P-870MH-C1

VDSL Modem Over POTS

User's Guide

Version 3.50
12/2006
Edition 1

ZyXEL

www.zyxel.com

About This User's Guide

Intended Audience

This manual is intended for network administrators who want to configure the P-870MH-C1. You should have a basic knowledge of TCP/IP networking concepts.

This manual does not provide a lot of background information about the features in the P-870MH-C1. If you are not already familiar with these features, you should learn about them from other sources, such as the Internet or the corresponding DSLAM User's Guide.

Related Documentation

- Quick Start Guide
  The Quick Start Guide is designed to help you get up and running right away. It contains a detailed easy-to-follow connection diagram, default settings, handy checklists and information on setting up your network and configuring for Internet access.
- Supporting Disk
  Refer to the included CD for support documents.
- ZyXEL Web Site
  Please refer to www.zyxel.com for additional support documentation and product certifications.

User Guide Feedback

Help us help you. Send all User Guide-related comments, questions or suggestions for improvement to the following address, or use e-mail instead. Thank you!

The Technical Writing Team,
ZyXEL Communications Corp.,
6 Innovation Road II,
Science-Based Industrial Park,
Hsinchu, 300, Taiwan.

E-mail: techwriters@zyxel.com.tw

Document Conventions

Warnings and Notes

These are how warnings and notes are shown in this User's Guide.

Warnings tell you about things that could harm you or your device.

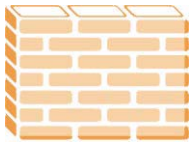
Notes tell you other important information (for example, other things you may need to configure or helpful tips)--or recommendations.

Syntax Conventions

- P-870MH-C1 is an abbreviation of the complete product name.
- Product labels, screen names, field labels and field choices are all in **bold** font.
- Command keywords are in `courier new` font.
- User input fields are enclosed in angle brackets <>.
  `sys hostname <hostname>`
- In commands, the vertical bar `|` means "or".
  `vlanQoS modechane <0|1>`
- In commands, optional fields are enclosed in square brackets `[]`. The User's Guide explains what happens if you do or do not enter the value in the square brackets.
  `sys stdio [<0..3600>]`
- A key stroke is denoted by square brackets and uppercase text, for example, [ENTER] means the "enter" or "return" key on your keyboard.
- "Enter" means for you to type one or more characters and then press the [ENTER] key. "Select" or "choose" means for you to use one of the predefined choices.
- A right angle bracket (>) within a screen name denotes a mouse click. For example, **Maintenance > Log > Log Setting** means you first click **Maintenance** in the navigation panel, then the **Log** sub menu and finally the **Log Setting** tab to get to that screen.
- Units of measurement may denote the "metric" value or the "scientific" value. For example, "k" for kilo may denote "1000" or "1024", "M" for mega may denote "1000000" or "1048576" and so on.
- "e.g.," is a shorthand for "for instance", and "i.e.," means "that is" or "in other words".

Icons Used in Figures

Figures in this User's Guide may use the following generic icons. The P-870MH-C1 icon is not an exact representation of your device.

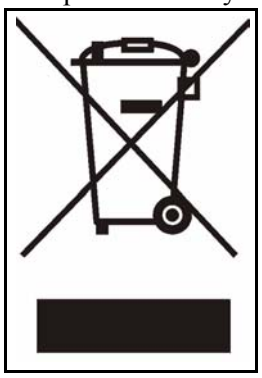
P-870MH-C1 	Computer 	Notebook computer 
Server 	DSLAM 	Firewall 
Telephone 	Switch 	Router 

Safety Warnings

For your safety, be sure to read and follow all warning notices and instructions.

- Do NOT use this product near water, for example, in a wet basement or near a swimming pool.
- Do NOT expose your device to dampness, dust or corrosive liquids.
- Do NOT store things on the device.
- Do NOT install, use, or service this device during a thunderstorm. There is a remote risk of electric shock from lightning.
- Connect ONLY suitable accessories to the device.
- Do NOT open the device or unit. Opening or removing covers can expose you to dangerous high voltage points or other risks. ONLY qualified service personnel should service or disassemble this device. Please contact your vendor for further information.
- Make sure to connect the cables to the correct ports.
- Place connecting cables carefully so that no one will step on them or stumble over them.
- Always disconnect all cables from this device before servicing or disassembling.
- Use ONLY an appropriate power adaptor or cord for your device.
- Connect the power adaptor or cord to the right supply voltage (for example, 110V AC in North America or 230V AC in Europe).
- Do NOT allow anything to rest on the power adaptor or cord and do NOT place the product where anyone can walk on the power adaptor or cord.
- Do NOT use the device if the power adaptor or cord is damaged as it might cause electrocution.
- If the power adaptor or cord is damaged, remove it from the power outlet.
- Do NOT attempt to repair the power adaptor or cord. Contact your local vendor to order a new one.
- Do not use the device outside, and make sure all the connections are indoors. There is a remote risk of electric shock from lightning.
- CAUTION: RISK OF EXPLOSION IF BATTERY (on the motherboard) IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS. Dispose them at the applicable collection point for the recycling of electrical and electronic equipment. For detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the store where you purchased the product.
- Do NOT obstruct the device ventilation slots, as insufficient airflow may harm your device.
- Use only No. 26 AWG (American Wire Gauge) or larger telecommunication line cord.
- If you wall mount your device, make sure that no electrical lines, gas or water pipes will be damaged.

This product is recyclable. Dispose of it properly.



Contents Overview

Table of Contents

List of Figures

List of Tables

PART I
Introduction and SMT

This part contains the following chapters.

1

Introducing the P-870MH-C1

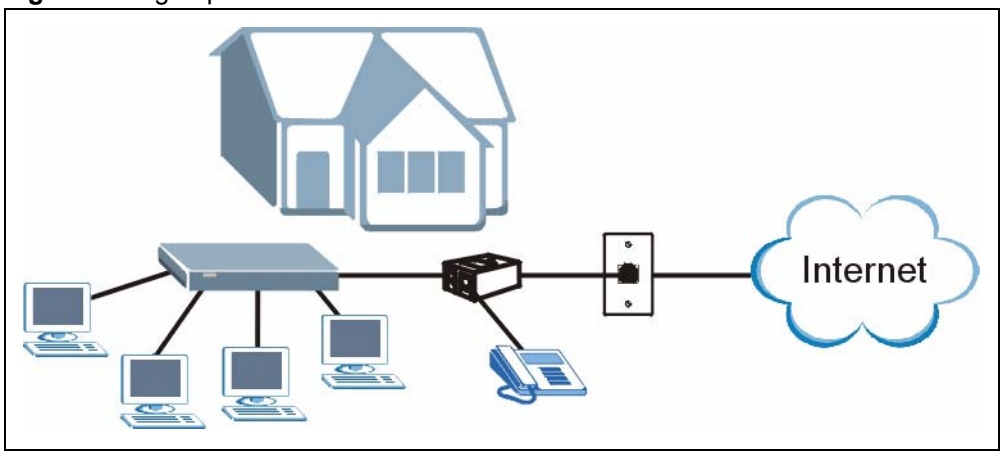
This chapter introduces the main applications and features of the P-870MH-C1. It also introduces the ways you can manage the P-870MH-C1.

1.1 Overview

The P-870MH-C1 is a VDSL modem with a four-port switch. VDSL offers high-speed Internet access, which is ideal for data, voice, and video services (also known as Triple Play Service). The four-port switch lets you connect up to four computers to the P-870MH-C1. See Appendix A on page 67 for a complete list of features.

The P-870MH-C1 is designed for high-speed Internet access at home.

Figure 1 High-speed Internet Access with the P-870MH-C1



Connect your computer(s) to the P-870MH-C1. The P-870MH-C1 uses the phone line to provide high-speed Internet access to the computer(s). You can continue to use the phone line for regular phone calls as well. See the Quick Start Guide for instructions to make these connections.

1.2 Ways to Manage the P-870MH-C1

Use any of the following methods to manage the P-870MH-C1.

- SMT (System Management Terminal) (Chapter 2 on page 23). This is the recommended method for device configuration and management. You can use the SMT to configure most of the settings on the P-870MH-C1.
- Command interface (Chapter 5 on page 41). Only use the commands to configure advanced settings not configurable in the SMT.
- FTP for firmware upgrades and configuration backup/restore (Chapter 4 on page 35)

1.3 Good Habits for Managing the P-870MH-C1

Do the following things regularly to make the P-870MH-C1 more secure and to manage the P-870MH-C1 more effectively.

- Change the password. Use a password that's not easy to guess and that consists of different types of characters, such as numbers and letters.
- Write down the password and put it in a safe place.

Back up the configuration (and make sure you know how to restore it). Restoring an earlier working configuration may be useful if the device becomes unstable or even crashes. If you forget your password, you will have to reset the P-870MH-C1 to its factory default settings. If you backed up an earlier configuration file, you would not have to totally re-configure the P-870MH-C1. You could simply restore your last configuration.

1.4 LEDs

Figure 2 LEDs

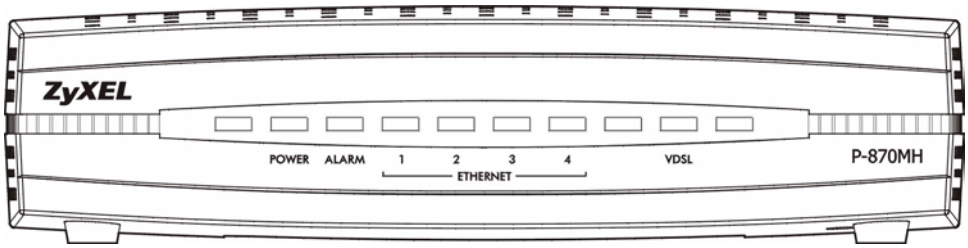


Table 1 LEDs

LED	COLOR	STATUS	DESCRIPTION
POWER	Green	On	The P-870MH-C1 is receiving power.
		Blinking	The P-870MH-C1 is performing testing.
		Off	The P-870MH-C1 is not receiving power.
ALARM	Red	On	The P-870MH-C1 is functioning abnormally.
		Blinks Once	This LED blinks once when the P-870MH-C1 starts up.
		Off	The P-870MH-C1 is functioning normally.
ETHERNET 1-4	Green	On	The P-870MH-C1 has a successful connection on this port.
		Blinking	The P-870MH-C1 is sending/receiving data on this port.
		Off	The P-870MH-C1 does not have a connection on this port.
VDSL	Green	On	The P-870MH-C1 has a successful DSL connection.
		Blinking	The P-870MH-C1 is looking for a DSL connection.
		Off	The P-870MH-C1 does not have a DSL connection.

2

Introducing the SMT

This chapter explains how to access and navigate the System Management Terminal and gives an overview of its menus.

2.1 SMT Introduction

The P-870MH-C1's SMT (System Management Terminal) is a menu-driven interface that you can access from a terminal emulator over a telnet connection. This chapter shows you how to access the SMT (System Management Terminal) menus via Telnet, how to navigate the SMT and how to configure SMT menus.

2.1.1 Procedure for SMT Configuration via Telnet

The following procedure details how to telnet into your P-870MH-C1.

1. In Windows, click **Start** (usually in the bottom left corner), **Run** and then type "`telnet 192.168.1.2`" (the default IP address) and click **OK**.
2. Enter "`1234`" in the **Password** field.
3. After entering the password you will see the main menu.

Please note that if there is no activity for longer than five minutes (default timeout period) after you log in, your P-870MH-C1 will automatically log you out. You will then have to telnet into the P-870MH-C1 again.

2.1.2 Entering Password

The login screen appears after you press [ENTER], prompting you to enter the password, as shown next.

For your first login, enter the default password "`1234`". As you type the password, the screen displays an asterisk "`*`" for each character you type.

Please note that if there is no activity for longer than five minutes after you log in, your P-870MH-C1 will automatically log you out.

Figure 3 Login Screen

```
Enter Password: ****
```

2.1.3 SMT Menus Overview

The following table gives you an overview of your P-870MH-C1's various SMT menus.

Table 2 SMT Menus Overview

MENUS	SUB MENUS	
1 General Setup	1.1 Configure Dynamic DNS	
3 LAN Setup	3.2 TCP/IP and DHCP Setup	3.2.1 IP Alias Setup
23 System Password		
24 System Maintenance	24.1 Status	
	24.2 System Information and Console Port Speed	24.2.1 Information
		24.2.2 Change Console Port Speed
	24.3 Log and Trace	24.3.1 View Error Log
		24.3.2 UNIX Syslog
	24.7 Upload Firmware	24.7.1 Upload System Firmware
		24.7.2 Upload System Configuration File
	24.8 Command Interpreter Mode	

2.2 Navigating the SMT Interface

The SMT (System Management Terminal) is the preferred interface that you use to configure your P-870MH-C1.

Several operations that you should be familiar with before you attempt to modify the configuration are listed in the table below.

Table 3 Navigating the SMT Interface

OPERATION	KEY STROKE	DESCRIPTION
Move down to another menu	[ENTER]	To move forward to a submenu, type in the number of the desired submenu and press [ENTER].
Move up to a previous menu	[ESC]	Press [ESC] to move back to the previous menu.
Move to a hidden menu	Press [SPACE BAR] to change **No** to **Yes** then press [ENTER].	Fields beginning with "Edit" lead to hidden menus and have a default setting of **No**. Press [SPACE BAR] once to change **No** to **Yes**, then press [ENTER] to go to the "hidden" menu.
Move the cursor	[ENTER] or [UP]/ [DOWN] arrow keys.	Within a menu, press [ENTER] to move to the next field. You can also use the [UP]/[DOWN] arrow keys to move to the previous and the next field, respectively.
Entering information	Type in or press [SPACE BAR], then press [ENTER].	You need to fill in two types of fields. The first requires you to type in the appropriate information. The second allows you to cycle through the available choices by pressing [SPACE BAR].
Required fields	<? > or **ChangeMe**	All fields with the symbol <?> must be filled in order to be able to save the new configuration. All fields with **ChangeMe** must not be left blank in order to be able to save the new configuration.
N/A fields	<N/A>	Some of the fields in the SMT will show a <N/A>. This symbol refers to an option that is Not Applicable.

Table 3 Navigating the SMT Interface (continued)

OPERATION	KEY STROKE	DESCRIPTION
Save your configuration	[ENTER]	Save your configuration by pressing [ENTER] at the message "Press ENTER to confirm or ESC to cancel". Saving the data on the screen will take you, in most cases to the previous menu.
Exit the SMT		Type 99, then press [ENTER].Type 99 at the main menu prompt and press [ENTER] to exit the SMT interface.

After you enter the password, the SMT displays the main menu, as shown next.

Figure 4 SMT Main Menu

```
                Copyright (c) 1994 - 2006 ZyXEL Communications Corp.

                           P-870MH-C1 Main Menu

 Getting Started                        Advanced Management
   1. General Setup                       23. System Password
   3. LAN Setup                           24. System Maintenance


 Advanced Applications



                                          99. Exit

                       Enter Menu Selection Number:
```

2.2.1 System Management Terminal Interface Summary

Table 4 Main Menu Summary

#	MENU TITLE	DESCRIPTION
1	General Setup	Use this menu to set up your general information.
3	LAN Setup	Use this menu to set up your wireless LAN and LAN connection.
23	System Security	Use this menu to set up wireless security and change your password.
24	System Maintenance	This menu provides system status, diagnostics, software upload information.
99	Exit	Enter this number to exit from SMT.

2.3 Changing the System Password

Change the P-870MH-C1 default password by following the steps below.

1. Enter 23 in the main menu to display **Menu 23 - System Security**.
2. Enter 1 to display **Menu 23.1 - System Security - Change Password** as shown next.
3. Type your existing system password in the **Old Password** field, for example "`1234`", and press [ENTER].

Figure 5 Menu 23.1 Change Password

```
          Menu 23 - System Password

  Old Password= ?
  New Password= ?
  Retype to confirm= ?

   Enter here to CONFIRM or ESC to CANCEL:
```

4 Type your new system password in the **New Password** field (up to 30 characters), and press [ENTER].

5 Re-type your new system password in the **Retype to confirm** field for confirmation and press [ENTER].

Note that as you type a password, the screen displays an astrisk“*” for each character you type.

3

Configuration Using the SMT

This chapter shows you how to configure the P-870MH-C1 using the SMT.

3.1 General Setup

Menu 1 — General Setup contains administrative and system-related information (shown next). The **System Name** field is for identification purposes. However, because some ISPs check this name you should enter your computer's "Computer Name".

- In Windows 95/98 click **Start**, **Settings**, **Control Panel**, **Network**. Click the **Identification** tab, note the entry for the **Computer name** field and enter it as the P-870MH-C1 **System Name**.
- In Windows 2000 click **Start**, **Settings**, **Control Panel** and then double-click **System**. Click the **Network Identification** tab and then the **Properties** button. Note the entry for the **Computer name** field and enter it as the P-870MH-C1 **System Name**.
- In Windows XP, click **start**, **My Computer**, **View system information** and then click the **Computer Name** tab. Note the entry in the **Full computer name** field and enter it as the P-870MH-C1 **System Name**.

The **Domain Name** entry is what is propagated to the DHCP clients on the LAN. If you leave this blank, the domain name obtained by DHCP from the ISP is used. While you must enter the host name (System Name) on each individual computer, the domain name can be assigned from the P-870MH-C1 via DHCP.

3.2 Procedure To Configure Menu 1

Enter 1 in the Main Menu to open **Menu 1 — General Setup**.

Figure 6 Menu 1 General Setup

```
                Menu 1 - General Setup

System Name= ?
Domain Name=
Press ENTER to Confirm or ESC to Cancel:
```

Fill in the required fields. Refer to the table shown next for more information about these fields.

Table 5 Menu 1 General Setup

FIELD	DESCRIPTION
System Name	Choose a descriptive name for identification purposes. This name can be up to 30 alphanumeric characters long. Spaces are not allowed, but dashes "-" and underscores "_" are accepted.
Domain Name	Enter the domain name (if you know it) here. If you leave this field blank, the ISP may assign a domain name via DHCP. You can go to Menu 24.8 and type "sys domainname" to see the current domain name used by your gateway. If you want to clear this field just press the [SPACE BAR]. The domain name entered by you is given priority over the ISP assigned domain name.
When you have completed this menu, press [ENTER] at the prompt "`Press ENTER to Confirm or ESC to Cancel:`" to save your configuration, or press [ESC] at any time to cancel.	

3.3 LAN Setup

This section describes how to configure the Ethernet using **Menu 3.2 — TCP/IP and DHCP Ethernet Setup**.

To edit Menu 3.2, enter 3 from the main menu to display **Menu 3 — LAN Setup**. When Menu 3 appears, press 2 and press [ENTER] to display **Menu 3.2 — TCP/IP and DHCP Ethernet Setup** as shown next.

Figure 7 Menu 3.2 TCP/IP and DHCP Ethernet Setup

```
                Menu 3.2 - TCP/IP and DHCP Ethernet Setup


DHCP= None                              TCP/IP Setup:
Client IP Pool:
  Starting Address= N/A                 IP Address= 192.168.1.2
  Size of Client IP Pool= N/A           IP Subnet Mask= 255.255.255.0


                                        Multicast= None

                                        Edit IP Alias= No


                Press ENTER to Confirm or ESC to Cancel:
```

The following table describes the fields in this screen.

Table 6 Menu 3.2 TCP/IP and DHCP Ethernet Setup

FIELD	DESCRIPTION
DHCP	If set to **Server**, your P-870MH-C1 can assign IP addresses, a default gateway and DNS servers to a compuer(s) set to use a dynamic IP address. (DHCP client). If set to **None**, the DHCP server will be disabled. When DHCP server is used, the following items need to be set:
Client IP Pool	

Table 6 Menu 3.2 TCP/IP and DHCP Ethernet Setup (continued)

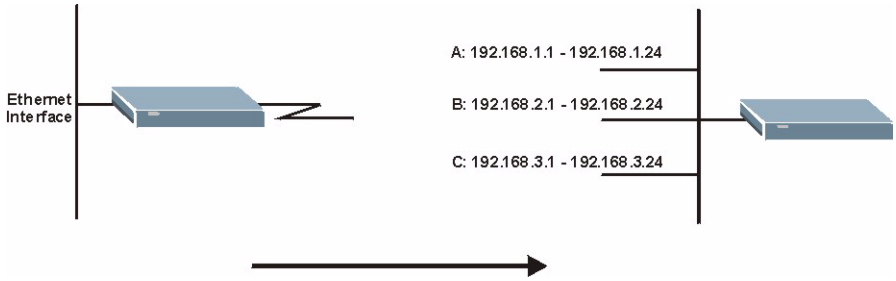
FIELD	DESCRIPTION
Starting Address	This field specifies the first of the contiguous addresses in the IP address pool.
Size of Client IP Pool	This field specifies the size or count of the IP address pool.
TCP/IP Setup	
IP Address	Enter the (LAN) IP address of your P-870MH-C1 in dotted decimal notation
IP Subnet Mask	Your P-870MH-C1 will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the P-870MH-C1 (refer to the appendices for more information).
Multicast	IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a Multicast group. The P-870MH-C1 supports both IGMP version 1 (**IGMP-v1**) and version 2 (**IGMP-v2**). Press the [SPACE BAR] to enable IP Multicasting or select **None** to disable it.
Edit IP Alias	The P-870MH-C1 supports three logical LAN interfaces via its single physical Ethernet interface with the P-870MH-C1 itself as the gateway for each LAN network. Press [SPACE BAR] to change **No** to **Yes** and press [ENTER] to display Menu 3.2.1.
When you have completed this menu, press [ENTER] at the prompt "`Press ENTER to Confirm or ESC to Cancel:`" to save your configuration, or press [ESC] at any time to cancel.	

3.3.1 IP Alias Setup

IP alias allows you to partition a physical network into different logical networks over the same Ethernet interface. The P-870MH-C1 supports three logical LAN interfaces via its single physical Ethernet interface with the P-870MH-C1 itself as the gateway for each LAN network.

The following figure shows a LAN divided into subnets A, B, and C.

Figure 8 IP Alias Network Example



In Menu 3.2, you configure the first network. Move the cursor to **Edit IP Alias** field and press [SPACEBAR] to choose **Yes** and press [ENTER] to display **Menu 3.2.1 — IP Alias Setup** as shown next. Use Menu 3.2.1 to configure the second and third network.

Make sure that the subnets of the logical networks do not overlap.

Figure 9 Menu 3.2.1 IP Alias Setup

```
                    Menu 3.2.1 - IP Alias Setup

                IP Alias 1= No
                  IP Address= N/A
                  IP Subnet Mask= N/A
                  RIP Direction= N/A
                    Version= N/A
                  Incoming protocol filters= N/A
                  Outgoing protocol filters= N/A
                IP Alias 2= No
                  IP Address= N/A
                  IP Subnet Mask= N/A
                  RIP Direction= N/A
                    Version= N/A
                  Incoming protocol filters= N/A
                  Outgoing protocol filters= N/A


                 Enter here to CONFIRM or ESC to CANCEL:
```

Follow the instructions in the following table to configure IP Alias parameters.

Table 7 Menu 3.2.1 IP Alias Setup

FIELD	DESCRIPTION
IP Alias	Choose **Yes** to configure the LAN network for the P-870MH-C1.
IP Address	Enter the IP address of your P-870MH-C1 in dotted decimal notation
IP Subnet Mask	Your P-870MH-C1 will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the P-870MH-C1
RIP Direction	Press [SPACE BAR] to select the RIP direction. Choices are **None**, **Both**, **In Only** or **Out Only**.
Version	Press [SPACE BAR] to select the RIP version. Choices are **RIP-1**, **RIP-2B** or **RIP-2M**.
Incoming Protocol Filters	Enter the filter set(s) you wish to apply to the incoming traffic between this node and the P-870MH-C1.
Outgoing Protocol Filters	Enter the filter set(s) you wish to apply to the outgoing traffic between this node and the P-870MH-C1.
When you have completed this menu, press [ENTER] at the prompt "`Press ENTER to Confirm or ESC to Cancel:`" to save your configuration, or press [ESC] at any time to cancel.	

3.4 System Maintenance

This section covers the information and diagnostic tools in SMT menus 24.1 to 24.7.

These tools include updates on system status, port status, log and trace capabilities and upgrades for the device firmware and configuration.

Type 24 in the main menu to open **Menu 24 – System Maintenance**, as shown in the following figure.

Figure 10 Menu 24 System Maintenance

```
                  Menu 24 - System Maintenance

                1.  System Status
                2.  System Information and Console Port Speed
                3.  Log and Trace



                7.  Upload Firmware
                8.  Command Interpreter Mode

                 Enter Menu Selection Number:
```

3.4.1 System Status

The first selection, System Status, gives you information on the status and statistics of the ports, as shown next. System Status is a tool that can be used to monitor your P-870MH-C1. Specifically, it gives you information on your line status, number of packets sent and received.

To get to System Status, type 24 to go to **Menu 24 — System Maintenance**. From this menu, type 1.

Figure 11 Menu 24.1 System Maintenance : Status

```
                    Menu 24.1 - System Maintenance - Status

Port   Status        TxPkts      RxPkts    Cols    Tx B/s    Rx B/s     Up Time
 LAN   100M/Full        289        5582       0       214       256     0:33:55
VDSL   HANDSHAKE           0           0       0         0         0     0:00:00

Port   Ethernet Address         IP Address           IP Mask        DHCP
 LAN  00:13:49:BB:94:AC     192.168.1.2       255.255.255.0        None


     System up Time:     0:34:00


                                  Press Command:

                      COMMANDS: 1-Reset Counters   ESC-Exit
```

The following table describes the fields in this menu. .

Table 8 Menu 24.1 System Maintenance: Status

FIELD	DESCRIPTION
Port	This field displays the type of the port (**LAN** or **VDSL**).
Status	This shows the status of the remote node.
TxPkts	The number of transmitted packets to this remote node.
RxPkts	The number of received packets from this remote node.
Cols	This is the number of collisions.
Tx B/s	This shows the transmission rate in bytes per second.

Table 8 Menu 24.1 System Maintenance: Status (continued)

FIELD	DESCRIPTION
Rx B/s	This shows the receiving rate in bytes per second.
Up Time	This is the time this channel has been connected to the current remote node.
Ethernet Address	This field displays the MAC address of the LAN interface.
IP Address	This field displays the IP address of the LAN interface.
IP Mask	This field displays the subnet mask of the LAN interface
DHCP	This field displays whether DHCP server is enabled on the LAN interface.
System Uptime	This field displays the time that elapsed since the device was last restarted.
Press Command	Etner 1 to reset the counters. Enter [ESC] to return to the previous screen.

3.4.2 System Information and Console Port Setting

To display **Menu 24.2 - System Information and Console Port Speed**, enter 2 in Menu 24. The screen displays as shown next. From this menu you have two choices.

Figure 12 Menu 24.2 System Information and Console Port Speed

```
            Menu 24.2 - System Information and Console Port Speed

            1. System Information
            2. Console Port Speed

            Please enter selection:
```

3.4.2.1 System Information

Enter 1 in Menu 24.2 to display the screen shown next.

Figure 13 Menu 24.2.1 System Maintenance: Information

```
            Menu 24.2.1 - System Maintenance - Information

              Name:
              Routing: IP
              ZyNOS F/W Version: V3.50(RT.0) | 09/01/2006
              Country Code: 255

              LAN
                Ethernet Address: 00:13:49:BB:94:AC
                IP Address: 192.168.1.2
                IP Mask: 255.255.255.0
                DHCP: None

                    Press ESC or RETURN to Exit:
```

The following table describes the fields in this menu.

Table 9 Menu 24.2.1 System Maintenance: Information

FIELD	DESCRIPTION
Name	Displays the system name of your P-870MH-C1. This information can be changed in **Menu 1 – General Setup**.
Routing	Refers to the routing protocol used.
ZyNOS F/W Version	Refers to the ZyNOS (ZyXEL Network Operating System) system firmware version. ZyNOS is a registered trademark of ZyXEL Communications Corporation.
Country Code	This field displays the code number for your country.
LAN	
Ethernet Address	Refers to the Ethernet MAC (Media Access Control) of your P-870MH-C1.
IP Address	This is the IP address of the P-870MH-C1 in dotted decimal notation.
IP Mask	This shows the subnet mask of the P-870MH-C1.
DHCP	This field shows the DHCP setting (**None** or **Server**) of the P-870MH-C1.

3.4.2.2 Console Port Speed

The console port is internal and is reserved for technician use only.

You can set up different port speeds for the console port through **Menu 24.2.2 – System Maintenance – Console Port Speed**.

Your P-870MH-C1 supports 9600 (default), 19200, 38400, 57600 and 115200 bps. Press [SPACE BAR] and then [ENTER] to select the desired speed in Menu 24.2.2.

Figure 14 Menu 24.2.2 System Maintenance : Change Console Port Speed

```
        Menu 24.2.2 - System Maintenance - Change Console Port Speed

                  Console Port Speed: 9600




                  Press ENTER to Confirm or ESC to Cancel:
```

Once you change the console port speed, you must also set the speed parameter for the communication software you are using to connect to the P-870MH-C1.

3.4.3 Log and Trace

The first place you should look for clues when something goes wrong is the error logs. Follow the procedures to view the local error/trace log:

1. Type 24 in the main menu to display **Menu 24 – System Maintenance**.
2. From Menu 24, type 3 to display **Menu 24.3 – System Maintenance – Log and Trace**.

Figure 15 Menu 24.3 System Maintenance: Log and Trace

```
          Menu 24.3 - System Maintenance - Log and Trace

             1. View Error Log


                       Please enter selection:
```

3 Enter 1 from **Menu 24.3 — System Maintenance — Log and Trace** and press [ENTER] to display the error logs.

After the P-870MH-C1 finishes displaying the error log, you will have the option to clear it. Samples of typical error and information messages are presented in the next figure.

Figure 16 Sample Error and Information Messages

```
56 Wed Jan 01 00:07:04 2003 PP0b  INFO  Login Successfully
57 Wed Jan 01 00:07:04 2003 PP0b  INFO  SMT Password pass
59 Wed Jan 01 00:24:14 2003 PP0b  INFO  Login Successfully
60 Wed Jan 01 00:24:14 2003 PP0b  INFO  SMT Password pass
62 Wed Jan 01 00:34:31 2003 PP0b  INFO  Login Successfully
63 Wed Jan 01 00:34:31 2003 PP0b  INFO  SMT Password pass
Clear Error Log (y/n):
```

4

Introducing the FTP Server

This chapter explains how to log in, use, and log out of the FTP server in the P-870MH-C1. You can use the FTP server to upload firmware, back up the current configuration, and restore a previously-saved configuration.

The procedures depend on the FTP client you use. The following examples use the standard, command-based FTP client provided in Windows 2000.

4.1 Logging in to the FTP Server

1. FTP to the device. The default IP address is 192.168.1.2.
2. When prompted, leave the user name blank, and enter the password (default: **1234**).

Figure 17 User Name and Password

```
C:\>ftp 192.168.1.2
Connected to 192.168.1.2.
220  FTP version 1.0 ready at Wed Jan 01 03:44:06 2003
User (192.168.1.2:(none)):
331 Enter PASS command
Password:
230 Logged in
```

The P-870MH-C1 displays the prompt.

Figure 18 Prompt

```
ftp>
```

4.2 Upload Firmware

On your computer, the new firmware file has a .bin extension. (If you have a compressed file, uncompress it first.) On the P-870MH-C1, the firmware is called `ras` (no extension).

Follow these directions to upload new firmware to the P-870MH-C1.

1. Log in to the device using FTP. See Section 4.1 on page 35.
2. Change the transfer mode to binary.

3 Transfer the .bin file from the computer to the P-870MH-C1, and rename it to `ras`.

Figure 19 Example: Upload Firmware Using FTP

```
ftp> bin
200 Type I OK
ftp> put 350rt0b4.bin ras
200 Port command okay
150 Opening data connection for STOR ras
226 File received OK
ftp: 1079080 bytes sent in 2.83Seconds 380.76Kbytes/sec.
```

Wait for the P-870MH-C1 to reboot.

Do not interrupt the P-870MH-C1 while it is uploading new firmware or rebooting after the upload. Interrupting the P-870MH-C1 might permanently damage it.

When the P-870MH-C1 is ready again, you can log in to confirm that the P-870MH-C1 is running the new firmware.

4.3 Back up the Current Configuration

On the P-870MH-C1, the current configuration is stored in the file called `rom-0` (no extension).

Follow these directions to back up the current configuration.

1 Log in to the device using FTP. See Section 4.1 on page 35.
2 Change the transfer mode to binary.
3 Transfer the rom-0 file from the P-870MH-C1 to the computer, and rename it if desired.

Figure 20 Example: Back up Current Configuration Using FTP

```
ftp> bin
200 Type I OK
ftp> get rom-0 zyxel.rom
200 Port command okay
150 Opening data connection for RETR rom-0
226 File sent OK
ftp: 16384 bytes received in 0.13Seconds 125.07Kbytes/sec.
```

4.4 Restoring a Previously-saved Configuration

Follow these directions to restore a previously-saved configuration file from the computer to the P-870MH-C1.

1 Log in to the device using FTP. See Section 4.1 on page 35.
2 Change the transfer mode to binary.

3 Transfer the configuration file from the computer to the P-870MH-C1, and rename it to `rom-0`.

Figure 21 Example: Upload Firmware Using FTP

```
ftp> bin
200 Type I OK
ftp> put zyxel.rom rom-0
200 Port command okay
150 Opening data connection for STOR rom-0
226 File received OK
221 Goodbye for writing flash
ftp: 16384 bytes sent in 0.00Seconds 16384000.00Kbytes/sec.
```

Wait for the P-870MH-C1 to reboot.

Do not interrupt the P-870MH-C1 while it is uploading the configuration file or rebooting after the upload. Interrupting the P-870MH-C1 might permanently damage it.

When the P-870MH-C1 is ready again, you can log in to confirm that the P-870MH-C1 is using the restored configuration file.

4.5 Logging out of the FTP Server

Type `quit` to log out of the FTP server.

PART III
CLI

This part contains the following chapters.

5

Introducing the Command Interface

This chapter explains how to log in, use, and log out of the command interface in the P-870MH-C1.

Refer to the release notes for your device for a complete list of commands available. Use of undocumented commands or misconfiguration can damage the unit and possibly render it unusable.

5.1 Starting the Command Interface (Logging In)

You can access the command interface via the SMT or Telnet.

5.1.1 Via the SMT

To access the CI from the SMT, enter 8 from **Menu 24 — System Maintenance**. Type "`exit`" to return to the SMT main menu when finished.

Figure 22 Valid Commands

```
                Menu 24 - System Maintenance

              1.  System Status
              2.  System Information and Console Port Speed
              3.  Log and Trace

              7.  Upload Firmware
              8.  Command Interpreter Mode


            Enter Menu Selection Number: 8


Copyright (c) 1994 - 2006 ZyXEL Communications Corp.
ras>
```

5.1.2 Via Telnet

Follow the steps below to log into the command interface via Telnet

1 Telnet to the device. The default IP address is 192.168.1.2.

2 When prompted, enter the password (default: **1234**).

Figure 23 Password

```
Password : ****
```

The P-870MH-C1 displays the prompt.

Figure 24 Prompt

```
Copyright (c) 1994 - 2006 ZyXEL Communications Corp.
ras>
```

You can change the prompt by setting the host name. (See Section 7.4 on page 52.)

5.2 Using the Command Interface

The P-870MH-C1 uses a one-level command structure. You must type the full command every time. For example, enter `sys version`; do not enter `sys`, press [ENTER], and then enter `version`.

Figure 25 Command Interface: One-level Structure

```
ras> sys version

 ZyNOS version: V3.50(RT.1) | 10/01/2006
 romRasSize: 1079042
 system up time:     0:05:47 (8790 ticks)
 bootbase version: V1.04 | 06/23/2006
 ZyNOS CODE: RAS Aug 18 2006 16:54:32
 Product Model: P-870MH-C1
ras>
```

Commands can be abbreviated to the smallest unique string that differentiates the command from other available commands. For example, the `sys version` command in the previous example can be abbreviated to `s ve`.

Figure 26 Command Interface: Abbreviated Commands

```
ras> s ve

 ZyNOS version: V3.50(RT.1) | 10/01/2006
 romRasSize: 1079042
 system up time:     0:05:47 (8790 ticks)
 bootbase version: V1.04 | 06/23/2006
 ZyNOS CODE: RAS Aug 18 2006 16:54:32
 Product Model: P-870MH-C1
ras>
```

Type `help` or `?` to display a list of commands that are available, or type a command followed by `help` or `?` to display the subcommands that are available for that command.

Figure 27 Command Interface: Help or ?

```
ras> ?
Valid commands are:
sys             exit            ip              vdsl
vlanQoS
ras> vdsl help
status          pktcntclr
ras>
```

See Chapter 7 on page 57 for a list of available commands.

5.3 Stopping the Command Interface (Logging Out)

Type `exit` to log out of the command interface.

6

ip Commands

This chapter introduces the basic `ip` commands.

6.1 ip address

Syntax:

```
ip address [<ip>]
```

Parameter(s):

`<ip>`	=	Specifies the new management IP address of the P-870MH-C1.

Use this command to look or set the management IP address of the P-870MH-C1. This IP address is the same one you use to access the P-870MH-C1. If you change this IP address, you have to log in to the P-870MH-C1 again.

6.2 ip arp status

Syntax:

```
ip arp status
```

Use this command to look at the ARP table and ARP statistics for the P-870MH-C1.

Figure 28 Example: ip arp status

```
ras> ip arp status
received 569 badtype 0 bogus addr 0 reqst in 0 replies 1 reqst out 1
cache hit 168 (98%), cache miss 3 (1%)
IP-addr         Type           Time  Addr              stat iface
192.168.1.34    10 Mb Ethernet 270   00:10:B5:AE:56:9B 41   enif0
192.168.1.255   10 Mb Ethernet 0     FF:FF:FF:FF:FF:FF 43   NULL
num of arp entries= 2
```

6.3 ip igmpsnp disable

Syntax:

```
ip igmpsnp disable
```

Use this command to disable IGMP snooping. See Section 6.6 on page 51 for examples of this command.

6.4 ip igmpsnp disp

Syntax:

```
ip igmpsnp disp
```

Use this command to display the current status of IGMP snooping and to look at the multicast groups currently passing through the P-870MH-C1. See Section 6.6 on page 51 for examples of this command.

6.5 ip igmpsnp enable

Syntax:

```
ip igmpsnp enable
```

Use this command to enable IGMP snooping. See Section 6.6 on page 51 for examples of this command.

6.6 ip igmpsnp maxresptime

Syntax:

```
ip igmpsnp maxresptime [<0..255>]
```

Parameter(s):

`<0..255>`	=	Specifies the maximum response time for IGMP snooping.

Use this command to look at or set the maximum response time for IGMP snooping. You have to use this command when IGMP snooping is disabled. You cannot use this command when IGMP snooping is enabled. See Section 6.6 on page 51 for examples of this command.

6.7 ip igmpsnp queryinterval

Syntax:

```
ip igmpsnp queryinterval [<0..255>]
```

Parameter(s):

`<0..255>`	=	Specifies the query interval for IGMP snooping.

Use this command to look at or set the query interval for IGMP snooping. You have to use this command when IGMP snooping is disabled. You cannot use this command when IGMP snooping is enabled. See Section 6.6 on page 51 for examples of this command.

6.8 ip igmpsnp robust

Syntax:

```
ip igmpsnp robust [<0..255>]
```

Parameter(s):

`<0..255>`	=	Specifies the robustness setting for IGMP snooping.

Use this command to look at or set the robustness for IGMP snooping. You have to use this command when IGMP snooping is disabled. You cannot use this command when IGMP snooping is enabled. See Section 6.6 on page 51 for examples of this command.

6.9 ip igmpsnp Command Example

IGMP snooping is enabled by default. If you want to configure any settings, you have to disable IGMP snooping first. The following figure shows some examples.

Figure 29 Enable IGMP Snooping

```
ras> ip igmpsnp enable
IGMP Snooping is enabled
```

Figure 30 Disable IGMP Snooping

```
ras> ip igmpsnp disable

IGMP Snooping is disabled
```

Figure 31 Configure IGMP Snooping

```
ras> ip igmpsnp disable

IGMP Snooping is disabled
ras> ip igmpsnp maxresptime 20
SP_MaxResponseTime = 20
ras> ip igmpsnp queryinterval 25
SP_QueryInterval = 25
ras> ip igmpsnp robust 20
SP_Robustness = 20
ras> ip igmpsnp enable
IGMP Snooping is enabled
ras> ip igmpsnp disp

IGMP Snooping is: Enabled

group count: 0
MaxResponseTime=20,  QueryInterval=25,   Robustness=20
-----------------------------------------------------------
GroupID    LANGroup       To          TimeOut
-----------------------------------------------------------
```

Figure 32 Display Current Statistics for IGMP Snooping

```
ras> ip igmpsnp disp

IGMP Snooping is: Disabled

group count: 0
MaxResponseTime=20,  QueryInterval=25,   Robustness=20
-----------------------------------------------------------
GroupID    LANGroup       To          TimeOut
-----------------------------------------------------------
```

6.10 ip ping

Syntax:

```
ip ping <ip>
```

Parameter(s):

`<ip>`	=	Specifies the IP address of the device you want the P-870MH-C1 to ping.

Use this command to ping a device on the network. You can use this command to test the network connection between the P-870MH-C1 and the device with the specified IP address. See Section 6.2 on page 46 for examples of this command.

6.11 ip tcp status

Syntax:

```
ip tcp status
```

Use this command to look at TCP packet statistics and TCP sockets on the P-870MH-C1.

Figure 33 Example: ip tcp status

```
ras> ip tcp status
( 1)tcpRtoAlgorithm              4     ( 2)tcpRtoMin                    0
( 3)tcpRtoMax           4294967295     ( 4)tcpMaxConn          4294967295
( 5)tcpActiveOpens               0     ( 6)tcpPassiveOpens              1
( 7)tcpAttemptFails              0     ( 8)tcpEstabResets               0
( 9)tcpCurrEstab                 1     (10)tcpInSegs                  562
(11)tcpOutSegs                 672     (12)tcpRetransSegs               0
(14)tcpInErrs                    0     (15)tcpOutRsts                   0
    &TCB Rcv-Q Snd-Q  Local socket          Remote socket          State
802f5024     0   602  192.168.1.2:23        192.168.1.34:1406      Estab
802f5138     0     0  0.0.0.0:21            0.0.0.0:0              Listen
```

6.12 ip udp status

Syntax:

```
ip udp status
```

Use this command to look at UDP packet statistics and UDP sockets on the P-870MH-C1.

Figure 34 Example: ip udp status

```
ras> ip udp status
( 1)udpInDatagrams              0     ( 2)udpNoPorts                1715
( 3)udpInErrors                 0     ( 4)udpOutDatagrams              0
    &UCB Rcv-Q  Local socket
802bbe50     0  0.0.0.0:1024
802bbe1c     0  0.0.0.0:53
802bbde8     0  0.0.0.0:69
802bbdb4     0  0.0.0.0:263
802bbcb0     0  0.0.0.0:520
```

7

sys Commands

This chapter introduces the basic `sys` commands.

7.1 sys cpu display

Syntax:

```
sys cpu display
```

Use this command to look at CPU utilization for the last minute.

Figure 35 Example: sys cpu display

```
ras> sys cpu display
CPU usage status:
  baseline 338874 ticks
 sec   ticks   util  sec   ticks   util  sec   ticks   util  sec  ticks   util
   0  330060   2.60    1  330434   2.49    2  330125   2.58    3  330447   2.48
   4  330176   2.56    5  330254   2.54    6  330439   2.48    7  329741   2.69
   8  322693   4.77    9  327038   3.49   10  324811   4.15   11  330232   2.55
  12  330245   2.54   13  330066   2.59   14  330282   2.53   15  330217   2.55
  16  329978   2.62   17  330417   2.49   18  330326   2.52   19  330272   2.53
  20  329968   2.62   21  330173   2.56   22  330281   2.53   23  330456   2.48
  24  330439   2.48   25  330262   2.54   26  330261   2.54   27  330313   2.52
  28  330242   2.54   29  330487   2.47   30  330407   2.49   31  330355   2.51
  32  330454   2.48   33  330145   2.57   34  330321   2.52   35  330004   2.61
  36  330174   2.56   37  330436   2.49   38  330339   2.51   39  330546   2.45
  40  330252   2.54   41  330451   2.48   42  327617   3.32   43  324994   4.09
  44  329210   2.85   45  323175   4.63   46  323430   4.55   47  330038   2.60
  48  327282   3.42   49  313833   7.39   50  326312   3.70   51  329123   2.87
  52  329937   2.63   53  330430   2.49   54  330135   2.57   55  330315   2.52
  56  330416   2.49   57  330327   2.52   58  330502   2.47   59  330088   2.59
  60  330479   2.47   61  330430   2.49   62  328438   3.08
```

Each field is described in the following table.

Table 10 sys cpu display Output Values

LABEL	DESCRIPTION
baseline	This field displays the total number of CPU cycles in each one-second interval.
sec	This field identifies each one-second interval. Second 0 is the first (earliest) interval.

Table 10 sys cpu display Output Values (continued)

LABEL	DESCRIPTION
ticks	This field displays the number of CPU cycles that the CPU was free in each interval.
util	This field displays the CPU utilization in the specified interval. This is equal to the number of CPU cycles that the CPU was busy in each interval, divided by the total number of CPU cycles in each interval.

7.2 sys date

Syntax:

```
sys date [<year> <month> <date>]
```

Parameter(s):

`<year>`	=	Specifies the current year, in four digits <`yyyy`>.
`<month>`	=	Specifies the current month <1..12>.
`<date>`	=	Specifies the current day <1..31>. (Days 29, 30, and 31 are not allowed in some months.)

Use this command to look at or set the current date and time in the P-870MH-C1. If you enter the optional parameters, the command changes the value of the setting to the specified parameter. If you do not enter any of the parameters, the command displays the current value. See Section 6.1 on page 45 for examples of this command.

7.3 sys domain

Syntax:

```
sys domain
```

Use this command to display the domain name of the P-870MH-C1.

7.4 sys hostname

Syntax:

```
sys hostname [<hostname>]
```

Parameter(s):

`<hostname>`	=	Specifies the system name of the P-870MH-C1. The name consists of 1-9 printable characters. Spaces and tabs are not allowed.

Use this command to look at or set the system name of the P-870MH-C1. The system name is used in the prompt that you see when you log in to the P-870MH-C1. If the name is blank, the prompt is `ras`. See Section 6.1 on page 45 for examples of this command.

7.5 sys romreset

Syntax:

```
sys romreset
```

Use this command to reset the P-870MH-C1 to its factory default settings. The P-870MH-C1 also reboots. Afterwards, you have to connect to the P-870MH-C1 again. See Section 6.1 on page 45 for examples of this command.

7.6 sys stdio

Syntax:

```
sys stdio [<0..3600>]
```

Parameter(s):

<0..3600>	=	Specifies the idle timeout, in minutes, for each management session. Enter 0 to disable the idle timeout.

Use this command to set the idle timeout for each management session. You can also disable the timeout by setting this value to 0. See Section 6.1 on page 45 for examples of this command.

7.7 sys time

Syntax:

```
sys time [<hour> [<min> [<sec>]]]
```

Parameter(s):

<hour>	=	Specifies the current hour <0..23>.
<min>	=	Specifies the current minute <0..59>.
<sec>	=	Specifies the current second <0..59>.

Use this command to look at or set the current time in the P-870MH-C1. If you enter the optional parameters, the command changes the value of the setting to the specified parameter. If you do not enter any of the parameters, the command displays the current value. If you enter some but not all of the parameters, the P-870MH-C1 continues to use the current value for unspecified parameters.

7.8 sys version

Syntax:

```
sys version
```

Use this command to look at information about the current firmware version.

Figure 36 Example: sys version

```
ras> sys version

 ZyNOS version: V3.50(RT.0)b2 | 07/13/2006
 romRasSize: 1076656
 system up time:     0:20:29 (1e065 ticks)
 bootbase version: V1.04 | 06/23/2006
 ZyNOS CODE: RAS Jul 12 2006 16:20:22
 Product Model: P-870MH-C1
```

Each field is described in the following table.

Table 11 sys version Output Values

LABEL	DESCRIPTION
ZyNOS version	This field displays the current firmware version.
romRasSize	This field displays the size of the current firmware version.
system up time	This field displays how long the P-870MH-C1 has been running since the last time it was reset or turned on.
bootbase version	This field displays the current bootbase version. Bootbase is software that contains the most basic operating instructions of the P-870MH-C1.
ZyNOS CODE	This field displays the current ZyNOS version.
Product Model	This field displays the model name.

8

vdsl Commands

This chapter introduces the basic `vdsl` commands.

8.1 vdsl pktcntclr

Syntax:

```
vdsl pktcntclr
```

Use this command to clear the VDSL statistics in the P-870MH-C1. These statistics are displayed by the `vdsl status` command.

8.2 vdsl status

Syntax:

```
vdsl status
```

Use this command to look at various statistics about the VDSL connection. You can clear many of these statistics by using the `vdsl pktcntclr` command.

Figure 37 Example: vdsl status

```
ras> vdsl status
============================================================
           VDSL DSP Firmware Version: 1.52
 VDSL Line State:  HANDSHAKE   Total Transmit Power: 0.0 dB
 DS Payload Rate:       0kbps   Local Attenuation:    0.0 dB
 US Payload Rate:       0kbps   Local SNR Margin:     0.0 dB
 VDSL retrain:        0 times   Local avg SNR:        0.0 dB
 DSP recovery:        0 times
------------------------------------------------------------
           COE Parameters:
 Romote Transmit Power:  0.0 dB
 Romote Init SNR:        0.0 dB
 Romote SNR Margin:      0.0 dB
 Remote Attenuation:     0.0 dB
------------------------------------------------------------
           Counters since last reset
 RX Packet Count:           0   TX Packet Count:           0
 Local FEC Error:           0   Remote FEC Error:          0
 Local CRC Error:           0   Remote CRC Error:          0
 Local SEF Error:           0   Remote SEF Error:          0
 Local LOS Error:           0   Remote LOS Error:          0
------------------------------------------------------------
           Failure Condition
 Overall:                   0
 Error Code:                0   Watch Dog Timer:          83
 Local LOS:                 0   Remote LOS:                0
 Local SEF:                 0   Remote SEF:                0
 Local NCDI:                0   Remote NCDI:               0
 Local LCDI:                0   Remote LCDI:               0
============================================================
```

9

vlanQoS Commands

This chapter introduces the `vlanQoS` commands.

9.1 vlanQoS 1qconfig

Syntax:

```
vlanQoS 1qconfig <item#> <T|F|U> <port#> [<port#> [<port#> [...]]]
```

Parameter(s):

`<item#>`	=	Specifies the item number of the VLAN. See the `vlanQoS 1qset` command for more information about the item number.
`<T|F|U>`	=	Specifies what type of port the specified port(s) is(are) in the specified VLAN. T: Tagged port F: Forbidden port U: Untagged port
`<port#>`	=	Specifies the port number <1..5> of each port to which the specified type is assigned. Port 5 is the DSL port.

Use this command to configure port settings for an IEEE 802.1Q VLAN. You have to use the `vlanQoS 1qset` command to create the VLAN first.

Run the `vlanQoS save` command to save this change to non-volatile memory. See Section 6.4 on page 48 for examples of this command.

9.2 vlanQoS 1qset

Syntax:

```
vlanQoS 1qset <vid>
```

Parameter(s):

`<vid>`	=	Specifies the VLAN ID.

Use this command to create a new IEEE 802.1Q VLAN in the P-870MH-C1. This VLAN replaces any existing VLAN with the same item number. If there is no existing VLAN, all of the ports are forbidden by default.

In the P-870MH-C1, each VLAN has an associated item number. You can look up the item number by using the `vlanQoS disp` command. You can also calculate it. The item number is the VLAN ID mod 8, or the remainder when the VLAN ID is divided by eight.

Run the `vlanQoS save` command to save this change to non-volatile memory. See Section 6.4 on page 48 for examples of this command.

9.3 vlanQoS clear

Syntax:

```
vlanQoS clear <p|P|1|a|A> [<item#>|<port#>]
```

Parameter(s):

`<p|P|1|a|A>`	=	Specifies which settings you want to clear. p|P: Port-based VLAN settings and QoS settings 1: IEEE 802.1Q settings a|A: All port-based VLAN settings, IEEE 802.1Q settings, and QoS settings
`<item#>`	=	Specifies the item number of the VLAN. See the `vlanQoS 1qset` command for more information about the item number. You can only use this parameter if you clear IEEE 802.1Q settings (option `1`)
`<port#>`	=	Specifies the port number <1..5>. Port 5 is the DSL port. You can only use this parameter if you clear port-based VLAN settings (options `p` or `P`).

Use this command to reset port-based VLAN settings and/or IEEE 802.1Q settings to their default values. For port-based VLAN settings, you can reset a specific port or all ports. For IEEE 802.1Q settings, you can reset a specific VLAN or all VLANs.

Run the `vlanQoS save` command to save this change to non-volatile memory. See Section 6.3 on page 47 and Section 6.4 on page 48 for examples of this command.

9.4 vlanQoS disp

Syntax:

```
vlanQoS disp
```

Use this command to display the current settings for port-based VLAN or IEEE 802.1Q VLAN (whichever one is active) and for QoS. For IEEE 802.1Q VLAN, forbidden ports are indicated by a blank value or an **F**.

Run the `vlanQoS save` command to save this change to non-volatile memory. See Section 6.3 on page 47, Section 6.4 on page 48, and Section 6.5 on page 50 for examples of this command.

9.5 vlanQoS modechane

Syntax:

```
vlanQoS modechane <0|1>
```

Parameter(s):

`<0|1>`	=	Specifies whether the P-870MH-C1 uses port-based VLAN (`0`) or IEEE 802.1Q VLAN (`1`).

Use this command to specify whether the P-870MH-C1 uses port-based VLAN or IEEE 802.1Q VLAN. The P-870MH-C1 always uses one or the other, but the default settings for either mode make the P-870MH-C1 behave like a regular switch.

Run the `vlanQoS save` command to save this change to non-volatile memory. See Section 6.3 on page 47 and Section 6.4 on page 48 for examples of this command.

9.6 vlanQoS pvlanset

Syntax:

```
vlanQoS pvlanset <port#> <port#> [<port#> [<port#> [...]]]
```

Parameter(s):

`<port#>`	=	Specifies the incoming (first parameter) and outgoing (second parameter) port number <1..5>. Port 5 is the DSL port.

Use port-based VLAN to create groups of ports that broadcast traffic to each other. For example, if you combine ports 1, 2, and 5 (DSL), then incoming traffic on any of these ports is broadcast to the other ports. They do not broadcast traffic to ports 3 and 4, and ports 3 and 4 do not send traffic to ports 1, 2, or 5. If you then combine ports 3, 4, and 5, incoming traffic from port 5 is broadcast to ports 1-4 because it is part of both groups. Incoming traffic from ports 3 and 4 is only broadcast to ports 3-5.

Run the `vlanQoS save` command to save this change to non-volatile memory. See Section 6.4 on page 48 for examples of this command.

9.7 vlanQoS ratio

Syntax:

```
vlanQoS ratio <0|1|2|3>
```

Parameter(s):

`<0|1|2|3>`	=	Specifies how much more traffic is switched for high-priority ports than for low-priority ports. 0: 4:1 ratio 1: 16:1 ratio 2: 64:1 ratio 3: Always switch traffic for the high-priority ports first.

Use this command to specify how much more traffic is switched for high-priority ports than for low-priority ports. Use the `vlanQoS qosset` command to set the priority of each port.

Run the `vlanQoS save` command to save this change to non-volatile memory. See Section 6.5 on page 50 for examples of this command.

9.8 vlanQoS save

Syntax:

```
vlanQoS save
```

Use this command to save the current settings for port-based VLAN, IEEE 802.1Q VLAN, and QoS to non-volatile memory in the P-870MH-C1. Otherwise, these settings are lost when the P-870MH-C1 reboots or restarts.

9.9 vlanQoS Command Examples

This section shows two VLAN configuration examples.

9.9.1 Port-based VLAN

Commands:

```
vlanQoS modechane <0|1>
vlanQoS pvlanset <port#> <port#> [<port#> [<port#> [...]]]
vlanQoS disp
vlanQoS clear <p|P|1|a|A> [<item#>|<port#>]
vlanQoS save
```

The P-870MH-C1 always uses either port-based VLAN or IEEE 802.1Q VLAN. In either case, the default settings make the P-870MH-C1 behave like a regular switch.

Use port-based VLAN to create groups of ports that broadcast traffic to each other. For example, if you combine ports 1, 2, and 5 (DSL), then incoming traffic on any of these ports is broadcast to the other ports. They do not broadcast traffic to ports 3 and 4, and ports 3 and 4 do not send traffic to ports 1, 2, or 5. If you then combine ports 3, 4, and 5, incoming traffic from port 5 is broadcast to ports 1-4 because it is part of both groups. Incoming traffic from ports 3 and 4 is only broadcast to ports 3-5.

Use the `vlanQoS save` command to save your changes to non-volatile memory.

Examples:

Figure 38 Enable Port-based VLAN (Disable IEEE 802.1Q VLAN)

```
ras> vlanQoS mode 0
ras> vlanQoS save
```

Figure 39 Look at the Current Settings for Port-based VLAN

```
ras> vlanQoS mode 0
ras> vlanQoS disp
```

Figure 40 Configure Port-based VLAN

```
ras> vlanQoS mode 0
ras> vlanQoS disp
ras> vlanQoS pvlanset 1 2 5

==================   Port Base VLAN Setting   =================
                                Outgoing
                 WLAN   LAN1   LAN2   LAN3   LAN4   VDSL
  I                0      1      2      3      4      5
  n     WLAN  0    v                    v      v      v
  c     LAN1  1           v      v                    v
  o     LAN2  2           v      v                    v
  m     LAN3  3    v                    v      v      v
  I     LAN4  4    v                    v      v      v
  n     VDSL  5    v      v      v      v      v      v
  g

=============================================================ras>
vlanQoS save
ras> vlanQoS disp
```

Figure 41 Reset Port-based VLAN Settings to Default Values

```
ras> vlanQoS clear p
ras> vlanQoS save
```

Figure 42 Disable Port-based VLAN (Enable IEEE 802.1Q VLAN)

```
ras> vlanQoS mode 1
ras> vlanQoS save
```

9.9.2 IEEE 802.1Q VLAN

Commands:

```
vlanQoS modechane <0|1>
vlanQoS 1qset <vid>
vlanQoS 1qconfig <item#> <T|F|U> <port#> [<port#> [<port#> [...]]]
vlanQoS disp
vlanQoS clear <p|P|1|a|A> [<item#>|<port#>]
vlanQoS save
```

The P-870MH-C1 always uses either port-based VLAN or IEEE 802.1Q VLAN. In either case, the default settings make the P-870MH-C1 behave like a regular switch.

IEEE 802.1Q VLAN allows you to specify tagged, untagged, and forbidden ports for up to eight VLANs. If the P-870MH-C1 receives untagged frames from any port, it switches these like a regular switch.

In the P-870MH-C1, each VLAN has an associated item number. You can look up the item number by using the `vlanQoS disp` command. You can also calculate it. The item number is the remainder when the VLAN ID is divided by eight (or VLAN ID mod 8). If you create a VLAN with the same remainder as an existing VLAN, the new VLAN ID replaces the old one.

Use the `vlanQoS save` command to save your changes to non-volatile memory.

Examples:

Figure 43 Enable IEEE 802.1Q VLAN (Disable Port-based VLAN)

```
ras> vlanQoS mode 1
ras> vlanQoS save
```

Figure 44 Look at the Current Settings for IEEE 802.1Q VLAN

```
ras> vlanQoS mode 1
ras> vlanQoS disp

======================   802.1Q Setting   ======================
(T):TAGGING; (F):FORBIDDEN; (U):UNTAGGED;

Port ID       :    0     1     2     3     4     5
Priority      :    L     L     L     L     L     L
                  WLAN  LAN1  LAN2  LAN3  LAN4  VDSL
ITEM  VID     :
 0      0
 1      0
 2      0
 3      0
 4      0
 5      0
 6      0
 7      0

================================================================

Broadcast Storm is DISABLE
Action for Unknown Multicast frames is FLOODING
================================================================
ras>
```

Figure 45 Create New IEEE 802.1Q VLAN and Configure Port Settings

```
ras> vlanQoS mode 1
ras> vlanQoS 1qset 10
ras> vlanQoS 1qconfig 2 T 1 2 5
ras> vlanQoS save
ras> vlanQoS disp

======================   802.1Q Setting   ======================
(T):TAGGING; (F):FORBIDDEN; (U):UNTAGGED;

Port ID       :    0     1     2     3     4     5
Priority      :    L     L     L     L     L     L
                  WLAN  LAN1  LAN2  LAN3  LAN4  VDSL
ITEM  VID     :
 0      0
 1      0
 2     10                T     T                 T
 3      0
 4      0
 5      0
 6      0
 7      0

================================================================

Broadcast Storm is DISABLE
Action for Unknown Multicast frames is FLOODING
================================================================
ras>
```

Figure 46 Configure Port Settings for Existing IEEE 802.1Q VLAN

```
ras> vlanQoS mode 1
ras> vlanQoS 1qconfig 2 U 2
ras> vlanQoS save
ras> vlanQoS disp

======================   802.1Q Setting   ======================
(T):TAGGING; (F):FORBIDDEN; (U):UNTAGGED;

Port ID       :    0     1     2     3     4     5
Priority      :    L     L     L     L     L     L
                  WLAN  LAN1  LAN2  LAN3  LAN4  VDSL
ITEM  VID     :
 0      0
 1      0
 2     10                T     U                 T
 3      0
 4      0
 5      0
 6      0
 7      0

================================================================

Broadcast Storm is DISABLE
Action for Unknown Multicast frames is FLOODING
================================================================
ras>
```

Figure 47 Reset IEEE 802.1Q Settings to Default Values

```
ras> vlanQoS clear p
ras> vlanQoS save
```

Figure 48 Disable IEEE 802.1Q VLAN (Enable Port-based VLAN)

```
ras> vlanQoS mode 0
ras> vlanQoS save
```

PART III Appendices and Index

This part contains the following chapters.

A

Specifications

The following tables provide the specifications for the P-870MH-C1.

Table 12 Specifications

FEATURE	SPECIFICATION
Default IP Address	192.168.1.2
Default Subnet Mask	255.255.255.0
Default Password	1234
VDSL	Band plan 12a Speed up to 100/45 Mbps Multi-Carrier Modulation (MCM) or Quadrature Amplitude Modulation (QAM) Selectable Rate Adoption Complies with ITU-T G.993.1, G.994.1
Operating Requirements	Temperature: 5~40 C Humidity: 20-80% RH (non-condensing)
Storage Requirements	Temperature: -30~60 C Humidity: 20-95% RH (non-condensing)
Power Requirements	12V AC, 1.25A
Hardware	RJ-11 connector (VDSL) Four auto MDI/MDI-X 10/100Base-TX Ethernet RJ45 ports (ETHERNET) RESET button Power switch, push button
QoS	Layer 2 QoS IEEE 802.1p QoS, 2 queues support IEEE 802.1Q tag-based and port-based support
Multicast	IGMP snooping IETF draft-ietf-magmasnoop-04 or later
Bridge	Transparent Bridging support IEEE 802.1D Spanning Tree support Ethernet over VDSL bridging

B

Legal Information

Copyright

Disclaimer

ZyXEL does not assume any liability arising out of the application or use of any products, or software described herein. Neither does it convey any license under its patent rights nor the patent rights of others. ZyXEL further reserves the right to make changes in any products described herein without notice. This publication is subject to change without notice.

Trademarks

ZyNOS (ZyXEL Network Operating System) is a registered trademark of ZyXEL Communications, Inc. Other trademarks mentioned in this publication are used for identification purposes only and may be properties of their respective owners.

Certifications

Federal Communications Commission (FCC) Interference Statement

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operations.

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

If this equipment does cause harmful interference to radio/television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement

- The device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment, under 47 CFR 2.1093 paragraph (d)(2). End users must follow the specific operating instructions for satisfying RF exposure compliance. To maintain compliance with FCC RF exposure compliance requirements, please follow operation instruction as documented in this manual.
- This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- IEEE 802.11b or 802.11g operation of this product in the U.S.A. is firmware-limited to channels 1 through 11.
- To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.

注意 ！

依據　低功率電波輻射性電機管理辦法

第十二條　經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條　低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
前項合法通信，指依電信規定作業之無線電信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

Notices

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device has been designed for the WLAN 2.4 GHz network throughout the EC region and Switzerland, with restrictions in France.

This Class B digital apparatus complies with Canadian ICES-003.

Viewing Certifications

1. Go to http://www.zyxel.com.
2. Select your product from the drop-down list box on the ZyXEL home page to go to that product's page.
3. Select the certification you wish to view from this page.

ZyXEL Limited Warranty

ZyXEL warrants to the original end user (purchaser) that this product is free from any defects in materials or workmanship for a period of up to two years from the date of purchase. During the warranty period, and upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, ZyXEL will, at its discretion, repair or replace the defective products or components without charge for either parts or labor, and to whatever extent it shall deem necessary to restore the product or components to proper operating condition. Any replacement will consist of a new or re-manufactured functionally equivalent product of equal value, and will be solely at the discretion of ZyXEL. This warranty shall not apply if the product is modified, misused, tampered with, damaged by an act of God, or subjected to abnormal working conditions.

Note

Repair or replacement, as provided under this warranty, is the exclusive remedy of the purchaser. This warranty is in lieu of all other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular use or purpose. ZyXEL shall in no event be held liable for indirect or consequential damages of any kind of character to the purchaser.

To obtain the services of this warranty, contact ZyXEL's Service Center for your Return Material Authorization number (RMA). Products must be returned Postage Prepaid. It is recommended that the unit be insured when shipped. Any returned products without proof of purchase or those with an out-dated warranty will be repaired or replaced (at the discretion of ZyXEL) and the customer will be billed for parts and labor. All repaired or replaced products will be shipped by ZyXEL to the corresponding return address, Postage Paid. This warranty gives you specific legal rights, and you may also have other rights that vary from country to country.

Registration

Register your product online to receive e-mail notices of firmware upgrades and information at www.zyxel.com for global products, or at www.us.zyxel.com for North American products.

Index

P

R

S

T

W