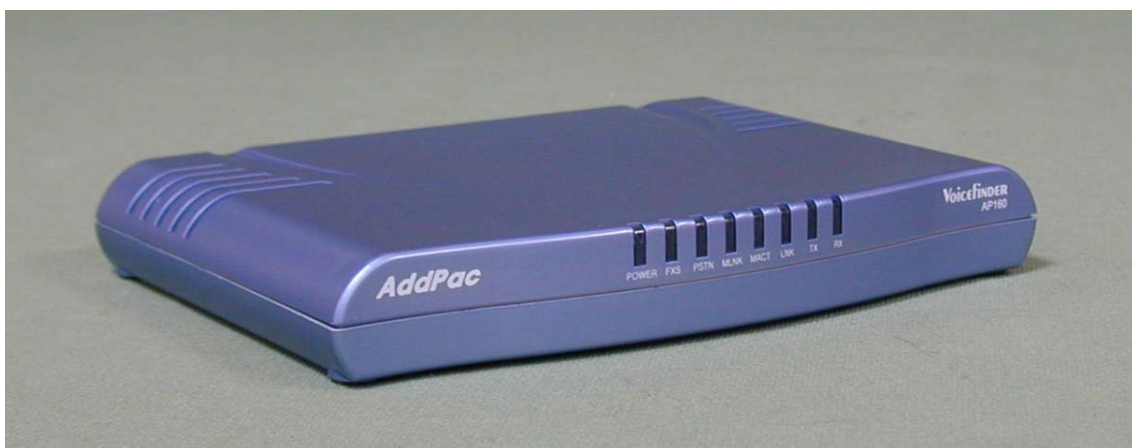


VoiceFinder

AP160 VoIP Gateway

(Residential Gateway)

User's Guide



AddPac Technology, Co. Ltd.

2nd fl., Jeong-Am Building., 769-12 Yoksam-dong
Kangnam-ku Seoul, Korea 135-080

Phone (82 2)568-3848

Fax (82 2)568-3847

E-mail : info@addpac.com

<http://www.addpac.com>

[Contents]

Getting into the VoiceFinder AP160 User's Manual

<http://www.addpac.com> 1

Chapter 1. VoiceFinder AP160 Overview.....8

1.1. Introduction to the AP160 dial-up VoIP Gateway.....8

1.2. Main Features.....10

1.3. APOS Internetworking Software..... 14

1.4. Hardware Configuration and Network Interface 16

1.4.1. VoiceFinder AP160 Main Body 16

1.4.2. Network Interface 20

1.4.3. Voice Processing Interface..... 21

Chapter 2. Before Installation.....22

2.1. Unpacking.....22

2.2. Installation Requirements.....24

2.2.1. Electrical Requirements..... 24

2.2.2. General Requirements 25

2.2.3. Prerequisites for Network Connection..... 26

2.2.3.1. Async (PSTN) Port..... 26

2.2.3.2. Ethernet Port..... 26

2.2.3.3. RS-232C Serial Console Port 26

Chapter 3. Gateway Installation and Operation.....28

3.1. Installation29

3.1.1. Installation Procedure..... 29

3.1.2. Console Connection..... 30

3.1.3. Plug-In Power 32

3.2. Environment Configuration34

3.2.1. User and Gateway Management Environment..... 35

3.2.2. Interface Configuration Environment 36

3.2.3. Routing Configuration Environment 37

3.2.4. Security and Internet Configuration Environment..... 37

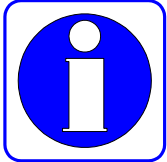
3.2.5. System Status and Debugging Environment..... 37

3.2.6. Voice Integration Configuration Environment..... 38

- Chapter 4. Gateway Configuration and Commands39**
 - 4.1. Gateway Booting..... 39**
 - 4.2. Command Usage 42**
 - 4.2.1. Commands of the User Mode..... 45
 - 4.2.2. Commands of the Manager Mode 46
 - 4.2.3. Commands of the Configuration Mode..... 48
 - 4.2.3.1. Global Configuration(config) Commands..... 48
 - 4.2.3.2. Commands of the Async Interface(PSTN Modem) Configuration Mode .. 50
 - 4.2.4. PPP Configuration 55
- Appendix A VoiceFinder AP160 VoIP Gateway Technical Description.....66**

Getting into the VoiceFinder AP160 User's Manual

Information This chapter provides the overview of the VoiceFinder AP160 gateway user's manual and an explanation of the symbols and legends involved.



In this manual, we only explain the AP160 specific configuration and commands. Please refer the AP200 user's guide about the other part or common part of VoiceFinder series.

[Composition of the Manual]

The VoiceFinder AP160 user's manual serves to assist the operation of the AP160 dial-up VoIP gateway. This manual is composed of 4 chapters and 1 Appendixes as the following :

The user experienced with gateway may refer directly to the chapters as needed. But those less experienced are highly recommended to thoroughly understand the manual before operation of the gateway.

- Chapter 1 『**VoiceFinder AP160 Overview**』 provides an introduction to the hardware and software features of VoiceFinder AP160 and technical support request method.
- Chapter 2 『**Before Installation**』 provides the installation environment and cable requirements, along with recommendations for safe operation of the equipment.
- Chapter 3 『**Installation and Operation Environment**』 explains the basics for connecting with LAN, Async Modem and Console Port
- Chapter 4 『**Gateway Configuration and Commands**』 explains in detail about configuring the user Interface and the corresponding commands along with configuration examples. This chapter provides important information and requires comprehensive understanding.
- Appendix A 『**VoiceFinder AP160 Technical Specifications** 』 provides

detail technical specifications for the VoiceFinder AP160 dial-up VoIP gateway.

For technical support, please contact AddPac Technology Co. Ltd.

AddPac Technology Co., Ltd
2nd Fl. Jeong-Am Bulding, 769-12
Yeoksam-Dong, Kangnam-Ku, Seoul, Korea
Phone (02) 568-3848
Fax (02) 568-3847
E-mail : info@addpac.com
<http://www.addpac.com>

VoiceFinder AP160 dial-up VoIP gateway user's manual's revision history are as follows.



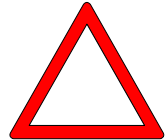

Revision No.	Date	Contents	Written By
Version 1.0	Mar. 15. 2003	Initial Released	AddPac R&D Part

[Symbols and Legends]

The symbols and legends used in this User's Manual are as follows :

- Commands and Keywords are typed in Bold.
- Variables that require user inputs are typed in *Italic*.
- Square brackets([]) are Optional values.
- Keywords that are required but need selection are grouped in braces({}) and are separated by Slashes(/).
- Angle brackets(<>) are required but appropriate parameters must be inputted.

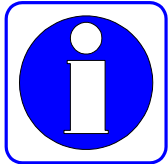
The following symbols are used for the user's reference in reading the user's manual.

<p>Danger</p> 	<p>Danger</p> <p>This symbol signals possible danger. Misuse could result in physical injuries. In procedures with this symbol, the user is strongly advised to follow safety regulations in order to avoid electrical shock.</p>
<p>Warning</p> 	<p>Warning</p> <p>This symbol warns the user that misuse in this procedure could result in hardware damage of the equipment or loss of data.</p>
<p>Caution</p> 	<p>Caution</p> <p>This symbol calls for the user's caution. Misuse in this procedure could result in software damage of the equipment, loss of data or system configuration.</p>
<p>Information</p> 	<p>Reference</p> <p>This symbol indicates reference, providing detail information for understanding the user manual.</p>

Chapter 1. VoiceFinder AP160 Overview

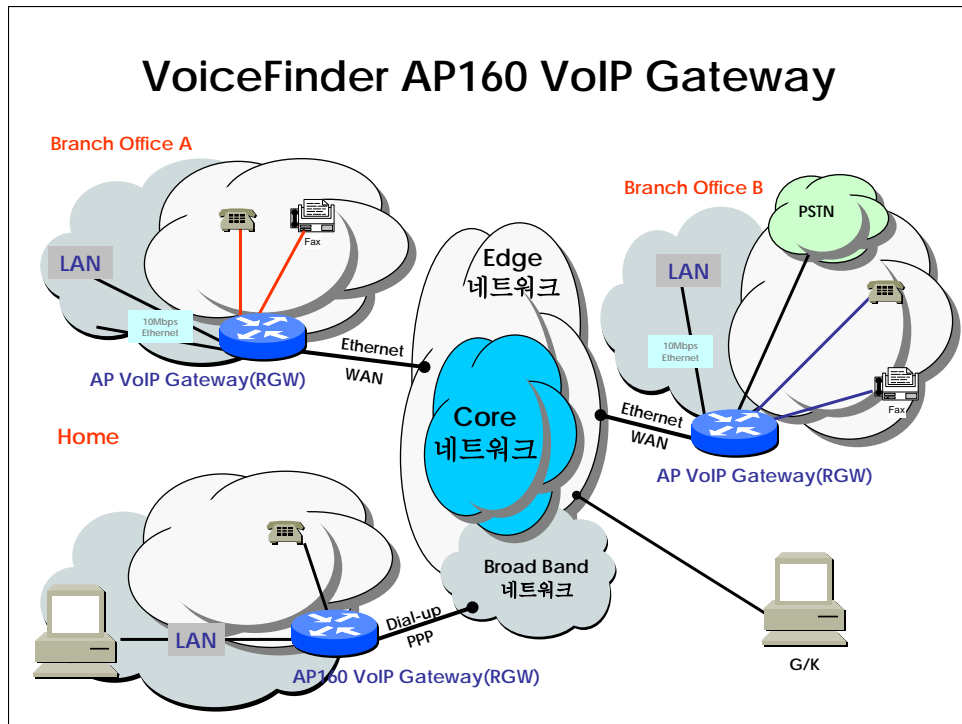
1.1. Introduction to the AP160 dial-up VoIP Gateway

Information



VoiceFinder AP160 dial-up VoIP gateway is a high-performance VoIP gateway using PPP protocol over PSTN dial-up modem. This network equipment, with an internal dial-up modem, supports cost-efficient data and voice service in junction with PSTN networks.

Following Diagram shows a sample network diagram using AP160 dial-up VoIP Residential Gateway.

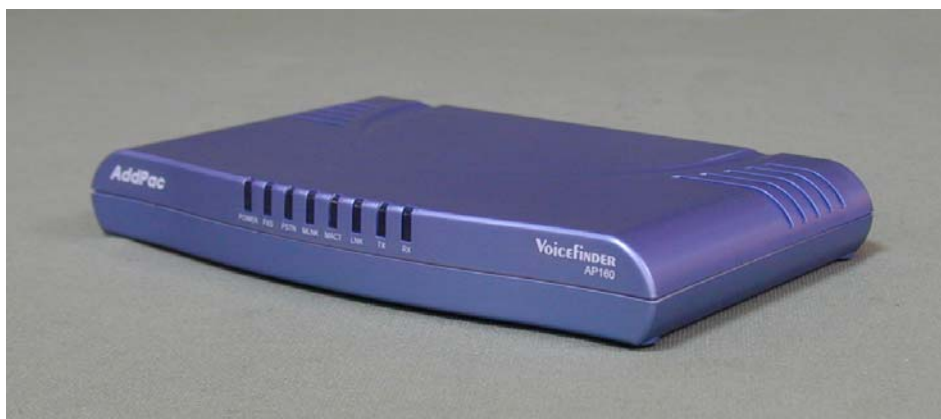


[Figure 1-1 Network Inter-connection Diagram using VoiceFinder AP160 dial-up VoIP gateway]

This VoiceFinder AP160 dial-up VoIP gateway supports inter-operability completely with carrier-class backbone gateways including small-size VoIP gateways such as CISCO, Clarent, 3COM, Lucent, etc. Also, this equipment provides the CISCO-style APOS Router Series operation and management

features. These features help to install the AP200 RGW easily.

Following Figure 1-2 shows the external form on the table of AP160 dial-up VoIP Residential Gateway.



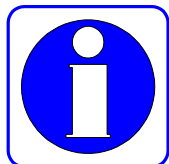
[Figure 1-2 VoiceFinder AP160 dial-up VoIP residential gateway's external form]

As supplementary service features of AP160 dial-up gateway, this equipment supports the Packet Filtering and Firewall function using Access List method. Firewall function restricts the local network access from outside network using source and destination IP address access list information at Network Layer(IP Layer) and Transport Layer(TCP/UDP Layer).

Also, using DHCP(Dynamic Host Configuration Protocol), this equipment can assign the IP address to network client automatically (DHCP server mode) and can receive the dynamic IP address of itself from DHCP Server(DHCP client mode). And AP160 dial-up VoIP gateway solves the IP address shortage problem due to explosive increment of internet user using NAT(Network Address Translation) protocol. The local IP address can be hidden from outside world when NAT protocol is used in AP160 dial-up VoIP gateway. This means that AP160 dial-up VoIP gateway can be used as a security function terminal simultaneously.

1.2. Main Features

Information



VoiceFinder AP200 VoIP Residential Gateway provides high-performance voice over IP(VoIP) solution including IP-routing services for small enterprise, government and other public offices as well as internet game room and cyber apartment.

Moreover, VoiceFinder AP200 VoIP Gateway maintains best voice quality under low bandwidth traffic using the latest voice compression algorithm and enhanced QoS management features of AddPac Technologies.

In addition, AP200 VoIP Gateway supports various network protocols such as IP routing, bridging, PPP, NAT/PAT, and network management features such as SNMP MIB v2, Web based Management, Cisco-Style CLI, etc.

This VoIP Gateway typically was designed using high-performance 32bit RISC Microprocessor based architecture with fixed network interface configuration : dual 10Mbps Ethernet, asynchronous serial port for console.

Hardware Description

VoiceFinder AP160 dial-up VoIP gateway supports the various network interface and voice interface module based on latest Embedded H/W technology and system memory. The main H/W features are followings.

- High Performance VoIP Residential Gateway
- High Performance WAN-to-LAN IP routing solution
- High Performance 32bit RISC Microprocessor Architecture
- Fixed 1-Port PSTN modem Interface (RJ45)
- Fixed 1-Port 10Mbps Ethernet Interface for LAN Service (RJ45)
- Fixed 1 Port FXS Voice Interface (RJ11)
- Fixed 1-Port Asynchronous Serial Interface for Console Port (RJ45)
- Compact Design
- DC External Power Supply Adaptor
- Various System LED Display
- AC-DC External Power Supply Adaptor

Voice over IP Service

- Supports Voice and Data integration services
- Supports the maximum 2 FXS voice port
- ITU-T H.323 v2 VoIP Protocol with ITU-T H.235 Security Features
- Supports the G.723.1, G.729.A, G.711 Voice Compression Algorithms using High Performance DSP
- Supports Following Voice Processing Feature
 - ✓ VAD(Voice Activity Detection)
 - ✓ T.38 G3 FAX Relay(In-band 및 Out-band)
 - ✓ DTMF(Dual Tone Multi Frequency)
 - ✓ CNG (Comfort Noise Generation)
- G.168 Echo Cancellation
- Supports Enhanced QoS Management Features for Voice Traffics
- Supports the scalability, reliability, stability for H.323 based VoIP services
- Support Fast Connect Mode.
- Support H.323 call setup via normal connect mode if peer side does not support Fast Connect Mode.
- Support Voice Codec automatic negotiation function and Voice Codec Mode Setting by Operator.
- Support Adjustment of Frame Number per Packet
- Support the GK Discovery and Communication.(GRQ/GCF/GRJ)
- Support H.323 Endpoint Registration and Deregistration in GateKeeper (RRQ/RCF/RRJ, URQ/UCF/URJ).
- Support Lightweight RRQ Function
- Support VoIP Gateway H.323 ID Assignment, Modification and Transfer Function.
- Support Capital and Small letter Recognition of H.323 ID.
- Support H.323 E.164 Telephone Number Assignment, Modification and Transfer Function.
- Support Outbound Call routing function via GateKeeper.
- Support Inbound Call routing function using Phone number.
- Support Inbound/Outbound Call Number deletion and addition
- Support PBX side outbound call number Insertion in Calling Party Address.
- Support Voice Prompt for 1 Stage and 2 Stage Dialing
- Support Last digit recognition
- Call restriction about Specific Phone Number or Line
- Tone (Dial tone, Ring back tone, Busy tone, Congestion tone)

- LLO (Line Lock Out) Function
- Support Announcement Function for incorrect dialing, busy, network failure, Non-exist Phone number.
- Configuration Management and System Management
- Operation Data Automatic Backup and restore Function
- Port Diagnostic and Testing Function
- Support Secondary Gatekeeper in case of First Gatekeeper Failure
- H.225, RAS, H.245 Call Tracing Function
- DTMF transmission and Recognition Function (Out of band)
- FAX Tone automatic recognition
- Support Real-time FAX and Simultaneous FAX Transmission in All Channel (T.38)
- Redundancy Support in T.38 FAX
- Support PLAR(Private Line Auto Ring Down)
- Trunk Emulation for Broadcasting Equipment
- Ring Cadence Adjustment for Broadcasting Equipment
- BusyOut Function in case of LAN or Gatekeeper Failure (Rerouting at PBX)
- Call Pickup and Call Transfer between FXS port
- Polarity Inversion in FXS port
- Hook Flash Relay for supplementary service

IP Routing Protocols

VoiceFinder AP160 dial-up VoIP gateway supports various IP routing protocols. The main IP routing features are followings.

- High Performance IP routing capability with reliability
- Static, Default IP routing protocols
- Transparent Bridging (IEEE Spanning Tree Protocol) and VLAN routing protocols

Network Managements

VoiceFinder AP200 VoIP Residential Gateway supports various network management protocols and functions.

- Standard SNMP Agent (MIB v2) Support

- Remote Management using Console, Rlogin, Telnet.
- Traffic Queuing
- Web based Managements using HTTP sever.

Security Functions

VoiceFinder AP200 VoIP Residential Gateway supports various security function.

- Standard & Extended IP Access List for network security function.
- Access Control and Data Protections
- Enable/Disable for Specific Protocols
- Multi-level User Account managements
- Auto-Disconnect for Telnet/Console Sessions

Operation and Managements

VoiceFinder AP200 VoIP Residential Gateway supports following operation and maintenance features.

- System Performance Analysis for Process, CPU, Connection I/F
- Configuration Backup & Restore for APOS Managements
- Debugging, System Auditing, and Diagnostics Support
- System Managements with Data Logging
- System Booting and Auto-rebooting with Watchdog Feature
- IP Traffic Statistics with Accounting

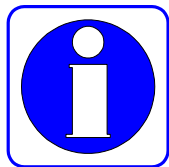
Other Scalability Features

VoiceFinder AP200 VoIP Residential Gateway supports various supplementary service functions.

- Network Address Translation (NAT) Function
- Port Address Translation (PAT) Function
- Cisco Style Command Line Interface(CLI)
- Network Time Protocol(NTP) Support
- Remote S/W Upgrade for APOS Management using FTP/TFTP

1.3. APOS Internetworking Software

Information This part explains about Software Architecture of APOS(AddPac VoiceFinder Operating System).



APOS Internetworking Software for AP PassFinder Router, VoiceFinder Gateway

APOS Operating System is a best VoIP Gateway and Router software to provide scalability, reliability, stability, and QoS for IP(Internet Protocol) based Inter-networking solutions.

This APOS Operating System is designed using light, compact, and reliable Embedded Real-Time OS.

Also, APOS provides optimized performance functionality with easy-to-use, easy-to-installation, and maintenance.

Industry Standard Network Protocol Support

APOS Operating Software supports the industry standard network protocols. For example, WAN/LAN data networking protocols(HDLC,PPP,etc), ATM related protocols such as PPPoA (Point-to-Point Protocol over ATM), IPoA (IP over ATM), Network Management Protocols(SNMP v2,v3, Web based Management), VPN* based on IPsec, and various supplementary and usable protocols are supported by APOS.

Integrated Networking Solution

APOS Operating Software provides VoIP(Voice over Internet Protocol) solution including data networking solution. As VoIP protocols, H.323 v2, SIP*, and MGCP/MEGACO* protocols are supported by APOS. Using these Voice and Data Inter-networking protocols, APOS can be used for the various IAD(Integrated Access Device) application such as ATM Multi-service VoIP Router, Leased-Line VoIP Router, Frame-Relay VoIP Application, etc.

Optimized Performance and Functionality

APOS Operating Software supports the excellent packet processing performance, various QoS Schemes, and overload control capability. The Packet Processing Capability of APOS is implemented by Light Embedded Real-Time Kernel, Optimized Device Driver(LAN Device, DSP, etc), Cache Control Technique(I-CACHE, D-CACHE), Heuristic Polling and Interrupt based Device Access Control Schemes, Optimized TASK Priority Control, etc.

The VoiceFinder QoS schemes of APOS can be used to improve the voice quality. The technique used for QoS function can be divide to two side in view of VoIP gateway terminal. First, in transmit side, Priority Queuing, QoS Profile Scheme, Virtual Network Transmit Algorithm, RTP Packet Transmit Interval Control, RTP Redundancy Scheme, IP Header Field (TOS, DiffServ, etc) Control Techniques are applied in VoiceFinder VoIP Gateway for Transmit Side QoS Control. In receive side, APOS VoiceFinder Operating Software use Dynamic Jitter Buffering, Error Concealment and T.38 Fax data error recovery techniques to improve the receive side voice quality.

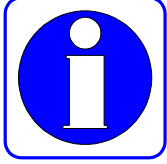
The overload control function supported by APOS sustains the reliable system operation when overload traffic is occurred in VoIP Gateway or Router System.

Easy to use, Easy to Installation, and Maintenance

For easy installation and simple usability, APOS Operating Software supports simple maintenance and inter-operability using Cisco-Style command line interface. Moreover, it is possible to simple maintenance using web based management schemes and remote management functions

1.4. Hardware Configuration and Network Interface

Information This Chapter explains the external form and network interface module parts of VoiceFinder AP200 VoIP Residential Gateway.



1.4.1. VoiceFinder AP160 Main Body

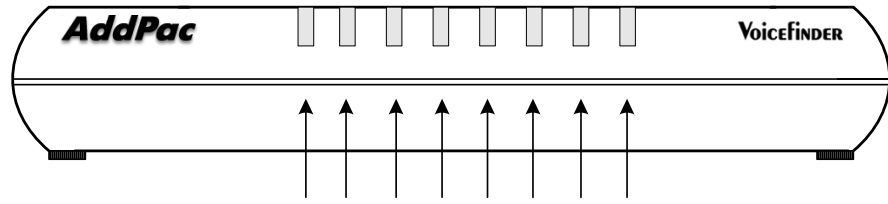
The external form of A160 dial-up VoIP gateway is made by high degree of strength ABS material. The front panel of this equipment is designed to display the LED that indicates the system operation status. The back panel of AP200 VoIP gateway is designed to support the FXS voice interface port, PSTN modem interface, PSTN interface and LAN interfaces including RS-232C serial port.

Front View of AP160

To check the system operation status easily, AP160 VoIP dial-up gateway provides the front panel LED. Following Figure 1-3 and 1-4 shows the external form of front panel and represents the explanation of each parts.



[Figure 1-3 Front Panel Picture of VoiceFinder AP160 dial-up VoIP gateway]



[Figure 1-4 The front panel diagram of VoiceFinder AP160 dial-up VoIP gateway]

Table 1-1 shows the functional explanation about each LED of VoiceFinder AP160 dial-up VoIP gateway.

No.	Interface	Explanation
(1)	POWER	Power LED, display whether external power is supplied normally or not. (Green)
(2)	FXS	Display the operation status of "FXS" voice interface port.(Yellow)
(3)	PSTN	Display the operation status of PSTN backup port (Red)
(4)	MLINK	Display the LINK status of PSTN modem interface (Green)
(5)	MACK	Display the activity status such as transmission and receive packet of PSTN modem interface. (Yellow)
(6)	LNK	Display the LINK status of Ethernet interface.(Green)
(7)	TX	Display the transmission activity of Ethernet interface.(Yellow)
(8)	RX	Display the transmission activity of Ethernet interface.(Yellow)

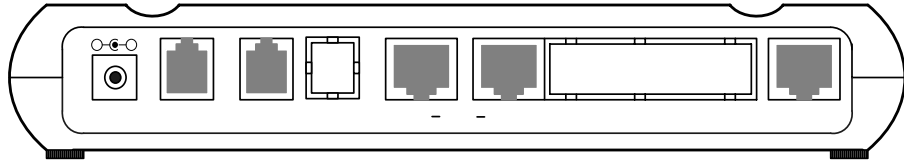
[Table 1-1. The explanation of front panel LEDs of AP160 dial-up VoIP gateway]

Rear View of AP160

In rear side of AP160 dial-up VoIP gateway, this equipment provides the PSTN modem interface(including PSTN backup interface), one(1) 10Mbps Ethernet interfaces, RS-232C serial port for management, and FXS interface port for voice signal processing. An Ethernet port is used for VoIP service via WAN side such as xDSL, cable modem interface. Also this Ethernet port can be used for external modem application via LAN port of Personal Computer.

Standard Configuration Model

Following figure shows the standard configuration of the back side panel of AP160 dial-up VoIP gateway.



[Figure 1-5 Back side panel diagram of VoiceFinder AP160 dial-up VoIP gateway]

Following Table 1-2 explains the back side panel interface of AP160 dial-up VoIP gateway.

No.	Interface	Explanation
(1)	DC power	External DC power supply input (5V)
(2)	PSTN	This port is used to connect PSTN subscriber line for VoIP service via dial-up modem or PSTN backup (RJ11)
(3)	FXS	1 FXS Port : As a FXS voice interface port, analog phone or FAX machine can be connected (RJ11)
(4)	UP-LAN-NORMAL	10 Mbps Ethernet interface for WAN or LAN connection. UP port is used for uplink or direct connection with PC LAN port. NORMAL port can be used for LAN port connection via HUB equipment. UP and NORMAL ports are not two LAN port. Therefore user should select one(1) LAN port type among UP and NORMAL LAN ports. (RJ45)
(6)	Console	RS-232C port for system management (RJ45)

[Table 1-2 The explanation of back side panel Interfaces of AP160 dial-up VoIP gateway]

Following Figure 1-6 shows the back panel interface picture of AP160 dial-up VoIP gateway.



[Figure 1-6 Back side panel picture of VoiceFinder AP160 dial-up VoIP gateway]

1.4.2. Network Interface

The Standard Model of AP160 dial-up VoIP gateway supports network interfaces such as following lists.

- **1 port PSTN modem interface including PSTN backup interface**
- **1 Port 10Mbps Ethernet Interface**
- **1 Port RS232C Asynchronous Serial Interface.**

Above listed network interface can be used in the various WAN/LAN network environment for VoIP network integration. VoiceFinder AP160 dial-up VoIP gateway provides the VoIP service over PPP(Point-to-Point Protocol) via conventional PSTN line using internal PSTN modem chip of AP160.

Also, using the Ethernet port , AP160 dial-up VoIP gateway supports the standard VoIP service via LAN. The Leased Line, xDSL, and Cable networks are one of networks supported by AP160 dial-up VoIP gateway.

The next explains the network interfaces of AP160 dial-up VoIP residential gateway.

1-Port async dial-up modem Interface (RJ11)

VoiceFinder AP160 dial-up VoIP gateway provides one(1) port PSTN modem interface. Using this PSTN modem interface, AP160 supports the VoIP service via PSTN line. The PPP protocol is used as a WAN inter-connection protocol via PSTN modem.

1-Port 10Mbps Ethernet LAN Interface (RJ45)

AP160 dial-up VoIP residential gateway supports the one(1) 10Mbps Ethernet Interfaces. Using this LAN Interface, various network application services are possible.

This interface is implemented using standard RJ-45 connector interface.

1-Ports Async Serial Interface for Console Port (RJ45)

AP160 dial-up VoIP residential gateway provides the network management features using RS-232C asynchronous serial interface port.

This interface is implemented using standard RJ-45 connector interface.

1.4.3. Voice Processing Interface

The FXS type voice processing modules on board of AP160 are analog Line Interface solutions which can interface to general Phone, FAX Machine, etc.

- **FXS Interface Voice Processing Module**
- **PSTN modem port including PSTN back up port**

VoiceFinder AP160 dial-up VoIP gateway can perform the modem call to PSTN(Public Switched Telephone Network) using PPP protocol directly. Also, the incoming call into PSTN modem port can be relayed to FXS voice port directly.

In addition to VoIP service via PSTN modem port, AP160 supports the conventional PSTN call via PSTN backup port when the VoIP service via Internet is not available or network failure is occurred. When a special key such as "#" key is pressed at analog phone, AP160 relays analog phone that is connected to FXS port to PSTN line directly.



Chapter 2. Before Installation

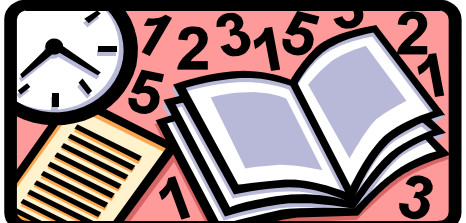
2.1. Unpacking

Before unpacking, check for external damage of the packaging box .

If an external damage of the packaging has been found, please contact AddPac Technology Co. Ltd. sales department (sales@addpac.com, tel : +82-2-568-3848) for an immediate exchange of product.

If no external damage has found, confirm if the following items are enclosed.

No.	Item	Contents	Q'ty
1	VoiceFinder AP160 Gateway Main Body	 <p style="text-align: center;">1</p>	
2	LAN Cable (for RJ45 to RJ45)		1
3	Console Port cable (for RJ45 to DB9)		1
4	External Power and Power Cable (220V Power Cord)		1

5	AP160 User Guide (This part will be omitted)		1
---	---	--	---

[Table 2-1. VoiceFinder AP160 Package]

If any item is missing, immediately contact AddPac Technology Co. Ltd. customer support

2.2. Installation Requirements

Warning

The following is the recommendation for safe operation of the equipment.



- Ensure the AP2160 dial-up VoIP gateway is in a dust-free environment before and after installation.
- Ensure the AP160 dial-up VoIP gateway cover is opened on a flat and safe surface.
- To prevent accidents, avoid ties, scarf, sleeves, and any other loose clothing from entangling with the Chassis.
- Avoid any actions that may effect the equipment or the operator.

2.2.1. Electrical Requirements

There are two main sources of electrical problems with the AP160 dial-up VoIP gateway : the power supply and static electricity.

Danger



This section describes safety recommendations for each case.

- **Electrical Safety**
 - ✓ In case of the occurrence of an electrical accident, operate at a position where immediate shut-off of power supply is possible.
 - ✓ Switch the power off when installing or taking the cover off the equipment.
 - ✓ Avoid operating the equipment alone at a potentially dangerous environment.
 - ✓ Do not assume the power is switched off, but always confirm the power status.
 - ✓ Be extremely cautious when operating in a humid environment or with an uncovered power extension cable.

- **Prevention of Static Electricity**

- ✓ The main chip-set of the Gateway are very delicate and misuse may result in static electrical damage.
- ✓ If a static prevention waist strap is available, strap it around the wrist and earth the cord before operating the equipment.
- ✓ If no waist tap is available, earthing by holding a metal part of the Chassis will help prevent static electricity.

2.2.2. General Requirements

Warning



The VoiceFinder AP160 dial-up VoIP gateway is ready for use where electronic products are used. However, a location with the following conditions is recommended for maximum performance.

- **A level and well ventilated location is recommended.**
- **Secure the equipment safely where intended to install.**
- **Avoid placing objects on top of the equipment.**
- Install the equipment in a cool location avoiding direct sunlight.
- Maintain distance from flammable, chemical, or magnetic objects

2.2.3. Prerequisites for Network Connection

Observe EIA standards and limitations when installing the Gateway

Warning



The following section describes the Ethernet Cable, and the Console Cable VoiceFinder AP160 supports.

2.2.3.1. Async (PSTN) Port

VoiceFinder AP160 VoIP Gateway는 한 개의 RJ11형의 PSTN 포트를 장비의 후면부에 가지고 있습니다. 전면부에는 이 포트의 상태를 표시하는 LED가 있습니다. 이 포트를 이용하여 전화망에 접속할 때는 규정된 케이블과 커넥터를 사용하시기 바랍니다.

2.2.3.2. Ethernet Port

VoiceFinder AP160 VoIP Gateway는 두 개의 RJ45형의 10BaseTX Ethernet Port를 장비의 후면부에 가지고 있고 전면부에는 이 포트의 상태를 표시하는 LED가 있습니다. 이 포트들은 물리 적으로 연결되어 있으며 Corss cable을 사용할 경우는 LAN1에, direct cable을 사용할 경우에는 LAN0에 접속 하십시오. 장비는 두 포트를 하나의 인터페이스로 인식하기 때문에 두개의 포트를 동시에 사용할 수는 없습니다. 이 포트를 이용하여 LAN 망에 접속할 때는 규정된 케이블과 커넥터를 사용하시기 바랍니다. Ethernet 케이블에 대한 PIN 사양은 부록 C의 Cable 사양을 참조하십시오.

2.2.3.3. RS-232C Serial Console Port

VoiceFinder AP160 VoIP Gateway는 한 개의 RJ-45형의 RS-232C Femail DCE 커넥터 인터페이스를 장비의 후면부에 가지고 있고 이 포트를 통하여 AP160의 Initial Configuration등을 하거나 장비를 모니터링하고 디버깅하는데 사용할 수 있습니다. 이 포트를 이용하여 장비를 관리하는 경우에는 규정된 케이블과 커넥터를 사용하시기 바랍니다. RS-232C Console 케이블에 대한 PIN 사양은 부록

C의 Cable 사양을 참조하십시오.

Chapter 3. Gateway Installation and Operation

This chapter provides information about the basic installation procedure of VoiceFinder AP160 and related commands.

[Prerequisites] Unless a separate order is made, the tools and certain cables are not provided in the package. Prepare the following equipments and tools before installation.

- Standard screwdriver set

- Cable for LAN and WAN(Serial) port connection
 - ✓ RJ-45 to RJ-45 cable for LAN port
 - ✓ RS-232c console cable with RJ-45 connector (included in equipment box)

- Cable for connecting with phone port
 - ✓ RJ-11 to RJ-11 ordinary phone-line cable

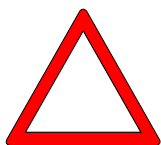
- PC with Console Terminal or Communication Emulator application (The Hyper Terminal Program in Windows will suffice. Configure as : 9,600 Baud, No Parity, 8Bit Data 1Stop Bit)

3.1. Installation

3.1.1. Installation Procedure

- Plug in the console cable and configure the console terminal. (Refer to 3.1.2 for details.)
- Connect the network to the desired port. Use RJ-45 cable with the LAN 1 port for connection with ADSL/Cable Modem or Router, and the RJ-45 cable with the LAN 0 port for connection with the HUB/Switch.
- Log in the Gateway after the booting message on the console with the root account. (Configuration is only possible when logged in with the root account.)
- Switch to Configuration Mode.
- Assign an internet address to the desired port of usage. (Refer to Interface Configuration.)
- Configure the settings for the routing and VoIP related. (Refer to Chapter 4 and 5.)
- Confirm the configured settings. (Refer to the Gateway administrative commands.)

Caution



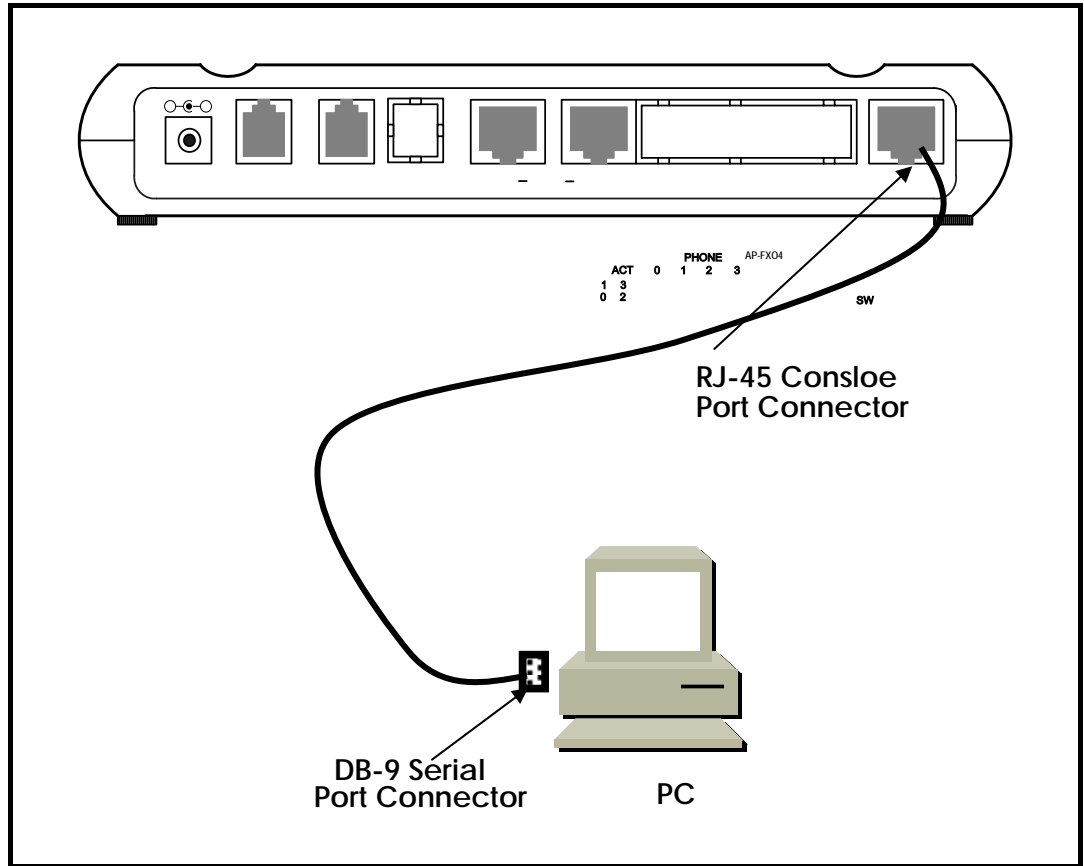
- Save the settings on Flash Memory. (**VoiceFinder AP160 immediately operates under the new settings, but under certain network environments rebooting is required.**) (Refer to the following instructions for this part.)
- Using commands such as Ping, Telnet, rlogin etc. check the status of other

Gateways or PCs connected to the Gateway.

- Check the routing table to confirm if the Gateway is receiving the network information correctly.
- Use the Ping command to check other gateways or PCs connection.
- This completes the basic configuration procedure. For optional functions, refer to the related chapter

3.1.2. Console Connection

- Connect the console port in the rear side of the Gateway with the serial port of the prepared console terminal. **(Refer to [Diagram 3.1 Console Cable Connection])**
 - ✓ Use console cable provided in the package.
 - ✓ If using a PC for the console terminal, connect with the PC serial port.
- In order to use the PC as a console terminal, a communication emulator application is required. Under normal circumstances, the Hyper Terminal Program in Windows will suffice.
- The console terminal should be configured as : 9,600 Baud, No Parity, 8Bits Data, One(1) Stop Bit. The VoiceFinder AP200 Gateway is set to operate with the configurations above. Therefore, these settings are required for communication between the Gateway and the console terminal. **(Refer to [Diagram 3-2 Hyper Terminal Configuration])**
- When configuring the Hyper Terminal, select the Hyper Terminal menus in the following order: File → Configuration → Connection Target → Format and set each item.
- The console port serves the purpose of configuring the VoiceFinder AP160 Gateway settings and checking its operating status.



[Fig 3.1 RS-232C Console Cable Connection]

Port Configuration	Settings
Modem to Connect	Direct connection(Null Modem) to Com port
Bit per Second	9,600
Data Bit	8
Parity	None
Stop Bit	1
Flow Control	None

[Fig 3.2 Hyper Terminal Configuration]

3.1.3. Plug-In Power

Warning



- The VoiceFinder AP200 Gateway is capable of recognizing and using both 110V and 220V.
- The package provides a 220V power cable. If the power supply is 110V, please use a 110V adapter.
- Switching the power switch on will turn the Power LED on the front side of the Gateway green.
- The supply of power will display the booting message on the console terminal and will turn the RUN LED green
- When the Gateway is being booted, the messages are displayed : (Refer to Fig. 3.3)
 - ✓ The booting title message is displayed. (This message contains information about the routing software version, Gateway status check results, memory size and status)
 - ✓ On the display of the log-in message, input the username "root" and the password "Gateway".
 - ✓ The completion of log-in will display the prompt "1router#" on the Gateway console terminal.
 - ✓ There are two types of prompts displayed for the VoiceFinder AP200 : "1router>" and "1router#". The " > " prompt indicates that the user is

not an administrator. At this prompt, the user is unable to use certain commands : particularly the configuration commands. The " # " prompt indicates that the user is an administrator(or root), and is authorized to use all the functions and commands.

- ✓ Log-in as "Admin" allows Gateway setting configuration. Therefore, it is advised to change the Gateway password for security purposes. Refer to the Administrative contents for password change.

The display below is the message for initial booting of the VoiceFinder AP160 gateway.

```
System Bootstrap, Version 1.2
Decompressing the image:
#####[OK]

System Boot Loader, Version 2.0.2/HDT
Copyright (c) by AddPac Technology Co., Ltd. Since 1999.

System Bootstrap, Version 1.2
Decompressing the image:
#####
#####[OK]

VoiceFinder Gateway Series (AP160)
Serial Number: AP160-ff0494
32BIT RISC Processor With 16777216 Bytes System Memory
8388608 Bytes System Flash Memory
2097152 Bytes 2nd System Flash Memory

1 RS232 Serial Console Interface
1 Ethernet/IEEE 802.3 Interface

AP160 System software Revision 6.10T
Released at Mon Aug 14 06:43:45 2000
Program is 1503168 bytes, checksum is 0xc02a8fe

Local Time : Thu Jun 28 08:30:42 1990
Copyright (c) by AddPac Technology Co., Ltd. Since 1999.

Voice Module type (0): FXS
```

```
DSP S/W download (0): .. OK

The System is ready. Please login to system.
login:
Interface async0, changed state to UP

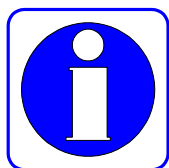
Interface ethernet0.0, changed state to UP
VoipGateway::Init1 - No IP address on the VoIP Interface

login:
```

[Fig. 3.3 VoiceFinder AP160 Initial Screen]

3.2. Environment Configuration

Information The Gateway requires various configurations of parameters according to the application. This section provides important information for using the Gateway and the user is highly advised to follow the following procedures before configuring the Gateway.



- Clarify the network address according to the IP with the network diagram.
- Determine which routing protocol to use. (e.g. Static, Default etc.) In doing so, discussion with the administrator of the connecting network is required.
- Determine the protocol to use with each LAN 1(WAN) port. (e.g. PPPoE, Ethernet etc.)
- When the conditions above are determined, thoroughly understand the related commands

Environment configuration is required only once at initial installation. But when the network components have changed, settings must be reconfigured. At completion of configuration, users always save the settings to prevent loss of data when switching the power on or off.

In order to log in at an unconfigured gateway, the user must use a set username and password. The user access authority for VoiceFinder AP160 is divided into 4 levels: admin, high, normal, low. All users, other than Admin is prompted "1router>" at log-in.

The user must log-in at admin level for Gateway configuration. **Factory settings for admin level log-in uses "root" for username and "router" for password. The user is prompted with "1Gateway#" for Admin level log-in and is allowed to configure the equipment.**

VoiceFinder AP160 configuration is divided into two parts: global configuration, which effects all the gateways of the network, and interface configuration, which effects only the gateway of configuration. By function, configuration is divided into: "user and gateway administration", "interface configuration", "routing and bridging configuration", "system status and debugging configuration", etc.

This manual describes configuration according to its functions.

3.2.1. User and Gateway Management Environment

The Gateway may be accessed through console connection or telnet. The VoiceFinder AP160 gateway allows 1 connection through console session and 512 connections through application sessions such as telnet, FTP, SNMP, etc. The sessions may affect the Gateway performance; therefore the user is advised not to connect more than 10 sessions

This configuration allows the setting of the user password. The default username for VoiceFinder AP160 gateway is "root" and its password is "router". (This default setting is for "admin" level access.) When the gateway configuration is completed, a change of password is advised. This is to prevent unauthorized users from reconfiguring the settings. The VoiceFinder AP160 gateway saves the password and the configuration in safety area.

This configuration mode allows gateway software upgrade, and commands related to system administration such as configuration saving and backup.

It also provides commands for checking the system status. These include commands for displaying CPU resource availability, debugging commands to show packets received and dispatched by the gateway, and show commands to show the configuration status

3.2.2. Interface Configuration Environment

In order to communicate in an Ethernet and WAN(LAN or HomePNA Port) environment, an IP address must be configured for each port. For commands related to port IP address connection, refer to interface related commands. For the WAN(SERIAL) port, configuration for lower level protocols is required as well as IP address.

The LAN 1(for WAN) ports for VoiceFinder AP200 are supports Legacy LAN, PPP(PPPoE) for ADSL connection. In order to connect to the network, the WAN protocol must match the one used at the other equipment, including configuration variables. Discussion with the administrator of the other equipment is recommended.

The Interface configuration mode, allows traffic management of particular packets per interface. For security related Access-List, DHCP information, refer to the "Configurations for Security and Internet" section.

For packet management information, refer to the "Configurations for Routing" section.

3.2.3. Routing Configuration Environment

The VoiceFinder AP160 dial-up VoIP gateway supports static, default routing protocols. The routing protocol is responsible for assignment of packet route, and VoiceFinder AP160 supports multi-protocols simultaneously. Therefore it is required to configure which protocol to use. Refer to "Routing Configuration Environment" and "Interface Configuration Environment".

3.2.4. Security and Internet Configuration Environment

The VoiceFinder AP160 dial-up VoIP gateway supports additional functions for security and internet environment.

The functions provided include Packet Filtering, Access-List, NAT(Network Address Translation), PAT(Port Address Translation) and Multi-Level account for security and DHCP server, client and relay for internet connection. Refer to Chapter 4 for details

3.2.5. System Status and Debugging Environment

The VoiceFinder AP160 dial-up VoIP gateway supports the "Show" command for checking the system operation status and the "Debug" command for locating system errors. The "Show" commands not only provides information about the status of interface, but also status for NAT configuration, Access-list, DHCP, registered user, buffers and all others assisting proper operation of the Gateway.

The "debug" command provides information regarding proper operation of the Gateway by displaying operating TCP/IP or Layer 2 on the terminal screen.

For more details, refer to Chapter 4.

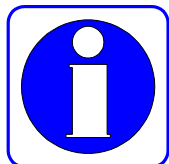
3.2.6. Voice Integration Configuration Environment

The VoiceFinder AP160 dial-up VoIP gateway allows integration of voice applications and data. The VoiceFinder AP160 dial-up VoIP gateway provides a status check of voice and fax support / connection, voice gateway configuration, quality of voice control, PABX connection configuration, and other configuration / status report of voice related.

For detail information, refer to Chapter 5 "Voice Configuration and Related Commands".

Chapter 4. Gateway Configuration and Commands

Information This chapter describes how to configure the VoiceFinder AP160 dial-up VoIP gateway and commands of the VoiceFinder AP160 dial-up VoIP gateway.



In this part, we only explain the AP160 specific configuration and commands. Please refer the AP200 user's guide about the other part or common part of VoiceFinder series.

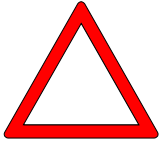
4.1. Gateway Booting

The operator can use all commands of the AP160 through the consol or telnet connection.

When power is supplied, the gateway is booted as follows:

- The gateway performs a self-test and checks basic operations of the CPU, the memory and interfaces.
- The boot loader is executed, and the boot loader seeks for proper gateway software image files. In the default configuration, the boot loader loads gateway software in the flash memory.
- If the boot loader does not find any proper gateway software image file from the flash memory, the boot loader stands by in the boot mode until it receives proper gateway software from the system. (At this time, the boot loader can download gateway software through TFTP or FTP protocol.)
- When gateway software is loaded, gateway starts to operate according to configuration information saved in the gateway. However, if there is no configuration information, the gateway operates according to the default values, and in this case, the operator shall set up related items for normal operation of the network.

Caution



When booting the system, set Gateway environment and save configuration information as using "copy running-config" command.

If the system is normally booted, the following message will appear.

```
System Bootstrap, Version 1.2
Decompressing the image:
#####[OK]

System Boot Loader, Version 2.0.2/HDT
Copyright (c) by AddPac Technology Co., Ltd. Since 1999.

System Bootstrap, Version 1.2
Decompressing the image:
#####
#####[OK]

VoiceFinder Gateway Series (AP160)
Serial Number: AP160-ff0494
32BIT RISC Processor With 16777216 Bytes System Memory
8388608 Bytes System Flash Memory
2097152 Bytes 2nd System Flash Memory

1 RS232 Serial Console Interface
1 Ethernet/IEEE 802.3 Interface

AP160 System software Revision 6.10T
Released at Mon Aug 14 06:43:45 2000
Program is 1503168 bytes, checksum is 0xc02a8fe
Local Time : Thu Jun 28 08:30:42 1990
```



```
Copyright (c) by AddPac Technology Co., Ltd. Since 1999.
```

```
Voice Module type (0): FXS
```

```
DSP S/W download (0): .. OK
```

```
The System is ready. Please login to system.
```

```
login:
```

```
Interface async0, changed state to UP
```

```
Interface ethernet0.0, changed state to UP
```

```
VoipGateway::Init1 - No IP address on the VoIP Interface
```

```
login:
```

4.2. Command Usage

The operator can use all commands of the VoiceFinder AP160 dial-up VoIP gateway through the consol or telnet terminal (VT100 terminal.)

There are three kinds of commands – commands of the user mode, commands of the manager mode and commands of the configuration mode. Commands of the user mode enable the operator to check limited information of the system and provide a connection function for data communication.

Commands of the manager mode enable the operator to check configuration status of the Gateway and perform debugging. And commands of the configuration mode enable the operator to change configuration environment and set new environment.

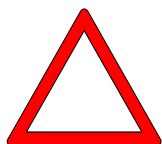
The VoiceFinder AP160 dial-up VoIP gateway has following features regarding operator's entering commands.

- Although the operator enters only a part of the command, the VoiceFinder AP160 dial-up VoIP gateway automatically recognizes the whole command. For example, if the operator enters only "sh" or "sho" instead of "show" the VoiceFinder AP160 dial-up VoIP gateway automatically recognizes "sh" or "sho" as "show."
- The VoiceFinder AP160 dial-up VoIP gateway provides an online help function so the user can check corresponding items for the command and command syntax.
- The VoiceFinder AP160 dial-up VoIP gateway provides "More" function that divides a long message into several messages so that the operator can see the whole message by scrolling the screen.
- The VoiceFinder AP160 dial-up VoIP gateway provides Help and "?"

functions to display available commands for the corresponding mode and descriptions of commands.

- The VoiceFinder AP160 dial-up VoIP gateway provides "History" function. With the history function, the operator does not need to enter the command that the operator had used before. Instead, the operator only needs to use the numbers on the Gateway prompt.
- There are three modes for the Gateway commands, and in each mode, different commands are used. The following describes commands that can be used in each mode.

Caution

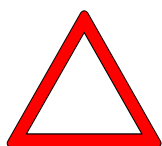


The commands indicated with "*" among the optional commands are not currently supported. They are to be supported in the higher version Gateways.

Ex) router# clear ?

- counters Clear counters on one or all interfaces
- *interface Clear the hardware logic on an interface
- logging Clear logging buffer
- utilization Clear system usage information

Caution



To cancel commands, use "no" command. If the operator uses "no" command for the commands that have default values, the optional values that had been set before will return to default values.

Ex) router(config)# no ?

- access-list : Add an access list entry
- arp : Remove a static ARP entry
- bridge : Set bridge Parameter to default value
- dhcp-list : Configure list entry
- ethernet : Configure Ethernet
- hostname : Set system's network name
- interface : Select an interface to configure

ip	: Set Ip routing mode
logging	: Modify message logging facilities
nat-list	: List NAT(Network Address Translation) lists
queue-list	: Build a custom queue list
route	: Establish static routes
router	: Enable a routing process
service	: Modify use of network based services
snmp	: Set SNMP community/configuration information
user	: Remove Gateway user
utilization	: System resource using information

4.2.1. Commands of the User Mode

Every person who logged in the gateway can use commands of the user mode.

The prompts is indicated as "1router >" in the user mode..

Command	Description
?	Displays commands currently available and description of these commands.
clock	Indicates system time.
exit	Logs out the operator from the gateway.
help	Explains command-using method in an interactive way.
history	Shows history of the used command lines.
ping	Sends an echo message to another network device and tests if the echo message reaches the destination.
rlogin	Establishes rlogin connection that is similar to the telnet by an original login.
show	Shows configuration status and operating status of the gateway. However, in the user mode, "show" command shows only limited information.
telnet	Establishes a protocol connection to log in a neighboring network device through a virtual terminal.
traceroute	Traces the path the packet passes through to reach the destination.
user	Adds a gateway user or shows user information of the Gateway. With this command, the current user cannot check information of the user who has higher authority than him/herself.

4.2.2. Commands of the Manager Mode

The device manager who logged in the gateway can use commands of the manager mode. To use commands of the manager mode, the user shall log in the gateway with the root account or manager's ID. Only the manager can return to the configuration mode of the gateway.

In the manager mode, commands usually show more information than in the user mode according to the options. For example, "show" command shows more information in the manager mode than in the user mode.

In the manager mode, the manager cannot use commands that are used in the user mode.

The prompt is indicated as "1router#" in the manager mode.

Commands	Description
?	Displays commands currently available and description of these commands.
clear	Clears statistical data saved in the Gateway.
clock	Indicates system time.
configure	Enters into the system configuration mode.
copy	Saves configuration data that is currently used in the non-volatile memory of the system.
debug	Displays packets and other information of the system for system debugging. Be careful in using the command since it can increase system load. (See "un-debug" command.)
exit	Logs out the operator from the Gateway.
help	Explains command-using method in an interactive way.
history	Shows history of the used command lines.
load	VoIP related command. Loads the VoIP configuration script file to the VoIP Configuration of the Gateway.

no	Cancels commands entered in the command line or returns commands into default values.
ping	Sends an echo message to another network device and tests if the echo message reaches the destination.
reboot	Reboots the system.
rlogin	Establishes rlogin connection that is similar to the Telnet with by original login.
save	VoIP Command. Make VoIP Configuration Script File uses Gateway VoIP Running Configuration.
show	Shows configuration status and operating status of the Gateway. However, in the user mode, "show" command shows only limited information.
telnet	Logs in a neighboring network device through a virtual terminal.
test	Tests sub-systems of the Gateway – the memory, interfaces and so on.
tracert	Traces the path that the packet passes through to reach a certain destination.
who	Checks users who are currently online in the Gateway, login method and login time.
write	Saves the Gateway configuration file.
undebg	Stops execution of "debug" command.
user	Adds a Gateway user or shows user information of the Gateway. With this command, the current user cannot check information of the user who has higher authority than him/herself.

4.2.3. Commands of the Configuration Mode

Only the user who has the root account or equivalent authorities can access to the configuration mode. In the manager mode, the user cannot change the existing configuration of the Gateway nor make a new configuration of the Gateway.

The configuration mode can be divided into several kinds – the interface Configuration mode, the Global Configuration mode and the VoIP Configuration mode.

The prompt is indicated as "router(config)#" in the global configuration mode. In the global configuration mode, the user can make any configuration relating to the Gateway except the interface configuration. And in the interface configuration mode, the user can make any configuration relating to the interface – IP address configuration, WAN protocol configuration and so on.

The prompt is indicates as "router(config-serial0)" in the interface configuration mode.

4.2.3.1. Global Configuration(config) Commands

Commands	Description
access-list	Creates the access-list. From #0 to #29 are covered by the standard access-list, and from #30 to #59 are covered by the extended access-list.
accounting-list	A configuration command to use the IP account.
arp	Adds or deletes a certain Ethernet address in the ARP table.
bridge	Sets bridge related items.
clock	Sets system time of the Gateway.
debug-port	Display debug message into remote telnet terminal.

dhcp-list	Enables the Gateway to function as a DHCP server or send a DHCP packet broadcasting to other Gateways.
dial-peer	Sets dial-peer with "VoIP" command.
exit	Goes to the previous mode.
gateway	Makes voice gateway related configuration with "VoIP" command.
hostname	Changes the Gateway name of the network.
Interface	Enters into the interface configuration mode or creates a logical interface.
ip	Enables IP routing.
kill	Disconnects a certain Telnet session in the Telnet process.
logging	Changes or sets the message logging function.
nat-list	Creates Network Address Translation (NAT.)
no	Cancel commands entered in the command line or returns commands into default values.
num-exp	Sets a phone number extension in the VoIP.
queue-list	Creates a queue-list to set the custom queue.
route	Adds or deletes static routes.
router	Enables a routing processor to use routing protocol.
service	Sets network-based service configuration - SNMP, Telnet, FTP and TFTP.
snmp	Sets "SNMP" command related items.
traceroute	Execute traceroute
translation-rule	Set translation rules in VoIP Service.
ttl	Changes Time-To-Live (TTL) value.
user	Registers or changes gateway users.
utilization	An optional command to set time intervals to check availabilities of the CPU, the Ethernet and the serial.
voice	Sets VoIP Service or Available Codecs.
voice-port	Sets the VoIP port.
voip-interface	Sets the VoIP Interface.

4.2.3.2. Commands of the Async Interface(PSTN Modem) Configuration Mode

In the Async interface configuration mode, the user needs to define a certain interface before Async modem starting configuration. AP160 supports one(1) PSTN modem Async modem interface.

Entering the async modem parameter setting mode:

Ap160 (config)# interface async 0 <cr>

Commands	Description
backup	backup parameter setting
modem	Modem control configuration.
encapsulation	Setting encapsulation type of interface
ppp	PPP parameter setting commands

4.2.3.2.1. Backup Commands

Commands	Description
delay	Delays before backup line up or down transitions.
idle-timeout	Specific the numbers of idle second before a call is disconnect.
interface	Configure an interface as a backup.

4.2.3.2.2. Modem Commands

Commands	Description
dialing	Modem interface's dialing parameter setting commands
do-script	Modem script running commands
keep-active	This commands keep the modem interface of AP160 alive or always connected mode
script	This command is used for the registration of modem script

	file
shell	Using this command, a operator can enter the modem AT command line mode directly
speed	This command is used for UART transmission speed setting between CPU and dial-up modem.

4.2.3.2.2.1. do-script commands

These commands are modem script running commands. Therefore, these commands are used when a specific modem script execution is needed.

Related command

Ap160 (config-async0)# modem script <dialer | hangup | reset | startup>

Commands	Description
dialer	Modem script for dialing
hangup	Modem script for the termination of connection mode
reset	Modem script for reset
startup	Modem script for initialization
stop-dial	Modem script for stop-dialing

4.2.3.2.2.2. script commands

This commands are used for registration of modem script file

Commands	Description
dialer	AT command for the modem connection (example : ATDT9W1231234) Default : none
hangup	AT command for the termination of modem connection mode Default : "+++ATH"
reset	AT command for the modem reset Default : "ATZ"
startup	AT command for the modem initialization

	Default : "ATS7=45 S0=0 L1 M1 V1 W2 X1 E0 Q0"
--	---

4.2.3.2.3. Encapsulation commands

Command	Description
PPP	Setting PPP mode for encapsulation type

4.2.3.2.4. PPP Parameter related Commands

Commands	Description
authentication	PPP authentication type setting(CHAP/PAP). Default : none
async	PPP Async mode setting Default: none
Bcp	PPP BCP(Bridge Control Protocol) enable Default: disabled
chap	PPP chap authentication parameter setting default: none
compression	PPP Compression Control negotiation setting Default: compression pcf compression acfc
echo	PPP echo interval parameter setting Default: interval : 6 sec Timeout count : 3
lpcp	PPP IPCP option parameter setting Default: ms-dns, default-router
Pap	PPP PAP authentication parameter setting Default: none
peer	PPP peer default ip address setting Default: none
timeout	PPP negotiation timeout setting

	Default: 5 sec
*role	PPP operation mode setting (As Server/client) Default : not implemented yet.

4.2.3.2.4.1. PPP authentication related Commands

Commands	Description
chap	PPP CHAP authentication setting.
pap	PPP PAP authentication setting.

4.2.3.2.4.2. PPP async parameter Commands

Commands	Description
map	PPP async map setting Default: 000a0000
<cr>	Async enable Default: enabled

4.2.3.2.4.3. PPP chap parameter Commands

Commands	Description
hostname	PPP CHAP hostname setting Default: none
password	PPP CHAP password setting Default: none

4.2.3.2.4.4. PPP compression parameter Commands

Commands	Description
pcf	Protocol field Compression setting Default: enabled
acfc	Address and Control Field Compression setting

	Default: enabled
--	------------------

4.2.3.2.4.5. PPP echo parameter Commands

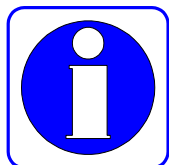
Commands	Description
interval	PPP LCP echo request transmission interval setting. Default: 6 sec
timeout	PPP LCP echo timeout count setting. Default: 3

4.2.3.2.4.6. PPP IPCP parameter Commands

Commands	Description
Default-router	IPCP option field to get default router information from Server . Default: enabled
ms-dns	IPCP option field to get DNS information from Server . Default: enabled

4.2.4. PPP Configuration

Information



Point to Point Protocol (PPP) is one of standard transmission rules to send data through the WAN link. RFC1661 describes PPP specifications. Not only in the synchronous WAN (serial) line but also in the asynchronous WAN (dial-up line) PPP can be used. Since PPP is a standard rules, it guarantees compatibility with different manufacturers' devices.

VoiceFinder AP160 dial-up VoIP gateway has an internal dial-up modem chip on board. The PSTN line is connected to PSTN modem port of AP160 directly. Users should set encapsulation mode as a PPP protocol mode for VoIP service via PSTN modem.

PPP consists of two kinds of protocol as follows:

- **Link Control Protocol (LCP):** LCP decides the encapsulation format, limits the packet size, performs authentication in the link, decides normal operation time and breakdown time, detects loopback link faults and other faults, and automatically terminates the link.
- **Network Control Protocol (NCP):** NCP communicates with various higher layer (network layer) protocols.

If a PPP encapsulation option is given to VoiceFinder AP160 dial-up VoIP gateway, PPP operation is possible. Current software installed in the router supports CHAP(Challenge Handshake Authentication Protocol) the authentication option that uses PAP(Password Authentication Protocol) and the magic number configuration option. Software always sends the magic number configuration option. However, software sends the authentication option only when the authentication option is set.

[Procedure]

Step	Operation
1	Enter into the interface configuration mode.
2	Give PPP encapsulation protocol to the interface.
3	Move to the IP configuration mode.
4	Give an IP address to the interface.
5	Enable CHAP or PAP authentication. (Optional)
6	Set CHAP or PAP parameters. (Optional)
7	Set PPP default peer IP. (Optional)
8	(If necessary) use "debug" command to check if AP160 dial-up VoIP gateway is normally operating.
9	Make the interface up.
10	With "show interface" command, check if the interface is normally operating.
11	(For abnormal operation) find faults and recover faults as using "debug" command.

[Related Commands and Syntax]

- **interface { async/ ethernet } { 0 / 1 }**

Selects the interface to set up and enters into the interface configuration mode.

- **modem dialing | do-script | keep-active | shell | speed} {...}**

Enters into the async interface configuration mode

For a detailed command usage, please refer chapter "4.2.3.2.2 Modem commands"

- **encapsulation { ethernet / ieee / vlan / ppp }**

Selects the modem encapsulation mode among above listed encapsulation mode

- **ip address** *<ip_address> <net_mask>*

Sets the IP address for the selected interface.

In case the dynamic IP address is assigned via PPP protocol, IP address is assigned automatically via IPCP protocol

- **user add** *<username> <password> {admin/high/normal/low}*
 1. Sets the login name and the password to authenticate a router that is trying to access to another router that functions as a PPP PAP/CHAP server.
 2. This command functions same as the command that the router manager uses to register a login user. This is because the router shares the PPP registered user database and the router user database. The operator registers users as using the same command.
 3. The difference from the registration of router users is that "user add" command does not use the registered user level for PPP connection in the user registration..

- **ppp authentication** *{chap/pap} [callin/{pap/chap}]*
 - i. Sets the PPP authentication method as CHAP or PAP in the interface configuration mode.
 - ii. The "callin" option is to connect only incoming calls by CHAP authentication. .
 - iii. {pap/chap} option is to respond to the calls which request both of CHAP and PAP authentications.

- **ppp chap hostname** *name*
 - i. This command is for PPP client devices. This command registers a user name to request connection to the PPP server device when using PPP CHAP authentication. (An optional command for CHAP authentication)
 - ii. If this command is not used, the router name (displayed in the router prompt) will be considered as the user name.

- **ppp chap password** *password*
This command is for PPP client devices. This command registers a password to request connection to the PPP server device when using PPP CHAP authentication. (An optional command for CHAP authentication).

- **ppp pap sent-username** *username* **password** *password*
Sets PAP authentication in the PPP client device. When the client device sets a PPP call, the client device sends the user name and the password to the server for authentication. At this time, the user name and the password shall be the same with those set in the server. (An optional command for PAP authentication)

- **ppp peer default-ip-address** *<ip-address>*
 1. Sets the router as a PPP server and the IP address to allocate to the serial interface of the other side. (An optional command)
 2. When the router receives the IP address, the router decides the subnet mask of the IP address that it received based on the IP subnet that has been set in its local interface.

- **ppp timeout** *<second>*
 1. Sets PPP negotiation timeout for PPP negotiation between two gateway. (An optional command)
 2. The default is five seconds.

- **shutdown / no shutdown**
An optional command to make the current interface up/down.

- **show interface** *<if-name>*
Shows the interface status of "if-name."

- **show modem**
Shows the modem control status of async 0 interface
Using this command, a user check the configuration of async 0 interface.

- **debug ppp { chap/error/negotiation/packet }**

1. Decodes PPP low level packets..
2. "Chap" option decodes challenge authentication related information.
3. "Error" option decodes PPP protocol level errors and error statistics.
4. "Negotiation" option decodes LCP and NCP protocol to set the PPP link.
5. "Packet" option decodes PPP low level packets.

- **debug async modem 0 <cr>**

Using this debug command, a user monitors the status machine of async 0 interface.

[Example] Normal PPP Configuration and Usage

```
!  
interface ether0.0  
no ip address  
!  
interface async0  
ip address 210.222.41.245 255.255.255.0  
    ☞ Sets the IP address as "210.222.41.245/24 bit mask."  
modem script dialer atdt9w01414  
    ☞ Sets the dialer modem command script used at call out.  
ppp authentication pap callin  
    ☞ Sets the PPP authentication mode as PAP for the async 0  
interface.  
ppp pap sent-username addpac password 12345678  
    ☞ Registers the user name (addpac) and the password (12345678)  
with the normal priority in the server.  
ppp compression pfc  
    ☞ Enable the PPP compression type PFC  
ppp compression acfc  
    ☞ Enable PPP compression type ACFC  
ppp ipcp ms-dns  
    ☞ Enable PPP IPCP option DNS.  
ppp ipcp default-route  
    ☞ Enable PPP IPCP option default router.  
!  
snmp name AP160B  
!  
route 0.0.0.0 0.0.0.0 async0  
    ☞ Set default route as async 0 interface.  
!
```

[Example] Added Commands during PAP Configuration (Client)

This is when AP160 dial-up VoIP gateway is used as a PPP CallIn on the client side.

```

AP160(config)# interface async 0
  ☞ Enters into the interface configuration mode.
AP160(config-async0)# encapsulation ppp
  ☞ Sets the PPP mode.
AP160(config-async0)# ppp authentication pap
  ☞ Sets the PPP authentication mode as PAP for the async 0
  interface.
AP160(config-async0)# ppp pap sent-username ADDPAC password
12345678
  ☞ Sends the user name and the password that were saved in
  the server during PPP connection.
AP160(config-async0)# ppp timeout 100
  ☞ Sets PPP connection negotiation timeout value as 100
  seconds.
AP160(config-async0)# end
  ☞ Exits from the configuration menu.
AP160 # debug ppp packet
  ☞ Stops PPP packet debugging.
AP160 #
AS0: CONNECT 26400
async0 LCP: TIMEOUT
async0 LCP: 0 CONFREQ id=1
      ASYNCMAP  0xa0000      MagicNumber  0x7b7b      PCOMP
ACCOMP

Interface async0, changed state to CONNECT
AS0: Welcome to 3Com Total Control HiPer ARC (TM)
AS0: Networks That Go The Distance (TM)

AP160# async0 LCP: TIMEOUT
async0 LCP: 0 CONFREQ id=1

```

```

ASYNCMAP 0xa0000 MagicNumber 0x7b7b PCOMP
ACCOMP
async0 LCP: I CONFREQ id=1
MRU 1514 ASYNCMAP 0x0 AuthProto PAP
MagicNumber 0xd07f37aa PCOMP ACCOMP 110405ea
130300
async0 LCP: O CONFREQ id=1
110405ea 130300
async0 LCP: I CONFACK id=1
ASYNCMAP 0xa0000 MagicNumber 0x7b7b PCOMP
ACCOMP
async0 LCP: I CONFREQ id=2
MRU 1514 ASYNCMAP 0x0 AuthProto PAP
MagicNumber 0xd07f37aa PCOMP ACCOMP
async0 LCP: O CONFACK id=2
MRU 1514 ASYNCMAP 0x0 AuthProto PAP
MagicNumber 0xd07f37aa PCOMP ACCOMP
async0 PAP: INITIAL
async0 IPCP: CLOSED
async0 CCP: CLOSED
async0 LCP: O ECHOREQ id=0
00007b7b
async0 PAP: O AUTHREQ id = 3 user = addpac01 passwd =
add3848
async0 LCP: I ECHOREP id=0
d07f37aa

voip_line_up

Line protocol on interface async0, changed state to UP
voip_line_up
async0 PAP: I AUTHACK id=3 msg =
async0 IPCP: O CONFREQ id=3
addr 0.0.0.0 ms-dns 0.0.0.0 ms-dns 0.0.0.0
async0 IPCP: REQSENT

```

```
async0 CCP: STOPPED
async0 IPCP: I CONFREQ id=3
    compress VJ0f00  addr 168.126.0.233
async0 IPCP: O CONFREJ id=3
    compress VJ0f00
async0 IPCP: I CONFNAK id=3
    addr 210.222.41.217  ms-dns 168.126.63.1  ms-dns
168.126.63.2
async0 IPCP: O CONFREQ id=4
    addr 210.222.41.217  ms-dns 168.126.63.1  ms-dns
168.126.63.2
async0 IPCP: I CONFREQ id=4
    addr 168.126.0.233
async0 IPCP: O CONFACK id=4
    addr 168.126.0.233
async0 IPCP: I CONFACK id=4
    addr 210.222.41.217  ms-dns 168.126.63.1  ms-dns
168.126.63.2

Set  DNS  Address  Primary  168.126.63.1  Secondary
168.126.63.2
async0 IPCP: UP AP160 # no debug ppp packet
☞ Stops PPP packet debugging
```

[Example] Added Commands during CHAP Configuration (Client)

This is when the AP160 dial-up VoIP gateway is used as a PPP CallIn client in the client side.

```
AP160(config)# interface async 0
    ☞ Enters into the interface configuration mode.
AP160(config-async0)# encapsulation ppp
    ☞ Sets the PPP mode.
AP160(config-async0)# ppp authentication chap
    ☞ Sets the PPP authentication mode as CHAP for the async 0
    interface.
AP160(config-async0)# ppp chap hostname ADDPAC
    ☞ If the user name that was saved in the server during PPP CHAP
    connection is different from the user name of the client router,
    this command sends the user name of the server side.
AP160(config-async0)# ppp chap password ADDPACGateway
    ☞ Sets the user name of the server side to check the password
    that the server sends during PPP CHAP connection.
AP160(config-async0)# ppp timeout 100
    ☞ Sets PPP connection negotiation timeout value as 100 seconds.
AP160(config-async0)# end
    ☞ Exits from the configuration mode.
AP160# debug ppp packet
    ☞ Decodes PPP packets.
AP160#
AP160# async0 LCP: TIMEOUT
AP160# async0 LCP: O CONFREQ id=1
AP160#          ASYNCMAP 0xa0000 MagicNumber 0x7b7b PCOMP ACCOMP
AP160# async0 LCP: I CONFREQ id=1
AP160#          MRU 1514 ASYNCMAP 0x0 AuthProto CHAP
AP160# debug ppp packet
    ☞ Stops PPP packet debugging.
```


Appendix A VoiceFinder AP160 VoIP Gateway Technical Description

This Chapter explains the supported Technical Specification of VoiceFinder AP160 dial-up VoIP Residential Gateway. (* means that the item will be scheduled to implement)

IP Routing Service

IP Routing Protocols	Static
	IEEE 802.1Q VLAN Routing

LAN Service

Ethernet Interface	10Mbps Ethernet Interface
Configuration Management	Port Configuration
	Secondary/Subnet Support
	MTU Size Change
	ARP Entry Revalidate Function
	Transmit/Receive Connection Recovery Function

Voice over IP Service

VoIP Protocols	ITU-T H.323 v2 Protocol with ITU-T H.235 Security Feature
	Session Initiation Protocol (SIP)
Voice Compression	G.723.1 MP-MLQ, 6.3Kbps, 5.3Kbps
	G.729.A CS-ACELP, 8Kbps
	G.711 PCM, 64Kbps
Voice Processing	Voice Activity Detection (VAD)
	T.38 Real Time Protocol(In band, Out Band Mode)
	Dual Tone Multi Frequency (DTMF)
	Comfort Noise Generation (CNG)
	Echo Cancellation

Network Managements

SNMP	Standard SNMP Agent MIB v2
Web	Web Based Management using HTTP Server Interface
Others	Traffic Queuing
	RTP/RTCP Flow Control

Security Functions

IP Access List	Standard and Extended IP Access List, IP Packet Filtering
PPP User Authentication	Password Authentication Protocol (PAP)
	Challenge Handshake Authentication Protocol (CHAP)
Others	Access Control and Data Protections
	Enable/Disable for Specific Protocols
	Multi-level User Account Management
	Auto-disconnect for Telnet/Console Sessions

Operation and Managements

Console Port	RS-232C based Async Serial Interface Support
Remote Management	Console, Rlogin, Telnet
System Performance Analysis	Process, CPU, and Connection Interface
APOS Management	APOS Configuration Back-up and Restore
	Remote Upgrade Function using FTP/TFTP
Others	Debugging and System Auditing
	Data Logging and Diagnostics
	System Booting, Auto-rebooting with Watch-dog Timer
	IP Traffic Statistics with Accounting

Other Supplementary Features

DHCP	Dynamic Host Configuration Protocol (DHCP) Server and Relay Functions
ADSL	PPPoE (Static IP, Dynamic IP)
NAT/PAT	Network Address Translation (NAT) Protocol
	Port Address Translation (PAT) Protocol
Bridging	IEEE Standard Spanning Tree Bridging Protocol
	Remote Bridging Support
	Concurrent Bridging Support

User Interface	Industry Standard Command Line Interface (CLI)
Others	Network Time Protocol (NTP) Support

Hardware Specification

Microprocessor	32bit RISC Microprocessor
Network Interface	1-Port Async Dial-up modem interface (RJ11)
	1-Port 10Mbps Ethernet Interface for LAN (RJ45)
	1-Port Async Serial Interface for RS-232C Console Port (RJ45)
	1-Port FXS Voice Interface (RJ11)
Memory	2MB Flash Memory
	16MB SDRAM / Main Memory
System LED	LAN, Async, Power LED (Front Panel)
Power	DC External Power Supply (5V x 1.2A)
Power Requirement	5 Watt
Operating Temperature	0°C ~ 55°C
Storage Temperature	-40°C ~ 85°C
Relative Humidity	5% ~ 95%
Cooling Method	Natural Air Cooling
Depth x Width x Height	26mm x 200mm x 137mm
Weight	400g