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5224AV-2GBE/2SFP

IP Digital Subscriber Line Access Multiplexer

HW Installation and User Guide

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Mandatory Regulations

The following sections describe the mandatory regulations that govern the installation and operation of the 5224AV-2GBE/2SFP.

List of Terms

Table 1 lists the terms used in this chapter.

Table 1   List of Terms

Term	Expansion
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 5224AV-2GBE/2SFP. You must adhere to these instructions so that your system meets regulatory requirements.

Prevention of Access

The 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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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Preface

Scope

This document describes the 5224AV-2GBE/2SFP. 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 5224AV-2GBE/2SFP *CLI Command Reference*.

For information about how to manage the DSLAM through Web GUI, refer to the 5224AV-2GBE/2SFP *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.

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1 — Installation of the 5224AV-2GBE/2SFP

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 ware before installing the 5224AV-2GBE/2SFP. 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 5224AV-2GBE/2SFP, 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 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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 type of 5224AV-2GBE/2SFP hardware with the front panel view.
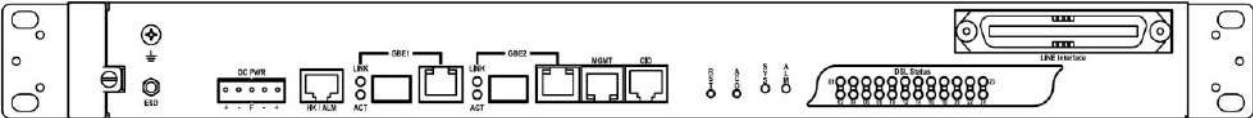

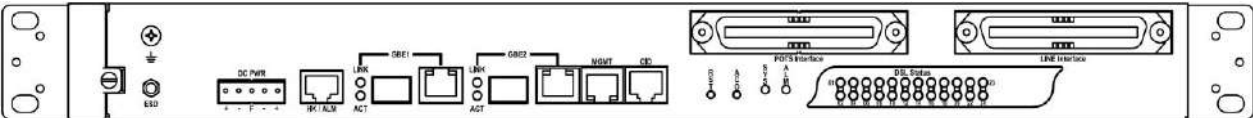**Figure 1-1   5224AV-2GBE/2SFP with DC power and no splitter**
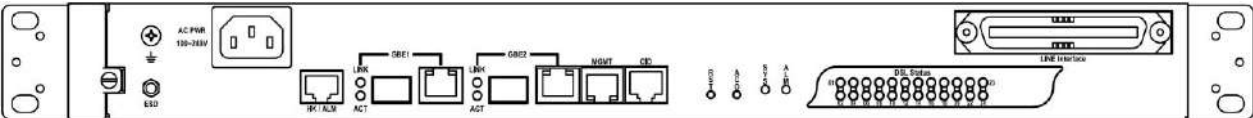

Figure 1-2   5224AV-2GBE/2SFP with DC power and splitter

Figure 1-3   5224AV-2GBE/2SFP with AC power and no splitter
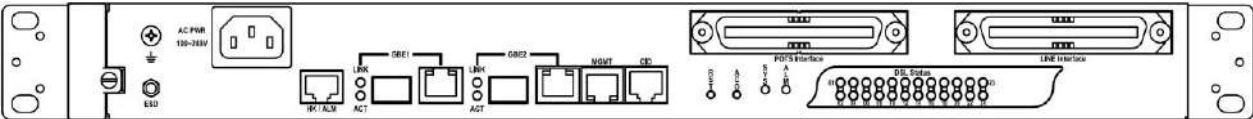
Figure 1-4   UAMP 2200 with AC power and splitter

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 5224AV-2GBE/2SFP

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)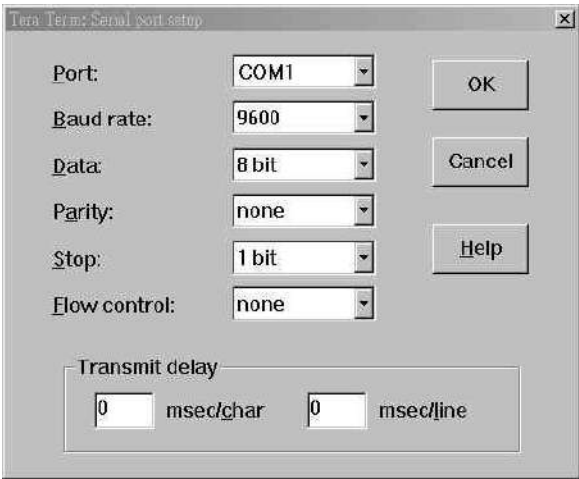; and it can be shipped with the mounting brackets installed in one of three mounting positions or shipped loose (see Figure 1-6).

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.

STANDARD FRONT MOUNT

MOUNTING BRACKET

MOUNTING BRACKET

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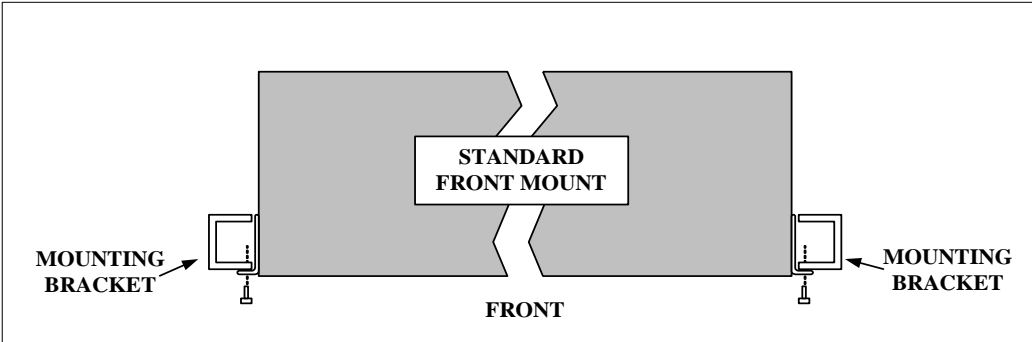
Figure 1-6   Mounting Bracket Orientation (Top View)

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.

For 23'' Rack

For 19'' Rack
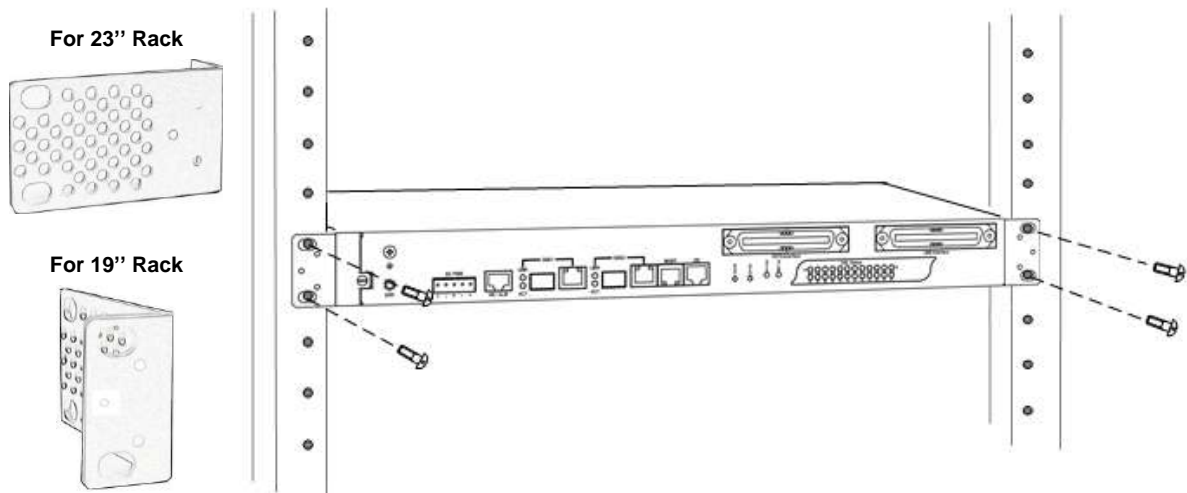
Figure 1-7   Mounting Bracket Position for Standard Mount (5224AV-2GBE/2SFP-DC shown)

1.2.5   Power and Ground Connections
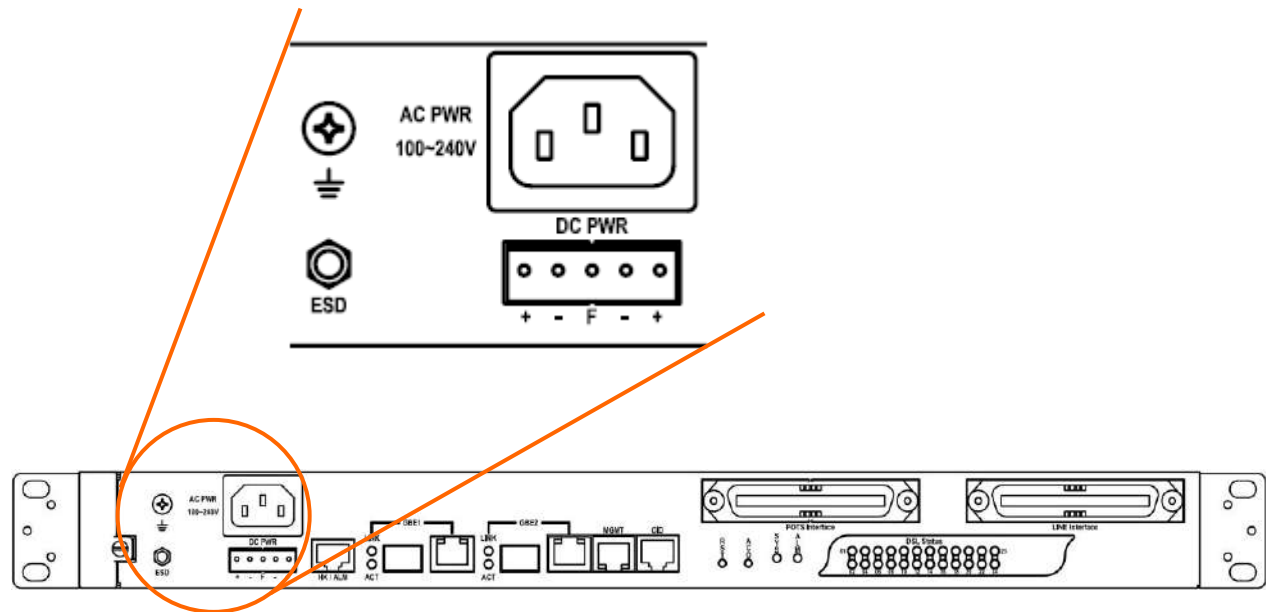
Figure 1-8   Power connection and power switch of 5224AV-2GBE/2SFP

AC Power Connection

If your 5224AV-2GBE/2SFP 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 (±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 5224AV-2GBE/2SFP can be powered from two –48V 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: -60V ~ -36V DC, and make sure that the polarity is correct.

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

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.

Ground Connections

This section provides the grounding rule for the 5224AV-2GBE/2SFP. 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 5224AV-2GBE/2SFP 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.
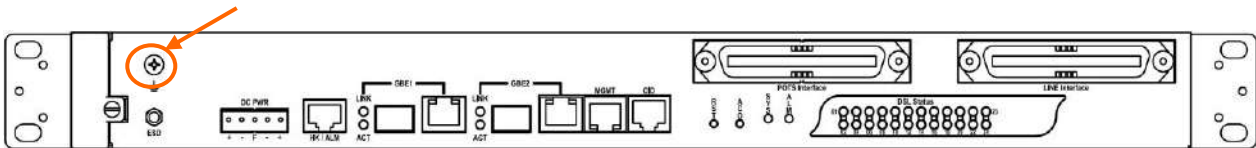

Figure 1-9   5224AV-2GBE/2SFP grounding screw on the front panel

1.2.6 Connecting the VDSL/ADSLx and POTS interfaces

The 5224AV-2GBE/2SFP supports 24 ports VDSL2/ADSLx subscribers per box. Depending on your box, there maybe 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:

POTS port 24 ← 1   **LINE** port 24 ← 1
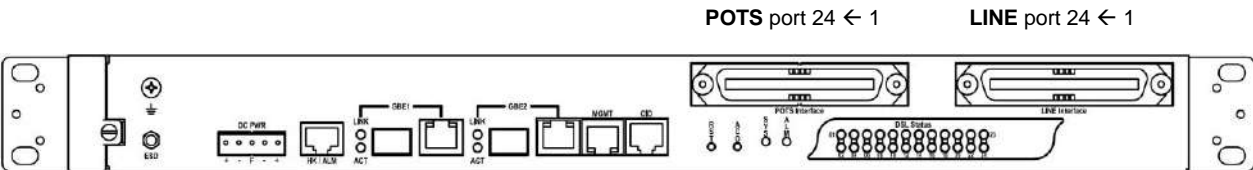
The pin assignment of Line/POTS interface is illustrated below (the numbers in the connector figures below represent PIN numbers). **Please be aware of the different style pin-assignment.**

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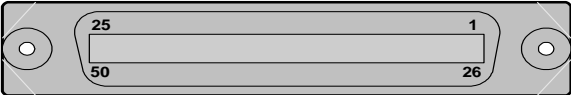
Pin No.	25	24	23	22	21	20	19	18	~	8	7	6	5	4	3	2	1
Port No.	X	Ring 23	Tip 23	Ring 21	Tip 21	Ring 19	Tip 19	Ring 18	~ ~	Ring 7	Tip 7	Ring 5	Tip 5	Ring 3	Tip 3	Ring 1	Tip 1
Pin No.	50	49	48	47	46	45	44	43	~	33	32	31	30	29	28	27	26
Port No.	Ring 24	Tip 24	Ring 22	Tip 22	Ring 20	Tip 20	Ring 18	Tip 18	~	Tip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

| 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 1-12   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.
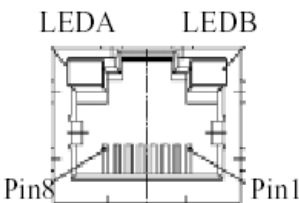
1,2	T/Rx+,T/Rx-
3,6	T/Rx+,T/Rx-
4,5	T/Rx+,T/Rx-
7,8	T/Rx+,T/Rx-

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

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.

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.*

1.2.8 Ethernet Port (MGMT)

The 5224AV-2GBE/2SFP 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.

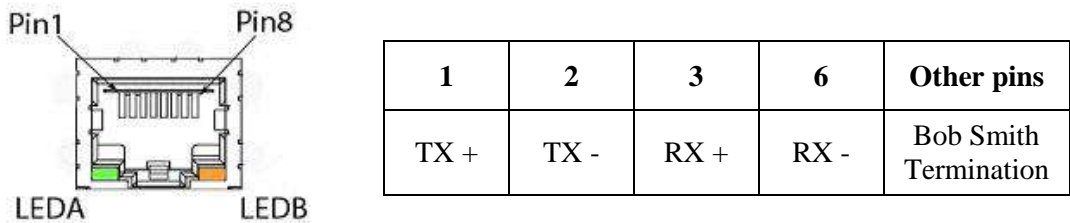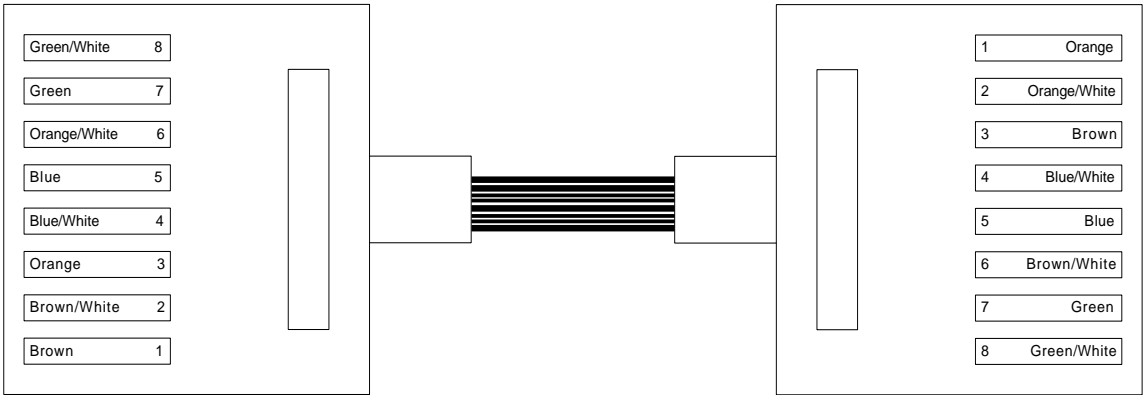| 1	2	3	6	Other pins
TX +	TX -	RX +	RX -	Bob Smith Termination

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.

Name	Pin		Pin	Name
Tx+	1		3	Rx+
Tx-	2		6	Rx-
Rx+	3		1	Tx+
Rx-	6		2	Tx-

1.2.9 Console Port (CID)

The Console interface (CID) on the front panel is the main control interface of the 5224AV-2GBE/2SFP. The RJ45 connector pin assignment is illustrated below:

1 2 3 4 5 6 7 8

3	4	6	Other pins
TX	RX	GND	unused
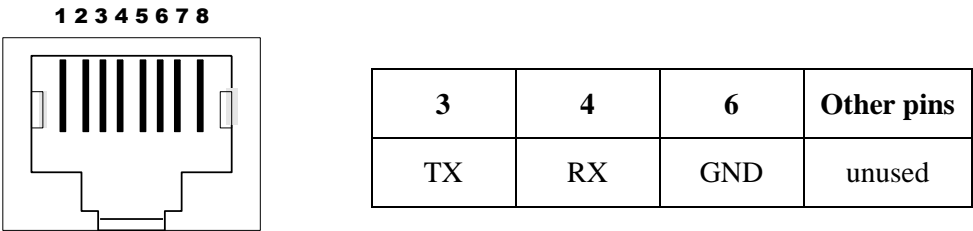
Figure 1-15   Console Port RJ-45 pin assignment

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
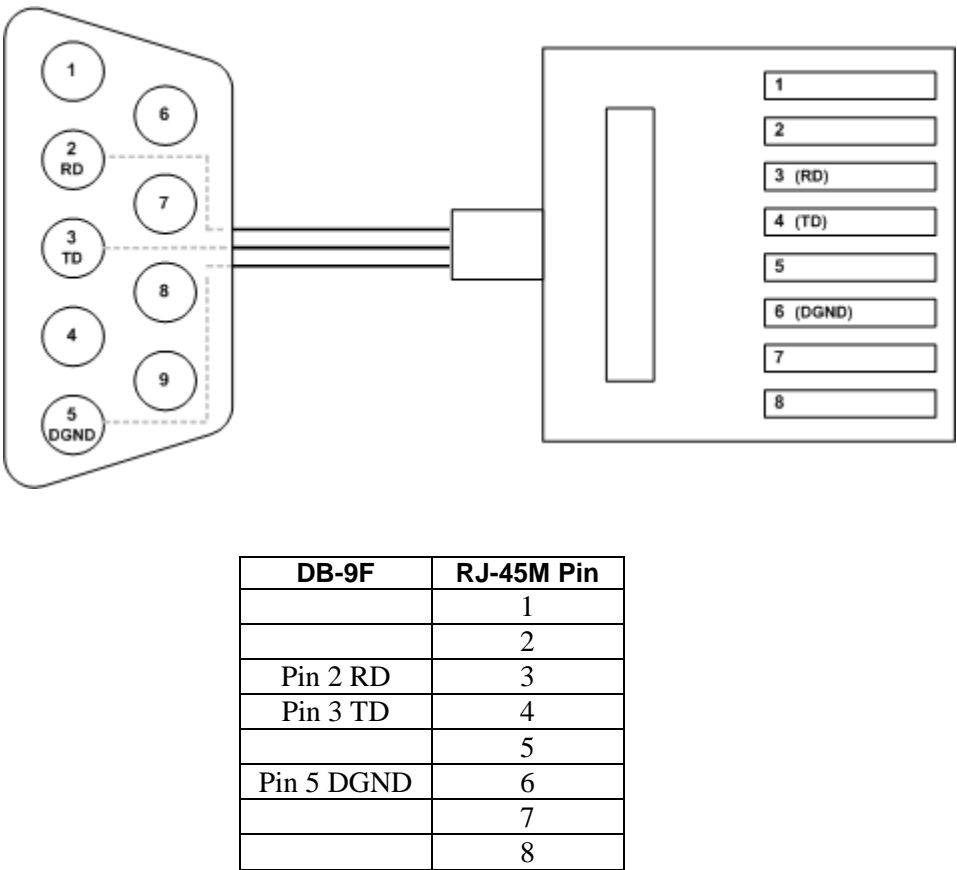
Figure 1-16   Pin Assignment of Console Cable

1.2.10 Housekeeping and Alarm Contact Output Interface

The 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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

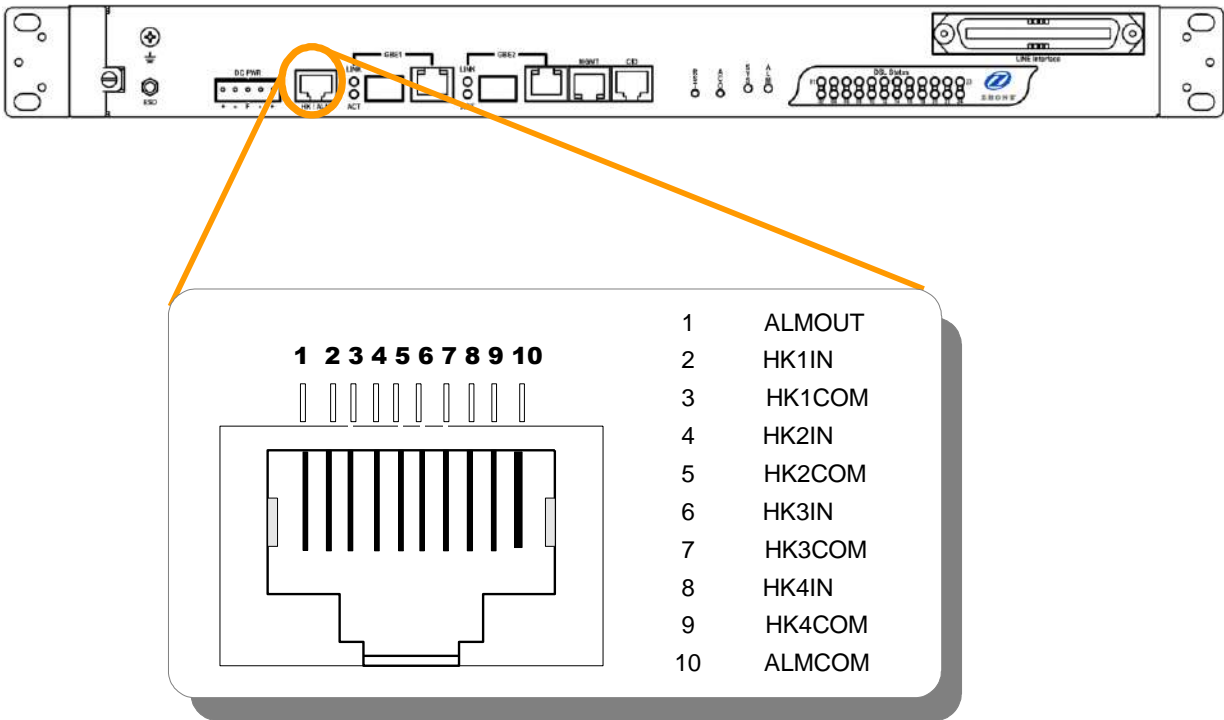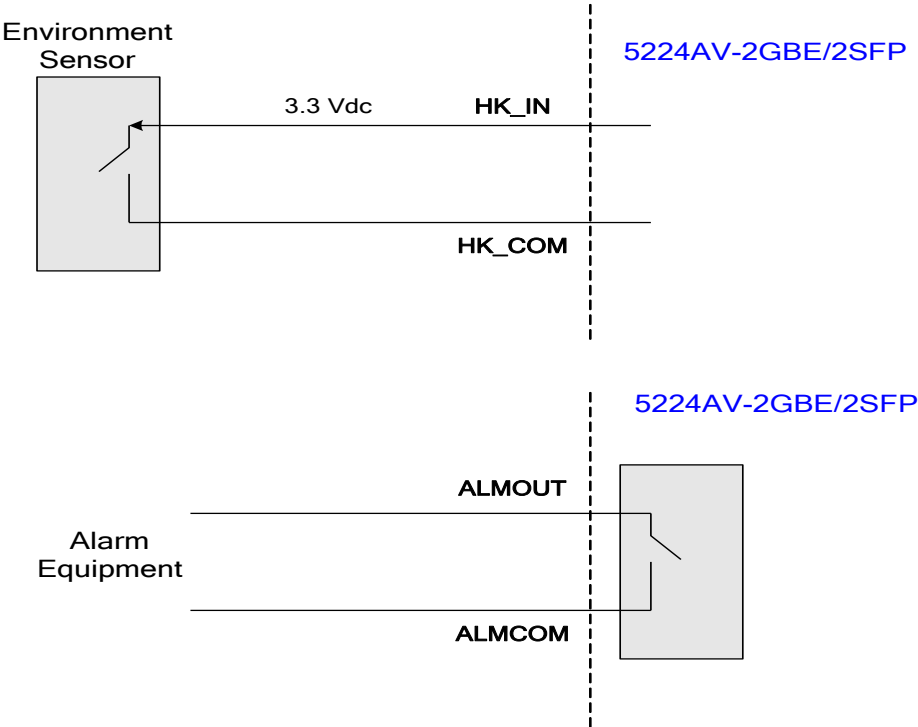**Note —**The maximum current and voltage for ALMOUT / ALMCOM is restricted to 0.5 A 30 VDC or 0.15 A 125 VAC (resistive load).

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 5224AV-2GBE/2SFP. Referring to the previous section, use a console cable to connect a host PC and the 5224AV-2GBE/2SFP through its console port (COM). Then on PC run the terminal program with the setting shown below:
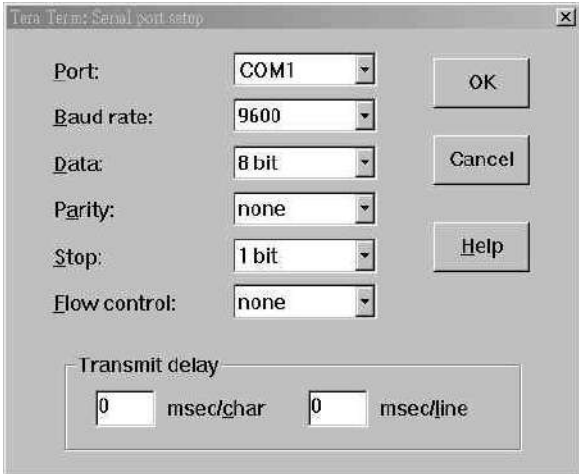
In the PC terminal screen, type in the login user name and password to login the system. Type the following CLI command to check current IP setting of all the management ports.

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
VDSLMGR 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 5224AV-2GBE/2SFP, 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
```

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```
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 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP in the Web GUI:

a. On the menu tree, click on **Configuration → Management → Mgmt Link Config**.

b. Enter new IP setting in the **GBE (In Band)** section for in-band IP configuration.

c. Enter new IP setting in the **MGMT (Out Band)** section for out-band IP configuration.

d. Click on **Modify** button to apply the modification.

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.

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1.4 Configuration Import/Export

The configuration database of 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP *Web Configuration Tool Guide*.

1.5   Firmware Update

To update firmware or bootloader, the 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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.

Description	Perform software image or bootloader remote download.
Syntax	firmware write <ip> <username> <password> <string> {image | bootloader} [noreboot]
Parameter	

	Name	Description
	<ip>	FTP server IP address **Type**: Mandatory
	<username>	Username **Valid values**: 1 ~ 31 characters **Type**: Mandatory
	<password>	Password **Valid values**: 0 ~ 31 characters **Type**: Mandatory
	<string>	Image path and filename **Valid values**: 1 ~ 64 characters **Type**: Mandatory
	image	Perform remote download for the software image **Type**: Mandatory
	bootloader	Perform remote download for the bootloader **Type**: Mandatory
	noreboot	No Reboot after command commplete. Must reboot system manually for the changes to take effect! **Type**: 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.**

4. 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 5224AV-2GBE/2SFP *Web Configuration Tool Guide*.

2 — *Operating and Maintaining the 5224AV-2GBE/2SFP*

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 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP system sites are normally unattended, however, technicians should be dispatched when needed. The 5224AV-2GBE/2SFP system maintenance efforts and monitor the system for alarms during those on-site operations.

2.1.4 Electrostatic Discharge Protection

The 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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 (5224AV-2GBE/2SFP2-15x/16x-DC)

- 0°C to 50°C and 5% to 95% humidity at 35°C (5224AV-2GBE/2SFP2-15x/16x-AC)

2.2   Powering the 5224AV-2GBE/2SFP 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
	Caution: Powering down the DSLAM stops DSL service to subscribers. POTS service is not affected.
1	Put on the antistatic wrist strap and connect it to a grounding point.
2	Disconnect the power connection.
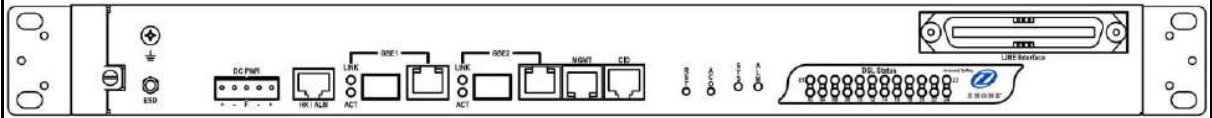
2.3 Controls and LED Indication

The 5224AV-2GBE/2SFP 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   5224AV-2GBE/2SFP Controls and LED Indication

5224AV-2GBE/2SFP Front Panel		
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 Off	100 / 1000 Mbps 10 Mbps
GBE1-Link/Act GBE2-Link/Act (LED A on RJ-45)	Green - On Off Green - Blink	Valid network connection established Inactive Transmitting or receiving data
MGMT- Speed (LED B on RJ-45)	Orange Off	100 Mbps 10 Mbps
MGMT-Link/Act (LED A on RJ-45)	Green - On Off Green - Blink	Valid Ethernet connection established Disconnection 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
Interface	**Description**	
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.	
Button	**Description**	
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)
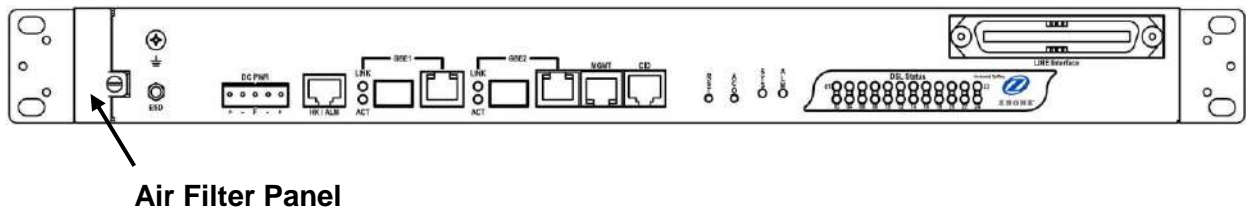
Air Filter Panel

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.

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3 — *Troubleshooting the 5224AV-2GBE/2SFP*

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 5224AV-2GBE/2SFP

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3.1   Introduction to Troubleshooting

This chapter describes instructions for the 5224AV-2GBE/2SFP system problems. These procedures may require the presence of technicians at remote 5224AV-2GBE/2SFP system sites and plus an 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 5224AV-2GBE/2SFP.
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 5224AV-2GBE/2SFP

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
5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP 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 5224AV-2GBE/2SFP.

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 5224AV-2GBE/2SFP.

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

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

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