ARTDio

Voice Internet Phone Gateway

User Manual

IPC 1000 Series

version：1.0　update date：2004/1/6

ARTDio Company Inc.

1. Safety Instructions

WARNING

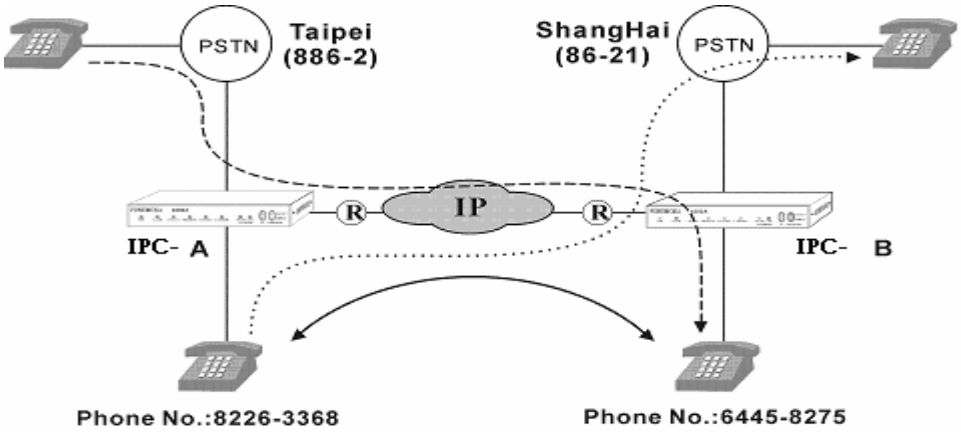
1. Do not attempt to service the product yourself. Any servicing of this product should be referred to qualified service personal.
2. To avoid electric shock, do not put your finger, pin, wire, or any other metal objects into vents and gaps.
3. To avoid accidental fire or electric shock, do not twist power cord or place it under heavy objects.
4. The product should be connected to a power supply of the type described in the operating instructions or as marked on the product.
5. To avoid hazard to children, dispose of the product's plastic packaging carefully.
6. The phone line should always be connected to the LINE connector. It should not be connected to the PHONE/FAX connector as it may cause damage to the product.
7. Please read all the instructions before using this product.

Table of Contents

2. Preface

The IPC unit is a personal VoIP gateway developed using the latest in VoIP technology. Equipped with QoS capability, the IPC unit is able to provide enhanced voice quality while at the same time using limited bandwidth. It is also very simple to install and easy to carry and operate.

When you are connected to the Internet, the IPC unit turns your regular home phone into an IP phone while maintaining the same traditional dialing behavior. When you are making traditional phone calls, dial as usual. Your friends can use your same number to call you. You will hear the phone ring as before. When you want to make IP phone calls, simply dial the "＊" or "#" digits and follow it with the same telephone number normally used. If both of parties are equipped with IPC units, you will be making VoIP calls without occurring additional phone bills.



Besides the ability to make free Internet phone calls, the IPC unit also provides the following unique features.

While out, you can use the IPC unit to place IP calls

When you are away from home, you can still use the IPC unit to place calls to people who are also using the IPC unit. Simply use a standard phone or even a mobile phone to call the IPC unit located at your home, the IPC unit will then transfer your calls through the IP network to the remote IPC unit that is located at your intended recipient's residence.

Using Analogy Phone make SIP calls

After simply configuration, you can use standard phone to make SIP calls to connect to IP phone or soft phone, which support SIP protocol.

Making long distance phone calls while paying local phone bill

If you live in Taipei, you can make a phone call to anyone located in the Shanghai area through another IPC unit located in Shanghai. Because there are no costs involved when placing a call from the Taipei IPC unit to the Shanghai IPC unit there are no additional costs incurred. The IPC unit in Shanghai is only charged the Shanghai local phone rates. Since the Shanghai IPC is covering the charge, you must obtain permission (a configuration setting) from the Shanghai IPC unit.

3. Package Contents

The IPC 1000 series VoIP Gateway Unit

AC/DC Power Adapter

RJ-45 Ethernet Cable

RJ-11 Telephone Cable

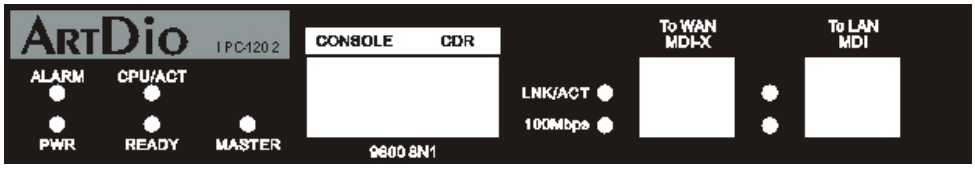
User's Manual

CD-ROM

4. Panel Descriptions

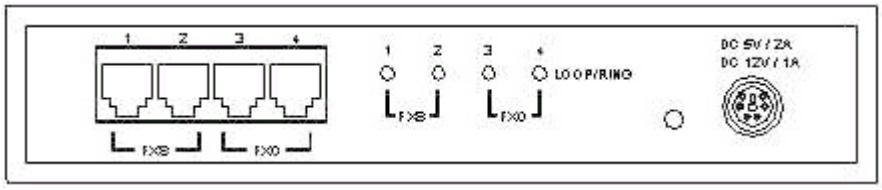
4.1 Front Panel

IPC 1000



4.2 Rear Panel

IPC 1000



4.3 LED Indicators

LED	Label	Description	
10/100 Ethernet	LNK/ACT	On	Link up
		Off	Link down
		Flash	Sending/Receiving data packets
	100Mbps	On (LNK is on)	100Mbps
		Off (LNK is on)	10Mbps
LOOP/RING	FXS	On	Off hook
		Off	On hook
		Flash	Ringing out
	FXO	On	Line is active
		Off	Line is inactive
		Flash	Ringing in
Device	Alarm	The red light “On” indicates that the configured phone number does not match the phone number of the connected phone line.	
	Power	“On” indicates that the power supply is working normally.	
	CPU/ACT	“On” indicates that the CPU is working normally.	
	Time SRVR	“On” indicates that IPC is able to access the network’s Time Server.	
	Forward	“On” indicates that Call Forwarding is enabled.	
	A. Answer	“On” indicates that Auto Answer is enabled.	

4.4 Connectors

Ports	Label	Description
Voice Ports	FXS	Connects to a telephone set or fax machine
	FXO	Connects to the phone line
Ethernet Ports	LAN/Internet	RJ-45 connector MDI-X connects to a Modem
	PC	RJ-45 connector MDI connects to a PC
Console Port	Console	RJ-45 connector

5. Information required before Installation

You need to prepare the following information before installing the IPC unit.

5.1 The IPC unit's IP Address

The IPC unit requires an IP address for operation. Before installation you need to know how to obtain an IP address from your local ISP. Static IP, DHCP or PPPoE can be used. The following table helps you to decide what information you need. If your ISP offers static IP, you may need to obtain an IP from MIS personnel in order to prevent an IP conflict. Otherwise DHCP (most cable broadband providers offer this) and PPPoE (most ADSL broadband providers offer this) will work fine.

IP Environment		Requiring information
Static IP	Public IP Address	*IP Address* *Subnet Mask* *Default Gateway* It is strongly suggested that you obtain an IP address from MIS personnel in order to prevent an IP conflict.
	Private IP Address	*IP Address* *Subnet Mask* *Default Gateway* It is strongly suggested that you obtain an IP address from MIS personnel in order to prevent IP conflicts. Your private IP requires an IP Sharing device and you must configure the IP Sharing device to treat the IPC unit and the IP that it is using as a virtual server.
Dynamic IP address (DHCP)		DHCP mode
PPPoE		*Account Number* *Password* This information is normally provided by your ISP. If you don't have this information please contact your ISP.

5.1.1 The IPC Unit's phone number

A traditional phone number is required. You can use an existing phone line at home or an extension line at your office. The IPC unit must be configured with the phone number, and area code that your phone line belongs to, such as 2 for Taipei, 7 for Kaohsiung, 21 for Shanghai and 10 for Peking.

The IPC unit can also be connected to a PBX extension line. In this case you need to know the Trunk Access Code of the PBX which is normally assigned "9" or "0" by most companies.

5.1.2 SIP Information

Before configuring SIP, the IPC unit requires SIP information for operation. The following table helps you to decide what information you need.

Items	Description
1. SIP Proxy	The proxy server is an intermediate device that receives SIP requests from a client and then forwards the requests on the client's behalf. If you don't know which SIP proxy for setting, contact your distributor.
2. Public Address (SIP Phone number) Example: sip@iptel.org	The public address is like phone number, you can get SIP phone number from SIP proxy or contact your distributor.
3. Outbound Authentication	The authentication information is for SIP proxy server or other SIP phone requested.
5. SIP Phone Book	Using index and SIP phone number mapping, you can use a standard phone to make SIP calls.

5.1.3 Setting a password for Web based Management

You will need to prepare a password for Web based Management. It can be a digit and/or letter combination ranging from 1 to 6 digits (E.g. 123). You will need this password to access the web management interface (Browser Based). If you don't set this password, you will not have access to the web management interface.

6. Installation and Configuration

After preparing the information you need as specified in section 5, follow the following steps to install the IPC Unit. Connect the phone or system console to perform basic configurations

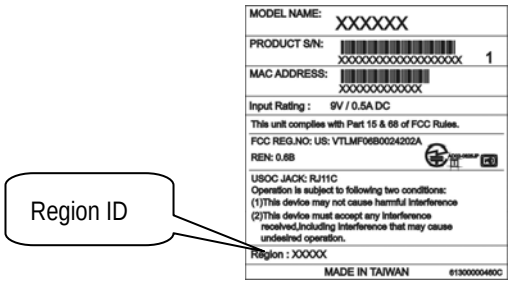
With the IPC unit, you can use either a telephone or a system console to perform basic configurations such as setting the region ID.

Before you connect the RJ-45 connector to the console port, you have to configure your VT100 terminal to match the settings of the IPC unit's console port. The console port's terminal connection is set to 9600 baud, 8 data bits, 1 stop bit and no parity. Turn on the IPC unit's power and wait for the terminal to display "Press Enter…" follow the directions to begin.

6.1 Step 1：Confirming the Region ID

Skip this step if you are installing your IPC unit in the default region. The default Region ID is printed on the label located outside the box. If you are installing your IPC unit at any region other then the region ID specified on the label, you will then need to configure the IPC to the correct Region ID. The Region ID is coded as follows:

ID NO.	Country	ID NO.	Country	ID NO.	Country	ID NO.	Country
01	Argentina	02	Australia	03	Philippines	04	Portugal
05	Brazil	06	Canada	07	China	08	Russia
09	Sweden	10	Vietnam	12	France	13	Germany
15	Hong Kong	18	India	22	Italy	23	Japan
24	Korea	26	Malaysia	27	Mexico	28	Netherlands
29	New Zealand	36	Singapore	38	Slovenia	39	South Africa
40	Spain	42	Switzerland	43	Taiwan	44	Thailand
46	British	47	USA	60	Iran	61	Dubai



Phone Setting

1. Connect the power.
2. Connect the phone cable to the “Phone” socket on the rear panel as pictured above.
3. When the CPU/ACT LED is on, pick up the handset and listen for the dialing tone.
4. Dial “##0000” and listen for 3 short beep.
5. Dial “9507#” ；Assuming you are modifying for China (The last 2 digits are the regional ID)
6. Dial “971#” ；Sets the new regional ID.
7. Hang up the phone. The device will be updated with the new region setting after it restarts (restart time is about 10 seconds)

System console settings

IPC>enable

IPC #configure

Enter configuration commands, one per line. End with CNTL/Z

IPC (config)# regional_id *07*

IPC (config)#exit

IPC #delete nvram

This command resets the system with factory defaults.

All system parameters will revert to their default factory settings. All static

and dynamic addresses will be removed.

Reset system with factory defaults, [Y]es or [N]o? Yes

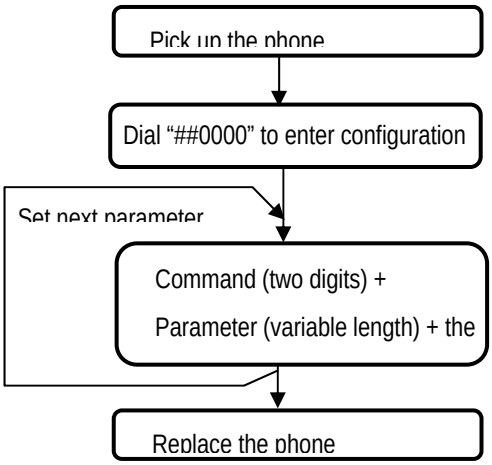
6.2 Step 2：Parameter Settings

We recommend using a traditional phone to configure the unit’s parameters, as this is the easiest way. The following two sections contain the procedures used to configure the IPC unit according to how you obtain your IP address (Static IP; DHCP or PPPoE).

Since a lot of the configuration procedures in the following sections are using a standard telephone set to modify the settings. Configuring the IPC unit via the phone set will be described first.

Using a Traditional Telephone to Configure the IPC unit

Follow the steps specified on the following figure.



Every time you set a parameter item and press the "#" key to complete it, a successful setting will be confirmed by three equal tones in succession. If your setting is unsuccessful you will be prompted with one long tone.

The Command length is two-digits long. For example, "configure area code" would be "01", "configure phone number" would be "02" and "restart" would be "98" etc. For details please refer to section 11.5 Appendix E: Phone-Set Command Codes and Parameters.

6.2.1 Static IP and DHCP Mode

If your network environment is using a static IP, you need to prepare the information as specified in section 0. Information required before Installation.

The following table shows an example.

Area Code	2 (Taipei)
Phone Number	82261111
IP Address	210.67.96.121
Subnet Mask	255.255.255.248
Default Gateway	210.67.96.120
Web Management Password	123

Using the information contained in the example above. The procedure is as follows:

1. Connect the IPC unit to a suitable Power source.
2. Connect a traditional phone set to the "FXS" connector located on the rear panel.
3. When the CPU/ACT light is on, pick up the phone to hear the dialing tone.
4. ##0000 ; you should hear three short tones.
5. 012#" ; the number "2" digit represents the Taipei area code.
6. 0282261111# ; Phone Number
7. 030# ; the digit "0" is used to enable "manual" IP mode.
8. 04210*67*96*121# ; IP address.
9. 05255*255*255*248# ; Subnet Mask.
10. 06210*67*96*120# ; Default Gateway.
11. 88123# ; "123" is the web management password.
12. 981# ; restarts the IPC
13. Hang up the phone. The system should now restart.

If your network is using DHCP, you should skip steps 8, 9, 10 and jump to step 11, while modifying step 7 to "031#".

You can also use console to configure IP address. But phone number can't be configured by console.

IPC>enable

IPC #configure

Enter configuration commands, one per line. End with CNTL/Z

IPC (config)#ip state user

IPC (config)#ip address *210.67.96.121 255.255.255.248*

System need to restart

IPC (config)#ip default-gateway *210.67.96.120*

IPC (config)#exit

IPC #restart

This command resets the system. System will restart operation code agent.

Reset system, [Y]es or [N]o? Yes

6.2.2 PPPoE

If your network environment is using PPPoE, you need to prepare the information as specified in section 0.

Information required before Installation.

The following table shows an example.

Area Code	2 (Taipei)
Phone Number	82261111
PPPoE Account	85432102@hinet.net
PPPoE Password	234iol26
Web management password	123

There are three ways to configure user name and password of PPPoE

1. Use phone set to configure user name and password of PPPoE:

You can configure the user name and password by using phone set. The command 36 is used for username, and 37 is for password of PPPoE. Since the user name and password use characters and telephone can input digits, you need a mapping between characters and digits. You can find them at **錯誤! 找不到參照來源。 錯誤! 找不到參照來源。**
Example user name：83721@hinet.net，Password：123ab，The procedure is below

1. Connect the phone to IPC.
2. When CPU/ACT is light, pick up the phone and press
3. ＃＃0000 ；You will hear 3 short tones.
4. 36383337323140484 94*44554*4*44554# ；Set user name：83721@hinet.net
5. 373132334142# ；Set password is 123ab
6. 981# ；Save and restart.

2. Use Console to configure user name and password of PPPoE:

IPC >enable

IPC #configure

Enter configuration commands, one per line. End with CNTL/Z

IPC (config)#**pppoe username** 85432102@hinet.net

IPC (config)#**pppoe password** 234iol26

IPC (config)#exit

IPC #**restart**

This command resets the system. System will restart operation code agent.

Reset system, [Y]es or [N]o? Yes

3. Use WEB Interface to configure user name and password of PPPoE:

You can configure the user name and password by using WEB interface. Follow the steps to finish configuration.

Step 1: Using a traditional phone set to configure the web management password and phone number

You will need to use a web browser to perform the PPPoE settings through the IPC unit's web based management interface. To enter the web based management interface you must have previously configured a password. Follow the next procedure to setup your password and phone number.

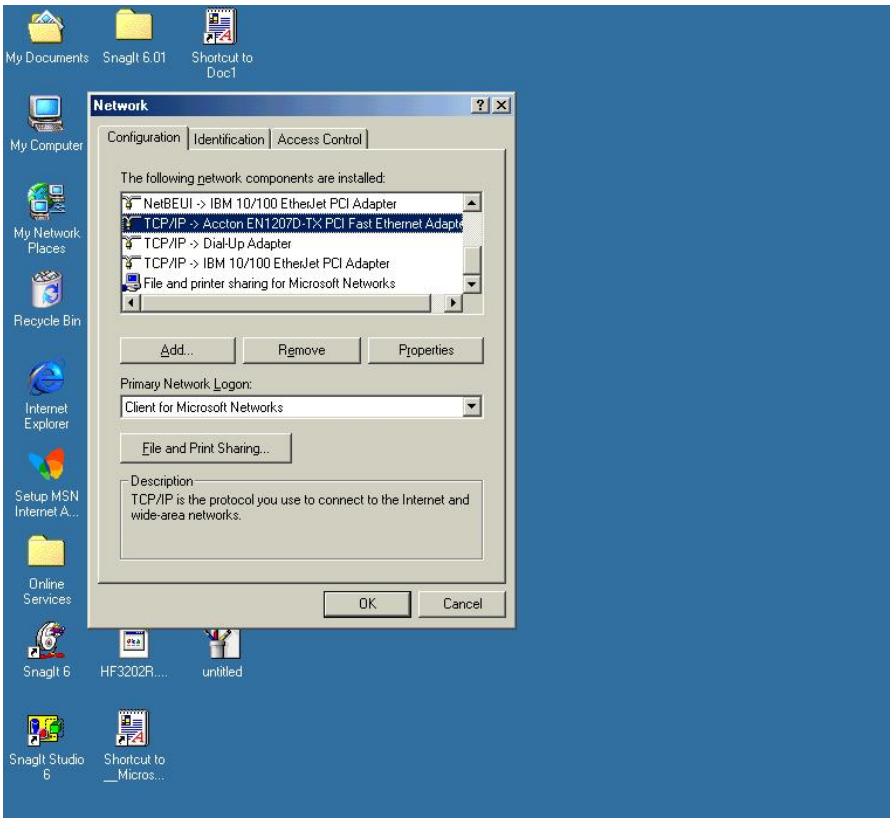
1. Connect the IPC unit to a suitable Power source.
2. Connect a traditional phone set to the "Phone/FAX" connector located on the rear panel.
3. When the CPU/ACT light is on, pick up the phone. You should hear the dialing tone.
4. ##0000 ; you should hear three short tones.
5. 012# ; the number "2" digit represents the Taipei area code.
6. 0282261111# ; Phone Number
7. 88123 ; "123" is the web management password.
8. 030# ; "0" is to enable "manual" IP mode.
9. 04192*168*0*2# ; IP address.
10. 05255*255*255*0# ; Subnet Mask .
11. 981# ; Used to restart the IPC unit.
12. Hang up the phone to complete the configuration.

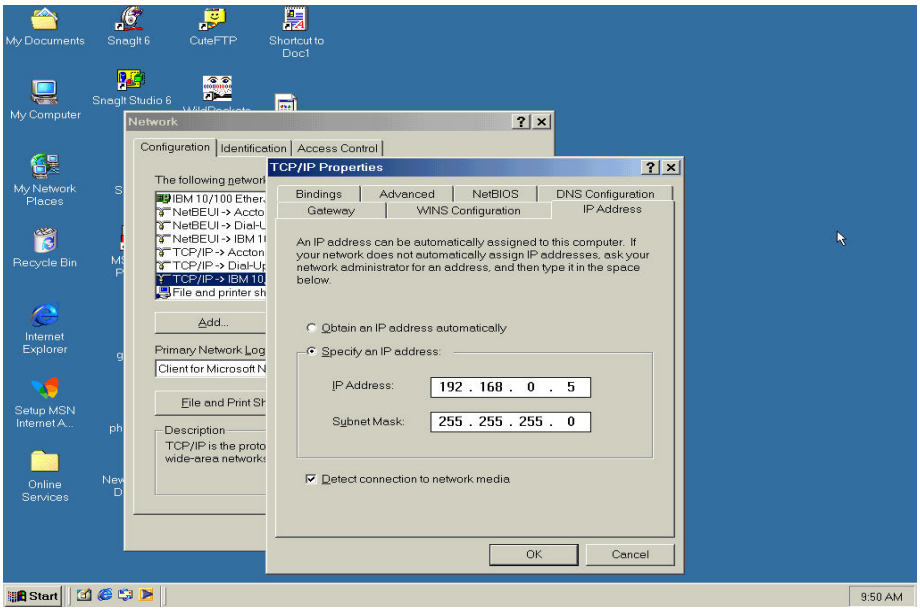
Items 8, 9, 10 can be omitted if this is the first time to configure it.

Step 2：Configure IP address of PC

Use the provided Ethernet cable to connect your PC to the port labeled "PC", located on the rear panel of the IPC unit.

Because the IPC unit's default IP setting is 192.168.0.2, you must configure your PC to the same subnet. 192.168.0.x for example. The following example uses 192.168.0.5 for the IP address and 255.255.255.0 for the subnet mask.

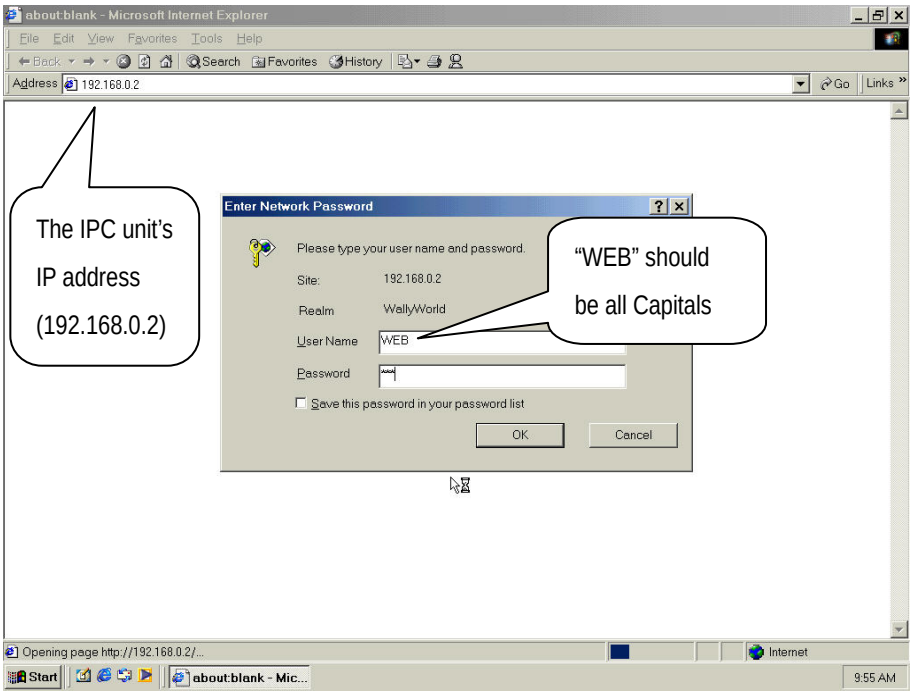




After you have completed the PC's IP address setting, you will be required to restart the PC in order for the new settings to take affect.

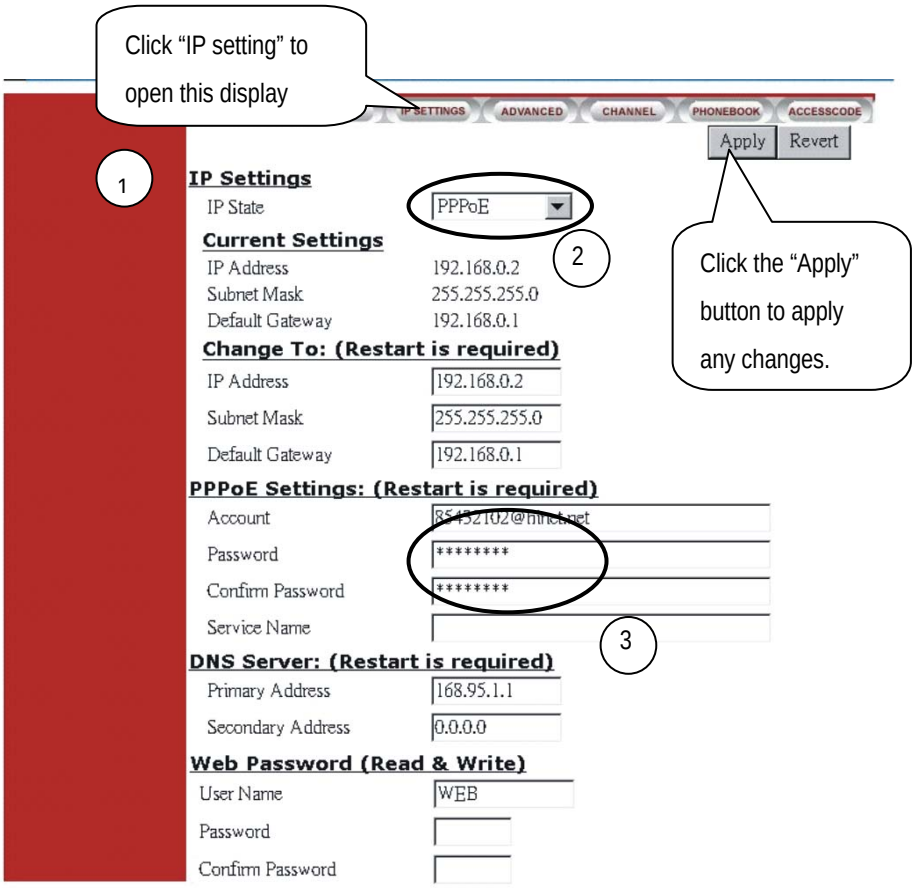
Step 3: Using the browser to configure the PPPoE Parameters of the IPC unit

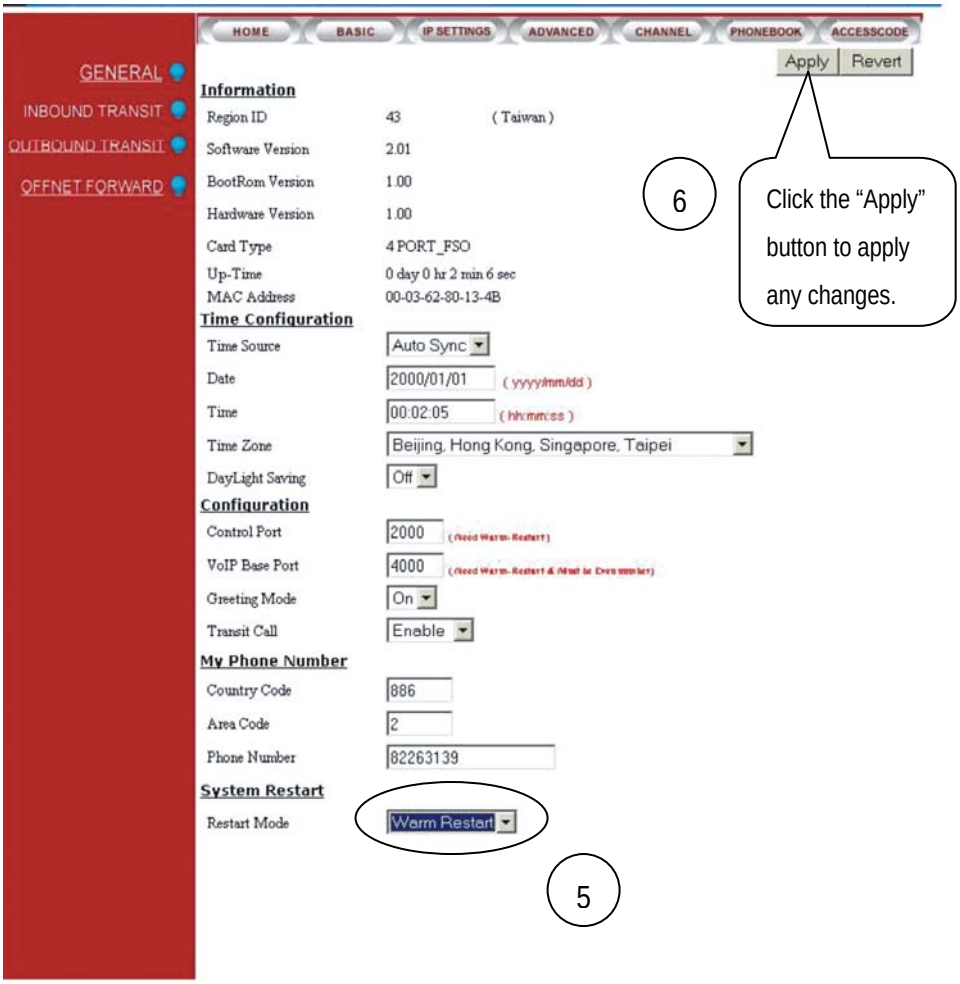
On the PC that is connected to the IPC unit, enter the IPC unit's IP address (Default 192.168.0.2) and press enter. The IPC will then prompt you with a dialogue box requesting that you enter a password. Use "WEB" (all capitals), for the User field and "123" for the password field that you have previously configured. Click the OK button; you should now have access to the IPC unit's web based management interface page.



Upon entering the web based configuration interface.

1. Click on "IP SETTING" at the top of the page and you will see the page as shown in the following image.
2. Select PPPoE from the "IP State" pull down menu.
3. Fill in the "Account", "Password", and "Confirm Password" under the PPPoE Settings. You can obtain this information from your ISP.
4. Click on the Apply button.
5. Click the "BASIC" button at the top to go to the BASIC page. Select "Warm Start" to restart the system. You can also perform a warm start using the phone by picking up the handset and dialing "##0000" then "981#".
6. After restarting, the IPC unit will use PPPoE to obtain it's IP address.


Click “IP setting” to open this display
IP SETTINGS
ADVANCED
CHANNEL
PHONEBOOK
ACCESSCODE
Apply
Revert
1
IP Settings
IP State
PPPoE
2
Current Settings
IP Address 192.168.0.2
Subnet Mask 255.255.255.0
Default Gateway 192.168.0.1
Change To: (Restart is required)
IP Address 192.168.0.2
Subnet Mask 255.255.255.0
Default Gateway 192.168.0.1
PPPoE Settings: (Restart is required)
Account
Password ********
Confirm Password ********
Service Name
3
DNS Server: (Restart is required)
Primary Address 168.95.1.1
Secondary Address 0.0.0.0
Web Password (Read & Write)
User Name WEB
Password
Confirm Password
Click the “Apply” button to apply any changes.



At this stage, your IPC should be able to use PPPoE to access the Internet. However, if you configured a wrong account number or password, your IPC can not access the Internet. You are not able to use PC to access IPC by using the IP address of 192.168.0.2 because IPC has been set in PPPoE mode. You have to use phone set to configure IPC back to fix IP mode (##0000 030#) and use PC browser to configure correct parameters.

6.2.3 Notice for Cable ISP users

Most Cable ISP's usually offer DHCP to their customers, allowing only one user at a time to access the Internet. Because of this, Cable ISP's usually request that their customers register their equipment's MAC addresses. Only the equipment using a registered MAC address is allowed to access the Internet. If you are applying for an additional account that is designated to be used by the IPC unit alone, you will only need to register the MAC address used by the IPC unit with your Cable ISP. Because cable ISP's don't normally allow more then one MAC address to access the internet from one particular account, it is essential that you use an IP sharing device to connect the local area network (that your PC and IPC unit are members of) to your ISP.

If you will be using an existing account that has already had your PCs MAC address registered to it, you will need to use an IP Sharing device to connect to your Cable ISP and then have your PC and the IPC unit connect to the LAN side of the IP Sharing device. In the meantime call ISP to change the registered MAC address from your PC MAC address to the IP Sharing device's MAC address. Because you

will be using an IP Sharing device, you will need to set the IP Sharing device to treat the IPC unit's UDP port 2000 as a Virtual Server.

Step 4：Inspection

After connecting the IPC unit to your network, we strongly suggest that you follow these procedures to check if the IPC unit is working properly.

Step 1：Check the LED of Time SRVR on front panel

If the Time SRVR LED located on the front panel is on within 5 minutes of initial use, proceed to step 2. Otherwise perform the following procedures.

Check if the ADSL Modem is working. (Does the PC have access other webside successful?).

Check that your Ethernet connection is operating. The LNK/ACT LED should be on if the Ethernet link is functioning; otherwise you may need to check your Ethernet cable connections.

Use your web browser to access the IPC's web based interface and check if the phone number, IP address, PPPoE account number and password are correctly configured.

Does your network utilize a Firewall? If so, you should open the ports that the IPC unit is using. Please refer to section 10.2 Firewall for details.

Step 2：Dial your IPC unit distributors' customer service number

PPlease get the phone number and IP address of distributors' IPC, and save them into the static phone book. Please refers to the page 65 (section 11.3 Appendix C: Editing the Phone Book) for the detail. After the LED of Time SRVR comes on, it indicates that the IPC unit is able to access the Internet. Try to dial the distributor's IPC number. After one of customer service personnel answers the call, check to see if you are able to talk with them

If you are able to communicate with customer service personnel properly, proceed to step 3.

Most failures involve single way communications. In other words you can hear the call recipient's but the recipient can't hear you. This happens when your IP Sharing device is used but has not been configured to treat the IPC unit as a Virtual Server.

If the Virtual Server has been configured properly on the IP Sharing device, check it the IP (obtained via PPPoE by the sharing device) is a private IP. The IPC unit works fine using a private IP on the LAN side of the IP Sharing device. However it will not work if the IP Sharing device's WAN side is using a private IP address. Check the WAN side IP address to see if it is part of the following IP range. If it is, it is a private IP address.

Private IP address range:

10.0.0.0 – 10.255.255.255

172.16.0.0 – 172.31.255.255

192.168.0.0 – 192.168.255.255

If the phone's audio level is too loud, perform the following steps to decrease the volume to a more comfortable level.

1. Pick-up the phone and dial：
2. ##0000 ; enter phone configuration mode
3. 922# ; decrease volume by 2dB

Or 9222# ; decrease volume by 4dB

Or 92222# ; decrease volume by 6dB

4. Hang-up the phone and redial to test

Step 3：Dialing the IPC unit from a tradition phone line or mobile phone

Place a call from a tradition phone line or mobile phone to the IPC unit; go through the following check list. The column titled "solutions" suggest ways to solve the problem.

Check Items	Solutions
Make sure the phone set connected to the IPC unit rings.	If the telephone does not ring and the "LINE" LED located at the rear panel does not flash, please check that the phone line is connected to the "Line" port.
The audio volume is too high and the quality is poor	Perform the following: ##0000 ;Enter Setting Mode 912# ; decrease volume by 2dB Or 9122# ; decrease volume by 3dB Or 91222# ; decrease volume by 4dB Hang up the phone and then redial.
Under conversion mode, press the digits "1234567" on the phone located at the calling side and see if the phone connected to the IPC unit is able to hear the DTMF sounds.	If you can't hear the tone, it means that DTMF has been filtered by the central office switches. IP learning and Inbound Transit functions will not function. Please contact your local telephone company's service department.

Step 4：Using the IPC unit's phone to place a regular call to a remote IPC unit

Use the IPC unit's phone to place a regular phone call to a remote IPC (no*or # digits) unit. If you are not able to reach the remote IPC unit, please check if the phone line connected to the IPC unit is limited and not able to place long distance calls. The called party's line may also be busy. Try again later.

Step 5：Check that the Manual IP Learning function works

Use the IPC unit's phone to place a regular phone call to a remote IPC unit. Ask the recipient to press the "#" key twice to enter manual IP Learning mode. If the IP Learning function is unsuccessful, you will hear one long tone. You may want to try adjusting the IP Learning sensitivity as followed.

Hang up, and then pick up the phone
Dial "##0000"
Dial "911#" ; to increase volume by 2db.
Dial "9111#" ; to increase volume by 3db.
Dial "91111#" ; to increase volume by 4db.

Hang up the phone and then try to perform the IP Learning function again. If the IP Learning function is successful, you will hear three short tones.

Step 6：Using the IPC unit's phone to place an IP call to a remote IPC unit
(Dial: #phone number of called party#)

At this point, you should be able to place IP calls. Place an IP phone call to the IPC unit that has completed the IP learning as shown on step 5, it should work fine. However, if it does not work, and you hear a busy tone instead, count out how long the busy tone lasts. If the busy tone lasts about 4 seconds, this indicates that there may be network problems. If the busy tone ends soon after it starts, this indicates that the recipient is busy. Try again later.

7. Placing IP calls

Besides the IPC unit's ability to place IP calls, it also does well at maintaining the same method you use to place regular calls. The following table demonstrates how to place both regular and IP based calls.

Dialing Method	Description
Placing traditional Phone Calls	
Phone number	Place traditional phone calls as usual
On-net calls (between two IPC units) and Outbound Transit Calls	
"#" + phone number + "#"	Placing calls through an IP
"#" + phone number + "*"	Sending a fax through an IP
Inbound Transit Calls – Placing a local call from a traditional phone to a local IPC unit ,then transferring your call to another IPC unit	
"#" +Inbound Transit password + "#" + phone number + "#"	Using a traditional phone while out to call a remote IPC unit via your local IPC unit.
"#" + Inbound Transit password + "#" + phone number + "*"	Using a traditional FAX machine while out to send a FAX to a remote IPC unit via your local IPC unit.

The leading "#" key represents an IP phone call or an IP fax call. All calls end with the "#" key. This represents a voice call while the "*" key represents a fax call.

Phone Book and IP Learning

The most remarkable feature of the IPC unit is that it turns your traditional phone into an IP enabled phone. When you make traditional phone calls, dial as usual. When making IP calls, dial as you usually do when placing a regular call. The only difference is that for IP based calls, you must dial a leading "*" or "#" digit before dialing your phone number, end with the "*" or "#" keys. When you make IP based calls, besides the "*" or "#" keys, you are simply dialing the same telephone number.

This is because the IPC unit comes with a dynamic phone book built in, keeping a record of all phone numbers and their IP mapping. When a user initiates an IP based call, the IPC unit will search the phone book and obtain the phone number's IP. If it is the first time you are using a particular number to place an IP based call, you must perform the IP Learning function manually. The IP Learning function will get the phone number/IP mapping of the IPC unit that's connected to the phone line, the mapping will then be stored in the built in phone book. *The stored phone number/IP information will be saved on flash memory every hour*.

Perform the following steps to complete the IP Learning:

1. Use the phone connected to the IPC unit to dial the IPC unit's number that you are learning (without the "#" key). For example:

002862164451234

2. When the recipient answers the phone, ask him/her to press the "#" key twice. The learning process will then begin and both parties should hear the learning tone (one short tone every two seconds).
3. About 15 seconds later, you should hear three tones in succession to confirm a successful learning. Otherwise you will hear a long tone that indicates it has failed.
4. Hang up the phone

The automatic IP learning function uses the phone that's connected to the IPC unit and dials "*" + the IPC unit's number that is being learnt + "#". If the local IPC unit can't find the recipient IPC unit's IP, it will start the learning process automatically. For details please refer to section 11.2 Appendix B: Automatic IP Learning.

For inbound and outbound transit calls, the IP Learning process between the two IPC units must be completed before you can make calls. When you begin using the IPC unit, you must initiate the IP learning process. When that is complete, your phone number as well as your friend's phone number will exist in the phone IPC unit's (built in) address book. In this case the IPC unit will not start the IP learning automatically. You will hear a busy tone if the phone number of the remote IPC unit does not exist in your IPC unit's (built in) phone book.

7.1 When the IP information stored in the dynamic phone book is no longer correct

After you have completed the IP learning process with the recipient's IPC unit, in some rare occasions you might find that the learned IP information is not correct. This usually happens when the recipient's IPC unit has changed its IP address and has failed to notify your IPC unit. The most common occurrence where the recipient IPC is unable to notify your IPC unit of its IP address change is when the recipient IPC unit is in the process of sending an IP change notification to your IPC unit and your IPC unit was unable to receive it. Your IPC unit may have been powered off or temporarily unable to access the Internet. If this happens, when you place an IP call using "#" +phone number + "#", you will always hear a busy tone. You will then need to reinitiate the learn IP address process manually.

7.2 Voice Calls

7.2.1 Making traditional phone calls (through your local PSTN)

Application: Making traditional phone calls. While the IPC unit is connected between the phone line and the phone set, you can still use the phone to make traditional phone calls.

Dialing using a traditional phone number.

Example: 82263368, 0921856888, 073936022, 00214087213333.

7.2.2 Making On-net IP calls between IPC units

Application: Making IP phone calls between two IPC units.

Dialing Method: "#" + telephone number of the recipient IPC unit+ "#"

If this is the first time you are calling this number, you have to learn the recipient number's IP manually before placing the IP call. For details

please refer to section 11.1 Appendix A: Manual IP Learning Procedure.

Example: #82263368#, #073936022#, #00214087213333#

7.2.3 Outbound transit calls (Placing calls from the IPC unit to a traditional phone line via another IPC unit)

Application: Placing calls from a IPC unit to a traditional phone line via another IPC unit. The dialed phone number must have the same area code as the IPC unit you are calling. Since the called IPC unit places the (local) call to the called number via a traditional phone line, it will be billed for the cost of a local call.

Dialing Method: "#" + phone number of called party + "#"

Configuration:

1. IP Learning must previously be completed between both IPC units.
2. Your IPC unit must also have previously obtained permission from the other IPC unit that it is attempting to dial through. This means that the other IPC unit must configure your telephone number (including your country and area code) and MAC address into its permissions table.

Using the phone set to configure the permissions table

If you wanted to permit the 886-2-82263368 IPC unit to place outbound transit calls through your IPC unit, you will need to get its MAC address. The MAC address is found on the label on the bottom of the chassis. Only the last six digits of the MAC address are needed (e.g. 80-05-E0). MAC addresses with characters ranging from A to F should be entered as: A - *1, B - *2, C - *3, D - *4, E - *5, F - *6)

	Pick up the phone and dial	Description
1.	##0000	To enter the configured Mode
2.	26 8005*50 886282263368#	To enter the MAC address and phone number: MAC: 80-05-E0 Phone number: 886-2-82263368

Use the phone set to delete a permission table entry

The following example shows how to remove a IPC unit's MAC entry from the permissions table. You only have to specify the IPC unit's MAC address that you want to delete from the permissions table. The MAC address with characters ranging from A to F should be entered as: A - *1, B - *2, C - *3, D - *4, E - *5, F - *6)

	Pickup the phone and dial	Description
1.	##0000	To enter the configured mode
2.	27 8005*50#	To enter MAC Address

		MAC: 80-05-E0

The transit function is only for local calls only. You can not transit long distance and/or international calls.

7.2.4 Inbound Transit Calls

Application: While out, you can place phone calls from traditional phones to local IPC units at home. The IPC unit at home will answer the call (requires that auto-answer be enabled) with a greeting. You then dial '#' + Inbound Transit password + '#' + called IPC number + '#'. If the password you entered is correct, your call will be connected through the IP network

Configuration：

(1) IP Learning must be previously completed between both IPC units.

(2) You must configure your password

Follow this procedure to use your phone to configure your unit's Inbound Transit password

1) Pick up the handset listen for the dialing tone

2) Dial "##0000" (after which you will hear 3 short tones)

3) Dial "23" + "Inbound Transit password" + "#" (the password limited to 1 to 8 digits)

This example demonstrates configuring "123" as the Inbound Transit password.

	Pickup the phone and dial	Description
1.	##0000	To enter the configured mode
2.	23123#	Enter "123" as the Inbound Transit password
3	Hang up the phone	

The auto-answer feature of the IPC unit at home must be enabled

(The factory default value is "Disabled")

Procedure for using the phone to enable the auto-answer function：

1) Pick up the handset and listen for the dialing tone.

2) Dial "##0000" (after which you will hear 3 short tones)

3) Dial ""131#"

4) Hang up your telephone.

(4) Be sure that the "Transit Call" function of the IPC unit at home is enabled. (The factory default value is "Enable")

Procedure for enabling Transit Calls:

1) Pick up the handset and listen for the dialing tone.

2) Dial "##0000" (after which you will hear 3 short tones)

3) Dial ""221#"

4) Hang up your telephone.

7.3 Sending Faxes over an IP network

7.3.1 Sending Faxes between IPC units over an IP network

Application: Sending free faxes over an IP network between IPC units.

How to dial: "#"+ the fax number you want to dial+ "*"

Example：#82263368*; #073936022*; #00214087213333*

7.3.2 Using Outbound Transit to send faxes

Application: Dialing: "#" + the fax number you want to send + "*"

Configuration：Please refer to 7.2.3 Outbound transit calls (Placing calls from the IPC unit to a traditional phone line via another IPC unit)

Dialing： '#' + the fax number that you want to send + '*'

Example：#073936022*；#00214087213333*

7.3.3 Using Inbound Transit to send faxes

Application: While out, you can still send a fax over an IP network using the IPC unit that is located at your home. Simply have your fax machine dial manually to the IPC unit located at your home. Your IPC will then answer and play a greeting message. You can then dial '#' + the Inbound Transit password + '#' + the recipient fax machine's number + '＊'. If the password is correct, the call will be connected (through the IP network) to the remote Fax machine. When the remote fax machine responds, press the "START" key on the fax machine to send your FAX.

Configurations:

Pease refer to section 7.2.4 Inbound Transit Calls for detail.

How to dial: '#' + 'the Inbound Transit password' + '#' + 'fax number' + '＊'

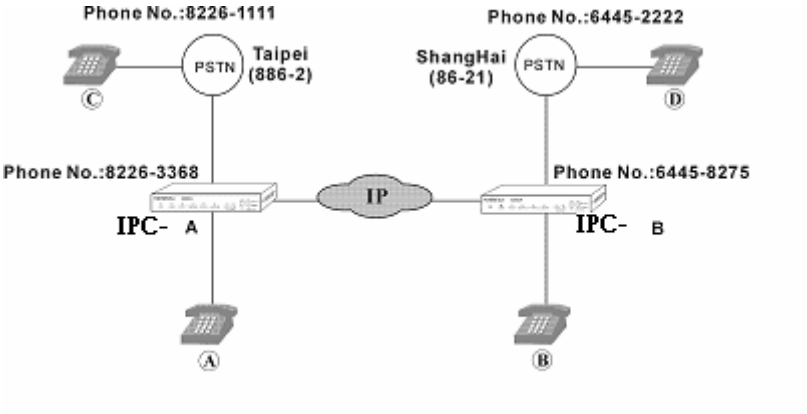
The following example assumes the password is "123"

Example：#123#82263368＊；#123#073936022＊；#123#00214087213333＊

7.4 Dialing Examples

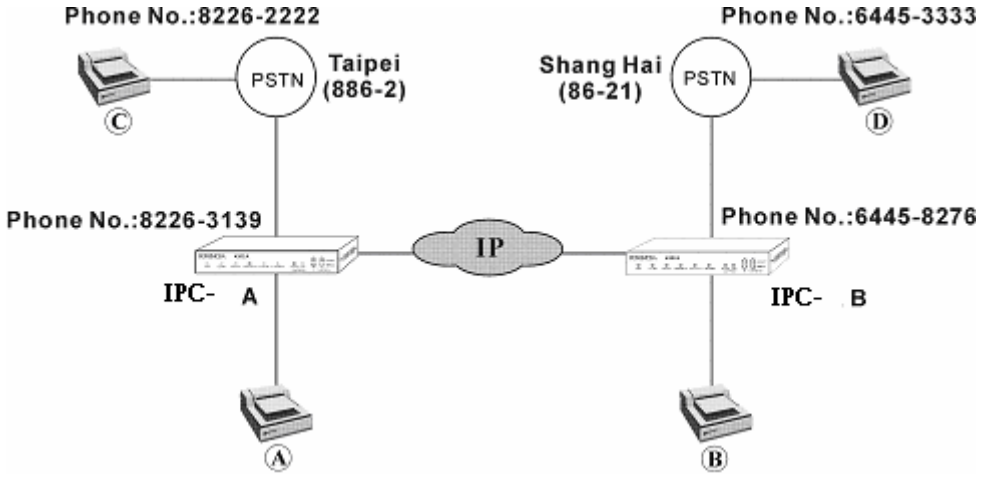
7.4.1 Voice Examples

The following example shows you how to make voice calls (including traditional and IP calls) between Taipei and Shanghai.


Phone No.:8226-1111
Phone No.:6445-2222
PSTN
Taipei
(886-2)
ShangHai
(86-21)
PSTN
C
D
Phone No.:8226-3368
Phone No.:6445-8275
IP
IPC- A
IPC- B
A
B

Caller	Receiver	How to dial
A The Taipei phone number is: 8226-3368	B. Shanghai 6445-8275	#002862164458275#
	C. Taipei 8226-1111	82261111
	D. Shanghai 6445-2222	#002862164452222#
B. The Shanghai phone number is: 6445-8275	A. Taipei 8226-3368	#00886282263368#
	C. Taipei 8226-1111	#00886282261111#
	D. Shanghai 6445-2222	64452222
C. The Taipei phone number is: 8226-1111	A. Taipei 8226-3368	82263368
	B. Shanghai 6445-8275	82263368 #123#002862164458275# (PIN Code：123)
	D. Shanghai 6445-2222	002862164452222 (Regular international phone call)
D. The Shanghai phone number is: 6445-2222	A. Taipei 8226-3368	64458275 #123#00886282263368# (PIN Code：123)
	B. Shanghai 6445-8275	64458275
	C. Taipei 8226-1111	00886282261111 (Regular international phone call)

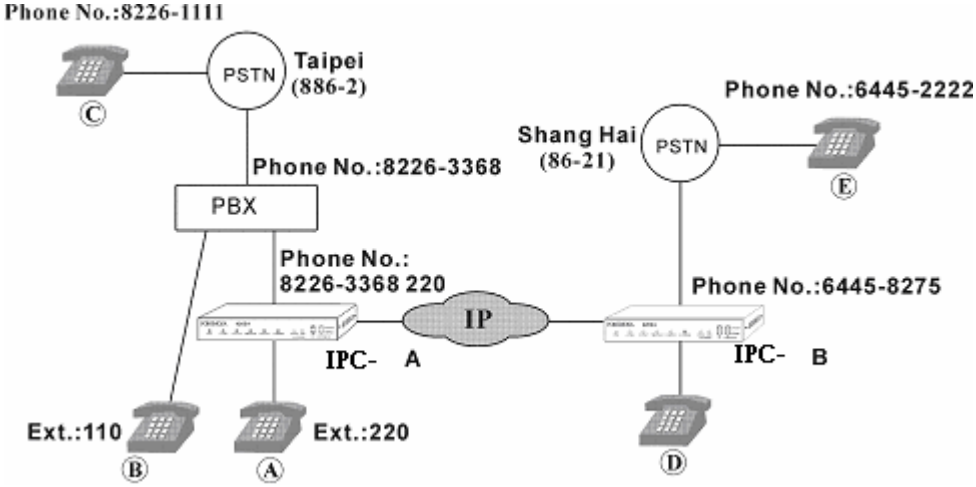
7.4.2 FAX sending examples



Caller	Receiver	Dialing Modes
A. The Taipei phone number is: 8226-3139	B. Shanghai 6445-8276	#002862164458276*
	C. Taipei 8226-2222	82262222
	D. Shanghai 6445-3333	#002862164453333*
B. The Shanghai phone number is: 6445-8276	A. Taipei 8226-3139	#00886282263139*
	C. Taipei 8226-2222	#00886282262222*
	D. Shanghai 6445-3333	64453333
C. The Taipei phone number is: 8226-2222	A. Taipei 8226-3139	82263139
	B. Shanghai 6445-8276	82263139(Wait for the greeting) #123#002862164458276* (PIN Code：123)
	D. Shanghai 6445-3333	002862164453333 (Regular international phone call)
D. The Shanghai phone number is: 6445-3333	A. Taipei 8226-3139	64458276(Wait for the greeting) #123#00886282263139* (PIN Code：123)
	B. Shanghai 6445-8276	64458276
	C. Taipei 8226-2222	00886282262222 (Regular international phone call)

7.5 Connecting the IPC unit to the PBX extension line

The IPC unit can also be connected to a PBX extension line as shown in the diagram below. However, the IPC unit does not support the digital line extension type. The IPC unit currently only supports the analog line extension type. The methods for dialing and using are similar to a standard connection. One of the differences is that the phone number that needs to be configured to the IPC unit should include the extension number. It is also necessary that the PBX access code used to get an external line (the digits to get an external line), should be configured also. As the following example shows, the PBX phone number is 82263368 and the extension number is 220. So IPC unit A should be configured to 82263368220.



7.5.1 Configuring the Phone Number

When connecting the IPC unit to a PBX extension line, the phone number must be configured according to the following:

The PBX line number + the extension number

As shown in the figure above, the PBX phone number is 82263368 and the extension number is 220, IPC unit A should then be configured to 82263368220.

7.5.2 Disabling Auto Answer

Because the IPC unit is connected to an extension line of the office PBX, it is recommended that you disable the automatic answering function (the factory default value is “Disable”). Please note that automatic IP Learning is not supported when the IPC unit is installed under the Office PBX. You must conduct the IP Learning process manually. Please refer to the procedure specified in 11.1 Appendix A: Manual IP Learning Procedure.

Procedures for disabling auto-answer using the phone set：

1. Pick up telephone
2. Dial “## 0000” to enter the settings mode
3. Dial “130#” to disable the auto-answering function (the factory default value is “Disable”)
4. Hang up your phone

7.5.3 PBX CO line access (trunk access code) configuration

When the IPC unit is connected to the extension line, you need to configure the PBX CO line access code with your IPC unit, so that it is able to acquire the external phone line of the PBX automatically. If the access code is not configured, Auto IP Learning and Outbound transit call functions won’t work.

You can configure the access code using the phone set. Follow the instructions below:

1. Pick up the telephone.
2. Dial “##0000” to enter the settings mode
3. Dial 19 9*#：Assuming the prefix code is ‘9’. The “*” key is used to set a 1 second pause）。
4. Hang up the phone

Length of called phone number on Outbound Transit Calls

If the IPC unit has been configured with the PBX CO line access code, the IPC unit will presume that a PBX is connected. For

outbound transit calls, it may get sent to another extension line or pass through the PBX to a normal phone line. If the Outbound Transit call is sent to another extension line, there is no need to include the PBX CO access code.

However, if the Outbound Transit calls are sent to a normal phone number, the IPC unit will need to dial the PBX CO access code before dialing the phone number. When the IPC unit receives an Outbound Transit Call request from another IPC unit, it will check the length of the called phone number (excluding the country and area code). If the length is 5 digits or more, the IPC unit will dial the previously configured PBX CO access code along with the called phone number. Otherwise the IPC unit will assume that it is an extension call. The PBX CO access code then has no effect. Please refer to the following example.

The PBX CO access code is set to "9*" on IPC unit A.

When IPC unit B dials an Outbound Transit Call via IPC unit A using #008862<u>82261111</u>#, IPC unit A will then dial the number "9", then 82261111 after a one second pause (Because the called numbers has 8 digits [82261111]).

When IPC B dials #008862<u>110</u>#, IPC A dials "110" without using the PBX CO access code, because the called numbers is only 3 digits long (110).

7.5.4 Calling Examples

Refer to the diagram at section 錯誤! 找不到參照來源。 錯誤! 找不到參照來源。. The following table will demonstrate how to dial. In the following example it is assumed that the Inbound Transit password is set to "123"

Calling side	Called side	Dialing
A. ext. 220	B. ext. 110	110
	C. Taipei 8226-1111	9,82261111
	D. Shanghai 6445-8275	#002862164458275#
	E. Shanghai 6445-2222	#002862164452222#
B. ext. 110	A. ext. 220	220
	C. Taipei 8226-1111	9, 82261111
	D. Shanghai 6445-8275	(Auto-answer must be enabled on IPC unit A) 220 (IPC unit A extension number) #123#002862164458275#
	E. Shanghai 6445-2222	9,00286216445-2222 (Regular international phone call)
C. Taipei 8226-1111	A. ext. 220	1. 82263368 (to PBX) 2. 220

	B. ext. 110	1. 82263368 (to PBX) 2. 110
C. Taipei 8226-1111	D. Shanghai 6445-8275	1. 82263368 (to PBX) 2. 220(dial ext. to IPC unit A) 3. #123#002862164458275#
	E. Shanghai 6445-2222	00286216445-2222 (Regular international phone call)
D. Shanghai 6445-8275	A. ext. 220	#00886282263368220#
	B. ext. 110	#008862110#
	C. Taipei 8226-1111	#00886282261111#
	E. Shanghai 6445-2222	64452222
E. Shanghai 6445-2222	A. ext. 220	1. 64458275 (goes to IPC unit B, auto-answer must be enabled) 2. #123#00886282263368220#
	B. ext. 110	1. 00886282263368 2. 110 (Regular international phone call)
	C. Taipei 8226-1111	00886282261111 (Regular international phone call)
	D. Shanghai 6445-8275	64458275

8. SIP (Session Initiation Protocol)

8.1 What is SIP

Session Initiation Protocol (SIP) is the Internet Engineering Task Force's (IETF's) standard for multimedia conferencing over IP. SIP is an ASCII-based, application-layer control protocol (defined in RFC 2543) that can be used to establish, maintain, and terminate calls between two or more end points. Like other VoIP protocols, SIP is designed to address the functions of signaling and session management within a packet telephony network. *Signaling* allows call information to be carried across network boundaries. *Session management* provides the ability to control the attributes of an end-to-end call.

SIP provides the following capabilities:

1. Determine the location of the target end point—Supports address resolution, name mapping, and call redirection.
2. Determine the media capabilities of the target end point—By using Session Description Protocol (SDP), SIP determines the highest level of common services between the end points. Conferences are established using only the media capabilities that can be supported by all end points.
3. Determine the availability of the target end point—If a call cannot be completed because the target end point is unavailable, SIP determines whether the called party is already on the phone or did not answer in the allotted number of rings. It then returns a message indicating why the target end point is unavailable.
4. Establish a session between the originating and target end point—If the call can be completed, SIP establishes a session between the end points. SIP also supports mid-call changes, such as the addition of another end point to the conference or the changing of a media characteristic or codec.
5. Handle the transfer and termination of calls—SIP supports the transfer of calls from one end point to another. During a call transfer, SIP simply establishes a session between the transferee and a new end point (specified by the transferring party) and terminates the session between the transferee and the transferring party. At the end of a call, SIP terminates the sessions between all parties.

8.1.1 Components of SIP

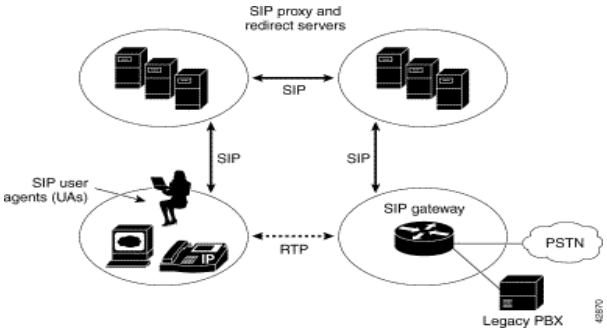
SIP is a peer-to-peer protocol. The peers in a session are called User Agents (UAs). A user agent can function in one of the following roles:

1. User agent client (UAC)—A client application that initiates the SIP request.
2. User agent server (UAS)—A server application that contacts the user when a SIP request is received and that returns a response on behalf of the user.

Typically, a SIP end point is capable of functioning as both a UAC and a UAS, but functions only as one or the other per transaction. Whether the endpoint functions as a UAC or a UAS depends on the UA that initiated the request.

From an architecture standpoint, the physical components of a SIP network can be grouped into two categories: clients and servers.

8.1.2 SIP Architecture



8.1.3 SIP Clients

SIP clients include the following:

1. Phones—Can act as either a UAS or UAC. Soft phones (PCs that have phone capabilities installed) and Cisco SIP IP phones can initiate SIP requests and respond to requests.
2. Gateways—Provide call control. Gateways provide much functionality. The most common one is a translation function between SIP conferencing endpoints and other terminal types. This function includes translation between transmission formats and between communications procedures. In addition, the gateway also translates between audio and video codec and performs call setup and clearing on both the LAN side and the switched-circuit network side.

8.1.4 SIP Servers

SIP servers include the following:

1. Proxy server—The proxy server is an intermediate device that receives SIP requests from a client and then forwards the requests on the client's behalf. Basically, proxy servers receive SIP messages and forward them to the next SIP server in the network. Proxy servers can provide functions such as authentication, authorization, network access control, routing, reliable request retransmission, and security.
2. Redirect server—provides the client with information about the next hop or hops that a message should take, then the client contacts the next hop server or UAS directly.
3. Registrar server—Processes requests from UACs for registration of their current location. Registrar servers are often co-located with a redirect or proxy server.

8.2 SIP Configuration

IPC can communicate with IP Phone or Soft Phone, which support SIP protocol. You can also make IP calls with other IPC Series Gateway.

8.2.1 SIP Basic Information

Register and Outbound Proxy

Before using SIP service, you must register to a proxy server and configure an outbound proxy server.

Channel Specific Registration

Each channel can be configured a SIP phone number, so before setting a SIP phone number, you must select a channel.

Public Address Setting and Contact Address

Public Address is like a phone number, and SIP standard is xxx@xxxxx. Get SIP phone numbers and configure at WEB page. Contact address is used when makes SIP calls without proxy.

Making a point-to-point SIP calls without proxy, the phone number is “contact address+ @ + IP address”. For example: 12@210.300.21.22. Following actions and configure the SIP parameters and please refer to section 0 SIP COMMON found WEB page.

1. Enter WEB page
2. Select ADVANCED \ SIP COMMON
3. Enter domain name or IP address in ‘Outbound Proxy Setting’ field and select ‘Enable’.
4. Enter domain name or IP address in ‘Registrar Setting’ field and select ‘Enable’.
5. Select a channel
6. Enter SIP phone number in ‘Public Address Setting’ field.
7. Enter contact address in “Contact Address Setting’ field.
8. Click ‘Apply’.

8.2.2 SIP Outbound Authentication

Configure outbound authentication if SIP proxy server or other SIP phone request for authentication. The information includes realm, username, port and password.

Following actions and configure the SIP parameters and please refer to section 0 found WEB page.

1. Enter WEB page
2. Select ADVANCED \ SIP OUTBOUND AUTHENTICATION
3. Enter authentication information including realm, username, port and password.
4. Click 'Apply'

8.2.3 SIP Inbound Authentication

Configure inbound authentication if you request authentication of other SIP phone.

Following actions and configure the SIP parameters and please refer to section 9.2.10 found the WEB page.

1. Enter WEB page
2. Select ADVANCED \ SIP INBOUND AUTHENTICATION
3. Enter domain or IP address in 'Realm' field.
4. Enter authentication information including username, port and password.
5. Click 'Apply'.

8.2.4 STUN

The STUN (Simple Traversal UDP through NAT (Network Address Translation)) server is an implementation of the STUN protocol that enables STUN functionality in SIP-based systems. The STUN server tar ball also includes a client API to enable STUN functionality in SIP endpoints.

STUN is an application-layer protocol that can determine the public IP and nature of a NAT device that sits between the STUN client and STUN server.

Please refer to section 9.2.11 found WEB page and parameters.

8.2.5 SIP Phone Book

Configuring SIP phone book is for using standard phone to make a SIP call easier. Another word is mapping table of index and SIP phone number. After configuring SIP phone book, you can pick up a phone and dial a number *# XXX# to make a SIP call.

Following actions and configure the SIP parameters and please refer to section 9.2.14PHONE BOOK \ SIP found WEB page.

1. Enter WEB page
2. Select PHONEBOOK \ SIP
3. Enter numbers in 'index' field.
4. Enter Name, Host and select via proxy or not.
5. Click 'Apply'.

8.3 Place SIP Calls

After you have configured the SIP phone on the SIP phone book, you can easily make SIP call as follow:

1. Pick up the phone
2. Dial " *# " + Index + ""#"

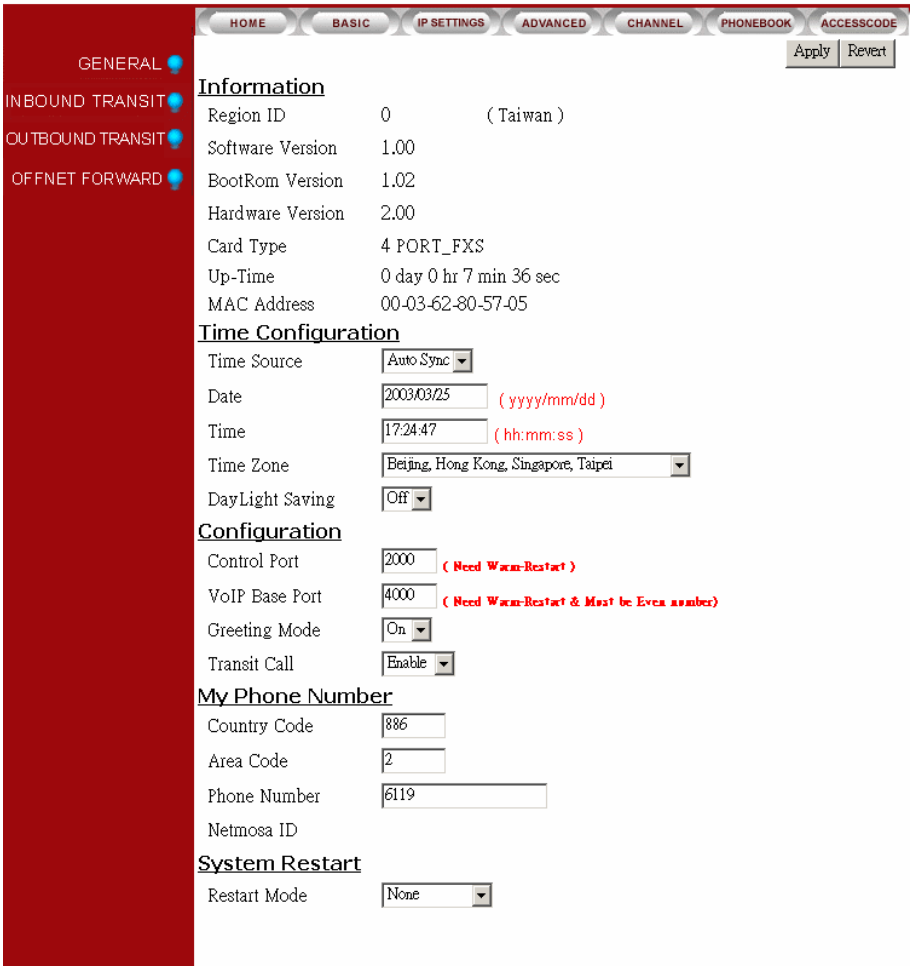
9. WEB MANAGEMENT INTERFACE

9.1 The Tree Architecture of Web Management

HOME	BASIC	GENERAL
		Inbound Transit
		Outbound Transit
		Off net Forward
	IP SETTING	
	ADVANCED	General
		Set Remote IPC
		SIP COMMON
		SIP OUTBOUND AUTHENTICATION
		SIP INBOUND ATHENTICATION
		STUN
	CHANNEL	
	PHONE BOOK	IPC
		SIP
	ACCESS CODE	

9.2 Parameters of Web Pages

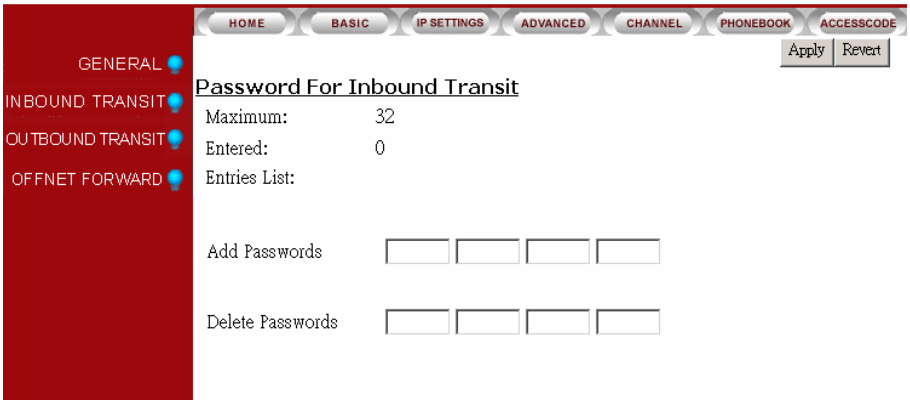
9.2.1 BASIC / GENERAL



Category	Section	Description	Default Setting
Information	Region ID	Display region ID.(Read only)	0
	Software Version	Display software version.(Read only)	
	BootRom Version	Display Boot Rom Version.(Read only)	
	Hardware Version	Display hardware Version.(Read only)	
	Card Type	Display IPC's card type. (Read only)	
	Up-Time	Display the use time since from system reboot.(Read only)	

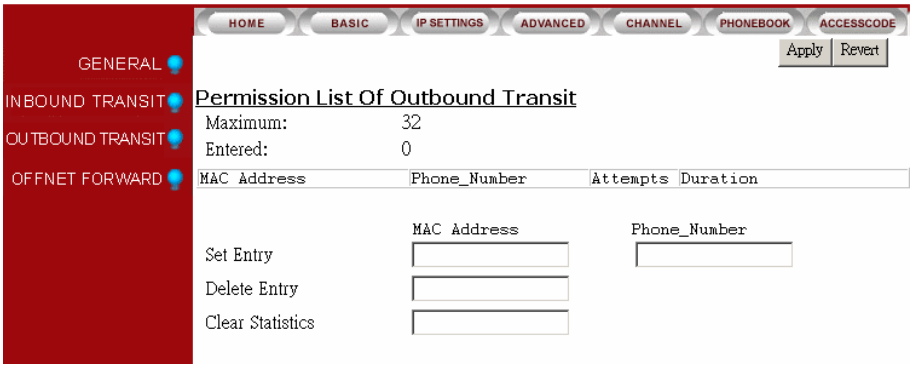
	MAC Address	Display MAC address.(Read only)	
Time Configuration	Time Source	Select system date and the way of synchronization. Auto Sync: Auto synchronize date and time. Manual: Manual adjust date and time.	Auto Sync
	Date	Manually Input date, only effected in Manual Mode. yyyy / mm / dd	
	Time	Manual input time, only effected in Manual Mode of Time Source. hh : mm : ss	
	Time Zone	Select local system time zone. Select correct Time Zone.	
	Daylight saving	ON: Enable daylight saving. OFF: Disable daylight saving.	OFF
Configuration	Control Port	UDP port to transfer signal packets. It can be setting in the range of 0 to 65535. (Must reboot system to apply changes)	2000
	VoIP Base Port	Base of UDP port to receive RTP packets. It can be setting in the range of 0 to 65534.(Must be Even, after setting this item, please reboot system to apply changes)	4000
	Greeting Mode	Play greeting when Auto Answering function is enabled. ON: Play greeting. OFF: Do not play greeting.	ON
	Transit Call	Enable: Enable Transit Cal. Disable: Disable Transit Call.	Enable
My Phone Number	Country Code	Country Code (such as US: 1, China: 86)	
	Area Code	Area Code (Shanghai: 21, Taipei: 2)	
	Phone Number	The phone number of IPC.	
System Restart	Restart Mode	None: Not to restart system. Cold restart: Cold restart. Warm restart: Warm restart.	None

9.2.2 BASIC / INBOUND TRANSIT



Category	Section	Description	Default Setting
Password For Inbound Transit	Maximum	Maximum number of entries allowed.	32
	Entered	Number of entries of password have been entered.(Read only)	0
	Entries List	The list of entries list.(Read only)	
	Add Passwords	Add passwords. Maximum four sets of password can be entered at the same time. Password must be digits at length of 1-8 digits.	
	Delete Passwords	Delete password. Maximum four sets of password can be deleted at the same time.	

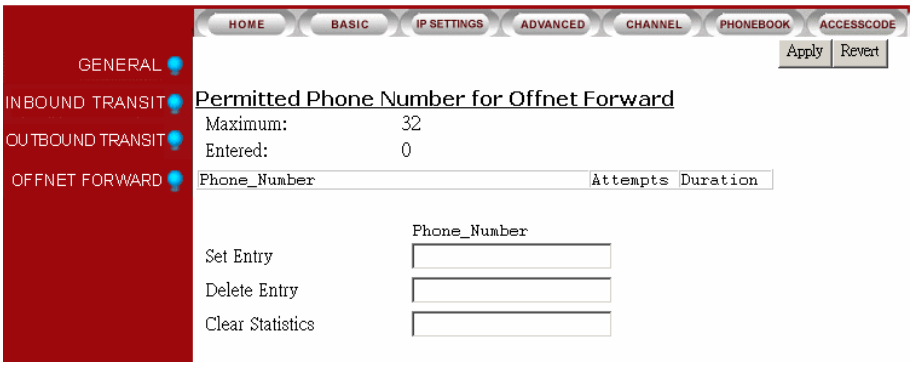
9.2.3 BASIC / OUTBOUND TRANSIT



Category	Section	Description	Default Setting
Permission List of Outbound Transit	Maximum	Maximum number of entries allowed	32

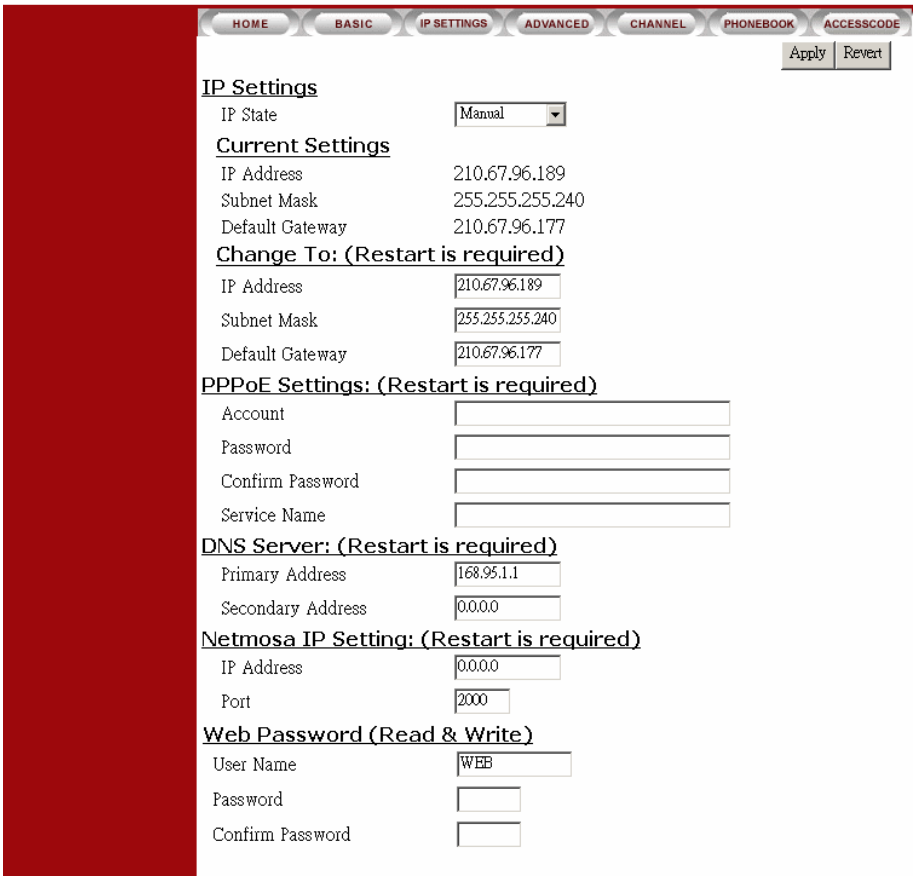
	Entered	Number of entries of phone number that have been entered.(Read only)	0
	Entries List	Display the detail of all Permission List of Outbound Transit.(Read only) 1. MAC Address: MAC address of permitted device. 2. Phone Number of permitted device. 3. Attempts: Call attempts 4. Duration: Call duration in the unit of seconds.	
	Set Entry	The MAC address and Phone number and Dial Out PIN Code of the device that are permitted to make outbound transit calls 1. MAC Address: Enter the complete MAC address, for example, 00-03-62-80-13-49. 2. Phone Number: Enter phone number including country and area code, for example, 886282263368345.	
	Delete Entry	Remove the device from permission table. 1. MAC Address: MAC address of the device to be removed. For example, 00-03-62-80-13-49.	
	Clear Statistic	Clear the statistic data of Outbound transit calls, Call attempt and Duration. User has to enter the MAC address of the device that wants to clear the statistic data.	

9.2.4 BASIC / OFFNET FORWARD



Category	Section	Description	Default Setting
Permitted Phone Number for Off net Forward	Maximum	Maximum number of entries allowed for off-net forward calls. (Read only)	32
	Entered	The entries that have been entered and its statistic data (Read only)	0
	Set Entry	Permitted phone number for off-net forward calls.	
	Delete Entry	Phone number that to be deleted from off-net forward calls.	
	Clear Statistic	Clear the statistics data of permitted phone number for off-net forward calls.	

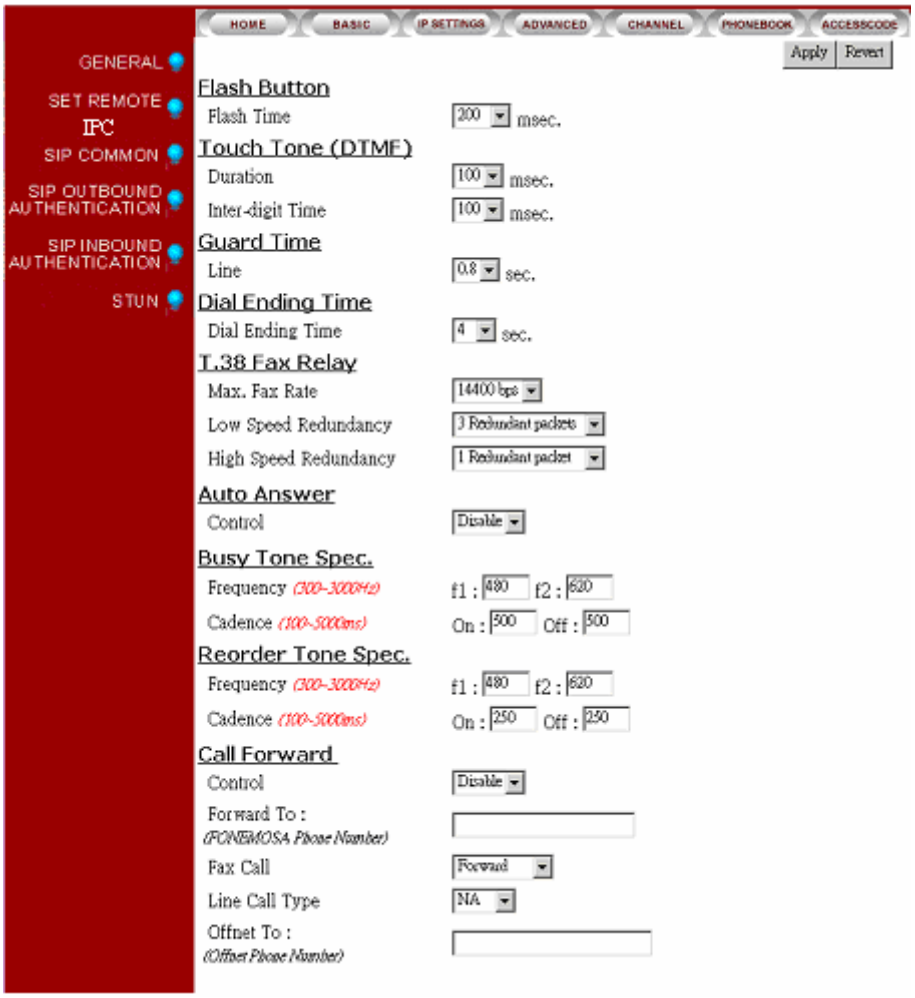
9.2.5 IP SETTING



Category	Section	Description	Default Setting
IP Settings	IP State	The way to obtain IP address: Manual: Entered by user (Static IP) Auto(DHCP): Assigned by DHCP server PPPoE: Assigned by PPPoE of ISP	Manual
	Current Setting	Display the configured IP address, subnet mask address and default gateway. (Read only)	192.168.0.2 255.255.255.0 192.168.0.1
	Change To	Enter the IP address that will be used after next restart, Including: 1. IP Address 2. Subnet Mask Address 3. Default Gateway (This item is used only on Manual mode of IP Setting.)	

PPPoE Settings	Account	The user's account of PPPoE protocol, provided by ISP.	
	Password	The user's password of PPPoE protocol.	
	Confirm Password	Confirm the user's password of PPPoE protocol.	
	Service Name	The service name of PPPoE account, provided by ISP. (Most ISP doesn't need this)	
DNS Server	Primary Address	The primary address of DNS server. The default setting would be different according to the local area. In Taiwan, the default setting is 168.95.1.1.	168.95.1.1
	Secondary Address	The secondary address of DNS server.	
Web Password	User Name	The user's name of Web Management Interface.(12 character)	WEB
	Password	The password of Web Management Interface.(6 character)	
	Password Confirm	Enter the password again to confirm it.	

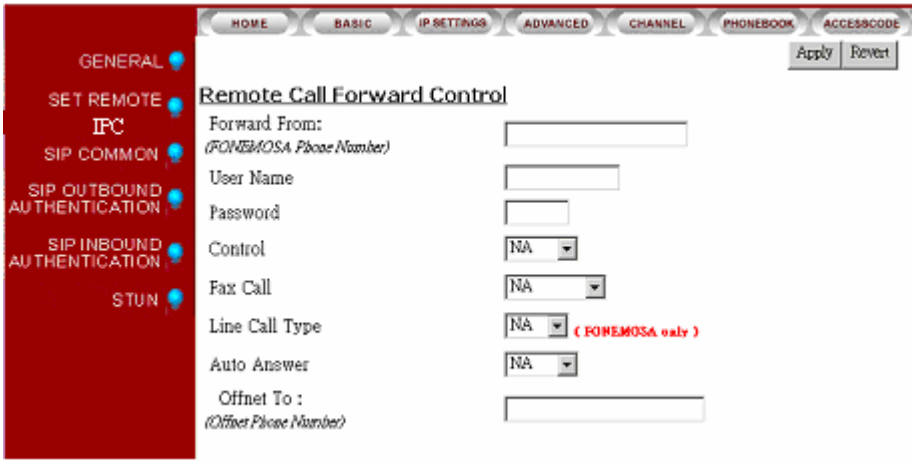
9.2.6 ADVANCED / GENERAL



Category	Section	Description	Default Setting
Flash Button	Flash Time	System confirmed “Flash” time.	200 msec
Touch Tone (DTMF)	Duration	The duration to send a DTMF.	100 msec
	Inter-digit	The inter-digit time of sending string of DTMF digits.	100 msec
Guard Time	Line	The time defines how long the system will not take incoming call after call has been disconnected.	0.8 sec
Dial Ending Time	Dial Ending Time	When select ISR dialing mode, don’t append # for ending. The time define how long to end a call.	0 (need append # for ending) 1-9 (seconds)
T.38 Fax Relay	Max Fax Rate	The max Fax transfer rate.	14400 bps

	Low Speed Redundancy	The number of redundant packets in low speed. No Redundant Packet: 1 Redundant Packet: 2 Redundant Packet: 3 Redundant Packet: 4 Redundant Packet:	3 Redundant Packet
	High Speed Redundancy	The number of redundant packet in high speed. No Redundant Packet: 1 Redundant Packet: 2 Redundant Packet:	1 Redundant Packet
Auto Answer	Control	Enable/Disable Auto Answer mode. Enable/Disable.	Disable
Busy Tone Spec	Frequency	f1, f2	(300 ~ 3000Hz)
	Cadence	on, off The on and off duration in playing the tone	(100 ~ 5000ms)
Reorder Tone Spec	Frequency	f1, f2	(300 ~ 3000Hz)
	Cadence	on, off The on and off duration in playing the tone	(100 ~ 5000ms)
Call Forward	Control	Enable/Disable Call Forward mode. Enable/Disable	Disable
	Forward to (IPC phone number)	The phone number including country and area codes of remote IPC that the call will be forwarded to.	
	Fax Call	Fax call will be forwarded or not. Forward/ No Forward	Forward
	Line Call Type	Not available (it is for 4202/4202A only)	
	Off net to (Off net Phone number)	The regular phone number that will be forwarded to through the remote IPC defined in the entry of “Forward to” of this web page.	

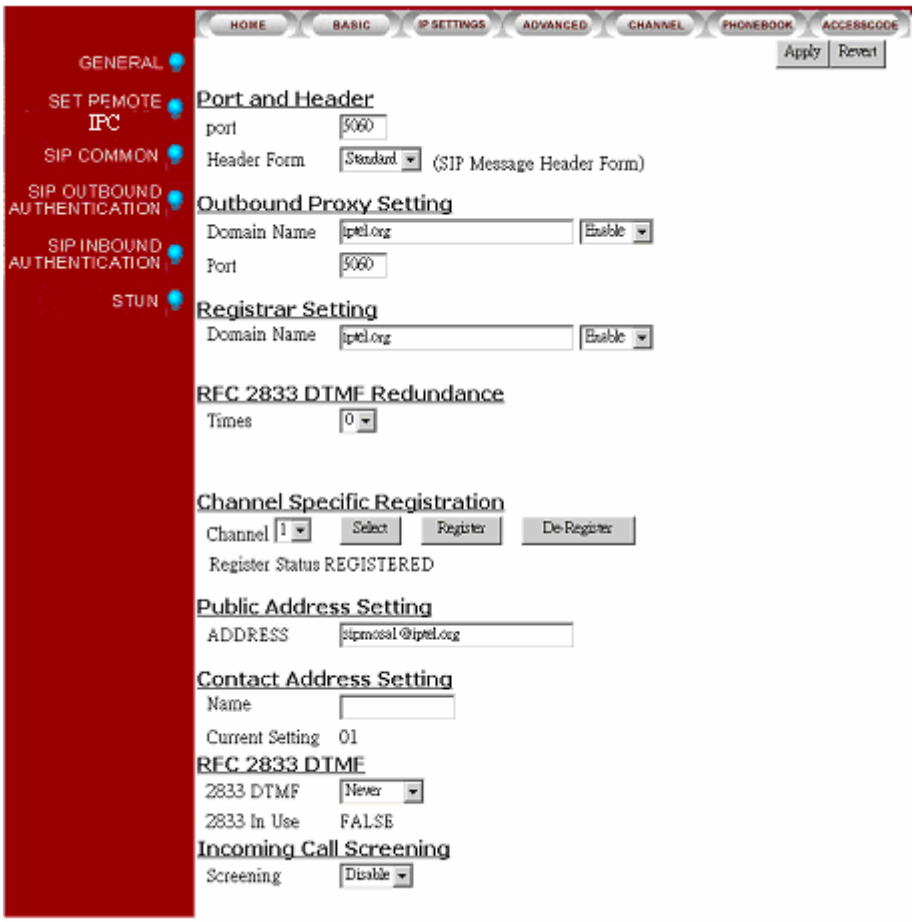
9.2.7 ADVANCED / SET REMOTE IPH



Category	Section	Description	Default Setting
Remote Call Forward Control	Forward From	Enter the phone number including country and area code of remote IPC that you want to configure.	
	User Name	Enter the user name of Web Management of device that you want to configure	
	Password	Enter the password of Web Management of device that you want to configure. You need to have a password. It can not be blank.	
	Control	Enable/Disable the function of Call Forward of the device you are configuring to: NA: Don't change Enable Disable	NA
	Fax Call	Enable/Disable the forward function of fax call of the device that you are configuring to: NA: Don't change Forward/ No Forward	NA
	Line Call Type	It has no effect on 4204/4208/4216	NA
	Auto Answer	Enable or Disable the auto answer function of the device that you are configuring to: NA: Don't change Enable/Disable	NA

	Off net To	Configure the off net forward phone number of the device that you are configuring to.	

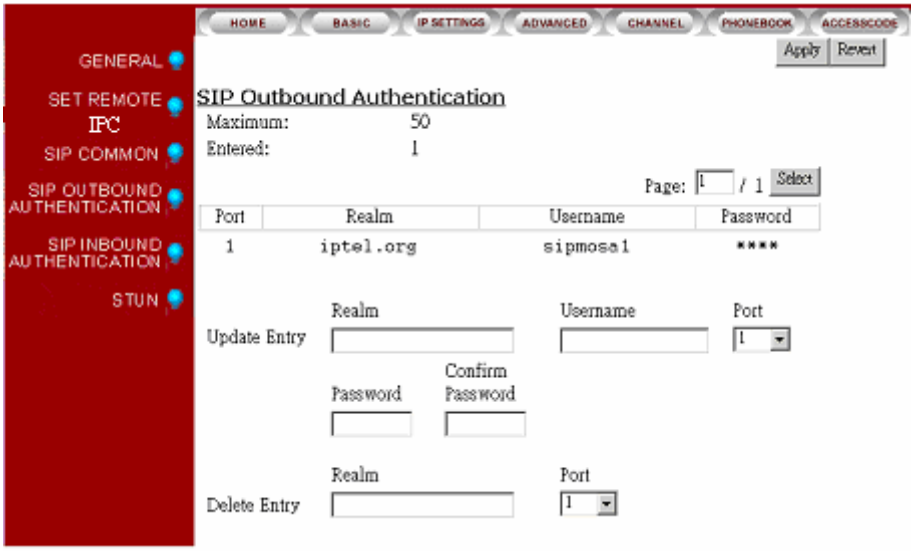
9.2.8 SIP COMMON



Section	Item Field	**Description**		Default
Port and Header	Port	The control port number of SIP protocol.		5060
	Header Form	Choice 'Standard' or 'Compact' to be the header format of SIP packet.		Standard
Outbound Proxy Setting	Domain Name	Enter domain name or IP address of proxy.		Empty Disable
	Port	Enter control port number of SIP protocol.		5060
Registrar Setting	Domain Name	Enter domain name or IP address of proxy that you want to register.		Empty Disable
RFC 2833 DTMF Redundance	Times	The times for sending DTMF packets. If the network environment isn't stable, you can increase the value.		0
Channel Specific Registration	Channel	Select a port Select: Select Button Register: Register Button De-Register: Cancel Register Button		1
	Register Status	Register Status	Read Only	Empty
Public Address Setting	Address	Enter SIP phone number of the port.		Empty

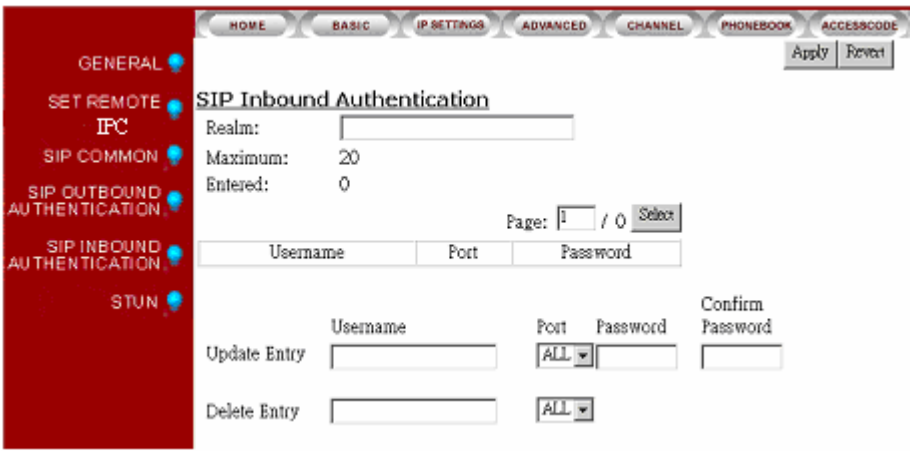
Section	Item Field	Description		Default
Contact Address Setting	Name	Enter Contact Address		Empty
	Current Setting	Display Contact Address setting	Read Only	01
RFC 2833 DTMF	2833 DTMF	Enable/Disable RFC 2833 DTMF.		Never
	2833 In Use	Display status	Read Only	
Incoming Call Screening	Screen	Enable/Disable if SIP calls must be through proxy. Disable means must be through proxy.		Disable

9.2.9 SIP Outbound Authentication



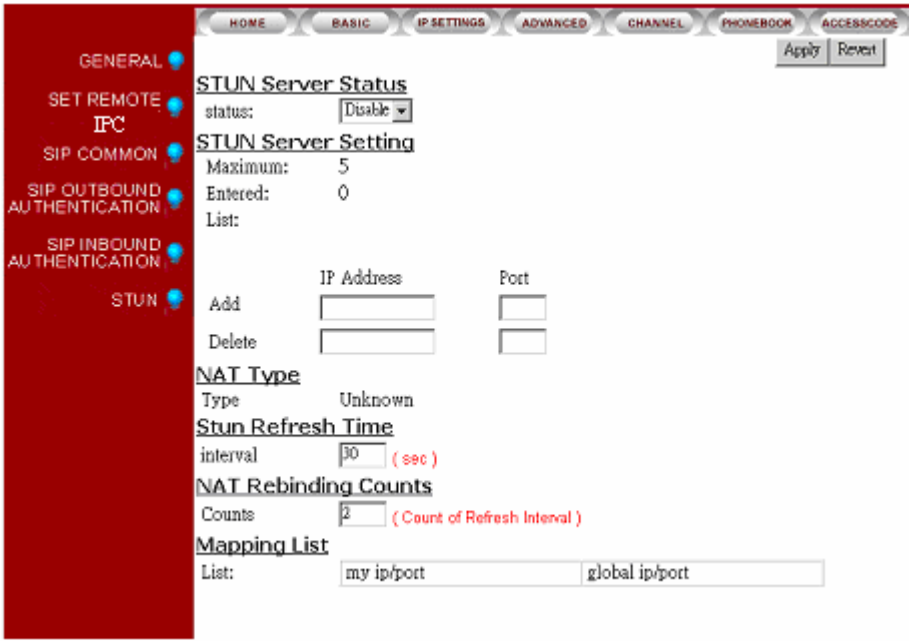
Section	Item Field	Description	Default
SIP Outbound Authentication	Maximum	Maximum number of entries allowed (Read Only)	50
	Entered	Number of entries of authentication entered. (Read Only)	0
	Entries List	List of entries (Read Only) 1. Port: Port number 2. Realm: Domain name or IP address. 3. Username: Username 4. Password: Password	Empty
	Update Entry	Enter the information of outbound authentication 1. Realm: Domain name or IP address. 2. Username: Enter Username 3. Port: Select a port number 4. Password: Enter password 5. Confirm Password: Enter password again for confirmed.	Empty
	Delete Entry	Delete the information of outbound authentication 1. Realm: Domain name or IP address. 2. Port: Select a port number	Empty

9.2.10 SIP INBOUND ANTHENTICATION



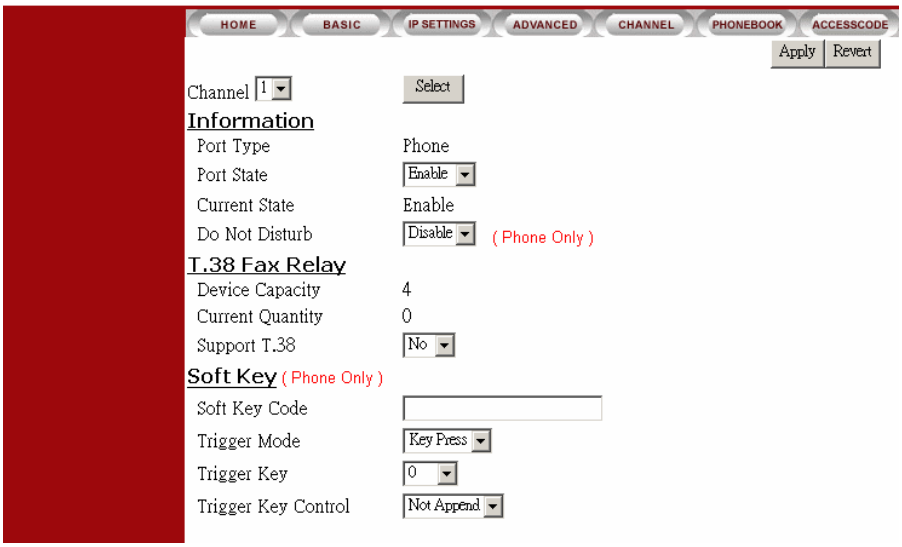
Section	Item Field	Description	Default
SIP Inbound Authentication	Realm	Enter domain name or IP address	Empty
	Maximum	Maximum number of entries allowed (Read Only)	20
	Entered	Number of entries of authentication entered. (Read Only)	0
	Entries List	Display the entries (Read Only) 1. Username: username 2. Port: port number 3. Password: password	Empty
	Update Entry	Enter entries of authentication 1. Username: Enter username 2. Port: Enter port number 3. Password: Enter password 4. Confirm Password: Enter password again for confirmed.	Empty
	Delete Entry	Delete entries of authentication Username: Enter username Port: Enter port number	Empty

9.2.11 STUN



Section	Item Field	Description		Default
STUN Server Status	Status	Enable or Disable STUN Server service.		Disable
STUN Server Setting	Maximum	Maximum number of entries allowed	(Read Only)	5
	Entered	Number of entries of STUN server entered.	(Read Only)	0
	List	Display the information of server entered.	(Read Only)	
	Add	Add a server IP Address: Enter IP address Port: Enter port number		Empty
	Delete	Delete a server IP Address: Enter IP address Port: Enter port number		Empty
NAT Type	Type	Display NAT type	(Read Only)	Unknown
Stun Refresh Time	Interval	The time interval for checking STUN server alive.		30
NAT Rebinding Counts	Counts	Send rebinding NAT counts.		2
Mapping List	List	My ip/port: Display private IP and port number. Global ip/port: Display public IP and port number.	(Read Only)	Empty

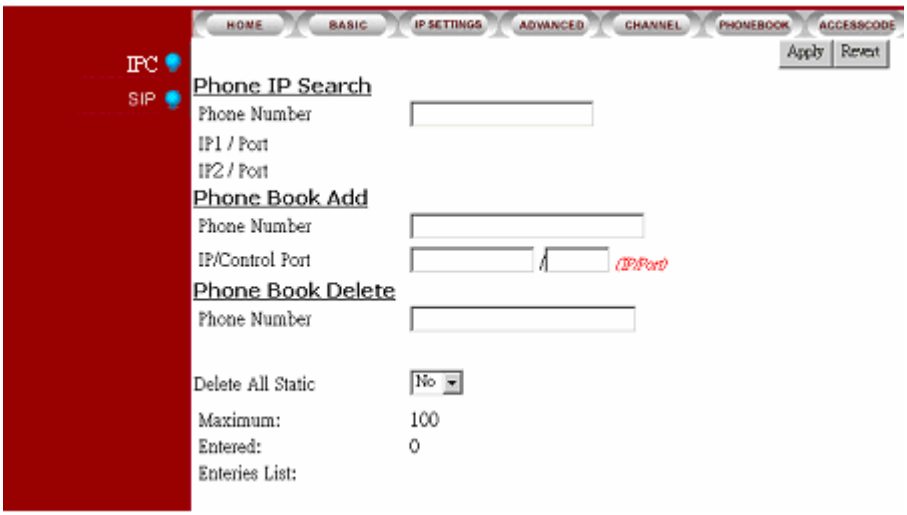
9.2.12 CHANNEL



Category	Section	Description	Default Setting
	Channel	Channel number: 1/2/3/4	1
Information	Port Type	Display port type. (Read only) Phone: FXS Interface, connect to telephone set or Fax machine. Line: FXO Interface, connect to phone line. NA: Not available.	
	Port State	Enable/Disable all functions of this port. Enable/Disable	Enable
	Current State	Display the current state of this port. (Read only) Enable/ Disable.	
	Do not Disturb	Enable/Disable does not disturb function	Disable
T.38 Fax Relay	Device Capacity	Maximum number of T.38 fax port can be configured. (Read only)	4

	Current Quantity	Display the number of T.38 Fax ports have been configured. (Read only)	0
	Support T.38	Check box asking if you want to configure the port as a T.38 fax. Yes/ No	No
Soft Key	Soft Key Code	Enter numbers for Soft Key Code	Empty
	Trigger Mode	Select a trigger mode to trigger soft Key. Key Press/Off hook	Key press
	Trigger Key	Select a number to be Trigger key	0
	Trigger Key Control	Enable or disable Soft Key Function. Append/Not append	Not Append

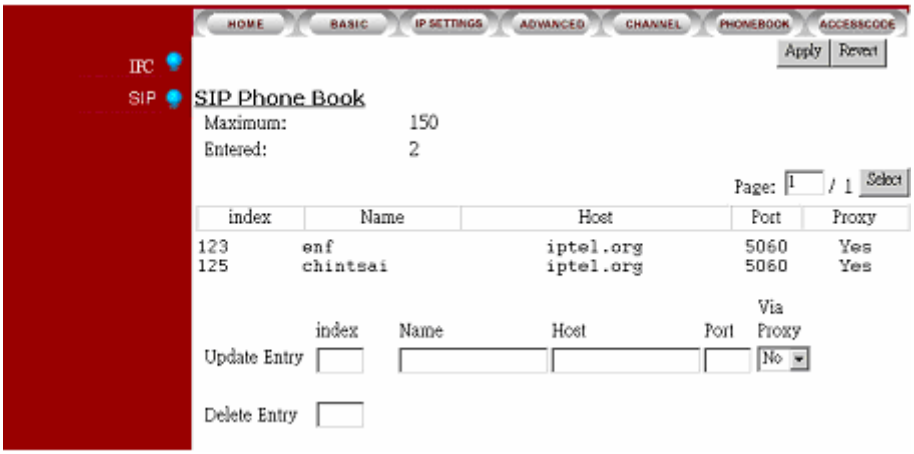
9.2.13 PHONEBOOK \ IPH



Category	Section	Description	Default Setting
Phone IP search	Phone number	The phone number including country code and area code that will be searched.	

Phone Book Add	Phone Number	The phone number that users want to add or modify. (Including country and area codes)	
	IP/Control Port	The IP address/UDP port of IPC units that users want to add or modify.	
Phone Book Delete	Phone Number	The phone number that users want to delete.	
	Delete All Static	Delete all phone numbers of static Phone Book that add manually. Yes: All delete. No: Do not delete.	No
	Maximum	The max entries of phone number that can be add manually. (Read only)	100
	Entered	The entries of phone number that have been added. (Read only)	0
	Entered List	List all phone number that are on the table (Read only)	

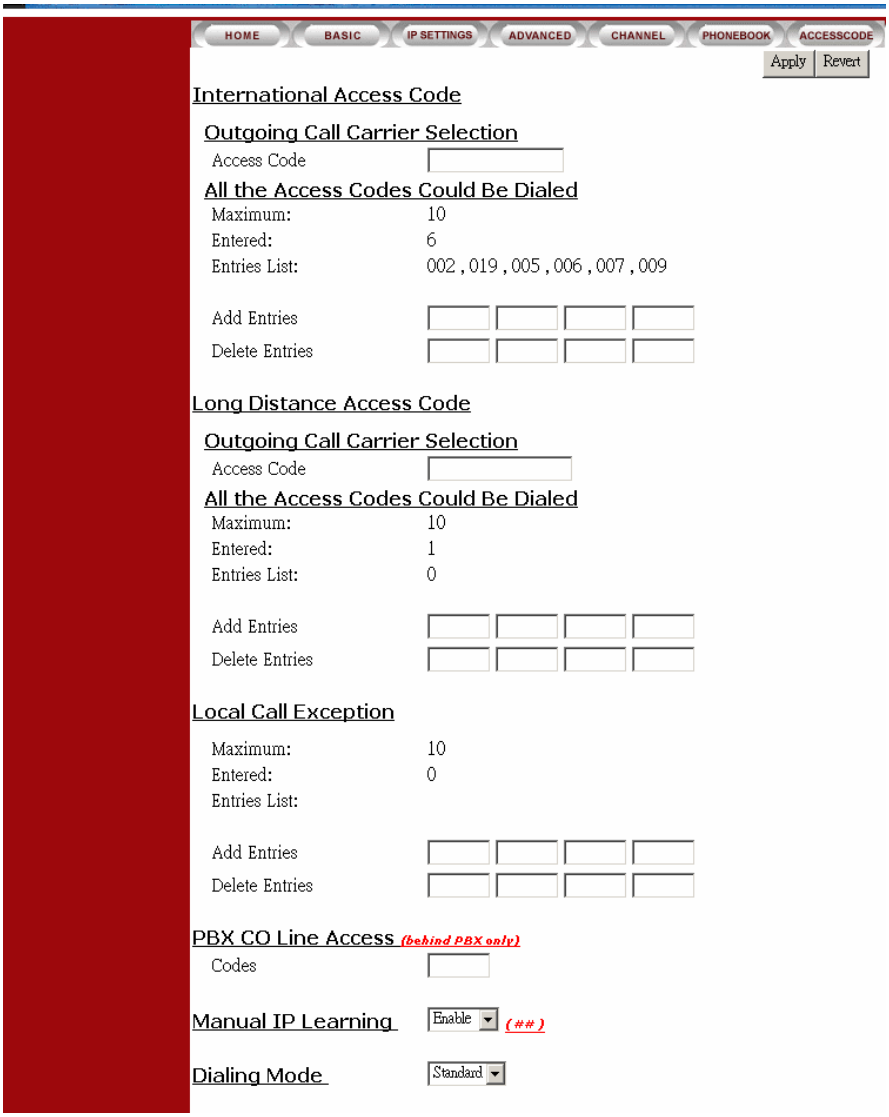
9.2.14 PHONE BOOK \ SIP



Section	Item Field	Description	Default
SIP Phone Book	Maximum	Maximum number of entries allowed (Read Only)	50
	Entered	Number of entries of phone books entered. (Read Only)	0
	Entries List	Display phone books (Read Only) 1. index: Dialing number 2. Name: Username 3. Host: Domain name or IP address. 4. Port: Port number 5. Proxy: Via proxy or not	Empty

Section	Item Field	Description	Default
	Update Entry	Enter entries 1. Index: Enter dialing number 2. Name: Enter username 3. Port: Enter port number 4. Via Proxy: Select via Proxy or not	Empty
	Delete Entry	Delete entries Index: Enter the index.	Empty

9.2.15 ACCESSCODE



Category	Section	Description	Default Setting
Outgoing Call Carrier(International)	Access Code	The international access code to be inserted on the outgoing international calls.	Depends on the region ID configured

All the access codes could be dialed(International)	Maximum	The max entries of all international access codes that could be dialed. (Read only)	Depends on the region ID configured
	Entered	The entries that were already entered. (Read only)	Depends on the region ID configured
	Entries List	The entries list of all international access codes that could be dialed.	Depends on the region ID configured
	Add Entries	Add entries of all international access codes that could be dialed. Four entries could be entered at a time.	
	Delete Entries	Delete entries of all international access codes that could be dialed. Four entries could be entered at a time.	
Outgoing Call Carrier Selection(Long Distance)	Access Code	The long distance access code to be inserted on the outgoing long distance calls.	Depends on the region ID configured
All the access codes could be dialed (Long Distance)	Maximum	The max entries of all long distance access codes that could be dialed. (Read only)	Depends on the region ID configured
	Entered	The entries that have been entered. (Read only)	Depends on the region ID configured
	Entries List	List all long distance access codes that could be dialed.	
Local Call Exception	Add Entries	Add the leading digits of phone number that does not belong to local call. For the outbound transit call, if the first digits of phone number are matched with the phone number, it will not be treated as local call. It will be treated as a long distance call.	
	Delete Entries	Delete an entry of Local Call Exception.	

PBX CO Line Access	Codes	PBX CO line access code, the code to seizure an external phone line. If you need to pause for 1 or 2 second, digit 'P' can be followed. For instance, 9P stands for dial 9 and wait for 1 second.	
Manual IP Learning		Enable/Disable the function of Manual IP Learning. Enable/Disable	Enable
Dialing Mode		Standard/ISR	Standard

10. Special Conditions

10.1 Using a Private IP in a NAT Environment

The IPC unit is able to communicate with other IPC units under a NAT environment using Private IP addresses on the LAN side of your IP Sharing device. However you must configure the IP Sharing device to treat the IPC unit as a Virtual Server using UDP port 2000. All incoming packets transmitted to UDP port 2000 will be forwarded to the IPC unit's private IP.

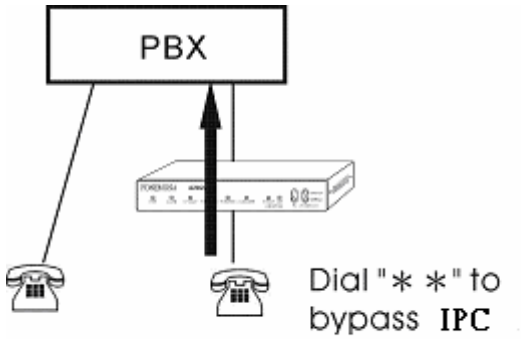
10.2 Firewall

If your network environment like most enterprises uses a Firewall, you will have to ask MIS personnel to enable the ports listed in the following table.

Packet Modes	Using Ports
Call Control Packets	UDP 2000
Voice Packets (RTP)	UDP 4000 – 4007
Fax Packets	UDP 4008 – 4011
SIP Packets	UDP 5060
FTP software upgrade	TCP 21
Web management	TCP 80

10.3 Bypassing the IPC unit

When the IPC unit is connected to a PBX extension line, some PBX features such as Call Forwarding or other functions that start with "*" or "#" will not be available, this is because they are now being used by the IPC unit. You can however dial "**" to bypass the IPC unit and access the line directly. The IPC unit will send the total amount of digits you dialed to the Line port. For example, if the access code to disable Call Forwarding on the PBX is*81, you can dial "**" first then dial *81.



11. Appendix

11.1 Appendix A: Manual IP Learning Procedure

Perform the following steps to carry out the IP Learning function:

1. Use the phone that's connected to the IPC unit to dial at regular intervals the IPC unit's number that you are attempting to learn (without the "#" key). For example: 002862164451245
2. When the recipient answers the phone, ask him/her to press the "#" key twice. The learning process will then begin and both sides should hear the learning tone (a short tone every two seconds).
3. About 15 seconds later, you should hear three consecutive tones indicating a successful learning. Otherwise you will hear a long tone indicating that learning has failed.
4. Hang up the phone

The manual IP Learning function can be used when the IPC unit is connected to a PBX extension line. You must dial the PBX first then transfer to the extension number that the IPC unit is connected to. Assuming you are dialing from Taipei to Shanghai and the number you are dialing is 86-21-43532158 using extension 540, follow the steps below:

1. Dial "002 86 21 43532158" which connects to the recipient's PBX
2. Dial the extension number "540" after the greeting.
3. When the recipient at extension number "540" answers the call, ask him/her to press the "#" key twice.
4. The IP Learning function will then begin and the called party will hear the learning tone (a short tone every two seconds).
5. It takes from 15 to 20 seconds to complete the IP Learning process.
   A successful IP Learning will be confirmed with three consecutive tones on the caller's side. (One long tone indicates the process has been unsuccessful)
6. The recipient can now hang up the phone.

When the above is complete, you should then be able to make an IP call to the IPC unit by dialing "#002862143532158540#".

11.2 Appendix B: Automatic IP Learning

Between two IPC units, you can also dial "*" + the phone number + "#". However, the Automatic IP Learning process will start every time the phone number's IP information can't be found in the (built in) dynamic phone book. The result acquired after a successful learning process will be stored in the dynamic phone book and saved to flash memory every hour. This will ensure that data won't be lost even when the IPC unit's power is turned off. However because the information is saved on an hourly basis, some information may be lost if the IPC is turned off between saves. The Automatic IP Learning procedure is slightly different depending on whether the Automatic Answering function on the remote IPC unit is enabled or not. Two examples with detailed procedures are described below:

Example 1: The Automatic Answering function on the remote IPC unit is disabled (factory default value)：

The following example assumes you are dialing from Taiwan to Shanghai and the number you are dialing is 86-21-43532158.
Pick up the handset and dial "*002862143532158#"

If the number you are dialing can not be found in the dynamic phone book, the IPC unit will then use the phone line to reach the remote IPC unit and attempt get the IP information back. Since the automatic answering function is disabled, the learning process will start until the called party answers the phone. The remote phone set connected to the remote IPC unit will ring until the called party picks up the phone. When the called party answers the phone, he/she will hear a busy tone and hang up the phone. At that point the IP Learning process begins.

The calling side will hear the learning tone (a short tone every two seconds, an unsuccessful learning process will respond with busy tone). If the learning process is successful, the IPC unit will disconnect the traditional phone and automatically switch to IP mode. The called IPC unit's phone will ring again and the calling side will hear the ring back tone.
The called party will then pick up the phone and you can begin voice communication over IP

Example 2: The Automatic Answering function on the remote IPC unit is enabled.
Assuming you are dialing from Taiwan to Shanghai and the number you are dialing is 86-21-43532158, the IP Learning steps are:
Pick up the handset and dial "*002862143532158#"

If the number you are dialing can not be found in the internal phone book, the IPC unit will use the phone line to reach the remote IPC unit and reacquire the IP information. Since the automatic answering function is enabled, the learning process will not start when the remote IPC unit answers the call. The calling side will hear the learning tone (a short tone every two seconds, an unsuccessful learning process will respond with busy tone). If the learning process is successful, the IPC unit will disconnect the traditional phone and automatically switch to IP mode. The called IPC unit's phone will ring and the calling side will hear the ring back tone. When the remote party answers the call, you can begin voice communication over IP.

11.3 Appendix C: Editing the Phone Book

11.3.1 Using the Web based management interface to edit the static phone book

If you already know the static IP address and Signaling UDP Port of a particular remote IPC unit, you can use the web based management to edit the Static Phone Book so that you can make IP phone calls without having to go through the IP Learning process. The Static Phone Book keeps all phone numbers with their known IP addresses. In the "Phone Number" field, you should enter a complete phone number including the country and area code. For example, if the number you are dialing is 02-82263368, you must enter 886282263891. If the number is under a PBX, you must enter 886282263891314. The number 82263891 represents the company phone number and 314 is the extension number.

In the "IP/Control Port" field, you should enter the static IP address of the remote IPC unit as well as the Signaling UDP port used. The factory default is 2000.

11.3.2 Moving a dynamic phone book entry to the static phone book

If the called IPC unit is using a static IP address, you can also use the manual or automatic IP learning process to acquire the IP address first, you can then move it into the static phone book. After the IP has been successfully learnt, follow the steps below to move it into the static phone book.

1. Pick up the phone that's connected to the IPC unit
2. Dial ##0000 ;to enter the phone configuration mode
3. Dial 32 + phone number ;to move the phone number's IP to the static phone book
4. Dial 981 ;a restart is required
5. Hang up the phone

11.4 Appendix D: Enabling/disabling the automatic answer mode

Enable the automatic answer mode using a telephone set:

Pick up the handset and listen for the dialing tone

Dial "##0000" (you will then here three short tones)

Dial "131#" (Auto-answer mode will now be enabled)

Hang up the phone

Disable the automatic answer mode using a telephone set:

Pick up the hand set and listen for the dialing tone

Dial "##0000" (you will then here three short tones)

Dial "130#" (Auto-answer mode will now be disabled)

Hang up the phone

11.5 Appendix E: Phone-Set Command Codes and Parameters.

Phone-Set

Pick up the handset and listen for the dialing tone. Dial "##0000" and listen for three consecutive tones before setting the following parameters. The details please refer to 錯誤! 找不到參照來源。 錯誤! 找不到參照來源。

Command	Description	Parameters
01	Area Code	1 ~ 3 digits
02	Phone Number	1 ~ 19 digits
03	IP State	0 : static; 1: DHCP; 2: PPPoE
04	IP Address	xxx*xxx*xxx*xxx
05	Subnet Mask	xxx*xxx*xxx*xxx
06	Default Gateway	xxx*xxx*xxx*xxx
07	Primary DNS Server IP	xxx*xxx*xxx*xxx
08	Secondary DNS Server IP	xxx*xxx*xxx*xxx
09	Channel T.38 (FAX) Control	xxc where, xx: channel, c: 0 disable, 1 enable
10	Channel Port State Control	xxc where, xx: channel, c: 0 disable, 1 enable
11	Select Control Port	0~65535
12	Select VoIP Base Port	0~65534 (limit to even port number only)
13	Auto-Answer Control	0 : disable ; 1: enable
14	Call Forward Control	0 : disable ; 1: enable
15	Set Call Forward Phone Number	1 ~ 19 digits
16	Set Fax Call Control	0 : no forward ; 1: forward
17	Select Line Call Type (IPC only)	0 : voice call; 1: fax call

19	Set PBX CO Line Access Code	6 digits (0~9 or * where, * means pause)
20	Manual IP Learning Control	0 : disable ; 1: enable
21	Select Greeting Mode	0 : off ; 1: on
22	Inbound/Outbound Transit Call Control	0 : disable ; 1: enable
23	Add an Inbound Transit Call Password	1 ~ 8 digits
24	Delete an Inbound Transit Call Password	1 ~ 8 digits
25	Delete All inbound transit call Passwords	1 : do it
26	Add a Member Entry of an Outbound Transit Call	MAC + Phone Number where, MAC : last 6 digits of the MAC address; 0 ~ 9, A (*1), B (*2), C (*3), D (*4),E (*5), F (*6). Phone Number: 1 ~ 19 digits
27	Delete a Member Entry of an Outbound Transit Call	MAC where, MAC : last 6 digits of the MAC address; 0 ~ 9, A (*1), B (*2), C (*3), D (*4),E (*5), F (*6)
28	Delete all Outbound Transit Call members	1: do it
29	Add off-net number	Phone Number (1 ~ 19 digits) (4202A only)
30	Delete off-net number	Phone Number (1 ~ 19 digits) (4202A only)
31	Delete all off-net numbers	1: do it (4202A only)
36	Set the username of PPPoE	User name (use the mapping table to map character into digits)
37	Set the password of	Password (use the mapping table to map character

	PPPoE	into digits)
40	Listen for the IP Address	(ending "#" is not required) (4202A only)
41	Listen for the Subnet Mask	(ending "#" is not required) (4202A only)
42	Listen for the Default Gateway	(ending "#" is not required) (4202A only)
88	Change the Web based management interface Password	1 ~ 6 digits
89	Export the IPC unit's IP Information to a PC	xxx*xxx*xxx*xxx (the IP address of the destination PC)
90	Add an FTP Server Password	(null) : clear password 1 ~ 6 digits : password
91	Line Port Transmission/Receiving Volume Adjustment	0: normal volume 1: Receiving +2 dB 11: Receiving +3 dB 111: Receiving +4 dB 2: Transmission -2 dB 22: Transmission -3 dB 222: Transmission -4 dB
92	Phone Port Transmission/Receiving Volume Adjustment	0: normal volume 1 or 11 or 111: +2 dB 2: -2 dB 22: -4 dB 222: -6 dB
94	Set the Alarm Clock Time	0 : disable or, hh*mm*c where, hh*mm: hour*minute c: 1: alarm one time; 2: alarm every day
95	Region ID	2 digits
96	Play audio Greeting	(# stop play)
97	Reset unit to Factory Default	1: reset all; 2: preserve IP

	values	
98	System Restart	1: do it
99	Record audio Greeting	*: start record (#: stop record) 0: start play (#: stop play) 9#: save #: exit record mode

11.6 Specifications

Specification	
Voice	
Voice Port	IPC4304:2FXS + 2 FXO
Fax Transit	T.30/T.38
Foreign Exchange Station (FXS) Interface	Circuit to connect a standard phone or fax machine.
Foreign Exchange Office (FXO) Interface	Circuit to connect to a PSTN center office or PBX extension line.
Connector Type	RJ11
Voice Compression	G.711/G.723/G.729AB
Voice Activity Detection (VAD)	G.729A B
Echo Cancellation	G.165/G.168 16ms echo tail
Jitter Buffer	Adaptive jitter buffer adjustment
Input/Output Gain	In/Out + / -6 db (adjustable)
Packet Time	40ms
Transmission Protocol	RTP
Call Control Protocol	Proprietary Call Control Protocol and SIP
Phone Book	Auto learning and manual setting

Management Function	
Management Tools	Web browser, traditional phone and console
IP Address	Fixed IP address Dynamic address (DHCP), PPPoE
Firmware Upgrade	FTP
Other Specification	
Power Supply	Power Adaptor OUTPUT: 9VDC 600mA
Dimension	172mm x 35mm x 176mm 6.8” x 1.4” x 6.9”
Working Environment	Operation temperature : 0℃ to 50℃ Storage temperature: -10℃ to70℃
Electromagnetic radiation Standard	FCC part 15 Class B CE Mark, UCCI
LAN Interface	
Number of Ports	2 ports
Interface Standard	10 / 100 Ethernet, Auto Negotiation (10/100 Mbps Auto Negotiation)
Connectors type	RJ-45

11.7 Mapping table of characters used in PPPoE user name and password

HINT 1:

Character	Digits to key-in
0	30
1	31
2	32
3	33
4	34
5	35
6	36
7	37
8	38
9	39
A	41
B	42
C	43
D	44
E	45
F	46
G	47
H	48
I	49
J	4*0
K	4*1
L	4*2
M	4*3
N	4*4
O	4*5
P	50
Q	51

R	52
S	53
T	54
U	55
V	56
W	57
X	58
Y	59
Z	5*0
@	40
=	3*3

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