FCC Certifications

This Equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received; including interference that may cause undesired operation.

CE Mark Warning

This equipment complies with the requirements relating to electromagnetic compatibility, EN 55022 class A for ITE, the essential protection requirement of Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Company has an on-going policy of upgrading its products and it may be possible that information in this document is not up-to-date. Please check with your local distributors for the latest information. No part of this document can be copied or reproduced in any form without written consent from the company.

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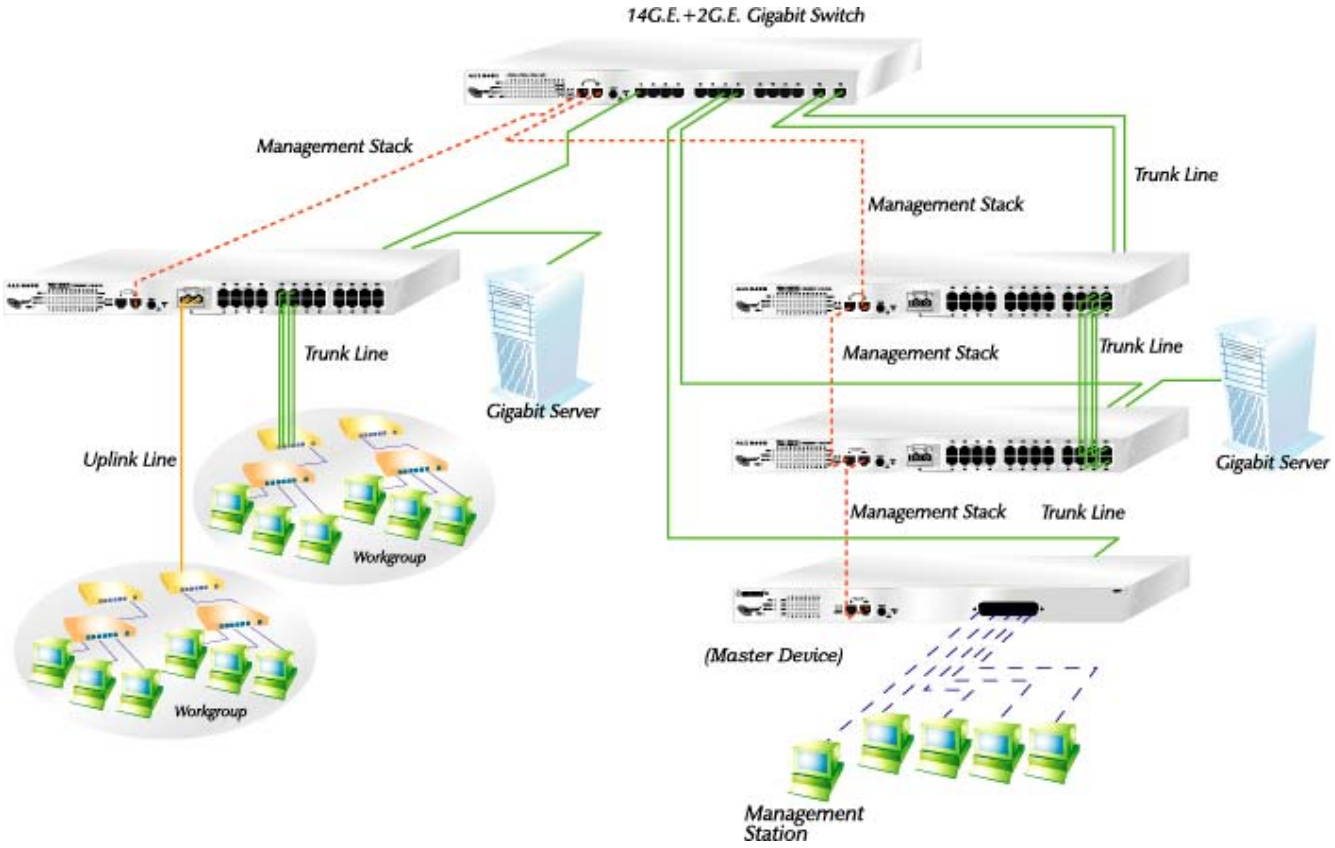
1. Overview

The **Gigabit Managed Cluster** is a powerful, high-performance, high port-density networking system, which can upgrade and integrate your existing network from 10/100Mbps to a simplex, efficient, centralized management environment and very high-speed network architecture. As all members operate as teamwork, all connected members of the family are treated as a Single-Managed device through its proprietary management bus. Also, the management stacking provides 800 meters distance extensibility for wide coverage and flexibility of implementation.

With its built-in rich, various and advanced management functions, system administrator can monitor and control the whole system or individual port of any members easily and remotely.

The members of the **Gigabit Managed Cluster** are:

- **24F.E.+2G.E Gigabit Clustering Switch**
- **14+2G.E. Gigabit Clustering Switch**
- **16V+2G.E. EoVDSL Clustering Switch**

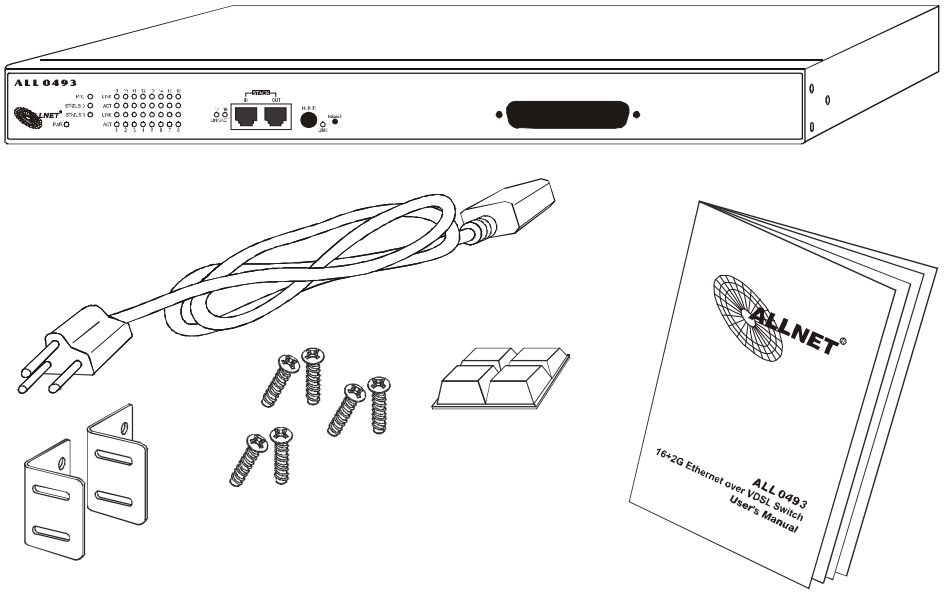

14G.E.+2G.E. Gigabit Switch
Management Stack
Trunk Line
Management Stack
Trunk Line
Gigabit Server
Management Stack
Trunk Line
Uplink Line
Gigabit Server
Workgroup
Management Stack
Trunk Line
(Master Device)
Workgroup
Management
Station

2. Unpacking Information

Thank you for purchasing the 16V+2G.E. EoVDSL Clustering Switch. Before you start, please check all the contents of this package.

The product package should include the following:

1. One 16V+2G.E. EoVDSL Clustering Switch
2. One power cord
3. Rubber foot and screws
4. Rack-mount brackets
5. User's Manual



3. Introduction to 16V+2G.E. EoVDSL Clustering Switch

3.1 General Description

The device is a 16V+2G.E.-port Ethernet over VDSL clustering switch with sixteen VDSL ports (within 1 RJ-21 connector) and two Gigabit slide-in slots on the rear panel for optional fiber/copper Gigabit modules.

VDSL□Very-high-bit-rate Digital Subscriber Line□is the new generation DSL technology that offers much bandwidth than other DSL technologies. The EoVDSL switch is a DSLAM (Digital Subscriber Line Access Multiplexer), which accommodates well proven Ethernet and VDSL technology to extend Ethernet over single-pair phone line by using VDSL signal. The 30Mbps (15Mbps upstream, 15Mbps downstream) bandwidth and 5 selective transmission modes empowers the most widespread telephone line best advantage with minimum installation time and expense to allow voice and data signal transmit on the same telephone wires without interference. Moreover, the maximum 1.5km distance extensibility provides wide coverage for service providers. It is ideal for providing broadband services to living/working people in community like apartment, hotel and campus. This is more and more important especially when bandwidth-consuming applications is booming.

Out of the ordinary dumb switches, the 16V+2G.E. EoVDSL Clustering Switch embedded advanced management capability; that the device can be remotely managed by Telnet and Internet browser. This is much useful for system manager to monitor and control the system efficiently.
The 2 Gigabit slide-in slots on the rear panel provide fat pipes for up linking to backbone or connecting to servers. Both RJ-45 and Fiber modules are the solution to fit your existing network and flexible media selectivity.

Store-and-forward switching mode promises the low latency plus eliminates all the network errors, including runt and CRC error packets. To work under full-duplex mode, transmission and reception of the frames can occur simultaneously without causing collisions as well as double the network bandwidth.

The switch is plug-n-play without any software to configure and also fully compliant with all kinds of network protocols. Moreover, the rich diagnostic LEDs on the front-panel provide the operating status of individual port and whole system.

3.2 Key Features

- Complies IEEE 802.3, IEEE 802.3u, IEEE802.3x, IEEE 802.3z/ab standards
- Complies with IEEE802.1Q VLAN tag (IVL)
- Complies with IEEE802.1p CoS with 2-level priority
- Supports Ethernet over VDSL
- The whole management stack can stack up to 8 sets
- 16 * VDSL ports within 1 RJ-21 connector
- 2 * 1000Mbps Copper/Fiber slide-in slots
- Proprietary management bus extend up to 800 meters for management stacking
- Supports real-time clock (optional)
- Supports IGMP snooping
- Supports SNMP management
- Supports port sniffering
- Supports port group VLAN and up to 255 groups
- Supports 802.1Q VLAN and up to 255 groups
- One RS-232 female console connector
- Supports 8MB SDRAM for run time data storage
- Supports 2MB Flash EPROM for cooperation and configuration data storage
- Supports 6K MAC entries
- Supports 3Mbit packet switching
- 19″ rack mountable
- Internal universal switching power supply
- FCC Class A, CE

3.3 The Front Panel

The front panel of the switch is shown as below

Port Operation

There are 16 VDSL ports within 1 RJ-21 connector on the front panel.
The VDSL supports 5 selective transmission modes that operate in different band allocation and result in different upstream and downstream bandwidth. Due to different telephone line quality, cross talk or extension distance may affect actual achievable speed; you can configure individual port in built-in management interface for optimized connectivity.

The following is the summary table of transmission modes, bandwidth and distance extensibility tested for **AWG 26 (0.4mm)** twisted-pair without noise and cross talk.

Profile Name	Profile Type	Real Link Downstream Rate (Mbps)	Real Link Upstream Rate (Mbps)	Maximum Distance between the CO Port and the CPE
ANSI	Public	15.17	4.27	3000 ft
ETSI	Public	11.38	4.27	3500 ft
VE-5	Private	5.69	5.69	4000 ft
VE-10 (default)	Private	11.38	11.38	3500 ft
VE-15	Private	15.17	17.06	3000 ft

Note: The payload rate is about 9% less than the line rate due to framing overhead

Wiring for VDSL ports

Please connect a telco cable to the RJ-21 female connector on the front panel, and connect the other end to a MDF (Main Distribution Frame) or directly connect to VDSL CPEs with phone line.

Attention The proprietary management bus ("STACK" RJ-45 ports) on the front panel is reserved for management stacking, **only straight-through UTP/STP cable can be used**. There is no Duplex Mode issue and the distance extensibility can up to 800 meters.

LEDs Definition

The rich diagnostic LEDs on the front panel can provide the operating status of individual port and whole system.

Power LED

This indicator lights green when the switch is receiving power; otherwise, it is off.

RTC LED

When standalone using the switch, this indicator indicates the optional Real Time Clock is functioning or not. If it does, the *RTC LED* lights green. In the management stack, the *RTC LED* blinks green to indicate management bus activity

STATUS 0 LED

When this LED steady green, it means the device acts competent leading role, an indispensable essential for system administrator to control and monitor whole system. At the time one member of the cluster disconnected or new member joined, the "STATUS 0" LED blinks. Soon, one and only one master will be raised. You can refer to "HUB ID" for relative information in the next.

STATUS 1 LED

The "STATUS 1" LED flashes green when Run Time Error occurs.

Port LEDs (VDSL)

Every VDSL port relevant two LEDs (LINK; ACT) for indicating connection status.

Port LEDs definition summary table

LED	Status	Statement
LINK	Green	Well connected with CPE device
ACT	Flashing Green	There is traffic transverses the port

If the port is connected but the relevant LED is dark, check the following items:

1. The switch and the connected device's power are on or not.
2. The connecting cable is good and with correct type
3. The cable is firmly seated in its connectors in the switch and in the associated device
4. The connecting device, including any network adapter is well installed and functioning
5. Confirm the CPE device is implemented within the scope of operative without interference

LINK/ACT LEDs (For slide-in slots on the rear panel)

The slide-in slot has a LINK/ACT LED itself. When one slide-in module is well installed and functioning, the relevant one lights green.

LINK LED ("STACK" port)

The LED lights green, when a management stack is made via the "STACK" port and negotiates with associated devices successfully.

HUB ID Rotary Switch

All members of the management stack are ranked according to their "HUB ID"(Device ID). There are eight degrees (0~7) in the rotary switch. The smaller number, the higher degree. Device with smallest "HUB ID" will be the "Master" device. Then, system management can perform by the way of the "Master Device".

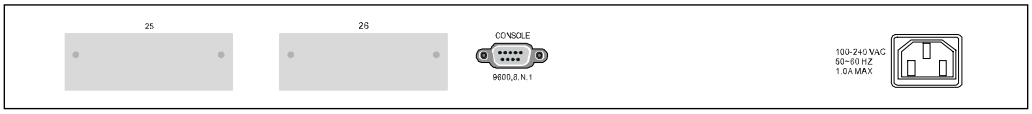
Attention Every device in the management stack should have a unique "HUB ID". In the meanwhile, a "HUB ID" which has been using by a device, reused by another, the management stack will fail.

RESET Button

The system will reboot when “RESET” button is pressed.

3.4 The Rear Panel

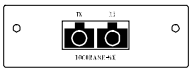
The rear panel of the switch is shown as below

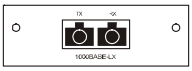


Gigabit Slide-in slots

The two slide-in slots on the rear panel are reserved for following optional gigabit modules. They can provide fat pipes for up linking to backbone or connecting to servers.

--Gigabit Fiber


1000BASE-SX


1000BASE-LX

--Gigabit Copper


1000BASE-T

Gigabit Module Operation

Port	Media	Speed	Duplex Mode
Gigabit port	1000BASE-T	10Mbps	Full Duplex
			Half Duplex
		100Mbps	Full Duplex
			Half Duplex
		1000Mbps	Full Duplex
	1000BASE-SX	1000Mbps	Full Duplex
	1000BASE-LX	1000Mbps	Full Duplex

Wiring for Gigabit Slide-in Module

Following are the summaries of cabling required:

Media	Speed	Wiring	Distance
1000BASE-T	10Mbps	Category 3,4,5 UTP/STP	100m
	100Mbps	Category 5 UTP/STP	100m
	1000Mbps	Category 5 UTP/STP	100m
1000BASE-SX	1000Mbps	62.5/125 μm MMF	220m
		50/125 μm MMF	500m
1000BASE-LX	1000Mbps	62.5/125 μm MMF	550m
		50/125 μm MMF	550m
		9/125 μm SMF	10km

Console Port

The RS-232 console is an interface for connecting a terminal directly. Through the console port, it provides rich diagnostic information includes network statistics, link status and system setting. The operating mode of the console port is:

- DCE
- 9600 (Fix baud rate)
- n (No parity checking)
- 8 (8 Data bits)
- 1 (1 stop bit)
- None (No flow control)

You can use a normal RS-232 cable and connect to the console port on the device. After the connection, you can run any terminal emulation program (Hyper Terminal, Winterm, Telix, … and so on) to enter the startup screen of the device. All the detail software operation, please refer to "Console port (out-of-band) connection" session of chapter 5.

Power Receptacle

For compatibility with electric service in most areas of the world, the switch's power supply automatically adjusts to line power in the range 100-240 VAC and 50-60 Hz. Plug the female end of the power cord firmly into the receptacle on the rear panel of the switch. Plug the other end of the power cord into an electric service outlet then the power will be ready.

4. Installing 16V+2G.E. EoVDSL Clustering Switch

This switch can be placed directly on your desktop, or mounted in a rack. If you install the device in a normal-standalone standard, the switch is an Intelligent Switch, and users can immediately use most of the features simply by attaching the cables and turning the power on. In this case, any managerial proceedings are effective only in the range of the switch. After management stacking, you can enjoy the powerful management functions and control the whole system.

4.1 Desktop Installation

For desktop installation, the switch needs to put on a clean, flat desk or table close to a power outlet. Plug in all network cables and the power cord, then the system is ready.

Before installing the switch, you must ensure:

1. It is accessible and cables can be connected easily
2. Cabling is away from:
   - Sources of electrical noise such as radios, transmitters and broadband amplifiers
   - Power lines and fluorescent lighting fixtures.
3. Keep water or moisture off
4. Airflow around the unit and through the vents in the side of the case is great for heat radiation (company recommend that you provide a minimum of 25 mm clearance)

To prolong the operational life of your units:

1. Never stack unit more than eight sets high if freestanding
2. Do not place objects on top of any unit or stack
3. Do not obstruct any vents at the sides of the case

4.2 Rack-mount Installation

The switch may standalone, or may be mounted in a standard 19-inch equipment rack. Rack mounting produces an orderly installation when you have a number of related network devices. The switch is supplied with rack mounting brackets and screws. These are used for rack mounting the unit.

Rack Mounting the Switch in the 19-inch rack:

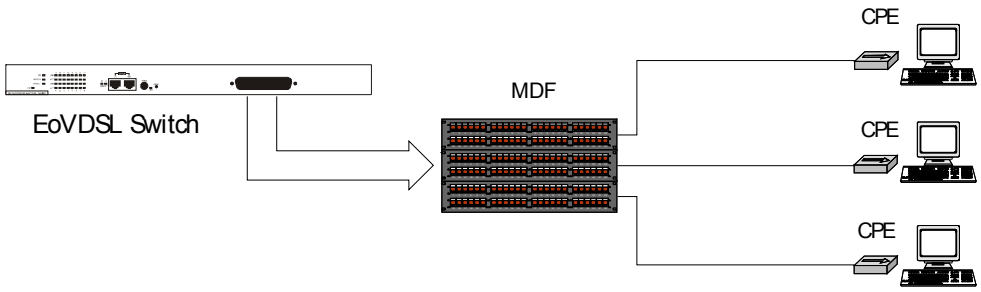
1. Disconnect all cables from the switch before continuing.
2. Place the unit the right way up on a hard, flat surface with the front facing toward you.
3. Locate a mounting bracket over the mounting holes on one side of the unit.
4. Insert the screws and fully tighten with a suitable screwdriver.
5. Repeat the two previous steps for the other side of the unit.
6. Insert the unit into the 19" rack and secure with suitable screws (not provided).
7. Reconnect all cables.

4.3 Installing Network Cables

After placing the switch on the desktop, we need to know how to connect the device to network.

Station Connections

Refer to the wiring statement of the previous section; connect each station to the CPE (VDSL modem), which is compatible with EoVDSL switch with correct type of cables.


CPE
MDF
EoVDSL Switch
CPE
CPE

Switch-to-Switch Connections

In making a switch-to-switch connection, use Gigabit ports to connect another switch or backbone is strongly recommended. The Gigabit ports provide the fat pipe to the server or backbone connectivity for boosting the total system performance. Refer to the wiring statement of the previous section; connect each station to the switch with correct type of cables.
Furthermore, as the switch supports port aggregation (port-trunk) capability and up to 7 groups, it is also great to build up switch-to-switch connectivity. For detail information, please refer to the "Management Guide" session.

4.4 Module Installation

The three slide-in slots on the front and rear panel are purposed for installing optional modules. They can be used as a network backbone or connect to a server. Follow the steps as described to install a module:

1. Power off the switch
2. Removing the two screws on the face plate of slide-in slot with a flat-head screwdriver
3. Push the module gently into the slot along the slide tracks
4. Ensuring that it firmly engages with the connector then tighten the screws to secure the module

Attention The slide-in slots are not hot swappable, power off the switch before installing modules

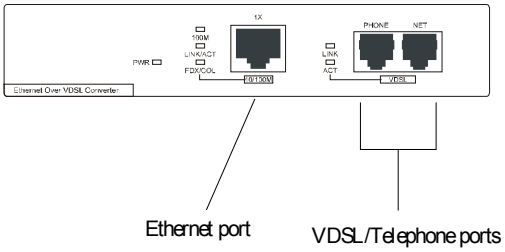
4.5 Management Stack

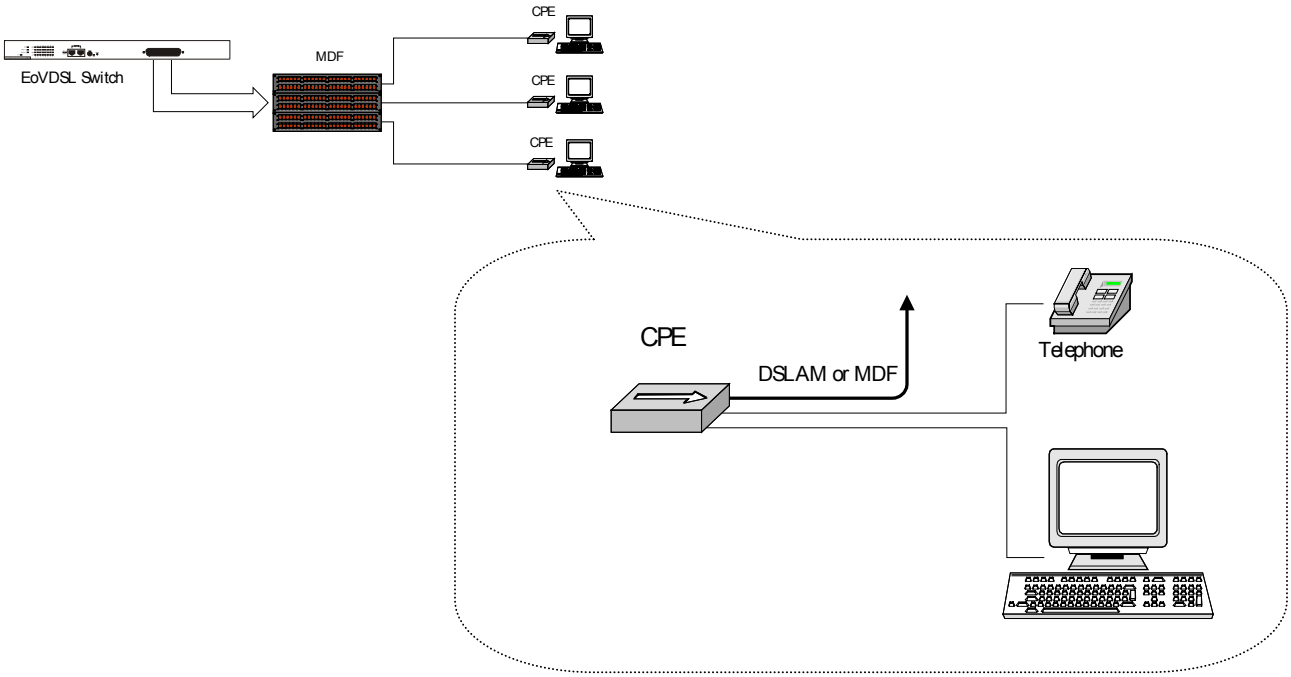
There are two RJ-45 ports on the front panel for proprietary management stack. Only straight-through UTP/STP cable can be used.
Plug one end of the cable in the "IN" port and the other end to the "OUT" port of next device. Repeat the step for every device in the cluster, then ending at last switch.

Attention：Before management stacking, be sure of every device uses a unique "HUB ID", or the management stack will not work

4.6 CPE Installation

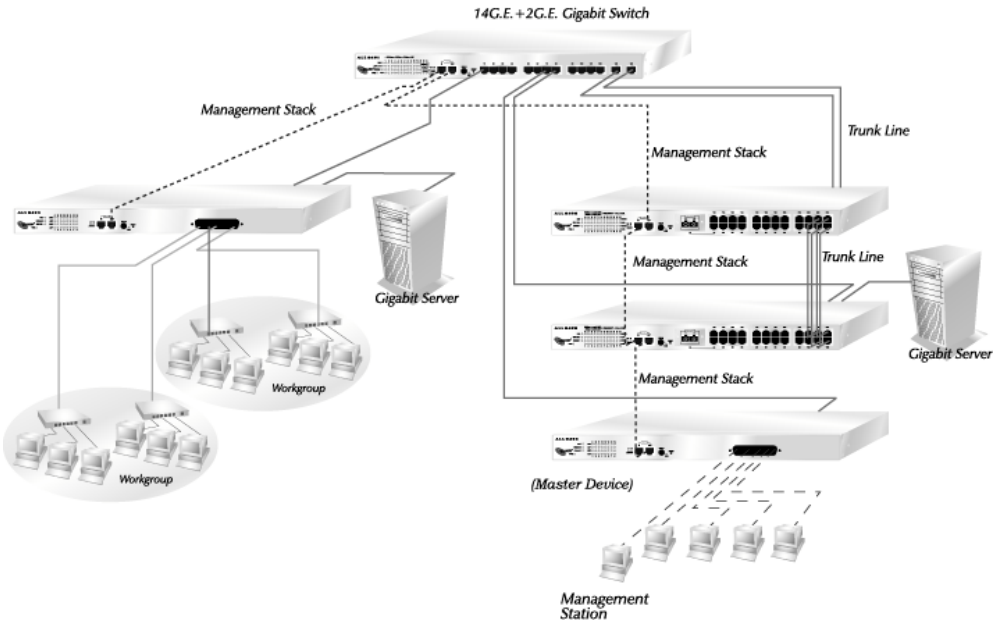
The CPE device is an Ethernet over VDSL converter that transforms VDSL signals into Ethernet signals and contrariwise. Before connecting CPE to your PC, one Ethernet interface card should be well installed. The RJ-45 Ethernet port is used to connect to PC with UTP/STP twisted-pair. Both RJ-11 connectors can be used to connect to VDSL or Telephone alternatively.
For compatible CPE device information, please contact with your local distributor.



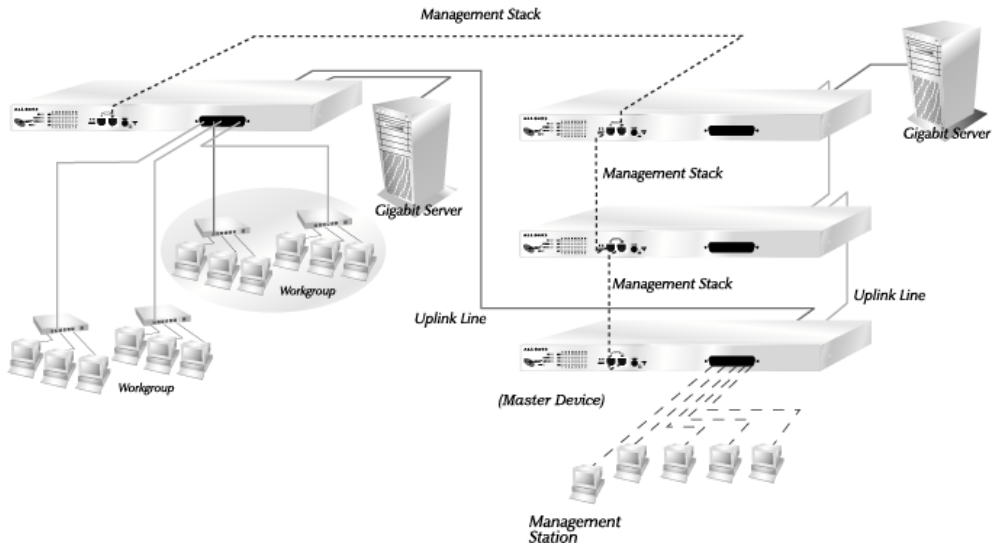


4.7 Network Application

Backbone Solution



Bus Solution



5. Management Guide

This section instructs you how to enter and proceed the advanced management capability, which can be accessed by RS-232 serial port (out-of-band) on the rear panel or by Telnet session / Internet Browser over the network (in-band).

The management functions such as□

- Port Information/configuration/Statistic/Location Search/Duplex mode/Flow Control
- SNMP parameters
- IGMP snooping
- Spanning Tree Algorithm
- 802.1Q/Port Group VLAN
- Port Aggregation
- Address Table
- Upgrade system firmware
- Reboot system, etc……

Factory Default value:

IP□ 10.0.0.1
Subnet Mask□ 255.0.0.0
Default Gateway□ 10.0.0.254

Both standalone switch and the cluster can be managed using either a standard Web Browser or a Telnet session from any computer attached to the network. The SNMP management feature also permits the switch to be managed from any SNMP network management station running a network management program.

- To manage the *Standalone switch*□
  Access the switch with its IP address "10.0.0.1" (factory default value)
- To manage any of the Clustering switch□
  Access the switch with the IP address of Master device in the management stack. Then select the switch you want to manage in the

first page

Privilege levels:

"root" root can do any configuration includes changing password and enable/disable management capability via console port. The default password of root is "super user"

"admin" admin can do any configuration except changing password. The default password of admin is "admin"

"guest" guest can view whole the runtime information only, moreover, access to Web management interface is not allowed. The default password is "guest"

5.1 Console Port (Out-of-band) connection

After attaching a RS-232 cable (Straight-through) to the serial port of a PC running a terminal emulation program, press **"Enter"** key then login screen appears. Enter your username and password to login the management console.

Note

The management functions of console program are exactly the same with web-based management interface but in text mode. For further operation, please refer to *'Starting a Web Browser Session'*.

Attention **1.** The factory default value of UserName and Password is **"admin"**

2. For detail console port configurations, please refer to "Console Port" in chapter 3

3. System configurations via the Console Port only will be allowed by the way of master device

5.2 In-Band Connections (Web Browser / Telnet)

To manage the switch through in-band access, you should configure the management station with an IP address and subnet mask compatible with your clustering switch.

Starting a Telnet Session

To access the switch through a Telnet session□

1. Sure of the switch is configured with an IP address and the switch is reachable from a PC

2. Start the Telnet program on a PC and connect to the switch

Note□

The management functions of Telnet program are exactly the same with web-based management interface but in text mode. For further operation, please refer to *'Starting a Web Browser Session'*.

Starting a Web Browser Session

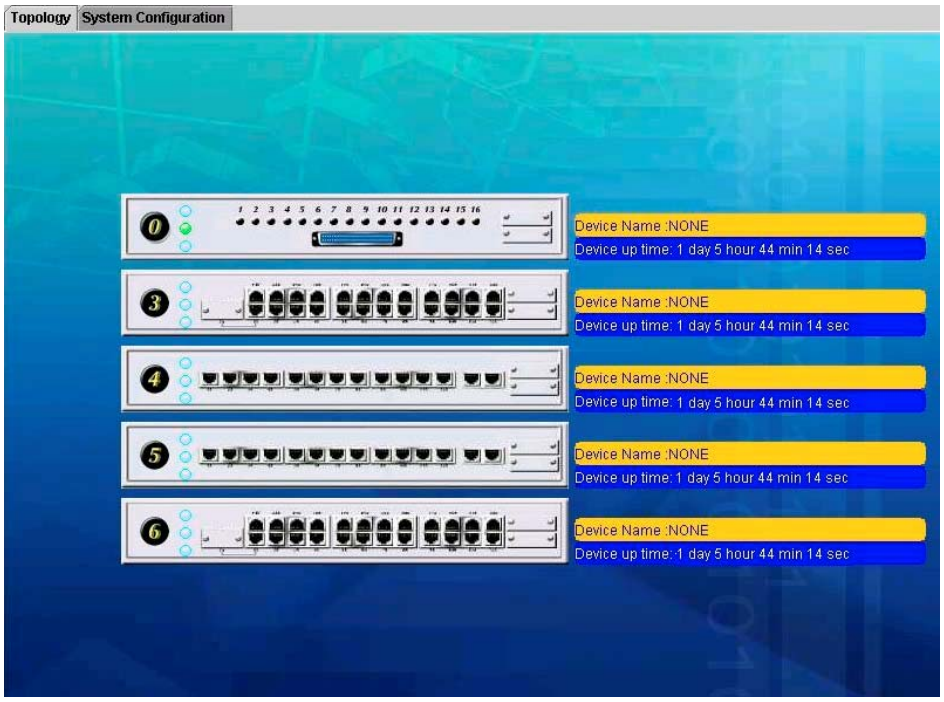
This Web Browser User Interface is coded by Java Applet and running on the **Java™ Virtual Machine (JVM) version 1.3.1** platform. You should configure the management station with an IP address and subnet mask compatible with your clustering switch for accessing it. Also, the management station should be well configured and connected to Internet for automatically downloading (upgrading) the suitable JVM through Internet from "http://java.sun.com". Or you can download it yourself by the URL "http://java.sun.com/j2se/1.3/download.html" and then manually install it.

> Attention：Occasionally the newer Java™ Virtual Machine is not backward compatible, that JVM version 1.3.1 is strongly recommended to ensure properly operation

Running your Web Browser and enter the IP address "10.0.0.1" (When your switches are in a well-installed management stack, remember that the portal IP address will be vary with your actually management topology) as the URL in the "address" field. After authentication procedure, the home page shows up. In this page, you can view the management stack topology or standalone switch.

Topology

This screen displays one or more switches of the management stack. Basic properties can be read by the screen, include Hardware characteristic, Device Name, Device Up time, Master and Slave relationship. Also, by mouse clicking listed items can enter for further operation.

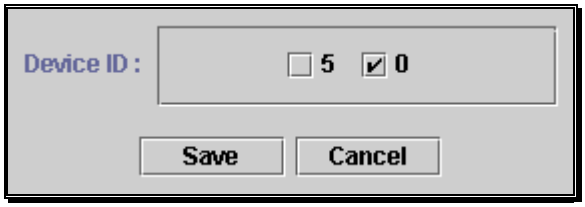


System Configuration

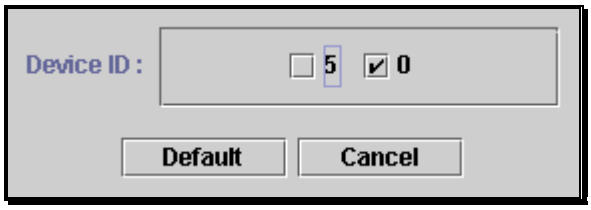
If you are managing a Master or a Standalone device, the system configuration parameters are equal to parameters of Net Configuration and Device Information in **Device** tab. For further information, please refer to **Device** statement.

After clicking the 16V+2G.E. EoVDSL Clustering Switch, main screen shows up.

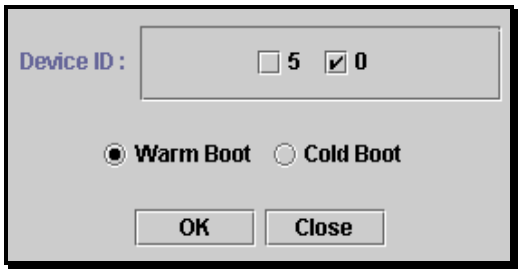
Function	Statement
<Home>	Shortcut to back to home page
<Save>	Save the current setting to **Non-volatile Memory**. The difference between **<Save>** and **<Apply>** is that *Apply* applies settings right away but saves the values in the system memory. Every time when switch reboots, system obtains system parameters from **Non-volatile Memory** you **<Saved>** before but not buffer memory. Select the one(s) you want to save parameters, then click "Save" button to save it to **Non-volatile Memory**.



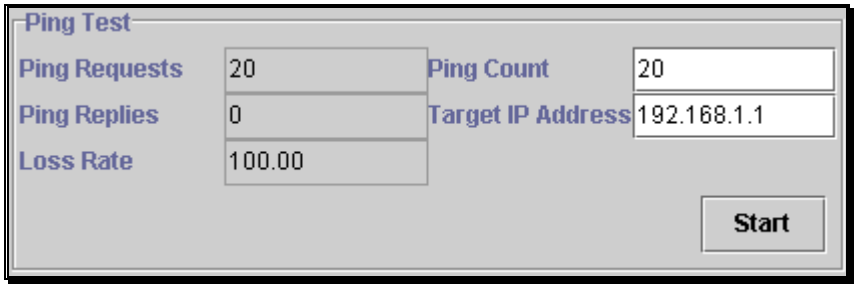
<Default>	Make the switch(es) returning to factory default value. Select the switch and click "Default" button, the selected-switch(es) will return to initial value. If you want to clear the previous value in the **Non-volatile Memory**, please **<Save>** it.



<Reboot> You can specify switch(es) and reboot it.
Warm Boot Reboot the switch in a short time.
Cold Boot Boot the switch and with fully Power On Self Test (POST). The system is completely checked but spend much time.



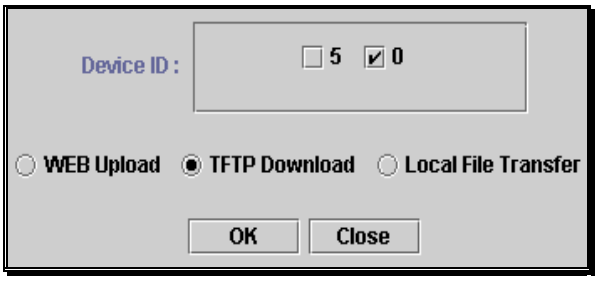
<Ping> The **Ping** is a commonly used tool to detect the remote host or IP address exists or not. Moreover, network status also can be known by the ratio of packets Reply and Loss.



<Telnet> By simply clicking the **<Telnet>** button, the Telnet program implements and displays login screen.

<Contact> Contact technicians for technical support by E-Mail

<Upgrade>

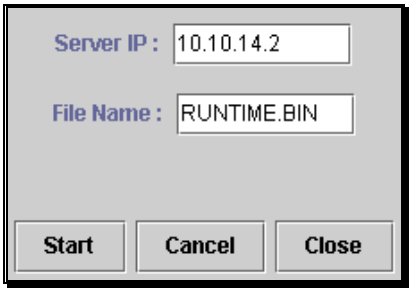


WEB Upload

1. Select Device ID and "WEB Upload" radio button then click OK
2. Specify the file path by clicking Browse button and click Start

TFTP Download

1. Select Device ID and "TFTP Download" radio button then click OK
2. Enter the TFTP server's IP address in Server IP field
3. Enter file name in File Name field
4. Click Start button to download the code and system update with it automatically



Local File Transfer

1. Select Device ID and "Local File Transfer" radio button then click

OK

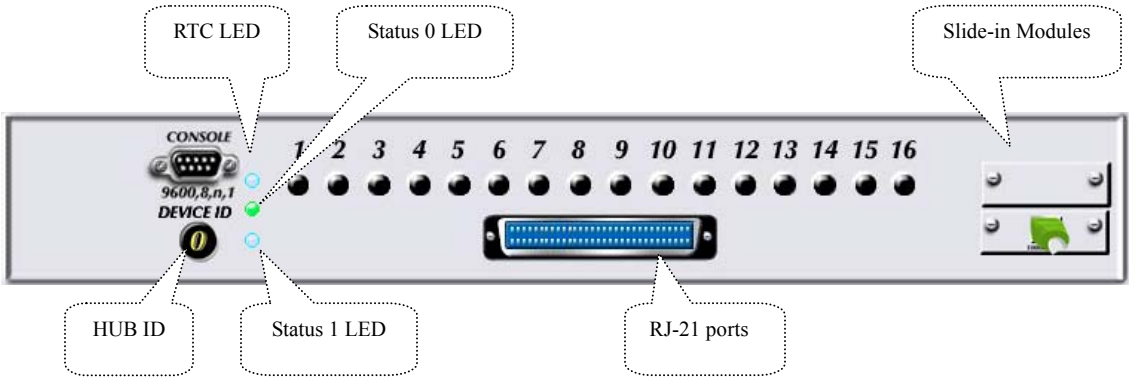
2. Click “Application” or ”Java Applet” radio button
3. The system starting software synchronization from Master Device **(That the synchronized hardware should be identical to Master Device)**

Application --- System firmware
Java Applet --- Web User Interface

<Device□> The shortcut to go to another member switch in the management stack

Device

Panel Display



Network Configuration

IP Address	IP address of this device
Subnet Mask	NetMask of your network
Gateway IP	IP address of Gateway

Device Information

Name	Naming the system (optional)
Location	Where the management stack locates (optional)

Note

The Network Configuration and Device Information of Master Device in the management stack will become system parameters automatically.

Topology Info

Information

Device ID	H/W. Ver	Boot-UP Ver	POST Ver.	Runtime Ver.	JAVA Applet Ver.	Agent Status	Device Name	Device Location
0	R0	2.0(6/12/20...	2.0(6/12/...	2.0(7/11/2002)	2.0(8/13/2002)	MASTER	Marketing D...	Headquarter
5	R0	2.0(6/12/20...	2.0(6/12/...	2.0(7/11/2002)	2.0(8/14/2002)	SLAVE	Manufacturi...	NONE

This page displays information about the switch(es), such as Device ID, Hardware version, Boot-Up version, POST version, Runtime version (Firmware version), JAVA Applet version (Web User Interface version), Device Name and Device Location. When management stack persist, by the Device ID, all the members are transparently listed.

Ports

Information

It is a ports' configurations summary table. Via the summary table, you can know status of each port clear at a glance, like *Link Up/Link Down, Enable/Disable, Link Speed, Profile, Up/Down Rate, Up/Down SNR, Duplex mode* and *Flow Control*.

Information | Configuration | Statistic | Location Search | OAM-Like

Port	Name	Type	Link	Admin	Profile	Up Rate	Down Rate	Up SNR	Down SNR
1	Alex	VDSL	Link Down	Enable	VE-5	0.000	0.000	0.000	0.000
2	Max	VDSL	Link Down	Enable	VE-15	0.000	0.000	0.000	0.000
3	Crystal	VDSL	Link Down	Enable	VE-10	0.000	0.000	0.000	0.000
4	Tina	VDSL	Link Down	Enable	VE-10	0.000	0.000	0.000	0.000
5	Jeff	VDSL	Link Down	Enable	VE-10	0.000	0.000	0.000	0.000
6	Richard	VDSL	Link Down	Enable	VE-10	0.000	0.000	0.000	0.000
7	Maggie	VDSL	Link Up	Enable	ETSI	4.690	12.500	34.600	40.860
8	Max	VDSL	Link Down	Enable	VE-15	0.000	0.000	0.000	0.000
9	Max	VDSL	Link Down	Enable	VE-15	0.000	0.000	0.000	0.000
10	Max	VDSL	Link Down	Enable	VE-15	0.000	0.000	0.000	0.000
11	N/A	VDSL	Link Down	Enable	VE-10	0.000	0.000	0.000	0.000
12	N/A	VDSL	Link Down	Enable	VE-10	0.000	0.000	0.000	0.000
13	N/A	VDSL	Link Down	Enable	VE-10	0.000	0.000	0.000	0.000
14	N/A	VDSL	Link Down	Enable	VE-10	0.000	0.000	0.000	0.000
15	N/A	VDSL	Link Down	Enable	VE-10	0.000	0.000	0.000	0.000

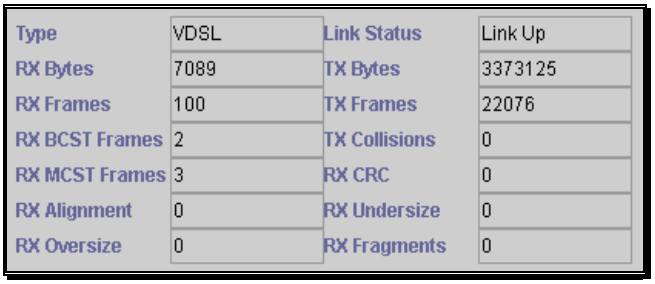
Port	Name	Type	Link	Admin	Speed	Duplex	Flow Ctrl
17	N/A	NONE	Link Down	Disable	Auto	Auto	Disable
18	N/A	1000T	Link Up	Enable	100M	Full	Disable

The line quality is determined by using the **SNR** (Signal to Noise Ratio) and applies to VDSL line connections only. SNR is the ratio of the amplitude of the actual signal to the amplitude of noise signals at a given point in time. The higher SNR, the better line quality. Please manually adapt profile according to line quality

and distance to get better performance or replace the line with new one.

Note

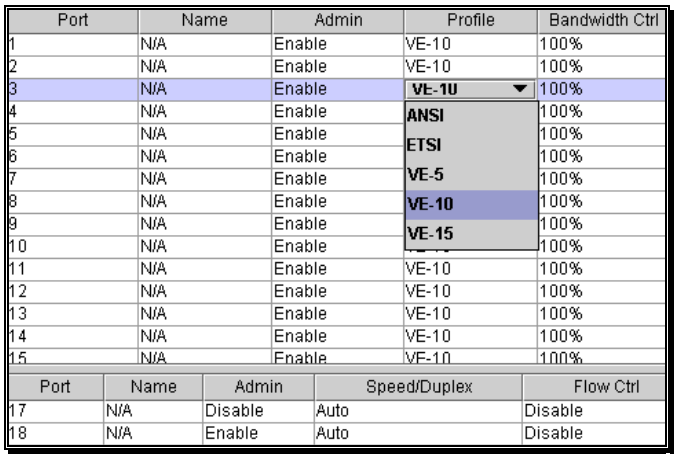
Also by simply clicking the port on the '**Panel Display'**, the port information screen pops up



Type	VDSL	Link Status	Link Up
RX Bytes	7089	TX Bytes	3373125
RX Frames	100	TX Frames	22076
RX BCST Frames	2	TX Collisions	0
RX MCST Frames	3	RX CRC	0
RX Alignment	0	RX Undersize	0
RX Oversize	0	RX Fragments	0

Configuration

Port attributes can be setup in this page.



Port	Name	Admin	Profile	Bandwidth Ctrl
1	N/A	Enable	VE-10	100%
2	N/A	Enable	VE-10	100%
3	N/A	Enable	VE-10	100%
4	N/A	Enable		100%
5	N/A	Enable		100%
6	N/A	Enable		100%
7	N/A	Enable		100%
8	N/A	Enable		100%
9	N/A	Enable		100%
10	N/A	Enable		100%
11	N/A	Enable	VE-10	100%
12	N/A	Enable	VE-10	100%
13	N/A	Enable	VE-10	100%
14	N/A	Enable	VE-10	100%
15	N/A	Enable	VE-10	100%

ANSI
ETSI
VE-5
VE-10
VE-15

Port	Name	Admin	Speed/Duplex	Flow Ctrl
17	N/A	Disable	Auto	Disable
18	N/A	Enable	Auto	Disable

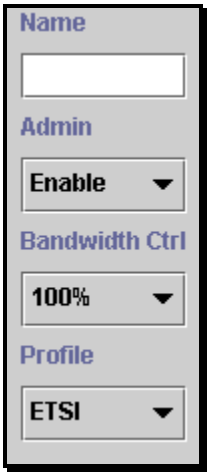
Setup Port Attributes

1. Click the "Name" column of the port. Enter a name for identification, like 'Richard'; and **press Enter**
2. Leave the "Admin" column 'Enable' value to make the port to be in operation or 'Disable' to pause it
3. Select **Profile (VDSL port)**---VE-10; ETSI; VE-5; VE-10, VE-15
   Duplex mode (Gigabit port)---10Half/10Full; 100Half/100Full, 'Auto' for auto-negotiation and **1000Full auto-detection**

4. Select 'Enable' to take "Flow Control" effect or select the predefined "Bandwidth Control" scale (10%~100%)
5. Click Apply button to apply settings

Note

Also accomplished by simply mouse right-click the port on the '**Panel Display**' then select **'Configuration'**, the configuration screen pops up



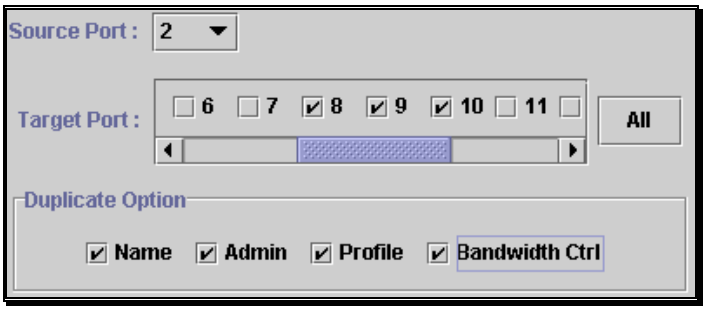
Flow Control operation mode (Gigabit port)

Speed / Duplex mode	Flow Control
10Half	Back pressure
100Half	Back pressure
1000Half	Back Pressure

Speed / Duplex mode	Flow Control
10Full	IEEE 802.3x Pause Frame
100Full	IEEE 802.3x Pause Frame
1000Full	IEEE 802.3x Pause Frame

Duplicate Port Attributes

Click “Duplicate” button, the dialogue screen appears.



1. Select Source Port (for example Port 2)
2. Select Target Port, click All for select all (for example Port 8, 9, 10)
3. Select the port attributes you want to duplicate
4. Click OK to submit values
5. Click Apply button to apply settings
6. As the following result, port 2 is duplicated to port 8, 9, 10 accompany with specified attributes.

Port	Name	Admin	Profile	Bandwidth Ctrl
1	Alex	Enable	VE-10	100%
2	Max	Enable	VE-15	50%
3	Crystal	Enable	VE-10	100%
4	Tina	Enable	VE-10	100%
5	Jeff	Enable	VE-10	100%
6	Richard	Enable	VE-10	100%
7	N/A	Enable	VE-10	100%
8	Max	Enable	VE-15	50%
9	Max	Enable	VE-15	50%
10	Max	Enable	VE-15	50%
11	N/A	Enable	VE-10	100%
12	N/A	Enable	VE-10	100%
13	N/A	Enable	VE-10	100%
14	N/A	Enable	VE-10	100%
15	N/A	Enable	VE-10	100%

Note

Also accomplished by simply mouse right-click the port on the ‘**Panel Display**’ then select **‘Copy Setting’** to duplicate port properties and select **‘Past Setting’** when point at destination port

Statistic

Ether Like Frame Types

RX Bytes	**N**umber of bytes received in good and bad frames
RX Frames	**N**umber of good and bad packets received
RX crc_err	**N**umber of CRC errors received
TX Byte	**N**umber of bytes transmitted in good and bad frames
TX Frames	**N**umber of good and bad packets transmitted
TX Collisions	**N**umber of collisions on transmitted frames
TX drops	**F**rames dropped due to lack of receive buffer
TX underruns	**I**ncrements when packet transmission fails due to the inability of the interface to retrieve packets from the local packet buffer fast enough to transmit them onto the network

RX Good Frame Types

RX Bytes	**N**umber of bytes received in good and bad frames
RX frames	**N**umber of good and bad packets received
RX broadcasts	**N**umber of good broadcasts
RX multicasts	**N**umber of good multicasts
RX less64_pkts	**N**umber of short frames with invalid CRC (<64 bytes)
RX 65to127_pkts	**N**umber of 65 to 127-bytes frames in good and bad packets
RX 128to255_pkts	**N**umber of 128 to 255-bytes frames in good and bad packets
RX 256to511_pkts	**N**umber of 256 to 511-bytes frames in good and bad packets
RX 512to1023_pkts	**N**umber of 512 to 1023-bytes frames in good and bad packets

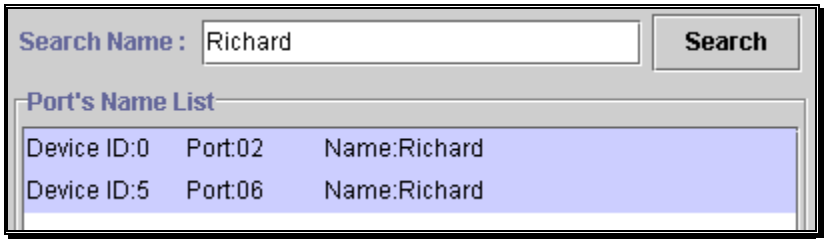
RX 1024more_pkts	**N**umber of 1024 to max-length-type frames in good and bad packets

RX Error Frame Types

RX alignment_err	**N**umber of alignment errors received
RX crc_err	**N**umber of CRC errors received
RX oversize_err	**N**umber of long frames with valid CRC
RX undersize_err	**N**umber of short frames with valid CRC
RX fragments_err	**N**umber of short frames with invalid CRC
RX jabbers_err	**N**umber of long frames with invalid CRC

Location Search

A denominate port can be searched by its given name. (Match whole word only)



OAM-Like

OAM (Operation Administration Maintenance) is a powerful tool indispensable to telecommunication technician for troubleshooting and diagnosis. Experienced technicians can perform looping tests with OAM tool to discover abnormal nodes or segments.

The OAM-Like is a simplified-OAM, which features the switch to run looping tests while remote administration by simply mouse clicking. The VDSL switch also negotiates with CPE to know the link status and recognize hardware version, software version and Ethernet port link status of CPE device.

- **Information**

Link	VDSL port Link status (Link Up/Down)
CPE H/W Ver	Hardware version of CPE

CPE S/W Ver Software version of CPE

CPE Ethernet Link Ethernet port status (Link Up/Down)

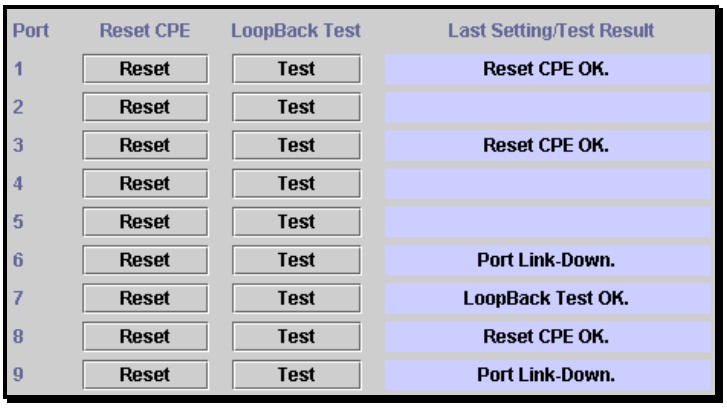
- **Configuration**

Reset button

Click the Reset button can reset the CPE which is connected to the port.

Test button

Click the TEST button to perform LoopBack Test. The test result shows on the right.



Port	Reset CPE	LoopBack Test	Last Setting/Test Result
1	Reset	Test	Reset CPE OK.
2	Reset	Test	
3	Reset	Test	Reset CPE OK.
4	Reset	Test	
5	Reset	Test	
6	Reset	Test	Port Link-Down.
7	Reset	Test	LoopBack Test OK.
8	Reset	Test	Reset CPE OK.
9	Reset	Test	Port Link-Down.

SNMP

Simple Network Management Protocol (SNMP) is a communication protocol for managing devices on a network. It is commonly used for network administrators to communicate with multiple devices (hub, switch, router ……) for configuring and monitoring while convenient for troubleshooting but no miscellaneous platform consideration.
The built-in SNMP is an agent, which watches the status of it self. The Network Management Station (A computer attached to network with SNMP management program well installed) can be used to access it.

Community

A valid entry of Community String and IP Address is for authentication to login to the SNMP agent for configuration. Moreover, the community capacity can up to 3 sets and only by the way of specified IP address here will be allowed to access the agent. One entry consist of IP address "0.0.0.0" will allow the ones who know the community string to access the agent (with Read-Only access right) without limitation.

To Add a community

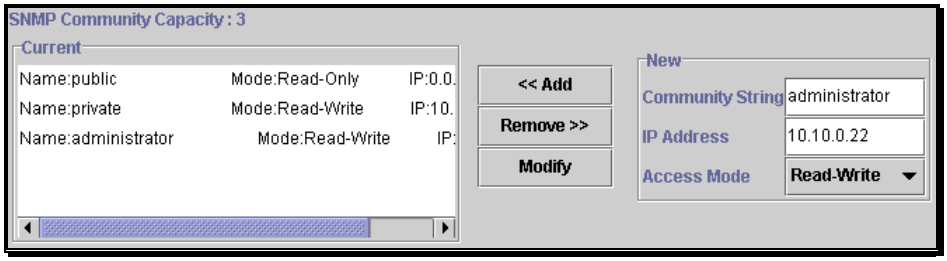
1. Input a name as a community string for authentication in the "Community String" field (ex: administrator)
2. Enter the IP address in the "IP address" field you allow to access from (ex: 192.168.1.22)
3. Click the "Access Mode" combo box and select a authority (Read-Only / Read-Write)
4. Click <<Add button to add this entry

To Remove a Community

1. Select the community you want to remove from the "Current" list
2. Click Remove>> button to remove it

To Modify a Community

1. Select one community you want to modify in the “Current” column
2. The “New” column lists the corresponding values; please modify it
3. Click Modify button to update the entry



Trap Manager

Trap Manager specifies the Network Management Stations (NMS) that will receive trap messages from the SNMP agent and can up to 5 entries. A Trap Manager entry with Aging Time “0” will never expire; and Aging Time “10” will expire when 10 minutes is up and no trap messages can corresponding entry receive.

To Add a Trap Manager

1. Input a name for authentication in the “Community String” field (ex: administrator)
2. Enter the IP address in the “IP address” field you allow to access from (ex: 192.168.1.22)
3. Enter a expiry time for this entry will be durable in minutes (“0” for never expires)
4. Click <<Add button to add the entry

To Remove a Community

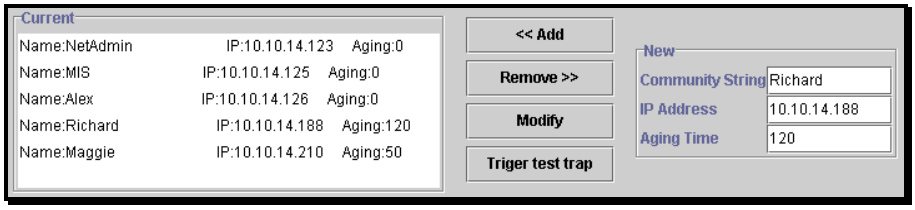
1. Select the community you want to remove from the “Current” list
2. Click Remove>> button to remove it

To Modify a Community

1. Select one community you want to modify in the “Current” column
2. The “New” column lists the corresponding values; please modify it
3. Click Modify button to update the entry

To test Trap Manager

Press Trigger test trap button, one test trap will be sent to all NMS that have been added to Trap Manager list.



Trap Filtering

Check the "Enable" boxes by mouse clicking to receive a notice when corresponding event occurs.

Option	Enable
Cold Boot	☑
Warm Boot	☑
Cluster Changed	☑
Link UP	☑
Link Down	☑
Device Inserted	☑
Device Removed	☑
Port Intrusion	☑
Flash Updated	☑
Test Only	☑
Console Login	☑
SNMP Authentication Failure	☑
STA Topology Change	☑
STA New Root	☑

VLAN

The VLAN is a group of ports that may spread around the network but communicate as though they belong to one subnet. By using IEEE 802.1Q compliant VLAN, all ports can be reorganized into separate broadcast domains for security reasons and reduce bandwidth occupation instead of using routers to divide whole network into subnets. It produces cleaner network environment by reducing broadcast traffic and simplify network management by allowing you to move devices to another VLAN without changing physical connections.

- **802.1Q VLAN**

  Before enabling 802.1Q VLAN , pay attention to

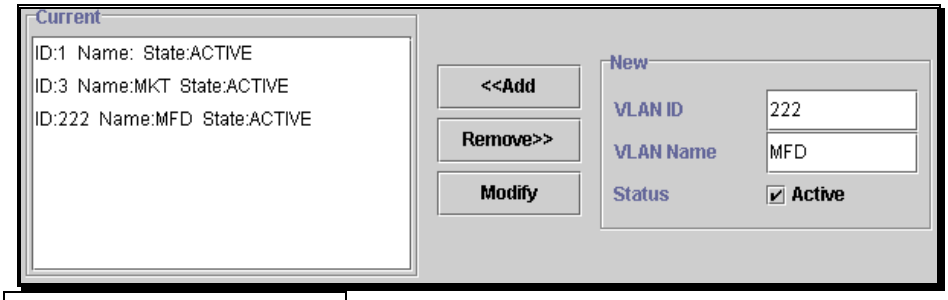
  · All ports are default to VLAN 1 and assigned PVID 1
  · All the ports of a Aggregation Group must be treated as an integer when added to/deleted from a VLAN

  VLAN Static List

  This screen is used to Add / Remove / Modify VLAN and up to 255 groups. The VLAN groups that have been created are all listed here.

  To create a new VLAN group

  1. Specify the name for the new VLAN group (VLAN name is only used for identification)
  2. Enter a number (VLAN ID) for the new VLAN group
  3. Check the "**Active**" box to activate the VLAN or leave it blank and activate it afterward
  4. Click <<Add button to create the new VLAN



To remove a VLAN group

1. Select a VLAN group you want to remove from the "Current" list
2. Click Remove>> button to remove it

Attention 1. If a removed port is no longer belong to any other group, it is temporarily disabled because no one can communicate with it.
2. If one port's PVID is equal to this VLAN ID, removing this VLAN group will not allow until you change it.

To modify a VLAN group

1. Select a VLAN group you want to modify from the current list
2. Modify parameters in "New" column
3. Click Modify button to submit the new parameters

VLAN Static Table

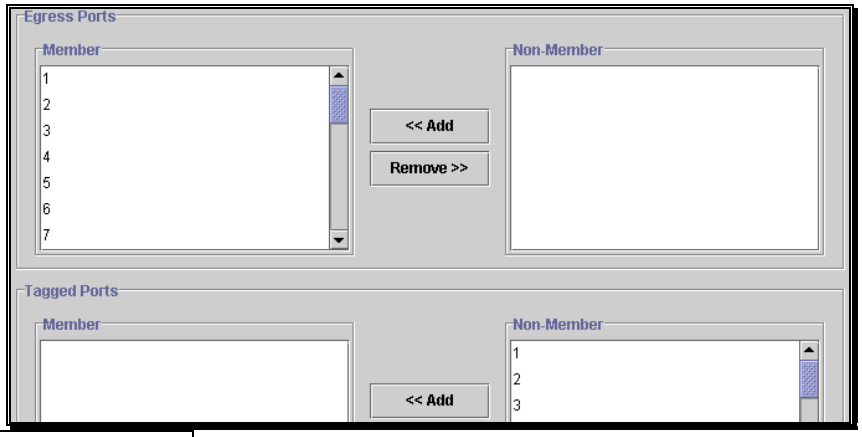
This screen is used to Add/Remove member ports of a VLAN.

Egress Ports/Member

The ports that have been added to the displayed VLAN group

Tagged Ports/Member

The tagged ports of the displayed VLAN group



To add member port

1. Click the "VLAN ID" combo box and select a VLAN you want new ports to join in
2. Select ports (press Shift/Ctrl key for selecting multi ports) in the "Non-Member" column
3. Click <<Add button to join selected ports in

To remove member port

1. Click the "VLAN ID" combo box and select a VLAN you want to remove ports
2. Select ports (with Shift/Ctrl key to select multi ports) in the "Member" column
3. Click Remove>> button to delete selected ports

Note

1. If a removed port is no longer belong to any other group, it is temporarily disabled because no one can communicate with it
2. The port which is assigned a PVID and the PVID is equal to VLAN ID, removing the port will not allow until you change it

VLAN Port Configuration

When the VLAN-enabled switch receives an untagged packet, the packet will be sent to the port's default VLAN according to the PVID (port VLAN ID) of

the receiving port.

Port	PVID	Ingress Filtering
1	1	Disable
2	1	Disable
3	1	Disable
4	1	Enable
5	1	Enable
6	1	Disable
7	1	Disable
8	1	Enable
9	1	Disable
10	1	Enable
11	1	Disable

To change the PVID

1. Double click the "PVID" column of a port
2. Input a new VLAN ID (1~255)
3. Press **"Enter"** to submit the value
4. Click Apply button to apply it

Note

1. All the ports are default as members of VLAN 1 and assigned PVID 1
2. The port which was assigned a PVID and the PVID is equal to VLAN ID, removing the port will not allow until you change it
3. Automatically, a port will join the VLAN of its PVID, and if the VLAN does not exist, system will create it

To Enable/Disable Ingress Filtering

When one packet comes in from **Port X** to **VLAN Y**, but **Port X** is not a member of **VLAN Y**

Ingress Filter **Enabled** The filter checks the packet and detects **Port X** does not belong to the **VLAN Y**, the Ingress Filter discards the packet.

Ingress Filter Disabled All the packets destined to **VLAN Y** are all unobstructed.

Click the “Ingress Filtering” column of a port and select ‘Enable’ to activate Ingress Filter

Port Group VLAN

The Port Group VLAN (Port-based VLAN) is concentrate on definite ports. The packets forwarding policies are based on destination MAC addresses or related ports by voluntary learning relationship of MAC addresses and its related ports.

All Together

Click All Together button then all the ports of the switch will be added to VLAN group 1

All Independent

Click All Independent button then all the ports will be divided into separated subnets, that are 26 subnets

Every port can belong to different Port Group VLANs simultaneously without limitation.

IGMP Snooping

Multicasting is widely used to support multi-media applications such as video conferencing. The multicasting simply broadcasts its services to the group of a network instead of establishing connections separately with every host that subscribed the services. With no Multicast Filtering-aware switches, a multicast server may floods broadcast-data overall the broadcast domain and wastes a lot of bandwidth.

The Internet Group Management Protocol (IGMP) snooping uses the protocol to make switches join/leave multicast group and interacts switches to optimize the network performance by monitoring the IGMP packets and forward to the ports containing multicast hosts or switches. This will efficiently reduce the multicast traffic rather than flooding overall network. IGMP snooping is more and more important especially when the multi-media demand is booming.

Note

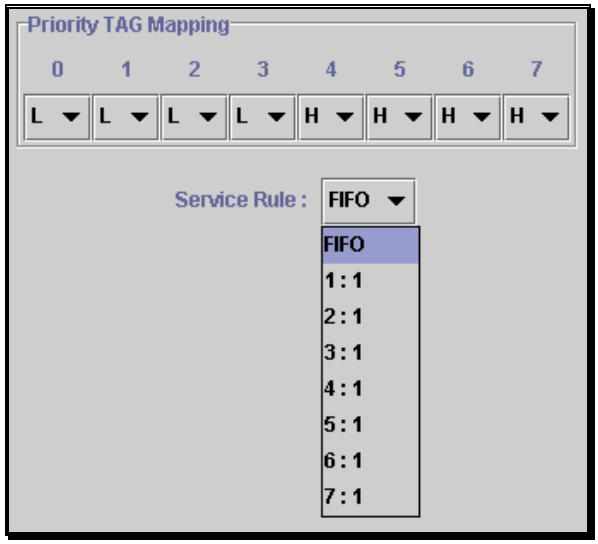
As IGMP Snooping only operates under 802.1Q VLAN mode, please change VLAN mode from Port Group VLAN to 802.1Q VLAN before enabling IGMP Snooping.

Priority

This switch supports IEEE802.1p CoS with 2-level priority. There are 8 traffic classes and 8 Service Rules in the Priority Map. When one packet carries with priority-tag, which has specified a CoS (Class of Service) comes into the switch, the specified CoS tag will determine what priority (Low/High) will it get according to the Priority Map in the switch.

Service Rule

FIFO	The first in packet, the first out packet **(No priority)**
1□1	Send 1 high priority packet, then 1 low priority packet
2□1	Send 2 high priority packets, then 1 low priority packet
3□1	Send 3 high priority packets, then 1 low priority packet
4□1	……..
5□1	……..
6□1	……..
7□1	Send 7 high priority packets, then 1 low priority packet



Address Table

The address table is the learning table, which is composed of many entries and is the most important base to do packet filtering and forwarding.

MAC Address List

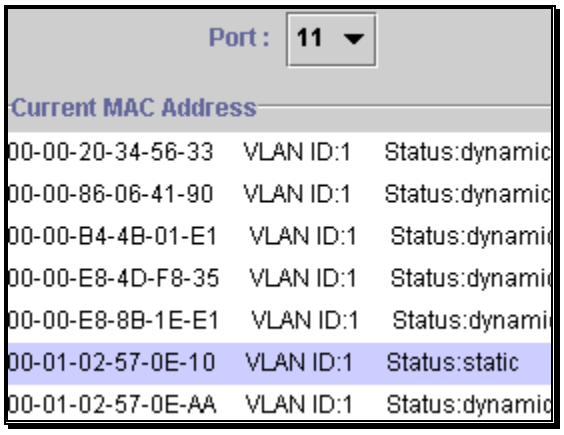
Choose the port you preferred to view the address table and click "Refresh" button, the MAC address table will be list.

Configuration

Dynamic Address Counts	Number of MAC addresses automatically learned by the current clustering switch
Static Address Counts	Number of MAC addresses manually added to the current clustering switch

To add a static address

1. Click the combo box and select a port, then the MAC address table of the port appears
2. Fill in configuration value (VLAN ID, MAC address), then click "<<Add" button (Note that ports on the switch are all default to VLAN 1)



Note

The ports of Port Aggregation Group can not be added in Static Address table

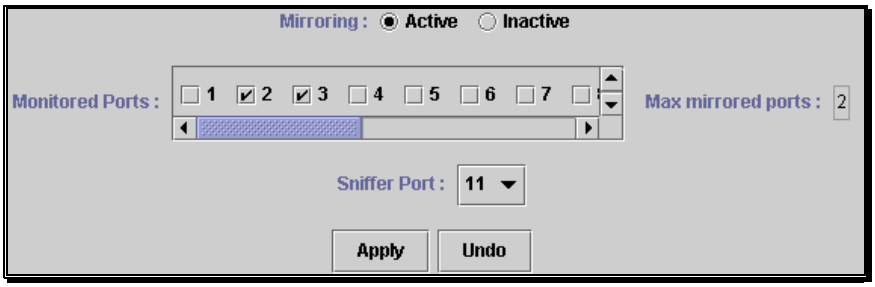
To remove a static address

1. Click the static address in the MAC address table of the port
2. Click "Remove>>" button to remove it from MAC address table

Mirror

Port mirror is used to mirror traffic from source port to a target port for analysis. Only 2 ports can be monitored (mirrored) simultaneously to 1 sniffer port (target port). (Note that the target port must be in the same VLAN as the source port)

1. Click "Active" radio button to activate port mirror
2. Select 'Monitored Ports' (up to 2 ports)
3. Click 'Sniffer Port' combo box and select a sniffer port (target port) and click "Apply" to apply
4. This figure describes port 2 and port 3 will be mirrored to port 11



6. Product Specifications

Standard	IEEE802.3 10BASE-T
	IEEE802.3u 100BASE-TX
	IEEE802.3x full-duplex operation and flow control
	IEEE802.3ab 1000BASE-T
	IEEE802.3z 1000BASE-SX, 1000BASE-LX
	IEEE802.1Q VLAN interoperability
	IEEE802.1p Priority Operation
	Ethernet over VDSL
Interface	16 * VDSL ports within 1 RJ-21 connector
	2 * slide-in slots for optional gigabit copper/fiber modules
	1 * RS-232 console port
	1 * system reset button
	2 * RJ-45 connectors for proprietary management bus
	1 * HUB ID rotary switch
Cable Connections	RJ-45 (10BASE-T): Category 3,4,5 UTP/STP
	RJ-45 (100BASE-TX): Category 5 UTP/STP
	RJ-45 (1000BASE-T): Category 5, 5e UTP/STP
	62.5/125 μm MMF
	50/125 μm MMF
	9/125 μm SMF

LED indications	System Power; RTC; Status 0; Status 1; Link (management stack) VDSL Port LINK; ACT Slide-in slot LINK/ACT
Memory	6K MAC entries 3Mbit packet switching
Emission	FCC Class A, CE
Operating Temperature	0^0 ~ 50^0C (32^0 ~ 122^0F)
Operating Humidity	10% - 90%
Power Supply	100~240 VAC, 50~60 Hz