

IPOWER Build In Proxy Settings

1. H.323 Protocol and Port Usage

1) RAS message and port

RAS message is a protocol used for communication between the H.323 terminals, such as IPOWER IP phone and Gatekeeper.

Gatekeeper is the most complex component in the H.323 protocol family. H.323 describes the task of the Gatekeeper. The task includes registration (the ability of seeking an online user on a special terminal), admission (check access authorization), and status (monitor the usability of the network resource such as Gateway and terminal).

An H.323 terminal uses GRQ (Gatekeeper request) RAS message to send gatekeeper request message to a special detecting port of the gatekeeper such as 1719. This RAS message uses UDP protocol and dynamic port.

2) Q.931 Call Signaling and port

Two TCP protocols connections are required to build a connection between two H.323 endpoints for a point-to-point conference. One is used to build a call signaling connection; and the other is used to control and exchange capabilities of call signaling.

The callee builds TCP connection corresponding with the “well-known port”. This connection, which carries the call signaling built messages specified by H.255.0, usually been specified as Q.931 channel or call signaling channel.

In the H.323 protocol, Q.931 call signaling usually uses TCP protocol and port 1720.

3) H.245 message and port

Call controlling message uses the second TCP connection mentioned above. While receiving call signaling, the callee monitors TCP connection on a dynamic port by which to respond the call signaling. Then the second TCP connection, carrying the call signaling controlling messages defined by H.245, will be setup by the caller. H.245 channel shall not be disconnected until the communication is over.

In the H.323 protocol, H.245 message uses TCP protocol and dynamic ports.

4) RTP protocol and port

H.245 channel used to exchange audio messages, define master/slave relationship, open the logical channel and setup RTP communication transported media stream by terminals.

The OpenLogicalChannel message sent by the caller describes the port and address of UDP to which to send RTCP receiving reports by the callee.

In the H.323 protocol, RTP uses the UDP protocol and a dynamic port which should be an even number.

5) RTCP protocol and port

Once the callee is ready for receiving the data sent by the caller, it will send an OpenLogicalChannelAck message through the logical channel. The acknowledging message includes UDP port to which to send RTP and RTCP data by the caller.

In the H.323 protocol, RTCP uses UDP protocol and RTP port number+1. As the RTP uses dynamic port, RTCP also uses the dynamic port.

2. NAT effect to the H.323 communication

1) NAT basic principles

With rapid development of Internet, more and more users access internet. As a result, Internet is threatened with the crisis such as explosion of route list and exhaustion of B class addresses even the whole addresses. NAT (Network address translation) technology, allowing all hosts within LAN to visit the Internet through one or more public IP addresses, is widely used now. NAT technology can relay transparently part messages of TCP、UDP and ICMP. Next let us regard TCP as the main object to discuss the working principles.

TCP setups connection based on so-called connection abstraction and its corresponding objects is a virtual circuit connection instead of a single TCP port. That is to say TCP uses the connection but not the protocol port number as the basic abstraction concept. In the TCP, connection is identified by a pair of endpoints. TCP defines endpoint as a pair of integer (host, port). Therefore, a TCP connection can be defined with a 4-in-1 unit (Source address: source port; destination address: destination port). This connection abstraction allows more than one connections abstraction share one endpoint. For example, two connections (192.168.0.3 : 1184 ; 166.111.64.87 : 80)、(192.168.0.5 : 1184 ; 166.111.64.87 : 80) share one endpoint (166.111.64.87 : 80), and shall not be distinguished. It shows that the abstraction based on connection supplies the basis to connect with the outside through one IP address. In fact, although UDP has no connection, it can be regarded as virtual connection.

Currently, many proxy software support NAT, such as Win2000 server build-in router and remote visit function; Winroute pro ;Sygate ;Wingate and Winproxy, etc. Most router products based on hardware also support NAT. Many users use NAT solution to connect LAN to the Internet network through ADSL, Ethernet broadband access, cable modem, ISDN or dial-up

2) NAT effect to the H.323 communication

Concluded from the introduction mentioned above, the IPOWERT IP phone with private IP address can send out TCP and UDP data to the outside normally because of NAT function; while receive TCP and UDP data from outside to the specified IPOWERT IP Net phone in local LAN abnormally.

Because messages received by the IPOWERT IP phone outside LAN or other H.323 terminals only includes public IP address and dynamic port number. When the responded messages reach to the LAN, the server or

router in charge of NAT doesn't know where to send the relevant data. As a result, the bidirectional communication is fail.

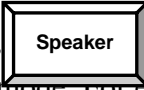

3. Solutions –Build in proxy and port mapping


1) IPOWERT Build in proxy

H.323 proxy is built in the PA 168X IP phone. Its principle is that when the phone finds its own IP address belongs to the three segments specified for private network by IANA, Such as 10.0.0.1---10.255.255.254, 172.16.0.1---172.31.255.254 or 192.168.0.1---192.168.255.254, the IPOWERT IP phone will transfer Q.931 call signaling dynamic port and H.245 message dynamic port which use TCP to the fixed ports, q931 port and h245 port being preset in the IPOWERT; RAS dynamic port, RTP and RTCP dynamic which use UDP protocol are also transferred to the preset fixed ports, Such as ras port and rtp port in the IPOWERT. As the RTCP port number is always equal to RTP port number + 1, it is unnecessary to preset rtcp port in the PA 168X, therefore no rtcp port setup command in the IPOWERT. After the above transform, IPOWERT IP phone uses the designated port number. Using with the NAT device to map the port, the outside data can reach the designated IP phone correctly in the LAN.


2) IPOWERT IP phone Build in proxy setup

Telnet configuration

Pick up the handle or press  , and then input the password and on the keypad to enter safe mode. For example, the IP address of the phone is 192.168.1.100 

On the PC connect  with the phone or in the same LAN of the phone, click Start button and then input “Telnet 192.168.1.100” into the popup Run dialog. Or input command “Telnet 192.168.1.100” under “DOS prompting windows”, then the Telnet window popup. Input the password of the IP phone, then the following information will be displayed

```
IPOWER 1.30 settings
Password: ****
P:\>
```

 **Note** The default IP address of IPOWERT is 192.168.1.100 and the password is 1234. Successive 3 times of error input will disconnect the IPOWERT phone.

Then you can setup the IPOWERT build in proxy function by following commands:

P:\>set proxy 1	*Open build in proxy function
P:\>set proxyip 0.0.0.0	Set auto search outside IP address when LAN using NAT
P:\> set rtpport 8020	Set rtp port as 8020, using UDP protocol
P:\> set registerport 1820	Set RAS port as 1820, using UDP protocol
P:\>set signalport 5066	Set Q.931 port as 5066, using TCP protocol

P:\>set controlport 5068 Set H245 port as 5068, using TCP protocol
 P:\>write Run the above commands on the IPOWERT IP phone

- Note**
1. Set proxy 0 Disable build in proxy
 2. Set proxy 1 Enable build in proxy
 3. Set proxy 2 With Citron private protocol used
 4. Set proxy 3 with Auvtech private system used
 5. Set proxy 4 stun; with SIP protocol used according to requirement of system
 6. Set proxy 5 with vida private system used
 7. Set proxy 6 with aivgr private system used

Set in web browser

Input the IP address 192.168.1.100 of the IPOWERT IP phone into the address field of an opened browser, then you will see the login page. After inputting the correct password, the following configuration page will popup. Refer to Fig 1

network settings					
iptype	static	ppp id	test1	ppp pin	test1
local ip	192.168.1.67	subnet mask	255.255.255.0	router ip	192.168.1.254
dns	202.106.196.115	dns2	202.106.196.115	mac	00-09-45-6f-ae-f0
protocol settings					
protocol	h323	proxy	enable	proxy ip	0.0.0.0
use service	<input checked="" type="checkbox"/>	service id		service addr	67.120.9.11
service port	1080	rtp tos	0	rtp port	8020
register port	1820	signal port	5066	control port	5068
local type	phonenumber	call type	advanced	dtmf	control string
service type	common	account	1058046	pin	477457

Fig 1 Build in proxy set in web browser

Once the proxy is designated, please set the port of Q.931; H.245; RAS and RTP. To get the detail set rules, please read the note carefully.

After configuration, please click Update button to save the set. Once IPOWERT IP phone restarts successfully, the new configuration is effective.

- Note**
1. Ports preset by IPOWERT shall be within 1024-65534 and avoid using the “well-known port”; details please refer to RFC1700 “assigned port number”
 2. According to the requirement of the H.323 protocol, RTP port number shall be even number; since RTCP port is equal to RTP port number +1, it is unnecessary to set RTCP port.
 3. Avoid setting Q931 port as 1720.
 4. Only with Gatekeeper, could IPOWERT build in proxy be effective.
 5. When more than one phones in the LAN, each phone needs to be set. And different phone should map different port.

6. In this booklet, we only tell you how to configure PA168B/C/E Build in proxy.
To know how to configure other parameter, please refer to PA168B/C/E user manual.

Apply Port Mapping Technology when using NAT

When IPOWERT build in proxy is active, port mapping shall be made on the server or router using NAT, so that data send by IPOWERT phone outside or other H.323 terminals can be transported to the correct address within LAN. This is so called reverse NAT, i.e. transmitting data send on the public IP address relevant port of the server or router using NAT to the IPOWERT phone with private IP address within LAN.

As IPOWERT phone is setup as above-mentioned, it can call IPOWERT phone outside the LAN or other H.323 terminals under the same gatekeeper; IPOWERT phone outside the LAN can also call the IPOWERT phone within the LAN.

Two IPOWERT phones with private IP address within the LAN can call each other if being configured correctly.

4. Network illustration

The fig 2 shows that two different LANs at different locations connect to the internet by NAT

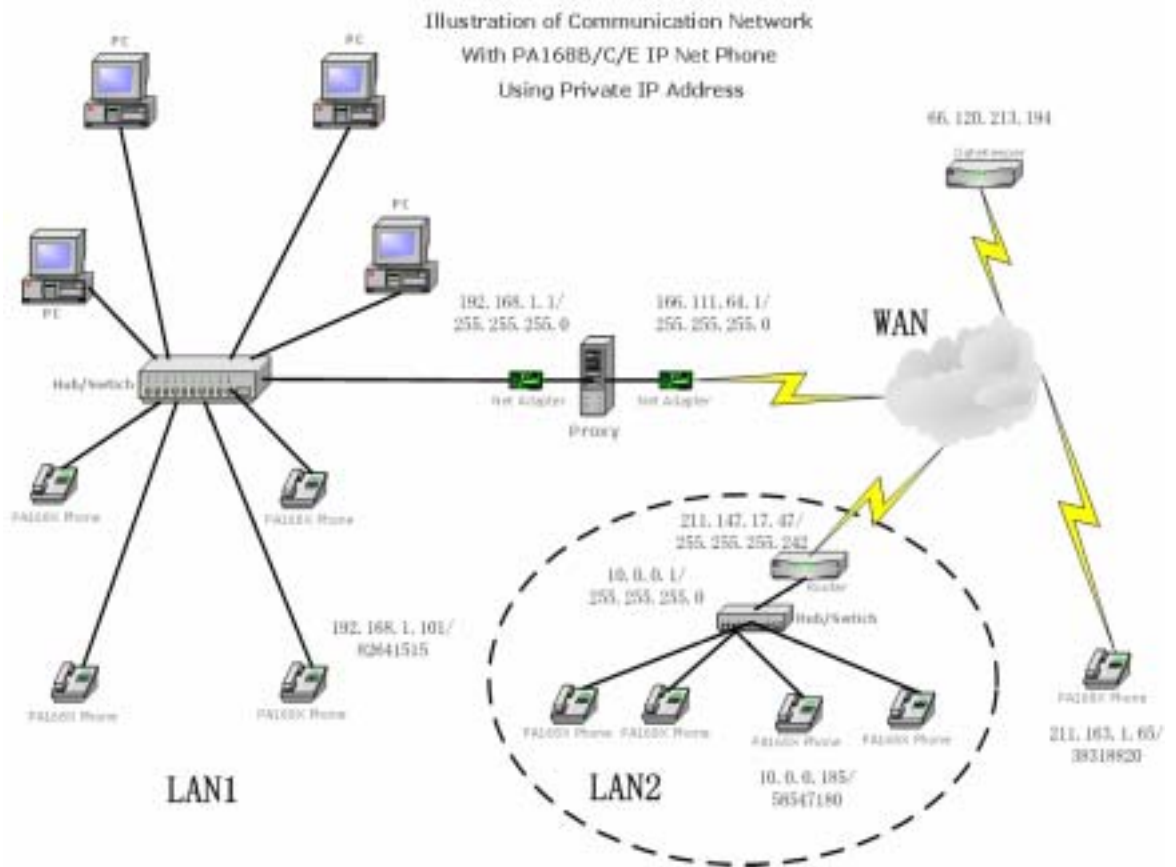


Fig 2 Communication Network

There is an H323 Gatekeeper with IP address 66.120.213.194 in the Internet, and a IPOWERT IP phone with IP address 211.163.1.65 and E.164 number 38318820

login the Gatekeeper.

LAN1 is 192.168.1.1/255.255.255.0, with public IP address 166.111.41.1 connects to the internet by a proxy. In this LAN, an IP phone with IP address 192.168.1.101, E.164 number 82641515 login to the Gatekeeper with IP address 66.120.213.194

LAN2 is 10.0.0.1/255.255.255.0, with public IP address 211.147.17.47 connects to the internet by a router. In this LAN, an IP phone with IP address 10.0.0.185, E.164 number is 58547180 login to the Gatekeeper with IP address 66.120.213.194

5. Configuration in Win2000Server

Now we take an example by settings the NAT function of Win200Server “Router and Remote visit” to introduce how to setup Port Mapping with two net cards.

- 1) Configure the NAT function of Win2000Server “Router and Remote visit” correctly. Then the PC in the LAN can access internet.
- 2) Then the IPOWERT IP phone can call other H323 terminal at the same GK or a same IPOWERT IP phone in another LAN. However, the phones in the same LAN can not communicate with each other, please configure port mapping as follows:

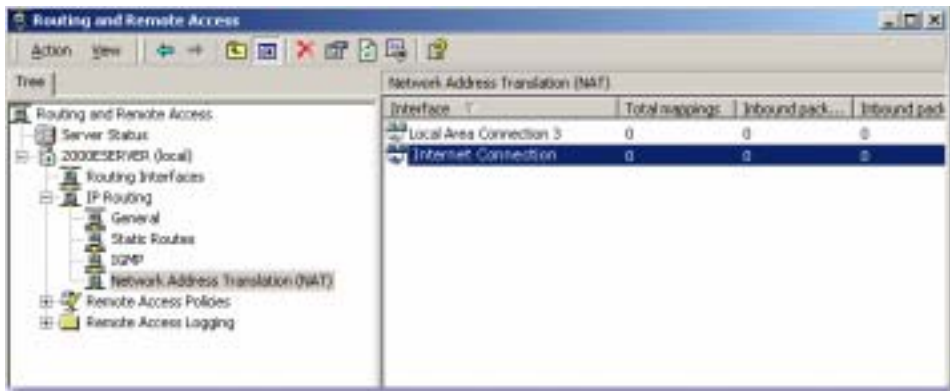


Fig 3 Select net interface

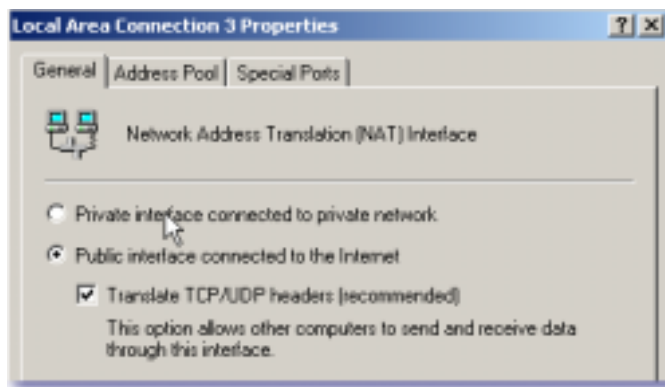


Fig 4 Open property window

- 3) Login Win2000Server as an administrator. Select Start>Manage Tool>Router and Remote Visit to open the Router and Remote Visit manage, then choose NAT item and select the net port connected to the internet.
- 4) Right click Outside link and select Properties in popping menu. In the

Outside link property window, select Special Port. Refer to fig 3,4.

- 5) Select TCP, and then add preset Q.931 call signaling port and H.245 port by clicking Edit button. For example, Q.931 uses 1721 port and H245 uses 1722 port. After edition, click OK button.

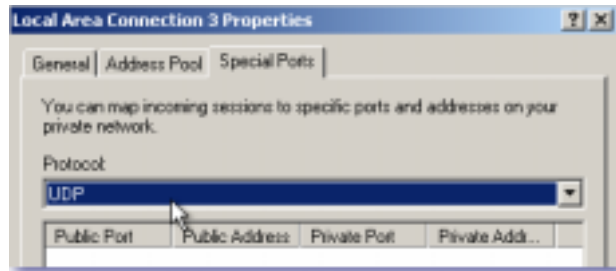


Fig 5 Edit TCP special port

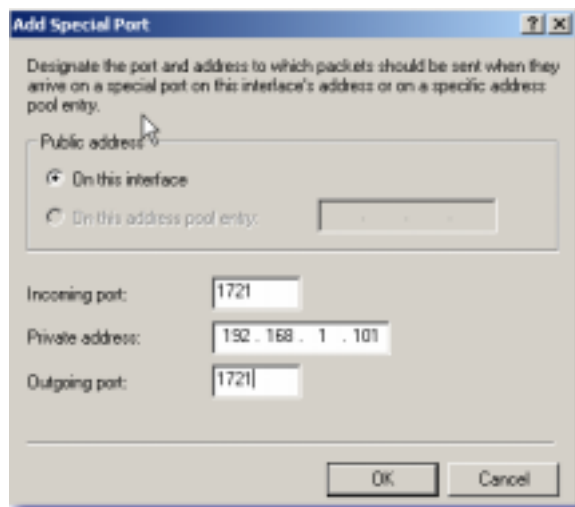


Fig 6 Edit TCP port

- 6) Select UDP protocol, and then add preset RTP port and RAS port by clicking Edit button. For example, RTP uses 1723 port and RAS uses 1724 port. After edition, click OK button to return. Refer to fig 5 and fig 6 please.
 - 7) Once finish the configuration, click OK button to back to “Router and Remote Visit” manage window. Then you can set other PA168B/C/E IP phones in the LAN as the operation mentioned above.
6. Winroute pro.4.1 Configuration

Now we take an example by Winroute pro 4.1 with NAT function to introduce how to configure Port Mapping using double net cards while dial-up virtual adapter.

The NAT device server can also connect to the network with cable modem or PPPoE virtual dial-up instead of using double net cards.

- 1) Port mapping configuration when connecting to the Internet with double NIC
 - Configure the NAT function of Winroute pro 4.1 correctly, and then the PC within LAN can access Internet.
 - Access Winroute Administration as an administrator, select Settings>Advanced>Port Mapping. Refer to Fig 7 please.

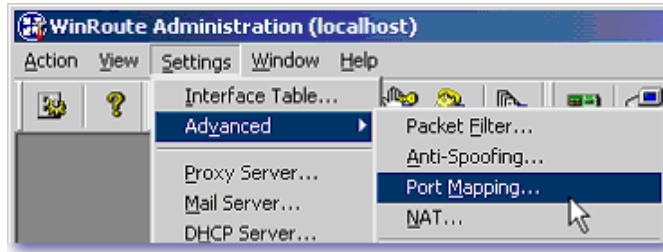


Fig 7 Select Port Mapping submenu

In Port Mapping window click Add button, then Edit Item dialog will popup. Select TCP/UDP from Protocol dropdown list; select <Unspecified> from Listen dropdown list; select port range radio button; set the port range by filling the fields with port number; input the IP address of the net phone into Destination fields; the port number will be filled in the Destination auto. Then click OK to return. Refer to Fig 8. Repeat above operation to map port to other phones in the LAN.

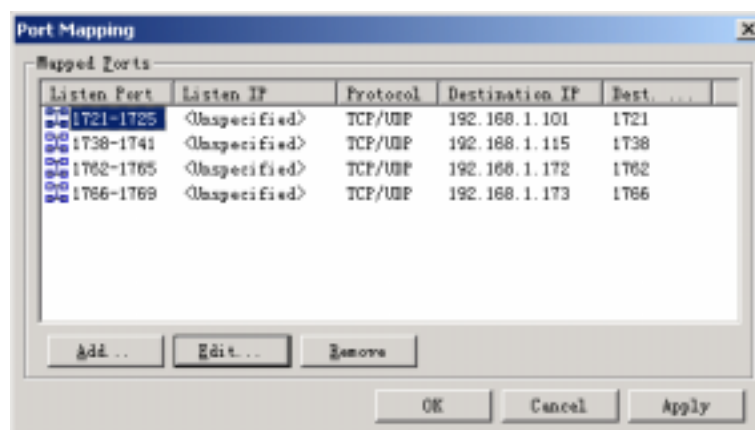


Fig 8 Set Port Mapping

- 2) Port Mapping configuration while connecting net by dial-upping or PPPoE virtual dial-upping.

Set dial-up connection, and then configure NAT function in the Winroute pro correctly. Then refer to step 6 1) to configure the Port Mapping in Winroute pro. Then the PA168B/C/E can call each other by dialing private IP address.

7. Configured by Sygate Office Network 4.2

1) Sygate Office Network 4.2

Configure Sygate Office Network Correctly

No matter connect to the internet by dialup, PPPoE virtue dialup, please follows sygate manual to configure Sygate Office Network correctly.

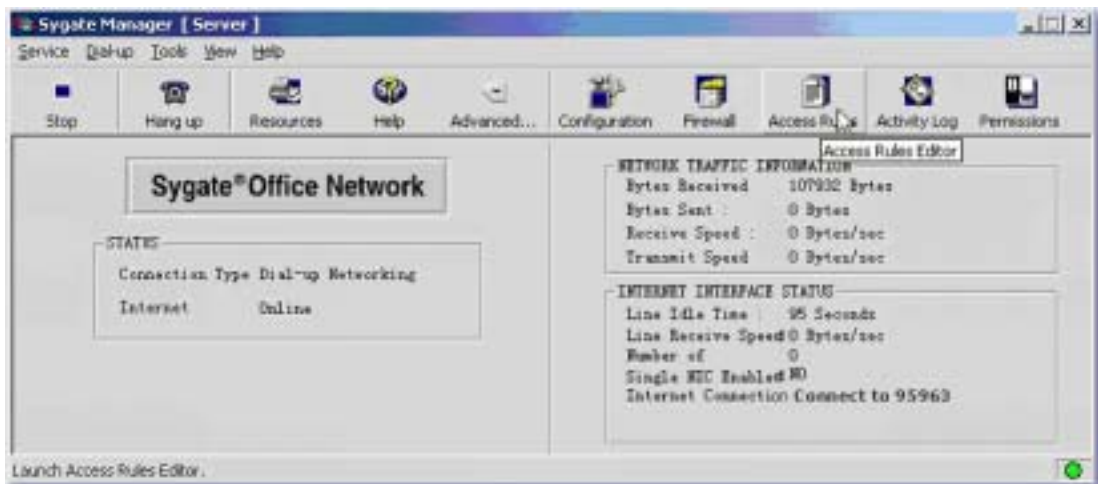
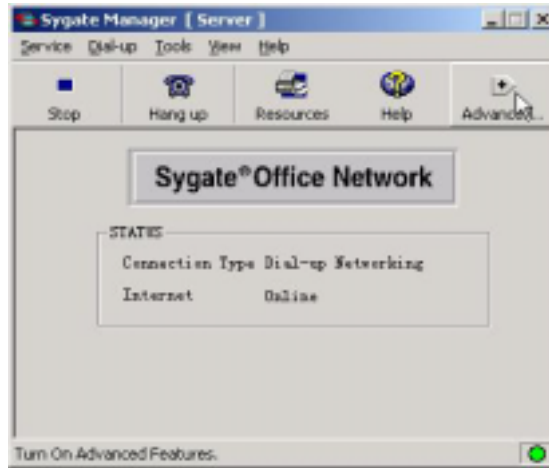


Fig 9 Sygate Manager Window

2) Sygate Manager /Open Sygate Manager

Open Sygate window, and then click Advance ... button. The complete Sygate Manager window will popup.

3) Open Access rules Editor dialog

In **Sygate Manager** Window, click “Access Rules” button, then the Access rules Editor Dialog will popup.

4) Add new visit rules

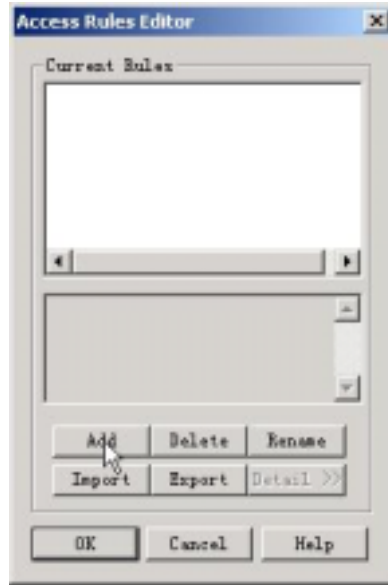


Fig 10 Use Access Rules Editor



Fig 11 Add New visit rules

Click “Add” buttons, then the “Add new rule” dialog will popup. Select “Add a new rule” radio button and then click “OK” to confirm. Then the complete “Access Rules Editor” window will be displayed. Refer to Fig 11 .

5) Edit new visit rule

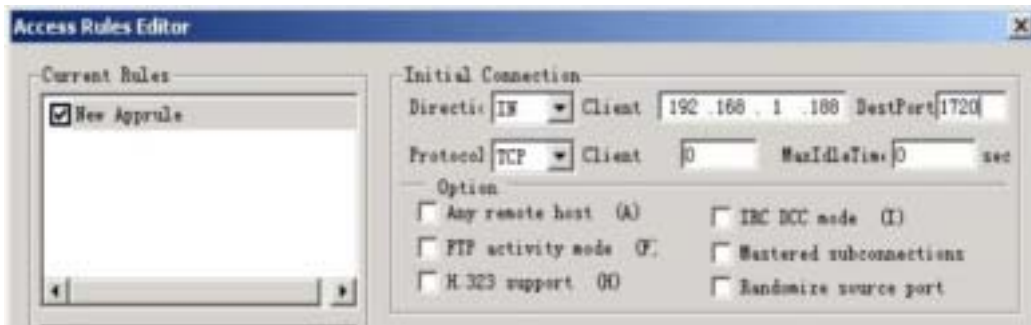




Fig 12 Edit New Visit Rules

Select “IN” from Initial Connection dropdown list to show that the rule is effective to the data package from remote. Select TCP or UDP from Protocol Type dropdown list. It is decided by the rules of the different port. To get detail information, please see H.323 protocol and port chapter.

Input IP address of PA168B/C/E into Client IP field. Input the designated port into the DestPort.

Click “Rename” button to add a suitable name to the rule. For example, q931T82642006, indicates that Q.931 signaling, using TCP protocol and phone number is 82642006. Repeat above operation to set another 5 rules.

6) Use new visit rules

Have finished editing all visit rules, click “OK” in fig 12, and then you will see the “Sygate Message” dialog requiring reset. Please click “Yes” button to confirm the operation. Once the program reset, the configuration is effective.

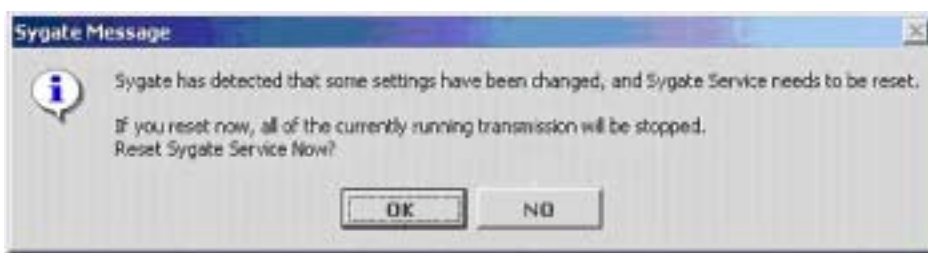


Fig 13 Inquiry Dialog

8. Router configuration

➤ **Linksys** router:

- 1) Please follow the user manual of router to connect ADSL Modem, router and PC.
- 2) On the PC connecting with the router to open the setting page of the router: open the IE on the PC and then input the IP address of the router, as 192.168.1.254. Return and then you will see a dialog requiring user name and password. Input the password, (default password is admin) and then click OK

to enter the setup page of the router.

- 3) Set ADSL username and password: Select PPPoE from WAN Connection Type dropdown list. Then input the username and password into the corresponding fields.

LINKSYS SETUP

This screen contains all of the router's basic setup functions. Most users will be able to use the router's default settings without making any changes. If you require help during configuration, please see the user guide.

Host Name: (Required by some ISPs)

Domain Name: (Required by some ISPs)

Firmware Version: 2.44.2, Dec 13 2002

LAN IP Address: (MAC Address: 00-0E-25-ED-54-FD)
 192 . 168 . 1 . 254 (Device IP Address)
 255.255.255.0 (Subnet Mask)

WAN Connection Type: (MAC Address: 00-0E-25-ED-54-FE)
 PPPoE Select the Internet connection type you wish to use

User Name: aredfox@zgc

Password:

Connect on Demand: Max Idle Time 5 Min.

Keep Alive: Redial Period 30 Sec.

Fig 14 Basic setup page of Linksys router

- 4) Set ADSL username and password. Select **PPPoE** from **WAN Connection Type** dropdown list and then enter the username and password into the corresponding fields.
- 5) Set ports: Click **Advanced** in the top menu to enter advanced setup page and then click **Forwarding** to enter the port set page.
- 6) Input the range of the port into **Ext.Port** fields; then select **Protocol TCP** and **Protocol UDP** to check boxes to active the these two protocols ; then input the phone's IP address into **IP Address**; then select **Enable** check box to active the setting. Then click **Apply** to confirm. Refer to Fig 15 please.



Filters **Forwarding** Dynamic Routing Static Routing DMZ Host QoS MAC Addr. Clone Setup

Port forwarding can be used to set up public services on your network. When users from the Internet make certain requests on your router, they will be redirected to the specified IP.

Ext.Port		Protocol TCP	Protocol UDP	IP Address	Enable
5110	To 5113	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	192.168.1.110	<input checked="" type="checkbox"/>
5114	To 5117	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	192.168.1.114	<input checked="" type="checkbox"/>
5118	To 5121	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	192.168.1.118	<input checked="" type="checkbox"/>
5122	To 5125	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	192.168.1.122	<input checked="" type="checkbox"/>
5126	To 5129	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	192.168.1.126	<input checked="" type="checkbox"/>
5130	To 5133	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	192.168.1.130	<input checked="" type="checkbox"/>
5134	To 5137	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	192.168.1.134	<input checked="" type="checkbox"/>
5138	To 5141	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	192.168.1.138	<input checked="" type="checkbox"/>
5142	To 5145	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	192.168.1.142	<input checked="" type="checkbox"/>
2427	To 2427	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	192.168.1.99	<input checked="" type="checkbox"/>

UPnP Forwarding Port Triggering

Apply Cancel

Fig 15 Enter advanced setup page and set ports

If you are common ADSL user, complete above configuration is OK. Those who use other proxy software or router with NAT function, please refer to relevant operation.

Reserves the right to make changes in technical and product specification without prior notice.