Configuring X.25 Services

Router Software Version 10.0
Site Manager Software Version 4.0

Part No.112926 Rev. A
January 1996

Bay Networks

4401 Great America Parkway
Santa Clara, CA 95054

8 Federal Street
Billerica, MA 01821

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About This Guide

If you are responsible for configuring and managing Bay Networks™ routers, read this guide to learn how to customize Bay Networks router software for X.25 services.

Configuring X.25 Services offers

- An overview of Bay Networks X.25 services (Chapter 1)
- Implementation notes that may affect how you configure X.25 services (Chapter 2)
- Directions for enabling X.25 (Chapter 3)
- Descriptions of X.25 parameters and instructions for editing those parameters (Chapter 4)
- Default parameter settings (Appendix A)

Audience

Written for system and network managers, this guide describes how to configure the Bay Networks implementation of X.25 services to suit your environment.

Before You Begin

Before using this guide, you must complete the following procedures:

- Create and save a configuration file that has at least one X.25 interface.
- Retrieve the configuration file in local, remote, or dynamic mode.
- Reboot the router with the configuration file.

Refer to *Configuring Routers* for instructions.

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Conventions

arrow character (➔)	Separates menu and option names in instructions. Example: Protocols➔AppleTalk identifies the AppleTalk option in the Protocols menu.
bold text	Indicates text that you need to enter and command names in text. Example: Use the **dinfo** command.
italic text	Indicates variable values in command syntax descriptions, new terms, file and directory names, and book titles.
quotation marks (“ ”)	Indicate the title of a chapter or section within a book.
`screen text`	Indicates data that appears on the screen. Example: `Set Bay Networks Trap Monitor Filters`
vertical line (|)	Indicates that you enter only one of the parts of the command. The vertical line separates choices. Do not type the vertical line when entering the command. Example: If the command syntax is **show at routes** | **nets**, you enter either **show at routes** or **show at nets**, but not both.

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Acronyms

BFE	Blacker Front-End
BOFL	Breath of Life (message)
CPU	central processing unit
CUG	closed user group
CUGOA	closed user group with outgoing access
DCE	Data Circuit-Terminating Equipment
DDN	Defense Data Network
DoD	Department of Defense
DTE	Data Terminal Equipment
HDLC	High-level Data Link Control
IP	Internet Protocol
ISO	International Organization for Standardization
ITU-T	International Telecommunications Union–Telecommunications sector (formerly CCITT)
LAN	local area network
LAP	Link Access Procedure
LAPB	Link Access Procedure Balanced
MIB	Management Information Base
OSI	Open Systems Interconnection
OSPF	Open Shortest Path First
PAD	packet assembler/disassembler
PDN	Public Data Network
PDU	protocol data unit

PLP	Packet Level Protocol
PPP	Point-to-Point Protocol
PSN	packet-switching network
RFC	Request for Comments
RIP	Routing Information Protocol
RPOA	recognized private operating agencies
SNAP	Subnetwork Access Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol
VC	virtual circuit

Chapter 1
X.25 Overview

The X.25 Protocol provides access for LAN traffic to packet-switching networks (PSNs). X.25 allows many different kinds of equipment to communicate across networks at a relatively low cost.

Common carriers, mainly the telephone companies, designed X.25. An agency of the United Nations, the International Telecommunications Union–Telecommunications sector (ITU-T, formerly CCITT), administers the X.25 Protocol. X.25 is a global standard, and is the dominant communications protocol in use around the world today.

X.25 Interface

X.25 defines the interaction across PSNs between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE). DTEs include devices such as terminals, hosts, and routers; DCEs include devices such as modems, packet switches, and other ports.

Figure 1-1 shows an X.25 network. A DTE (in this case, Router A) connects to a DCE in the PSN. The PSN connects to another DCE and, finally, to another DTE (Router B).

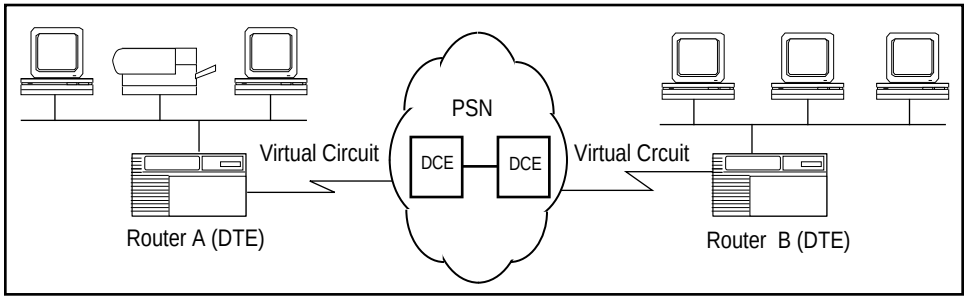


Figure 1-1. X.25 Network

To begin communication, one DTE device (for example, a router) calls another DTE to request a data exchange session. The called DTE can accept or refuse the connection. If the called DTE accepts the connection, the two systems begin full-duplex data transfer. Either side can terminate the connection at any time. Because public data networks (PDNs), the most commonly used type of PSN, typically use error-prone analog lines, the X.25 Protocol provides extensive error checking, recovery, and packet sequencing.

A DTE can be a device that does not itself implement X.25. In this case, the DTE connects to a DCE through a packet assembler/disassembler (PAD), which is a device that translates data into packet form.

X.25 and the OSI Model

The Open Systems Interconnection (OSI) Basic Reference Model combines a nonproprietary structured computer system architecture with a set of common communication protocols. It comprises seven layers. Each layer provides specific functions or services and follows the corresponding OSI communications protocols to perform those services.

The X.25 Protocol focuses on three of the seven layers in the OSI model: the physical layer, the data link layer, and the network, or packet, layer. As you read the following sections, refer to Figure 1-2, which illustrates the correspondence between X.25 and the OSI model. Figure 1-2 conforms to the typical rendering of the OSI model, which depicts the physical layer at the bottom of the protocol stack, and refers to succeeding layers as representing higher-level protocols.

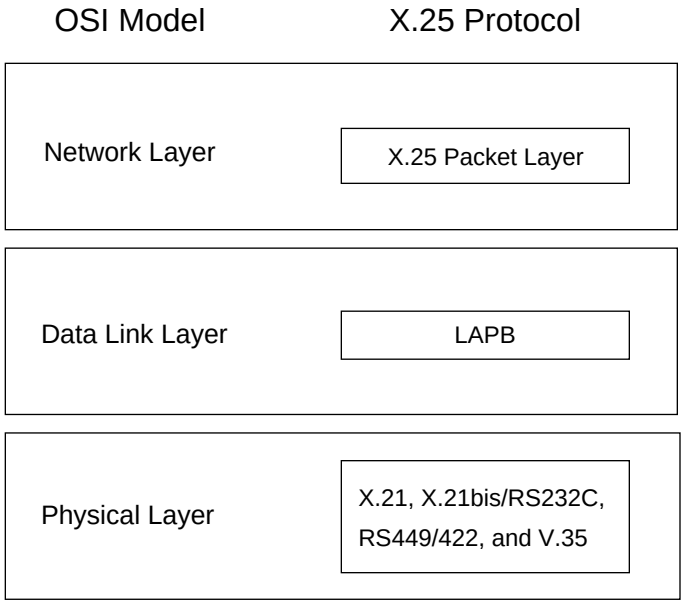


Figure 1-2. OSI/X.25 Correspondence

Physical Layer

The physical layer manages the transmission of bits across the physical connection or modem interface. Bay Networks supports all of the standard media for X.25 transmission: X.21, X.21bis/RS232C, RS449/422, and V.35.

Data Link Layer

The data link layer defines the link access procedures for transferring frames of data accurately and reliably across the access lines between the DTE and the DCE.

Link Access Procedure Balanced Protocol

X.25 uses the Link Access Procedure Balanced (LAPB) protocol at the data link layer to

- Initialize the link between the DTE and the local DCE device
- Frame X.25 data packets before transmitting them to the DCE

LAPB is a version of High-level Data Link Control (HDLC), which is an OSI standard.

Figure 1-3 shows a LAPB frame. The LAPB information field contains the X.25 data packet. Once an X.25 packet reaches the destination router, the LAPB protocol strips away the LAPB frame and delivers the packet to the network layer for further processing.

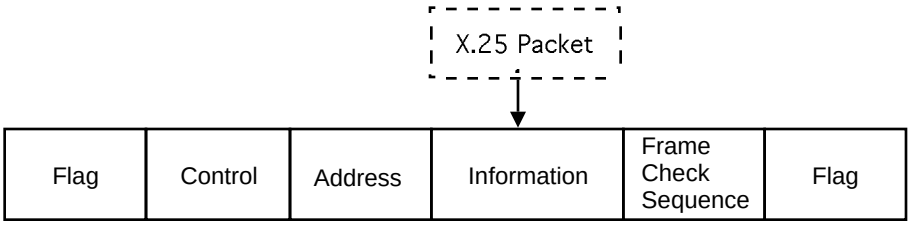


Figure 1-3. LAPB Frame

LAPB Implementation on Bay Networks Routers

The implementation of the LAPB protocol on the AN® and ASN® routers, and on BN® and LN® routers with Octal Sync, differs from that on other Bay Networks routers. On the AN and ASN routers and BN and LN routers with Octal Sync, LAPB is implemented in software in routers that use the QUICC 68360 driver. On the other routers, LAPB is implemented in the hardware using the MK5025 chip.

Note: *The different LAPB implementations result in two different LAPB MIBs. This means that if you copy an existing configuration from a Bay Networks router that uses the MK5025 chip to the AN or ASN, or the BN or LN with octal sync, the configuration may not work because the location of the LAPB MIB is different.*

Although detailed discussion of the LAPB MIB is beyond the scope of this guide, when you configure X.25, you automatically set up LAPB for all routers.

Network Layer

The network, or packet, layer establishes the virtual circuit and provides procedures for call establishment, data transfer, flow control, error recovery, and call clearing. The router uses the network layer to determine destination X.121 addresses and to specify which user-configurable X.25 facilities the network layer supports. (See "Determining the X.121 Destination," later in this chapter, for more information about X.121 addresses.) The X.25 Protocol defines *how* the DTE and its respective DCE communicate and exchange data.

The X.25 network transmits data over *virtual circuits* (VCs) between each source and destination on the network. Because as many as 128 VCs can exist on the same physical link at the same time, multiple devices can share the bandwidth of the transmission line, sending data in multiple packets from the source to the destination.

X.25 Network Types

The Bay Networks router transmits data across three types of X.25 network services.

- Public Data Network (PDN)

  The X.25 PDN service provides end-to-end connectivity between the router and a remote DTE that supports Internet RFC 1356 X.25 services. IP uses PDN service to transmit IP datagrams. OSI uses PDN service to send OSI protocol data units (PDUs) over the X.25 network. No other protocols use PDN services. The Bay Networks router supports Internet RFC 1356 for IP and OSI.

- Defense Data Network (DDN)

  The X.25 DDN service provides end-to-end connectivity between a router and a remote DTE that supports X.25 DDN Standard Service. IP uses DDN service to transmit IP datagrams. OSI uses DDN service to send OSI protocol data units (PDUs) over the X.25 network. No other protocols use DDN services.

You can implement an X.25 DDN network as a Blacker Front-End (BFE) network. BFE is an external, standalone encryption device that you connect to your router to establish X.25 DDN networks.

- Point-to-Point Service

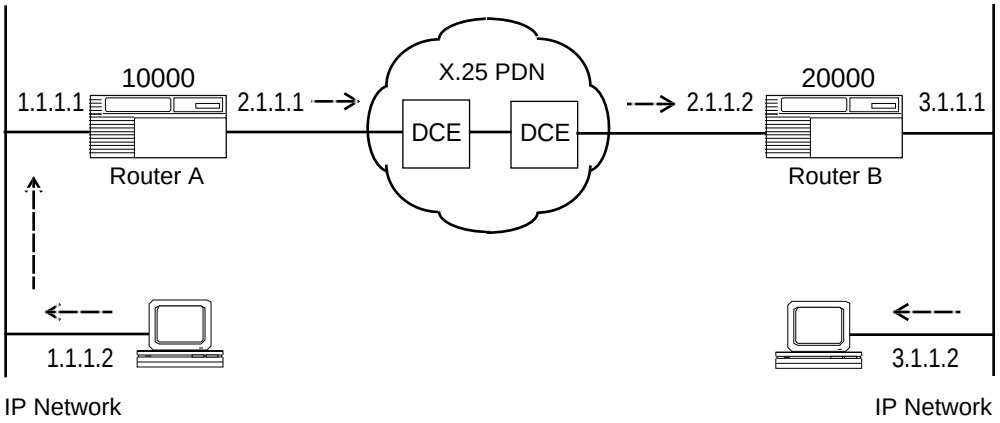
  Point-to-Point service is proprietary to Bay Networks, so Bay Networks routers must be at both ends of the connection. AppleTalk, transparent and spanning tree bridging, DECnet, IP, VINES, XNS, IPX, and OSI can use Point-to-Point X.25 service to transmit datagrams over the X.25 network.

The type of datagram traffic that the router forwards depends upon the type of network layer service enabled on each of the router's network interfaces. For example, if you configure an interface for DDN services, you cannot configure any other type of service. You can, however, configure an interface to run PDN and Point-to-Point services together.

How X.25 Services Work

End-users on a LAN use the services of the Bay Networks router to access X.25 networks. The router acts as a DTE device; it encapsulates user data in X.25 format and transmits it across the network.

To demonstrate how Bay Networks X.25 services work, the following sections explain how Router A, which is configured for X.25 PDN services, routes data from IP endstation 1.1.1.2 over the X.25 network to IP endstation 3.1.1.2. Refer to Figure 1-4 as you read the next sections.



Key

DCE = Data Circuit-terminating Equipment
10000, 20000 = X.121 Addresses

Figure 1-4. Sample X.25 Configuration

Determining the X.121 Destination

Each interface connecting to the X.25 network has an X.121 address. For example, in Figure 1-4 the X.121 network addresses for Routers A and B are 10000 and 20000, respectively. Router A communicates with Router B over the X.25 network by setting up virtual circuits that connect the two X.25 interfaces.

Data transmission begins when

1. Router A receives an IP datagram from IP endstation 1.1.1.2.
2. Router A checks its IP routing table to determine the next hop on the datagram's path (in this example, IP address 2.1.1.2).
3. Once Router A determines that the next hop is located across the X.25 network, it checks to see which destination X.121 address maps to the next hop's IP address via the IP adjacent host table (in this example, X.121 address 20000).

4. To transmit the datagram across the network, the router now establishes a virtual connection between itself and destination X.121 address 20000.

   Router A begins by selecting an unused virtual circuit. The router assigns the circuit a 12-bit virtual circuit number (Figure 1-5), which it chooses from a user-specified range of virtual circuit numbers. The virtual circuit number identifies the logical channel portion of the circuit that connects the router and its DCE.

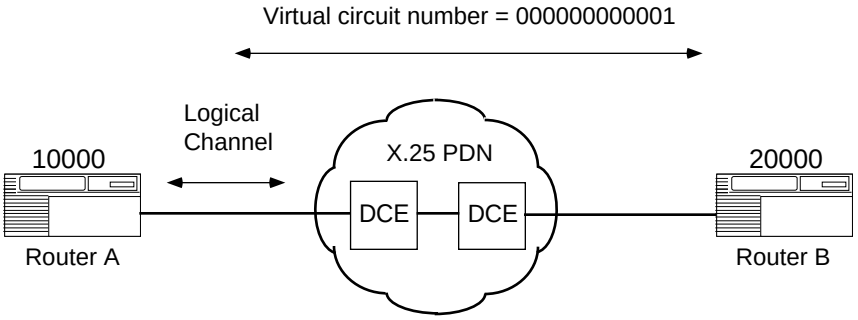


Figure 1-5. Virtual Circuit Connecting Bay Networks Routers

The logical channel consists of a 4-bit logical channel group number concatenated with an 8-bit logical channel number. The logical channel number identifies this circuit as the one that will carry all data transmitted between the router and the destination DTE, once the connection to the destination X.121 address is established.

Establishing a Virtual Circuit

After Router A determines the destination X.121 address, the two routers establish a virtual circuit as follows:

1. Router A uses the services of the packet layer protocol to generate a call request packet that it sends to Router B**.**

   Along with various optional X.25 facilities, the call request packet specifies the outgoing logical channel number, Router A's X.121 address, and Router B's X.121 address (Figure 1-6).

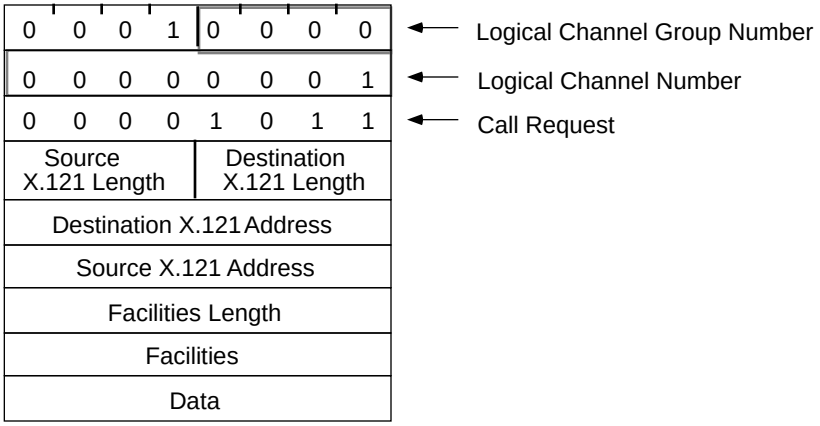


Figure 1-6. X.25 Call Request Packet Format

2. When the local DCE receives Router A's call request, the DCE forwards it across the X.25 network, where it is eventually routed to Router B.
3. Router B checks the called address for a match to its configured X.121 address. It also check the calling address for a match to the remote X.121 address configured in the service record.
4. If it finds both matches, it accepts the call, and responds with a call accept packet that establishes the virtual connection between the two routers.

Once the virtual circuit is established, the router can transmit and receive data (Figure 1-7).

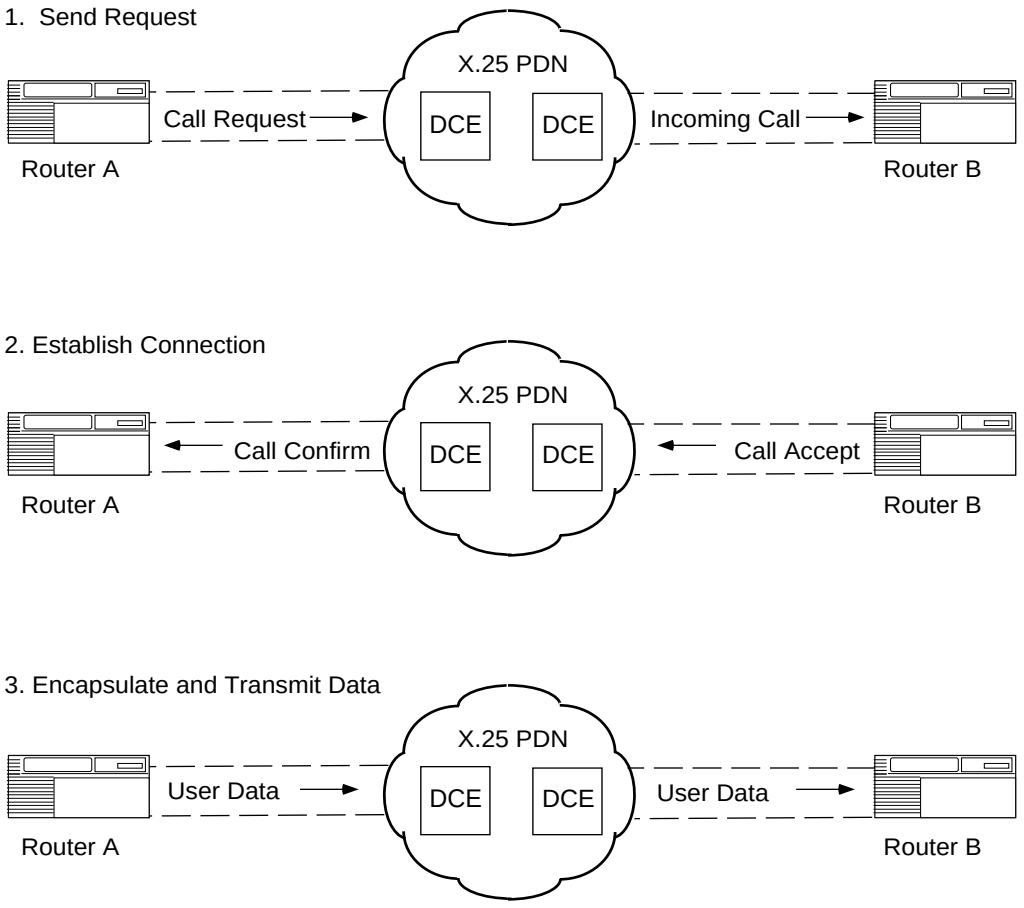


Figure 1-7. Setting Up an X.25 Call Connection

Transmitting Data

After Router B establishes the circuit, data travels between endstations 1.1.1.2 and 3.1.1.2 as follows:

1. Router A begins processing the packets it receives from IP endstation 1.1.1.2 across the X.25 network to Router B.
2. Router B removes the X.25 packet headers and trailers and forwards only the IP data to IP endstation 3.1.1.2 (Figure 1-8).

3. IP endstation 3.1.1.2 transmits data to endstation 1.1.1.2.

   Note that other IP endstations (for example, 1.1.1.3) can use the virtual circuit to transmit data in the direction of endstation 3.1.1.2 until the call is cleared.

   The call request and call accept packets specify the logical channel numbers (LCNs) assigned to the virtual connections between each router and its corresponding DCE. As a result, subsequent X.25 data packets contain only the logical channel numbers, rather than the complete X.121 destination addresses.

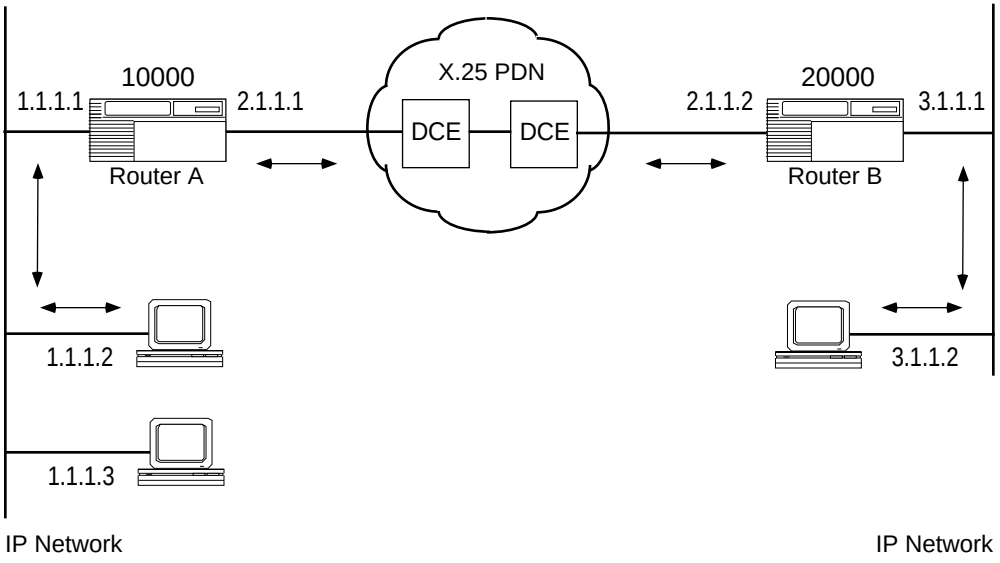


Figure 1-8. Routing IP Traffic across the X.25 Network

Chapter 2
Implementation Notes

This chapter provides information about special features of the Bay Networks X.25 implementation, including

- Data compression
- Load sharing
- Clocking sources for routers set back to back
- Max Window Size and Max Packet Length parameters
- Flow control negotiation
- Configuring LAPB for an AN or ASN
- Configuring synchronous lines
- DDN default service record

X.25 Data Compression

Bay Networks data compression software enables you to reduce line costs and improve response times over X.25 networks.

Our data compression eliminates redundancies in data streams. When you use compression on your network, bandwidth efficiency improves, enabling you to transmit more data over a given amount of network bandwidth.

To use data compression with X.25, you must set the X.25 service record parameter, Enable Compression, to Enable. See Chapter 4 for information about how to access this parameter.

For a complete discussion of data compression, descriptions of compression parameters, and instructions for configuring compression for an X.25 interface, see *Configuring Data Compression Services*.

Load Sharing

The Bay Networks implementation of X.25 on PDN networks includes load sharing across as many as four VCs, using a round-robin algorithm to distribute traffic. This feature improves performance by increasing the effective window size, that is, the number of packets that a DTE can transmit before it receives an acknowledgment.

To take advantage of multiple virtual connections and load sharing across them, you must set the Max Connections network service record parameter to a value greater than one (refer to Chapter 4).

Clocking Sources for Routers Set Back-to-Back

If two Bay Networks routers are operating back-to-back without a clocking source, you must configure internal clocking on both routers. Use a crossover cable to connect the ports.

The default clocking source for X.25 is external. When you configure X.25 and LAPB on an existing network, external clocking can cause unpredictable results on any internally clocked line. Clocking sources must be the same for each device within the network.

Packet-level Parameters: Max Window Size and Max Packet Length

When you configure X.25 packet-level parameters, make certain to set the Max Window Size and Max Packet Length parameters for peer routers to the same value. If you do not, the routers cannot perform network service-level negotiations.

For example, if you set the Max Window Size for Router A to 7, set the Max Window Size for peer Router B to 7. Similarly, if you set the Max Packet Length for Router A to 512, set the Max Packet Length for peer Router B to 512.

Window size and packet length can affect packet throughput across the X.25 network. Setting either the Max Window Size or Max Packet Length parameter too low can cause the router to drop packets. You may want to configure these parameters at higher values than the default settings. Refer to Chapter 4 for information about how to access these parameters.

Flow-Control Negotiation

The Bay Networks implementation of X.25 enables the router to negotiate flow control, which regulates the rate of data transfer among elements of a network to prevent congestion and overload. For flow-control negotiation to work properly, you must set the following parameters as shown in Tables 2-1 and 2-2.

Table 2-1. X.25 Packet-level Parameters

Parameter	Value
Flow Control Negotiation	On
Max Window Size	See the parameter descriptions for options
Max Packet Length	See the parameter descriptions for options
Acceptance Format	DEFEXT (specifies default Basic format)
Release Format	DEFEXT (specifies default Basic format)

Table 2-2. X.25 Service Record Parameters

Parameter	Value
Flow Facility	Negot (negotiate flow facility)
Window Size	See the parameter descriptions for options
Packet Size	See the parameter descriptions for options

Configuring LAPB for an AN or ASN

When you create a new X.25 line on a Bay Networks AN or ASN router, Site Manager automatically uses default values to configure LAPB. If you want to edit the LAPB parameters, you can access them through the Edit Line Parameters window after you have created the new X.25 line.

Configuring Synchronous Lines with X.25

Table 2-3 shows the default synchronous line configurations for an AN/ASN and a BN/VME router.

Table 2-3. Synchronous Line Parameter Defaults for X.25

Synchronous Line Parameter	AN/ASN X.25	BN/VME X.25
BOFL	Disable	Disable
MTU*	512	1600
Service	Transparent	LAPB
Transmit Window	1	7
Min Frame Spacing*	1	7
Local Addr	EXPLICIT	1†
Promiscuous	Enable	Enable
Remote Addr	EXPLICIT	3†
WAN Protocol	LAPB	X.25
Sync Polling‡	Enable	Disable

*. Set this parameter to the same value on both sides of the X.25 connection. The default is calculated to be 2 times the packet size times the window size.

†. The addresses are those of the BN/VME router configured as a DCE; they are reversed if the router is configured as a DTE.

‡. Set this parameter to Disable if the physical interface is not V.35.

If you want to edit the synchronous line parameters, you can access them through the Edit Line Parameters window after you have created the new X.25 line. For more information on these parameters, refer to *Configuring Line Services*.

DDN Default Service Record

When you configure the Service Type as DDN, you can automatically configure service records that use default parameter values for every DDN SVC on your network. This means that you do not have to individually configure DDN service records. To use the default DDN service record feature, set the Use Default Service Configuration packet-level parameter to ON.

You can also change the default values that apply when you set the Use Default Service Configuration parameter to ON. Refer to Chapter 4 for instructions.

If you want to configure specific DDN SVCs with nondefault values, you can configure them individually. If you set the Default DDN parameter to ON, the default values apply to all SVCs, but if you then edit an individual SVC, values that you assign to that SVC apply.

Chapter 3
Enabling X.25 Service

This chapter describes how to enable X.25 service. It assumes you have read *Configuring Routers* and that you have

1. Opened a configuration file
2. Specified router hardware if this is a local mode configuration file
3. Selected the link or net module connector on which you are enabling X.25

When you enable X.25 service, you must configure a subset of X.25 parameters. The Configuration Manager supplies default values for the remaining parameters. If you want to edit these default values, refer to Chapter 4,"Editing X.25 Parameters."

Enabling X.25 on an Interface

To enable X.25 service:

1. Select the link or net module connector on which you are enabling X.25.
2. Select the X.25 Protocol.
3. Configure packet-level parameters.
4. Add X.25 service records.
5. Enable bridging and routing protocols
6. Configure routing protocols over X.25 circuits.

The following sections describe how to perform each of these steps.

Selecting a Connector

1. **In the main Configuration Manager window, click on the circuit (connector) you want to configure:**

   For example, if you selected the module 5300 Quad Sync, click on the connector COM1 to configure the first synchronous circuit. The Configuration Manager displays the Add Circuit window (Figure 3-1) with the selected circuit highlighted.

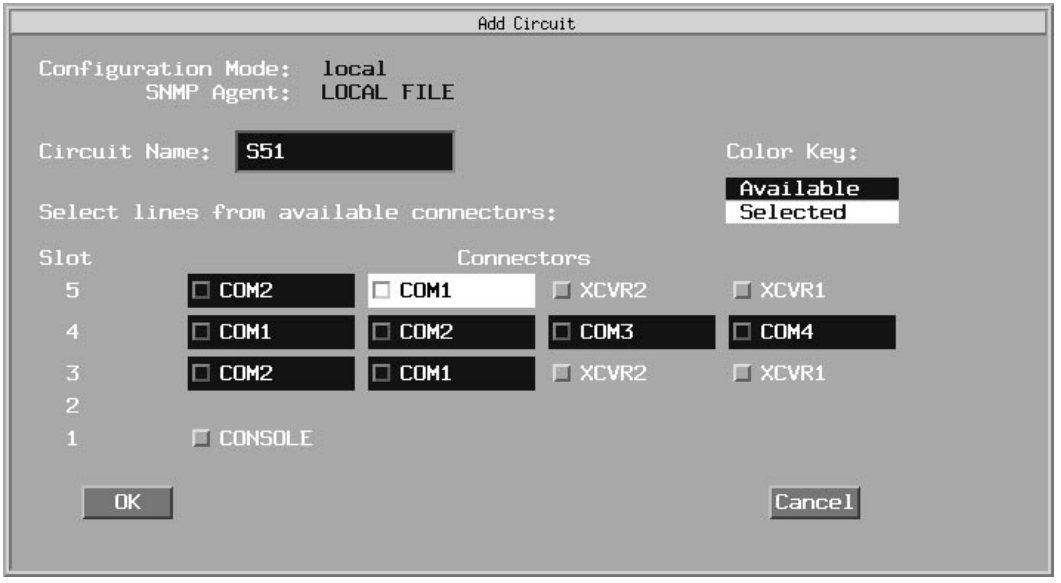


Figure 3-1. Add Circuit Window

2. **Click on OK to accept the values shown.**

   The WAN Protocols window appears (Figure 3-2).

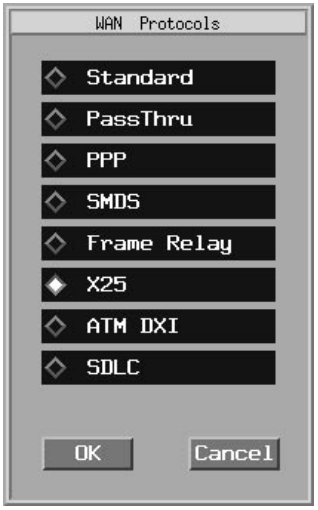


Figure 3-2. WAN Protocols Window

3. **Select X.25 from the WAN Protocols menu to display the X.25 Packet Config window (Figure 3-3).**

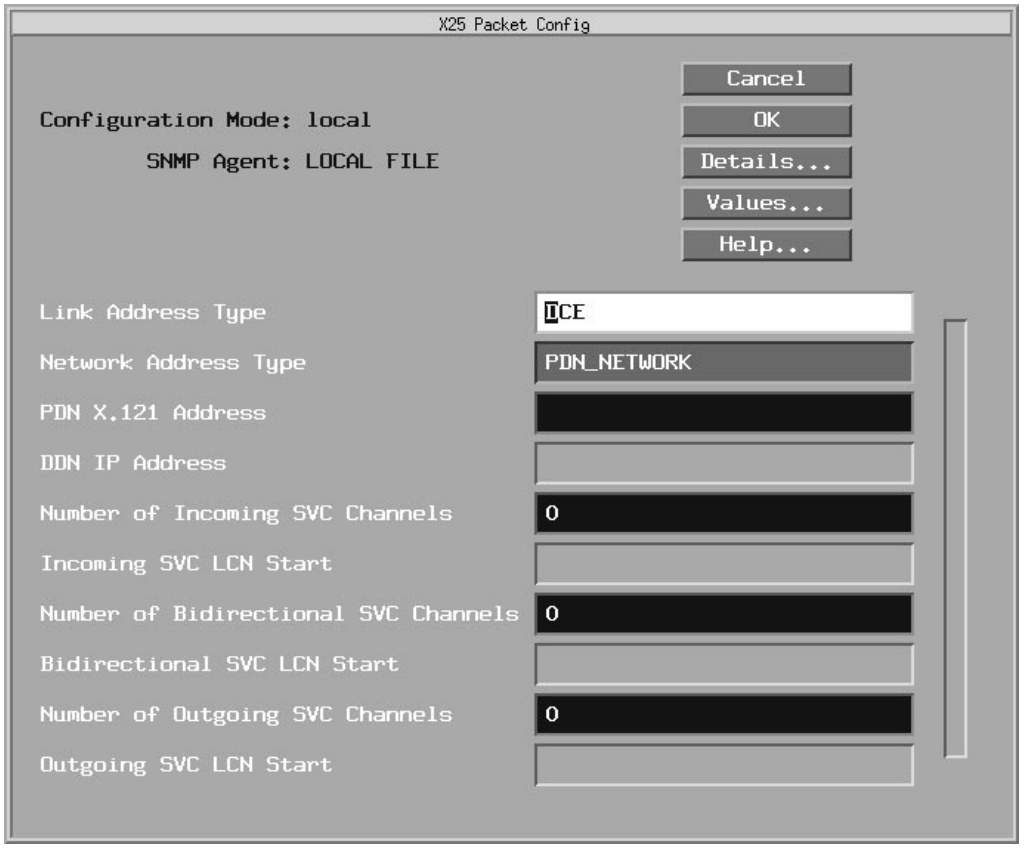


Figure 3-3. X.25 Packet Config Window

Configuring X.25 Packet-level Parameters

1. **Configure the packet-level parameters using the descriptions that follow as a guide.**
2. **When you are done, click on OK to display the X.25 Service Configuration window (Figure 3-4).**

You add X.25 service records from this window. Refer to “Adding X.25 Network Service Records,” later in this chapter, for instructions.

Note: *After you enable X.25 service on the router, you can edit the default settings for the rest of the X.25 parameters. See Chapter 4, “Editing X.25 Parameters,” for instructions.*

X.25 Packet-level Parameter Descriptions

Use the following descriptions as guidelines when you set the parameters in the X.25 Packet Config window.

At any time, you can get help or obtain a list of acceptable values for a parameter by clicking on the appropriate button on the upper right side of each window. To enter a value, you can either

- Type directly into the parameter field.
- Click on Values and then select a value from the list displayed (the default selection is highlighted).

Parameter:	**Link Address Type**
Default:	DCE
Options:	DCE | DTE
Function:	Specifies whether this interface provides logical DCE or DTE services.
Instructions:	Specify the service type as DCE or DTE. You must set one end of the link as a DCE and the other end as a DTE.
MIB Object ID:	99999.31.2

Parameter:	**Network Address Type**
Default:	PDN_Network
Options:	PDN_Network | DDN_Network | BFE_Network
Function:	Specifies the type of X.25 network to which the interface connects. The value of this parameter determines the format of the local X.121 address.
Instructions:	Specify PDN_Network for a Public Data Network or a Point-to-Point connection. Specify DDN_Network for a Defense Data Network. Specify BFE_Network for a DDN that uses BFE encryption. Note that: If you specify PDN_Network you must enter the local address in X.121 address format, that is, you must specify a value for the PDN X.121 Address parameter. If you specify DDN_Network or BFE_Network, you must enter the local address in IP address format, that is, you must specify a value for the DDN IP Address parameter. The router will translate the address into X.121 format.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.50

Parameter:	**PDN X.121 Address**
Default:	None
Options:	Any valid X.121 address
Function:	Specifies the X.121 address assigned to this interface. The X.25 network service provider supplies the X.121 address. Set this parameter only if you set the Network Address Type parameter to PDN_Network.
Instructions:	Enter the appropriate X.121 address.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.52

Parameter:	**DDN IP Address**
Default:	None
Options:	Any valid IP address
Function:	Specifies the IP address assigned to this interface. The router translates the address into X.121 format and uses it as the local address. Set this parameter only if you set the Network Address Type parameter to DDN_Network or BFE_Network.
Instructions:	Enter the appropriate IP address.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.51

Note: *The following parameters require you to specify logical channel number (LCN) value ranges for SVCs. Each SVC channel you configure on the router must have a unique logical channel number. There are three types of SVC channels: incoming, bidirectional, and outgoing. You must configure at least one SVC channel for X.25 to establish calls. The total number of channels you configure cannot exceed 512.*

Parameter:	**Number of Incoming SVC Channels**
Default:	0
Range:	0 to 512
Function:	Specifies the number of logical channels that accept incoming calls only.
Instructions:	Enter the number of channels that you assign to incoming calls only on this interface.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.36

Parameter:	**Incoming SVC LCN Start**
Default:	0
Range:	1 to 4095
Function:	Specifies the lowest logical channel number that the router can assign to logical channels that accept incoming call requests only.
Instructions:	Enter a number greater than the highest number reserved for PVC channels, but small enough that the last SVC channel number will be less than 4095.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.37

Parameter:	**Number of Bidirectional SVC Channels**
Default:	0
Range:	0 to 512
Function:	Specifies the number of logical channels that both accept incoming calls and transmit outgoing calls.
Instructions:	Enter the number of logical channels that you assign to both accept and transmit calls on this interface.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.38

Parameter:	**Bidirectional SVC LCN Start**
Default:	0
Range:	1 to 4095
Function:	Specifies the lowest logical channel number that the router can assign to bidirectional logical channels.
Instructions:	Enter a number greater than the highest number reserved for incoming SVC channels, but small enough that the last SVC channel number will be less than 4095.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.39

Parameter:	**Number of Outgoing SVC Channels**
Default:	0
Range:	0 to 512
Function:	Specifies the number of logical channels that transmit outgoing calls only.
Instructions:	Enter the number of channels that you assign to outgoing calls only.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.40

Parameter:	**Outgoing SVC LCN Start**
Default:	0
Range:	1 to 4095
Function:	Specifies the lowest logical channel number that the router can assign to logical channels that transmit outgoing call requests only.
Instructions:	Enter a number greater than the highest number reserved for bidirectional SVC channels, but small enough that the last SVC channel number will be less than 4095.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.41

Parameter:	**Use Default Service Configuration**
Default:	OFF
Options:	ON | OFF
Function:	Creates default DDN service records for every DDN SVC on your network.
Instructions:	Select ON if you want to use default values for your DDN SVCs. Refer to configuration instructions in Chapter 4 if you want to set this parameter to ON and still individually configure some of your DDN SVCs.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.54

Adding X.25 Network Service Records

After you click on OK in the X.25 Packet Config window, the X.25 Service Configuration window appears (Figure 3-4). Complete the following steps to add X.25 network service records.

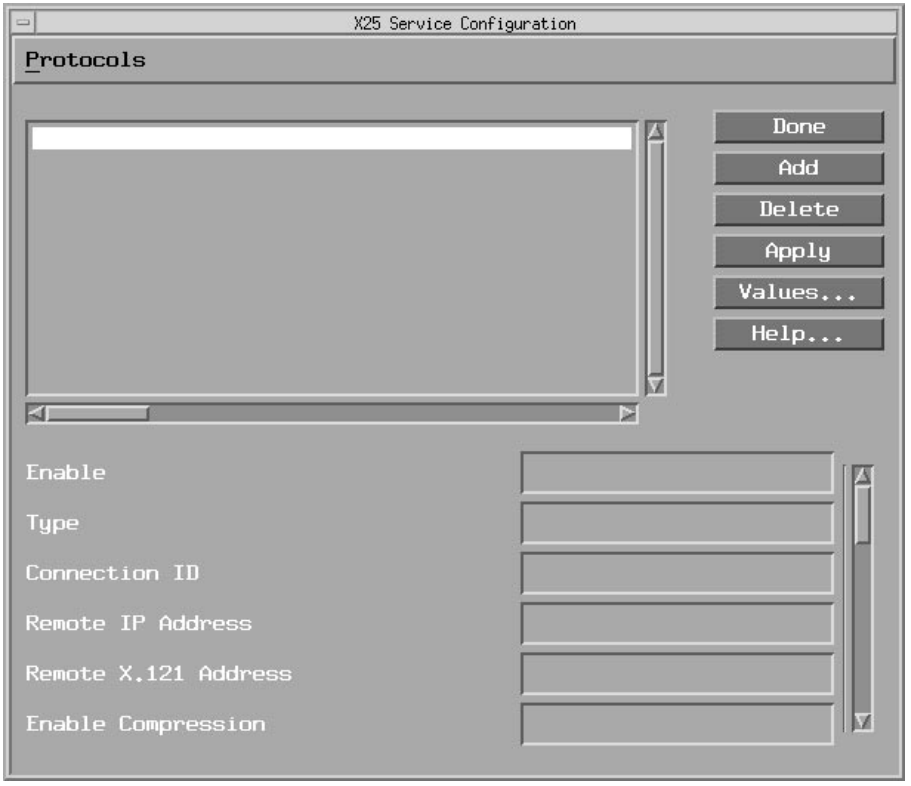


Figure 3-4. X.25 Service Configuration Window for a PDN Network

1. **Click on Add to display the X.25 Service window (Figure 3-5).**

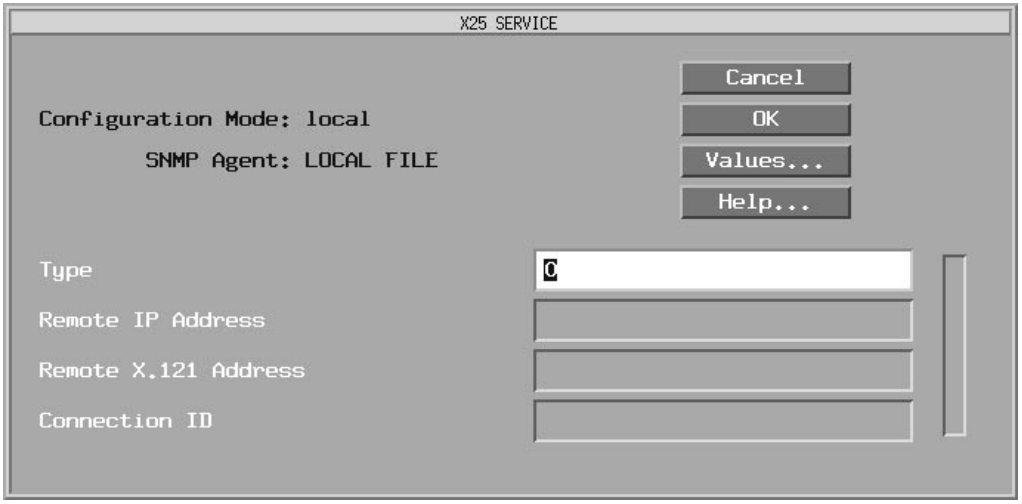


Figure 3-5. X.25 Service Window

2. **Configure the X.25 network service parameters using the descriptions that follow as a guide.**
3. **When you are done, click on OK.**

   The X.25 Service Configuration window appears. It now displays the record you just added. At this point you can

   - Add another network service record by repeating Steps 1 through 3.
   - Enable bridging and routing services on the X.25 circuit by following the instructions in the next section, “Enabling Bridging and Routing Services on an X.25 Circuit.”
   - Edit the remaining X.25 network service parameters, for which the default values are currently in effect (see Chapter 4, “Editing X.25 Parameters”).

X.25 Network Service Record Parameter Descriptions

Use the following descriptions as guidelines when you configure the parameters in the X.25 Service window.

Parameter:	**Type**
Default:	None
Options:	PDN | DDN | PTOP
Function:	Specifies the type of X.25 service that this interface supplies.
Instructions:	Select PDN for Public Data Network service, DDN for Department of Defense Network service, or PTOP for Point-to-Point network service.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.9

Parameter:	**Remote IP Address**
Default:	0.0.0.0
Options:	Any valid IP address
Function:	Specifies a destination IP address that is reachable over this X.25 interface. This parameter is not used with Point-to-Point service. You must specify a remote IP address if you plan to enable IP on this interface. For DDN services, the router translates the remote IP address you specify into an X.121 address so that it can route IP traffic over the network. For PDN services, the router uses the remote IP address you specify to define an adjacent host for the IP interface.
Instructions:	Enter a 32-bit destination IP address in dotted decimal notation. If you run OSI over DDN, you must also enter this IP address in the SNPA field of the OSI External Address Adjacency Configuration window. To enter this value in the SNPA field, you must convert the IP address into X.121 format. Refer to *Configuring OSI Services* for more information.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.13

Parameter:	**Remote X.121 Address**
Default:	None
Options:	Any valid X.121 address
Function:	Specifies a destination X.121 address. You must specify a destination X.121 address if you are configuring PDN or Point-to-Point services. If you are configuring DDN services, the router derives this address from the remote IP address.
Instructions:	Enter a destination X.121 address that is reachable over this X.25 interface.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.12

Parameter:	**Connection ID**
Default:	1
Range:	1 to 255
Function:	Identifies each circuit to its remote destination. You can have multiple Point-to-Point circuits configured to the same X.121 destination, and each of them requires a unique Connection ID. Both the local and remote configurations for each circuit must have the same connection ID. You use the Connection ID parameter with PTOP service only.
Instructions:	Assign a unique connection ID for each X.121 connection.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.11

Adding X.25 Network Service Records to a Previously Configured Interface

To add a new network service record to an existing X.25 interface, begin at the Configuration Manager window and proceed as follows:

1. **Select Circuits→Edit Circuits to display the Circuit List window.**
2. **Select the X.25 interface to which you want to add network service records.**
3. **Click on Edit to display the Circuit Definition window.**
4. **Select X25 Protocol→Service.**

   The X.25 Service Configuration window appears (refer to Figure 3-4). It lists all network service records currently defined for the interface. Follow the instructions in the section, "Adding X.25 Network Service Records."

Enabling Bridging and Routing Services on an X.25 Circuit

After you have added at least one network service record, you can enable bridging and routing protocols on the X.25 circuit.

Note: *If you configure multiple DDN or PDN network service records on the X.25 circuit, you need to enable bridging/routing protocols on that circuit only once. However, if you configure multiple PTOP network service records on the X.25 circuit, you must enable bridging/routing protocols for each PTOP network service record. This is because the router uses a different internal circuit for each PTOP record configured on the circuit.*

To enable bridging and routing services:

1. **Select a network service record in the X.25 Service Configuration window (FIgure 3-6).**
2. **Select Protocols→Add/Delete (Figure 3-6).**

   The Select Protocols window appears (Figure 3-7).
3. **Select the bridging/routing protocols you want to enable on the circuit, then click on OK.**

After you have selected the protocols, refer to the appropriate configuration guide for instructions on how to configure the parameters associated with these protocols.

When you have specified the protocol-specific parameters in all windows, the Configuration Manager redisplays the X.25 Service Configuration window.

4. **Enable additional bridging/routing protocols on the circuit by repeating Steps 1 through 3, or click on Done to exit the window.**

Configuring IP Interfaces over X.25 Circuits

The Configuration Manager allows you to configure multiple IP interfaces on a single X.25 PDN circuit. This means that a single X.25 circuit can respond to multiple IP addresses, each on a different subnet, at the same time.

This section leads you through the Configuration Manager windows that appear when you configure IP interfaces on a single X.25 circuit. To configure multiple IP addresses over X.25:

1. **From the X.25 Service Configuration window (Figure 3-6), select Protocols→Add/Delete.**

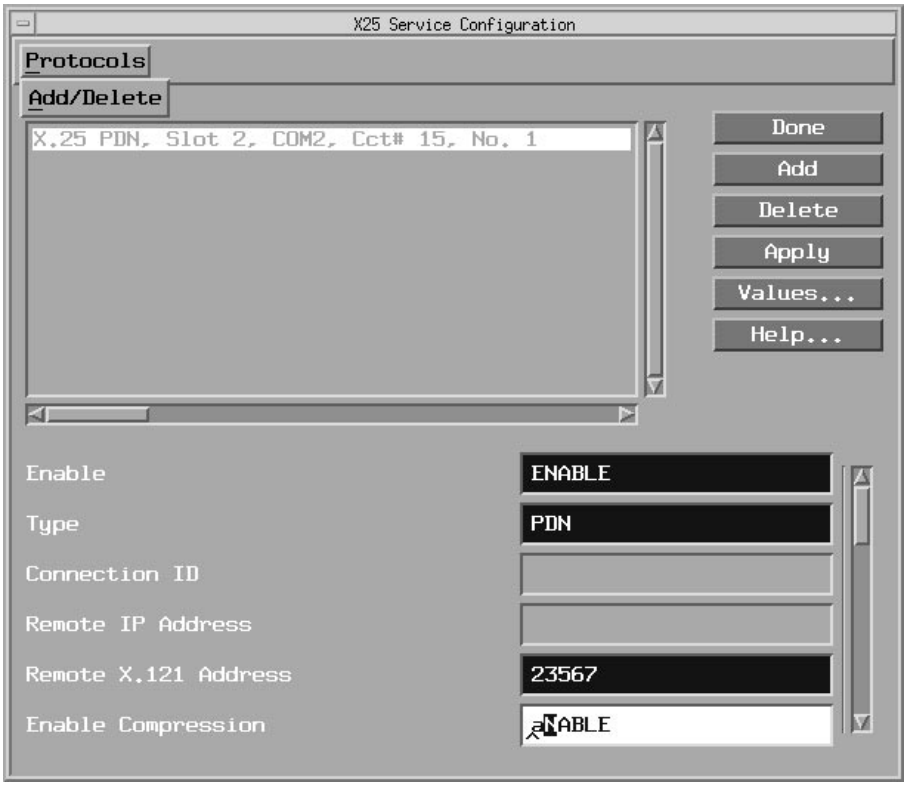


Figure 3-6. Selecting the Protocols Add/Delete Function in the X.25 Service Configuration Window

The Select Protocols window appears (Figure 3-7).

Figure 3-7. Select Protocols Windows

2. **From the Select Protocols window, select IP and click on OK to display the IP Configuration window (Figure 3-8).**

Figure 3-8. IP Configuration Window

3. **Configure the parameters using the descriptions that follow as a guide.**

   Note that you do not need to set the Unnumbered Assoc Addr parameter.

Parameter:	**IP Address**
Default:	None
Options:	Any valid IP address
Function:	Assigns a 32-bit IP address to the interface.
Instructions:	Enter the IP address of the interface in dotted decimal notation.
MIB Object ID:	1.3.6.1.4.1.18.3.5.3.2.1.4.1.4

Parameter:	**Subnet Mask**
Default:	0.0.0.0
Options:	The Configuration Manager automatically calculates an appropriate subnet mask, depending on the class of the network to which the interface connects. However, you can change the subnet mask with this parameter.
Function:	Specifies the network and subnetwork portion of the 32-bit IP address.
Instructions:	Accept the assigned subnet mask or enter another subnet mask in dotted decimal notation.
MIB Object ID:	1.3.6.1.4.1.18.3.5.3.2.1.4.1.6

Parameter:	**Transmit Bcast Addr**
Default:	0.0.0.0
Options:	0.0.0.0 or any valid IP broadcast address
Function:	Specifies the broadcast address that this IP subnet uses to broadcast packets. Accepting 0.0.0.0 for this parameter specifies that the IP router will use a broadcast address with a host portion of all 1s. Accepting 0.0.0.0 does not configure the router to use the address 0.0.0.0 to broadcast packets. For example, if you have IP address 123.1.1.1 and a subnet mask of 255.255.255.0, accepting the default value 0.0.0.0 configures the IP router to use the address 123.1.1.255 to broadcast packets. To set an explicit broadcast address of all 1s, enter 255.255.255.255 for this parameter.
Instructions:	Accept the default, 0.0.0.0, unless the calculated broadcast address (host portion) of all 1s is not adequate. In that case, enter the appropriate IP broadcast address in dotted decimal notation.
MIB Object ID:	1.3.6.1.4.1.18.3.5.3.2.1.4.1.8

4. **When you are finished configuring the parameters in the IP Configuration window, click on OK to display the Enter Adjacent Host window (Figure 3-9).**

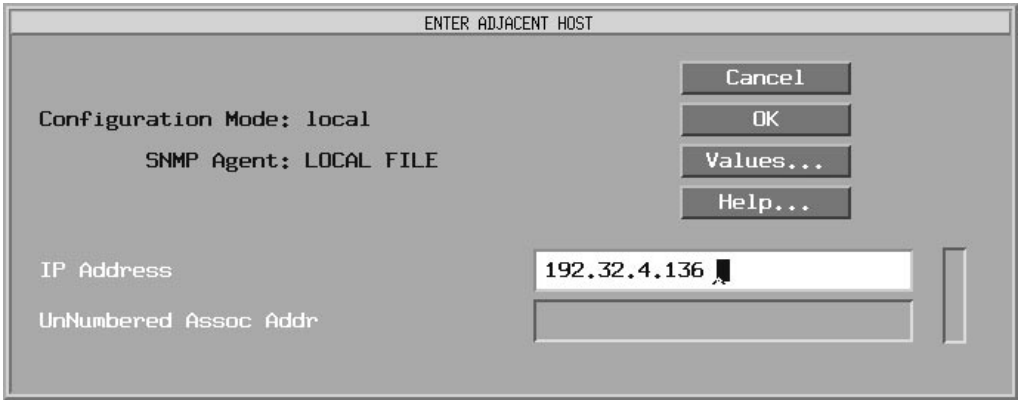


Figure 3-9. Enter Adjacent Host Window

5. **Enter the IP address of the adjacent host.**

You do not need to enter a value for the Unnumbered Assoc Addr parameter.

Parameter: IP Address

Default: None

Options: The IP address of the remote X.25 interface which the X.25 call will terminate. This address must be on the same IP network as the local X.25 interface.

Function: Assigns a 32-bit IP address to the interface.

Instructions: Enter the IP address of the interface in dotted decimal notation.

MIB Object ID: 1.3.6.1.4.1.18.3.5.3.2.1.4.1.4

6. **Click on OK to return to the X.25 Service Configuration window (Figure 3-6).**
7. **Select Protocols→Edit IP→Interfaces to display the IP Interfaces window (Figure 3-10).**

Figure 3-10. IP Interfaces Window

Note: *For information on the parameters in the IP Interfaces window, refer to* Configuring IP Services.

8. **Click on Add to configure additional IP interfaces on the X.25 circuit.**

   The IP Configuration window appears (Figure 3-11).

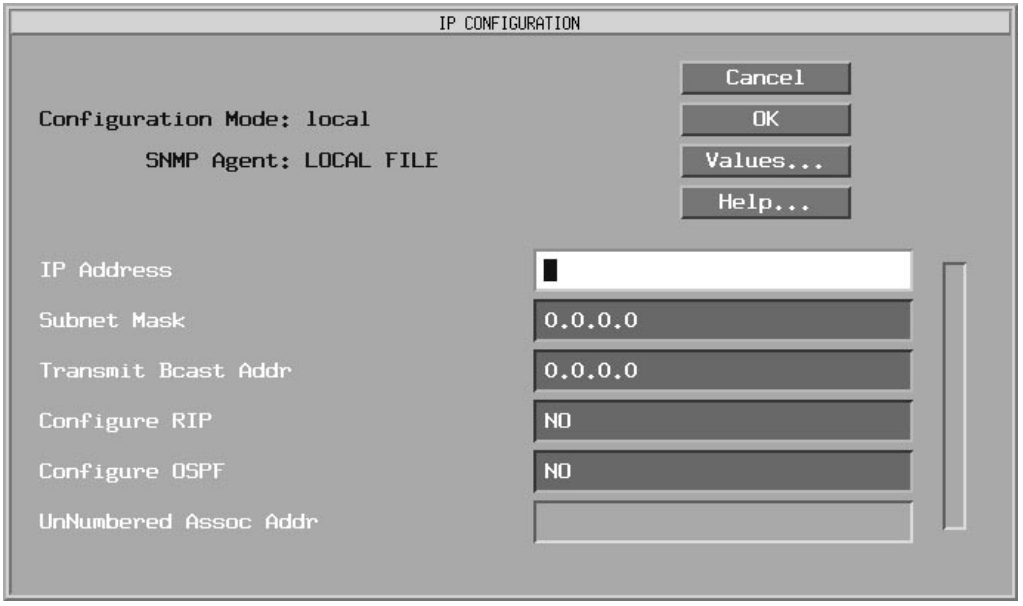


Figure 3-11. Adding an IP Interface to an X.25 Circuit

9. Configure the parameters, using the descriptions that follow as a guide.

See Step 3 for descriptions of the IP Address, Subnet Mask, and Transmit Bcast Addr parameters.

Note that you do not need to set the Unnumbered Assoc Addr parameter.

Parameter:	**Configure RIP**
Default:	None
Options:	YES | NO
Function:	Specifies whether the Routing Information Protocol (RIP) is configured on this interface.
Instructions:	Click on Values and select YES or NO.
MIB Object ID:	None

Parameter:	**Configure OSPF**
Default:	None
Options:	YES | NO
Function:	Specifies whether the Open Shortest Path First (OSPF) protocol is configured on this interface.
Instructions:	Click on Values and select YES or NO.
MIB Object ID:	None

For detailed information on RIP and OSPF, refer to *Configuring IP Services*.

10. **After you have specified the parameters in the IP Configuration window, click on OK.**

    The Enter Adjacent Host window appears (refer to Figure 3-9).

11. **Specify the IP address for the remote host, as previously described.**

    If you need to specify additional IP interfaces on the X.25 circuit, click on Add in the IP Interfaces window (refer to Figure 3-10) and continue adding IP interfaces until you are finished.

Chapter 4
Editing X.25 Parameters

After you enable X.25, you can edit all X.25 parameters from the Configuration Manager window (Figure 4-1). Refer to *Configuring Routers* for instructions on using Site Manager to access this window.

For each X.25 parameter, this chapter gives the default setting, valid parameter options, the parameter function, instructions for setting the parameter, and the Management Information Base (MIB) object ID.

The Technician Interface allows you to modify parameters by executing **set** and **commit** commands with the MIB object ID. This process is equivalent to modifying parameters using Site Manager. For more information about using the Technician Interface to access the MIB, refer to *Using Technician Interface Software*.

Caution: *The Technician Interface does not verify that the value you enter for a parameter is valid. Entering an invalid value can corrupt your configuration.*

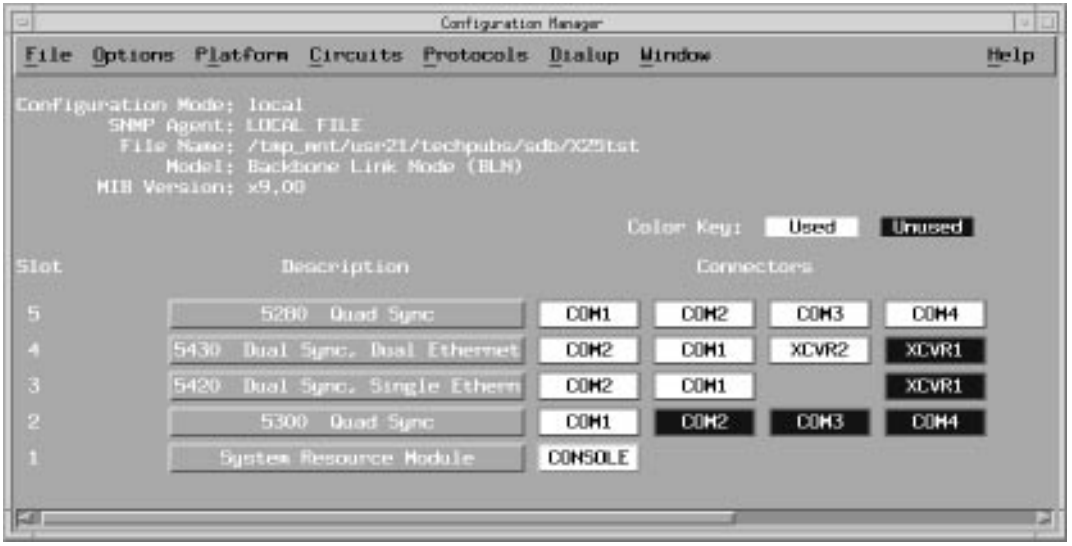


Figure 4-1. Configuration Manager Window

Editing the X.25 Global Parameter

The X.25 global parameter enables X.25 services for the entire router. To edit the X.25 global parameter, begin at the Configuration Manager window, shown in Figure 4-1, and proceed as follows:

1. **Select Protocols→X25→Global.**

   The Edit X.25 Global Parameters window appears (Figure 4-2).

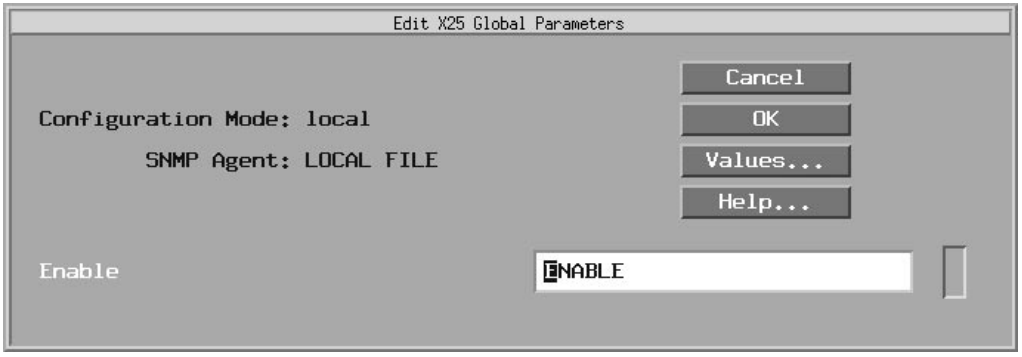


Figure 4-2. Edit X.25 Global Parameters Window

2. **Enable or disable X.25 services, using the Enable parameter as described in the following parameter description.**
3. **Click on OK to save your changes.**

X.25 Global Parameter Description

Use the following parameter description to edit the X.25 global parameter.

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Globally enables or disables X.25 services.
Instructions:	Set to Disable if you want to disable X.25 services.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.1.2

Editing X.25 Packet-level Parameters

The X.25 packet-level parameters are specific to individual X.25 interfaces. To edit packet-level parameters for an existing interface, begin at the Configuration Manager window (refer to Figure 4-1), and proceed as follows:

1. **Select Circuits→Edit Circuits to display the Circuit List window.**

2. **Select the X.25 interface that you want to edit; then click on Edit.**

   The Circuit Definition window appears.

3. **Select X25 Protocol→Packet.**

   The X.25 Packet Level Edit window appears (Figure 4-3).

4. **Edit the packet-level parameters that you want to change, using the parameter descriptions that follow as a guide.**

5. **Click on OK to exit the window.**

Note: *When you reconfigure an interface in dynamic configuration mode, X.25 packet-level and LAPB service restart on that interface.*

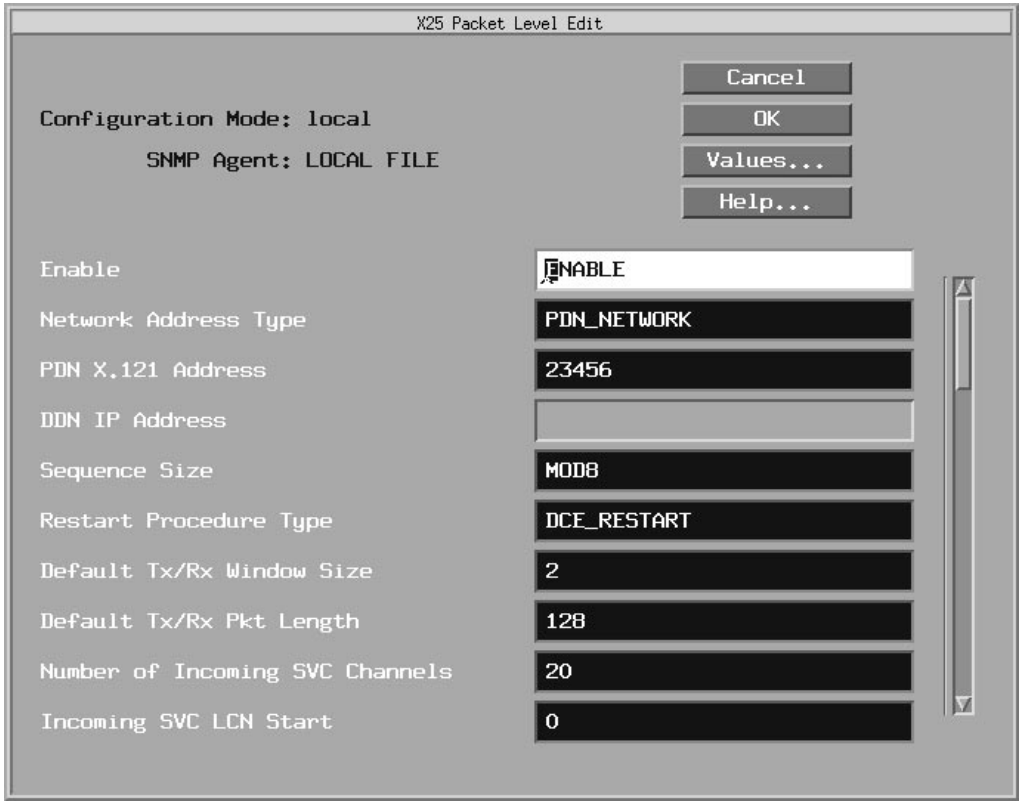


Figure 4-3. X.25 Packet Level Edit Window

X.25 Packet-level Parameter Descriptions

Use the following descriptions as guidelines when you edit the parameters in the X.25 Packet Level Edit window (refer to Figure 4-3). Because you may want to edit the parameters you set previously to enable X.25 services, this chapter repeats descriptions for those parameters and adds descriptions for the parameters for which the Configuration Manager supplies default values.

Caution: *Line speed, packet size, and window size all affect packet throughput across the X.25 network. Setting any of these variables too low can cause the router to drop packets. Therefore, use caution when changing the default settings for the following X.25 parameters:*

- *Max Window Size*
- *Max Packet Length*
- *Window Size*
- *Packet Size*

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables packet-level services for the interface.
Instructions:	Set to Disable to disable packet-level services.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.2

Parameter:	**Network Address Type**
Default:	None
Options:	PDN_Network | DDN_Network | BFE_Network
Function:	Specifies the type of X.25 network to which the interface connects. The value of this parameter determines the format of the local X.121 address.
Instructions:	Do not set this parameter if you have a Point-to-Point connection. Specify PDN_Network for a Public Data Network. Specify DDN_Network for a Defense Data Network. Specify BFE_Network for a DDN network that uses BFE encryption. If you specify PDN_Network, you must enter the local address in X.121 address format, that is, you must specify a value for the PDN X.121 Address parameter. If you specify DDN_Network or BFE_Network, you must enter the local address in IP address format, that is, you must specify a value for the DDN IP Address parameter. The router will translate the address into X.121 format.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.50

Parameter:	**PDN X.121 Address**
Default:	None
Options:	Any valid X.121 address
Function:	Specifies the X.121 address assigned to this interface. The X.25 network service provider supplies the X.121 address. Set this parameter only if you set the Network Address Type parameter to PDN_Network.
Instructions:	Enter the appropriate X.121 address.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.52

Parameter:	**DDN IP Address**
Default:	None
Options:	Any valid IP address
Function:	Specifies the IP address assigned to this interface. The router translates the address into X.121 format and uses it as the local address. Set this parameter only if you set the Network Address Type parameter to DDN_Network or BFE_Network.
Instructions:	Enter the appropriate IP address.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.51

Parameter:	**Sequence Size**
Default:	MOD8
Options:	MOD8 | MOD128
Function:	Specifies the modulo of sequence numbering.
Instructions:	Set to the appropriate sequence size.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.10

Parameter:	**Restart Procedure Type**
Default:	DTE_Restart (for DTE) or DCE_Restart (for DCE)
Options:	DTE_Restart | DTE_Norestart | DTE_DXE | DCE_Restart
Function:	For each X.25 interface, this parameter specifies the device type (DTE or DCE) at the X.25 packet level. It also enables you to turn on restart procedures, which clear all virtual circuits and let you initialize a link. You can also use the restart procedures to recover from a network failure.
Instructions:	Select the value that matches your device type and determine whether you want to enable restart procedures. Select DTE_Restart if your interface is a DTE. Select DCE_Restart if your interface is a DCE. Select DTE_Norestart if you have a DTE interface but do not want to enable restart procedures. DTE_DXE is for a DTE/DTE environment, and it leaves the DTE unassigned, while still providing restart procedures.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.45

Parameter:	**Default Tx/Rx Window Size**
Default:	2
Range:	1 to 7 (for MOD8) or 1 to 127 (for MOD128)
Function:	Specifies a default window size for this packet layer. The value in this parameter applies only if the Flow Control Negotiation parameter is set to OFF in both the packet level and service record parameters.
Instructions:	To specify a window size other than 2, enter a value within the specified range.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.42

Parameter:	**Default Tx/Rx Pkt Length**
Default:	128
Options:	16 | 32 | 64 | 128 | 256 | 512 | 1024 | 2048 | 4096
Function:	Specifies a default packet size for this packet layer. The value in this parameter applies only if the Flow Control Negotiation parameter is set to OFF.
Instructions:	To specify a nonstandard default packet size, set to one of the available options.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.43

Note: *The following parameters require you to specify logical channel number (LCN) value ranges for SVCs. Each SVC channel you configure on the router must have a unique logical channel number. There are three types of SVC channels: incoming, bidirectional, and outgoing. You must configure at least one SVC channel for X.25 to establish calls. The total number of channels you configure cannot exceed 512.*

Parameter:	**Number of Incoming SVC Channels**
Default:	0
Range:	0 to 512
Function:	Specifies the number of logical channels that accept incoming calls only.
Instructions:	Enter the number of channels that you assign to incoming calls only on this interface.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.36

Parameter:	**Incoming SVC LCN Start**
Default:	0
Range:	1 to 4095
Function:	Specifies the lowest logical channel number that the router can assign to logical channels that accept incoming call requests only.
Instructions:	Enter a number greater than the highest number reserved for PVC channels, but small enough that the last SVC channel number will be less than 4095.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.37

Parameter:	**Number of Bidirectional SVC Channels**
Default:	0
Range:	0 to 512
Function:	Specifies the number of logical channels that both accept incoming calls and transmit outgoing calls.
Instructions:	Enter the number of logical channels that you assign to both accept and transmit calls on this interface.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.38

Parameter:	**Bidirectional SVC LCN Start**
Default:	0
Range:	1 to 4095
Function:	Specifies the lowest logical channel number that the router can assign to bidirectional logical channels.
Instructions:	Enter a number greater than the highest number reserved for Incoming SVC channels, but small enough that the last SVC will be less than 4095.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.39

Parameter:	**Number of Outgoing SVC Channels**
Default:	0
Range:	0 to 512
Function:	Specifies the number of logical channels that transmit outgoing calls only.
Instructions:	Enter the number of channels that you assign to outgoing calls only.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.40

Parameter:	**Outgoing SVC LCN Start**
Default:	0
Range:	1 to 4095
Function:	Specifies the lowest logical channel number that the router can assign to logical channels that transmit outgoing call requests only.
Instructions:	Enter a number greater than the highest number reserved for bidirectional SVC channels, but small enough that the last SVC channel number will be less than 4095.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.41

Parameter:	**Use Default Service Configuration**
Default:	OFF
Options:	ON | OFF
Function:	Creates default DDN service records for every DDN SVC on your network.
Instructions:	Select ON if you want to use default values for your DDN SVCs. Refer to configuration instructions in Chapter 4 if you want to set this parameter to ON and still individually configure some of your DDN SVCs.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.54

Parameter:	**T1 Timer**
Default:	60 seconds
Range:	1 to 999
Function:	Specifies how long the router waits to receive an acknowledgment of a transmitted command frame. Specifically, the T1 timer sets, in seconds, the timeout values for Restart, Reset, and Clear commands. The router uses this timer to set up data links.
Instructions:	We recommend that you accept the default value, 60.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.32

Caution: *We recommend that you accept the default T1 Timer, T2 Timer, T3 Timer, and T4 Timer values. Reset these parameters with caution.*

Parameter:	**T2 Timer**
Default:	180 seconds
Range:	1 to 999
Function:	Specifies the call-confirmation timeout value in seconds. The value for this timer is the amount of time the router has to respond to a call-confirmation condition. This timer represents the ITU-T (formerly CCITT) T11 timer for the DCE and the T21 timer for the DTE.
Instructions:	We recommend that you accept the default value, 180.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.33

Parameter:	**T3 Timer**
Default:	200 milliseconds
Range:	200 to 2000
Function:	Specifies the congestion or busy condition watchdog timeout value in milliseconds. The value for this timer is the length of time the router has to respond to a congestion or busy condition.
Instructions:	We recommend that you accept the default value, 200.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.34

Parameter:	**T4 Timer**
Default:	200 milliseconds
Range:	200 to 2000
Function:	Specifies the data packet transmission watchdog timer in milliseconds. The value for this timer is the length of time that the router has to respond to an acknowledgment frame. This is a Bay Networks proprietary internal timer.
Instructions:	We recommend that you accept the default value, 200.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.35

Parameter: **Flow Control Negotiation**

Default: OFF

Options: ON | OFF

Function: Enables the flow-control negotiation facility on this interface.

When you enable flow-control negotiation, the router can negotiate the maximum window size and packet length for virtual circuits on this interface on a per-call basis. It uses the Max Window Size and Max Packet Length parameter settings as a boundary check during negotiations. The receiving DTE may accept these values or reply with a counterproposal.

When you disable flow-control negotiation, the router uses the values specified by these parameters:

– Default Tx/Rx Window Size

– Default Tx/Rx Pkt Length

Configure the remote peer router to match these default values.

Instructions: To enable flow-control negotiation, set this parameter to ON. Then be sure to set the following parameters as shown in Table 4-1, or flow-control negotiation will not work.

MIB Object ID: 1.3.6.1.4.1.18.3.5.9.4.5.1.14

Table 4-1. Parameter Settings for Flow-Control Negotiation

Parameter	Value
X. 25 Packet-Level parameters	
Max Window Size/Max Packet Length	See parameter descriptions
Acceptance Format	DEFEXT
Release Format	DEFEXT
X. 25 Service Record parameters	
Flow Facility	Negot
Window Size/Packet Size	See parameter descriptions

Parameter:	**Max Window Size**
Default:	2
Range:	1 to 7 (for MOD8) or 1 to 127 (for MOD128)
Function:	Specifies the maximum window size allowed in the facilities field of outgoing and incoming call request packets generated by the router and transmitted on this interface.
Instructions:	If you set the Sequence Size parameter to MOD8, accept the default, 2, or enter a value between 1 and 7. If you set the Sequence Size parameter to MOD128, enter a value between 1 and 127.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.11

Parameter:	**Max Packet Length**
Default:	128
Options:	16 | 32 | 64 | 128 | 256 | 512 | 1024 | 2048 | 4096
Function:	Specifies the maximum length, in bytes, of the information field of outgoing X.25 packets generated by the router and transmitted on this interface.
Instructions:	Accept the default, 128, or set to one of the available options.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.12

Caution: *Window size and packet length can affect packet throughput across the X.25 network. Setting either the Max Window Size or Max Packet Length parameter too low can cause the router to drop packets.*

Also note that on peer routers, the values of the Max Window Size and Max Packet Length parameters must be the same. For example, if you set the Max Window Size for Router A to 7, then set the Max Window Size for peer Router B to 7.

Parameter:	**Tx/Rx Throughput Class**
Default:	THRCLASS75
Options:	THRCLASS75 | 150 | 300 | 600 | 1200 | 2400 | 4800 | 9600 | 19200 | 48000
Function:	Specifies the default data throughput rate (amount of data in bits per second) for packets transmitted and received on this X.25 interface. This is the throughput value that the router first uses when bringing up the line. If the router receives an incoming call requesting to negotiate a throughput rate different from this value, the router checks the Max Throughput Class parameter value to determine whether it can support the requested rate.
Instructions:	To specify a nonstandard default data throughput rate, select one of the available options.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.44

Parameter:	**Throughput Class Negotiation**
Default:	OFF
Options:	ON | OFF
Function:	Permits the negotiation of throughput classes, allowing you to determine the amount of throughput you want to go through the switch. When you enable this parameter, the router can negotiate the throughput rate for virtual circuits on this interface on a per-call basis. The receiving DTE may accept the proposed rate or reply with a counterproposal.
Instructions:	If you want the router to accept calls with throughput negotiation, set this parameter to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.15

Parameter:	**Max Throughput Class**
Default:	19200
Options:	75 | 150 | 300 | 600 | 1200 | 2400 | 4800 | 9600 | 19200 | 48 K | 64 K
Function:	Specifies the maximum throughput rate (amount of data in bits per second) that this interface can send across the X.25 network. If the Throughput Class Negotiation parameter is set to ON, the default value (19200) is the maximum value allowed by this parameter.
Instructions:	Accept the default, 19200, or select one of the available options.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.13

Parameter:	**Network User Identification**
Default:	OFF
Options:	ON | OFF
Function:	Specifies whether this interface supports the network user identification (NUI) service facility. When you enable this parameter, the router can provide administrative and management information to the DCE on a per-call basis.
Instructions:	To enable Network User Identification facility support, set this parameter to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.16

Parameter:	**Incoming Calls Accept**
Default:	ON
Options:	ON | OFF
Function:	Specifies whether this interface accepts incoming calls. When you enable this parameter, the router can accept incoming call requests on this interface.
Instructions:	To disable incoming calls, set this parameter to OFF.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.17

Parameter:	**Outgoing Calls Accept**
Default:	ON
Options:	ON | OFF
Function:	Specifies whether this interface generates outgoing call requests. When you enable this parameter, the router can initiate outgoing call requests on this interface.
Instructions:	To disable outgoing calls, set this parameter to OFF.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.18

Parameter:	**Fast Select Accept**
Default:	OFF
Options:	ON | OFF
Function:	Enables the fast select accept facility on this interface. When you enable this parameter, the router can accept incoming call requests with fast select facility on this interface.
Instructions:	To enable the fast select accept facility, set this parameter to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.19

Parameter:	**Reverse Charge Accept**
Default:	OFF
Options:	ON | OFF
Function:	Enables or disables the reverse charge accept facility on this interface. When you enable this parameter, the router can accept calls with the reverse charge facility.
Instructions:	To enable the reverse charge accept facility, set this parameter to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.20

Note: *When this parameter is set to ON, the router accepts calls with the reverse charge facility, but it does not maintain a record of the charges.*

Parameter:	**Fast Select**
Default:	OFF
Options:	ON | OFF
Function:	Enables the fast select request facility on this interface. When you enable this parameter, call request packets the router generates and transmits on this interface can contain up to 128 bytes of user data.
Instructions:	To enable the fast select request facility, set this parameter to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.21

Parameter:	**Reverse Charging**
Default:	OFF
Options:	ON | OFF
Function:	Enables or disables the reverse charge request facility on this interface. Packet network charges accrue whenever the router generates an outgoing call request packet. When you enable this parameter, these packet network charges are charged to the receiving DTE.
Instructions:	To enable the reverse charge request facility, set this parameter to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.22

Parameter:	**CUG Selection**
Default:	Null
Options:	Null | Basic (16) | Extended (32)
Function:	Specifies the type of closed user group (CUG) facility that the interface supports.
Instructions:	If you accept the default value, Null, no closed user groups are supported; if you set this parameter to Basic, the Basic facility is supported; if you set this parameter to Extended, the Extended facility is supported. Ensure that the value of this parameter matches the value of the network service record parameter CUG Facility Format.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.23

Parameter:	**CUG Outgoing Access**
Default:	Null
Options:	Null | CUGOA
Function:	Specifies whether or not this interface supports a closed user group (CUG) with outgoing access.
Instructions:	To enable CUG with outgoing access, set this parameter to CUGOA. If you enable this option, set the CUG Selection parameter to Extended. In addition, set the network service record parameter CUG Facility Type to OA.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.24

Parameter:	**CUG Bilateral Selection**
Default:	Null
Options:	Null | Bilateral
Function:	Specifies whether or not this interface supports a bilateral closed user group (CUG).
Instructions:	To enable CUG with bilateral facility support, set this parameter to Bilateral. If you enable this option, set the CUG Selection parameter to Extended. In addition, set the network service record parameter CUG Facility Type to Bilateral.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.25

Parameter:	**RPOA Selection**
Default:	OFF
Options:	ON | OFF
Function:	Enables the recognized private operating agencies (RPOA) selection facility on this interface. When you enable this parameter, the router can accept incoming calls with this facility; the router accepts both RPOA Basic format and Extended format.
Instructions:	To enable the RPOA facility, set this parameter to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.26

Note: *When this parameter is set to ON, the router accepts calls with the RPOA facility, but it does not validate them.*

Parameter:	**Charging Information**
Default:	OFF
Options:	ON | OFF
Function:	Specifies whether this packet layer accepts incoming calls with charging information; however, the packet layer does not collect any charging information.
Instructions:	To enable the charging information facility, set this parameter to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.27

Parameter:	**Transit Delay**
Default:	OFF
Options:	ON | OFF
Function:	Specifies whether this packet layer accepts incoming calls with transit delay. Note that the router does not send outgoing calls with transit delay.
Instructions:	To enable transit delay, set this parameter to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.28

Parameter: **Full Addressing**

Default: ON

Options: ON | OFF

Function: Specifies whether the router includes a full local DTE address in all outgoing call requests transmitted on this interface.

Instructions: To enable full addressing, set this parameter to ON.

MIB Object ID: 1.3.6.1.4.1.18.3.5.9.4.5.1.29

Parameter: **Acceptance Format**

Default: Basic (2)

Options: Basic (2) | Allext (255) | Defext (128)

Function: Specifies the call accept packet format as follows:

- Basic is Basic call accept packet format.
- ALLEXT is Extended call accept packet format.
- DEFEXT specifies that when an incoming call does not include facilities, a default Basic call accept packet format is used.

Instructions: Select the appropriate call accept packet format.

MIB Object ID: 1.3.6.1.4.1.18.3.5.9.4.5.1.30

Parameter: **Release Format**

Default: Basic (2)

Options: Basic (2) | Allext (255) | Defext (128)

Function: Specifies the format of the call clear packet as follows:

- Basic is Basic call clear packet format.
- ALLEXT is Extended call clear packet format.
- DEFEXT specifies that when an incoming call does not include facilities, a default Basic call clear packet format is used.

Instructions: Select the appropriate call clear packet format.

MIB Object ID: 1.3.6.1.4.1.18.3.5.9.4.5.1.31

Parameter:	**CCITT Conformance**
Default:	DXE1988
Options:	DXE1980 | DXE1984 | DXE1988 | FDSEL1980 | FDSEL1984 | FDSEL1988
Function:	Specifies the CCITT (now ITU-T) specification to which the router's operation conforms.
Instructions:	Select a CCITT conformance year that matches your network requirements. For example, if you are connecting to a DXE1980-compliant network, select DXE1980.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.46

Parameter:	**Network Standard**
Default:	None
Options:	None | ISO | DOD
Function:	Specifies the network standard with which your router complies. The value of this parameter is in addition to the ITU-T (formerly CCITT) specification with which your network conforms.
Instructions:	Select the appropriate network standard. Choose None if you want to use only the CCITT Conformance value. Select ISO if you are connecting to a network that complies with the International Organization for Standardization. Select DOD if you are connecting to a network that complies with Department of Defense specifications (DDN networks).
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.47

Parameter:	**Statistics Computation**
Default:	Disable
Options:	Enable | Disable
Function:	Specifies whether the router computes statistics for the packet level and all the virtual circuits associated with this line instance. If you set this parameter to Disable, the router computes no statistics, which maximizes data throughput. If you set this parameter to Enable, the router computes statistics.
Instructions:	Set this parameter to Enable or Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.5.1.49

Editing X.25 Network Service Records

To edit the parameters for an existing X.25 network service record, begin at the Configuration Manager window, (refer to Figure 4-1), and proceed as follows:

1. **Select Circuits→Edit Circuits.**

   The Circuit List window appears.

2. **Select an X.25 interface; then click on Edit.**

   The Circuit Definition window appears.

3. **Select X25 Protocol→Service.**

The X.25 Service Configuration window appears (Figure 4-4). It lists all currently defined network service records.

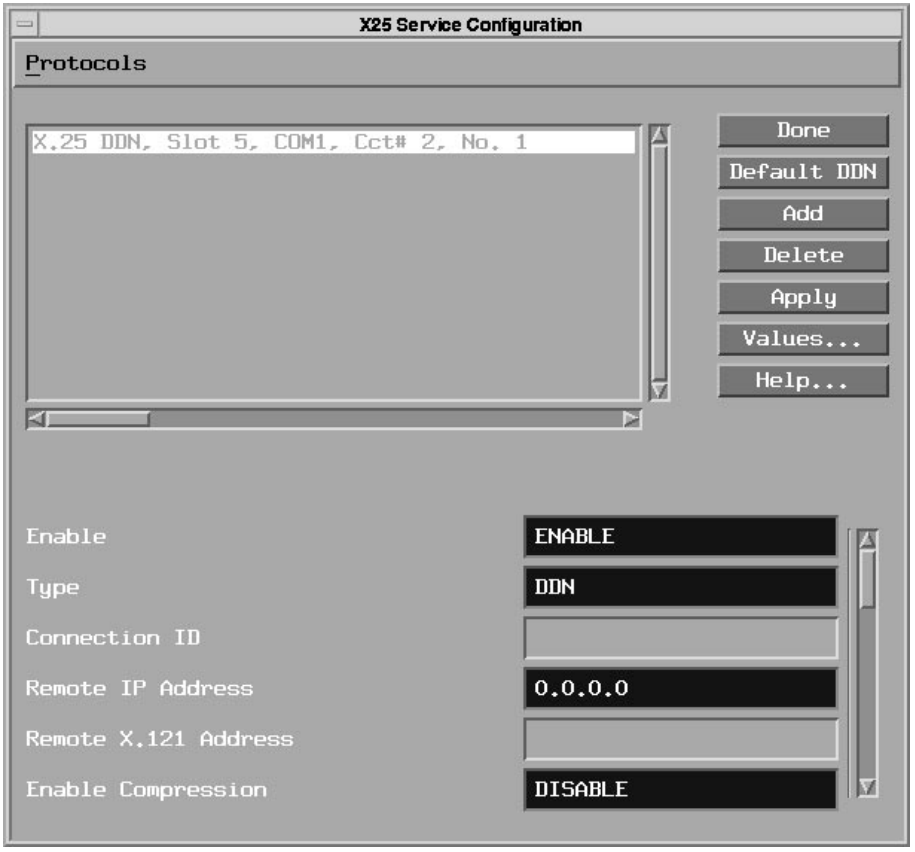
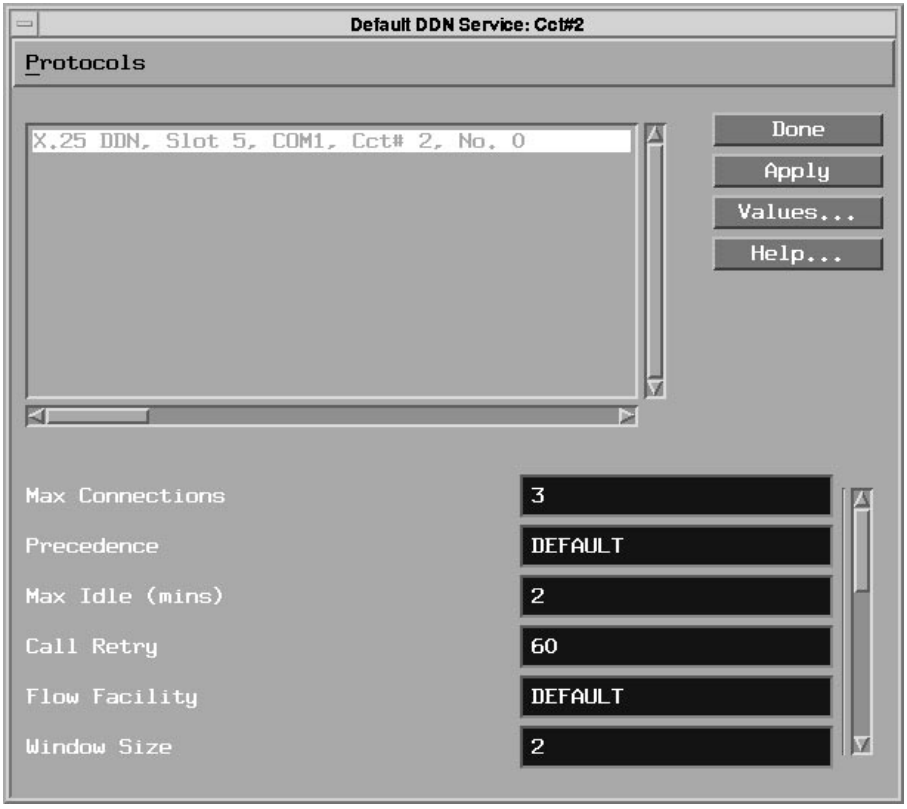


Figure 4-4. X.25 Service Configuration Window for a DDN Network

4. **Select the network service record you want to edit.**
5. **Edit the network service parameters that you want to change, using the parameter descriptions that follow these instructions as guidelines.**

6. **If you are configuring DDN Service Records and you want to change the default values for service record parameters, click on Default DDN, and edit service record parameters in the Default DDN Service screen (Figure 4-5).**



7. **Click on Apply to implement your changes.**

   The values that you have selected are the new default DDN service record parameter values. They apply to all DDN circuits, except those that you configure individually, following Steps 1 through 5 of this procedure.

8. **Click on Done.**

X.25 Network Service Record Parameter Descriptions

This section provides information on how to set all network service record parameters in the X.25 Service Configuration window (refer to Figure 4-4).

Parameter:	**Enable**
Default:	Enable
Options:	Enable | Disable
Function:	Enables or disables the network service record.
Instructions:	Set this parameter to Disable only if you want to disable this service record.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.2

Parameter:	**Type**
Default:	None
Options:	PDN | DDN | PTOP
Function:	Specifies the type of X.25 service that this interface supplies.
Instructions:	Select PDN for Public Data Network service, DDN for Department of Defense Network service, or PTOP for Point-to-Point network service.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.9

Parameter:	**Connection ID**
Default:	1
Range:	1 to 255
Function:	Identifies each circuit to its remote destination. You can have multiple Point-to-Point circuits configured to the same X.121 destination, and each of them requires a unique Connection ID. Both the local and remote configurations for each circuit must have the same connection ID. You use the Type parameter with PTOP service only.
Instructions:	Assign a unique connection ID for each X.121 connection.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.11

Parameter: **Remote IP Address**

Default: 0.0.0.0

Options: Any valid IP address

Function: Specifies a destination IP address that is reachable over this X.25 interface. This parameter is not used with Point-to-Point service.

You must specify a remote IP address if you plan to enable IP on this interface. For DDN services, the router translates the remote IP address you specify into an X.121 address so that it can route IP traffic over the network. For PDN services, the router uses the remote IP address you specify to define an adjacent host for the IP interface.

Instructions: Enter a 32-bit destination IP address in dotted decimal notation.

If you run OSI over DDN, you must also enter this IP address in the SNPA field of the OSI External Address Adjacency Configuration window. To enter this value in the SNPA field, you must convert the IP address into X.121 format. Refer to *Configuring OSI Services* for more information.

MIB Object ID: 1.3.6.1.4.1.18.3.5.9.4.2.1.13

Parameter: **Remote X.121 Address**

Default: None

Options: Any valid X.121 address

Function: Specifies a destination X.121 address. You must specify a destination X.121 address if you are configuring PDN or Point-to-Point services. If you are configuring DDN services, the router derives this address from the remote IP address.

Instructions: Enter a destination X.121 address that is reachable over this X.25 interface.

MIB Object ID: 1.3.6.1.4.1.18.3.5.9.4.2.1.12

Parameter:	**Enable Compression**
Default:	Disable
Options:	Enable | Disable
Function:	Enables data compression.
Instructions:	Set this parameter to Enable if you want the X.25 service to use compression for this connection. Otherwise, accept the default, Disable.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.33

Parameter:	**Broadcast**
Default:	OFF
Options:	ON | OFF
Function:	Indicates whether you want the X.25 service to send IP broadcast messages to the remote IP address.
Instructions:	Set this parameter to ON if you want the X.25 service to send broadcast messages to the IP address. Otherwise, accept the default, OFF.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.14

Parameter:	**Max Connections**
Default:	2
Range:	1 to 4
Function:	Specifies the maximum number of virtual circuits that the router can establish with the remote device specified in this record. Increasing the number of connections to the same destination may improve the rate of data throughput. To take advantage of multiple virtual connections and load sharing across them, set this parameter to a value greater than 1. This parameter has meaning only for PDN services.
Instructions:	Accept the default, 2, or enter a value within the specified range.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.15

Parameter:	**Precedence**
Default:	OFF
Options:	ON | OFF
Function:	Specifies the priority of IP packets that this X.25 interface transmits and that traverse the X.25 network. This parameter has meaning only for DDN services.
Instructions:	To enable IP packet prioritization, set Precedence to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.16

Parameter:	**Max Idle (Mins)**
Default:	2
Range:	1 to 999
Function:	Specifies the maximum number of minutes that a virtual circuit can remain idle. Once the Max Idle timer expires, X.25 clears the circuit. Point-to-Point connections do not use this parameter. Use this parameter to minimize CPU and network overhead during periods of low datagram traffic.
Instructions:	Accept the default value, 2, or enter a timeout value within the specified range.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.17

Parameter:	**Call Retry**
Default:	60
Range:	10 to 999
Function:	Specifies the interval in seconds between call request packets the router sends to a specific destination. If a call attempt fails, the router waits the number of seconds this parameter specifies before sending another call request packet to the destination. If the router receives any IP datagrams for this destination, it drops them during this period.
Instructions:	Accept the default, 60, or enter a call retry interval within the specified range.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.18

Parameter:	**Flow Facility**
Default:	Default
Options:	Negot | Default
Function:	Enables or disables the X.25 flow-control facility on each virtual circuit. If you enable this parameter, calls the router transmits to the remote X.121 address in this service record will contain flow control. You must also enable the flow-control facility at the packet layer.
Instructions:	To enable flow-control facility negotiations, set this parameter to Negot.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.19

Parameter:	**Window Size**
Default:	2
Range:	1 to 7 (for MOD8) or 1 to 127 (for MOD128)
Function:	Specifies the window size that appears in the facilities field of outgoing call request packets to the X.121 address in this service record.
Instructions:	Accept the default, 2, or enter a window size within the specified range.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.20

Note: *Remember that the window size and packet size can affect packet throughput across the X.25 network. Setting the Window Size or Packet Size parameter too low could cause the router to drop packets.*

Parameter:	**Packet Size**
Default:	128
Options:	16 | 32 | 64 | 128 | 256 | 512 | 1024 | 2048 | 4096
Function:	Specifies the packet size that appears in the facilities field of outgoing call request packets to the remote X.121 address in this service record.
Instructions:	Accept the default, 128, or enter a packet size within the specified range.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.21

Note: *Do not set this parameter to a value greater than you specify for the packet-level parameter Max Packet Length.*

Parameter:	**Fast Select Request**
Default:	OFF
Options:	ON | OFF
Function:	Enables the fast select request facility on each virtual circuit. When you enable this parameter, call request packets this router generates and sends to the remote X.121 address in this service record contain the fast select request facility.
Instructions:	To enable the fast select request facility, set this parameter to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.22

Parameter:	**Fast Select Accept**
Default:	OFF
Options:	ON | OFF
Function:	Enables the fast select accept facility. When you enable the fast select accept facility, the router can accept incoming fast select call requests from the remote X.121 address in this service record.
Instructions:	To enable the fast select accept facility, set this parameter to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.23

Parameter:	**Reverse Charge Request**
Default:	OFF
Options:	ON | OFF
Function:	Enables or disables the reverse charge request facility. Packet network charges accrue whenever the router generates an outgoing call request packet. When you enable Reverse Charge Request, these packet network charges accrue to the receiving DTE.
Instructions:	To enable the reverse charge request facility, set this parameter to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.24

Parameter:	**Reverse Charge Accept**
Default:	OFF
Options:	ON | OFF
Function:	Enables or disables the reverse charge accept facility. When you enable this parameter, the router accepts network packet charges from incoming call request packets.
Instructions:	To enable the reverse charge accept facility, set this parameter to ON.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.25

Parameter:	**DDN BFE**
Default:	Disable
Options:	Disable | Enable
Function:	Enables or disables DDN Blacker Front-End (BFE) support.
Instructions:	To enable DDN BFE support, set this parameter to Enable.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.31

Parameter: **User Facility (hex)**

Default: None

Options: Any facility that needs to be included in the call request packet

Function: Allows you to add support for a facility Bay Networks does not transmit. To generate calls with the following facilities, you must enter the appropriate facility code in this parameter. You must also set the associated parameter at the packet level to ON. Table 4-2 gives the facilities, which are also the names of the packet level parameters, and the corresponding facility codes.

Table 4-2. User Facilities and Codes

Facility/Packet-Level Parameter	Code
Throughput Class Negotiation	02
Network User IDentification	C6
RPOA Selection	44
Transit Delay	49

Instructions: Specify a facility in hexadecimal form.

MIB Object ID: 1.3.6.1.4.1.18.3.5.9.4.2.1.29

Note: *If you need to set this parameter back to nil after you have configured it, you must*

1. *Select User Facility from the appropriate network service record (refer to "Editing X.25 Network Service Records" earlier in this chapter).*
2. *Overwrite the erroneous value by typing all spaces where you previously entered a hexadecimal value.*
3. *Click on Apply to implement your changes.*
4. *Click on Done to exit the X.25 Service Configuration window.*

Parameter:	**CUG Facility Format**
Default:	None
Options:	None | Basic | Extended
Function:	Specifies the closed user group (CUG) facility format that the interface can accept. The value of this parameter should match the value of the X.25 packet-level parameter CUG Selection.
Instructions:	If you are not configuring a CUG for this interface, select None. To configure the Basic format, select Basic. To configure the extended format, select Extended.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.26

Parameter:	**CUG Facility Type**
Default:	Normal
Options:	Normal | OA | Bilateral
Function:	Defines the type of CUG facility that the interface will accept. This parameter works with the X.25 packet-level parameters CUG Outgoing Access and CUG Bilateral Selection.
Instructions:	Select Normal to enable routing between CUGs. Select OA to allow communication between CUGs with outgoing access. If you select OA, make sure that you set the packet-level parameter CUG Outgoing Access to CUGOA. Select Bilateral to allow communication between bilateral CUGs. If you select this option, make sure that you set the packet-level parameter CUG Bilateral Selection to Bilateral.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.27

Parameter:	**CUG Number**
Default:	0
Range:	0 to 9999
Function:	Identifies each CUG with a number so that information is routed to the correct CUG.
Instructions:	Enter a number for the closed user group.
MIB Object ID:	1.3.6.1.4.1.18.3.5.9.4.2.1.28

Deleting X.25 Network Service Records

To delete a network service record, begin at the X.25 Service Configuration window, (refer to Figure 4-4), and proceed as follows:

1. **Select the network service record that you want to delete.**
2. **Click on Delete.**

   The X.25 Service Configuration window no longer lists the network service record you deleted.
3. **Click on Done to save your changes and exit the window.**

Deleting X.25 from the Router

To delete X.25 from the router globally, begin at the Configuration Manager window, (refer to Figure 4-1), and proceed as follows:

1. **Select Protocols→X25→Delete X.25.**

   A window pops up and prompts:

   ```
   Do you REALLY want to delete X.25?
   ```
2. **Click on OK.**

Site Manager returns you to the Configuration Manager window. X.25 is no longer configured on the router.

Appendix A
X.25 Parameter Default Settings

Tables A-1 through A-3 list X.25 parameters and their default values.

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Table A-1. X.25 Global Parameter

Parameter	Default
Enable	Enable

Table A-2. X.25 Packet-level Parameters

Parameter	Default
Enable	Enable
Link Address Type	DCE
Network Address Type	None
PDN X.121 Address	None
DDN IP Address	None
Sequence Size	MOD8
Restart Procedure Type	DTE_Restart (for DTE) DCE_Restart (for DCE)

(continued)

Table A-2. X.25 Packet-level Parameters *(continued)*

Parameter	Default
Default Tx/Rx Window Size	2
Default Tx/Rx Pkt Length	128
Number of Incoming SVC Channels	0
Incoming SVC LCN Start	
Number of Bidirectional SVC Channels	0
Bidirectional SVC LCN Start	0
Number of Outgoing SVC Channels	0
Outgoing SVC LCN Start	0
T1 Timer	60 s
T2 Timer	180 s
T3 Timer	200 ms
T4 Timer	200 ms
Flow Control Negotiation	Off
Max Window Size	2
Max Packet Length	128
Tx/Rx Throughput Class	THRCLASS75
Throughput Class Negotiation	Off
Max Throughput Class	19200

(continued)

Table A-2. X.25 Packet-level Parameters *(continued)*

Parameter	Default
Network User Identification	Off
Incoming Calls Accept	On
Outgoing Calls Accept	On
Fast Select Accept	Off
Reverse Charge Accept	Off
Fast Select	Off
Reverse Charging	Off
CUG Selection	Null
CUG Outgoing Access	Null
CUG Bilateral Selection	Null
RPOA Selection	Off
Charging Information	Off
Transit Delay	Off
Full Addressing	On
Acceptance Format	Basic (2)
Release Format	Basic (2)
CCITT Conformance	DXE1988
Network Standard	None
Statistics Computation	Disable

Table A-3. X.25 Network Service Record Parameters

Parameter	Default
Enable	Enable
Type	None
Connection ID	1
Remote IP Address	0.0.0.0
Remote X.121 Address	None
Enable Compression	Disable
Broadcast	Off
Max Connections	2
Precedence	Off
Max Idle (Mins)	2
Call Retry	60
Flow Facility	Default
Window Size	2
Packet Size	128
Fast Select Request	Off
Fast Select Accept	Off
Reverse Charge Request	Off
Reverse Charge Accept	Off
DDN BFE	Disable
User Facility (hex)	None
CUG Facility Format	None
CUG Facility Type	Normal
CUG Number	0

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