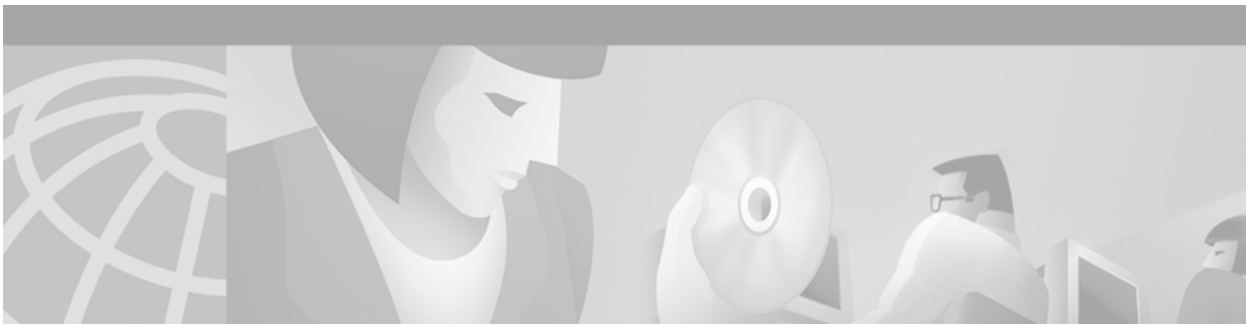

Octal-Port DMT ATU-C Line Card

This feature module describes the Cisco IOS support for the octal-port DMT ATU-C (8xDMT) line card. It includes information on new and modified commands.

This document includes the following sections:

Feature Overview

The 8xDMT line card provides higher port density for the Cisco 6015, Cisco 6160, and Cisco 6260. This line card:

- Supports eight ADSL modem connections per card.
- Converts ADSL modulation from the line card into digital data streams to and from the NI-2 card.
- Negotiates the line rate with the customer premises equipment (CPE) when it trains and bases the rate on line quality and distance.
- Provides subscriber and port provisioning through DSL profiles.
  - Allows single latency—Fast or interleaved path selection.
  - Supports trellis encoding.
  - Supports bit swapping.
- Interoperates with certain CPE. For more detailed information, see the "Supported Platforms" section on page 4.

Note Check with a Cisco customer representative to verify CPE compatibility with the 8xDMT.

Benefits

G.hs Support (ITU G.994.1)

G.hs support is provided through both the MIB and the CLI. Features from G.hs that are supported include:

- Enabling/disabling all or one of the following modes.
  - G.dmt
  - T1.413 Issue 2
  - G.lite
- Setting auto mode defers the mode selection to the ATU-R.
- Displaying current mode/capability.

Bit Swapping

Bit swapping is a mechanism that allows DMT transceivers to reallocate bits between carriers and adjust gain scaling based on the carrier SNR margin.

Fast or Interleaved Path Selection

The fast path feature allows you to configure either the fast or the interleave path via DSL profile configuration commands provided that the CPE also supports fast path. You can use either the interleave or fast path with the 8xDMT line card provided that the CPE also supports fast path. The fast path provides improved latency characteristics for applications that cannot tolerate latency (for example, voice).

The parameters for either path are configurable using the DSL profile configuration commands. Note that although you can configure both paths, only one path will actually be enabled (dual latency is not supported at this time). Thus the maximum bit rates for the unused path must be zero. For example, to configure and use the fast path, you must specify nonzero maximum bit rates for the fast path. Once you configure the maximum bit rates for the fast path, the rates for the interleave path must be zero. The IOS software ensures that only one path is enabled at a given time.

Trellis Encoding

Trellis encoding is a method of providing better performance in a noisy environment. The end result of using Trellis encoding is that you can transmit at faster line rates with lower error rates, thus providing a faster overall throughput in a moderately noisy environment. You can enable or disable trellis encoding for a specific DSL profile.

Enhanced Line Quality Monitoring and Management

The 8xDMT improves the manageability of DMT ports on supported DSLAMs. The following commands are used to configure this functionality:

- **dmt minrate-blocking**

  DMT **minrate-blocking** customizes the DMT port reaction to lines that train below configured minimum bit rates. Formerly, if a line trained below the configured minimum bit rate threshold, it would generate a minor alarm, but the DMT port remained active. The **dmt minrate-blocking** prevents DMT ports from training when bit rates fall below the configured minimum threshold specified in the **dmt bitrate minimum** command.

Note The original option, which generates a minor alarm when configured minimum bit rates are not met, is configured by default in DSL profiles. The default configuration is **no dmt minrate-blocking**.

- **dmt rate-adaptation**

  The dmt rate-adaptation command monitors the signal-to-noise ratio (SNR) on DSL lines. When enabled, software monitors the upstream and downstream DMT ports for low SNR margins. When the actual upstream or downstream margin falls below the **dmt rate-adaptation margin** for the duration of the configured **rate-adaptation interval**, the line drops and attempts to retrain. If the line is able to retrain, it trains to a lower bit rate with improved SNR margins.

Restrictions

The 8xDMT card is not spectrally compatible with SDSL, G.shdsl, or IDSL. Place these cards in a separate chassis half when using them in the same chassis as 8xDMT line cards.

Related Features and Technologies

The 8xDMT line card is an upgrade of the 4xDMT (6260) and 4xFlexi (6160, 6260, 6015) line cards.

Related Documents

Hardware Documents

A complete list of all DSL hardware product related documentation is available on the World Wide Web at http://www.cisco.com/univercd/cc/td/doc/product/dsl_prod/index.htm.

Software Documents

A complete list of all DSL IOS software product related documentation is available on the World Wide Web at http://www.cisco.com/univercd/cc/td/doc/product/dsl_prod/ios_dsl/index.htm.

In the ATM software product related documentation, look for information pertaining to the Cisco LightStream 1010, which uses the same software base as the NI-2 DSL systems. This documentation is available on the World Wide Web at http://www.cisco.com/univercd/cc/td/doc/product/atm/index.htm.

Supported Platforms

DSLAMs

This feature supports the 8xDMT line card on the Cisco 6015, Cisco 6160, and Cisco 6260 platforms with NI-2. Table 1details the total available ADSL modem connections for each chassis.

Table 1 Number of Available Modem Connections for Each Chassis

Chassis	Number of Available 8xDMT Slots	Total ADSL Modem Connections
Cisco 6015	6	48
Cisco 6160	32	256
Cisco 6260	30	240

The 8xDMT is designed for use with the Cisco 6015, Cisco 6160, or Cisco 6260 chassis in one of the following configurations:

- Cisco 6015, Cisco 6160, or Cisco 6260 with a POTS splitter chassis—Provisions one modem directly and is physically connected to one specific subscriber line through the POTS splitter chassis.
- Cisco 6015, Cisco 6160, or Cisco 6260 without a POTS splitter chassis—Provisions one modem directly and is physically connected to one specific subscriber line through the main distribution frame (MDF) connections.

CPE

- Cisco 677
- Cisco 678
- Cisco Soho 77
- Cisco 827
- Cisco IAD 2423
- Cisco 1700, Cisco 2600, and Cisco 3600 series with ADSL WIC
- Alcatel Speed Touch Home
- Alcatel Speed Touch Pro
- Efficient Networks 5260 and 5262
- Westell modems based on Alcatel Microelectronics firmware version 1.4.1
- CPE using ADI chipsets with firmware versions 0X3019BE70 (Version 3.0), 0X2219BE04 (Version 2.2), or 0X2019BE2D (Version 2.0) should operate similar to the Cisco 677

Note A correct firmware version does not guarantee interoperation with third-party CPE. Some hardware variations can affect performance and error rates. Test the interoperation of CPE with the 8xDMT in the targeted deployment model before provisioning service.

Supported Standards, MIBs, and RFCs

Standards

- ANSI T1.413-Issue 2, Category 1 only
- ANSI T1.413-Issue 2, Annex F (Reduced NEXT)
- Universal Test & Operations PHY for ATM, Level 2; A standard for transport of ATM cells over a 16-bit parallel data bus. See ATM Forum document af-phy-0039.000.
- ITU G.992.1, Annex A (G.dmt)
- ITU G.992.2. (G.lite)
- ITU G.994.1. (G.hs)

Standard MIBS

To obtain lists of supported MIBs by platform and Cisco IOS release and to download MIB modules, go to the Cisco MIB web site on Cisco Connection Online (CCO) at http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml.

- IETF RFC 1695, Definitions of Managed Objects for ATM Management Version 8.0 using SMIv2
- IETF RFC 2662, Definitions of Managed Objects for the ADSL Line (obsoletes ADSL Forum TR-006, SNMP-based ADSL Line MIB)
  - Objects not supported for 8xDMT:

    From AdslLineConfProfileEntry - adslAtucConfRateChanRatio, adslAtucConfMaxSnrMgn, adslAtucConfUpshiftSnrMgn, adslAturConfRateChanRatio, adslAturConfMaxSnrMgn, adslAturConfUpshiftSnrMgn,adslAturConfMinUpshiftTime.

    AdslLineAlarmConfProfileEntry
- ADSL Forum TR-014, DMT Line Code Specific MIB
  - Objects not supported for 8xDMT:

    From AdslLineDmtConfProfileEntry- adslAtucDmtConfFreqBins, adslAturDmtConfFreqBins, adslAtucDmtConfInterleavePath, adslAtucDmtConfFastPath, adslAturDmtConfInterleavePath, adslAturDmtConfFastPath.

Cisco-Derived MIBS

- CISCO-ADSL-LINE-MIB
  - Objects not supported for DMT8:
- CISCO-ADSL-DMT-LINE-MIB
  - Objects not supported for DMT8:

    From the cAdslDmtLineConfProfileGroup cAdslAtucDmtConfBitSwapEnabled, cAdslAtucDmtConfBitSwapFrom, cAdslAtucDmtConfBitSwapTo. You can set these objects via SNMP, however, the 8xDMT cards will ignore these objects when provisioning ports for service.

To obtain lists of supported MIBs by platform and Cisco IOS release and to download MIB modules, go to the Cisco MIB web site on Cisco Connection Online (CCO) at http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml.

Prerequisites

To use the 8xDMT feature, you must have one of the following DSLAMs with the 8xDMT line card, and IOS 12.1(6) or above installed:

- Cisco 6015
- Cisco 6160
- Cisco 6260

Configuration Tasks

See the following sections for configuration tasks for the 8xDMT feature. Each task in the list indicates if the task is optional or required.

- Preprovisioning the 8xDMT Line Card, page 6 (optional)
- Creating and Associating a DSL Profile with Each Port, page 7 (required)
- Modifying the DSL Profile, page 7 (optional)

Preprovisioning the 8xDMT Line Card

Starting at the global configuration prompt, use the following commands to preprovision a slot for use with the 8xDMT line card:

	Command	Purpose
Step 1	`DSLAM(config)# slot 1 ATUC-1-DMT8`	This command associates the 8xDMT line card with the specified slot.
Step 2	`DSLAM(config)# dsl-profile 8xDMT`	Creates and names the DSL profile, *8xDMT* in this example.
Step 3	`DSLAM(config-dsl-prof)# exit`	Return to the global configuration prompt.
Step 4	`DSLAM(config)# interface atm1/1`	Enter interface configuration mode on the port where you will associate the *8xDMT* DSL profile. Repeat this process on each port that you wish to associate with a DSL profile.
Step 5	`DSLAM(config-if)# dsl profile 8xDMT`	Associates the DSL profile named *8xDMT* with atm interface 1/1.
Step 6	`DSLAM(config-if)# exit`	Return to the global configuration prompt.

Tips After you have completed these steps, insert the 8xDMT line card to activate the card with your preprovisioned configuration.

Verifying the Preprovisioned Slot

Use the **show running-configuration** command to verify that you preprovisioned the slot correctly.

Creating and Associating a DSL Profile with Each Port

Before starting this configuration task, install the 8xDMT line card. Refer to the *Octal-Port DMT ATU-C Line Card FRU Installation and Configuration Notes* for information on installing the 8xDMT line card.

Starting at the global configuration prompt, use the following procedure to associate a DSL profile with a port:

	Command	Purpose
Step 1	`DSLAM(config)# dsl-profile 8xDMT`	Select the profile that you want to attach to the selected port. The profile name *8xDMT* is used as an example.
Step 2	`DSLAM(config-dsl-prof)# exit`	Return to the global configuration prompt.
Step 3	`DSLAM(config)# interface atm1/1`	Enter interface configuration mode on the port where you will associate the *8xDMT* DSL profile. Repeat this process on each port that you wish to associate with a DSL profile.
Step 4	`DSLAM(config-if)# dsl-profile 8xDMT`	Associate the DSL profile *8xDMT* with atm interface 1/1.
Step 5	`DSLAM(config-if)# exit`	Return to the global configuration prompt.

Verifying the DSL Profiles

You can use the **show dsl profile** *profile-name* command to verify that a DSL profile is attached to a port. You can also use the **show running-configuration** command to verify that the DSL profile is associated with a port.

Tips If no DSL profile appears in the **show running-configuration** command output, the default DSL profile is enabled. See the "Command Reference" section on page 10 for the default configuration values.

Modifying the DSL Profile

Starting at the global configuration prompt, use the following procedure to modify the default bit rate, signal-to-noise ratio, DMT check bytes, and overhead framing parameters in your DSL profile:

Caution Before migrating from interleave mode to fast path, determine whether the deployed CPEs offer support for the feature. The Cisco 600 series CPEs currently do not support fast path.

	Command	Purpose
Step 1	`DSLAM(config)# dsl-profile 8xDMT`	Enter DSL profile configuration mode.
Step 2	`DSLAM(config-dsl-profile)# dmt bitrate maximum fast downstream 3200 upstream 640`	Set a DMT bit rate of 3200 kbps downstream and 640 kbps upstream on the fast path. Automatically configures the interleaved path to 0 kbps.

	Command	Purpose
Step 3	`DSLAM(config-dsl-profile)# dmt check-bytes fast downstream 0 upstream 0`	Set the upstream and downstream FEC check (redundancy) bytes to 0.
Step 4	`DSLAM(config-dsl-profile)# dmt margin downstream 12 upstream 6`	Set the downstream and upstream signal-to-noise ratio (SNR) margins for a DSL profile.
Step 5	`DSLAM(config-dsl-profile)# dmt overhead-framing mode1`	Set the overhead framing mode, in this example to 1.
Step 6	`DSLAM(config-dsl-profile)# exit`	Return to the global configuration prompt.

Troubleshooting Tips

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain documentation, troubleshooting tips, and sample configurations from online tools.

For Cisco.com registered users, additional troubleshooting tools are available from the TAC website. To obtain troubleshooting help, go to the Cisco Troubleshooting Assistant web site on Cisco Connection Online (CCO) at:

http://www.cisco.com/kobayashi/support/tac/tsa/dslstep.html

Also see the "Monitoring and Maintaining the 8xDMT Line Card" section on page 8.

Monitoring and Maintaining the 8xDMT Line Card

Use the following commands to monitor and maintain the 8xDMT line card:

Command	Purpose
`DSLAM# show dsl interface atm s`*`lot/port`* `DSLAM# show dsl status DMT`	These commands display basic information about the DSL link, including port status, dsl statistics, line errors, and cards detected.
`DSLAM# show facility-alarm status`	The **show facility-alarm status** command displays all of the current major and minor alarms and the user-configurable alarm thresholds for temperature. After an alarm condition is indicated (by LEDs or bells), you can use the **show facility-alarm status** command to determine the cause of the alarm. **Note** You must turn on the alarms in the profile for alarms to be displayed.
`DSLAM# show hardware`	The **show hardware** command shows information on each of the slots in your chassis. It tells whether line cards, fan trays, and PEMs are present.

Configuration Examples

The following example shows a profile named 8xDMT2 being created. The profile uses the default profile values for any parameters not specified.

```
Current configuration : 7019 bytes
!
version 12.1
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname DSLAM
!
boot system flash:ni2-dsl-mz.121-6.DA.bin
slot 1 ATUC-4FLEXIDMT
slot 2 ATUC-1-DMT8
slot 3 ATUC-4FLEXIDMT
slot 4 ATUC-4FLEXIDMT
slot 5 ATUC-4FLEXIDMT
slot 6 ATUC-4FLEXIDMT
enable password cisco
!
!
!
!
!
!
dsl-profile default
 dmt bitrate maximum interleaved downstream 8032 upstream 864
 cap bitrate maximum downstream 7168 upstream 1088
!
dsl-profile 8xdmt
!
dsl-profile 8xDMT2
 dmt overhead-framing mode1
 dmt check-bytes fast downstream 12 upstream 6
 dmt margin downstream 12 upstream 6
 dmt bitrate maximum fast downstream 3200 upstream 640
 dmt bitrate maximum interleaved downstream 0 upstream 0
network-clock-select 1 system
ip subnet-zero
ip host-routing
no ip finger
```

Command Reference

This section documents the new and modified commands that are specific to the8xDMT feature. All other commands used with this feature are documented in the *Command Reference for Cisco DSLAMS with NI-2*. For information on other Cisco IOS commands that can be used on the NI-2 DSL systems, see the Cisco *ATM Switch Router Command Reference Guide*.

alarms

To enable alarms in profile command mode, use the **alarms** command. To disable alarms, use the **no** form of the command.

alarms

Syntax Description

This command has no keywords or arguments.

Defaults

Disabled.

Command Modes

Profile configuration.

Command History

Release	Modification
12.0(5)DA	This command was introduced in a previous release.
12.1(6)DA	Conditions that cause alarms were added.

Usage Guidelines

The command affects minor alarms for DSL subscriber ports only. The alarms this command controls apply to these event classes:

- Near End LOS
- Near End interleaved LOCD
- Near End fast LOCD
- Near End LOF
- No CPE detected
- Bit rates below configured minimum
- Subscriber port failure
- Upstream or downstream bit rate not above minimum bit rate

Enabling or disabling alarms affects the specified profile only. For example, if you disable alarms on the default profile, other profiles are unaffected.

Use **alarms** and **no alarms** to enable and disable minor alarms related to DSL subscriber ports. When these alarms are disabled, you receive no notification when alarm conditions exist. (Notification methods include console messages, LEDs, the output of the **show facility-alarm** command, and relay alarm signals to external systems for audible or visible alarms.) However, you can track the condition of DSL ports on which alarms are disabled, including conditions that ordinarily trigger alarms, using the command **show dsl interface atm** *slot#/port#*.

You can suppress minimum bit rate alarms without disabling other alarms for the profile.

Note The alarms command has no effect on critical alarms, major alarms, or minor alarms related to subsystems other than the DSL subscriber ports.

Examples

In this example, the command enables alarms for the default profile:

```
DSLAM# configure terminal
DSLAM(config)# dsl-profile default
DSLAM(config-dsl-prof)# alarms
```

Related Commands

Command	Description
dsl-profile *profile name*	Select an existing DSL profile for modification.
show dsl interface atm *slot#/port#*	Display DSL, DMT, and ATM status for a port.
show dsl profile	Display a specific profile, all ports to which the profile is currently attached, and those port settings.
show facility-alarm status	Display the current major and minor alarm status, if any, and display the configuration of the alarm thresholds.

dmt bitrate

To set the maximum and minimum allowed bit rates for the fast or interleaved DMT profile parameters, use the **dmt bitrate** profile configuration command. To reset this command to the default value, use the **no** form of this command.

dmt bitrate maximum {fast | interleaved} downstream *dmt-bitrate* **upstream** *dmt-bitrate*

dmt bitrate minimum {fast | interleaved} downstream *dmt-bitrate* **upstream** *dmt-bitrate*

Syntax Description

dmt-bitrate	The DMT bit rate is given as a multiple of 32 kbps. If you enter a nonmultiple of 32 kbps, the system rejects and aborts the command. See the allowed ranges and default values in Usage Guidelines.
fast	Specify the DMT fast latency path.
interleaved	Specify the DMT interleaved latency path.

Defaults

- The default **no dmt bitrate maximum interleaved** sets the maximum downstream and upstream interleaved bit rate to 640 and 128 kbps respectively. This command causes the port to retrain.
- The default **no dmt bitrate maximum fast** sets both the maximum downstream and upstream fastpath bit rates to zero. This command causes the port to retrain.
- The default no dmt bitrate minimum interleaved sets both the minimum downstream and upstream interleaved bit rates to zero. This command does not cause the port to retrain.
- The default no dmt bitrate minimum fast sets both the minimum downstream and upstream fastpath bit rates to zero. This command does not cause the port to retrain.

Command Modes

Profile configuration.

Command History

Release	Modification
12.0(5)DA	This command was introduced in a previous release.
12.1(5)DA	The **fast** keyword was added.

Usage Guidelines

Only the alarm subsystem uses the minimum bit rate settings. Cisco IOS asserts an alarm if the line card trains at a rate below the configured minimum bit rate. However, no alarm occurs when you disable alarms. See alarms in the *Command Reference for Cisco DSLAMS with NI-2*, for more information on enabling and disabling alarms.

If alarms are enabled for the profile, setting the DMT bit rate to 0 disables the associated minimum DMT bit rate alarm.

Table 2 lists the allowable DMT bit rate ranges and default values.

Table 2 Allowable Ranges and Default Values for DMT Bit Rates

		Downstream			Upstream		
Configuration Parameter	Data Path	Aggregate Range (kbps)	Path Range (kbps)	Path Default (kbps)	Aggregate Range (kbps)	Path Range (kbps)	Path Default (kbps)
DMT bit rate max	Fast	8064 to 32	8064 to 32	0	864 to 32	864 to 0	0
DMT bit rate min	Fast	8064 to 32	8064 to 0	0	864 to 32	864 to 0	0
DMT bit rate max	Interleaved	8064 to 32	8064 to 32	640	864 to 32	864 to 0	128
DMT bit rate min	Interleaved	8064 to 32	8064 to 0	128	864 to 0	864 to 0	0

Caution This command causes the port to retrain when you change the value of the bit rate parameter.

Setting a parameter to its current value does not cause a retrain. If a port is training when you change the parameter, the port stops training and retrains to the new parameter.

Examples

In this example, the command sets the maximum interleaved bit rate of the default profile to 3200 kbps downstream and 640 kbps upstream:

```
DSLAM# configure terminal
DSLAM(config)# dsl-profile default
DSLAM(config-dsl-prof)# dmt bitrate maximum interleaved downstream 3200 upstream 640
```

Related Commands

Command	Description
show dsl profile	Display a specific profile, all ports to which the profile is currently attached, and those port settings.

dmt check-bytes

To set upstream and downstream FEC check (redundancy) bytes, use the **dmt-checkbytes** profile configuration command. To reset this command to the default value, use the **no** form of this command.

dmt check-bytes {fast | interleaved} downstream *bytes* **upstream** *bytes*

Syntax Description

bytes	Enter the upstream and downstream FEC check bytes. The allowed values are 0, 2, 4, 6, 8, 10, 12, 14, and 16.
fast	Specify the DMT fast latency path.
interleaved	Specify the DMT interleaved latency path.

Defaults

Downstream: 16

Upstream: 16

Command Modes

Profile configuration.

Command History

Release	Modification
12.0(5)DA	This command was introduced.
12.1(6)DA	The **fast** keyword was added.

Usage Guidelines

Caution This command causes the port to retrain when you change the *check-bytes* parameter.

Setting a parameter to its current value does not cause a retrain. If a port is training when you change the parameter, the port untrains and retrains to the new parameter.

Conditions on the line, the configured bit rate, and the capabilities of the ATU-R CPE affect the achievable value for this parameter. As a result, the check-bytes value to which the line trains may be smaller than the value you configure. If you want to use more check bytes than the system is allowing you, use the **dmt bitrate** command to reduce the bit rate.

Use the command **show dsl interface atm** *slot#/port#* to display the configured and actual check-bytes values for the connection.

Examples

In this example, the command sets the interleaved FEC check-bytes for the default profile to 12 downstream and 6 upstream.

```
DSLAM# configure terminal
DSLAM(config)# dsl-profile default
DSLAM(config-dsl-prof)# dmt check-bytes interleaved downstream 12 upstream 6
```

Related Commands None.

dmt margin

To set upstream and downstream signal-to-noise ratio (SNR) margins for a DMT profile, use the **dmt margin** command. To reset this command to the default value, use the **no** form of this command.

dmt margin downstream *dmt-margin* **upstream** *dmt-margin*

Syntax Description

dmt-margin	Enter the upstream and downstream SNR margins in decibels. The range is 0 to 15.

Defaults

Downstream: 6 dB

Upstream: 6 dB

Command Modes

Profile configuration.

Command History

Release	Modification
12.0(5)DA	This command was introduced.

Usage Guidelines

Caution This command causes the port to retrain when you change the parameter.

Setting a parameter to its current value does not cause a retrain. If a port is training when you change this value, the port untrains and retrains to the new value.

Examples

In this example, the command sets the SNR margins of the default profile to 12 dB downstream and 6 dB upstream:

```
DSLAM# configure terminal
DSLAM(config)# dsl-profile default
DSLAM(config-dsl-prof)# dmt margin downstream 12 upstream 6
```

Related Commands

None.

dmt minrate-blocking

To force a port *not* to retrain when actual bit rates fall below the values configured in the **dmt bitrate minimum** command, use the **dmt minrate-blocking** command. To disable dmt minrate-blocking, use the **no** form of the command.

dmt minrate-blocking

Syntax Description

This command has no arguments or keywords.

Defaults

The default configuration, **no dmt minrate-blocking**, generates a minor alarm when the bit rates on a DMT port violate the minimum allowed bit rates specified in the **dmt bitrate minimum** command (if alarms are enabled in the DSL profile).

Command Modes

DSL profile configuration.

Command History

Release	Modification
IOS 12.1(6)DA	This command was introduced.

Usage Guidelines

To specify the bit rate below which a DMT port will not retrain, use the **dmt bitrate minimum** command.

Examples

The following example describes how to enable **dmt minrate-blocking**:

```
configure terminal
 dsl-profile 8xDMT
  dmt minrate-blocking
```

dmt overhead-framing

To set the overhead framing mode, use the **dmt overhead-framing** command.To reset this command to the default value, use the **no** form of this command.

dmt overhead-framing {mode0 | mode1 | mode2 | **mode3**}

Syntax Description

mode0	Full overhead framing with asynchronous bit-to-modem timing.
mode1	Full overhead framing with synchronous bit-to-modem timing.
mode2	Reduced overhead framing with separate fast and sync bytes in the fast and interleaved latency buffers respectively.
mode3	Reduced overhead framing with merged fast and sync bytes, using either the fast or interleaved latency buffer.

Defaults

Mode3.

Command Modes

Profile configuration.

Command History

Release	Modification
12.0(5)DA	This command was introduced.
12.1(6)DA	Mode 0 was added.

Usage Guidelines

Note Conditions on the line and the capabilities of the ATU-R CPE affect the achievable value for this parameter. As a result, the overhead framing value to which the line trains may not be the same as the value you configure.

There are two types of ADSL framing:

- Full overhead
- Reduced overhead

There are also two versions of full overhead:

- Asynchronous
- Synchronous

You select the type of ADSL framing by choosing one of four modes:

- Mode 0—Full overhead framing with asynchronous bit-to-modem timing (an enabled synchronization control mechanism).
- Mode 1—Full overhead framing with synchronous bit-to-modem timing (a disabled synchronization control mechanism).

- Mode 2—Reduced overhead framing with separate fast and sync bytes in the fast and interleaved latency buffers respectively.
- Mode 3—Reduced overhead framing with merged fast and sync bytes using either the fast or interleaved latency buffer.

Note Mode 3 is recommended for use on DMT interfaces adhering to the ANSI T1.413 Issue 2 standard. Mode 3 is required for flexi line card DMT interfaces.

The number of overhead bytes per frame varies according to the overhead framing mode and the operating mode, as shown in Table 3.

Table 3 Overhead Bytes per Frame

	Overhead Bytes			
	T1.413 and G992.1		G992.2	
Framing Mode	Downstream	Upstream	Downstream	Upstream
Mode 0	4	3	N/A	N/A
Mode 1	3	3	N/A	N/A
Mode 2	2	2	N/A	N/A
Mode 3	1	1	1	1

If, during the training sequence, the ATU-R indicates a lower framing structure than that specified by the ATU-C, the ATU-C falls back to the framing structure number indicated by the ATU-R.

Management requirements drive the determination of overhead, full or reduced. Full overhead provides more bandwidth to the embedded operations channel (EOC), enabling higher polling rates. However, reduced overhead provides enough EOC bandwidth to satisfy typical applications.

The **dmt overhead-framing** command does not cause port retrain when you change the parameter.

Examples

In this example, the command sets the overhead framing mode in the profile named 8xDMT.

```
DSLAM# configure terminal
DSLAM(config)# dsl-profile 8xDMT
DSLAM(config-dsl-prof)# dmt overhead-framing mode2
```

Related Commands

Command	Description
show dsl profile	Display a specific profile, all ports to which the profile is currently attached, and those port settings.

dmt rate-adaptation enable

DMT rate adaptation monitors upstream and downstream DMT ports for signal-to-noise ratio (SNR) margins during specified time intervals. If an unacceptable SNR margin is detected, the port is retrained at a lower bit rate to improve the SNR margins. To enable rate adaptation on a DMT port, use the **dmt rate-adaptation enable** command at the DSL profile configuration prompt. To disable dmt rate adaptation, use the **no** form of the command.

dmt rate-adaptation enable

This command has no arguments or keywords.

Defaults

Enabling dmt rate-adaptation configures the commands **dmt rate-adaptation interval** and **dmt rate-adaptation margin** with their default values. For information on the default values of **dmt rate-adaptation interval** and **dmt rate-adaptation margin** see the "dmt rate-adaptation interval" section on page 22 and the "dmt rate-adaptation margin" section on page 24.

Command Modes

DSL profile configuration

Command History

Release	Modification
IOS 12.1(6)DA	This command was introduced.

Usage Guidelines

If you wish to modify the default configuration of the **dmt rate-adaptation interval** and **dmt rate-adaptation margin** see the "dmt rate-adaptation interval" section on page 22 and the "dmt rate-adaptation margin" section on page 24.

Examples

The following example enables **dmt rate-adaptation** with default interval and margin values:

```
config terminal
 dsl-profile austin
  dmt rate-adaptation enable
```

Related Commands

Command	Description
dmt rate-adaptation interval	Sets the upstream and downstream time intervals at which a DMT port is monitored for SNR margins.
dmt rate-adaptation margin	Sets the SNR values below which the DMT port retrains to a lower bit rate.

dmt rate-adaptation interval

To change the intervals during which a DMT port is monitored for signal-to-noise ratio (SNR) margins, use the **dmt rate adaptation interval** command in DSL profile configuration mode. To disable **dmt rate adaptation interval**, use the **no** form of this command.

dmt rate-adaptation interval {downshift [downstream *number-of eoc-updates* **upstream** *seconds***]}**

Syntax Description

downshift	The **downshift** keyword indicates that a line with excessive SNR margins retrains to a lower bit rate.
downstream	The **downstream** keyword tells IOS to monitor downstream ports for SNR margins exceeding those specified in the **dmt rate-adaptation margin** command.
number-of eoc-updates	The *number-of eoc-updates* argument specifies the monitoring interval *in multiples of six seconds* on a downstream DMT port. **Note** The *downstream margin* (see **"dmt rate-adaptation margin" section on page 24**) is obtained from the CPE via the embedded operations channel (EOC). The **downstream** *number-of eoc-updates* parameter specifies a number of consecutive EOC read events. Depending upon the type of CPE, EOC messages are sent once every 6 to 15 seconds (not counting EOC timeouts). Hence, a *downstream downshift interval* value of 10 on CPE reporting margins every 6 seconds results in a 1 minute monitoring interval (10x6 seconds). Specifying a *downstream downshift interval* value of 10 on CPE that report margins every 15 seconds (10x15 seconds) yields a 2.5 minute monitoring interva1.
upstream	The **upstream** keyword tells IOS to monitor upstream ports for SNR margins exceeding those specified in the **dmt rate-adaptation margin** command.
seconds	The seconds argument specifies the monitoring interval *in seconds* on an upstream DMT port.

Defaults

Following are the default settings for the **dmt rate adaptation interval**:

- **downstream—**10

Note Remember, a downstream value of 10 can yield a monitoring interval between 1 minute to 2.5 minutes in length.

- **upstream**—10

Command Modes

DSL profile configuration

Command History

Release	Modification
IOS 12.1(6)DA	This command was introduced.

Usage Guidelines

Use the **dmt rate-adaptation interval** to specify the frequency at which line margins are checked on a DMT port. The **dmt rate-adaptation interval** command works in conjunction with the **dmt rate-adaptation margin** command. If the actual SNR margins on a port remain lower than the margins configured in the **dmt rate-adaptation margin** command, for the duration of time specified in the **dmt rate-adaptation interval** command, the line drops and retrains to a lower bit rate, to improve SNR margin quality on the line.

Note If line conditions improve, the line does not automatically drop and retrain to a higher bit rate. If the line conditions improve, the administrator must execute a **shut** then a **no shut** on the port to retrain to a higher bit rate.

Examples

The following example configures a downstream monitoring interval of roughly 60 to 150 seconds. The upstream monitoring interval is 20 seconds.

```
config terminal
 dsl-profile austin
  dmt rate-adaptation interval downshift downstream 10 upstream 20
```

Related Commands

Command	Description
dmt rate-adaptation enable	Turns on rate adaptation.
dmt rate-adaptation margin	Sets the SNR margins below which a DMT port retrains to a lower bit rate.

dmt rate-adaptation margin

To configure the minimum acceptable SNR margins on a DMT port, which force the port to retrain when bad margins exist for the duration of the **dmt rate-adaptation interval,** use the **dmt rate adaptation margin** command in DSL profile configuration mode. To disable **dmt rate adaptation margin** use the **no** form of this command.

dmt rate-adaptation margin {min [downstream *dB* **upstream** *dB*]}

Syntax Description

min	The **min** keyword specifies that you are configuring the minimum acceptable SNR margins on a port. If the port SNR exceeds the configured value, the port retrains to a lower bit rate.
downstream	Specifies the minimum acceptable SNR margin for downstream traffic on a port.
dB	SNR margins measured in decibels. The valid range is –15 to 15.
upstream	Specifies the minimum acceptable SNR margin for upstream traffic on a port.
dB	SNR margins measured in decibels. The valid range is -15 to 15.

Defaults

The default configuration is derived from the **no dmt rate-adaptation enable** command. This specifies minimum upstream and downstream SNR margins of 0 dB.

Command Modes

DSL profile configuration

Command History

Release	Modification
IOS 12.1(6)DA	This command was introduced.

Usage Guidelines

Use the **dmt rate-adaptation margin** command to configure the acceptable SNR margin thresholds on a specified port. The **dmt rate-adaptation margin** command works in conjunction with the **dmt rate-adaptation interval** command. If the actual SNR margins on a port remain lower than the margins configured in the **dmt rate-adaptation margin** command, for the duration of time specified in the **dmt rate-adaptation interval** command, the line drops and retrains to a lower bit rate, to improve SNR margin quality on the line.

Note If line conditions improve, the line does not automatically drop and retrain to a higher bit rate. If the line conditions improve, the administrator must execute a **shut** then a **no shut** on the affected port to retrain to a higher bit rate.

slot

To provision a slot for a specific card type, or to change the line coding for a flexi line card, use the **slot** command.

slot *slot# cardtype*

Syntax Description

slot#	The number of the slot you want to provision. The range is 1 to 38. **Note** The number of slots varies by chassis. The Cisco 6130 has 38 slots, the Cisco 6160 has 34 slots, and the Cisco 6260 has 32 slots.
cardtype	The line card type for which you want to configure the slot. The valid card types are • ATUC-1-4DMT—4-port DMT card • ATUC-1-4DMT-I—4-port DMT over ISDN card • ATUC-4FLEXICAP—4-port flexi card configured as CAP • ATUC-4FLEXIDMT—4-port flexi card configured as DMT • ATUC-1-DMT8—8-port DMT card • ITUC-1-8IDSL—8-port IDSL card • STUC-4-2B1Q-DIR-1—4-port SDSL card **Note** Some line cards do not function in all NI-2 DSL systems. For example, the Cisco 6100 system supports only a dual-port CAP ATU-C line card. Consult the hardware documentation for your DSL system to determine which line cards it supports.

Defaults

None.

Command Modes

Global configuration.

Command History

Release	Modification
12.0(5)DA	This command was introduced.
12.1(1)DA	New card types were added.
12.1(6)DA	New card types were added.

Usage Guidelines

Use the **slot** command to provision a slot for a line card.

Card mismatch error conditions include the following:

- A line card is already installed in the specified slot
- The specified slot contains one type of card but is provisioned for another type

If you attempt to provision an empty slot, the major alarm “MODULE-MISSING” asserts.

The 8xDMT line card is spectrally incompatible with both the 8-port IDSL line card and the 4-port SDSL (STU-C) line card. If you install spectrally incompatible cards in the same chassis, the lines served by those cards can suffer reduced performance. For best performance in a chassis with a mixture of line card types, always install 8xDMT line cards on one side of the chassis and install IDSL and SDSL cards on the opposite side.

Examples

The command in this example provisions slot 30 for an 8xDMT line card.

```
DSLAM# configure terminal
DSLAM(config)# slot 30 ATUC-1-DMT8
```

Related Commands

Command	Description
show hardware	Display information about the physical modules in the chassis.

Glossary

A

ADSL Asymmetric Digital Subscriber Line. A digital subscriber line (DSL) technology in which the transmission of data from server to client is much faster than the transmission from the client to the server.

ADSL Transmission Unit—central office See *ATU-C*.

ADSL Transmission Unit—remote See *ATU-R*.

asymmetric digital subscriber line See *ADSL*.

Asynchronous Transfer Mode See *ATM*.

ATM Asynchronous Transfer Mode. A cell-based data transfer technique in which channel demand determines packet allocation. ATM offers fast packet technology, real time, demand led switching for efficient use of network resources.

ATU-C ADSL Transmission Unit—central office.

ATU-R ADSL Transmission Unit—remote.

C

CBOS Cisco Broadband Operating System. Operating System that users access to configure and operate the Cisco products.

CCO Cisco Connection Online.

chassis The card cage (housing) where modules are placed.

Cisco Connection Online See *CCO*.

CLI Command Line Interface.

CPE customer premises equipment.

CTC Common Transmit Clock.

D

DMT Discrete Multitone.

DDTS Cisco Distributed Defect Tracking System.

digital signal level 3 See *DS3*.

Distributed Defect Tracking System See *DDTS*.

DS3 digital signal level 3. Framing specification used for transmitting digital signals at 44.736 Mbps on a T3 facility.

DSLAM Digital Subscriber Line Access Multiplexer. Concentrates and multiplexes digital subscriber line signals at the telephone service provider location to the broadband wide area network. Replaces ADSLAM.

F

frame A packet as it is transmitted over a serial line. The term derives from character oriented protocols where special start-of-frame and end-of-frame characters were added when transmitting packets.

FTP File Transfer Protocol. The Internet protocol (and program) used to transfer files between hosts.

G

G.992.2 The ITU standard for line coding and framing for splitterless, reduced spectrum ADSL. Also known as G.lite.

G.994.1 The ITU standard for signalling, identification, and negotiation between broadband systems; an integral part of G.dmt and G.lite. Also known as G.hs.

G.997.1 The ITU standard for performance monitoring on DMT access technologies.

G.dmt Pseudonym for G.992.1.

G.hs Pseudonym for G.994.1. HandShake (hs)

G.lite Pseudonym for G.992.2

H

Handshake Part of the procedure to set up a data communications link. The handshake can be part of the protocol itself or an introductory process. The computers wishing to talk to each other set out the conditions they can operate under. Sometimes, the handshake is just a warning that a communication is imminent.

I

IP Internet Protocol. The network layer protocol for the Internet Protocol suite.

IP address The 32-bit address assigned to hosts that want to participate in a TCP/IP Internet.

ITU The International Telecommunications Union; a telecommunications standards body.

L

LCD Loss of Cell Delineation

LODS Loss Of Delay Synchronization

LOF Loss Of Frame.

loopback A diagnostic test that returns the transmitted signal back to the sending device after it has passed through a network or across a particular link. The returned signal can then be compared to the transmitted one. The discrepancies between the two help to trace the fault. When trying to locate a faulty piece of equipment, loopbacks will be repeated, eliminating satisfactory machines until the problem is found.

LOS loss of signal.

M

Management Information Base See *MIB*.

MIB Management Information Base. A collection of objects that can be accessed via a network management protocol, such as SNMP and CMIP (Common Management Information Protocol).

N

NI-2 A second generation network interface card.

P

PVC Stands for permanent virtual connection. A fixed virtual connection between two users: The public data network equivalent of a leased line. No call setup or clearing procedures are needed.

R

route The path that network traffic takes from its source to its destination. The route a datagram may follow can include many gateways and many physical networks. In the Internet, each datagram is routed separately.

router A system responsible for making decisions about which of several paths network (or Internet) traffic will follow. To do this, it uses a routing protocol to gain information about the network and algorithms to choose the best route based on several criteria known as "routing metrics." See also *bridge*.

routing table Information stored within a router that contains network path and status information. It is used to select the most appropriate route to forward information along.

S

Simple Network Management Protocol See *SNMP.*

slot A numbered location within a chassis capable of housing a module.

SNMP Simple Network Management Protocol. The network management protocol of choice for TCP/IP-based internets.

SVC Stands for switched virtual connection. A temporary virtual connection between two users.

T

TCP Transmission Control Protocol. The major transport protocol in the Internet suite of protocols providing reliable, connection-oriented full-duplex streams.

T1.413 The ANSI standard for line coding and framing for full rate ADSL.

Telnet The virtual terminal protocol in the Internet suite of protocols. Allows users of one host to log into a remote host and act as normal terminal users of that host.

TFTP Trivial File Transfer Protocol. A simple file transfer protocol (a simplified version of FTP) that is often used to boot diskless workstations and other network devices such as routers over a network (typically a LAN). Has no password security.

training The procedure used by the ATU-C and ATU-R to establish an end-to-end ADSL connection.

training mode Characteristic of a router that allows it to use RADSL technology to adjust its line speed according to noise conditions on the transmission line.

Transmission Control Protocol See *TCP.*

Trivial File Transfer Protocol See *TFTP.*

trellis encoding A channel coding technique which provides forward error correction capability.

twisted pair Two insulated copper wires twisted together with the twists or lays varied in length to reduce potential signal interference between the pairs.

U

upstream rate The line rate for message or data transfer from the source machine to a destination machine on the network. Also see downstream rate.

V

VC Virtual circuit. A logical circuit created to ensure reliable communication between two network devices. A virtual circuit is defined by a VPI/VCI pair, and can be either permanent (PVC) or switched (SVC). In ATM, a virtual circuit is called a virtual channel. Sometimes abbreviated VC. See also *PVC*, *SVC*, *VCI*, and *VPI*.

virtual circuit See *VC*.

VCI Virtual channel identifier. A 16-bit field in the header of an ATM cell. The VCI, together with the VPI, is used to identify the next destination of a cell as it passes through to the ATM switch. Sometimes called virtual channel connection. See also *VPI*.

VPI Virtual path identifier. An 8-bit field in the header of an ATM cell. The VPI, together with the VCI, is used to identify the next destination of a cell as it passes through the network. See also *VCI*.