

Starbridge Lynx 524 Wireless ADSL Router

User Manual

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1 Overview

Thank you for choosing our product. The Starbridge Lynx 524 Wireless ADSL Router uses Broadcom's CPE solution that fully complies with ADSL, ADSL2 , ADSL2+ and IEEE802.11b/g standards. It will provide your SOHO with convenient Internet access.

1.1 Features

1.1.1 Data Rate

- Downstream data rate up to 24 Mbps
- Upstream data rate up to 1Mbps

1.1.2 ADSL Compliance

- ITU G.992.1 (G.DMT)
- ITU G.992.2 (G.Lite)
- ITU G.992.3 (G.DMT.BIS)
- ITU G.992.4 (G.lite.bis)
- ITU G.992.5
- ITU G.994.1 (G.hs)
- Compatible with all T1.413 issue 2 (full rate DMT over analog POTS), and CO DSLAM equipment
- TR-069 compliant with ACS

1.1.3 Wireless

- Fully IEEE 802.11b & IEEE 802.11g compatible
- Wireless data rate up to 54 Mbps
- Operating in the unlicensed 2.4 GHz ISM band
- Supports 64/128 bits WEP security and user authentication

1.1.4 Network Protocol & Features

- Ethernet to ADSL Self-Learning Transparent Bridging
- Internet Control Message Protocol (ICMP)
- IP Static Routing

- Routing Information Protocol (RIP, RIPv2)
- Network Address Translation (NAT)
- Virtual Server, Port Forwarding
- Dynamic Host Configuration Protocol (DHCP)
- DNS Relay, DDNS
- IGMP Proxy
- Simple Network Time Protocol (SNTP)
- VPN pass-through (IPSec/PPTP/L2TP)
- Parent control

1.1.5 ATM Capabilities

- RFC 1483 Multi-protocol over ATM “Bridged Ethernet” compliant
- RFC 2364 PPP over ATM compliant
- RFC 2516 PPP over Ethernet compliant
- ATM Forum UNI3.1/4.0 PVC - Up to 8 PVCs
- VPI Range: 0-255
- VCI Range: 32-65535
- UNI 3.0 & 3.1 Signaling
- ATM AAL5 (Adaption Layer type 5)
- OAM F4/F5

1.1.6 FIREWALL

- Built-in NAT
- MAC Filtering
- Packet Filtering
- Stateful Packet Inspection (SPI)
- Denial of Service Prevention (DoS)
- DMZ

1.1.7 Management Support

- Web Based GUI
- Upgrade or update via FTP/HTTP
- Command Line Interface via Telnet
- Diagnostic Test
- Firmware upgrade-able for future feature enhancement

1.1.8 Operating System Support

- WINDOWS 98/SE/ME/2000/XP/VISTA
- Macintosh
- LINUX

1.1.9 Environmental

- Operating humidity: 10%-90% non-condensing
- Non-operating storage humidity: 5%-95% non-condensing

1.2 Packet Contents

The packet contents are as the following:

- | | |
|---------------------|-----|
| ● ADSL ROUTER | x 1 |
| ● External Splitter | x 1 |
| ● Power Adapter | x 1 |
| ● Telephone Line | x 1 |
| ● Ethernet Cable | x 1 |
| ● User Manual(CD) | x 1 |

1.3 System Requirements

Before using this ROUTER, verify that you meet the following requirements:

- Subscription for ADSL service. Your ADSL service provider should provide you with at least one valid IP address (static assignment or dynamic assignment via dial-up connection).
- One or more computers, each contains an Ethernet 10/100M Base-T network interface card (NIC).

- A hub or switch, if you are connecting the device to more than one computer.
- For system configuration using the supplied web-based program: A web browser such as Internet Explorer v5.0 or later, or Netscape v4.7 or later.

1.4 Factory Defaults

The device is configured with the following factory defaults:

- IP Address: 192.168.1.1
- Subnet Mask: 255.255.255.0
- SSID: Lynx524
- Encapsulation: RFC 2516 LLC
- VPI/VCI: According to local information

1.5 Warnings and Cautions

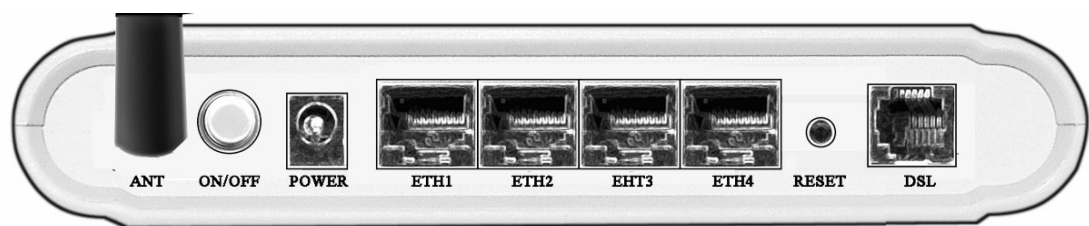
- Never install telephone wiring during storm. Avoid using a telephone during an electrical storm. There might be a risk of electric shock from lightening.
- Do not install telephone jacks in wet locations and never use the product near water.
- To prevent dangerous overloading of the power circuit, be careful about the designed maximum power load ratings. Not to follow the rating guideline could result in a dangerous situation.
- Please note that telephone line on modem must adopt the primary line that directly outputs from junction box. Do not connect Router to extension phone. In addition, if your house developer divides a telephone line to multi sockets inside the wall of house, please only use the telephone that has connected with the splitter of ADSL Router when you access the Internet. Under the above condition, if you also install telephone with anti-cheat-dial device, please pull out this kind of telephone, otherwise ADSL Router may occur frequently off-line.

2 Hardware Description

Front Panel



| LED | Color | Function |
|--------|-------|--|
| PWR | Green | On: Power Off: No power |
| ETH1-4 | Green | On: LAN link established and active via LAN port Blinking: ADSL data activity occurs Off: No LAN link via LAN port |
| WLAN | Green | On: The wireless module is ready and idle Blinking: Data transmitting or receiving over WLAN Off :The wireless module is not installed |
| DSL | Green | On: ADSL link established and active Quick blinking: ADSL is trying to establish a connection Slow blinking: No ADSL link |
| INET | Green | Blinking: ADSL data activity occurs. Off: No ADSL data is being sent or received |



Rear panel

| Port | Function |
|--------|--|
| DSL | Connect the device to an ADSL telephone jack or splitter using a RJ-11 telephone cable |
| RESET | System reset or reset to factory defaults. |
| LAN | Connect the device to user's PC's Ethernet port, or to the uplink port on user's hub/switch, using a RJ-45 cable |
| POWER | Connect to the supplied power adapter |
| ON/OFF | Switch it on or off |
| ANT | Antenna interface |

3 Hardware Installation

This chapter shows user how to connect Router. Meanwhile, it introduces the appropriate environment for the Router and installation instructions.

1. Using a telephone line to connect the **DSL** port of ROUTER to the **Modem** port of the splitter, and using a other telephone line connect user's telephone to the **PHONE** port of the splitter, then connect the wall phone jack to the **LINE** port of the splitter.

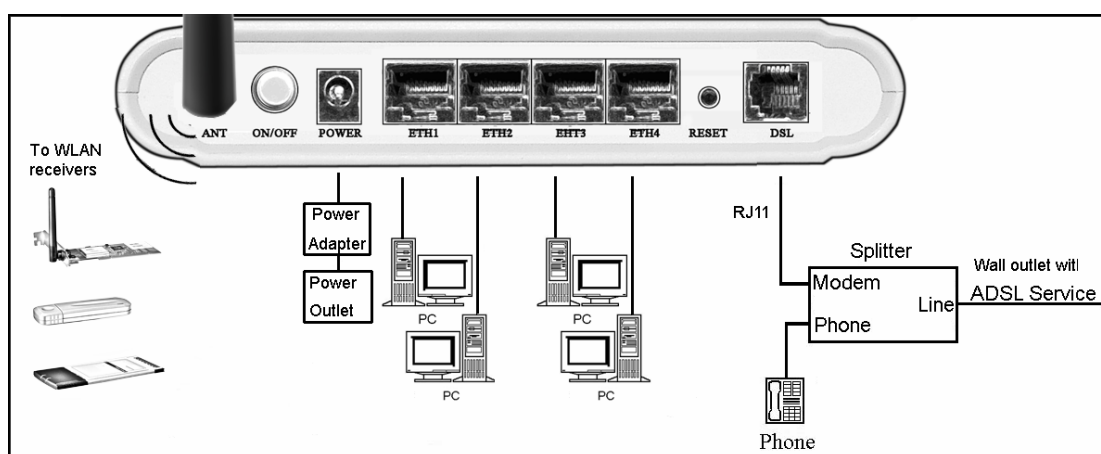
The splitter comes with three connectors as below:

LINE: Connects to a wall phone jack (RJ-11 jack)

ROUTER: Connects to the DSL jack of ROUTER

PHONE: Connects to a telephone set

2. Using an Ethernet Cable to connect the LAN port of the ROUTER to user's LAN or a PC with network card installed. Or using an USB cables to connect the USB port of the ROUTER to user's PC.



3. Connect the power cable to the PWR connector on ROUTER, then plug in the AC power adapter to the AC power outlet, and then press the on-off button.

Notes: Without the splitter and certain situation, transient noise from telephone can interfere with the operation of the Router, and the Router may introduce noise to the telephone line. To prevent this from happening, a small external splitter must be connected to each telephone.

4 PC Configuration Guide

4.1 Local PC Configuration in Windows 95, 98, ME, XP

1. In the Windows task bar, click the “Start” button, point to “Settings”, and then click “Control Panel”.
2. Double-click the “Network” icon.
3. On the “Configuration” tab, select the TCP/IP network associated with user’s network card and then click “Properties”.
4. In the “TCP/IP Properties” dialog box, click the “IP Address” tab. Set the IP address as 192.168.1.x (x can be a decimal number from 2 to 254.) like 192.168.1.2, and the subnet mask as 255.255.255.0.
5. On the “Gateway” tab, set a new gateway as 192.168.1.1, and then click “Add”.
6. Configure the “DNS” tab if necessary. For information on the IP address of the DNS server, please consult with user’s ISP.
7. Click “OK” twice to confirm and save user’s changes.
8. User will be prompted to restart Windows. Click “Yes”.

4.2 Local PC Configuration in Windows 2000

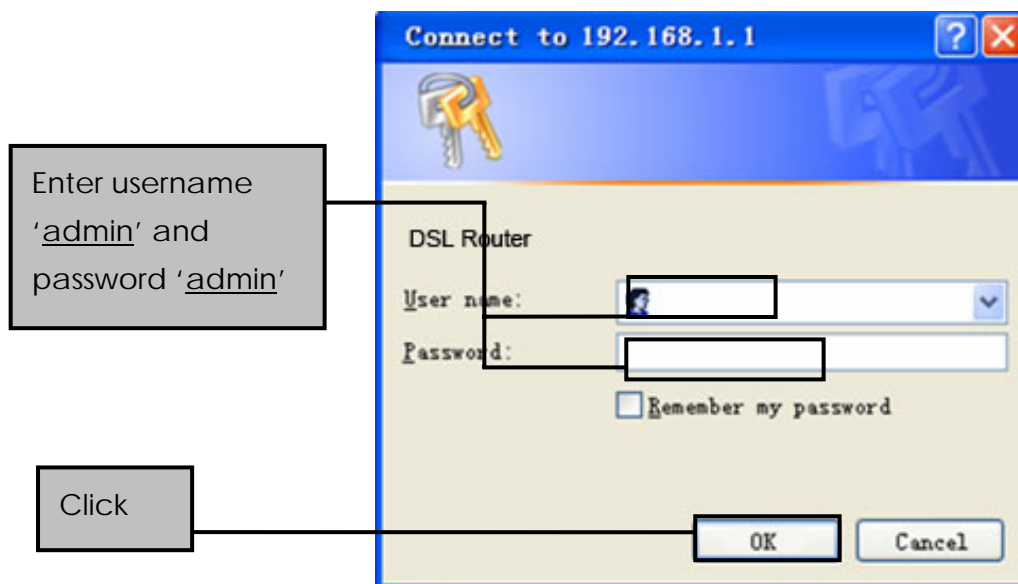
1. In the Windows task bar, click the “Start” button, point to “Settings”, and then click “Control Panel”.
2. Double-click the “Network and Dial-up Connections” icon.
3. In the “Network and Dial-up Connections” window, right-click the “Local Area Connection” icon, and then select “Properties”.
4. Highlight “Internet Protocol (TCP/IP)”, and then click “Properties”.
5. In the “Internet Protocol (TCP/IP) Properties” dialog box, set the IP address as 192.168.1.x (x can be a decimal number from 2 to 254.), and the subnet mask as 255.255.255.0 and the default gateway as 192.168.1.1. Then click “OK”.
6. Configure the “DNS” tab if necessary. For information on the IP address of the DNS server, please consult with user’s ISP.
7. Click “OK” twice to confirm and save user’s changes.

5 Web-based Management Guide

In order to use the web-based management software, it will be necessary to use a computer that occupies the same subnet as the Router. The simplest way to do this for many users will be to use DHCP server that is enabled by default on the Router.

5.1 LAN setting page

Launch a web browser, such as Internet Explorer, and then use <http://192.168.1.1> to log on to the setting pages.



After user log in to the modem, the general status page appears.

5.2 Internet Access Configuration

The setup wizard will guide you to configure the DSL router to access Internet.

Quick Setup

If there aren't any pre-configured PVCs in the router, you can find **Quick Setup** option on the left of router configuration page. Or user can delete the PVCs pre-configured to find the option.

1. From home page, click **Quick Setup**.

ATM PVC Configuration

Select the check box below to enable DSL Auto-connect process.

☒ DSL Auto-connect

2. Unselect the check box to disable DSL Auto-connect process. Set VPI/VCI value provided by your ISP.

The Port Identifier (PORT) Virtual Path Identifier (VPI) and Virtual Channel Identifier (VCI) are needed for setting up the ATM PVC. Do not change VPI and VCI numbers unless your ISP instructs you otherwise.

PORT: [0-3]

VPI: [0-255]

VCI: [32-65535]

Enable Quality Of Service

Enabling QoS for a PVC improves performance for selected classes of applications. However, since QoS also consumes system resources, the number of PVCs will be reduced consequently. Use **Advanced Setup/Quality of Service** to assign priorities for the applications.

Enable Quality Of Service ☐

a PPP over Ethernet (PPPoE)

1. Select **PPP over Ethernet (PPPoE)** as connection type, and select **LLC/SNAP-BRIDGING** as encapsulation mode.

- ☐ PPP over ATM (PPPoA)
- ☒ PPP over Ethernet (PPPoE)
- ☐ MAC Encapsulation Routing (MER)
- ☐ IP over ATM (IPoA)
- ☐ Bridging

Encapsulation Mode

LLC/SNAP-BRIDGING

2. Input **PPP Username & PPP Password** and then click **Next**. The user interface allows a maximum of 256 characters in the user name and a maximum of 32 characters in the password. Please remember to enable NAT and Firewall as below.

| | |
|------------------------|---|
| PPP Username: | <input type="text" value="username"/> |
| PPP Password: | <input type="password" value="••••••••"/> |
| PPPoE Service Name: | <input type="text"/> |
| Authentication Method: | <input type="text" value="AUTO"/> ▼ |

☐ Enable Fullcone NAT

☒ NAT

☒ Firewall

☐ Dial on demand (with idle timeout timer)

☐ PPP IP extension

☐ Use Static IP Address

☐ Retry PPP password on authentication error

☐ Enable PPP Debug Mode

☒ Bridge PPPoE Frames Between WAN and Local Ports (Default Enabled)

PPPoE service name can be blank unless your Internet Service Provider gives you a value to enter.

Authentication method is default to **Auto**. It is recommended that you leave the **Authentication method** in **Auto**, however, you may select **PAP** or **CHAP** if necessary. The default value for MTU (Maximum Transmission Unit) is **1500** for PPPoA and **1492** for PPPoE. Do not change these values unless your ISP asks you to.

The gateway can be configured to disconnect if there is no activity for a specific period of time by selecting the **Dial on demand** check box and entering the **Inactivity timeout**. The entered value must be between 1 minute to 4320 minutes.

The **PPP IP Extension** is a special feature deployed by some service providers. Unless your service provider specifically requires this setup, do not select it. If you need to select it, the PPP IP Extension supports the following conditions:

- It allows only one computer on the LAN.
- The public IP address assigned by the remote using the PPP/IPCP protocol is actually not used on the WAN PPP interface. Instead, it is forwarded to the computer's LAN interface through DHCP. Only one system on the LAN can be connected to the remote, since the DHCP server within the ADSL gateway has only a single IP address to assign to a LAN device.
- NAPT and firewall are disabled when this option is selected.
- The gateway becomes the default gateway and DNS server to the computer through DHCP using the LAN interface IP address.
- The gateway extends the IP subnet at the remote service provider to the LAN computer. That is, the PC becomes a host belonging to the same IP subnet.
- The ADSL gateway bridges the IP packets between WAN and LAN ports, unless the packet is addressed to the gateway's LAN IP address.

3. Unselect **Enable IGMP Multicast**, and select **Enable WAN Service** and then click **Next**

| | |
|-----------------------|---|
| Enable IGMP Multicast | <input type="checkbox"/> |
| Enable WAN Service | <input checked="" type="checkbox"/> |
| Service Name | <input type="text" value="pppoe_0_0_35_1"/> |

4. Configure the DSL Router's IP Address and Subnet Mask for LAN interface. In this page, you can use DHCP (Dynamic Host Configuration Protocol) to control the assignment of IP addresses on your local network (LAN only).

IP Address:

Subnet Mask:

☐ Disable DHCP Server
☒ Enable DHCP Server

Start IP Address:

End IP Address:

Subnet Mask:

Leased Time (hour):

☒ Configure the second IP Address and Subnet Mask for LAN interface

IP Address:

Subnet Mask:

| Item | Description |
|---|---|
| IP address | This is the IP address that other devices on your local network will use to connect to the modem. |
| Subnet mask | This defines the size of your network. The default is 255.255.255.0 . |
| Disable / Enable DHCP server | The DHCP server assigns an IP addresses from a pre-set pool of addresses upon request from DHCP client (e.g. your computer). Do not disable the DHCP server unless you wish to let another device handle IP address issuance on the local network. |
| Start / end IP address | This is the beginning and ending range for the DHCP server addresses. |
| Lease time | The amount of time before the IP address is refreshed by the DHCP server. |
| Configure the second IP address and... | Use this feature to create a public network on your local LAN, accessible from the Internet. By assigning an address to this interface and then statically setting your LAN clients to the same network, the LAN clients are accessible from the public network |

| | |
|--|-----------------------------|
| | (e.g. FTP or HTTP servers). |
|--|-----------------------------|

5. Set SSID for wireless network if user enabled the wireless function.

Enable Wireless ☒

Enter the wireless network name (also known as SSID).

SSID:

6. Make sure that the settings below match the settings provided by your ISP.

| | |
|----------------------------|------------------------|
| PORT / VPI / VCI: | 0 / 0 / 35 |
| Connection Type: | PPPoE |
| Service Name: | pppoe_0_0_35_1 |
| Service Category: | UBR |
| IP Address: | Automatically Assigned |
| Service State: | Enabled |
| NAT: | Enabled |
| Firewall: | Enabled |
| IGMP Multicast: | Disabled |
| Quality Of Service: | Disabled |

7. Click on the **Save/Reboot** button to save your configurations.

b PPP over ATM (PPPoA)

1. Select **PPP over ATM (PPPoA)** as connection type, and select **VC/MUX** as encapsulation mode.

- ☒ PPP over ATM (PPPoA)
- ☐ PPP over Ethernet (PPPoE)
- ☐ MAC Encapsulation Routing (MER)
- ☐ IP over ATM (IPoA)
- ☐ Bridging

Encapsulation Mode

2. Input **PPP Username & PPP Password** and then click **Next**. The user interface allows a maximum of 256 characters in the user name and a maximum of 32 characters in the password. Please remember to enable NAT and Firewall as below.

| | |
|---|---|
| PPP Username: | <input type="text" value="username"/> |
| PPP Password: | <input type="password" value="••••••••"/> |
| Authentication Method: | <input type="text" value="AUTO"/> |
| <input type="checkbox"/> Enable Fullcone NAT | |
| <input checked="" type="checkbox"/> NAT | |
| <input checked="" type="checkbox"/> Firewall | |
| <input type="checkbox"/> Dial on demand (with idle timeout timer) | |
| <input type="checkbox"/> PPP IP extension | |
| <input type="checkbox"/> Use Static IP Address | |
| <input type="checkbox"/> Retry PPP password on authentication error | |
| <input type="checkbox"/> Enable PPP Debug Mode | |

Authentication method is default to **Autoc**. It is recommended that you leave the **Authentication method** in **Auto**, however, you may select **PAP** or **CHAP** if necessary. The default value for MTU (Maximum Transmission Unit) is **1500** for

PPPoA and **1492** for PPPoE. Do not change these values unless your ISP asks you to.

The gateway can be configured to disconnect if there is no activity for a specific period of time by selecting the **Dial on demand** check box and entering the **Inactivity timeout**. The entered value must be between 1 minute to 4320 minutes.

The **PPP IP Extension** is a special feature deployed by some service providers. Unless your service provider specifically requires this setup, do not select it. If you need to select it, the PPP IP Extension supports the following conditions:

- It allows only one computer on the LAN.
- The public IP address assigned by the remote using the PPP/IPCP protocol is actually not used on the WAN PPP interface. Instead, it is forwarded to the computer's LAN interface through DHCP. Only one system on the LAN can be connected to the remote, since the DHCP server within the ADSL gateway has only a single IP address to assign to a LAN device.
- NAPT and firewall are disabled when this option is selected.
- The gateway becomes the default gateway and DNS server to the computer through DHCP using the LAN interface IP address.
- The gateway extends the IP subnet at the remote service provider to the LAN computer. That is, the PC becomes a host belonging to the same IP subnet.
- The ADSL gateway bridges the IP packets between WAN and LAN ports, unless the packet is addressed to the gateway's LAN IP address.

3. Unselect **Enable IGMP Multicast**, and select **Enable WAN Service** and then click **Next**

| | |
|-----------------------|---|
| Enable IGMP Multicast | <input type="checkbox"/> |
| Enable WAN Service | <input checked="" type="checkbox"/> |
| Service Name | <input type="text" value="pppoa_0_0_35_1"/> |

4. Configure the DSL Router's IP Address and Subnet Mask for LAN interface. In this page, you can use DHCP (Dynamic Host Configuration Protocol) to control the assignment of IP addresses on your local network (LAN only).

IP Address:

Subnet Mask:

☐ Disable DHCP Server

☒ Enable DHCP Server

Start IP Address:

End IP Address:

Subnet Mask:

Leased Time (hour):

☒ Configure the second IP Address and Subnet Mask for LAN interface

IP Address:

Subnet Mask:

| Item | Description |
|-------------------------------------|--|
| IP address | This is the IP address that other devices on your local network will use to connect to the modem. |
| Subnet mask | This defines the size of your network. The default is 255.255.255.0 . |
| Disable / Enable DHCP server | The DHCP server assigns an IP addresses from a pre-set pool of addresses upon request from DHCP client (e.g. your computer). Do not disable the DHCP server unless you wish to let another device handle IP address issuance on the local network. |
| Start / end IP address | This is the beginning and ending range for the DHCP server addresses. |
| Lease time | The amount of time before the IP address is refreshed by the DHCP server. |

| | |
|---|---|
| Configure the second IP address and... | Use this feature to create a public network on your local LAN, accessible from the Internet. By assigning an address to this interface and then statically setting your LAN clients to the same network, the LAN clients are accessible from the public network (e.g. FTP or HTTP servers). |
|---|---|

5. Set SSID for wireless network if user enabled the wireless

Enable Wireless ☒

Enter the wireless network name (also known as SSID).

SSID:

6. Make sure that the settings below match the settings provided by your ISP.

| | |
|----------------------------|------------------------|
| PORT / VPI / VCI: | 0 / 0 / 35 |
| Connection Type: | PPPoA |
| Service Name: | pppoa_0_0_35_1 |
| Service Category: | UBR |
| IP Address: | Automatically Assigned |
| Service State: | Enabled |
| NAT: | Enabled |
| Firewall: | Enabled |
| IGMP Multicast: | Disabled |
| Quality Of Service: | Disabled |

7. Click on the **Save/Reboot** button to save your configurations.

c Bridging (RFC 2684)

Select the bridge operating mode if your ADSL service provider tells you that you should. To configure bridging, do the following:

1. Select **Bridging (RFC 2684)** as connection type.

- ☐ PPP over ATM (PPPoA)
- ☐ PPP over Ethernet (PPPoE)
- ☐ MAC Encapsulation Routing (MER)
- ☐ IP over ATM (IPoA)
- ☒ Bridging

Encapsulation Mode

LLC/SNAP-BRIDGING ▼

2. Select the appropriate **Encapsulation mode** and click **Next**. The following screen appears:

Enable Bridge Service: ☒

Service Name:

3. Enable or disable bridge service and enter a bridge service name. Click **Next**. Configure the DSL Router IP Address and Subnet Mask for your Local Area Network (LAN).

IP Address:

Subnet Mask:

4. Set SSID for wireless network if user enabled the wireless function.

Enable Wireless ☒

Enter the wireless network name (also known as SSID).

SSID:

5. The summary page presents the entire configuration summary. Click **Save** if the settings are correct or **Back** to change any of the settings.

| | |
|----------------------------|----------------|
| PORT / VPI / VCI: | 0 / 0 / 35 |
| Connection Type: | Bridge |
| Service Name: | br_0_0_35 |
| Service Category: | UBR |
| IP Address: | Not Applicable |
| Service State: | Enabled |
| NAT: | Disabled |
| Firewall: | Disabled |
| IGMP Multicast: | Not Applicable |
| Quality Of Service: | Disabled |

Note: If you want to cancel all modification that you do on the Router, please select from “Management⇒Setting⇒Restore Default Settings” to restore factory default settings.

5.3 Wireless setting

5.3.1 Basic

| | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | Enable Wireless |
| <input type="checkbox"/> | Hide Access Point |
| <input type="checkbox"/> | Clients Isolation |
| <input type="checkbox"/> | Disable WMM Advertise |
| SSID: | <input type="text" value="Lynx524"/> |
| BSSID: | <input type="text" value="00:1F:2C:FF:FF:E5"/> |
| Country: | <input type="text" value="UNITED STATES"/> ▼ |
| Max Clients: | <input type="text" value="128"/> |
| | |
| <input type="checkbox"/> | Enable Wireless Guest Network |
| Guest SSID: | <input type="text" value="Guest"/> |

Enable Wireless: Click this check box to enable the wireless network function.

Hide Access Point: Checking this box can hide the SSID of this access point. Then other people in the network cannot find the SSID of this device.

Clients Isolation: Enable it if you don't want your wireless clients to communicate with each other.

SSID: The system will detect the SSID of your router and displayed in this field for your reference. The default SSID is Lynx524.

The SSID is the identification characters of a router. The default words will be shown on this page. If you do not check the Hide Access Point item, the router will periodically broadcasts its SSID to allow the wireless clients within the range to recognize its presence. This can create a security hole since any wireless clients which got the broadcast might associate to your system.

Please be noted that if you want to communicate, all wireless clients should use the same SSID with the router or access point.

Country: For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

5.3.2 Security

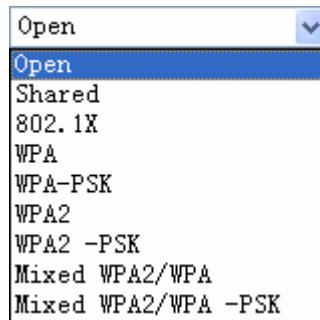
To configure security features for the Wireless interface, please open Security item from **Wireless** menu. This web page offers nine authentication protocols for user to secure user's data while connecting to networks. There are four selections including Open, Shared, 802.1X, WPA, WPA-PSK, WPA2, WPA2-PSK, Mixed WPA-WPA2, Mixed WPA-WPA2-PSK. Different item leads different web page settings. Please read the following information carefully.

The wireless security page allows user to configure the security features of user's wireless network.

| | |
|-------------------------|----------------------|
| Select SSID: | Lynx524 ▼ |
| Network Authentication: | Shared ▼ |
| WEP Encryption: | Enabled ▼ |
| Encryption Strength: | 64-bit ▼ |
| Current Network Key: | 1 ▼ |
| Network Key 1: | <input type="text"/> |
| Network Key 2: | <input type="text"/> |
| Network Key 3: | <input type="text"/> |
| Network Key 4: | <input type="text"/> |

Enter 13 ASCII characters or 26 hexadecimal digits for 128-bit encryption keys
Enter 5 ASCII characters or 10 hexadecimal digits for 64-bit encryption keys

There are several security methods to choose from, depending on user's needs and the capabilities of user's wireless machines.



- **WEP open** and **WEP shared** —WEP is an encryption scheme that is used to protect user's wireless data communications. WEP uses a combination of 64-bit keys or 128-bit keys to provide access control to user's network and encryption security for every data transmission. To decode a data transmission, each wireless client on the network must use an identical 64-bit or 128-bit key. WEP is an older wireless encryption method that is not as hard to break as the more-recent WPA.
- **802.1x** — In 802.1x (also known as RADIUS), a separate machine called an authentication server receives a user ID and password. It grants or denies access based on whether the ID and password match any entries in its account list. User can optionally enable WEP encryption with this option. Because it requires a separate machine acting as the authentication server, 802.1x is most often used in business environments.
- **WPA**— WPA is a more recent encryption method that addresses many of the weaknesses in WEP. Any client capable of WPA encryption should use it instead of WEP.
- **WPA (PSK)** — This is WPA encryption combined with a *pre-shared key (PSK)*, which is a text string known only to the gateway and authorised wireless clients. The gateway rejects the login if the client's PSK does not match.
- **WPA2** — WPA2 is a more advanced encryption method than WPA. Because it is a more recent standard, some of user's wireless devices might not be able to use it.
- **WPA2 (PSK)** — this option uses WPA2 with a pre-shared key.
- **WPA2 and WPA**— This option supports WPA2/WPA encryption for devices capable of one or the other standard. The gateway automatically detects whether a particular device can use WPA2 or WPA.

- **WPA2 AND WPA (PSK)** — this has WPA2 or WPA encryption based on client abilities, as well as a pre-shared key.

After making changes, click **Apply** to save.

Appendix: Frequent Asked Questions

Q: None of the LEDs are on when user power on the ADSL router?

A: Please make sure what user use is the power adaptor attached with the ADSL router package , and check the connection between the AC power and ADSL router.

Q: DSL LED does not turn on after connect telephone line?

A: Please make sure what user use is the standard telephone line (as attached with the package), make sure the line is connected correctly and check whether there is poor contact at each interface. Wait for 30 seconds to allow the ADSL router establishes connection with user ADSL operator.

Q: DSL LED is in the circulation of slow-flashing and fast-flashing after connect telephone line?

A: This situation means the ADSL router is in the status of failing to establish connection with Central Office. Please check carefully and confirm whether the ADSL router has been installed correctly.

Q: LAN LED does not turn on after connect Ethernet cable?

A: Please make sure Ethernet cable is connected hub/PC and ADSL router correctly. Then please make sure the PC/hub have been power on.

Please make sure that user use parallel network cable to connect UpLink port of hub, or use parallel network cable to connect PC. If connect normal port of hub (not UpLink port), user must use cross-cable. Please make sure that user's network cables meet the networking requirements above.

Q: PC cannot access the Router?

A: Please make sure that all devices communicating with the device must use the same channel (and use the same SSID). Otherwise user's PC will not find the wireless Router.

Q: PC cannot access the Internet?

A: First check whether PC can ping the interface Ethernet IP address of this product successfully (default value is 192.168.1.1) by using ping application. If ping application fails, please check the connection of Ethernet cable and check whether the states of LEDs are in gear.

If the PC uses private IP address that is set manually (non-registered legal IP address), please check:

1. Whether IP address of the PC gateway is legal IP address. Otherwise please use the right gateway, or set the PC to Obtain an IP address automatically.
2. Please confirm the validity of DNS server appointed to the PC with ADSL operator. Otherwise please use the right DNS, or set the PC to Obtain an IP address automatically.
3. Please make sure user have set the NAT rules and convert private IP address to legal IP address. IP address range of the PC that user specify should meet the setting range in NAT rules.
4. Central Office equipment may have problem.
5. The country or the wireless network type user selected is wrong.

Q: PC cannot browse Internet web page?

A: Please make sure DNS server appointed to the PC is correct. User can use ping application program to test whether the PC can connect to the DNS server of the ADSL operator.

Q: Initialization of the PVC connection failed?

A: Be sure that cable is connected properly from the DSL port to the wall jack. The DSL LED on the front panel of the ADSL router should be on. Check that user's VPI, VCI, type of encapsulation and type of multiplexing setting are the same as what user collected from user's service provider, Re-configure ADSL router and reboot it. If user still can not work it out, user may need to verify these variables with the service provider.

If the cause is not above given , please contact user's local service provider!

***** Caution *****

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes of modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC statement

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC RF Radiation Exposure Statement:

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

“ To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter”.

FCC Part 68 Statement

This equipment complies with Part 68 of the FCC rules. This unit bears a label, which contains the FCC registration number and ringer equivalence number (REN). If requested, this information must be provided to the telephone company.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment, for repair or warranty information, please contact our company. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.