

## **EAM2000-12**

### **12-Port E1 Access Multiplexer**

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

## **INSTALLATION**

### **1. Unpack and inspect the EAM2000-12.**

If there is visible damage, do not attempt to connect the device; contact Customer Support at 1-877-638-2638 (001-603-427-0600 for international customers) or Support@NetToNet.com.

### **2. Install the EAM2000-12 in an IP DSLAM chassis.**

**NOTE** There must be a Multiplexer Uplink Module installed in the IP DSLAM chassis in order for Access Modules to operate.

All Access Multiplexer Modules for Net to Net Technologies' IP DSLAMs are hot swappable; installing or removing an Access Module while the chassis is powered up does not affect the operational status of other Access Modules within the chassis. The IPD12000 is a fourteen slot chassis; slots 1-12 are reserved for Access Modules (such as the EAM2000-12) and slots 13-14 are reserved for Multiplexer Uplink Modules (such as the MUM200-2). Access Modules may be placed in any order in slots 1-12. The IPD4000 is a five slot chassis; slots 1-4 are reserved for Access Modules and slot 5 is reserved for a Multiplexer Uplink Module.

- a. Align the EAM2000-12 with the slot module guides of the chosen slot for installation (slot 1-12 on the IPD12000 or slot 1-4 on the IPD4000).
- b. Slide the EAM2000-12 firmly into the chassis. **DO NOT USE EXCESS FORCE.**
- c. Secure the EAM2000-12 by tightening the fastening screws on the module faceplate.
- d. Verify that the PWR (Power) LED on the EAM2000-12 faceplate is illuminated.

### 3. Connect the E1 Line(s).

Plug the E1 cable into the RJ21 connector for the chosen slot on the back of the IP DSLAM. The EAM2000-12 will connect with remote E1 modems at distances up to 6,000 feet before requiring an E1 repeater. For each port being connected to a remote E1 modem, verify that the E1 link has been established; the E1 LK LED for that port will show steady illumination to indicate the connection has been made. Link up should occur within 20 seconds depending on the quality, gauge and distance of the copper cables. Default bandwidth for the EAM2000-12 is 1,984 kbps.

**E1 RJ21 Connector Port Pinout**

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

(Pins 13 and 38 are not used)

**NOTE** Once the EAM2000-12 has been installed, all settings are software selectable via Net to Net Technologies' Network Management System (NMS). For further information regarding EAM2000-12 configuration and management please refer to the Circuit Configuration section further on in this manual and/or to the Management User Guide for IP and Mini DSLAMs.

## OVERVIEW

### EAM2000-12 Management

Statistical and configuration data for the EAM2000-12 are maintained in an embedded web server that resides within the firmware of Net to Net Technologies' Multiplexer Uplink Modules (MUMs). This firmware contains Net to Net's Network Management System (NMS) and Simple Network Management Protocol (SNMP).

#### Accessing EAM2000-12 data in a newly installed IP DSLAM

- a. Connect your PC to the Ethernet RJ45 MGMT port located on the faceplate of the MUM installed in your IP DSLAM.
- b. Verify the connection; solid illumination of the MGMT LNK LED on the MUM faceplate indicates the connection has been established.
- c. Launch a web browser such as Microsoft Internet Explorer (v4.0 or higher) or Netscape Navigator (v4.0 or higher).
- d. Type the default IP address into the address field at the top of your browser and press the Enter key.

- 192.168.254.252 if the MUM is in slot 13 (IPD12000) or slot 5 (IPD4000)
  - 192.168.254.253 if the MUM is in slot 14 (IPD12000)
- e. Log in with a default username and password (both of which are case sensitive). Please note that General Users have "read only" access; for NMS configuration you must log in as a Superuser.
- general / Password
  - superuser / Password

**NOTE** Once accessed initially, the management system within the MUM can be configured such that NMS and SNMP can be reached from any computer on your network. For further instruction please refer to the Management User Guide for IP and Mini DSLAMs.

### Accessing EAM2000-12 data in a previously installed IP DSLAM

- a. Establish a connection with the MUM either directly (through the Ethernet RJ45 MGMT port on the MUM faceplate) or, if the system has been so configured, from a PC on your network.
- b. For direct connections verify that the MGMT LNK LED on the MUM faceplate is illuminated, indicating the connection has been established.
- c. Launch a web browser such as Microsoft Internet Explorer (v4.0 or higher) or Netscape Navigator (v4.0 or higher).
- d. Enter the assigned IP address\* into the address field at the top of your browser window. Press the Enter key.
- e. Log in with your assigned username and password.\* Please note that General Users have "read only" access; for NMS configuration you must log in as a Superuser.

\*If the IP address, username or password is unknown, contact your System Administrator or Information Technology Manager.

### Default Settings

No configuration is necessary for the EAM2000-12 to operate at default settings. If however, a change is required, default settings can easily be modified within NMS. For information regarding specific parameter configurations, refer to the EAM2000-12 Circuit Configuration section on the following page and/or the Management User Guide for IP and Mini DSLAMs.

#### Management Password Administration Defaults\*

General Username: general    Super Username: superuser

General Password: Password    Super Password: Password

\*Usernames and passwords are case sensitive.

## Management System Configuration Defaults

IP Addresses: Subnet Mask: 255.255.255.0  
IPD12000 slot 13 192.168.254.252 Default Gateway: 0.0.0.0  
IPD12000 slot 14 192.168.254.253 In-band Management: disabled  
IPD4000 slot 5 192.168.254.252 Uplink VLAN ID: 0

## EAM2000-12 Circuit Defaults

Circ. ID: n/a Pri [Priority]: 0  
IP Range 1: 0.0.0.0 - 255.255.255.255 Flood: Upl [Uplink]  
IP Range 2: 0.0.0.0 - 0.0.0.0 Frame Type: CRC [Cyclic Redundancy Check]  
Speed: 1,984 kbps Line Code: HDB3 [High Density Binary 3]  
Protocol: ALL Clock Source: Local  
Backbone-VLAN: 0  
VLAN: 0 - 0

## Data Storage

Configuration backup is inherent in the EAM2000-12. Upon initial power up of the IP DSLAM, the default parameters of the EAM2000-12 will remain in place unless changed through NMS. Once changed, new configurations will automatically be recorded in the Random Access Memory (RAM) of the EAM2000-12 and the Non-Volatile Random Access Memory (NVRAM) of the MUM. While data stored in EAM2000-12 RAM will be erased if the unit loses power, data stored within MUM NVRAM will remain intact (even if the unit loses power) unless deliberately cleared or reconfigured.

## EAM2000-12 CIRCUIT CONFIGURATION

Circuit configurations common to all Access Module models are defined in the Management User Guide for IP and Mini DSLAMs. Circuit configurations specific to E1 technology are outlined below. Default settings for any of these may be altered via the Circuit Configuration window of Net to Net's Network Management System (NMS).

### Speed

There are eight timeslot/bandwidth options for the E1 link; default is 1,984 kbps across all 31 channels. Remote E1 modems determine line speed through their communication with the EAM2000-12.

#### EAM2000-12 Timeslot & Bandwidth Options

Timeslots	1-4	1-8	1-12	1-16	1-20	1-24	1-28	1-31
Bandwidth (kbps)	256	512	768	1,024	1,280	1,536	1,792	1,984

**NOTE** Although all 31 channels continually run at 1,984 kbps, the Timeslot configuration for each port determines how many of the channels will be receiving data for that port. Ports configured to operate as fractional E1 lines require contiguous timeslots, as indicated in the table above.

## Frame Type

Frame type is the E1 data encapsulation method. A frame consists of 248 bits (8-bit samples of each of the 31 E1 channels plus a synchronization bit) transmitted at a rate of 8,000 frames per second (1,984 kbps) across the E1 line.

### **Cyclic Redundancy Check (Default)**

The Cyclic Redundancy Check (CRC) detects line errors and scrutinizes data integrity across the E1 line by appending a CRC character to the end of the data block. The character is a hexadecimal value calculated from the contents of each data block. The remote modem makes a similar calculation upon receipt of each data block and requests retransmission if there is a difference. CRC may be disabled on the EAM200-12 through Net to Net's Network Management System (NMS). For further instruction, refer to the Management User Guide for IP and Mini DSLAMs.

## Line Code

Line code is the E1 mode of transmission. The following line code options fall within the International Telecommunication Union - Telecommunication Standardization Sector (ITU-T) G.703 Standards for Transmission Facilities.

### **High Density Binary 3 (Default)**

High Density Binary 3 (HDB3) is used to accommodate the minimum ones density requirement in the European public network. HDB3 line coding helps prevent loss of synchronization between the EAM2000-12 and remote E1 modems by using bipolar violations to guarantee there will always be pulses in the line.

### **Alternate Mark Inversion**

The Alternate Mark Inversion (AMI) mode of transmission simply alternates positive and negative pulses. It is typical, with AMI, for a link to encounter long strings of zeros, which can potentially cause loss of synchronization between remote units. Net to Net Technologies' products however, meet the European minimum ones density requirement internally such that, even with AMI, loss of synchronization is prevented between the EAM2000-12 and remote E1 modems as it is with HDB3 line coding.

## Timing

### **Local (Default)**

The transmit clock source will originate from an oscillator onboard the EAM2000-12.

### **Loop**

The transmit clock source will originate from the remote E1 modem.

## ADDITIONAL INFORMATION

### LED Indicators

LED	State	Indication	Additional Information
<b>PWR (Power)</b>	solid green	unit is operational	If the Power LED is not illuminated, it is unlikely the EAM2000-12 is receiving power and none of the LEDs will be illuminated.
<b>E1 LK (Link)</b>	solid green	E1 connection is established	An E1 link exists and the port may be transmitting data but it is not receiving any packets from the remote E1 modem.
	pulsing green	E1 connection is established and active	The port is receiving valid data or status packets from the remote E1 modem.
	no illumination	<b>Loss of Synchronization (LOS)</b> The incoming connection to the port has been lost; no data is being received.	If the outgoing connection from the port has also been lost then the remote E1 modem will have LOS as well.
<b>E1 RX (Receiving)</b>	flashing amber	E1 activity	The port is either receiving data from the remote E1 modem or statistical packets from the IP DSLAM management.
	solid amber	heavy Rx traffic	The port is receiving large amounts of data from the remote E1 modem.
	no illumination	no activity	A link may exist but the port is not receiving any data from the remote E1 modem.
<b>E1 TX (Transmitting)</b>	flashing amber	E1 activity	The port is transmitting data to the remote E1 modem.
	solid amber	heavy Tx traffic	The port is transmitting large amounts of data to the remote E1 modem.
	no illumination	no activity	A link may exist but the port is not transmitting any data to the remote E1 modem.
<b>E1 AL (Alarm)</b>	no illumination	E1 is operational	Note: If the E1 LK LED also remains unlit then the port has LOS.
	solid amber	<b>Remote Alarm Indication (RAI)</b> The outgoing connection from the port has been lost; no data is being transmitted.	The remote E1 modem has lost its incoming connection and has LOS.
	pulsing amber	<b>Alarm Indication Signal (AIS)</b> An indirect connection has been lost; the port may no longer be receiving data from the remote E1 modem.	The remote E1 modem has lost a connection with an intermediate device and LOS or RAI.

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

## Regulatory Compliance

### European Regulatory Compliance Information for Class A Equipment

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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