

Model 3124

ADSL2+ IpDSLAM

User Manual



Important

This is a Class A device and is not intended for use in a residential environment.

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About this guide

This guide describes installing and operating the Patton Electronics Model 3124 ADSL2+ IpDSLAM.

Audience

This guide is intended for the following users:

- Operators
- Installers
- Maintenance technicians

Structure

This guide contains the following chapters and appendices:

- [Chapter 1](#) on page 7 describes the Model 3124
- [Chapter 2](#) on page 11 describes installing the Model 3124 hardware
- [Chapter 3](#) on page 19 configuring the Model 3124 for use
- [Chapter 4](#) on page 42 details how to power up and deactivate the Model 3124
- [Chapter 5](#) on page 47 contains troubleshooting and maintenance information
- [Chapter 6](#) on page 51 contains information on contacting Patton technical support for assistance
- [Appendix A](#) on page 54 contains compliance information for the Model 3124
- [Appendix B](#) on page 56 contains specifications for the Model 3124
- [Appendix C](#) on page 62 contains a list of abbreviations used in this document

For best results, read the contents of this guide *before* you install the NTU.

Precautions

Notes, cautions, and warnings, which have the following meanings, are used throughout this guide to help you become aware of potential problems. **Warnings** are intended to prevent safety hazards that could result in personal injury. **Cautions** are intended to prevent situations that could result in property damage or impaired functioning.

Note A note presents additional information or interesting sidelights.



The shock hazard symbol and **WARNING** heading indicate a potential electric shock hazard. Strictly follow the warning instructions to avoid injury caused by electric shock.



The alert symbol and **WARNING** heading indicate a potential safety hazard. Strictly follow the warning instructions to avoid personal injury.



The shock hazard symbol and **CAUTION** heading indicate a potential electric shock hazard. Strictly follow the instructions to avoid property damage caused by electric shock.



The alert symbol and **CAUTION** heading indicate a potential hazard. Strictly follow the instructions to avoid property damage.

Safety when working with electricity



- Do not open the device when the power cord is connected. For systems without a power switch and without an external power adapter, line voltages are present within the device when the power cord is connected.
- For devices with an external power adapter, the power adapter shall be a listed *limited Power Source*. The mains outlet that is utilized to power the device shall be within 10 feet (3 meters) of the device, shall be easily accessible, and protected by a circuit breaker in compliance with local regulatory requirements.
- For AC powered devices, ensure that the power cable used meets all applicable standards for the country in which it is to be installed.
- For AC powered devices which have 3 conductor power plugs (L1, L2 & GND or Hot, Neutral & Safety/Protective Ground), the wall outlet (or socket) must have an earth ground.
- For DC powered devices, ensure that the interconnecting cables are rated for proper voltage, current, anticipated temperature, flammability, and mechanical serviceability.
- WAN, LAN & PSTN ports (connections) may have hazardous voltages present regardless of whether the device is powered ON or OFF. PSTN relates to interfaces such as telephone lines, FXS, FXO, DSL, xDSL, T1, E1, ISDN, Voice, etc. These are known as “hazardous network voltages” and to avoid electric shock use caution when working near these ports. When disconnecting cables for these ports, detach the far end connection first.
- Do not work on the device or connect or disconnect cables during periods of lightning activity.



This device contains no user serviceable parts. This device can only be repaired by qualified service personnel.



If one has reason to open the chassis or case, then the precautions mentioned above shall be followed. This includes both the warnings relating to disconnection of the input power, and the warnings relating to the disconnection of WAN, LAN & PSTN ports.



This device is NOT intended nor approved for connection to the PSTN. It is intended only for connection to customer premise equipment.



In accordance with the requirements of council directive 2002/96/EC on Waste of Electrical and Electronic Equipment (WEEE), ensure that at end-of-life you separate this product from other waste and scrap and deliver to the WEEE collection system in your country for recycling.



CAUTION

Electrostatic Discharge (ESD) can damage equipment and impair electrical circuitry. It occurs when electronic printed circuit cards are improperly handled and can result in complete or intermittent failures. Do the following to prevent ESD:

- Always follow ESD prevention procedures when removing and replacing cards.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to safely channel unwanted ESD voltages to ground.
- To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively. If no wrist strap is available, ground yourself by touching the metal part of the chassis.

General observations

- Clean the case with a soft slightly moist anti-static cloth
- Place the unit on a flat surface and ensure free air circulation
- Avoid exposing the unit to direct sunlight and other heat sources
- Protect the unit from moisture, vapors, and corrosive liquids

Typographical conventions used in this document

This section describes the typographical conventions and terms used in this guide.

General conventions

The procedures described in this manual use the following text conventions:

Table 1. General conventions

Convention	Meaning
Garamond blue type	Indicates a cross-reference hyperlink that points to a figure, graphic, table, or section heading. Clicking on the hyperlink jumps you to the reference. When you have finished reviewing the reference, click on the Go to Previous View button  in the Adobe® Acrobat® Reader toolbar to return to your starting point.
Futura bold type	Commands and keywords are in boldface font.
<i>Futura bold-italic type</i>	Parts of commands, which are related to elements already named by the user, are in boldface italic font.
<i>Italicized Futura type</i>	Variables for which you supply values are in <i>italic</i> font
Futura type	Indicates the names of fields or windows.
Garamond bold type	Indicates the names of command buttons that execute an action.
< >	Angle brackets indicate function and keyboard keys, such as <SHIFT>, <CTRL>, <C>, and so on.
Are you ready?	All system messages and prompts appear in the Courier font as the system would display them.
% dir *.*	Bold Courier font indicates where the operator must type a response or command

Mouse conventions

The following conventions are used when describing mouse actions:

Table 2. Mouse conventions

Convention	Meaning
Left mouse button	This button refers to the primary or leftmost mouse button (unless you have changed the default configuration).
Right mouse button	This button refers the secondary or rightmost mouse button (unless you have changed the default configuration).
Point	This word means to move the mouse in such a way that the tip of the pointing arrow on the screen ends up resting at the desired location.
Click	Means to quickly press and release the left or right mouse button (as instructed in the procedure). Make sure you do not move the mouse pointer while clicking a mouse button.
Double-click	Means to press and release the same mouse button two times quickly
Drag	This word means to point the arrow and then hold down the left or right mouse button (as instructed in the procedure) as you move the mouse to a new location. When you have moved the mouse pointer to the desired location, you can release the mouse button.

Chapter 1 **Introduction**

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Model 3124 ADSL2+ IpDSLAM Overview

The Model 3124 is a 1.5U high box-type IP DSLAM with a rack-mountable enclosure. The system provides 24/48 ADSL/2/2+ ports and is able to provide the broadband data communication services and multimedia services at the same copper line. The Model 3124 is capable of delivering very high speed data service; full-rate of ADSL2+ for 48 subscribers with 1 Gigabit uplinks. With advanced QoS features, Model 3124 is ideal for next generation broadband network to deliver rich video contents, DSL, POTS, and VoIP service over ADSL2+ link.

The Model 3124 provides one uplink ports with electrical Gigabit Ethernet (GbE) interfaces. It contains a fixed fan card and a dust filter. It is also suitable for small size application and can be easily deployed in remote location, for instance, remote terminal, business parks, street cabinets, etc... to extend the service reach distance.

Figure 1 shows the front panel view of the Model 3124.

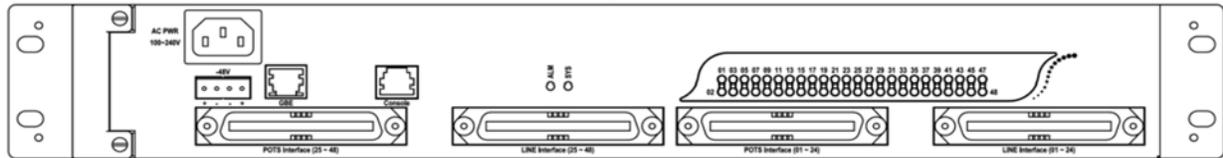


Figure 1. Model 3124 Front Panel

Features

- Highly compact solution that provides 24/48 ADSL/2/2+ only by 1.5U space and stackable for higher port density
- Equipped with fan and air filter, low power requirements plus full diagnostics and alarm reporting capability
- Standard-based with remote configuration and software upgrade that help service providers minimize daily operational costs
- Support multi-ADSL speed including ADSL, ADSL2, ADSL2+ via POTS/ISDN user interface
- Wide operating temperature range from -10°C ~ 65°C
- Provide one GBE trunk interface with electrical (RJ-45) port
- User-friendly CLI, web-based GUI, and EMS (NMS) through in-band channel for carrying out the OAM&P of the system
- Support system software download via FTP for both local and remote terminals
- Support database export and import functionality via TFTP for configuration backup and restoration
- Support SNTP to automatically calibrate the time and date of the system
- Support on board thermal sensor to detect over temperature conditions with software configurable thresholds that generate SNMP traps and syslog alarm entries
- Provide SSH (Secure Shell) for more secure remote operation
- Meet CE requirement

Application

The Model 3124 supports up to 48 ADSL/2/2+ lines per 1.5U box. Users can manage the system with CLI/SNMP/Web GUI via in-band management channel.

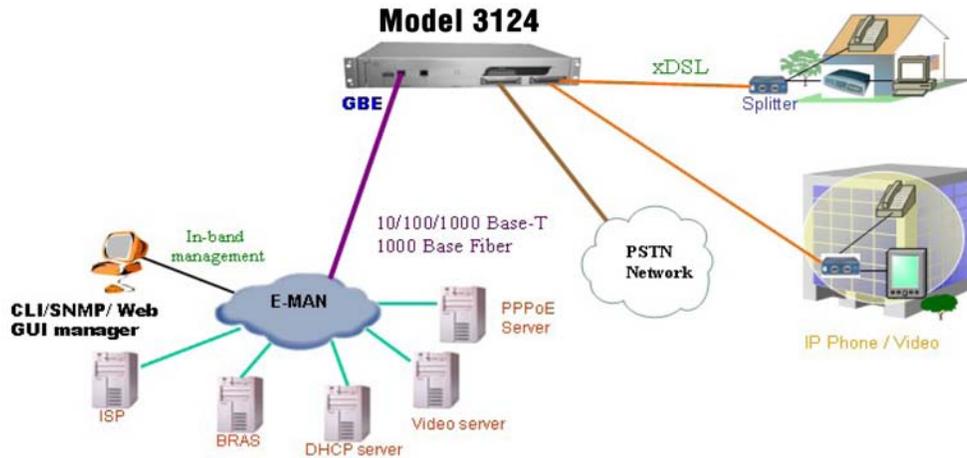


Figure 2. System application

Detailed Description of the Model 3124

Module Functional Block Diagram

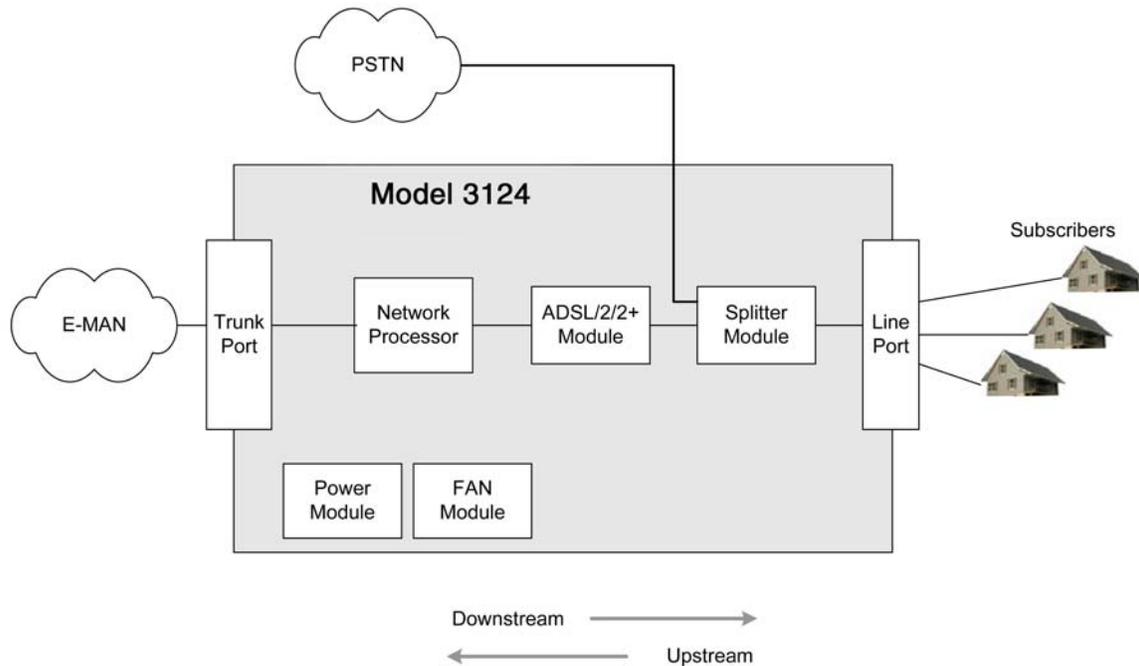


Figure 3. Model 3124 Module Functional Block Diagram

After the DSL module aggregate 24/48 ports DSL traffic into the network processor card, the network processor terminates the ATM traffic into Ethernet packets through its SAR (Segmentation and Reassembly) function. The network processor also provides the Layer-2 Ethernet functions; it can support the mapping between the ATM VCI and VLAN ID (802.1q) and priority queues (802.1p). The mapping functionality between ATM PVC and VLAN ID include one PVC to one VLAN ID and multiple PVCs to one VLAN ID. And these mappings can be configurable.

LEDs and Interfaces

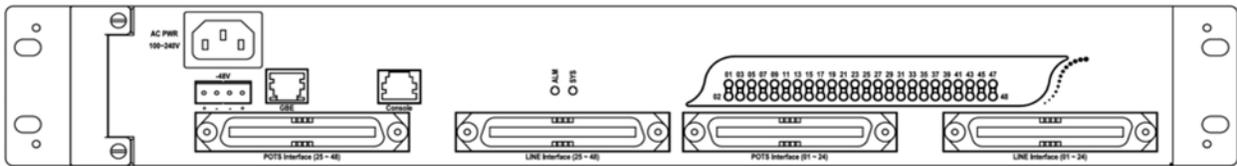


Figure 4. Model 3124 Front Panel

Table 3. Model 3124 LEDs

LED	Description
SYS	To indicate the system operation status
ALM	To indicate the system alarm status
GBE	To indicate the optical trunk port status
DSL Status	To indicate the DSL status for each DSL port.
GBE - Speed (LED on RJ-45)	To indicate the trunk port transmission speed (Orange color LED on the Ethernet port)
GBE - Link/Act (LED on RJ-45)	To indicate the trunk port data activity status (Green color LED on the Ethernet port)

Table 4. Model 3124 Interfaces

Interface	Description
GBE	Gigabit Ethernet electrical trunk port
Console	RS-232 port connected to the terminal for monitoring and controlling the system.
POTS	RJ-21 connector (50-pin dual row header) for connecting POTS lines.
LINE	RJ-21 connector (50-pin dual row header) for connecting DSL lines.

Cooling System

The cooling system of the Model 3124 consists of a fixed fan card and a swappable air filter. The fan card has four fans to blow air through the DSLAM for cooling. The air filter is for trapping air-bourn particulates. The filter is field-installable and filed- replaceable.

Features:

- Built-in 4 DC fans with error indicating signal for monitoring the status of fan module
- The fan will be turned on when system temperature is higher than T°C and will be turned off when system temperature is less than T-10°C (the temperature threshold T can be configured).

Chapter 2 **Hardware Installation**

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Pre-Installation

This section provides safety information to review before installing the Model 3124. The information includes required installation tools, safety requirements, and electrostatic discharge protection.

Tools and Test Equipment Requirements

To install and maintain the Model 3124, you should have the tools and test equipment listed in [table 5](#).

Table 5. Required Installation Tools and Materials

Item Required	Purpose
Anti-static wrist strap	Protect the Model 3124 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

Safety Requirement

To prevent possible serious injury, do not apply power to the Model 3124 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 Model 3124 system power.

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 Model 3124 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.

Hardware Installation

The hardware installation for the Model 3124 is simple and without complex hardware setting. However, it should be installed following the standard installation procedures. During installation, basic safety precautions 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.

Installation Overview

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

1. Mount the system into the desired location of a rack.
2. Connect to the DC power supply, and then check the voltage. Make sure the AC power is not connected before wiring the power cable and grounding.
3. Connect the cable between system and MDF.

After executing the previous procedures, please check the cable connection robustness and correctness before turning on the power supply.

4. Connect Console cable to COM port of a computer. Then, run the terminal program with the setting shown below in [table 6](#).

Table 6. Console Setting

Parameter	Setting
Baud Rate:	9600 bps
Data bit:	8 bit
Parity:	None
Stop bit:	1 bit
Flow Control:	None
Terminal Protocol:	VT100

Mounting the Model 3124

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 5](#) on page 14).

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.

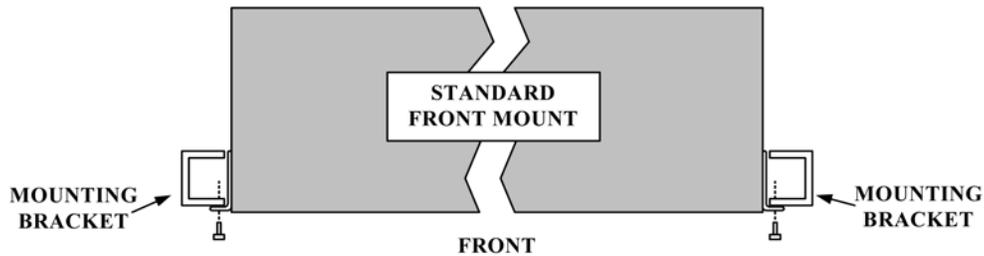


Figure 5. Mounting Bracket Orientation (Top View)

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. To mount the Model 3124:

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 1-2).

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.



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



Figure 6. Mounting Bracket Position for Standard Mount

Power and Ground Connections

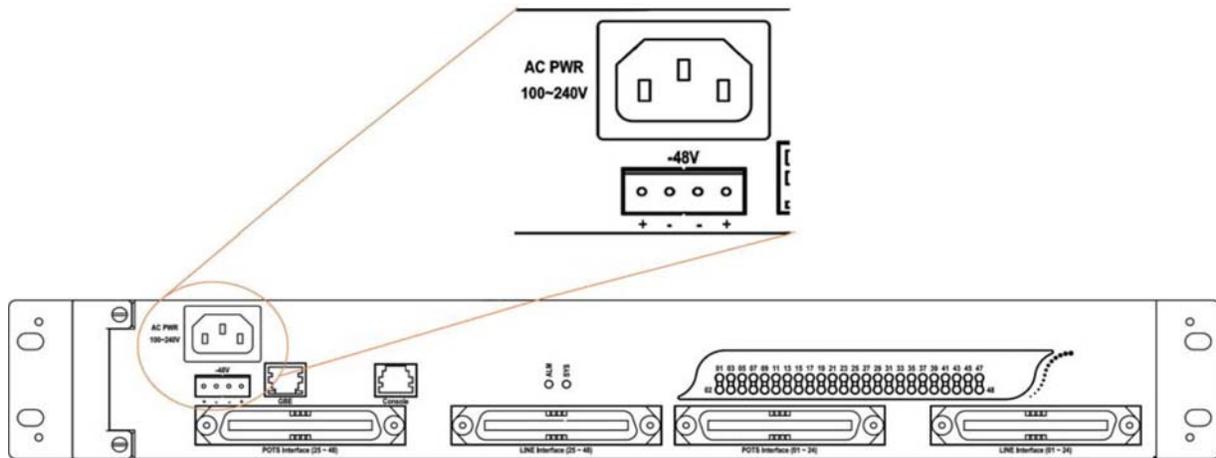


Figure 7. Model 3124 DC and AC Power Connections

DC Power Connection

The DC power interface is a 4-pin terminal block with polarity signs on the front panel of the DSLAM.

The Model 3124 can be powered from two -48V DC power supply. The DC power connector is a 4P terminal block; 2P is for accommodating one DC power input and other 2P is for accommodating another DC power input. 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: $-72\text{V} \sim -36\text{V}$ DC, and make sure that the polarity is correct.



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.

AC Power Connection (Option)

If your Model 3124 uses AC power, connect the AC power cord to the AC supply socket on the front panel of the DSLAM (refer to [Figure 7](#)), and plug the cord into the external power source. The voltage must be 100 to 240 VAC.

Ground Connection

This section provides the grounding rule for the Model 3124. 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 rear panel of the DSLAM, refer to Figure 1-4) 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 Model 3124 should be grounded by connecting a #14 or #12 AWG conductor between the grounding screw (on the rear panel of the DSLAM, refer to Figure 1-4) and the earth ground or main grounding bar. The resistance between the chassis and the grounding bar should be less than 25 Ohm.



Figure 8. Model 3124 grounding screw on the rear panel

Connecting the ADSLx and POTS interfaces

The Model 3124 supports 24/48 ADSLx subscribers per box. There are four RJ-21 50-pin female connectors on the front panel of the system. Two connectors are for the ADSL line and two connectors are for the POTS interface.

To connect the subscriber lines, use cables with the RJ-21 50-pin male connector. When installing, just plug the end of a cable with the RJ-21 50-pin male connector into the POTS or LINE interface female connector on the front panel. The other side of the cable is generally tied to the MDF.

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

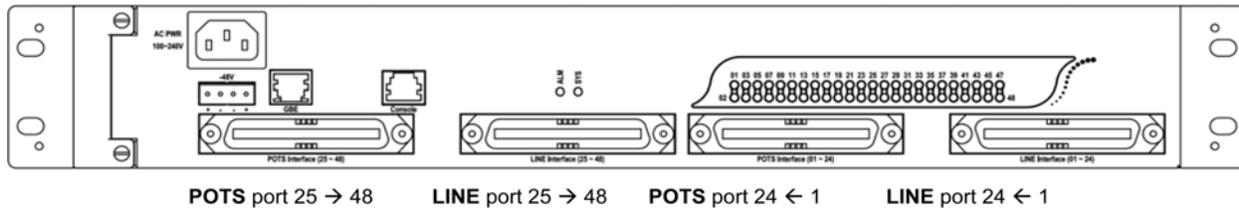


Figure 9. Model 3124 Line/POTS ports

The pin assignment of Line/POTS interface is illustrated below (the numbers in the connector figures below represent PIN numbers).

- **For Ports 1-24:**



Table 7. Ports 1-24 Pin Assignment

PIN	1	2	3	4	5	6	7	8	-	18	19	20	21	22	23	24	25
Port	Tip 1	Tip 2	Tip 3	Tip 4	Tip 5	Tip 6	Tip 7	Tip 8	-	Tip 18	Tip 19	Tip 20	Tip 21	Tip 22	Tip 23	Tip 24	X
PIN	26	27	28	29	30	31	32	33	-	43	44	45	46	47	48	49	50
Port	Ring 1	Ring 2	Ring 3	Ring 4	Ring 5	Ring 6	Ring 7	Ring 8	-	Ring 18	Ring 19	Ring 20	Ring 21	Ring 22	Ring 23	Ring 24	X

- **For Ports 25-48:**

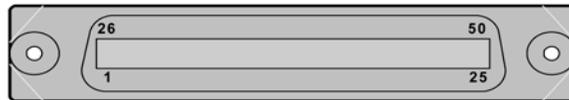


Table 8. Ports 25-48 Pin Assignment

PIN	1	2	3	4	5	6	7	8	-	18	19	20	21	22	23	24	25
Port	Tip 25	Tip 26	Tip 27	Tip 28	Tip 29	Tip 30	Tip 31	Tip 32	-	Tip 42	Tip 43	Tip 44	Tip 45	Tip 46	Tip 47	Tip 48	X
PIN	26	27	28	29	30	31	32	33	-	43	44	45	46	47	48	49	50
Port	Ring 25	Ring 26	Ring 27	Ring 28	Ring 29	Ring 30	Ring 31	Ring 32	-	Ring 42	Ring 43	Ring 44	Ring 45	Ring 46	Ring 47	Ring 48	X

Connecting the GBE trunk interface

The system provides one trunk interface that is an electrical RJ-45 port.

RJ-45 Electrical Trunk Port

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

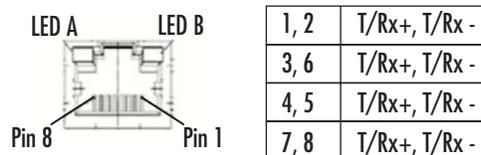


Figure 10. Trunk Port RJ-45 pin assignment

Console Port

The Console interface on the front panel is the main control interface of the Model 3124. Figure 11 shows the RJ45 connector pin assignment:

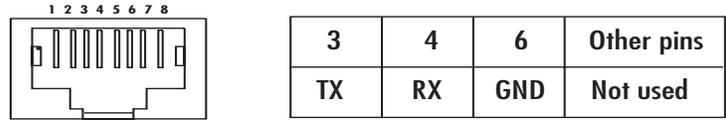


Figure 11. Console Port RJ-45 pin assignment

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 Console port of the DSLAM; the DB9 connector of the cable is connected to the PC COM port. The DTE relative pin assignment of the console cable is shown below:

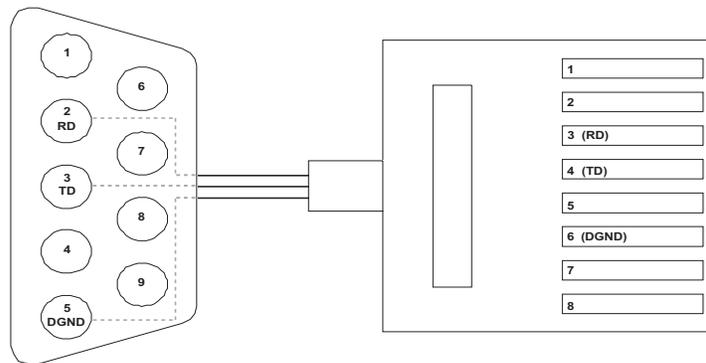


Figure 12. Pin assignment of Console Interface

Table 9. Pin Assignment of Console Cable

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

Chapter 3 **Configuration**

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Provisioning a Management IP Port

This section describes how to use CLI commands or Web GUI to provision an IP port for the Model 3124.

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

Before changing the system IP address, you can connect to the DSLAM via console port and type in the following CLI command to check current setting:

Command	Explanation
enable	Enter enable command mode.
show management all	Display all system management port IP settings.

CLI

Use the following commands to provision an IP port using the CLI:

Command	Explanation
enable	Enter enable command mode.
configure	Enter configure command mode.
management gbe <ipv4 address> [netmask <netmask>]	Set in-band management port IP setting.
management gbe vlan <vlan id>	Restrict incoming VLAN tag of in-band management. This setting is optional, not mandatory.
route default <ipv4 address>	Set IP address of the default gateway.
runningcfg write partition <number>	Save new setting to memory (partition).

Web GUI

Use the following commands to provision an IP port in the Web GUI:

1. On the menu tree, click on **System > Board Setup**. The Board Setup page displays.
2. Type in the new IP setting in the **GBE (In Band)** section for in-band IP provisioning.
3. Click on **Modify** to submit the modification.
4. Save the new setting to flash memory. On the menu tree, click on **Maintenance > Database**. The Database Configuration page displays.
5. Click on the **DB Config Select** drop-down list and select **Save Running Config to Flash**. Select write flash at Partition 1 or Partition 2. Then, click the **Write_Running** button. Wait for memory write success message.

Configuration Import/Export

The Model 3124 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 Model 3124 also provides the configuration export/import feature.

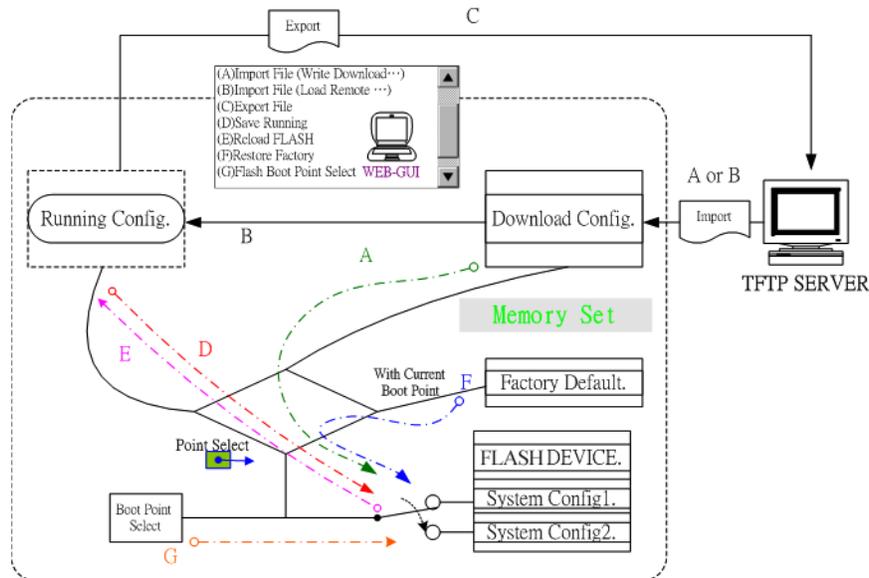


Figure 13. DB Configuration Concept

CLI

Suppose that TFTP Server IP address is 172.16.100.181 and configuration file name is 'testcfg':

A – Import file from TFTP Server to the Download Config and then write Download Config to the Flash (partition 1 or partition 2).

Example:

```
enable
configure
remotecfg login 172.16.100.181 get testcfg write partition <number>
```

B – Import file from TFTP Server to the Download Config and then load Download Config to the Running Config.

Example:

```
enable
configure
remotecfg login 172.16.100.181 get testcfg load
```

C – Export: export file from Running config to the TFTP server.

Example:

```
enable
configure
runningcfg login 172.16.100.181 put testcfg
```

D –Save Running config to the Flash (partition 1 or partition 2).

Example:

```
enable
configure
runningcfg write partition <number>
```

E –Reload Flash data to the Running config

Example:

```
enable
configure
runningcfg load partition <number>
```

F–Set system configuration (current boot point) to factory default value

Example:

```
enable
configure
restore-factory
```

G –Select Configuration Flash Boot Point

Example:

```
enable
configure
runningcfg active partition <number>
```

Web GUI

On the menu tree, click on **Maintenance > Database**. The Database Configuration page is displayed. Select the database configuration action you want to perform:

- “A – Import File (Write Download Config To Flash)” on page 23
- “B – Import File (Load Remote Config to Running Config)” on page 25
- “C – Export File (Put Running Config to Remote TFTP Server)” on page 26
- “D – Save Running Config to Flash (System Config)” on page 27
- “E – Reload FLASH to Running Config” on page 28
- “F – Restore Factory Default” on page 29
- “G – Flash Boot Point Configuration Select” on page 30

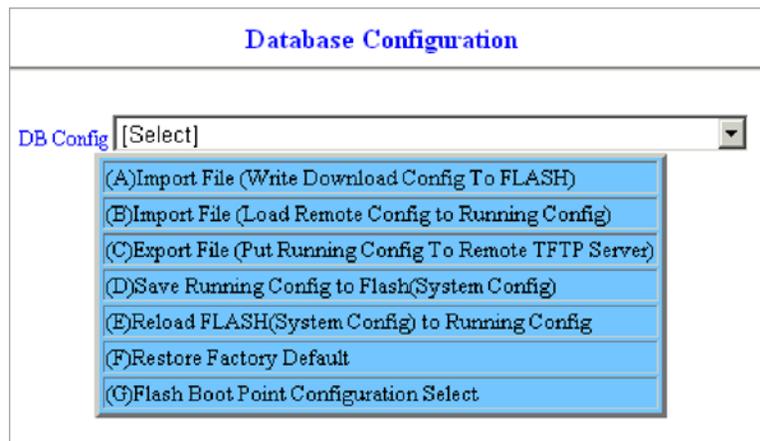


Figure 14. Database configuration menu in the Web GUI

A – Import File (Write Download Config To Flash)

Type in the TFTP Server IP address and the name of the file you want to download. Then click on **Get File** button.

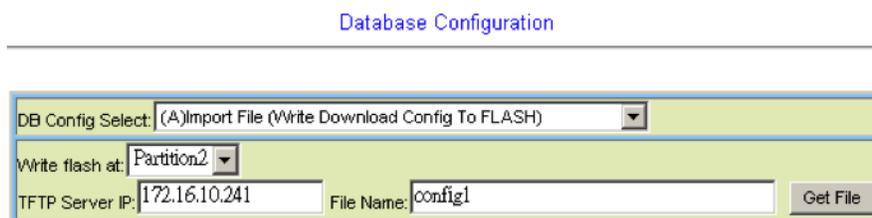


Figure 15. Write Download Config to Flash: Get File

Write downloaded Config to Flash in progress:

Database Configuration

DB Config Select: (A)Import File (Write Download Config To FLASH)	
Write flash at: Partition2	
TFTP Server IP: 172.16.10.241	File Name: config1 <input type="button" value="Get File"/>
Action Name	WRITE_DOWNLOAD
Action Status	MEMORY WRITE IN PROGRESS

Figure 16. Write Download Config to Flash: Write File

Write to memory successfully:

Database Configuration

DB Config Select: (A)Import File (Write Download Config To FLASH)	
Write flash at: Partition2	
TFTP Server IP: 172.16.10.241	File Name: config1 <input type="button" value="Get File"/>
Action Name	WRITE_DOWNLOAD
Action Status	MEMORY WRITE SUCCESS

Figure 17. Write Download Config to Flash: Write Successful

Fail to Get File:

DB Config Select: (A)Import File (Write Download Config To FLASH)	
Write flash at: Partition2	
TFTP Server IP: 172.16.10.28	File Name: config1 <input type="button" value="Get File"/>
Action Name	GET_LOCAL
Action Status	TFTP GET FAIL

Figure 18. Write Download Config to Flash: Fail to Get File

B – Import File (Load Remote Config to Running Config)

Type in the TFTP Server IP address and the name of the file you want to download. Then click on **Get File** button.

Database Configuration

DB Config Select: (B)Import File (Load Remote Config to Running Config) ▼		
TFTP Server IP: 172.16.10.241	File Name: config1	Get File

Figure 19. Load Remote Config to Running Config: Get File

Load to Running Config successfully:

Database Configuration

DB Config Select: (B)Import File (Load Remote Config to Running Config) ▼		
TFTP Server IP: 172.16.10.241	File Name: config1	Get File
Action Name	LOAD_REMOTE	
Action Status	MEMORY READ SUCCESS	

Figure 20. Load Remote Config to Running Config: Write Successful

Fail to Get File:

Database Configuration

DB Config Select: (B)Import File (Load Remote Config to Running Config) ▼		
TFTP Server IP: 172.16.10.28	File Name: config1	Get File
Action Name	GET_LOCAL	
Action Status	TFTP GET FAIL	

Figure 21. Load Remote Config to Running Config: Fail to Get File

C – Export File (Put Running Config to Remote TFTP Server)

Type in the TFTP Server IP address and the name of the file you want to export. Then click on **Put File** button.

Database Configuration

DB Config Select: (C)Export File (Put Running Config To Remote TFTP Server) ▼		
TFTP Server IP: 172.16.10.241	File Name: config1	Put File

Figure 22. Put Running Config to Remote TFTP Server: Put File

TFTP put file successfully:

Database Configuration

DB Config Select: (C)Export File (Put Running Config To Remote TFTP Server) ▼		
TFTP Server IP: 172.16.10.241	File Name: config1	Put File
Action Name	PUT_REMOTE	
Action Status	TFTP PUT SUCCESS	

Figure 23. Put Running Config to Remote TFTP Server: Put File Successful

TFTP put file fail:

Database Configuration

DB Config Select: (C)Export File (Put Running Config To Remote TFTP Server) ▼		
TFTP Server IP: 172.16.10.28	File Name: config1	Put File
Action Name	PUT_REMOTE	
Action Status	TFTP PUT FAIL	

Figure 24. Put Running Config to Remote TFTP Server: Put File Fail

D – Save Running Config to Flash (System Config)

Click on the drop-down list and select partition, and then click on **Write_Running** button to write running configuration to Flash.

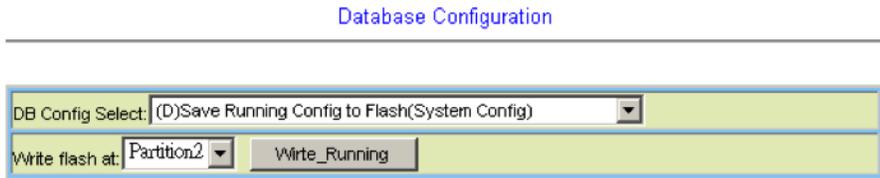


Figure 25. Save Running Config to Flash: Write Running Configuration

Write running config to Flash successfully:

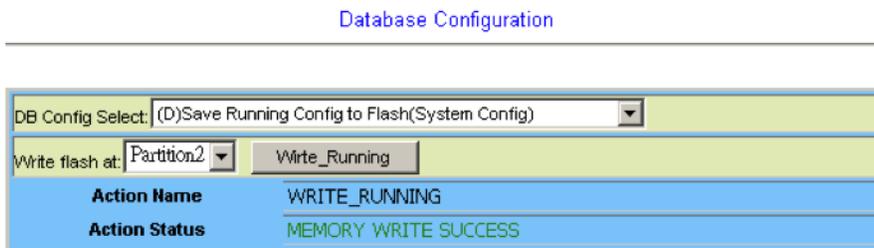


Figure 26. Save Running Config to Flash: Write Successful

E – Reload FLASH to Running Config

Click on the drop-down list and select partition, and then click on **LOAD_FLASH** button to load configuration from Flash to Running Config.

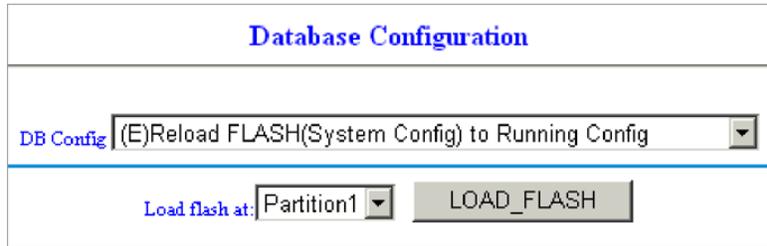


Figure 27. Load FLASH to Running Config: Load Configuration

Load configuration from FLASH to Running Config successfully:

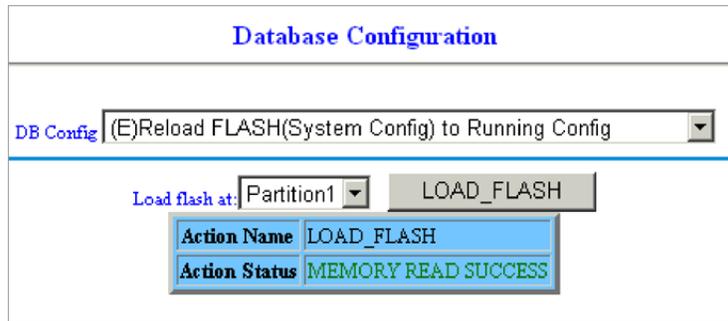


Figure 28. Load FLASH to Running Config: Load Configuration Successful

F – Restore Factory Default

Except out-band IP address and user account, all other configuration will be restored to factory default.

Click on **Factory_Default** button to restore factory default configuration.

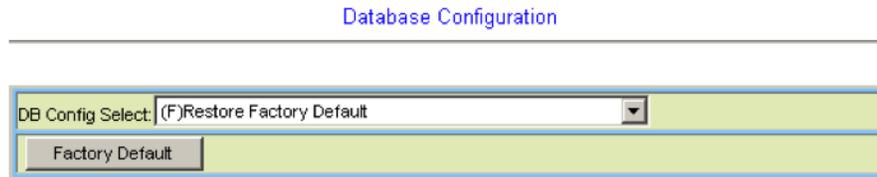


Figure 29. Restore Factory Default

After loading default configuration to Flash successfully, you must click on the RESTART button to restart the system.

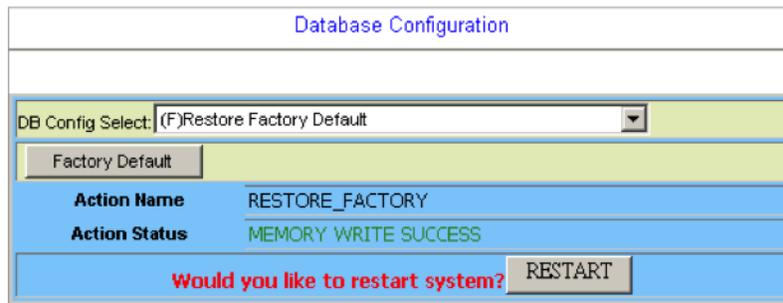


Figure 30. Restore Successful

G – Flash Boot Point Configuration Select

Click on the Boot Config drop-down list and select the partition (Partition1 or Partition2) as the boot point. Click on **Apply** and then restart the system. The system will restart and load the configuration in the partition you select into the running configuration.

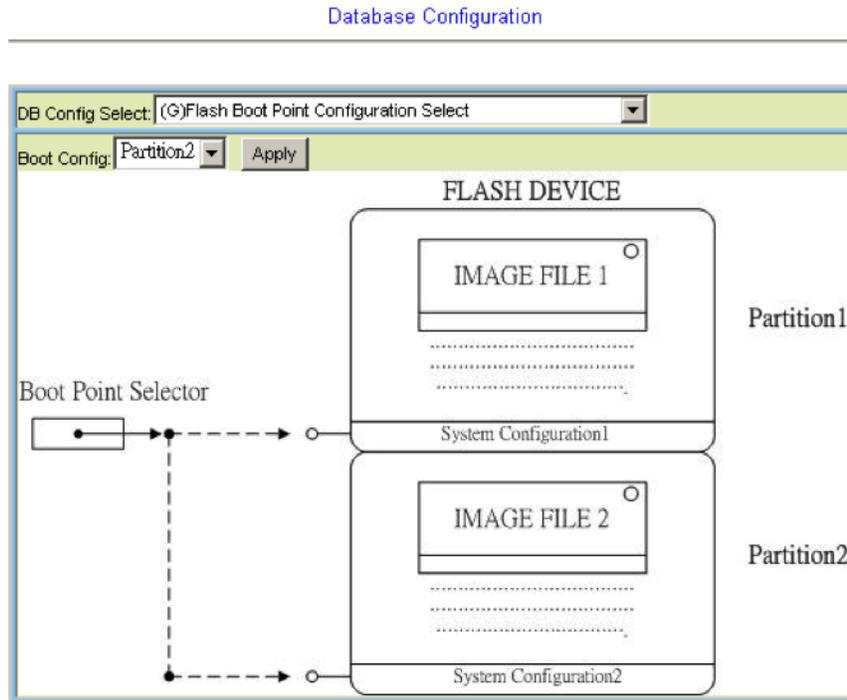


Figure 31. Flash Boot Point Configuration Select

Firmware Update

CLI

If you want to update firmware code, you must get the image file from FTP Server.

Suppose that the FTP Server IP address is 172.16.10.219 and the image filename is 'vmlinux_patton0.74B04'.

Example:

1. Enter the following commands in order to update the firmware for Model 3124.

Table 10. Firmware Update Procedure

Command	Purpose
enable	Enter enable mode.
configure	Enter configuration mode.
firmware login 172.16.100.219 username share password tg123	Login to update the firmware.
firmware upgrade vmlinux_patton0.74B04	Firmware upgrade may take a few minutes, don't turn off or reset the system during the process.
exit	Return to enable mode.
show firmware status	When status returns "Upgraded already!", you can restart the system to run new firmware image. Once you upgrade successfully, you can't upgrade the second time unless you have restarted the system.
show firmware partition	Show partition information.

```

Current Version:0.74B04
Partition  Version      Date      Status
-----
1           0.74B03      2007/10/12  --
2           0.74B04      2007/10/26  Active

```

Note The 'Active' status of the firmware partition information means the active partition for next time restart, not current running partition. You can see which partition by referring to the Current Version.

2. The Model 3124 provides two firmware memory partitions. If you want to change the firmware partition for booting, use the following commands (if you change to the non-active partition, system will restart immediately):

Command	Purpose
enable	Enter enable mode.
configure	Enter configuration mode.
firmware partition <number>	Select partition 1 or 2 for next power-on.

Web GUI

On the menu tree, click on **Maintenance > Firmware Update**. The Firmware Update page is displayed. Once you have entered all the necessary values, click on the **Firmware Update** button to start updating the firmware.

Firmware Update

Firmware Update			
Remote FTP Server IP	172 . 16 . 10 . 41 : 21		
Server User Name	[share]		
Server Password	[●●●●●]		
File Name	[vmlinux_patton0.74B04]		
Firmware Update Status	No Action[0]		
Firmware Partition Select	Partition 1		
Once system has 2 versions, an operator can use Partition Select from 1 to 2, vice versa. (e.g)Partition changes from version A.a to version B.b			
Partition Location	Version	Build Date	Status
Partition:1	0.74B04	2007/10/26	Active
Partition:2	0.74B03	2007/10/12	----
Current Version	0.74B04		
1.[Warning]Upgrading firmware may take a few minutes, please don't turn off or reset the system.			
2.Once the system has upgraded already, please restart it!			

Figure 32. Firmware update no action

Enter the following parameters:

- **Firmware Update:** Once you have typed in the parameter values, click on this button to start firmware update.
- **Remote FTP Server IP:** Type in the IP address of the FTP server.
- **Server User Name:** Type in the ftp user name.
- **Server Password:** Type in the ftp password.
- **File Name:** Type in the firmware filename.
- **Firmware Update Status:** This field shows current status of firmware update process.
- **Firmware Partition Select:** Choose a firmware memory partition (Partition 1 or 2). If you change to the other partition (not current partition), the system will restart immediately.

FTP Get In Progress

The following message is displayed during getting file from FTP server.

```
incoming cluster id 0
FTP SERVER IP=172.16.10.41
Waiting for FTP Session (about 30 sec..)
```

Firmware Write In Progress

The Flash Write process may take a few minutes. **You must not turn off or reset the system during the process.**

Firmware Write Successful

When the Flash Write process has completed successfully, the Firmware Update Status shows “Firmware has upgraded already”. You can now restart the system.

Software Configuration Overview

Note For more detailed software configuration instructions, refer to the *Model 3124 Administrator’s Reference Guide* available online at www.patton.com/manuals/3124-arg.pdf and the *Model 3124 Command Line Reference Guide* available online at www.patton.com/manuals/3124-cli.pdf.

The software architecture of the Model 3124 is shown in the figure below. It can be divided into three layers: the management layer, the OAM&P layer, and the firmware layer.

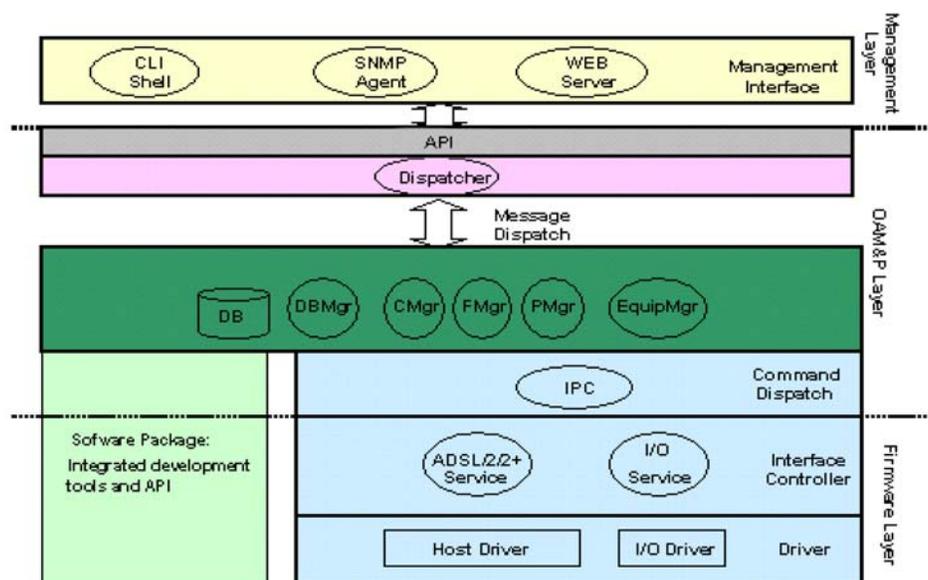


Figure 33. Management Software Model

As in the figure, CLI shell, SNMP agent, and WEB server are in the top-most layer (management layer) of the system software and offering OAM&P function of the DSLAM based on the conceptual management features as follows:

- Configuration Management
- Performance Management
- Fault Management

The Model 3124 uses flash memory as the database (DB) to store system configuration parameters. The firmware layer includes ADSL drivers, Memory and I/O control, etc.

Features of the Management Interface include:

- Support CLI, SNMP (v1, v2c), and web-based GUI management interface through in-band channels
- Support up to 10 CLI sessions at the same time
- The in-band management connection of the system is the highest priority of all supported in-band traffic categories
- Support Telnet interface for remote operators to login system operating console
- Support up to 32 configurable SNMP trap destinations and allow the SNMP traps to be sent to any specified SNMP aware device, for instance, Network management center

Configuration Management

The configuration management contains the following aspects:

- System Setup, such as setup for management IP address/net mask, GBE interface (including to enable/disable and query the administrative/operational status of the trunk port), line port (including to enable/disable/reset ADSL port, query the administrative/operational status of the port, and bind profiles on a per port basis), CLI session and timeout, Cluster, SNTP, IP routes, and user administration (including login authorization and provides three security levels).
- Bridge Configuration (refer to “[Bridge Configuration](#)” on page 34)
- ADSL Configuration (see “refer to “[ADSL Configuration](#)” on page 35)
- ATM traffic management
- SNMP setup

The configuration management provides detecting and reporting to the operators through SNMP Trap for all memory updates reflecting changes in the system configuration. It also provides logging the changes in the operational state and making this information available (on-demand) to the operators over the operation interface. The system contains a database (DB) to store all the provisioning data so that the configuration can be restored in re-booting. Authorized operators can query the DB to obtain configuration data.

Bridge Configuration

The bridge configuration of the Model 3124 includes the following aspects:

- Interface setup
- VLAN configuration: static VLAN, protocol based VLAN, VLAN translation, and IP/MAC anti-spoofing.
- Access Control: Filtering, VLAN priority remark, rate limit, and priority queue mapping.
- Forwarding database
- DSL Line Identify
- IGMP configuration
- IPoA configuration

ADSL Configuration

Configuration for an ADSLx user port is provisioned by the parameter set, which is a group of attributes that determine the user port behaviors; and we call it as a profile. The Model 3124 provides a profile-based provisioning per the definition of ITUT G997.1 and RFC 2662 for ADSL line configuration data and a mechanism to associate the ADSL port to these profiles. One or more ADSL lines may be configured to share parameters of a single profile.

The ADSL profiles of Model 3124 include:

- **Service Profile**
The parameters include Rate adaptive mode selection, Min/max/planned bit rate, Interleaving Max delay, and Minimum impulse noise protection.
- **Spectrum Profile**
The parameters include the Power management setting, Min/max/target noise margin, allowed ADSL modes of operation, Carrier mask, RFI band data, Maximum nominal aggregate transmit power, Maximum PSD level, PSD shape (for ADSL2+), Power back off initiation, and Maximum aggregate receive power.
- **TCA Profile**
The parameters include ESs, SESs, UASs for interval and day PM, and LOS, LOF, LOPWR, LOL, Error Frame for interval PM only.

The system provides up to 120 Service profiles and Spectrum profiles respectively, and provides up to 16 TCA profiles. One of the profiles is a fix default that cannot be modified; users are allowed to create, and edit the other profiles. Each profile contains a parameter set for downstream and upstream direction respectively. Users can also observe the actual values of these parameters through CLI, Web-GUI, or EMS.

The ADSL configuration also includes the function for user to query the line status, the physical layer status, and the channel interface status for ATU-C and ATU-R. The status information includes the attenuation rate, actual net data rate, the line attenuation, SNR margin, transmission power, actual interleaving delay, channel characteristics per subcarrier, quiet line noise PSD, ...etc.

Performance Management

Performance management supports performance monitoring by collecting and thresholding performance parameter counters against 15-minute intervals for each interface and module respectively. Users can query the data of these parameters through CLI, Web-GUI, or EMS.

Performance statistics include the following:

1. Statistics for current interval:
A real-time aspect contains the reflection of the current value situation before the new interval. The current value includes values of current 15-min interval and current 1-day interval.
2. Statistics history at 15-minute basis:
The system stores previous 96 statistics of PM parameters at 15-min interval for retrieving.
3. Statistics history at 1-day basis:
The system stores previous 1 statistics of PM parameters at 1-day interval for retrieving.

Most of the performance parameter thresholds are user-programmable. The Model 3124 uses a threshold crossing alert (TCA) to notify the management system when one of the counts during a measurement interval exceeds its threshold.

The TCA contains the following information:

- Specific interface involved
- Error condition identifying the measurement type
- Value of the parameter
- Occurrence date and time of the event

The performance management also provides the traffic counter including transmitted packets, error packets and discarded packets for each interface (network and subscriber interface) and ATM cell counter in both transmit and receive direction. Users can observe these data through CLI, Web-GUI, or EMS.

ADSL Performance Management Statistics

The Model 3124 provides the following ADSL PM statistics:

Table 11. ADSL PM Statistics

Item	Description
ATUC_LOS	Loss of signal count
ATUC_LOF	Loss of frame count
ATUC_LOM	Loss of margin count
ATUC_LOL	Loss of link count
ATUC_ES	Errored Seconds
ATUC_SES	Severely Errored Seconds
ATUC_UAS	Unavailable Seconds
ATUC_RelnitCounter	The number of times the modem left showtime and tried to re-initialize the line because of detection of a persistent defect
ATUC_FailedInitCounter	The number of times the modem tries to initialize the line but fails.
ATUC_CU	User Total Cell Count
ATUC_CD	Delineated Total Cell Count
ATUC_HEC	ATM Header Error Count
ATUC_IBE	Idle Cell Bit Error Count
ATUC_CVS	The counter associated with the number of Coding Violations encountered by the channel.
ATUC_FECCS	The counter associated with the number of corrected codewords encountered by the channel.
ATUR_LOS	Far End Loss of signal count
ATUR_LOF	Far End Loss of frame count
ATUR_LOM	Far End Loss of margin count
ATUR_LPR	Far End Loss of power count
ATUR_ES	Far End Errored Seconds
ATUR_SES	Far End Severely Errored Seconds
ATUR_UAS	Far End Unavailable Seconds
ATUR_HEC	Far End ATM Header Error Count
ATUR_IBE	Far End Idle Cell Bit Error Count

Table 11. ADSL PM Statistics

Item	Description
ATUR_CVS	The far end counter associated with the number of Coding Violations encountered by the channel.
ATUR_FECCS	The far end counter associated with the number of corrected code words encountered by the channel.

The Model 3124 provides the following ADSL PM thresholds:

Table 12. ADSL PM Thresholds

NE Threshold	FE Threshold
15 min ES threshold	15 min ES threshold
15 min SES threshold	15 min SES threshold
15 min UAS threshold	15 min UAS threshold
15 min LOS threshold	15 min LOS threshold
15 min LOF threshold	Not supported
Not supported	15 min LOPWR threshold
15 min LOL threshold	Not supported
15 min ErrFrm threshold	15 min ErrFrm threshold
24 hour ES threshold	24 hour ES threshold
24 hour SES threshold	24 hour SES threshold
24 hour UAS threshold	24 hour UAS threshold

Remote Network Monitoring (RMON) Feature

The Model 3124 supports performance statistics defined in RMON MIB groups 1 (Ethernet statistics), 2 (history control), 3 (Ethernet history), 4 (alarm), 5 (event), and 6 (log) per RFC 2819 for all network uplink 10/100/1000 ports. The supported parameters are as follows:

Table 13. RMON ETH Statistics Variables

Variable	Description
Rx DropEvents	Monitoring rx dropped packets
Rx Bytes	Monitoring rx bytes packets
Rx Packet	Monitoring rx packets
Rx BroadcastPkts	Monitoring rx broadcast packets
Rx MulticastPkts	Monitoring rx multicast packets
Rx CRC Align Errors	Monitoring rx error alignment packets
Rx Undersize Pkts	Monitoring rx undersize packets
Rx Oversize Pkts	Monitoring rx oversize packets
Rx Fragments	Monitoring rx fragments packets
Rx Jabbers	Monitoring rx jabber packets
Tx Collisions	Monitoring tx single collision packets
Tx/Rx Pkts 64bytes	Monitoring tx/rx 64 bytes

Table 13. RMON ETH Statistics Variables

Variable	Description
Tx/Rx Pkts 65~127bytes	Monitoring tx/rx 65 to 127 bytes
Tx/Rx Pkts 128~255bytes	Monitoring tx/rx 128 to 255 bytes
Tx/Rx Pkts 256~511bytes	Monitoring tx/rx 256 to 511 bytes
Tx/Rx Pkts 512~1023bytes	Monitoring tx/rx 512 to 1023 bytes
Tx/Rx Pkts 1024~1518bytes	Monitoring tx/rx 1024 to 1518 bytes
Tx Bytes	Monitoring tx bytes packets
Tx Packet	Monitoring tx packets
Tx MulticastPkts	Monitoring tx multicast packets
Tx BroadcastPkts	Monitoring tx broadcast packets

Table 14. RMON ETH History Control Variables

Variable	Description
HistoryDropEvents	Monitoring rx dropped packets
Historybytes	Monitoring rx bytes packets
HistoryPackets	Monitoring rx packets
HistoryBroadcastPkts	Monitoring rx broadcast packets
HistoryMulticastPkts	Monitoring rx multicast packets
HistoryCRCAlignErrors	Monitoring rx error alignment packets
HistoryUndersizePkts	Monitoring rx undersize packets
HistoryOversizePkts	Monitoring rx oversize packets
HistoryFragments	Monitoring rx fragments packets
HistoryJabbers	Monitoring rx jabber packets
HistoryCollisions	Monitoring tx single collision packets
HistoryTxBytes	Monitoring tx bytes
HistoryTxPackets	Monitoring tx packets
HistoryTxMulticast	Monitoring tx multicast
HistoryTxBroadcast	Monitoring tx broadcast
HistoryUtilization	Monitoring tx Utilization

Fault Management

Fault management is conceptually partitioned into two levels: the system top level, and interface-specific level. Both levels are alarm-level configurable and can be Major and Minor. All the alarms are mask-able.

Fault management provides the alarm output through hardware output interface (on the system front panel) and visible indicator (LED). The alarm/status indications are automatically generated as a result of certain events/conditions. The Model 3124 supports query of all current alarm status. It is also able to keep 256 records of historical alarms and events respectively.

The Model 3124 provides the ability to group alarms in a hierarchical alarm presentation scheme. Alarms of the same rank can exist at the same time. A lower-ranking alarm will be demoted if a higher-ranking alarm is raised for the same object. For example, if a far-end LOS is raised on a circuit and then a far-end LPR is raised on the circuit, the LPR alarm stands and the LOS closes. The alarm hierarchy used in the Model 3124 system is shown in the following table:

Table 15. Model 3124 Alarm Hierarchy

Priority	Alarm Type
Highest	all activation failures (ADSL_COMMF_FE or ADSL_NOPEER_FE)
—	far-end LPR
—	near-end LOS or far-end LOS
Lowest	near-end LOF or far-end LOF (near-end and far-end are independent; for example, FE-LOS does not restrain NE-LOF)

Note LOM, LCD, and NCD are not included in the alarm hierarchy; they're treated independently.

Note The PM counters LPR, LOS, and LOF follow the alarm hierarchy rule. When these alarms exist at the same time, only the PM counter of a higher-ranking alarm will count (the PM counters of other lower-ranking alarms will not).

System Alarms

The Model 3124 provides the following System alarms:

- Fan Failure Alarm
- Above Temperature
- Below Temperature
- Self-test Fail
- DSP Fail - you can see which DSP chip is fail from the user interface (Web GUI, CLI, etc.). There is a number 1 ~ 4 in the alarm message/description corresponding to the DSP chip 1 ~ chip 4

ADSL Alarms

The Model 3124 provides the following ADSL alarms:

- LOS (Loss of Signal) -Near End/Far End
- LOF (Loss of Frame) -Near End/Far End
- LOM (Loss of Margin) -Near End/Far End
- LCD (Loss of Cell Delineation) -Near End/Far End
- NCD (No Cell Delineation) -Near End/Far End
- LOPWR (Loss of Power) -Far End
- COMMF: Unable to communicate with peer modem -Far End
- NOPEER: No peer present – Far End

Loopback Testing

The Model 3124 supports ATM and ADSL loop diagnostics.

- **ATM:**

The system provides F5 end-to-end or segment loopback.

- **ADSL:**

The system provides Dual Ended Loop Testing (DELT) for each ADSL line on a per port basis, according to the definition per section 8.12.3 of ITUT G992.3.

The following test parameters are supported:

- Channel Characteristics Function $H(f)$ per subcarrier (CCF-ps),
- Quiet Line Noise PSD $QLN(f)$ per subcarrier (QLN-ps),
- Signal-to-Noise Ratio $SNR(f)$ per subcarrier (SNR-ps),
- Line Attenuation (LATN),
- Signal Attenuation (SATN),
- Signal-to-Noise Ratio Margin (SNRM),
- Attainable Net Data Rate (ATTNDR),
- Far-end Actual Aggregate Transmit Power (ACTATP),
- Near-End Actual Aggregate Transmit Power (ACTATP).

Cluster Feature

The Model 3124 supports Cluster feature that can make a group of NEs (network elements) work together as a single NE from the management point of view. Operators can manage the NEs in a cluster, called cluster nodes, via the same single IP address in terms of CLI, Web-based GUI or SNMP based management interfaces. The Model 3124 currently provides cluster feature that a cluster can include up to four cluster members (NEs). There are one Master and the other members are all Slaves in a cluster. The Master works as a gateway of the Slaves, and it also can forward CLI/Web/SNMP commands to the destination Slave. The Slaves can execute the commands and respond to the Master.

It uses star topology for conducting a Clustering Management group.

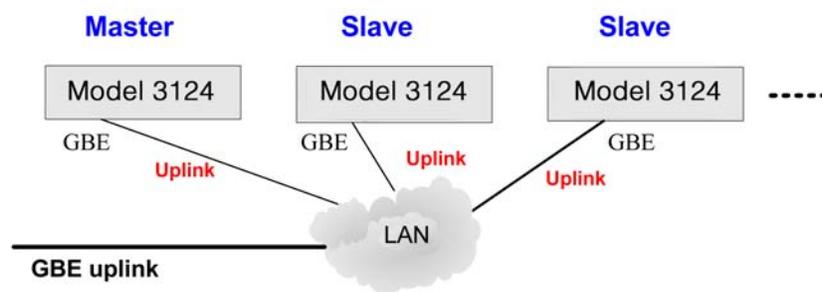


Figure 34. Cluster network topology - Star

Before you group a Master and a Slave IPDSLAM, some parameters need to be well configured:

1. Cluster domain name: The group name for a cluster must be the same on Master and Slave.
2. Cluster IP address: IP address to be used for remote management when Master and Slave are grouped together.
3. NE cluster name: A name to identify Master or Slave.
4. Set private IP address on in-band port for both Master and Slave IPDSLAM. The private IP is used for communication between Master and Slave. The management center actually uses Cluster IP address for remote management.
5. Master and Slave need to be configured with same management VLAN.
6. The default gateway should be configured to the router that is aware how to route management traffic to Management Center of the management network. The setting of Cluster default gateway should be the same between Master and Slave.

Chapter 4 **Operation and Maintenance**

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Maintenance Requirement

Tools and Equipment Requirements

table 16 lists required tools and test equipment for the Model 3124 system maintenance.

Table 16. 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

System Spares

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

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 Model 3124 system sites are normally unattended, however, technicians should be dispatched when needed. The Model 3124 system maintenance efforts and monitor the system for alarms during those on-site operations.

Electrostatic Discharge Protection

The Model 3124 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.

Routine Maintenance

Always monitor the Model 3124 system performance at the central office/ remote sites using the SNMP. It allows users to view the current system status, alarm information and to take the necessary corrective action if a problem is reported.

Also keep each Model 3124 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: -10°C to 60°C and 0% to 95% humidity at 35°C

Powering the Model 3124 Up or Down

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

Powering Up the DSLAM

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. If you use AC power, ensure the AC power is being supply.
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 “Resolving Problems Indicated Through LEDs” on page 48 for information on how to resolve problems indicated through LEDs.

Powering Down the DSLAM



Powering down the DSLAM stops DSL service to subscribers. POTS service is not affected.

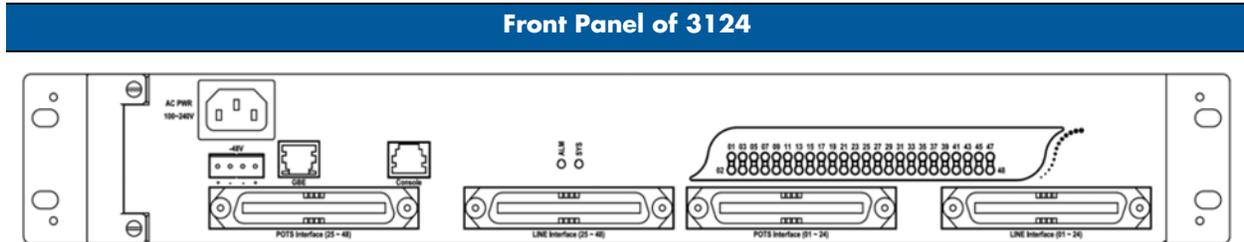
1. Put on the antistatic wrist strap and connect it to a grounding point.
2. Disconnect the AC power cord from the AC supply socket on the front panel.

Controls and LED Indication

The Model 3124 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.

3124 LEDs and Interfaces

Table 17. 3124 Controls and LED Indication



LED	Color	Indication/Condition
SYS	Yellow	At power on phase
	Red	Self-test fail
	Green	Normal Operation
ALM	Yellow	At power on phase
	Red	Major alarm set
	Red - Flash	Major and Minor alarm set
	Yellow	Minor alarm set
	Green	Normal Operation
DSL Status	Green	Port is activated and linked
	Green - Flash	Port is activated but not linked
	Off	Disabled
GBE - Speed* (LED B on RJ-45)	Orange	100 / 1000 Mbps
	Off	10 Mbps
GBE - Link/Act* (LED A on RJ-45)	Green	Active
	Green - Flash	Inactive
	Off	Data Tx/Rx
Interface	Description	
GBE	Gigabit Ethernet electrical trunk port 1	
Console	RS-232 port connected to the terminal for monitoring and controlling the system.	
POTS	RJ-21 connector (50-pin dual row header) for connecting POTS lines.	
LINE	RJ-21 connector (50-pin dual row header) for connecting DSL lines.	

Replacing the Air Filter

This section provides procedures on how to replace the air filter (replace every three months).

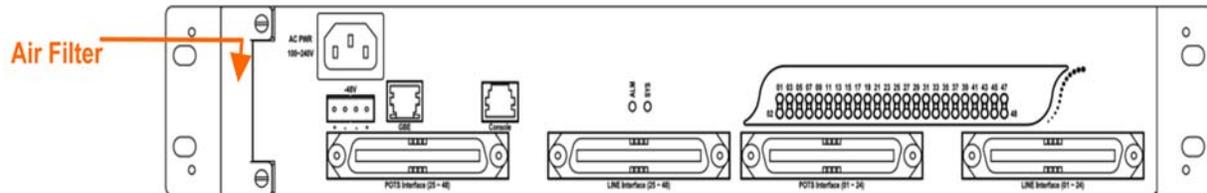


Figure 35. Model 3124 Air Filter Location

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.

Chapter 5 **Troubleshooting**

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Introduction

This chapter describes instructions for the Model 3124 system problems. These procedures may require the presence of technicians at remote Model 3124 system sites and plus an operator at PC to monitor system alarms by console or EMS during maintenance.

Resolving Problems Indicated Through LEDs

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

Table 18. 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 “ Procedures for Troubleshooting the Model 3124 ” on page 48).
	Red	Self-test failed. There is a functional problem with the system.	Replace the Model 3124.
ALM	Red	Major alarm set	See “ Resolving Problems Indicated Through Alarms ” on page 48
	Red - Flash	Major and Minor alarm set	See “ Resolving Problems Indicated Through Alarms ” on page 48
	Yellow	Minor alarm set	See “ Resolving Problems Indicated Through Alarms ” on page 48

Resolving Problems Indicated Through Alarms

Alarms of the system are viewed through CLI, Web GUI, JG-3124, or EMS. If an alarm indicates a problem, refer to “[Procedures for Troubleshooting the Model 3124](#)” on page 48 for troubleshooting procedures.

Procedures for Troubleshooting the Model 3124

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. Refer to the list below for available troubleshooting procedures:

- “[Troubleshoot Model 3124 Power-Up Problems](#)” on page 49
- “[Troubleshoot ADSLx Service Problems](#)” on page 49
- “[Troubleshoot POTS Service Problems](#)” on page 49
- “[Subscriber Service Problems](#)” on page 50

Troubleshoot Model 3124 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

Procedure:

1. Check that the power cord is connected to the power socket on the front panel, and the other end of the cord is connected to a power outlet.
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 Model 3124.
4. Contact your provider.

Troubleshoot ADSLx Service Problems

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

Procedure:

1. If all subscribers connected to the DSLAM are affected, and the SYS LED on the front panel is not lit, check the both end of power cords:
 - if one of the power cords is not connected, power up the DSLAM by plugging the power cord to the power socket/power outlet.
 - if the power cords are both connected, see “[Troubleshoot Model 3124 Power-Up Problems](#)” on page 49 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. If only some subscribers are affected, identify the ports that have problems. Check that the subscribers are connected to the line interfaces properly.
4. Contact your provider.

Troubleshoot POTS Service Problems

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

Procedure:

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.

Subscriber Service Problems

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

Procedure:

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 ADSLx service.

If this step results in POTS service to the affected subscribers but there is still no ADSLx service to them, refer to “[Troubleshoot ADSLx Service Problems](#)” on page 49 to troubleshoot ADSLx service problems.

If this step results in ADSL service to the affected subscribers but there is still no POTS service to them, refer to “[Troubleshoot POTS Service Problems](#)” on page 49 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.

Chapter 6 **Contacting Patton for assistance**

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 - Out-of-warranty service 52
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 - Shipping instructions 53

Introduction

This chapter contains the following information:

- “Contact information”—describes how to contact PATTON technical support for assistance.
- “Warranty Service and Returned Merchandise Authorizations (RMAs)” —contains information about the RAS warranty and obtaining a return merchandise authorization (RMA).

Contact information

Patton Electronics offers a wide array of free technical services. If you have questions about any of our other products we recommend you begin your search for answers by using our technical knowledge base. Here, we have gathered together many of the more commonly asked questions and compiled them into a searchable database to help you quickly solve your problems.

- Online support—available at www.patton.com.
- E-mail support—e-mail sent to support@patton.com will be answered within 1 business day
- Telephone support—standard telephone support is available Monday through Friday, from 8:00 A.M. to 5:00 P.M. EST (8:00 to 17:00 UTC-5), Monday through Friday by calling +1 (301) 975-1007

Warranty Service and Returned Merchandise Authorizations (RMAs)

Patton Electronics is an ISO-9001 certified manufacturer and our products are carefully tested before shipment. All of our products are backed by a comprehensive warranty program.

Note If you purchased your equipment from a Patton Electronics reseller, ask your reseller how you should proceed with warranty service. It is often more convenient for you to work with your local reseller to obtain a replacement. Patton services our products no matter how you acquired them.

Warranty coverage

Our products are under warranty to be free from defects, and we will, at our option, repair or replace the product should it fail within one year from the first date of shipment. Our warranty is limited to defects in workmanship or materials, and does not cover customer damage, lightning or power surge damage, abuse, or unauthorized modification.

Out-of-warranty service

Patton services what we sell, no matter how you acquired it, including malfunctioning products that are no longer under warranty. Our products have a flat fee for repairs. Units damaged by lightning or other catastrophes may require replacement.

Returns for credit

Customer satisfaction is important to us, therefore any product may be returned with authorization within 30 days from the shipment date for a full credit of the purchase price. If you have ordered the wrong equipment or you are dissatisfied in any way, please contact us to request an RMA number to accept your return. Patton is not responsible for equipment returned without a Return Authorization.

Return for credit policy

- Less than 30 days: No Charge. Your credit will be issued upon receipt and inspection of the equipment.
- 30 to 60 days: We will add a 20% restocking charge (crediting your account with 80% of the purchase price).
- Over 60 days: Products will be accepted for repairs only.

RMA numbers

RMA numbers are required for all product returns. You can obtain an RMA by doing one of the following:

- Completing a request on the RMA Request page in the *Support* section at www.patton.com
- By calling +1 (301) 975-1000 and speaking to a Technical Support Engineer
- By sending an e-mail to returns@patton.com

All returned units must have the RMA number clearly visible on the outside of the shipping container. Please use the original packing material that the device came in or pack the unit securely to avoid damage during shipping.

Shipping instructions

The RMA number should be clearly visible on the address label. Our shipping address is as follows:

Patton Electronics Company

RMA#: xxxx

7622 Rickenbacker Dr.

Gaithersburg, MD 20879-4773 USA

Patton will ship the equipment back to you in the same manner you ship it to us. Patton will pay the return shipping costs.

Appendix A **Compliance information**

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Compliance

EMC

- FCC Part 15, Class A
- EN55022, Class A
- EN55024

Low-Voltage Directive (Safety)

- IEC/EN60950-1, 2nd edition

PSTN Regulatory

- This device is not intended nor approved for connection to the PSTN

Radio and TV Interference (FCC Part 15)

This device generates and uses radio frequency energy, and if not installed and used properly—that is, in strict accordance with the manufacturer’s instructions—may cause interference to radio and television reception. The device has been tested and found to comply with the limits for a Class A computing device in accordance with specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the device does cause interference to radio or television reception, which can be determined by disconnecting the unit, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

CE Declaration of Conformity

Patton Electronics, Inc declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The Declaration of Conformity may be obtained from Patton Electronics, Inc at www.patton.com/certifications.

The safety advice in the documentation accompanying this device shall be obeyed. The conformity to the above directive is indicated by CE mark on the device.

Authorized European Representative

D R M Green

European Compliance Services Limited.

Avalon House, Marcham Road

Abingdon,

Oxon OX14 1UD, UK

Appendix B **Specifications**

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Physical Specifications

Table 19. Physical Specifications

Item	Value
Width	431.8 mm (17 in.) not including the mounting brackets
Height	66 mm (1.5U)
Depth	275 mm
Weight	4.3 Kg
Rack	Standard rack (19" or 23")

Environmental Specifications

Table 20. Environmental Specifications

Item	Value
Operating Temperature	-10 ~ 65°C
Relative Humidity	5% to 95% (non-condensing) at 35°C

Power Specifications

Table 21. Power Specifications

Item	Value
Power Supply Interface	DC: Dual A+B feeds, -72V ~ -36V, nominal – 48V. AC (optional): 100 ~ 240V/50 ~ 60Hz.
Power Consumption	Full load 48 ports: 96 W per system Full load 24 ports: 60 W per system

Trunk Interface

- Support IEEE 802.1X authentication for trunk interface.
- Support RJ45 connectors for uplink port.
- Electrical interface:
 - Support IEEE 802.3 10/100/1000 Base-T auto-sensing GbE.
 - Support auto-adaptive between full-duplex and half-duplex operation modes for 10 and 100 Mbps operation speed on a per trunk port basis. The system only supports full-duplex mode for 1000 Mbps.

Line Interface

- Support a total of 24/48 subscriber lines and provisioning of the operation modes (ADSL/2/2+) on a per port basis.
- Support ADSL operation modes that comply with ANSI T1.413, G.992.1 Annex A (POTS) and B (ISDN), and G.992.2 G.lite.
- Support ADSL2 operation modes that comply with G.992.3 Annex A (POTS) and B (ISDN) respectively.
- Support ADSL2+ operation modes that comply with G.992.5 Annex A (POTS), B (ISDN), L (REDSL2+), and M (extended upstream bandwidth over POTS) respectively.
- Support data rate:
 - up to 25 Mbit/s downstream, 1.5 Mbit/s upstream (G.992.5),
 - up to 3 Mbit/s upstream (Annex M), at integer multiples of 4 kbit/s for ADSL/ADSL2 and 8 kbit/s for ADSL2+.
- Handshake procedure of each DMT ATU-C ADSLx circuit complies with ITU-T G.994.1.
- Support EOC and Overhead Channel Access defined in ITU-T G.992.5 and G.997.1
- Support ATM Transmission Convergence function defined in ITU-T G.992.5 Annex K
- Spectral Mask of transmitter signal complies with the PSD specified in ITU-T G.992.5 Annex A
- Support capability for the controllable spectrum bound defined in ITU-T G.992.5
- Support latency path function as defined in ITU-T G.992.5
- Support the capability of selectable pilot subcarrier for downstream direction specified in ITU-T G.992.5
- Physical layer management of each DMT xDSL circuit complies with ITU-T G.997.1.
- DMT xDSL subscriber interfaces support the following functions:
 - Upstream and downstream non-overlapped mode
 - Scrambling functionality
 - FEC functionality
 - Trellis coding
 - Bit-swap

- Interleaving selection
- Support rate adaptation modes defined in ITU-T G.992.5 and G.997.1 including Manual, Rate Adaptive At Init, and Dynamic Rate Adaptation modes
- Support Seamless Rate Adaptation (SRA) to on-line reconfigure the total data rate according to the line condition
- The subscriber interface is able to support Fast Channel or Interleaved Channel independently for each ADSL port.
- Support loop diagnostic function specified in ITU-T G.992.5 for each ADSL port independently (support DELT loop diagnostics).
- Support detection of Dying Gasp message from ADSL CPE.
- Support power management link states (L0, L2, L3) defined in ITU-T G.992.5
- For power management, the transitions between L0 and L2 in downstream is on conditions according to the control parameters specified in ITU-T G.992.5 and G.997.1

POTS Splitter Module

- Compliant with ETSI TS 101 952-1-1 option A for European, ETSI TS 101 952-1-3 for Annex B European ISDN, or ANSI 600.
- The splitter/low pass filter is passive element. Even the system is loss of power (power supply fails), the POTS service is still OK.

Management Interface

- In-band management: provide all system OAM&P functions: software updates, configurations import/export, and management system interaction through Ethernet trunk port.

OAM&P

- Configuration Management
- Performance Management
- Fault Management
- Status Monitoring

Ethernet/IP Functionality

- **General Bridging Function**

- Support IPv4 packet
- Support IEEE802.1d Ethernet bridge function between trunk Ether port and ATM VCs
- Support static source MAC table provisioning, automatic source MAC learning and block duplicate ones
- The system is able to maintain 4K entries in its own static MAC address table and to provision the supported number of MAC entries of a line port with a restriction of less than the maximum supported number, 128.

- **VLAN**

- Support IEEE 802.1q Port-based VLAN and Protocol-based VLAN
- Support 512 non-stacked VLAN-ID simultaneously ranging from 1 to 4095
- Support VLAN stacking and VLAN cross-connect
- Support IP Spoofing prevention
- Support MAC anti-Spoofing
- Support port isolation functionality. When port isolation is enabled, no Layer-2 bridging between different ports (or subscriber lines) is supported in a VLAN
- Support static VLAN group and membership provisioning

- **Multicast**

- Support IP multicast forwarding and the multicast works well for RFC2684 bridged payload encapsulation mode
- Support up to 256 multicast groups and 512 copies simultaneously
- Support profile-based Multicast Access Control (up to 48 profiles) and assign any profile to a subscriber interface (the number of multicast channels within a profile is 256)
- Support to limit maximum number of IGMP groups joined per bridge port
- Support IGMP snooping/proxy per IGMP v1, v2, and v3
- Support selection between IGMP proxy and IGMP snooping

- **ACL/Filtering**

- Support Layer-2 frame filtering based on source/destination MAC addresses and EtherType
- Support Layer-3 filtering based on IP header including source/destination IP address, protocol ID, and TCP/UDP destination port number

- **Relay Functionality**

- Support DHCP forward and DHCP relay agent option-82 functionality. The value within Circuit ID and Remote ID sub-options is configurable.
- Support PPPoE relay

- **QoS**
 - The system is able to control the bandwidth occupied by broadcast, multicast, and unknown unicast (flooding) traffic respectively on a per VLAN basis.
 - Support rate-limit profile binding per bridge port
 - Support Three Color Marking (TCM) policer
 - Support Ethernet rate limit per bridge port
 - Support ToS (type of service) /DiffServ (differentiated services) stripping and priority queuing
 - Support DSCP mapping to 802.1p
 - Support selectable adopted priority queue mechanisms according to Strict Priority Queue (SPQ) and Weighted Fair Queue (WFQ)
 - Support configurable mapping function between ATM PVC and 802.1p priority queue
 - Support IP CoS technology
- **ICMP**
 - Support ICMP (Internet Control Message Protocol) function; can send/respond the ICMP request message to/from other system
- **Support IPSec/L2TP/PPTP VPN pass-through function**

ATM and Interworking Function (IWF)

- Support 8 PVCs per subscriber line; VPI range is from 0 to 255 and VCI range from 32 to 65535 (ATM Forum UNI 3.1/4.0, PVCs only). The VPI and VCI value can be created and deleted via CLI, Web-GUI, and EMS.
- Support multi-protocol encapsulation over ATM per RFC 2684 / RFC 1483 for bridged mode and routed mode (IPoA).
- Comply with ITU-T I.361 UNI cell format and support AAL5 per ITU-T I.363.5.
- Support line-level fault management ITU-T Rec. I.610 OA&M F5 loopback on DSL ports including both origination and reception/return of F5 loopback cells.
- Commit the supported ATM service categories in the increasing order of UBR, nrt-VBR, rt-VBR, and CBR on a per port basis.
- Provide PCR (peak cell rate) configurable parameter for UBR and CBR service; PCR and SCR (sustainable cell rate) configurable parameters for rt-VBR and nrt-VBR.
- Support upstream and downstream traffic shaping and policing on per PVC basis.
- Support profile-based ATM traffic management (up to 252 profiles with one default and 251 user-configurable profiles) and the downstream/upstream ATM profile assignments are independent
- Support PPPoE transparent forwarding and PPPoE intermediate agent
- Support PPPoE/PPPoA interworking as defined in section 3.5.4 of TR-101.

Appendix C **Abbreviations**

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Abbreviations

Table 22. Abbreviations

Abbreviation	Explanation
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
RMON	Remote Monitoring
SNMP	Simple Network Management Protocol
UNI	User-Network Interface