

AμD8000-12, AμD8000-12B and AμD8000Q-12B

12-Port ADSL Micro DSLAMs with a Convertible 10/100 Ethernet Management/Uplink Port

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1.0 ADSL MICRO DSLAM MODELS

All of Net to Net Technologies' ADSL Micro DSLAM models support both G.lite and Full Rate operational modes, in addition to allowing both voice and data to share the same subscriber loop.

1.1 AμD8000-12

The AμD8000-12 (Annex A) is a 12-port ADSL Micro DSLAM with an integrated Plain Old Telephone Service (POTS) splitter.

1.2 AμD8000-12B

The AμD8000-12B (Annex B) is a 12-port ADSL Micro DSLAM that supports Integrated Services Digital Network (ISDN) with Four Binary, Three Ternary (4B3T) line encoding.

1.3 AμD8000Q-12B

The AμD8000Q-12B (Annex B) is a 12-port ADSL Micro DSLAM that supports Integrated Services Digital Network (ISDN) with Two Binary, One Quaternary (2B1Q) line encoding.

2.0 INSTALLATION

CAUTION Net to Net Technologies strongly recommends the use of proper electrostatic discharge (ESD) precautions when handling this equipment.

2.1 Unpack and Inspect the Equipment

The following components should be included:

- 1 AμD8000
- 4 Rubber Bumpers
- 1 Pluggable DC Terminal Strip
- 1 DB9 Female to RJ45 Male Adapter

If there is visible damage, do not attempt to connect the device. Contact Customer Support at 1-877-638-2638 (1-603-427-0600 for international customers) or support@nettonet.com.

2.2 Select the Installation Site

CAUTION Do not stack AμD8000 chassis on top of one another; the air vents on top of the chassis require a minimum of 1/2 inch free airspace for adequate circulation. The maximum recommended ambient temperature for the AμD8000 is 65° Celsius (149° Fahrenheit).

Affix the (4) provided rubber bumpers to the bottom corners of the unit to provide surface grip.

2.2.1 Tabletop

Place the AuD8000 such that the cables will not become a tripping hazard or pull loose from the unit.

2.2.2 Rack

AuD8000s may be placed side by side horizontally on a standard 19" shelf. Ensure all cables are secured such that they will not become a tripping hazard or pull loose from the unit. A customized 19" shelf, complete with horizontal mounting brackets for two AuD8000s, is available for purchase as a separate accessory; contact your sales representative for further information.

2.2.3 Remote Cabinet

AuD8000s may be placed side by side horizontally within a cabinet. Vertical door mount brackets are available for purchase as separate accessories; contact your sales representative for further information.

2.3 Install the Micro Interface Module (if applicable)

The Micro Interface Module (MIM) provides additional uplink ports for Net to Net's AuD8000: 10/100 Ethernet, T1 or E1 dependent upon the MIM model purchased. A MIM is not required for AuD8000 operational purposes however, because the AuD8000's 10/100 Ethernet port can also function as an uplink port.

- Using a flat-head screwdriver to loosen the fastening screws, remove the blanking plate covering the MIM port on the front of the AuD8000.

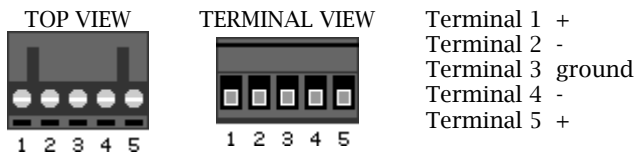
CAUTION The blanking plate should be stored for possible future use: if the MIM is removed from the AuD8000, it must be replaced with either another MIM or a blanking plate. DO NOT OPERATE AN AuD8000 WITH AN OPEN MIM PORT.

- Align the MIM with the module guides inside your AuD8000's MIM port.
- Slide the MIM firmly into the chassis. DO NOT USE EXCESS FORCE.
- Secure the MIM by tightening the fastening screws on the MIM faceplate with a flat-head screwdriver.

2.4 Power Up Your AuD8000

The DC power terminal block on the AuD8000 (rear, right-hand side) has five terminals: two positive, two negative and one ground. Only one positive terminal and one negative terminal must be connected for operational purposes, though the second positive and negative terminals may be connected to a back-up DC power supply for redundancy purposes. The ground terminal must be connected regardless; DO NOT OPERATE THE AuD8000 WITHOUT A GROUND CONNECTION.

Pluggable DC Terminal Strip



- Loosen the screw above the center terminal (3) on the pluggable DC terminal strip included with your A μ D8000
- Insert your ground wire into the center terminal (3) and re-tighten the screw to secure the connection
- Loosen the screw above one of the two terminals directly on either side of the ground terminal (2 or 4)
- Insert your negative DC power lead into the terminal for which you just loosened the screw (2 or 4) and then re-tighten the screw to secure the connection
- Loosen the screw above one of the two outside terminals (1 or 5): use Terminal 1 for the positive lead if you connected your negative lead to Terminal 2, use Terminal 5 for the positive lead if you connected your negative lead to Terminal 4

NOTE Your positive and negative leads must be inserted into consecutive terminals: either Terminals 1 and 2 or Terminals 4 and 5. The A μ D8000 will not power up if Terminals 1 and 4 or Terminals 2 and 5 are paired together for connection to your DC power supply

- Insert your positive DC power lead into the terminal for which you just loosened the screw (1 or 5) and then re-tighten the screw to secure the connection
- Plug the terminal strip into the terminal block on the back of the A μ D8000
- Turn on your power source and verify that the Power LED on the front, right-hand side of the A μ D8000 is illuminated

2.5 Connect Your ADSL Line(s)

Plug your ADSL cable RJ21 connector into the corresponding RJ21 port on the back of the A μ D8000. For most applications, an A μ D8000 ADSL link requires a straight-through DSL cable. For each port being connected to a remote ADSL modem, verify that the ADSL link has been established; the ADSL Lk (Link) LED for that port will illuminate solid or flashing green to indicate the connection has been made. Link up time for connections between the A μ D8000 and remote ADSL modems can vary from one to five minutes depending on the quality, gauge and distance of the copper cables.

2.5.1 Default Configurations

2.5.1.1 Operational Mode

The default A μ D8000 operational mode is MULTIMODE: each port will detect, and match, the operational mode of the remote ADSL modem to which it's connected.

2.5.1.2 Bandwidth

The default AuD8000 bandwidth is ADAPTIVE: each port will automatically train up to the best possible speed supported by the AuD8000, the ADSL modem at the remote end and the copper cable pair connecting the two.

2.5.2 ADSL RJ21 Pinout

	Port	1	2	3	4	5	6	7	8	9	10	11	12
ADSL	Tip	26	27	28	29	30	31	32	33	34	35	36	37
	Ring	1	2	3	4	5	6	7	8	9	10	11	12
VOICE	Tip	39	40	41	42	43	44	45	46	47	48	49	50
	Ring	14	15	16	17	18	19	20	21	22	23	24	25

Pins 13 and 38 are not used.

2.6 Connect Your Uplink Interface Line(s)

2.6.1 10/100 Ethernet Uplink

NOTE For the best connection results, the remote device (PC, hub, switch, etc.) should be set to auto-negotiate duplex mode and speed. If the remote device cannot be configured to auto-negotiate, speed may be hard set at either 10 Mbps or 100 Mbps but duplex mode **MUST** be hard set to Half Duplex; a 10/100 Ethernet uplink connection cannot be made if the remote device is hard set to Full Duplex.

Plug your Ethernet cable RJ45 connector into the RJ45 10/100 Ethernet port on the front of the AuD8000. For most applications, an AuD8000 Ethernet uplink connects to a PC using a straight-through Ethernet cable and to a hub or a switch using a crossover Ethernet cable. For any other connection combinations you must verify the pinout of the Ethernet device to which you are connecting the AuD8000 in order to determine which type of cable is required. Verify the connection; solid green illumination of the Lnk (Link) LED indicates an Ethernet connection has been established. If the Lnk LED is illuminated but not the 100 LED then a 10 Mbps connection has been established. If the Lnk and 100 LEDs are both illuminated, then a 100 Mbps connection has been established.

The 10/100 Ethernet port on the AuD8000 is dual-functioning as both a management port and an uplink port. If you do not wish to utilize the 10/100 Ethernet port as an uplink, it can be configured for use as a management port only; refer to Section 3.2.4.

2.6.1.1 Configuration Defaults

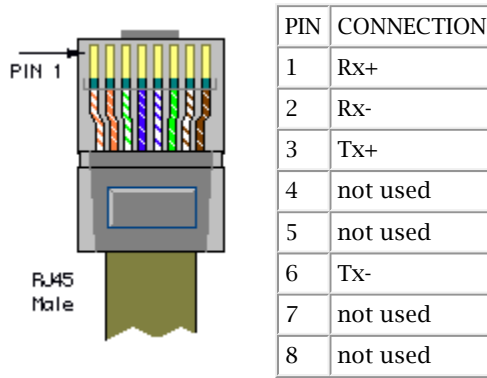
2.6.1.1.1 Duplex Mode

Auto-negotiating: the 10/100 Ethernet port will detect, and match, the duplex mode of the remote device (PC, hub, switch, etc.) to which it's connected.

2.6.1.1.2 Speed

Auto-negotiating: the 10/100 Ethernet port will detect, and match, the speed of the remote device (PC, hub, switch, etc.) to which it's connected.

2.6.1.2 Ethernet RJ45 Pinout



2.6.2 MIM Uplink Ports

Refer to the following instructions according to the MIM model installed in your AuD8000. For more detailed information refer to your MIM model installation instructions.

2.6.2.1 10/100 Ethernet

A MIM 10/100 Ethernet port functions identically to the AuD8000 10/100 Ethernet port. Refer to Section 2.6.1.

2.6.2.2 T1

Plug the T1 cable(s) into the T1 RJ45 port(s) on the MIM installed in your AuD8000. For most applications, a T1 uplink requires a straight-through T1 cable. Verify the connection(s): solid or flashing green illumination of the Lnk (link) LED(s) on the MIM faceplate indicate the T1 uplink connection(s) have been established.

2.6.2.2.1 Configuration Defaults

2.6.2.2.1.1 Speed

The MIM T1 port(s) determine speed via communication with the remote T1 equipment to which they are connected.

2.6.2.2.1.2 Frame Type

Extended Super Frame (ESF): data is assembled into 24-frame transmission clusters and integrates both Facilities Data Link (FDL) and Cyclic Redundancy Check (CRC)

2.6.2.2.1.3 Line Code

Bipolar with 8 Zero Substitution (B8ZS): prevents loss of synchronization with remote equipment by using bipolar violations to guarantee the presence of pulses in the T1 line.

2.6.2.2.1.4 Line Attenuation

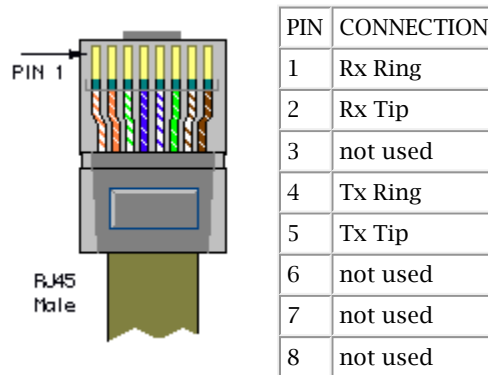
0 dB: receivers on most newer T1 transmission equipment can automatically adjust for incoming amplitude.

2.6.2.2.1.5 Timing

The MIM T1 port(s) derive timing from an intermediate device on the T1 line.

2.6.2.2.2 T1 RJ45 Pinout

If the cable(s) you are using are shielded, they must be grounded through Pins 3, 6, 7 & 8.



2.6.2.3 E1

Plug the E1 cable(s) into the E1 RJ45 port(s) on the MIM installed in your AuD8000. For most applications, an E1 uplink requires a straight-through E1 cable. Verify the connection(s): solid or flashing green illumination of the Lnk (link) LED(s) on the MIM faceplate indicate the E1 uplink connection(s) have been established.

2.6.2.3.1 Configuration Defaults

2.6.2.3.1.1 Speed

The MIM E1 port(s) determine speed via communication with the remote E1 equipment to which they are connected.

2.6.2.3.1.2 Frame Type

Cyclic Redundancy Check (CRC): detects line errors and scrutinizes data integrity across the E1 line by appending a hexadecimal checksum to the end of each E1 frame

2.6.2.3.1.3 Line Code

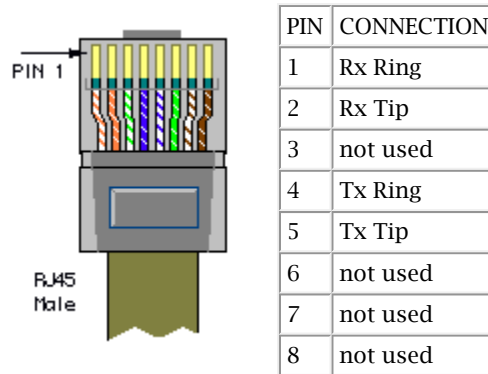
High Density Binary 3 (HDB3): accommodates the minimum ones density requirement in the European public network by using bipolar violations to guarantee the presence of pulses in the E1 line

2.6.2.3.1.4 Timing

The MIM E1 port(s) derive timing from an intermediate device on the E1 line.

2.6.2.3.2 E1 RJ45 Pinout

If the cable(s) you are using are shielded, they must be grounded through Pins 3, 6, 7 & 8.



NOTE Once your MIM has been installed, default parameter configurations may be adjusted as desired via Net to Net Technologies' Network Management System (NMS). Refer to Net to Net's NMS Management User Guide for further configuration instruction and to your MIM Installation Instructions regarding parameter definitions and options.

2.6.3 DSLAM Interconnection

AuD8000 10/100 Ethernet ports and MIM-10/100 Ethernet ports may be interconnected (daisy-chained) with additional Net to Net Micro, Mini or IP DSLAMs such that a single router can be used for all. The uplink port at one end (ONLY one) of each 10/100 Ethernet uplink connection between two DSLAMs must be configured to utilize the DSLAM Interconnection function via NMS (refer to Section 3.2.5).

3.0 INITIAL CONFIGURATION

Initial configuration of an AuD8000 can be accomplished via either Command Line Interface (CLI) or Net to Net Technologies' Network Management System (NMS). Initial configuration via CLI requires a direct connection from your PC to the RJ45 COM (Communication) Port on the front of the AuD8000. Initial configuration via NMS requires a direct connection from your PC to the RJ45 10/100 Ethernet Port (also on the front of the AuD8000). For more complete information regarding initial (and subsequent) management configuration, please refer to the NMS and/or CLI Management User Guides.

NOTE Although the AuD8000-12 can also be managed via Simple Network Management Protocol (SNMP), initial configuration of IP Address, Subnet Mask and Gateway must first be completed via either CLI or NMS before you will be able to access AuD8000 management with SNMP.

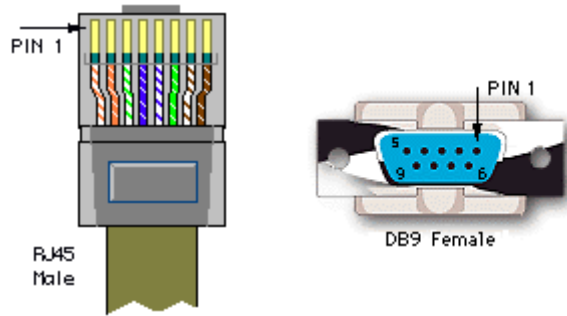
3.1 Via Command Line Interface (CLI)

Initial configuration of an AuD8000 via CLI requires the provided DB9 Female to RJ45 Male Adapter, a straight-through RJ45 to RJ45 Ethernet cable and a terminal emulator program installed on your PC. See Net to Net's CLI Management User Guide for complete system requirements.

3.1.1 Establish a Connection with Your PC

3.1.1.1 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	AμD8000 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

3.1.1.2 Connect Your PC to the AμD8000 COM Port

Connect one end of a straight-through 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 AμD8000.

3.1.2 Log into CLI

3.1.2.1 Launch Your Terminal Emulator

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

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

3.1.2.2 Log In

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

Net to Net Technologies
Copyright (C) [year]
[product model name] 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.

Default Super Username: "superuser"
Default Password: "Password"
(usernames and passwords are case sensitive)

3.1.2.3 CLI Prompt

A command prompt will appear once you have logged in. The CLI command prompt is the Micro DSLAM system name (see Net to Net's CLI Management User Guide). The default system name is the DSLAM model name: AuD8000-12, AuD8000-12B or AuD8000Q-12B.

AuD8000-12 ->

3.1.3 Configure Your AuD8000 Management Parameters

Enter commands at the CLI prompt exactly as shown for each management parameter; the command will not be recognized if entered incorrectly.

3.1.3.1 IP Address, Subnet Mask and Gateway

The AuD8000 Subnet Mask and Gateway configurations must match the proprietary configurations on your PC. The AuD8000 IP Address must be in the same proprietary range as your PC but cannot duplicate it exactly. Contact your System Administrator or Information Technology Manager if you do not know the values necessary to properly configure these fields.

```
AuD8000-12 ->set slot 1 ip_address xxx.xxx.xxx.xxx  
AuD8000-12 ->set slot 1 subnet_mask xxx.xxx.xxx.xxx  
AuD8000-12 ->set slot 1 default_gateway xxx.xxx.xxx.xxx
```

Replace "x"s with the appropriate proprietary values.

<p>NOTE Most management settings can be configured with CLI through a direct COM Port connection regardless of the IP Address, Subnet Mask and Gateway settings on your AuD8000-12. However, you will not be able to utilize NMS or SNMP unless either your AuD8000-12 has been configured with proprietary settings for these three parameters or your PC has been configured to accept Net to Net's defaults.</p>
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3.1.3.2 Inband Management

If remote network utilization of NMS, CLI or SNMP is desired, you must configure Inband Management.

```
AuD8000-12 ->set slot 1 inband_management on
```

CAUTION Managing the ApD8000 via an inband connection can increase the security risks of management access by unapproved and/or unwanted users. It is recommended that inband management be disabled when not in use.

3.1.3.3 Inband Management VLAN ID

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

```
ApD8000 ->set slot 1 inband_mgmt_vlan_id x
(x = 0 - 4085)
```

3.1.3.4 Make Additional Configuration Changes as Desired

You may now make desired configurations with CLI through either the established direct connection or (if you chose to set Inband Management in Section 3.1.3.2) via a remote network connection (using Telnet). Likewise, if you chose to set Inband Management, you will now also be able to utilize SNMP across the network. For information regarding specific parameter configurations, refer to Net to Net's CLI Management User Guide (<http://www.nettonet.com/support/docs/210-000052>) and/or SNMP Management User Guide (<http://www.nettonet.com/support/docs/210-000053>).

NOTE Net to Net Technologies recommends changing default community strings, immediately following initial setup, to help ensure that any subsequent configurations to the ApD8000 will not be inadvertently altered or deleted. Refer to the CLI Management User Guide.

3.1.3.5 Log Out of CLI

If you do not log out of CLI, the ApD8000 will automatically log you out after five minutes of inactivity.

```
ApD8000-12 ->logout
```

CAUTION If you disconnect your PC from the COM Port without logging out and a new connection is established before the five minute inactivity period has expired, the new user will have full access to your ApD8000 management system without being required to log in.

3.2 Via Net to Net's Network Management System (NMS)

NOTE For ease of configuration, Net to Net Technologies recommends that you set the ApD8000-12 IP Address, Subnet Mask and Gateway with CLI via a direct connection between your PC and the ApD8000-12 COM Port (refer to Section 3.1). Initial configuration of these three parameters is a much shorter and simpler process with CLI than with NMS.

Initial configuration of an ApD8000 via NMS requires a straight-through RJ45 to RJ45 Ethernet cable and a web browser such as Microsoft Internet Explorer or Netscape Navigator on your PC. See the NMS Management User Guide (<http://www.nettonet.com/support/docs/210-000048>) for complete system requirements.

3.2.1 Establish a Connection With Your PC

3.2.1.1 Configure Your PC to Enable Communication with NMS

The following instructions are based on a Windows operating system; different operating systems may vary in their requirements. Contact your System Administrator or Information Technology Manager if you are having trouble with these settings. On your PC:

- Click the Start button in the lower left-hand corner of your monitor
- Select Settings
- Click Control Panels
- Double-click the Network icon
- Click the Configuration tab
- Scroll down under Network Components and double-click your TCP/IP Ethernet Adapter
- Click the IP Address tab

<p>NOTE Make note of the current IP Address and Subnet Mask configurations on your PC BEFORE entering Net to Net's defaults; once initial configuration of NMS has been completed, you will need to reconfigure your PC with these original proprietary values.</p>
--

- Click Specify an IP Address
- Enter an IP Address within Net to Net's default range:

AuD8000 default: 192.168.254.252

Your PC: 192.168.254.xxx

The IP Address entered for your PC must be within the same range as Net to Net's default AuD8000 IP Address, but cannot exactly duplicate it. As such, xxx is user defined (0 - 255) but cannot equal 252.

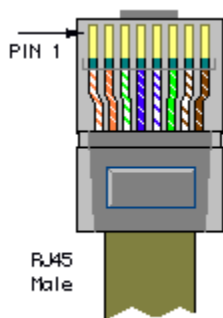
- Enter Net to Net's default Subnet Mask (255.255.255.0)
- Click Add
- Click OK (you may be prompted to reboot your PC)

3.2.1.2 Connect Your PC to the AuD8000 10/100 Ethernet Port

The 10/100 Ethernet Port auto-negotiates speed and duplex mode by default. For the best configuration results, your PC should be set to auto-negotiate speed and duplex mode as well. If your PC cannot be configured to auto-negotiate, speed may be hard set at either 10 Mbps or 100 Mbps but duplex mode **MUST** be hard set to Half Duplex; a 10/100 Ethernet management connection cannot be made with the AuD8000 if your PC is hard set to Full Duplex.

Connect your PC to the Ethernet RJ45 MGMT Port on the front of the AuD8000 using a straight-through Ethernet cable. Verify the connection; solid green illumination of the Lnk (Link) LED indicates an Ethernet connection has been established. If the Lnk LED is illuminated but not the 100 LED then a 10 Mbps connection has been established. If the Lnk and 100 LEDs are both illuminated, then a 100 Mbps connection has been established.

MGMT RJ45 Ethernet Port Pinout



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

3.2.2 Log into NMS

3.2.2.1 Launch Your Web Browser

Launch a web browser such as Microsoft Internet Explorer (v4.0 or higher) or Netscape Navigator (v4.0 or higher) and type the AuD8000's default IP Address (192.168.254.252) into the address field at the top of the browser window. Press the Enter key.

3.2.2.2 Log In

Once the AuD8000's default IP Address has been entered, the NMS Log In window will appear on your screen. Enter Net to Net's default username and password. You must log in as a Superuser in order to make configuration changes.

Default Super Username: "superuser"
Default Password: "Password"
(usernames and passwords are case sensitive)

Click OK.

3.2.2.3 NMS Navigation

Once you have logged into NMS, use the Tab key or your mouse to move from field to field. Net to Net does not recommend using the Enter key to navigate; some web browsers (such as Microsoft Internet Explorer) will equate pressing the Enter key with clicking the Submit button.

3.2.3 Configure Your AuD8000 Management Parameters

The NMS main window will appear automatically upon log in. Click the MGMT (Management) Configuration button in the top, left-hand corner of the window. A floating window will pop up with the AuD8000 model type, revision and MAC Addresses, as well as several fields for configuration.

CAUTION It is recommended that you set ALL applicable fields in the MGMT Configuration window BEFORE clicking the Submit button; each time the Submit button is clicked you will be required to re-establish NMS connectivity.

3.2.3.1 IP Address, Subnet Mask and Gateway

Enter your proprietary IP Address, Subnet Mask and Gateway configurations in the appropriate fields. The AuD8000 Subnet Mask and Gateway configurations must match the proprietary configurations that were on your PC prior to Net to Net's defaults being entered (Section 3.2.1.1). The IP

Address entered should be in the same proprietary range as that which was on your PC but cannot duplicate it exactly. Contact your System Administrator or Information Technology Manager if you do not know the values necessary to properly configure these fields.

3.2.3.2 Inband Management

If remote network utilization of NMS, CLI or SNMP is desired, click the Inband MGMT box so that a checkmark appears.

CAUTION Managing the AuD8000 via an inband connection can increase the security risks of management access by unapproved and/or unwanted users. It is recommended that inband management be disabled when not in use.

3.2.3.3 Inband Management VLAN ID

If your network is running VLANs to facilitate packet direction and/or promote packet security, enter an Inband MGMT (Management) VLAN ID in the appropriate field. If your network is not running VLANs, leave the Inband MGMT VLAN ID field blank.

3.2.3.4 Submit Changes

Click the Submit button and exit your web browser.

NOTE NMS connectivity will be lost immediately upon clicking the Submit button; you must close your web browser, reconfigure the IP Address and Subnet Mask on your PC and then re-launch your web browser. Refer to Section 3.2.6.

3.2.4 Configure Your 10/100 Ethernet Port

Click the 10/100 Lk LED on the AuD8000 pictured in the NMS main window. The Management Port Configuration window will pop up with several fields for configuration; click the desired settings and then click the Submit button.

3.2.4.1 Uplink Mode

3.2.4.1.1 On (default)

The 10/100 Ethernet port can be utilized for an uplink connection as well as management access.

3.2.4.1.2 Off

The 10/100 Ethernet port can be utilized for management access ONLY.

3.2.4.2 Duplex

3.2.4.2.1 Auto-negotiation (default)

The 10/100 Ethernet port detects, and matches, the duplex mode of the remote device (PC, hub, switch, etc.) to which it's connected.

3.2.4.2.2 Half

The 10/100 Ethernet port receive and transmit functions are mutually exclusive; data transmission occurs in only one direction at a time. Packet collisions are not unusual.

3.2.4.2.3 Full

The 10/100 Ethernet port receive and transmit functions occur simultaneously, preventing packet collisions and effectively doubling aggregate bandwidth.

3.2.4.3 Speed

Click the desired speed configuration in the pull-down menu: 10 Mbps, 100 Mbps or auto-negotiation.

3.2.4.3.1 Auto-negotiation (default)

The 10/100 Ethernet port detects, and matches, the speed of the remote device (PC, hub, switch, etc.) to which it's connected.

3.2.5 DSLAM Interconnection

The AuD8000 may be interconnected (daisy-chained) with additional Net to Net Micro or IP DSLAMs such that a single router may be used for all. The uplink port at one end (ONLY one) of each connection between two DSLAMs must be configured to utilize the DSLAM Interconnection function.

Click the blue button to the right of the COM port on the AuD8000 pictured in the NMS main window. A DSLAM Interconnection Configuration window will pop up with the Micro DSLAM model type and revision number. Click the desired interconnection configuration in the pull-down menu and then click the submit button.

NOTE The AuD8000 10/100 Ethernet port must be configured as an uplink port in order to interconnect with other DSLAMs.

3.2.5.1 Neither (default)

The AuD8000 is not configured for interconnection.

3.2.5.2 MIM

The AuD8000 is configured for DSLAM interconnection via a MIM uplink port.

3.2.5.3 10/100 (MGMT)

The AuD8000 is configured for DSLAM interconnection via the 10/100 Ethernet Port.

3.2.6 Reconnect with NMS

3.2.6.1 Reconfigure the IP Address and Subnet Mask on Your PC

The following instructions are based on a Windows operating system; different operating systems may vary in their requirements. Contact your System Administrator or Information Technology Manager if you are having trouble with these settings. On your PC:

- Click the Start button in the lower left-hand corner of your monitor
- Select Settings
- Click Control Panels
- Double-click the Network icon
- Click the Configuration tab
- Scroll down under Network Components and double-click your TCP/IP Ethernet Adapter
- Click the IP Address tab
- Depending upon which option was selected PRIOR to entering Net to Net's default IP Address and Subnet Mask (in Section 3.2.1.1), do one of the following:

Click Obtain an IP Address Automatically

OR

Click Specify an IP Address and then manually enter your proprietary IP Address and Subnet Mask

NOTE The Subnet Mask entered on your PC must match the proprietary configurations set on the AuD8000 in Section 3.2.3.1. The IP Address entered must be in the same proprietary range that was set on the AuD8000 but cannot duplicate it exactly. Contact your System Administrator or Information Technology Manager if you do not know the values necessary to properly configure these fields.

- Click OK (you may be prompted to reboot your PC)

3.2.6.2 Relaunch Your Web Browser

Launch your web browser and type the AuD8000's new IP Address (as defined in Section 3.2.3.1) in the address field at the top of the browser window. Press the Enter key.

3.2.6.3 Log In

Enter Net to Net's default username and password. You must log in as a Superuser in order to make configuration changes.

Default Super Username: "superuser"

Default Password: "Password"

(usernames and passwords are case sensitive)

Click OK.

3.2.6.4 Make Additional Configuration Changes as Desired

You may now make desired configurations with NMS through either the established direct connection or (if you chose to set Inband Management in Section 3.2.3.2) via a remote network connection. Likewise, if you chose to set Inband Management, you will now also be able to utilize SNMP across the network. For information regarding specific parameter configurations, refer to Net to Net's NMS Management User Guide (<http://nettonet.com/support/docs/210-000048>) and/or SNMP Management User Guide (<http://nettonet.com/support/docs/210-00000>).

NOTE Net to Net Technologies recommends changing default passwords immediately following initial setup to help ensure that any subsequent configurations to the AuD8000 will not be inadvertently altered or deleted. Refer to the NMS Management User Guide.

3.2.6.5 Log Out of NMS

If you do not log out of NMS, the AuD8000 will automatically log you out after five minutes of inactivity.

CAUTION If you leave your workstation without logging out and another user accesses NMS before the five minute inactivity period has expired, the new user will have full access to your AuD8000 management system without being required to log in.

4.0 AuD8000 DEFAULT CONFIGURATIONS

No configuration is necessary for the AuD8000 to operate at default settings.

4.1 User Access

NOTE All usernames and passwords are case sensitive.

4.1.1 Network Management System (NMS) and Command Line Interface (CLI)

ACCESS	USERNAME	PASSWORD
read/write	superuser	Password
read only	general	Password

4.1.2 Simple Network Management Protocol (SNMP)

ACCESS	COMMUNITY STRING
read/write	Password
read only	Password

4.2 AuD8000 Management Parameters

PARAMETER	DEFAULT CONFIGURATION
Gateway	0.0.0.0
Inband Management	off
Inband Management VLAN ID	0 (off)
IP (Internet Protocol) Address	192.168.254.252
Management IP Address Filter Range	0.0.0.0 - 255.255.255.255 (all)
Subnet Mask	255.255.255.0
System Name	[DSLAM model name]
Telnet	enabled
TFTP (Trivial File Transfer Protocol)	enabled
Uplink DSLAM Interconnection	neither (off)
Web Server (NMS)	enabled

4.3 AuD8000 Port Parameters

PARAMETER	DEFAULT CONFIGURATION
Circuit Identification	n/a (no default)
Back-bone VLAN	0 (off)
Flood	uplink
Frame Type	1483LLC
IP Range 1	0.0.0.0 - 255.255.255.255 (all)
IP Range 2	0.0.0.0 - 0.0.0.0
Operational Mode	Multimode
Priority (VLAN)	0 (none)
Protocol	all
Speed Downstream	n/a (Adaptive Port Mode)
Speed Upstream	n/a (Adaptive Port Mode)
VLAN Range	0 - 0 (off)
VCI (Virtual Channel Identifier)	0
VPI (Virtual Path Identifier)	35
VPI/VCI Detect	on

4.4 10/100 Ethernet Management/Uplink Parameters

PARAMETER	DEFAULT
Speed	Auto-Negotiate
Duplex Mode	Auto-Negotiate

4.5 MIM Uplink Parameters

4.5.1 10/100 Ethernet

PARAMETER	DEFAULT
Speed	Auto-Negotiate
Duplex Mode	Auto-Negotiate

4.5.2 T1

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

4.5.3 E1

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

5.0 ADSL PARAMETER DEFINITIONS AND OPTIONS

5.1 Operational Mode

5.1.1 Multimode (default)

The ADSL port detects and matches the operational mode of the remote ADSL modem to which it's connected.

5.1.2 Full Rate: G.DMT, T1.413 or Alcatel

An in-line splitter is required at the remote end of the ADSL connection when a single line is being utilized for both phone and data.

5.1.3 G.lite

Microfilters are required at the remote end of the ADSL connection when a single line is being utilized for both phone and data.

5.2 Port Mode

5.2.1 Adaptive (default)

The ADSL port automatically trains up to the best possible speed supported by the AuD8000, the ADSL modem at the remote end and the copper cable pair connecting the two.

5.2.2 On

The ADSL port requires upstream and downstream bandwidths to be specified individually.

5.2.3 Off

The ADSL port is administratively turned off.

5.3 Bandwidth and Distance

The default ADSL bandwidth setting is adaptive, allowing each port to train up to the best possible speed circumstances will allow. The eventual outcome could be any combination of existing possible upstream and downstream bandwidths, and may or may not be reflected in the following tables. When port mode is set to ON, upstream and downstream bandwidths must be selected manually for that port. See Net to Net's NMS, CLI and/or SNMP Management User Guides for further instruction regarding AuD8000 parameter configuration.

Distance capabilities listed below assume the use of 26 American Wire Gauge (AWG) cable; connections made with cable of a greater gauge (e.g., 24 AWG) will link up at greater distances. The AuD8000 may not link up if the cable is in poor condition or if

the cable distance is greater than a particular bandwidth will support. Remote ADSL modems determine bandwidth through their communication with the AuD8000.

NOTE The following tables show maximum possible distances for various sample combinations of upstream and downstream bandwidths over a typical ADSL line. Data given is meant solely as a guide in determining achievable distances at various bandwidth settings; these tables are NOT COMPREHENSIVE. The many possible combinations of upstream and downstream bandwidths, along with attainable corresponding distances for each combination, are far more numerous than that which is feasible to list here.

5.3.1 Full Rate T1.413, Alcatel and G.DMT

UP	kbps	1,024	1,024	1,024	960	896	832	736	576	416	384	288	192	96
DWN*		8,064	7,712	7,072	5,632	4,480	3,584	2,784	2,144	1,696	1,184	832	512	288
DIST	ft	8,000	9,000	10,000	11,000	12,000	13,000	14,000	15,000	16,000	17,000	18,000	19,000	20,000
	m	2,438	2,743	3,048	3,353	3,658	3,962	4,267	4,572	4,877	5,182	5,486	5,791	6,096

*Under optimal circumstances, the AuD8000 is capable of reaching downstream speeds of up to 10,512 kbps.

5.3.2 G.lite

UPSTREAM	kbps	512	416	288	192	128
DOWNSTREAM		1,536	1,536	1,056	768	448
DISTANCE	feet	15,000	16,000	17,000	18,000	19,000
	meters	4,572	4,877	5,182	5,486	5,791

Net to Net Technologies' ADSL Micro DSLAMs exceed the International Telecommunications Union - Telecommunications Standardization Sector (ITU-T) Recommendation G992.1 minimum requirements of 640 kbps upstream and 6,000 kbps downstream speeds.

5.4 VPI/VCI Detect

ADSL data travels by way of Asynchronous Transfer Mode (ATM) Cells across Permanent Virtual Circuits (PVCs). Each PVC consists of one Virtual Channel across one Virtual Path. The AuD8000 supports one PVC per port.

- Virtual Path Identifier (VPI): an 8-bit field in ATM cell headers that routes a cell over the correct Virtual Path
- Virtual Channel Identifier (VCI): a 16-bit field in ATM cell headers that routes a cell to the proper Virtual Channel once it is on the correct Virtual Path

5.4.1 On (default)

The ADSL port will automatically "snoop" the line to determine the VPI/VCI setting of the remote ADSL modem to which it's connected and set itself accordingly. If no ATM cells are detected (at any VPI/VCI setting), the port will default to VPI 0 and VCI 35. Once it does detect ATM cells from the remote ADSL modem, it will then reconfigure the VPI/VCI with the same settings at which the ATM cells were detected.

5.4.2 Off

The ADSL port will default to VPI 0 and VCI 35 UNLESS the port was previously set to VPI/VCI Detect ON and had already detected the VPI/VCI of the remote ADSL modem. In this case, turning the VPI/VCI Detect function OFF will lock in the previously detected settings until, or unless, VPI/VCI values are altered manually. Each port must be assigned the same VPI/VCI as the remote ADSL modem to which it's connected in order for the units to communicate.

NOTE An ADSL port's VPI/VCI Detect function should be set to OFF before manual configuration of VPI and VCI values.
--

5.5 Frame Type

Frame type is the ADSL data encapsulation method for carrying traffic over an ATM network as defined by the Internet Engineering Task Force (IETF) Request for Comment 1483 (RFC1483).

5.5.1 1483LLC (default)

Logic Link Control (LLC) encapsulation multiplexes multiple protocols over a single ATM Virtual Circuit whereby 1483LLC is the protocol-identifying frame header.

5.5.2 1483VCM

Virtual Circuit Multiplexing (VCM) creates a separate ATM Virtual Circuit connection for each protocol type without additional encapsulation.

6.0 ADDITIONAL INFORMATION

6.1 Data Storage

Configuration backup is inherent in the AuD8000-12. Default parameters remain in place unless changed via CLI, NMS or SNMP.

6.1.1 Memory

Parameter configurations are automatically recorded in both Random Access Memory (RAM) and Non-Volatile Random Access Memory (NVRAM).

6.1.1.1 RAM

Data stored only in RAM, such as traffic statistics and link up/down time, will be erased if the AuD8000-12 loses power.

6.1.1.2 NVRAM

Data stored in NVRAM, such as management and port parameter configurations, will remain intact (even if the AuD8000-12 loses power) unless deliberately cleared or reconfigured.

6.1.2 Saving to Local Files

AuD8000-12 management and port configurations can be flash uploaded to a local file on your PC or local network via a Trivial File Transfer Protocol (TFTP) tool and a GET command. Configuration files can also be flash downloaded FROM a local file TO an AuD8000-12, simply replace the GET command with a PUT command. Refer to your TFTP user manual for further instruction.

6.1.2.1 AuD8000-12 Backup

An AuD8000-12 backup file records ALL management AND port configurations.

ITEM	DATA NEEDED FOR BACKUP	EXAMPLE
Host Name	DSLAM_IP Address (xxx.xxx.xxx.xxx)	193.166.254.98
Remote Filename	NVR_BACKUP.BIN.[superuser password]	nvr_backup.bin.Password
Local Filename	user preference	aud4_backup.bin

6.1.2.2 AuD8000-12 Template

An AuD8000-12 template file records all management and port configurations EXCEPT IP Address.

ITEM	DATA NEEDED FOR BACKUP	EXAMPLE
Host Name	DSLAM_IP Address (xxx.xxx.xxx.xxx)	193.166.254.98
Remote Filename	NVR_CFG.BIN.[superuser password]	nvr_cfg.bin.Password
Local Filename	user preference	n2n_aud800012_template.bin

6.1.2.3 ADSL Port Template

An ADSL port configuration file records all of one port's configurations EXCEPT Circuit ID.

ITEM	DATA NEEDED FOR BACKUP	EXAMPLE
Host Name	DSLAM_IP Address (xxx.xxx.xxx.xxx)	193.166.254.98
Remote Filename	NVR_PORTCFG.BIN.[superuser password].[1][port]	nvr_portcfg.bin.Password.[1][4]
Local Filename	user preference	adsl_servicelevel4_template.bin

A previously saved port configuration file can be downloaded to multiple ports on your AuD8000-12 simultaneously by entering the port value [port] as:

a comma separated list nvr_portcfg.bin.Password.[1][4,6,8]
a dash indicated range nvr_portcfg.bin.Password.[1][6-12]
or using the keyword "all" nvr_portcfg.bin.Password.[1][all]

6.2 Data Management

6.2.1 Reset

A system reset will clear AuD8000 RAM and restore all port configurations to their original default settings. It will NOT clear NVRAM; management settings will remain as configured. A system reset takes approximately one [1] minute to complete, after which you will be required to log back in.

6.2.1.1 Manual

Using a paperclip, mechanical pencil or similar tool, press the Reset Button on the front, left-hand side of the AuD8000 for one [1] second. The button is not labeled.

6.2.1.2 Via CLI

Use the CLI Reset command.

```
AuD8000-12 ->reset
```

6.2.2 Clear NVRAM

Clearing NVRAM on the AuD8000 restores ALL management and port configurations to their original default settings. The process takes approximately one [1] minute to complete.

CAUTION Clearing NVRAM to restore original default settings includes restoring Net to Net's 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 PC to AuD8000 connection for any subsequent configurations.

6.2.2.1 Manual

Using a paperclip, mechanical pencil or similar tool, press the Reset Button on the front, left-hand side of the AuD8000 for one [1] second. The button is not labeled. Upon releasing the reset button, within five [5] seconds, press the button once again (for one [1] second). After pressing the Reset Button the first time, the passage of 5 seconds will be indicated by the successive flashing of the ADSL Link (Lk) LEDs for Ports 1-5.

NOTE If you do not press the Reset Button a second time within the allotted five seconds, the AuD8000 will reset (Section 6.2.1), rather than clear, NVRAM.

6.2.2.2 via CLI

Use the CLI Clear NVRAM command.

```
AuD8000-12 ->clear_nvram
```

6.3 LED Indications

LED	State	Indication	Additional Information
Power	solid green	AuD8000 is receiving power	If the Power LED is not illuminated, it is unlikely that the AuD8000 is receiving power, in which case none of the LEDs will be illuminated.
10/100 Ethernet Lnk (Link) (see NOTE on following page)	solid green	Ethernet connection is established	If the Lnk LED is illuminated, but not the Ethernet 100 LED, then a 10 Mbps connection has been established. If the Lnk and 100 LEDs are both illuminated, then a 100 Mbps connection has been established.
	no illumination	no Ethernet connection	The Ethernet 100 and Act LEDs will remain unlit by default.
10/100 Ethernet Act (Activity) (see NOTE on following page)	flashing amber	Ethernet activity	Traffic is flowing without any problems.
	solid amber	heavy traffic	
	no illumination	no Ethernet activity	Either there is no Ethernet link or a link exists but there is no activity.
10/100 Ethernet 100 (see NOTE on following page)	solid green	Ethernet connection is established	If the Ethernet Lnk LED is illuminated, but not the 100 LED, then a 10 Mbps connection has been established. If the Lnk and 100 LEDs are both illuminated, then a 100 Mbps connection has been established.
	no illumination	no Ethernet connection	The Ethernet 100 and Act LEDs will remain unlit by default.

ADSL Lk (Link)	pulsing green	ADSL connection is established and active	The port has received valid data from the remote ADSL modem within the last second.
	solid green	ADSL connection is established	An ADSL link exists and the port may be transmitting but it has not received any data from the remote ADSL modem within the last second.
	no illumination	no ADSL connection	The ADSL Rx and Tx LEDs will remain unlit by default.
ADSL Rx (Receiving)	flashing amber	ADSL activity	The port is receiving data from the remote ADSL modem.
	solid amber	heavy Rx traffic	The port is receiving large amounts of data from the remote ADSL modem.
	no illumination	no activity	An ADSL link may exist but the port is not receiving any data from the remote modem.
ADSL Tx (Transmitting)	flashing amber	ADSL activity	The port is transmitting data to the remote ADSL modem.
	solid amber	heavy Tx traffic	The port is transmitting large amounts of data to the remote ADSL modem.
	no illumination	no activity	An ADSL link may exist but the port is not transmitting any data to the remote modem.

(A pulsing LED blinks steadily at a rate of once per second. A flashing LED blinks at a more rapid, less constant rate.)

NOTE The 10/100 Ethernet Lnk LED behaves identically for both management and uplink connections.

6.4 Regulatory Compliance for Class A Equipment

NEBS: GR-63-CORE, GR-1089-CORE

EMC: FCC Part 15; CSA/C108.8; EN55022; EN55024

Safety: UL 60950-1 1st Edition, CSA 22.2 No. 60950-1-03; EN60950-1:2001

CE Marking

6.4.1 US Federal Communications Commission (FCC)

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Caution: Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

6.4.2 Industry Canada

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la Classe A est conforme à la norme NMB-003 du Canada.

6.4.3 Europe

This Class A product complies with European Norm EN55022.

Warning: In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures to correct the situation.

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