X.25 and LAPB Commands

This section describes the function and displays the syntax of each X.25 and LAPB command. For more information about defaults and usage guidelines, see the corresponding chapter of the *Router Products Command Reference* publication.

bfe { **enter** | **leave**} *interface-type number*

Use the **bfe** EXEC command to allow the router to participate in emergency mode or to end participation in emergency mode when the interface is configured for **x25 bfe-emergency decision** and **x25 bfe-decision** ask.

enter Causes the router to send a special address

translation packet that includes an **enter emergency mode** command to the BFE if the emergency mode window is open. If the BFE is already in emergency mode, this command enables the sending of address translation

information.

leave Disables the sending of address translation

information from the router to the BFE when the

BFE is in emergency mode.

interface-type Interface name.number Interface number.

clear x25-vc *interface-name number* [lcn]

Use the **clear x25-vc** privileged EXEC command to clear switched virtual circuits (SVCs) and to reset permanent virtual circuits (PVCs). This command without an *lcn* argument clears all X.25 virtual circuits at once by restarting the packet layer service.

interface-name Name of the interface

number Interface unit numberlcn (Optional) Virtual circuit

[no] cmns enable

Use the **cmns enable** interface configuration command to enable Connection-Mode Network Service (CMNS) on a nonserial interface. Use the **no cmns enable** command to disable this capability.

encapsulation bfex25

Use the **encapsulation bfex25** interface configuration command to configure BFE encapsulation on a router attached to a BFE device.

The default serial encapsulation is HDLC. You must choose an X.25 encapsulation method.

encapsulation ddnx25

A router using DDN X.25 Standard Service can act as either a DTE or a DCE device. Use the encapsulation ddnx25 interface configuration command to set DTE DDN X.25 operation.

The default serial encapsulation is HDLC. You must choose an X.25 encapsulation method.

encapsulation ddnx25-dce

A router using DDN X.25 Standard Service can act as either a DTE or a DCE device. Use the encapsulation **ddnx25-dce** interface configuration command to set DCE DDN X.25 operation. The default serial encapsulation is HDLC. You must choose an X.25 encapsulation method.

encapsulation lapb

Use the encapsulation lapb interface configuration command to exchange datagrams over a serial interface using LAPB encapsulation and operating as the DTE. One end of the link must be DTE and the other end must be DCE. The default serial encapsulation is HDLC. You must choose a LAPB encapsulation method.

encapsulation lapb-dce

Use the encapsulation lapb-dce interface configuration command to exchange datagrams over a serial interface using LAPB encapsulation and operating as the DCE. One end of the link must be DTE and the other end must be DCE. The default serial encapsulation is HDLC. You must choose a LAPB encapsulation method.

encapsulation multi-lapb

For DTE operation, use the **encapsulation multi-lapb** interface configuration command to use multiple local-area network (LAN) protocols on the same line at the same time. The default serial encapsulation is HDLC. You must choose a LAPB encapsulation method.

encapsulation multi-lapb-dce

For DCE operation, use the **encapsulation multi-lapb-dce** interface configuration command to enable use of multiple LAN protocols on the same line at the same time. The default serial encapsulation is HDLC. You must choose a LAPB encapsulation method.

encapsulation x25

A router using X.25 Level 3 can act as a DTE or DCE device. Use the **encapsulation x25** interface configuration command to set X.25 DTE operation. The default serial encapsulation is HDLC. You must choose an X.25 encapsulation method.

encapsulation x25-dce

A router using X.25 Level 3 can act as a DTE or DCE device. Use the **encapsulation x25-dce** interface configuration command to set X.25 DCE operation. The default serial encapsulation is HDLC. You must choose an X.25 encapsulation method.

[no] ip tcp header-compression [passive]

Use the **ip tcp header-compression** interface configuration command to implement TCP header compression. The header compression complies with the IETF RFC 1144 standard. The **no ip tcp header-compression** command disables this feature.

passive

(Optional) Outgoing packets are compressed only if incoming TCP packets on the virtual circuit (VC) for a TCP header compression map are compressed. When the **passive** option is not set, all compressible traffic intended for the TCP header compression address map is compressed.

lapb hold-queue queue-size
[no] lapb hold-queue [queue-size]

Use the **lapb hold-queue** interface configuration command to define the number of frames that can be held while LAPB is unable to send. Use the **no lapb hold-queue** command without an argument to remove this command from the configuration file and return to the default value.

queue-size

Number of frames. A hold queue limit of 0 allows an unlimited number of frames in the hold queue. The default is 10 frames for LAPB encapsulation; X25 encapsulation may not set this parameter because proper operation requires that LAPB send all requested frames.

lapb k window-size

Use the **lapb k** interface configuration command to specify the maximum permissible number of outstanding frames, called the window size.

window-size Frame count. It can be a value from 1 to 7. The

default is 7.

lapb n1 bits

Use the **lapb n1** interface configuration command to specify the maximum number of bits a frame can hold (the LAPB N1 parameter).

bits Number of bits from 1088 through 32832; it must be a multiple of eight. The default is 12056 bits

(1507 bytes total, or 1503 bytes of user information).

lapb n2 tries

Use the **lapb n2** interface configuration command to specify the maximum number of times a data frame can be transmitted (the LAPB N2 parameter).

tries Transmission count. It can be a value from 1 through 255. The default is 20 transmissions.

lapb protocol protocol

Use the **lapb protocol** interface configuration command to configure the protocol carried on the LAPB line.

protocol Protocol. It can be one of the following: ip, xns,

decnet, appletalk, vines, clns (ISO CLNS), ipx (Novell IPX), and apollo. The default is IP.

lapb t1 milliseconds

Use the **lapb t1** interface configuration command to set the retransmission timer period (the LAPB T1 parameter).

milliseconds

Time in milliseconds. It can be a value from 1 through 64000. The default is 3000 milliseconds.

show cmns [interface-name]

Use the **show cmns** EXEC command to display information pertaining to CMNS traffic activity. In particular, you can use this command to display X.25 Level 3 parameters for LAN interfaces (such as Ethernet or Token Ring).

interface-name (Optional) Interface to describe

show interfaces serial number

Use the **show interfaces serial** EXEC command to display information about a serial interface.

number Interface port number.

show llc2

Use the **show llc2** privileged EXEC command to display active LLC2 connections.

show x25 map

Use the **show x25 map** EXEC command to display information about configured address maps.

show x25 remote-red

Use the **show x25 remote-red** EXEC command to display the one-to-one mapping of the host IP addresses and the remote BFE device's IP addresses.

show x25 route

Use the **show x25 route** EXEC command to display the X.25 routing table.

show x25 vc [lcn]

Use the **show x25 vc** EXEC command to display the parameters and statistics of the active X.25 virtual circuit. To examine a particular virtual circuit, add an LCN argument to the **show x25 vc** command.

lcn (Optional) Logical channel number (LCN)

[no] x25 accept-reverse

Use the **x25** accept-reverse interface configuration command to instruct the router to accept all reverse charge calls. The **no x25** accept-reverse command disables this facility.

x25 address x.121-address

Use the $\mathbf{x25}$ address interface configuration command to set the X.121 address of a particular network interface.

x.121-address Variable-length X.121 address. The address is assigned by the X.25 network service provider.

x25 bfe-decision {no | yes | ask}

Use the **x25 bfe-decision** interface configuration command to direct how a router configured for **x25 bfe-emergency decision** will participate in emergency mode.

no Prevents the router from participating in emergency mode and from sending address translation information to the BFE device. This is the default.

yes Allows the router to participate in emergency mode

and to send address translation information to the BFE when the BFE enters emergency mode. The router obtains this information from the table created

by the **x25 remote-red** command.

ask Configures the router to prompt the console operator

to enter the bfe EXEC command.

x25 bfe-emergency {never | always | decision}

Use the **x25 bfe-emergency** interface configuration command to configure the circumstances under which the router participates in emergency mode.

never Prevents the router from sending address translation

information to the BFE. If it does not receive address translation information, the BFE cannot open a new connection for which it does not know the address.

This is the default.

always Allows the router to pass address translations to the

BFE when it enters emergency mode and an address

translation table has been created.

decision Directs the router to wait until it receives a diagnostic

packet from the BFE device indicating that the emergency mode window is open. The window is only open when a condition exists that allows the BFE is to enter emergency mode. When the diagnostic packet is received, the router's

participation in emergency mode depends on how it is configured using the **x25 bfe-decision** command.

[no] x25 default protocol

Use the x25 default interface configuration command to set a default protocol. Use the **no x25 default** command to remove the protocol specified.

protocol Specifies the protocol to assume; may be **ip** or **pad**.

[no] x25 facility facility-keyword value

Use the **x25 facility** interface configuration command to force facilities on a per-call basis for calls originated by the router; switched calls are not affected. Use the **no x25 facility** command to disable a facility.

facility-keyword User facility.

value Facility value; see the X.25 user facilities table

in the *Router Products Command Reference* publication for a list of supported facilities and

their values.

x25 hic *circuit-number*

Use the **x25 hic** interface configuration command to set the highest incoming-only virtual circuit number.

circuit-number Virtual circuit number from 1 through 4095, or

0 if there is no incoming-only virtual circuit

range. The default is 0.

x25 hoc circuit-number

Use the **x25** hoc interface configuration command to set the highest outgoing-only virtual circuit number.

circuit-number Virtual circuit number from 1 through 4095, or

0 if there is no outgoing-only virtual circuit

range. The default is 0.

x25 hold-queue packets [no] x25 hold-queue [packets]

To set the maximum number of packets that can be held until a virtual circuit is able to transmit, use the **x25 hold-queue** interface configuration command. To remove this command from the configuration file and restore the default value, use the **no x25 hold-queue** command without an argument.

packets Number of packets. A hold queue value of 0 allows

an unlimited number of packets in the hold queue.

The default is 10 packets.

x25 hold-vc-timer minutes no x25 hold-vc-timer

Use the **x25 hold-vc-timer** interface configuration command to prevent overruns on some X.25 switches caused by Call Request packets. This command starts the hold-vc-timer to prevent additional calls to a destination for a given period of time. The **no x25 hold-vc-timer** command restores the default value for the timer.

minutes Number of minutes to prevent calls from going to a

previously failed destination. Incoming calls will still

be accepted. The default is 0 minutes.

x25 host name x.121-address [cud call-user-data] no x25 host name

Use the **x25 host** global configuration command to define a static host name-to-address mapping. Use the **no x25 host** command to remove the host name.

name Host name.

x.121-address The X.121 address.

cud call-user-data (Optional) Specifies the Call User Data

(CUD) field in the X.25 Call Request

packet.

x25 htc circuit-number

Use the **x25 htc** interface configuration command to set the highest two-way virtual circuit number.

circuit-number Virtual circuit number from 1 through 4095,

or 0 if there is no two-way virtual circuit range. The default is 1024 for X.25 network service interfaces; 4095 for CMNS network

service interfaces.

x25 idle minutes

The router can clear a switched virtual circuit (SVC) after a period of inactivity. Use the **x25 idle** interface configuration command to set this period.

minutes Idle period in minutes. The default is 0 (causes the

router to keep the SVC open indefinitely).

[no] x25 ip-precedence

Use the **x25 ip-precedence** interface configuration command to enable the ability to open a new virtual circuit based on the IP precedence value. The command **no x25 ip-precedence** causes the precedence value to be ignored when opening virtual circuits.

x25 ips bytes

Use the **x25 ips** interface configuration command to set the interface default maximum input packet size to match that of the network.

bytes Byte count. It can be one of the following values:

16, 32, 64, 128, 256, 512, 1024, 2048, or 4096. The

default is 128 bytes.

x25 lic circuit-number

Use the **x25 lic** interface configuration command to set the lowest incoming-only virtual circuit number.

circuit-number Virtual circuit number from 1 through 4095, or 0

if there is no incoming-only virtual circuit range.

The default is 0.

[no] x25 linkrestart

Use the **x25 linkrestart** interface configuration command to force a packet-level restart when the link level resets. This command restarts X.25 Level 3 when errors occur in Level 2 (LAPB). The **no** form of this command disables this function.

x25 loc circuit-number

Use the **x25 loc** interface configuration command to set the lowest outgoing-only virtual circuit number.

circuit-number Virtual circuit number from 1 through 4095,

or 0 if there is no outgoing-only virtual circuit

range. The default is 0.

x25 ltc circuit-number

Use the **x25 ltc** interface configuration command to set the lowest two-way virtual circuit number.

circuit-number Virtual circuit number from 1 through 4095,

or 0 if there is no two-way virtual circuit

range. The default is 1.

[no] x25 map protocol-keyword protocol-address x.121-address [option]

Use the **x25 map** interface configuration command to set up the LAN protocol-to-X.121 address mapping for the host. Because no defined protocol can dynamically determine such mappings, you must enter a mapping for each host with which the router will exchange traffic. Use the **no** form of this command with the appropriate network protocol and X.121 address arguments to retract a network protocol-to-X.121 mapping.

protocol-keyword Protocol type. Supported protocol keywords

are listed in the X.25 user facilities table in the *Router Products Command Reference*

publication.

protocol-address Protocol address.

x.121-address X.121 address. Both addresses specify the

network protocol-to-X.121 mapping.

option (Optional) Provides additional functionality

or the X.25 facilities to be specified for originated calls. Can be any of the options listed in the protocols supported by X.25 PVCs table in the *Router Products Command*

Reference publication.

x25 map bridge x.121-address broadcast [option]

Use the **x25 map bridge** interface configuration command to configure bridging over X.25. The command specifies Internet-to-X.121 address mapping.

x.121-address The X.121 address.

broadcast Required keyword for bridging over X.25.

option (Optional) Services that can be added to this

map; see X.25 map options table in the *Router Products Command Reference* publication for

a list of supported services.

[no] x25 map cmns nsap mac-address [no] x25 map cmns nsap [x.121-address]

Use the **x25 map cmns** interface configuration command to map NSAP addresses to either MAC-layer addresses or X.121 addresses after enabling CMNS on a nonserial interface. To retract a mapping, use the **no** form of this command with the appropriate address arguments.

nsap NSAP address. The NSAP can be either the

actual DTE NSAP address or the prefix of the NSAP address. The NSAP prefix is sufficient

for a best match to route a call.

mac-address MAC-level address.

x.121-address (Optional) X.121 address.

x25 map compressedtcp *ip-address x.121-address* [option] **no x25 map compressedtcp** *ip-address x.121-address*

Use the **x25** map compressedtcp interface configuration command to map compressed TCP traffic to X.121 addresses. The **no** form of this command deletes a TCP header compression map for the link.

ip-address IP address.

x.121-address X.121 address.

options (Optional) Services that can be added to this

map; see X.25 map options table in the *Router Products Command Reference* publication for

a list of supported services.

x25 modulo modulus

Use the **x25 modulo** interface configuration command to set the window modulus.

modulus Either 8 or 128. The value of the modulo parameter

must agree with that of the device on the other end of

the X.25 link. The default is 8.

x25 nvc count

Use the **x25 nvc** interface configuration command to specify the maximum number of switched virtual circuits (SVCs) that a protocol can have open simultaneously to one host. To increase throughput across networks, you can establish up to eight switched virtual circuits to a host/protocol.

count

Circuit count from 1 to 8. A maximum of eight VCs can be configured for each protocol/host pair. Protocols that do not tolerate out-of-order delivery, such as encapsulated TCP header compression, will only use one virtual circuit despite this value. The default is 1.

x25 ops bytes

Use the **x25 ops** interface configuration command to set the interface default maximum output packet size to match that of the network.

bytes

Byte count that is one of the following: 16, 32, 64, 128, 256, 512, 1024, 2048, or 4096. The default is 128 bytes.

x25 pvc *circuit protocol-keyword protocol-address* [option] **no x25 pvc** *circuit protocol-keyword protocol-address*

Use the encapsulating version of the $\mathbf{x25}$ \mathbf{pvc} interface configuration command to establish an encapsulation permanent virtual circuit (PVC). To delete the PVC, use the \mathbf{no} form of this command with the appropriate channel number, protocol keyword, and protocol address.

circuit Virtual-circuit channel number which must be

less than the virtual circuits assigned to the

switched virtual circuits (SVCs).

protocol-keyword Protocol type. For a list of supported

protocols, see the protocols supported by X.25 PVCs table in the *Router Products Command Reference* publication.

protocol-address Address of the host at the other end of the

PVC.

option (Optional) PVC's flow control parameters if

they differ from the interface defaults. The *option* arguments add certain features to the mapping specified and can be either of the options listed in PVC options table in the *Router Products Command Reference*

publication.

x25 pvc *pvc-number1* **interface** *interface-name* **pvc** *pvc-number2* [*option*]

Use the switched version of the **x25 pvc** interface configuration command to configure a switched permanent virtual circuit (PVC) for a given interface.

pvc-number1 PVC number that will be used on the local

interface (as defined by the primary interface

command).

interface Required keyword to specify an interface.

interface-name Remote interface type and unit number (serial

0, for example).

pvc Required keyword to specify a switched

PVC.

pvc-number2 Number that will be used on the remote

interface.

option (Optional) Adds certain features to the

mapping specified; can be either option listed in the switched PVC options table in the Router Products Command Reference

publication.

x25 pvc *pvc-number1* **tunnel** *ip-address* **interface serial** *string* **pvc** *pvc-number2* [*options*]

Use the tunnel version of the **x25 pvc** interface configuration command to connect two permanent virtual circuits (PVCs) across a TCP/IP LAN.

pvc-number1 PVC number of the connecting device.

tunnel Indicates two PVCs will be connected across

a TCP/IP LAN.

ip-address IP address of the router to which you are

connecting.

interface serial Indicates the interface is serial.

string Serial interface specification that accepts

either a number or a string in Cisco 7000 series format (number/number) to denote the

serial interface.

pvc Indicates a PVC.

pvc-number2 Remote PVC number on the target interface.

options (Optional) Adds certain features for the

connection; can be either option listed in the X.25 PVC tunnel options table in the *Router Products Command Reference* publication.

x25 remote-red host-ip-address remote-black blacker-ip-address

Use the **x25 remote-red** interface configuration command to set up the table that lists the Blacker Front End (BFE) nodes (host or gateways) to which the router will send packets.

host-ip-address IP address of the host or a router that the

packets are being sent to.

remote-black Delimits the addresses for the table being

built.

blacker-ip-address IP address of the remote BFE device in

front of the host to which the packet is

being sent.

[no] x25 route [# position] x.121-address [cud pattern] interface interface number

x25 route [# position] x.121-address [cud pattern] ip ip-address [ip- address2 ... ip-address6]

no x25 route [# position] x.121-address [**cud** pattern] **ip** ip-address [no] x25 route [# position] x.121-address [cud pattern] alias interface number

[no] x25 route [# position] x.121-address [substitute-source rewrite-pattern] [substitute-dest rewrite-pattern] [cud pattern] **interface** *interface number*

Use the x25 route global configuration command to create an entry in the X.25 routing table. Enter the no x25 route command with the appropriate arguments and keywords to remove an entry from the table.

Note For typographical reasons, the last command is shown on three lines. When using the optional keywords in this variation of the x25 route command, the substitute-source keyword must precede the **substitute-dest** keyword, and both must precede the **cud** keyword. The entire command must be on one line.

| # position | (Optional) A pound sign (#) followed by a |
|---------------|--|
| | number to designate a positional parameter |
| | at which to insert the new entry. If no |
| | position parameter is given, the entry is |
| | appended to the end of the routing table. |
| x.121-address | Called X.121 address pattern. This |
| | argument can be either an actual X.121 |

destination address or a regular expression such as 1111*, representing a group of X.121 addresses.

cud pattern (Optional) Call User Data pattern, which is

> specified as a printable ASCII string. The Call User Data field may be present in a call packet and is commonly 4 bytes long.

interface *interface number*

Specifies the destination interface (type followed by the unit or port number); for example, **interface** Ethernet 0.

ip ip-address

Specifies an IP address of the network interface or DTE for connections routed through a LAN. Optionally, up to five alternate IP addresses can be listed and each in turn will be tried in the event that the first destination fails, thus allowing alternate routes and decreasing the likelihood of failure.

alias interface number

Configures an interface alias. Specify the interface type followed by the unit or port number of the interface. Encapsulation calls are normally accepted when the destination address is that of the interface (or the zero-length X.121 address). Aliases allow the specified interface to accept calls with other destination addresses.

substitute-source rewrite-pattern Optional) See the pattern rewrite elements and character matching tables in the *Router Products Command Reference* publication for summaries of pattern and character matching, respectively.

substitute-dest rewrite-pattern

(Optional) Specifies the called X.121 address to replace in locally routed X.25 calls. (For backwards compatibility, the substitute keyword will be accepted as substitute-dest and written to nonvolatile memory in the new format.) The backslash (\) character is treated specially in the argument rewrite-pattern; it indicates that the digit immediately following it selects a portion of the original called address to be inserted in the new called address. The characters \0 are replaced with the entire original address. The characters \1 through \9 are replaced with the strings that matched the first through ninth parenthesized parts of X.121-pattern. See the pattern matching table in the Router Products Command Reference for a summary of pattern rewrite elements.

x25 routing [use-tcp-if-defs] no x25 routing

Use the **x25 routing** global configuration command to enable X.25 switching or tunneling. The **no** form of this command disables the forwarding of X.25 calls.

use-tcp-if-defs

(Optional) May be used to modify the acceptance of calls received over TCP.

x25 rpoa name number no x25 rpoa name

Use the **x25 rpoa** global configuration command to specify a sequence of packet network carriers. The **no** form of this command removes the specified name.

name Recognized Private Operating Agency (RPOA),

which must be unique with respect to all other RPOA names. It is used in the **x25 facility** and **x25 map**

interface configuration commands.

number Sequence of 1 or more numbers used to describe an

RPOA; up to 10 numbers are accepted.

[no] x25 suppress-called-address

Use the **x25 suppress-called-address** interface configuration command to omit the destination address in outgoing calls. Use the **no** form of this command to reset this command to the default state.

[no] x25 suppress-calling-address

Use the **x25 suppress-calling-address** interface configuration command to omit the source address in outgoing calls. Use the **no** form of this command to reset this command to the default state.

x25 t10 seconds

Use the **x25 t10** interface configuration command to set the value of the Restart Indication retransmission timer (T10) on DCE devices.

seconds Time in seconds. The default is 60 seconds.

x25 t11 seconds

Use the **x25 t11** interface configuration command to set the value of the Incoming Call timer (T11) on DCE devices.

seconds Time in seconds. The default is 180 seconds.

x25 t12 seconds

Use the **x25 t12** interface configuration command to set the value of the Reset Indication retransmission timer (T12) on DCE devices.

seconds Time in seconds. The default is 60 seconds.

x25 t13 seconds

Use the **x25 t13** interface configuration command to set the value of the Clear Indication retransmission timer (T13) on DCE devices.

seconds Time in seconds. The default is 60 seconds.

x25 t20 seconds

Use the **x25 t20** interface configuration command to set the value of the Restart Request retransmission timer (T20) on DTE devices.

seconds Time in seconds. The default is 180 seconds.

x25 t21 seconds

Use the **x25 t21** interface configuration command to set the value of the Call Request timer (T21) on DTE devices.

seconds Time in seconds. The default is 200 seconds.

x25 t22 seconds

Use the **x25 t22** interface configuration command to set the value of the Reset Request retransmission timer (T22) on DTE devices.

seconds Time in seconds. The default is 180 seconds.

x25 t23 seconds

Use the **x25 t23** interface configuration command to set the value of the Clear Request retransmission timer (T23) on DTE devices.

seconds Time in second. The default is 180 seconds.

x25 th delay-count

Use the **x25** th interface configuration command to set the data packet acknowledgment threshold. When set, this parameter will instruct the router to send acknowledgment packets when it is not busy sending other packets, even if the number of input packets has not reached the input window size count. This command improves line responsiveness at the expense of bandwidth.

delay-count

Value between zero and the input window size. A value of 1 sends one Receiver Ready acknowledgment per packet at all times. The default is 0 (which disables the acknowledgment threshold).

[no] x25 use-source-address

Use the **x25 use-source-address** interface configuration command to over-ride the X.121 addresses of outgoing calls forwarded over a specific interface. Use the **no** form of this command to prevent updating the source addresses of outgoing calls.

x25 win packets

Use the **x25 win** interface configuration command to change the default incoming window size to match that of the network.

packets

Packet count that can range from 1 to one less than the window modulus. The default is 2 packets.

x25 wout packets

Use the **x25 wout** interface configuration command to change the default outgoing window size to match that of the network.

packets Packet count that can range from 1 to the window modulus. The default is 2 packets.