

VDSL2 IP DSLAM

VC-2402 / VC-2402-48

Quick Installation Guide

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Mandatory Regulations

The following sections describe the mandatory regulations that govern the installation and operation of the VC-2402.

List of Terms

Table 1 lists the terms used in this chapter.

List of Terms

Term	Expansion
CE	Conformité Européenne
EN	European Standards
FCC	Federal Communications Commission
ITU-T	Telecommunication Standardization Sector of the International Telecommunications Union
RoHS	Restriction of Hazardous Substances

General Requirements

The sections that follow outline the mandatory regulations that govern the installation and operation of the VC-2402. You must adhere to these instructions so that your system meets regulatory requirements.

Prevention of Access

The VC-2402 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 VC-2402 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 and cards 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 requirement.

Package Contents

VC-2402 / VC-2402-48

- VC-2402 / VC-2402-48 Unit x 1
- AC / DC Power Cord x 1
- CD (Containing User's Manual, QIG) x 1
- Quick Installation Guide x 1
- 2-Meter Telco-50 Cable x 2
- Console Cable x 1
- Rack-mounting x 2
- Screw Package x 2
- Connector Tenon x 2

If any of above items are damaged or missing, please contact your dealer immediately.

1. Installation of the VC-2402

1.1 Pre-Installation

This section provides the information users have to ware before installing the VC-2402. 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 VC-2402, 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 VC-2402 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 VC-2402 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 VC-2402 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 VC-2402 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 VC-2402 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.

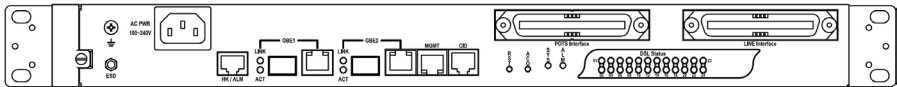
This chapter provides the VC-2402 system hardware installation procedures and install samples for reference. Please perform the procedures in the suggested order.

1.2.1 Hardware Type

There are two different types of VC-2402 hardware with the front panel view:



VC-2402-48 with DC power and splitter



VC-2402 with AC power and splitter

1.2.2 Installation Overview

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

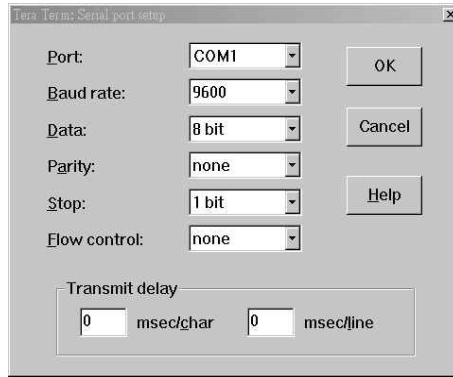
Step 1: Mount the system into the desired location of a rack.

Step 2: Turn the power switch in OFF position. Connect to the DC power supply, and then check the voltage. Make sure the power switch is in OFF position before wiring the power cable and grounding.

Step 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.

Step 4: Connect Console cable to COM port of a computer. Then run the terminal program with the setting shown below:



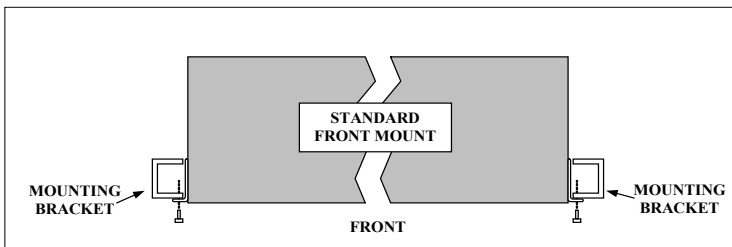
Console Setting

Users can also access the DSLAM via Ethernet. By default the out-band IP address of the DSLAM is obtained via DHCP. Users can also set the IP address manually 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.

1.2.3 Mounting the VC-2402

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.

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.



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.



Note

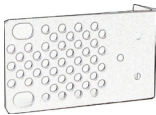
The chassis should be empty during the chassis mounting procedures. Remove any unit in the chassis, and store them according to static-sensitive device storage procedures.



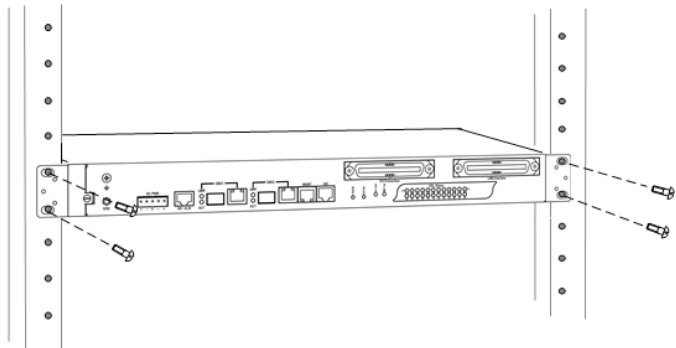
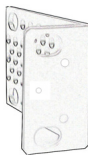
Warning

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

For 23" Rack

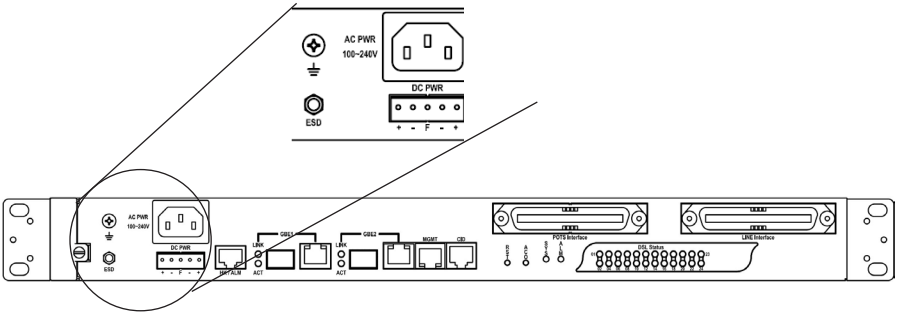


For 19" Rack



Mounting Bracket Position for Standard Mount (VC-2402-48 shown)

1.2.4 Power and Ground Connections



Power connection of VC-2402

AC Power Connection

If your VC-2402 uses AC power, connect the AC power cord to the AC supply socket on the front panel of the DSLAM, and plug the cord into the external power source. The voltage must be 100 to 240 VAC ($\pm 10\%$ tolerance).

DC Power Connection

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

The VC-2402-48 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: $-60\text{V} \sim -36\text{V}$ 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

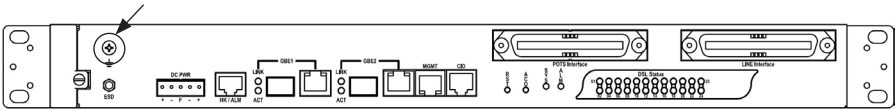
This section provides the grounding rule for the VC-2402. All remote system sites must be properly grounded for optimum system performance.

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) 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 VC-2402 should be grounded by connecting a #14 or #12 AWG conductor between the grounding screw (on the front panel of the DSLAM) and the earth ground or main grounding bar. The resistance between the chassis and the grounding bar should be less than 25 Ohm.



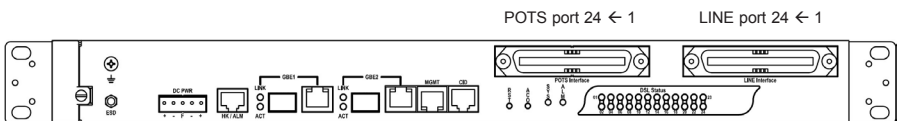
VC-2402 grounding screw on the front panel

1.2.5 Connecting the VDSL/ADSLx and POTS interfaces

The VC-2402 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.

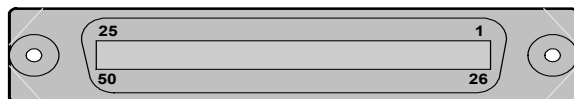
To connect the subscriber lines, use cables with the RJ21 50-pin male connectors. When installing, just plug the end of a cable with connector into the POTS or LINE interface female connector on the front panel. The other end of the cable is generally tied to the MDF.

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



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

For Line port 1~24:

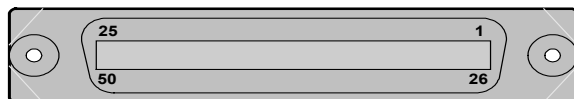


PIN No	13	12	11	10	9	8	7	6	5	4	3	2	1
Port No.	P13	P11	P11	P9	P9	P7	P7	P5	P5	P3	P3	P1	P1
	P12	P12	P10	P10	P8	P8	P6	P6	P4	P4	P2	P2	NC
PIN No	38	37	36	35	34	33	32	31	30	29	28	27	26

PIN No	X	25	24	23	22	21	20	19	18	17	16	15	14
Port No.		NC	P23	P23	P21	P21	P19	P19	P17	P17	P15	P15	P13
		P24	P24	P22	P22	P20	P20	P18	P18	P16	P16	P14	P14
PIN No	X	50	49	48	47	46	45	44	43	42	41	40	39

Pin Assignment of LINE Interface

For POTS port 1~24:



PIN No	13	12	11	10	9	8	7	6	5	4	3	2	1
Port No.	P13	P12	P11	P10	P9	P8	P7	P6	P5	P4	P3	P2	P1
	P13	P12	P11	P10	P9	P8	P7	P6	P5	P4	P3	P2	P1
PIN No	38	37	36	35	34	33	32	31	30	29	28	27	26

PIN No	X	25	24	23	22	21	20	19	18	17	16	15	14
Port No.		NC	P24	P23	P22	P21	P20	P19	P18	P17	P16	P15	P14
		NC	P24	P23	P22	P21	P20	P19	P18	P17	P16	P15	P14
PIN No	X	50	49	48	47	46	45	44	43	42	41	40	39

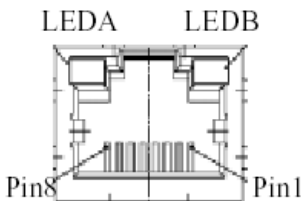
Pin Assignment of POTS Interface

1.2.6 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.



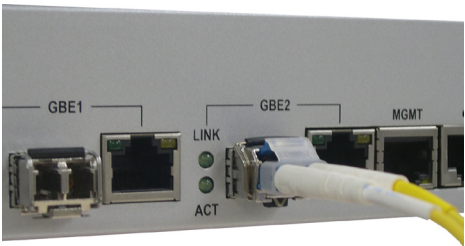
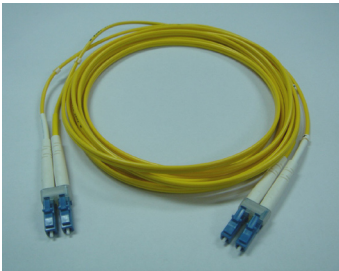
1,2	T/Rx+,T/Rx-
3,6	T/Rx+,T/Rx-
4,5	T/Rx+,T/Rx-
7,8	T/Rx+,T/Rx-

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



Connecting optical fiber to the trunk port



Note

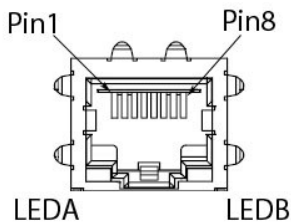
Please observe the proper connecting terminals for transmitting cable to TX LC-type receptacle, and receiving cable to RX LC-type receptacle on the front panel.



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.

1.2.7 Ethernet Port (MGMT)

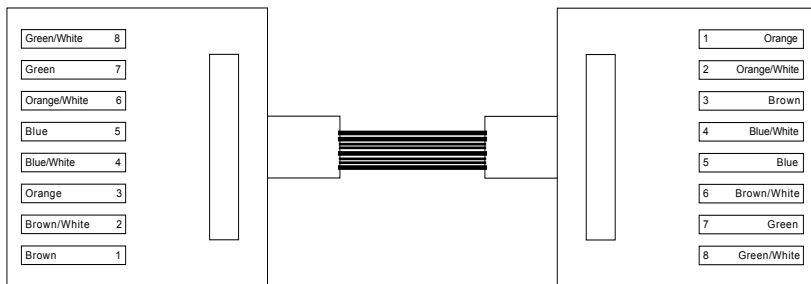
The VC-2402 provides one RJ45 Jack (MGMT) on the front panel for Ethernet interface connection. The detailed pin assignment is shown in the following figure and table.



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

Ethernet Port RJ-45 pin assignment

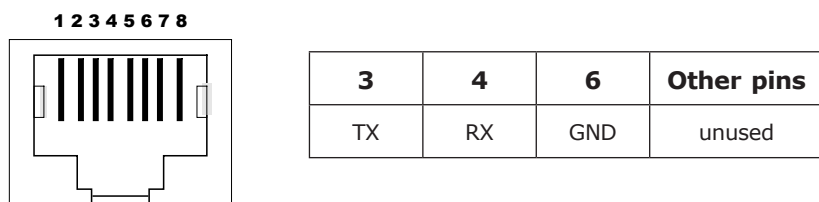
To connect the Ethernet interface to PC, the Ethernet crossover cable is required. The detailed pin assignment is shown below.



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

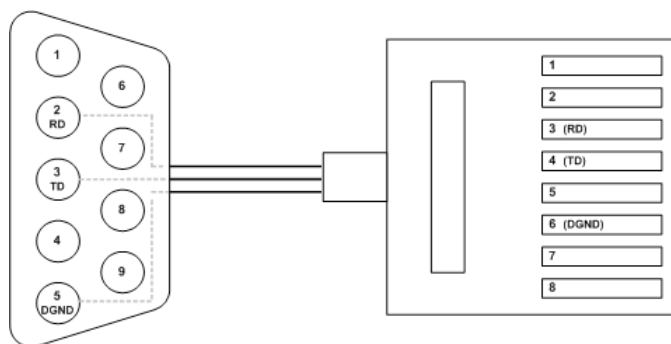
1.2.8 Console Port (CID)

The Console interface (CID) on the front panel is the main control interface of the VC-2402. The RJ45 connector pin assignment is illustrated below:



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

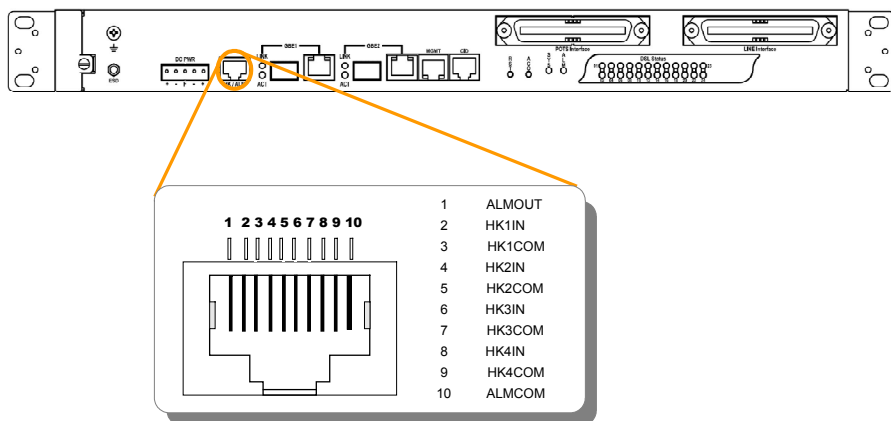
Pin Assignment of Console Cable

1.2.9 Housekeeping and Alarm Contact Output Interface

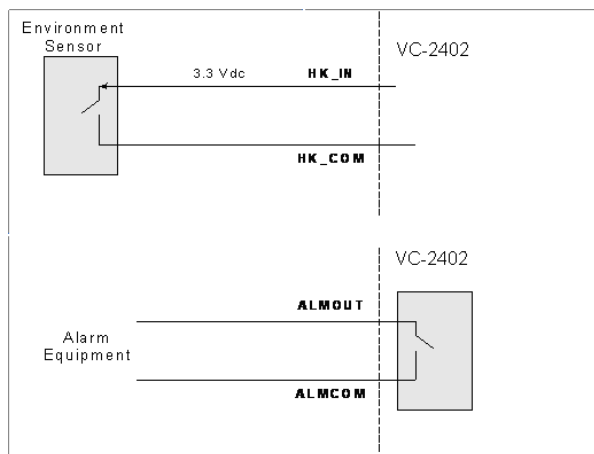
The VC-2402 has an RJ-50 port (HK) on the front panel to provide four housekeeping inputs and one alarm contact output. Generally, housekeeping contacts can connect to environment-sensor- controlled switch to indicate the operation environment condition.

The HK circuit contains a photo coupler powered by the VC-2402 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:



Pin assignment of Housekeeping Inputs and Alarm Contact Output



Operation diagram of Housekeeping Inputs and Alarm Contact Output

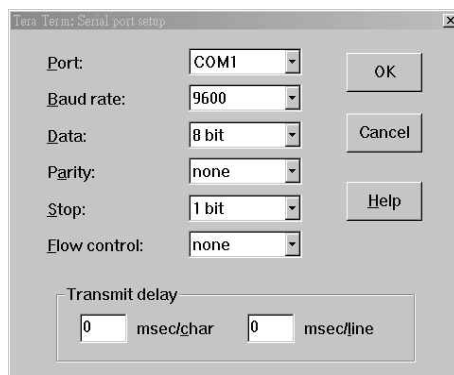


Note

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 VC-2402. Referring to the previous section, use a console cable to connect a host PC and the VC-2402 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:

VC-2402 IPDSLAM v0.05 (2008/05/09 16:29:59)
Hardware Version      : D
CPLD Version         : B3
CLI Module Version    : 3.0.1.76
FWAPI Module Version  : 1.0.4.9
SNMP Module Version   : v4.6
SNTP Module Version   : 1.0
OAMP Module Version   : 3.0.1.76
VDSLGR Module Version : 2.25
VDSLGR EMU Module Version : 2.1.0.18
WEB Module Version    : 2.2-x
WDDI Module Version   : 2.4.3.10
WLS Module Version    : 3.2.3.10
localhost:>enable
localhost:%show management
                        GBE          MGMT
-----
MAC Address   : 00:30:4f:71:36:71  00:30:4f:71:36:75
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 user-name 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 VC-2402, 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   : 00:30:4f:71:36:71  00:30:4f:71:36:75
IP Address    : 192.168.5.3          172.16.77.35
Network mask  : 255.255.255.0        255.255.255.0
MTU           : 1500                 1500
MGMT default gateway : 172.16.77.177
Inband VLAN ID: No limit
Inband VLAN Priority: 0
localhost:(conf)#runningcfg save
Writing FLASH ...
Save success.
localhost:%ping 172.16.10.141
PING 172.16.10.141 (172.16.10.141): 56 data bytes
64 bytes from 172.16.10.141: icmp_seq=0 ttl=62 time=1.6 ms
64 bytes from 172.16.10.141: icmp_seq=1 ttl=62 time=1.0 ms
64 bytes from 172.16.10.141: icmp_seq=2 ttl=62 time=1.1 ms
64 bytes from 172.16.10.141: icmp_seq=3 ttl=62 time=1.0 ms
64 bytes from 172.16.10.141: icmp_seq=4 ttl=62 time=1.1 ms

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

```

Now you can access the VC-2402 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 VC-2402 in the Web GUI:

- On the menu tree, click on **System ---> NT-Trunk Setup**. The NT-Trunk Setup page is displayed.
- Enter new IP setting in the **GBE (In Band)** section for in-band IP configuration.
- Enter new IP setting in the **MGMT (Out Band)** section for out-band IP configuration.

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

Node ID: [Main User] [Refresh]

NT-Trunk Setup

Previous Command Result: Normal.

Modify

Address Management

GBE (In Band)				MGMT (Out Band)					
IP Address	192	168	5	3	IP Address	172	16	77	35
Subnet Mask	255	255	255	0	Subnet Mask	255	255	255	0
MAC					Gateway	172 . 16 . 77 . 177			
Inband VID	0								
Priority	0								

Gigabit Ethernet Speed Configuration

	Config Status	OpState	Determine First
GBE1	(1)Auto Negotiate	Down	Files first
GBE2	(1)Auto Negotiate	Down	Files first

HTTP Port

	MGMT Speed	Remote ADDR	System Name
80	AutoNegotiate	192.168.7.73	localhost

Please remember to save new settings to flash memory:

On the menu tree, click on **Maintenance** ---> **Database**. The Database Configuration page is displayed. Click on the Database Control Action drop-down list and select **(A) Save runtime config. and set to new active DB** then click on Submit button (you can specify the DB filename to save or let 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.

Node ID: [Main User] [Refresh]

Database Configuration

Database Control Action:
 (A) Save runtime config. and set to new active DB

FTP Server IP: []

FTP Account: []

FTP Password: []

Filename: []

Inband DB: []

General DB: []

Boot inband DB: [2008/03/27 17:33:45]

Boot general DB: [2008/03/27 17:33:30]

Set active inband DB: [2008/04/17 04:05:37]

Set active general DB: [2008/04/17 04:05:22]

Current Database Status: **MEMORY WRITE SUCCESS**

Submit

User Guide:

- (A) Save inband configuration and runtime configuration as the active restoration database for next power-on restoration.
- (B) Restore inband configuration and control plane configuration by setting another restoration database active.
- (C) Restore inband configuration and control plane configuration by setting another restoration database active and system restart.

1.4 Configuration Import/Export

The configuration database of VC-2402 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 VC-2402 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 VC-2402 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:

Ex:

```
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)

Ex:

```
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:

Ex:

```
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:

Ex:

```
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:

Ex:

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

(I) Export in binary mode:

Ex:

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

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

Ex:

```
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:

Ex:

```
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 VC-2402 User's Manual.

1.5 Firmware Update

To update firmware or bootloader, the VC-2402 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 VC-2402 and the FTP server is fine. You can use '**ping** <ip address>' command to ping the FTP server from the CLI, or you can ping the VC-2402 from the FTP server.
4. FTP get firmware image or bootloader and then write to Flash:


```
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 complete.
		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.**

- 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 VC-2402 User’s Manual.

2. Operating and Maintaining the VC-2402

2.1 Maintenance requirement

2.1.1 Tools and Equipment Requirements

Lists required tools and test equipment for the VC-2402 system maintenance.

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 VC-2402 system sites are normally unattended, however, technicians should be dispatched when needed. The VC-2402 system maintenance efforts and monitor the system for alarms during those on-site operations.

2.1.4 Electrostatic Discharge Protection

The VC-2402 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 VC-2402 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 VC-2402 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 (using DC power, Model: VC-2402-48)
- 0°C to 50°C and 5% to 95% humidity at 35°C (using AC power, Model: VC-2402)

2.2 Powering the VC-2402 Up or Down

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

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.

Procedures of Powering Down the DSLAM

Step	Action
1	Put on the antistatic wrist strap and connect it to a grounding point.
2	Disconnect power connection.



Caution

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

2.3 Controls and LED Indication

The VC-2402 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.

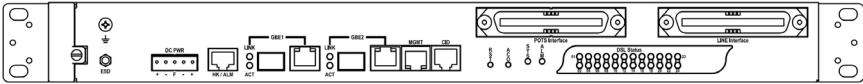
BLINK: Alternating between OFF and ON.

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.

VC-2402 Controls and LED Indication

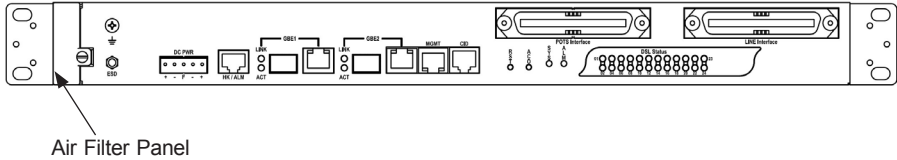
VC-2402 Front Panel		
		
LED	Color	Indication / Condition
SFP1 - LINK	Green - On	Valid network connection established
SFP2 - LINK	Off	Disconnection
SFP1- ACT	Green - Blink	Transmitting or receiving data
SFP2- ACT	Off	Disconnection
GBE1- Speed	Orange	100 / 1000 Mbps
GBE2- Speed	Off	10 Mbps
(LED B on RJ-45)		
GBE1-Link/Act	Green - On	Valid network connection established
GBE2-Link/Act	Off	Inactive
(LED A on RJ-45)	Green - Blink	Transmitting or receiving data
MGMT- Speed	Orange	100 Mbps
(LED B on RJ-45)	Off	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
DSL Status	Green	Normal operation
	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.	
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.	
Button	Description	
RST	An embedded hardware button for hardware resetting.	
ACO	For Alarm Cut Off service.	

2.4 Cleaning Units

This section provides procedures on how to:

- clean the air filter every three months



Procedure Clean the Air Filter



You must loosen the connection of the Air Filter Panel to the DSLAM and pull out the Air Filter before cleaning 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 clean air filter into the air filter slot of the DSLAM.
- 5 Reinstall the Air Filter Panel.

3. Troubleshooting the VC-2402

3.1 Introduction to Troubleshooting

This chapter describes instructions for the VC-2402 system problems. These procedures may require the presence of technicians at remote VC-2402 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 VC-2402.
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 or Web GUI.

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

3.4 Procedures for Troubleshooting the VC-2402

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
VC-2402 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 VC-2402 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 switch on the front panel is set to the ON position.
 - 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 VC-2402.
 - 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 VC-2402.
 - 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 switch on the front panel:
 - if the power switch is set to the OFF position, power up the DSLAM by sliding the power switch to the ON position
 - if the power switch is set to the ON position, 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.
-

