



## **XOT Protocol**

**bintec Dm713-I**

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## I Related Documents

bintec Dm772-I Common Configuration for Interfaces

# Chapter 1 Introduction

## 1.1 Introduction to XOT Protocol

The XOT protocol allows X.25 packets to be transported over TCP/IP networks. To transfer these packets, it is important to have a reliable link. In packet switching networks, this is generally a LAPB (or LAPD) link. However, when the type of network is different (e.g. Frame Relay switch networks) the LAPB link must be replaced for another one that is equally reliable. Choosing TCP/IP as link layer allows for terminals that operate in X.25 over Frame Relay, local Ethernet, Token Ring networks etc. to be interconnected, since packet sequences are converted into datagram sequences. These are forwarded and routed over all IP networks until they reach their destination. Here, the X.25 packets are recovered.

This method of encapsulating X.25 over TCP is defined in the RFC (Request For Comments) 1613 standard, compatible with the XOT protocol.

## Chapter 2 Configuration

### 2.1 Configuration Commands

XOT Protocol configuration can be accessed from the main menu as follows:

- (1) At the (\*) prompt, enter **process 4** (or **P4**).
- (2) At the configuration (*Config*>) prompt, enter **node xot** or **network xxx**, where xxx is the name of the XOT interface (this can be viewed by running **list devices**).
- (3) At the XOT protocol configuration (*XOT Config*>) prompt, use the configuration commands described in this chapter to configure the XOT protocol parameters.

There are certain commands that are common to all device interfaces. These commands are described in the manual that details how to configure common interfaces (bintec-Dm 772-I Common Configurations for Interfaces).

In this chapter, the XOT Protocol configuration commands are explained in detail.

Command	Function
? ( <i>HELP</i> )	Lists the available commands and their options.
<i>ACK-DELAY</i>	Sets a custom value for TCP delayed ACK.
<i>ADDRESS</i>	Associates an NA to an IP address.
<i>DISABLE</i>	Disables a feature.
<i>ENABLE</i>	Enables a feature.
<i>LIST</i>	Lists the parameters.
<i>LOCAL-IP-ADDRESS</i>	Configures the IP address to be used as the local IP for outgoing tcp connections.
<i>NO</i>	Deletes a parameter or an element from a table.
<i>RESTORE</i>	Restores the default values.
<i>SET</i>	Sets a parameter value.
<i>STANDBY-TIMEOUT</i>	Configures the disconnection timer for the tcp connections in idle.
<i>EXIT</i>	Returns to the Config> prompt.

#### 2.1.1 ? (HELP)

Displays a list of the available commands and their options.

**Syntax:**

```
XOT Config>?
```

**Example:**

```
XOT config>?
  ack-delay   Set a custom value for TCP delayed ACK
  address     Assign a determined NA to an IP address
  disable     Disable some XOT configuration parameters
  enable      Enable some XOT configuration parameters
  list        List configuration
  local-ip-address  Local ip address used by outgoing connections
  no          Negates a command or sets its defaults
  restore     Restore the default values
  set         Assign values to parameters
  standby-timeout  Timeout to close tcp connections in standby state
  exit
XOT Config>
```

#### 2.1.2 ACK-DELAY

Configures the delay, in milliseconds, used by the TCP delayed ACK technique. Default is 100 milliseconds. This timer allows you to merge several ACK responses into one.

**Syntax:**

```
XOT config>ack-delay <time>
```

Where *<time>* refers to the milliseconds that need to elapse before a TCP ACK is sent. Values range from 1 to 500 (ms).

**Example:**

```
XOT Config>ack-delay 30
XOT Config>
```

**Command history:**

Release	Modification
11.01.09	The " <i>ack-delay</i> " command was introduced as of version 11.01.09.

## 2.1.3 ADDRESS

Assigns a given NA to an IP address. You can also set an alternative IP address, which you can use to connect when the configured timeout expires.

Entries are listed by NA, i.e. from the lowest to the highest numbers and from the most restrictive (fewer wildcards) to the least restrictive (more wildcards).

Optionally, you can specify the VRF associated to the IP address (main and alternative) when you want to route traffic over a VRF different from the main one. The main destination and alternative VRFs don't need to match. Whenever the VRF is not specified in configured IP addresses, it is deemed to be the main VRF.

**Syntax:**

```
XOT config>ADDRESS <na>
ip-address          ip-address to establish a tcp connection
alternative-ip-address  alternative-ip-address to try if primary fails
timeout            timeout to try with the alternative ip address
```

Each option has the following meaning:

<i>&lt;na&gt;</i>	Calling NA for the indicated IP address.  In addition to the NA digits, you can enter the following wildcards to establish a pattern.  "X": The digit is not important.  "S" The digit is not important. This is entered at the end of the NA and indicates that it is part of the sub-addressing. Consequently, in cases where the DNS consults, a final called NA digit is suppressed for each character of this type that is found.  "E" The digit is not important. This indicates how the sub-addressing is defined from this digit and in cases where there is DNS consultation, the called NA is cut off in the consultation starting from this inclusive character.
<i>ip-address</i>	IP address to which an X.25 address is associated. (This parameter must be introduced - mandatory).  You can request the IP address by consulting a DNS server, the IP address to be entered can be "0.0.0.0" or "dns".  To resolve the IP address, the device sends a petition to the DNS server that has been configured in the DNS client. This petition contains the called NA as a name to be resolved. If the server responds with "unknown name" the device can execute a new petition by sending the truncated called NA complying with the sub-addressing rules that have been defined with the corresponding wildcards.
<i>alternative-ip-address</i>	Alternative-ip-address to try if primary fails.
<i>timeout</i>	Wait time before trying with the alternative IP address.

**Example:**

```
XOT Config>address 21324242 ip-address 192.22.24.56
XOT Config>address 21324242 alternative-ip-address 172.43.55.23
XOT Config>address 21324242 timeout 2m
XOT Config>address 5xxxxxss ip-address dns
```



```
XOT Config>address 6xxxxxxx ip-address dns
XOT Config>address 8xxxxxxx ip-address dns
XOT Config>
```

## 2.1.4 DISABLE

The "*disable*" command cannot be entered on its own and acts as a mere introduction for what follows.

### Syntax:

```
XOT Config>disable ?
  ext-packet-mode    Configure the port to work in 8 mode
XOT Config>
```

### 2.1.4.1 DISABLE EXT-PACKET-MODE

Configures the port to operate in mode 8.

### Example:

```
XOT Config>disable ext-packet-mode
XOT Config>
```

## 2.1.5 ENABLE

The "*enable*" command cannot be entered on its own and acts as a mere introduction for what follows.

### Syntax:

```
XOT Config> enable ?
  ext-packet-mode    Configure the port to work in 128 mode
XOT Config>
```

### 2.1.5.1 ENABLE EXT-PACKET-MODE

Configures the port to operate in mode 128.

### Example:

```
XOT Config>enable ext-packet-mode
XOT Config>
```

## 2.1.6 LIST

Lists the different parameters.

### Syntax:

```
XOT config>list ?
  address    List the address table
  port       Lists the XOT port parameters
XOT Config>
```

### 2.1.6.1 LIST ADDRESS

Lists the address table.

### Example:

```
XOT Config>list address
  X25 Address          IP Address          Altern. IP Addr.  Call Timeout.
  123456                1.1.1.1              1.1.1.2           30
  8xxxxxxx             dns
```

### 2.1.6.2 LIST PORT

Lists the XOT port parameters.

**Example:**

```
XOT Config>list port
Port information: xot
Layer 3 Window: 2
Ext pkt mode: Disabled
Packet size: 128
Caller Number:
NA calling process: Outgoing calls
PVC low: 0
PVC high: 0
SVC low: 100
SVC high: 100
Channel Direction: DEC
Stand-by connections timeout: 60 sg.
Local IP address: 10.5.4.1
XOT Config>
```

**2.1.7 LOCAL-IP-ADDRESS**

Configures the local IP address to be used in outgoing TCP connections instead of letting the system automatically manage the local address.

**Syntax:**

```
XOT config>LOCAL-IP-ADDRESS <local-ip-address>
```

The *<local-ip-address>* must be a valid address. Otherwise, outgoing connections cannot be established.

**Example:**

```
XOT Config>local-ip-address 192.22.24.56
XOT Config>
```

**2.1.8 NO**

Deletes a parameter or an element from a table.

**Syntax:**

```
XOT config>no ?
  address      Delete an element from the address table
  local-ip-address  Local ip address used by outgoing connections
  na-calling    Delete the NA calling assigned to the XOT port
XOT config>
```

**2.1.8.1 NO ADDRESS**

Deletes an element from the address table.

**Example:**

```
XOT config>no address 1321231
XOT config>
```

**2.1.8.2 NO LOCAL-IP-ADDRESS**

Stops the local IP address used to establish outgoing TCP connections from being automatically managed by the system.

**Example:**

```
XOT config>no local-ip-address
XOT config>
```

**2.1.8.3 NO NA-CALLING**

Deletes the NA calling assigned to the XOT port.

*Example:*

```
XOT Config>no na-calling
Deleted NA-CALLING port xot
XOT Config>
```

## 2.1.9 RESTORE

Restores the default values.

*Syntax:*

```
XOT Config>restore ?
all
port
XOT Config>
```

### 2.1.9.1 RESTORE ALL

Restores default values for all ports.

*Example:*

```
XOT Config>restore all
Restored default values for all ports
XOT Config>
```

### 2.1.9.2 RESTORE PORT

Restores default values for the XOT port.

*Example:*

```
XOT Config>restore port
Restored default values port: xot
XOT Config>
```

## 2.1.10 SET

Assigns values to parameters.

*Syntax:*

```
XOT Config>set ?
channel-direction    Configure the number order in the logical channel
na-calling           Configure the NA calling
packet-size          Configure the packet size
packet-window        Configure the window size
process-na-calling   Calling NA process
svc                  Configure the SVC numbers
XOT Config>
```

### 2.1.10.1 SET CHANNEL-DIRECTION

Defines whether the outgoing call SVCs are to be assigned in decreasing or increasing order.

*Syntax:*

```
Config>set channel-direction ?
decreasing    Decreasing order
increasing    Increasing order
XOT Config>
```

#### 2.1.10.1.1 SET CHANNEL-DIRECTION DECREASING

Assigns the channels in decreasing order, beginning with the highest.

*Example:*

```
XOT Config>set channel-direction decreasing
```

```
XOT Config>
```

### 2.1.10.1.2 SET CHANNEL-DIRECTION INCREASING

Assigns the channels in increasing order, beginning with the lowest.

*Example:*

```
XOT Config>set channel-direction increasing
XOT Config>
```

### 2.1.10.2 SET NA-CALLING

Configures NA calling, sent in the call request packets.

*Example:*

```
XOT Config>set na-calling 123456
XOT Config>
```

### 2.1.10.3 SET PACKET-SIZE

Configures the packet size.

*Example:*

```
XOT Config>set packet-size 256
XOT Config>
```

### 2.1.10.4 SET PACKET-WINDOW

Configures the window size.

*Example:*

```
XOT Config>set packet-window 7
XOT Config>
```

### 2.1.10.5 SET PROCESS-NA-CALLING

Adds or suppresses the NA in the calling packets processed by our router.

*Syntax:*

```
XOT config>set process-na-calling ?
two-way      Adds the NA to all the calls
suppress     Suppress the NA in all the calls which pass through the port
outgoing     Adds the NA to all the outgoing calls
incoming     Adds the NA to all the incoming calls
automatic    Automatic depending on the interface
XOT config>
```

**Automatic.** Automatic according to the interface. If it is DCE, the NA is added to the calls coming in through the port. If the interface is DTE, the NA is added to outgoing calls.

**Suppress.** Suppresses the NA in all calls passing through the port.

**Outgoing calls.** Adds the NA to the outgoing calls.

**Incoming calls.** Adds the NA to the incoming calls.

**Two way:** In all calls. Adds the NA to all calls.

*Example:*

```
XOT Config>set process-na-calling suppress
XOT Config>
```

### 2.1.10.6 SET SVC

Configures the logical channels.

**Syntax:**

```
XOT Config>set svc ?
  high   Configure the highest SVC number
  low    Configure the lowest SVC number
XOT Config>
```

**2.1.10.6.1 SET SVC LOW**

Configures the lowest logical channel (0 = deactivated, 1 – 4095).

**Example:**

```
XOT Config>set svc low 1
XOT Config>
```

**2.1.10.6.2 SET SVC HIGH**

Configures the highest logical channel (0 = deactivated, 1 – 4095).

**Example:**

```
XOT Config>set svc high 10
XOT Config>
```

**2.1.11 STANDBY-TIMEOUT**

Configures the time that must elapse before disconnecting the TCP connections that are idle or in stand-by. This value is configured in seconds, 60 by default. This timer allows you to reuse TCP connections whose X.25 call has been released and are free, allowing a new X.25 call to be established with the same remote end without have to re-establish the TCP connection. This saves both time and resources.

**Syntax:**

```
XOT config>standby-timeout <time>
```

Where *<time>* is the time, in seconds, that must elapse before established TCP connections that do not have an active X.25 call are disconnected. Values range from 0 (Immediate) to 86400 (1 day).

**Example:**

```
XOT Config>standby-timeout 30
XOT Config>
```

**2.1.12 EXIT**

Run **exit** to return to the previous prompt.

**Syntax:**

```
XOT Config>exit
```

**Example:**

```
XOT Config>exit
Config>
```

## Chapter 3 Monitoring

### 3.1 Monitoring Commands

XOT Protocol monitoring is accessed from the main menu as follows:

- (1) At the (\*) prompt, enter **process 3** (or **P3**).
- (2) At the monitoring (+) prompt, enter **node xot**.
- (3) At the XOT protocol monitoring (XOT>) prompt, use the monitoring commands described in this chapter to monitor router parameters.

In this chapter, the XOT monitoring commands are explained in detail.

Command	Function
? (HELP)	Lists the available commands and their options.
CLEAR	Deletes call statistics and information.
LIST	Lists the TCP servers' state.
TRACE	Controls the internal debugging traces for the XOT interface.
EXIT	Returns to previous prompt.

#### 3.1.1 ? (HELP)

Displays a list of available commands and their options.

*Syntax:*

```
XOT+?
```

*Example:*

```
XOT+?
  clear    Clears statistics and calls information
  list     Lists statistics and calls information
  trace    Controls events debugging dynamically
  exit
XOT+
```

#### 3.1.2 CLEAR

Deletes interface statistics, data on active calls and information on the calls executed.

*Syntax:*

```
XOT +CLEAR ?
  call      Clear finished calls
  statistics Clear statistics
```

##### 3.1.2.1 CLEAR CALL

Deletes the information stored on executed calls. This information can be viewed by running **list call released**.

*Syntax:*

```
XOT +CLEAR CALL
```

##### 3.1.2.2 CLEAR STATISTICS

Deletes the statistics for a specific active call and the interface statistics.

*Syntax:*

```
XOT +CLEAR STATISTICS ?
  all       Clear global and all calls statistics
  call      Clear a call statistics
  interface Clear global statistics
```

### 3.1.2.2.1 CLEAR STATISTICS ALL

Deletes all supported statistics, both for the interface and for all the active calls.

*Syntax:*

```
XOT +CLEAR STATISTICS ALL
```

### 3.1.2.2.2 CLEAR STATISTICS CALL

Deletes the statistics for a specific active call. The call is selected through its call identifier (this can be checked by running **list call active**). If the call identifier does not exist or the call is not active, an error message is sent.

*Syntax:*

```
XOT+ CLEAR STATISTICS CALL <call id>
```

*Example:*

```
XOT +clear statistics call 1
XOT +
```

### 3.1.2.2.3 CLEAR STATISTICS INTERFACE

Deletes interface statistics. The statistics can be checked by running **list statistics interface**.

*Syntax:*

```
XOT +clear statistics interface
```

## 3.1.3 LIST

*Syntax:*

```
XOT+list ?
  call          List call information
  statistics    List call statistics
XOT+
```

### 3.1.3.1 LIST CALL

Displays the list of active and released XOT calls.

*Syntax:*

```
XOT+list call ?
  active       Lists information of current call
  released     Lists information of finished calls
```

#### 3.1.3.1.1 LIST CALL ACTIVE

Displays information on the active calls. If there are no calls, this is blank. Internally, active calls are managed through a call identifier, necessary for the **clear statistics call** and **list statistics call** commands.

The following is displayed for each call: call identifier, NRIs called and calling, the circuit numbers used in local and remote, the local and remote IP addresses with the corresponding TCP ports, the call direction (incoming or outgoing), call duration, request and call establishment dates.

*Syntax:*

```
XOT +LIST CALL ACTIVE
```

*Example:*

```
XOT +LIST CALL ACTIVE
-- Call Id 2 --
Called:          9910001  Local SVC:   109  Local IP: 172.24.78.149:1025
Calling:         9910002  Remote SVC:  100  Remote IP: 172.24.78.96:1998
Outgoing call           Duration: 00:00:37
SetupTime: 2007-09-12 10:56:41  ConnectTime: 2007-09-12 10:56:41
XOT +
```

### 3.1.3.1.2 LIST CALL RELEASED

Displays information on the released calls. If there are no calls, this is blank.

The following is displayed for each call: call identifier, NRIs called and calling, the circuit numbers used in local and remote, the local and remote IP addresses with the corresponding TCP ports, the call direction (incoming or outgoing), call duration, request and call establishment dates and the release cause and diagnosis.

*Syntax:*

```
XOT +LIST CALL RELEASED
```

*Example:*

```
XOT +LIST CALL RELEASED
-- Call Id 1 --
Called:          9910001  Local SVC:   109  Local IP: 172.24.78.149:1024
Calling:         9910002  Remote SVC:  100  Remote IP: 172.24.78.96:1998
Outgoing call    Duration: 00:01:39
SetupTime:      2007-09-12 10:53:57  ConnectTime: 2007-09-12 10:53:57
ReleaseTime:    2007-09-12 10:55:36  Release C/0x00 D/0xA3

XOT +
```

### 3.1.3.2 LIST STATISTICS

Displays the statistics for the active call and the XOT interface.

*Syntax:*

```
XOT+list statistics ?
call          List a call statistics
interface     List interface statistics
```

#### 3.1.3.2.1 LIST STATISTICS CALL

Displays the statistics for a specific active call. The call is selected through its call identifier, which can be checked by running **list call active**. The call identifier admits values between 0 and 65535. If the call identifier does not correspond to an active call, an error message appears. The statistics can be deleted by running **clear statistics call**.

Displays the sent and received packets and bytes, as well as the number of erroneous XOT packets received.

*Syntax:*

```
XOT +LIST STATISTICS CALL <call id>
```

*Example:*

```
XOT +LIST STATISTICS CALL 1

-- Call Id 1 --
Rx packets:      359  Tx packet:    359
Rx bytes:        16121  Tx bytes:    16129
Rx error pkts:   0

XOT +
```

#### 3.1.3.2.2 LIST STATISTICS INTERFACE

Displays information on the XOT interface. All the statistics belonging to the call in progress are shown. The number of calls requested, established and rejected are shown (both for incoming and outgoing calls). For established calls, the number of received and sent frames and bytes is shown, together with the number or erroneous XOT frames received.

Finally, information on the TCP sessions used in the calls is displayed: this indicates the open TCP connections and which ones among them are in stand-by. Please note that, for performance reasons, TCP sessions do not close when an XOT call finishes. They switch to stand-by for some time so that, if you want to make another call to the same destination, the connection can be used again and less time is lost establishing the call.

This information can be deleted by running **clear statistics**.



**Syntax:**

```
XOT +LIST STATISTICS INTERFACE
```

**Example:**

```
XOT +LIST STATISTICS INTERFACE

Requested Calls:          0
  Total Incoming:        0   Current Incoming:        0
  Total Outgoing:        17  Current Outgoing:        0

Established Calls:        1
  Total Incoming:        0   Current Incoming:        0
  Total Outgoing:        2   Current Outgoing:        1
  Rx packets:           513  Tx packets:           513
  Rx bytes:             22975 Tx bytes:             22993
  Rx error pkts:        0

Refused Calls:           15
  Total Incoming:        0
  Total Outgoing:        15

TCP
  Used sessions:         1   Stand-By sessions:        0

XOT +
```

## 3.1.4 TRACE

For low level debugging tasks, some traces that can be viewed with the rest of the device events. Default is traces disabled.

**Syntax:**

```
XOT +trace ?
  level    Controls debugging level
```

The traces displayed are not associated to any event logging subsystem. The process of showing traces overloads the device. Consequently, we recommend disabling them until our technical support personnel says otherwise.

**Note**

The trace level is maintained between device start-ups. If you enable a given level and you don't want to use traces, you must disable them.

### 3.1.4.1 TRACE LEVEL

Specifies the detail level for the low level traces. This admits values between 0 and 20. Default is 0. A 0 trace level disables traces.

**Syntax:**

```
XOT +trace level <value>
```

## 3.1.5 EXIT

Run **exit** to return to the previous prompt.

**Syntax:**

```
XOT+exit
```

**Example:**

```
XOT+exit
+
```

## Chapter 4 XOT Interfaces

### 4.1 Creating XOT interfaces

First, create the XOT interface.

Run **add device xot** from the configuration menu. This creates the interface and assigns an interface name.

```
*P 4
User configuration
Config>ADD DEVICE XOT
Config>
```

You can view the list of interfaces configured in the router by running **list devices** (user configuration prompt *Config>*).

```
*P 4
User configuration
Config>LIST DEVICES
Interface      Con   Type of interface      CSR   CSR2  int
ethernet0/0    LAN1  Fast Ethernet interface fa200e00      27
serial0/0      WAN1  Frame Relay            fa200a00 fa203c00  5e
serial0/1      WAN2  X25                    fa200a20 fa203d00  5d
serial0/2      WAN3  X25                    fa200a60 fa203f00  5b
bri0/0         ISDN1 ISDN Basic Rate Int    fa200a40 fa203e00  5c
x25-node       ---   Router->Node           0         0
xot            ---   XOT                     0         0
Config>
```

When you create an XOT interface, the routing is carried out through the node routing commands. Since X.25 calls are routed with an IP address, only one XOT interface needs to be created.

### 4.2 Configuring XOT Interfaces

Before configuring the XOT protocol, it is advisable to have the corresponding part for the IP protocol configured so the addresses are assigned to the interfaces.

To configure the XOT protocol, the following operation must be carried out:

From the system console, enter **P 4** to access the configuration process.

```
*
*P 4
Config>
```

- **Accessing the XOT prompt**

From the configuration prompt, run **node xot** to access the XOT port configuration.

*Syntax:*

```
Config>NODE XOT
```

*Example:*

```
Config>NODE XOT
XOT Config>
```

- **To display the present values of the port you wish to use on screen**

Enter the command at the XOT prompt (*XOT Config>*).

*Example:*

```
XOT Config>LIST PORT
Port information: xot
Packet window: 2
Ext pkt mode: Disabled
Packet size: 128
```

```

Caller Number: 101010
NA caller process: Automatic
PVC low: 0
PVC high: 0
SVC low: 100
SVC high: 100
Channel Direction: DEC
XOT Config>

```

## 4.3 Configuring the X.25 parameters

The meaning of the commands and the parameters that modify them are as follows:

### Packet window

Specifies the maximum number of X.25 packets waiting acknowledgment. This window takes values between 1 and 128. Default is 2.

*Example:*

```

XOT Config>set packet-window <window_size>
XOT Config>

```

### Extended Packet Mode

Specifies the PS field module for the X.25 network level. This is the module used to consecutively list the X.25 packets sent. It takes values between 8 and 128 (corresponding to the Disable and Enable values in this parameter). Default is 8 (Disabled).

*Example:*

```

XOT Config>enable extended-packet-mode
XOT Config>

```

Or:

```

XOT Config>disable extended-packet-mode
XOT Config>

```

### Packet size

Specifies the maximum length of an X.25 packet. Said length is limited to 4.096 octets. Default is 128 octets.

*Example:*

```

XOT Config>set packet-size <packet_size>
XOT Config>

```

### NA Calling

The NA (Network Address) is the X.25 calling address for the request call packets exiting through the port. This is independent from the NA they were received with in the router. Default is not programmed.

*Example:*

```

XOT Config>set na-calling <na_calling>
XOT Config>

```

This number can consist of up to 15 ASCII characters.

Run **no na calling** to delete this.

### Process NA calling

This option allows you to add or suppress the NA of the call packets processed by the router. The values that can be given are:

**Automatic.** Automatic according to the interface. If it is DCE, NA is added to the calls incoming through the port. If the interface is DTE, NA is added to the outgoing calls.

**Suppress.** Suppresses NA in all calls passing through the port.

**Outgoing calls.** Adds NA to the outgoing calls.

Incoming calls. Adds NA to the incoming calls.

Two way. Adds NA to all calls.

*Example:*

```
XOT Config>set process-na-calling suppress
XOT Config>
```

### SVC low

Indicates the lowest SVC number that can be used in X.25 communications. Values range from 1 to 4.095. Default is 100.

*Example:*

```
XOT Config>set svc low <SVC_low>
XOT Config>
```

### SVC high

Indicates the highest SVC number that can be used in X.25 communications. Values range from 1 to 4.095. Default is 100.

*Example:*

```
XOT Config>set svc high <SVC_high>
XOT Config>
```

The number of logical channels is only significant internally and may have nothing to do with the X.25 ports. What's important is the total number of logical channels configured, as this determines the maximum number of connections.

### Channel direction

Specifies if the logical channel numbers are used in ascending or descending order. Possible values are **increasing** and **decreasing**. Default is decreasing.

*Example:*

```
XOT Config>SET CHANNEL-DIRECTION INCREASING
XOT Config>
```

Or:

```
XOT Config>SET CHANNEL-DIRECTION DECREASING
XOT Config>
```

## 4.3.1 Assigning Addresses

The following commands are used to associate X.25 addresses to IP destination addresses.

### Add address

*Example:*

```
XOT Config>address 21324242 IP-ADDRESS 192.22.24.56
XOT Config>address 21324242 ALTERNATIVE-IP-ADDRESS 172.43.55.23
XOT Config>address 21324242 TIMEOUT 120s
XOT Config>
```

### List address

*Example:*

```
XOT Config>list address
  X25 Address      IP Address      Altern. IP Addr.  Call Timeout.
  21324242         192.22.24.56   172.43.55.23     30
XOT Config>
```

### Delete address

*Example:*

```
XOT Config>no address 21324242
XOT Config>
```

In the examples given, calls with NA 21324242 are sent to the router with the following IP address 192.22.24.56.

It is unnecessary to add the addresses to the incoming calls.

If the alternative IP address is left as 0.0.0.0, the alternative IP connection feature is not used.

### 4.3.2 Liberation causes and diagnostics

Under the following circumstances, a call directed to an XOT interface is released.

<b>Cause</b> (hex)	<b>Diagnostic</b> (dec)	<b>Motive</b>
0D	120	A specific NA/addr association has not been configured.
09	120	A specific IP address cannot be reached.
11	119	The timer has timed out in the TCP connection. The remote stops answering TCP packets.
09	119	The remote has closed the TCP connection.