVC CHANNELS PER PORT** is greater than *0*, and the call did not access a PAD, specifies whether the port can (*on*) or cannot (*off*) receive calls with call user data (up to 128 bytes).

HUNT GROUP ADDRESS SUBSTITUTION

If **COMPONENT** is *port* this field may be set to *"on"* to indicate that any call to this port made using a hunt group address, will use the configured EPN in the outgoing call request packet as the called address, not the hunt group address. If the field is *"off"*, then the hunt group address is used as the called address.

I-FRAME NUMBERING

If **COMPONENT** is *port*, specifies whether I-frame (information frame) numbering should be *basic* or *extended.*

INTERNAL BAUD RATE

When clocking is internal, the board provides this speed to the device attached. See Syntax for specific baud rates.

LOCAL X.3 PROFILE ID

A string of 1 to 20 characters specifying the local X.3 profile used with calls to an asynchronous endpoint. It can be either user-defined or one of the three system-supplied profile IDs: *simple, transparent*, or *mbit*. The common profile is *simple*; the profile suitable for file transfers is *transparent*; and the profile needed to invoke the M-bit procedure between an asynchronous block device and an X.25P endpoint is *mbit*.

LOGICAL PORT TYPE

If **COMPONENT** is *port*, specifies if the link layer and packet layer logical port type should be *DCE* or *DTE*. The normal case is for this type to be DCE for connection to an X.25P host.

MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2)

A number from *1* to *255* specifying the maximum number of attempts the port can make to complete a transmission before the module issues an alarm. If a poor connection exists, a greater number of attempts is recommended.

Parameters *(continued)*

MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K)

The maximum number of sequentially numbered I (information) frames that the port can have unacknowledged at once. If **COMPONENT** is *port* and **I-FRAME NUMBERING** is *basic*, a number from *1* to *7* or if **I-FRAME NUMBERING** is *extended*, a number from *1* to *32*.

Many outstanding I frames lower the overhead for transmission packet handshaking that occurs between the endpoint and switch. Fewer outstanding I frames provide more robust, but slower, acknowledgement.

MAXIMUM PACKET SIZE

If **COMPONENT** is *port* and depending on the value specified for **DEFAULT NETWORK LEVEL PACKET SIZE** , the maximum byte size of the packet that the network allows. In PAD mode, the maximum packet size is 256, regardless of the value entered for this prompt.

MAXIMUM REMOTE PACKET SIZE

This prompt will only occur if the response to **SEGMENTATION** was "on". It indicates what the remote node will use as its maximum packet size when communicating to this node.

MAXIMUM WINDOW SIZE

If **COMPONENT** is *port*, specifies the maximum network window size to be a value between the **DEFAULT NETWORK LEVEL WINDOW SIZE** and 7. This is the highest window size that may be negotiated on a call setup.

MODULE ADDRESS

If **COMPONENT** is *module*, a set of numbers identifying the address of the X.25P. If the X.25P is installed directly into the node, the address is <*module*>, where *module* is the node slot number the X.25P occupies.

If the X.25P is installed in a concentrator, the address is <*concentrator/module*>; where *concentrator* is the node slot number that the LIM, which connects the concentrator to the module, occupies; and *module* is a number indicating the MPC15 (*frs*) or MPC7 (*rrs*) slot number that the X.25P occupies. Multiple module address entries are allowed.

NUMBER OF ORIGINATE ONLY CHANNELS

If **SVC DIRECTION** is *2way*, a number from *0* to the remainder of the number of receive-only channels from the maximum number of configured SVC channels. Specification of this parameter prevents blocking originating traffic from the host.

NUMBER OF RECEIVE ONLY CHANNELS

If **SVC DIRECTION** is *2way*, a number from *0* to the maximum number of configured SVC channels (*SVC_channels*). Specification of this parameter prevents blocking receiving traffic to the host.

Parameters *(continued)*

NUMBER OF <PVC/SVC> CHANNELS PER PORT

A number from *0* to *X* specifying a contiguous number of channels in the PVC or SVC range. The module channels assigned to a port are a contiguous range of PVC channels, followed by a contiguous range of SVC channels. There may be a gap between the range of PVC channels and the range of SVC channels, if the **SVC STARTING LOGICAL CHANNEL NUMBER** is set to a number other than one higher than the number of PVCs. The total number of available channels is represented by *X*.

NUMBER OF USER CHANNELS

If **COMPONENT** is *module*, specifies the number of channels (*1* to *507*) that can be distributed among the four or eight ports. The maximum number of recommended user channels can be reduced from *507* if non-standard packet and/or window sizes are chosen, due to the increased overhead of working with larger packet and/or window sizes. Refer to **X.25P Administration** for details.

NUMBER OF USER CHANNELS PER PORT

If **COMPONENT** is *port*, specifies the number of channels, in terms of *1* to *X*, to be allocated to the port being administered. The maximum value *X* cannot exceed *507*. Refer to **X.25P Administration** for details.

PAD INACTIVITY TIMER (T)

Specifies the number of minutes from *2* to *20* that the PAD is to wait for a call to be placed. The PAD inactivity timer is activated when the asynchronous end user accesses the PAD, but does not place a call. If a call is not placed within the allocated time, the call/connection between the end user and the PAD is taken down.

PAD RETRY COUNTER (N)

A number from *2* to *20* that specifies how many times an asynchronous end user can unsuccessfully attempt to establish a call before the call/connection between the end user and the PAD is taken down. The PAD Retry Counter (N) is increased each time the PAD enters the PAD wait state.

PADDLEBOARD TYPE

The type of I/O board for this module. The RS232 IO board can support 8 ports, while the V.35 IO board supports 4 ports. In addition, all clocking is external for the V.35, while the RS232 I/O board can provide clocking if the option is selected.

PORT NUMBER

If **COMPONENT** is *port*, a number from *1* to *4* for V.35 or *1* to *8* for RS232, indicating the port or ports to be entered. Multiple port number entries are allowed with the same command iteration. The information specified is assigned to each port in the range or list; however, PVC information cannot be entered.

Parameters *(continued)*

PACKET SIZE NEGOTIATION

Specifies whether the packet size negotiation feature, which is used to negotiate the maximum length of data packets on a specified logical channel, should be turned *on* or *off*.

PREDEFINED DESTINATION

If **COMPONENT** is *port*, a string of 1 to 72 characters consisting of the network, area, exchange, and local service address of a particular network service followed by optional parameters.

PVC DESTINATION

If **COMPONENT** is *port*, specifies the address of the opposite end of the **PVC LOGICAL CHANNEL NUMBER.** The address can be a destination string that has the same format as a **PREDEFINED DESTINATION** or, depending on the destination module, it can specify a single destination channel. (Any logical channel, except an X.25P channel in the SVC channel range, can be the destination for another PVC.)

Destination Module	Physical Port Destination Address Format
DKAP	*<address>.<module>.<channel set>.<lci>*
SAM/SAMSL	*<address>.<samsl module>/<board>.<port>*
SAM/SAMML	*<address>.<samml module>.<samml port>/<board>.<port>*
TY/MSM/CPM/AIM	*<address>.<module>.<port>*
X.25/X.25P/X.75	*<address>.<module>.<port>.<lci>*

The physical port destination address fields are

- *<address>*
  Refer to discussions of *predefined destination* (*PDD*) in **X.25P Administration**.
- *<board>*
  The SAM board number.
- *<channel>*
  The module channel number of the destination.
- *<channel set>*
  The identifier of the DKAP channel set.
- *<lci>*
  The *logical channel identifier* of the destination. (An lci number is relative to the port—or, for a DKAP— a channel set. A channel number is relative to the module.)

Parameters *(continued)*

- *<module>*
  A number identifying the node slot that the module occupies. It has the format: <module> or <concentrator/module>.
- *<port>*
  The port number of the destination. For SAMs, it is the port number relative to the board.
- *<samml module>*
  The module number of the SAMML module connecting the SAM to the node.
- *<samml port>*
  The port number of the SAMML link connecting the SAM to the node. If a dual-link SAM is configured, the SAMML port should be an odd number.
- *<samsl module>*
  The module number of the SAMSL link connecting the SAM to the node.

PVC GROUP
If **COMPONENT** is *port*, a string of 1 to 8 characters specifying an existing two-way group assigned to the PVC range. This group was previously entered with **enter group**.

PVC LOGICAL CHANNEL NUMBER
If **NUMBER OF PVC CHANNELS PER PORT** is greater than *1*, a number from *1* to *<Y>* indicating the logical channel for which a **PVC DESTINATION** is to be entered. *<Y>* is the maximum **NUMBER OF PVC CHANNELS** allocated.

PVC X.3 PROFILE ID
A string of 1 to 20 characters specifying the local X.3 profile used with calls made on this PVC to an asynchronous endpoint. The default is the value entered for *LOCAL X.3 PROFILE ID* for the port.

REVERSE CHARGING ACCEPTANCE
If **COMPONENT** is *port* and **NUMBER OF SVC CHANNELS PER PORT** is greater than *0*, specifies whether a call will be accepted (*on*) or rejected (*off*) if the reverse charging facility is present in the call request packet.

SEGMENTATION
If **COMPONENT** is *port*, specifies whether segmentation is *on* or *off* for the port. When segmentation is *on*, the two ends of the virtual circuit may be using different packet sizes, and the other end of the virtual call must also have segmentation set to *on*.

SOFTWARE VERSION
If **COMPONENT** is *module*, a string of 1 to 14 characters specifying the software version filename to be downloaded to the module. If **DOWNLOAD SERVER** is *controller*, enter *standard* as the software version filename. If **DOWNLOAD SERVER** is not *controller*, enter a valid software release number or the name of the file to be downloaded from the server.

Parameters *(continued)*

SVC DIRECTION
Specifies the direction of SVC calls on the port to be *originate, receive,* or *2way*.

SVC GROUP
If **COMPONENT** is *port*, a string of 1 to 8 characters specifying the existing group assigned to the SVC channel range. This group was previously entered with **enter group**.

SVC STARTING LOGICAL CHANNEL NUMBER
If **COMPONENT** is *port*, a number may be supplied to be added to the first logical channel number to be used for SVC channels. Normally this offset is zero.

THROUGHPUT CLASS NEGOTIATION
If **COMPONENT** is *port* and if **NUMBER OF SVC CHANNELS PER PORT** is greater than *0*, specifies whether throughput class negotiation is *on* or *off* for the port. If *off*, the module clears all calls with throughput class negotiation facility requests. If *on*, the module negotiates, but does not limit, the X.25P throughput class with the external X.25P equipment to specific bidirectional data transfer rate.

TRANSIT DELAY
If **COMPONENT** is *port*, specifies the number of milliseconds (from *10* to *500* milliseconds) that may be caused by delays in transit through the network.

UPLOAD ALWAYS BEFORE DOWNLOAD
If **COMPONENT** is *module*, specifies whether (*yes* or *no*) a memory dump should be sent to the upload server before the control computer initiates a download.

UPLOAD ONLY AFTER FAULT
If **COMPONENT** is *module*, specifies whether (*yes* or *no*) an upload dump should be sent to the upload server after a fault is detected in the module.

UPLOAD SERVER
If **COMPONENT** is *module*, specifies a valid service address on the host that is to receive the memory dump prior to the control computer initiating a download or after a fault.

WAITING ACKNOWLEDGEMENT TIMER (T1)
If **COMPONENT** is *port*, specifies the number of milliseconds (from *50* to *60000* milliseconds, in multiples of 50 milliseconds) for which the module must wait before acknowledging a timer violation so an alarm can be issued. If multiple trunk segments exist between two endpoints, more time is recommended.

WINDOW SIZE NEGOTIATION
If **COMPONENT** is *port*, specifies whether the window size negotiation feature should be turned *on* or *off* for the logical channel.

Prompted Entry: Entering X.25P Module Information

```
CC0> enter
OBJECTS [...x25p...]: x25p
COMPONENT [module, port]: module
MODULE ADDRESS: 22
NUMBER OF USER CHANNELS [1-507: +(200)]: +

DOWNLOAD SERVER [+(controller)]: +
SOFTWARE VERSION [+(standard)]: +
UPLOAD SERVER [+(none)]: tohost
UPLOAD ALWAYS BEFORE DOWNLOAD [yes, no: +(no)]: +
UPLOAD ONLY AFTER FAULT [yes, no: +(no)]: yes
PADDLEBOARD TYPE [rs232, v.35: +(v.35)]: v.35

MODULE ADDRESS:    Delete
CC0>
```

Prompted Entry: Entering X.25P Module Port Information

```
CC0> enter
OBJECTS [...x25p...]: x25p
COMPONENT [module, port]: port
MODULE ADDRESS: 22
PORT NUMBER [1-4]: 1
COMMENT [up to 60 chars double quoted, none: +(none)]:
"in Room 202"
INITIAL SERVICE STATE [in, out: +(out)]:
EXTERNAL BAUD RATE [1200-2.048M: +(64k)]: +
I-FRAME NUMBERING [basic, extended: +(basic)]: +
MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K) [1-7: +(7)]: +

INFO: The values for the T1 TIMER are expressed in milli-seconds
      and only multiples of 50 msec are allowed.

WAITING ACKNOWLEDGEMENT TIMER (T1) [50-60000: +(3000)]: +

MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2) [1-255: +(7)]: +
ACTION WHEN N2 COUNT EXCEEDED [disconnect, reset: +(reset)]: +
ACTION WHEN DISC RECEIVED [disconnect, reset: +(disconnect)]: +
LOGICAL PORT TYPE [dce, dte: +(dce)]: +
BILLING STATUS [on, off: +(off)]: +
WINDOW SIZE NEGOTIATION [on, off: +(on)]: +
DEFAULT NETWORK LEVEL WINDOW SIZE [1-7: +(2)]: +
MAXIMUM WINDOW SIZE [2-7: +(2)]: +
PACKET SIZE NEGOTIATION [on, off: +(on)]: +
DEFAULT NETWORK LEVEL PACKET SIZE [128, 256, 512, 1024: +(128)]: +
MAXIMUM PACKET SIZE [128, 256, 512, 1024: +(128)]: +
SEGMENTATION [on, off: +(off)]: on
MAXIMUM REMOTE PACKET SIZE [128, 256, 512, 1024: +(128)]: +
```

Prompted Entry: Entering X.25P Module Port Information *(continued)*

```
DEFAULT CALLING ADDRESS [up to 15 digits, none: +(none)]: 5554605
DEFAULT CALLING ADDRESS SUBSTITUTION [on, off: +(off)]: +
CALLING ADDRESS MASKING [on, off: +(off)]: on
CALLING ADDRESS MASKING STRING [up to 15 digits, none: +(none)]: 373
CALLING ADDRESS MASKING DIGITS [0-12: +(0)]: 4
CALLED ADDRESS MASKING [on, off: +(off)]: on
CALLED ADDRESS MASKING STRING [up to 15 digits, none: +(none)]: 23344
CALLED ADDRESS MASKING DIGITS [0-9: +(0)]: 2
LOCAL X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent:
  +(transparent)]: mbit

INFO:  The maximum number of channels recommended given packet and window
       size constraints is nnn.
       Exceeding this number can exceed the module capacity.

NUMBER OF USER CHANNELS PER PORT [1-200: +(200)]: 12
NUMBER OF SVC CHANNELS PER PORT [0-12: +(12)]: 7
NUMBER OF PVC CHANNELS PER PORT [0-5: +(5)]: 5
SVC STARTING LOGICAL CHANNEL NUMBER [6-4089: +(6)]: +
SVC DIRECTION [originate, receive, 2way: +(2way)]: +
SVC GROUP [up to 8 chars]: switched
NUMBER OF RECEIVE ONLY CHANNELS [0-7: +(0)]: +
NUMBER OF ORIGINATE ONLY CHANNELS [0-7: +(0)]: +
ADDRESS CHECKING [on, off: +(off)]: +
ENDPOINT NUMBERS FOR SVC CHANNELS FOR PORT <N> [0000-9999]: 1000
HUNT GROUP ADDRESS SUBSTITUTION [on, off: +(off)]: +
CLOSED USER GROUP PROFILE ID [up to 8 chrs, none: +(none)]: +
PREDEFINED DESTINATION [up to 72 chars, none: +(none)]: +
REVERSE CHARGING ACCEPTANCE [on, off: +(off)]: +
FAST SELECT ACCEPTANCE [on, off: +(on)]: +
CALLED ADDRESS MODIFIED NOTIFICATION [on, off: +(off)]: +
THROUGHPUT CLASS NEGOTIATION [on, off: +(off)]: +
DEFAULT NETWORK LEVEL THROUGHPUT CLASS [75, 150, 300, 600, 1200,
                    2400, 4800, 9600, 19.2k, 48k, 64k: +(2400)]: +
PAD INACTIVITY TIMER (T) [2-20, off: +(off)]: +
PAD RETRY COUNTER (N) [2-20, off: +(off)]: +
TRANSIT DELAY [10-500: +(50)]: +
PVC GROUP [up to 8 chars]: perm
INFO: Enter assignment of destinations to logical channels using the
      following prompts.  Hit <DEL> once when finished making entries.

  PVC LOGICAL CHANNEL NUMBER [1-5]: 1
  PVC X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent:
    +(mbit): +
  PVC DESTINATION [up to 72 chars, none: +(none)]: home

  PVC LOGICAL CHANNEL NUMBER [1-5]:

PORT NUMBER [1-4]:    Delete
CC0>
```

remove x25p

The **remove x25p** command enables you to take an X.25P module and its ports out of service.

When a module is removed from service, its in-service ports are automatically taken out of service and remain in the ready-for-service (*rfs*) state. When module service is restored, the ready-for-service ports are automatically put back into service. If any module ports were previously taken out of service (either manually or because of a fault) these ports remain out of service and must be returned to the in-service state via **restore x25p <port>**.

The restricted access state, depicted in the software as *access*, enables existing calls over a given port to remain up, but access to be denied to new switched calls. Calls originating on a PVC logical channel are not denied access on the basis of the restricted *access* service state.

When access is restricted on an in-service X.25P port, the port state is changed to *restricted* access. When access is restricted on a ready-for-service X.25P port, the port state is changed to *ready for restricted access*.

If a port belonging to a hunt group is put in the restricted access state, new calls are routed to the next available port in the hunt group.

Syntax

You can input **remove x25p** in prompted or one-line entry.

```
CC0> remove
OBJECTS [...x25p...]: x25p

COMPONENT [module, port, access]:
```

If COMPONENT is "access":

```
DIRECTION [incoming, outgoing, both: +(both)]:

MODULE ADDRESS:
```

If COMPONENT is "port" or "access":

```
PORT NUMBER [1-<N>]:
```

(where <N> is 4 if the module has a "v.35" PADDLEBOARD TYPE and 8 if "rs232")

Parameters

This section contains an explanation of the parameters used in the **remove x25p** prompting sequence that differ from those used in **enter x25p**. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

COMPONENT

Specifies whether the component to be removed from service is a *module* or *port*, or whether the *access* to the port is to be removed from restricted access.

DIRECTION

If **COMPONENT** is *access*, specifies whether access should be restricted to *incoming* or *outgoing* calls or *both*.

Prompted Entry: Removing X.25P Ports from Service

```
CC0> remove
OBJECTS [...x25p...] x25p
COMPONENT [module, port, access]: port
MODULE ADDRESS: 22
PORT NUMBER [1-<N>]: 1
CC0>
```

One-line Entry: Removing X.25P Ports from Service

```
CC0> remove x25p port 22 1
```

restore x25p

The **restore x25p** command puts an X.25P module or its ports into service for the first time or after either was automatically or manually removed from service.

When a module is removed from service, its in-service ports are automatically taken out of service and remain in the ready-for-service (*rfs*) state. When module service is restored, the ready-for-service ports are automatically put back into service. If any module ports were previously taken out of service (either manually or because of a fault) these ports remain out of service and must be returned to the in-service state via **restore x25p <port>**.

The restricted access state, depicted in the software as *access*, enables existing calls over a given port to remain up, but access to be denied to new switched calls. Calls originating on a PVC logical channel are not denied access on the basis of the restricted *access* service state.

When the X.25P module is in service and any of its ports are in the restricted access service state are put into service with **restore x25p**, the port service state is changed to *in service*. When the module is out of service and any of its ports in the restricted access service state are put into service with **restore x25p**, the port service state is changed to *ready-for-service.*

Syntax

You can input **restore x25p** in prompted or one-line entry.

```
CC0> restore
OBJECTS [...x25p...]: x25p

COMPONENT [module, port, access]:
```

If COMPONENT is "access":

```
DIRECTION [incoming, outgoing, both: +(both)]:

MODULE ADDRESS:
```

If COMPONENT is "port" or "access":

```
PORT NUMBER [1-<N>]:
```

(where <N> is 4 if the module has a PADDLEBOARD TYPE of "v.35", and 8 if "rs232")

Parameters

This section contains an explanation of the parameters used in the **restore x25p** prompting sequence that differ from those used in **enter x25p**. Refer to Syntax for the prompting sequence, system defaults, and parameter options.

COMPONENT

Specifies whether the component to be restored to service is a *module* or *port*; or whether the *access* to the port is to be restored from restricted access.

DIRECTION

If **COMPONENT** is *access*, specifies whether access restriction should be lifted for *incoming* or *outgoing* calls or whether access restriction should be lifted for *both* incoming and outgoing calls.

Prompted Entry: Restoring an X.25P Module to Service

```
CC0> restore
OBJECTS [...x25p...] x25p
COMPONENT [module, port, access]: module
MODULE ADDRESS: 22
<system output>
```

One-line Entry/Output: Restoring an X.25P Module to Service

```
CC0> restore x25p module 22
Download in progress. Hit <DEL> to put process in background.
Download proceeding > > > >    Delete
CC0>
```

verify x25p

The output of the **verify x25p** command enables you to check the contents of the database for a particular X.25P module or all X.25P modules.

Syntax

You can input **verify x25p** in prompted or one-line entry.

```
CC0> verify
OBJECTS [...x25p...]: x25p
MODULE ADDRESS [+(all)]:
```

Parameters

Except for being able to specify the word *all*, meaning every X.25P module, the **MODULE ADDRESS** parameter definition for **verify x25p** is the same as that for **enter x25p**.

Prompted Entry: Verifying X.25P Module Information

```
CC0> verify
OBJECTS [...x25p...]: x25p
MODULE ADDRESS [+(all)]: 22
<report output>
```

One-line Entry/Output: Verifying X.25P Module and Port Information

```
CC0> verify x25p 22
   95-12-31 19:21:50 NODE=Redqueen
     MODULE ADDRESS: 22
     MODULE TYPE: x25p                  NCHLS: 200
     SERVICE STATE: out (manual)
     DOWNLOAD SERVER: controller
     VERSION: standard
     UPLOAD SERVER: none
     UPLOAD ALWAYS BEFORE DOWNLOAD: no
     UPLOAD ONLY AFTER FAULT: no
     PADDLEBOARD TYPE: v.35
             LINE                                      N2      DISC
     PORT    SPEED  CLOCKING  I-F_NUMB  K  T1    N2  ACTION  ACTION
       1     64000  external  basic     2  4000  7   reset   reset
       2   NO OPTIONS SPECIFIED
       3   NO OPTIONS SPECIFIED
       4   NO OPTIONS SPECIFIED
```

One-line Entry/Output: Verifying X.25P Module and Port Information *(continued)*

```
                RESTRIC  USER
    PORT  SRVC  ACC_DIR  CHNL_NUM  CHNL_RANGE  PVC/SVC  GROUP     EPN
      1   out   N/A      40        1-6         pvc      perm      0090
                                   7-40        svc      switched  0050-0080
      2   NO OPTIONS SPECIFIED
      3   NO OPTIONS SPECIFIED
      4   NO OPTIONS SPECIFIED

          WINDOW    WINDOW    MAXIMUM  PACKET    PACKET    MAXIMUM
    PORT  SIZE NEG  SIZE DEF  WIN SIZE SIZE NEG  SIZE DEF  PACKT SIZE
      1   on        2         4        on        128       256
      2   NO OPTIONS SPECIFIED
      3   NO OPTIONS SPECIFIED
      4   NO OPTIONS SPECIFIED

          PORT                        REMOTE MAX
    PORT  TYPE  ADDCHK  SEGMENTATION  PACKET SIZE  BILLING
      1   dce   off     off           N/A          off
      2   NO OPTIONS SPECIFIED
      3   NO OPTIONS SPECIFIED
      4   NO OPTIONS SPECIFIED

    95-12-31 19:21:50 NODE=Redqueen
M   verify x25p 22

    SWITCHED VIRTUAL CIRCUIT DATA:

                    RECEIVE            ORIGINATE START    DEFAULT
    PORT  DIRECT    ONLY      TWO-WAY  ONLY      SVC CH   CALLING ADDRESS
      1   2way      7-10      11-34    35-40     7        2015556796
      2   NO OPTIONS SPECIFIED
      3   NO OPTIONS SPECIFIED
      4   NO OPTIONS SPECIFIED

          FAST SEL  REV    THROUGHPUT  THROUGHPUT  TRANSIT   CUG
    PORT  ACCEPT    CHARG  CLASS NEG   CLASS DEFL  DELAY     PROFILE
      1   on        off    on          9600        50        techpubs
      2   NO OPTIONS SPECIFIED
      3   NO OPTIONS SPECIFIED
      4   NO OPTIONS SPECIFIED

          CALL_ADDR   INACTIVITY   RETRY     DEFAULT    HUNT
    PORT  MOD_NOTIF   TIMER        COUNTER   SUBST      SUBST
      1   off         off          off       off        off
      2   NO OPTIONS SPECIFIED
      3   NO OPTIONS SPECIFIED
      4   NO OPTIONS SPECIFIED
```

One-line Entry/Output: Verifying X.25P Module and Port Information *(continued)*

```
            CALLING     CALLING ADDR         CALLING ADDR
       PORT ADDR MASK   MASK STRING          MASK DIGITS
         1  on          90850                4
         2  NO OPTIONS SPECIFIED
         3  NO OPTIONS SPECIFIED
         4  NO OPTIONS SPECIFIED
            CALLED      CALLED  ADDR         CALLED ADDR
       PORT ADDR MASK   MASK STRING          MASK DIGITS
         1  on          none                4
         2  NO OPTIONS SPECIFIED
         3  NO OPTIONS SPECIFIED
         4  NO OPTIONS SPECIFIED
       95-12-31 19:21:50 NODE=Redqueen
   M   verify x25p 22
       PORT  X.3 PROFILE          PDD
         1   transparent          none
         2   NO OPTIONS SPECIFIED
         3   NO OPTIONS SPECIFIED
         4   NO OPTIONS SPECIFIED
       95-12-31 19:21:50 NODE=Redqueen
   M   verify x25p 22
       PERMANENT VIRTUAL CIRCUIT DESTINATION DATA:
       PORT NUMBER 1
       CHNL X.3 PROFILE           PVC DESTINATION
        1   transparent           9000/201/555/4321.31.5.4
        5-6 UNASSIGNED
       PORT NUMBER 2   NO OPTIONS SPECIFIED
       PORT NUMBER 3   NO OPTIONS SPECIFIED
       PORT NUMBER 4   NO OPTIONS SPECIFIED
       95-12-31 19:21:50 NODE=Redqueen
   M   verify x25p 22
       PORT  COMMENT
         1   "in Room 202"
         2
         3
         4
CC0>
```

Report Fields

This table correlates each report field heading shown in the output of **verify x25p** with the parameter for which you are prompted in **enter x25p** or **change x25p**. The information beneath each report field heading reflects the parameter option specified in either command. An *N/A* indicates that the parameter is *not applicable* or *not used*.

Report Field Name	Corresponding Parameter Name
ADDCHK	ADDRESS CHECKING
BILLING	BILLING STATUS
CALL_ADDR MOD_NOTIF	CALLED ADDRESS MODIFIED NOTIFICATION
CALLED ADDR MASK	CALLED ADDRESS MASKING
CALLED ADDR DIGITS	CALLED ADDRESS MASKING DIGITS
CALLED ADDR STRING	CALLED ADDRESS MASKING STRING
CALLING ADDR MASK	CALLING ADDRESS MASKING
CALLING ADDR DIGITS	CALLING ADDRESS MASKING DIGITS
CALLING ADDR STRING	CALLING ADDRESS MASKING STRING
CHNL_RANGE	None: the physical allocation of user channels
CLEAR NETW	CLEARING NETWORK IDENTIFICATION
CLOCKING	CLOCKING TYPE
COMMENT	COMMENT
CUG PROFILE	CLOSED USER GROUP PROFILE ID
DEFAULT CALLING ADDRESS	DEFAULT CALLING ADDRESS
DEFAULT SUBST	DEFAULT CALLING ADDRESS SUBSTITUTION
DIRECT	SVC DIRECTION
DISC_ACTION	ACTION WHEN DISC RECEIVED
DOWNLOAD SERVER	DOWNLOAD SERVER
EPN	ENDPOINT NUMBERS FOR SVC CHANNELS FOR PORT <N> *- or -* ENDPOINT NUMBERS FOR PVC CHANNELS
FAST SEL ACCEPT	FAST SELECT ACCEPTANCE
GATEWAY_ID	GATEWAY ID
HUNT SUBST	HUNT GROUP ADDRESS SUBSTITUTION
I-F NUMB	I-FRAME NUMBERING
INACTIVITY TIMER	PAD INACTIVITY TIMER (T)
K	MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K)
LINE SPEED	SPEED OR BAUD OF THE LINE
MAXIMUM PACKT SIZE	MAXIMUM PACKET SIZE
MODULE ADDRESS	MODULE ADDRESS
MODULE TYPE	None: type of module
NCHLS	None: the number of channels configured for the module
N2	MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2)
N2_ACTION	ACTION WHEN N2 COUNT EXCEEDED

Report Fields *(continued)*

Report Field Name	Corresponding Parameter Name
PACKET SIZE DEF	DEFAULT NETWORK LEVEL PACKET SIZE
PACKET SIZE NEG	PACKET SIZE NEGOTIATION
PADDLEBOARD TYPE	PADDLEBOARD TYPE
PDD	PREDEFINED DESTINATION
PERMANENT VIRTUAL CIRCUIT DESTINATION DATA	None: area of report showing data administered for PVCs
PORT	PORT NUMBER
PORT TYPE	LOGICAL PORT TYPE
PVC DESTINATION	PVC DESTINATION
PVC LOGICAL CHANNEL NUMBER	PVC LOGICAL CHANNEL NUMBER
PVC/SVC GROUP	PVC GROUP SVC GROUP
RECEIVE ONLY	NUMBER OF RECEIVE ONLY CHANNELS
REMOTE MAX PACKET SIZE	MAXIMUM REMOTE PACKET SIZE
RESTRIC ACC_DIR	None: direction in which the access is restricted
RETRY COUNTER	PAD RETRY COUNTER (N)
REV CHARG	REVERSE CHARGING INDICATION
SEGMENTATION	SEGMENTATION
SERVICE STATE	None: the operational status of the module
SRVC	None: operational status of the port
STRT SVC CHAN	SVC STARTING LOGICAL CHANNEL NUMBER
SWITCHED VIRTUAL CIRCUIT DATA	None: area of report showing data administered for SVCs
TARIFF IND	TARIFF INDICATION
THROUGHPUT CLASS DEFL	DEFAULT NETWORK LEVEL THROUGHPUT CLASS
THROUGHPUT CLASS NEG	
TRANSIT DELAY	TRANSIT DELAY
TWO_WAY	None: channels dedicated for two-way SVC service
T1	WAITING ACKNOWLEDGEMENT TIMER (T1)
T3	TIMER (T3)
UPLOAD ALWAYS BEFORE DOWNLOAD	
UPLOAD ONLY AFTER FAULT	UPLOAD ONLY AFTER FAULT
UPLOAD SERVER	UPLOAD SERVER
USER CHNL_NUM	NUMBER OF USER CHANNELS PER PORT
VERSION	SOFTWARE VERSION
WINDOW SIZE DEF	DEFAULT NETWORK LEVEL WINDOW SIZE
WINDOW SIZE NEG	WINDOW SIZE NEGOTIATION
X.3 PROFILE	LOCAL X.3 PROFILE ID

System Responses

This section contains system responses applicable to the **x25p** commands. It is organized by the key phrase that prefaces the response.

COMMAND FAILED:

Cannot delete every port of module <addr> while the module is in service.

Use **remove** to take the module out of service before attempting to delete the last port.

Cannot expand mailbox size.

The command processor cannot expand its message queue to receive the request. If the problem persists, contact your support group.

Changing PVC destination reached timeout.
Remove and restore port <num> of module <addr> to maintain database integrity.

Changing the PVC destination reached a time-out. The module port must be removed and restored to service.

Could not <remove/send> cug data from X25P.

The command failed because CUG data could not be sent to/removed from the X.25P module.

Database Full - Entry Failed

Additions of or changes to X.28 identification service signal (sig) cannot be made because the database is full.

Encountered unknown baud rate while executing line <num>.

The command failed because the command processor encountered an invalid baud rate.

Inconsistent CUG data encountered while executing line <num>.

The command failed because inconsistent information was entered for a CUG.

No more channels left for the module.

The command failed because available module channels were depleted.

No X.28 PAD id service signal currently entered.

The X.28 identification service signal (sig) cannot be deleted from the database because it is not administered.

Too many transactions.

Not enough storage space was allocated to request the measurements from the module. This response should only occur if duplicate measurements were requested in one report.

X.28 PAD identification service signal already entered.

An X.28 identification service signal (sig) is already administered. Use **change x28sig** for any modifications.

INFO:

Baud rate <num> is greater than normal limits.

The baud rate entered is greater than the normal limit of 68K, but it will be allowed and will be used in calculations involving baud rate for the port.

Cannot change port channel allocation, direction, or group with module in service.

This response occurs during the prompting sequence of **change x25p** to inform you that the module must be removed from service before the indicated information can be changed.

Cannot change PVC channel allocation or group with module in service.

This response occurs during the prompting sequence of **change x25p** to inform you that the module must be removed from service before the indicated information can be changed.

Cannot <change/enter> PVCs for a range or list of ports.

This response occurs during the prompting sequence of **change x25p** and **enter x25p** to tell you that the indicated information can be changed or entered.

Changing a PVC DESTINATION for an in-service port will cause the PVC to be taken down.

This response occurs during the prompting sequence of **change x25p** to inform you that if the port is still in service and the PVC destination is changed, the existing PVC destination is taken down and reconnected to newly specified destination.

Changing SVC direction may affect the entries to the number of receive-only and/or originate-only channels.

If the direction in which group members are to transmit and/or receive data is changed, then the number of channels allocated to each function are affected.

Command terminated due to memory limitations. All data entered has been saved. Make more changes using 'change x25p'.

Memory use is beyond the allocation. Any data entered is saved; add additional data with **change**.

Database transaction limit reached. All data entered has been saved.

The limit for database transactions occurred during entry of the gateway mapping table. All data entered until this point is saved in the database. Pressing Delete does **not** cause any entries to be lost. Use **delete** or **change** to remove information entered.

<Enter/Modify> assignment of destinations to logical channels using the following prompts. Hit <DEL> once when finished making <changes/entries>.

This response occurs during the prompting sequence of **change x25p** and **enter x25p** to tell you that the indicated information can be changed or entered and to escape command looping, press Delete .

INFO:

Module <addr> port <num> is in service. Only the comment field and PVC destinations can be changed on an in service module.

Only the comment and PVC destinations can be changed on an in-service port on an in-service module. If other changes are required, remove the module from service.

No channels left for originate only channels.

During an iteration of **enter x25p** or **change x25p**, the channels allocated for originate-only channels were depleted.

Place <local/remote> modem in loop-around mode.

This response occurs while running the *local_modem* or *remote_modem* diagnostic.

Reducing SVC channels assigned to port(s) may affect the entries to the number of receive-only and/or originate-only channels.

Before you reduce the number of assigned SVC channels, check the number of receive-only and/or originate-only channels allocated.

Test requires a loop-around connector on port. Replace port cable with loop-around connector.

The port requires a loop-around connector.

The current X.121 EPN range entered is <range>.

This response appears during modification of a gateway ID.

The default network level packet size is 128.

This message is printed instead of the prompt for *default network level packet size*, if the number of channels and window size used prohibit any higher packet size.

The maximum number of channels recommended given packet and window size constraints is nnn. Exceeding this number can exceed the module capacity.

The maximum number of user channels per port that should be configured is supplied during the prompting sequence as a convenience and recommendation. It is calculated using the formula in **X.25P Administration**.

The largest <packet/window> size recommended given the currently configured number of channels and <packet/window> size is <n>. Exceeding this number can exceed the module capacity .

The maximum packet size or the largest window size that should be configured is supplied during the prompting sequence of **change x25p port** while the module is in service. It is calculated from the formula in **X.25P Administration.**

The value for the T1 TIMER is expressed in milliseconds and only increments of 50 ms. are allowed.

The number of milliseconds specified for the T1 timer must be in increments of 50 milliseconds only.

INFO:

This port currently has no PVC service.
There are no more channels left to allocate to the PVC service.

During an iteration of **enter x25p port** or **change x25p port**, all channels were allocated as SVC channels.

With a Baud rate of 256000, no more than 2 ports are recommended with a DEFAULT NETWORK PACKET SIZE less than 512.

When the baud rate is 256,000, only two ports should be administered per module when the DEFAULT NETWORK PACKET SIZE is less than 512.

With a Baud rate of 512000, no more than 1 port is recommended when the DEFAULT NETWORK PACKET SIZE is less than 512, and no more than 2 ports are recommended when the DEFAULT NETWORK PACKET SIZE is 512 or more.

When the port baud rate is administered for 512,000 and when the DEFAULT NETWORK PACKET SIZE is less than 512, only one port should be administered per module; and when DEFAULT NETWORK PACKET SIZE is less than 512,000 and the DEFAULT NETWORK PACKET SIZE is 512 or more, no more than two ports should be administered per module.

With a Baud rate of 1024000, no more than 1 ports is recommended on a module.

When the port baud rate is 1,024,000 only one port should be administered per module.

INPUT ERROR:

This port currently has no <PVC/SVC> service.
The port for which information is currently being changed was not originally administered for PVC or SVC service.

A DNIC must be 4 digits.
A DNIC consists of four digits.

All <modules/ports> must be configured identically.
When modifying a range of components, all components must be identically administered in the database.

Allowed values are basic, extended.
The value entered for the **I-FRAME NUMBERING** prompt was something other than the allowed values of basic or extended for module 8 or module 128, respectively.

Allowed values are dce, dte.
The **LOGICAL PORT TYPE** prompt requires the value of dce or dte, which is used for determining the address for both the Layer 2 and Layer 3 X.25P frames and packets for the X.25P module.

Allowed values are yes, no
The prompt requires a response of either "yes" or "no".

An EPN must be 4 digits.
Enter either a single 4-digit number or a range of two 4-digit numbers separated by a dash.

A service <area/region> must be 3 digits.
A service area or region must consist of three digits.

At least one address component exceeds the 8 character limit.
Make sure that the address you are entering is properly administered using **enter address**.

Both the low and high EPN in a range must be 4 digits.
An EPN range consists of two sets of 4 digits each, ranging from *0000* to *9999*. Enter the correct number of digits for each part of the range and retry the command.

Cannot change multiple ports with PVC service.
Multiple ports having PVC connections must be changed individually because each PVC logical channel is connected to only one PVC destination.

Cannot mix module types, and this group contains <type> modules.
The specified group was assigned to a different module type than that indicated. Different hardware types cannot be mixed within a group. Enter a group associated with the correct hardware type and continue the command.

Cannot re-assign channels for ports while module is in service.
Module and port information cannot be changed while the module is in service. Use **remove** to take the module out of service, then retry the command.

INPUT ERROR:

Cannot reduce user channels below total port allocation <number of current allocation>.

The total number of user channels cannot be reduced below the total number of channels allocated to the module ports.

Could not send cug profile data to X25P Module.

An error in communication with the module occurred while trying to send the new cug profile data. Remove and restore the module to get the module and the controller back in sync.

Could not remove cug profile data from X25P module.

An error in communication with the module occurred while trying to delete the cug profile data. Remove and restore the module to get the module and the controller back in sync.

CUG profile <id> is a <gateway/network> CUG profile.

The specified profile is not the correct type of CUG profile. Make sure you properly administered the profile ID using **enter profile**.

CUG profile <id> is not entered.

Information was not added to the database for the specified CUG profile ID.

Database updated, but new PVC was not established. Remove and restore port to establish new PVC.

An error in communication with the module occurred while trying to notify it of the new PVC. The PVC will not be setup until the port is removed and then restored.

Download server <name> is not a valid service address.

The address used for the **DOWNLOAD SERVER** prompt is not a valid service address on this node.

Encountered unknown baudrate while executing line <num>.

The line indicated had a zero or invalid baud rate, causing an error in calculating the total throughput for the module. Change the port and specify a valid baud rate.

Group <name> is already assigned to <PVC/SVC> service.
PVC and SVC services cannot share a group.

The group specified was previously assigned to a different service type. Service types cannot be mixed within a group.

Group <name> is not entered.

No information was added to the database for the specified group.

Group <name> is not a <originating/receiving/2way> group, as required.

The group must be an originating, receiving, or two-way to correspond with the type of service selected.

Inconsistent configuration of port <num>.

All ports on the same module must be identically administered.

INPUT ERROR:

Inconsistent CUG data encountered while executing line <num>.
An error occurred in processing the cug data entered. Verify the module and correct any discrepancies.

Input string too long.
The X.28 identification service signal (sig) entered exceeds the maximum of 72 characters.

Internal database error for port <num>, while executing line <num>.
The specified port cannot be entered in the database.

Invalid concentrator type for an X.25P module.
An X.25P module can only reside in an MPC15 (*frs*) or MPC7 (*rrs*).

**Lists must be entered as follows: item1, item2, item3,...
where an item may be a single digit or range of digits.**
Lists must be entered using commas to separate each *item* or range of digits.

Maximum of 6 modules allowed.
Only six modules can be administered at any one given point.

Module Does Not Exist: <addr>.
The specified module was not administered.

Module <addr> already configured.
You cannot enter the specified module because it is already administered in the database.

Module <addr> currently has configured ports. All ports must be deleted before deleting module.
Module information cannot be deleted until all port information is deleted.

Module <addr> is a <type> module, x25p expected.
The specified module address is a module other than an X.25P.

Module <addr> is being downloaded.
The requested measurements cannot be compiled because the module is downloading software.

Module <addr> is downloading.
The specified module is currently downloading software.

Module <addr> is in service. Remove before retrying command.
The module must be out of service for the operation. Use **remove x25p**.

Module <addr> is not an x.25p module.
The module at the specified address is a module other than an X.25P.

Module <addr> is not in service.
The module must be in service for the operation. Use **restore x25p**.

Module <addr> port <num> already configured.
The specified port is already administered in the database.

INPUT ERROR:

Module <addr>, Port <num> has no SVC service.
The specified module port does not have any logical channels configured as SVC channels.

Module <addr> port <num> is in service. Remove before retrying command.
The attempted changes cannot be made while the module is in service. Use **remove x25p**.

Module <addr>, port <num> is not configured.
The specified module port is not administered in the database.

Module <addr> port <num> is not entered.
The specified module port is not administered in the database.

Module/port in service and range of ports entered. Remove from service to change port parameters or enter only one port to change comments or PVC destinations.
The only changes allowed on an in-service port on an in-service module is to change comments or PVC destinations. But these changes are only allowed on a single port at a time. Redo the command, for a single port to make these changes.

No module in slot <addr>.
The specified module address (slot number) is empty.

No more available channels at these packet size and window size.
The packet and window size values must be adjusted because the port allocation was consumed.

No more channels left for the module.
The module depleted its allocation of available channels.

Not a legal string: <string>
The specified string is not valid.

Number of PVC channels or SVC channels must be greater than 0.
0 is not a valid entry for the **NUMBER OF PVC CHANNELS** prompt if SVCs were not previously entered.

Parameter out of range: <range>
The specified range exceeds the allowed minimum/maximum.

Port <num> has no PVC channels. Cannot change PVC destination.
If the specified port does not have any PVC channels allocated, the PVC destination cannot be modified.

Port <p> on module <m> is <already/not> in the restricted access state.
The port on the module you are trying to put into the restricted access state is already in that state.

INPUT ERROR:

Port <p> on module <m> is <already/not> in the ready for restricted access state.

The port on the module you are trying to put into the ready for restricted access state is already in that state.

Port <p> on module <m> is in the ready for restricted access state.

Use **restore x25p** to restore this port to service.

Port <p> on module <m> is in the restricted access state.

Use **restore x25p** to restore this port to service.

Port <p> on module <m> is out of service.

You cannot remove a port if it is out of service. If you want to restore the port to service, use **restore x25p**.

Range must be in the form nnnn-nnnn; no spaces permitted.

The range entered must contain two 4-digit numbers, separated by a dash, without spaces.

Simcon access error. Module %s port %d has inconsistent data.61s Remove and restore module to synchronize control computer with module.

An error in communication with the module occurred while trying to enter/change/delete a port on an in-service module. Remove the module, verify whether the enter/change/delete occurred, and redo it while the module is out of service.

Slot is reserved: <addr>

The specified slot number (module address) is reserved for another module.

The default calling address may not contain alphabetic characters.

The default calling address must contain numbers only.

The EPN <num> is not entered as a range.

The endpoint number specified is not the lowest endpoint number of a range or is not encompassed within a range; it is a single endpoint number.

The first EPN in a range must be less than the second EPN.

In a range of EPNs, such as *xxxx-yyyy*, xxxx (the first EPN) must be a lower number than yyyy (the second EPN).

The value <num> is not an increment of 50.

For timer values, the input must be in increments of 50 milliseconds. This input was not such an increment.

The predefined destination is not a valid service address.

The address given for this PDD is not a valid service address on this node.

The sum of all the port baudrates exceeds the maximum module throughput.

Adding up the throughput of each port configured for the module resulted in a value greater than 2Meg. Reconfigure some ports to bring the total below the 2Meg maximum.

INPUT ERROR:

The value must be an integer (2-20) or 'off'.
The valid responses for this command are integers between 2 and 20, or the string, "off".

There are too many slashes.
Your entry contains too many slashes.

The resulting high EPN is greater than 9999.
The high end of an EPN range cannot exceed *9999*.

This EPN must match the low EPN of the entered range <num>.
The specified endpoint number is a number within an endpoint range. Either specify the lowest number of the range or the entire range.

This EPN range must match the entered EPN range <num-num>.
The endpoint number range entered is encompassed within an endpoint number range. Either specify the lowest number of the range or the entire range.

This EPN or range conflicts with existing <level> address <addr>.
The EPN/EPNs conflicts with the existing local, speedcall, or logical device address.

This port cannot be assigned to a trunk group.
The group entered was previously assigned to a group with a different hardware type. You cannot mix hardware types in a group.

Total number of channels specified for all ports exceeded the available limit: <limit>.
The total channels specified for all administered ports exceeds the allowed limit.

Upload service <name> is not a valid service address.
The name entered for the module level **UPLOAD SERVER** prompt must be a valid service address on the node.

X.121 address <addr> is already entered.
You cannot specify an X.121 address that is already administered in the database.

X.3 Profile <id> is not entered.
No information for the specified X.3 profile ID is administered in the database.

REMOVE/RESTORE FAILED:

could not send message to module <addr>.
The remove/restore operation was unable to send a message to the specified module.

incorrect configuration of <port <num> on> module <addr>.
The specified module port was not administered properly.

Module address <addr> contains a <type> module.
The specified module is not an X.25P module.

Module address <addr> contains no module.
The restore operation failed because the specified module address is empty.

Module address <addr> is beyond CLOCK.
The specified module resides in a slot number that is higher than the clock's.

module <addr> did not respond to command.
The specified module did not respond to the command processor.

module <addr> is being downloaded. Try again later.
The restore operation is already taking place for the module address specified.

module <addr> is in the diagnostic state. Try again later.
The remove/restore operation failed because diagnostics are currently being run on the module.

module <addr> to busy to process port <num>.
The remove/restore operation failed because the module does not have the resources to process the operation for the specified port.

must have at least one port configured before restoring module <addr>.
The restore process failed because a minimum of one port must be administered before the specified module can be restored to service.

reason for failure unknown (port <num>). Try again later.
The remove/restore operation failed for the specified port.

system too busy to process command. Try again later.
The remove/restore operation failed because the system is under a heavy load and could not accept the command.

unexpected acknowledgement from module <addr> (port <num>).
The remove/restore operation failed because it received an unexpected acknowledgement from the specified module port.

unexpected acknowledgement from syncmaint.
The remove/restore operation failed because it received an unexpected acknowledgement from the **syncmaint** function.

DIAGNOSTICS:

```
Boot tests in progress - . . .
Offline diagnostic boot test: <PASS/FAIL>

Extended RAM test in progress - . . .
Offline diagnostic memory test: <PASS/FAIL>

Diagnostic download in progress - . . .
Offline diagnostic downloaded test:
 Inst. Set:   <PASS/FAIL>
 Timer test:  <PASS/FAIL>
 Port 1:      <PASS/FAIL>
 Port 2:      <PASS/FAIL>
 Port 3:      <PASS/FAIL>
 Port 4:      <PASS/FAIL>
```

The previous responses indicate that the named diagnostic is in progress and whether it passed or failed.

```
Diagnose completed -
  test failed; mismatch of transmitted and received data.
  test passed.
```

The previous responses indicate that the diagnostic process completed and the test passed or failed with the condition noted.

```
Diagnose not completed -
  control computer did not respond.  Try again later.
  control computer error (error code: <num>).
  download failed (error code: <num>).
  download file not found.
  module <addr> did not respond to command.  Try again later.
  module <addr> did not respond to reinitialization.  Try again later.
  module <addr> has no resources to process command.  Try again later.
  module <addr> is being downloaded.
  module <addr> is too busy to process command.  Try again later.
  module <addr> must be in service for online diagnose.
  module <addr> must be out of service for offline diagnose.
  module <addr> unknown error code:  <num>.
  port <num> must be out of service for loop-around diagnose.
  system too busy to process command.  Try again later.
```

The previous responses indicate that the diagnostic process could not complete because of the reason stated.

Local DCE/DTE has Level 1 down - HDLC test failed. Wait a few minutes and try again.

The module needs additional time to bring Level 1 up.

WARNING:

CUG profile <id> has not been entered.
The specified CUG profile identifier is not administered.

Database updated, but new PVC was not established.
Remove and restore port to establish new PVC.
A new PVC cannot be established until you remove and restore the port.

Download server <addr> is not a valid service address.
The address entered is invalid. Enter the correct address and retry the command.

Module <addr> has invalid X.28 PAD identification service signal.
Remove and restore module to synchronize control computer module.
The specified module must be removed and restored so the currently entered X.28 identification service signal (sig) becomes valid.

Simcon access error. Module <addr> port <num> has inconsistent data.
Remove and restore module to synchronize control computer with module.
To synchronize module/port data with that of the database, use **remove** and **restore**.

The number of channels specified has exceeded the recommended limit.
Module capacity may be exceeded.
The recommended number of channels that appeared in the information message that accompanies the **NUMBER OF USER CHANNELS PER PORT** prompt was exceeded. Potential module capacity problems with performance or congestion might occur as a consequence. However, this message is only a warning and the module may operate successfully with this configuration.

The predefined destination is not a valid service address.
The specified PDD is invalid. To enter a valid PDD use **enter address**.

The PVC destination is not a valid service address.
The correct address must be administered in the database with **enter address**. Addresses that were already administered can be checked with **verify address**.

The sum of all the port baud rates exceeds the maximum
module throughput.
The trunk speed value entered caused the sum of the port baud rates to exceed the total module throughput.

The sum of all the port baud rates exceeds the recommended maximum port configuration.
If the configured combinations of EXTERNAL BAUD RATE and DEFAULT NETWORK LEVEL PACKET SIZE exceed the recommended limits for the module configuration, this warning appears.

NO KEY PHRASE:

Cannot abort; <remove/restore> in progress.
You pressed Delete when the remove/restore operation could not be terminated.

Concentrator address <addr> is not a remote shelf.
The address specified must be that of an MPC15 (*frs*) or MPC7 (*rrs*). X.25P modules cannot reside in ISN (*isn*) concentrators.

Data from module <addr> truncated.
The module returned error information that exceeds the buffer size allocation. If the problem persists, contact your support group.

DATABASE BEING MODIFIED - TRY AGAIN LATER
The command process cannot continue because the database is being changed. Wait a while and retry the command.

Entries for port <num> <deleted/unchanged> and remaining entries not done.
Reconfiguration did not complete. Contact your support group.

Invalid data received for <component>.
The module or port returned invalid, incomplete, or unexpected data. If the problem persists, contact your support group.

Measurements not available for <component>.
The module or port is not in service.

Measurements not available yet for module <addr>; try again later.
Measurements were requested before the first five-minute interval collection completed. Wait until the module is in service for five minutes before retrying the command.

Measurement request for <component> returned error; report will be incomplete.
The module returned an error code instead of the requested measurements. Measurements for the module or port are missing from the report. If the problem persists, contact your support group.

Module address <addr> is empty.
The requested report cannot be generated because the specified module address (slot number) is unoccupied.

Module address <addr> is not an X25P module.
The requested report cannot be generated because the module address specified does not contain an X.25P module.

NO KEY PHRASE:

Module <addr> is already in service/ready for service/out of service.
The remove/restore operation cannot be executed because the module is currently in the specified state.

Module <addr> is not entered.
The requested report cannot be generated because the specified module is not administered.

Module <addr>, port <num> is not entered.
The requested report cannot be generated because the module port is not administered.

No measurements available.
A partial report was generated and all measurements for the specified component were unavailable. The values in the fields appear as *N/A*.

No reply to command.
The reconfiguration could not complete. Contact your support group.

No response from module <addr>.
The named module does not respond to requests for measurements. If the problem persists contact your support group.

Not all commands ack'd.
The reconfiguration could not complete. Contact your support group.

Partial changes made. Remove and restore module to synchronize control computer with module.
All changes were not downloaded to the module; thus, the module and control computer are not synchronized. Removing and restoring the module causes data to be redownloaded to the module.

Port <num> on module <addr> is already <in/ready for/out of> service.
The remove/restore operation cannot be executed because the module port is currently in the specified state.

NO KEY PHRASE:

Port <num> on module <addr> is already in the <ready for> restricted access state.

The remove/restore operation cannot be executed because the module port is currently in the specified state.

Port <num> on module <addr> is in the <ready for> restricted access state.
Use restore x25P access to restore this port to service.

Access to the port cannot be restricted because it already is restricted.

Port <num> on module <addr> is out of service.
Use restore x25p module port to restore this port to service.

The remove operation cannot be executed because the module port is currently not in service.

Process terminated (DEL received); remaining modules will not be <downloaded/removed/restored>.

The Delete key was pressed at the system console; therefore, the specified operation cannot continue on the remaining modules.

SERIOUS DATABASE TRANSACTION PROBLEM - UPDATE NOT ACCEPTED

The command process cannot continue because of a critical problem in the database. (Possibly, a file was removed from the disk.) Contact your local support group.

System too busy to process command; Try again later.

The system is under a heavy load and could not accept the command. Wait a while before retrying the command.

Too many ports specified; report will be incomplete.

Not enough storage space was allocated for the measurements received from the module for the named component. Duplicate measurements might have been requested for one report.

Unable to retrieve data from module <addr>.

An error occurred in the interface between the command processor and the maintenance process. If the problem persists, contact your support group.

Appendix A. X.25P Module I/O Distribution Board and Port Specifications

Module/ Module Board	I/O Distribution Board	Port Connections/ Speeds	Port Numbers	Connector Type and Remarks
X.25P /MC1D153A1	AWJ24	2-V.35 DTE	1,2	J2: 50 pin shell Use top connector
		2-V.35 DTE	3,4	J6: 50 pin shell Use bottom connector
	CSD4	4-RS-232-C DTE/DCE	1-4	J2: 50 pin shell Use top connector
		4-RS-232-C DTE/DCE	5-8	J3: 50 pin shell Use bottom connector

Port Type	Clocking	Port Diagnostics
DCE	internal	internal and external port, and test_frame
DCE	external	internal port, local and remote modem, and test_frame
DTE	external	internal port, local and remote modem, and test_frame
DTE	internal	internal and external port, and test_frame

Appendix B.
X.25P Database Entry Forms

This appendix contains sample database entry forms that should be used when initially entering an X.25P component or an X.28 PAD ID service signal in the database or when making any extensive changes. They should be used in conjunction with similar forms completed for addresses (for billing, PDD, and EPN), groups, and profiles. These forms are provided in the *Node Reference*.

This appendix contains the following sample database entry forms:

The forms list prompts that appear when the **enter** command is used, and the possible values (or range of values) that can be entered in response to the prompts. Default values are shown in *italics*. The information contained in this appendix is supplemented by explanations furnished in **X.25P Administration** and **X.25P Commands**.

FORM B-1. Entering an X.25P Module

COMPONENT [module, port]	module	module	module	module
MODULE ADDRESS				
NUMBER OF USER CHANNELS [1-507 (*200*)]				
DOWNLOAD SERVER [*controller*]				
If DOWNLOAD SERVER is *controller*: **SOFTWARE VERSION** [standard]				
If SOFTWARE VERSION is not *standard*: **SOFTWARE VERSION**				
UPLOAD SERVER [*none*]				
If UPLOAD SERVER is not *none*: **UPLOAD ONLY AFTER FAULT** [yes, *no*]				
PADDLEBOARD TYPE [rs232, *v.35*]				

FORM B-2. Entering an X.25P Port

COMPONENT [module, port]	port	port	port	port
MODULE ADDRESS				
If PADDLEBOARD TYPE is *rs-232*: **PORT NUMBER** [1-8]				
If PADDLEBOARD TYPE is *v.35*: **PORT NUMBER** [1-4]				
COMMENT [up to 60 chars double quoted, *none*]				
INITIAL SERVICE STATE [in, *out*]				
If PADDLEBOARD TYPE is *rs-232*: **CLOCKING TYPE** [internal, external]				
If CLOCKING TYPE is *internal*: **INTERNAL BAUD RATE** [1200, 2400, 4800, *9600*, 14.4k, 19.2k]				
If PADDLEBOARD TYPE is *v.35*: **EXTERNAL BAUD RATE** [1200-2.048M]				
If CLOCKING TYPE is *external* and if PADDLEBOARD TYPE is *rs232*: **EXTERNAL BAUD RATE** [1200-*19.2k*]				
I-FRAME NUMBERING [*basic*, extended]				
If I-FRAME NUMBERING is *basic*: **MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K)** [1-*7*]				
If I-FRAME NUMBERING is *extended*: **MAXIMUM NUMBER OF OUTSTANDING I-FRAMES (K)** [1-32, *20*]				

FORM B-2. Entering an X.25P Port (continued)

WAITING ACKNOWLEDGEMENT TIMER (T1) [50-60000, *3000*]				
MAXIMUM ATTEMPTS TO COMPLETE A TRANSMISSION (N2) [1-255, *7*]				
ACTION WHEN N2 COUNT EXCEEDED [disconnect, *reset*]				
ACTION WHEN DISC RECEIVED [*disconnect*, reset]				
LOGICAL PORT TYPE [*dce*,dte]				
BILLING STATUS [on, *off*]				
WINDOW SIZE NEGOTIATION [*on*, off]				
DEFAULT NETWORK LEVEL WINDOW SIZE [1-7, *2*]				
MAXIMUM WINDOW SIZE [<*default*>-7]				
PACKET SIZE NEGOTIATION [*on*, off]				
DEFAULT NETWORK LEVEL PACKET SIZE [*128*, 256, 512, 1024]				
If DEFAULT NETWORK LEVEL PACKET SIZE is *128*: **MAXIMUM PACKET SIZE** [128, *256*, 512, 1024]				

FORM B-2. Entering an X.25P Port (continued)

If DEFAULT NETWORK LEVEL PACKET SIZE is *256*: **MAXIMUM PACKET SIZE** [*256*, 512, 1024]				
If DEFAULT NETWORK LEVEL PACKET SIZE is *512*: **MAXIMUM PACKET SIZE** [*512*, 1024]				
SEGMENTATION [on, *off*]				
If SEGMENTATION is *on*: **MAXIMUM REMOTE PACKET SIZE** [*128*, 256, 512, 1024]				
DEFAULT CALLING ADDRESS: [up to 15 digits, *none*]				
If DEFAULT CALLING ADDRESS is not *none*: **DEFAULT CALLING ADDRESS SUBSTITUTION** [on, *off*]				
CALLING ADDRESS MASKING [on, *off*]				
If CALLING ADDRESS MASKING is *on*: **CALLING ADDRESS MASKING STRING** [up to 15 digits, *none*]				
If CALLING ADDRESS MASKING is *on*: **CALLING ADDRESS MASKING DIGITS** [*0* to <n>]				

FORM B-2. Entering an X.25P Port (continued)

CALLED ADDRESS MASKING [on, *off*]				
If CALLED ADDRESS MASKING is *on*: **CALLED ADDRESS MASKING STRING** [up to 15 digits, *none*]				
If CALLED ADDRESS MASKING is *on*: **CALLED ADDRESS MASKING DIGITS** [*0* to <n>]				
LOCAL X.3 PROFILE ID [up to 20 chars, mbit, simple, *transparent*]				
NUMBER OF USER CHANNELS PER PORT [1-<*X*>]				
NUMBER OF SVC CHANNELS PER PORT [0-<*Z*>]				
If a single port is entered and channels remain on the port: **NUMBER OF PVC CHANNELS PER PORT** [O-<*Y*>]				
If NUMBER OF SVC CHANNELS > 0: **SVC STARTING LOGICAL CHANNEL NUMBER** [*(<Y+1>)*-(4096-<x>)]				

FORM B-2. Entering an X.25P Port (continued)

SVC DIRECTION [originate, receive, *2way*]				
SVC GROUP [up to 8 chars]				
If SVC DIRECTION is *2way*: **NUMBER OF RECEIVE ONLY CHANNELS** [*0*-<SVC_channels>]				
If NUMBER OF SVC CHANNELS PER PORT minus NUMBER OF RECEIVE ONLY CHANNELS equals *0*: **INFO: No channels left for originate only channels**				
If NUMBER OF SVC CHANNELS PER PORT minus NUMBER OF RECEIVE ONLY CHANNELS does not equal *0*: **NUMBER OF ORIGINATE ONLY CHANNELS** [*0*-<remain_SVCs>]				
ADDRESS CHECKING [on, *off*]				
ENDPOINT NUMBERS FOR SVC CHANNELS FOR PORT <N> [0000-9999]				
HUNT GROUP ADDRESS SUBSTITUTION [on, *off*]				

FORM B-2. Entering an X.25P Port (continued)

CLOSED USER GROUP PROFILE ID [up to 8 chars, *none*]				
If SVC DIRECTION is *2way* and NUMBER OF RECEIVE ONLY CHANNELS is less than the SVC_channels; or if SVC DIRECTION is *originate*: **PREDEFINED DESTINATION** [up to 72 chars, *none*]				
REVERSE CHARGING ACCEPTANCE [on, *off*]				
FAST SELECT ACCEPTANCE [*on*, off]				
CALLED ADDRESS MODIFIED NOTIFICATION [on, *off*]				
THROUGHPUT CLASS NEGOTIATION [on, *off*]				
DEFAULT NETWORK LEVEL THROUGHPUT CLASS [75, 150, 300, 600, 1200, *2400*, 4800, 9600, 19.2k, 48k, 64k]				
PAD INACTIVITY TIMER (T) [2-20, *off*]				
PAD RETRY COUNTER (N) [2-20, *off*]				
TRANSIT DELAY [10-500, *50*]				
If NUMBER OF PVC CHANNELS > 0: **PVC GROUP** [up to 8 chars]				

FORM B-2. Entering an X.25P Port (continued)

If NUMBER OF PVC CHANNELS > 0: **ENDPOINT NUMBERS FOR PVC CHANNELS** [0000-9999]				
PVC LOGICAL CHANNEL NUMBER [1-<Y>]				
PVC X.3 PROFILE ID [up to 20 chars, mbit, simple, transparent, *LOCAL_X.3prof*]				
PVC DESTINATION [up to 72 chars, *none*]				
PORT NUMBER [1-4]				

Appendix C.
X.25P RS-232-C and V.35 Lead States

Depending on the I/O distribution board used, X.25P module ports can be configured for industry standard RS-232-C or V.35 connections for DTE or DCE.

This appendix furnishes tables that correlate supported RS-232-C/V.35 lead states, pin numbers, and actions to the equipment function (DTE/DCE). The first two tables require a CSD4 I/O board (RS-232-C); the last table requires an AWJ24 I/O board (V.35).

TABLE C-1. RS-232-C Lead States for DTE

RS-232-C Lead	Pin Number	Action
DTR	20	Asserted during link initialization. Remains asserted while link is up.
DSR	6	Must be asserted for link to come up.
DCD	8	Half-duplex: only high while the port is receiving data. Full-duplex: always high while the link is in service.
RTS	4	Half-duplex: asserted when the port is sending data. Full-duplex: always asserted while the link is in service.
CTS	5	Half-duplex: must be high for the port to transmit; sensed by the DTE. Full-duplex: always high while the link is in service.
TD	2	Data transmitted from the local node to the DSU or modem.
RD	3	Data received by the local node from the DSU or modem.
TC	15	Clocking received from the DSU or modem.
RC	17	Clocking received from the DSU or modem.
FG	1	Ground.
SG	7	Ground.

TABLE C-2. RS-232-C Lead States for DCE

RS-232-C Lead	Pin Number	Action
DTR	20	Asserted during link initialization. Remains asserted while link is up.
DSR	6	Asserted during link initialization. Remains high while the link is in service.
DCD	8	Asserted during link initialization. Remains high while link is in service.
RTS	4	Half-duplex: low when the port is sending; sensed by the DCE. Full-duplex: always high while the link is in service.
CTS	5	Half-duplex: low when the port desires to transmit; driven by the DTE. Full-duplex: always high while the link is in service.
TD	2	Data received by the local node from the DSU or modem.
RD	3	Data transmitted to the DSU or modem.
TC	15	Clocking provided to the DTE by the DCE.
RC	17	Clocking provided to the DTE.
FG	1	Ground.
SG	7	Ground.

TABLE C-3. V.35 Lead States for DTE

V.35 Lead	Pin Number	Action
DTR	H	Asserted during link initialization. Remains asserted while link is in service.
DSR	E	Must be asserted for link to come up.
DCD	F	Half-duplex: only high while the port is receiving data. Full-duplex: always high while the link is in service.
RTS	C	Half-duplex: high when the port is sending data. Full-duplex: always high while the link is in service.
CTS	D	Half-duplex: must be high for the port to transmit; sensed by the DTE. Full-duplex: always high while the link is in service.
TD+	S	Data transmitted from the local node to the DSU or modem.
TD-	P	Data transmitted from the local node to the DSU or modem.
RD+	T	Data received by the local node from the DSU or modem.
RD-	R	Data received by the local node from the DSU or modem.
TC+	AA	Clocking received from the DSU or modem.
TC-	Y	Clocking received from the DSU or modem.
RC+	X	Clocking received from the DSU or modem.
RC-	V	Clocking received from the DSU or modem.
FG	A	Ground.
SG	B	Ground.

Index

D

E

F

M

N

O

P

R

S

T

U

V

W

X