Industrial Classed H685 H820 Cellular Router

User Manual for VPN setting

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1 Prologue

This document is suitable for the following products, it will show how to setup a VPN Router that has IPSec VPN capabilities for secure remote access to your cellular network from anywhere on the Internet. Detailed configuration will be shown for multiple brands of routers

Type	Description
H685ev/H820ev	EVDO Router
H685td/H820td	TD-SCDMA Router
H685w/H820w	WCDMA HSUPA/HSDPA Router

1.1 Version

Version	Date	Description	Author
1.1.3	2010-11-11	Nearly complete	
1.4.31	2012-11-16	Modify	Jason

1.2 Referenced Documents

H685_Datasheet_Eng.pdf
H820_Datasheet_Eng.pdf
H685_Usermanual_Eng.pdf
H820_Usermanual_Eng.pdf

1.3 Notice

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2 How to Configure IPSec

IPSec provides authentication and encryption services to protect unauthorized viewing or modification of data within your network or as it is transferred over an unprotected network, such as the public Internet. IPSec is generally implemented in two types of configurations:

- Site-to-site— this configuration is used between two IPSec security gateways, such as PIX Firewall. A site-to-site VPN interconnects networks in different geographic locations.
- Remote access— this configuration is used to allow secure remote access for VPN clients, such as mobile users. A remote access VPN allows remote users to securely access centralized network resources.

IPSec can be configured to work in two different modes:

- Tunnel Mode—This is the normal way in which IPSec is implemented between two security gateways that are connected over an un-trusted network, such as the public Internet
- Transport Mode—this method of implementing IPSec is typically done with PPTP to allow authentication of remote Windows 2000 VPN clients.

The main task of IPSec is to allow the exchange of private information over an insecure connection. IPSec uses encryption to protect information from interception or eavesdropping. However, to use encryption efficiently, both parties should share a secret that is used for both encryption and decrypting of the information.

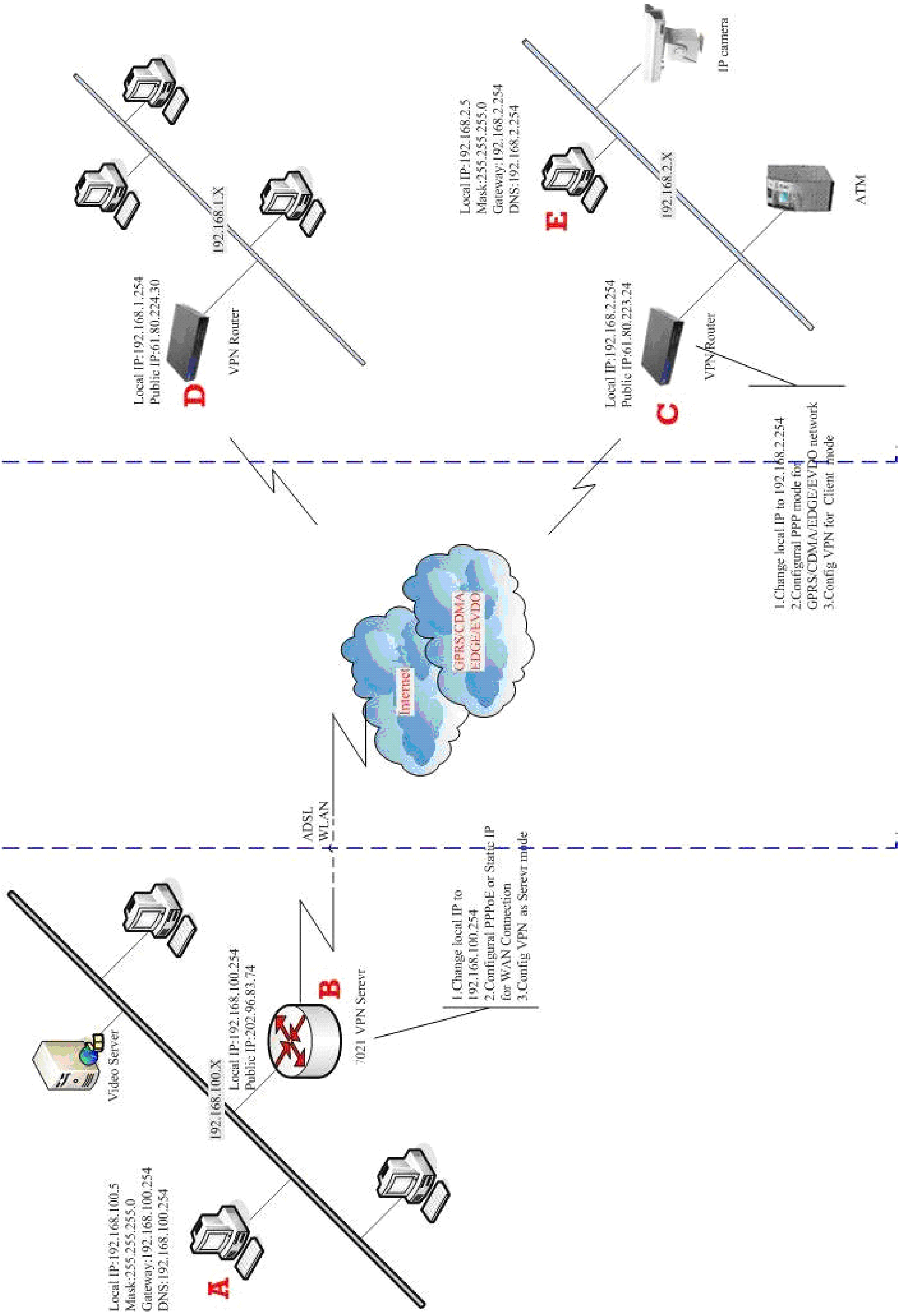
IPSec operates in two phases to allow the confidential exchange of a shared secret:

- Phase 1, which handles the negotiation of security parameters required to establish a secure channel between two IPSec peers. Phase 1 is generally implemented through the Internet Key Exchange (IKE) protocol. If the remote IPSec peer cannot do IKE, you can use manual configuration with pre-shared keys to complete Phase 1.
- Phase 2, which uses the secure tunnel established in Phase 1 to exchange the security parameters required to actually transmit user data.

The secure tunnels used in both phases of IPSec are based on security associations (SAs) used at each IPSec end point. SAs describe the security parameters, such as the type of authentication and encryption that both end points agree to use.

In order To enable and configure IPSec, we prepare a test environment, please according to the diagram and perform the following steps

Note: Point A, B, C, E is must.



1.Change local IP to 192.168.100.254
2.Configural PPPoE or Static IP for WAN Connection
3.Config VPN as Serevr mode

1.Change local IP to 192.168.2.254
2.Configural PPP mode for GPRS/CDMA/EDGE/EVDO network
3.Config VPN for Client mode

In this example, we will be working with a VPN server and two VPN Router. Throughout the screen shots and the rest of the article, I will refer to the following IP address. Please write them down or print them for reference, it will help you understand the rest of the article

about A:
local IP: 192.168.100.5
gateway: 192.168.100.254

about B:
WAN IP:202.96.83.74(from your ISP)
Local Router IP:192.168.100.254

About C:
WAN IP:61.80.223.24(Remote computer on the Internet)
Local Router IP:192.168.2.254
LAN IP Network:192.168.2.x

About D:
WAN IP:61.80.224.30(Remote computer on the Internet)
Local Router IP: 192.168.1.254
LAN IP Network:192.168.1.x

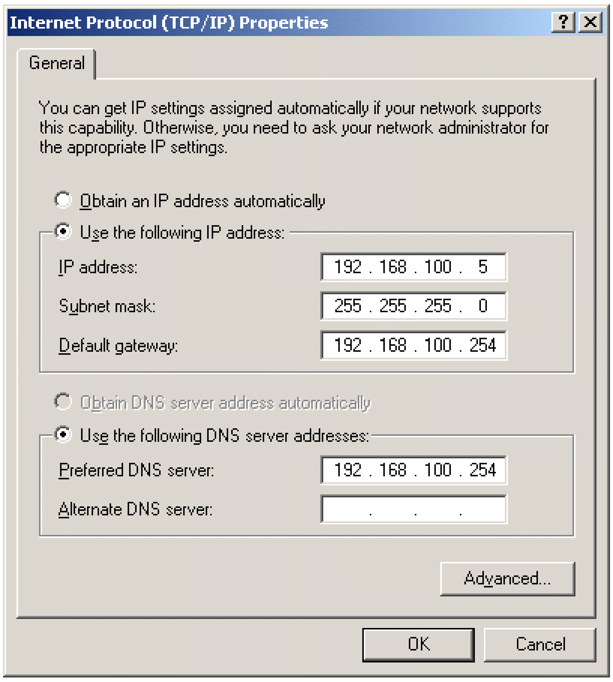
2.1 Notes

It is wise to change the IP Schema of your cellular network from the default your router configures. This will aid you in connecting multiple networks together - especially two VPN routers of the same brand. Often the default IP Schema is 192.168.0.254, all you need to do is change the second Router. In this example, I configure my first Router is 192.168.1.254 and another Router is 192.168.2.254. This step is not totally necessary but it could save you some routing headaches later.

It is also wise to convert your computers over to STATIC IP address instead of dynamic IP address. If your computers have dynamic IP address, you will not know what the IP address is of the computer you want to connect to from the road. One day it might be .2 the next day it might be .5. Again this is not necessary, but it will save you headaches later.

Static IP Schema Example (about A LAN Computer 1)

IP Address:	192.168.100.5
Subnet:	255.255.255.0
Gateway:	192.168.100.254 (router address)
DNS:	192,168.100.254 (router address again)



Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: 192 . 168 . 100 . 5

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 192 . 168 . 100 . 254

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

Preferred DNS server: 192 . 168 . 100 . 254

Alternate DNS server: . . .

Note: You need change PC IP the same with VPN Router Gateway. Otherwise you didn't connection WEB configuration

2.2 VPN server (point B)

You need a H685/H820 or a CISCO router as a vpn server in point B.
And this section describes how to configure H685/H820.

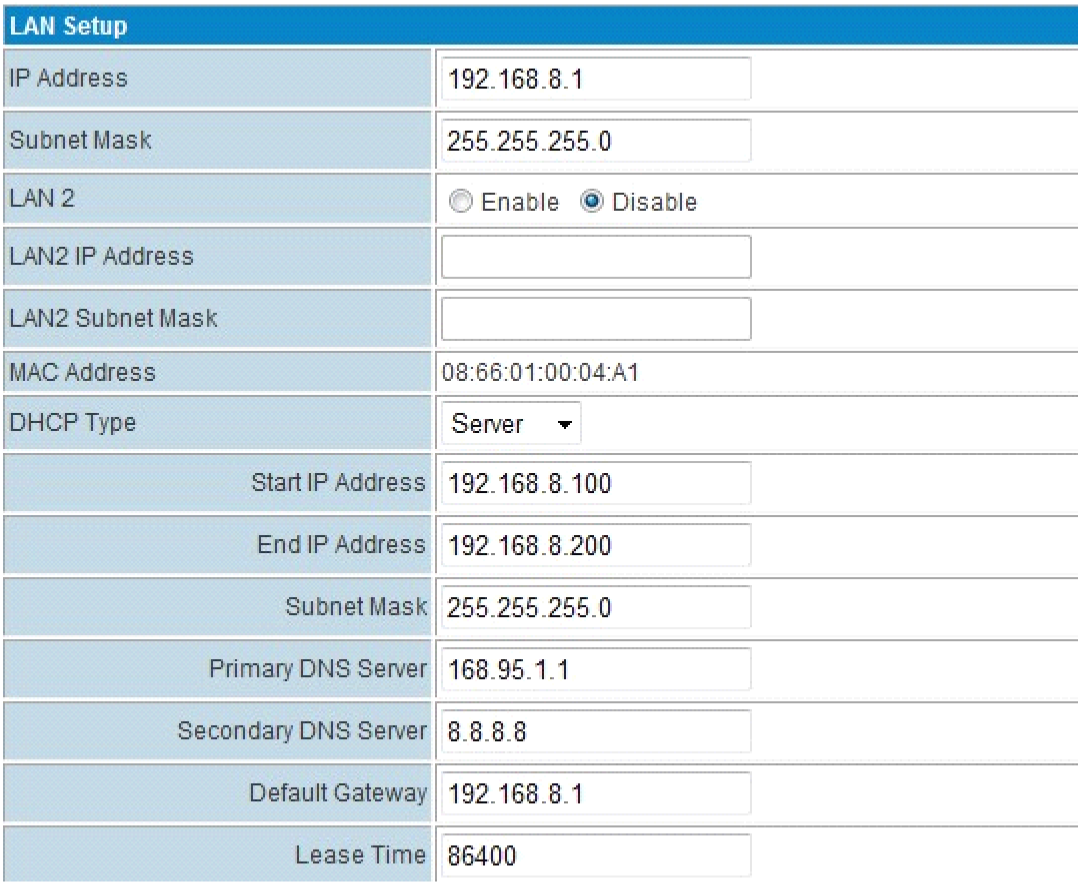
2.2.1Logon the WEB configuration

Access http://192.168.8.1 to configure the VPN router from A point PC, you can see a login window

Default Username: admin
Default Password: admin

Notice: You can change the login password after you succeed logon WEB configuration, Choose "password" menu and change the login password

2.2.2Change local IP



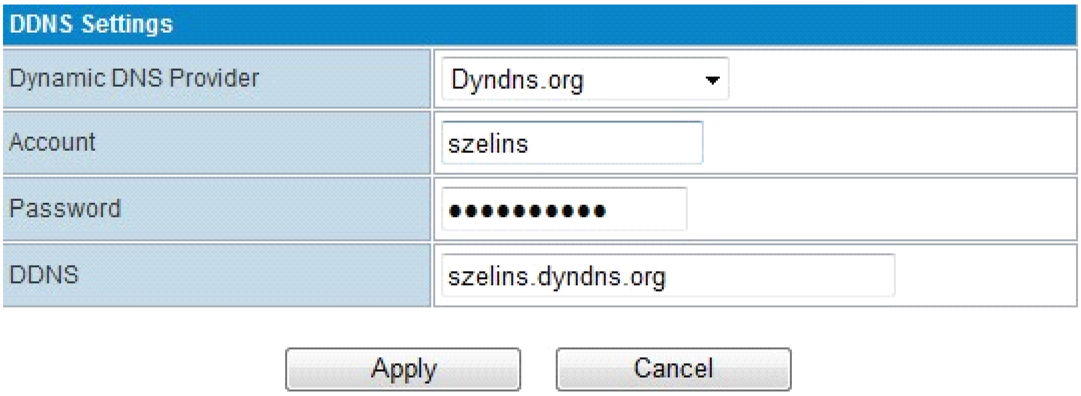
LAN Setup

IP Address	192.168.8.1
Subnet Mask	255.255.255.0
LAN 2	○ Enable ● Disable
LAN2 IP Address	
LAN2 Subnet Mask	
MAC Address	08:66:01:00:04:A1
DHCP Type	Server ▾
Start IP Address	192.168.8.100
End IP Address	192.168.8.200
Subnet Mask	255.255.255.0
Primary DNS Server	168.95.1.1
Secondary DNS Server	8.8.8.8
Default Gateway	192.168.8.1
Lease Time	86400

2.2.3 Configure WAN

Refer to “Chapter 3.3.3.1 WAN – Cellular Network” of the manual (H820_Usermanual.Eng.pdf / H685_Usermanual.Eng.pdf) to configure the WAN.

Configure DDNS if you want to use dynamic IP.



DDNS Settings

Dynamic DNS Provider	Dyndns.org ▾
Account	szelins
Password	●●●●●●●●●●●
DDNS	szelins.dyndns.org

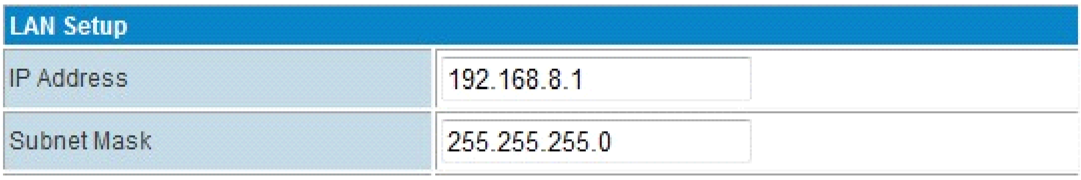
Refer to “Chapter 3.3.14.1.3 DDNS settings” of the manual (H820_Usermanual.Eng.pdf / H685_Usermanual.Eng.pdf) to configure the DDNS.

NOTE: it’s not must if you choose static IP.

2.2.4 Configure VPN Router as VPN Server

The VPN Router also supports VPN Server function. So you can configure it as a VPN server.

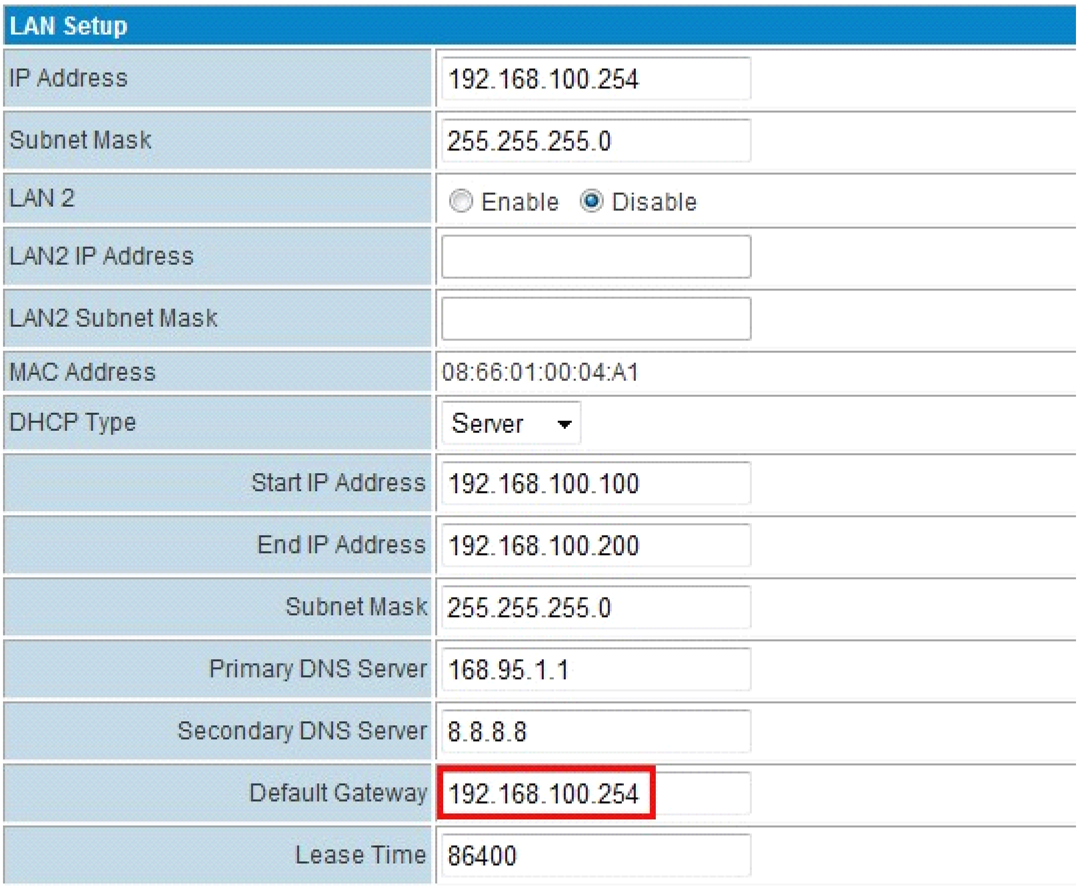
2.2.4.1 Change local IP address



LAN Setup

IP Address	192.168.8.1
Subnet Mask	255.255.255.0

Change local IP with 192.168.100.254



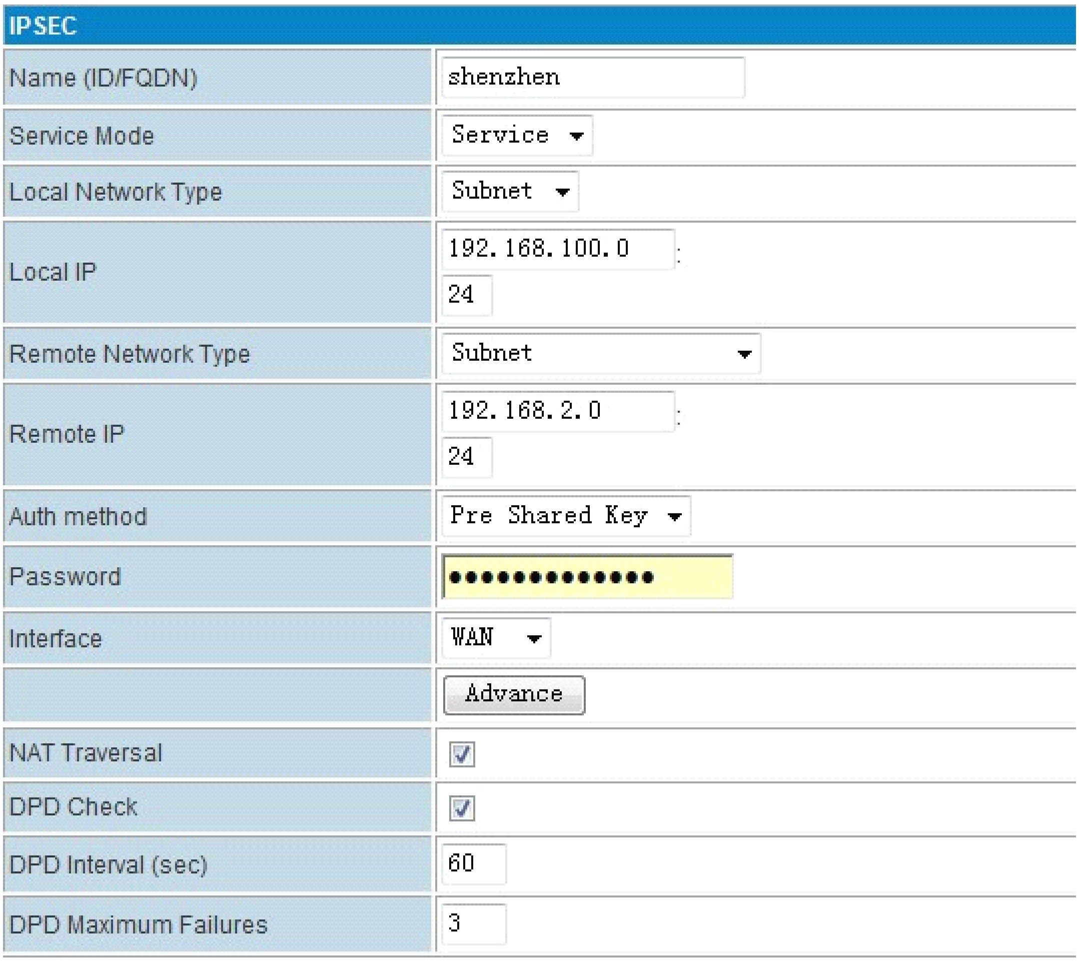
LAN Setup

IP Address	192.168.100.254
Subnet Mask	255.255.255.0
LAN 2	○ Enable ● Disable
LAN2 IP Address	
LAN2 Subnet Mask	
MAC Address	08:66:01:00:04:A1
DHCP Type	Server
Start IP Address	192.168.100.100
End IP Address	192.168.100.200
Subnet Mask	255.255.255.0
Primary DNS Server	168.95.1.1
Secondary DNS Server	8.8.8.8
Default Gateway	192.168.100.254
Lease Time	86400

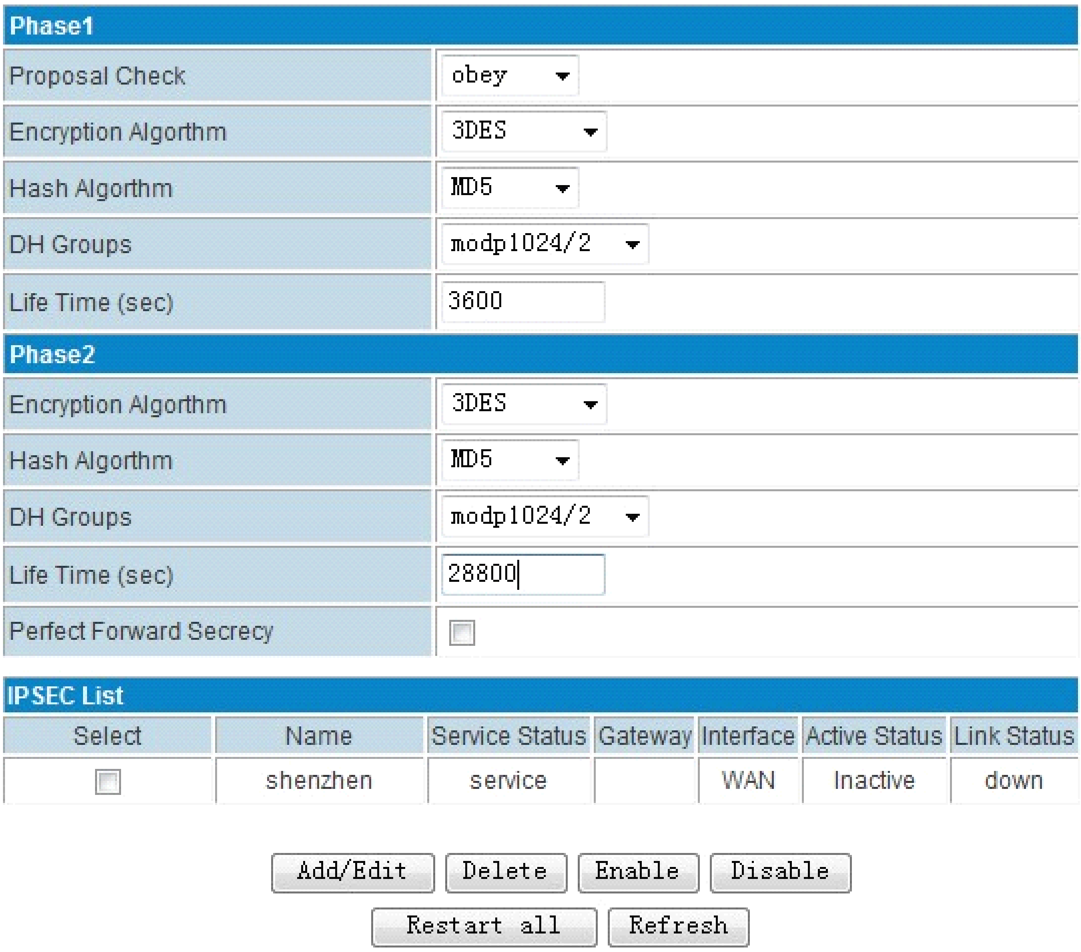
Notes: Do not forget to manually change the “Default Gateway” same as IP Address

2.2.4.2 Configure VPN Server

- Choose VPN>IPSec>Add/Edit
- VPN Server. Configuration as below



IPSEC	
Name (ID/FQDN)	shenzhen
Service Mode	Service
Local Network Type	Subnet
Local IP	192.168.100.0 : 24
Remote Network Type	Subnet
Remote IP	192.168.2.0 : 24
Auth method	Pre Shared Key
Password	••••••••••••••
Interface	WAN
	Advance
NAT Traversal	☑
DPD Check	☑
DPD Interval (sec)	60
DPD Maximum Failures	3



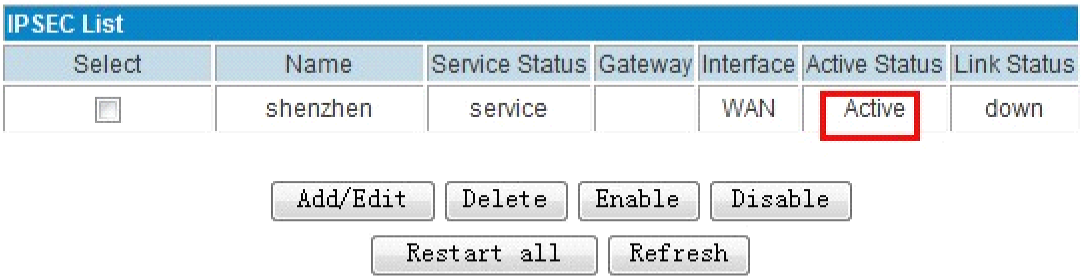
Phase1	
Proposal Check	obey
Encryption Algorthm	3DES
Hash Algorthm	MD5
DH Groups	modp1024/2
Life Time (sec)	3600

Phase2	
Encryption Algorthm	3DES
Hash Algorthm	MD5
DH Groups	modp1024/2
Life Time (sec)	28800
Perfect Forward Secrecy	□

IPSEC List

Select	Name	Service Status	Gateway	Interface	Active Status	Link Status
□	shenzhen	service		WAN	Inactive	down

Notes: Do not “Enable” the configured IPSec VPN.



IPSEC List

Select	Name	Service Status	Gateway	Interface	Active Status	Link Status
□	shenzhen	service		WAN	Active	down

2.2.5 Configure CISCO router as VPN server

You also can use CISCO Router as VPN server.
This is the sample of CISCO7200 configuration:

```
crypto keyring shenzhen
 pre-shared-key hostname shenzhen key test
```

```
crypto isakmp profile shenzhen
 description china SZ shenzhen
   vrf SMEP
   keyring shenzhen
   match identity host shenzhen
   keepalive 60 retry 10

  crypto ipsec transform-set vpnset esp-des esp-md5-hmac

crypto ipsec profile shenzhen
 set transform-set vpnset
 set isakmp-profile shenzhen

crypto dynamic-map shenzhen 1
 set security-association lifetime kilobytes 536870912
 set security-association lifetime seconds 43200
 set transform-set vpnset
 set isakmp-profile shenzhen
 reverse-route
crypto map COREVPN 26 ipsec-isakmp dynamic shenzhen
```

2.3 VPN Client for VPN Router (point C)

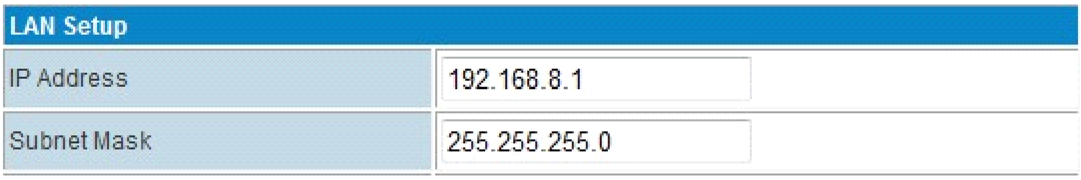
Access http://192.168.8.1 to configure VPN router from point E PC, you can see the following logon window.

Username:	admin
Password:	admin

2.3.1 Configure WAN1

Refer to “Chapter 3.3.3.1 WAN – Cellular Network” of the manual (H820_Usermanual.Eng.pdf / H685_Usermanual.Eng.pdf) to configure the WAN.

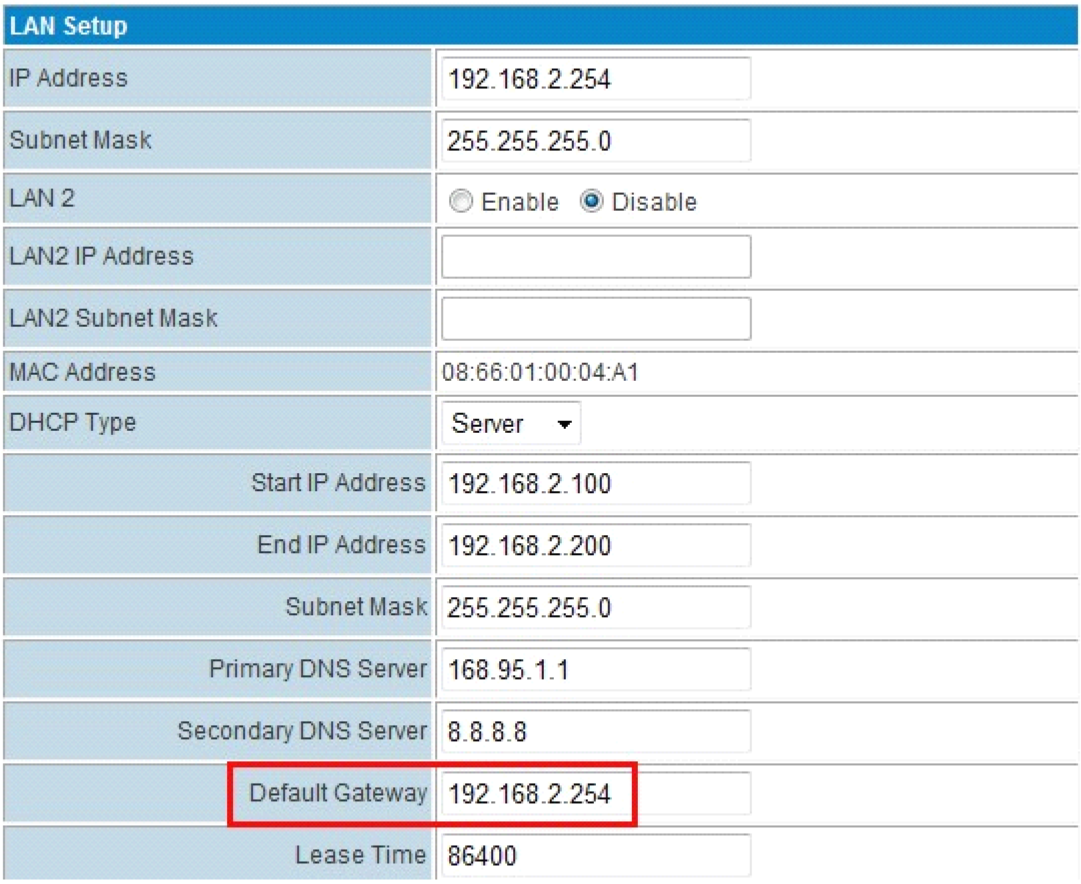
2.3.2 Change local IP address



LAN Setup

IP Address	192.168.8.1
Subnet Mask	255.255.255.0

Change local IP into 192.168.2.254

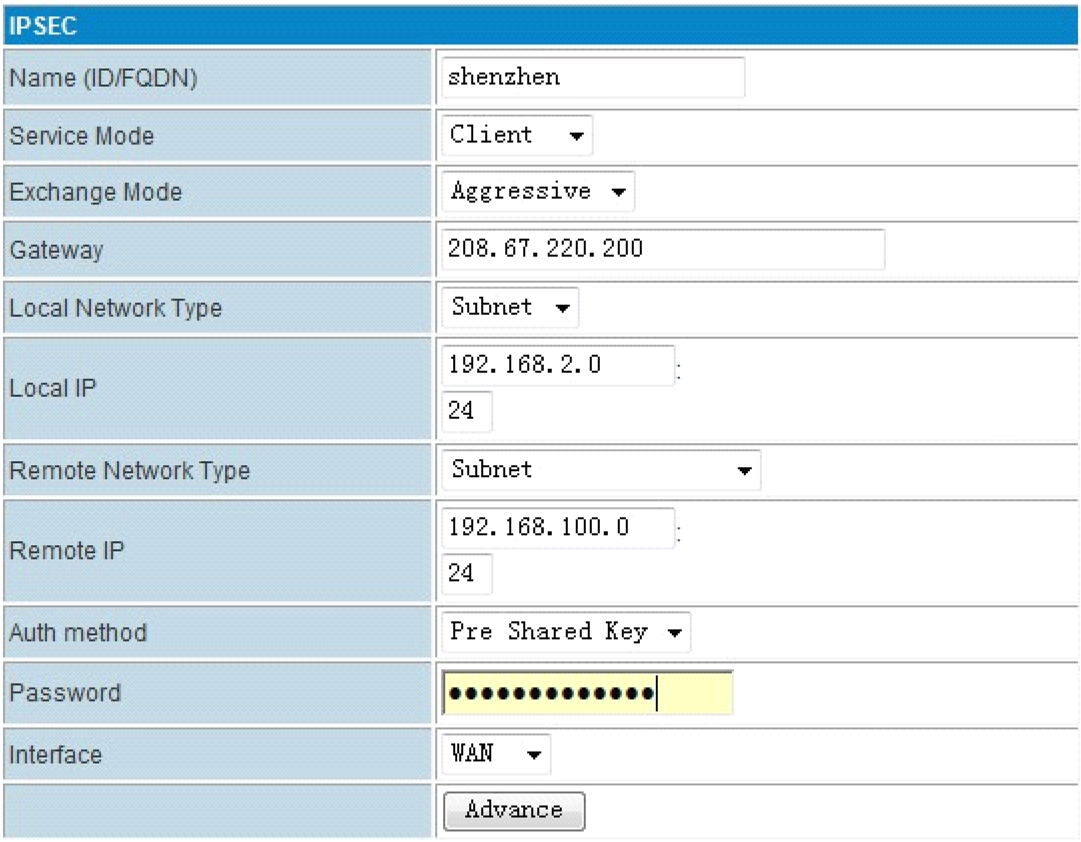


LAN Setup

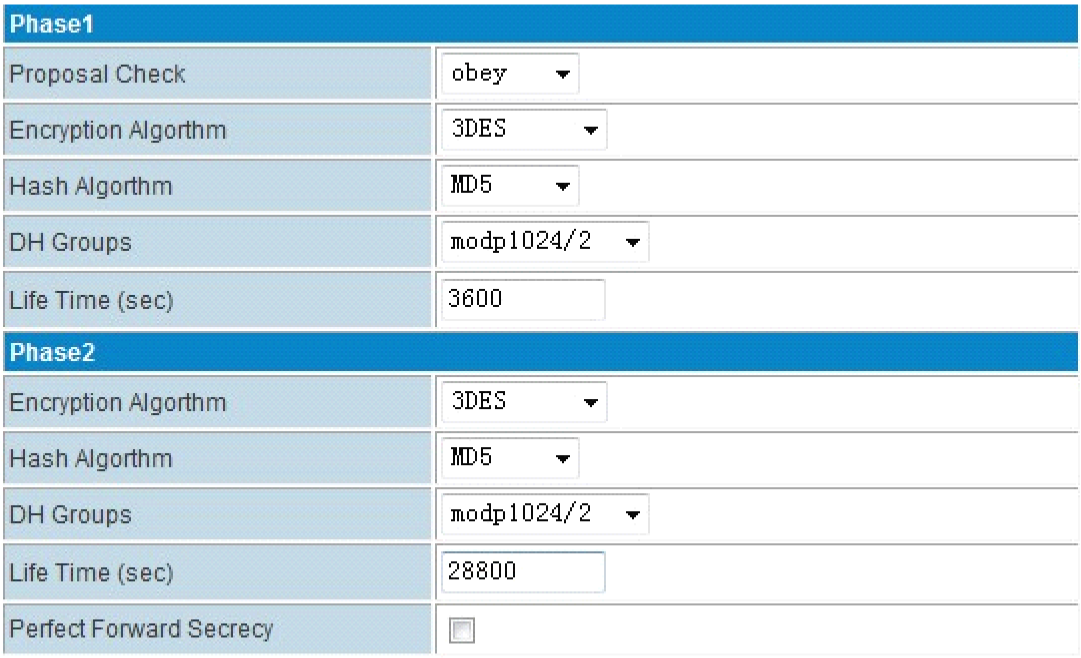
IP Address	192.168.2.254
Subnet Mask	255.255.255.0
LAN 2	○ Enable ● Disable
LAN2 IP Address	
LAN2 Subnet Mask	
MAC Address	08:66:01:00:04:A1
DHCP Type	Server ▾
Start IP Address	192.168.2.100
End IP Address	192.168.2.200
Subnet Mask	255.255.255.0
Primary DNS Server	168.95.1.1
Secondary DNS Server	8.8.8.8
Default Gateway	192.168.2.254
Lease Time	86400

Notes: Do not forget to manually change the “Default Gateway” same as IP Address

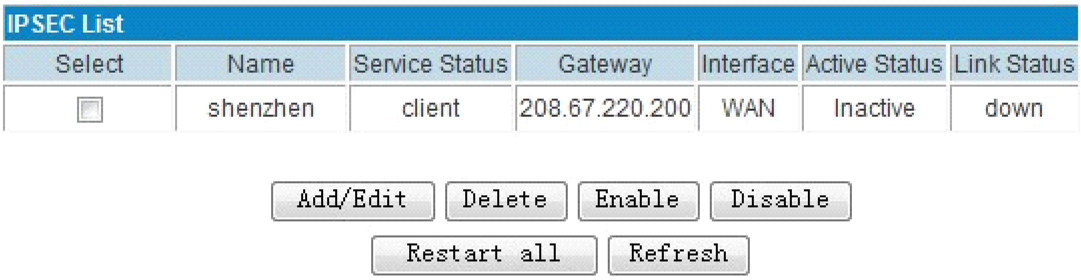
2.3.3Configre VPN Router as Client



IPSEC	
Name (ID/FQDN)	shenzhen
Service Mode	Client
Exchange Mode	Aggressive
Gateway	208.67.220.200
Local Network Type	Subnet
Local IP	192.168.2.0 : 24
Remote Network Type	Subnet
Remote IP	192.168.100.0 : 24
Auth method	Pre Shared Key
Password	●●●●●●●●●●●●●●
Interface	WAN
	Advance

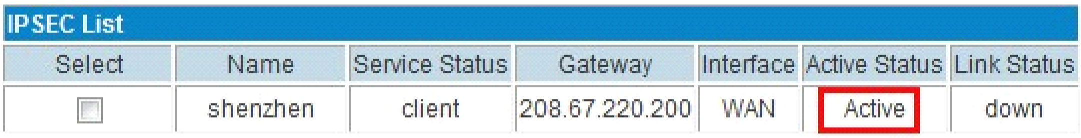


Phase1	
Proposal Check	obey
Encryption Algorthm	3DES
Hash Algorthm	MD5
DH Groups	modp1024/2
Life Time (sec)	3600
Phase2	
Encryption Algorthm	3DES
Hash Algorthm	MD5
DH Groups	modp1024/2
Life Time (sec)	28800
Perfect Forward Secrecy	□


IPSEC List

Select	Name	Service Status	Gateway	Interface	Active Status	Link Status
□	shenzhen	client	208.67.220.200	WAN	Inactive	down

Notes: Do not “Enable” the configured IPSec VPN.


IPSEC List

Select	Name	Service Status	Gateway	Interface	Active Status	Link Status
□	shenzhen	client	208.67.220.200	WAN	Active	down

3 How to configure PPTP

In order to enable and configuring PPTP for VPN, we prepare a test environment, please according to the diagram and perform the following steps
Note: Point A, B, C, E is must.

In this example, we will be working with a VPN server and some PC .Throughout the screen shots and the rest of the article; I will refer to the following IP address. Please write them down or print them for reference, it will help you understand the rest of the article

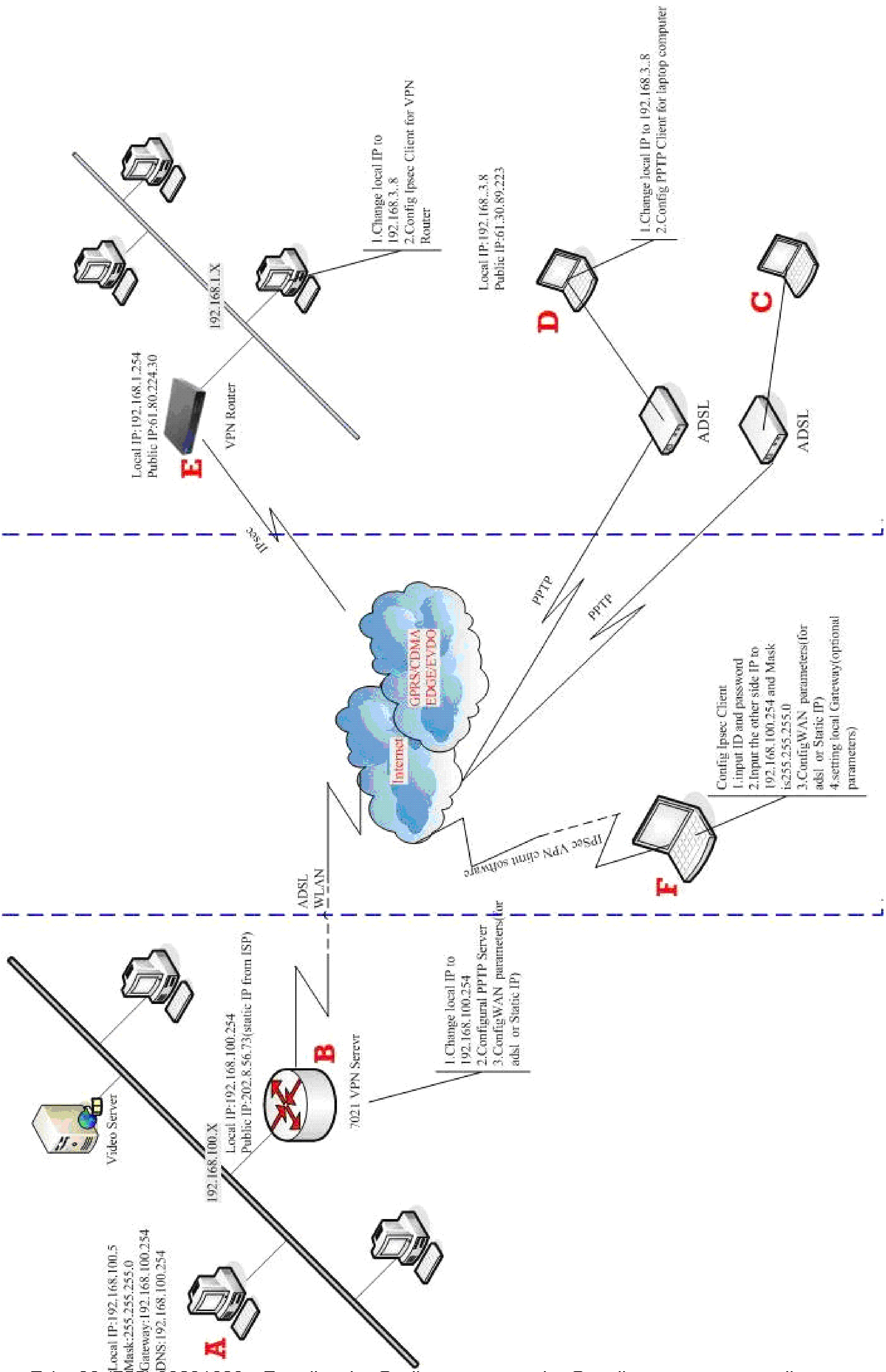
about A:
local IP:192.168.100.5
Subnet mask: 255.255.255.0
gateway:192.168.100.254

about B:
WAN IP:202.56.8.73(from your ISP)
Local Router IP:192.168.100.254

About D:
WAN IP:61.30.89.223(Remote computer on the Internet)
Local Router IP:192.168.3.8

About E:
WAN IP:61.80.224.30(Remote computer on the Internet)
Local Router IP: 192.168.1.254
LAN IP Network:192.168.1.x

about F:
local IP:192.168.100.4
Subnet mask: 255.255.255.0
gateway:192.168.100.254


A
Local IP:192.168.100.5
Mask:255.255.255.0
Gateway:192.168.100.254
DNS:192.168.100.254
Video Server
192.168.100.X
Local IP:192.168.100.254
Public IP:202.8.56.73(static IP from ISP)
B
7021 VPN Serevr
1.Change local IP to 192.168.100.254
2.Configural PPTP Server
3.ConfigWAN parameters(for adsl or Static IP)
ADSL
WLAN
Internet
GPRS/CDMA
EDGE/EVDO
IPsec VPN client software
F
Config Ipsec Client
1.input ID and password
2.Input the other side IP to 192.168.100.254 and Mask is255.255.255.0
3.ConfigWAN parameters(for adsl or Static IP)
4.setting local Gateway(optional parameters)
PPTP
PPTP
Ipsec
E
Local IP:192.168.1.254
Public IP:61.80.224.30
VPN Router
192.168.1.X
1.Change local IP to 192.168.3..8
2.Config Ipsec Client for VPN Router
Local IP:192.168.3..8
Public IP:61.30.89.223
D
1.Change local IP to 192.168.3..8
2.Config PPTP Client for laptop computer
ADSL
ADSL
C

3.1 Notes about IP Your Configuration

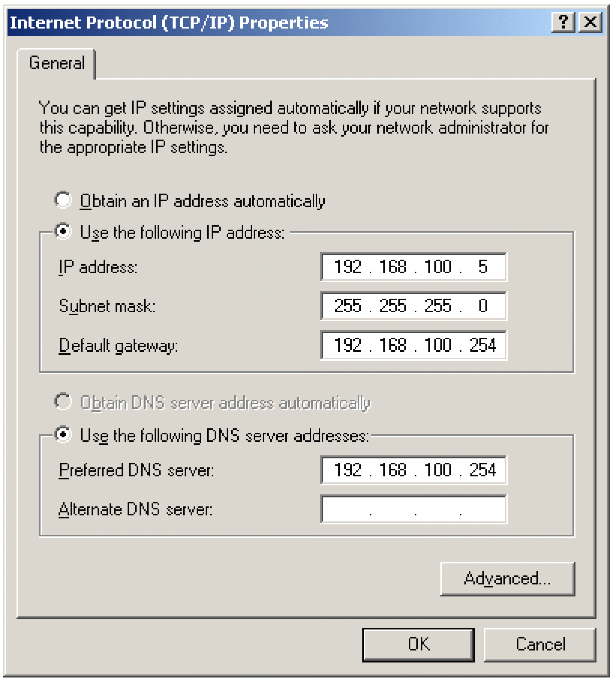
It is wise to change the IP Schema of your cellular network from the default your router configures. This will aid you in connecting multiple networks together - especially two VPN routers of the same brand. Often the default IP Schema is 192.168.0.254, all you need to do is change the second Router. In this example, I made my first Router is 192.168.1.254 and another Router is 192.168.2.254. This step is not totally necessary but it could save you some routing headaches later.

It is also wise to convert your computers over to STATIC IP address instead of dynamic IP address. If your computers have dynamic IP address, you will not know what the IP address is of the computer you want to connect to from the road. One day it might be .2 the next day it might be .5. Again this is not necessary, but it will save you headaches later.

Static IP Schema Example

About A LAN Computer 1

IP Address:	192.168.100.5
Subnet:	255.255.255.0
Gateway:	192.168.100.254 (router address)
DNS:	192,168.100.254 (router address again)



Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: 192 . 168 . 100 . 5

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 192 . 168 . 100 . 254

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

Preferred DNS server: 192 . 168 . 100 . 254

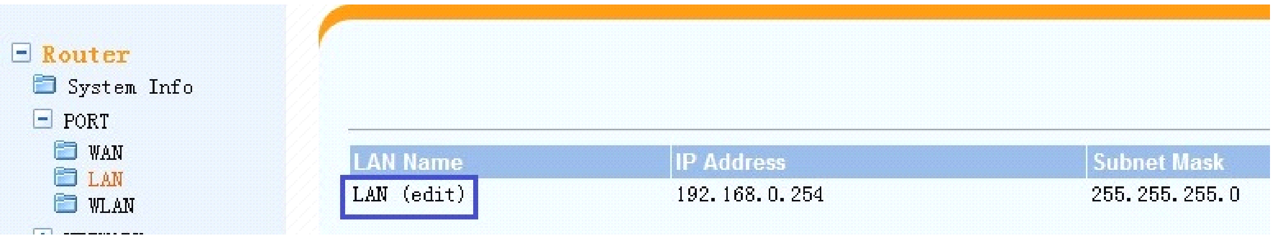
Alternate DNS server: . . .

Note: You need change PC IP the same with VPN Router Gateway. Otherwise you didn’t connection WEB configuration

3.2 PPTP server (point B)

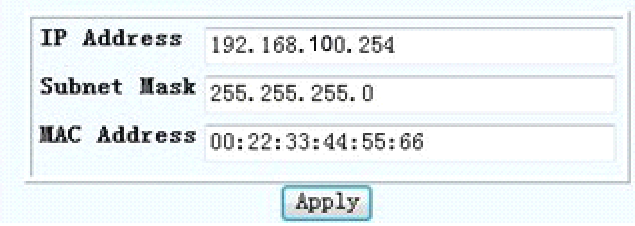
H685/H820 cannot support PPTP Server feature. We use H685m/H700/H720 series router for PPTP Server.

3.2.1Change local IP address



LAN Name	IP Address	Subnet Mask
LAN (edit)	192.168.0.254	255.255.255.0

- Click ”LAN (edit)” to change local IP into 192.168.100.254



IP Address: 192.168.100.254

Subnet Mask: 255.255.255.0

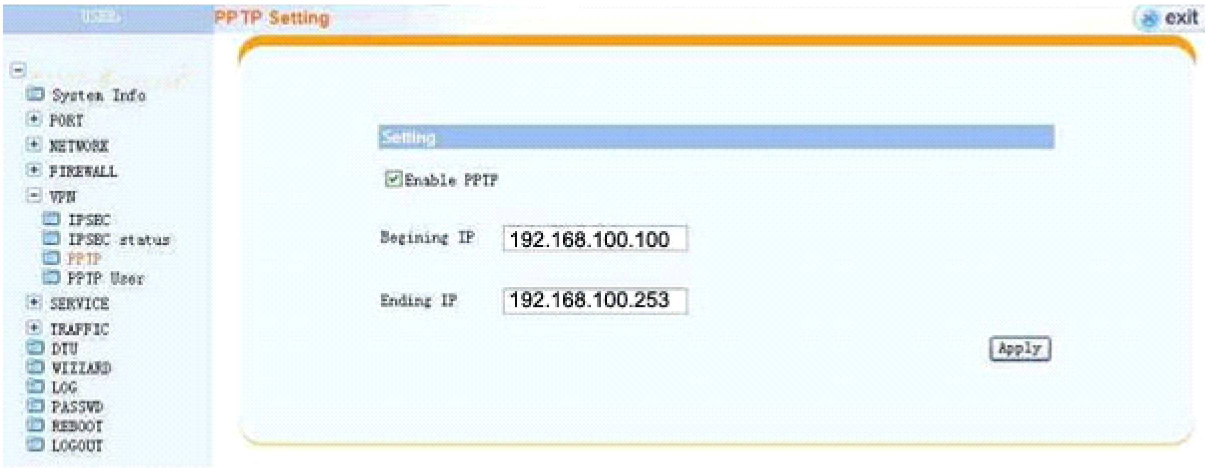
MAC Address: 00:22:33:44:55:66

3.2.2 Configuration WAN

Refer to H685m/H700/H720 usermanual to configure the WAN of H685m/H700/H720.

3.2.3 Configure PPTP Server

Click “VPN”, and choose ”PPTP”, select “Enable PPTP”, type the start IP and end IP as below.



☑ Enable PPTP

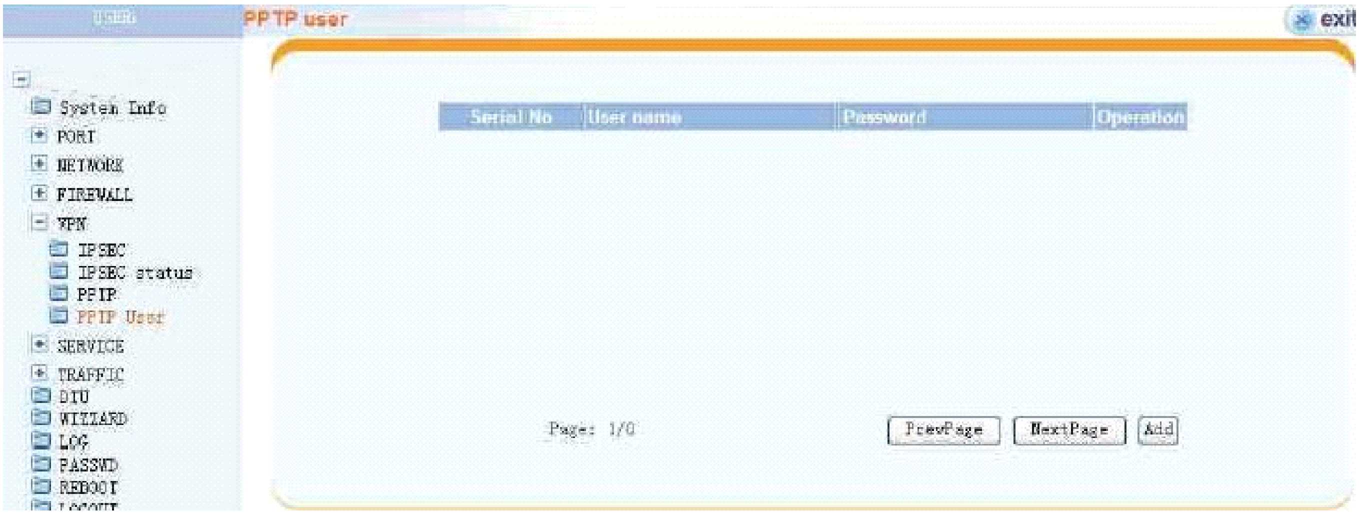
Begining IP: 192.168.100.100

Ending IP: 192.168.100.253

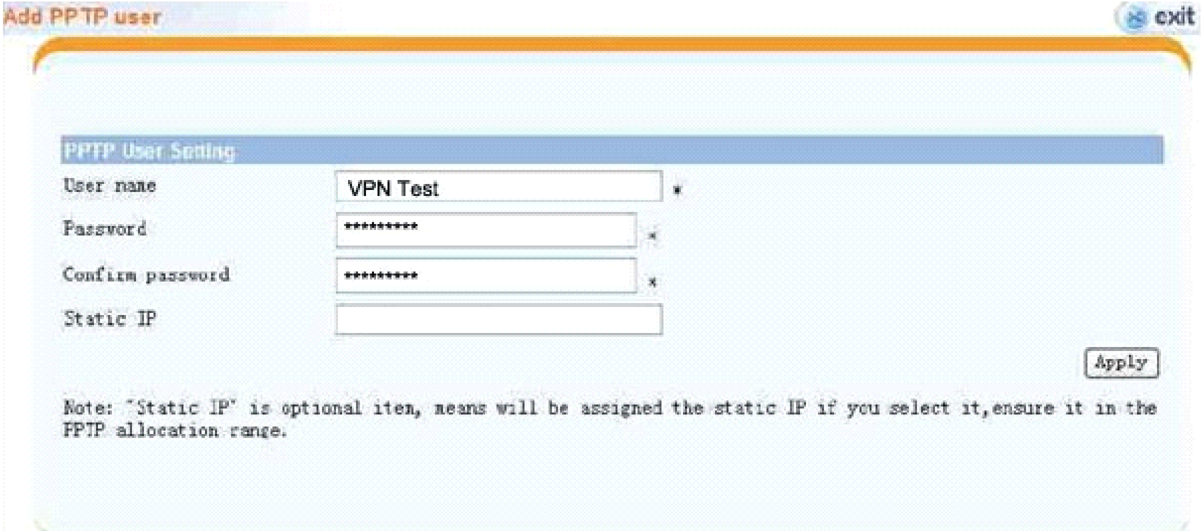
click *Enable PPTP*, and fill in *Beginning IP* and *Ending IP*, which will be assigned to PPTP client. The Beginning IP and Ending IP range must be the same range with the router. For example, the router's IP is 192.168.100.1, then you can put *Beginning IP* as 192.168.100.100 and *Ending IP* as 192.168.100.253

After setting, please re-power on the router.

Follow the picture below, at "VPN –PPTP User"



Click "Add" button,

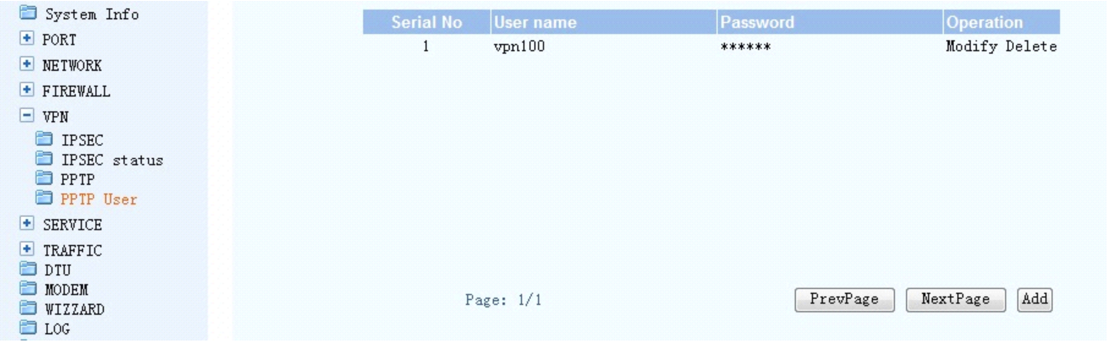


User name	VPN Test *
Password	********** *
Confirm password	********** *
Static IP	

Note: "Static IP" is optional item, means will be assigned the static IP if you select it,ensure it in the PPTP allocation range.

Fill in *User name*, *Password* and *Confirm password*, click Apply button to save.

It will show the following if the user creating is successful.



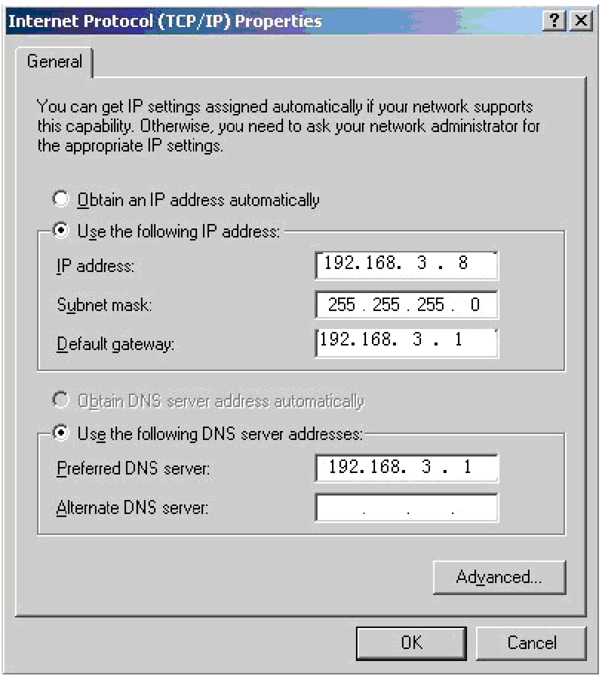
Serial No	User name	Password	Operation
1	vpn100	******	Modify Delete

Page: 1/1

3.3 Laptop/H685(H820) as Client (Point D)

3.3.1Change local IP address

You need change the PC IP as below.



Internet Protocol (TCP/IP) Properties

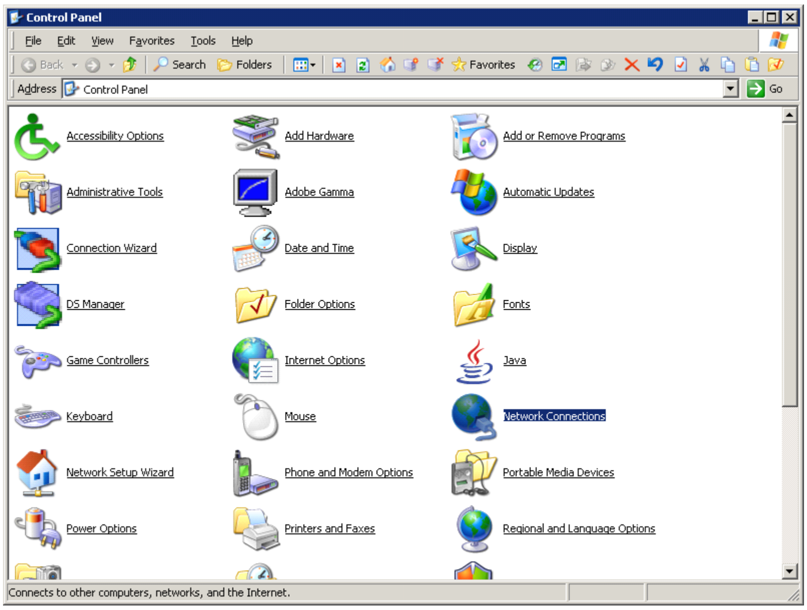
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically
● Use the following IP address:
IP address: 192.168. 3 . 8
Subnet mask: 255 . 255 . 255 . 0
Default gateway: 192.168. 3 . 1

○ Obtain DNS server address automatically
● Use the following DNS server addresses:
Preferred DNS server: 192.168. 3 . 1
Alternate DNS server: . . .

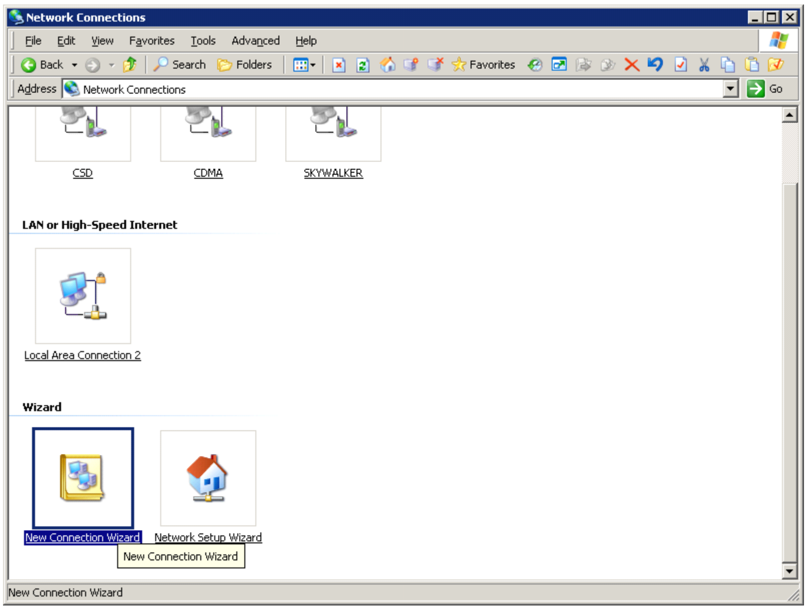
3.3.2Configure PPTP client

Open “Network Connections”.



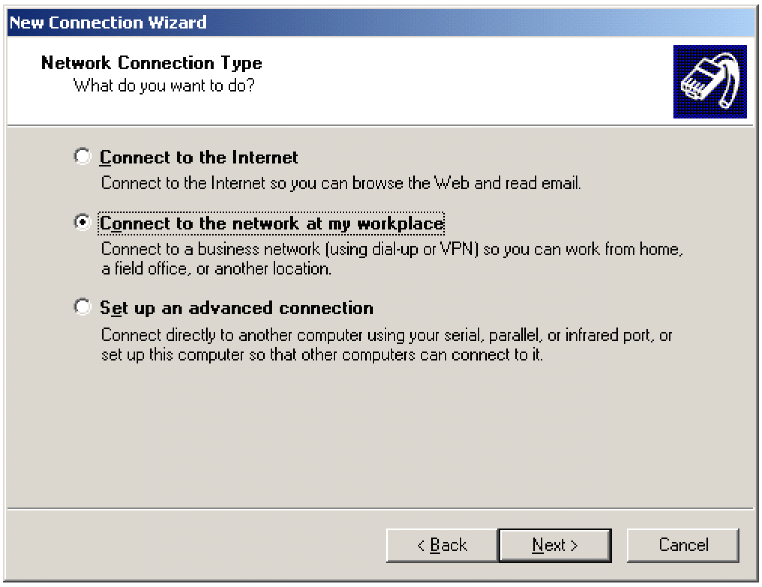
Connects to other computers, networks, and the Internet.

Click “network Connection” ,click “Next” to continue


Network Connections
File Edit View Favorites Tools Advanced Help
Back Search Folders Favorites
Address Network Connections Go
CSD
CDMA
SKYWALKER
LAN or High-Speed Internet
Local Area Connection 2
Wizard
New Connection Wizard
Network Setup Wizard
New Connection Wizard

New Connection Wizard

The Network Connection Wizard opens. Click“Next”to continue. Put a check mark on “Connect to the Internet at my workplace” and click next



New Connection Wizard

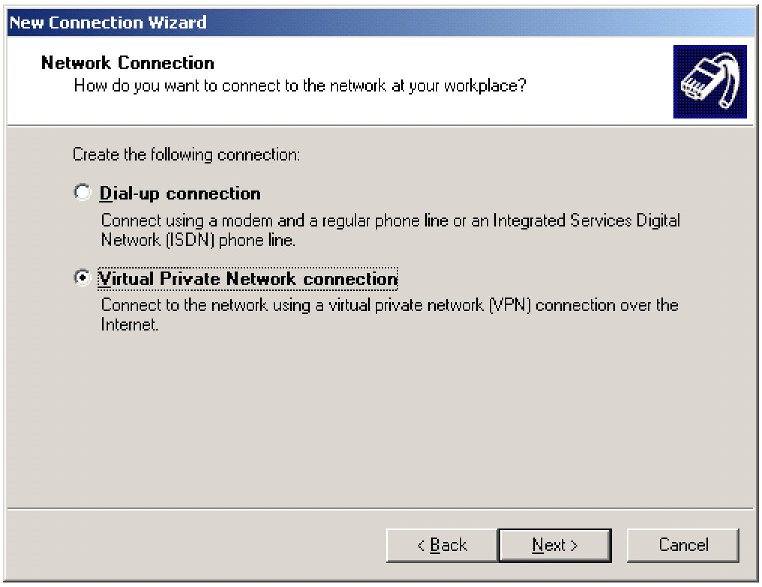
Network Connection Type
What do you want to do?

○ Connect to the Internet
Connect to the Internet so you can browse the Web and read email.

● Connect to the network at my workplace
Connect to a business network (using dial-up or VPN) so you can work from home, a field office, or another location.

○ Set up an advanced connection
Connect directly to another computer using your serial, parallel, or infrared port, or set up this computer so that other computers can connect to it.

Select the option “Virtual Private Network connect” and click next



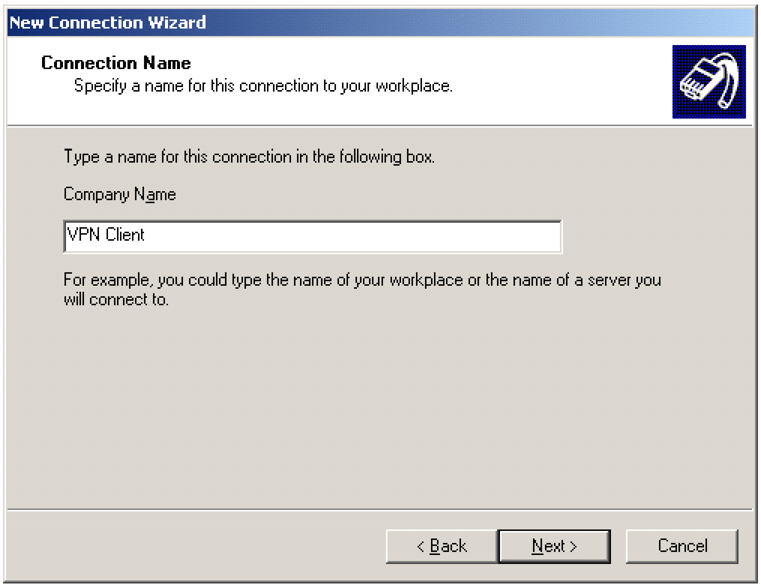
New Connection Wizard

Network Connection
How do you want to connect to the network at your workplace?

Create the following connection:

○ Dial-up connection
Connect using a modem and a regular phone line or an Integrated Services Digital Network (ISDN) phone line.

● Virtual Private Network connection
Connect to the network using a virtual private network (VPN) connection over the Internet.



New Connection Wizard

Connection Name
Specify a name for this connection to your workplace.

Type a name for this connection in the following box.

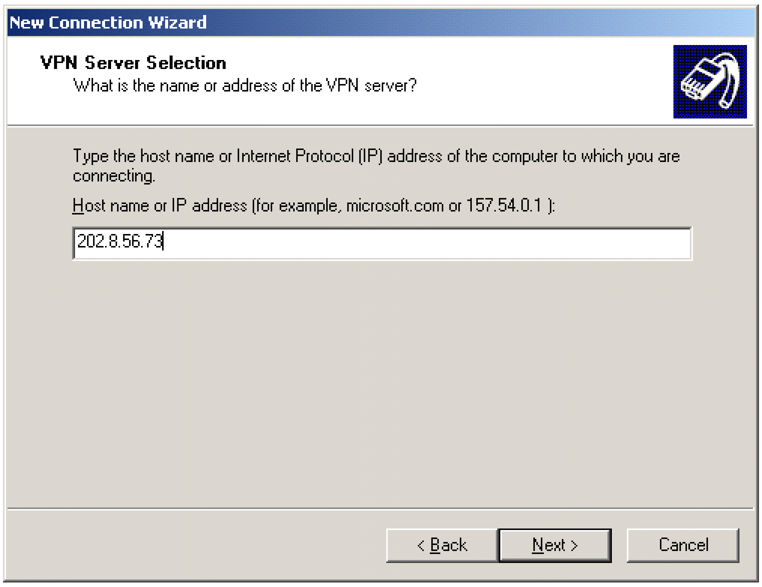
Company Name

VPN Client

For example, you could type the name of your workplace or the name of a server you will connect to.

Type a name for this connection

Type the host name it was VPN server IP address of the computer



New Connection Wizard

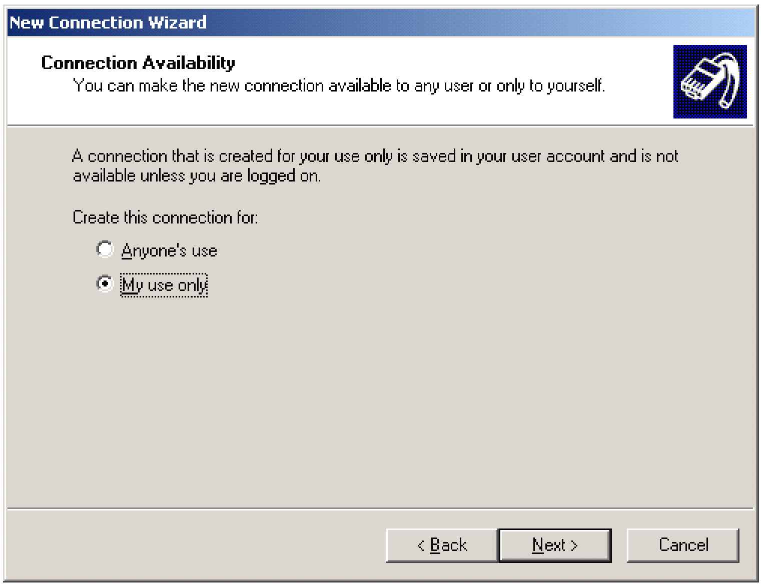
VPN Server Selection
What is the name or address of the VPN server?

Type the host name or Internet Protocol (IP) address of the computer to which you are connecting.

Host name or IP address (for example, microsoft.com or 157.54.0.1):

202.8.56.73

Select “my Use only “option



New Connection Wizard

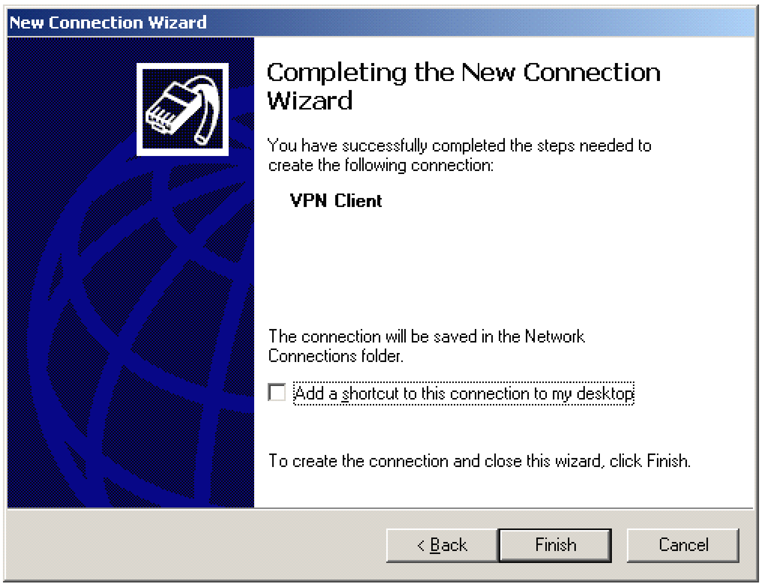
Connection Availability
You can make the new connection available to any user or only to yourself.

A connection that is created for your use only is saved in your user account and is not available unless you are logged on.

Create this connection for:

○ Anyone's use
● My use only

As showing below picture, Click “Finish” to succeed your new Connection installation



New Connection Wizard

Completing the New Connection Wizard

You have successfully completed the steps needed to create the following connection:

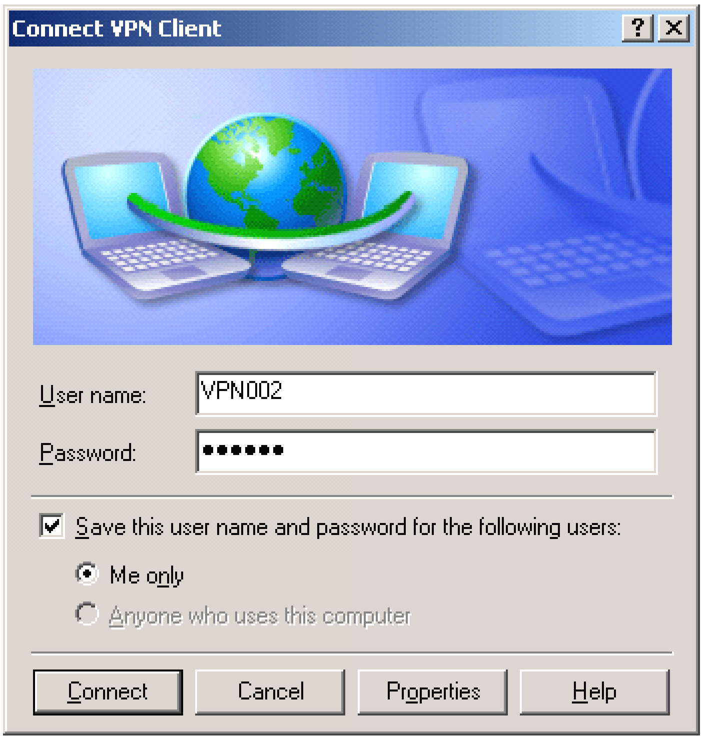
VPN Client

The connection will be saved in the Network Connections folder.

□ Add a shortcut to this connection to my desktop

To create the connection and close this wizard, click Finish.

Input user name and password, Connection will be create when both of them is the same with that in the server



Connect VPN Client

User name: VPN002

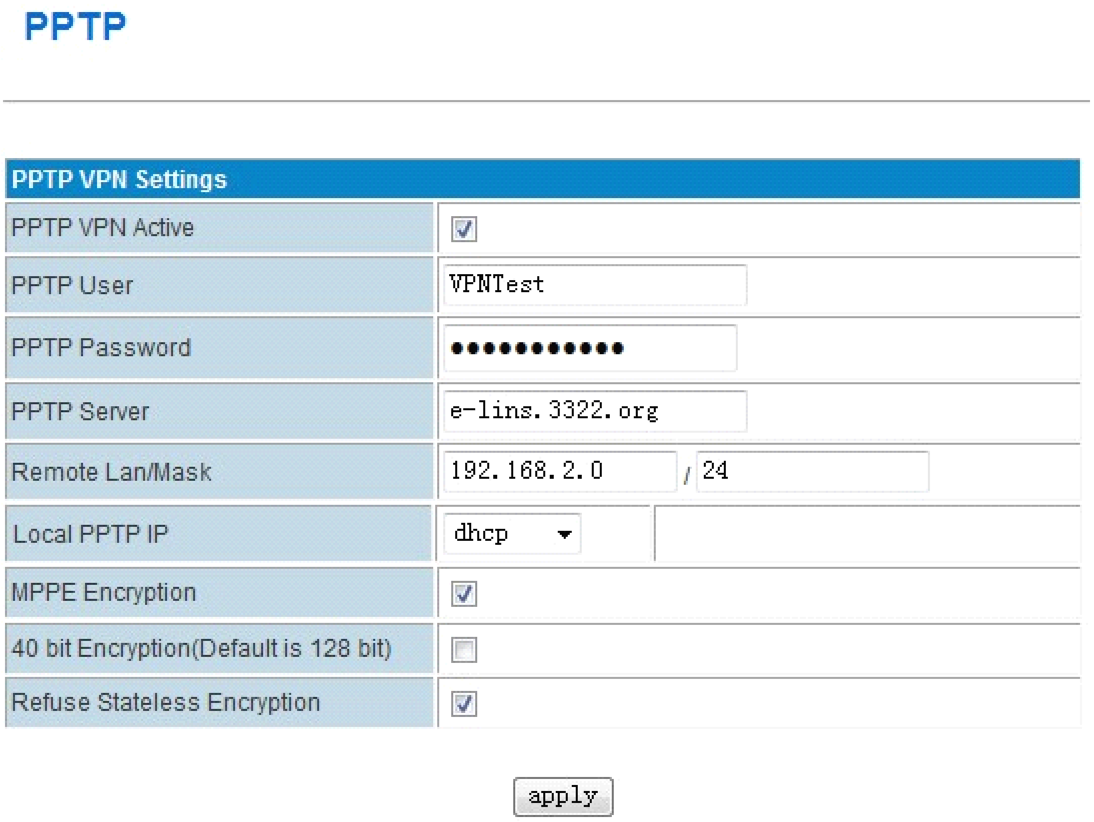
Password: ●●●●●●

☑ Save this user name and password for the following users:

● Me only

○ Anyone who uses this computer

3.3.3 Configure PPTP client of H685/H820



PPTP

PPTP VPN Settings	
PPTP VPN Active	☑
PPTP User	VPNTest
PPTP Password	●●●●●●●●●●●
PPTP Server	e-lins.3322.org
Remote Lan/Mask	192.168.2.0 / 24
Local PPTP IP	dhcp
MPPE Encryption	☑
40 bit Encryption(Default is 128 bit)	□
Refuse Stateless Encryption	☑

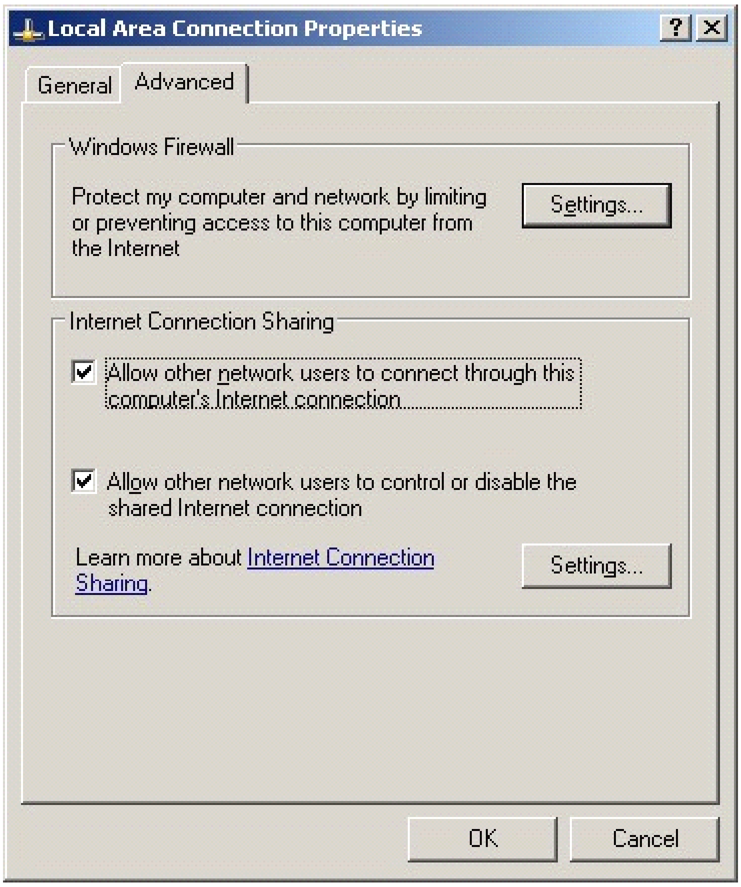
3.4 IPSec Client for Software (Point F)

3.4.1 Configure IPSec Client of Software

3.4.1.1 Set-up

This software is suit for Win2000，Win2003，and Windows XP System, but Win2000 system need to add install SP3 or SP4.

It is suitable for personal user and subnet user connects to the company network, after you have succeeded in dialup to create a VPN network. If you need to put this computer as Gateway .at subnet network to make VPN communication. When your install it, please choice install “VPN_NAT”, don’t used NAT from window offer (it means our common used of “internet connection sharing”)



Windows Firewall

Protect my computer and network by limiting or preventing access to this computer from the Internet

Settings...

Internet Connection Sharing

☑ Allow other network users to connect through this computer's Internet connection

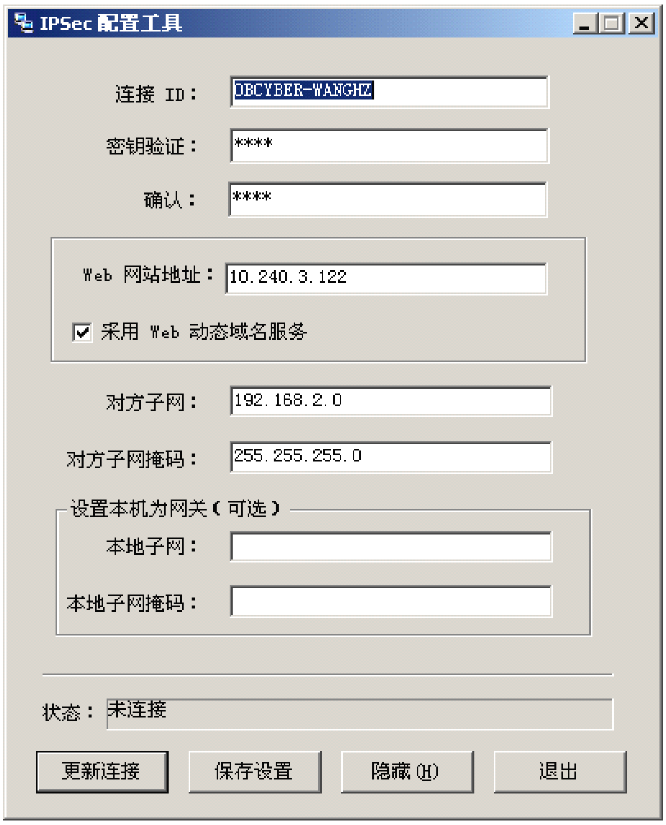
☑ Allow other network users to control or disable the shared Internet connection

Learn more about Internet Connection Sharing.

Settings...

3.4.1.2 Configure IPSec Tool

If you have succeed create a new Connection installation, Run the IPSec configure tools,



连接 ID：0BCYBER-WANGHZ

密钥验证：****

确认：****

Web 网站地址：10.240.3.122

☑ 采用 Web 动态域名服务

对方子网：192.168.2.0

对方子网掩码：255.255.255.0

设置本机为网关（可选）

本地子网：

本地子网掩码：

状态：未连接

According to configuration for your VPN Router Server, type the connection ID, password, etc.