

**VX-MD4024**

**IP Digital Subscriber Line Access Multiplexer**

## **HW Installation and User Guide**

Part Number A0-31-0129-2.1

Issue 2.1 Draft, **April 2010**



## **Mandatory Regulations**

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The following sections describe the mandatory regulations that govern the installation and operation of the VX-MD4024 .

### **List of Terms**

Table 1 lists the terms used in this chapter.

**Table 1 List of Terms**

<b>Term</b>	<b>Expansion</b>
CE	Conformité Européenne
EEC	European Economic Community
EN	European Standards
FCC	Federal Communications Commission
IEC	International Electrotechnical Commission

### **General Requirements**

The sections that follow outline the mandatory regulations that govern the installation and operation of the VX-MD4024 . You must adhere to these instructions so that your system meets regulatory requirements.

#### **Prevention of Access**

The VX-MD4024 must be accessible only to authorized personnel. Install this apparatus in a restricted access location or similar environment to prevent unauthorized access.

#### **Laser Interface**

The VX-MD4024 uses Class I lasers as optical transmitter sources which are inherently safe unless mishandled. The radiation from laser diodes is much more intense than other light sources radiation. Only trained operating personnel thoroughly familiar with laser radiation hazards should install or remove the fiber optic cables in this system.

#### **EMC Compliance**

EMC compliance may require the use of ferrites, shielded cables or other special accessories. Where required, these special accessories must be installed as per the instructions.

## **Regulations compliance**

### **Safety Approval**

The system complies with the following safety norms:

- Product Safety Requirements identified in EN60950:2000
- Over Voltage Protection Requirements of ITU-T K.20

### **EMI/EMC**

The system meets the requirements of Telecommunications Network Equipment: EN300-386.

### **Electromagnetic Compliance**

The system complies with the standard **FCC Part 15 Class A and EN55022**.

### **RoHS**

The system complies with the RoHS.

### **CE**

The system conforms to the CE requirements.

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**Abbreviations**

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# Preface

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## Scope

This document describes the VX-MD4024 . It contains:

- Procedures for installing the DSLAM (chapter 1)
- Procedures for operating and maintaining the DSLAM (chapter 2)
- Procedures for troubleshooting the DSLAM (chapter 3)
- Expansions of abbreviations used in the manual (Abbreviations)

## Audience

This document is intended for system engineers or operating personnel.

## Related Documentation

For information about how to manage the DSLAM through Command Line Interface (CLI) commands, refer to the VX-MD4024 *CLI Command Reference*.

For information about how to manage the DSLAM through Web GUI, refer to the VX-MD4024 *Web Configuration Tool Guide*.

## Documentation Conventions

The following conventions are used in this manual to emphasize information that will be of interest to the reader.

**Danger** — The described activity or situation might or will cause personal injury.

**Warning** — The described activity or situation might or will cause equipment damage.

**Caution** — The described activity or situation might or will cause service interruption.

**Note** — The information supplements the text or highlights important points.

## **1 — Installation of the VX-MD4024**

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**1.1 Pre-Installation**

**1.2 Hardware Installation**

**1.3 Provisioning a Management IP Port**

**1.4 Configuration Import/Export**

**1.5 Firmware Update**

## 1.1 Pre-Installation

This section provides the information users have to beware of before installing the VX-MD4024 . The information includes required installation tools, safety requirements, and electrostatic discharge protection.

### 1.1.1 Tools and Test Equipment Requirements

To install and maintain the VX-MD4024, you should have the tools and test equipment listed in the Table 1-1.

**Table 1-1 Required Installation Tools and Materials**

Item Required	Purpose
Anti-static wrist strap	Protect the VX-MD4024 system from electrostatic discharge damage.
Hand tools	Screw drivers for equipment removal and replacement.
Wire cutter/stripper	Prepare wires for electrical connections.
Accessories and hardware kit	Screws, bolts, etc., for securing the equipment on the desired location.

### 1.1.2 Safety Requirement

To prevent possible serious injury, do not apply power to the VX-MD4024 system at the central office or any remote site until you've completed all of the installation procedures and connected it to the external facilities. Be cautious, when turning on/off the VX-MD4024 system power.

### 1.1.3 Electrostatic Discharge Protection

The terminal cards contain static-sensitive components. When handling them, be sure to wear a properly grounded anti-static wrist strap to prevent the damage from electrostatic discharge. If a wrist strap is not available, hold all cards only by their edges or extractor handles. Do not touch any component or traces on the cards. For future use, store cards in original shipped antistatic bags, or in an approved static-protected bag or container.

To minimize the possible damage from electrostatic discharge, do not install the VX-MD4024 in cold, dry places where static electricity can build up. Also, when handling cards, do not touch their rear-edge connector traces. These electrical contact points should be kept free of body oils and other contaminants.

## 1.2 Hardware Installation

The hardware installation for the VX-MD4024 is simple and without complex hardware setting. However, it should be installed following out the standard installation procedures. During installation, basic safety precaution should always be taken, especially, be sure to wear an antistatic wrist strap to prevent static electricity from damaging the system and injury to the operator. Handle electronic components as little as possible.

This chapter provides the VX-MD4024 system hardware installation procedures and install samples for reference. Please perform the procedures in the suggested order.

### 1.2.1 Hardware Type

There are a total of 4 different types of VX-MD4024 hardware with the front panel view.

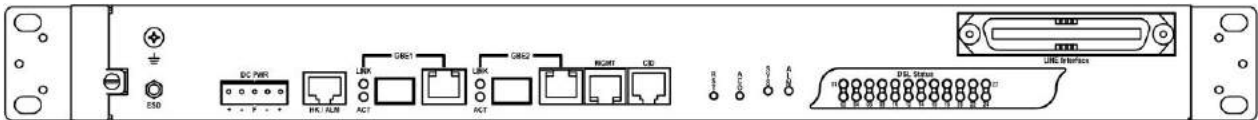


Figure 1-1 VX-MD4024 with DC power and no splitter

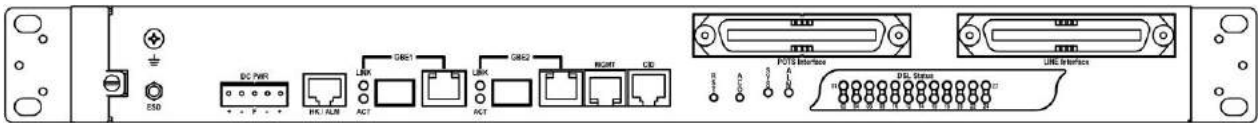


Figure 1-2 VX-MD4024 with DC power and splitter

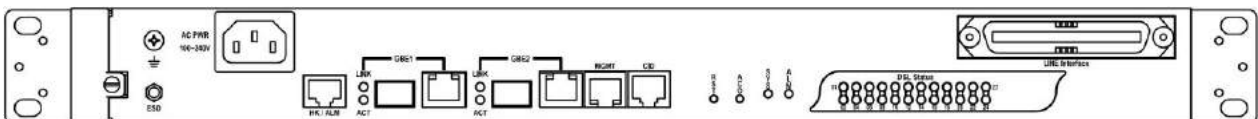


Figure 1-3 VX-MD4024 with AC power and no splitter

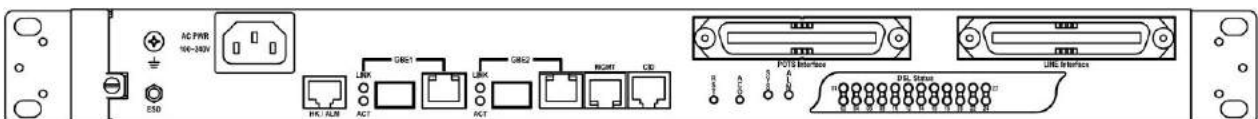


Figure 1-4 UAMP 2200 with AC power and splitter

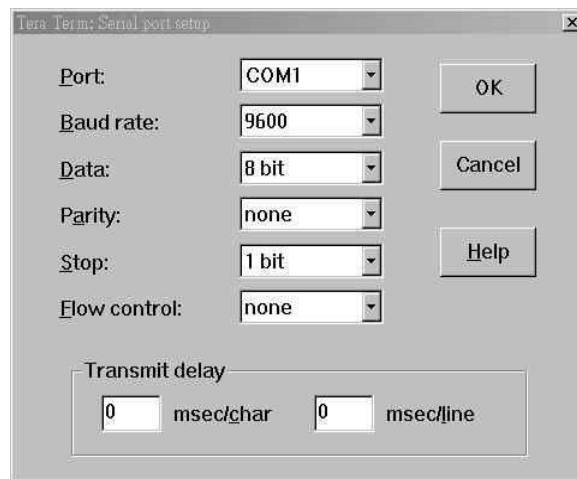
## 1.2.2 Factory Default Management IP Addresses

- Management Out-of-band IP-Address, Subnet Mask  
*192.168.1.1, 255.255.255.0*
- Management Out-of-band Default Gateway  
*192.168.1.254*
- Management In-band IP-Address, Subnet Mask  
*192.168.5.3, 255.255.255.0*

## 1.2.3 Installation Overview

The installation consists of the following procedures. Each procedure will be explained in detail in the following sections:

- Step 1:** Mount the system into the desired location of a rack.
- Step 2:** Wire electrical ground for the system and connect the cables between system and MDF.
- Step 3:** Please check the cable connection robustness and correctness.
- Step 4:** Check the voltage of the DC power supply, and then connect the system DC inputs to the power source outputs.
- Step 5:** Connect Console cable to COM port of a computer. Then run the terminal program with the setting shown below:



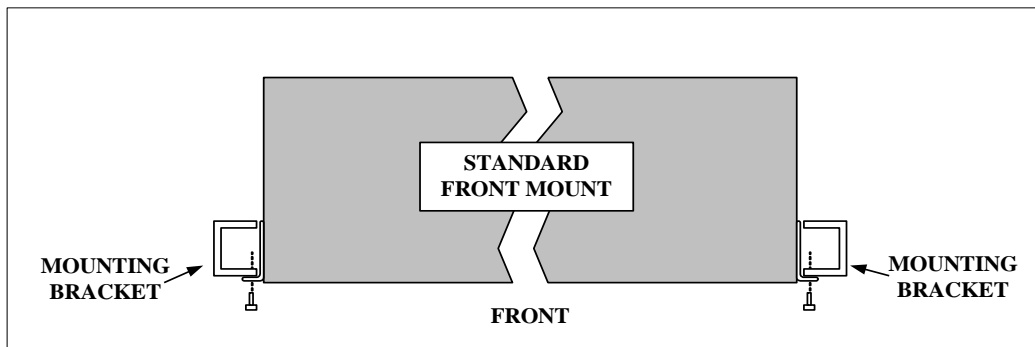
**Figure 1-5 Console Setting**

Users can also access the DSLAM via Ethernet. Refer to section 1.2.2 for the factory default IP settings of the DSLAM. Users can modify the IP address by using the CLI commands or Web Configuration Tool (refer to section 1.3). It's possible to access the DSLAM with telnet on port 23.

### 1.2.4 Mounting the VX-MD4024

The position and orientation of the brackets depends on the rack used for mounting. The DSLAM can be front-mounted in a standard channel rack (5-inch projection); and it can be shipped with the mounting brackets installed in one of three mounting positions or shipped loose (see Figure 1-6).

The mounting brackets can be rotated for use in wall mounting. Optional adhesive feet may be attached to the bottom of the chassis so that it can be placed on a desk or other smooth surface.



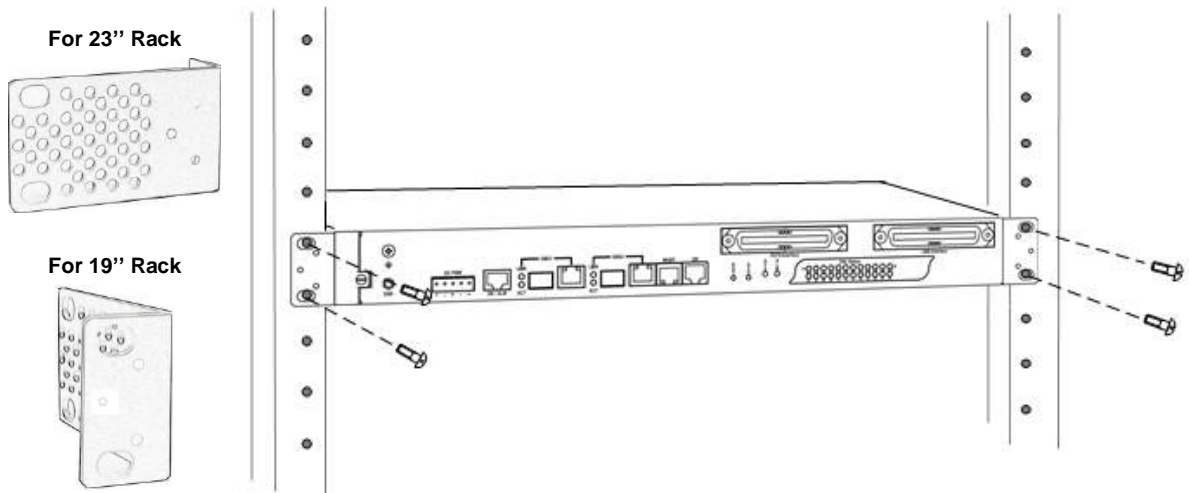
**Figure 1-6 Mounting Bracket Orientation (Top View)**

After the site requirements have been verified, the chassis may be installed at the specified location. When mounting the chassis, practice good safety habits. Use two or more people to secure the chassis. Relay rack mounting normally requires at least two people.

Step	Action
1	Locate the chassis and obtain the appropriate chassis mounting hardware.
2	Determine and obtain the tools required for the chassis mounting hardware.
3	From the front of the relay rack, position the chassis in its relay rack mounting location.
4	Using the appropriate rack mounting hardware, secure the chassis in its relay location on both left and right side of mounting bracket (see Figure 1-7).

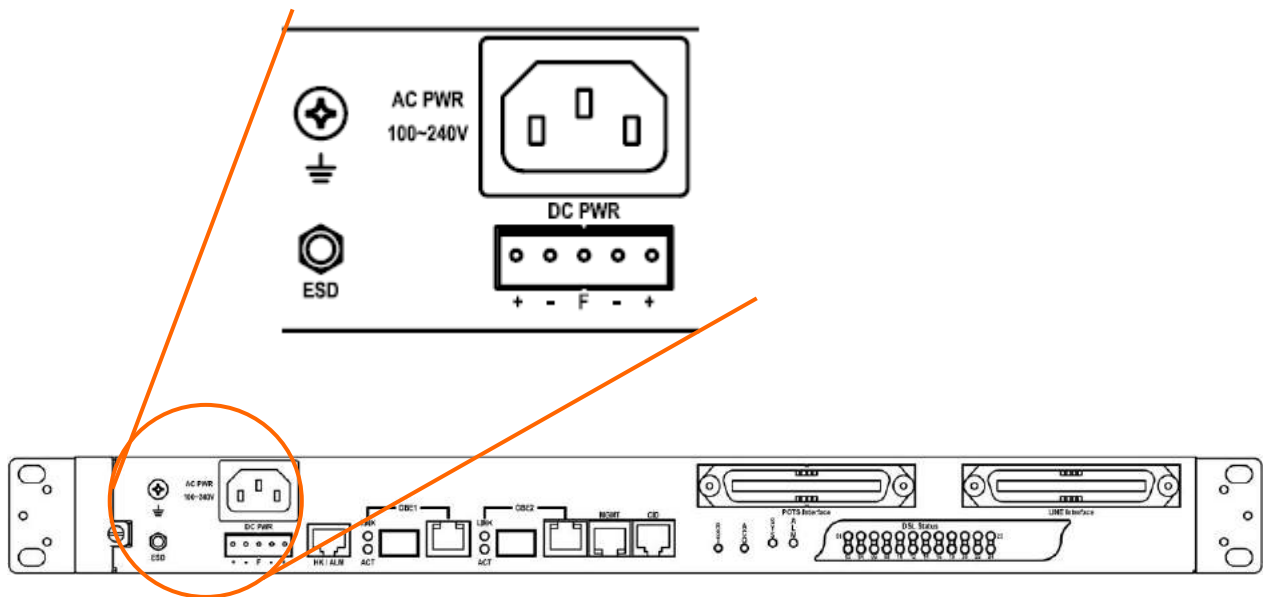
**Note** — The chassis should be empty during the chassis mounting procedures. Remove any unit in the chassis, and store them according to static-sensitive device storage procedures.

**Warning** — Hazardous voltages may exist on the chassis. Always practice good safety habits when wiring a live circuit or performing maintenance.



**Figure 1-7 Mounting Bracket Position for Standard Mount (VX-MD4024 -DC shown)**

## 1.2.5 Power and Ground Connections



**Figure 1-8 Power connection and power switch of VX-MD4024**

### AC Power Connection

If your VX-MD4024 uses AC power, connect the AC power cord to the AC supply socket on the front panel of the DSLAM (refer to Figure 1-8), and plug the cord into the external power source. The voltage must be 100 to 240 V ( $\pm 10\%$  tolerance).

### DC Power Connection

The DC power interface is a 5-pin terminal block with polarity signs on the front panel of the DSLAM.

The VX-MD4024 can be powered from two  $-48\text{V}$  DC power supply. The DC power connector is a 5P terminal block; 2P is for accommodating one DC power input and other 2P is for accommodating another DC power input. The center pin of the terminal block is FGND. The DC power should be connected to a well-fused power supply.

After completing chassis installation, please apply power to the fused power distribution panel feeding the chassis. When using a DC voltmeter, please check for proper voltage:  $-60\text{V} \sim -36\text{V}$  DC, and make sure that the polarity is correct.



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**Warning** — Ensure that all power sources to the chassis (power distribution panel) are turned off during the connection.

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**Note** — It is recommended that the -48VDC power be supplied directly and independently by a power feeding system and also avoid having a parallel or mutual connection with other -48VDC power supplier of telecom equipment. This is to guarantee our products against interferences by other equipment while they are working.

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## Ground Connections

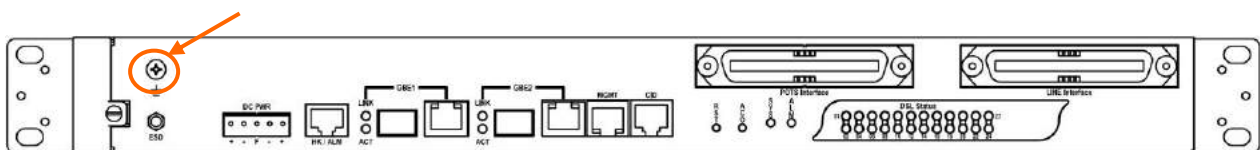
This section provides the grounding rule for the VX-MD4024 . All remote system sites must be properly grounded for optimum system performance.

### In Central Office:

There should be a CO GND that is adequately grounded. If the measured resistance from the grounding screw (on the front panel of the DSLAM, refer to Figure 1-9) to CO GND is less than 5 Ohm, then it can be assumed that the system is well grounded. If the measured resistance is larger than 5 Ohm, it is recommended to connect the grounding screw to CO GND using #14 or #12 AWG wire gauge conductor.

### In Remote Cabinet:

The VX-MD4024 should be grounded by connecting a #14 or #12 AWG conductor between the grounding screw (on the front panel of the DSLAM, refer to Figure 1-9) and the earth ground or main grounding bar. The resistance between the chassis and the grounding bar should be less than 25 Ohm.



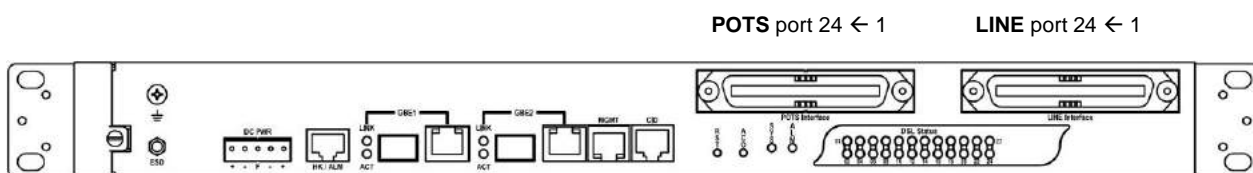
**Figure 1-9 VX-MD4024 grounding screw on the front panel**

### 1.2.6 Connecting the VDSL/ADSLx and POTS interfaces

The VX-MD4024 supports 24 ports VDSL2/ADSLx subscribers per box. Depending on your box, there may be two RJ21 50-pin female connectors on the front panel of the system. One for VDSL/ADSLx line and the other for POTS interface.

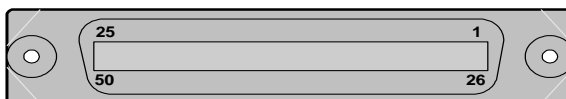
To connect the subscriber lines, use cables with the RJ21 50-pin male connectors. When installing, just plug the end of a cable with connector into the POTS or LINE interface female connector on the front panel. The other end of the cable is generally tied to the MDF.

The following figure shows the Line/POTS port position of the system:



The pin assignment of Line/POTS interface is illustrated below (the numbers in the connector figures below represent PIN numbers). **Please be aware of the different style pin-assignment.**

**Line port 1~24:**

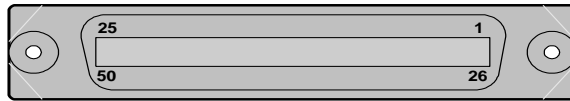


Pin No.	25	24	23	22	21	20	19	18	~	8	7	6	5	4	3	2	1
Port No.	X	Ring 23	Tip 23	Ring 21	Tip 21	Ring 19	Tip 19	Ring 18	~	Ring 7	Tip 7	Ring 5	Tip 5	Ring 3	Tip 3	Ring 1	Tip 1
Pin No.	50	49	48	47	46	45	44	43	~	33	32	31	30	29	28	27	26
Port No.	Ring 24	Tip 24	Ring 22	Tip 22	Ring 20	Tip 20	Ring 18	Tip 18	~	Tip 8	Ring 6	Tip 6	Ring 4	Tip 4	Ring 2	Tip 2	X

**Figure 1-10 Pin Assignment of LINE Interface (VDSL2 30a, Horizontal Tip/Ring model)**

Pin No.	25	24	23	22	21	20	19	18	~	8	7	6	5	4	3	2	1
Port No.	X	Tip 25	Tip 24	Tip 23	Tip 22	Tip 21	Tip 20	Tip 19	~	Tip 8	Tip 7	Tip 6	Tip 5	Tip 4	Tip 3	Tip 2	Tip 1
Pin No.	50	49	48	47	46	45	44	43	~	33	32	31	30	29	28	27	26
Port No.	X	Ring 25	Ring 24	Ring 23	Ring 22	Ring 21	Ring 20	Ring 19	~	Ring 8	Ring 7	Ring 6	Ring 5	Ring 4	Ring 3	Ring 2	Ring 1

**Figure 1-11 Pin Assignment of LINE Interface (VDSL2 17a, Vertical Tip/Ring model)**

**POTS port 1~24:**

<b>Pin No.</b>	<b>25</b>	<b>24</b>	<b>23</b>	<b>22</b>	<b>21</b>	<b>20</b>	<b>19</b>	<b>18</b>	~	<b>8</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>Port No.</b>	X	Tip 25	Tip 24	Tip 23	Tip 22	Tip 21	Tip 20	Tip 19	~	Tip 8	Tip 7	Tip 6	Tip 5	Tip 4	Tip 3	Tip 2	Tip 1
<b>Pin No.</b>	<b>50</b>	<b>49</b>	<b>48</b>	<b>47</b>	<b>46</b>	<b>45</b>	<b>44</b>	<b>43</b>	~	<b>33</b>	<b>32</b>	<b>31</b>	<b>30</b>	<b>29</b>	<b>28</b>	<b>27</b>	<b>26</b>
<b>Port No.</b>	X	Ring 25	Ring 24	Ring 23	Ring 22	Ring 21	Ring 20	Ring 19	~	Ring 8	Ring 7	Ring 6	Ring 5	Ring 4	Ring 3	Ring 2	Ring 1

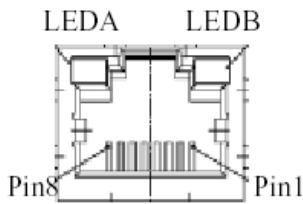
**Figure 1-12 Pin Assignment of POTS Interface**

### 1.2.7 Connecting the GBE1/GBE2 trunk interface

The system provides two types of trunk interfaces (two ports for each type): electrical (RJ-45) and optical (mini-GBIC) interfaces. When both electrical and optical ports are connected, system will automatically select the interface according to the priority setting (Fiber first or Copper first).

#### RJ-45 Electrical Trunk Interface

The pin assignment of RJ-45 connector on the trunk port is shown in the following figure and table.



1,2	T/Rx+,T/Rx-
3,6	T/Rx+,T/Rx-
4,5	T/Rx+,T/Rx-
7,8	T/Rx+,T/Rx-

#### Mini-GBIC (SFP) Trunk Interface

Prepare a proper SFP module and install it into the optical trunk port. Then you can connect fiber optics cabling that uses LC connectors or SC connectors (with the use of an optional SC-to-LC adapter) to the fiber optics connector on the trunk port.

Fiber optics cable with LC duplex connector

Connect the optical fiber to the SFP socket



**Figure 1-13 Connecting optical fiber to the trunk port**

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**Note** — Please observe the proper connecting terminals for transmitting cable to TX LC-type receptacle, and receiving cable to RX LC-type receptacle on the front panel.

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**Warning** — *Never look directly at the transmitting ports of optical interface that might be emitting laser, in order to prevent damage to the eye from the laser radiation.*

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### 1.2.8 Ethernet Port (MGMT)

The VX-MD4024 provides one RJ45 Jack (MGMT) on the front panel for Ethernet interface connection. The detailed pin assignment is shown in the following figure and table.

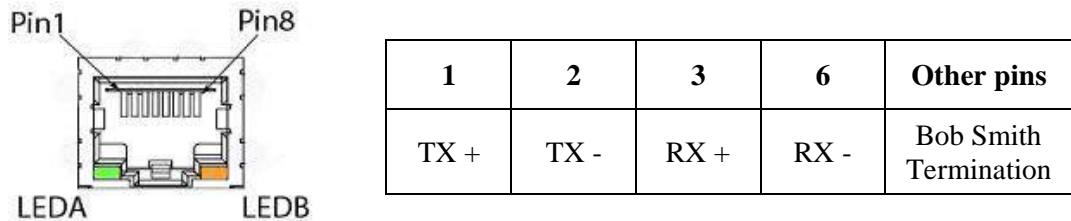
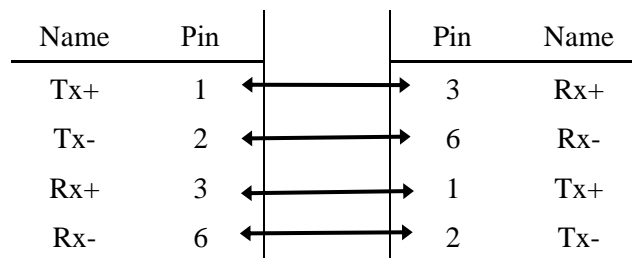
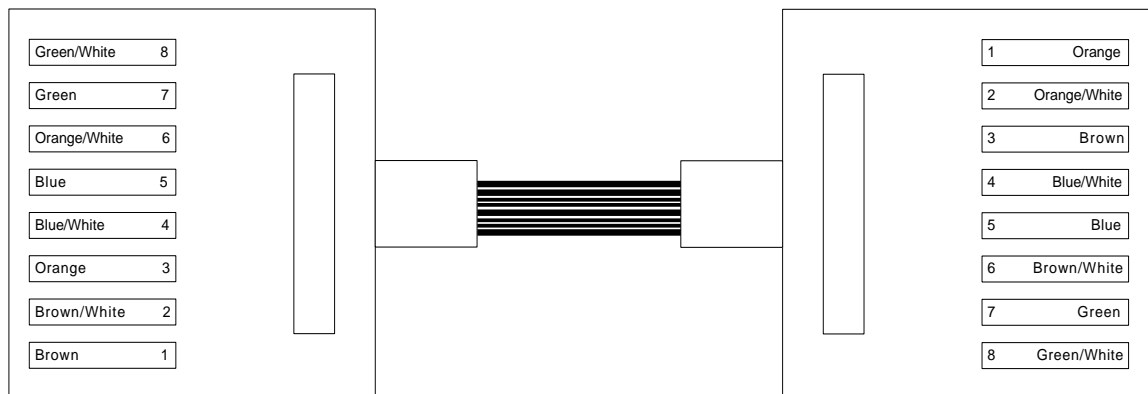


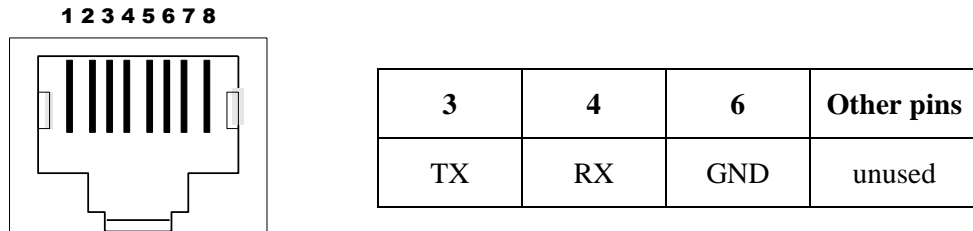
Figure 1-14 Ethernet Port RJ-45 pin assignment

To connect the Ethernet interface to PC, the Ethernet crossover cable is required. The detailed pin assignment is shown below.



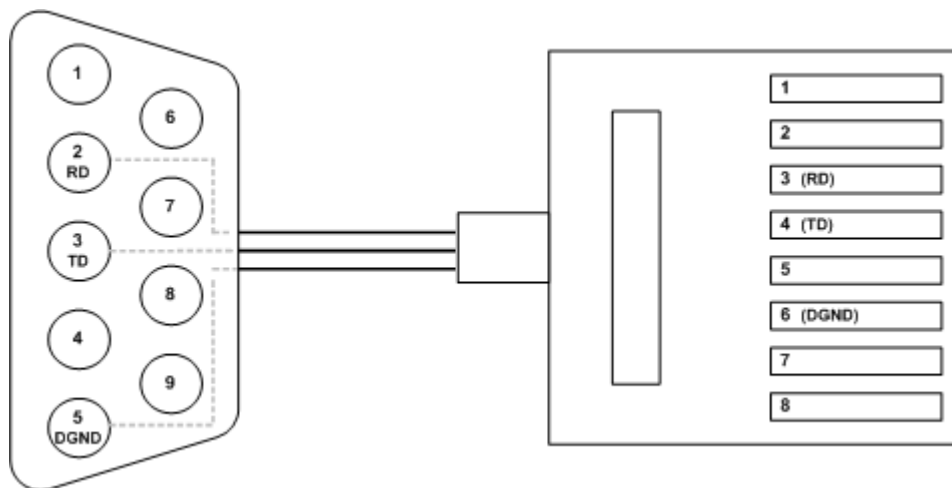
### 1.2.9 Console Port (CID)

The Console interface (CID) on the front panel is the main control interface of the VX-MD4024 . The RJ45 connector pin assignment is illustrated below:



**Figure 1-15 Console Port RJ-45 pin assignment**

To connect the host PC to the console port, a RJ45 (male) connector-to-RS232 DB9 (female) connector cable is required. The RJ45 connector of the cable is connected to the CID port of the DSLAM; the DB9 connector of the cable is connected to the PC COM port. The pin assignment of the console cable is shown below:



DB-9F	RJ-45M Pin
	1
	2
Pin 2 RD	3
Pin 3 TD	4
	5
Pin 5 DGND	6
	7
	8

**Figure 1-16 Pin Assignment of Console Cable**

### 1.2.10 Housekeeping and Alarm Contact Output Interface

The VX-MD4024 has an RJ-50 port (HK) on the front panel to provide four housekeeping inputs and one alarm contact output. Generally, housekeeping contacts can connect to environment-sensor- controlled switch to indicate the operation environment condition.

The HK circuit contains a photo coupler powered by the VX-MD4024 to detect the “open” or “close” status of the loop between HK\_IN and HK\_COM (user does not need to feed 3.3v power into the circuit). As to the alarm output, there is a relay between ALMOUT and ALMCOM to control the status of the loop to be “open” or “close” to the alarm equipment (close between ALMOUT and ALMCOM for alarm; open if no alarm).

The pin assignment of housekeeping and alarm contact output interface is illustrated below:

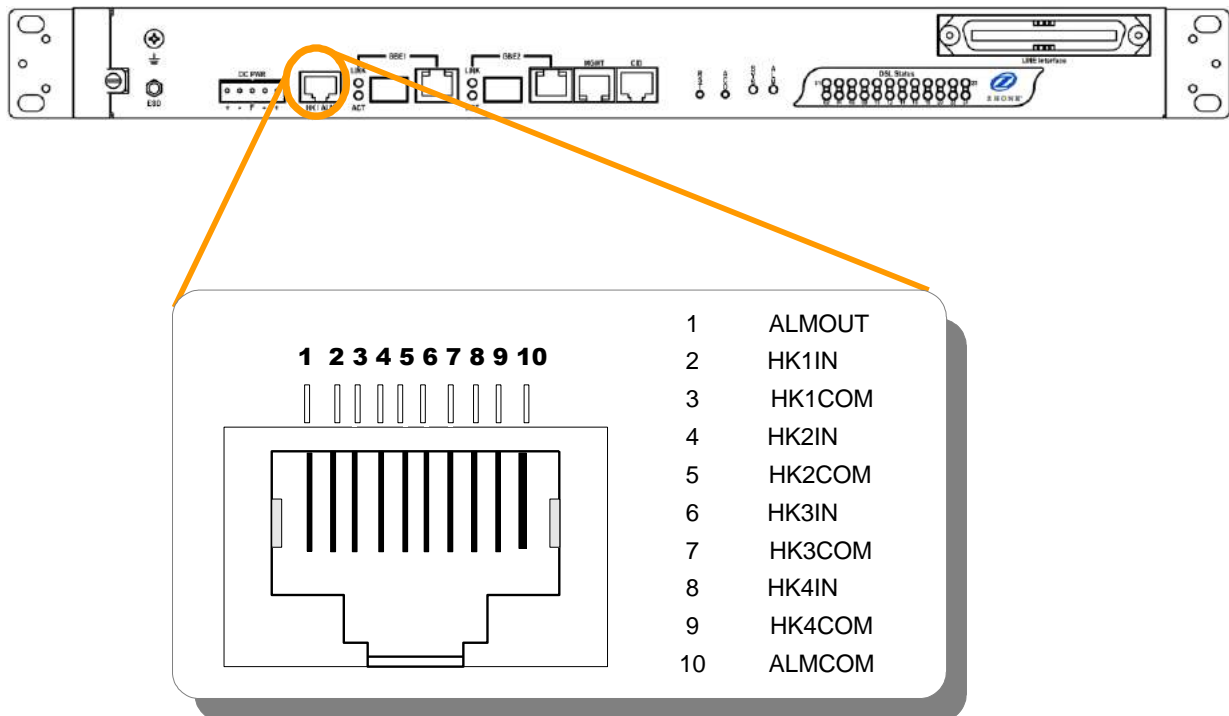
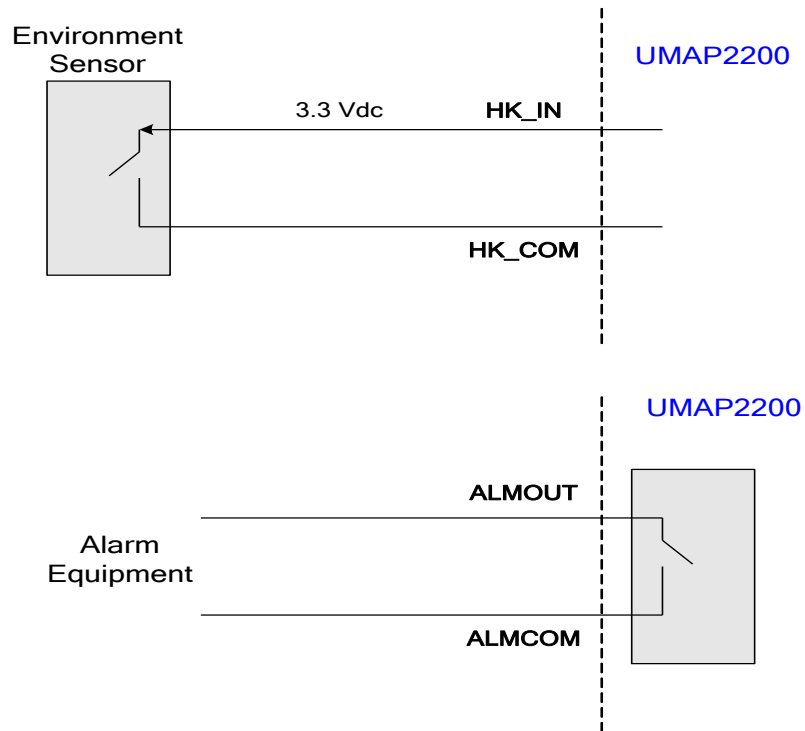


Figure 1-17 Pin assignment of Housekeeping Inputs and Alarm Contact Output



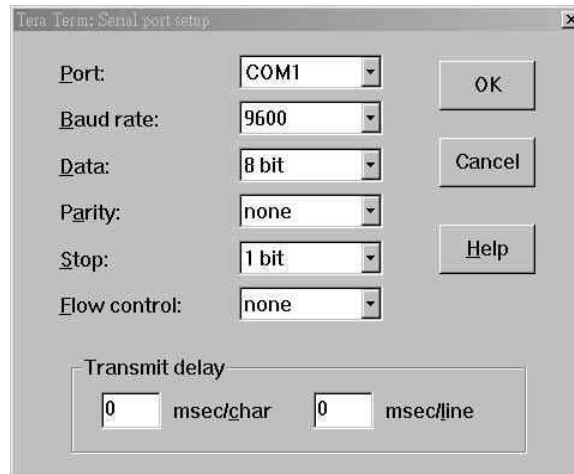
**Figure 1-18 Operation diagram of Housekeeping Inputs and Alarm Contact Output**

**Note —**The maximum current and voltage for ALMOUT / ALMCOM is restricted to 0.5 A 30 VDC or 0.15 A 125 VAC (resistive load).



### 1.3 Provisioning a Management IP port

This section describes how to use CLI commands or Web GUI to provision an IP port for the VX-MD4024. Referring to the previous section, use a console cable to connect a host PC and the VX-MD4024 through its console port (COM). Then on PC run the terminal program with the setting shown below:



In the PC terminal screen, type in the login user name and password to login into the system. Type the following CLI command to check current IP setting of all the management ports.

**enable** /\*Go to enable command mode\*/  
**show management** /\*Display all system management port IP setting\*/

```

WDS login: admin
Password:
VDSL2 IP-DSLAM v1.01 (04/19/2010 11:26:51)
Hardware Version          : D
CPLD Version              : B3
CLI Module Version        : 3.7.2.130
FWAPI Module Version      : 1.0.5.2
SNMP Module Version       : 6.6[MIB v6.2]
OAMP Module Version       : 3.7.2.143
Inband Database Version   : v4.22.0
General Database Version  : v4.22.0
VDSL2MGR Module Version   : 3.40
WEB Module Version        : 4.1-c
WDDI Module Version       : 2.4.3.11
WLS Module Version        : 3.2.4.1
localhost:>enable
localhost:%show management
-----
                GBE                MGMT
-----
MAC Address   : 00:50:C2:11:88:DD  00:50:C2:11:88:D1
IP Address    : 192.168.5.3         192.168.1.1
Network mask  : 255.255.255.0      255.255.255.0
MTU           : 1500               1500
-----
MGMT default gateway : 192.168.1.254
Inband VLAN ID: No limit
Inband VLAN Priority: 0

```

```
localhost:~
```

**Note** — For both CLI and Web Configuration Tool, the default login username and password are: **admin/admin**.

Then type the following commands to change in-band or out-band IP settings as you want:

```
configure /*Enter configure mode*/
management gbe <ipv4 address> [netmask <netmask>] /*Set in-band management port IP
setting*/
management gbe vlan <vlan id> <priority> /*Restrict incoming VLAN tag of in-band
management; this setting is optional not
mandatory*/
management mgmt <ipv4 address> [<netmask>] [<default_gateway>] /*Set out-band
management port IP setting*/
runningcfg save [<inbandBackupName>] [<generalBackupName>] /*Save new setting to
memory*/
```

After setting the in-band/out-band IP of the VX-MD4024, remember to connect its Ethernet port MGMT to the Ethernet LAN. Then in the previous PC terminal screen, type the following command to verify if the Ethernet connection between the management station and the DSLAM is working.

```
ping <ipv4 address> /*Ping to the management station to verify the connection is
working*/
```

```
localhost:~#configure
localhost:(conf)#management mgmt 172.16.77.35 255.255.255.0 172.16.77.177
localhost:(conf)#show management
-----
                GBE                MGMT
-----
MAC Address   : 00:50:C2:11:88:DD  00:50:C2:11:88:D1
IP Address    : 192.168.5.3         172.16.77.35
Network mask  : 255.255.255.0      255.255.255.0
MTU           : 1500               1500
-----
MGMT default gateway : 172.16.77.177
Inband VLAN ID: No limit
Inband VLAN Priority: 0
localhost:(conf)#runningcfg save
Writing FLASH ...
Save success.
localhost:~#ping 172.16.10.141
PING 172.16.10.141 (172.16.10.141): 56 data bytes
64 bytes from 172.16.10.141: icmp_seq=0 ttl=62 time=1.6 ms
64 bytes from 172.16.10.141: icmp_seq=1 ttl=62 time=1.0 ms
64 bytes from 172.16.10.141: icmp_seq=2 ttl=62 time=1.1 ms
```

```

64 bytes from 172.16.10.141: icmp_seq=3 ttl=62 time=1.0 ms
64 bytes from 172.16.10.141: icmp_seq=4 ttl=62 time=1.1 ms

--- 172.16.10.141 ping statistics ---
5 packets transmitted, 5 packets received, 0% packet loss
round-trip min/avg/max = 1.0/1.1/1.6 ms
localhost:%

```

Now you can access the VX-MD4024 via Telnet on port 23 (for using CLI) or Web GUI by entering its IP address in your browser's URL/address field.

Besides CLI, you can also change the in-band/out-band management IP of the VX-MD4024 in the Web GUI:

- On the menu tree, click on **Configuration → Management → Mgmt Link Config**.
- Enter new IP setting in the **GBE (In Band)** section for in-band IP configuration.
- Enter new IP setting in the **MGMT (Out Band)** section for out-band IP configuration.
- Click on **Modify** button to apply the modification.

**IPDSLAM** localhost Cluster ID Main Unit Refresh Logout

**Configuration / Management / Mgmt Link Config**

Previous Command Result: Normal

Modify

**Gigabit Ethernet Configuration & Status**

	Config Status	Admin Status	Op Status	Determine First
GBE1	(1)Auto Negotiate	Enable	Down	SFP first
GBE2	(1)Auto Negotiate	Enable	Down	SFP first

**MGMT Speed Remote IP Address HTTP Port**

AutoNegotiate	192.168.7.29	80
---------------	--------------	----

**Address Management**

GBE (In Band)		MGMT (Out Band)	
IP Address	192 . 168 . 5 . 3	IP Address	172 . 16 . 10 . 105
Subnet Mask	255 . 255 . 255 . 0	Subnet Mask	255 . 255 . 0 . 0
MAC	00:55:66:77:88:BB	Gateway	172 . 16 . 10 . 254
Inband VID	0		
Priority	0		

**Route Table**

Add Delete

	Destination	NetMask	Gateway
🔍	0 . 0 . 0 . 0	0 . 0 . 0 . 0	0 . 0 . 0 . 0

Please remember to save new settings to flash memory:

On the menu tree, click on **System → Save & Restore**. Click on the *Database Control Action* drop-down list and select **(A) Save runtime config. and set to new active DB** and then click on Submit button (you can specify the DB filename to be saved or let the system determine). This

will save inband configuration and runtime configuration as the active restoration database for next power-on restoration. You shall wait for memory write success message.

The screenshot shows the IPDSLAM web interface for 'localhost'. The page title is 'System / Save & Restore'. On the left sidebar, the 'System' menu is expanded, and 'Save & Restore' is highlighted with a red circle. The main content area shows a 'Database Control Action' dropdown menu set to '(A) Save runtime config. and set to new active DB' with a 'Submit' button. Below this is a table of configuration fields:

FTP Server IP	
FTP Account	
FTP Password	
Filename	
Inband DB	
General DB	
Boot inband DB	16 04/01/2010 13:42:46
Boot general DB	16 04/01/2010 13:42:46
Set active inband DB	16 04/01/2010 13:42:46
Set active general DB	16 04/01/2010 13:42:46
Current Database Status	MEMORY WRITE SUCCESS

Below the table is a 'User Guide' section with the following text:

User Guide:  
 (A) Save inband configuration and runtime configuration as the active restoration database for next power-on restoration.  
 (B) Restore inband configuration and control plane configuration by setting another restoration database active.  
 (C) Restore inband configuration and control plane configuration by setting another restoration database active and system restart.  
 (D) Clear inband configuration and control plane configuration in the active restoration database. (Warn: runtime config. is also cleared.)  
 (E) Clear inband configuration and control plane configuration in the active restoration database and system restart. (Warn: runtime config. is also cleared.)  
 (F) Clear control plane configuration in the active restoration database. (runtime config. is also changed.)  
 (G) Clear control plane configuration in the active restoration database and restart. (runtime config. is also changed.)  
 (H) Export runtime configuration in cli command format to ftp server.  
 (I) Export runtime configuration in binary format to ftp server.  
 (J) Import database in cli command format from ftp server and set it to the active restoration database.  
 (K) Import database in cli command format from ftp server and set it to the active restoration database and system restart.  
 (L) Import database in binary format from ftp server and set it to the active restoration database.  
 (M) Import database in binary format from ftp server and set it to the active restoration database and system restart.  
 (N) Export Alarm(History) Log.

## 1.4 Configuration Import/Export

The configuration database of VX-MD4024 contains two kinds of database - inband database and general database. Inband database contains configuration for the inband channel and is shared by two boot images (no matter which boot point you choose, the inband configuration keeps the same). General database contains other configuration.

The VX-MD4024 provides the configuration preservation feature that the configuration database is stored in flash memory (two partitions available). In addition to the configuration preservation feature, the VX-MD4024 also provides the configuration export/import feature.

The following paragraph describes how to do the configuration DB export/import in CLI and Web.

### In CLI:

#### (A) Save runtime config. and set to new active DB:

```
enable
configure
runningcfg save [<inbandBackup Name>] [<generalBackup Name>]
                /*Backup Name is optional. When inband Backup Name is specified, general Backup Name is
                also optional. If omitted, use the same name as <inbandBackupName>*/
```

#### (B) Choose another DB / (C) Choose another DB and restart: (total 16 DB for selection)

```
enable
configure
runningcfg restore index <inbandBackupIndex> [<generalBackupIndex>] [noreboot]
                or
runningcfg restore name <inbandBackupName> [<generalBackupName>] [noreboot]
                /*You must add the word "noreboot" for action (B) so that the system will not reboot
                automatically once the DB is changed*/
```

#### (D) Clear active DB including inband / (E) Clear active DB including inband and restart:

```
enable
configure
runningcfg clear all [noreboot]
                /*You must add the word "noreboot" for action (D) so that the system will not reboot automatically
                once the DB is cleared*/
```

**(F) Clear active DB excluding inband / (G) Clear active DB excluding inband and restart:**

```
enable
configure
runningcfg clear general [noreboot]
/*You must add the word "noreboot" for action (F) so that the system will not reboot automatically
once the DB is cleared*/
```

**(H) Export in CLI command format:**

```
enable
configure
runningcfg put <FTP server ip address> <username> <password> cli <filename>
```

**(I) Export in binary mode:**

```
enable
configure
runningcfg put <FTP server ip address> <username> <password> binary <filename>
```

**(J) Import CLI command / (K) Import CLI command and restart:**

```
enable
configure
runningcfg get <FTP server ip address> <username> <password> cli <filename>
runningcfg import download cli [noreboot]
/*You must add the word "noreboot" for action (J) so that the system will not reboot automatically
once the DB is imported*/
```

**(L) Import binary DB / (M) Import binary DB and restart:**

```
enable
configure
runningcfg get <FTP server ip address> <username> <password> binary <filename>
runningcfg import download binary [noreboot]
/*You must add the word "noreboot" for action (L) so that the system will not reboot automatically
once the DB is imported*/
```

**In Web:**

Please refer to VX-MD4024 *Web Configuration Tool Guide*.

## 1.5 Firmware Update

To update firmware or bootloader, the VX-MD4024 must get the firmware files from an FTP Server in which the firmware image and checksum file have been put.

---

**Note:** it is suggested to set the '**connection timeout**' of the FTP server **no less than 3 minutes (i.e. 180 seconds)**, in order to prevent firmware update failure due to FTP timeout for some FTP servers.

---

Following paragraph describes the procedures and commands to use when users want to upgrade the firmware /bootloader by using CLI.

### In CLI:

1. Login the CLI interface and check current system firmware partition or bootloader version:

```
localhost:>show firmware partition
      or
localhost:>show bootloader
```

2. Prepare an FTP server and make sure the needed files are put in it.
3. Make sure that the connection between VX-MD4024 and the FTP server is fine. You can use '**ping <ip address>**' command to ping the FTP server from CLI, or you can ping the VX-MD4024 from the FTP server.
3. FTP get firmware image or bootloader and then write to Flash: (see next page)

```
localhost:>enable //go to enable mode
localhost:%configure //go to configuration mode
localhost:(conf)#firmware write <FTP server ip address> <username>
<password> <filename> {image|bootloader} [noreboot]

//get files from FTP server and write to FLASH.
// The word “noreboot” in this command is optional. If you add it in the command,
you must reboot the system manually for the changes to take effect; otherwise the
system will reboot automatically once the firmware/bootloader is updated.
```

<b>Description</b>	Perform software image or bootloader remote download.	
<b>Syntax</b>	firmware write <ip> <username> <password> <string> {image   bootloader} [noreboot]	
<b>Parameter</b>		
	<b>Name</b>	<b>Description</b>
	<ip>	FTP server IP address <b>Type:</b> Mandatory
	<username>	Username <b>Valid values:</b> 1 ~ 31 characters <b>Type:</b> Mandatory
	<password>	Password <b>Valid values:</b> 0 ~ 31 characters <b>Type:</b> Mandatory
	<string>	Image path and filename <b>Valid values:</b> 1 ~ 64 characters <b>Type:</b> Mandatory
	image	Perform remote download for the software image <b>Type:</b> Mandatory
	bootloader	Perform remote download for the bootloader <b>Type:</b> Mandatory
	noreboot	No Reboot after command complete. Must reboot system manually for the changes to take effect! <b>Type:</b> Optional

*Note:* Getting file from FTP Server and writing to Flash ROM needs several minutes; you can get latest status by using command ‘**show firmware status**’. During the Flash writing process, **you MUST NOT turn off or reset the system.**

- After system restarts, login the CLI again and use the ‘show firmware partition’ or ‘show bootloader’ command to check if the software upgrade is successful.

#### **In Web:**

Please refer to VX-MD4024 *Web Configuration Tool Guide*.



## **2 — *Operating and Maintaining the VX-MD4024***

---

**2.1 Maintenance Requirement**

**2.2 Powering the DSLAM Up or Down**

**2.3 Controls and LED Indication**

**2.4 Replacing Units**

## 2.1 Maintenance requirement

### 2.1.1 Tools and Equipment Requirements

Table 2-1 lists required tools and test equipment for the VX-MD4024 system maintenance.

**Table 2-1 Required Installation Tools and Materials**

Item Required	Purpose
Anti-static wrist strap	Protect the system from electrostatic discharge damage
Hand tool	Screwdrivers for equipment removal and replacement
Wire cutter/stripper	Prepare wires for electrical connections
Wire-wrap gun and bit	Removing and replacing the system interconnection wires
Wires	System interconnections to external facilities
VF transmission and signaling test sets	Testing faulty POTS
Fuse and alarm panel	For protection and simplifying troubleshooting

### 2.1.2 System Spares

Always keep spares for the DSLAM at each central office for replacement purposes. During the system trouble-shooting procedures, certain cards at the central office and/or remote site will be required to be replaced.

### 2.1.3 Dispatching Maintenance Personnel

Some procedures in this manual involve end-to-end system testing, for which technicians are needed at each remote site. The remote VX-MD4024 system sites are normally unattended, however, technicians should be dispatched when needed. The VX-MD4024 system maintenance efforts and monitor the system for alarms during those on-site operations.

### 2.1.4 Electrostatic Discharge Protection

The VX-MD4024 system contains static-sensitive components. Be sure to wear a properly grounded antistatic wrist strap when handling them. Also, when removing and replacing a card, hold it either by its front ejector handle or by its edges.

Do not touch its rear connector contacts, which must remain free of contaminants.

### 2.1.5 Routine Maintenance

Always monitor the VX-MD4024 system performance at the central office/ remote sites using the SNMP. It allows user to view the current system status, alarm information and to take the necessary corrective action if a problem is reported.

Also keep each VX-MD4024 system site free of dust and other pollutant that could affect system performance. In addition, be sure to maintain the environment conditions at the central office and at each remote system site. The ideal operating temperature is about 20°C. The following is the acceptable operating condition range:

- -40°C to 65°C and 5% to 95% humidity at 35°C (VX-MD4024 2-15x/16x-DC)
- 0°C to 50°C and 5% to 95% humidity at 35°C (VX-MD4024 2-15x/16x-AC)

## 2.2 Powering the VX-MD4024 Up or Down

This section describes how to power up the DSLAM and how to power down the DSLAM.

**Table 2-2 Procedures of Powering Up the DSLAM**

Step	Action
1	Put on the antistatic wrist strap and connect it to a grounding point.
2	Ensure that the DSLAM is securely installed.
3	Ensure that the DSLAM ground strap is connected to a suitable ground point.
4	Ensure that –48 Vdc power is being supplied to the DSLAM.
5	Ensure that the POTS lines, subscriber lines, and alarm equipment are connected.
6	Wait for a minute, and then check the LEDs on the DSLAM. If the LEDs show some problem, refer to section 3.2 for information on how to resolve problems indicated through LEDs.

**Table 2-3 Procedures of Powering Down the DSLAM**

Step	Action
	<i><b>Caution:</b> Powering down the DSLAM stops DSL service to subscribers. POTS service is not affected.</i>
1	Put on the antistatic wrist strap and connect it to a grounding point.
2	Disconnect the power connection.

## 2.3 Controls and LED Indication

The VX-MD4024 has simple controls and indicators on its front panel. The indicators show the current operating states of various system elements and serve as maintenance aids for local technicians at each site. The remaining controls on the cards are also provided for local system testing and maintenance.

In general there are following LED modes:

OFF: The LED is not powered.

ON: The LED is powered up constantly.

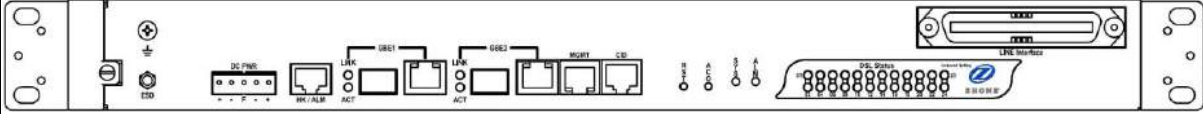
BLINK: Alternating between OFF and ON.

Fast-BLINK: Blinking at estimated frequency of 650 ms per on/off cycle

Slow-BLINK: Blinking at estimated frequency of 2700 ms per on/off cycle

SCAN: The LEDs ON/OFF in sequence.

**Table 2-4 VX-MD4024 Controls and LED Indication**

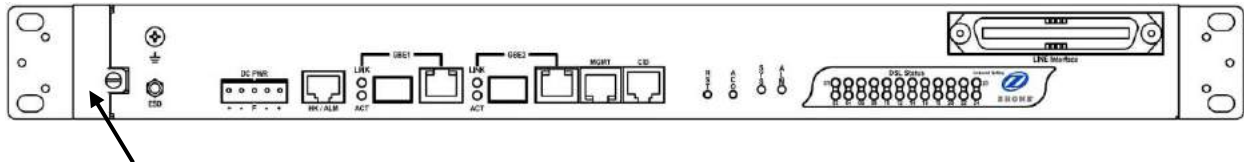
<b>VX-MD4024 Front Panel</b>		
		
LED	Color	Indication / Condition
SFP1 - LINK SFP2 - LINK	Green - On	Valid network connection established
	Off	Disconnection
SFP1- ACT SFP2- ACT	Green - Blink	Transmitting or receiving data
	Off	Disconnection
GBE1- Speed GBE2- Speed (LED B on RJ-45)	Orange	100 / 1000 Mbps
	Off	10 Mbps
GBE1-Link/Act GBE2-Link/Act (LED A on RJ-45)	Green - On	Valid network connection established
	Off	Inactive
	Green - Blink	Transmitting or receiving data
MGMT- Speed (LED B on RJ-45)	Orange	100 Mbps
	Off	10 Mbps
MGMT-Link/Act (LED A on RJ-45)	Green - On	Valid Ethernet connection established
	Off	Disconnection
	Green - Blink	Transmitting or receiving data

SYS	Amber	At power on phase
	Red	Self-test fail
	Green	Normal Operation
	Green - Blink	Remote download in operation
ALM	Off	At power on phase
	Red	Major alarm set
	Red – Blink	Major and Minor alarm set
	Amber	Minor alarm set
	Green	Normal operation
DSL Status	Green - Scan	At power on phase
	Green - On	Port is activated, and linked
	Off	Disabled
	Green – Fast Blink	Diagnostic, training
	Green – Slow Blink	Hand-shaking
<b>Interface</b>	<b>Description</b>	
HK/ALM	RJ-50 port for housekeeping inputs and one alarm contact output.	
GBE1	Gigabit Ethernet trunk port 1 including an electrical (RJ-45) and an optical (SFP) interface	
GBE2	Gigabit Ethernet trunk port 2 including an electrical (RJ-45) and an optical (SFP) interface	
MGMT	Ethernet Port connected to LAN for providing system out-band EMS/Telnet control interface, such as system monitor, control or software upgrade.	
CID	RS-232 port connected to the terminal for monitoring and controlling the system.	
LINE	RJ-21 connector (50-pin dual row header) for connecting DSL lines.	
<b>Button</b>	<b>Description</b>	
RST	An embedded hardware button for hardware resetting.	
ACO	For Alarm Cut Off service.	

## 2.4 Replacing Units

This section provides procedures on how to:

- replace the air filter (replace every three months)



**Air Filter Panel**

### Procedure 2-1 Replace the Air Filter

**Note** — You must loosen the connection of the Air Filter Panel to the DSLAM and pull out the Air Filter before replacing the air filter.

- 1 Put on the antistatic wrist strap and connect it to a grounding point.
- 2 Turn the screw on the Air Filter Panel counterclockwise until it loosens the connection of the panel to the DSLAM. Remove the Air Filter Panel.
- 3 Pull the air filter out of the DSLAM.
- 4 Slide the replacement air filter into the air filter slot of the DSLAM.
- 5 Reinstall the Air Filter Panel.

## **3 — *Troubleshooting the VX-MD4024***

---

**3.1 Introduction to Troubleshooting**

**3.2 Resolving Problems Indicated Through LEDs**

**3.3 Resolving Problems Indicated Through Alarms**

**3.4 Procedures for Troubleshooting the VX-MD4024**



### 3.1 Introduction to Troubleshooting

This chapter describes instructions for troubleshooting the VX-MD4024. These procedures may require the presence of technicians at remote VX-MD4024 system sites and an additional operator at PC to monitor system alarms by console or EMS during maintenance.

### 3.2 Resolving Problems Indicated Through LEDs

This section describes what to do to solve problems indicated by LEDs on the system front panel.

**Table 3-1 Problems Indicated by LEDs**

LED	Activity	Problem	Action
SYS	Not lit even though DSLAM is powered up	There is a power up problem with the system.	Troubleshoot the DSLAM for power up problems; see section 3.4.
	Red	Self-test failed. There is a functional problem with the system.	Replace the VX-MD4024 .
ALM	Red	Major alarm set	See section 3.3.
	Red-Flash	Major and Minor alarm set	See section 3.3.
	Yellow	Minor alarm set	See section 3.3.
GBE1/GBE2 (If SFP interface is activated)	Not lit even though DSLAM is powered up	No link	Troubleshoot the DSLAM for fiber optics problems; see section 3.4.

### 3.3 Resolving Problems Indicated Through Alarms

Alarms of the system are viewed through CLI commands, Web GUI or EMS.

If an alarm indicates a problem, refer to section 3.4 for troubleshooting procedures.

### 3.4 Procedures for Troubleshooting the VX-MD4024

When you follow a troubleshooting procedure, start from the first step of the procedure. If the first step does not solve the problem, proceed to the next step; keep going through the steps until the problem is solved. Use the following table to find out the appropriate procedure for troubleshooting the listed problems.

**Table 3-2 List of Troubleshooting Procedures**

Type of problem	Procedure Number
VX-MD4024 power up problems	3-1
Fiber optics problems	3-2
VDSL/ADSLx service problems (POTS service is ok)	3-3
POTS service problems (VDSL/ADSLx service is ok)	3-4
Subscriber service problems (no POTS and VDSL/ADSLx service)	3-5

### **Procedure 3-1 Troubleshoot VX-MD4024 Power Up Problems**

---

Problem indication:

- The SYS LED on the front panel is not lit even though the DSLAM is powered up
- Alarm that indicates a system power up problem
- Subscribers connected to the DSLAM do not have DSL service; POTS service is ok

**1** Check that the power is being supplied to the DSLAM.

**2** Check that the power feeds are connected to the DSLAM, and that power is present on the two power feeds with correct polarity.

**3** Replace the VX-MD4024 .

**4** Contact your provider.

---

### **Procedure 3-2 Troubleshoot Fiber Optics Problems**

---

Problem indication:

- The GBE1/GBE2 LED on the system front panel is not lit (maybe the signal power detected by the fiber optical receiver being below the minimum power threshold) but the SFP interface has been activated

- Alarm that indicates loss of signal

- Subscribers connected to the DSLAM do not have DSL service; POTS service is ok

**1** Check the connection of the fiber optics link. Check that the connections are secure and that the transmit and receive connections are not reversed.

**2** Disconnect the fiber optics link from the dual fiber optics connector and do a physical loopback at the VX-MD4024 .

**a** If the GBE1/GBE2 LED turns green, the problem is with the fiber optics link.

**b** If the GBE1/GBE2 LED does not turn green, the problem is with the DSLAM. Follow **Procedure 3-1** to troubleshoot the DSLAM.

**3** If the problem is with the fiber optics cabling, clean or replace as appropriate.

**4** Contact your provider.

---

### **Procedure 3-3 Troubleshoot VDSL/ADSLx Service Problems**

---

Problem indication: No VDSL/ADSLx service to the affected subscribers (POTS service is ok).

- 1** If all subscribers connected to the DSLAM are affected, and the SYS LED on the front panel is not lit, check the power source.
    - If the power source is not connected properly, power up the DSLAM by fixing the power source.
    - If the power source is correct, follow **Procedure 3-1** to troubleshoot the DSLAM for power up problem
  - 2** If all subscribers are affected, check the SYS LED on the front panel; if it is red, replace the DSLAM.
  - 3** Check the GBE1/GBE2 LED (if SFP interface is activated); if it is not lit, follow **Procedure 3-3** to troubleshoot the DSLAM for fiber optics problems.
  - 4** If only some subscribers are affected, identify the ports that have problems. Check that the subscribers are connected to the line interfaces properly.
  - 5** Contact your provider.
- 

### **Procedure 3-4 Troubleshoot POTS Service Problems**

---

Problem indication: No POTS service to the affected subscribers (VDSL/ADSLx service is ok).

- 1** Check the connection of the POTS lines at the POTS connector for the DSLAM.
  - 2** Use a bridging connector to couple the POTS and subscriber lines. If this solves the problem, replace the DSLAM.
  - 3** Check the condition of the POTS lines and connectors.
-

### **Procedure 3-5 Subscriber Service Problems**

---

Problem indication: No POTS and VDSL/ADSLx service to the affected subscribers.

- 1** Check the connection of the subscriber lines and POTS lines at the subscriber line connector for DSLAM for subscribers that do not have POTS and VDSL/ADSLx service.

If this step results in POTS service to the affected subscribers but there is still no VDSL/ADSLx service to them, follow **Procedure 3-3** to troubleshoot VDSL/ADSLx service problems.

If this step results in ADSL service to the affected subscribers but there is still no POTS service to them, follow **Procedure 3-4** to troubleshoot POTS service problems.

- 2** Use a bridging connector to couple the POTS and subscriber lines. If this results in POTS service to the affected subscribers, contact your provider.
  - 3** Check the condition of the subscriber lines and connectors.
-

## **Abbreviations**

---

<b>ADSL</b>	asymmetrical digital subscriber line
<b>ADSLx</b>	ADSL/ADSL2/ADSL2+
<b>ANSI</b>	American National Standards Institute
<b>ATM</b>	asynchronous transfer mode
<b>CLI</b>	command line interface
<b>DSLAM</b>	digital subscriber line access multiplexer
<b>EMS</b>	element management system
<b>DSL</b>	digital subscriber line
<b>EMC</b>	electromagnetic compatibility
<b>EMI</b>	electromagnetic immunity
<b>ETSI</b>	European Telecommunications Standards Institute
<b>Mbps</b>	megabit per second
<b>MDF</b>	main distribution frame
<b>LED</b>	light emitting diode
<b>POTS</b>	plain old telephone service
<b>PSTN</b>	public switched telephone network
<b>PVC</b>	permanent virtual circuit
<b>SNMP</b>	simple network management protocol
<b>VDSL</b>	Very high speed digital subscriber line



