



SNMP Management User Guide

Simple Network Management Protocol

For Management of Select Net to Net Micro DSLAMs and IP DSLAMs

210-0000999 rev01

© Copyright 2002 Net To Net Technologies, Inc.

™ The Net To Net Logo is a trademark of Net To Net Technologies, Inc.

Worldwide Headquarters

Net To Net Technologies
112 Corporate Drive
Portsmouth, NH 03801
USA
+1 877-638-2638

<http://www.nettonet.com/>
Contact@nettonet.com

EMEA Headquarters

Net To Net Technologies
Victoria House 19 Park Way
Newbury Berkshire RG14 1EE
UK
+44 (0) 1635 570950

Contents

1.0 OVERVIEW

1.1 System Requirements

- 1.1.1 RS232 Cable
- 1.1.2 Terminal Emulator
- 1.1.3 MIB Browser
- 1.1.4 Command Prompt

1.2 Multi-User Support

1.3 Default Settings

- 1.3.1 User Access Defaults
- 1.3.2 System Defaults
- 1.3.3 Uplink Interface Defaults
- 1.3.4 Circuit Defaults
- 1.3.5 SNMP Trap Defaults

1.4 Data Storage

- 1.4.1 RAM and NVRAM
- 1.4.2 Local File
 - 1.4.2.1 IP DSLAM
 - 1.4.2.2 Micro DSLAM

1.5 Data Management

- 1.5.1 Reboot the System
 - 1.5.1.1 Micro DSLAM
 - 1.5.1.2 IP DSLAM
- 1.5.2 Clear NVRAM
 - 1.5.2.1 Micro DSLAM
 - 1.5.2.2 IP DSLAM
- 1.5.3 IP DSLAM Module Replacement
 - 1.5.3.1 Interface Module
 - 1.5.3.2 Multiplexer Uplink Module (MUM)

2.0 INITIAL MANAGEMENT CONFIGURATION VIA CLI

2.1 Establish a Connection with the Micro DSLAM or MUM2000-2

- 2.1.1 Plug the Provided Cable Adapter Into Your PC
- 2.1.2 Connect Your PC to the DSLAM COM Port
- 2.1.3 Launch a Terminal Emulator
- 2.1.4 Log In

2.2 CLI Prompt

3.0 CLI COMMANDS

3.1 Command Overview

- 3.1.1 Syntax
- 3.1.2 Errors
 - 3.1.2.1 Syntax Error
 - 3.1.2.2 Slot and/or Port Number Error
- 3.1.3 History
 - 3.1.3.1 Back
 - 3.1.3.2 Forward

3.2 SET

- 3.2.1 System Configuration
 - 3.2.1.1 IP Address
 - 3.2.1.2 Subnet Mask
 - 3.2.1.3 Gateway
 - 3.2.1.4 Inband Management

- 3.2.1.5 Inband Management VLAN ID
- 3.2.1.6 Password
- 3.2.1.7 SNMP Community String

3.2.2 Port Configuration

- 3.2.2.1 Speed
- 3.2.2.2 VLAN Range
- 3.2.2.3 Backbone-VLAN
- 3.2.2.4 Priority
- 3.2.2.5 Flood
- 3.2.2.6 SDSL Line Code

3.3 SHOW

3.3.1 SHOW Command Example

3.3.2 SHOW ALL

- 3.3.2.1 Micro DSLAM, IPD4000 with a MUM2000-2 or IPD12000 with one MUM2000-2
- 3.3.2.2 IPD12000 with two MUM2000-2s

3.3.3 Firmware Version

3.4 Independent Commands

3.4.1 System Name

3.4.2 Regulating System Management

- 3.4.2.1 Enable Telnet (Default)
- 3.4.2.2 Disable Telnet
- 3.4.2.3 Enable Web Server (Default)
- 3.4.2.4 Disable Web Server
- 3.4.2.5 Allow
- 3.4.2.6 Who
- 3.4.2.7 Enable TFTP (Default)
- 3.4.2.8 Disable TFTP
- 3.4.2.9 Reset
- 3.4.2.10 Clear NVRAM

3.4.3 HELP

3.4.4 LOGOUT

4.0 SIMPLE NETWORK MANAGEMENT PROTOCOL (SNMP)

4.1 Establish a DSLAM Connection

4.2 Configuring and Managing DSLAM data with MIBs

5.0 MIB Object Identifiers (OIDs)

5.1 Chassis Configuration MIB

- 5.1.1 MUM and Micro DSLAM Chassis Configuration
- 5.1.2 SNMP Configuration

5.2 Chassis Status MIB

- 5.2.1 MUM and Micro DSLAM Chassis Status
- 5.2.2 UIM Status
- 5.2.3 MGMT (Management) Port Status

5.3 Port Configuration MIB

- 5.3.1 Interface Module and Micro DSLAM Port Configuration
- 5.3.2 VLAN ID Configuration

5.4 Model-Specific Interface Module and Micro DSLAM Port Configuration MIB

- 5.4.1 ADSL Configuration
- 5.4.2 IDSL Configuration
- 5.4.3 SDSL Configuration
- 5.4.4 T1 Configuration
- 5.4.5 E1 Configuration

5.5 Module Status MIB

- 5.5.1 Interface Module and Micro DSLAM Module Status

5.6 Port Status MIB

5.6.1 Term Definitions

5.6.1.1 NtnCounter32

5.6.1.2 NtnGauge32

5.6.1.3 NtnTimeTicks

5.6.2 Interface module and Micro DSLAM Port Status

5.7 Network Management System (NMS) Trap MIB

5.7.1 Environmental and Inventory Trap Status

6.0 SNMP Traps

6.1 SNMP Target IP Address(es)

6.2 SNMP Trap Definitions

6.2.1 Authentication Trap

6.2.2 Fan Trap

6.2.3 Cold Start Trap

6.2.4 Link Up/Down Trap

6.2.5 Module Present Trap

6.2.6 Module Removed Trap

6.3 Trap Notification

7.0 Technical Support

1.0 OVERVIEW

Select [model name] Micro DSLAMs and IP DSLAMs can be managed with Command Line Interface (CLI), through either a direct PC to DSLAM connection or from a remote network connection via Telnet (utilizing a DOS prompt program). These DSLAMs also incorporate portions of the Systems Group and Interfaces Group of Object Identifiers (OIDs) from the Internet Engineering Task Force (IETF) standardized Management Information Base (MIB-II). MIB-II is part of the IETF Request for Comment 1213 (RFC1213) and complies with Simple Network Management Protocol (SNMP). SNMP is the standard for management of Transmission Control Protocol and Internet Protocol (TCP/IP) networks and network devices, such as Ethernet bridges and routers. Also included with these DSLAMs are [model name]'s enterprise MIBs and a select number of SNMP traps.

1.1 System Requirements

1.1.1 RS232 Cable

Required for establishing a direct connection from the Micro DSLAM or IP DSLAM MGMT (Management) Port to your PC for initial configuration via CLI.

1.1.2 Terminal Emulator

Required for running CLI. Any standard terminal emulator currently on the market will serve the purpose; there are no specific program requirements.

1.1.3 MIB Browser

Required for MIB configuration. Any standard Management Information Base browser (MIB browser) currently on the market will serve the purpose; there are no specific program requirements.

1.1.4 Command Prompt

Required for remote CLI configuration via Telnet. Any standard command prompt program currently on the market will serve the purpose, there are no specific program requirements.

NOTE In order to utilize MIBs, the DSLAM's IP Address, Subnet Mask and Gateway must first be configured via CLI (or NMS - see **model name**'s NMS Management User Guide). As such, an RS232 Cable and Terminal Emulator are required even if you plan to manage your DSLAM via SNMP.

1.2 Multi-User Support

[model name]'s CLI capable products support up to 10 CLI connections concurrently: 1 direct PC to DSLAM connection via the RS232 port and up to 9 remote connections via Telnet. There are two classes of CLI users: Superuser (read/write) and General User (read only). All Superusers access CLI with the same password, as do all General Users. Likewise, there are two classes of SNMP users: read/write and read only. All read/write users access SNMP with the same password, as do all read only users.

1.3 Default Settings

No configuration is necessary for a Micro DSLAM or IP DSLAM to operate at default settings.

1.3.1 User Access Defaults

CLI Username/Password		
ACCESS	USERNAME*	PASSWORD*
read only	general	Password
read/write	superuser	Password

*Usernames and passwords are case sensitive.

SNMP Community String	
ACCESS	COMMUNITY STRING*
read only	Password
read/write	Password

*Community strings are case sensitive.

1.3.2 System Defaults

IP Address	
MODEL	DEFAULT IP
IPD12000 Slot 13	192.168.254.252
IPD12000 Slot 14	192.168.254.253
IPD4000 Slot 5	192.168.254.252
Micro DSLAM	192.168.254.252

System Parameters	
PARAMETER	DEFAULT
Gateway	0.0.0.0
Inband Management	disabled
Inband Management VLAN ID	0 (off)
Mgmt (Management) IP Address Filter Range	0.0.0.0 - 255.255.255.255 (all)
Subnet Mask	255.255.255.0

Mini DSLAM	192.168.254.252
------------	-----------------

TFTP (Trivial File Transfer Protocol)	on
Uplink DSLAM Interconnection	1 (neither/off)
Web Server (NMS)	enabled

1.3.3 Uplink Interface Defaults

10/100 Ethernet Uplink	
PARAMETER	(non-configurable)
Duplex Mode	Auto-Negotiate
Speed	Auto-Negotiate

T1 Uplink	
PARAMETER	DEFAULT
Frame Type	ESF (Extended Super Frame)
Line Buildout	0 dB
Line Code	B8ZS (Bipolar with 8 Zero Substitution)

E1 Uplink	
PARAMETER	DEFAULT
Frame Type	CRC (Cyclic Redundancy Check)
Line Code	HDB3 (High Density Bipolar 3)

1.3.4 Circuit Defaults

PARAMETER	DEFAULT
Circ. ID (Circuit Identification)	n/a (no default)
IP Range 1	0.0.0.0 - 255.255.255.255
IP Range 2	0.0.0.0 - 0.0.0.0
Protocol	All (all traffic)

PARAMETER	DEFAULT
VLAN Range	0-0 (off)
Backbone-VLAN	0 (off)
Pri (VLAN Priority)	0 (none)
Flood	Upl (Uplink)

1.3.5 SNMP Trap Defaults

SNMP Trap Notification	
IP ADDRESS	DEFAULT
#1	0.0.0.0
#2	0.0.0.0
#3	0.0.0.0
#4	0.0.0.0

SNMP Trap Enable/Disable	
TRAP	DEFAULT
Authentication Trap	enabled
Environment Trap	enabled
Cold Start Trap	disabled
Module/Port Trap	disabled

1.4 Data Storage

1.4.1 RAM and NVRAM

Configuration backup is inherent in [model name] Technologies' Micro DSLAMs and IP DSLAMs. Upon initial power up, default parameters will remain in place unless changed through CLI or SNMP. Once changed, new configurations will automatically be recorded in both Random Access Memory (RAM) and Non-Volatile Random Access Memory (NVRAM). Data stored in the RAM of individual IP DSLAM interface modules or directly in Micro DSLAM RAM is volatile; interface module RAM will be erased if the module is removed from the chassis or the chassis loses power and Micro DSLAM RAM will likewise be lost if the chassis loses power. Data stored within NVRAM however, will remain intact (even if the DSLAM loses power) unless deliberately cleared or reconfigured.

1.4.2 Local File

DSLAM configurations can be saved locally on your PC as a backup and/or for use as a template for future configurations. Once a DSLAM has been configured as desired, the settings can be flash uploaded through a Trivial File Transfer Protocol (TFTP) tool, using a SET command. Configurations can also be downloaded from a local file to your DSLAM using a GET command. Refer to your TFTP user manual for further instruction.

NOTE Default configuration files can also be created via your terminal emulator. Refer to your terminal emulator user manual for instructions.

1.4.2.1 IP DSLAM

If your IP DSLAM has two MUMs installed, files must be saved for each MUM individually; the TFTP GET and SET commands will treat each MUM as a separate unit.

1.4.2.1.1 Template Use

Save all IP DSLAM system and port configurations, EXCEPT IP Address, to a local file on your PC using your TFTP tool, a GET (or SET) command, and the following information:

Host name: [IP DSLAM MUM IP Address]
Remote filename: NVR_CFG.bin.[superuser password]
Local filename: [user preference]

1.4.2.1.2 Backup Use

Save all IP DSLAM chassis and port configurations, INCLUDING IP Address, to your PC using your TFTP tool, a GET (or SET) command, and the following information:

Host name: [IP DSLAM MUM IP Address]
Remote filename: NVR_backup.bin.[superuser password]
Local filename: [user preference]

1.4.2.2 Micro DSLAM

Save Micro DSLAM port configurations* to your PC using your TFTP tool, a GET (or SET) command, and the following information:

Host name: [Micro DSLAM IP Address]
Remote filename: NVR_CFG.bin.[superuser password]
Local filename: [user preference]

*At present time, only Micro DSLAM PORT configurations can be saved to a local file; SYSTEM configurations must be manually set for each unit.

1.5 Data Management

1.5.1 Reboot the System

A system reboot clears DSLAM and interface module RAM, restoring all port configurations to original default settings. It does NOT clear NVRAM; system settings will remain as configured.

1.5.1.1 Micro DSLAM

There are three methods for clearing RAM on a Micro DSLAM:

- Power down the Micro DSLAM and allow a minimum of 5 seconds to pass before restoring power
- Use the CLI command RESET; see Section 3.3.1.8
- Using a paperclip, mechanical pencil or similar tool, press and hold the Reset Button on the front, left-hand side of the chassis for a minimum of 10 seconds

1.5.1.2 IP DSLAM

There are three methods for clearing RAM on an IP DSLAM:

- Power down the IP DSLAM and allow a minimum of 5 seconds to pass before restoring power
- Use the CLI command RESET; see Section 3.3.1.8
- Power down individual interface modules as needed by sliding them out of the chassis far enough to disengage the board connector at the back of the chassis. Ensure the power LED on the module faceplate is no longer illuminated and then allow a minimum of 5 seconds to pass before reinstalling the module(s).

1.5.2 Clear NVRAM

CAUTION Clearing NVRAM will restore ALL system and port configurations to original DEFAULT SETTINGS including the original default IP Address, Subnet Mask and Gateway. Additionally, Inband

Management will revert to its original default setting (OFF) and you will be required to establish a direct connection with your DSLAM for any subsequent configurations.

1.5.2.1 Micro DSLAM

Micro DSLAM NVRAM can ONLY be cleared using the CLI command CLEAR_NVRAM; see Section 3.3.1.9.

1.5.2.2 IP DSLAM

There are two methods for clearing NVRAM on an IP DSLAM:

- Use the CLI command CLEAR_NVRAM; see Section 3.3.1.9
- Install the MUM2000-2 you wish to clear into a powered IP DSLAM chassis devoid of interface modules* and allow a minimum of 40 seconds to pass before installing any interface modules

*If there are interface modules already installed in the IP DSLAM, it is not necessary to completely remove them: simply slide each one out of the chassis far enough to disengage the connector at the back of the chassis, ensuring that the power LED on the interface module faceplate is no longer illuminated.

1.5.3 IP DSLAM Module Replacement

Both interface and multiplexer uplink modules may be physically swapped at any time. Modules will retain the previous module's configurations or resort to original [model name] defaults as outlined below.

1.5.3.1 Interface Module

IF THE REPLACEMENT INTERFACE MODULE IS:	THEN MODULE CONFIGURATIONS WILL REVERT TO:
same model as previous, new/unconfigured	same configurations as previous module
same model as previous, already configured	same configurations as previous module
different model than previous, new/unconfigured	original default settings (see Section 1.4 Default Settings)
different model than previous, already configured	original default settings (see Section 1.4 Default Settings)

A replacement interface module (of like model) will take on the same configurations as the previous module ONLY if the MUM remains in the chassis and the chassis retains power during the interim. Otherwise the replacement module will revert to original default settings.

1.5.3.2 Multiplexer Uplink Module (MUM)

[model name] Technologies recommends clearing the NVRAM of a previously configured MUM before using it as a replacement in a different chassis (see Section 1.5.2). Once cleared, the MUM will follow the same replacement principles as would a new or unconfigured MUM.

IF THE REPLACEMENT MUM IS:	THEN CHASSIS AND INTERFACE MODULE
----------------------------	-----------------------------------

	CONFIGURATIONS WILL REVERT TO:
same model as previous, new/unconfigured	same configurations as previous MUM (see NOTE below)
different model than previous, new/unconfigured	same configurations as previous MUM (see NOTE below)

NOTE A replacement MUM can retain the same configurations as the previous MUM for the following parameters only:

- IP Address, Subnet Mask and Gateway
- Inband Management and Inband Management VLAN ID
- General and Superuser Passwords

ALL OTHER PARAMETERS WILL REVERT TO ORIGINAL DEFAULT SETTINGS.

A replacement MUM will take on the same parameter configurations as the previous MUM ONLY if there is at least one interface module in the IP DSLAM AND the IP DSLAM retains power during the interim. Otherwise, ALL parameters on the replacement MUM will revert to original default settings.

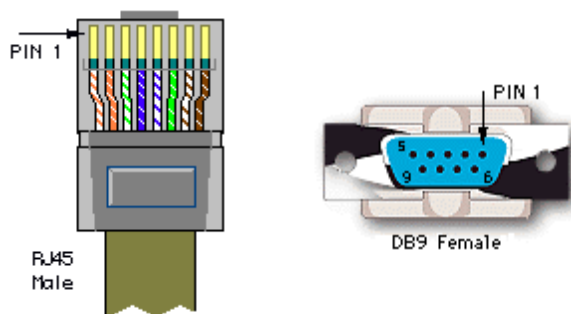
2.0 INITIAL MANAGEMENT CONFIGURATION VIA CLI

If prior configurations have been made to your DSLAM (including IP Address, Subnet Mask and Gateway), skip to Section 2.1.3 Launch a Terminal Emulator.

2.1 Establish a Connection with the Micro DSLAM or MUM2000-2

2.1.1 Plug the Provided Cable Adapter Into Your PC

Plug the provided DB9 Female to RJ45 Male Adapter into the RS232 serial port on your PC. The adapter pinout is as follows:



PIN	SpD20XX RJ45 PORT PINOUT	DIRECTION	PC RS232 SERIAL PORT PINOUT
1	Transmit Data TxD	→	RxD Receive Data
2	Data Set Ready DSR	←	RTS Request to Send
3	Clear to Send CTS	←	DTR Data Terminal Ready

4	Receive Data	RxD	←	TxD	Transmit Data
5	Ground	GND	↔	GND	Ground
6	Data Terminal Ready	DTR	→	CTS	Clear to Send
7	Request to Send	RTS	→	DSR	Data Set Ready
8	No Connect	NC		DCD	Data Carrier Detect

2.1.2 Connect Your PC to the DSLAM COM Port

Connect one end of a STRAIGHT-THROUGH RJ45 TO RJ45 ETHERNET CABLE to the adapter plugged into your PC, and the other end of the cable into the RJ45 COM Port located on the front of the Micro DSLAM or MUM2000-2 faceplate.

2.1.3 Launch a Terminal Emulator

Launch a Terminal Emulator on your PC and configure the program settings. Actual settings will depend upon the Terminal Emulator model type being used, though they should be modeled after the list below. Refer to your Terminal Emulator user manual for further information.

Port: Com 1 Stop: 1 bit
 Baud: 9600 Transmit Delay: n/a
 Bit: 8 Flow Control: Software or XON/XOFF
 Parity: none

2.1.4 Log In

Once your Terminal Emulator has been launched and configured, the following information will appear on your screen:

```

\[model name] Technologies
Copyright(C) [year]
[product] Version [number] (Boot Prom [number] )
System Build Date: [date,time,year]
Mac Address: [address] , IP Address: [address]

```

This information will be followed by a request for username and, once username has been entered, a request for password. You must log in as a Superuser in order to make configuration changes.

Username/Password Defaults		
ACCESS	USERNAME*	PASSWORD*
read/write	superuser	Password
read only	general	Password

*Usernames and passwords are case sensitive.

2.2 CLI Prompt

Once you have logged in, a command prompt will appear: the prompt default is the model name of the MUM or Micro DSLAM you are logged into. The CLI command prompt can be

answered with a variety of command possibilities as outlined in Section 3.0 CLI Commands.

[model name] ->

3.0 CLI COMMANDS

3.1 Command Overview

3.1.1 Syntax

- Each CLI command must be typed in the sequence shown for that command
- CLI commands are NOT case sensitive
- The start and end values of a number range may be separated by either a space (" ") or a dash (" - ")
- A correctly entered command will be mirrored back to you, followed by therequested data or a statement indicating what the action was.

3.1.2 Errors

For correctly typed commands, the command will be mirrored back to you, indicated that it has been carried out successfully.

3.1.2.1 Syntax Error

Incorrect syntax will prompt an error message and the command will not be carried out.

3.1.2.2 Slot and/or Port Number Error

Although a command with incorrect slot and/or port number(s) will not receive an error message (if all else is correct), neither will it be mirrored back to you. Incorrect slot and/or port numbers include slots that are physically empty and slot or port numbers that are beyond the realm of possible options.

CAUTION Any command NOT mirrored back to you, has NOT been carried out.

3.1.3 History

The ten most recently entered CLI commands can be reviewed by pressing the ↑ and ↓ keys.

3.1.3.1 Back

The Up Arrow Key (↑) scrolls back through commands from the most to the least recent of the last ten commands entered.

3.1.3.2 Forward

The Down Arrow Key (↓) Scrolls forward through commands from the least to the most recent of the last ten commands entered.

NOTE You can only scroll forward if you have already scrolled back; it is not possible to scroll forward from the most recent command.

3.2 SET

The SET command is used to configure both slots and ports either individually or as groups.

3.2.1 System Configuration

System configurations made to the MUM2000-2 apply to ALL slots and ALL ports in the IP DSLAM and system configurations made to the Micro DSLAM apply to ALL ports on the Micro DSLAM; these configurations cannot be set individually for specific ports.

Unless your PC has been configured to accept [model name]'s default system settings, you will need to set a proprietary **IP Address, Subnet Mask and Gateway** once the IP DSLAM or Micro DSLAM has been installed and you have logged on to your Terminal Emulator. IP Address, Subnet Mask and Gateway are all user defined within the proper syntax (XXX.XXX.XXX.XXX), though the maximum allowable value for each triple-digit quadrant is 255.

If remote network access of CLI, SNMP or NMS ([model name]'s Network Management System) is desired, you must set **Inband Management** and, if your network is running VLANs to facilitate packet direction and/or promote packet security, you must also set **Inband MGMT (Management) VLAN ID**. If any of these proprietary values are unknown, contact your System Administrator or Information Technology Manager for further information. If you have an IPD12000 with two MUMs, system settings for each MUM must be configured separately.

NOTE Configuration changes can be made with CLI at any time via a direct connection from the COM Port to your PC, regardless of IP Address, Subnet Mask and Gateway.

3.2.1.1 IP Address

The IP Address configured for your DSLAM must be in the same range as that of your PC but cannot duplicate it exactly.

```
[model name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the  
IPD4000, 1 for the Micro DSLAM] IP_ADDRESS [XXX.XXX.XXX.XXX]
```

E.g., [model name] ->set slot 13 ip_address 255.255.255.207

NOTE When configuring a Micro DSLAM via CLI, enter the slot number as "1" for all commands.

Default: 192.168.254.xxx

xxx=252 IPD12000 Slot 13*, IPD4000 Slot 5, all Micro DSLAMs
xxx=253 IPD12000 Slot 14*

*As a method of preventing duplicate IP Address conflicts, DEFAULT IP Addresses for the IPD12000 are configured according to the slot location of each MUM.

3.2.1.2 Subnet Mask

DSLAM subnet mask must be configured to match the proprietary subnet mask of your PC.

```
[model name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the  
IPD4000, 1 for the Micro DSLAM] SUBNET_MASK [XXX.XXX.XXX.XXX]
```

E.g., [model name] ->set slot 13 subnet_mask 255.255.255.207

Default: 255.255.255.0

3.2.1.3 Gateway

DSLAM gateway must be configured to match the proprietary gateway of your PC.

```
[model name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the  
IPD4000, 1 for the Micro DSLAM] DEFAULT_GATEWAY  
[XXX.XXX.XXX.XXX]
```

E.g., [model name] ->set slot 13 default_gateway 255.255.255.207

Default: 0.0.0.0

3.2.1.4 Inband Management

Inband Management allows users to utilize CLI, SNMP and NMS from any computer on your local network; this applies to ALL ports in ALL slots of the IP DSLAM and ALL ports on the Micro DSLAM.

```
[model name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the  
IPD4000, 1 for the Micro DSLAM] INBAND_MANAGEMENT [ON, OFF]
```

E.g., [model name] ->set slot 13 inband_management on

Default: OFF

3.2.1.5 Inband Management VLAN ID

If your network is running VLANs to facilitate packet direction and /or promote packet security, you must set Inband MGMT (Management) VLAN ID. Do not set Inband MGMT VLAN ID if your network is not running VLANs.

```
[model name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the  
IPD4000, 1 for the Micro DSLAM] INBAND_MGMT_VLAN_ID [0-4085]
```

E.g., [model name] ->set slot 13 inband_mgmt_vlan_id 100

Default: 0

NOTE Inband Management VLAN ID applies only to remote network access, it does not apply to direct connections between your PC and an IP DSLAM or Micro DSLAM management/ethernet port.

3.2.1.6 Password

Passwords may be alpha and/or numeric up to 15 case-sensitive characters in length. You will be prompted for values.

NOTE General and Superuser passwords cannot be configured with CLI via Telnet; password configuration via CLI can only be accomplished through a direct PC to DSLAM connection.

3.2.1.6.1 General User (Read Only)

Only one password can be assigned for CLI read only access; all General Users utilize the same password. General User access of CLI is limited to the

HELP [?], LOGOUT and SHOW commands.

```
[model name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the
IPD4000, 1 for the Micro DSLAM] GENERAL_PASSWORD
```

```
E.g., [model name] ->set slot 5 general_password
Password: *****
Verify: *****
```

Default: "Password"

3.2.1.6.2 Superuser (Read/Write)

Only one password can be assigned for CLI read/write access; all Superusers utilize the same password.

```
[model name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the
IPD4000, 1 for the Micro DSLAM] SUPERUSER_PASSWORD
```

```
E.g., [model name] ->set slot 5 superuser_password
Password: *****
Verify: *****
```

Default: "Password"

3.2.1.7 SNMP Community String

Community Strings may be alpha and/or numeric up to 15 case-sensitive characters in length. You will be prompted for values.

3.2.1.7.1 Read Only

Only one community string can be assigned for SNMP read only access; all Read Only Users utilize the same community string. Read Only access of SNMP is limited to _____.

```
[model name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the
IPD4000, 1 for the Micro DSLAM]
SNMP_READONLY_COMMUNITY
```

```
[model name] ->set snmp_readonly_community
Community: *****
Verify: *****
```

Default: "Password"

3.2.1.7.2 Read / Write

Only one community string can be assigned for SNMP read/write access; all Read/Write Users utilize the same community string.

```
[model name] ->SET SLOT [13 or 14 for the IPD12000, 5 for the
IPD4000, 1 for the Micro DSLAM]
SNMP_READWRITE_COMMUNITY
```

```
[model name] ->set snmp_readwrite_community
Community: *****
Verify: *****
```

Default: "Password"

3.2.2 Port Configuration

The remainder of the SET commands apply to each port within the IP DSLAM or Micro DSLAM individually and may be configured independently for each subscriber line if so desired.

3.2.2.1 Speed

The interface module or Micro DSLAM model type will determine the number of options and individual speeds available for each port. Selecting OFF will disable the port. See individual Interface Module User Guides and Micro DSLAM Installation Instructions to obtain specific speed vs. distance capabilities and the default speed settings for each model. When configuring bandwidth, speed must be expressed in kbps and entered as a whole number followed by a "k".

```
[model name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4
for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number]
SPEED [XXXX]k
```

E.g., [model name] ->set slot 2 port all speed [XXXX]k

Default: varies

3.2.2.2 VLAN Range

[model name] Technologies' IP DSLAMs and Micro DSLAMs comply with the IEEE (Institute of Electrical and Electronics Engineers, Inc.) Standard for Local and Metropolitan Area Networks, specifically the 802.1Q Virtual Bridge Local Area Networks Standard. VLAN (Virtual Local Area Network) start and end tags indicate the 802.1Q VLAN tag range to be supported for each port. VLAN tags are a packet's primary identification unless used in conjunction with a Backbone-VLAN (see Section 3.1.2.3 Backbone-VLAN). Each port may be configured with VLAN 0, a single VLAN or one or more VLAN ranges (the number of configurable ranges depends upon the Micro DSLAM or interface module model type).

3.2.2.2.1 VLAN 0 / OFF (Default)

Starting VLAN tag=0

Ending VLAN tag=0

```
[model name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL
or 1-4 forthe IPD4000, 1 for the Micro DSLAM] PORT [ALL or port
number] VLAN_RANGE [1-10] 0-0
```

E.g., [model name] ->set slot 5 port 3 vlan_range 1 0-0

Only packets WITHOUT a designated VLAN tag will be allowed to communicate across a port set at VLAN 0.

PACKETS COMING FROM	WITH	WILL BE
WAN	no VLAN tag	transmitted
	any VLAN tag	dropped
uplink	no VLAN tag	transmitted

any VLAN tag	dropped
--------------	---------

3.2.2.2.2 Single VLAN / Access Port

Starting VLAN tag = 1-4085

Ending VLAN tag = Starting VLAN tag

```
[model name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL
or 1-4 forthe IPD4000, 1 for the Micro DSLAM] PORT [ALL or port
number] VLAN_RANGE [1-10] [(1-4085) - (1-4085)]
```

E.g., [model name] ->set slot 5 port 3 vlan_range 1 100-100

Any port configured with a single VLAN tag is automatically designated as an 802.1Q VLAN Access Port; only packets with the specified VLAN tag will be allowed to communicate across that port.

PACKETS COMING FROM	WITH	WILL BE
WAN	no VLAN tag	transmitted; the configured VLAN tag will automatically be added to the packet, prior to transmission, along with the configured VLAN ID, configured Priority and a zero [0] CFI bit.
WAN	any VLAN tag	dropped
uplink	no VLAN tag	dropped
uplink	the specified VLAN Access tag	transmitted; the VLAN tag will automatically be removed from the packet prior to transmission.
uplink	a tag that does not match the configured VLAN Access tag	dropped

3.2.2.2.3 VLAN Range / Trunk Port

Starting VLAN tag = 1 - 4084

Starting VLAN tag < ending VLAN tag ≤ 4085

```
[model name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL
or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or
port number] VLAN_RANGE [1-10] [(1-4085)-(1-4085)]
```

E.g., [model name] ->set slot 5 port 3 vlan_range 1 100-250

A port set with one or more specified VLAN ranges will automatically be designated as an 802.1Q VLAN Trunk Port; only packets tagged within the specified VLAN range(s) will be allowed to communicate across that port. Up to 10 VLAN ranges may be specified per port on select DSLAM and interface module models.

PACKETS COMING FROM	WITH	WILL BE
WAN	no VLAN tag	dropped

WAN	a VLAN tag within the specified trunk port range	transmitted as is; the packet will retain its original tag configurations for VLAN ID, Priority and CFI bit.
WAN	a VLAN tag outside of the trunk port range	dropped
uplink	no VLAN tag	dropped
uplink	a VLAN tag within the specified trunk port range	transmitted as is; the packet will retain its original tag configurations for VLAN ID, Priority and CFI bit.
uplink	a VLAN tag outside of the trunk port range	dropped

3.2.2.3 Backbone-VLAN

Backbone-VLAN = 0-4085

Default: 0 (disabled)

```
[model name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4
for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number]
BACKBONE_VLAN [0-4085]
```

E.g., [model name] ->set slot 2 port all backbone_vlan 100

Used in conjunction with standard VLAN tags (see Section 3.1.2.2 VLAN Range), the single Backbone-VLAN tag becomes the primary identifier, allowing a router with backbone capabilities to make smarter decisions in directing unlearned traffic. This helps prevent traffic from being flooded to incorrect network clouds. Once packets have been directed to the correct network by the Backbone-VLAN tag, standard VLAN tags then direct the packets to the appropriate ports.

PACKETS COMING FROM	WITH	WILL BE
WAN	both Backbone-VLAN & VLAN tags	dropped, regardless of whether the Backbone-VLAN tag is in accordance with current configurations.
WAN	standard VLAN tags only	transmitted in accordance with the standard VLAN rules as listed in Section 3.1.2.2. If the packet adheres to the standard VLAN rules and Backbone-VLAN is currently configured, then a Backbone-VLAN tag will automatically be added to the packet, prior to transmission, along with the configured VLAN ID, configured Priority and a zero [0] CFI bit.
uplink	both Backbone-VLAN & VLAN tags	dropped if Backbone-VLAN is not currently configured, or if Backbone-VLAN is configured but the packet's Backbone-VLAN tag does not match the current configuration. If the packet's Backbone-VLAN tag DOES match the current configuration, the packet will follow the standard VLAN rules as listed in Section 3.1.2.2.
uplink	standard VLAN tags only	dropped, if Backbone-VLAN is currently configured. If Backbone-VLAN is NOT currently configured, then the packet will follow the standard VLAN rules as listed in Section 3.1.2.2.

NOTE A Backbone-VLAN tag cannot be used independently; standard VLAN tags must be set. Additionally, the DSLAM uplink connection for the port being configured must run through a

router in order for a Backbone-VLAN tag to function.

3.2.2.4 Priority

Priority = 0 - 7

Default: 0 (no priority)

```
[model name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4
for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number]
PRIORITY [0-7]
```

E.g., [model name] ->set slot 4 port 3 priority 5

In compliance with the IEEE 802.1p Standard (a subset of 802.1Q), each port can be set with one of eight levels of prioritization designated numerically from 0 to 7: 0 denotes no priority and 7 denotes the highest priority. CLI and SNMP do not currently act on Priority configurations, they simply add a priority designation to Access Port VLAN tags or replace the priority designation in Trunk Port VLAN tags. This allows packets coming from ports configured with higher priorities to scavenge bandwidth from lower priority ports if, or when, bandwidth becomes scarce at a n intermediate or destination device with prioritization capabilities.

IF PORT IS CONFIGURED WITH	THEN
VLAN 0 (OFF)	the configured priority is irrelevant; the packet doesn't have VLAN tags.
a Single VLAN (Access Port)	the configured priority will automatically be added to the VLAN tag and Backbone-VLAN tag (if utilized).
one or more VLAN Ranges (Trunk Port)	the existing priority in the VLAN tag(s) and Backbone-VLAN tag (if utilized) will automatically be replaced with the configured priority.

3.2.2.5 Flood

Flood refers to the method in which interface modules handle unknown unicasts (traffic directed to a single MAC Address), broadcasts (traffic directed to all MAC Addresses) and multicasts (traffic directed to multiple MAC Addresses) for each port. 802.1Q standard dictates that packets should be forwarded (flooded) if within the VLAN range for that port. There are two options:

3.2.2.5.1 Upl (Uplink - Default)

```
[model name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL
or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or
port number] FLOOD UPL
```

E.g., [model name] ->set slot 2 port all flood upl

Unknown unicast, broadcast and multicast traffic is flooded to the DSLAM's uplink interface ports only. This prevents communication between interface ports without the intervention of an upstream device such as a router. If communication between interface ports IS desired, the upstream device must be properly configured to allow it.

3.2.2.5.2 Vln (VLAN)

```
[model name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL  
or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or  
port number] FLOOD VLN
```

E.g., [model name] ->set slot 2 port all flood vln

Unknown unicast, broadcast and multicast traffic (within the sender's VLAN range) is flooded to the DSLAM's interface ports, in addition to the uplink interface ports.

3.2.2.6 SDSL Line Code

SDSL Line Code refers to the method of line amplitude modulation for SDSL lines.

NOTE SDSL Line Code is currently configurable on **SIM2000 interface modules and Micro DSLAMs only**; it is hard set on all other \model name SDSL products. Additionally, line code applies to ALL ports on the SIM2000 and Micro DSLAM; it cannot be configured for individual ports.

3.2.2.6.1 G.SHDSL (Default)

```
[model name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL  
or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or  
port number] SDSL_LINE_CODING G.SHDSL
```

E.g., [model name] ->set slot 2 port all sdsl_line_coding g.shdsl

Transmission Convergence/Pulse Amplitude Modulation (TC/PAM) line code is a sixteen-level PAM technique which incorporates advanced Trellis code, precoding, spectral shaping, equalization circuits and forward error correction. Otherwise known as G.SHDSL.

3.2.2.6.2 2B1Q

```
[model name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL  
or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or  
port number] SDSL_LINE_CODING 2B1Q
```

E.g., [model name] ->set slot 2 port all sdsl_line_coding 2b1q

Two Binary, One Quaternary (2B1Q) line code is a four-level PAM technique which reduces the signaling rate to half of the bit rate, thereby doubling transmission efficiency.

3.2.2.6.3 CAP

```
[model name] ->SET SLOT [ALL or 1-12 for the IPD12000, ALL  
or 1-4 for the IPD4000, 1 for the Micro DSLAM] PORT [ALL or  
port number] SDSL_LINE_CODING CAP
```

E.g., [model name] ->set slot 2 port all sdsl_line_coding cap

Carrierless Amplitude and Phase (CAP) line code modulates transmit and receive signals into two wide-frequency bands that can pass through a filter without being attenuated.

3.3 SHOW

A SHOW command returns the current configuration of a requested parameter (as identified by slot number, port number and parameter name). Enter SHOW commands as you would SET commands (Section 3.1) - simply replace the word SET with the word SHOW and exclude configuration values from the end of the command (see Section 3.2.1 Show Command Example). The following parameter configurations can be requested with a SHOW command:

Backbone-VLAN	Inband MGMT VLAN ID	Speed
Default Gateway	IP Address	Subnet Mask
Flood	Priority	VLAN Range
Inband Management	SDSL Line Coding	

3.3.1 SHOW Command Example

A request for speed configuration would be entered as follows:

```
[model name] ->SHOW SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for
the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number] SPEED
```

E.g., [model name] ->show slot 5 port all speed

The response to the above request would appear as follows:

```
Slot 5 Port 1 Speed = ____ kbps
Slot 5 Port 2 Speed = ____ kbps
Slot 5 Port 3 Speed = ____ kbps
Slot 5 Port 4 Speed = ____ kbps
Slot 5 Port 5 Speed = ____ kbps
Slot 5 Port 6 Speed = ____ kbps
Slot 5 Port 7 Speed = ____ kbps
Slot 5 Port 8 Speed = ____ kbps
Slot 5 Port 9 Speed = ____ kbps
Slot 5 Port 10 Speed = ____ kbps
Slot 5 Port 11 Speed = ____ kbps
Slot 5 Port 12 Speed = ____ kbps
```

The number of ports listed, and the speed shown for each port, would depend upon the interface module model type in slot 5 and the current speed configuration as set for each particular port.

3.3.2 SHOW ALL

```
[model name] ->show
```

OR

```
[model name] ->show all
```

The SHOW ALL command lists system configuration data as follows:

3.3.2.1 Micro DSLAM, IPD4000 with a MUM2000-2 or IPD12000 with one MUM2000-2

Slot [1, 4, 13 or 14]* MUM Version:	[X.XX.XX]
Mac Address:	[XX-XX-XX-XX-XX-XX]
IP Address / Subnet Mask:	[XXX.XXX.XXX.XXX] / [XXX.XXX.XXX.XXX]
Default Gateway:	[XXX.XXX.XXX.XXX]
Inband Management	[ON or OFF]
Inband Mgmt VlanID:	[1-4085]
Allow Management from:	[XXX.XXX.XXX.XXX to XXX.XXX.XXX.XXX]
Web Server:	[Enabled or Disabled]
TFTP Server:	[Enabled or Disabled]
Telnet:	[Enabled or Disabled]

*Slot 1 MUM indicates Micro DSLAM, Slot 4 MUM indicates a MUM2000-2 in an IPD4000 (Slot 4 only) and Slot 13 or Slot 14 MUM indicates a MUM2000-2 in an IPD12000 (Slot 13 or 14 only)

3.3.2.2 IPD12000 with two MUM2000-2s

The SHOW ALL command for an IPD12000 with two MUM2000-2s will list some of the system configuration data for both MUMs. However, Allow Management from, Web Server, TFTP Server and Telnet information will only be listed for the MUM through which you are logged in. E.g., if you were logged into the system via the MUM in Slot 13, system configuration data would list as follows:

Slot 13 MUM Version:	[X.XX.XX]
Mac Address:	[XX-XX-XX-XX-XX-XX]
IP Address / Subnet Mask:	[XXX.XXX.XXX.XXX] / [XXX.XXX.XXX.XXX]
Default Gateway:	[XXX.XXX.XXX.XXX]
Inband Management	[ON or OFF]
Inband Mgmt VlanID:	[1-4085]
Allow Management from:	[XXX.XXX.XXX.XXX to XXX.XXX.XXX.XXX]
Web Server:	[Enabled or Disabled]
TFTP Server:	[Enabled or Disabled]
Telnet:	[Enabled or Disabled]

Slot 14 MUM Version:	[X.XX.XX]
Mac Address:	[XX-XX-XX-XX-XX-XX]
IP Address / Subnet Mask:	[XXX.XXX.XXX.XXX] / [XXX.XXX.XXX.XXX]
Default Gateway:	[XXX.XXX.XXX.XXX]
Inband Management	[ON or OFF]
Inband Mgmt VlanID:	[1-4085]

3.3.3 Firmware Version

Firmware Version functions only as a SHOW command and cannot be entered as a SET command.

```
[model name] ->SHOW SLOT [ALL or 1-12 for the IPD12000, ALL or 1-4 for
the IPD4000, 1 for the Micro DSLAM] PORT [ALL or port number]
FIRMWARE_VERSION
```

E.g., [model name] ->show slot 5 port all firmware_version

The response to the above request would appear as follows:

```
Slot 5 Port 1 MUX Version: ____, CONV Version: ____,
Slot 5 Port 2 MUX Version: ____, CONV Version: ____,
Slot 5 Port 3 MUX Version: ____, CONV Version: ____,
Slot 5 Port 4 MUX Version: ____, CONV Version: ____,
Slot 5 Port 5 MUX Version: ____, CONV Version: ____,
Slot 5 Port 6 MUX Version: ____, CONV Version: ____,
Slot 5 Port 7 MUX Version: ____, CONV Version: ____,
Slot 5 Port 8 MUX Version: ____, CONV Version: ____,
Slot 5 Port 9 MUX Version: ____, CONV Version: ____,
Slot 5 Port 10 MUX Version: ____, CONV Version: ____,
Slot 5 Port 11 MUX Version: ____, CONV Version: ____,
Slot 5 Port 12 MUX Version: ____, CONV Version: ____,
```

The number of ports listed, and the firmware versions shown for each port would depend upon the interface module model type in slot 5.

3.4 Independent Commands

The following commands are used independently of the SET and SHOW commands.

3.4.1 System Name

User defined identifier of up to 32 alpha-numeric characters; replaces model name as the CLI command prompt.

```
[model name] ->SYSTEM_NAME [user defined]
```

E.g., [model name] ->system_name dslam412_mum13
(the command prompt would then appear as: dslam412_mum13 ->)

Default: [MUM or Micro DSLAM model name]

3.4.2 Regulating System Management

3.4.2.1 Enable Telnet (Default)

Allows up to nine remote users to manage a DSLAM with CLI (via Telnet). See Section 1.2 Multi-User Support.

```
[model name] ->enable_telnet
```

3.4.2.2 Disable Telnet

Disallows remote DSLAM management with CLI (via Telnet).

```
[model name] ->disable_telnet
```

3.4.2.3 Enable Web Server (Default)

Allows DSLAM management via [model name] Technologies' Network Management System (NMS). See [model name]'s NMS Management User Guide.

```
[model name] ->enable_web_server
```

3.4.2.4 Disable Web Server

Disallows DSLAM management via NMS.

```
[model name] ->disable_web_server
```

3.4.2.5 Allow

Specifies the IP Address(es) from which a DSLAM can be remotely managed.

NOTE DSLAMs are always manageable via a direct physical connection with the MUM2000-2 or Micro DSLAM COM (Communication) port, regardless of management IP Address specifications.

```
[model name] ->ALLOW [ALL,ip_address or ip_address ip_address]
```

3.4.2.5.1 All IP Addresses (Default)

```
[model name] ->allow all OR
```

```
[model name] ->allow 0.0.0.0 - 255.255.255.255
```

3.4.2.5.2 IP Address Range

```
[model name] ->allow [ip_address] - [ip_address]
```

E.g., [model name] ->allow 152.152.152.001 - 152.152.152.254

3.4.2.5.3 Single IP Address

```
[model name] ->allow [ip_address]
```

E.g., [model name] ->allow 152.152.152.001

3.4.2.5.4 COM (Communication) Port Only

```
[model name] ->allow 0.0.0.0
```

Every ALLOW command entered overwrites all previously entered ALLOW commands.

3.4.2.6 Who

Returns the IP Addresses of all users currently logged on to the management system and specifies whether each user is a Superuser or General User. Also specifies which user, if any, is logged on via a direct connection through the DSLAM COM port (as opposed to remote connections via Telnet).

```
[model name] ->who
```

3.4.2.7 Enable TFTP (Default)

Allows system configurations to be saved to a local file via a Trivial File Transfer Protocol (TFTP) tool. See Section 1.4.2 Local File.

```
[model name] ->enable_tftp
```

3.4.2.8 Disable TFTP

Disallows saving system configurations to a local file via TFTP.

[model name] ->disable_tftp

3.4.2.9 Reset

Reboots the DSLAM, clearing Micro DSLAM or interface module RAM and restoring all port configurations to original default settings. It does not clear NVRAM; system settings will remain as configured. A system reset takes approximately one minute to complete, after which you will be required to log back in.

[model name] ->reset

3.4.2.10 Clear NVRAM

CAUTION Clearing DSLAM NVRAM restores ALL system and port configurations to original default settings including IP Address, Subnet Mask and Gateway. Additionally, Inband Management will revert to its original default setting (OFF) and you will be required to establish a direct connection with your DSLAM for any subsequent configurations.

Clearing NVRAM takes approximately one minute to complete, after which you will be required to log back in.

[model name] ->clear_nvram

3.4.3 HELP

The HELP command posts, to your screen, a list of usage possibilities including SET/SHOW sub-commands and independent commands.

[model name] ->help OR
[model name] ->?

The response to either of the above HELP Commands appears as follows:

```
Usage: [?,CLEAR_NVRAM,HELP,LOGOUT,WHO]
       [DISABLE_TELNET,DISABLE_TFTP,DIABLE_WEB_SERVER,ENABLE_TELNET,ENABLE_TFTP,ENABLE_
allow [ALL, IP_ADDRESS [IPADDRESS]]
       [SET,SHOW] SLOT [ALL, slotnumber] [PORT] [ALL, portnumber] ITEM VALUE
```

Slot is MANDATORY for all SET/SHOW commands

ITEMS	VALUES
-----	-----
ALLOW	Allow IP_Address [IP_ADDRESS] (for mgmt)
BACKBONE_VLAN	[0-4085]
CLEAR_NVRAM	Reboots the unit and restores factory defaults
DEFAULT_GATEWAY	xxx.xxx.xxx.xxx
DISABLE_TELNET	Disables TELNET Capabilities

DISABLE_TFTP	Disables TFTP Server
DISABLE_WEB_SERVER	Disables the web server interface (NMS)
ENABLE_TELNET	Enables TELNET Capabilities
ENABLE_TFTP	Enables TFTP Server
ENABLE_WEB_SERVER	Enables the web server interface (NMS)
FIRMWARE_VERSION	Displays the firmware version
FLOOD	[UPL,VLN]
GENERAL_PASSWORD	You will be prompted for values
INBAND_MANAGEMENT	[ON,OFF]
INBAND_MGMT_VLAN_ID	[0-4085]
IP_ADDRESS	xxx.xxx.xxx.xxx
LOGOUT	Logs user out of CLI
PRIORITY	[0-7]
RESET	
SDSL_LINE_CODING	[GSHDSL,CAP,2B1Q]
SNMP_READONLY_COMMUNITY	You will be prompted for values
SNMP_READWRITE_COMMUNITY	You will be prompted for values
SPEED	[XXXXk,OFF] where XXXX = speed (in kbps)
SUBNET_MASK	xxx.xxx.xxx.xxx
SUPERUSER_PASSWORD	You will be prompted for values
SYSTEM_NAME	_____
VLAN_RANGE	VLAN_RANGE: SHOW=[ALL,1-10], SET=[1-10]
	VLAN_ID: [0-4085]-[0-4085]
WHO	Who's logged on

3.4.4 LOGOUT

Logs users out of the DSLAM management system.

[model name] ->logout

4.0 SIMPLE NETWORK MANAGEMENT PROTOCOL (SNMP)

SNMP is the standard for management of TCP/IP (Transmission Control Protocol/Internet Protocol) networks and network devices such as Ethernet bridges and routers. The management functionality of Net to Net Technologies' Micro DSLAMs and select IP DSLAM MUMs includes a portion of SNMP v1.0: the MIB-II System Group and Interfaces Group of OIDs. SNMP is comprised of MIBs (Management Information Bases) sanctioned by IETF (the Internet Engineering Task Force). MIBs are comprised of a group of OIDs (Object Identifiers); each of which represents a system configuration or request for data.

NOTE You will not be able to manage your DSLAM via SNMP unless, or until, initial configuration has been completed via CLI (see Section 2.0) or NMS (see Net to Net's NMS Management User Guide), specifically IP Address, Subnet Mask and Gateway.

4.1 Establish a DSLAM Connection

You must have a MIB browser installed on your PC in order to utilize the Management Information Base; see Section 1.2 System Requirements.

NOTE If you have already made a direct connection between the IP DSLAM or Micro DSLAM and your PC for the purpose of CLI configurations (see Section 2.1) and/or if you have already configured Inband Management through CLI (see Section 3.1.2), skip to step 3.

1. Connect your PC to the Management (MGMT) Port on the front of the Micro DSLAM or on the MUM faceplate.

MGMT/Ethernet RJ45 Port Pinout

Pin 1	Rx+	Pin 5	not used
Pin 2	Rx-	Pin 6	Tx-
Pin 3	Tx+	Pin 7	not used
Pin 4	not used	Pin 8	not used

2. If your PC is not already on, turn it on now.
3. Launch your MIB browser and perform any necessary program configurations. Refer to your MIB browser user manual for further information.
4. Download the supported portions of MIB-II from the Internet Engineering Task Force (IETF) web site: www.ietf.org/rfc.html. Once at the site, enter RFC 1213 and click "go". \[model name] Technologies supports a portion of both the MIB-II System Group and the MIB-II Interfaces Group of OIDs which can be found in sections 6.3 and 6.4 (pages 13-22) of RFC 1213. Refer to your MIB browser user manual for instructions on how to compile the MIB-II OIDs into your MIB browser.

The System Group

sysContact*
 sysDescr
 sysLocation*
 sysName*
 sysObjectId
 sysServices
 sysUpTime

The Interfaces Group

ifAdminStatus* ifInUnknownProtos**
 ifDescr ifLastChange ifOutOctets
 ifIndex ifMtu ifOutUcastPkts
 ifInDiscards** ifNumber ifPhysAddr**
 ifInErrors** ifOperStatus ifQlen**
 ifInNUcastPkts ifOutDiscards** ifSpecific
 ifInOctets ifOutErrors** ifSpeed
 ifInUcastPkts ifOutNUcastPkts ifType

*configurable

**Although these OIDs are supported, SNMP does not have the capability to identify corresponding events. As such, the counter values will show as zero.

5. Contact Technical Support at \[model name] Technologies to obtain the \[model name] Enterprise MIBs (see Section 6.0 Technical Support). Refer to your MIB browser user manual for instructions on how to compile the \[model name] Enterprise MIBs into your MIB browser.

4.2 Configuring and Managing DSLAM data with MIBs

IP DSLAM and Micro DSLAM data is accessed and configured through MIB browsers with the

use of Object Identifiers, as outlined in Section 5.0. Actual usage of Object Identifiers (OIDs) varies between different MIB browser models; refer to your MIB browser user manual for specific instruction regarding the entry of OIDs and other qualifying data.

5.0 MIB Object Identifiers (OIDs)

NOTE The OID base for ALL \model name MIBs is 1.3.6.1.4.1.8059.

5.1 Chassis Configuration MIB

The nntechChassisConfigurationMIB defines the SNMP Application Programming Interface for Multiplexer Uplink Module (MUM) and Micro DSLAM parameter configuration as well as Simple Network Management Protocol (SNMP) parameter configuration.

5.1.1 MUM and Micro DSLAM Chassis Configuration

MUM	OID	Input/Return Values	Syntax	Notes and Definitions
Notes (mumCfgNotes)	1.1.1.1.1.1.1	Y=user defined	0-128 octet string	Meant as a "scratchpad" for the Administrator to record such things as Chassis ID or customer name. Cannot exceed 128 alpha-numeric characters. Default is blank.
Index (mumCfgIndex)	1.1.1.1.1.2.1.1.X	X=1-2	32 bit integer	1=IPD12000 Slot 13, IPD4000 Slot 5, or Micro DSLAM 2=IPD12000 Slot 14
IP Address (mumCfgIpAddress)	1.1.1.1.1.2.1.2.X	YYY.YYY.YYY.YYY Y=user defined	IP Address	Default when X=1: 192.168.254.252 X=2: 192.168.254.253
Subnet Mask (mumCfgSubnetMask)	1.1.1.1.1.2.1.3.X	YYY.YYY.YYY.YYY Y=user defined	IP Address	Default: 255.255.255.0
Gateway (mumCfgDefaultGateway)	1.1.1.1.1.2.1.4.X	YYY.YYY.YYY.YYY Y=user defined	IP Address	Default: 0.0.0.0
Inband Management (mumCfgInbandMgmt)	1.1.1.1.1.2.1.5.X	Y=1-2	32 bit integer	1=ON 2=OFF (default) When ON, allows network access to the IP DSLAM or Micro DSLAM via the assigned IP Address, Subnet Mask and Gateway.

Inband Management Vlan ID (mumCfgInbandMGMTVlanID)	1.1.1.1.1.2.1.6.X	Y=0-4085	32 bit integer	0=OFF (default) 1-4085=user defined Support of 802.1Q VLANs as applicable to inband management traffic only; does not apply to out of band traffic received from the MGMT Port.
Interconnection (mumCfgInterConnection)	1.1.1.1.1.2.1.7.X	Y=1-3	32 bit integer	1=neither (default) 2=Uplink 1 3=Uplink 2 Allows the Administrator to daisy-chain one IP DSLAM to another so that a single router may be used for both. Does not apply to Micro DSLAMs.

5.1.2 SNMP Configuration

See Section 6.0 SNMP Traps for more detailed information regarding trap configurations.

SNMP	OID	Input/Return Values	Syntax	Notes and Definitions
Trap Notice Index (snmpCfgNoticeIndex)	1.1.1.1.1.3.1.1.1.X	X=1-4	32 bit integer	Numeric designation of trap notification assignment; up to 4 may be configured.
Trap Notice IP Address (snmpCfgNoticeIpAddress)	1.1.1.1.1.3.1.1.2.X	YYY.YYY.YYY.YYY Y=user defined	IP Address	Default: 0.0.0.0 Designates the IP Address(es) to which trap notifications will be sent.
Authentication Trap (snmpCfgAuthenticationTrapState)	1.1.1.1.1.3.2	Y=1-2	32 bit integer	1=enable (default) 2=disable Standard, MIB-II compliant trap; sends notification whenever an SNMP request is made with an incorrect community string.
Fan Trap (snmpCfgFanTrapState)	1.1.1.1.1.3.3	Y=1-2	32 bit integer	1=enable (default) 2=disable Enables or disables [model name]'s enterprise specific

				Environmental Fan Trap (as identified in Section 5.7.1 Environmental and Inventory Traps); sends notification of any changes in the operational status of chassis fans.
Cold Start Trap (snmpCfgColdstartTrapState)	1.1.1.1.1.1.3.4	Y=1-2	32 bit integer	1=enable 2=disable (default) Based on MIB-II standards though the trap sends notification for both cold start (power up) and warm start (reboot or reset) occurrences whereas a true MIB-II compliant trap would send notification of cold starts only.
Link Up/Down Trap (snmpCfgLinkUpDwnTrapState)	1.1.1.1.1.1.3.5	Y=1-2	32 bit integer	1=enable 2=disable (default) The Link Up/Down Trap is a standard MIB-II compliant trap that sends notification whenever a port changes operational status.
Read/Write Community String (comReadWriteAccess)	1.1.1.1.1.1.3.6.1	Y=user defined	0-15 octet string	User will be allowed to view, as well as set, parameter attributes. NOTE: For security purposes, this is a hidden attribute; the returned octet string for "GET" requests will be represented by asterisk.
Read Only Community String (snmpCfgcomReadOnlyAccess)	1.1.1.1.1.1.3.6.2	Y=user defined	0-15 octet string	User will be allowed to view, but not set, parameter attributes.

				NOTE: For security purposes, this is a hidden attribute; the returned octet string for "GET" requests will be represented by asterisk.
Embedded Web Server (unqEmbHttpWebsrvrState)	1.1.1.1.1.1.4.1	Y=1-2	32 bit integer	1=enable (default) 2=disable Allows, or disallows, access to [model name] Technologies' Network Management System (NMS).

5.2 Chassis Status MIB

The nntechChassisStatusMIB defines the SNMP Application Programming Interface for retrieving MUM and Micro DSLAM data as well as Uplink Interface Module (UIM) data.

5.2.1 MUM and Micro DSLAM Chassis Status

MUM	OID	Input/Return Values	Syntax	Notes and Definitions
Chassis Type (mumStaChassisType)	1.1.2.1.1.1.1	Y=1-4	32 bit integer	Chassis model type: 1=IPD12000 2=IPD4000 4=Micro DSLAM
Fan State (mumStaFanState)	1.1.2.1.1.1.2	Y=1-3	32 bit integer	Current status of chassis fans: 1=on all four fans are operational 2=fault

				one or more fans are no longer functioning 3=alert none of the four fans are functional
Index (mumStaIndex)	1.1.2.1.1.1.4.1.1.X	X=1-2	32 bit integer	DSLAM type or MUM location: 1=IPD12000 Slot 13, IPD4000 Slot 5, or Micro DSLAM 2=IPD12000 Slot 14
Mac Address (mumStaMacAddress)	1.1.2.1.1.1.4.1.2.X	YY.YY.YY.YY.YY.YY Y=user defined	17 octet string	Mac Address of the MUM or Micro DSLAM.
Firmware Revision (mumStaFirmWareRev)	1.1.2.1.1.1.4.1.3.X	Y.YY.YY Y=user defined	7 octet string	Firmware revision of the MUM or Micro DSLAM.
MUM Type (mumStaType)	1.1.2.1.1.1.4.1.4.X	Y=22-29, 127-128	32 bit integer	MUM or Micro DSLAM model type: 127=MUM2000-2 128=MUM200S-2 22=SμD2011-12T 23=SμD2011-12E 24=SμD2003-12T 25=SμD2003-12E 26=SμD2011-6T 27=SμD2011-6E 28=SμD2002-6T 29=SμD2002-6E

5.2.2 UIM Status

UIM and Uplink Port	OID	Input/Return Values	Syntax	Notes and Definitions
MUM Index (mumStaUIMMumIndex)	1.1.2.1.1.1.5.1.1.X.Y	X=1-2 Input X and Y (see UIM Index below); returns X.	32 bit integer	MUM slot location (or Micro DSLAM): 1=IPD12000 Slot 13, IPD4000 Slot 5 or Micro DSLAM 2=IPD12000 Slot 14
UIM Index (mumStaUIMIndex)	1.1.2.1.1.1.5.1.2.X.Y	Y=1-4 Input X and Y (see MUM Index above); returns Y.	32 bit integer	1=MUM UIM Port 1 Uplink Port 1 (Micro DSLAM Port #2) 2=MUM UIM Port 2 Uplink Port 2 (Micro DSLAM Port #3) 3=Uplink Port 3

				(Micro DSLAM Port #4) 4=Uplink Port 4 (Micro DSLAM Port #5) NOTE: Micro DSLAM Uplink Ports 1-4 are labeled as Ports #2-#5; Port #1 is the Management Port.
UIM Type (mumStaUIMType)	1.1.2.1.1.1.5.1.3.X.Y	Z=1-5*	32 bit integer	UIM model type or Micro DSLAM Uplink Port Type: 1=UIM-10/100, Micro DSLAM 10/100 Uplink Port 2=UIM-T1, Micro DSLAM T1 Uplink Port 3=UIM-DS3, Micro DSLAM DS3 Uplink Port 4=UIM-E1, Micro DSLAM E1 Uplink Port 5=UIM-E3, Micro DSLAM E3 Uplink Port *For the MUM200-2 only Z=1-3; 2=UIM-T1 and UIM-E1 and 3=UIM-T3 and UIM-E3.
UIM Link Status (mumStaUIMLinkState)	1.1.2.1.1.1.5.1.4.X.Y	Z=1-3	32 bit integer	UIM or Micro DSLAM Uplink Port link status: 1=link 2=no link 3=fault

5.2.3 MGMT (Management) Port Status

MGMT Port	OID	Input/Return Values	Syntax	Notes and Definitions
MUM Index (mumStaMgmtPortMumIndex)	1.1.2.1.1.1.6.1.1.X	X=1-2	32 bit integer	DSLAM type or MUM location: 1=IPD12000 Slot 13, IPD4000 Slot 5, or Micro DSLAM 2=IPD12000 Slot 14
MGMT Port Type (mumStaMgmtPortType)	1.1.2.1.1.1.6.1.2.X	Y=1	32 bit integer	MGMT Port type: 1=management
MGMT Port Link Status (mumStaMgmtPortLinkState)	1.1.2.1.1.1.6.1.3.X	Y=1-3	32 bit integer	MGMT Port link status:

1=link 2=no link 3=fault

5.3 Port Configuration MIB

The nntechAccessModuleConfigurationMIBs defines the SNMP Application Programming Interface for parameter configuration of individual ports on interface modules and Micro DSLAMs.

5.3.1 Interface Module and Micro DSLAM Port Configuration

Port	OID	Input/Return Values	Syntax	Notes and Definitions
Slot Index (ifCfgSlotIndex)	1.2.1.1.1.2.1.1.1.X.Y	X=1-12 Input X and Y (see Port Index below); returns X.	32 bit integer	Interface Module slot number of port being configured: IPD12000=1-12 IPD4000=1-4 Micro DSLAM=1
Port Index (ifCfgPortIndex)	1.2.1.1.1.2.1.1.2.X.Y	Y=1-48 Input X and Y (see Slot Index above); returns Y.	32 bit integer	Port number of the port being configured. The range of possible port numbers varies dependent upon the interface module or Micro DSLAM model type.
Circuit ID (ifCfgPortCircuitID)	1.2.1.1.1.2.1.1.3.X.Y	Z=user defined	0-15 octet string	Circuit ID number as assigned to a port on an interface module or Micro DSLAM by the user. Default is blank.
IP Filter Range 1 start value (ifCfgPortFltrIp1Start)	1.2.1.1.1.2.1.1.4.X.Y	ZZZ.ZZZ.ZZZ.ZZZ Z=user defined	IP Address	Default: 0.0.0.0 Starting IP Address for the first IP filter range; the default start and end values indicate ALL IP Addresses are allowed.
IP Filter Range 1 end value (ifCfgPortFltrIp1End)	1.2.1.1.1.2.1.1.5.X.Y	ZZZ.ZZZ.ZZZ.ZZZ Z=user defined	IP Address	Default: 255.255.255.255 Ending IP Address for the first IP filter range; the default start and end values indicate ALL IP Addresses are allowed.
IP Filter Range 2 start value (ifCfgPortFltrIP2Start)	1.2.1.1.1.2.1.1.6.X.Y	ZZZ.ZZZ.ZZZ.ZZZ Z=user defined	IP Address	Default: 0.0.0.0 Starting IP Address for

				the second IP filter range; the default start and end values indicate the second IP filter range is not in use.
IP Filter Range 2 start value (ifCfgPortFiltrIp2Start)	1.2.1.1.1.2.1.1.7. X.Y	ZZZ.ZZZ.ZZZ.ZZZ Z=user defined	IP Address	Default: 0.0.0.0 Ending IP Address for the second IP filter range; the default start and end values indicate the second IP filter range is not in use.
Backbone VLAN* (ifCfgPortBackboneVlan)	1.2.1.1.1.2.1.1.8. X.Y	Z=0-4085	32 bit integer	0=OFF (default) 1-4085=user defined The primary identifier used by routers with backbone capability in directing traffic to appropriate network clouds. Cannot be used independently, must be used in conjunction with standard VLAN tags.
VLAN Priority* (ifCfgPortVlanPriority)	1.2.1.1.1.2.1.1.9. X.Y	Z=0-7	32 bit integer	0=no priority (default) 1-7=user defined (1 is lowest priority, 7 highest) IP DSLAMs and Micro DSLAMs do not currently support VLAN Priority. Priority is configurable however; packets may be designated with a priority for use by other equipment through which the packets might pass. The indication is that ports with a higher priority may scavenge bandwidth from lower priority ports if, or when, bandwidth becomes scarce.
Flood Mode (ifCfgPortFloodMde)	1.2.1.1.1.2.1.1.10. X.Y	Z=1-2	32 bit integer	1=Multiplexer Uplink (default) Unknown unicasts or broadcasts are flooded only to the IP DSLAM's or Micro DSLAM's uplink interface ports within the sender's VLAN range, preventing communication between access ports without the intervention of an upstream device such as a router. 2=VLAN

				Unknown unicasts or broadcasts are flooded to any of the IP DSLAM or Micro DSLAM's uplink interface ports or access ports within the sender's VLAN range.
Protocol (ifCfgPortIpFitProtocol)	1.2.1.1.1.2.1.1.11.X.Y	Z=1-2	32 bit integer	1=ALL traffic (default) 2=TCP/IP traffic only
Reset (ifCfgPortReset)	1.2.1.1.1.2.1.1.12.X.Y	Z=1-2	32 bit integer	1=reset 2=no reset (default) Upon entry of value "1" all port statistics are reset to zero and recalculation begins. Because port statistics equal zero only at the instance of reset, this value will always be "returned" as 2.

*See [CLI] Section 3.1.7 Backbone-VLAN and [CLI] Section 3.1.8 Priority for specific rules and compliance.

5.3.2 VLAN ID Configuration

VLAN	OID	Input/Return Values	Syntax	Notes and Definitions
VLAN Slot Index (ifCfgIfSlotIndex)	1.2.1.1.1.2.2.1.1.X.Y.Z	X=1-12 Input X, Y and Z (see Port Index and VLAN Index below); returns X.	32 bit integer	Interface module slot number of port for which you wish to set VLAN tags: IPD12000=1-12 IPD4000=1-4 Micro DSLAM=1
VLAN Port Index (ifCfgIfPortIndex)	1.2.1.1.1.2.2.1.2.X.Y.Z	Y=1-48 Input X, Y and Z (see Slot Index above and VLAN Index below); returns Y.	32 bit integer	Port number of the port for which you wish to set VLAN tags. The range of possible port numbers varies dependent upon the interface module or Micro DSLAM model type.
VLAN Index (ifCfgVLANIndex)	1.2.1.1.1.2.2.1.3.X.Y.Z	Z=1-10 Input X, Y and Z (see Slot Index and Port Index above); returns Z.	32 bit integer	Numeric designation of VLAN tag assignment; up to 10 may be configured.
VLAN ID Start* (ifCfgVLANIdStart)	1.2.1.1.1.2.2.1.4.X.Y.Z	A=0-4085	32 bit integer	The start value of a VLAN ID Range assigned to the designated port.
VLAN ID End* (ifCfgVLANIdEnd)	1.2.1.1.1.2.2.1.5.X.Y.Z	A=0-4085	32 bit integer	The end value of a VLAN ID Range assigned to the designated port.

*See [CLI] Section 3.1.6 VLAN Range for specific rules and compliance.

5.4 Model-Specific Interface Module and Micro DSLAM Port Configuration MIB

The nntechAccessModuleConfigurationMIB also defines the SNMP Application Programming Interface for port configurations specific to IDSL, SDSL, ADSL, T1 and E1 technology as applies to Interface Modules and Micro DSLAMs.

5.4.1 ADSL Configuration

ADSL	OID	Input/Return Values	Syntax	Notes and Definitions
Slot Index (ifCfgAdslSlotIndex)	1.2.1.1.1.2.3.1.1.X.Y	X=1-12 Input X and Y (see Port Index below); returns X.	32 bit integer	Defines interface module slot number of port being configured: IPD12000=1-12 IPD40000=1-4
Port Index (ifCfgAdslPortIndex)	1.2.1.1.1.2.3.1.2.X.Y	Y=1-48 Input X and Y (see Slot Index above); returns Y.	32 bit integer	Port number of port being configured. The range of possible port numbers varies dependent upon the interface module model type.
Port Mode (ifCfgAdslPortMode)	1.2.1.1.1.2.3.1.3.X.Y	Z=1-3	32 bit integer	1=ON 2=OFF 3=Adaptive (default) Method by which a port defines its bandwidth. A port set to Adaptive Mode will automatically train up to the best possible speed supported by both the equipment and the copper pair. Port Mode ON indicates both upstream and downstream bandwidths must be specified manually. OFF indicates the port has been administratively turned off.
VPI/VCI Detect (ifCfgPortAdslVpiVciDetect)	1.2.1.1.1.2.3.1.4.X.Y	Z=1-2	32 bit integer	1=ON (default) 2=OFF Method by which VPI/VCI (Virtual Path Identifier/Virtual Channel Identifier) values will be set. A port set to VPI/VCI Detect ON will auto-detect the line VPI/VCI values for that port starting with the defaults VPI=0 and VCI=35. If no ATM cells are detected at that

				setting, the port will automatically "snoop" the line to determine which VPI/VCI setting the remote ADSL modem is transmitting on and then set itself accordingly. A port set to OFF requires VPI and VCI values to be entered manually for that port (see VPI and VCI below).
Data Reception Rate (ifCfgAdslRxRate)	1.2.1.1.1.2.3.1.5.X.Y	Z=1-32	32 bit integer	ADSL upstream speed runs from 32 kbps to 1024 kbps. Current port speed equals Zx32 kbps. E.g., when Z=24, upstream speed is 768 kbps (24x32 kbps). NOTE: A zero (0) returned via a GET command indicates the port is in Adaptive Mode (see Port Mode above) and is experiencing linkdown.
Data Transmission Rate (ifCfgAdslTxRate)	1.2.1.1.1.2.3.1.6.X.Y	Z=1-252	32 bit integer	ADSL downstream speed runs from 32 kbps to 8064 kbps. Current port speed equals Zx32 kbps. E.g., when Z=252, downstream speed is 8064 kbps (252x32 kbps). NOTE: A zero (0) returned via a GET command indicates the port is in Adaptive Mode (see Port Mode above) and is experiencing linkdown.
Frame Type (ifCfgPortAdslFrameType)	1.2.1.1.1.2.3.1.7.X.Y	Z=1-2	32 bit integer	1=1483LLC Logic Link Control (default) 2=1483VCM Virtual Circuit Multiplexing Frame type is the ADSL data encapsulation method for carrying traffic over an ATM network as defined by the IETF RFC 1483.
VPI (ifCfgPortAdslVpi)	1.2.1.1.1.2.3.1.8.X.Y	Z=0-255	32 bit integer	Default=0 when VPI/VCI Detect is set to ON - see VPI/VCI Detect above Virtual Path Identifier (VPI) is an 8-bit field in ATM cell headers that routes the cell over the

				correct Virtual Path. When manually assigning VPIs, each port must be assigned the same VPI as the remote ADSL modem to which it is being connected.
VCI (ifCfgPortAdslVci)	1.2.1.1.1.2.3.1.9.X.Y	Z=0-65535	32 bit integer	Default=35 when VPI/VCI Detect is set to ON -see VPI/VCI Detect above Virtual Channel Identifier (VCI) is a 16-bit field in ATM cell headers which identifies the Virtual Channel, within the Virtual Path, over which a stream of cells will travel. When manually assigning VCIs, each port must be assigned the same VCI as the remote ADSL modem to which it is being connected.
Standard Mode (ifCfgPortAdslStandardMde)	1.2.1.1.1.2.3.1.10.X.Y	Z=1-5, 255	32 bit integer	1=T1.413 2=G.lite 3=G.DMT 4=Multimode (default) 5=Alcatel 255=no link (standard mode is unknown due to port linkdown) Multimode allows each port to detect the operational mode of the remote ADSL modem to which it's connected and configure itself accordingly. G.DMT, T1.413 and Alcatel are all Full Rate modes which require an in-line splitter to be installed both at the Central Office and at the customer premises. G.lite requires a splitter at the Central Office and microfilters at the customer premises.

5.4.2 IDSL Configuration

IDSL	OID	Input/Return Values	Syntax	Notes and Definitions
------	-----	---------------------	--------	-----------------------

Slot Index (ifCfgIdslSlotIndex)	1.2.1.1.1.2.4.1.1.X.Y	X=1-12 Input X and Y (see Port Index below); returns X.	32 bit integer	Interface module slot number of port being configured: IPD12000=1-12 IPD40000=1-4
Port Index (ifCfgIdslPortIndex)	1.2.1.1.1.2.4.1.2.X.Y	Y=1-48 Input X and Y (see Slot Index above); returns Y.	32 bit integer	Port number of the IDSL port being configured. The range of possible port numbers varies dependent upon the interface module model type.
Speed (ifCfgPortIdslRxTxRate)	1.2.1.1.1.2.4.1.3.X.Y	Z=0-2, 255	32 bit integer	IDSL data receive and transmit rates: 1=128 kbps 2=144 kbps (default) 255=port OFF NOTE: A zero (0) returned via a GET command indicates a problematic port.

5.4.3 SDSL Configuration

SDSL	OID	Input/Return Values	Syntax	Notes and Definitions
Slot Index (ifCfgSdslSlotIndex)	1.2.1.1.1.2.5.1.1.X.Y	X=1-12 Input X and Y (see Port Index below); returns X.	32 bit integer	Interface module slot number of port being configured: IPD12000=1-12 IPD4000=1-4 Micro DSLAM=1
Port Index (ifCfgSdslPortIndex)	1.2.1.1.1.2.5.1.2.X.Y	Y=1-48 Input X and Y (see Port Index above); returns Y.	32 bit integer	Port number of SDSL port being configured. The range of possible port numbers varies dependent upon the interface module or Micro DSLAM model type.
Speed (ifCfgPortSdslRxTxRate)	1.2.1.1.1.2.5.1.3.X.Y	Z=0-10, 255	32 bit integer	SDSL data receive and transmit rates. Default is 272 kbps. 1=144 kbps 7=1168 kbps 2=272 kbps 8=1552 kbps 3=400 kbps 9=2064 kbps 4=528 kbps 10=2320 kbps 5=784 kbps 255=port OFF 6=1040 kbps Possible SDSL Rx/Tx data return rates vary dependent upon the interface module or Micro DSLAM model type

				and may not include all of the bandwidth rates listed above. NOTE: A zero (0) returned via a GET command indicates a problematic port.
Line Code (ifCfgPortSdslLineCode)	1.2.1.1.1.2.5.1.4. X.Y	Z=1-3	32 bit integer	SDSL Line Coding options: 1=CAP (default) Carrierless Amplitude and Phase Modulation 2=2B1Q Two Binary, One Quaternary 3=TC/PAM G.SHDSL-Multirate Symmetric Single-pair DSL Not all [model name] SDSL products have a line coding option; some SDSL models carry only one type of line coding (customer specified) per unit and cannot be configured otherwise through MIBs.

5.4.4 T1 Configuration

T1	OID	Input/Return Values	Syntax	Notes and Definitions
Slot Index (ifCfgT1SlotIndex)	1.2.1.1.1.2.6.1.1. X.Y	X=1-12 Input X and Y (see Port Index below); returns X.	32 bit integer	Interface module slot number of port being configured. IPD12000=1-12 IPD4000=1-4
Port Index (ifCfgT1PortIndex)	1.2.1.1.1.2.6.1.2. X.Y	Y=1-48 Input X and Y (see Slot Index above); returns Y.	32 bit integer	Port number of T1 port being configured. The range of possible port numbers varies dependent upon the interface module model type.
Speed (ifCfgPortT1RxTxRate)	1.2.1.1.1.2.6.1.3. X.Y	Z=0-8, 255	32 bit integer	T1 data receive and transmit rates: 1=192 kbps 6=1152 kbps 2=384 kbps 7=1344 kbps 3=576 kbps 8=1536 kbps 4=768 kbps 255 = port OFF 5=960 kbps NOTE: A zero (0) returned via a GET command indicates a problematic port.

<p>Frame Type (ifCfgPortT1FrameType)</p>	<p>1.2.1.1.1.2.6.1.4.X.Y</p>	<p>Z=1-2</p>	<p>32 bit integer</p>	<p>1=Extended Super Frame (ESF-default) 2=Super Frame (SF/D4)</p> <p>Frame type is the T1 data encapsulation method: SF assembles data into 12-frame transmission clusters, ESF assembles data into 24-frame transmission clusters and also integrates Facilities Data Link (FDL) and Cyclic Redundancy Check (CRC).</p>
<p>Line Code (ifCfgPortT1LineCode)</p>	<p>1.2.1.1.1.2.6.1.5.X.Y</p>	<p>Z=1-2</p>	<p>32 bit integer</p>	<p>1=Bipolar with 8 Zero Substitution (B8ZS-default) 2=Alternate Mark Inversion (AMI)</p> <p>Line Code is the T1 mode of transmission per the ITU-T G.703 Standards for Transmission Facilities. B8ZS uses bipolar violations to guarantee there will always be pulses in the line. AMI alternates positive and negative pulses.</p>
<p>Line Buildout (ifCfgPortT1TxBuildOut)</p>	<p>1.2.1.1.1.2.6.1.6.X.Y</p>	<p>Z=1-4</p>	<p>32 bit integer</p>	<p>1=0 db (default) 2=-7.5 db 3=-15 db 4=-22 db</p> <p>Line Buildout decreases the transmit amplitude of the T1 signal to prevent it from becoming too strong (across short distances) for repeaters, switches and other T1 transmission equipment. Receivers on most newer T1 equipment can automatically adjust for incoming amplitude, allowing them to run at 0 db (default), regardless of distance.</p>
<p>Clock Source (ifCfgPortT1ClockSrc)</p>	<p>1.2.1.1.1.2.6.1.7.X.Y</p>	<p>Z=1-2</p>	<p>32 bit integer</p>	<p>1=Local (default) 2=Loop</p> <p>The clock source can be set to originate locally via an oscillator onboard the interface module or it can be set to originate with the remote T1 modem across the loop.</p>

5.4.5 E1 Configuration

E1	OID	Input/Return Values	Syntax	Notes and Definitions
Slot Index (ifCfgE1SlotIndex)	1.2.1.1.1.2.7.1.1.X.Y	X=1-12 Input X and Y (see Port Index below); returns X.	32 bit integer	Interface module slot number of port being configured. IPD12000=1-12 IPD4000=1-4
Port Index (ifCfgE1PortIndex)	1.2.1.1.1.2.7.1.2.X.Y	Y=1-48 Input X and Y (see Slot Index above); returns Y.	32 bit integer	Port number of E1 port being configured. The range of possible port numbers varies dependent upon the interface module model type.
Speed (ifCfgPortE1RxTxRate)	1.2.1.1.1.2.7.1.3.X.Y	Z=0-8, 255	32 bit integer	E1 data receive and transmit rates: 1=256 kbps 6=1536 kbps 2=512 kbps 7=1792 kbps 3=768 kbps 8=1984 kbps 4=1024 kbps 255 = port OFF 5=1280 kbps NOTE: A zero (0) returned via a GET command indicates a problematic port.
Frame Type (ifCfgPortE1FrameType)	1.2.1.1.1.2.7.1.4.X.Y	Z=1-2	32 bit integer	1=Cyclic Redundancy Check (CRC-default) 2=No CRC Frame type is the E1 data encapsulation method; CRC detects line errors and scrutinizes data integrity across the E1 line by appending a character to the end of the data block. If the remote modem does not find the correct character when it receives the data block, it will request retransmission.
Line Code (ifCfgPortE1LineCode)	1.2.1.1.1.2.7.1.5.X.Y	Z=1-2	32 bit integer	1=High Density Binary 3 (HDB3-default) 2=Alternate Mark Inversion (AMI) Line Code is the E1 mode of transmission per the ITU-T G.703 Standards for Transmission Facilities. HDB3 uses bipolar violations to guarantee there will always be pulses in the line. AMI alternates positive and negative pulses.
Clock Source (ifCfgPortE1ClockSrc)	1.2.1.1.1.2.7.1.6.X.Y	Z=1-2	32 bit integer	1=Local (default) 2=Loop

The clock source can be set to originate locally via an oscillator onboard the interface module or it can be set to originate with the remote E1 modem across the loop.

5.5 Module Status MIB

The nntechAccessModuleStatusMIBs defines the SNMP Application Programming Interface for retrieving interface module or Micro DSLAM configuration statistics.

5.5.1 Interface Module and Micro DSLAM Module Status

Module	OID	Input/Return Values	Syntax	Notes and Definitions
Module Count (ifStaCount)	1.2.2.1.1.1.1	Y=0-12	32 bit integer	The number of interface modules in an IP DSLAM chassis. IPD12000=0-12 IPD4000=0-4 Please note that although Micro DSLAMs have no interface modules, the OID will return a Module Count value of "1".
Slot Index (ifStaSlotIndex)	1.2.2.1.1.1.2.1.1.X	X=1-12 Input X; returns X.	32 bit integer	The slot number location of the interface module for which statistics are being sought. Micro DSLAMs will return a value of "1".
Module Type (ifStaType)	1.2.2.1.1.1.2.1.2.X	Y=as listed	32 bit integer	Interface module or Micro DSLAM model type: 1=IAM144-12 2=SAM1000-12 3=TAM1500-12 4=SAM2000-12 5=EAM2000-12 6=SIM2000-24 9=SAM2000Q-12 10=AAM8000-12 14=SAM2000G-12 15=SAM2000V-12 16=SAM2000QV-12 17=SAM2000GV-12 18=SIM2000-12 20=SIM2000V-24 21=SIM2000V-12 22=S μ D2011-12T 23=S μ D2011-12E 24=S μ D2003-12T 25=S μ D2003-12E 26=S μ D2011-6T 27=S μ D2011-6E 28=S μ D2002-6T 29=S μ D2002-6E

Firmware Revision (ifStaFirmwareRev)	1.2.2.1.1.1.2.1.3.X	Y.YY.YY	7 octet string	Current Firmware revision of the interface module or Micro DSLAM.
--	---------------------	---------	----------------	---

5.6 Port Status MIB

The ntntechAccessModuleStatusMIB also defines the SNMP Application Programming Interface for retrieving configuration statistics for each individual port. Syntax data presented in the following table is defined as follows:

5.6.1 Term Definitions

5.6.1.1 NtnCounter32

Z = 0 - 4294967295
(an increasing non-negative integer).

The counter will start over from zero under the following conditions: the counter has reached maximum value, the MUM is removed from an IP DSLAM, the Reset Button is depressed on a Micro DSLAM, or statistics are reset by way of the CLI CLEAR_NVRAM or the ifStaModStaPortReset OID.

5.6.1.2 NtnGauge32

Z = 0 - 4294967295
(a non-negative integer capable of increasing or decreasing between the minimum and maximum values).

The gauge will remain at maximum value whenever the information being modeled is greater than or equal to the maximum value. If the information being modeled once again falls below the maximum value, the gauge value will decrease as well. Percentage calculations will restart under the following conditions: the MUM is removed from an IP DSLAM, the Reset Button is depressed on a Micro DSLAM, or statistics are reset by way of the CLI CLEAR_NVRAM or the ifStaModStaPortReset OID.

5.6.1.3 NtnTimeTicks

Z = 0 - 4294967295
(an increasing non-negative integer, representing seconds).

The counter will pause when link is lost and will resume from the same point once link is reestablished. The counter will start over from zero under the following conditions: the counter has reached maximum value, the MUM is removed from an IP DSLAM, the Reset Button is depressed on a Micro DSLAM, or statistics are reset by way of the CLI CLEAR_NVRAM or the ifStaModStaPortReset OID.

5.6.2 Interface module and Micro DSLAM Port Status

Port	OID	Input/Return Values	Syntax	Notes and Definitions
------	-----	---------------------	--------	-----------------------

Slot Index (ifStaPortSlotIndex)	1.2.2.1.1.1.3.1.1.X.Y	X=1-12 Input X and Y (see Port Index below); returns X.	32 bit integer	The slot number location of the interface module for which statistics are being sought. Micro DSLAMs will return a value of "1".
Port Index (ifStaPortPortIndex)	1.2.2.1.1.1.3.1.2.X.Y	Y=1-48 Input X and Y (see Slot Index above); returns Y.	32 bit integer	The port number for which statistics are being sought. The range of possible port numbers varies dependent upon the interface module or Micro DSLAM model type.
Firmware Revision (ifStaPortFirmwareRev)	1.2.2.1.1.1.3.1.3.X.Y	Z.ZZ.ZZ	7 octet string	Firmware Revision of the specified port.
Link Status (ifStaPortLinkState)	1.2.2.1.1.1.3.1.4.X.Y	Z=1-5	32 bit integer	Port link status: 1=Link Up 2=Link Down 3=Loop Back 4=Defect 5=Disabled
Non-Unicast WAN Rx Utilization (ifStaPortRxWanNUCastUtil)	1.2.2.1.1.1.3.1.5.X.Y	Z%	32 bit integer NtnCounter32	Utilization percentage for Non-Unicast WAN traffic reception across the specified port.
Non-Unicast WAN Rx Rate (ifStaPortRxWanNUCastRate)	1.2.2.1.1.1.3.1.6.X.Y	Z kbps	32 bit integer NtnGauge32	CURRENT Non-Unicast WAN reception bandwidth of specified port.
Maximum Non-Unicast WAN Rx Rate (ifStaPortRxWanNUCastMaxRate)	1.2.2.1.1.1.3.1.7.X.Y	Z kbps	32 bit integer NtnGauge32	MAXIMUM Non-Unicast WAN reception bandwidth of specified port.

Average Non-Unicast WAN Rx Rate (ifStaPortRxWanNUCastAveRate)	1.2.2.1.1.1.3.1.8.X.Y	Z kbps	32 bit integer NtnGauge32	AVERAGE Non-Unicast WAN reception bandwidth of specified port.
Non-Unicast WAN Tx Utilization (ifStaPortTxWanNUCastUtil)	1.2.2.1.1.1.3.1.9.X.Y	Z%	32 bit integer NtnCounter32	Utilization PERCENTAGE for Non-Unicast WAN traffic transmission across specified port.
Non-Unicast WAN Tx Rate (ifStaPortTxWanNUCastRate)	1.2.2.1.1.1.3.1.10.X.Y	Z kbps	32 bit integer NtnGauge32	CURRENT Non-Unicast WAN transmission bandwidth of specified port.
Maximum Non-Unicast WAN Tx Rate (ifStaPortTxWanNUCastMaxRate)	1.2.2.1.1.1.3.1.11.X.Y	Z kbps	32 bit integer NtnGauge32	MAXIMUM Non-Unicast WAN transmission bandwidth of the specified port.
Average Non-Unicast WAN Tx Rate (ifStaPortTxWanNUCastAveRate)	1.2.2.1.1.1.3.1.12.X.Y	Z kbps	32 bit integer NtnGauge32	AVERAGE Non-Unicast WAN transmission bandwidth of the specified port.
Unicast WAN Rx Utilization (ifStaPortRxWanUCastUtil)	1.2.2.1.1.1.3.1.13.X.Y	Z%	32 bit integer NtnCounter32	Utilization PERCENTAGE for Unicast WAN traffic reception across specified port.
Unicast WAN Rx Rate (ifStaPortRxWanUCastRate)	1.2.2.1.1.1.3.1.14.X.Y	Z kbps	32 bit integer NtnGauge32	CURRENT Unicast WAN reception bandwidth of the specified port.
Maximum Unicast WAN Rx Rate (ifStaPortRxWanUCastMaxRate)	1.2.2.1.1.1.3.1.15.X.Y	Z kbps	32 bit integer NtnGauge32	MAXIMUM Unicast WAN reception bandwidth of the specified port.
Average Unicast WAN Rx Rate (ifStaPortRxWanUCastAveRate)	1.2.2.1.1.1.3.1.16.X.Y	Z kbps	32 bit integer NtnGauge32	AVERAGE Unicast WAN reception bandwidth of

				the specified port.
Unicast WAN Tx Utilization (ifStaPortTxWanUCastUtil)	1.2.2.1.1.1.3.1.17.X.Y	Z%	32 bit integer NtnCounter32	Utilization PERCENTAGE for Unicast WAN traffic transmission across specified port.
Unicast WAN Tx Rate (ifStaPortTxWanUCastRate)	1.2.2.1.1.1.3.1.18.X.Y	Z kbps	32 bit integer NtnGauge32	CURRENT Unicast WAN transmission bandwidth of the specified port.
Maximum Unicast WAN Tx Rate (ifStaPortTxWanUCastMaxRate)	1.2.2.1.1.1.3.1.19.X.Y	Z kbps	32 bit integer NtnGauge32	MAXIMUM Unicast WAN transmission bandwidth of the specified port.
Average Unicast WAN Tx Rate (ifStaportTxWanUCastAveRate)	1.2.2.1.1.1.3.1.20.X.Y	Z kbps	32 bit integer NtnGauge32	AVERAGE Unicast WAN transmission bandwidth of the specified port.
Total WAN Rx Utilization (ifStaPortTotRxWanPercentUtil)	1.2.2.1.1.1.3.1.21.X.Y	Z%	32 bit integer NtnCounter32	Utilization PERCENTAGE for total WAN traffic reception across specified port.
Total WAN Rx Rate (ifStaPortTotRxWanRate)	1.2.2.1.1.1.3.1.22.X.Y	Z kbps	32 bit integer NtnGauge32	CURRENT total WAN reception bandwidth of the specified port.
Total WAN Tx Utilization (ifStaPortTotTxWanPercentUtil)	1.2.2.1.1.1.3.1.23.X.Y	Z%	32 bit integer NtnCounter32	Utilization PERCENTAGE for total WAN traffic transmission across specified port.
Total WAN Tx Rate (ifStaPortTotTxWanRate)	1.2.2.1.1.1.3.1.24.X.Y	Z kbps	32 bit integer NtnGauge32	CURRENT total WAN transmission bandwidth of the specified port.
Total Port Up Time (ifStaPortTotUpTime)	1.2.2.1.1.1.3.1.25.X.Y	Z seconds	32 bit integer NtnTimeTicks	Total port up time (from time of initial link or last

				reset to time of OID up time request).
Total Port Down Time (ifStaPortTotDwnTime)	1.2.2.1.1.1.3.1.26.X.Y	Z seconds	32 bit integer NtnTimeTicks	Total port down time (from time of shut down or lost link to time of OID down time request).

5.7 Network Management System (NMS) Trap MIB

The ntntechNMSTrapsMIB defines the SNMP Application Programming Interface for notification of IP DSLAM enterprise specific traps.

NOTE IP DSLAMs only; this MIB does not apply to Micro DSLAMs.

5.7.1 Environmental and Inventory Trap Status

Port	OID	Input/Return Values	Syntax	Notes and Definitions
Fan Trap (envFanTrap)	1.3.1.1.1.1.0.1	X=1	32 bit integer	There has been a change in the operational status of one of the four chassis fans; linked to the Fan State OID (see Section 5.2 Chassis Status MIB).
Module Present Trap (invIfModPresentTrap)	1.3.1.1.1.2.0.1	X=1-12 Y=as listed	32 bit integer	<p>A chassis slot which was previously vacant, now houses an interface module.</p> <p>X=slot number location IPD12000=1-12 IPD4000=1-4</p> <p>Y=interface module model type:</p> <p>1=IAM144-12 2=SAM1000-12 3=TAM1500-12 4=SAM2000-12 5=EAM2000-12 6=SIM2000-24 9=SAM2000Q-12 10=AAM8000-12 14=SAM2000G-12 15=SAM2000V-12 16=SAM2000QV-12 17=SAM2000GV-12 18=SIM2000-12 20=SIM2000V-24 21=SIM2000V-12</p>

Module Removed Trap (invIfModRemovedTrap)	1.3.1.1.1.2.0.2	X=1-12 Y=as listed above	32 bit integer	<p>A chassis slot which previously housed an interface module, is now housing an interface module of a different model type or has been vacant for at least 40 seconds.</p> <p>X=slot number location IPD12000=1-12 IPD4000=1-4</p> <p>Y=interface module model type (of the module which was removed) as listed above for the Module Present Trap.</p>
---	-----------------	-----------------------------	----------------	--

6.0 SNMP Traps

SNMP traps are designed to send warnings or error messages to a select IP address (or addresses) for defined sets of events that could occur independent, or regardless, of user actions. These traps are "all-or-none" settings: when a trap is enabled, it is enabled for every port on the IP DSLAM or Micro DSLAM. Likewise, when a trap is disabled, it is disabled for every port on the IP DSLAM or Micro DSLAM. SNMP Trap settings cannot be configured with CLI, they must be configured through your MIB browser.

6.1 SNMP Target IP Address(es)

The default trap notification IP is 0.0.0.0, meaning trap notifications have no set destination until a target IP is assigned, regardless of whether the traps themselves are enabled. Up to four target IP Addresses may be configured.

NOTE The PC to which each target IP Address is assigned must have a MIB browser running in order to receive traps, regardless of whether the traps themselves are enabled.

6.2 SNMP Trap Definitions

6.2.1 Authentication Trap

The Authentication Trap is a standard, MIB-II compliant trap that sends notification whenever an SNMP request is made with an incorrect community string; can be enabled or disabled.

6.2.2 Fan Trap

The Fan Trap is an enterprise specific trap that sends notification whenever one of the four chassis fans experience a change in operational status; can be enabled or disabled.

6.2.3 Cold Start Trap

The Cold Start Trap (based on MIB-II standards) sends notification of both cold start (power up) and warm start (reboot or reset) occurrences; can be enabled or disabled.

6.2.4 Link Up/Down Trap

The Link Up/Down Trap is a standard MIB-II compliant trap that sends notification whenever a port changes operational status; can be enabled or disabled.

6.2.5 Module Present Trap

The Module Present Trap is an enterprise specific trap that sends notification whenever an empty chassis slot is loaded with an interface module; cannot be disabled.

6.2.6 Module Removed Trap

The Module Removed Trap is an enterprise specific trap that sends notification whenever an interface module is either replaced with another interface module of a different model type, or removed from the chassis such that the slot is left vacant for 40 seconds or more; cannot be disabled.

6.3 Trap Notification

One trap notification will be sent to each target IP Address for every trap occurrence, meaning every time there is a change in operational status. E.g., if a fan goes out and stays out each target IP Address will get ONE notice. However, if a line or equipment problem were to cause continual system reboot, each target IP Address would receive MULTIPLE trap notifications (one for each reboot).

7.0 Technical Support

For additional information please refer to the Technical Support page at NetToNet.com. This page includes electronic copies of all product documentation and a list of Frequently Asked Questions (and answers) as well as a DSL Distance and Bandwidth Quick Reference Guide. If you are unable to locate the answers to your questions here, please contact [model name] Technologies' Technical Support Department directly:

North and South America

<http://www.nettonet.com/support/>
support@nettonet.com

Europe, Middle East and Africa

<http://www.nettonet.com/support/>
support-emea@nettonet.com

1-(800)-638-2638

44-(0)-1635-570953

1-(603)-427-0600

© Copyright 2004 Net to Net Technologies, Inc.

™ The Net to Net Logo is a trademark of Net to Net Technologies, Inc.

Worldwide Headquarters

Net to Net Technologies
112 Corporate Drive
Portsmouth, NH 03801
USA
+1 877-638-2638
support@nettonet.com

<http://www.NetToNet.com/>

EMEA Headquarters

Net to Net Technologies
Victoria House 19 Park Way
Newbury Berkshire RG14 1EE
UK
+44 (0) 1635 570950
support-emea@nettonet.com