VoiceFinder AP-MG3000N

Media Gateway

Installation Guide

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Getting into the VoiceFinder AP-MG3000N User's Manual

This chapter provides the overview of the PassFinder AP-MG3000N Gateway user's manual and an explanation of the symbols and legends involved.

[Composition of the Manual]

The PassFinder AP-MG3000 installation guide serves to assist the installation of the AP-MG3000N Gateway. This manual is composed of 4 chapters as the following.

Thos experienced with Gateways 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 **AP-MG3000N Overview** 』 provides an introduction to the hardware and software features of PassFinder AP-MG3000N 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**』 explains the basic installation information on connecting the gateway with cables, how to use Console terminal and etc.

- Chapter 4 『**Appendix**』 includes the specification of the gateway, the cable and etc.

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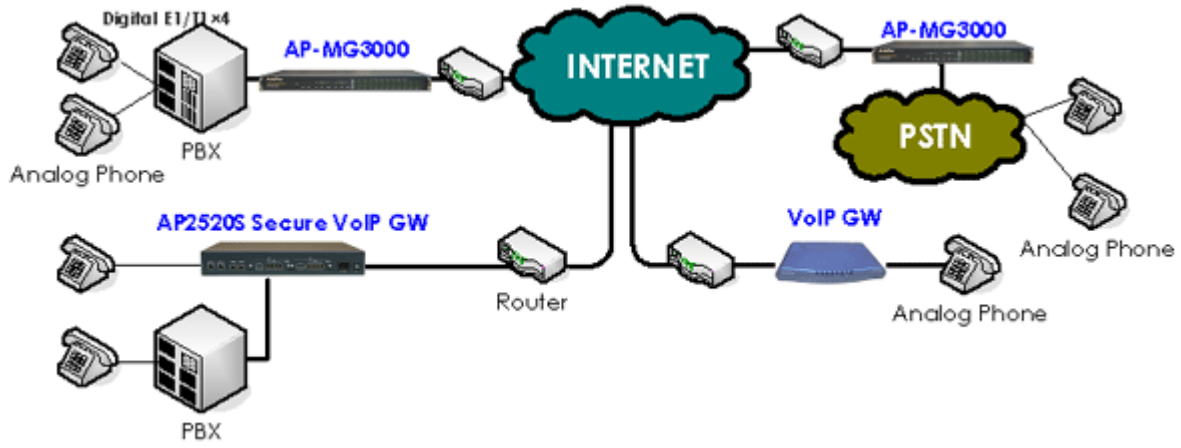
Revision No.	Date	Comments	Written by
Version 1.0	May 21, 2005	Initial Released	AddPac R&D Center

Chapter 1. VoiceFinder AP-MG3000N Overview

Introduction to the VoiceFinder AP-MG3000N

VoiceFinder AP-MG3000N Media Gateway is a high performance Media Gateway providing high scalability, cost-effective service in a small footprint. Moreover, AP-MG3000 supports major VoIP call control protocols including H.323, SIP, and MGCP concurrently on one embedded OS, and maintains state-of-art voice quality on any types of conventional IP networks by utilizing new level of QoS capability.

Figure 1-1 : The network diagram using VoiceFinder AP-MG3000 Gateway.



[Figure 1-1 Standard Network Diagram using AP-MG3000N]

The exterior of AP-MG3000N Media Gateway is as below.

[Figure 1-2 The Exterior of VoiceFinder AP-MG3000N Media Gateway]

VoiceFinder AP-MG3000N Gateway Overview

Meet the needs for VoIP Trunking, Security, and IP Centrex

VoiceFinder AP-MG3000 offers 120 channels of unprecedented quality of digital VoIP com munication with the density requirement. Not only general QoS algorithm, AP-MG3000 supports the advanced QoS algorithms to maintain state-of-art voice quality on any types of conventional IP networks. Also, the front panel of AP-MG3000 incorporates 120 LEDs clearly indicating operational status of VoIP channels such as channel occupation status, security enable/disable status.

High-Capacity Media Gateway Solution for Enterprises

AddPac VoiceFinder VoIP gateways have been recognized with their unmated level of performance and reliability in the IP telephony market. With the years of experience and the know-how at the enterprise and carrier-class markets, AP-MG3000 Media Gateway delivers true voice over IP service to businesses worldwide. Moreover, AP-MG3000 supports multi-stack operation of H.323, SIP and MGCP control protocols which well suitable for any commercial VoIP deployment.

Best Choice for Secure VoIP Communication

In Internet environment, security is the issue that needs to be confronted. AP-MG3000 takes upon this complicated task with its built-in security processor, the first-of-its-kind in commercial Media Gateway market. Especially, choosing AP-MG3000 enables service

providers to rapidly deploy future secured service. Including AP-MG3000, AddPac Technology carries SRTP protocol based secure VoIP Gateways such as VoiceFinder AP500S, AP2520S. AP-MG3000 is the right choice for secured, next generation communication.

VoiceFinder AP-MG3000N Gateway Hardware Specification

<Table 1-1> VoiceFinder AP-MG3000N Hardware Specification

Microprocessor	64bit RISC Microprocessor	
Memory	Flash Memory	8Mbyte
	SDRAM Memory	64Mbyte High-Speed SDRAM
	Boot Memory	512Kbyte Flash Memory
HW Security Processor (Optional)	DES and 3DES for Data Encryption, ECB, CBC Mode	
	RSA and Diffie-Hellman for public key	
	SHA-1 and MD5, HMAC for authentication	
Network Interface Module	2-Port 10/100Mbps Fast Ethernet Interface (2 x RJ45) 1-Port RS-232C Console (1 x RJ45) 1-Port Asynchronous Serial Interface	
Trunk Interface Modules	1-Port PBX Digital E1/T1 Trunk Interface (1 x RJ45)	
	2-Port PBX Digital E1/T1 Trunk Interface (2 x RJ45)	
	4-Port PBX Digital E1/T1 Trunk Interface (4 x RJ45)	
Power Requirement	VAC 110~220V, 50/60Hz, 25Watt	
Operating Temp	0°C to + 45°C (32° to 112°F)	
Relative Humidity	5% to 95% (Non-condensing)	
Dimensions(H x W x D)	43 x 435 x 205(mm) - 19" Rack Mountable Chassis	
Weight(kg)	4.8Kg	

VoiceFinder AP-MG3000N Support Protocol and Service

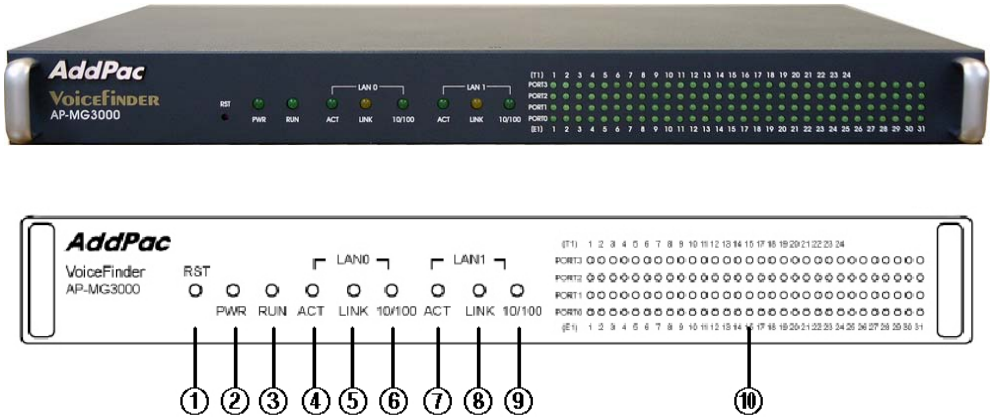
<Table 1-2> VoiceFinder AP-MG3000N Support Protocol and Service

Routing Protocols	Static and IEEE 802.1Q VLAN Routing, RIP v1/v2, OSPF v2
WAN Protocols	Point-to-Point Protocol (PPPoE for ADSL), DHCP, Static IP
Voice over IP Services	ITU-T H.323 v3 VoIP Protocol with ITU-T H.235 Security Feature
	ISDN-PRI, R2, DTMF Signaling Protocol Support
	H.323, SIP, and MGCP Triple Stack Support
	SIP protocol support compliant with IETF RFC3261(or RFC2543)
	G.723.1, G726-16K,G726-32K,G.729.A, G.711 Voice Compressions
	Voice Processing Features Supports - VAD, DRMF, CNG, G.168 and T.38 FAX Relay
	ITU-T H.323 Gateway, Gatekeeper Support
	Enhanced QoS Management Features for Voice Traffics
Network Management	Standard SNMP Agent (MIB v2) Support
	Traffic Queuing
	Remote Management using Console, Rlogin, Telnet
	Web based Managements using HTTP Server Interface
Security Functions	Standard SRTP Protocol for Secure VoIP Telephony System
	Standard 3DES for Voice Packet Enc/Dec
	Standard & Extended IP Access List
	Access Control and Data Protections
	Enable/Disable for Specific Protocols
	Multi-Level User Account Management
	Auto-disconnect for Telnet/Console Sessions

	PPP User Authentication Supports → Password Authentication Protocol(PAP) → Challenge Handshake Authentication Protocol (CHAP)
Operation & Management	System Performance Analysis for Process, CPU
	Configuration Backup & Restore for APOS Managements
	Debugging, System Auditing, and Diagnostics Support
	System Booting and Auto-rebooting with Watchdog Feature
	System Managements with Data Logging
	IP Traffic Statistics with Accounting
	PC based Key management scheme
Other Scalability Features	DHCP Server & Relay Functions
	Network Address Translation (NAT) Function
	Port Address Translation (PAT) Function
	Transparent Bridging (IEEE Standard) Function → Spanning Tree Bridging Protocol Support → Remote Bridging Support → Concurrent Routing and Bridging Support
	Cisco Style Command Line Interface(CLI)
	Network time Protocol(NTP) Support

VoiceFinder AP-MG3000N Gateway Front Part

On the front panel of AP-MG3000N Media Gateway, various LEDs are placed for easy operation monitoring along with two(2) Digital E1/T1 Voice interfaces, two(2) Ethernets, Console port making possible WAN-to-LAN VoIP service and IP routing service.



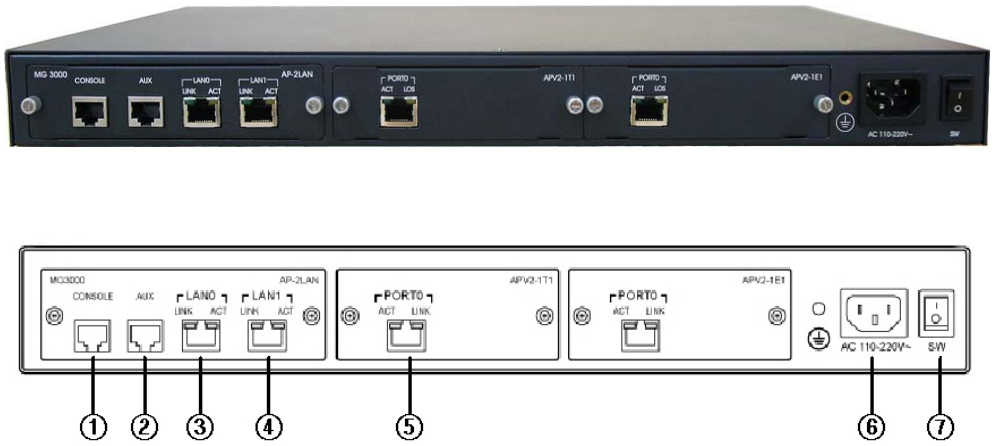
[Figure 1-3 VoiceFinder AP-MG3000N Front View]

<Table 1-3> The below table describes the front panel LED of VoiceFinder AP-MG3000N Gateway

No.	Part	Description
①	**RST**	Resets the system by hardware. (**Red**)
②	**PWR**	Indicates power supply. (**Green**)
③	**RUN**	Indicates proper functioning of the equipment. (ACT **Green**)
④	**LAN0 ACT**	Indicates LAN 0 ACT Status. (**Green**)
⑤	**LAN0 LINK**	Indicates LAN0 Link Status.(**Yellow**)
⑥	**LAN0 10/100**	Indicates LAN0 10/100Mbps Link Status. (100Mbps Link **Green**)
⑦	**LAN0 ACT**	Indicates LAN 0 ACT Status. (**Green**)
⑧	**LAN0 LINK**	Indicates LAN0 Link Status.(**Yellow**)
⑨	**LAN0 10/100**	Indicates LAN0 10/100Mbps Link Status. (100Mbps Link **Green**)
⑩	**Channel LED**	Indicates currently active voice channel of Voice E1/T1. (**Green**)

VoiceFinder AP-MG3000N Gateway Rear Part

AP2620 VoIP Gateway's rear view adapts external architecture for user friendly cable and power switch working.



[Figure 1-4 VoiceFinder AP-MG3000N Rear View]

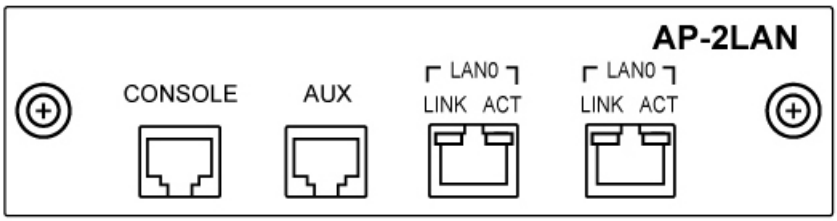
<Table 1-4> VoiceFinder AP-MG3000N Gateway Rear View Interface Description

No.	Label	Description
①	**CONSOLE**	RJ45 / Console Interface
②	**AUX**	RJ45 / Asynchronous Serial Interface
③	**LAN0**	RJ45 / LAN 0 Ethernet Interface
④	**LAN1**	RJ45 / LAN1 Ethernet Interface
⑤	**PORT0**	RJ45 / E1 or T1 Interface
⑥	**AC 110~220V**	Connects AC power cable. The AP-MG3000 Gateway uses both 110 and 220V AC.
⑦	**SW**	Switch for power supply.

Network Interface Slot

2-Port 10/100Mbps Ethernet, 1-Port RS-232C Console, 1-Port Async Interface

AP-2LAN network module for multi service router comes with 2-port 10/100 Fast Ethernet interface, 1-port RS-232C console interface, 1-port Async serial interface(RJ45).



[Figure 1-5 AP-2LAN card for AP-MG3000N]

Trunk Interface Modules

1-Port PBX Digital E1 Trunk Interface Module

VoiceFinder AP-MG3000N Media Gateway supports digital E1 voice processing module for PBX interworking. Digital E1 interface module supports ISDN-PRI, MFC-R2, DTMF and accommodate maximum 30 voice channels.

[Figure 1-6 APV2-1E1 card for AP-MG3000N]

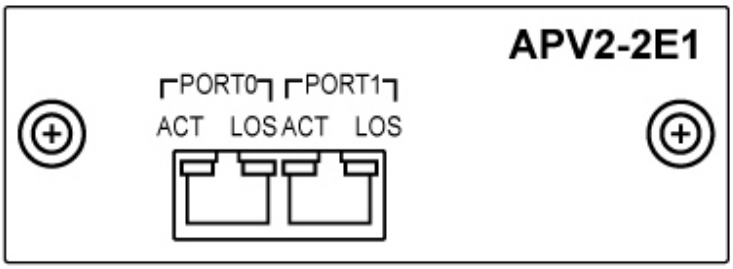
1-Port PBX Digital T1 Trunk Interface Module

VoiceFinder AP-MG3000 VoIP Gateway supports digital T1 voice processing module for PBX interworking. Digital T1 Interface module supports ISDN-PRI, MFC-R2, DTMF and accommodate maximum 23 voice channels.

[Figure 1-7 APV2-1T1 card for AP-MG3000N]

2-Port PBX Digital E1 Trunk Interface Module

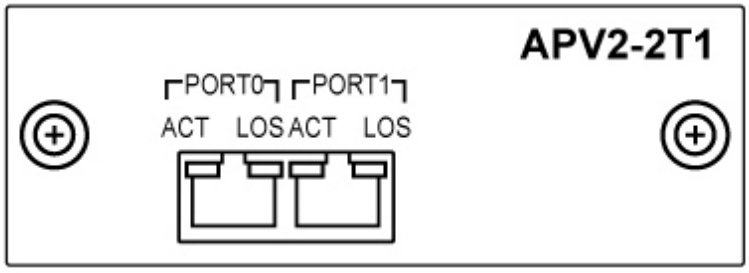
VoiceFinder AP-MG3000N Media Gateway supports digital E1 voice processing module for PBX interworking. Digital E1 interface module supports ISDN-PRI, MFC-R2, DTMF and accommodate maximum 60 voice channels.



[Figure 1-8 APV2-2E1 card for AP-MG3000N]

2-Port PBX Digital T1 Trunk Interface Module

VoiceFinder AP-MG3000N Media Gateway supports digital T1 voice processing module for PBX interworking. Digital T1 interface module supports ISDN-PRI, MFC-R2, DTMF and accommodate maximum 46 voice channels.

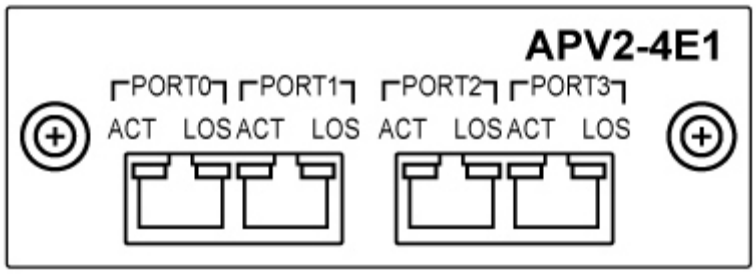


[Figure 1-9 APV2-2T1 card for AP-MG3000N]

4-Port PBX Digital E1 Trunk Interface Module

VoiceFinder AP-MG3000N Media Gateway supports digital E1 voice

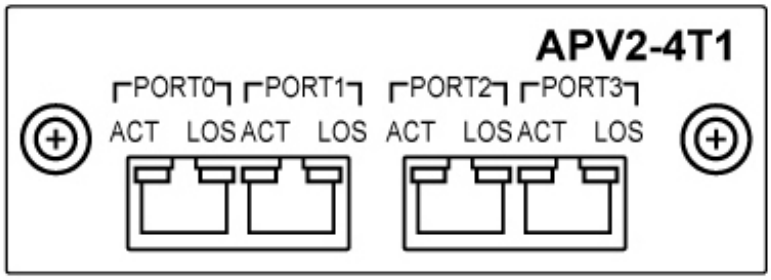
processing module for PBX interworking. Digital E1 interface module supports ISDN-PRI, MFC-R2, DTMF and accommodate maximum 120 voice channels.



[Figure 1-10 APV2-4E1 card for AP-MG3000N]

4-Port PBX Digital T1 Trunk Interface Module

VoiceFinder AP-MG3000N Media Gateway supports digital T1 voice processing module for PBX interworking. Digital T1 interface module supports ISDN-PRI, MFC-R2, DTMF and accommodate maximum 92 voice channels.



[Figure 1-11 APV2-1T1 card for AP-MG3000N]

Chapter 2. Before AP-MG3000N Installation

Installation Requirements

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

- Ensure the AP-MG3000 VoIP Gateway is in a dust-free environment before and after installation.
- Ensure the AP-MG3000 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.

Electrical Requirements

There are two main sources of electrical problems with the AP2520 : the power supply and static electricity.

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.

General Requirements

VoiceFinder AP-MG3000N is ready for use where electronic products are used. However, a location with the following conditions are 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.**

Prerequisites for Network Connection

Observe EIA standards and distance limitations when installing the Gateway

The following section describes the synchronous serial cable, Ethernet Cable and the Console Cable VoiceFinder AP-MG3000 supports.

Preparation for Installation

Unless ordered in advance, the tools and certain cables are not provided in the package. Prepare the following equipments and tools before the installation.

- Standard screwdriver set

- Cable for LAN and serial port
  - ✓ RJ-45 to RJ-45 cable for LAN port
  - ✓ RS-232c console cable with RJ-45 connector (included in the package)

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

Ethernet Port

AP-MG3000 VoIP Gateway has two(2) RJ45 type Ethernet Ports and LEDs of the ports on the front panel. Make sure to use specified cable and connectors to use the ports.

RS-232C Serial Console Port

AP-MG3000 VoIP Gateway has RJ-45 type RS-232C Female DCE connector interface on the front panel. This port is used for Initial Configuration, monitoring and debugging of the Gateway. Make sure to use specified cable and connectors to use the port.

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.

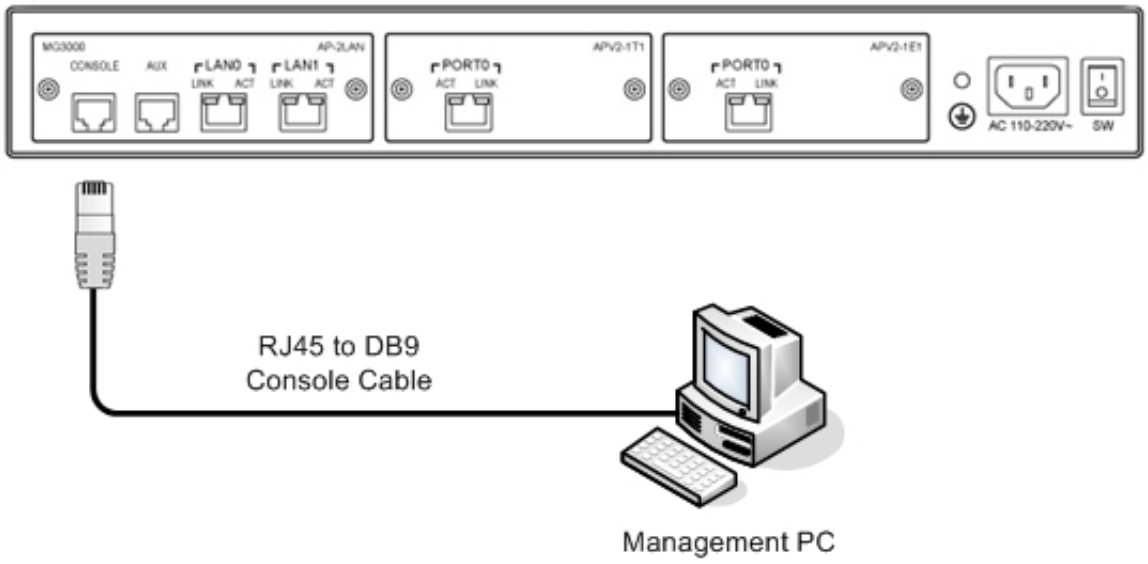
No.	**Item**	**Contents**	**Q'ty**
1	VoiceFinder AP-MG3000N Gateway Main Body		1
2	LAN Cable (For RJ45 to RJ45)		1
3	Console Port Cable (For RJ45 to DB9)		1
4	AC Power Cable (220V)		1

[Figure 2-1 VoiceFinder AP-MG3000N Package]

Chapter 3. AP-MG3000N Installation

Console Interface Connection

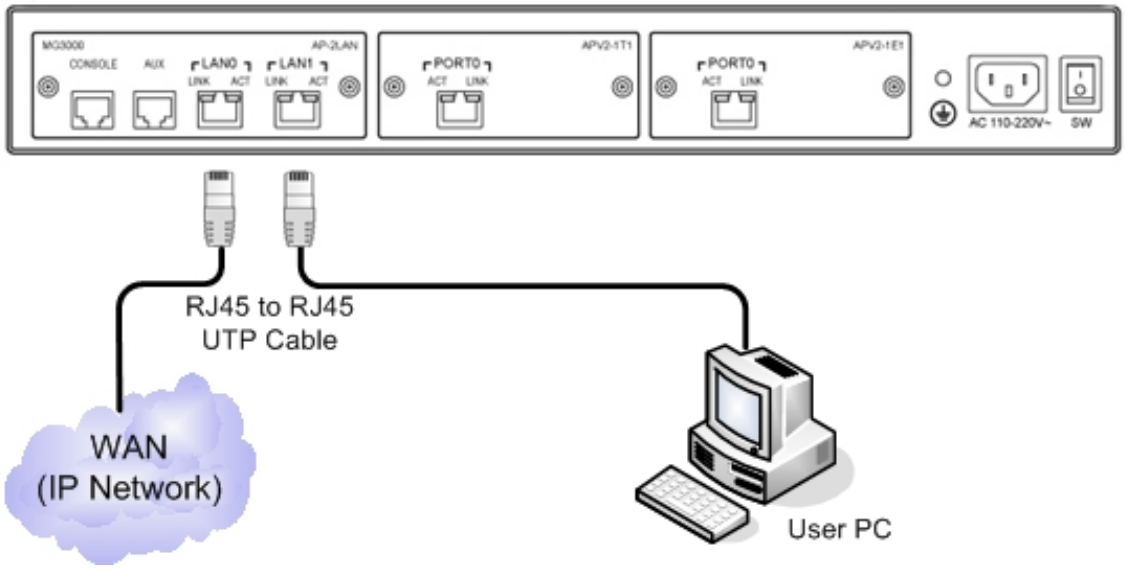
- Connect the console port in the rear side of the Gateway with the serial port of the prepared console terminal. **(Refer to [Figure 3.1])** Use the console cable provided with the package. If using a PC as the console terminal, connect to the Ethernet port of the PC.



[Figure 3-1 Connection between AP-MG3000N Console Port and Terminal PC]

Ethernet Interface Connection

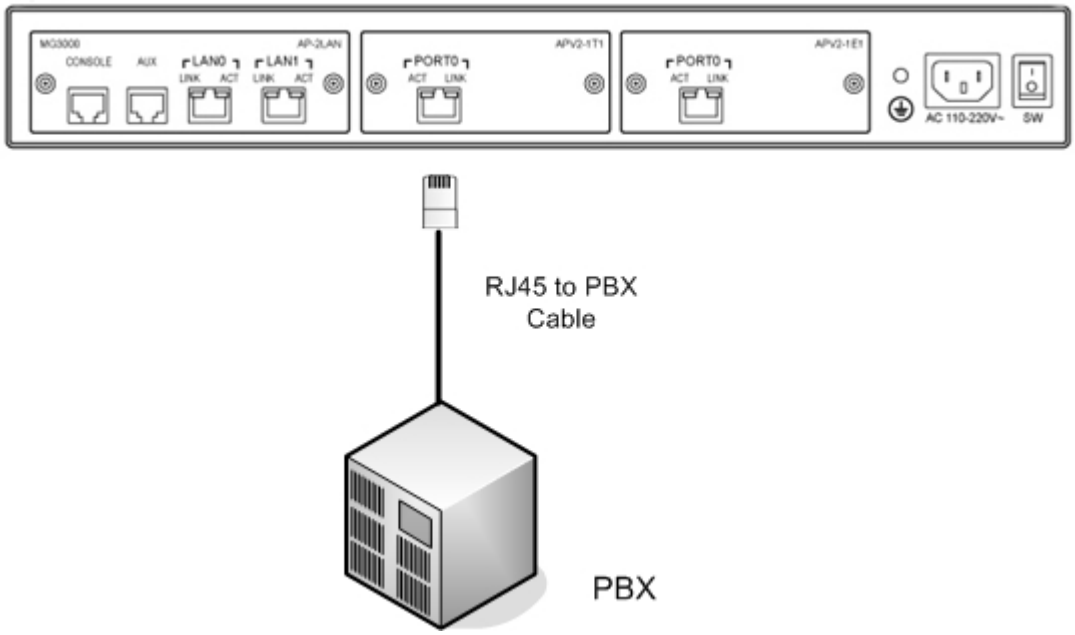
- Connect the network to the desired port using RJ-45 connector. Below figure shows a network config with LAN0 for WAN, LAN1 for PC.



[Figure 3-2 Connection between AP-MG3000N LAN0/LAN1 and WAN equipment/PC]

E1 Interface Connection

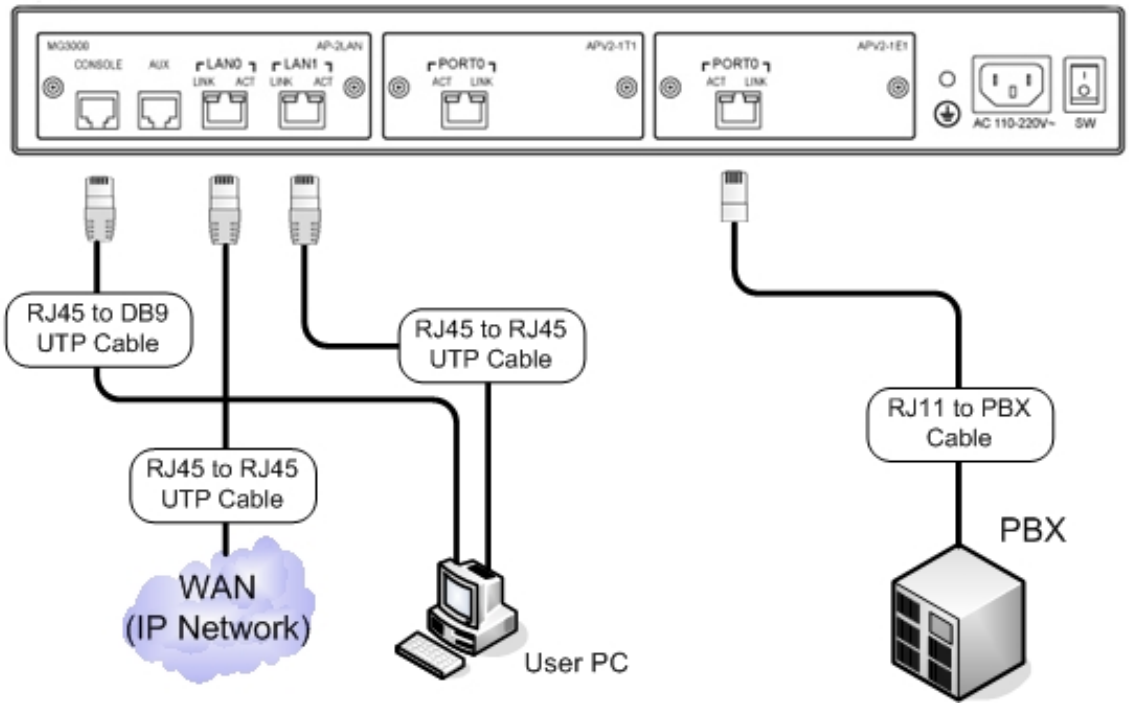
Usually this VoIP modules interwork with PBX thruogh Digital E1. APVI-1E1 VoIP Digital E1 Interface module supports ISDN-PRI, MFC-R2, DTMF and accommodates maximum 32 voice channels.



[Figure 3-3 VoiceFinder AP-MG3000N E1 Interface Connection]

Connection for AP-MG3000N Interfaces

The below figure is an example of VoiceFinder AP-MG3000 Gateway Interface connection.



[Figure 3-4 An Example of connection of the VoiceFinder AP-MG3000N Interfaces]

Chapter 4. Power Supply and Check Operational Status

AP-MG3000N Gateway Booting and Operation

When power is supplied, the system is booted as described below..

- VoiceFinder AP-MG3000 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 software image files. The boot loader loads the broadcasting system software from the flash memory.

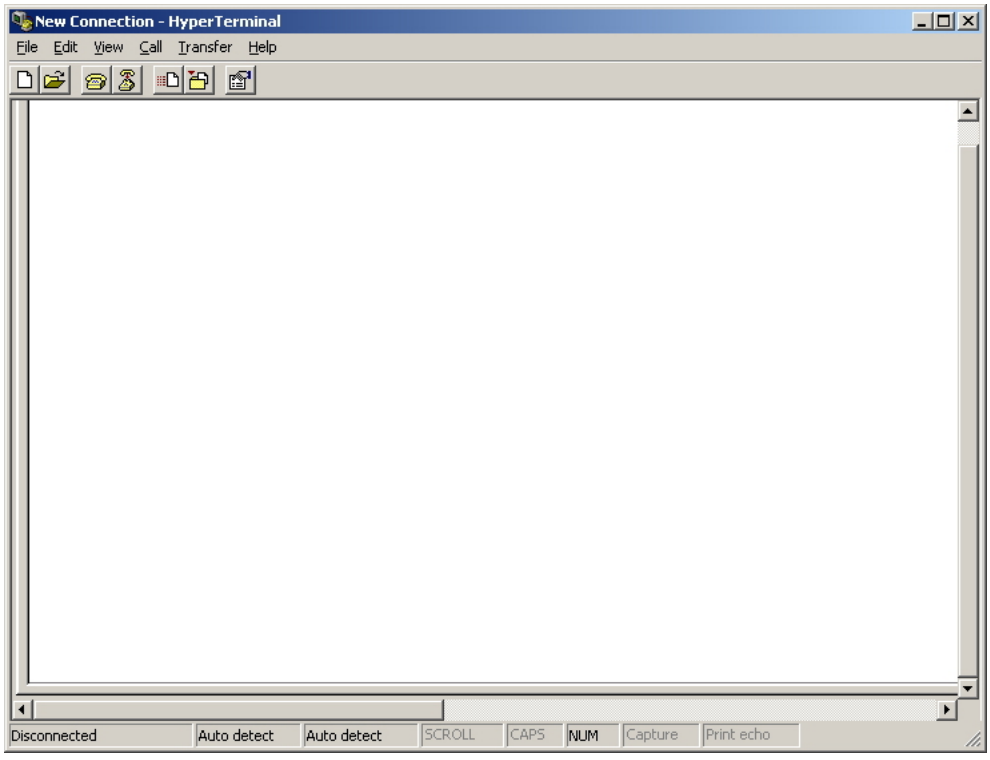
- If the boot loader cannot find proper software image file from the flash memory, the boot loader stands by in the boot mode until it receives proper software from the remote system. (At this time, the boot loader can download software through TFTP or FTP protocol.)

- When the software is loaded, the broadcasting system starts to operate according to configuration information. However, if there is no configuration information, it operates according to the default values, and in this case, the operator shall set up related items for normal operation of the network.

After connecting all the interfaces, supply the power to VoiceFinder AP-MG3000 Gateway. Supply the power after connecting the adapter to VoiceFinder AP-MG3000 Gateway. Do not connect the adapter to the power supply before connecting it to the gateway. Also, use 110V adapter in case the power supply is 110V. However, the gateway detects both 110V and 220V, so there is no additional setting required.

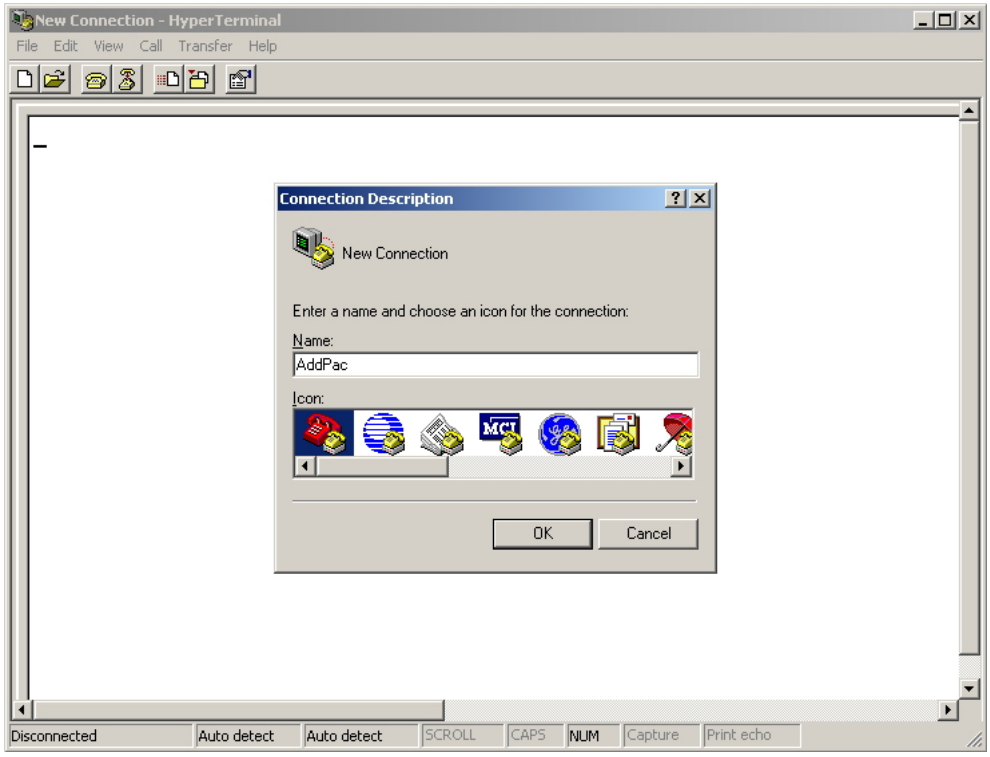
Use Console Terminal with HyperTerminal

- To use a PC as a Console terminal, the communication emulator application should be installed. When the PC is MS-Windows line, use the HyperTerminal Application.



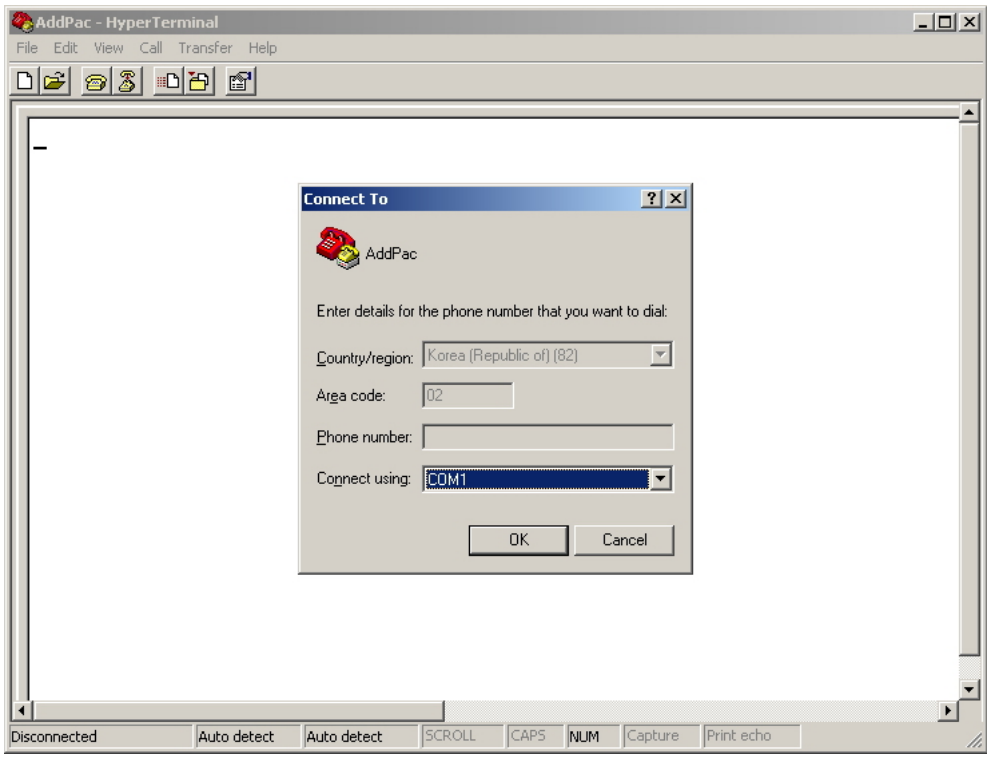
[Figure 4-1 MS-Windows Terminal Emulator - HyperTerminal]

- Assign a name to the connection. "AddPac" is used at the below example.



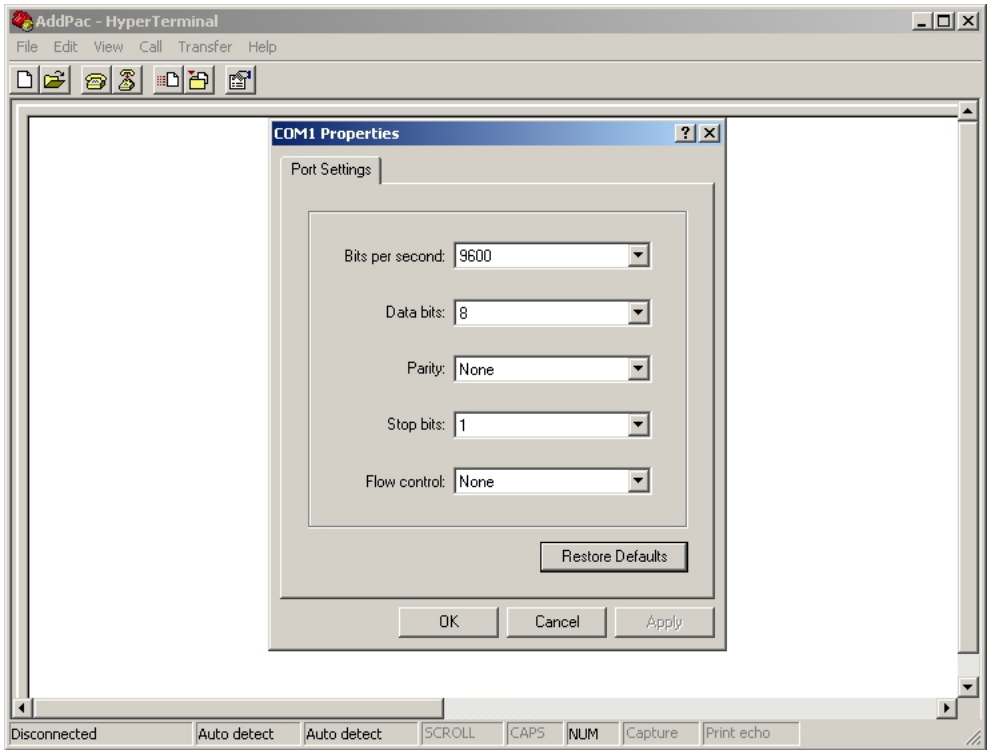
[Figure 4-2 Assign a name for the new connection in HyperTerminal]

Select the interface whether the Console cable is connected. Typically, the Console cable is connected to the RS-232C 9Pin Serial Port, so select the right port according to the user environment. "Com1" is selected at the below example.



[Figure 4-3 Select the interface for Console cable]

Set the port information. The below examples is based on “COM1” port.



[Figure 4-4 COM1 Port Configuration]

- After the configuration, press "Enter" button, then the below message will be displayed on the HyperTerminal. This message shows the routing S/W version, Gateway H/W test result, memory and etc.

```
System Reboot...

System Boot Loader, Version 2.3.1/1
Copyright (c) by AddPac Technology Co., Ltd. Since 1999.

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

PassFinder Router Series (MG3000N)
Serial Number: MG3000N-XXXXXX
64BIT RISC Processor With 100MHz Clock
64 Mbytes System Memory
512 Kbytes System Boot Flash Memory
4 Mbytes System Flash Memory

1 RS232 Serial Console Interface
2 Ethernet/IEEE 802.3 Interface

MG3000N System software Revision 8.21
Released at Thu May 19 16:00:00 2005
Program is 2602124 bytes, checksum is 0x14a98c0d

Local Time : Sat May 21 10:58:21 2005
Copyright (c) by AddPac Technology Co., Ltd. Since 1999.
```

```
Hardware Revision ID = 0
Voice Module type (0): E1    [4]
Voice Module type (1): NULL [0]

Interface ethernet0.0, changed state to UP
VOIP_INTERFACE_UP : (172.17.201.40)
Voice Module ready
E1 Framer (0/0): ... OK
E1 Framer (0/1): ... OK
E1 Framer (0/2): ... OK
E1 Framer (0/3): ... OK

The System is ready. Please login to system.
login: DSP S/W download (0): ..... OK

Interface E1 (0/0) link UP
Interface E1 (0/1) link UP
Interface E1 (0/2) link UP
Interface E1 (0/3) link UP
Gatekeeper shutdowned.

VoIP in service.

login: root
password:
MG3000N   -   Login   : root at Console on Sat May 21 10:58:39 2005
MG3000N#
```

[Figure 4-5 The initial message of VoiceFinder AP2620 Gateway]

- With the log-in message, input the user name “root” and the password “router”. After the log-in process, the prompt “MG3000N#” is displayed on the console terminal.

Chapter 5. Appendix

Cable Specification

This Appendix provides information about the Pinout specifications of the following cables used with VoiceFinder AP-MG3000N Gateway.

- Console Port Signal and Pinout (RJ-45 to DB9)
- Ethernet Cable Assemble (RJ-45 to RJ-45) Pinout
- E1/T1 Cable (RJ-45 to PBX) Pinout

[Console Port Signal & Pinout]

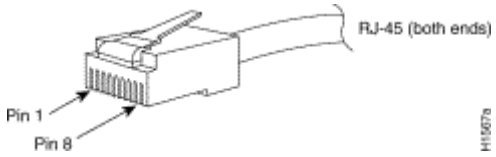
In order to connect the gateway console port with the Terminal Emulating PC, the RJ-45 to DB9 (Female DTE Connector) cable is used. The transferred signal and Pinout specifications are enlisted in the following table.

<Table 5-1> The transferred signal and Pinout specification

Gateway Console (DTE)	RJ-45	DB-9	Console Device (PC)
Signal	RJ-45 Pin	DB-9 Pin	Signal
RTS	1	8	CTS
DTR	2	6	DSR
TxD	3	2	RxD
GND	4	5	GND
GND	5	5	GND
RxD	6	3	TxD
DSR	7	4	DTR
CTS	8	7	RTS

[UTP cable (RJ-45 to RJ-45) Pinout]

In order to connect the gateway with other equipments (i.e. HUB), the RJ-45 to RJ-45 Ethernet Cable is used. The RJ-45 Connector Pin sequence is provided below and the transferred signal and Pinout specifications are enlisted at the below table.



[Figure 5-1 100Base-TX RJ-45 Connector]

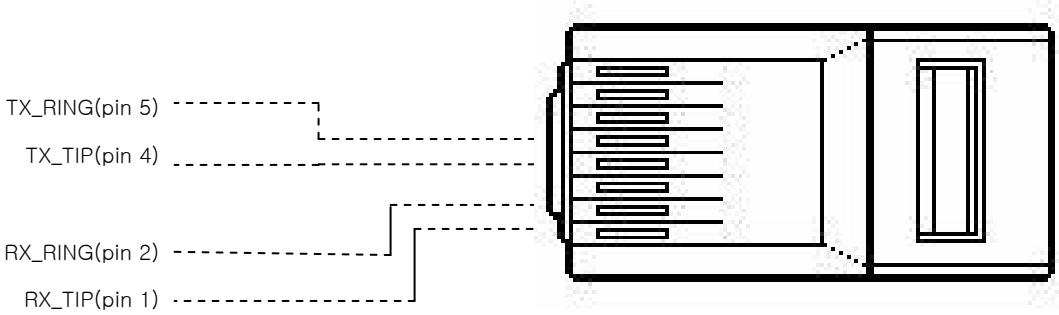
<Table 5-2> Signal and Pinout of Direct Ethernet Cable

RJ-45	Signal	Direction	RJ-45 Pin
1	**Tx +**	→	1
2	**Tx -**	→	2
3	**Rx +**	←	3
4	**-**	**-**	4
5	**-**	**-**	5
6	**Rx -**	←	6
7	**-**	**-**	7
8	**-**	**-**	8

1. These specifications are for serial cables connecting the gateway and the HUB.
2. For gateway to gateway or gateway to PC connection, the Cross Cable must be used.

[E1/T1 Cable (RJ-45 to PBX) Pinout]

- Addpac E1/T1 can be connected with RJ45 cable. RJ45 pin array is as below, PBX's RX is assigned for RJ45 pin 1 and 2, TX is for pin 4 and 5.



[Figure 5-2 Digital E1/T1 RJ45 Pinout]