Prestige 964

Cable Router with 11g AP

User's Guide

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ZyXEL
Unleash Networking Power

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Prestige 964
Cable Router with 11g AP

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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.

Notice 1

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

Notice 2

This equipment must be installed and operated in accordance with provided instructions and the antenna (s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Information for Canadian Users

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operation, and safety requirements. The Industry Canada does not guarantee that the equipment will operate to a user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly. The customer should be aware that the compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

For their own protection, users should ensure that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution

Users should not attempt to make such connections themselves, but should contact the appropriate electrical inspection authority, or electrician, as appropriate.

Note

This digital apparatus does not exceed the class A limits for radio noise emissions from digital apparatus set out in the radio interference regulations of Industry Canada.

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; refer to the separate Warranty Card 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 (USA and territories only). If the customer desires some other return destination beyond the U.S. borders, the customer shall bear the cost of the return shipment. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

Customer Support

When you contact your customer support representative please have the following information ready:

- Prestige Model and serial number.
- Warranty Information.
- Date you received your Prestige.
- Brief description of the problem and the steps you took to solve it.

METHOD / LOCATION	e-mail – Support/Sales	Telephone/Fax	Web Site/FTP Site	Regular Mail
Worldwide	support@zyxel.com.tw support@europe.zyxel.com sales@zyxel.com.tw	+886-3-578-3942 +886-3-578-2439	www.zyxel.com www.europe.zyxel.com ftp.europe.zyxel.com	ZyXEL Communications Corp., 6 Innovation Road II, Science-Based Industrial Park, HsinChu, Taiwan.
	webmaster@zygate.com.tw	+886-3-480-8163 +886-3-499-3173	www.zygate.com.tw ftp.zygate.com.tw	ZyGATE Communications, Inc., 2F, No.48, Lung-Chin Road, Lung-Tan, Taoyuan, Taiwan.
North America	support@zyxel.com sales@zyxel.com	+1-714-632-0882 800-255-4101 +1-714-632-0858	www.zyxel.com ftp.zyxel.com	ZyXEL Communications, Inc., 1650 Miraloma Avenue, Placentia, CA 92870, U.S.A.
Denmark	support@zyxel.dk sales@zyxel.dk	+45-3955-0700 +45-3955-0707	www.zyxel.dk ftp.zyxel.dk	ZyXEL Communications A/S, Columbusvej 5, 2860 Soeborg, Denmark.
Malaysia	support@zyxel.com.by sales@zyxel.com.my	+603-795-44-688 +603-795-35-407	www.zyxel.com.my	Lot B2-06, PJ Industrial Park, Section 13, Jalan Kemajuan, 46200 Petaling Jaya Selangor Darul Ehasn, Malaysia
Norway	support@zyxel.no sales@zyxel.no	+47-22-80-6180 +47-22-80-6181	www.zyxel.no	ZyXEL Communications A/S Nils Hansens vei 13. N-0667 Oslo, Norway
Sweden	support@zyxel.se sales@zyxel.se	+46(0)-31-744-3810 +46(0)-31-744-3811	www.zyxel.se	ZyXEL Communications A/S Anders Carlssons Gata 7417 55 Goteborg Sweden
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Preface

About Your Cable Router with 11g AP

Congratulations on your purchase of the Prestige 964 Cable Router with 11g AP.

The Prestige is a broadband cable access modem integrated with IP routing functionality, USB interface, 4-port auto crossover 10/100M auto-negotiating switch,11g wireless data access and network management features. It is designed for:

- Home offices and small businesses with cable access service via Ethernet port as Internet access media.
- Multiple office/department connections.
- E-commerce/EDI applications.
- Your Prestige is easy to install and to configure.

The feature rich command sets allow you to access and configure your Prestige over a telnet connection.

About This User's Guide

This manual is designed to guide you through the telnet configuration of your Prestige for its various applications.

Regardless of your particular application, it is important that you follow the steps outlined in *Chapter 2* to connect your Prestige to your LAN. You can then refer to the appropriate chapters of the manual, depending on your applications.

Related Documentation

- Support Disk

  More detailed information about the Prestige and examples of its use can be found in our included disk (as well as on the www.zygate.com.tw web site). This disk contains information on configuring your Prestige for Internet Access and related softwares.

- Quick Installation Guide

  Our Quick Installation Guide will help you to set up and operate your Prestige right away. It contains a detailed connection diagram, Prestige default settings, information on setting up your PC.

- Packing List sheet

  Finally, you should have a Packing List sheet, which lists all items that should have come with your Prestige.

- ZyGATE Web and FTP Server Sites

  You can access release notes for firmware upgrades and other information at ZyGATE web and FTP server sites. Refer to the Customer Support page in this User’s Guide for more information.

Syntax Conventions

- For brevity's sake, we will use "e.g." as a shorthand for "for instance" and "i.e." for "that is" or "in other words" throughout this manual.
- The P964 APR may be referred to as the Prestige 964 cable router with 11g AP in this user's guide.

Chapter 1
Getting to Know Your P964 APR

This chapter provides functional overviews, key features, applications and product specifications of your P964 APR

1.1 Overview of the P964 APR

The P964 APR is a high bandwidth Internet access Cable Modem with integrated router device that connects your home/office LAN to the Internet using the hybrid fiber coaxial (HFC) cable; the same cable that brings television into a cable television (CATV) subscriber's home. Through 4 Ethernet and 1 USB ports of the P964 APR , up to 5 computers and can be directly connected to the HFC cable network for high-speed access to the Internet without an external Ethernet hub. Ideally, It allows 253 computer users using the same cable to access the internet.

P964 APR provides model for supporting the Multimedia Cable Network System (MCNS) Data Over Cable Service Interface Specification (DOCSIS) specifications in 1.0/1.1/2.0 version. MCNS is a consortium of cable television companies whose goal is to create standards for interoperable data-over-cable systems.

The P964 APR is powered by one external 9V DC-input power supply.

1.2 Hardware Interfaces

P964 APR has integrated 4-port Ethernet switch and one USB 1.1 interfaces concurrently. The 4-port switch provides auto crossover MDI/MDI-x function and is 10/100M bps Ethernet auto-negotiating. The physical user interfaces of P964 APR provide you with the capability of wired connecting up to 5 stations without the need of external Ethernet hub/switch. If you have more than 5 wired computers, to choose a hub/switch can easily expand the number of LAN users. P964 APR is designed for wired and wireless computer users. The P964 APR is also equipped with a reset button which is used for user to reset the device to factory default user name and password of each user interfaces. Hold on the Reset button for 10 seconds, the user name and password will return to the factory default and the P964 APR will automatically reboot. Press the reset button will also make system reboot while P964 APR is not working properly.

1.3 Firmware Operation Mode

According to DOCSIS specification, a cable modem is basically a bridge device. It can be configured to serve specific CPEs by provisioning their MAC addresses. Only traffic to/from these CPEs will be forwarded. The others will be filtered. It can also be configured to serve specific numbers of CPEs. However, these services are provided by your cable operator. They have to setup one account for each CPE.

For most Internet users, they have only one access account. If they have two computers' at home and want to share this account for two or more users, they have to add another Internet sharing device, like a router.
The P964 APR is equivalent to a cable modem plus a router with the capability of wireless data access. This is very suitable for SOHO and SME for Internet sharing.

P964 APR has three major operation modes as shown in Figure 1-1.

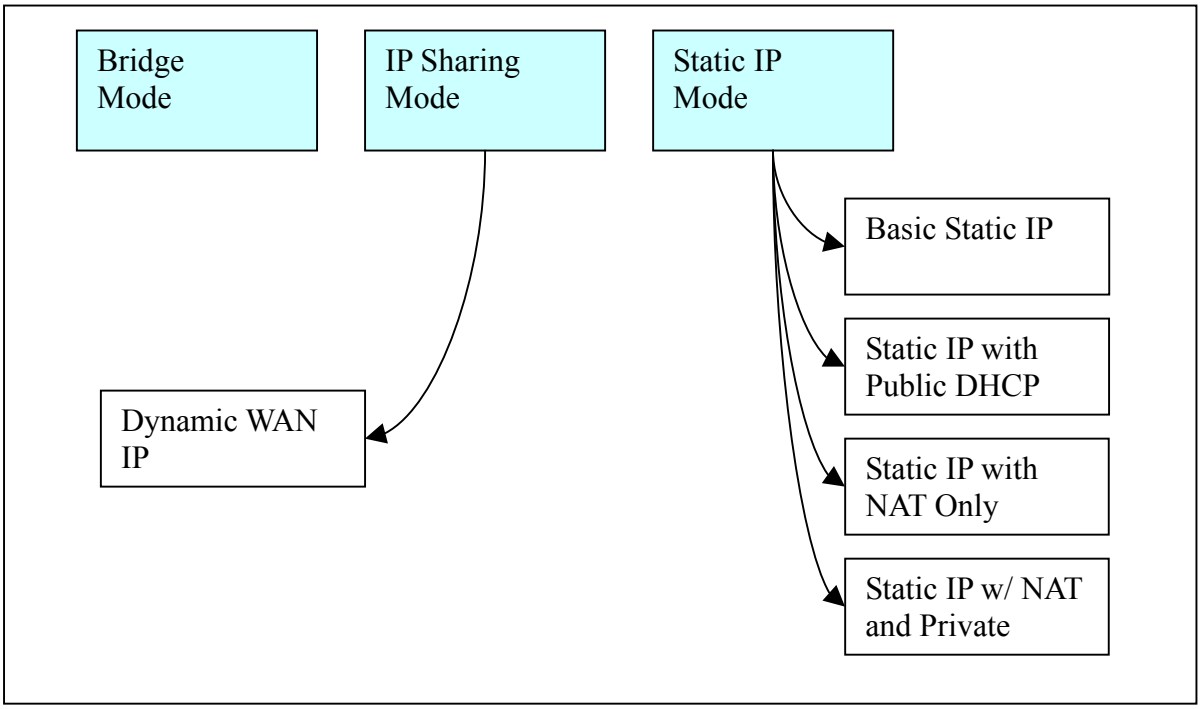


Figure 1-1 Prestige 964 Operation Mode

1.3.1 Bridge Mode

In Bridge mode, P964 APR operates just like a normal cable modem/router. All operation is compliant to DOCSIS specifications.

1.3.2 IP Sharing Mode

In IP Sharing mode, the P964 APR operates as a NAT router. It requires one public IP address from MSO's DHCP pool and provides private IP address space for LAN users. The public IP can be static assigned or dynamically assigned through DHCP.

1.3.3 Static IP Mode

In Static IP mode, P964 APR provide a routed subnet on its Ethernet interface. A public IP subnet can be assigned at the Ethernet interface such that the end user can have a static assigned subnet. At the same time, the LAN users can also use private IP addresses to get on Internet.

1.4 Key Features of the P964 APR

The following are the key features of the P964 APR:

DOCSIS 1.0/1.1/2.0 Compliant cable modem

Provides interoperability with other DOCSIS compliant cable modems and cable headend equipment.

Peak downstream signaling rates of 38Mbps and upstream signaling rates of 30 Mbps

Access the Internet with high performance network capability.

DOCSIS cable systems are capable of providing signaling rate of up to 43/55 Mbps and 30 Mbps for downstream and upstream respectively. This bandwidth however, is shared by several subscribers because there are very few computers today that can connect to a network at such high speeds. Hence, typical connection speeds are 5 Mbps downstream and 1 Mbps upstream.

IP routing, TCP, ICMP, ARP, TFTP, RIP1, RIP2 with MD5

Improves network performance through containment of broadcast messages and improves security support for unicast, broadcast and multicast IP packets. The RIP supports key-string encrypted with MD5 for authentication with the CMTS.

4-port Auto-negotiating and Auto MDI/MDI-X 10/100 Mbps Ethernet Switch

The 4-port LAN interface automatically detects if it is on a 10 Mbps or a 100 Mbps Ethernet.

56-bit DES Baseline Privacy

Software Remotely Upgradeable

The software and configuration information is downloadable from the cable headend to the Prestige. This eliminates the need for a cable technician's visit to install software upgrades.

Upgrade P964 APR Firmware via LAN

The firmware of the P964 APR can be upgraded via the LAN.

Built-in Diagnostic Features

P964 APR support remote troubleshooting via CMTS-initiated diagnostics, eliminating visit by a technician. The front panel status indicator LEDs and web based status monitoring are also incorporated to easy diagnostics from LAN interfaces.

SNMP

SNMP (Simple Network Management Protocol) is a protocol used for exchanging management information between network devices. SNMP is a member of TCP/IP protocol suite. Your P964 APR supports SNMP agent functionality, which allows a manager station to manage and monitor the P964 APR through the network. The P964 APR supports SNMP version one, two and three.(SNMP v1, v2 and v3).

Network Address Translation (NAT)

NAT (Network Address Translation - NAT, RFC 1631) allows the translation of an Internet Protocol address used within one network to a different IP address known within another network.

DHCP (Dynamic Host Configuration Protocol)

DHCP (Dynamic Host Configuration Protocol) allows the individual client computers to obtain the TCP/IP configuration at start-up from a centralized DHCP server. The Prestige has built-in DHCP server capability,

enabled by default, which means it can assign IP addresses, an IP default gateway and DNS servers to all systems that support the DHCP client.

Web based Management & Configuration

The P964 APR supports web based management and configuration interface.

Text based configuration file

The P964 APR supports text based configuration file download and hence makes router deployment simplified.

TACACS+ server support

The function allows access control to all interfaces for MSO to connect to TACACS+ server for telnet authentication.

Predefined frequency band setting

This function assist the installation procedure by specifying predefined frequency band to accelerate the downstream scanning at the first time the cable router is getting on line.

Hardware reset to factory default

The hardware reset button supports reset to factory default user name and password of user interfaces.

High throughput wireless data access

802.11g at 54Mbps ultra high wireless connectivity.

1.5 Product Specifications

Table 1-1~Table 1-Table 1-1 list the P964 APR specifications including the DOCSIS 2.0 standards and its general specifications.

Table 1-1 DOCSIS Specifications

CLASS	FEATURES	
	DOWNSTREAM	UPSTREAM
Operating Frequency	88MHz ~ 860MHz	5MHz ~ 42MHz
Modulation	64/256QAM	QPSK or 8*/16/32*/64*/128*QAM or QPSK
Channel Width	6MHz	200/400/800/1600/3200/6400* kHz
Input Impedance	75 ohms Nominal	75 ohms Nominal
Maximum Data Rates	38.00 Mbps	30 Mbps**
Receive Input Level	–15 dBmV to +15 dBmV	
Transmission Output Power		A-TDMA: +8 dBmV ~ +54 dBmV (32/64QAM)

CLASS	FEATURES	
		+8 dBmV ~ +55 dBmV (8/16 QAM) +8 dBmV ~ +58 dBmV (QPSK) S-CDMA: +8 dBmV ~ +53 dBmV (all modulation)

* With A-TDMA or S-CDMA enabled CMTS

** Speed of 30Mbps is attainable only with A-TDMA or S-CDMA technology.

Table 1-2 802.11g Access Point specifications

Frequency range	2.4~2.497GHz
Transmit power	Typical 15dBm
Security & authentication	IEEE 802.1x, WPA, RADIUS support, SSID, MAC control
Data encryption	AES, TKIP, 64/128bits WEP
Radio modulation	802.11g: OFDM with BPSK, QPSK, 16 QAM, 64 QAM 802.11b: CCK, DQPSK, DBPSK

Table 1-3 General Specifications

Number of LAN users	Up to 253
Power Requirements	9V DC @1.5 Amps Max.
Operating Requirements	Temperature: 0ºC to 40ºC (32ºF to 104ºF) **(Please see NOTE)** Humidity: 5 % to 90 % (non-condensing)
Dimensions	197(W) x 143(D) x 31(H) mm 7.76(W) x 5.63(D) x 1.22(H) inches
Power Adapter	110/220V AC, 50~60 Hz

NOTE: To keep the P964 APR operating at optimal internal temperature, keep the bottom, sides and rear of the P964 APR clear of obstructions and away from the exhaust of other equipment. Don't stack the P964 APR together in order to assure the safety.

Chapter 2
Hardware Installation and Initial Setup

This chapter shows the procedures for installing and starting the P964 APR.

2.1 Front Panel LEDs and Back Panel Ports

The P964 APR provides LEDs as status indicator for diagnostics purpose. The following figure and table describe the functions of LEDs on the front panel of P964 APR :

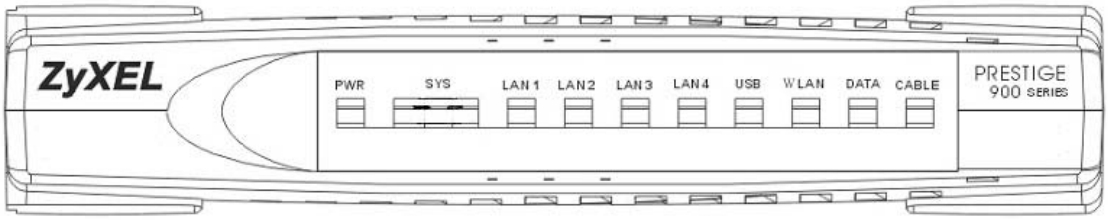


Figure 2-1 P964 APR front panel

Table 2-1 P964 APR LED Functions

FUNCTION	NAMING	COLOR	LED DESCRIPTION
Power	PWR	Green	On: Power On Off: Power Off
System	SYS	Green or Orange	On (Green): System ready and running successfully On (Orange): System is loading the configuration On (Green): System rebooting Off: System not ready
LAN link/activity	LAN 1~4	Green (10M) or Orange (100M)	On: LAN 1~4 Ethernet port link successful Flashing: LAN 1~4 is Sending or Receiving Off: LAN 1~4 Ethernet port not ready

USB	USB	Green	On: USB link successful Flashing: Sending or Receiving Off: USB not ready
WLAN	WLAN	Green	On: WLAN link successful Flashing: Sending or Receiving Off: WLAN not ready
Cable data activity	DATA	Green	Flashing: WAN port (Cable Interface) TX/RX Off: Connection is idle
Cable link status	CABLE	Green	On: The P964 APR is registered successfully with Cable Modem Terminal System (CMTS) Slow Flash (2 seconds interval): The P964 APR is scanning downstream channel Fast Flash (1 second interval): The P964 APR is locked on to downstream channel and is ranging and registering with CMTS

The SYS LED is always GREEN while system is ready or rebooting. The SYS LED will become ORANGE when the system is loading its configuration. Don't power off or reset your P964 APR during the SYS LED is ORANGE. You can only power off or reset your P964 APR after the SYS LED returns GREEN. Otherwise, your P964 APR will not work properly anymore.

.

The next figure shows the rear panel of your P964 APR and the connection diagram.

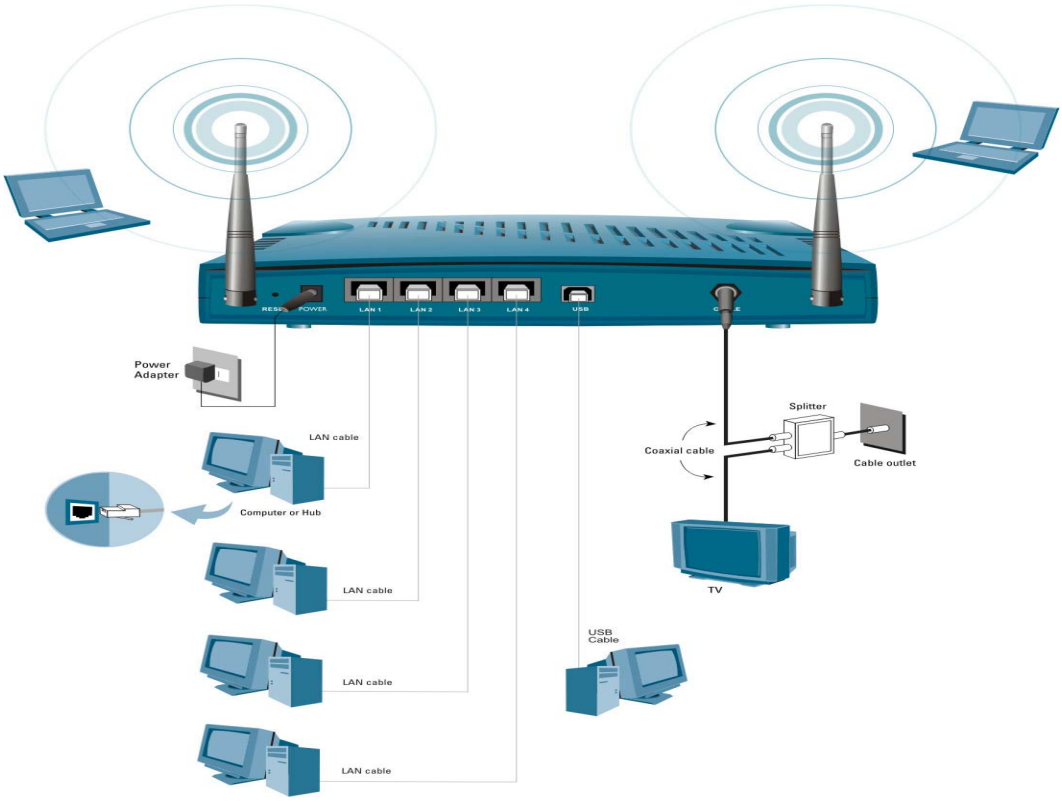


Figure 2-2 P964 APR Rear Panel and Connections

2.2 Additional Installation Requirements

In addition to the contents of your package, there are other hardware and software requirements you need before you can install and use your P964 APR. These requirements include:

1. You must have a network interface card (NIC), USB and WLAN interface supported on your computer and configure the TCP/IP protocol stack properly.
2. An ISP account. Before installing your P964 APR, you need to establish an internet access account with your local cable operator. They might ask for your cable router's HFC MAC address and model number. Please locate the MAC address at the back of your P964 APR.

NOTE: HFC MAC address can be found on the bar code sticker. Use the HFC MAC address when registering with your cable company.

After the P964 APR is properly set up, you can make future changes to the configuration through telnet connections. The Telnet configuration will be introduced later on.

2.2.1 Setting up Your Windows 95/98/Me Computer

Installing TCP/IP Components

1. Click **Start**, **Settings, Control Panel** and double-click the **Network** icon.
2. The **Network** window **Configuration** tab displays a list of installed components.

To install TCP/IP:

a. In the **Network** window, click **Add**.
b. Select **Protocol** and then click **Add**.
c. Select **Microsoft** from the list of manufacturers.
d. Select **TCP/IP** from the list of network protocols and then click **OK**.

Configuring TCP/IP

1. In the **Network** window **Configuration** tab, select your network adapter's **TCP/IP** entry and click **Properties**.
2. Click the **IP Address** tab. Click **Obtain an IP address automatically**.
3. Click the **DNS Configuration** tab. Select **Disable DNS**.
4. Click the **Gateway** tab. Highlight any installed gateways and click **Remove** until there are none listed.
5. Click **OK** to save and close the **TCP/IP Properties** window.
6. Click **OK** to close the **Network** window.
7. Turn on your Prestige and restart your computer when prompted. Insert the Windows CD if prompted.

Verifying TCP/IP Properties

1. Click **Start** and then **Run**. In the **Run** window, type "winipcfg" and then click **OK** to open the **IP Configuration** window.
2. Select your network adapter. You should see your computer's IP address, subnet mask and default gateway.

2.2.2 Setting up Your Windows NT/2000/XP Computer

Configuring TCP/IP

1. Click **Start**, **Settings**, **Network and Dial-up Connections** and right-click **Local Area Connection** or the connection you want to configure and click **Properties**. For Windows XP, click **start**, **Control Panel**, **Network and Internet Connections** and then **Network Connections**. Right-click the network connection you want to configure and then click **Properties**.
2. Select **Internet Protocol (TCP/IP)** (under the **General** tab in Win XP) and click **Properties**.
3. The **Internet Protocol TCP/IP Properties** window opens. Click **Obtain an IP address automatically**.
4. Click **Obtain DNS server automatically**.
5. Click **Advanced**, **IP Settings** tab and remove any installed gateways, then click **OK**.
6. Click **OK** to save and close the **Internet Protocol (TCP/IP) Properties** window.

7. Click **OK** to close the **Local Area Connection Properties** window.
8. Turn on your Prestige and restart your computer (if prompted).

Verifying TCP/IP Properties

1. Click **Start**, **Programs**, **Accessories** and then **Command Prompt**.
2. In the **Command Prompt** window, type "ipconfig" and then press **ENTER**. The window displays information about your IP address, subnet mask and default gateway.

2.2.3 Setting up Your Macintosh Computer

Configuring TCP/IP Properties

1. Click the **Apple** menu, **Control Panel** and double-click **TCP/IP** to open the **TCP/IP Control Panel**.
2. Select **Ethernet** from the **Connect via** list.
3. Select **Using DHCP Server** from the **Configure** list.
4. Close the **TCP/IP Control Panel**.
5. Click **Save** if prompted, to save changes to your configuration.
6. Turn on your Prestige and restart your computer (if prompted).

Verifying TCP/IP Properties

Check your TCP/IP properties in the **TCP/IP Control Panel**.

2.3 Factory Default Settings

The **P964 APR** is configured as a IP sharing router with NAT and DHCP enabled and with following factory default.

Table 2-2 P964 APR factory default

Items	Settings
LAN IP Address	192.168.1.1
Subnet Mask	255.255.255.0
DHCP IP Pool	192.168.1.33 – 192.168.1.64
Web user username	user
Web user password	1234

The default might be different from different cable operators. Please consult with your cable Internet service provider for any change.

2.4 Initializing the Cable Sharing Gateway

This section outlines how to connect your P964 APR to the LAN and the cable network.

Step 1. Preparing the CATV Coaxial Cable Connection

Locate the coaxial cable at the installation site and move the cable end, or install a two-way splitter as necessary to provide a connection near the P964 APR cable modem location.

Step 2. Connecting the P964 APR to the Cable System

Connect the P964 APR to the cable port using an F-type connector. (If the quality or general condition of the coaxial cable at the installation site is in question, we recommended that you replace the coaxial cable). The cable port on the P964 APR is labeled "**CABLE**".

Step 3. Connecting Ethernet Cable(s) or USB cable to the P964 APR

If you do not have an Ethernet interface card (NIC) in your computer, please install one or use the USB connectivity. The Ethernet interface of your P964 APR support 10/100M auto-negotiating and auto MDI/MDI-X function. You can use any type of Ethernet cable to connect it to your computer directly or through an external switch/hub.

Step 4. Connecting the Power Adapter to your P964 APR

Connect the power adapter to the port labeled POWER on the rear panel of your P964 APR.

Step 5. P964 APR Initialization

The P964 APR is powered on whenever you connect the power adapter to the power outlet. It will initialize the system and start to connect with headend CMTS. When the CABLE LED shines steadily, the P964 APR is ready to handle data traffic. The first initialization process might take several minutes because it will scan for the proper downstream and upstream channels. When the P964 APR is ready, it will memorize the channel attributes. If you power cycle the P964 APR, the next connection process will be faster.

2.5 Network Configuration of Your Computer

You must have a network interface card installed on your computer and configure the TCP/IP protocol stack properly. For Windows® 95/98/NT/2000, please configure your computer as a DHCP client. The IP address identifies the computer on the network and enables the headend CMTS to route data to and from your computer.

For Windows® 95/98, you can use the following command to verify the TCP/IP configuration.

```
Winipcfg
```

For Windows® NT/XP/2000, you can use the following command to verify the TCP/IP configuration.

```
Ipconfig
```

2.6 Router Configuration

You do not need to ask your cable company for a special configuration. The P964 APR can act as a DHCP client to acquire an IP address from the headend. Besides, it can act as a DHCP server at the LAN port and assign an IP address to your computers on the LAN subnet. What you have to do is to configure the LAN port with the proper IP address and netmask. If you already have a DHCP server on your LAN subnet, you can disable the DHCP server in the P964 APR but you have to assign an IP address/netmask for the LAN port.

2.7 Power On Your P964 APR

You should connect at least one of the LAN,USB port to your computer. Connect the cable port and the power port to the appropriate devices . Plug the power adapter into a wall outlet When connected, it is powered on, the P964 APR executes an automatic installation procedure:

1. Scans and locks on to the service provider's downstream frequency.
2. Obtains timing, signal, power level, authentication, addressing, and other operational parameters from the headend CMTS.
3. Downloads its configuration file and is then operational.

During the initialization, the LEDs on the P964 APR turns on:

1. The Power LED should be ON.
2. The CABLE LED will flash with a 2 seconds duration while scanning the downstream channel. When it has locked on to a downstream channel and is communicating with the headend CMTS, the CABLE LED will flash with a 1 second duration. Once the cable connection is completed, it will remain "ON". It may need 40 seconds from step 1 to step 2..
3. The DATA LED flashes when the P964 APR is receiving or transmitting data through the coaxial cable. It is OFF when no data is transferred.
4. Depending on which port is connected successfully, the LAN (1~4) LED , WLAN, or the USB LED will be "ON" and flashing while sending/receiving data to/from your computer/laptop.

After the initial setup and P964 APR is powered on, you can modify the configuration remotely through telnet connections.

Please note that if there is no activity for longer than 3 minutes after you log in, your P964 APR will automatically log you out.

Chapter 3
Web Based Management

This chapter describes the web based management & configuration interface.

3.1 Introduction

Before accessing the P964 APR web pages, follow the procedures below to set up your Windows NT/2000/XP Computer Configuring TCP/IP

1. Click **Start**, **Settings**, **Network and Dial-up Connections** and right-click **Local Area Connection** or the connection you want to configure and click **Properties**. For Windows XP, click **start**, **Control Panel**, **Network and Internet Connections** and then **Network Connections**. Right-click the network connection you want to configure and then click **Properties**.
2. Select **Internet Protocol (TCP/IP)** (under the **General** tab in Win XP) and click **Properties**.
3. The **Internet Protocol TCP/IP Properties** window opens. Click **Obtain an IP address automatically**.
4. Click **Use the following IP address**
5. Set the IP address as 192.168.1.x, where x represents any number between 10 to 30.
6. Set the net mask as 255.255.255.0
7. Click **Advanced**, **IP Settings** tab and remove any installed gateways, then click **OK**.
8. Click **OK** to save and close the **Internet Protocol (TCP/IP) Properties** window.
9. Click **OK** to close the **Local Area Connection Properties** window.

Verifying TCP/IP Properties

10. Click **Start**, **Programs**, **Accessories** and then **Command Prompt**.
11. In the **Command Prompt** window, type "ipconfig" and then press **ENTER**. The window displays information about your IP address, subnet mask and default gateway.

After you have finished the TCP/IP configuration setup, You may access the web pages by typing the web address **" http://192.168.1.1:8080/"**.

The P964 APR cable router provides users to configure LAN settings including DHCP server IP, netmask, DHCP clients' start IP address and the number of CPEs. To configure the LAN setting, users use a PC to browse the LAN IP of the cable router. The web functions only open to the LAN, no access from HFC cable is allowed. When browsing started, the cable router prompts the following windows for user to login.

Figure 3-1 Web Management – "User Login" Page

After input username/password, click "OK" and the following page will be displayed.

There are four tags "Status", "Basic", "Advanced" and "wireless" as shown in in the web management interface of P964APR. The "Status" tag will show the connection status and software information. "Basic" and "Advanced" tags are used for the configuration to LAN interface.

1. "Status"
   The "Status" tag will show the connection status, software information and event logs of your P964APR.
2. "Basic"
   Click "Basic", users can set DHCP server IP, and net mask, etc.
3. "Advanced"
   This function is designed especially for users who want more control of LAN interface. For example, users can block packet from some CPEs to access the Internet. Users can also open some well known ports or some special port for accessing from the Internet.
4. "Wireless"
   Users can configure the wireless access point by clicking the "wireless" tag. There are four groups of configuration setups in the "Wireless" tag.

3.2 "Status" Page

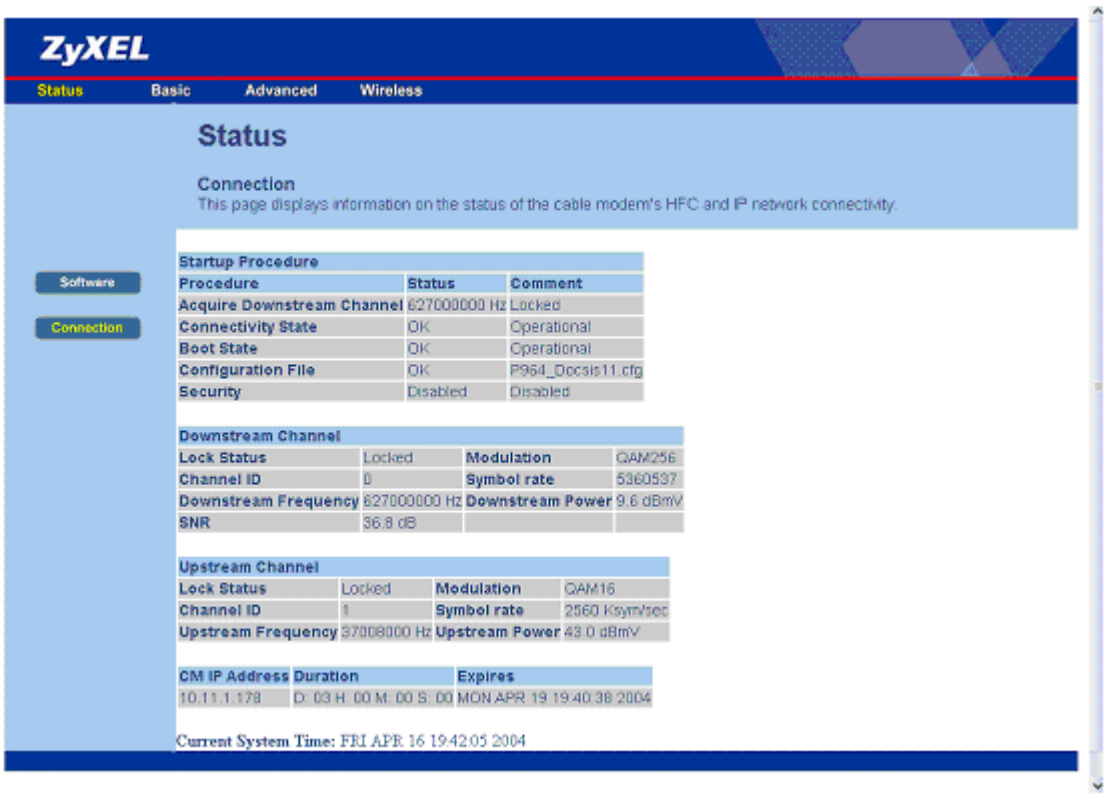


Figure 3-2 Web Management - Status

The "Connection" icon in Figure 3-2 shows the connection status of the cable router. Users can also click the "Software" icon in this page to show the software information of the box .

3.3 "Basic" Page

When click "Basic" tag, the following page is displayed.

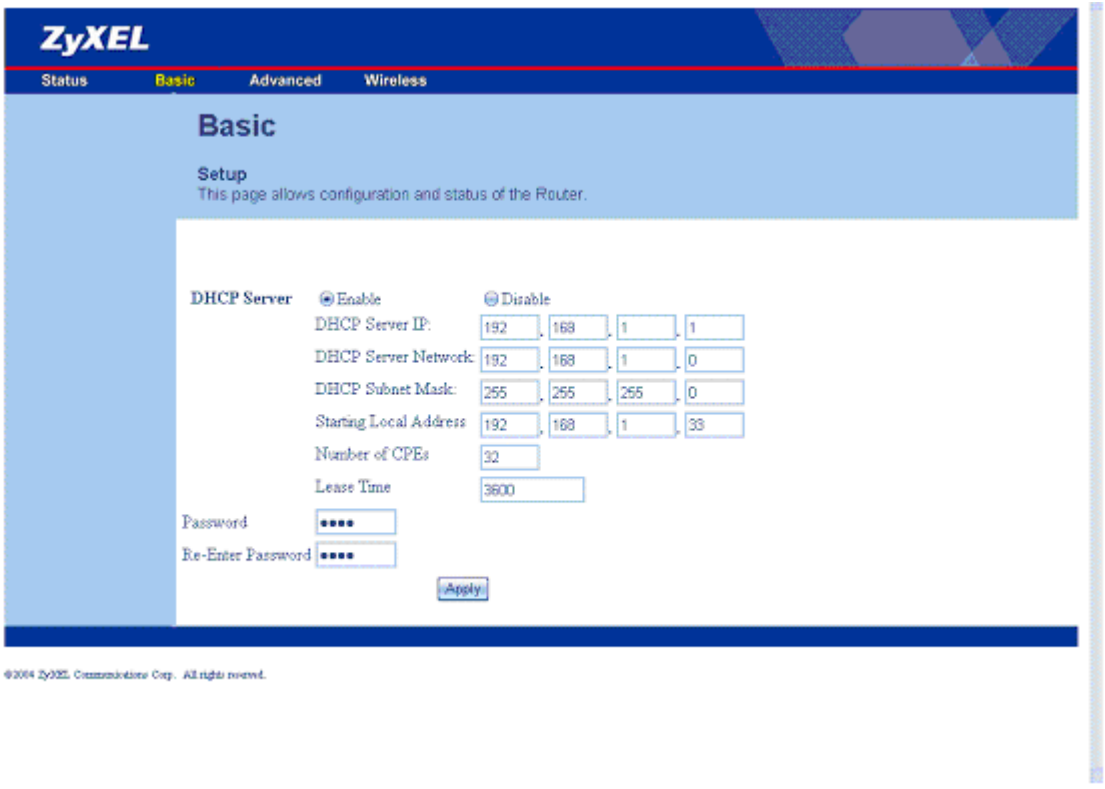


Figure 3-3 Web Management - Basic

From the "Basic" page, users can set the DHCP server IP for the LAN as well as the network, netmask, DHCP's starting IP, and the number of CPEs. User can also set lease time for the CPEs. But to update these above settings may prevent users from accessing Internet. Do not update it unless you can handle it. Besides, the password for user privilege to logon to the web based management interface can be changed in this page. Type the same password as **Password** field in the **Re-Enter Password** to double confirm new user password. After finish the configuration, click "**Apply"** icon to save the settings.

3.4 "Advanced" Page

The "Advanced" is a powerful tool to set more advanced features for the P964 APR. When click the

"Advanced" tag, there are 6 functions as shown in the following picture:

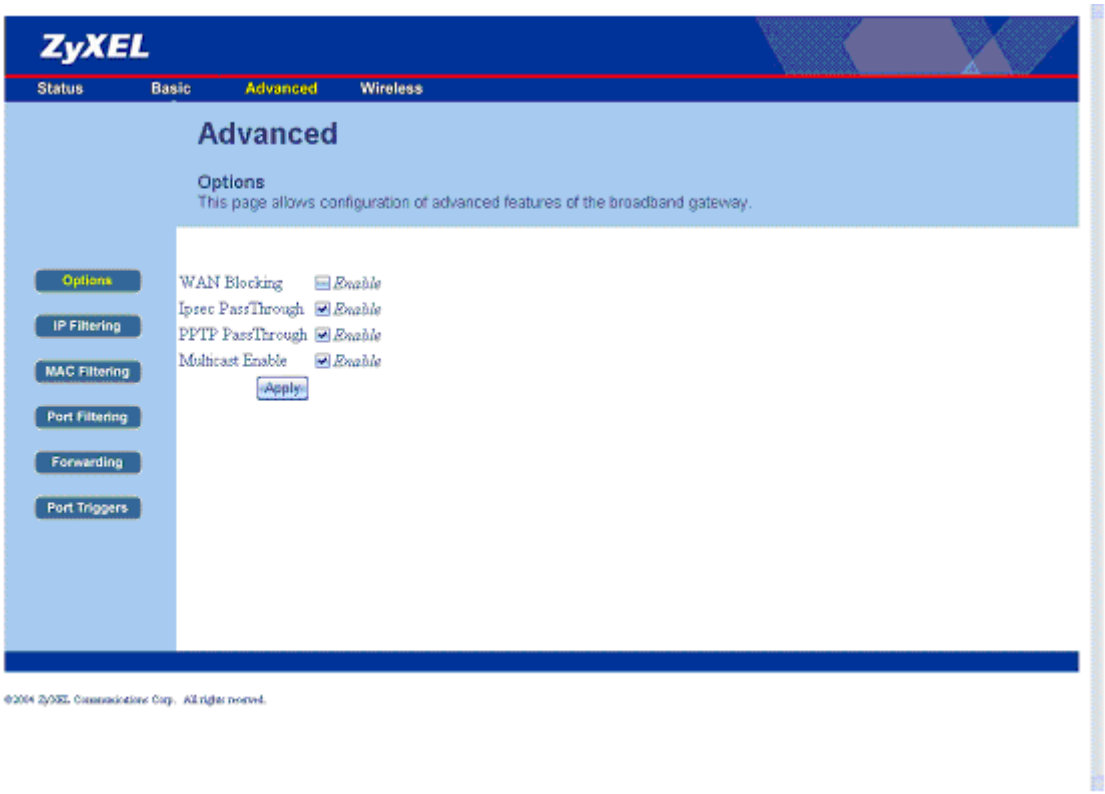


Figure 3-4 Web Management – Advanced: Options

3.4.1 Web Management – Advanced: Options

The "Option" icon allows users to configure advanced features of the P964 APR.

Table 3-1 Web Management – Advanced: Options

Function	Description
WAN Blocking	Do not response to some ICMP's probing packets, e.g. ping, traceroute and etc.
IPsec PassThrough	Allow users to execute IPSec VPN client in the workstations
PPTP PassThrough	Allow users to execute PPTP client in the workstations
Multicast Enable	Allows users to enable or disable multicast IGMP protocol

After finishing the configuration, click "**Apply"** icon to save the settings.

3.4.2 Web Management – Advanced: IP Filtering

The "IP Filtering" in the "Advanced" page allows users to configure IP address filters in order to block Internet traffic to specific network devices on the LAN. Click "IP Filtering" icon, the window is shown as below:

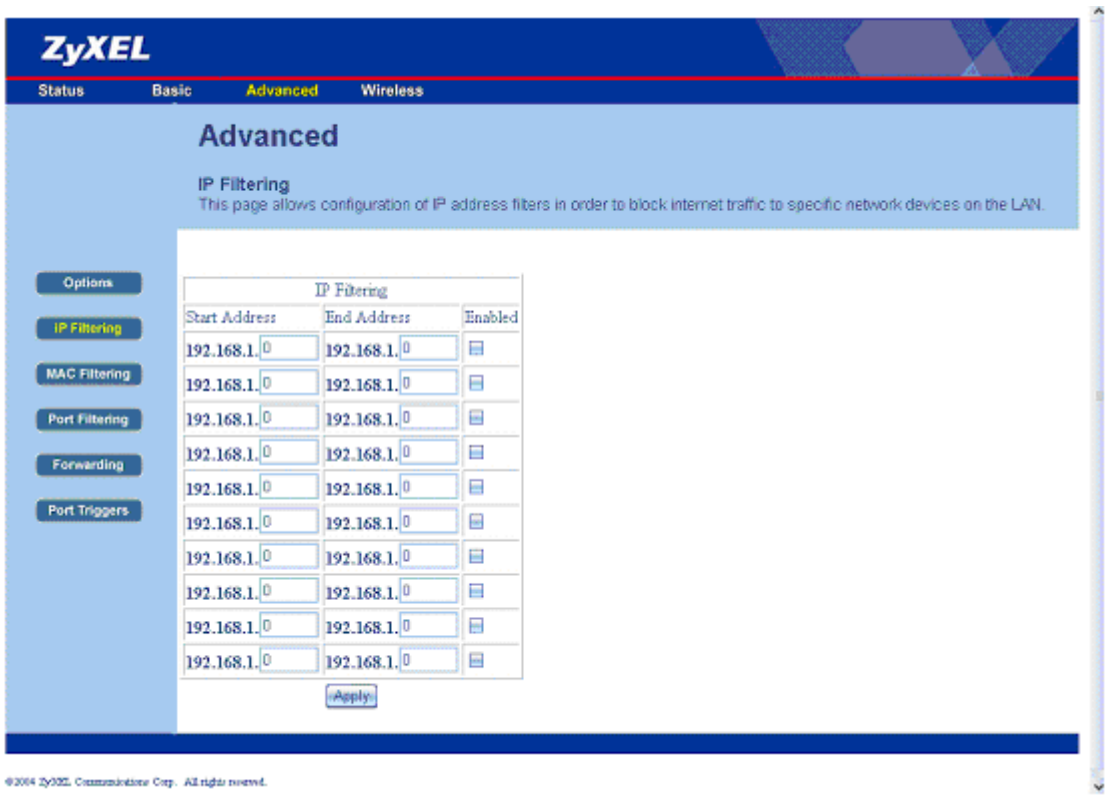


Figure 3-5 Web Management – Advanced: IP Filtering

Users can block specific CPEs to access the Internet. For example, there is a CPE with "192.168.10.20" IP address, users can set it as "enabled" in the above window and click "**Apply"** icon to save the settings. The CPE can not access the Internet after the IP filtering settings is completed.

3.4.3 Web Management – Advanced: MAC Filtering

"MAC Filtering" allows configuration of MAC address filters in order to block Internet traffic to specific network devices on the LAN. Click "MAC Filtering" icon, the screen is displayed.

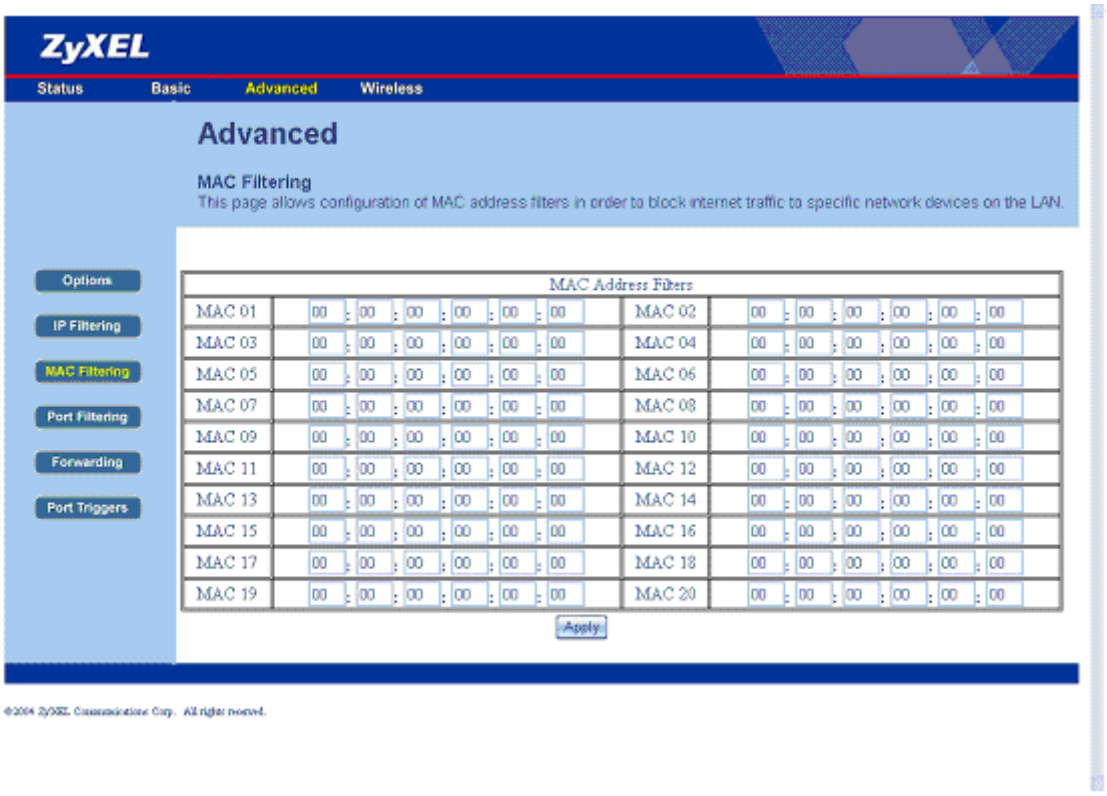


Figure 3-6 Web Management – Advanced: MAC Filtering

Users can block specific CPEs to access the Internet. It has the same effect as "IP Filtering" except this function use MAC address instead of IP address. After finish the configuration, click **Apply** button to save the settings.

3.4.4 Web Management – Advanced: Port Filtering

"Port Filtering" allows configuration of port filters in order to block specific Internet services to all devices on the LAN. Click "Port Filtering" icon, the screen is displayed.

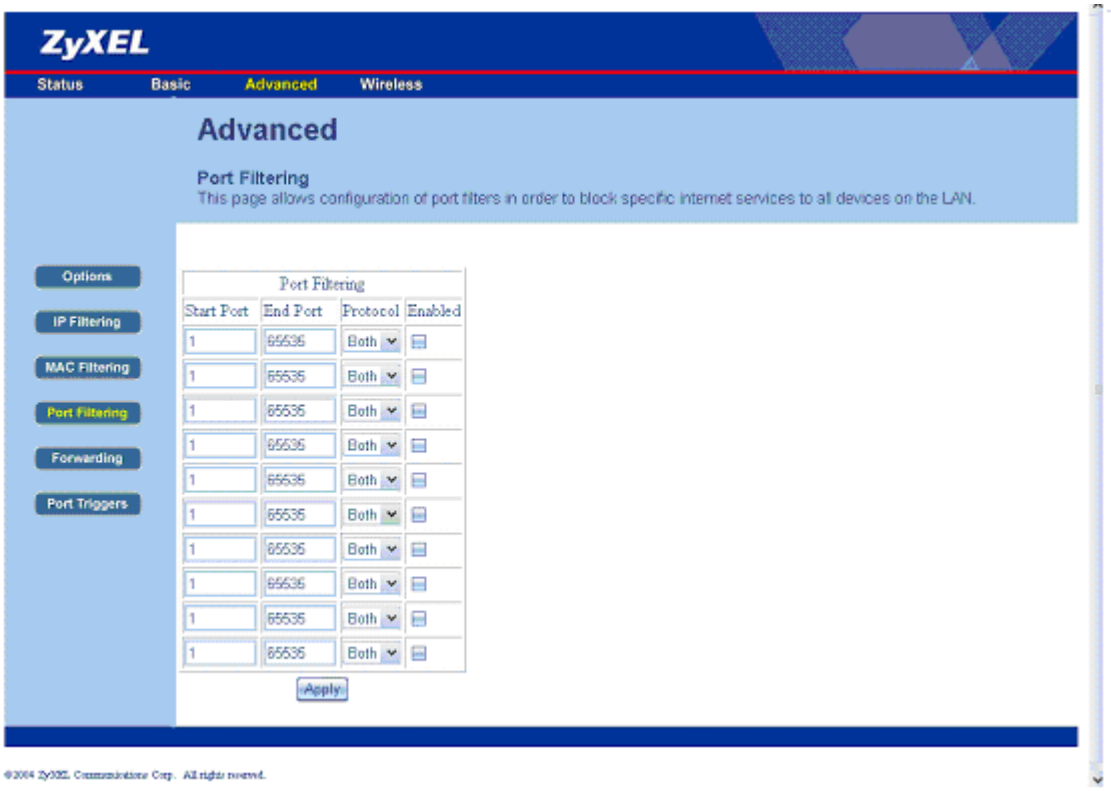


Figure 3-7 Web Management – Advanced: Port Filtering

The "Port Filtering" control CPEs not to access the Internet to get the services which is provided through the ports. After finish the configuration, click **Apply** button to save the settings.

3.4.5 Web Management – Advanced: Forwarding

The "Forwarding" page allows incoming requests on specific port numbers to reach web servers, FTP servers, mail servers, etc. so they can be accessible from the public Internet. Click "Forwarding" icon, the screen is shown as below.

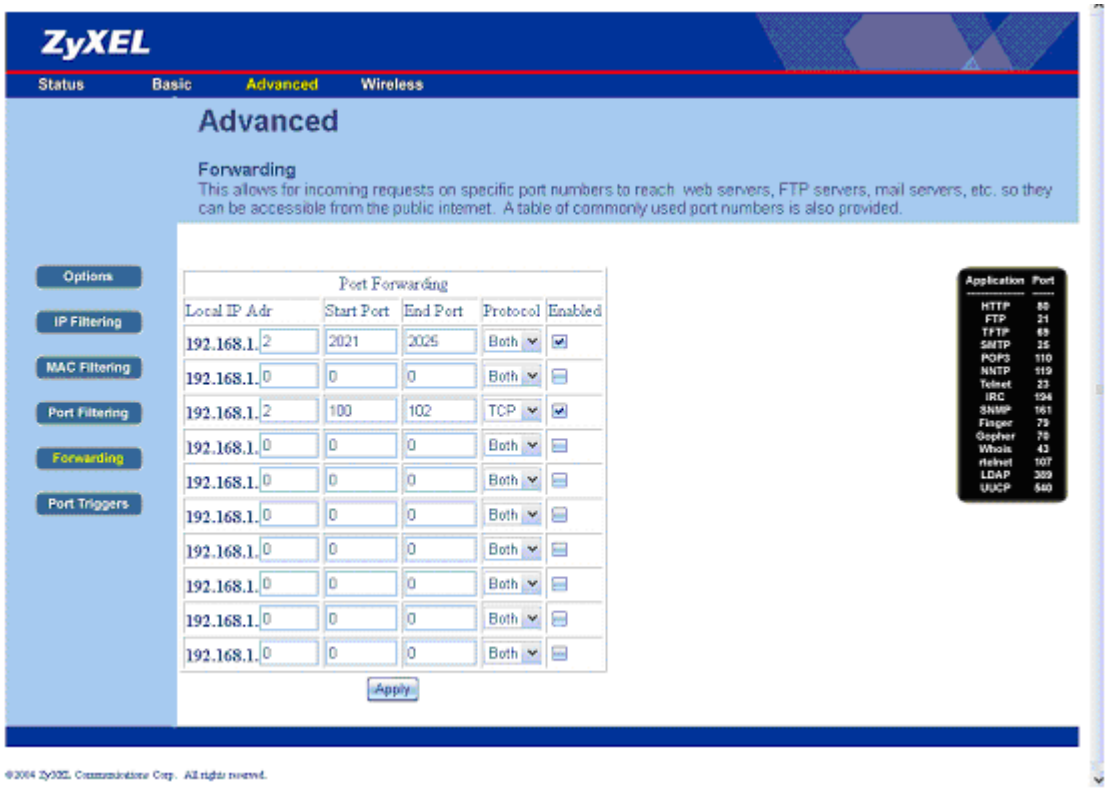


Figure 3-8 Web Management – Advanced: Forwarding

Set the local IP address on your LAN in the Local IP Adr field to allow for port number from the Start Port field to the End Port field to be accessed in the station. The Protocol field allows you to decide the port attribute from TCP/UDP/Both. A table of commonly used port numbers is also provided on the right side of this page. After finish the configuration, click Apply button to save the settings.

3.4.6 Web Management – Advanced: Port Triggers

This "Port Triggers" function allows user to configure dynamic triggers for specific devices on the LAN. This allows applications required specific port numbers with bi-directional traffic to function properly. Applications such as video conferencing, voice, gaming, and some messaging program may require these special settings.

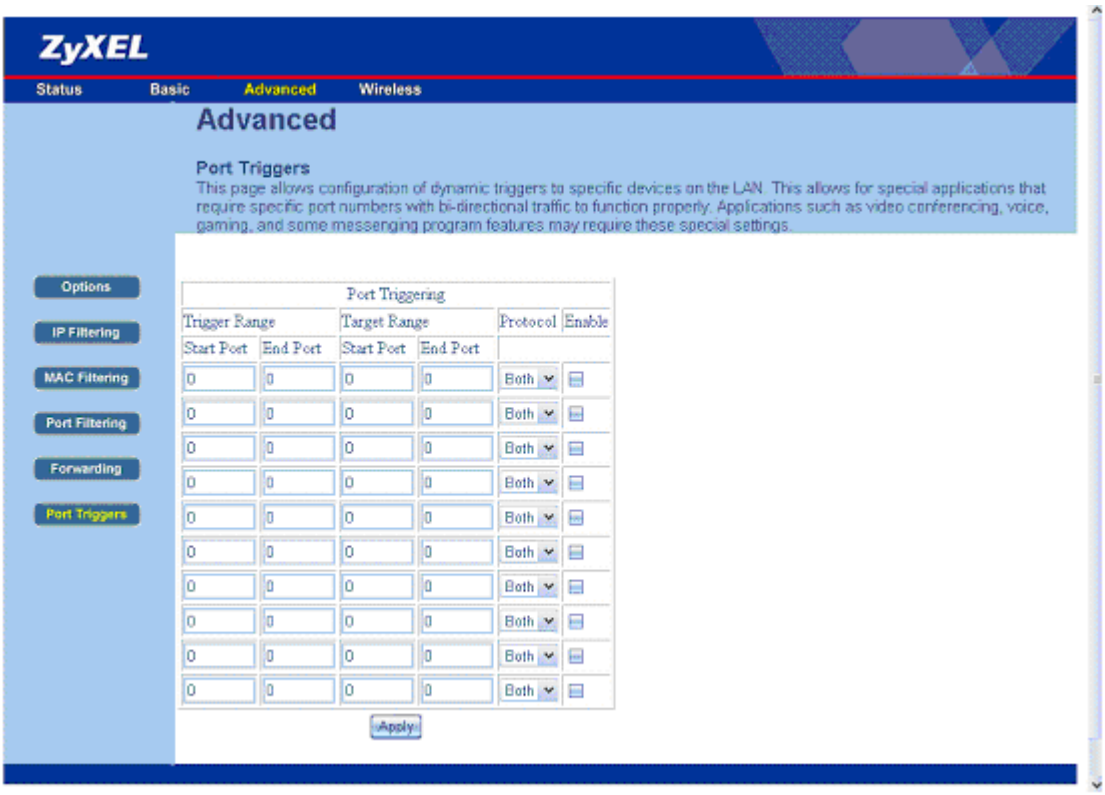


Figure 3-9 Web Management – Advanced: Port Triggers

After finishing the configuration setup, click **Apply** button to save the settings.

3.4.7 Web Management – Wireless: Configuration setup for Access Point

There are four groups of configuration setups in the "Wireless" tag. The following pages describe the detailed function of each group.

3.4.7.1 Wireless: 802.11b/g Basic

The "802.11b/g Basic" allows users to setup wireless configuration of the Access Point, It includes the parameter settings of SSID and channel number.

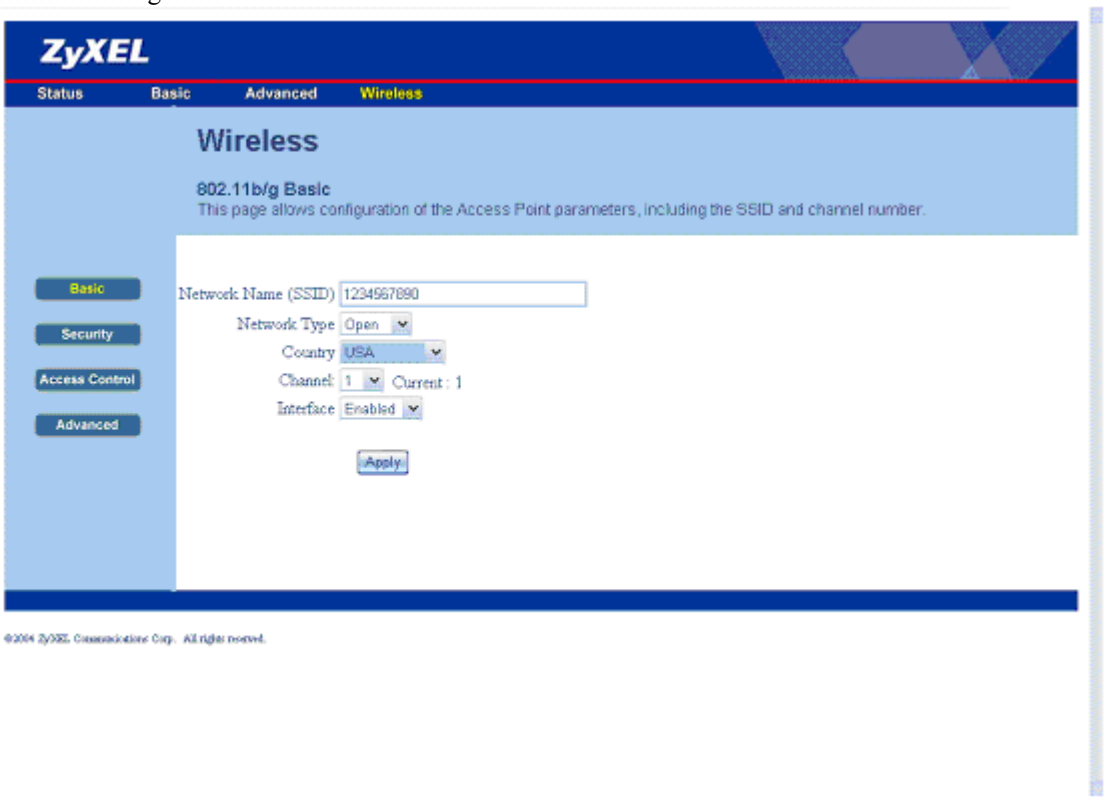


Figure 3-10 Web Management – Wireless: 802.11b/g Basic

Network Name (SSID):

"SSID" is an ASCII string up to 32 characters. 802.11b/ g client adapters must have the same ID to connect to P964 APR.

Network Type :

Selecting **"Open"**(default) causes the P964 APR to broadcast system SSID, wireless mobile users can see the P964 APR and join this group. In order to prevent this unwanted situation, choose **"close"** to

disable the SSID broadcasting function.

Country:

P964 APR supports the following channel for each country. The default setting is **"USA"**.

Worldwide	1 ~ 13	Jordan	10 ~ 13	USA	1 ~ 11
Thailand	1 ~ 14	China	1 ~ 13	Europe	1 ~ 13
Israel	5 ~ 7	Japan	1 ~ 14	All channels	1 ~ 14

Channel:

After setting the country option, you can assign channel number for each country.
Its default channel number is **"1"**.

Interface:

With this option , you may enable or disable the wireless interface card. The default setting is **"Enabled"**.

Click "**Apply**" button to save the settings.

3.3.7.2 Wireless: 802.11b/g Privacy

Click the "Security" icon, the "802.11b/g Privacy" allows users to setup wireless configuration of the WEP keys and/or pass phrase.

Network Authentication:

The Prestige 964 wireless AP supoorts the following authentications.

"Disabled": This is the default value. When "Disabled" is chosen, users can set "Data Encryption" as 'Off', 'WEP(64-bit)' or '(WEP)128-bit'.

The "Shared Key Authentication" can be set as 'Optional' or 'Required'. If "Shared Key Authentication" is set as 'Optional', users will be requested to enter the "PassPhrase" when connecting. If "Shared Key Authentication" is set as 'Required', users also need to set the same "Network Key" and "Current Network Key" to connect the AP. You can use "Generate WEP Keys" to set the "Network Key". The 802.11b/ g client devices must have the same settings to connect with P964 APR.

"802.1x": There must be a RADIUS server when use this setting. 802.11b/g client devices must have a relative setting for this option. It is also required to set the correct "PassPhrase" on RADIUS server while connecting with P964 APR.

"WPA": This option has the same requirement to set the RADIUS server. 802.11b/g client devices must support WPA option to connect with P964 APR.

"WPA-PSK": The RADIUS server is not required, but the "WPA Pre-Shared Key" must be set. In order to connect with P964 APR, 802.11b/g client devices must support WPA option. The P964 APR also has a

"WPA Group Rekey Interval" setting, the unit is in seconds, It is a function for WPA key changeing periodically by setting the interval.

Click "**Apply**" to Save all change.

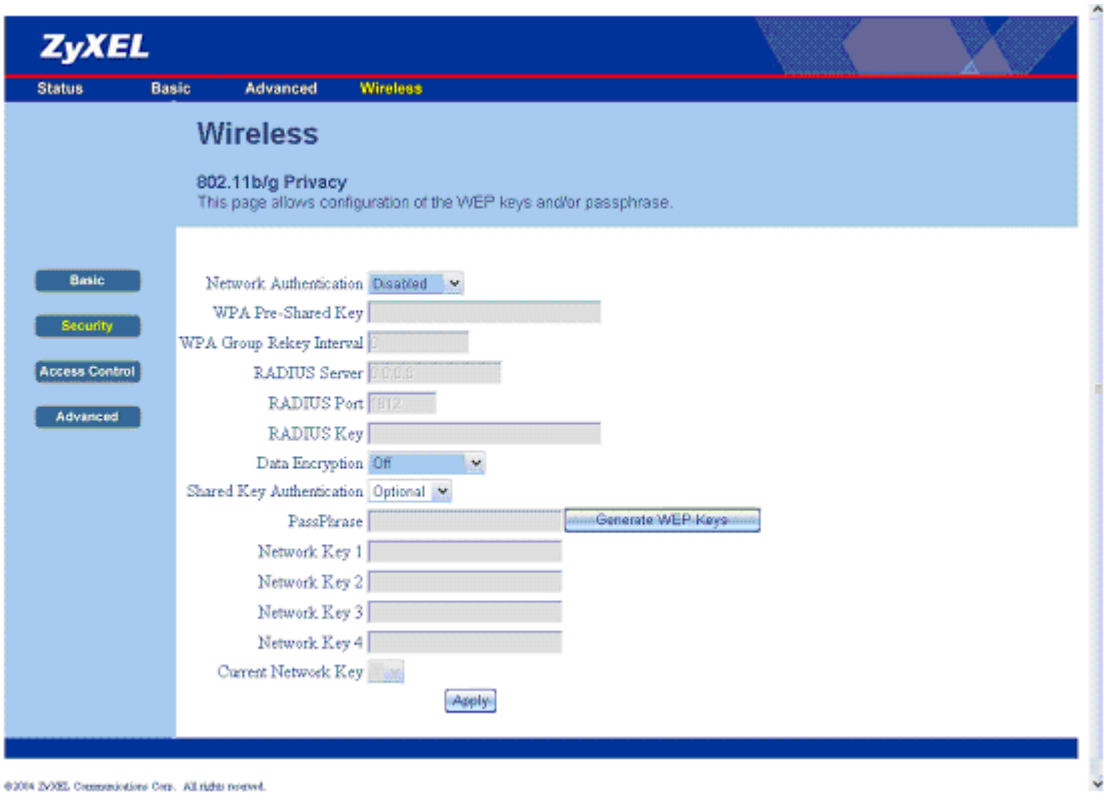


Figure 3-11 Web Management – Wireless: Security

The "802.11b/g Access Control" allows user to configure the Access Control of the AP and the connected clients.

"MAC Restrict Mode": The restrict mode can be set as 'Allow' or 'Deny' to allow or deny access client to connect the P964 APR. Choose 'Disabled' without any restrictions.
"MAC Addresses": MAC Addresses to 'Deny' or 'Allow'
Click "**Apply**" to Save all change.
"Connected Clients": Show the current connecting CPEs.

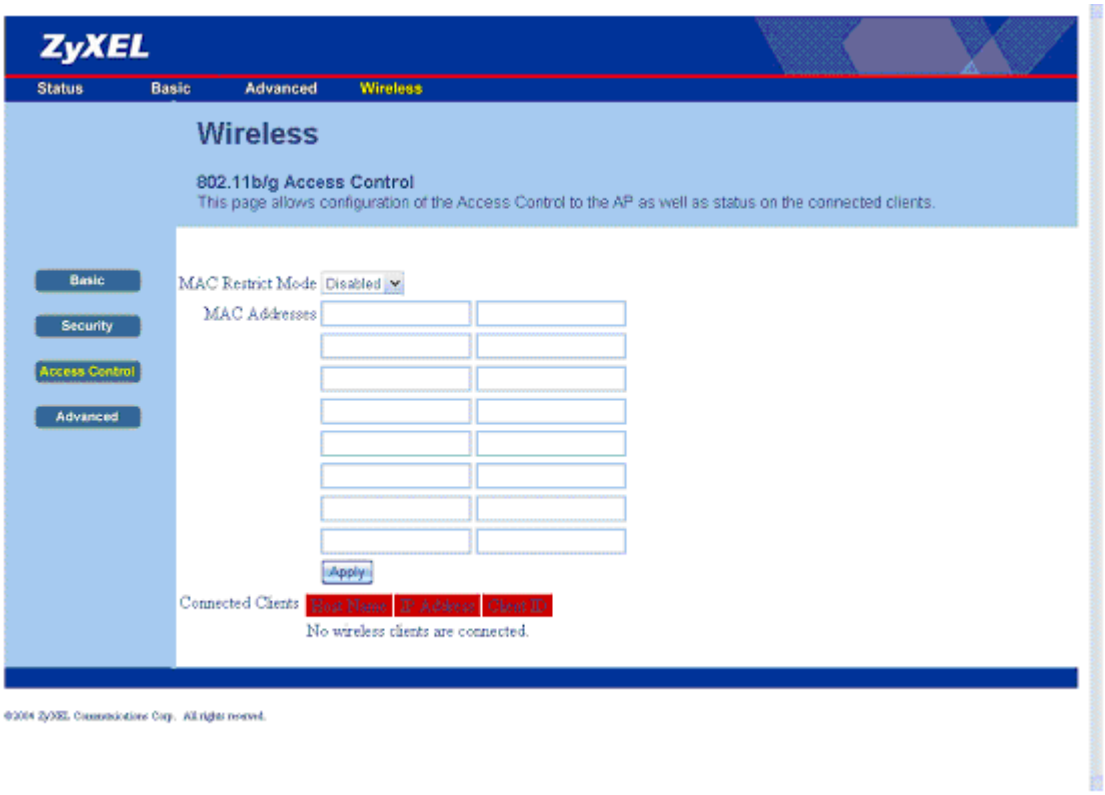


Figure 3-12 Web Management – Wireless: Access Control

The "802.11b/g Advanced" allows user to configure data rates and WiFi thresholds.
"54g Network Mode":

Max Compatibility - supports 802.11b/g clients
54g Only - supports only 802.11g clients
Max performance - supports only 802.11g clients and uses a proprietary method of improving performance. This mode may not work with all 802.11g clients.

"54g Protection":

54g Protection is a mechanism that is created for using RTS/CTS to maximize the throughput in mixed 802.11b/g networks. When set to 'Auto', it will use this method to maximize throughput. If the network only contains 802.11g clients, set this to off to maximize 11g performance. Mixed networks have an issue where a 11b client is not able to determine that a 11g client is transmitting so it will transmit anyway and squash the g transmission. The 54g protection will keep 11b clients from using too much bandwidth by determining when they can transmit so not to interfere with 11g clients.

"Rate":

Auto / 1.0 Mbps / 2.0 Mbps / 5.5 Mbps / 6.0 Mbps / 9.0 Mbps / 11.0 Mbps / 12.0 Mbps / 18.0 Mbps / 24.0 Mbps / 36.0 Mbps / 48.0 Mbps / 54.0 Mbps

"Output Power":

25% / 50% / 75% / 100%

"DTIM Interval":

DTIM interval - A DTIM interval, also known as a Data Beacon Rate, is the frequency at which an access point's beacon will include a DTIM. This frequency is usually measured in milliseconds (ms). DTIM - Delivery Traffic Indication Message. A DTIM is a signal sent as part of a beacon by an access point to a client device in sleep mode, alerting the device to a packet awaiting delivery.

"Fragmentation Threshold":

Fragmentation Threshold - This set the threshold at which wireless packets will be fragmented. This can be used to improve throughput when RF interference is causing poor throughput.

"RTS Threshold":

RTS - Request To Send. An RTS is a message sent by a networked device to its access point, seeking permission to send a data packet. RTS threshold - Request To Send threshold. The RTS threshold specifies the packet size of an RTS transmission. This helps control traffic flow through an access point, especially one with many clients. The setting normally does not need to be changed

Click "**Apply**" to Save all change.

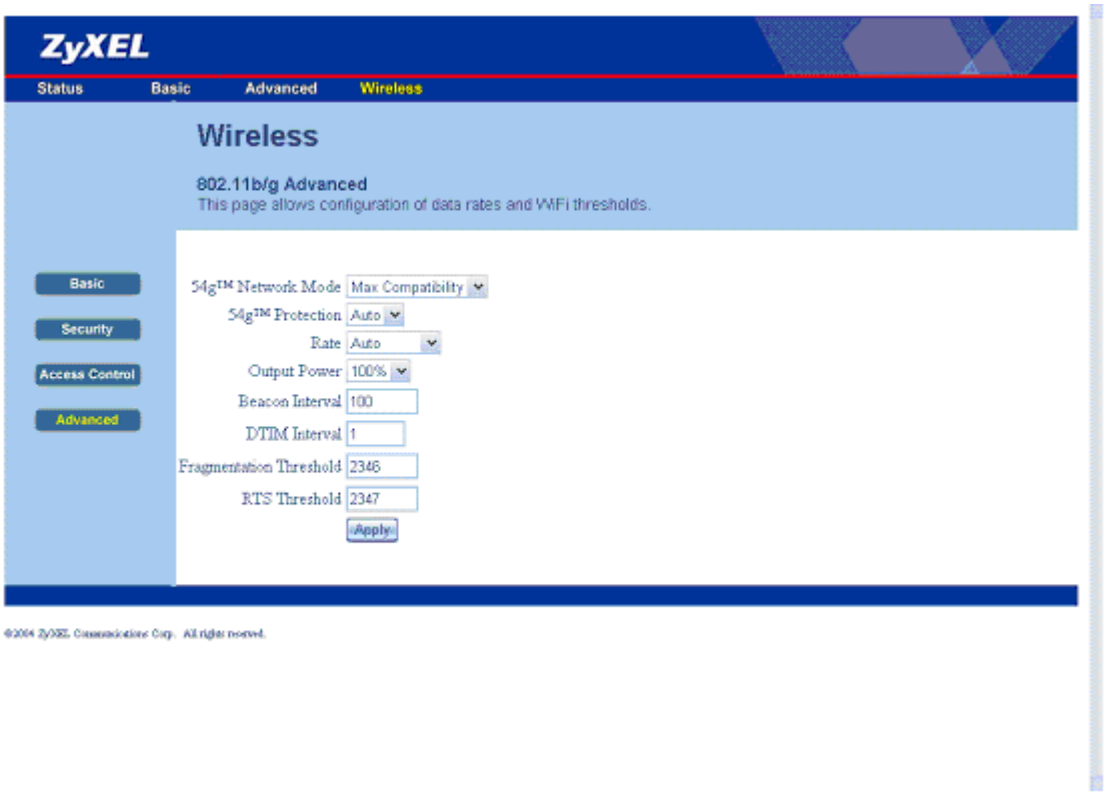


Figure 3-13 Web Management – Wireless: Advanced

Chapter 4
Troubleshooting

This chapter covers the potential problems you may run into and the possible remedies. After each problem description, some instructions are provided to help you to diagnose.

4.1 Problems with Cable Connection

Table 4-1 Troubleshooting for the link failure

PROB .EM	CORRECTIVE ACTION
The PWR LED is off.	Make sure that the power adaptor is connected to the P964 APR and plugged in to an appropriate power source. Check that the power source is turned on. If the error persists, you may have a hardware problem. In this case, you should contact your cable operator.
The SYS LED is off.	Turn the P964 APR power off and then on again.
LAN (1~4) LED and USB LED are OFF.	Check the LAN/USB LEDs on the front panel. One of these LEDs should be on. If they are all off, check the Ethernet cables between your P964 APR and hub/station or the USB cable ace on your station.
WLAN LED is OFF	Ensure the WLAN port setting of your NB or PC is ok. Make sure the SSID of your NB or PC is same as that of your P964 APR, if the situation persists, call ZyXEL for technical support.

4.2 Problems with Internet Access

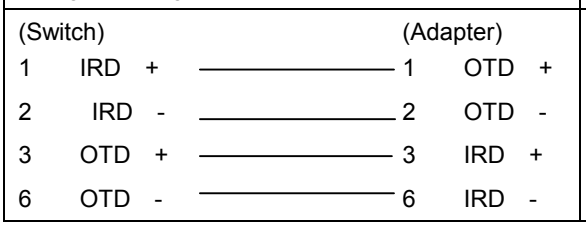
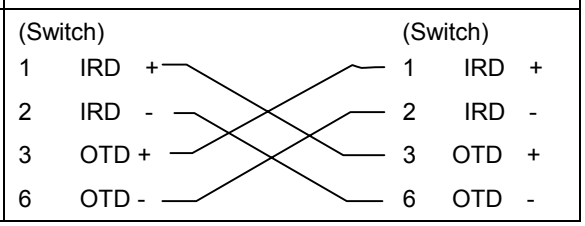
Table 4-2 Troubleshooting for the Internet Access

PROB .EM	CORRECTIVE ACTION
Cannot access e-mail or Internet Service.	Make sure that the coaxial cable is connected to the P964 APR and the Internet. Check with your service provider to see if your account has been activated. Check if your computer's network configuration is correct. For a dynamic IP address assignment, you have to activate your computer's DHCP client. And, you might need to assign a DNS server address. Refer to cable operator's configuration information.
	Check your TCP/IP parameters and verify that you have installed TCP/IP properly. If the problem persists, call your cable service provider to verify that their service is two-way and DOCSIS compliant.

All of the LEDs are ok, but I still cannot access the Internet.	If the LEDs are correct, then your P964 APR is operating properly. Try shutting down, powering off your computer and then turning it on again. This will cause your computer to re-establish communication with P964 APR. Check your TCP/IP parameters and verify that you have installed TCP/IP properly.

Appendix A
Hardware Specifications

Power Specification	Input: AC 110/220, 50/60Hz; Output: DC 9V
Operation Temperature	0º C ~ 40º C
Cable Specification for WAN/Internet	Female “F” Type RF Connector
Ethernet Specification for LAN	10/100Mbit Half / Full Auto-negotiation and Auto MDI/MDI-X
USB Interface Specification	USB 1.1

LAN Cable Pin Layout: Straight-Through	Crossover
	

Appendix B
Important Safety Instructions

The following safety instructions apply to the P964 APR:

Be sure to read and follow all warning notices and instructions. Care must be taken to allow sufficient air circulation or space between units when the P964 APR is installed inside a closed rack assembly. The operating ambient temperature of the rack environment might be greater than room temperature. The maximum recommended ambient temperature for the P964 APR is 40ºC (104ºF). Installation in a rack without sufficient airflow can be unsafe. Racks should safely support the combined weight of all equipment.

The connections and equipment that supply power to the P964 APR should be capable of operating safely with the maximum power requirements of the P964 APR. In case of a power overload, the supply circuits and supply wiring should not become hazardous. The input rating of the P964 APR is printed on the nameplate.

The AC adapter must plug in to the right supply voltage, i.e. 120VAC adapter for North America and 230VAC adapter for Europe. Make sure that the supplied AC voltage is correct and stable. If the input AC voltage is over 10% lower than the standard may cause the P964 APR to malfunction.

Installation in restricted access areas must comply with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA 70.

Do not allow anything to rest on the power cord of the AC adapter, and do not locate the product where anyone can walk on the power cord. Do not service the product by yourself. Opening or removing covers can expose you to dangerous high voltage points or other risks. Refer all servicing to qualified service personnel.

Generally, when installed after the final configuration, the product must comply with the applicable safety standards and regulatory requirements of the country in which it is installed. If necessary, consult the appropriate regulatory agencies and inspection authorities to ensure compliance.

A rare condition can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate building are interconnected, the voltage potential can cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and, if necessary, implement corrective action before interconnecting the products. If the equipment is to be used with telecommunications circuit, take the following precautions:

Never install wiring during a lightning storm.

Never install jacks in wet location unless the jack is specially designed for wet location.

Never touch uninsulated wires or terminals unless the line has been disconnected at the network interface.

Use caution when installing or modifying lines during an electrical storm. There is a remote risk of electric shock from lightning.

Glossary of Terms

10BaseT	The 10-Mbps baseband Ethernet specification that uses two pairs of twisted-pair cab ng (Category 3 or 5): one pair for transmitting data and the other for receiving data.
ARP	Address Resolution Protocol is a protocol for mapping an Internet Protocol address (I address) to a physical machine address that is recognized in the local network.
Authenti ity	Proof that the information came from the person or location that reportedly sent it. (ne example of authenticating software is through digital signatures.
Back Do r	A deliberately planned security breach in a program. Back doors allow special access to a computer or program. Sometimes back doors can be exploited and allow a cracker ur uthorized access to data.
Backbon	A high-speed line or series of connections that forms a major pathway within a netw k.
BackOri ce	BackOrifice is a remote administration tool which allows a user to control a computer across a TCP/IP connection using a simple console or GUI application. Ba cOrifice is a potentially disastrous Trojan horse since it can provide the user unlimited access to system.
Bandwid h	This is the capacity on a link usually measured in bits-per-second (bps).
Bit	(Binary Digit) -- A single digit number in base-2, in other words, either a 1 or a zero. The smallest unit of computerized data.
Brute Fo ce Hacking	A technique used to find passwords or encryption keys. Force Hacking involves tryir ; every possible combination of letters, numbers, etc. until the code is broken.
Byte	A set of bits that represent a single character. There are 8 bits in a Byte.
Cable M dem (CM)	A cable modem is a device that enables you to hook up your computer to a local cabl TV line and receive data at about 1.5 Mbps. This data rate far exceeds that of the prevalent 2 8 and 56 Kbps telephone modems, and up to 128 Kbps of ISDN that is about the data rate ava able to subscribers of Digital Subscriber Line (DSL) telephone service. A cable modem can e added to or integrated with a set top box that turns your TV set into an Internet channel. For c nputer attachment, the cable line must be split so that part of the line goes to the TV set and he other part goes to the cable modem and the computer. A cable modem is more like a network interface card (NIC) than a computer modem. All of the cable modems attached to a cable TV company coaxial cable line communicate with Cable Modem Termination System (CMTS) at the local cable TV company office. All cabl modems can receive only from and send signals to the CMTS, but not to other cable modems n the line.
Camping Out	Staying in a "safe" place once a hacker has broken into a system. The term can be used with a physical location, electronic reference, or an entry point for future attacks.
CATV	Cable TV system. Can be all coaxial- or HFC- (Hybrid Fiber Coax) based.
CDR	Call Detail Record. This is a name used by telephone companies for call related infor nation.
Channel	A specific frequency and bandwidth combination. In the present context, it means TV channels for television services and downstream data for cable modems.
CHAP	Challenge Handshake Authentication Protocol is an alternative protocol that avoids s nding passwords over the wire by using a challenge/response technique.

Cipher T xt	Text that has been scrambled or encrypted so that it cannot be read without decipheri g it. See Encryption
Client	A software program that is used to contact and obtain data from a Server software pr gram on another computer. Each Client program is designed to work with one or more specifi kinds of Server programs, and each Server requires a specific kind of Client. A Web Browser a specific kind of Client.
CMTS	Cable Modem Termination System. A central device for connecting the cable TV net ork to a data network like the Internet. Normally it is placed in the headend of the cable TV s stem.
Cookie	A string of characters saved by a web browser on the user's hard disk. Many web pag s send cookies to track specific user information. Cookies can be used to retain information s the user browses a web site. For example, cookies are used to 'remember' the items a shopper ay have in a shopping cart.
Counterr easures	Techniques, programs, or other tools that can protect your computer against threats.
CPE	Customer Premises Equipment. Used to describe the computer and/or other equipme : that the customer may want to connect to the cable modem.
Cracker	Another term for hackers. Generally, the term cracker refers specifically to a person ho maliciously attempts to break encryption, software locks, or network security.
Cracker ools	Programs used to break into computers. Cracker tools are widely distributed on the Internet. They include password crackers, Trojans, viruses, war-dia ers, and worms.
Cracking	The act of breaking into computers or cracking encryptions.
Crossove Ethernet cable	A cable that wires a pin to its opposite pin, for example, RX+ is wired to TX+. This c ble connects two similar devices, for example, two data terminal equipment (DTE) or da communications equipment (DCE) devices.
Cryptoar alysis	The act of analyzing (or breaking into) secure documents or systems that are protecte l with encryption.
CSU/DS J	Channel Service Unit/Data Service Unit. CSUs (channel service units) and DSUs (da a service units) are actually two separate devices, but they are used in conjunction and often co nbined into the same box. The devices are part of the hardware you need to connect computer eq ipment to digital transmission lines. The Channel Service Unit device connects with the digital communication line and provides a termination for the digital signal. The Data Servi e Unit device, sometimes called a digital service unit, is the hardware component you need transmit digital data over the hardware channel. The device converts signals from bridges, rou ers, and multiplexors into the bipolar digital signals used by the digital lines. Multiplexors mi voice signals and data on the same line.
DCE	Data Communications Equipment is typically a modem or other type of communicat n device. The DCE sits between the DTE (data terminal equipment) and a transmission circuit uch as a phone line.
Decrypti n	The act of restoring an encrypted file to its original state.
Denial o Service	Act of preventing customers, users, clients or other machines from accessing data on a computer. This is usually accomplished by interrupting or overw elming the computer with bad or excessive information requests.
DHCP	Dynamic Host Configuration Protocol automatically assigns IP addresses to clients w hen they

	log on. DHCP centralizes IP address management on central computers that run the I HCP server program. DHCP leases addresses for a period of time which means that addresses are nade available to assign to other systems.
Digital S gnature	Digital code that authenticates whomever signed the document or software. Software messages, Email, and other electronic documents can be signed electronically so that they cann t be altered by anyone else. If someone alters a signed document, the signature is no longer valid Digital signatures are created when someone generates a hash from a message, then encrypts and sends both the hash and the message to the intended recipient. The recipient decrypts the ha h and original message, makes a new hash on the message itself, and compares the new has with the old one. If the hashes are the same, the recipient knows that the message has not bee changed. Also see Public-key encryption.
DNS	Domain Name System. A database of domain names and their IP addresses. DNS is t e primary naming system for many distributed networks, including the Internet.
DOCSIS	Data over Cable Service Interface Specification. It is the dominating cable modem st ndard, which defines technical specifications for both cable modem and CMTS.
Domain lame	The unique name that identifies an Internet site. Domain Names always have 2 or mo e parts, separated by dots. The part on the left is the most specific, and the part on the right is he most general.
Downstr am	The data flowing from the CMTS to the cable modem.
Downstr am Frequenc /	The frequency used for transmitting data from the CMTS to the cable modem. Norm lly in the 42/65-850 MHz range depending on the actual cable plant capabilities.
DRAM	Dynamic RAM that stores information in capacitors that must be refreshed periodica y.
DTE	Originally, the DTE (data terminal equipment) meant a dumb terminal or printer, but oday it is a computer, or a bridge or router that interconnects local area networks.
EMI	ElectroMagnetic Interference. The interference by electromagnetic signals that can ca use reduced data integrity and increased error rates on transmission channels.
Encrypti n	The act of substituting numbers and characters in a file so that the file is unreadable u ntil it is decrypted. Encryption is usually done using a mathematical formula that determines ow the file is decrypted.
Ethernet	A very common method of networking computers in a LAN. There are a number of a laptations to the IEEE 802.3 Ethernet standard, including adaptations with data rates of 10 Mbi /sec and 100 Mbits/sec over coaxial cable, twisted-pair cable, and fiber-optic cable. The latest version of Ethernet, Gigabit Ethernet, has a data rate of 1 Gbit/sec.
Events	These are network activities. Some activities are direct attacks on your system, while others might be depending on the circumstances. Therefore, any activity, regardless of seve ty is called an event. An event may or may not be a direct attack on your system.
FAQ	(Frequently Asked Questions) -- FAQs are documents that list and answer the most c mmon questions on a particular subject.
FCC	The FCC (Federal Communications Commission) is in charge of allocating the electr magnetic spectrum and thus the bandwidth of various communication systems.
Firewall	A hardware or software "wall" that restricts access in and out of a network. Firewalls re most often used to separate an internal LAN or WAN from the Internet.

Flash me nory	The nonvolatile storage that can be electrically erased and reprogrammed so that data can be stored, booted, and rewritten as necessary.
FTP	File Transfer Protocol is an Internet file transfer service that operates on the Internet nd over TCP/IP networks. FTP is basically a client/server protocol in which a system running he FTP server accepts commands from a system running an FTP client. The service allows u rs to send commands to the server for uploading and downloading files. FTP is popular on the l ternet because it allows for speedy transfer of large files between two systems.
Gateway	A gateway is a computer system or other device that acts as a translator between two ystems that do not use the same communication protocols, data formatting structures, languages, nd/or architecture.
Hacker	Generally, a hacker is anyone who enjoys experimenting with technology including c mputers and networks. Not all hackers are criminals breaking into systems. Some are legitima e users and hobbyists. Nevertheless, some are dedicated criminals or vandals.
HDLC	HDLC (High-level Data Link Control) is a bit-oriented (the data is monitored bit by it), link layer protocol for the transmission of data over synchronous networks.
Headend	Central distribution point for a CATV system. Video signals are received here from s ellites and maybe other sources, frequency converted to the appropriate channels combined witl locally originated signals and rebroadcast onto the HFC plant. The headend is where the CM S is normally located.
HFC	HFC (hybrid fiber coaxial cable) is a telecommunication technology in which fiber o tic cable and coaxial cable are used in different portions of a network to carry broadband cont nt (such as video, data and voice). Typically, a local cable TV company might use fiber optic cal e from the cable headend (distribution center) to serving nodes located close to business and res lential users and from these nodes use coaxial cable to individual businesses and homes. An dvantage of HFC is that some of the characteristics of fiber optic cable (high bandwidth and lo noise and interference susceptibility) can be brought close to the user without having to replace he existing coaxial cable that is installed all the way to the home and business.
Host	Any computer on a network that is a repository for services available to other compu rs on the network. It is quite common to have one host machine provide several services, such s WWW and USENET.
HTTP	Hyper Text Transfer Protocol. The most common protocol used on the Internet. HTT is the primary protocol used for web sites and web browsers. It is also prone to certain kinc of attacks.
IANA	Internet Assigned Number Authority acts as the clearinghouse to assign and coordina e the use of numerous Internet protocol parameters such as Internet addresses, domain names, pr ocol numbers, and more. The IANA Web site is at http://www.isi.edu/iana.
ICMP	Internet Control Message Protocol is a message control and error-reporting protocol etween a host server and a gateway to the Internet. ICMP uses Internet Protocol (IP) datagram but the messages are processed by the TCP/IP software and are not directly apparent to the a plication user.
Integrity	Proof that the data is the same as originally intended. Unauthorized software or peop have not altered the original information.
internet	(Lower case i) Any time you connect 2 or more networks together, you have an inter et.
Internet	(Upper case I) The vast collection of inter-connected networks that all use the TCP/I protocols

	and that evolved from the ARPANET of the late 60's and early 70's. The Internet nov (July 1995) connects roughly 60,000 independent networks into a vast global internet
Internet ' /orm	See Worm.
Intranet	A private network inside a company or organization that uses the same kinds of softv ıre that you would find on the public Internet, but that is only for internal use.
Intruder	Person or software interested in breaking computer security to access, modify, or dar ıge data. Also see Cracker.
IP	Internet Protocol, is the underlying protocol for routing packets on the Internet and o ıer TCP/IP-based networks.
IPCP (PI ?)	IP Control Protocol allows changes to IP parameters such as the IP address.
IPX	Internetwork Packet eXchange The native NetWare internetworking protocol is IPX (Internetwork Packet Exchange). Like IP (Internet Protocol), IPX is an internetworki g protocol that provides datagram services.
IRC	Internet Relay Chat. IRC was developed in the late 1980s as a way for multiple users ɔn a system to "chat" over the network. Today IRC is a very popular way to "talk" in real time w h other people on the Internet. However, IRC is also one avenue hackers use to get informati n from you about your system and your company. Moreover, IRC sessions are prone to numerou attacks that while not dangerous can cause your system to crash.
ISP	Internet Service Providers provide connections into the Internet for home users and b sinesses. There are local, regional, national, and global ISPs. You can think of local ISPs as th gatekeepers into the Internet.
LAN	Local Area Network is a shared communication system to which many computers ar attached. A LAN, as its name implies, is limited to a local area. This has to do more with the elec rical characteristics of the medium than the fact that many early LANs were designed for epartments, although the latter accurately describes a LAN as well. LANs have different topolog s, the most common being the linear bus and the star configuration.
Linux	A version of the UNIX operating system designed to run on IBM Compatible compu ers.
Logic Bc mb	A virus that only activates itself when certain conditions are met. Logic bombs usual damage files or cause other serious problems when they are activated.
MAC	On a local area network (LAN) or other network, the MAC (Media Access Control) a ldress is your computer's unique hardware number. (On an Ethernet LAN, it's the same as you Ethernet address.) The MAC layer frames data for transmission over the network, then passes he frame to the physical layer interface where it is transmitted as a stream of bits.
MCNS	Multimedia Cable Network System is the consortium behind the DOCSIS standard f cable modems.
MSO	Multiple Service Operators. A cable TV service provider that also provides other serv ces such as data and/or voice telephony.
Name Re olution	The allocation of an IP address to a host name. See DNS
NAT	Network Address Translation is the translation of an Internet Protocol address used w thin one network to a different IP address known within another network - see also SUA.
NDIS	Network Driver Interface Specification is a Windows specification for how commun ation protocol programs (such as TCP/IP) and network device drivers should communicate with each other.

NetBIOS	Network Basic Input / Output System. NetBIOS is an extension of the DOS BIOS th : enables a PC to connect to and communicate with a LAN.
Network	Any time you connect 2 or more computers together so that they can share resources you have a computer network. Connect 2 or more networks together and you have an internet.
NIC	Network Interface Card. A board that provides network communication capabilities t and from a computer system. Also called an adapter.
Node	Any single computer connected to a network
One-way Cable Modem	A one-way Cable Modem uses the TV cable for the downstream (receive) and a telep ıone modem for upstream (transmit).
PAC	The box that calls/answers the phone call and relays the PPP frames to the PNS. A AC must have IP and dial-up capability.
Packet F ter	A filter that scans packets and decides whether to let them through.
PAP	Password Authentication Protocol PAP is a security protocol that requires users to en :r a password before accessing a secure system. The user's name and password are sent c er the wire to a server, where they are compared with a database of user account names and pass ords. This technique is vulnerable to wiretapping (eavesdropping) because the password can be aptured and used by someone to log onto the system.
Passwor Cracker	A program that uses a dictionary of words, phrases, names, etc. to guess a password.
Passwor encryption	A system of encrypting electronic files using a single key or password. Anyone who nows the password can decrypt the file.
Passwor Shadowi g	The encrypted password is no visible in the passwd file but stored in a shadow file th t is only readable by root. This prevents brute force attacks on the encrypted field to guess the assword. see e.g.: http://whatis.com/shadowpa.htm
Penetrati n	Gaining access to computers or networks by bypassing security programs and passw ds.
Phreakin ;	Breaking into phone or other communication systems. Phreaking sites on the Interne are popular among crackers and other criminals
Ping Atta k	An attack that slows down the network until it is unusable. The attacker sends a "pin ' command to the network repeatedly to slow it down. See also Denial of Service.
Pirate	Someone who steals or distributes software without paying the legitimate owner for i This category of computer criminal includes several different types of illegal activities Ma ing copies of software for others to use. Distributing pirated software over the Internet or a Bull in Board System. Receiving or downloading illegal copies of software in any form.
Pirated S ftware	Software that has been illegally copied, or that is being used in violation of the softw re's licensing agreement. Pirated software is often distributed through pirate bulletin boar s or on the Internet. In the internet underground it is known as Warez.
Plain Tex :	The opposite of Cipher Text, Plain Text is readable by anyone.
PNS	PPTP Network Server. A PNS must have IP connectivity.
POP	Post Office Protocol. This is a common protocol used for sending, receiving, and del ering mail messages.
Port	An Internet port refers to a number that is part of a URL, appearing after a colon (:) r ght after the domain name. Every service on an Internet server listens on a particular port num er on that server. Most services have standard port numbers, e.g. Web servers normally listen o port 80.

Port (H/W)	An interface on a computer for connecting peripherals or devices to the computer. A printer port, for example, is an interface that is designed to have a printer connected to it. Ports can be defined by specific hardware (such as a keyboard port) or through software.
POTS	Plain Old Telephone Service is the analog telephone service that runs over copper twisted-pair wires and is based on the original Bell telephone system. Twisted-pair wires connect homes and businesses to a neighborhood central office. This is called the local loop. The central office is connected to other central offices and long-distance facilities.
PPP	Point to Point Protocol. PPP encapsulates and transmits IP (Internet Protocol) datagrams over serial point-to-point links. PPP works with other protocols such as IPX (Internetwork Packet Exchange). The protocol is defined in IETF (Internet Engineering Task Force) RFC 1661 through 1663. PPP provides router-to-router, host-to-router, and host-to-host connections.
PPTP	Point-to-Point Tunneling Protocol.
Promiscuous Packet Capture	Actively capturing packet information from a network. Most computers only collect packets specifically addressed to them. Promiscuous packet capture acquires all network traffic it can regardless of where the packets are addressed.
Protocol	A “language” for communicating on a network. Protocols are sets of standards or rules used to define, format, and transmit data across a network. There are many different protocols used on networks. For example, most web pages are transmitted using the HTTP protocol.
Proxy Server	A server that performs network operations in lieu of other systems on the network. Proxy Servers are most often used as part of a firewall to mask the identity of users inside a corporate network yet still provide access to the Internet. When a user connects to a proxy server, via a web browser or other networked application, he submits commands to the proxy server. The server then submits those same commands to the Internet, yet without revealing any information about the system that originally requested the information. Proxy servers are an ideal way to allow all users on a corporate network channel through one point for all external communications. Proxy servers can be configured to block certain kinds of connections and stop some hacks.
PSTN	Public Switched Telephone Network was put into place many years ago as a voice telephone call-switching system. The system transmits voice calls as analog signals across copper twisted cables from homes and businesses to neighborhood COs (central offices); this is often called the local loop. The PSTN is a circuit-switched system, meaning that an end-to-end private circuit is established between caller and callee.
Public Key Encryption	System of encrypting electronic files using a key pair. The key pair contains a public key used during encryption, and a corresponding private key used during decryption.
PVC	Permanent Virtual Circuit. A PVC is a logical point-to-point circuit between customer sites. PVCs are low-delay circuits because routing decisions do not need to be made along the way. Permanent means that the circuit is preprogrammed by the carrier as a path through the network. It does not need to be set up or torn down for each session.
Ranging	The process of automatically adjusting transmission levels and time offsets of individual modems in order to make sure the bursts coming from different modems line up in the right timeslots and are received at the same power level at the CMTS.
Reconnaissance	The finding and observation of potential targets for a cracker to attack.
RFC	An RFC (Request for Comments) is an Internet formal document or standard that is the result of committee drafting and subsequent review by interested parties. Some RFCs are informational in nature. Of those that are intended to become Internet standards, the final version of the RFC

	becomes the standard and no further comments or changes are permitted. Change can occur, however, through subsequent RFCs.
RIP	Routing Information Protocol is an interior or intra-domain routing protocol that uses the distance-vector routing algorithms. RIP is used on the Internet and is common in the NetWare environment as a method for exchanging routing information between routers.
Router	A device that connects two networks together. Routers monitor, direct, and filter information that passes between these networks. Because of their location, routers are a good place to install traffic or mail filters. Routers are also prone to attacks because they contain a great deal of information about a network.
SAP	In NetWare, the SAP (Service Advertising Protocol) broadcasts information about available services on the network that other network devices can listen to. A server sends out SAP messages every 60 seconds. A server also sends out SAP messages to inform other devices that it is closing down. Workstations use SAP to find services they need on the network.
SATAN	A UNIX program that gathers information on networks and stores it in databases. It is helpful in finding security flaws such as incorrect settings, software bugs and poor policy decisions. It shows network services that are running, the different types of hardware and software on the network, and other information. It was written to help users find security flaws in the network systems.
Server	A computer, or a software package, that provides a specific kind of service to client software running on other computers.
Set-Top Box	A set-top box is a device that enables a television set to become a user interface to the Internet and also enables a television set to receive and decode digital television (DTV) broadcasts.
Shoulder Surfing	Looking over someone's shoulder to see the numbers they dial on a phone, or the information they enter into a computer.
SID (Service ID)	Used in the DOCSIS standard to define a particular mapping between a cable modem (CM) and the CMTS. The SID is used for the purpose of upstream bandwidth allocation and class-of-service management.
SNMP	System Network Management Protocol is a popular management protocol defined by the Internet community for TCP/IP networks. It is a communication protocol for collecting information from devices on the network.
Snooping	Passively watching a network for information that could be used to a hacker's advantage, such as passwords. Usually done while Camping Out.
SOCKS	A protocol that handles TCP traffic through proxy servers.
SPAM	Unwanted e-mail, usually in the form of advertisements.
Splitter	Passive devices that divide the traffic on trunk cables and send it down feeder cables
Spoofing	To forge something, such as an IP address. IP Spoofing is a common way for hackers to hide their location and identity
SSL (Secured Socket Layer)	Technology that allows you to send information that only the server can read. SSL allows servers and browsers to encrypt data as they communicate with each other. This makes it very difficult for third parties to understand the communications.
STP	Twisted-pair cable consists of copper-core wires surrounded by an insulator. Two wires are twisted together to form a pair, and the pair form a balanced circuit. The twisting prevents interference problems. STP (shielded twisted-pair) provides protection against external crosstalk.
Straight through	A cable that wires a pin to its equivalent pin. This cable connects two dissimilar devices, for

Ethernet :able	example, a data terminal equipment (DTE) device and a data communications equipı ent (DCE) device. A straight through Ethernet cable is the most common cable used.
SUA	Single User Account – The Prestige's SUA (Single User Account) feature allows mul ple user Internet access for the cost of a single ISP account - see also NAT.
Subscrib r Unit (SU)	An alternate term for cable modem.
TCP	Transmission Control Protocol handles flow control and packet recovery and IP prov ling basic addressing and packet-forwarding services.
Telnet	Telnet is the login and terminal emulation protocol common on the Internet and in U IX environments. It operates over TCP/IP networks. Its primary function is to allow use to log into remote host systems.
Tempest	Illegal interception of data from computers and video signals.
Terminal	A device that allows you to send commands to a computer somewhere else. At a min num, this usually means a keyboard and a display screen and some simple circuitry.
Terminal Software	Software that pretends to be (emulates) a physical terminal and allows you to type cc nmands to a computer somewhere else.
TFTP	Trivial File Transfer Protocol is an Internet file transfer protocol similar to FTP (File ransfer Protocol), but it is scaled back in functionality so that it requires fewer resources to r n. TFTP uses the UDP (User Datagram Protocol) rather than TCP (Transmission Control Prot col).
Three-w y Cable Modem	A three-way cable modem is a hybrid that can uses either a telephone modem or the V cable for the upstream traffic.
Trojan o Trojan Horse	Like the fabled gift to the residents of Troy, a Trojan Horse is an application designe to look innocuous. Yet, when you run the program it installs a virus or memory resident appl cation that can steal passwords, corrupt data, or provide hackers a back door into your computer Trojan applications are particularly dangerous since they can often run exactly as expected ithout showing any visible signs of intrusion.
Two-wa Cable Modem	A two-way Cable Modem uses the TV cable for both downstream and upstream traff .
UDP	UDP is a connectionless transport service that dispenses with the reliability services ovided by TCP. UDP gives applications a direct interface with IP and the ability to address a pa icular application process running on a host via a port number without setting up a connect n session.
UNIX	A widely used operating system in large networks.
Upstrean	The data flowing from the CM to the CMTS.
Upstrean Frequency	The frequency used to transmit data from the CM to the CMTS. Normally in the 5 to 42 MHz range for US systems and 5 to 65 MHz range for European systems.
URL	(Uniform Resource Locator) URL is an object on the Internet or an intranet that resic s on a host system. Objects include directories and an assortment of file types, including text file , graphics, video, and audio. A URL is the address of an object that is normally typed in the Add ess field of a Web browser. The URL is basically a pointer to the location of an object.
VPN	Virtual Private Network. These networks use public connections (such as the Interne to transfer information. That information is usually encrypted for security purposes.
Vulnerab lity	Point where a system can be attacked.
WAN	Wide Area Network s link geographically dispersed offices in other cities or around t e globe.

	Just about any long-distance communication medium can serve as a WAN link, inclu ing switched and permanent telephone circuits, terrestrial radio systems, and satellite sys ems.
War Dial r	A program that automatically dials phone numbers looking for computers on the othe end. They catalog numbers so that hackers can call back and try to break in.
Warez	A term that describes Pirated Software on the Internet. Warez include cracked games r other programs that software pirates distribute on the Internet
Web Cor igurator	This is a web-based router (not all) configurator that includes an Internet Access Wiz rd, Advanced.
Wire Tap ping	Connecting to a network and monitoring all traffic. Most wire tapping features can o y monitor the traffic on their subnet.
Worm	A program that seeks access into other computers. Once a worm penetrates another c mputer it continues seeking access to other areas. Worms are often equipped with dictionary-b ed password crackers and other cracker tools that enable them to penetrate more system Worms often steal or vandalize computer data.
WWW	(World Wide Web) -- Frequently used when referring to "The Internet", WWW has t o major meanings - First, loosely used: the whole constellation of resources that can be acces d using Gopher, FTP, HTTP, telnet, USENET, WAIS and some other tools. Second, the unive se of hypertext servers (HTTP servers).

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