



## CHAPTER 5

# Configuring VXSM Features

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## Configuring T1/E1 and T3 Lines

VXSM permits the user to configure many parameters associated with a physical T1, E1, or T3 line. To configure a line:

- 
- Step 1** Use the **cnfnoos** command to take the line out of service.
  - Step 2** Use the **dspln** command to display the current configuration of the line, for example

```
dspln <bay.line>
```

- Step 3** Determine which parameters need to be changed,
- Step 4** Use the **cnfln** command to change the required parameters.

For T1/E1 lines, this command is:

```
cnfln <bay.line> [-lt LineType >] [-sc SendCode >] [-lpb Loopback >] [-signal SignalMode>] [-detect LoopbackCodeDetection >] [-lc LineCoding >] [-len LineLength >] [-lm LineMod>] [-lbo LineBuildOut >] [-rep Repetition >]
```

For T3 lines, this command is:

```
cnfln <bay.line> [-lt <LineType>] [-sc <SendCode>] [-lc<LineCoding>] [-len<LineLength>] [-lpb <Loopback>] [-clock <TxClockSource>]
```

- Step 5** Use the **dspln** command to display the new parameter values and verify that they are correct.
- Step 6** Use the **cnflnis** command to bring the line into service.
- Step 7** Use the **upln** command to bring up the line.

The BERT (bit error rate testing) and alarm parameters can also be configured for the line using the **addbert**, **cnfbert** and **cnflnalm** commands

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## Configuring SONET Lines and Paths

VXSM permits the user to configure many parameters associated with a physical SONET line/path. To configure a SONET line, perform the following procedure.

- 
- Step 1** Use the **dnln** command to down the OC-3 line
- Step 2** Use the **dspln** command to display the current configuration of the line, for example  
`dspln n.m` (where *n* is bay and *m* is the line number)
- Step 3** Determine which parameters need to be changed,
- Step 4** Use the **cnfln** command to change the required parameters.
- ```
cnfln bay.line [<-slt MediumType>] [<-lpb LoopbackType>] [<-sfs FrameScramble>]
[<-rdiv DIVType>][<-rdip RDIPType>] [<-txtrace TraceToTransmit>]
[<-extrace TraceToExpect>]
```




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**Note** The **cnfln** command configures parameters at the physical OC-3 level only. To configure parameters at the path (ds1) level, use the **cnfpath** command.

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- Step 5** Use the **dspln** command to display the new parameter values and verify that they are correct.
- Step 6** Use the **upln** command to up the OC-3 line.
- 

To configure a SONET path, perform the following procedure.

- 
- Step 1** Use the **cnfpathoos** command to take the path out of service.
- Step 2** Use the **dsppath** command to display the current configuration of the path, for example  
`dsppath [<bay.line.path.vtg.vt>] | [<bay.line.path.ds1>]`
- Step 3** Determine which parameters need to be changed.
- Step 4** Use the **cnfpath** command to change the required parameters.
- This command has several versions depending upon the path type (ds1, ds3, e1, or sts). As an example, the ds1 version has the format:

```
cnfpath -ds1 [bay.line.path.vtg.vt] | [bay.line.path.ds1] [-lt <LineType>]
[-sc <SendCode>] [-lpb <Loopback>] [-signal <SignalMode>]
[-detect <LoopbackCodeDetection>] [-rep <Repetition>]
```




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**Note** VXSM supports two numbering schemes for mapping DS1 circuits to their vtg/vt values. These two schemes are known as standard and Titan. See next section for details.

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- Step 5** Use the **dsppath** command to display the new parameter values and verify that they are correct.
- Step 6** Use the **cnfpathis** to bring the path into service.
-

## VTG/VT to DS1 Mapping Scheme

For applications using the SONET-VT1.5/SDH-VC11 payload path type, VXSM supports two numbering schemes for mapping VTG/VT pairs to DS1s.

The first scheme conforms to ITU-T GR 253 (also Bellcore Std. TR 253) and is referred to as the 'standard' scheme.

The second scheme supports certain types of DACS equipment (for example Tellabs 5500 DACS). This scheme is referred to as the Titan scheme (also referred to as the M13 count method).

With this feature, the user can specify which numbering scheme is to be used.

This feature adds two new CLI commands; one to display the currently selected mapping scheme and one to change the mapping scheme.

The SONET-VT1.5/SDH-VC11 payload path type supports 7 VTGs each containing 4 VTs for total of 28 DS1s.

### Standard Scheme

In the ITU-T GR.253 spec, the VTG-VT number pairs are incremented such that the VTG number increments from 1-7 before the VT number is incremented. That is, the first VTG-VT pair is 1-1, the second pair is 2-1, the third pair is 3-1, and so on, up to 7-1. The next pair is 1-2, followed by 2-2, 3-2, 4-2 ..7-2, then 1-3, 2-3..7-3 and so on until 1-4, 2-4..7-4.

### Titan Scheme

In the Titan (M13 Count) numbering scheme, VTG-VT number pair are incremented such that the VT increments from 1-4, before the VTG is incremented. That is, the first VTG-VT pair is 1-1, the second pair is 1-2, and so on up to 1-4. The next pair is 2-1, followed by 2-2, 2-3, 2-4, then 3-1, 3-2, 3-3, 3-4 and so on until 7-1, 7-2, 7-3, 7-4.

The complete mapping schemes are shown in [Table 5-1](#).

**Table 5-1 VTG/VT to DS1 Mapping**

| DS1 | Standard, ITU-T GR 253 |    | Titan, M13 Count |    |
|-----|------------------------|----|------------------|----|
|     | VTG                    | VT | VTG              | VT |
| 1   | 1                      | 1  | 1                | 1  |
| 2   | 2                      | 1  | 1                | 2  |
| 3   | 3                      | 1  | 1                | 3  |
| 4   | 4                      | 1  | 1                | 4  |
| 5   | 5                      | 1  | 2                | 1  |
| 6   | 6                      | 1  | 2                | 2  |
| 7   | 7                      | 1  | 2                | 3  |
| 8   | 1                      | 2  | 2                | 4  |
| 9   | 2                      | 2  | 3                | 1  |
| 10  | 3                      | 2  | 3                | 2  |
| 11  | 4                      | 2  | 3                | 3  |

**Table 5-1 VTG/VT to DS1 Mapping (continued)**

| DS1 | Standard, ITU-T GR 253 |    | Titan, M13 Count |    |
|-----|------------------------|----|------------------|----|
|     | VTG                    | VT | VTG              | VT |
| 12  | 5                      | 2  | 3                | 4  |
| 13  | 6                      | 2  | 4                | 1  |
| 14  | 7                      | 2  | 4                | 2  |
| 15  | 1                      | 3  | 4                | 3  |
| 16  | 2                      | 3  | 4                | 4  |
| 17  | 3                      | 3  | 5                | 1  |
| 18  | 4                      | 3  | 5                | 2  |
| 19  | 5                      | 3  | 5                | 3  |
| 20  | 6                      | 3  | 54               | 4  |
| 21  | 7                      | 3  | 6                | 1  |
| 22  | 1                      | 4  | 6                | 2  |
| 23  | 2                      | 4  | 6                | 3  |
| 24  | 3                      | 4  | 6                | 4  |
| 25  | 4                      | 4  | 7                | 1  |
| 26  | 5                      | 4  | 7                | 2  |
| 27  | 6                      | 4  | 7                | 3  |
| 28  | 7                      | 4  | 7                | 4  |

## User Interface

The VTG/VT to DS1 mapping feature uses the following two CLI commands.

- Display VT mapping

Syntax: **dspvtmapping**

This command displays the current setting of VTG/VT to DS1 mapping scheme, values are standard or Titan. Standard denotes ITU-T GR 253, Titan denotes M13 count.

- Configuring VT mapping

Syntax: **cnfvtmapping** <VtMappingMode>

1—standard (default)

2—titan

This command switches the current setting of VTG/VT to DS1 mapping scheme to the alternative scheme.



**Note** To execute the **cnfvtmapping** command:

1. The **cnfvtmapping** command is valid on the VXSMOC-3 card only.

2. All SONET lines on the card must be down.
3. All SONET lines on the card must be configured with medium type as sonet.
4. All SONET paths on the card must be configured as VT1.5.

**Note**

When VT mapping mode is set to titan, the following commands are affected on the VXSM OC-3 card.

`cnfln`: the option `-slt` (medium type) are rejected

`cnfpath -sts`: the options `-payload` and `-tg` are rejected

In Titan mode, the DS1 path order will be changed in the following commands (see [Table 5-1](#) for path order).

CLI: `dsppaths -ds1`  
`dsppathalms -ds1`  
`dsppathstates` (for ds1 only)  
`dspvif***s` (for ds1 only)  
`dsplapds` (for ds1 only)  
`dspberts -ds1`  
`dspds0xcons` (for ds1 only)

## Configuring Clocking

The clock for the media gateway can be one of the following sources.

- A BITS clock source received on the PXM-45 back card on ports 35 and 36 using an E1 or T1 RJ-48 connector. In a redundant configuration, a Y-cable is for the BITS clock.
- The PXM internal oscillator (stratum 3 circuit on PXM-45 back card)
- A Clock derived from VXSM line or AXSM line

The clock source is configured on the active PXM card using the `cnfclksrc` command.

The syntax of this command is:

```
cnfclksrc <priority> <portid>[ -bits { e1|t1 } ][ -revertive { enable|disable } ]
```

where:

**priority**—This is either primary or secondary (default = primary)

**portid**—The specification of the port ID depends upon the selected clock source.

If the BITS clock source is selected, portid is specified as:

```
[shelf.]slot.port
```

shelf—always 1 and is purely optional.

- slot—the logical slot number 7 for a BITS circuit on the PXM UI S3 (regardless of where the active PXM resides).
- port—a logical number that indicates the upper or lower external clock connector on the UI S3 back card. The logical port number for the upper connector is 35. The lower connector is 36.

If a service module line is selected as the source, portid is specified as:

- [shelf.]slot:subslot.port:subport
- shelf—always 1 and optional.

- slot—the slot number of the service module.
- subslot—identifies the upper or lower bay of the back card, either a 1 for the upper bay or 2 for the lower bay (default is 1).
- port—is the line number on the service module back card. (The specified line must already be active (see upln).
- subport—is the logical port number. This value is the logical port (or ifNum) that you must have assigned through **addport**. Also, the logical port must be known to PNNI (see **dsppnports**).



**Note** When specifying a clock source on a VXSM card, the value 10 must be added to both the line and logical port numbers. For example, a primary clock source on a VXSM in slot 3, upper shelf, line 1, logical port 1 would be specified as:

```
cnfclksrc primary 3:1.11:11
```

- **-bits**—This keyword parameter is required if slot number 7 and port number of 35 or 36 are specified in portid (indicating BITS as the clock source) Type the string **-bits**, followed by a space, then either **e1** or **t1**.
- **-revertive**—An option that applies to only the BITS clock. Type the string **-revertive**, followed by the complete word **enable** or **disable**. The default is **disable**.

**Step 7** Use the **cnfclksrc** command again to configure the secondary clock source.

**Step 8** Use the **cnfclparms** command to configure the signal type and cable type for BITS sources (if applicable). The configuration applies to both (upper and lower) lines.

The syntax of this command is:

```
cnfclparms <signal type> <cable type>
```

where:

**signal type**, 1 = data; 2 = syn (this parameter is not supported in this release)

**cable type**, 1 = twisted; 2 = coax



**Note** E1 lines can be either twisted pair or coaxial cable. T1 lines must always be specified as twisted pair.

Below is an example of a sequence of clock configuration commands.

```
8850japan.7.PXM.a > cnfclksrc primary 7.35 -bits t1 -revertive enable
8850japan.7.PXM.a > cnfclksrc secondary 7.36 -bits t1 -revertive enable
8850japan.7.PXM.a > cnfclparms 1 1
```

Confirm the clock source using the **dspclksrc** command.

On the PXM card, use the **dspclksrcs** command to display the clocking configuration.

For example:

```
8850japan.7.PXM.a > dspclksrcs
Primary clock type:    bits t1
Primary clock source:  7.35
Primary clock status:  bad
Primary clock reason:  no clock
```

```

Secondary clock type:  bits t1
Secondary clock source: 7.36
Secondary clock status: bad
Secondary clock reason: no clock
Active clock:          internal
source switchover mode: revertive

```

Appendix A in this document covers the subject of clocking in greater detail.

## Connection Admission Control

Connection admission control (CAC) is configured when an ATM connection is added using the **addcon** command. CAC is applied depending upon the values specified for the service type, peak cell rate (PCR), and sustained cell rate (SCR) parameters.

These parameters permit you to specify the bandwidth (expressed as a cell rate) requirements for the virtual circuit being added. If the specified bandwidth is not available, the connection is denied.

The **addcon** command has four parameters for specifying required cell rate:

- -lpcr
- -rpcr
- -lscr
- -rscr
  - l—Means in the local to remote direction
  - r—Means remote to local direction

The four parameters allow the user to specify PCR and SCR values for the PVC in each direction.

If the service type is specified as CBR (constant bit rate), PCR values are used as maximum bandwidth requirements otherwise, SCR values are used as available bandwidth requirements.

To facilitate the CAC function, VXSM performs load balancing on all PVCs configured on the card.

## Configuring Redundancy

VXSM provides the following redundancy features.

- 1:1 Front card/back card redundancy
- 1:1 APS SONET line redundancy
- 1+1 APS SONET line redundancy
- PVC channel protection

### 1:1 Front Card/Back Card Redundancy

VXSM front and back cards can be configured for redundancy provided they are installed in adjacent slots (for example, 1 and 2, 9 and 10).

On the PXM card execute the **addred** command.

```
addred <redPrimarySlotNum> <redSecondarySlotNum> <redType>
```

*redPrimarySlotNum* and *redSecondarySlotNum* should be specified as the slot number of the active card and the standby card respectively.

<redType> is redundancy type where redType = 1(1:1 Y-Cable) or 2(1:N). Enter 1 for Y-cable.

## APS SONET Line Redundancy

To setup a working/protection line pair, use the **addapsln** command. This command allows the user to specify an OC-3 port as a working line and a corresponding OC-3 port as a protection line. 1:1, 1+1, and 1+1 Annex B protection types are supported.

To configure 1:1 or 1+1 line redundancy perform the following steps.

**Step 1** Use the **addapsln** command to setup a working protection line pair.

```
addapsln <working line> <protection line> <archmode>
```

Working line and protection line are expressed as *slot.bay.line*.

For working line, slot = physical slot of working line, bay = 1 (upper), line in the range of 1 to 4

For protection line, slot = physical slot of protection line, bay = 1 (upper), line in the range of 5 to 8

For archmode, 1 = (1+1), 2 = (1:1), 3 = (1+1AnxB)



**Note** 1+1 and 1+1AnxB are supported on the same card or across 2 card slots. 1:1 is supported only on the same card,.

**Step 2** Use the **cnfapsln** to configure aps fault thresholds and other parameters.

```
cnfapsln <working line> [-sf <SigFaultBER>] [-sd <SigDegradeBER>]
[-wtr <WaitToRestore >] [-dr <Direction>] [-rv <Revertive>] [-proto <Protocol>]
```

working and protection lines are expressed as *slot.bay.line* of the working line (see **addapsln** above).

SigFaultBER and sigDegradeBER are bit error rates for fault detect and fault degrade detect respectively. If these rates are detected, switchover takes place.

### SigFaultBER

This is an integer *n* in the range from 3 – 5, with a default value of 3. This parameter represents a value of  $10^{-n}$ , where *n* is  $10^{-3}$  to  $10^{-5}$ .

### sigDegradeBER

This is an integer *n* in the range from 5 – 9, with a default value of 5. This parameter represents a value of  $10^{-n}$ , where *n* is  $10^{-5}$  to  $10^{-9}$ .

### Waittorestore

This parameter defines the interval in minutes to wait before attempting to switch back to the working line after a switchover (not applicable if the line is configured in non-revertive mode). The range is 1 to 12 minutes.

The framer clears the signal-fault and signal-degrade states when the APS switchover occurs.

The permissible value of this parameter is an integer in the range from 1 – 12.

### Direction

This parameter configures the switching direction that this APS line will support.

1 = Unidirectional—On a failure, only that direction fails over.

2 = Bidirectional—On a failure, both directions fail over.

**Revertive**

This parameter is used to configure the APS revertive or nonrevertive mode.

1 = Nonrevertive mode—The protection line continues to be the active line. The active line does not switch to the working line.

2 = Revertive mode—Switches the working line back to the active state after the wait-to-restore interval has expired and the working line signal-fault/signal-degrade state has been cleared.

**Protocol**

This parameter configures the APS channel protocol to be implemented at the near end terminal.

The K1 and K2 overhead bytes in a SONET signal are used as an APS channel to effect the APS protocol.

1 = Bellcore—The APS channel protocol is implemented as defined in the Bellcore document GR-253-CORE.

2 = ITU—The APS channel protocol is implemented as defined in the ITU document G.783, Annex A.

**Note**

If APS is configured in non-revertive and unidirectional mode, VXSM displays the following behavior on card switchover (active-> standby):

1) If working line is active, after the VXSM switchover, working line will remain active.

2) If protection line is active, after the VXSM switchover, working line will be active provided there are no alarms on the working line. Otherwise, protection line will be active.

## PVC Channel Protection

Perform the following procedure to configure a dual PVC pair in which a primary PVC is protected by a secondary PVC.

**Step 1** Create the primary PVC using the **addcon** command. The -pref parameter is used to specify whether the PVC is a primary, secondary, or none. Specify 1 for primary.

**Step 2** Create the secondary PVC using the **addcon** command. The -pref parameter is used to specify whether the PVC is a primary, secondary, or none. Specify 2 for secondary.

**Note**

The primary PVC should be added first and then the secondary. When a PVC is deleted, the secondary should be deleted first. The PCR and SCR values for the primary and secondary PVCs must be the same.

Changing the preference of a PVC from secondary to primary or unknown and from primary of unknown to secondary are not allowed. Only primary to unknown and unknown to primary are allowed.

**Step 3** Use the **cnfconprotect** command to configure the protection.

```
cnfconprotect ifNum vpi vci protect fallbackPort fallbackVpi fallbackVci
```

**ifNum**

This is the interface number of the PVC, specify 1

**vpi, vci**

These are the vpi and vci values of the already created PVC.

**fallbackPort**

This specified whether protection is to applied or not. 1 = protect, 2 = no protection (default).

**fallbackVpi, fallbackVci**

These are the vpi and vci values of the fallback PVC

- Step 4** Use the **cnfoamparams** command to configure the operation, administration, and management (OAM) cells for a dual PVC protection group.

```
cnfoamparams gap retry recover
```

**gap**

This parameter defines in milliseconds the inter-cell gap for dual PVC (DPVC) operation, administration, and management (OAM) cells. The permissible range is 20 – 5000, with a default value of 5000.

**retry**

This parameter defines the retry threshold (in number of cells) during a PVC failure.

When the number of consecutive OAM cells being sent without receiving an acknowledgment (ACK) is equal to the value of this parameter, switchover occurs.

The permissible range is 0 – 20, with a default value of 3.

**recover**

This parameter defines the threshold (in number of cells) for recovery of a failed PVC.

The permissible range is 0 – 20, with a default value of 5.

When the number of consecutive OAM cells being sent while receiving an acknowledgment (ACK) is equal to the value of this parameter, the failed PVC is considered to have recovered from its failed state.



**Note** PVCs cannot be deleted while they are part of a dual PVC protection group and while they are active. To delete a PVC, first use **cnfconprotect** to set the group to unprotected (fallbackPort = 2). Then use the **dncon** to make the secondary PVC inactive, delete the secondary PVC and the primary PVC.

## Configuring PRI Backhaul

In switching applications, VXSM is able to extract Q.931 signaling frames from an ISDN PRI D channel and backhaul them to the media gateway controller for processing (this feature is described in Chapter 2). Configuration of this feature consists of the following steps.

- Step 1** Establishing a communication link between the VXSM and the media gateway controller. This communication link can be based upon a RUDP (Reliable UDP) session set.
- Step 2** Establishing an LAPD session between VXSM and the voice TDM network.

## Configuring RUDP

To configure an RUDP session between VXSM and the media gateway controller, perform the following steps.

- Step 1** Establish IP connectivity with the media gateway controllers (see Chapter 2 for details).

- Step 2** Use the **addsesset** command to create a session set.
- ```
addsesset <set number> <fault tolerant>
```
- set number**  
Integer value of 1 (currently only session set is supported)
- fault tolerant**  
Integer value
- 1 = fault tolerant
  - 2 = nonfault tolerant
- Step 3** Use the **addnsdn** command to add the domain server domain name
- ```
addnsdn <Domain Name>
```
- Step 4** Use the **addnssrvrip** command to add the IP address of the domain server
- ```
addnssrvrip 1 172.29.66.35
```
- Step 5** Use the **addmgcdn** command to assign the domain name of the media gateway controller
- ```
addmgcdn 1 mgc7
```
- Step 6** Use the **addsesgrp** command to create each session group
- ```
addsesgrp <group number> <set number> <mgcname>
```
- group number**  
Integer value of 1 or 2 (specify 1 for non-fault tolerant mode or 2 for fault tolerant mode).
- set number**  
Integer value of 1 (only 1 is supported)
- mgcname**  
Domain name of the call agent (a text string of 1-64 characters).
- Step 7** Use the **addses** command to create each RUDP session. Each session group can have up to four sessions.
- ```
addses <session number> <group number> <priority> <local port> <remote port>
```
- session number**  
Integer value (1 to 8)
- group number**  
Integer value (1 or 2)
- priority**  
Integer value in the range of 1 to 4. A lower number means higher priority.
- local port**  
Integer value in the range of 1124 to 65535
- remote port**  
Integer value in the range of 1124 to 65535
- Step 8** For each session that has been created, the session parameters can be further configured using the commands in [Table 5-2](#) (see Chapter 6 for CLI details).

Table 5-2 RUDP Session Commands

| Command                  | Configures the...                                                                                                                                                                                 |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cnfsesport</b>        | Local port/remote port values. The <local port, remote port and Remote IP address> combination must be unique across the group.                                                                   |
| <b>cnfsesmaxwindow</b>   | Maximum number of segments that can be sent without receiving an acknowledgement for a specific RUDP session.                                                                                     |
| <b>cnfsessyncatmpts</b>  | Maximum number of attempts to synchronize with MGC for a specific RUDP session.                                                                                                                   |
| <b>cnfsesmaxseg</b>      | Maximum number of octets to synchronize with VSC for a specific RUDP session.                                                                                                                     |
| <b>cnfsesmaxreset</b>    | Maximum number of autoresets that are performed before a connection is reset.                                                                                                                     |
| <b>cnfsesretrans</b>     | Timeout value for retransmission of unacknowledged packets in milliseconds and the maximum number of times consecutive retransmission are attempted before the connection is considered broken.   |
| <b>cnfsesack</b>         | Timeout value to send out an acknowledgment and the maximum number of acknowledgments that are accumulated before sending an acknowledgment.                                                      |
| <b>cnfsesoutofseq</b>    | Maximum number of out of sequence packets that are accumulated before sending an EACK segment is sent. A value of 0 indicates an DACK is sent immediately if an out of order segment is received. |
| <b>cnfsesnullsegmout</b> | Number of milliseconds of idle time before sending a null segment.                                                                                                                                |
| <b>cnfsesstatetmout</b>  | Number of milliseconds of idle time before sending a null segment.                                                                                                                                |

## Configuring LAPD

To configure a LAPD parameters for a DS0 used for ISDN D channel, perform the following steps.

- Step 1** Use the **addlapd** command to create an LAPD session on a specified DS0.

```
addlapd <bay.line.path.vtg.vt:ds0>|<bay.line.path.ds1:ds0>|<bay.line>:<ds0>[-side
<LAPDside>][-type <Type>][-window <WindowSize>]{-n200<n200>}[-t200 <Timer200>][-t203
<Timer203>][-ds0 <Ds0Format>][-profile <IsdnHdlcProfile>][-as <AS Name>][-appltype
<AppType>]
```

Use one of these formats to specify the DS0 on an OC-3 card:

**<bay.line.path.vtg.vt:ds0> |<bay.line.path.ds1:ds0>**

bay: 1

line: 1 - 4

path: 1 - 3

vtg: 1 - 7

vt: 1 - 4(T1)/3(E1)

ds1: 1 - 28

ds0: 1-24 (T1) 1-16(E1) for RUDP  
1-24 (T1) 1-31(E1) for SCTP

Use this format to specify the DS0 on a T1/E1 card

**<bay.line>:<ds0>**

bay: 1

line: 1 - 4

ds0: 1 - 24 (T1), 1 - 16(E1)

The following parameters are the same for both OC-3 and T1/E1 cards.

**side <LAPDsid>**

Specify whether the LAPD stack is at user side or network side

1 - network

2 - user

**-type <Type>**

Specify the switch type at the remote end of the ISDN line.

1 - CCITT

3 - AT&T 5ESS PRA

4 - AT&T 4ESS

6 - NT dms100 PRA

7 - VN 2 or VN 3

8 - INS Net

9 - tr6 MPC

10 - tr6 PBX

12 - Austel Primary

13 - National ISDN-1

14 - ETSI

15 - NT dms250

16 - Bellcore

17 - National ISDN-2

**-window <WindowSize>**

Specify the maximum number of sequentially numbered I-frames that may be outstanding

1..128 (default=7)

**-n200 <n200>**

Specify the maximum number of retransmissions of a frame

1..10 (default=3)

**-t200 <Timer200>**

Specify the maximum time to wait for acknowledgment of a transmit frame

100..1023000 ms (default=1000)

**-t203 <Timer203>**

Specify the maximum time in milliseconds allowed without frames being exchanged. This value should be greater than that for -t200

100..1023000 ms (default=1000)

**-ds0 <Ds0Format>**

Specify the DS0 format. 56k(1) is robbed-bit for T1.

1 - ds056k

2 - ds064k }

**-profile <IsdnHdlcProfile>**

Specify the HDLC profile which contains a list of HDLC attributes for the PRI backhaul connection

1..128 (default = 1)

**-as <AS Name>**

Specify the LAPD application server (AS) name (12 chars). An AS is a logical entity serving LAPD D-channel.Zero length string (size 0) means there is no AS association with this LAPD D-channel

This parameter is used for PRI backhaul using SCTP only and is not configurable for RUDP.

**-appltype <AppType>**

Specify the PRI backhaul application protocols as 1 or 2.

1 = sctp (default)

2 = rudp

**Step 2** When an LAPD session has been created, the session parameters can be further configured using the commands in [Table 5-3](#) (see Chapter 6 for CLI details).

**Table 5-3 LAPD Session Commands**

| Command               | Function                                                                                                                                                   |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>cnflapd</b>        | Modify an existing Lapd entry. The applType cannot be modified in this command. The line must be deleted and then added back again to change the applType. |
| <b>dsplapdcnt</b>     | Display LAPD statistics counters                                                                                                                           |
| <b>dsplapdhdlccnt</b> | Display LAPD HDLC statistics counters                                                                                                                      |

## Configuring Announcements

In switching applications VXSM supports the feature in which pre-recorded announcements can be delivered in either direction (to the calling or called party) under the control of the MGC. These announcements can be played during call setup and after the call has been established. The announcement files must be available in the VXSM memory to be played out or, if the file is not resident in VXSM memory, VXSM uses TFTP to obtain the file from an external announcement server, caches it and plays it out.

To configure the Announcements feature, perform the following steps.

**Step 1** It is the responsibility of the user to record all announcements and have them stored in PCM format as computer files in the announcement file server. The announcement file server must IP reachable from the VXSM.

**Step 2** Use the **cnfanndn** command to specify the name of the announcement file server.

```
cnfanndn <ServerDomainName>
```

**Step 3** Use the **cnfanncontrols** command to configure announcement parameters.

```
cnfanncontrols [-path <SubDirPath>] [-dn <DomainNameResolution>] [-ip <ipAddress>]
[-age <ageTime>] [-tout <ReqTimeOut >] [-per <maxPermanent>]
```

*SubDirPath* is a string up to 64 characters that specifies the subdirectory path to the default TFTP directory in the announcement file server in which the announcement files are stored.

*DomainNameResolution* specifies how the domain name of the announcement file server is to be resolved.

- 1 = Internal only (default value)—Indicates internal resolution of domain name for announcement file server.
- 2 = External only—Indicates external resolution of domain name for announcement file server.

If this parameter is set to the value 1, the IP address associated with the file server is determined according to the value of the **-ip** *ipAddress* parameter.

- *ipAddress*—IP address for the announcement file server. If the *DomainNameResolution* is configured as external only, this item is ignored.
- *ageTime*—Time in minutes that an announcement remains valid after it is fetched into the VXSM announcement cache. The range is 1 to 1440. After arriving in the cache, an announcement is not refreshed until it is aged. Subsequent play announcement requests do not affect the agetime or cause the file to be refreshed from the server.
- *ReqTimeOut*—Time, in seconds, within which an announcement must start playing after the VXSM receives the announcement signal from the MGC. The default value is 5 seconds.
- *maxPermanant*—Maximum number, in the range 0 to 136, that permanent announcement files can be added to Media Gateway. The default value is 41. A value of 0 indicates that the age time function is disabled.

**Step 4** Use the **addannfile** to map an announcement name number to the announcement filename. This command also lets you specify the number of times the announcement is to be played, whether the file is to be permanent or not, and the signal duration of the announcement file.

```
addannfile cannoAudioFileNumber FileName [-noc numberOfCycles] [-type fileType]
[-dur signalDuration]
```

- *cannoAudioFileNumber*—An index value that identifies the announcement file to be used by the media gateway. The permissible value of this parameter is an integer in the range from 1 - 1024.
- *Filename*—Specifies the name of a valid announcement file that has been stored in the media gateway announcement table. This announcement file name, which can be composed of up to 64 characters, can incorporate path or subdirectory information
- *noc*—Specifies the number of times the announcement file is to be played.

The permissible value of this parameter is an unsigned integer in the range from 0 - 65535, with a default value of 1.

The value zero specifies that an announcement file is to be played or looped continuously.

*type*—Specifies the type of the announcement file.

The integer value for this parameter must be one of the following:

- 1 = Dynamic file type (default)—A dynamic file can be removed from cache when the age of the file reaches a specified limit or in accordance with a least recently used (LRU) algorithm when the cache is full.
- 2 = Permanent file type—A permanent file can be stored in cache until it is deliberately deleted.

This parameter indicates the duration (in milliseconds) that the announcement file is to be played during an announcement cycle. This parameter is applicable only for purposes of playing a fixed announcement.

For fixed announcement play, the `-noc numberOfCycles` parameter and the `-dur signalDuration` parameter are used together to determine how long the announcement is to be played.

The permissible value for these parameters is an integer in the range from 0 - 65535.

A value zero for `-dur` indicates that the duration of the announcement is variable and that the `-noc numberOfCycles` parameter (see above) will be used to determine play time.

This parameter is used only when the Play Announcement signal from the MGC does not incorporate a parameter specifying the number of cycles that the announcement is to be played.

**Step 5** Use the `cnfannfile` to configure a specific announcement file.

```
cnfannfile cannoAudioFileName FileName [-noc numberOfCycles]
[-dur signalDuration]
```

- *cannoAudioFileName*—Index value that identifies the announcement file to be used by the media gateway. The permissible value of this parameter is an integer in the range from 1 - 1024.
- *Filename*—Specifies the name of a valid announcement file that has been stored in the media gateway announcement table. This announcement file name, which can be composed of up to 64 characters, can incorporate path or subdirectory information
- *noc*—Specifies the number of times the announcement file is to be played.

The permissible value of this parameter is an unsigned integer in the range from 0 - 2147483647, with a default value of 1.

The value zero specifies that an announcement file is to be played or looped continuously.

For fixed announcement play, the `-noc numberOfCycles` parameter and the `-dur signalDuration` parameter are used together to determine how long the announcement is to be played.

The permissible value for these parameters is an integer in the range from 0 - 65535.

A value zero for `-dur` indicates that the duration of the announcement is variable and that the `-noc numberOfCycles` parameter (see above) will be used to determine play time.

This parameter is used only when the Play Announcement signal from the MGC does not incorporate a parameter specifying the number of cycles that the announcement is to be played.

## Configuring Network Bypass

Configuration for the Network Bypass feature consists of making a mesh of PVCs between VXSM and other cards in the gateway. When the mesh of PVCs is complete the feature is enabled through the `cnfnwbypass` command.

For each PVC in the following procedure the attributes of the PVC are:

- AAL5

- PVC type is bearer
- Traffic type: UBR
- Peak Cell Rate to support 24 OC-3s
- No CAC (all internal PVCs run over the shelf's backplane)
- Internal PVCs are not assigned IP addresses

In order to configure the media gateway for the Network Bypass feature, perform the following procedure.

- 
- Step 1** Create a PVC between each VXSM card and its associated RPM or AXS M card. Specify the attributes listed above. The procedure is to configure the slave end at the RPM or AXSM first and the master end on the VXSM second. Details are provided in Chapter 3, the section titled Creating Connections to the RPM-XF Card.
- Step 2** For each VXSM card create one PVC to each of the other VXSM cards in the shelf. Use the **addcon** command and specify the attributes listed above. It does not matter which is the master and which is the slave.
- Step 3** For each VXSM card create a single pvc for which the VXSM card is specified for both ends. Use the **addcon** command and specify the attributes listed above.
- Step 4** By default, the network bypass feature is disabled. To enable the feature, enter the **cnfnwbypass** command on each VXSM card. The format of this command is:

**cnfnwbypass** *<nwbypass>*

*nwbypass*—Has the value 1, 2, or 3

1—disable (default)

2—unconditional enable

3—conditional enable

Conditional enable allows the MGC to control the use of this feature. It can explicitly, in a given call flow, ask for this attribute to be returned.

---

The current status of the network bypass feature can be shown by entering the **dspnwbypass** command.

## Configuring Differentiated Services

For VoIP applications, VXSM provides support for the quality of service (QoS) feature known as Differentiated Services (Diffserv). The DiffServ feature permits devices at the edge of the network to specify the contents of the Type of Service (ToS) field in the IPv4 header as a differentiated services point code. This point code can then be used by routers in the network to determine per hop behavior (PHB).

VXSM's support of this feature is to permits users to specify the values of the point code to be inserted into the IP header ToS field. The specified values are entered through the **cnfip tos** command and are applied card-wide. VXSM does not check the entered value nor does it understanding the meaning of the point code values. It is the responsibility of the network administrator to ensure that the routers understand how to process the point codes.

The **cnfiptos** commands allows you to specify ToS values for both control and bearer packets (although DiffServ is really confined to bearer packets). The command has the format:

**cnfiptos** <ControlToS> <BearerToS>

- *ControlToS*—An integer in the range of 0 to 255 with a default of 104
- *BearerToS*—An integer in the range of 0 to 255 with a default of 184

For the control path, the default of 104 maps to DiffServ Codepoint 011010 which is Assured Forwarding (AF31 PHB) for signalling/control (see RFC 2597 for more information)

For the bearer path, the default of 184 maps to Diffserv Codepoint 101110 which is Expedited Forwarding (EF) PHB or premium service. (see RFC 2598 for more information)

The current values of the ControlToS and the BearerToS parameters can be displayed using the **dsiptos** command.

## Configuring Fax and Modem Services

VXSM supports the management of non voice services within a voice connection. VXSM supports the following two methods.

- Fax, modem, and TTY passthrough over a VoIP or VoATM network
- T.38 Fax relay over VoIP. Both Call Agent controlled and Gateway controlled methods are supported.

VXSM provides event-handling for the VBD events that are detected in the voice or IP interface of the media gateway. The event handling is mapped to different event handling functions that are defined in VBD profiles or fax relay profiles.

Configuring for non voice services consists of the following major steps.

1. Set up event mapping with pointers to fax/modem/TTY passthrough and fax relay profiles
2. Set up fax/modem/TTY passthrough profiles
3. Set up T.38 fax relay profiles
4. Associate voice interfaces with particular voiceband event mappings

## Configuring Voiceband Event Mapping

The voiceband event mapping feature permits VXSM to determine how voiceband (VBD) events are to be handled. When this feature is configured, VBD events are mapped to different event handling functions defined in fax relay profiles and VBD profiles.

Perform the following procedure to configure a voiceband event mapping.

- 
- Step 1** VXSM automatically creates an event mapping table (index 1 for VoIP Switching, index 11 for AAL2 Trunking) that contains records for event mapping types and pointers to profiles. Use the **dspeventmapping** command to display the default values.

For fax/modem passthrough use **dspeventmapping -ced**

For TTY passthrough use **dspeventmapping -v18aTone**

For T.38 fax relay use **dspeventmapping -v21Tone**, **dspeventmapping -cngTone**

For low speed modem tones use: **dspeventmapping -v21Modem**, **dspeventmapping -v23Modem**, **dspeventmapping -bellModem**, or **dspeventmapping -v8bis** (the **-prof** and **-mode** parameters are not supported for low speed modems).

**Step 2** If the default values must be changed, use the appropriate **cnfeventmapping** command.

**For fax/modem passthrough use**

```
cnfeventmapping -ced<EventMappingIndex>[-htype <HandleType>]
[-prof <ProfileIndex>] [-mode<HandleMode>]
```

**For TTY passthrough use**

```
cnfeventmapping -v18aTone<EventMappingIndex>[-htype <HandleType>]
[-prof <ProfileIndex>] [-mode<HandleMode>]
```

**For T.38 fax relay use**

```
cnfeventmapping -v21Tone<EventMappingIndex>[-htype <HandleType>]
[-prof <ProfileIndex>] [-mode<EventHandleMode>]
```

```
cnfeventmapping -cngTone<EventMappingIndex>[-htype <HandleType>]
[-prof <ProfileIndex>] [-mode<EventHandleMode>]
```

**For low speed modem tones use:**

```
cnfeventmapping -v21Modem<EventMappingIndex>[-htype <HandleType>]
[-prof <ProfileIndex>] [-mode<EventHandleMode>]
```

```
cnfeventmapping -v23Modem<EventMappingIndex>[-htype <HandleType>]
```

```
cnfeventmapping -bell202<EventMappingIndex>[-htype <HandleType>]
```

```
cnfeventmapping -bellModem<EventMappingIndex>[-htype <HandleType>]
```

```
cnfeventmapping -v8bis<EventMappingIndex>[-htype <HandleType>]
```

**For V.110 use:**

```
cnfeventmapping -v110<EventMappingIndex>[-htype <HandleType>]
[-prof <ProfileIndex>]
```

**Where the parameters for these commands are:**

*EventMappingIndex*—Identifies a set of voice data events supported by VXSM and how they are managed in the media gateway. The entries with value 1 of this object is the default handling for the voice data events in the media gateway.

**-htype<HandleType>**—This object specifies the type of the handle function in response to this event detection. The value none specifies that the handling of this event is disabled.

1 = none (default for **-v110**)

2 = vbd

3 = fax

4 = tty

See note below.

**-prof**<*ProfileIndex*>—Specifies the index of the profile which defines the handling attributes in response to the event detection.

- If the *EventHandleType* is equal to **none**, this object is not applicable (not supported for H.248 and xGCP).
- If the *EventHandleType* is equal to **vbd**, the VBD profile with the given index is attached to event.
- If the *EventHandleType* is equal to **fax**, the fax profile with the given index is attached to the event.
- If *EventHandleType* is equal to **tty**, the TTY profile with the given index is attached to the event.
- The profile index value can be in the range of 1 to 25.

**-mode**<*HandleMode*>—Specifies the mode of event handling. Network manager cannot add or delete, but can modify the default entries (not supported for H.248 and xGCP. The value of the *EventHandlingMode* can be:

**1** (none) – MG detects tones from both TDM and IP side and does not send NSE event to peer on detecting VBD tones from TDM side. This mode can be used when remote end is a third-party gateway and does not support Cisco proprietary NSE protocol but it does detect tone from IP side.

**2** (nse) – MG detects tone from both TDM and IP side and sends a NSE event to peer on detecting the VBD tone from TDM side.

- For TGCP/MGCP, user can configure only *EventMappingType* for low speed modem event types (v21Modem, v23Modem, bellModem, v8bis). Configuring *ProfileIndex* and *EventHandlingMode* for low speed event types is not supported for TGCP/MGCP. These are supported only for H.248 (Megaco).
- For TGCP/MGCP, the low speed events are mapped to ced or v18aTone event types depending upon the *htype* value. If *htype* for low speed modem events is set to VBD, the ced event parameters such as profile and mode will apply to the event and if *htype* is set to TTY, v18aTone event parameters will apply to the event.

**Step 3** Any event mapping index that has been created and is no longer required can be removed with the **deleventmapping** command.

**deleventmapping** <*EventMappingIndex*>

Where <*EventMappingIndex*> specifies the event mapping index number to be deleted.

**Step 4** If additional event mapping records need to be created, use the **addeventmapping** command and repeat the steps above with additional profiles. The format of this command is:

**addevent mapping** <*EventMappingIndex*>

*EventMappingIndex* – Identifies a set of voice data events supported by VXSM and how they will be handled in the media gateway. An integer in the range 2 to 10 for VoIP Switching, 12 to 20 for AAL2 Trunking. A value of 1 signifies the default handling for the voice data events in the media gateway



**Note**

When a v21 event mapping is associated with a handle type = fax (**-htype 3**), the T.38 feature is enabled at the card level. Once the T.38 feature has been enabled for a specific event map, that configuration will be in effect until the event map has its v21 tone event association reconfigured for handle type = vbd (**-htype 2**). While the association is in effect, attempts to associate with any other event map have no effect.

## Configuring for V.110 Traffic

To configure the VXSM card to handle V.110 trunking traffic, perform the following steps.

- Step 1** Use the **cnfeventmapping -v110** command to enable the handling of V.110 events. The format of this command is

```
cnfeventmapping -v110<EventMappingIndex>[-htype <HandleType>]
[-prof <ProfileIndex>]
```

For *EventMappingIndex*, enter the value of 11 (for trunking)

For *<HandleType>*, enter 5 (for clear channel data)

For *<ProfileIndex>*, enter the index of the profile that defines the handling attributes in response to the event detection.



**Note** The **cnfeventmapping** command affects all CIDs associated with this particular event mapping index. Consequently it may take a while before the command completes, since messages are sent to all associated DSP channels

- Step 2** Use the **dspeventmapping -v110** command to verify step 1. The format of this command is:

```
dspeventmapping -v110<EventMappingIndex>
```

for example: **dspeventmapping -v110 11**

```
dspeventmapping -v110 11
=====
                V.110 Event Mapping Configuration
=====
Event Mapping Index      :                11
Event Index              :                v110
Event Handle Type       :                ccd
```

- Step 3** At initial configuration, a clear channel data profile is created automatically with an index value of 1. The profile can be checked with the **dspccdprof** command.

For example, **dspccdprof 1** displays:

```
archer.5.VXSM.a > dspccdprof 1
=====
                Clear Channel Data (CCD) Configuration Profile
=====
Profile Index           :                1
Jitter Buffer Maximum Delay :            135
Jitter Buffer Nominal Delay :                70
```

If the values in the profile need to be changed, the user can modify the existing profile using the **cnfccdprof** command or create a new profile using the **addccdprof** command.



**Note** When configuring the nominal jitter delay, it is crucial that its value is higher than the that of the Timer CU (configured using `addcon` or `cnfcon` commands) plus the expected network jitter. If the nominal jitter delay is set too low there is a risk that the jitter buffer will experience starvation. Starvation happens when there are no packets to be played out of the jitter buffer. In this case the V.110 link will experience bit-errors, possibly resulting in (V.110/Modem/Fax) device disconnects

## Configuring a Voiceband Data Profiles

The VBD profile is used to determine the handling of fax/modem passthrough when it is detected in a voice interface. The profile includes such information as codec to be used for upspeed, size of jitter buffer, and the value for the inactivity time-out.

Perform the following procedure to configure a voiceband data profile.

- Step 1** VXSM automatically creates a vbd profile (index 1 for VoIP Switching, index 11 for AAL2 Trunking), with default values. Use the **`dspvbdprof`** command to display the current values.

**`dspvbdprof <VbdProfileIndex>`**

```
knodar.10.VXSM.a > dspvbdprof 1
=====
                Voice Band Data Configuration Profile
=====
VBD Profile Index           :      1
VBD Upspeed CODEC Type     :    G.711u
VBD Jitter Buffer Delay Mode :    fixed
VBD Jitter Buffer Maximum Delay :    135
VBD Jitter Buffer Nominal Delay :     70
VBD Jitter Buffer Minimum Delay :     0
VBD Inactivity Timeout     :     4
VBD Locally Disable VAD    :    enable
VBD Packet Period Control  :    enable
VBD Packet Period          :     10
VBD Echo Canceller Override :    disable
VBD NonLinear Processor Override:    disable
```

Check the values in the profile and use the following steps only if additional profiles are to be created or if existing profiles are to be modified.

- Step 2** Use the **`addvbdprof`** command to create a VDB profile. The format of this command is:

```
addvbdprof<Index>[-upscod<Codec>][-jmax <JitterMaxDelay>][-jnom <JitterNomDelay>]
  [-inact <InactivityTimeout>][-vad <LocalVadDisable>][-ppcontrol <PacketPeriodControl>][-pp <PacketPeriod>][-ecan <EcanOverride>][-nlp <NLPOverride>]
```

**`VbdProfileIndex`**—Identifies the VBD profile. The entry with the value of this object set to 1 is the default VBD profile for the media gateway. The default VBD profile is automatically created by the system and cannot be added or deleted, but can be modified by network manager. An integer in the range of 2 to 25

**`-upscod`<UpspeedCodec>**—Specifies the CODEC type to use for upspeed. Upspeed is used to change

the transmission rate of the voice interface to a higher rate of CODEC type. If CODEC type is set to “none” that means VXSM will not change codec and packetization period during upspeed. In this case it is expected that MGC will change codec and packetization period on receiving VBD event notification

1 = none  
 14 = G.726-32 (h248 only)  
 15 = G.711u  
 16 = G.711a  
 27 = Clear channel

**-jmax**<MaxJitterDelay>—Specifies the maximum jitter buffer size in the VBD connection. The value of *MaxJitterDelay* should be greater than the value of *NomJitterDelay*. An integer in the range of 20 to 135 milliseconds

**-jnom**<NomJitterDelay>—Specifies the nominal jitter buffer size in the VBD connection. The value of *NomJitterDelay* should be smaller than the value of *MaxJitterDelay*. An integer in the range of 5 to 135 milliseconds.

**-inact**<InactivityTimeout>—Specifies a timeout value before teardown the call if there is no activity in the VBD connection. The value of 0 is to disable the inactivity detection. An integer in the range of 0 to 60 seconds.

**-vad** <LocalVadDisable>—Specifies whether VAD will be disabled or not by MG during upspeed. The value can be 1 (enable) and 2 (disable). Enable means VXSM will disable VAD during upspeed and disable means VAD will not be changed by MG during upspeed.

**-ppcontrol** <PacketPeriodControl>—Specifies whether packetization period will be changed by MG during upspeed or not. The value can be 1 (enable) and 2 (disable). Enable means VXSM changes packetization period during upspeed and disable means packetization period does not change by MG during upspeed. If the codec type set to none, the packetization period is not controlled by VXSM irrespective of the value of *PacketPeriodControl*.

**-pp**<PacketPeriod>—Specifies the packetization period for the VBD connection. The packetization period represents the time for the media gateway to collect the data from TDM side before it sends out the packet. The value can be:

4 = 10 ms  
 5 = 15 ms  
 6 = 20 ms  
 7 = 25 ms  
 8 = 30 ms

**-ecan** <EcanOverride>—Specifies VBD Echo Canceller Override

1 - enable  
 2 - disable (default)

**-nlp** <NLPOverride>—Specifies VBD NLP(NonLinear Processor) Override

1 - enable  
 2 - disable (default)

**Step 3** When a VBD profile has been created, the parameter values can be changed using the **cnfvbdprof** command. The format of this command is:

```
cnfvbdprof <Index>[-upscodc <Codec>][-jmax <JitterMaxDelay>][-jnom <JitterNomDelay>]
[-inact <InactivityTimeout>][-vad <LocalVadDisable>][-ppcontrol <PacketPeriodControl>]
[-pp <PacketPeriod>][-ecan <EcanOverride>][-nlp <NLPOverride>]
```



**Note** Use the **cnfvbdprof** command only when the gateway is out of service. If you execute the command when a voice call is on, the system might delete the existing calls.

For details of the parameters, refer to the **addvbdprof** command above.

## Configuring a TTY Data Profile

The TTY profile is used to determine the handling of TTY passthrough when it is detected in a voice interface. The profile includes such information as codec to be used for upspeed, size of jitter buffer, the value for the inactivity time-out, the value for packetization period and VAD control.

Perform the following procedure to configure a TTY data profile.

- Step 1** VXSM automatically creates a TTY profile (index = 1), with default values. Use the **dspttyprof** command to display the current values.

**dspttyprof** <TyProfileIndex>

```
ns1_knodar.3.VXSM.a > dspttyprof 1
=====
                        TTY Configuration Profile
=====
Profile Index           :           1
CODEC Type              :           G.711a
Jitter Buffer Delay Mode :           fixed
Jitter Buffer Maximum Delay :         135
Jitter Buffer Nominal Delay :          70
Jitter Buffer Minimum Delay :           0
Locally Disable VAD     :           enable
Packet Period Control   :           enable
Packet Period           :           10
Echo Cancellor Override :           disable
NonLinear Processor Override:         disable
```

Check the values in the profile and use the following steps only if additional profiles are to be created or if existing profiles are to be modified.

- Step 2** Use the **addttyprof** command to create a TTY profile. The format of this command is:

**addttyprof** <TyProfileIndex> [-**ttycodec** <Codec>][**-jmax** <JitterMaxDelay>][**-jnom** <JitterNomDelay>][**-vad** <LocalVadDisable>][**-ppcontrol** <PacketPeriodControl>] [**-pp** <PacketPeriod>][**-ecan** <EcanOverride>][**-nlp** <NLPOverride>]

*TyProfileIndex*—Identifies the TTY profile. The entry with the value of this object set to 1 is the default TTY profile for the media gateway. The default TTY profile is automatically created by the system and cannot be added or deleted, but can be modified by network manager. An integer in the range of 2 to 25

**-ttycodec**<Codec>—Specifies the CODEC type to use for TTY upspeed. Upspeed is used to change the transmission rate of the voice interface to a higher rate of CODEC type. If CODEC type is set to “none” that means VXSM will not change codec, VAD and packetization period during upspeed. In this case it is expected that MGC will change codec, VAD and packetization period on receiving VBD event notification.

1 = none  
 14 = G.726-32  
 15 = G.711u  
 16 = G.711a  
 27 = Clear channel

**-jmax**<*JitterMaxDelay*>—Specifies the maximum jitter buffer size in the TTY data connection. The value of *JitterMaxDelay* should be greater than the value of *JitterNomDelay*. An integer in the range of 20 to 135 milliseconds

**-jnom**<*JitterNomDelay*>—Specifies the nominal jitter buffer size in the TTY data connection. The value of *JitterNomDelay* should be smaller than the value of *JitterMaxDelay*. An integer in the range of 5 to 135 milliseconds

**-vad** <*LocalVadDisable*>—Specifies whether VAD will be disabled or not by MG during TTY upspeed. The value can be 1 (enable) and 2 (disable). Enable means VXSM disables VAD during upspeed and disable means VAD will not be changed by MG during upspeed. If the upspeed codec type set to none, the VAD will not be controlled by VXSM irrespective of the value of *LocalVadDisable*.

**-ppcontrol** <*PacketPeriodControl*>—Specifies whether packetization is changed by MG during upspeed or not. The value can be 1 (enable) and 2 (disable). Enable means VXSM changes packetization during upspeed and disable means packetization is not changed by MG during upspeed. If the upspeed codec type set to none, the packetization is not controlled by VXSM irrespective of the value of *PacketPeriodControl*.

**-pp** <*PacketPeriod*>—Specifies the value of the packetization period in TTY data connection. The value can be:

4 = 10 ms  
 5 = 15 ms  
 6 = 20 ms  
 7 = 25 ms  
 8 = 30 ms

**-ecan** <*EcanOverride*>—Specifies VBD Echo Canceller Override

1 - enable  
 2 - disable (default)

**-nlp** <*NLPOverride*>—Specifies VBD NLP(NonLinear Processor) Override

1 - enable  
 2 - disable (default)

**Step 3** When a TTY profile has been created, the parameter values can be changed with the **cnfttyprof** command. The format of this command is:

```
cnfttyprof <TtyProfileIndex> [-ttxcodec <Codec>][-jmax <JitterMaxDelay>][-jnom
<JitterNomDelay>][-vad <LocalVadDisable>][-ppcontrol <PacketPeriodControl>] [-pp
<PacketPeriod>][-ecan <EcanOverride>][-nlp <NLPOverride>]
```

For details on parameters, refer to the **addttyprof** command above.

## Configuring a T.38 Fax Relay Profile

The fax profile is used to determine the handling of T.38 fax relay when a V21 tone is detected in a voice interface. The profile includes such information as T.38 variant, error correction mode, inactivity time-out, fax rate.

Perform the following procedure to configure a voiceband data profile.

**Step 1** VXSM automatically creates a fax profile (index = 1), with default values. Use the **dspfaxprof** command to display the current values.

**dspfaxprof** <FaxProfileIndex>

```
M8850_NY.3.VXSM.a > dspfaxprof 1
=====
                        Fax Relay Configuration Profile
=====
Fax Profile Index      :      1
Control Mode           :      t38FallbackPt
Variant of T.38 Standered :      0
Transport Protocol     :      udp
Method Used for TCF    :      network
Maximum Transmission Rate :      14400
High-Speed Data Packet Rate :      30
Low-Speed Data Redundancy :      5
High-Speed Data Redundancy :      0
Named-Signal-Event Timeout :      1000
Inactivity Timeout     :      10
Nominal Delay          :      200
Error-Correcting-Mode Status :      enable
NSF Code Override Status :      enable
NSF Manufacturing Country Code :      173
NSF Vendor Code        :      0051
SG3 Fax Spoofing       :      enable
```

Check the values in the profile and use the following steps only if additional profiles are to be created or if existing profiles are to be modified.

**Step 2** Use the **addfaxprof** command to create a fax profile. The format of this command is:

```
addfaxprof <Index> [-mode <Mode>][-t38var <T38Variant>][-bearer
<BearerTxProtocol>][-maxtx <MaxFaxTxRate>][-hspktp <HsPacketSize>][-lsred
<LsDataRedundancy>] [-hsred <HsDataRedundancy>][-nsf <NsfOverrideEnable>][-nsfcc
<NsfCountryCode>][-nsfvc <NsfVendorCode>][-nse <NseAckTimeout>][-inact
<InactivityTimeout>][-nom <FaxNominalDelay>][-ecm <T30EcmEnable>][-sg3spoof
<Sg3Spoofing>]
```

*FaxProfileIndex*—Identifies the fax profile. The entry with the value of this object set to 1 is the default fax profile for the media gateway. The default fax profile is automatically created by the system and cannot be added or deleted, but can be modified by network manager. An integer in the range of 2 to 25

**-mode**<T38Mode>—This object specifies the control mode of a fax call that the gateway will follow upon detecting a V.21 preamble.

Enter a 1 or a 2 as defined below. The default is 1.

1 = t38FallbackPassthru - When a V.21 preamble is detected, T.38 is used to manage the fax call.

If T.38 attempt fails, then a passthrough is attempted.

2 = t38Only - When a V.21 preamble is detected, T.38 will be used to handle the fax call. If T.38 attempt fails, no other modes are attempted.

**-t38var**<T38Variant>—This object specifies the ITU-T T.38 version for different packet data coding.

ITU-T T.38 has 3 different versions, enter a 0, 1, or 2 as defined below. The default is 0.

0 = T.38 06-1998 standard.  
 1 = Same as 0  
 2 = T.38 03-2002 standard




---

**Note** This parameter is not configurable.

---

**-bearer** <BearerTxProtocol>—This object specifies the transport protocol in bearer path.

Enter 1 = udp - UDP (User Datagram Protocol). The default is 1.

**-maxtx** <MaxFaxTxRate>This object specifies the maximum fax transmission rate.

Enter the number for the appropriate rate. The default is 14400 bps.

3 = 2400 bps

4 = 4800 bps

5 = 7200 bps

6 = 9600 bps

7 = 14400 bps

8 = 1200 bps

**-hspkt** <HsPacketSize>This object specifies the packet rate of primary high-speed (HS) data packet.

Enter a number as follows:

.4 = 10

6 = 20

8 = 30 (default)

10 = 40

12 = 50

14 = 60

16 = 70

18 = 80

**-lsred** <LsDataRedundancy>This object specifies the number of preceding packets of IFP (Internet Fax Protocol) packet transmission redundancy for the low-speed control information exchanged during the first phase of a T.38 fax relay connection.

Enter a number in the range 0 to 8. The default is 5.

**-hsred** <HsDataRedundancy>This object specifies the number of preceding packets of the IFP packet transmission redundancy for the high-speed control and image information exchanged following the initial low-speed phase of a T.38 fax relay connection.

Enter a number in the range 0 to 2. The default is 0

**-nsf** <NsfOverrideEnable> This object enables or disables the gateway to override the NSF (Non-Standard Facilities) code in the following T.30 signals: NSF, NSC (Non-Standard Facilities Command) and NSS (Non-Standard Facilities Set-up).

Enter 1 or 2.

- 1 = enable
- 2 = disable

**-nsfcc** <NsfCountryCode> This object specifies the country code for identifying the country where the media gateway with non-standard capabilities was manufactured. This object is applicable only if **-nsf** is set to true.

Enter a number in the range 0 to 255. The default is 173.

**-nsfvc** <NsfVendorCode> Vendor Code (also called the Terminal Provider Code) in the NSF is a two-byte field identifying the manufacturer of the media gateway with non-standard capabilities. This object is applicable only if **-nsf** is set to true.

**-nse** <NseAckTimeout> This object specifies a timeout value for NSE timer. This timer is started after sending an NSE 200 while waiting for the NSE 201 acknowledgment or NSE 202 negative acknowledgment. Expiration of the timer indicates that the request to switch to T.38 has been rejected or discarded by the far end.

Enter a number in the range 250 to 10000 ms in the increments of 250 ms. The default is 1000 ms.

**-inact** <InactivityTimeout> This object specifies a timeout value before revert to voice mode if application supports it when there is no activity in the fax relay. The value of 0 is to disable the inactivity detection.

Enter a number in the range 0 to 65535 seconds. The default is 10.

**-nom** <FaxNominalDelay> This object specifies the nominal delay in the fax relay.

Enter a number in the range 5 to 65535 ms. The default is 200.

**-ecm** <T30EcmEnable> This object enables or disables T.30 ECM (Error Correcting Mode). ECM is a feature implemented by many new fax devices which improves image quality and page compression capabilities through a reliable image data transmission protocol ECM. When the value of this object is 'true', the ECM feature is enabled. Otherwise, the ECM feature is disabled. If fax calls are failing due to high packet loss, then set this object to false may improve the fax success rate.

Enter a 1 for enable, or 2 for disable.

**-sg3** <Sg3Spoofing> This object enables or disables SG3 spoofing feature. If enabled, the SG3 machines can interoperate in T.38 fax relay network by negotiating down to G3 speed.

**Step 3** When a fax profile has been created, the parameter values can be changed with the **cnffaxprof** command. The format of this command is:

Use the **cnffaxprof** command to create a fax profile. The format of this command is:

```
cnffaxprof <Index> [-mode <Mode>][-t38var <T38Variant>][-bearer
  <BearerTxProtocol>][-maxtx <MaxFaxTxRate>][-hspktp <HsPacketSize>][-lsred
  <LsDataRedundancy>] [-hsred <HsDataRedundancy>][-nsf <NsfOverrideEnable>][-nsfcc
  <NsfCountryCode>][-nsfvc <NsfVendorCode>][-nse <NseAckTimeout>][-inact
  <InactivityTimeout>][-nom <FaxNominalDelay>][-ecm <T30EcmEnable>][-sg3spoof
  <Sg3Spoofing>]
```

For details on the parameters, refer to the **addfaxprof** command above.

## Configuring H.248 for Call Agent Controlled T.38 Fax Relay

When configuring VXSM for CA controlled T.38 Fax Relay with H.248, the H.248 protocol must be setup correctly. This involves configuring the RTP termination with the IPFAX package and the VIF termination with the CTYP package.

**Step 1** Use the **dsptermtypes** command to display all currently configured VIF termination types.

For example:

```
archer.2.VXSM.a > dsptermtypes
=====
                All Termination Types
=====
```

```

Term Type ID      Term Type      Profile ID Package IDs
=====
          1          pdnRtp          0          0-G 4-DG 6-CG 10-RTP 34-IPFAX

```

**Step 2** Check that there is a term type with package 34 (IPFAX) configured. If not, use the **cnftermtype** command to add IPFAX. The format of this command is:

```
cnftermtype -rtp <Index> <PackageIds> <ProfileId>
```

where *PackageIds* is a list of package numbers separated by commas. The list of supported packages is:

```

0 = G—Generic.
4 = DG—Basic DTMF (Dual Tone Multifrequency) tones generator.
6 = CG—Call progress tones generator.
9 = NT—Network.
10 = RTP—RTP (Real-time Transport Protocol).
12 = AN—Generic announcement.
13 - BCG—
15 = SrvTn—Basic services tone generation.
26 - GRI—
27 - RtcpXr—
28 - XrBm—
30 - DS—
32 - Xnq—
34 - IPFAX—IP fax

```

For example:

```
archer.2.VXSM.a > cnftermtype 2 0,4,6,10,34
```

**Step 3** Use the **dspvifterms** command to display all configured VIF terminations.

For example:

```

Martler.2.VXSM.a > dspvifterms
=====
                        Term in all Voice Interfaces
=====

DS1/E1   DS0 Group  GW Link Profile   Packages
=====
1.1.1.1.1   1           1           0   0-G 4-DG 5-DD 6-CG 8-CT 11-TDMC 12-AN 15-n 33-CTYP
1.1.1.2.1   1           1           0   0-G 4-DG 5-DD 6-CG 8-CT 11-TDMC 12-AN 15-n

```

**Step 4** For any VIF being configured check that the package number 33 (CTYP) is configured. If not, use the **cnfvifterm** command to add CTYP. The format of this command is:

```
cnfvifterm <LineNum> <Ds0GrpIndex> <GatewayLinkId> <H248PkgIds><ProfileIndex>
<Repetition>
```

Where:

LineNum for OC-3—(bay.line.path.vtg.vt or bay.line.path.ds1)

```

bay {1 - upper}
line (range=1..4)
path (range=1..3)
vtg (range=1..7)
vt (range=1..4)(ds1) (range=1..3)(e1)
ds1 (range=1..28)

```

LineNum for T1/E1—(bay.line)

bay {1 - upper}  
line (range=1..24)

LineNum for T3—(bay.line.ds1)

bay {1 - upper}  
line (range=1..3)  
ds1 (range=1..28)

Ds0GrpIndex—DS0 group index

T1: (range=0..23)  
E1: (range=0..30)

GatewayLinkId—Gateway link ID an integer in the range 0 to 12 (0 = delete termination). The GatewayLinkId is used to associate the physical termination with a particular virtual gateway.

H248PkgIds—H248 package IDs {(multiple IDs) | #=current value}

0 - G  
4 - DG  
5 - DD  
6 - CG  
8 - CT  
11 - TDMC  
12 - AN  
13 - BCG  
15 - SrvTn  
19 - Lltr  
20 - BCAS  
21 - RBS  
22 - OSES  
23 - AMET  
24 - BCASAddr  
25 - CASB  
26 - GRI  
31 - EriTermInfo  
33 - CTYP

#—Current packagesProfileIndex—Profile index (range=0..25)(default=0)

Enter all the packages to be supported separated by commas. For example, 0,4,6,9,10,12,15,27,28.



**Note** To add a package, it is necessary to include all the current packages that are required and the package to be added. If only the added package is specified, all the current packages will be discarded.

Repetition—Bulk provisioning number

Single DS0 configuration (range=1..8064(OC-3)/1152(T1)/1488(E1))(default=1)  
Multiple DS0 configuration (range=1..336(OC-3)/48(T1E1))(default=1)

**Step 5** Use the **dspeventmapping -v21Tone** and the **dspeventmapping -cngTone** commands to check that they have been configured. For example

```
dspeventmapping -v21Tone 1
```

```

=====
                V21 Tone Event Mapping Configuration
=====
VBD Event Mapping Index:                1
VBD Event Index                        :   v21Tone
VBD Event Handle Type                  :   fax
VBD Event Profile Index                :   1
VBD Event Handle Mode                  :   none

dspeventmapping -cngTone 1
=====
                CNG Tone Event Mapping Configuration
=====
VBD Event Mapping Index:                1
VBD Event Index                        :   cngTone
VBD Event Handle Type                  :   fax
VBD Event Profile Index                :   1
VBD Event Handle Mode                  :   none

```

- Step 6** If event mapping for either v.21 or CNG tones is not configured, use the **cnfeventmapping -v21Tone** and the **cnfeventmapping -cngTone** commands as appropriate. The format for these commands is:

```

cnfeventmapping -v21Tone<EventMappingIndex>[-hType <HandleType>]
[-prof <ProfileIndex>] [-mode<EventHandleMode>]

cnfeventmapping -cngTone<EventMappingIndex>[-hType <HandleType>]
[-prof <ProfileIndex>] [-mode<EventHandleMode>]

```

See the “Configuring Voiceband Event Mapping” section on page 5-18 for more details.



**Note** By default CNG tone is set with HandleType=none & HandleMode=none. It is preferred to keep CNG tone settings at these settings unless some Call Agent requires something different.

## Configuring Fax-Relay to Support SG3 Fax Machines at G3 Speeds

VXSM supports Super Group 3 (SG3) fax machines to interoperate over T.38 fax-relay. To configure fax-relay support for SG3 fax machines, use the following procedure:

- Step 1** Use the **cnffaxprof** command to enable SG3 Spoofing on the fax relay configuration profile.
- Step 2** Use the **cnfeventmapping** command to set the eventmapping to fax-relay (fax) with V.21 tone and associate the above configured fax relay profile with it.
- Step 3** Use the **dsprofaxprof** <fax prof index> and **dspeventmapping -v21Tone** <eventmapping index> commands to ensure fax profile pointed to by the eventmapping index has SG3 spoofing enabled.

## Associating Voice Interfaces with Event Mapping

When the event mappings and fax profiles have been setup, the user should associate these with the VIFs to which they apply. To associate an event mapping and fax profiles with particular VIF, use the following procedure.

**Step 1** To associate a VIF with a particular event mapping, use the `cnfvifeventmapping` command. The format of this command is:

```
cnfvifeventmapping <Ds1Line> <Ds0GroupIndex> <EventMappingIndex> <Repetition>
```

Use the *Ds1Line* and *Ds0GroupIndex* parameters to specify the voice circuit. Use the *EventMappingIndex* parameter to specify the event mapping to be associated with the voice circuit.

Consecutive DS0s can be associated with the same event mapping with the *Repetition* parameter.

**Step 2** Repeat the use of the **cnfvifeventmapping** command to associate any non-consecutive DS0s or DS0s to be associated with a different event mapping index.

## Configuring the Voice Quality Monitoring Feature

Before the Voice Quality Monitoring Feature can be configured, the VXSM card must be configured for VoIP applications using the H.248 call control protocol (see earlier in this chapter).

**Step 1** Use the **dspdspparam** command to view the current DSP settings.

```
archer.2.VXSM.a > dspdspparam
=====
List DSP Parameters
=====
SID Payload Type           : decimal
RTCP Control                : true
RTCP Interval(milliseconds) : 5000
RTCP Interval Multiplier   : 5
VAD Adaptive                : true
DTMF Power Level (0.1 dBm) : -120
DTMF Power Twist (0.1 dB)  : 0
RTCP Timer Control         : startRtcpPktRcvd
VQM Control                 : disable
RTCPXR Control             : enable
RTCPXR Report Frequency    : 1
VQM Default Minimum Gap    : 16
RTCPXR external R factor   : 127
SES Threshold (ms)         : 50
```

The values that apply to VQM are:

- VQM Control
- RTCPXR Control
- RTCPXR Report Frequency
- VQM Default Minimum Gap
- RTCPXR external R factor
- Severely errored seconds (SES) threshold

Determine which of these settings (if any) need to be modified.

**Step 2** Use the **cnfdspparam** command to enable VQM and modify any other VQM settings. The format of this command is:

**cnfdspparam** [-**ptype** <PayloadType>][**-control** <RTCPControl>][**-interval** <RTCPInterval>][**-multi** <RTCPRxMultiplier>][**-vadapt** <VADAdaptive>] [**-dtmfpl** <DTMFPowerLevel>][**-dtmfpt** <DTMF Power Twist>][**-rteptm** <RTCP Timer Control>][**-vqm** <VQM Control>][**-xrcontrol** <RTCPXR Control>][**-xrmulti** <RTCPXR Report Freq.>] [**-gmin** <VQM default minimum gap>][**-rext** <RTCPXR ext. R factor>][**-sest** <SES Threshold>

The last six items apply to VQM.

To use the VQM feature, the **-vqm** parameter must be set to RFC3611 or XNQ VQM.

**-vqm** <VQM Control> is used to enable or disable the VQM feature where VQM Control is:

- 1 = disable
- 2 = RFC3611 VQM
- 3 = XNQ VQM

If XNQ VQM is enabled and H.248 package 32 is configured or if RFC 3611 VQM is enabled and packages 27 or 28 are configured, this parameter cannot be used to change VQM type to RFC 3611 VQM. To make this change, use **cnftermtype** to remove package 32 or 27 and 28 first

**-xrcontrol** <RTCPXR Control> is used to enable or disable the RTCP XR protocol where RTCPXR Control is:

- 1 = enable
- 2 = disable)

This parameter is not configurable and is always set to 1 and is not enabled for XNQ VQM.

**-xrmulti** <RTCPXR Report Freq> is used to configures the RTCP XR report frequency where RTCPXR Report Freq is an integer in the range of 1 to 5.

A value of 1 to 5 sends RTCP XR report every Nth RTCP packet.

This parameter is not configurable and is always set to 1 if VQM control is XNQ VQM.

**-gmin** <VQM default minimum gap> is used to configure the minimum gap (gmin) in the report block where VQM default minimum gap is an integer in the range of 1 to 255. The default gap minimum value is used if a value is not supplied by the MGC. The default value is 16.

For XNQ VQM, this parameter is not applicable and does not take effect.



**Note** One measure of voice quality is the frequency and distribution of lost and/or discarded packets. This measure divides a stream of voice packets into bursts and gaps where a burst is a period of relatively high rate of lost or discarded packets and a gap is period of low or no lost or discarded packets.

The **-gmin** parameter is a method of distinguishing between a burst and a gap by specifying the number of consecutively received (and not discarded) packets required to be considered a gap. Thus a value of 16 would require at least 16 consecutive received packets to be a gap. A values of 200 (say) would be a much more stringent requirement for a gap and thus a more stringent measure of voice quality.

**-rext** <RTCPXR ext. R factor> is used to configure the external R factor. The external R factor is a voice quality metric describing the segment of the call that is carried over a network segment external to the RTP segment (for example, an cellular network). RTCPXR ext. R factor is an integer in the range of 1 to 100 or the value 127. A value of 94 corresponds to toll quality, whereas values of 50 or less indicate a quality that is unusable. The value of 127 indicates that an external R factor is not available.

.For XNQ VQM, this parameter is not applicable and does not take effect.

**-sest** <SES Threshold> is used to specify the threshold for determining severe errored seconds (SES). A second is characterized as a severely errored second if there is degraded performance for more than the SES threshold period within that second. This parameter is a value in the range of 10 to 1000ms in increments of 5ms. The default is 50ms.

For RFC 3611 VQM, this parameter is not applicable and has no effect.

- Step 3** If an H.248 Termination Type has already been created, use the **cnftermtype** command to configure the RTCPXR packages. Otherwise, use the **addtermtype -rtp** command to create a new H.248 term type. The formats of these commands are:

**addtermtype -rtp** <Index> <PackageIds> <ProfileId>

**cnftermtype** <Index> <PackageIds> <ProfileId>

The PackageIds that are supported are:

- 0 - G
- 4 - DG
- 6 - CG
- 9 - NT
- 10 - RTP
- 12 - AN
- 13 - BCG
- 15 - SrvTn
- 26 - GRI
- 27 - RtcpXr (requires RFC 3611 VQM to be enabled)
- 28 - XrBm (requires RFC 3611 VQM to be enabled)
- 30 - DS
- 32 - Xnq (requires XNQ VQM to be enabled)
- 34 - IPFAX
- # - use current packages

Enter all the packages to be supported separated by commas. For example, 0,4,6,9,10,12,15,27,28.



**Note** To add a package, it is necessary to include all the current packages that are required and the package to be added. If only the added package is specified, all the current packages will be discarded.

The profileId field represents the property profile identifier with which the terminations within this termination type are to be associated.

The valid value for this parameter is a number in the range from 0 – 25, with a default value of 0.



**Note** The following steps 4, 5, 6, 7, 8, and 9 are needed only if RFC 3611 VQM is enabled.

- Step 4** The VXSM RFC3611 VQM feature uses a VQM profile to determine the conditions under which an alert or SNMP trap is triggered. A VQM profile contains a number of voice quality metrics where each metric specifies a reference value and a threshold percentage value. If an actual measured VQM metric (for example, round trip delay or voice packet loss rate) deviates from its reference value in the profile by more than the threshold percentage, an alert is triggered. All references and threshold percentages have built in default values.



**Note** An alert is triggered only if the deviation is in a direction that causes a worsening of voice quality. For example, if the Packet Loss Rate has a reference value of 10 and a threshold percentage of 20 percent, an alert is triggered if the rate exceeds 12 (10 + 20% of 10) indicating that voice quality has worsened. However, an alert is not triggered if the rate falls below 8 (10 - 20% of 10) indicating that voice quality has improved.

By default, the VXSM card automatically creates a voice quality monitoring profile with a profile number of 1. This profile cannot be added or deleted but it can be modified using the **cnfvqmthreshprof** command (see step 6 below for details). The user can either accept or modify profile #1 or create a new one. To create a new VQM threshold profile, use the **advvqmthreshprof** command. The format of this command is:

**advvqmthreshprof** <VQM Profile Index>

Where VQM Profile Index is an integer in the range 2 to 16. A profile with an index of 1 is automatically added. This profile can be modified but it cannot be deleted.

The reference and percentage values in the profile can be displayed with the **dspvqmthreshprof** command which has a voice format and a voiceband data format as follows:

**dspvqmthreshprof -vbd** <VQM Profile Index>

**dspvqmthreshprof -voice** <VQM Profile Index>

For example:

```
archer.2.VXSM.a > dspvqmthreshprof -voice 1
=====
                        VQM Threshold Profile (voice)
=====
Index                               :      1
Packet Loss Rate Ref. Value         :     100
Packet Loss Rate Alert Threshold Percentage(%) :    10
Jitter Buffer Discard Rate Ref. Value :     100
Jitter Buffer Discard Rate Alert Threshold Percentage(%) :    10
Nominal Jitter Level Ref. Value(ms) :      75
Nominal Jitter Level Alert Threshold Percentage(%) :    20
Inter-arrival Jitter Ref. Value(ms)  :      50
Inter-arrival Jitter Alert Threshold Percentage(%) :    20
Packet Round Trip Delay Ref. Value(ms) :    2000
Packet Round Trip Delay Alert Threshold Percentage(%) :    10
End System Delay Ref. Value(ms)      :     500
End System Delay Alert Threshold Percentage(%) :    25
Local Residual Echo Return Loss Ref. Value(dB) :     40
Local Residual Echo Return Loss Alert Threshold Percentage(%) :    50
G.711a conversational R factor Ref. Value :     85
G.711a conversational R factor Alert Threshold Percentage(%) :    10
G.711a conversational MOS Ref. Value :     42
G.711a conversational MOS Alert Threshold Percentage(%) :    10
G.711a listening MOS Ref. Value      :     45
G.711a listening MOS Alert Threshold Percentage(%) :    10
G.711u conversational R factor Ref. Value :     85
G.711u conversational R factor Alert Threshold Percentage(%) :    10
G.711u conversational MOS Ref. Value :     42
G.711u conversational MOS Alert Threshold Percentage(%) :    10
G.711u listening MOS Ref. Value      :     45
G.711u listening MOS Alert Threshold Percentage(%) :    10
G.723Lo conversational R factor Ref. Value :     60
G.723Lo conversational R factor Alert Threshold Percentage(%) :     6
G.723Lo conversational MOS Ref. Value :     31
G.723Lo conversational MOS Alert Threshold Percentage(%) :     6
```

|                                                                |   |    |
|----------------------------------------------------------------|---|----|
| G.723Lo listening MOS Ref. Value                               | : | 33 |
| G.723Lo listening MOS Alert Threshold Percentage(%)            | : | 6  |
| G.723Hi conversational R factor Ref. Value                     | : | 60 |
| G.723Hi conversational R factor Alert Threshold Percentage(%)  | : | 6  |
| G.723Hi conversational MOS Ref. Value                          | : | 32 |
| G.723Hi conversational MOS Alert Threshold Percentage(%)       | : | 6  |
| G.723Hi listening MOS Ref. Value                               | : | 34 |
| G.723Hi listening MOS Alert Threshold Percentage(%)            | : | 6  |
| G.723aLo conversational R factor Ref. Value                    | : | 60 |
| G.723aLo conversational R factor Alert Threshold Percentage(%) | : | 6  |
| G.723aLo conversational MOS Ref. Value                         | : | 31 |
| G.723aLo conversational MOS Alert Threshold Percentage(%)      | : | 6  |
| G.723aLo listening MOS Ref. Value                              | : | 33 |
| G.723aLo listening MOS Alert Threshold Percentage(%)           | : | 6  |
| G.723aHi conversational R factor Ref. Value                    | : | 60 |
| G.723aHi conversational R factor Alert Threshold Percentage(%) | : | 6  |
| G.723aHi conversational MOS Ref. Value                         | : | 32 |
| G.723aHi conversational MOS Alert Threshold Percentage(%)      | : | 6  |
| G.723aHi listening MOS Ref. Value                              | : | 34 |
| G.723aHi listening MOS Alert Threshold Percentage(%)           | : | 6  |
| G.726-32 conversational R factor Ref. Value                    | : | 70 |
| G.726-32 conversational R factor Alert Threshold Percentage(%) | : | 15 |
| G.726-32 conversational MOS Ref. Value                         | : | 38 |
| G.726-32 conversational MOS Alert Threshold Percentage(%)      | : | 10 |
| G.726-32 listening MOS Ref. Value                              | : | 40 |
| G.726-32 listening MOS Alert Threshold Percentage(%)           | : | 10 |
| G.729a conversational R factor Ref. Value                      | : | 65 |
| G.729a conversational R factor Alert Threshold Percentage(%)   | : | 8  |
| G.729a conversational MOS Ref. Value                           | : | 32 |
| G.729a conversational MOS Alert Threshold Percentage(%)        | : | 8  |
| G.729a listening MOS Ref. Value                                | : | 35 |
| G.729a listening MOS Alert Threshold Percentage(%)             | : | 8  |
| G.729ab conversational R factor Ref. Value                     | : | 65 |
| G.729ab conversational R factor Alert Threshold Percentage(%)  | : | 8  |
| G.729ab conversational MOS Ref. Value                          | : | 32 |
| G.729ab conversational MOS Alert Threshold Percentage(%)       | : | 8  |
| G.729ab listening MOS Ref. Value                               | : | 35 |
| G.729ab listening MOS Alert Threshold Percentage(%)            | : | 8  |

**Step 5** If any of the current values in the VQM threshold profile needs changing, use the **cnfvqmthreshprof** to make the changes. This command permits a large set of reference and percentage values to be configured in the profile as follows:

**cnfvqmthreshprof -vplr** <VQM Profile Index> <Voice Packet Loss Rate Ref> <Voice Packet Loss Rate Alert Thresh. Percentage>

**cnfvqmthreshprof -vjbd** <VQM Profile Index> <Voice Jitter Buffer Discard Rate Ref> <Voice Jitter Buffer Discard Rate Alert Thresh. Percentage>

**cnfvqmthreshprof -njit** <VQM Profile Index> <Nominal Jitter Level Ref> <Nominal Jitter Level Alert Thresh. Percentage>

**cnfvqmthreshprof -intj** <VQM Profile Index> <Voice Inter-arrival Jitter Ref> <Voice Inter-arrival Jitter Alert Thresh. Percentage>

**cnfvqmthreshprof -rtd** <VQM Profile Index> <Voice Packet Round Trip Delay Ref> <Voice Packet Round Trip Delay Alert Thresh. Percentage>

**cnfvqmthreshprof -esd** <VQM Profile Index> <Voice End System Delay Ref> <Voice End System Delay Alert Thresh. Percentage>

**cnfvqmthreshprof -lrerl** <VQM Profile Index> <Voice Local Residual Echo Return Loss Ref> <Voice Local Residual Echo Return Loss Alert Thresh. Percent.>

**cnfvqmthreshprof -moslq711a** <VQM Profile Index> <G.711a listening MOS Ref> <G.711a listening MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -moscq711a** <VQM Profile Index> <G.711a conversational MOS Ref>  
<G.711a conversational MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -rcq711a** <VQM Profile Index> <G.711a conversational R factor Ref> <G.711a conversational R factor Alert Thresh. Percentage>

**cnfvqmthreshprof -moslq711u** <VQM Profile Index> <G.711u listening MOS Ref> <G.711u listening MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -moscq711u** <VQM Profile Index> <G.711u conversational MOS Ref> <G.711u conversational MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -rcq711u** <VQM Profile Index> <G.711u conversational R factor Ref> <G.711u conversational R factor Alert Thresh. Percentage>

**cnfvqmthreshprof -moscq723Hi** <VQM Profile Index> <G.723-H conversational MOS Ref>  
<G.723-H conversational MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -rcq723Hi** <VQM Profile Index> <G.723-H conversational R factor Ref>  
<G.723-H conversational R factor Alert Thresh. Percentage>

**cnfvqmthreshprof -moslq723Hi** <VQM Profile Index> <G.723-H listening MOS Ref> <G.723-H listening MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -moscq723Lo** <VQM Profile Index> <G.723-L conversational MOS Ref>  
<G.723-L conversational MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -rcq723Lo** <VQM Profile Index> <G.723-L conversational R factor Ref>  
<G.723-L conversational R factor Alert Thresh. Percentage>

**cnfvqmthreshprof -moslq723Lo** <VQM Profile Index> <G.723-L listening MOS Ref> <G.723-L listening MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -moscq723aHi** <VQM Profile Index> <G.723a-H conversational MOS Ref>  
<G.723a-H conversational MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -rcq723aHi** <VQM Profile Index> <G.723a-H conversational R factor Ref>  
<G.723a-H conversational R factor Alert Thresh. Percentage>

**cnfvqmthreshprof -moslq723aHi** <VQM Profile Index> <G.723a-H listening MOS Ref> <G.723a-H listening MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -moscq723aLo** <VQM Profile Index> <G.723a-L conversational MOS Ref>  
<G.723a-L conversational MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -rcq723aLo** <VQM Profile Index> <G.723a-L conversational R factor Ref>  
<G.723a-L conversational R factor Alert Thresh. Percentage>

**cnfvqmthreshprof -moslq723aLo** <VQM Profile Index> <G.723a-L listening MOS Ref> <G.723a-L listening MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -moslq726** <VQM Profile Index> <G.726-32 listening MOS Ref> <G.726-32 listening MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -moscq726** <VQM Profile Index> <G.726-32 conversational MOS Ref> <G.726-32 conversational MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -rcq726** <VQM Profile Index> <G.726-32 conversational R factor Ref> <G.726-32 conversational R factor Alert Thresh. Percentage>

**cnfvqmthreshprof -moslq729ab** <VQM Profile Index> <G.729ab listening MOS Ref> <G.729ab listening MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -moscq729ab** <VQM Profile Index> <G.729ab conversational MOS Ref> <G.729ab conversational MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -rcq729ab** <VQM Profile Index> <G.729ab conversational R factor Ref> <G.729ab conversational R factor Alert Thresh. Percentage>

**cnfvqmthreshprof -moslq729a** <VQM Profile Index> <G.729a listening MOS Ref> <G.729a listening MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -moscq729a** <VQM Profile Index> <G.729a conversational MOS Ref> <G.729a conversational MOS Alert Thresh. Percentage>

**cnfvqmthreshprof -rcq729a** <VQM Profile Index> <G.729a conversational R factor Ref> <G.729a conversational R factor Alert Thresh. Percentage>

**cnfvqmthreshprof -vbdinterjit** <VQM Profile Index> <VBD Inter-arrival Jitter Ref> <VBD Inter-arrival Jitter Alert Thresh. Percentage>

**cnfvqmthreshprof -vbdjbdr** <VQM Profile Index> <VBD Jitter Buffer Discard Rate Ref> <VBD Jitter Buffer Discard Rate Alert Thresh. Percentage>

**cnfvqmthreshprof -vbdplr** <VQM Profile Index> <VBD Packet Loss Rate Ref> <VBD Packet Loss Rate Alert Thresh. Percentage>

The description, range, and default value for each parameter are shown in [Table 5-4](#). For each parameter, there is a reference value and a threshold percentage. If the measured value of the parameter deviates from the reference value by more than the threshold percentage, an alert is generated.

**Table 5-4 VQM Reference Ranges and Defaults**

| Parameter                            | Description                      | Reference Range and Default Values                                                                                                                        |
|--------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>-vplr</b><br><PktLossRate>        | Voice Packet Loss Rate           | Voice Packet Loss Rate: Rate is (1 to 100 default is 5)<br>Voice Packet Loss Rate Alert Thresh. Percentage (0 to 99, default is 10)                       |
| <b>-vjbdr</b><br><JBDDiscardRate>    | Voice Jitter Buffer Discard Rate | Voice Jitter Buffer Discard Rate: Range is (1 to 100, default is 11)<br>Voice Jitter Buffer Discard Rate Alert Thresh. Percentage (0 to 99, default is 1) |
| <b>-njit</b><br><NomJitterLevel>     | Nominal Jitter Level             | Nominal Jitter Level: Range is (1 to 65535, default is 50)<br>Nominal Jitter Level Alert Thresh. Percentage (0 to 99, default is 20)                      |
| <b>-intj</b><br><IntArrJitter>       | Voice Inter-arrival Jitter       | Voice Inter-arrival Jitter: Range is (1 to 65535, default is 50)<br>Voice Inter-arrival Jitter Alert Thresh. Percentage (0 to 99, default is 20)          |
| <b>-rtd</b><br><RoundTripDelay><br>> | Voice Packet Round Trip Delay    | Voice Packet Round Trip Delay: Range is (1 to 65535, default is 1000)<br>Voice Packet Round Trip Delay Alert Thresh. Percentage (0 to 99, default is 10)  |

|                                                |                                       |                                                                                                                                                                          |
|------------------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>-esd</b><br><EndSystemDelay<br>>            | Voice End System Delay                | Voice End System Delay: Range is (1 to 65535, default is 200)<br><br>Voice End System Delay Alert Thresh. Percentage (0.99, default is 10)                               |
| <b>-lrerl</b><br><LocalRERL>                   | Voice Local Residual Echo Return Loss | Voice Local Residual Echo Return Loss: Range is (1 to 100, default is 40)<br><br>Voice Local Residual Echo Return Loss Alert Thresh. Percentage (0 to 99, default is 10) |
| <b>-rcq711a</b><br><codec G.711a<br>RCQ>       | G.711a conversational R factor        | G.711a conversational R factor: Range is (1 to 100, default is 93)<br><br>G.711a conversational R factor Alert Thresh. Percentage (0 to 99, default is 20)               |
| <b>-moscq711a</b><br><codec G.711a<br>MOSQ>    | G.711a conversational MOS             | G.711a conversational MOS: Range is (10 to 50, default is 42)<br><br>G.711a conversational MOS Alert Thresh. Percentage (0 to 99, default is 14)                         |
| <b>-moslq711a</b><br><codec G.711a<br>MOSLQ>   | G.711a listening MOS                  | G.711a listening MOS: Range is (10 to 50, default is 42)<br><br>G.711a listening MOS Alert Thresh. Percentage (0 to 99, default is 5)                                    |
| <b>-rcq711u</b><br><codec G.711u<br>RCQ>       | G.711u conversational R factor        | G.711u conversational R factor: Range is (1 to 120, default is 93)<br><br>G.711u conversational R factor Alert Thresh. Percentage (0 to 99, default is 20)               |
| <b>-moscq711u</b><br><codec G.711u<br>MOSQ>    | G.711u conversational MOS             | G.711u conversational MOS: Range is (10 to 50, default is 42)<br><br>G.711u conversational MOS Alert Thresh. Percentage (0 to 99, default is 14)                         |
| <b>-moslq711u</b><br><codec G.711u<br>MOSLQ>   | G.711u listening MOS                  | G.711u listening MOS: Range is (10 to 50, default is 42)<br><br>G.711u listening MOS Alert Thresh. Percentage (0 to 99, default is 5)                                    |
| <b>-req723Hi</b><br><codec G.723-H<br>RCQ>     | G.723Hi conversational R factor       | [G.723Hi conversational R factor Ref (0..100 def=78)]<br><br>[G.723Hi conversational R factor Alert Thresh. Percentage (0..99 def=23)]                                   |
| <b>-moscq723Hi</b><br><codec G.723-H<br>MOSQ>  | G.723Hi conversational MOS            | [G.723Hi conversational MOS Ref (10..50 def=38)]<br><br>[G.723Hi conversational MOS Alert Thresh. Percentage (0..99 def=21)]                                             |
| <b>-moslq723Hi</b><br><codec G.723-H<br>MOSLQ> | G.723Hi listening MOS                 | [G.723Hi listening MOS Ref (10..50 def=38)]<br><br>[G.723Hi listening MOS Alert Thresh. Percentage (0..99 def=9)]                                                        |

|                                                  |                                  |                                                                                                                                                            |
|--------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>-req723Lo</b><br><codec G.723-L<br>RCQ>       | G.723Lo conversational R factor  | [G.723Lo conversational R factor Ref (0..100 def=74)]<br>[G.723Lo conversational R factor Alert Thresh. Percentage (0..99 def=23)]                         |
| <b>-moscq723Lo</b><br><codec G.723-L<br>MOSQ>    | G.723Lo conversational MOS       | [G.723Lo conversational MOS Ref (10..50 def=36)]<br>[G.723Lo conversational MOS Alert Thresh. Percentage (0..99 def=22)]                                   |
| <b>-moslq723Lo</b><br><codec G.723-L<br>MOSLQ>   | G.723Lo listening MOS            | [G.723Lo listening MOS Ref (10..50 def=36)]<br>[G.723Lo listening MOS Alert Thresh. Percentage (0..99 def=9)]                                              |
| <b>-req723aHi</b><br><codec G.723a-H<br>RCQ>     | G.723aHi conversational R factor | [G.723aHi conversational R factor Ref (0..100 def=78)]<br>[G.723aHi conversational R factor Alert Thresh. Percentage (0..99 def=23)]                       |
| <b>-moscq723aHi</b><br><codec G.723a-H<br>MOSQ>  | G.723aHi conversational MOS      | [G.723aHi conversational MOS Ref (10..50 def=38)]<br>[G.723aHi conversational MOS Alert Thresh. Percentage (0..99 def=21)]                                 |
| <b>-moslq723aHi</b><br><codec G.723a-H<br>MOSLQ> | G.723aHi listening MOS           | [G.723aHi listening MOS Ref (10..50 def=38)]<br>[G.723aHi listening MOS Alert Thresh. Percentage (0..99 def=9)]                                            |
| <b>-req723aLo</b><br><codec G.723a-L<br>RCQ>     | G.723aLo conversational R factor | [G.723aLo conversational R factor Ref (0..100 def=74)]<br>[G.723aLo conversational R factor Alert Thresh. Percentage (0..99 def=23)]                       |
| <b>-moscq723aLo</b><br><codec G.723a-L<br>MOSQ>  | G.723aLo conversational MOS      | [G.723aLo conversational MOS Ref (10..50 def=36)]<br>[G.723aLo conversational MOS Alert Thresh. Percentage (0..99 def=22)]                                 |
| <b>-moslq723aLo</b><br><codec G.723a-L<br>MOSLQ> | G.723aLo listening MOS           | [G.723aLo listening MOS Ref (10..50 def=36)]<br>[G.723aLo listening MOS Alert Thresh. Percentage (0..99 def=9)]                                            |
| <b>-rcq726</b><br><codec G.726<br>RCQ>           | G.726-32 conversational R factor | G.726-32 conversational R factor: Range is (1 to 100, default is 81)<br>G.726-32 conversational R factor Alert Thresh. Percentage (0 to 99, default is 22) |
| <b>-moscq726</b><br><codec G.726<br>MOSQ>        | G.726-32 conversational MOS      | G.726-32 conversational MOS: Range is (10 to 50, default is 39)<br>G.726-32 conversational MOS Alert Thresh. Percentage (0 to 99, default is 20)           |

|                                                |                                 |                                                                                                                                                          |
|------------------------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>-moslq726</b><br><codec G.726<br>MOSLQ>     | G.726-32 listening MOS          | G.726-32 listening MOS: Range is (10 to 50, default is 39)<br>G.726-32 listening MOS Alert Thresh. Percentage (0 to 99, default is 8)                    |
| <b>-rcq729a</b><br><codec G.729a<br>RCQ>       | G.729a conversational R factor  | G.729a conversational R factor: Range is (1 to 100, default is 82)<br>G.729a conversational R factor Alert Thresh. Percentage (0 to 99, default is 22)   |
| <b>-moscq729a</b><br><codec G.729a<br>MOSLQ>   | G.729a conversational MOS       | G.729a conversational MOS: Range is (10 to 50, default is 39)<br>G.729a conversational MOS Alert Thresh. Percentage (0 to 99, default is 19)             |
| <b>-moslq729a</b><br><codec G.729a<br>MOSLQ>   | G.729a listening MOS            | G.729a listening MOS: Range is (10 to 50, default is 39)<br>G.729a listening MOS Alert Thresh. Percentage (0 to 99, default is 8)                        |
| <b>-rcq729ab</b><br><codec G.729ab<br>RCQ>     | G.729ab conversational R factor | G.729ab conversational R factor: Range is (1 to 100, default is 82)<br>G.729ab conversational R factor Alert Thresh. Percentage (0 to 99, default is 22) |
| <b>-moscq729ab</b><br><codec G.729ab<br>MOSLQ> | G.729ab conversational MOS      | G.729ab conversational MOS: Range is (10 to 50, default is 39)<br>G.729ab conversational MOS Alert Thresh. Percentage (0 to 99, default is 19)           |
| <b>-moslq729ab</b><br><codec G.729ab<br>MOSLQ> | G.729ab listening MOS           | G.729ab listening MOS: Range is (10 to 50, default is 39)<br>G.729ab listening MOS Alert Thresh. Percentage (0 to 99, default is 8)                      |
| <b>-vbdplr</b><br><vbd<br>PktLossRate>         | VBD Packet Loss Rate            | VBD Packet Loss Rate: Range is (1 to 100, default is 2)<br>VBD Packet Loss Rate Alert Thresh. Percentage (0 to 99, default is 10)                        |
| <b>-vbdjbdr</b><br><vbd<br>JBDiscardRate>      | VBD Jitter Buffer Discard Rate  | VBD Jitter Buffer Discard Rate: Range is (1 to 100, default is 2)<br>VBD Jitter Buffer Discard Rate Alert Thresh. Percentage (0 to 99, default is 10)    |
| <b>-vbdinterjit</b><br><vbd IntArrJitter>      | VBD Inter-arrival Jitter        | VBD Inter-arrival Jitter: Range is (1 to 65535, default is 50)<br>VBD Inter-arrival Jitter Alert Thresh. Percentage (0 to 99, default is 20)             |

**Step 6** VXSM supports one trigger per call at any one time and there is no support for multiple simultaneous triggers in a single call. With the reference and threshold values for each of the VQM parameters set in the VQM threshold profile, each T1/E1 interface can be configured with its own single trigger parameter. In addition, a default trigger parameter can be configured for the whole gateway or a virtual gateway. If both the default gateway trigger parameter and T1/E1 interface level trigger parameters are configured, the quality alert will be based on the T1/E1 interface trigger metric.

Use the **cnfvqmtrigger** command to specify which alert parameter(s) should trigger an alert.

The formats of this command are as follows:

- **cnfvqmtrigger -gw** <VoiceType><VbdType>[-**profileId** <VQM Profile Index>]

This form of the command specifies default voice and voiceband trigger types for the gateway.

**cnfvqmtrigger -vgw** <Alert Trigger Index> <VoiceType><VbdType>[-**profileId** <VQM Profile Index>]

This form of the command specifies default voice and voiceband trigger types for a virtual gateway.

- **cnfvqmtrigger -e1** <Alert Trigger Index><VoiceType><VbdType>[-**profileId** <VQM Profile Index>]

This form of the command specifies voice and voiceband trigger types for a specific E1 interface. The interface is specified in the *Alert Trigger Index* in the form <bay.line.path.vtg.vt>.

- **cnfvqmtrigger -ds1** <Alert Trigger Index><VoiceType><VbdType>[-**profileId** <VQM Profile Index>]

This form of the command specifies voice and voiceband trigger types for a specific DS1 interface. The interface is specified in the *Alert Trigger Index* in the form <bay.line.path.vtg.vt> or <bay.line.path.ds1>

Voice and Voiceband Data trigger types are specified as follows:

For voice

- 1 - Not Config.
  - 2 - Packet Loss Rate
  - 3 - Jitter Buffer Discard Rate
  - 4 - Inter Arrival Jitter
  - 5 - Nominal Jitter Level
  - 6 - Packet Round Trip Delay
  - 7 - End System Delay
  - 8 - Local Residual Echo Return Loss
  - 9 - conversational R factor
  - 10 - conversational MOS
  - 11 - listening MOS
  - 255 - none(default)
- The default is 255

For voiceband data

- 1 = not configured
- 2 = Packet loss rate
- 3 - Jitter Buffer Discard Rate
- 4 - Inter Arrival Jitter
- 255 = disabled

The default is 255



**Note** Trigger types are shown in [Table 5-5](#).

For the profileId parameter, select the alert threshold profile for threshold values in the range from 1 to 16, the default value is 1.

**Table 5-5 VQM Trigger Types**

| Quality Alert Trigger           | DSP Parameter    | Alert Qualification                                                                                                                                                                                                                                                                                                                                                 | Voice Phase Trigger | VBD Phase Trigger |
|---------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------|
| Local End System Delay          | End System Delay | Instantaneous values above or below threshold must be integrated over a time interval of at least 1 second.                                                                                                                                                                                                                                                         | Yes                 | No                |
| Pkt Rnd Trip Delay              | Round Trip Delay | Instantaneous values above threshold must be integrated over 3 consecutive crossings which correspond roughly to a time interval of approximately 15 seconds. (typically 3 RTCP report intervals).                                                                                                                                                                  | Yes                 | No                |
| Cumulative Packet Loss Ratio    | Loss Rate        | No further verification necessary. This threshold crossing already represents averages over a suitable interval for transience or persistence verification                                                                                                                                                                                                          | Yes                 | Yes               |
| Cumulative Packet Discard Ratio | Discard Rate     | No further verification necessary. This threshold crossing already represents averages over a suitable interval for transience or persistence verification.                                                                                                                                                                                                         | Yes                 | Yes               |
| RFC3550 Inter-arrival Jitter    | RFC 3550 Jitter  | Averaged inter-arrival jitter J is a smoothed estimation of jitter. Thus average jitter J needs no further verification except at the beginning of a call where the total elapsed time interval must be at least 10 seconds for this metric to be valid. During the first 10 seconds, no alert will be generated due to invalid value for the inter-arrival jitter. | Yes                 | Yes               |
| MOS_LQ                          | MOS_LQ           | MOS_LQR similar to R-factor (see below) is a smoothed average over a time interval (10seconds) and hence need no further verification.                                                                                                                                                                                                                              | Yes                 | No                |

**Table 5-5 VQM Trigger Types (continued)**

|                            |              |                                                                                                                                                                                                                                                                               |     |    |
|----------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|
| MOS_CQ                     | MOS_CQ       | MOS_CQR similar to R-factor (see below) is a smoothed average over a time interval (10seconds) and hence need no further verification.                                                                                                                                        | Yes | No |
| R-Factor                   | R Factor     | R-factor similar is a smoothed average over a time interval (10seconds) and hence need no further verification.                                                                                                                                                               | Yes | No |
| Nominal Jitter Buffer Size | JB Nom Delay | Nominal jitter buffer size is already integrated over several samples (e.g. time) hence no further verification is necessary except at connection start. Averages should be over a total elapsed time of not less than 10 seconds to be meaningful.                           | Yes | No |
| RERL                       | RERL dB      | RERL = ERL+ERLE is a measure of the total echo loss imposed by the system. Instantaneous values above threshold must be integrated over 3 consecutive crossings which correspond roughly to a time interval of approximately 15 seconds. (typically 3 RTCP report intervals). | Yes | No |

**Step 7** If alert traps are to be sent to an SNMP network manager, use the **cnfvqmtrap** command to enable traps. The format of this command is:

**cnfvqmtrap** <Trap Enable>

For Trap Enable

1 = true (enable)

2 = false (disable)

**Step 8** If traps and/or events are generated at a very high rate, VXSM performance can be adversely affected. The **cnfvqmthrottle** command can be used to control the rate at which traps and events are generated.

There are two formats for the command, one for traps and one for events.

For traps, the format of the command is:

**cnfvqmthrottle -trap** [Trap Rate] [Trap Rate Interval]

*Trap Rate* is expressed as maximum traps per second in the range 1 to 1000 with a default of 100.

*Trap Rate Interval* is expressed as an integer with the value of 0 or a value in the range of 100 to 60,000 ms with a default of 1000 ms

For events, the format of the command is:

**cnfvqmthrottle -event** [Event Rate] [Event Rate Interval]

*Event Rate* is expressed as maximum traps per second in the range 1 to 1000 with a default of 100.

*Event Rate Interval* is expressed as an integer with the value of 0 or a value in the range of 100 to 60,000 ms with a default of 1000 ms.



**Note** Trap and Event rates and intervals can be configured only if the value for rate divided by the value for interval produce a result between 10 and 100 traps or events per second.

A rate interval value of 0, disables the throttle.

**Step 9** The **cnfvqmhistory** command can be used to configure how the history file is reported to a network management system. This command has a variety of formats as shown below.

```
cnfvqmhistory -vgw <VQM History Index> [-name <Group Name>][-reset <Reset VQM History Data>]
```

```
cnfvqmhistory -gw [-name <Group Name>][-reset <Reset VQM History Data>]
```

```
cnfvqmhistory -bpvc <VQM History Index> [-name <Group Name>][-reset <Reset VQM History Data>]
```

```
cnfvqmhistory -au4 <VQM History Index> [-name <Group Name>][-reset <Reset VQM History Data>]
```

```
cnfvqmhistory -au3 <VQM History Index> [-name <Group Name>][-reset <Reset VQM History Data>]
```

```
cnfvqmhistory -sts <VQM History Index> [-name <Group Name>][-reset <Reset VQM History Data>]
```

```
cnfvqmhistory -stm1 <VQM History Index> [-name <Group Name>][-reset <Reset VQM History Data>]
```

```
cnfvqmhistory -oc3 <VQM History Index> [-name <Group Name>][-reset <Reset VQM History Data>]
```

```
cnfvqmhistory -e1 <VQM History Index> [-name <Group Name>][-reset <Reset VQM History Data>]
```

```
cnfvqmhistory -ds1 <VQM History Index> [-name <Group Name>][-reset <Reset VQM History Data>]
```

The history table has multiple entries in which each entry tracks the history of a set of calls in a region. A history entries are grouped according to the following characteristics:

- 1 entry per T1/E1 interface (maximum of 336 entries)
- 1 entry per STS/AU3 path (a total of 12 entries)
- 1 entry per OC-3/STM1 line (a total of 4 entries)
- 1 entry per bearer IP interface (a total of 8 entries)
- 1 entry per virtual gateway
- 1 entry for gateway

The VQM History Index parameter defines the history entry as follows:

| Command            | VQM History Index Parameter and Ranges  |
|--------------------|-----------------------------------------|
| cnfvqmhistory -gw  |                                         |
| cnfvqmhistory -vgw | <vgwIndex><br>vgwIndex range is 1 to 12 |

| Command                             | VQM History Index Parameter and Ranges                                                                                                                                                                                                                  |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| cnfvqmhistory -bpvc                 | <vpi.vci><br>vpi range is 0 to 255<br>vci range is 0 to 65535                                                                                                                                                                                           |
| cnfvqmhistory -oc3                  | <bay.line><br>bay range is 1<br>line range is 1 to 4                                                                                                                                                                                                    |
| cnfvqmhistory -stm1                 | <bay.line><br>bay range is 1<br>line range is 1 to 4                                                                                                                                                                                                    |
| cnfvqmhistory -sts                  | <bay.line.path><br>bay range is 1<br>line range is 1 to 4<br>path range is 1 to 3                                                                                                                                                                       |
| cnfvqmhistory -au3                  | <bay.line.path><br>bay range is 1<br>line range is 1 to 4<br>path range is 1 to 3                                                                                                                                                                       |
| cnfvqmhistory -au4                  | <bay.line.path><br>bay range is 1<br>line range is 1 to 4<br>path range is 1                                                                                                                                                                            |
| cnfvqmhistory -ds1                  | <bay.line.path.vtg.vt><br>bay range is 1 line range is 1 to 4 path range is 1 to 3<br>vtg range is 1 to 7<br>vt range is 1 to 4 or<br><br><bay.line.path.ds1><br>bay range is 1<br>line range is 1 to 4<br>path range is 1 to 3<br>ds1 range is 1 to 28 |
| cnfvqmhistory -e1                   | <bay.line.path.vtg.vt><br>bay range is 1<br>line range is 1 to 4<br>path range is 1 to 3<br>vtg range is 1 to 7<br>vt range is 1 to 3                                                                                                                   |
| cnfvqmhistory -ln (T1/E1 card only) | <bay.line><br>bay range is 1 to 2<br>line range is 1 to 24                                                                                                                                                                                              |

| Command                           | VQM History Index Parameter and Ranges                                                |
|-----------------------------------|---------------------------------------------------------------------------------------|
| cnfvqmhistory -t3 (T3 card only)  | <bay.line><br>bay range is 1 to 2<br>line range is 1 to 3                             |
| cnfvqmhistory -ds1 (T3 card only) | <bay.line.ds1><br>bay range is 1 to 2<br>line range is 1 to 3<br>ds1 range is 1 to 28 |

The **-name** <Group Name> and **-reset** <Reset VQM History Data> parameters are common to all command formats.

The **-name** <Group Name> parameter is a user defined name to identify the group. This parameter is a text field with 1 to 128 characters.

The **-reset** *<Reset VQM History Data>* parameter is defined as:

- 1 = run
- 2 = stop
- 3 = reset



**Note** For each `cnfvqmhistory` command, VXSM has an equivalent `dspvqmhistory` command.

## Configuring Online Diagnostic Feature

The online diagnostics feature as implemented on the PXM45 card is supported on VXSM Release 5.0. When enabled using the PXM45 **cnfdiag** command, this feature performs nonintrusive diagnostic tests that use four of the VXSM's DSP codecs.

If the user executes the VXSM **dspspcodecpools** command, the resulting display shows the four codecs being used (for diagnostics) and subtracts them from the remaining available codecs (see example below).

```
MGX8850.9.VXSM.a > dspspcodecpools
=====
                    DSP codec capacity usage
=====

Codec pool          Current utilized   Current available
                    capacity (#calls)   capacity (#calls)
=====
G711 family                4                8060
G729/G726/T.38 family    0                4030
G723 family                0                3022
```

The online diagnostics feature does not reduce the maximum number of 8064 codecs available for calls on the VXSM card. If the number of call requests on the VXSM is sufficiently high, the online diagnostic feature is disabled automatically and the four codecs are made available for active calls.

## Configuring for Jitter Compensation

Configuring for jitter compensation is a matter of setting values for minimum, maximum, and nominal delays in the appropriate commands. The procedure is different between voice codec jitter and the various form of voiceband data.

### Jitter Delay for Voice Codecs

For voice codec transmissions (or Clear Channel for trunking signaling data), configuration of jitter delay is performed using the **cnfcodeparam** command.

This command has the format:

```
cnfcodeparam <AdaptationType> <CodecIndex> [-pref <Preference>]
[-vpktp <VoicePktPeriod>] [-vbdpkt <VBDPktPeriod>] [-mode <JitterMode>]
[-max <MaxDelay>] [-nom <NomDelay>] [-min <MinDelay>] [-dtmf <DtmfRelay>]
[-payload <PayloadType>]
```

The relevant jitter delay parameters are

**-mode** <JitterMode>, **-max** <MaxDelay>, **-nom** <NomDelay>, and **-min** <MinDelay>]

- 
- Step 1** Set the jitter mode parameter to either 1 for adaptive mode or 2 for fixed mode. Adaptive mode is normally used for voice codecs, fixed mode is normally used clear channel.
- Step 2** Enter a value, in milliseconds, for the nominal delay. The value should be the expected average jitter experienced on the arriving packets.
- For voice codecs, the permissible range of values that can be entered is 5 – 135 ms.  
In the absence of any other knowledge, the default value specified in the **cnfcodecparam** command generally operates satisfactorily.
- For clear channel enter a value of 70 ms
- Step 3** Enter a maximum delay value, in milliseconds, that is greater than the value for the nominal delay.
- For voice codecs, the permissible range of values that can be entered is 20 – 135 ms
- For VAD off, the recommended value for max. jitter delay is  $2J+P$  where:  
J = nominal delay value and P = the packetization period.
- For VAD on, the recommended value for max. jitter delay is  $2J+P+(P-S)$  where:  
J = nominal delay value, P = the packetization period, and S= 5ms for G.711/G.726-32 or 10ms for G.729a/ab.
- For clear channel enter a value of 135 ms
- Step 4** Enter a minimum delay value, in milliseconds, that is less than the value for the nominal delay.
- For voice codecs, the permissible range of values that can be entered is 0 – 135 ms
- For VAD off or on, the recommended value for max. jitter delay is  $0.5J$  where:  
J = nominal delay value.
- For clear channel enter a value of 0 ms.
- 

### Jitter Delay for AAL2 Applications

- For sub-cell multiplexing AAL2 situations in which the buffer is in **adaptive** mode, the jitter can adapt to a very low value and would be unable to adjust to a sudden jitter introduced by the CU\_TIMER. To avoid this condition from occurring, the value of the minimum jitter delay should be set at least as high as the value of the CU\_TIMER on the PVC at the remote end.
- For similar situations but where the buffer is in **fixed** mode, the value of the nominal jitter delay should be set as high as the value of the CU\_TIMER on the PVC at the remote end plus the expected average network jitter.
- When using Custom 110 AAL2 profile, the CU\_TIMER on the PVC at the remote end should be set to be less than or equal 10 msec (if subcell multiplexing is enable at the remote end). The reason for this is the limitation of the Custom 110 profile.
-

## Jitter Delay for Fax, TTY, and Modem Traffic

The nominal or maximum jitter delay values specified for voiceband data, such as fax, modem, and tty are configured using the configure voiceband data jitter command **cnfvbdjitter** and the appropriate **add** or **configure profile** command. These commands contain parameters for setting the nominal and maximum jitter delays. For example, to configure a tty profile, use the **cnfttyprof** command.

```
cnfttyprof <TyProfileIndex> [-ttycodec <Codec>][-jmax <JitterMaxDelay>][-jnom
<JitterNomDelay>][-vad <LocalVadDisable>][-ppcontrol <PacketPeriodControl>] [-pp
<PacketPeriod>]
```

Permissible values are shown in [Table 5-6](#).

**Table 5-6 Voiceband Data Jitter Delay Parameters**

| Command                   | Parameter     | Range (ms)    | Default (ms)  |
|---------------------------|---------------|---------------|---------------|
| Configure jitter buffer   | nominal delay | 5—135         | 70            |
| Configure jitter buffer   | maximum delay | Not available | Not available |
| Add/Configure Fax Profile | nominal delay | 20—200        | 200           |
| Add/Configure Fax Profile | maximum delay | Not available | Not available |
| Add/Configure TTY Profile | nominal delay | 5—135         | 70            |
| Add/Configure TTY Profile | maximum delay | 20—135        | 135           |
| Add/Configure vbd Profile | nominal delay | 5—135         | 70            |
| Add/Configure vbd Profile | maximum delay | 20—135        | 135           |

See *Cisco Voice Switch Services Configuration Guide for MGX Switches and Media Gateways Release 5.5.10* for details of these commands.



### Note

The default vbd -jnom 70 value may or may not work on a V.21 modem. Some low-speed modems establish active sessions very quickly. They are also very sensitive to silence gaps. An unavoidable silence gap occurs when the modem tone is first detected. An upspeed occurs. During the upspeed a jitter buffer adaptation and codec change takes place. This gap can cause a low-speed modem to prematurely disconnect or fail to fully train up. The default -jnom setting of 70 ms is based on fax and high-speed modem up speeds. If a network will be using low-speed modems such as V.21, assign a vbd profile with a value approximately 40 ms.

## DSP Resources Under Mixed Codec Conditions

When the same codec is used to set up calls on the gateway, the available DSP resources are fully used. However, when different codecs are used to set up calls, the amount of usable DSP resources may be limited due to fragmentation.

Fragmentation occurs when the available capacities on two different DSP resources have enough available capacity to support a call of a particular codec type but cannot support that codec type individually.

Consider two DSP resources whose available capacity is 1 unit each, making the total available capacity 2 units. However, a codec that requires 2 units cannot be supported in the system, because the available capacities are fragmented across the individual DSP resources.

The DSP allocation algorithm on VXSM does make an attempt to smooth the effects of fragmentation, but, towards the end, fragmentation could happen because the future pattern of calls cannot be predicted.

