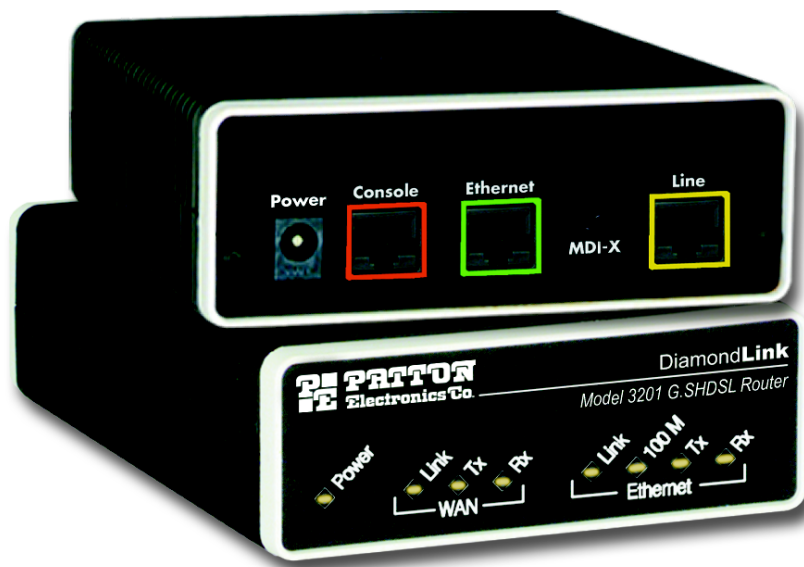


**For Quick  
Start Installation**  
see page 21

# Model 3201 and Model 3241 **G.SHDSL Router Modems**

## User Guide



### Important

This is a Class A device and is intended for use in a light industrial environment. It is not intended nor approved for use in an industrial or residential environment.

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This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If this product fails or does not perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall Patton Electronics be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. Patton Electronics specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

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## About this guide

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This guide describes installing and configuring a Patton Electronics Model 3201 or 3241 G.SHDSL Router modem. The instructions in this guide are based on the following assumptions:

- The router modem will connect to another router modem or DSLAM
- There is a LAN connected to the Ethernet port of the router modem
- Users will be connected to remote router modems

## Audience

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This guide is intended for the following users:

- Operators
- Installers
- Maintenance technicians

## Structure

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This guide contains the following chapters and appendices:

- Chapter 1 provides information about router modem features and capabilities
- Chapter 2 contains an overview describing router modem operation
- Chapter 3 provides quick start installation procedures
- Chapter 4 describes configuring the router modem for typical applications
- Chapter 5 describes configuring the router modem for specialized applications
- Chapter 6 describes configuring security for the router modem
- Chapter 7 describes configuring for network address translation (NAT)
- Chapter 8 contains definitions for the LED status indicators
- Chapter 9 describes router modem diagnostics
- Appendix A contains compliance information for the router modems
- Appendix B contains specifications for the router modems
- Appendix C provides cable recommendations
- Appendix D describes the router modem's ports
- Appendix E describes how to use the command line interface (CLI)

For best results, read the contents of this guide *before* you install the router modem.

## Precautions

---

Notes and cautions, which have the following meanings, are used throughout this guide to help you become aware of potential Router modem problems. *Warnings* relate to personal injury issues, and *Cautions* refer to potential property damage.

**Note** Calls attention to important information.



WARNING

**The shock hazard symbol and WARNING heading indicate a potential electric shock hazard. Strictly follow the warning instructions to avoid injury caused by electric shock.**



WARNING

**The alert symbol and WARNING heading indicate a potential safety hazard. Strictly follow the warning instructions to avoid personal injury.**



CAUTION

The shock hazard symbol and CAUTION heading indicate a potential electric shock hazard. Strictly follow the instructions to avoid property damage caused by electric shock.



CAUTION

The alert symbol and CAUTION heading indicate a potential hazard. Strictly follow the instructions to avoid property damage.



## Safety when working with electricity



- This device contains no user serviceable parts. The equipment shall be returned to Patton Electronics for repairs, or repaired by qualified service personnel.
- The external power adapter shall be a listed Limited Power Source. The mains outlet that is utilized to power the device shall be within 10 feet (3 meters) of the device, shall be easily accessible, and protected by a circuit breaker.
- If an AC power adapter is used, ensure that the power cable used meets all applicable standards for the country in which it is to be installed, and that it is connected to a wall outlet which has earth ground.
- Hazardous network voltages are present in WAN ports regardless of whether power to the unit is ON or OFF. To avoid electric shock, use caution when near WAN ports. When detaching the cables, detach the end away from the device first.
- Do not work on the system or connect or disconnect cables during periods of lightning activity.



In accordance with the requirements of council directive 2002/96/EC on Waste of Electrical and Electronic Equipment (WEEE), ensure that at end-of-life you separate this product from other waste and scrap and deliver to the WEEE collection system in your country for recycling.

## General observations

- Clean the case with a soft slightly moist anti-static cloth
- Place the unit on a flat surface and ensure free air circulation
- Avoid exposing the unit to direct sunlight and other heat sources
- Protect the unit from moisture, vapors, and corrosive liquids

## Factory default parameters

---

The **Model 3201/R** G.SHDSL router modem has the following factory default parameters.

- Ethernet IP address: 192.168.200.10/24
- WAN Connection: PPPoH Routed
- WAN IP address: 10.1.1.1
- Autonegotiate the G.SHDSL speed.

The **Models 3201/I/CP** and **3201/I/CO** bridge modems have the following factory default parameters.

- Ethernet IP Address:
  - 192.168.200.10 (for the CP version)
  - 192.168.200.11 (for the CO version)
- Autonegotiate the G.SHDSL speed.

## Typographical conventions used in this document

This section describes the typographical conventions and terms used in this guide.

### General conventions

The procedures described in this manual use the following text conventions:

Table 1. General conventions

Convention	Meaning
<b>Futura bold type</b>	Indicates the names of menu bar options.
<i>Italicized Futura type</i>	Indicates the names of options on pull-down menus.
Futura type	Indicates the names of fields or windows.
Garamond bold type	Indicates the names of command buttons that execute an action.
< >	Angle brackets indicate function and keyboard keys, such as <SHIFT>, <CTRL>, <C>, and so on.
Are you ready?	All system messages and prompts appear in the Courier font as the system would display them.
% dir *.*	Bold Courier font indicates where the operator must type a response or command

### Mouse conventions

The following conventions are used when describing mouse actions:

Table 2. Mouse conventions

Convention	Meaning
Left mouse button	This button refers to the primary or leftmost mouse button (unless you have changed the default configuration).
Right mouse button	This button refers the secondary or rightmost mouse button (unless you have changed the default configuration).
Point	This word means to move the mouse in such a way that the tip of the pointing arrow on the screen ends up resting at the desired location.
Click	Means to quickly press and release the left or right mouse button (as instructed in the procedure). Make sure you do not move the mouse pointer while clicking a mouse button.
Double-click	Means to press and release the same mouse button two times quickly
Drag	This word means to point the arrow and then hold down the left or right mouse button (as instructed in the procedure) as you move the mouse to a new location. When you have moved the mouse pointer to the desired location, you can release the mouse button.

# Chapter 1 **General Information**

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## Model 3201/3241 G.SHDSL Router Modem overview

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The Patton Models 3201 and 3241 router modems are G.SHDSL routers/bridges for delivering basic and advanced IP services from the wide-area network to a local 10/100Base-T Ethernet LAN.

G.SHDSL offers an alternative, standards based DSL transmission medium. It offers connection speeds of 2.3 Mbps (Model 3201) or 4.6 Mbps (Model 3241) in each direction over a single twisted-pair (TP). Supporting 100 or more users, the router modems are optimized for users in a small office, as an enterprise tele-working solution or for multimedia high-speed Internet access. Local and remote web-based management ensures easy setup and continuous trouble-free operation.

The following sections describe Model 3201 and 3241 features and capabilities:

- General attributes, see page 13
- G.SHDSL Characteristics (Model 3201/3241), see page 13
- Ethernet, see page 13
- Protocol support, see page 14
- PPP support, see page 14
- ATM protocols, see page 14
- Management, see page 14
- Security, see page 14

### General attributes

- Compact low-cost plug-and-play router
- 10/100 Ethernet
- Comprehensive hardware diagnostics, works with any operating system, easy maintenance and effortless installation.
- Built-in web configuration.
- Simple software upgrade using FTP into FLASH memory.
- Eight front panel LEDs indicate Power, DSL WAN, Ethernet LAN speed and status.
- Convenient and standard RJ connectors for Ethernet, Line, and Console.

### G.SHDSL Characteristics (Models 3201 and 3241)

- 2.3 Mbps (Model 3201) or 4.6 Mbps (Model 3241) speed over 2 wires.
- DTE rates:
  - Model 3201: 144 kbps to 2.32 Mbps, nx64k with n=3 to 36
  - Model 3241: 144 kbps to 4.6 Mbps, nxz64k n=3 to 72.
- Distance from 24,900 feet (7,589 m) at 144kbps (192 kbps line rate) to 10,200 feet (3,109 m) at 2.3 mbps on 26 AWG (0.4 mm) wire
- CO and CP modes supported
- EOC Management channel for remote end-to-end management.

### Ethernet

- Auto-sensing full-duplex 10Base-T/100Base-TX Ethernet.
- Standard RJ-45 and built-in MDI-X cross-over switch.
- IEEE 802.1d transparent learning bridge up to 1,024 addresses and Spanning Tree.

### **Protocol support**

- Complete internetworking with IP (RFC 741), TCP (RFC 793), UDP (RFC 768), ICMP (RFC 950), ARP (RFC 826).
- IP Router with RIP (RFC 1058), RIPv2 (RFC 2453) for up to 64 static routes.
- Built-in Ping and Traceroute facilities.
- Integrated DHCP Server (RFC 2131).
- DHCP relay agent (RFC 2132/RFC 1542) with 8 individual address pools.
- DNS Relay with primary and secondary Name Server selection.
- NAT (RFC 3022) with Network Address Port Translation (NAPT), MultiNat with 1:1, Many:1, Many:Many mapping, Port/IP redirection and mapping.

### **PPP Support**

- Point-to-Point Protocol over HDLC
- PPPoA (RFC 2364) Point-to-Point Protocol over ATM.
- PPPoE (RFC 2516) Client for autonomous network connection. Eliminates the requirement of installing client software on a local PC and allows sharing of the connection across a LAN.
- User configurable PPP PAP (RFC 1661) or CHAP (RFC 1994) authentication..

### **ATM Protocols**

- Multiprotocol over ATM AAL5 and Multiprotocol Bridged encapsulation RFC 2684 (Formerly RFC 1483) and RFC 1577 Classical IP over ATM. Default RFC-1483 route mode. Logical Link Control (LLC)/ Subnetwork Access Protocol (SNAP) encapsulation. Default VC mux mode.
- ATM UNI 3.0, 3.1, and 4.0 signaling ATM QoS with UBR, CBR, nrt-VBR, and rt-VBR.
- Peak cell rate shaping on a per-VCC basis up to 32 active VCCs across VPI 0-255, VCI 0-65525. Single default PVC: 8/35 with PCR=5,500 cells.

### **Management**

- User selectable ATM, PPP, or HDLC WAN datalink connection.
- Web-Based configuration via embedded web server
- CLI menu for configuration, management, and diagnostics.
- Local/Remote CLI (VT-100 or Telnet).
- SNMPv1 (RFC 1157) MIB II (RFC 1213)
- Logging via SYSLOG, and VT-100 console. Console port set at 9600 bps 8/N/1 settings no flow control.
- EOC access for End-To-End management, configuration, and control.

### **Security**

- Packet filtering firewall for controlled access to and from LAN/WAN.
- DoS Detection/protection.
- Password protected system.
- Access list for up to 5 hosts/networks which are allowed to access management system SNMP/HTTP/TEL-NET.
- Logging or SMTP on events: POST, POST errors, line/DSL, PPP/DHCP, IP.

## Front Panel Status LEDs

The G.SHDSL routers have all status LEDs on the front panel of the unit, and all electrical connections are located on the rear panel.



Figure 1. Model 3201

The status LEDs from left to right are (see table 3 for LED descriptions):

- Power
- WAN Link, Tx, and Rx
- Ethernet Link, 100M, Tx, and Rx

Table 3. Status LED descriptions

<b>Power</b>	Yellow	<i>ON</i> indicates that power is applied. <i>Off</i> indicates that no power is applied. <i>2 Hz flash</i> occurs during POST <i>1 Hz flash</i> occurs for non-fatal error. <i>8 Hz flash</i> on <b>all LEDs</b> for fatal POST outcome or critical error.	
<b>WAN (DSL)</b>	Link	Yellow	<i>Solid yellow</i> : connected <i>2 Hz flash</i> : training <i>8 Hz flash</i> : DSL error <i>No indication</i> : no signal detected.
	TX	Yellow	<i>Flashing</i> : when transmitting data from the unit to the WAN.
	RX	Yellow	<i>Flashing</i> : when receiving data from the WAN to the unit.
<b>Ethernet</b>	Link	Yellow	<i>On</i> : Ethernet is linked.
	100M	Yellow	<i>On</i> : 100 Mbps Ethernet is selected.
	TX	Yellow	<i>Flashing</i> : when data is transmitted from the unit to the LAN.
	RX	Yellow	<i>Flashing</i> : when data is received from the LAN.

## Rear panel connectors and switches

On the rear panel from left to right are the following:

- Power input connector
- Console Port
- Ethernet connector
- MDI-X switch
- Line connector

### Power input connector

The router modem comes with an AC or DC power supply. (see “Power and Power Supply Specifications” on page 115)

- The power connection to the router modem is a 2.5 mm barrel receptacle with the center conductor positive (see figure 2).
- 5 VDC, 1 A



Figure 2. Power connection barrel receptacle 5 VDC diagram

### External AC universal power supply

For additional specifications, see “Power and Power Supply Specifications” on page 115.

- Output from power supply: 5 VDC, 2 A
- Input to power supply: universal input 100–240 VAC 50/60 Hz 0.3A



An approved external power supply that incorporates a disconnect device must be used and positioned within easy reach of the operator’s position.



Connect the equipment to a 5 VDC source that is electrically isolated from the AC source. The 5 VDC source is to be reliably connected to earth.

### External 48 VDC power supply

Refer to see “Power and Power Supply Specifications” on page 115 for additional specifications.

- Input
  - Rated voltage: 36–60 VDC
  - Rated current: 0.25 A DC
  - 3-pin locking connector, 3.5 mm pitch
  - Transient over-voltage protection, 100VDC at 2 ms
- Output
  - Rated voltage: 5 VDC  $\pm$  5%, 5W
  - Rated current; 1 A DC
  - 6-inch cable terminated with 2.5 mm barrel plug, center positive



Connect the equipment to a 30–60 VDC source that is electrically isolated from the AC source. The 30–60 VDC source is to be reliably connected to earth.



**Console port (outlined in red)**

The unshielded RJ-45 RS-232 console DCE port (EIA-561) with the pin-out listed in the following table:

Pin No.	Signal Direction	Signal Name
1	Out	DSR
2	Out	CD
3	In	DTR
4	—	Signal Ground
5	Out	RD
6	In	TD
7	Out	CTS
8	In	RTS

**Ethernet port (outlined in green)**

Shielded RJ-45 10Base-T/100Base-TX Ethernet port using pins 1,2,3, & 6. See MDI-X switch for hub or transceiver configuration. The following table defines conditions that occur when the MDI-X switch is in the out position.

Pin No.	Signal Direction	Signal Name
1	Output	TX+
2	Output	TX-
3	Input	RX+
4	—	—
5	—	—
6	Input	RX-
7	—	—
8	—	—

**MDI-X**

The MDI-X push switch operates as follows:

- When in the default out position, the Ethernet circuitry takes on a straight-through MDI configuration and functions as a transceiver. It will connect directly to a hub.
- When in the in position, the Ethernet circuitry is configured in cross-over MDI-X mode so that a straight-through cable can connect the Model 3201 DSL modem's Ethernet port directly to a PC's NIC card.

**Line port (outlined in yellow)**

The RJ-11/4 DSL line port uses pins 2 and 3 of the RJ-11 port.

Pin No.	Signal Name
1	—
2	In/Out-A
3	In/Out-B
4	—

# Chapter 2 **Product Overview**

## **Chapter contents**

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## Product Overview

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The Model 3201 modem operates as a bridge or a router and has two ports for communication:

- The Ethernet port—Connects to the LAN side of the connection
- The Line port—Provides the G.SHDSL transmission connection between the CPE and CO DSL modem

The modem provides all layer 2 and layer 3 protocols required for end-to-end-link communication.

When configuring the 3201, questions must be answered so the 3201 functions as desired. For example, when a router or bridge module needs to be activated, some questions would be:

- Is a default gateway required?
- Which encapsulation technique is best for this application: PPPoA, Frame Relay, PPPoE or another?

These decisions can be made and implemented more easily if the Model 3201's fundamental architecture is understood. Also, while configuring the Model 3201 via a browser using the built-in HTTP server is very intuitive, an understanding of the architecture is essential when using the command-line interface (CLI) commands.

The fundamental building blocks comprise a router or bridge, interfaces, and transports. The router and bridge each have interfaces. A transport provides the path between an interface and an external connection. For example, the Ethernet transport attaches to an Internet Protocol (IP) interface. A transport consists of layer 2 and everything below it. Creating a transport and attaching it to a bridge or router's interface enables data to be bridged or routed. The supported transports are *PPPoA*, *PPPoE*, *Frame Relay*, *RFC 1483* (Multiprotocol Encapsulation over ATM AAL5), *IPoA*, *PPPoH*, and *Ethernet*.

Configuring an interface and transport for the router or bridge requires naming the interface and transport before attaching them. When using the built-in HTTP server web browser, this is done automatically. But when configuring the Model 3201 via CLI commands through the RS-232 control port, it must be done manually.

Model 3201 modems can connect over an ATM PVC or HDLC transport.

The PVC requires the configuration of the virtual path identifier (VPI) and virtual circuit identifier (VCI). The VPI can be any integer between 0–4095 inclusive. The general rule for the VCI is an integer between 1–65,535 inclusive. Examples in this manual use a VCI of 600 or above. The main restriction in choosing a VCI is that VCIs below 32 are reserved for such predefined functions as ILMI. The VCI values of 600 and above used in this manual are also above the range used by many signaling implementations for SVCs.

The HDLC is a packet-based transmission across the DSL Link.

Several ATM connections are offered to address a variety of user applications. Although they all use RFC1483 as the transport mechanism between the two 3201 modems, WAN services may use different PPP applications, such as *PPPoE routed*, *PPPoA routed*, or *PPPoA bridged*. Each one has its advantages and disadvantages.

## Applications Overview

The Model 3201 is used for bridged or routed applications.

- Note** In bridged applications the 3201 modem functions transparently on layer 2 to provide MAC level bridging for Ethernet networks. The bridging is between Ethernet and the DSL link between the two 3201 modems. The devices attached to each 3201 are on the same subnet. The number of attached devices and the size of the filter table are configurable. No IP address is necessary unless

the administrator desires management through a web browser. Then an IP address is necessary for the administrator to access the 3201 modem.

In a **typical bridged configuration**, the DSL bridge is transparent to the network. It bridges the DSL line to the Ethernet line, making both sides appear as a single subnet. However, it may still be beneficial to provide an IP address to the DSL modem for management. In the bridged configuration it is not necessary for the Ethernet port to have an IP address.

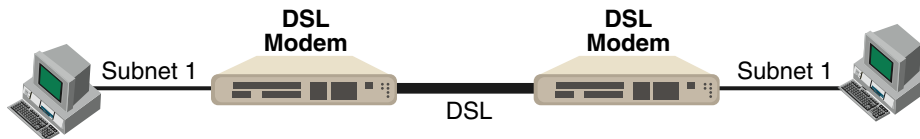


Figure 3. Bridged Application

In a **typical routed configuration**, the DSL router is treated as a separate device on the network that receives packets from the PC and DSLAM. The Ethernet and DSL networks are configured as separate IP subnets. The PC must have the DSL router set up as its default gateway.

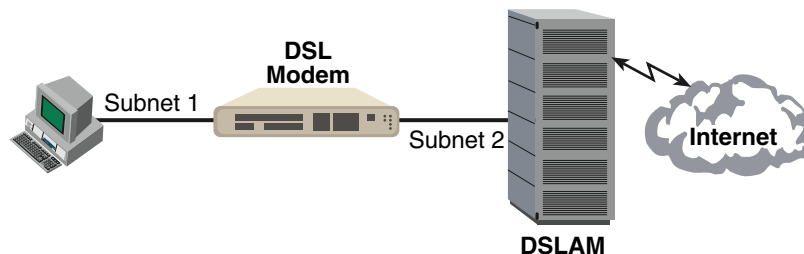


Figure 4. Routed Application

Model 3201 applications are divided as follows:

- Connecting two stand-alone Model 3201 Bridge/Routers back-to-back using *PPPoH Bridged* or *PPPoH Routed*. PPPoH Bridged can be considered as Ethernet extension since the same logical LAN exists at both ends of the 3201s and only bridging is required. PPPoH is network extension in the more general sense since a different logical network is on each end of the 3201s.
- Connecting the Model 3201 bridge/routers as a CPE device to a DSLAM. They can be configured for bridged or routed mode.
  - The bridged modes commonly used to connect to a DSLAM are RFC1483, HDLC (PPPoH), and PPPoA.
  - The routed modes are *RFC1483*, *HDLC (PPPoH)*, *PPPoA*, *IPoA* and *PPPoE*.

For more information about router modem applications, refer to Chapter 4, “Basic Application Configurations” on page 27 and Chapter 5, “Specialized Configurations” on page 78.

## Chapter 3 **Quick Start Installation**

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## Hardware installation

If you are already familiar with Model 3201/3241 Router Modem installation and configuration, this chapter will enable you to finish the job quickly. Installation consists of the following:

- Preparing for the installation (see section “What you will need”)
- Hooking up cables and verifying that the unit will power up (see section “Identify the connectors and attach the cables”)
- Connecting to a PC and launching a web browser for configuration (see “Web Operation and Configuration” on page 24)
- Changing the IP address (if desired) (see section “Router/Bridge Status LEDs” on page 23)

### What you will need

- Model 3201 or 3241 G.SHDSL Router Modem
- External power supply for Model 3201 or 3241 (included)
- Ethernet cable with RJ45 plugs on each end (included)
- PC computer

### Identify the connectors and attach the cables

All connectors are on the rear panel of the G.SHDSL Router. The Console port is Red, the Ethernet port is Green, and the Line is Yellow.

#### Connect the Line Interface

To function properly, the G.SHDSL Router must be connected using twisted-pair, unconditioned, dry, metal wire, between 19 (0.9mm) and 26 AWG (0.4mm). Leased circuits that run through signal equalization equipment are not acceptable.

The G.SHDSL Router is equipped with an RJ-45 interface jack (*Line*), which is a two-wire interface. Observe the signal/pin relationships on the G.SHDSL Router’s *Line* interface jack. The signal/pin relationship is shown in Figure 5.

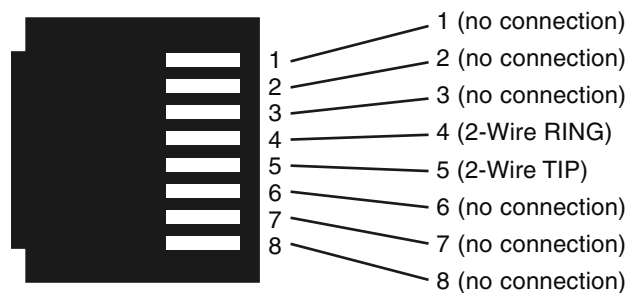


Figure 5. G.SHDSL Router (RJ-45) twisted pair line interface

*Connect the Ethernet Interface*

The G.SHDSL Router has an unshielded RJ-45 auto-MDIX10/100Base-T interface. This port is designed to connect directly to a 10/100Base-T network. Figure 6 shows the signal/pin relationships on this interface. You may connect this port to a hub or PC using a straight through or crossover cable that is up to 328 ft long.

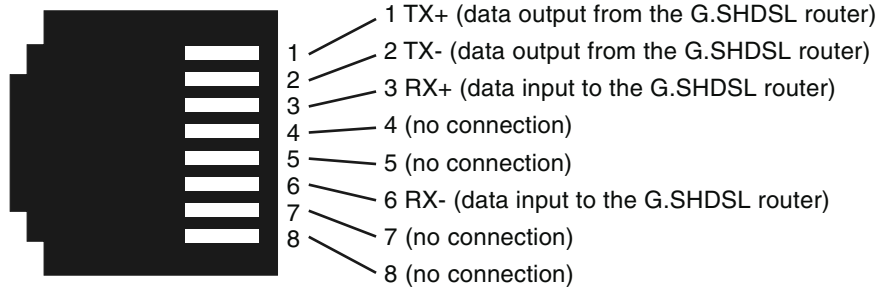


Figure 6. G.SHDSL Router 10/100Base-T RJ-45 Connector Pinout

*Connect the Power Source*

The G.SHDSL Router does not have a power switch, so it powers up as soon as it is plugged in.

The power connection is made via the barrel jack on the rear panel of the Model 3201/3241. No configuration is necessary for the power supply.

*Router/Bridge Status LEDs*

The LEDs indicate the status of power, the WAN (DSL) inter-modem link, and the Ethernet connection.

**Note** When extinguished, the LED indicators are clear; when lit, they shine a brilliant yellow.

<b>Power</b>		Yellow	ON indicates that power is applied. off indicates that no power is applied. 2 Hz flash occurs during POST 1 Hz flash occurs for non-fatal error. 8 Hz flash on <b>all LEDs</b> for fatal POST outcome or critical error.
<b>WAN (DSL)</b>	Link	Yellow	Solid yellow: connected 2 Hz flash: training 8 Hz flash: DSL error No indication: no signal detected.
	TX	Yellow	Flashing: when transmitting data from the unit to the WAN.
	RX	Yellow	Flashing: when receiving data from the WAN to the unit.
<b>Ethernet</b>	Link	Yellow	On: Ethernet is linked.
	100M	Yellow	On: 100 Mbps Ethernet is selected.
	TX	Yellow	Flashing: when data is transmitted from the unit to the LAN.
	RX	Yellow	Flashing: when data is received from the LAN.

## Web Operation and Configuration

You can connect a PC to configure the G.SHDSL Router using any standard web browser.

### Connect to a PC

1. Connect the G.SHDSL Router's *Ethernet* port to your PC.
2. The PC used for configuring the G.SHDSL Router should be set for DHCP client.
3. Connect the G.SHDSL Router to a power source to turn on the unit.
4. The G.SHDSL Router's *Ethernet* port uses the DHCP client to automatically assign an IP address and net-mask. The G.SHDSL Router will send the IP address to the PC.
5. Enter the G.SHDSL Router's IP address in the address bar of the web browser.
6. Log in and perform any desired configuration changes through the G.SHDSL Router's web browser interface (see Figure 7).

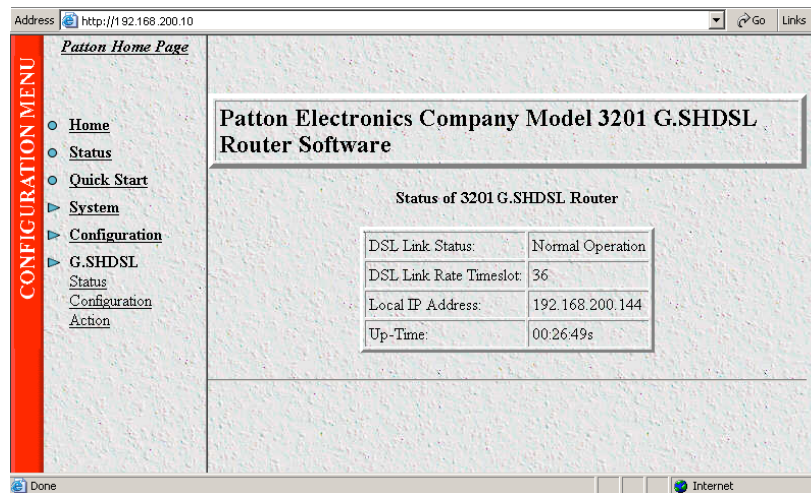


Figure 7. Model 3201 home page

The Model 3201/3241 menu structure is shown in figure 8 on page 25.



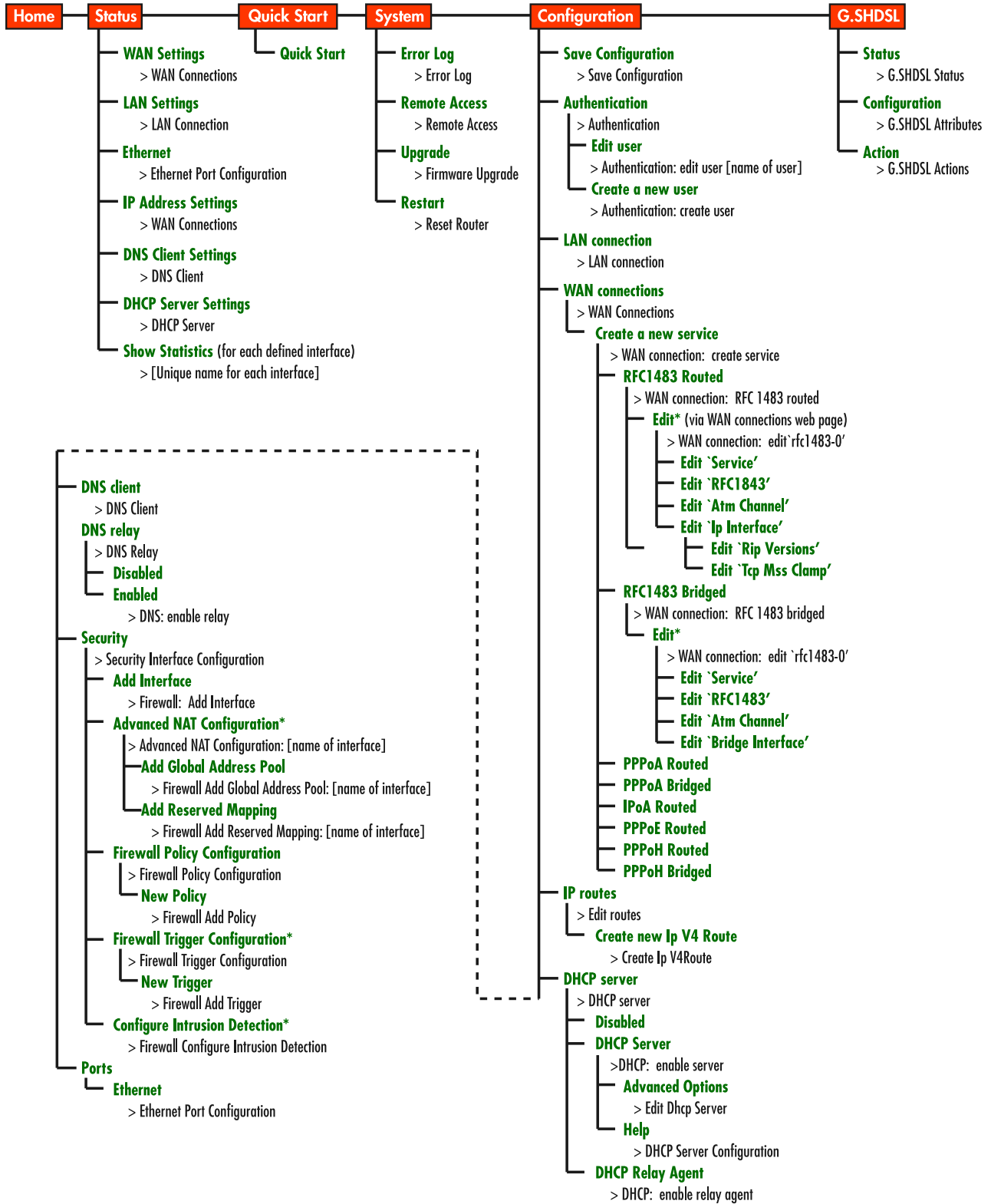


Figure 8. Model 3201/3241 Menu Structure

## Change the IP address

To change the IP address of the G.SHDSL Router:

1. In the router's web management interface, click on **Services Configuration > LAN** in the navigation menu on the left side of the screen.
2. The **LAN Connection** page displays.

**Default LAN Port**

The Secondary IP Address should be on the same subnet as the Primary IP Address and uses the same Subnet Mask. Addresses on other subnets can be added using Virtual Interfaces.

**Primary IP Address**

IP Address:  .  .  .

Subnet Mask:  .  .  .

**Secondary IP Address**

IP Address:  .  .  .

**Note:** there may be a short pause between clicking *Update* and receiving a response.

Figure 9. Ethernet port configuration web page

3. In the **Default LAN Port** section (Figure 9), enter the desired IP address and appropriate subnet mask for the unit in the **Primary IP Address** field.
4. Click **Update** to apply the new settings.

**Note** If the new IP address is in a different subnet, then once it is changed, you must change the IP address for the PC before you can access the 3201/3241 web pages again.

## Chapter 4 **Basic Application Configurations**

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## Introduction

The basic applications are divided according to whether the application is bridged or routed.

The bridged applications are *RFC 1483 Bridged*, *PPPoA Bridged*, and *HDLC Bridged*.

The routed applications are *RFC 1483*, *PPPoA*, *IPoA*, *PPPoE*, and *HDLC*.

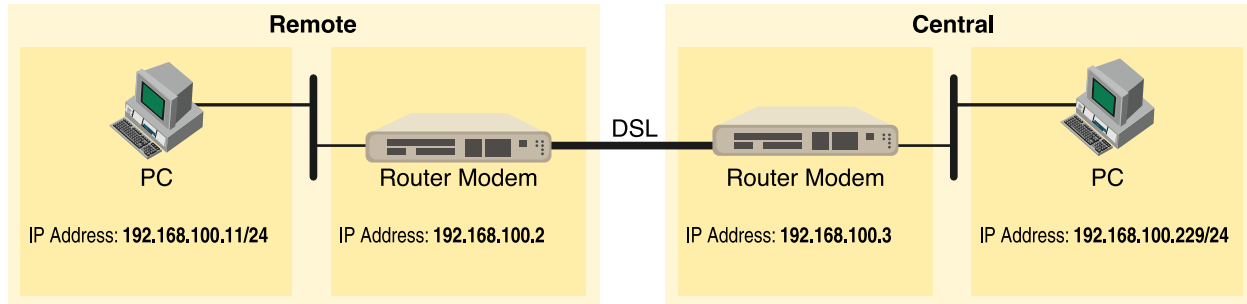
Another way of organizing the applications is according to the type of encapsulation: *PPP*, *RFC 1483*, or *Frame Relay*. PPP encapsulation is available as *PPPoA bridged or routed* and *PPPoE*. RFC 1483 and Frame Relay can be configured for bridged and routed connections.

The following table shows the parameters that can be configured via the HTTP server using a web browser.

Web Page Parameter	Routed WAN Services					Bridged WAN Services			Comments
	RFC 1483	PPPoA	IPoA	PPPoE	PPPoH	RFC 1483	PPPoA	PPPoH	
Description	X	X	X	X	X	X	X	X	
VPI	X	X	X	X		X	X		default = 0
VCI	X	X	X	X		X	X		default = 35
Encapsulation	LLC			VcMux		LLC			LLC or VcMux
Use DHCP	X		X		X				
WAN IP address	X		X		X				default mask = 255.255.255.0
LLC header				X					
HDLC header					ON			ON	
No authentication		X		X			X		
PAP		X		X			X		
CHAP		X		X			X		
User Name		X		X			X		
Password		X		X			X		
WAN IP address (Client modem for PPPoA)		X (0.0.0.0) for client							Local IP Mask = 255.255.255.0
Access Concentrator				X					
HDLC Encapsulation					X			X	

## Two stand-alone units directly connected

### Ethernet Extension (HDLC - PPPoH Bridged)



#### Model 3201 (Remote) Configuration Steps (PPPoH Bridged)

From the command line interface (CLI) via the RS-232 control port,

→ ip list interfaces

One IP interface is called *ip1* with an IP address of 192.168.1.1

Let's change the IP address so it is in the same subnet as both PCs. For example, to 192.168.100.2

→ ip set interface ip1 ipaddress 192.168.100.2 255.255.255.0

1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.
2. On the Menu, go to **Configuration**, then to **WAN Connections**. Delete the factory default WAN services already defined.

Click on **Create a new service** in the main window, select **PPPoH\_Bridged** and click on the **Configure** button.

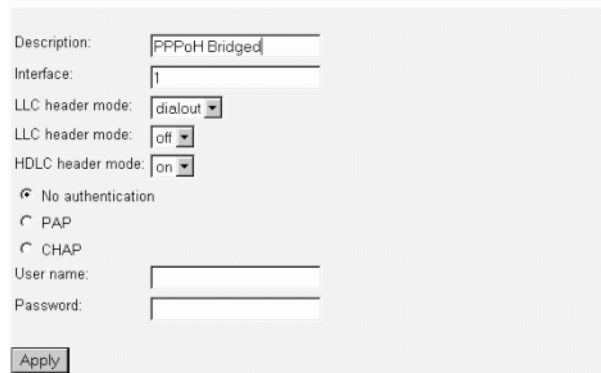
### WAN connection: create service

Please select the type of service you wish to create:

ATM:  RFC 1483 routed  RFC 1483 bridged  
 PPPoA routed  PPPoA bridged  
 IPoA routed  PPPoE routed  
 HDLC:  PPPoH routed  PPPoH bridged

3. In the Description field, enter the description you wish. In this example, it is called *PPPoH Bridged*.

## WAN connection: PPPoH bridged



The screenshot shows a configuration form for a WAN connection. The fields are as follows:

- Description: PPPoH Bridged
- Interface: 1
- LLC header mode: dialout
- LLC header mode: off
- HDLC header mode: on
- Authentication: No authentication (selected), PAP, CHAP
- User name: (blank)
- Password: (blank)
- Apply button

Verify the settings to be:

- Interface = 1
- LLC header mode = dialout
- LLC header mode = off
- HDLC header mode = on
- No authentication
- Leave User name and Password blank.

Click on **Apply**.

4. Go to **G.SHDSL** in the **Configuration Menu**, then the submenu **Configuration**.

### G.SHDSL Attributes:

Circuit ID	Circuit ID **30Byte Maxim
Clear Error Counters	Normal
Intended DSL Data Rate	36
Actual DSL Data Rate (kbps)	2312
DSL Rate: Number of i Bit	0
Terminal Type	Central
Interface Type	hdlc
PCM Mode	Ethernet Only
Clocking Options	Internal
PCM Transmit Clock Polarity	Normal
PCM Receive Clock Polarity	Normal
Loopback	Off
Annex Type	Annex A
Remote Circuit ID	
<input type="button" value="Configure"/>	
<b>Action</b>	

Change Terminal Type to *Central* and Interface Type to *hdlc*. Click on the **Configure** button.

In the Action submenu under G.SHDSL, change Action to **Deactivate**, then click on **Action**.

Return to Action, select **Start** and click on **Action**.

### **Model 3201 (Central) Configuration Steps (PPPoH Bridged)**

See the Web page images for the Remote Model 3201 configuration above.

From the command line interface (CLI) via the RS-232 control port,

```
→ ip list interfaces
```

One IP interface is called *ip1* with an IP address of 192.168.1.1

Change the IP address so it is in the same subnet as both PCs. For example, to *192.168.100.3*

```
→ ip set interface ip1 ipaddress 192.168.100.3 255.255.255.0
```

1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.
2. On the Menu, go to **Configuration**, then to **WAN Connections**. Delete the factory default WAN services already defined.

Click on **Create a new service** in the main window, select **PPPoH\_Bridged** and click on the **Configure** button.

In the **Description** field, enter the description you wish. In this example, it is called *PPPoH Bridged*.

Verify the settings to be:

- Interface = 1
- LLC header mode = dialout

- LLC header mode = off
- HDLC header mode = on
- No authentication
- Leave User name and Password blank.

Click on **Apply**.

3. Go to **G.SHDSL** in the Configuration Menu, then the submenu **Configuration**.

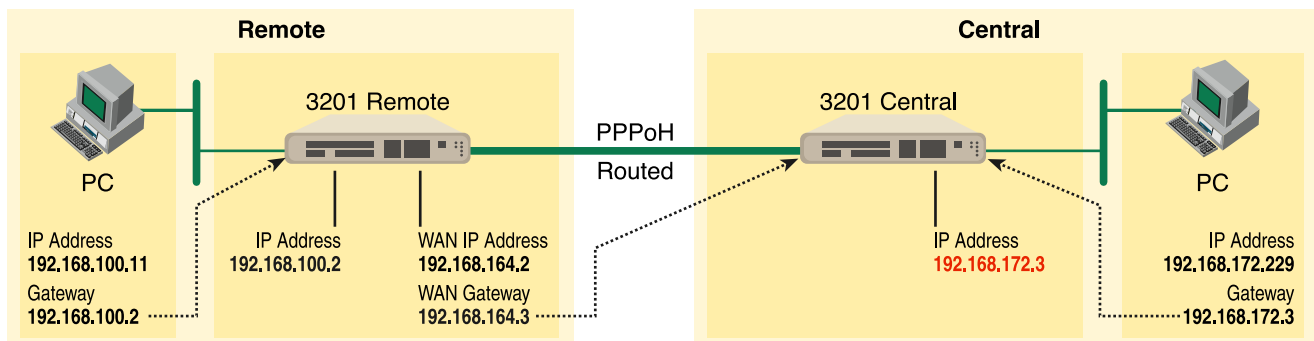
Leave Terminal Type as *Remote*.

Change Interface Type to **hdlc**. Click on the **Configure** button.

In the Action submenu under G.SHDSL, change Action to **Deactivate**, then click on **Action**.

Return to Action, select **Start** and click on **Action**.

### Network Extension (HDLC–PPPoH Routed)



### Model 3201 (Remote) Configuration Steps (PPPoH Routed)

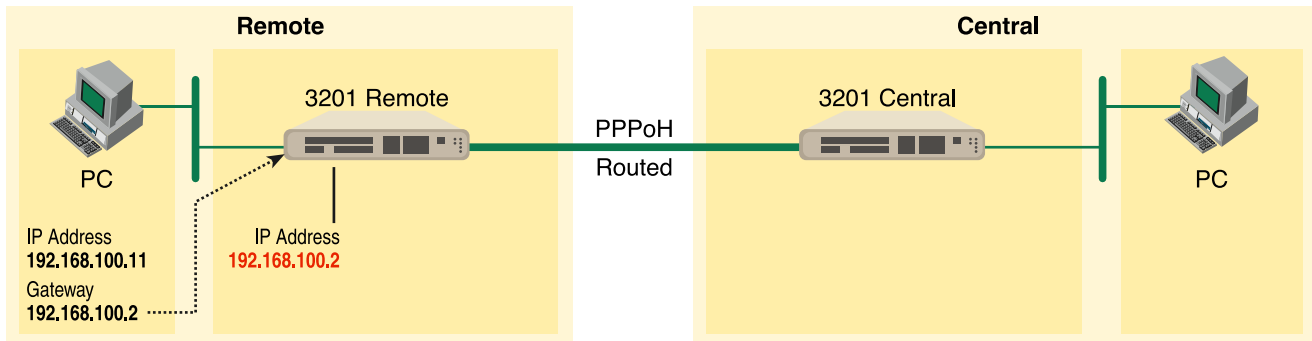
From the command line interface (CLI) via the RS-232 control port,

→ ip list interfaces

One IP interface was called ip1 with an IP address of 192.168.1.1 Change it to an IP address which is in the same subnet as the Desktop PC. For example, to 192.168.100.2. The default IP mask is 255.255.255.0.

→ ip set interface ip1 ipaddress 192.168.100.2 255.255.255.0





- Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.  
Click on **G.SHDSL** in the **Configuration Menu > Configuration** > verify that Terminal Type is **Central** and Interface Type is "**hdlc**." If changed, then click on **Configure**.  
Click on **Action** > Select **deactivate** for Action > Click on the **Action** button.
- On the Menu, go to **Configuration**, then to **WAN Connections**  
Delete both default WAN services already defined.  
Click on **Create a new service** in the main window, select **PPPoH\_Routed** and click on the **Configure** button.  
In the Description field, enter the description you wish. In this example, it is called *PPPoH Routed*.
  - Description: PPPoH Routed
  - Interface: 1
  - WAN IP address: 192.168.164.2
  - LLC Header Mode: off
  - HDLC Header Mode: ON
  - No authentication
  - Username: [blank]
  - Password: [blank]

## WAN connection:

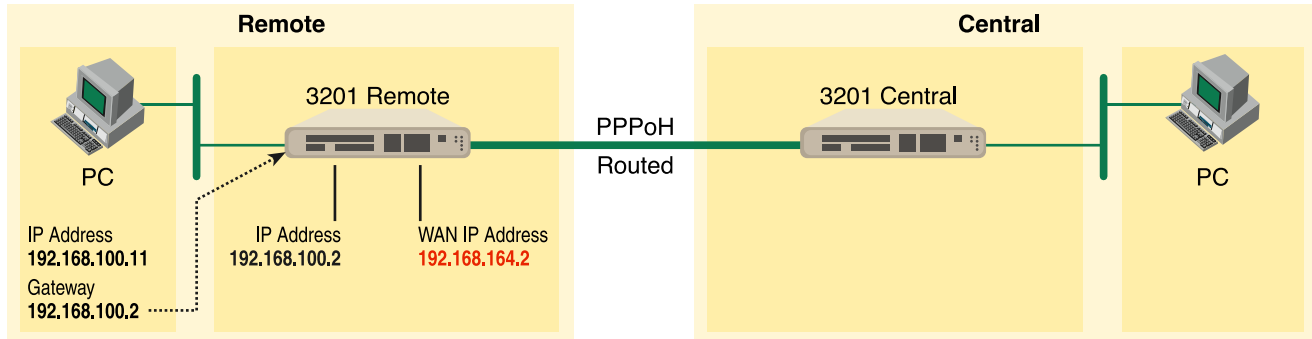
Description:	PPPoH Routed
Interface:	1
WAN IP address:	192.168.164.2
LLC header mode:	off
HDLC header mode:	on
<input checked="" type="radio"/> No authentication	
<input type="radio"/> PAP	
<input type="radio"/> CHAP	
User name:	
Password:	
<input type="button" value="Configure"/>	

Click on **Configure**.

- Go to **Configuration Menu > Configuration > WAN connections > Edit (for PPPoH Routed service) > Edit 'IP Interface' > Ipaddr:** [enter the WAN IP Address, in this example = 192.168.164.2] > Click on **Change**.

## Edit Ip Interface

Options	
Name	Value
Ipaddr:	192.168.164.2
Mask:	255.255.255.0
Dhcp:	false
MTU:	1500
Enabled:	true
Layer2Session:	
<input type="button" value="Change"/> <input type="button" value="Reset"/>	



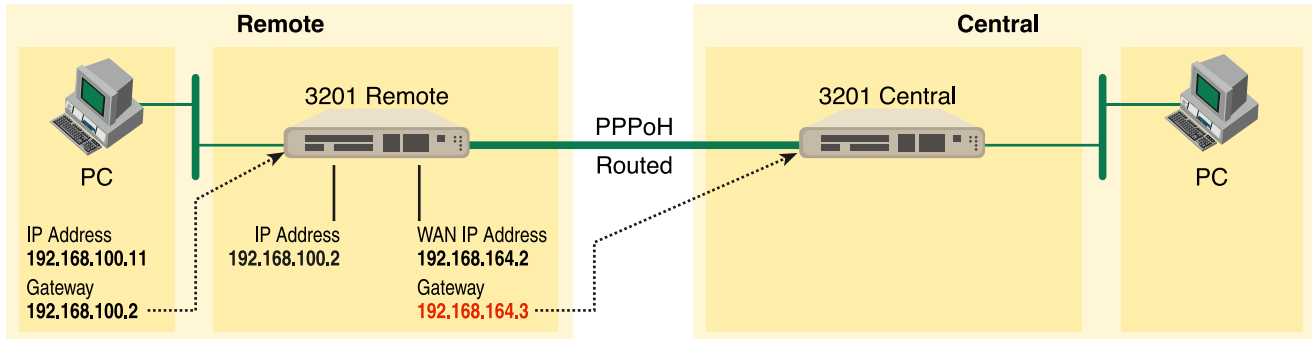
4. **Configuration Menu > Configuration > IP Routes > Click on Create new Ip V4 Route > Create the gateway to the remote 3201 by entering the WAN IP address of the remote 3201, in this example, enter 192.168.164.3 in the Gateway field > OK**

### Create Ip V4Route

Name	Value
Destination	0.0.0.0
Gateway	192.168.164.3
Netmask	0.0.0.0
Cost	1
Interface	

The other fields should be:

- Destination: 0.0.0.0
- Gateway: 192.168.164.3 [already configured in first part of step 4).]
- Mask: 0.0.0.0
- Cost: 1
- Interface: [blank]



5. Go to G.SHDSL in the Configuration Menu, then the submenu Status. The Modem State should be “deactivated.” (If not, go to the Action and change it to deactivate.)

Then in the Action submenu under G.SHDSL, change Action to Start, then click on **Action**.

**Model 3201 (Central) Configuration Steps (PPPoH Routed)**

See the web pages for the desktop above. Some parametric values are different although the process is the same.

From the command line interface (CLI) via the RS-232 control port,

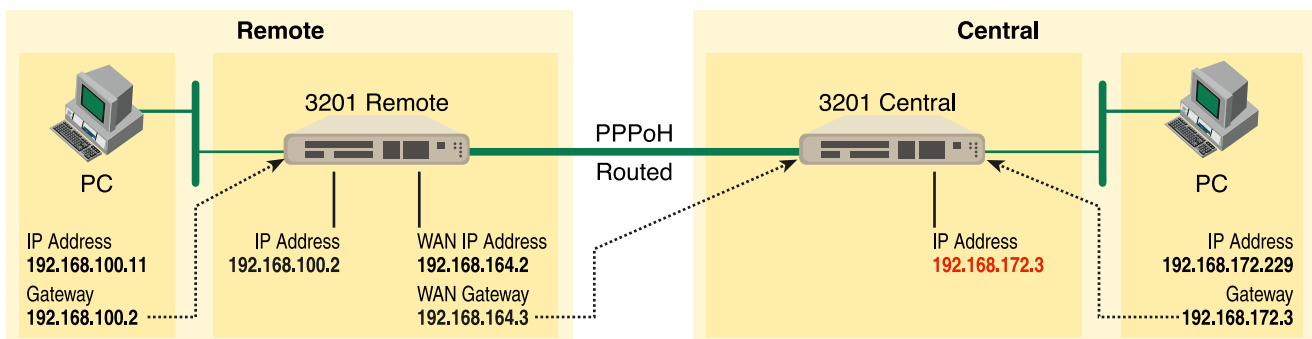
```
→ ip list interfaces
→ ip clear routes
→ pppoh clear transports

→ ethernet add transport eth1 ethernet
```

One IP interface was called ip1 with an IP address of 192.168.1.1

Change the IP address so it is in the same subnet as the laptop PC. The laptop’s IP address is 192.168.172.229, so in this example, change the IP address of the 3201 to 192.168.172.3. The default IP mask is 255.255.255.0.

```
→ ip set interface ip1 ipaddress 192.168.172.3 255.255.255.0
```



1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.

Click on **G.SHDSL** in the **Configuration Menu > Configuration** > verify that Terminal Type is *remote* and Interface Type is "*hdlc*." If changed, then click on **Configure**.

Click on **Action** > Select **deactivate** for Action > Click on the **Action** button.

2. On the Menu, go to **Configuration**, then to **WAN Connections**.

Delete both default WAN services already defined.

Click on **Create a new service** in the main window, select **PPPoH\_Routed** and click on the **Configure** button.

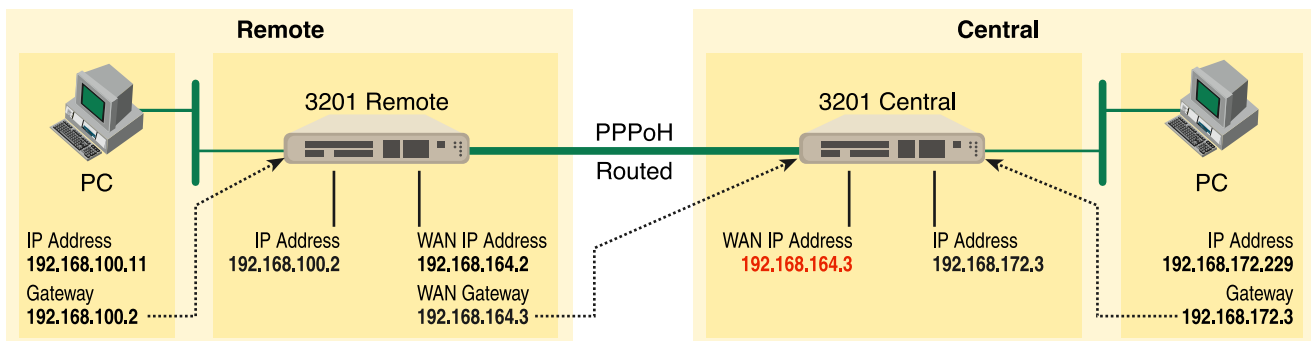
In the Description field, enter the description you wish. In this example, it is called *PPPoH Routed*.

Description:PPPoH Routed

- Interface:1
- WAN IP address: 192.168.164.3
- LLC Header Mode:off
- HDLC Header Mode:ON
- No authentication
- Username:[blank]
- Password:[blank]

Click on **Configure**.

3. Go to **Configuration Menu > Configuration > WAN connections > Edit (for PPPoH Routed service) > Edit 'IP Interface'** > **Ipaddr:** [enter the WAN IP Address, in this example = 192.168.164.3] > Click on **Change**.

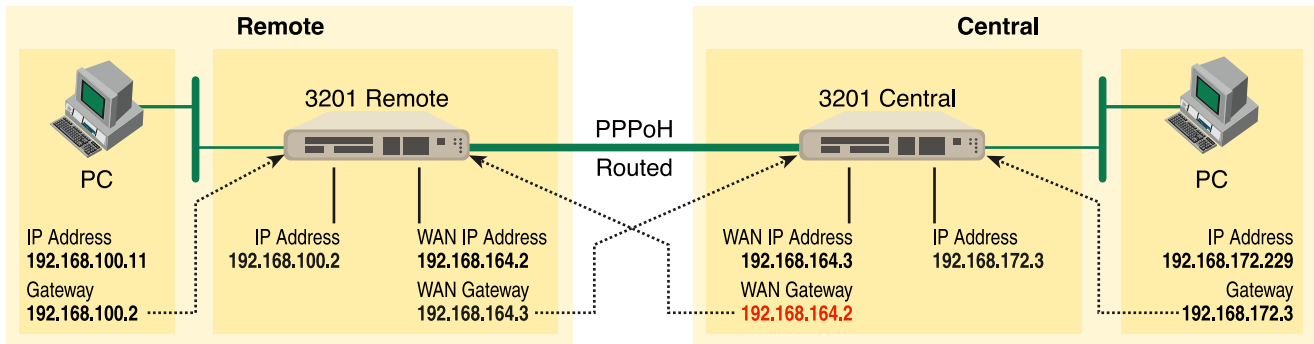


4. **Configuration Menu > Configuration > IP Routes** > Click on **Create new Ip V4 Route** > Create the gateway to the remote 3201 by entering the WAN IP address of the remote 3201, in this example, enter 192.168.164.2 in the Gateway field > OK

The other fields should be:

- Destination:0.0.0.0
- Gateway:192.168.164.2 [already changed in the first part of step 5).]
- Mask:0.0.0.0

- Cost:1
- Interface:[blank]



5. Go to **G.SHDSL** in the Configuration Menu, then the submenu **Status**. The Modem State should be “deactivated.” (If not, go to the Action and change it to deactivate.)

Then in the Action submenu under G.SHDSL, change Action to Start, then click on **Action**.

## DSLAM Connections with remote CPE units

### Bridged application configurations to a DSLAM

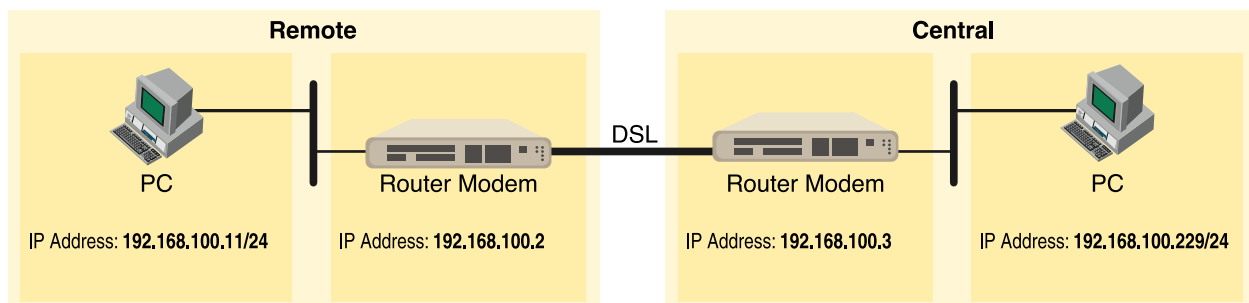
Three bridged services are offered, *RFC 1483 Bridged*, *PPPoA Bridged*, and *HDLC Bridged*.

The configurations show a desktop on one end and a laptop on the other. The laptop and its Model 3201 would be replaced with a DSLAM.

#### RFC 1483 Bridged Configuration.

No additional IP addresses are needed other than the IP address chosen earlier. In fact, if you are configuring and managing the model 3201 only from the CLI (Command Line Interface), an IP address is not needed at all. The limitation of no IP address precludes the user from doing web management of the 3201 since management is done via the Ethernet port.

As in the PPPoA Bridged application, both sides of the RFC 1483 bridged connection are on the same subnet.



### *Model 3201 (Remote) Configuration Steps (RFC 1483 Bridged)*

From the command line interface (CLI) via the RS-232 control port,

→ ip list interfaces

One IP interface is called ip1 with an IP address of 192.168.1.1

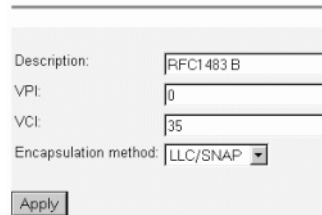
Change the IP address so it is in the same subnet as both PCs. For example, to 192.168.100.2

→ ip set interface ip1 ipaddress 192.168.100.2 255.255.255.0

1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.
2. On the Menu, go to Configuration, then to WAN Connections. Delete the factory default WAN services already defined.

Click on **Create a new service** in the main window, select **RFC\_1483\_Bridged** and click on the **Configure** button.

#### **WAN connection:**



The screenshot shows a web-based configuration form titled "WAN connection:". It contains four input fields: "Description:" with the value "RFC1483 B", "VPI:" with the value "0", "VCI:" with the value "35", and "Encapsulation method:" with a dropdown menu set to "LLC/SNAP". Below the fields is an "Apply" button.

In the Description field, enter the description you wish. In this example, it is called *RFC 1483 B*.

Leave VCI as 35 and Encapsulation Method as LLC/SNAP. Then click on **Apply**.

3. Go to **G.SHDSL** in the Configuration Menu, then the submenu **Configuration**.

**G.SHDSL Attributes:**

Circuit ID	Circuit ID ***30Byte Maxim
Clear Error Counters	Normal
Intended DSL Data Rate	36
Actual DSL Data Rate (kbps)	2312
DSL Rate: Number of i Bit	0
Terminal Type	Central
Interface Type	atm
PCM Mode	Ethernet Only
Clocking Options	Internal
PCM Transmit Clock Polarity	Normal
PCM Receive Clock Polarity	Normal
Loopback	Off
Annex Type	Annex A
Remote Circuit ID	
<input type="button" value="Configure"/>	

Change Terminal Type to *Remote* and Interface Type to *atm*. Click on the **Configure** button.

In the Action submenu under G.SHDSL, change Action to **Deactivate**, then click on Action.

Return to Action, select **Start** and click on **Action**.

***Model 3201 (Central) Configuration Steps (RFC 1483 Bridged)***

Although the some parametric values may vary from the desktop's Model 3201, the process is identical.

From the command line interface (CLI) via the RS-232 control port,

```
→ ip list interfaces
```

One IP interface is called ip1 with an IP address of 192.168.1.1

Change the IP address so it is in the same subnet as both PCs. For example, to 192.168.100.3

```
→ ip set interface ip1 ipaddress 192.168.100.3 255.255.255.0
```

1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.
2. On the Menu, go to Configuration, then to WAN Connections. Delete the factory default WAN services already defined.

Click on **Create a new service** in the main window, select **RFC\_1483\_Bridged** and click on the **Configure** button.

In the Description field, enter the description you wish. In this example, it is called *RFC 1483 B*.

Leave VCI as 35 and Encapsulation Method as LLC/SNAP. Then click on **Apply**.

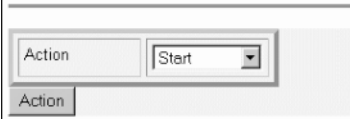
3. Go to G.SHDSL in the Configuration Menu, then the submenu Configuration.

Leave Terminal Type as *Remote*, but change Interface Type to *atm*. Click on the **Configure** button.

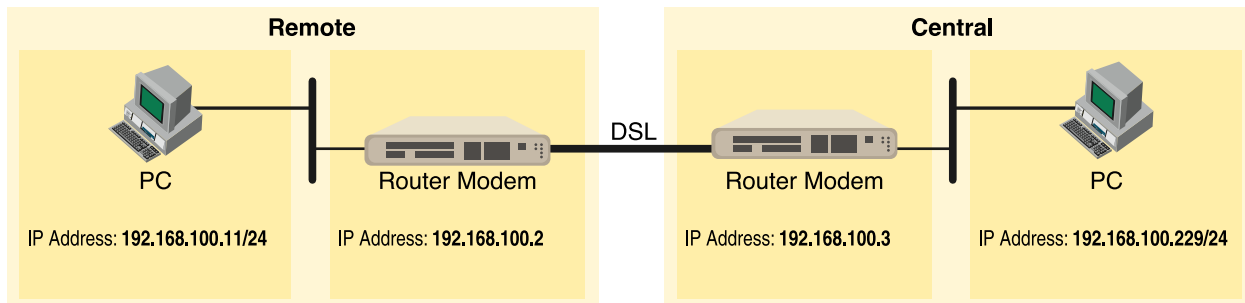


**G.SHDSL Actions:**

In the Action submenu under G.SHDSL, change Action to **Deactivate**, then click on **Action**.

**G.SHDSL Actions:**

Return to Action, select **Start** and click on **Action**.

*PPPoH Bridged Configuration**Model 3201 (Remote) Configuration Steps (PPPoH Bridged)*

From the command line interface (CLI) via the RS-232 control port,

→ ip list interfaces

One IP interface is called ip1 with an IP address of 192.168.1.1 Change the IP address so it is in the same subnet as both PCs. For example, to 192.168.100.2

→ ip set interface ip1 ipaddress 192.168.100.2 255.255.255.0

1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.
2. On the Menu, go to **Configuration**, then to WAN Connections. Delete the factory default WAN services already defined.

Click on **Create a new service** in the main window, select **PPPoH\_Bridged** and click on the **Configure** button.

## WAN connection: create service

Please select the type of service you wish to create:

ATM:  RFC 1483 routed  RFC 1483 bridged  
 PPPoA routed  PPPoA bridged  
 IPoA routed  PPPoE routed

HDLC:  PPPoH routed  PPPoH bridged

In the Description field, enter the description you wish. In this example, it is called *PPPoH Bridged*.

## WAN connection: PPPoH bridged

Description:

Interface:

LLC header mode:

LLC header mode:

HDLC header mode:

No authentication  
 PAP  
 CHAP

User name:

Password:

- Interface = 1
- LLC header mode = dialout
- LLC header mode = off
- HDLC header mode = on
- No authentication
- Leave User name and Password blank.
- Click on **Apply**.

### 3. Go to **G.SHDSL** in the Configuration Menu, then the submenu **Configuration**.

- Change Terminal Type to *Remote* and Interface Type to *hdlc*. Click on the **Configure** button.
- In the Action submenu under G.SHDSL, change Action to Deactivate, then click on **Action**.
- Return to Action, select **Start** and click on **Action**.

***Model 3201 (Central) Configuration Steps (PPPoH Bridged)***

From the command line interface (CLI) via the RS-232 control port,

→ ip list interfaces

One IP interface is called ip1 with an IP address of 192.168.1.1

Change the IP address so it is in the same subnet as both PCs. For example, to 192.168.100.3

→ ip set interface ip1 ipaddress 192.168.100.3 255.255.255.0

1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.
2. On the Menu, go to Configuration, then to WAN Connections. Delete the factory default WAN services already defined.

Click on **Create a new service** in the main window, select **PPPoH\_Bridged** and click on the **Configure** button.

In the Description field, enter the description you wish. In this example, it is called *PPPoH Bridged*.

- Interface = 1
- LLC header mode = dialout
- LLC header mode = off
- HDLC header mode = on
- No authentication
- Leave User name and Password blank.

Click on **Apply**.

3. Go to G.SHDSL in the Configuration Menu, then the submenu Configuration.

Leave Terminal Type as *Central*.

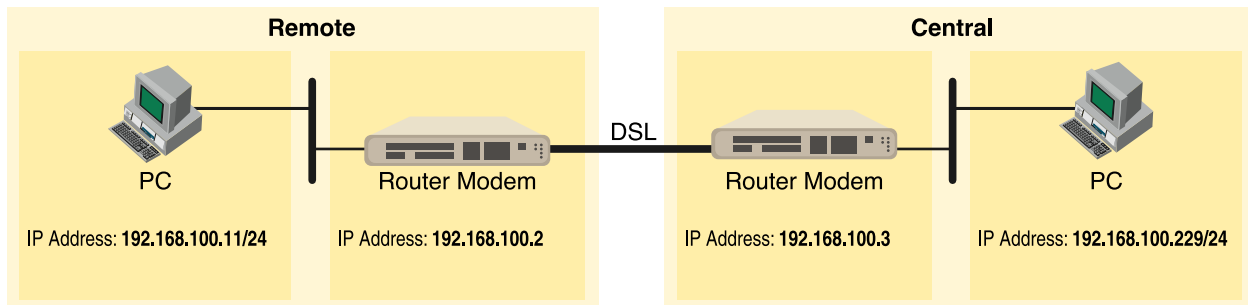
Change Interface Type to *hdlc*. Click on the Configure button.

In the Action submenu under G.SHDSL, change Action to Deactivate, then click on **Action**.

Return to Action, select Start and click on **Action**.

### PPPoA Bridged (RFC 2364) Configuration

The user data for transmission is in the form of IP packets but encapsulated in a PPP packet, transmitted and received through a PPP session to the connection. The PPP packets are encapsulated according to RFC 2364 for transmission over the ATM link. The packets are de-encapsulated on the receive side so that the IP data can be delivered to the end user.



### Model 3201 (Remote) Configuration Steps (PPPoA Bridged)

From the command line interface (CLI) via the RS-232 control port,

```
→ ip list interfaces
```

One IP interface is called ip1 with an IP address of 192.168.1.1

Change the IP address so it is in the same subnet as both PCs. For example, to 192.168.100.2

```
→ ip set interface ip1 ipaddress 192.168.100.2 255.255.255.0
```

1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.
2. On the Menu, go to Configuration, then to WAN Connections. Delete the factory default WAN services already defined.

Click on **Create a new service** in the main window, select **PPPoA\_Bridged** and click on the **Configure** button.

In the Description field, enter the description you wish. In this example, it is called *PPPoA Bridged*.

**WAN connection:**

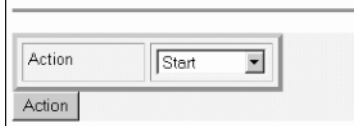
Description:	PPPoA Bridged
VPI:	0
VCI:	300
LLC header mode:	off
HDLC header mode:	off
<input checked="" type="radio"/> No authentication <input type="radio"/> PAP <input type="radio"/> CHAP	
User name:	
Password:	
<input type="button" value="Apply"/>	

- VPI = 0
- VCI = 300
- LLC header mode = off
- HDLC header mode = off
- No authentication
- Leave User name and Password blank.

Click on **Apply**.

3. Go to G.SHDSL in the Configuration Menu, then the submenu Configuration. Change Terminal Type to *Remote* and Interface Type to *atm*. Click on the **Configure** button. In the Action submenu under G.SHDSL, change Action to **Deactivate**, then click on **Action**.

### G.SHDSL Actions:



Return to Action, select **Start** and click on **Action**.

### ***Model 3201 (Central) Configuration Steps (PPPoA Bridged)***

From the command line interface (CLI) via the RS-232 control port,

→ ip list interfaces

One IP interface is called ip1 with an IP address of 192.168.1.1

Change the IP address so it is in the same subnet as both PCs. For example, to 192.168.100.3

→ ip set interface ip1 ipaddress 192.168.100.3 255.255.255.0

1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.
2. On the Menu, go to Configuration, then to WAN Connections. Delete the factory default WAN services already defined.

Click on **Create a new service** in the main window, select **PPPoA\_Bridged** and click on the **Configure** button.

In the Description field, enter the description you wish. In this example, it is called *PPPoA Bridged*.

- VPI = 0
- VCI = 300
- LLC header mode = off
- HDLC header mode = off

- No authentication
- Leave User name and Password blank.

Click on **Apply**.

3. Go to G.SHDSL in the Configuration Menu, then the submenu Configuration.

Leave Terminal Type as *Central*.

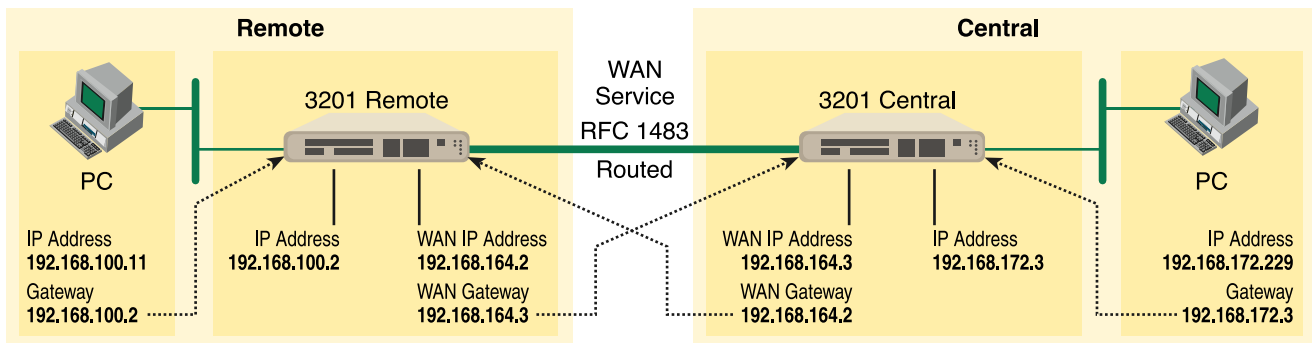
Change Interface Type to *atm*. Click on the **Configure** button.

In the Action submenu under G.SHDSL, change Action to Deactivate, then click on **Action**.

Return to Action, select **Start** and click on **Action**.

### Routed application configurations to a DSLAM

Five **routed** WAN services are offered, *RFC 1483*, *PPPoH*, *IPoA*, *PPPoA*, and *PPPoE Routed*.



#### RFC 1483 Routed

RFC 1483 provides the simplest method of connecting end stations over an ATM network. User data in the form of Ethernet packets is encapsulated into AAL-5 PDUs for transport over ATM. RFC 1483 provides no authentication and configuration that would be provided by PPP.

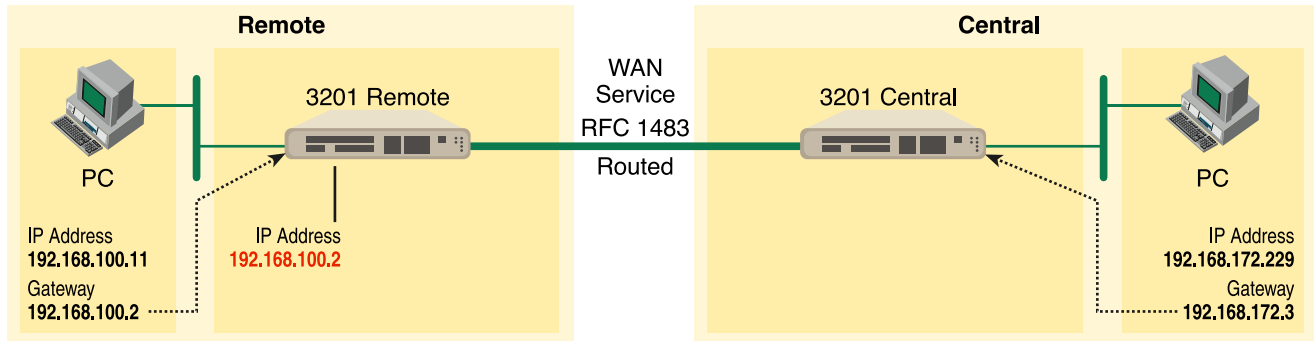
#### Model 3201 (Remote) Configuration Steps (RFC 1483 Routed)

From the command line interface (CLI) via the RS-232 control port,

```
→ ip list interfaces
```

One IP interface was called ip1 with an IP address of 192.168.1.1 Change it to an IP address which is in the same subnet as the Desktop PC. For example, to 192.168.100.2. The default IP mask is 255.255.255.0.

```
→ ip set interface ip1 ipaddress 192.168.100.2 255.255.255.0
```



1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.

Click on G.SHDSL in the Configuration Menu > Configuration > verify that Terminal Type is *Central* and Interface Type is *atm*. If changed, then click on **Configure**.

### G.SHDSL Actions:



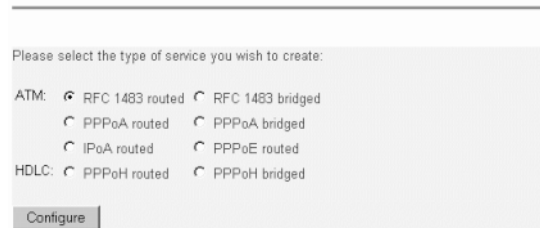
Click on Action > Select deactivate for Action > Click on the Action button.

2. On the Menu, go to Configuration, then to WAN Connections.

Delete both default WAN services already defined.

Click on **Create a new service** in the main window, select **RFC 1483 Routed** and click on the **Configure** button.

### WAN connection: create service



In the Description field, enter the description you wish. In this example, it is called *RFC 1483 Routed*. Change the configuration parameters to match the following.

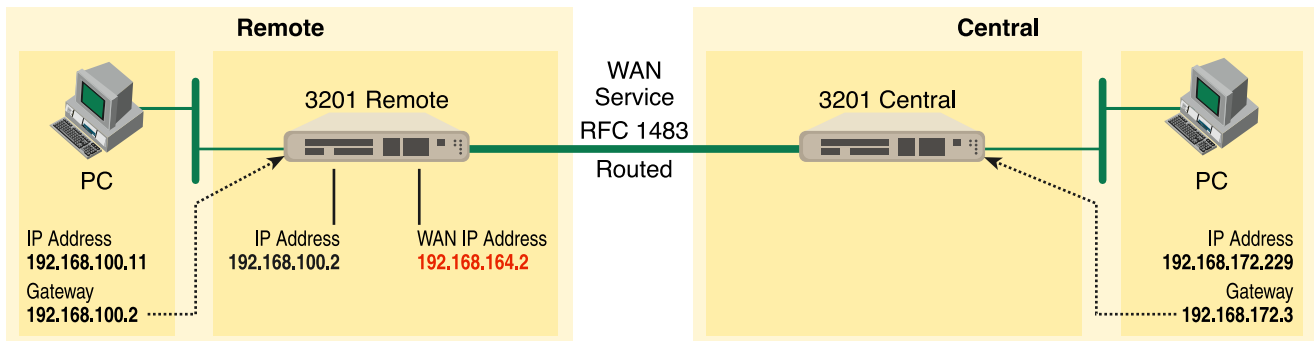
### WAN connection:

Description:	RFC 1483 Routed
VPI:	0
VCI:	35
Encapsulation method:	LLC/SNAP
<input type="checkbox"/> Use DHCP	
<input checked="" type="checkbox"/> WAN IP address:	192.168.164.2
<input type="button" value="Apply"/>	

Description:RFC 1483 Routed

- VPI:0
- VCI:35
- Encapsulation Method: LLC/SNAP
- WAN IP Address:192.168.164.2

Click on **Configure**.



3. Configuration Menu > Configuration > IP Routes > Click on Create new Ip V4 Route > Create the gateway to the remote 3201 by entering the WAN IP address of the remote 3201, in this example, enter 192.168.164.3 in the Gateway field > OK

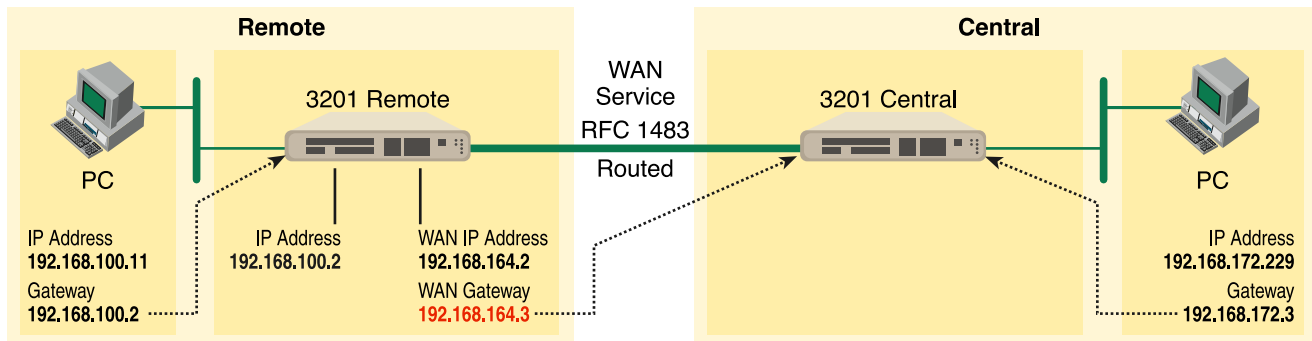


## Create Ip V4Route

Name	Value
Destination	0.0.0.0
Gateway	192.168.164.3
Netmask	0.0.0.0
Cost	1
Interface	

The other fields should be:

- Destination:0.0.0.0
- Gateway:192.168.164.3
- Mask:0.0.0.0
- Cost:1
- Interface:[blank]



4. Go to G.SHDSL in the Configuration Menu, then the submenu Status. The Modem State should be “deactivated.” (If not, go to the Action and change it to deactivate.)

Then in the Action submenu under G.SHDSL, change Action to **Start**, then click on **Action**.

### *Model 3201 (Central) Configuration Steps (RFC 1483 Routed)*

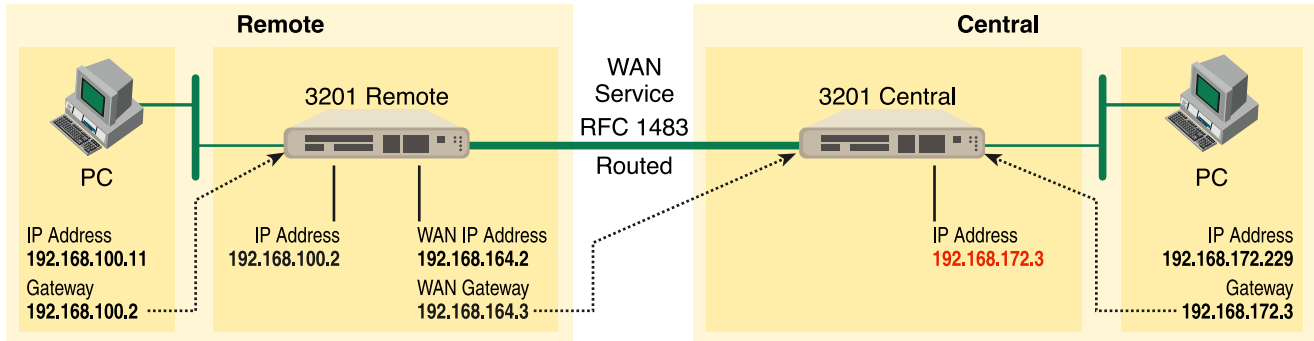
From the command line interface (CLI) via the RS-232 control port,

- ip list interfaces
- pppoh clear transports

One IP interface was called ip1 with an IP address of 192.168.1.1

Change the IP address so it is in the same subnet as the laptop PC. The laptop's IP address is 192.168.172.229, so in this example, change the IP address of the 3201 to 192.168.172.3. The default IP mask is 255.255.255.0.

```
→ ip set interface ip1 ipaddress 192.168.100.2 255.255.255.0
```



1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.

Click on G.SHDSL in the Configuration Menu > Configuration > verify that Terminal Type is *Remote* and Interface Type is *atm*. If changed, then click on **Configure**.

### G.SHDSL Attributes:

Circuit ID	Circuit ID **30Byte Maxim
Clear Error Counters	Normal
Intended DSL Data Rate	36
Actual DSL Data Rate (kbps)	2312
DSL Rate: Number of i Bit	0
Terminal Type	Remote
Interface Type	atm
PCM Mode	Ethernet Only
Clocking Options	Internal
PCM Transmit Clock Polarity	Normal
PCM Receive Clock Polarity	Normal
Loopback	Off
Annex Type	Annex A
Remote Circuit ID	
<b>Configure</b>	

Click on Action > Select deactivate for Action > Click on the Action button.

### G.SHDSL Actions:



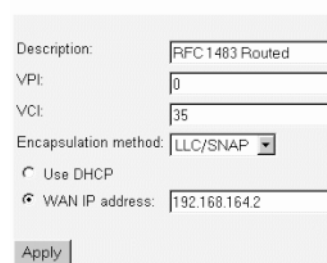
2. On the Menu, go to Configuration, then to WAN Connections.

Delete both default WAN services already defined.

Click on **Create a new service** in the main window, select **RFC 1483 Routed** and click on the **Configure** button.

In the Description field, enter the description you wish. In this example, it is called *RFC 1483 Routed*.

### WAN connection:



Description:RFC 1483 Routed

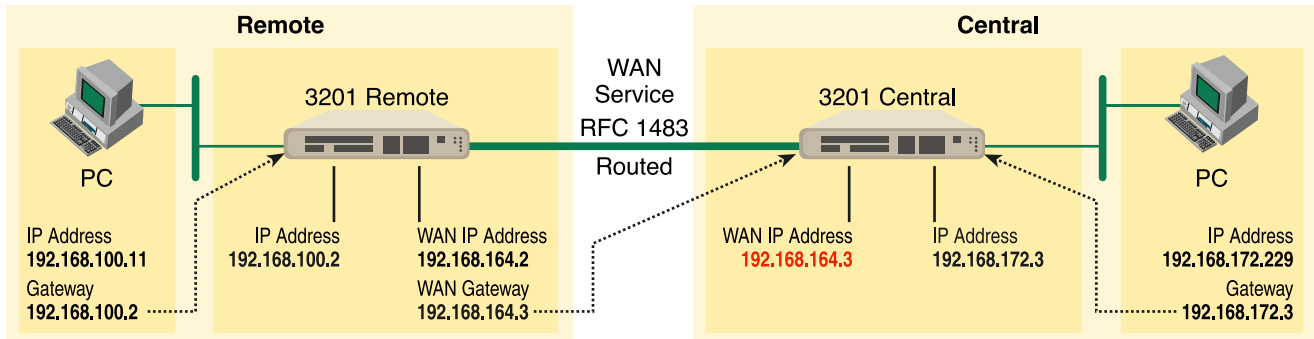
– VPI:0

– VCI:35

– Encapsulation Method: LLC/SNAP

– WAN IP Address:192.168.164.3

Click on **Configure**.



3. Configuration Menu > Configuration > IP Routes > Click on Create new Ip V4 Route > Create the gateway to the remote 3201 by entering the WAN IP address of the remote 3201, in this example, enter 192.168.164.2 in the Gateway field > OK

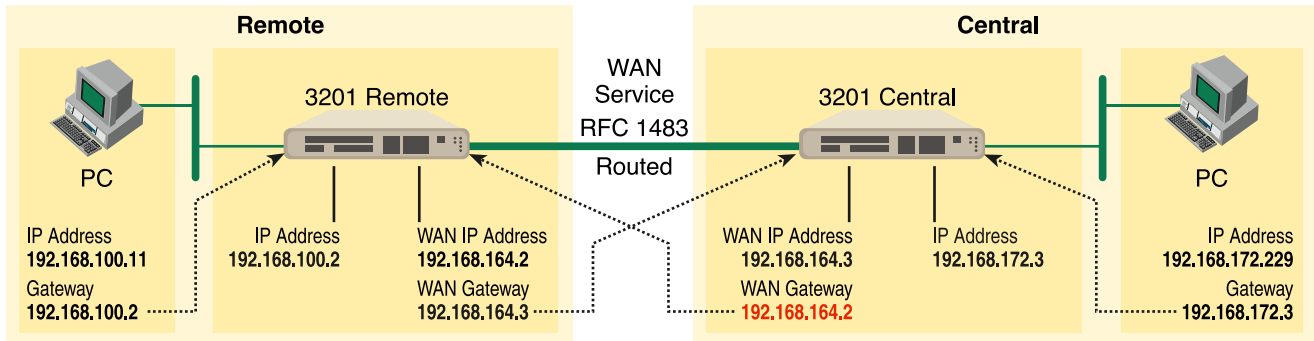
### Create Ip V4Route

Name	Value
Destination	0.0.0.0
Gateway	192.168.164.2
Netmask	0.0.0.0
Cost	1
Interface	

OK Reset  
Cancel

The other fields should be:

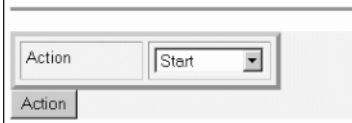
- Destination:0.0.0.0
- Gateway:192.168.164.2
- Mask:0.0.0.0
- Cost:1
- Interface:[blank]



- Go to G.SHDSL in the Configuration Menu, then the submenu Status. The Modem State should be “deactivated.” (If not, go to the Action and change it to deactivate.)

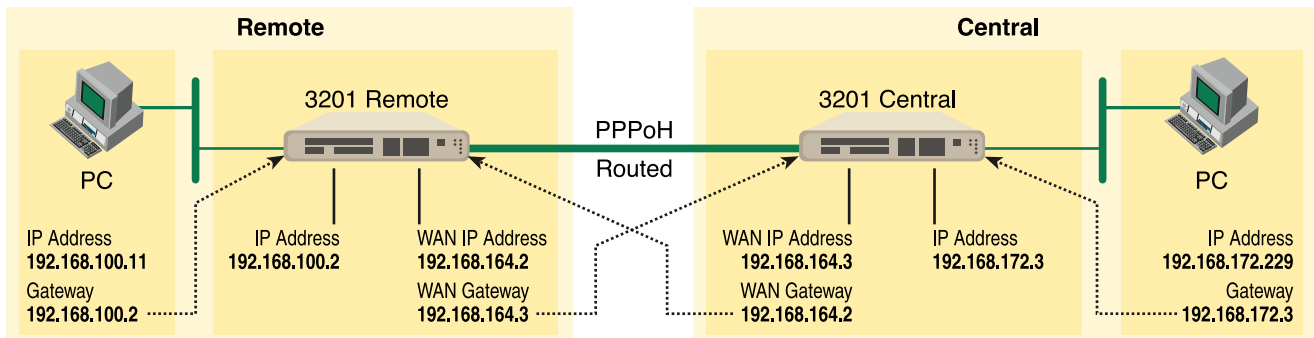
Then in the Action submenu under G.SHDSL, change Action to Start, then click on Action.

### G.SHDSL Actions:



The modems should link up within 30 seconds or so and the link is ready for communication.

### PPPoH Routed



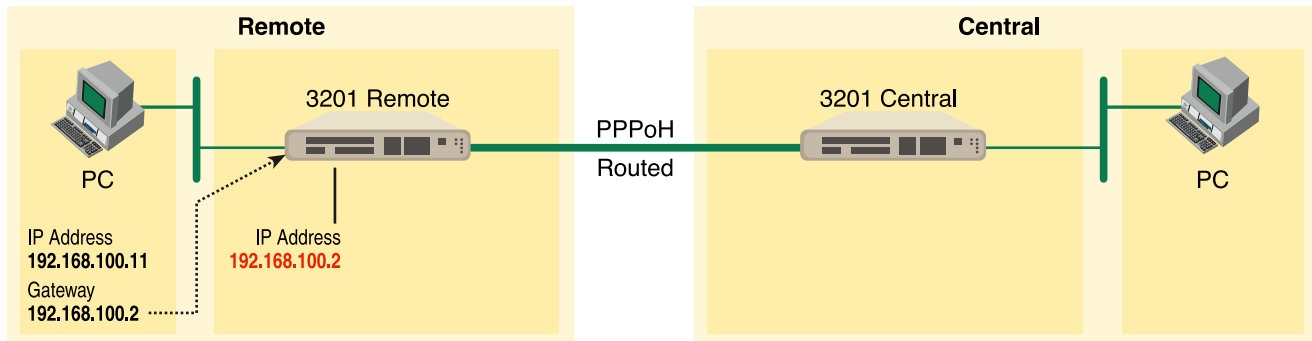
### Model 3201 (Remote) Configuration Steps (PPPoH Routed)

From the command line interface (CLI) via the RS-232 control port,

- ip list interfaces
- ip clear routes
- pppoh clear transports

One IP interface was called ip1 with an IP address of 192.168.1.1 Change it to an IP address which is in the same subnet as the Desktop PC. For example, to 192.168.100.2. The default IP mask is 255.255.255.0.

```
→ ip set interface ip1 ipaddress 192.168.100.2 255.255.255.0
```



1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.

Click on G.SHDSL in the Configuration Menu > Configuration > verify that Terminal Type is *Central* and Interface Type is *hdlc*. If changed, then click on **Configure**.

Click on Action > Select deactivate for Action > Click on the Action button.

2. On the Menu, go to Configuration, then to WAN Connections

Delete both default WAN services already defined.

Click on **Create a new service** in the main window, select **PPPoH\_Routed** and click on the **Configure** button.

**WAN connection: create service**

Please select the type of service you wish to create:

ATM:  RFC 1483 routed  RFC 1483 bridged  
 PPPoA routed  PPPoA bridged  
 IPoA routed  PPPoE routed

HDLC:  PPPoH routed  PPPoH bridged

In the Description field, enter the description you wish. In this example, it is called *PPPoH Routed*.

- Description:PPPoH Routed
- Interface:1
- WAN IP address: 192.168.164.2
- LLC Header Mode:off
- HDLC Header Mode:ON
- No authentication

– Username:[blank]

– Password:[blank]

Click on **Configure**.

Description:

Interface:

WAN IP address:

LLC header mode:

HDLC header mode:

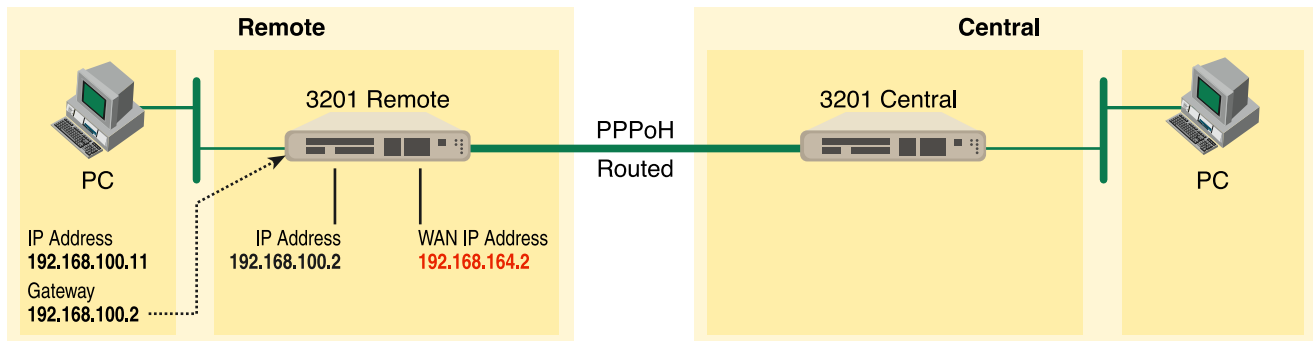
No authentication

PAP

CHAP

User name:

Password:



3. Go to Configuration Menu > Configuration > WAN connections > Edit (for PPPoH Routed service) > Edit 'IP Interface' > Ipaddr: [enter the WAN IP Address, in this example = 192.168.164.2] > Click on Change.

## Edit Ip Interface

Options	
Name	Value
Ipaddr:	192.168.164.2
Mask:	255.255.255.0
Dhcp:	false
MTU:	1500
Enabled:	true
Layer2Session:	

Change Reset

4. Configuration Menu > Configuration > IP Routes > Click on Create new Ip V4 Route > Create the gateway to the remote 3201 by entering the WAN IP address of the remote 3201, in this example, enter 192.168.164.3 in the Gateway field > OK

The other fields should be:

Destination:0.0.0.0

Gateway:192.168.164.3 [already configured in first part of step 5).]

Mask:0.0.0.0

Cost:1

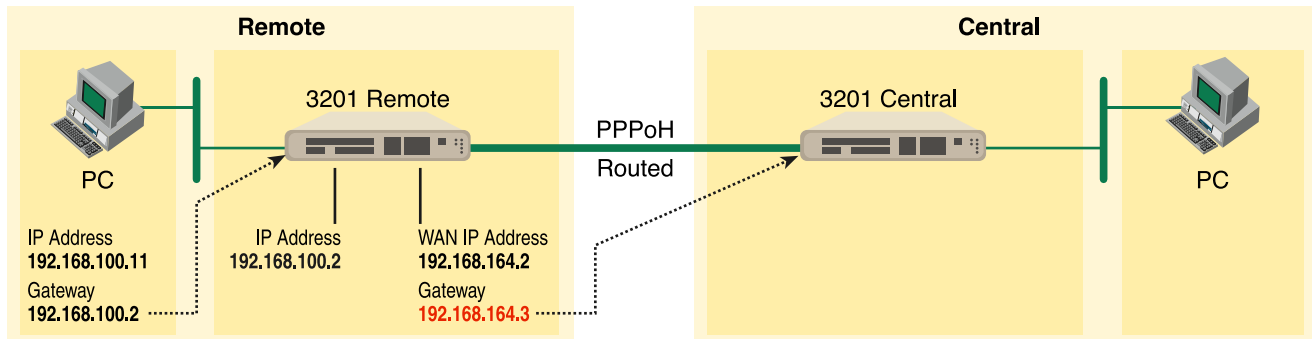
Interface:[blank]

## Create Ip V4Route

Name	Value
Destination	0.0.0.0
Gateway	192.168.164.3
Netmask	0.0.0.0
Cost	1
Interface	

OK Reset  
Cancel





5. Go to G.SHDSL in the Configuration Menu, then the submenu Status. The Modem State should be “deactivated.” (If not, go to the Action and change it to deactivate.)

Then in the Action submenu under G.SHDSL, change Action to Start, then click on **Action**.

### G.SHDSL Actions:

The screenshot shows the G.SHDSL Actions configuration interface. It features a dropdown menu for 'Action' with 'Start' selected, and an 'Action' button below it.

### *Model 3201 (Central) Configuration Steps (PPPoH Routed)*

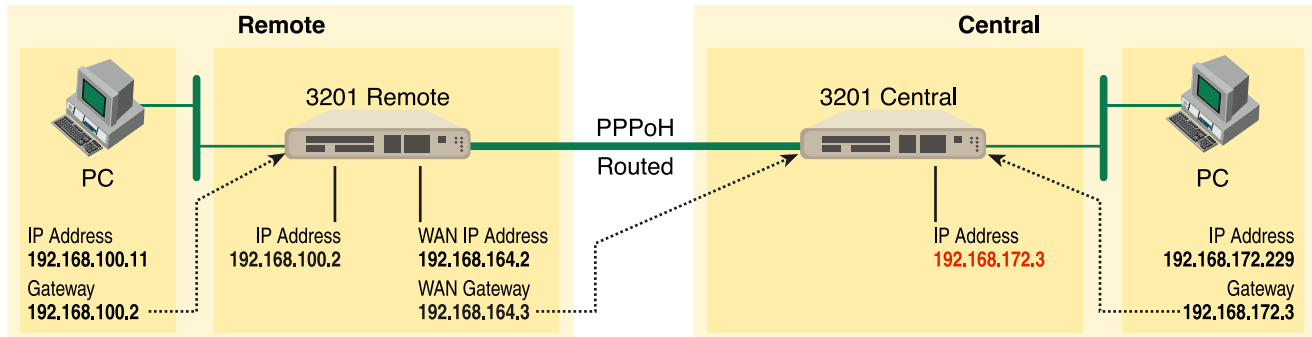
From the command line interface (CLI) via the RS-232 control port,

- ip list interfaces
- pppoh clear transports

One IP interface was called ip1 with an IP address of 192.168.1.1

Change the IP address so it is in the same subnet as the laptop PC. The laptop’s IP address is 192.168.172.229, so in this example, change the IP address of the 3201 to 192.168.172.3. The default IP mask is 255.255.255.0.

- ip set interface ip1 ipaddress 192.168.172.3 255.255.255.0



1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.

Click on G.SHDSL in the Configuration Menu > Configuration > verify that Terminal Type is *Central* and Interface Type is *hdlc*. If changed, then click on **Configure**.

Click on Action > Select deactivate for Action > Click on the **Action** button.

2. On the Menu, go to Configuration, then to WAN Connections.

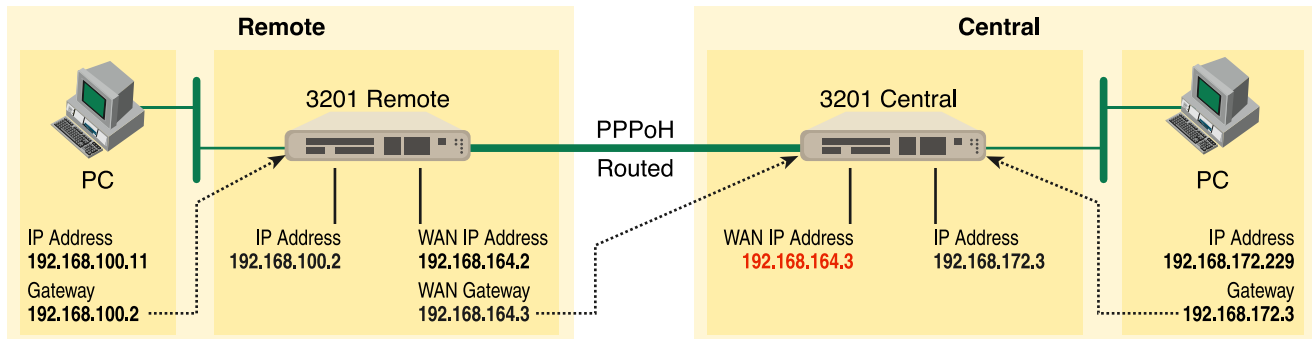
Delete both default WAN services already defined.

Click on **Create a new service** in the main window, select **PPPoH\_Routed** and click on the **Configure** button.

In the Description field, enter the description you wish. In this example, it is called *PPPoH Routed*.

- Description:PPPoH Routed
- Interface:1
- WAN IP address: 192.168.164.3
- LLC Header Mode:off
- HDLC Header Mode:ON
- No authentication
- Username:[blank]
- Password:[blank]

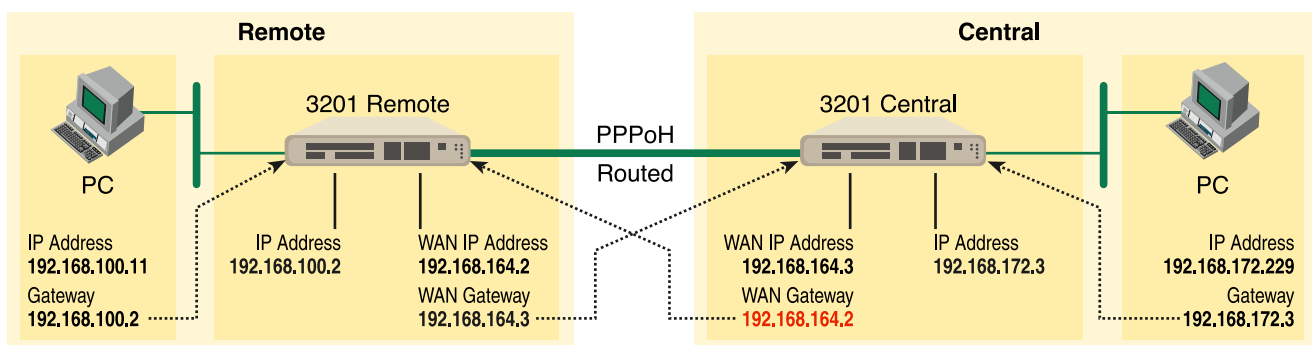
Click on **Configure**.



3. Go to Configuration Menu > Configuration > WAN connections > Edit (for PPPoH Routed service) > Edit 'IP Interface' > Ipaddr: [enter the WAN IP Address, in this example = 192.168.164.3] > Click on Change.
4. Configuration Menu > Configuration > IP Routes > Click on Create new Ip V4 Route > Create the gateway to the remote 3201 by entering the WAN IP address of the remote 3201, in this example, enter 192.168.164.2 in the Gateway field > OK

The other fields should be:

- Destination:0.0.0.0
- Gateway:192.168.164.2 [already changed in the first part of step 5).]
- Mask:0.0.0.0
- Cost:1
- Interface:[blank]



5. Go to G.SHDSL in the Configuration Menu, then the submenu Status. The Modem State should be "deactivated." (If not, go to the Action and change it to deactivate.)

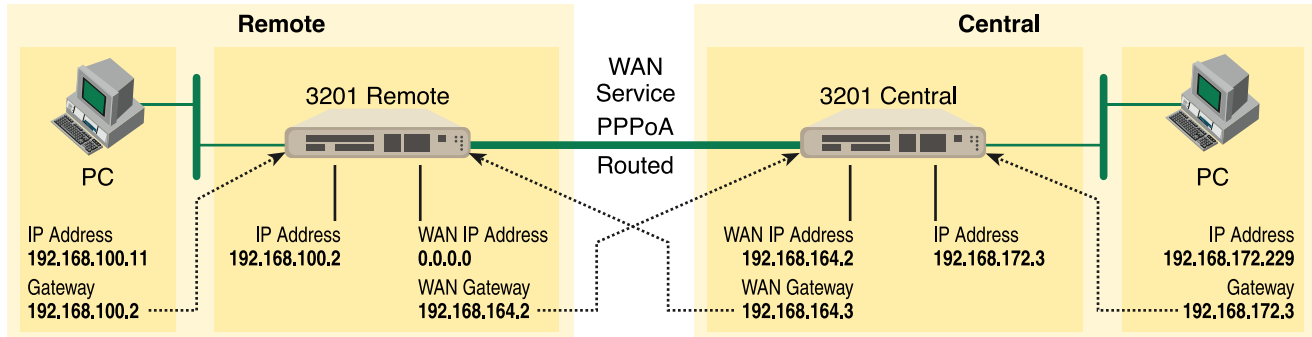
Then in the Action submenu under G.SHDSL, change Action to Start, then click on **Action**.

**PPPoA Routed (RFC 2364)**

This routed application is very similar to the PPPoA Bridged application. The user data for transmission is in the form of IP packets but encapsulated in a PPP packet, transmitted and received through a PPP session to the connection. The PPP packets are encapsulated according to RFC 2364 for transmission over the ATM link. The packets are de-encapsulated on the receive side so that the IP data can be delivered to the end user.

The Central (Model 3201) end functions as a local ISP which will authenticate the Remote user (Model 3201). The CPE side, with Remote and 3201-A, may represent a home PC which is connecting to a centralized PPP server (Local and 3201—B).

Since this is a routed application, there are differences to be noted. Referring to the application diagram, three unique subnets exist. The Ethernet LAN on the 3201 and Remote side, the Ethernet LAN on the 3201 and Central side, and lastly, the subnet of the ATM's PVC link between the two modems, 3201-A and 3201-B. The 3201-B and Local end (the Central side) may also be a DSLAM.

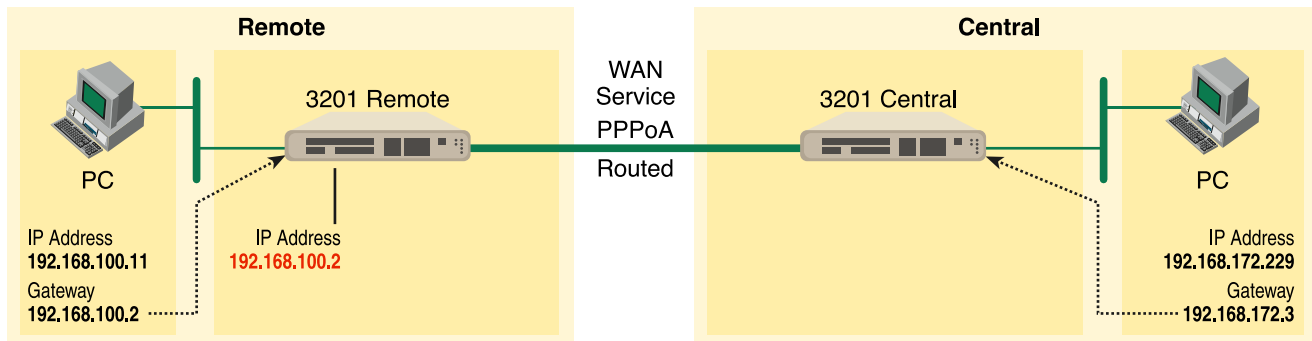
**Model 3201 (Remote—Client) Configuration Steps (PPPoA Routed)**

1. From the command line interface (CLI) via the RS-232 control port,

→ ip list interfaces

One IP interface was called ip1 with an IP address of 192.168.1.1 Change it to an IP address which is in the same subnet as the Desktop PC. For example, to 192.168.100.2. The default IP mask is 255.255.255.0.

→ ip set interface ip1 ipaddress 192.168.100.2 255.255.255.0



Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.

Click on G.SHDSL in the Configuration Menu > Configuration > verify that Terminal Type is *Central* and Interface Type is *atm*. If changed, then click on **Configure**.

Click on Action > Select deactivate for Action > Click on the **Action** button.

## 2. On the Menu, go to Configuration, then to WAN Connections

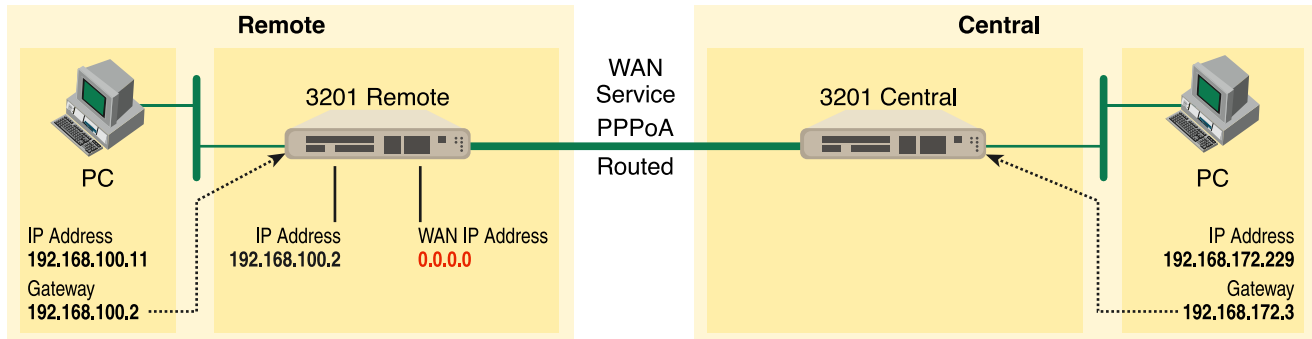
Delete both default WAN services already defined.

Click on **Create a new service** in the main window, select **PPPoA Routed** and click on the **Configure** button.

In the Description field, enter the description you wish. In this example, it is called *PPPoA Routed*. Change the configuration parameters to match the following.

- Description:PPPoA Routed
- VPI:0
- VCI:800
- WAN IP Address:0.0.0.0
- LLC Header Mode:off
- HDLC Header Mode:off
- CHAP
- User Name:fred
- Password:fredspass

Click on **Configure**.

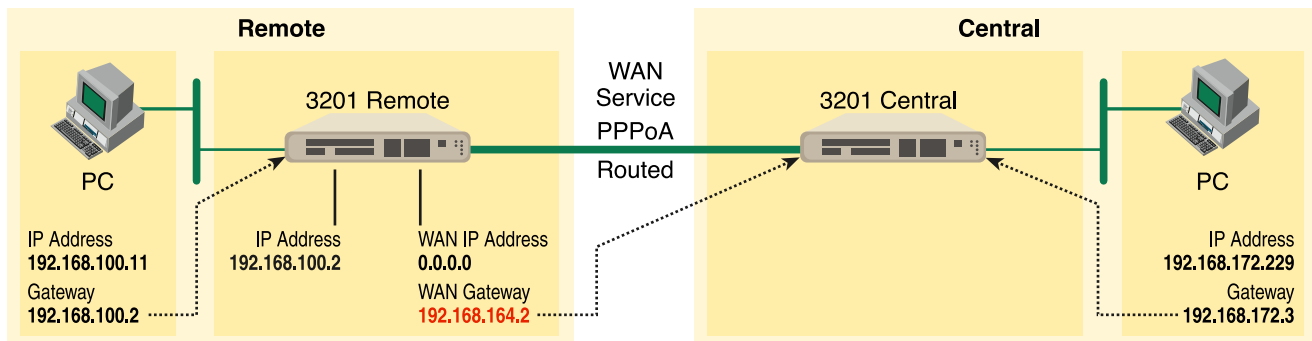


3. In the Configuration Menu, click on Configuration then > WAN Connections > Edit (for the WAN Service ppp1) > Edit 'PPP' and verify or change the following parameters on the Edit PPP webpage.

- Server:false
- Create Route:true
- Specific Route:false
- Subnet Mask:0.0.0.0
- Route Mask:0.0.0.0
- Hdlc:false
- LLC:false
- Lcp Max Configure:10
- Lcp Max Failure:5
- Lcp Max Terminate:2
- Dialin Auth:none
- Dialout Username:fred
- Dialout Password:fredspass
- Confirmation Password:fredspass
- Dialout Auth:chap
- Interface ID:1
- Remote IP:192.168.164.2
- Local IP:0.0.0.0
- Magic Number:0
- MRU:0
- IP Addr from IPCP:true

- Discover Primary DNS:true
- Discover Secondary DNS:true
- Give DNS to Relay:true
- Give DNS to Client:true
- Remote DNS:0.0.0.0
- Remote Secondary:0.0.0.0
- LCP Echo Every:10
- Auto Connect:false
- Idle Timeout:0
- Termination:true

Click on **Change** button.



#### 4. Click on Edit 'ATM Channel.'

Verify the Options to match the following. (Change if necessary.)

- Tx Vci:800
- Tx Vpi:0
- Rx Vci:800
- Rx Vpi:0
- Peak Cell Rate:2000
- Burst Tolerance:0
- MCR:0
- MBS:0
- Sustainable Cell Rate:0

- Class:UBR
- Port:atm

Click on the **Change** button if changes were made.

5. Click on Edit 'IP Interface.'

Verify or change if necessary the following Options parameters.

- Ipaddr:0.0.0.0
- Mask:0.0.0.0
- Dhcp:false
- MTU:1500
- Enabled:true

Click on the **Change** button if changes were made.

6. There is no gateway created in the IP routes submenu. Upon connecting, the server will provide this information while setting up the PPP connection.
7. Go to G.SHDSL in the Configuration Menu, then the submenu Status. The Modem State should be "deactivated." (If not, go to the Action and change it to deactivate.)

Then in the Action submenu under G.SHDSL, change Action to Start, then click on **Action**.

***Model 3201 (Central—Server) Configuration Steps (PPPoA Routed)***

Configuration via the web-pages has a bug which will be fixed. However the 3201 as servers functions properly via CLI configuration.

The following configuration is via the browser (web-pages). At the moment, do not use this method of configuration.

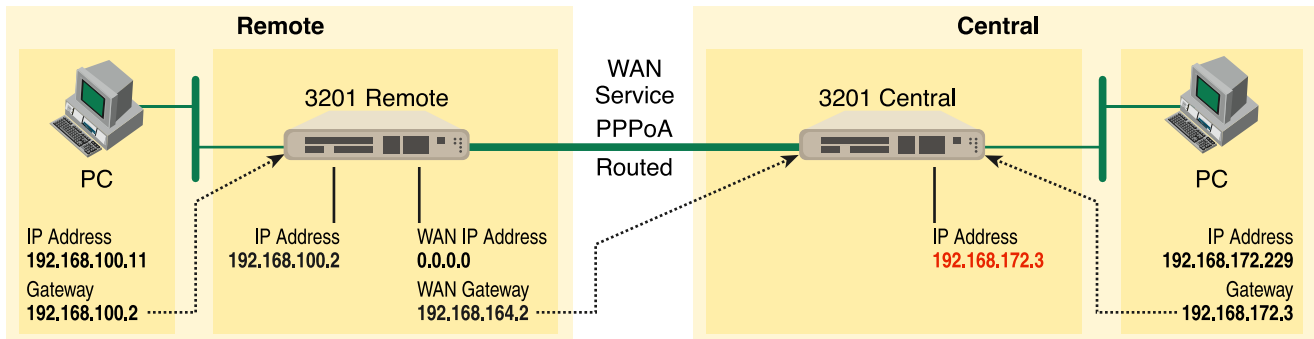
1. From the command line interface (CLI) via the RS-232 control port,

→ ip list interfaces

One IP interface was called ip1 with an IP address of 192.168.1.1 Change it to an IP address which is in the same subnet as the Desktop PC. For example, to 192.168.172.3. The default IP mask is 255.255.255.0.

→ ip set interface ip1 ipaddress 192.168.172.3 255.255.255.0





Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.

Click on G.SHDSL in the Configuration Menu > Configuration > verify that Terminal Type is *Central* and Interface Type is *atm*. If changed, then click on **Configure**.

### G.SHDSL Attributes:

Circuit ID	Circuit ID **30Byte Maxim
Clear Error Counters	Normal
Intended DSL Data Rate	36
Actual DSL Data Rate (kbps)	2312
DSL Rate: Number of i Bit	0
Terminal Type	Central
Interface Type	atm
PCM Mode	Ethernet Only
Clocking Options	Internal
PCM Transmit Clock Polarity	Normal
PCM Receive Clock Polarity	Normal
Loopback	Off
Annex Type	Annex A
Remote Circuit ID	
<input type="button" value="Configure"/>	

Click on Action > Select deactivate for Action > Click on the **Action** button.

### G.SHDSL Actions:

Action	Deactivate
<input type="button" value="Action"/>	

2. On the Menu, go to Configuration, then to WAN Connections

Delete both default WAN services already defined.

Click on **Create a new service** in the main window, select **PPPoA Routed** and click on the **Configure** button.

## WAN connection: create service

Please select the type of service you wish to create:

ATM:  RFC 1483 routed  RFC 1483 bridged  
 PPPoA routed  PPPoA bridged  
 IPoA routed  PPPoE routed  
 HDLC:  PPPoH routed  PPPoH bridged

In the Description field, enter the description you wish. In this example, it is called *PPPoA Routed*. Change the configuration parameters to match the following.

- Description: PPPoA Routed
- VPI: 0
- VCI: 800
- WAN IP Address: 192.168.164.2
- LLC Header Mode: off
- HDLC Header Mode: off

**Note** The following items are for dial-out service only, for when a remote is establishing a connection with a server.

- CHAP
- User Name: [leave blank]
- Password: [leave blank]

## WAN connection: PPPoA routed

Description:

VPI:

VCI:

WAN IP address:

LLC header mode:

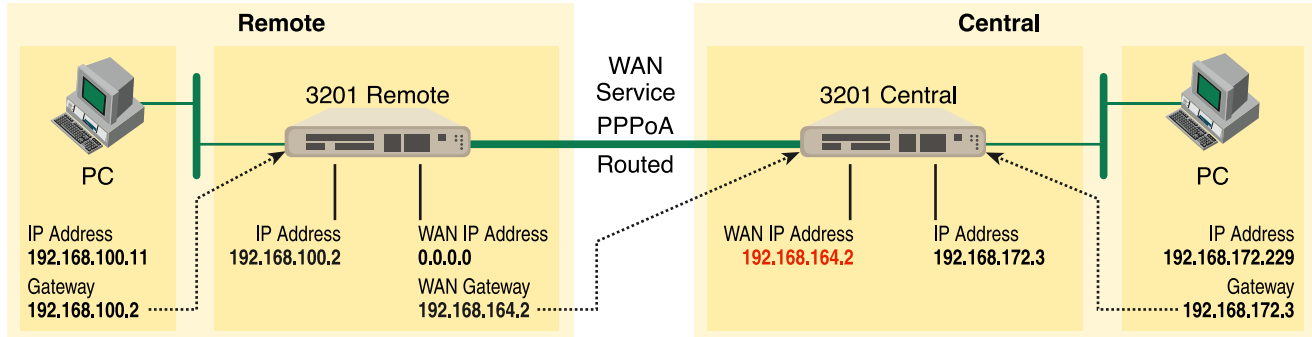
HDLC header mode:

No authentication  
 PAP  
 CHAP

User name:

Password:

Click on **Configure**.



- In the Configuration Menu, click on Configuration then > WAN Connections > Edit (for the WAN Service ppp1) > Edit 'PPP' and verify or change the following parameters on the Edit PPP webpage.

Parameters in *red italics* are those requiring changes from the default configuration.

- Server: *true*
- Create Route: true
- Specific Route: false
- Subnet Mask: 0.0.0.0
- Route Mask: 0.0.0.0
- HdLc: false
- LLC: false
- Lcp Max Configure: 10
- Lcp Max Failure: 5
- Lcp Max Terminate: 2
- Dialin Auth: *pap*
- Dialout Username: [blank]
- Dialout Password: [blank]
- Confirmation Password: [blank]
- Dialout Auth: none
- Interface ID: 2
- Remote IP: *192.168.164.3*
- Local IP: 192.168.164.2
- Magic Number: 0

- MRU: 0
- IP Addr from IPCP: true
- Discover Primary DNS: *false*
- Discover Secondary DNS: *false*
- Give DNS to Relay: false
- Give DNS to Client: false
- Remote DNS: 0.0.0.0
- Remote Secondary: 0.0.0.0
- LCP Echo Every: 10
- Auto Connect: false
- Idle Timeout: 0
- Termination: true

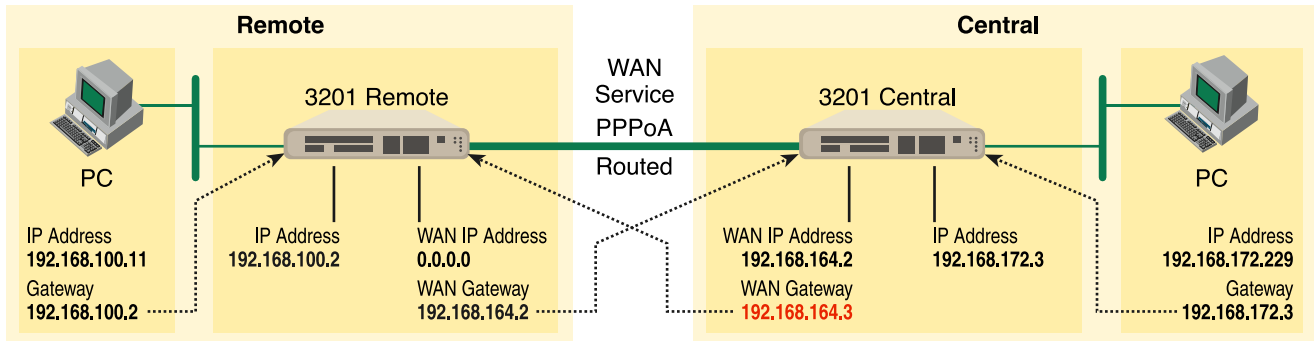
### Edit PPP

---

**Options**

Name	Value
Server:	<input type="checkbox"/> true
Create Route:	<input type="checkbox"/> true
Specific Route:	<input type="checkbox"/> false
Subnet Mask:	<input type="text" value="0.0.0.0"/>
Route Mask:	<input type="text" value="0.0.0.0"/>
Hdlc:	<input type="checkbox"/> false
LLC:	<input type="checkbox"/> false
Lcp Max Configure:	<input type="text" value="10"/>
Lcp Max Failure:	<input type="text" value="5"/>
Lcp Max Terminate:	<input type="text" value="2"/>
Dialin Auth:	<input type="checkbox"/> chap
Dialout Username:	<input type="text"/>
Dialout Password:	<input type="text"/>
Confirmation Password:	<input type="text"/>
Dialout Auth:	<input type="checkbox"/> pap
Interface ID:	<input type="text" value="2"/>
Remote Ip:	<input type="text" value="192.168.164.3"/>
Local Ip:	<input type="text" value="192.168.164.2"/>
Magic Number:	<input type="text" value="0"/>
MRU:	<input type="text" value="0"/>
Ip Addr From IPCP:	<input type="checkbox"/> true
Discover Primary DNS:	<input type="checkbox"/> false
Discover Secondary DNS:	<input type="checkbox"/> false
Give DNSto Relay:	<input type="checkbox"/> false
Give DNSto Client:	<input type="checkbox"/> false
Remote DNS:	<input type="text" value="0.0.0.0"/>
Remote Secondary DNS:	<input type="text" value="0.0.0.0"/>
Lcp Echo Every:	<input type="text" value="10"/>
Auto Connect:	<input type="checkbox"/> false
Idle Timeout:	<input type="text" value="0"/>
Enabled:	<input type="checkbox"/> true
Termination:	

Click on **Change** button.



4. Click on Edit 'ATM Channel.'

Verify the Options to match the following. (Change if necessary.)

- Tx Vci:800
- Tx Vpi:0
- Rx Vci:800
- Rx Vpi:0
- Peak Cell Rate:2000
- Burst Tolerance:0
- MCR:0
- MBS:0
- Sustainable Cell Rate:0
- Class:UBR
- Port:atm

Options	
Name	Value
Tx Vci:	800
Tx Vpi:	0
Rx Vci:	800
Rx Vpi:	0
Peak Cell Rate:	2000
Burst Tolerance:	0
MCR:	0
MBS:	0
Sustainable Cell Rate:	0
Class:	UBR
Port:	atm
<input type="button" value="Change"/> <input type="button" value="Reset"/>	

Click on the Change button if changes were made.

5. Click on Edit 'IP Interface.'

Verify or change if necessary the following Options parameters.

- Ipaddr:192.168.164.2
- Mask:255.255.255.0
- Dhcp:false
- MTU:1500
- Enabled:true

Options	
Name	Value
Ipaddr:	192.168.164.2
Mask:	255.255.255.0
Dhcp:	false
MTU:	1500
Enabled:	true
Layer2Session:	

Change Reset

Click on the Change button if changes were made.

6. Again, **Configuration Menu > Configuration > IP Routes > Click on Create new Ip V4 Route > Create** the gateway to the remote 3201 by changing or verifying the following parameters in the webpage Edit—Advanced Settings.

- Destination:0.0.0.0
- Gateway:192.168.164.3
- Mask:0.0.0.0
- Cost:1
- Interface:[blank]

Name	
Name	Value
Destination	0.0.0.0
Gateway	192.168.164.3
Netmask	0.0.0.0
Cost	1
Interface	

OK Reset  
Cancel

7. From the Configuration Menu, click on Configuration > Authentication > Create a new user > enter the information for the following parameters in the webpage Details for the new user. One of these authentication records is created for each remote end user connecting to the Server.

- Username:fred
- Password:fredspass
- May dialin:true
- Comments: [may leave blank or enter any comments for this user.]

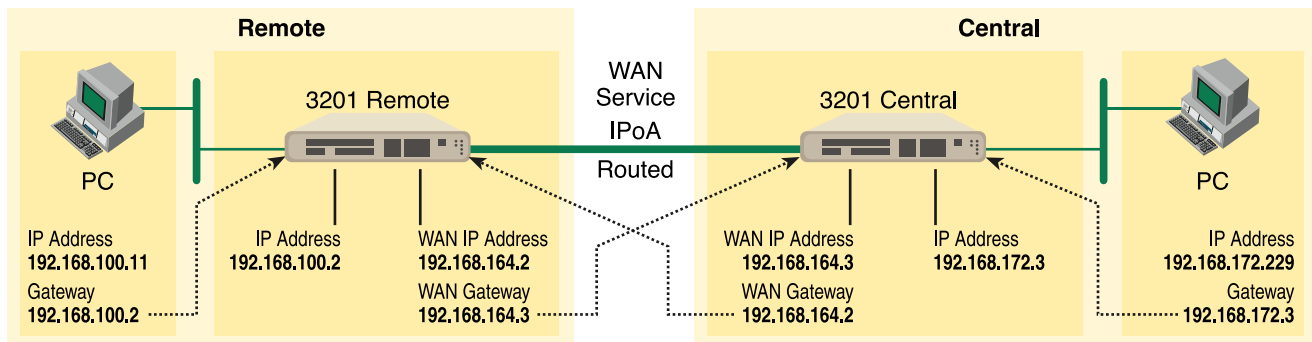
Click on the **Create** button.

8. Go to G.SHDSL in the Configuration Menu, then the submenu Status. The Modem State should be “deactivated.” (If not, go to the Action and change it to deactivate.)

Then in the Action submenu under G.SHDSL, change Action to Start, then click on **Action**.

### *IPoA Routed (RFC 1577)*

User data in the form of IP packets is encapsulated into AAL-5 PDUs for transport over ATM. The fact that the user data is routed at an IP layer instead of bridged at a MAC layer allows the source and destination to be on different subnets. A notable drawback of IPoA is the lack of authentication and configuration that would be provided by PPP.



### *Model 3201 (Remote) Configuration Steps (IPoA Routed)*

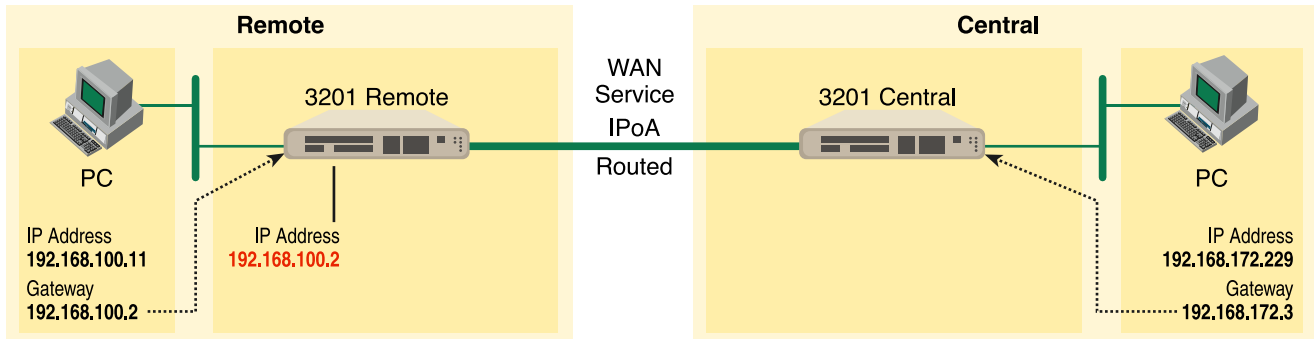
From the command line interface (CLI) via the RS-232 control port,

```
→ ip list interfaces
```

One IP interface was called ip1 with an IP address of 192.168.1.1 Change the IP address so it is in the same subnet as both PCs. For example, to 192.168.100.2. The default IP mask is 255.255.255.0.

```
→ ip set interface ip1 ipaddress 192.168.100.2 255.255.255.0
```





1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.
2. On the Menu, go to Configuration, then to WAN Connections. Delete the factory default WAN services already defined.

Click on **Create a new service** in the main window, select **IPoA\_Routed** and click on the **Configure** button.

### WAN connection: create service

Please select the type of service you wish to create:

ATM:  RFC 1483 routed  RFC 1483 bridged  
 PPPoA routed  PPPoA bridged  
 IPoA routed  PPPoE routed

HDLC:  PPPoH routed  PPPoH bridged

In the Description field, enter the description you wish. In this example, it is called *IPoA Routed*.

- VPI:0
- VCI:700
- WAN IP address: 192.168.164.2

**WAN connection: IPoA routed**

Description:

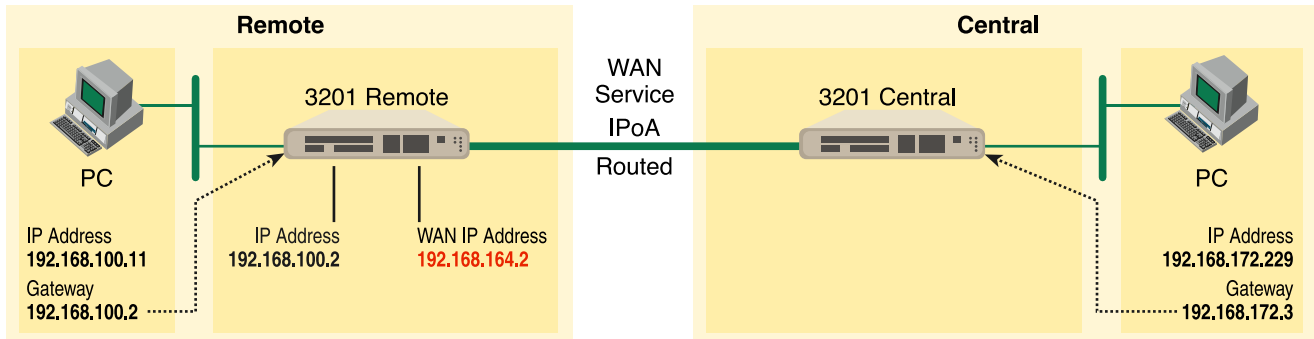
VPI:

VCI:

Use DHCP

WAN IP address:

Click on **Apply**.

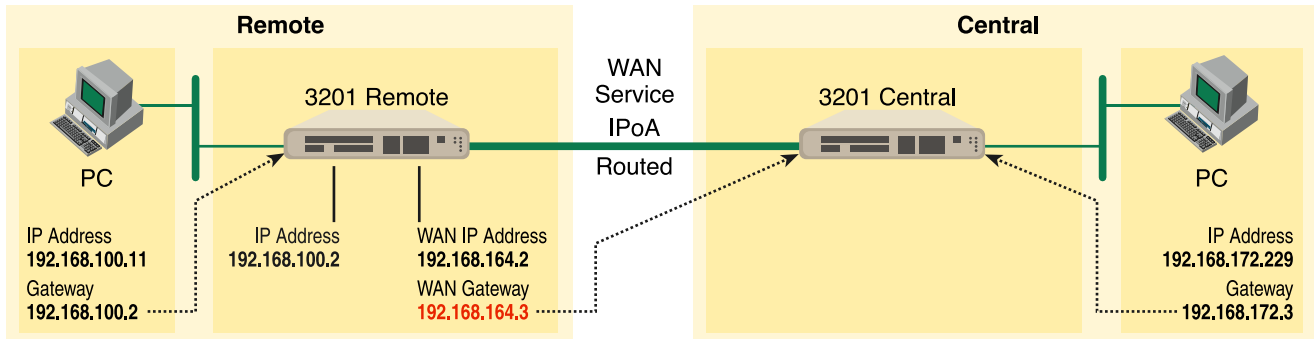


3. Returning to the 3201 Configuration Menu, click on Configuration, then IP Routes.
  - Click on “Create new Ip V4 Route.”
  - Destination:0.0.0.0
  - Gateway:192.168.164.3
  - Mask:0.0.0.0
  - Cost:1
  - Interface:[leave blank]

### Create Ip V4Route

Name	Value
Destination	0.0.0.0
Gateway	192.168.164.3
Netmask	0.0.0.0
Cost	1
Interface	

Click on **OK**.



- Go to G.SHDSL in the Configuration Menu, then the submenu Configuration.

Change Terminal Type to **Central** and Interface Type to **atm**. Click on the Configure button.

### G.SHDSL Attributes:

Circuit ID	Circuit ID **30Byte Maxim
Clear Error Counters	Normal
Intended DSL Data Rate	36
Actual DSL Data Rate (kbps)	2312
DSL Rate: Number of i Bit	0
Terminal Type	Central
Interface Type	atm
PCM Mode	Ethernet Only
Clocking Options	Internal
PCM Transmit Clock Polarity	Normal
PCM Receive Clock Polarity	Normal
Loopback	Off
Annex Type	Annex A
Remote Circuit ID	
<input type="button" value="Configure"/>	

In the Action submenu under G.SHDSL, change Action to Deactivate, then click on **Action**.

### G.SHDSL Actions:

Action	Deactivate
<input type="button" value="Action"/>	

Return to Action, select Start and click on **Action**.

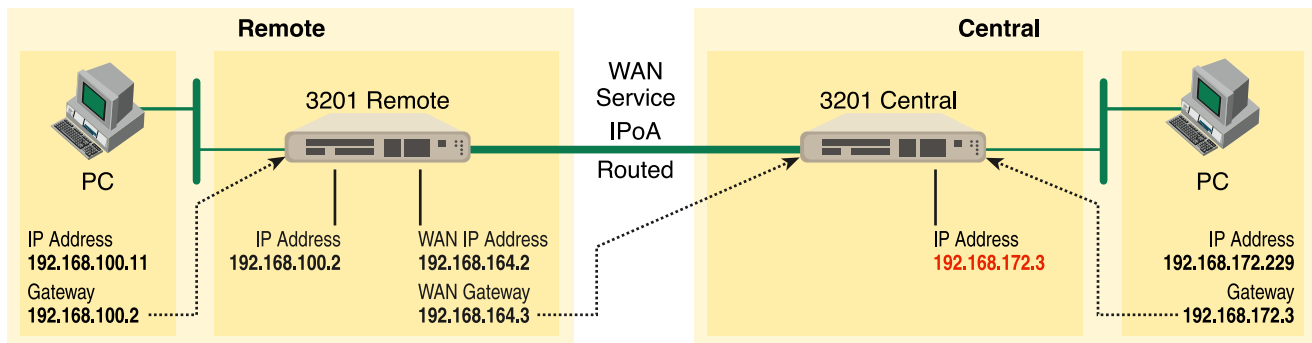
**Model 3201 (Central) Configuration Steps (IPoA Routed)**

From the command line interface (CLI) via the RS-232 control port:

→ ip list interfaces

One IP interface was called ip1 with an IP address of 192.168.1.1 Change the IP address so it is in the same subnet as both PCs. For example, to 192.168.172.3. The default IP mask is 255.255.255.0.

→ ip set interface ip1 ipaddress 192.168.172.3 255.255.255.0



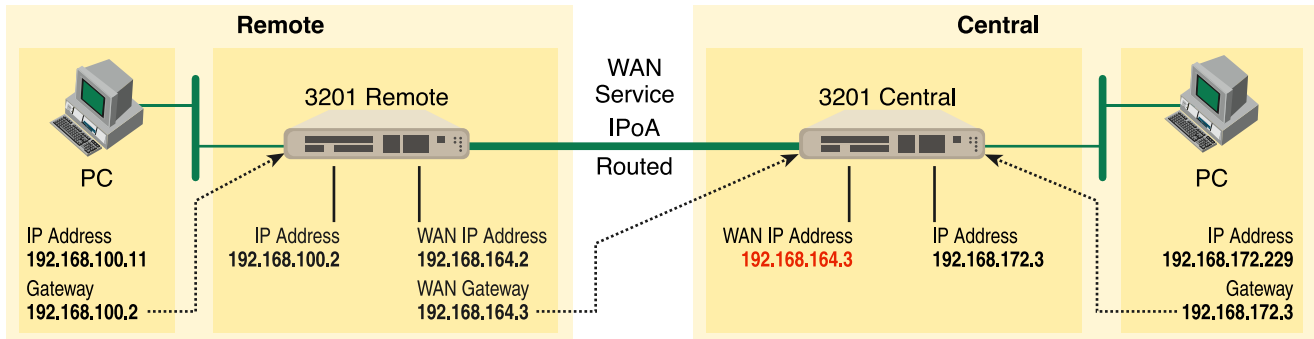
1. Now you can bring up the web-page management system on your browser by entering the IP address of the 3201.
2. On the Menu, go to Configuration, then to WAN Connections. Delete the factory default WAN services already defined.

Click on **Create a new service** in the main window, select **IPoA\_Routed** and click on the **Configure** button.

In the Description field, enter the description you wish. In this example, it is called *IPoA Routed*.

- VPI:0
- VCI:700
- WAN IP address: 192.168.164.3

Click on **Apply**.

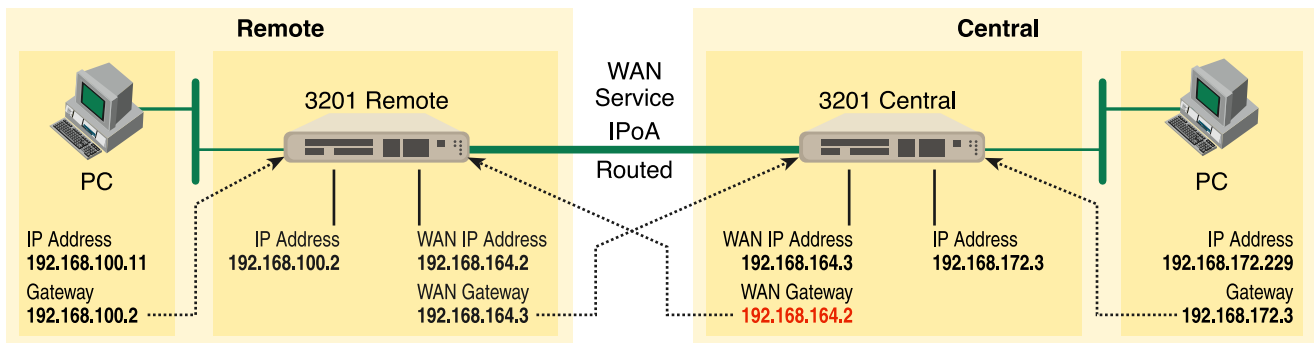


3. Returning to the 3201 Configuration Menu, click on Configuration, then IP Routes.

Click on “Create new Ip V4 Route.”

- Destination:0.0.0.0
- Gateway:192.168.164.2
- Mask:0.0.0.0
- Cost:1
- Interface:[leave blank]

Click on **OK**.



4. Go to G.SHDSL in the Configuration Menu, then the submenu Configuration.

Leave Terminal Type as *Remote*.

Change Interface Type to *hdlc*. Click on the **Configure** button.

In the Action submenu under G.SHDSL, change Action to Deactivate, then click on **Action**.

Return to Action, select Start and click on **Action**.

## Chapter 5 **Specialized Configurations**

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## IP Configurations

The router can be configured to use the RIP routing protocol, version 1 or 2, for accepting and sending RIP packets.

### Router

#### *RIP and RIPv2*

Name	Value
Accept V1:	true
Accept V2:	false
Send V1:	true
Send V2:	false
Send Multicast:	true

#### *Static Route*

1. Click on > Configuration, then > IP Routes on the Configuration Menu.
2. On the main web page entitled “Edit Routes,” click on **Create new Ip V4 Route**.

Name	Value
Destination	192.168.171.24
Gateway	192.168.164.3
Netmask	255.255.255.0
Cost	1
Interface	

3. Enter the destination IP address in the Value field of “Destination.”
4. Enter the IP address of the gateway which is the WAN IP address of the device on the other end of the DSL link in the Value field of “Gateway.”
5. Enter the appropriate netmask in the Value field of “Netmask.”
6. Leave Cost as “1.”
7. “Interface” is an ASCII field which you may leave blank or fill in for your identification.
8. Click **OK**.
9. Add additional static routes using the same procedure.

### DHCP Server and Relay

The DHCP Server or Relay are simply configured via the web page management pages.

1. Go to > Configuration Menu > Configuration > DHCP Server and the DHCP Server page is displayed.

At the bottom of the web page are three options for the DHCP Server Mode: Disabled, DHCP server (default), and DHCP Relay Agent.

**DHCP server**

---

**DHCP server status:**  
 Default Lease Time: 43200  
 Allow Bootp: true  
 Max Lease Time: 86400  
 Allow Unknown Clients: true  
 Enabled: true

**Subnet definitions:**

Subnet Value: 192.168.1.0  
 Subnet Mask: 255.255.255.0  
 Max Lease Time: 86400  
 Default Lease Time: 43200  
 Host Is Dns Server: true  
 Host Is Default Gateway: true  
 Subnet From Interface: iplan  
 IP range: 192.168.1.2 - 192.168.1.21

---

**DHCP Server Mode**

Disabled  
 DHCP server  
 DHCP relay agent

2. Click on **Configure** on the DHCP Server web page to change the configuration for any of the DHCP parameters.

The three categories of configuration parameters on this web page are the Address Range of the DHCP Server, the Lease Times in seconds, the selection of Domain Name Servers (if desired), and whether to use the router as the default gateway.

**DHCP: enable server**

---

**DHCP Server Setup**

Please enter details for DHCP server configuration:

**Address Range**  
Note that your LAN interface has IP address 192.168.100.2, with subnet mask 255.255.255.0, the IP address range should be within this subnet.  
 Use Default Range (192.168.100.3 - 192.168.100.22)

Starting IP Address   
 Ending IP Address

**Lease Times**

Default Lease Time  seconds  
 Maximum Lease Time  seconds

**Domain Name Servers**  
List here the primary and secondary domain name servers to be provided to LAN clients.  
 Use Router as DNS Server

Primary DNS Server Address   
 Secondary DNS Server Address

**Default Gateway**  
 Use Router as Default Gateway

Advanced Options



- Clicking on **Advanced Options** offers additional options for configuration. They are displayed in the following figure.

Name	Value
Default Lease Time:	43200
Allow Bootp:	true
Max Lease Time:	86400
Allow Unknown Clients:	true
Enabled:	true

Change Reset

- The router modem may be used as a DHCP Relay Agent if desired. Go to > Configuration Menu > Configuration > DHCP Server. Select DHCP Relay Agent at the bottom of the web page and click on Configure. The DHCP Relay agent page is displayed.

**DHCP: enable relay agent**

The DHCP server (or relay) is disabled.

Please enter details for DHCP relay configuration:

DHCP server IP address: 192.167.100.2

Apply

- Enter the DHCP server's IP address and click on **Apply**.

The router is now ready to operate as a DHCP Relay agent.

### **DNS Client**

The DNS client provides a method for retrieving a list of IP addresses for a host name as well as acquiring the host name for a given IP address. The DNS client will cache any results from the name server which reduces network traffic.

- Enter the DNS Servers by entering the IP address in the field next to the Add button.
- Click on **Add**.

More than one DNS Server may be added.

An alternative is to create a domain search list. The DNS Client uses this list when a user asks for the IP address list for an incomplete domain name. There may be up to a maximum of 6 incomplete domain names in the search list.

Enter the domain name and click on **Add** to add it to the list.



The screenshot shows the 'DNS client' configuration page. It has two main sections: 'DNS servers:' and 'Domain search order:'. The 'DNS servers:' section contains a text input field with '192.168.102.20' and a 'Delete' button. Below it is an empty text input field with an 'Add' button. The 'Domain search order:' section contains a text input field with 'universal.com' and a 'Delete' button. Below it is an empty text input field with an 'Add' button.

### *DNS Relay Mode*

In the DNS Relay web page, up to 10 DNS server addresses may be added to utilize the DNS servers already being used by the network.

1. Select **Enabled**.
2. Click on **Configure**.
3. Enter the DNS server address in the field following DNS server IP address:
4. Click on **Apply**.
5. Repeat to add more DNS server addresses, not to exceed the maximum of 10.



The screenshot shows the 'DNS: enable relay' configuration page. It has two main sections: 'DNS Relay Settings' and 'DNS server IP address:'. The 'DNS Relay Settings' section contains a text input field with 'The DNS relay is disabled'. Below it is a text input field with 'The DNS relay will be enabled'. The 'DNS server IP address:' section contains a text input field with '192.168.102.3' and an 'Apply' button.

## Chapter 6 **Security**

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Configuring the security interfaces.....	85
Deleting a Firewall Policy .....	86
Enabling the Firewall.....	87
Firewall Portfilters .....	87
Security Triggers.....	88
Intrusion Detection System (IDS) .....	89

## Introduction

---

Security provides the ability to setup and enforce security policies. The policies define the types of traffic permitted to pass through a gateway, either inbound, outbound, or both, and from which origins the traffic may be allowed to enter.

Within the security configuration is a stateful firewall. A stateful firewall utilizes a security mechanism to maintain information concerning the packets it receives. This information is used for deciding dynamically whether or not a packet may pass through.

Port filters are rules that determine how a packet should be handled. The rules define the protocol type, the range of source and destination port numbers and an indication whether the packet is allowed or not.

Security triggers are used with applications that require and create separate sessions. The most common example is FTP. An FTP client establishes a connection to a server using port 21, but data transfers are done on a separate connection or port. The port number, and who makes the connection, can vary depending on the FTP client. To allow FTP to work without triggers, you would need to set up port filters allowing the correct port numbers through. This is a significant security risk.

This risk can be avoided by using security triggers. Triggers tell the security mechanism to expect these secondary sessions and how to handle them. Rather than allowing a range of port numbers, triggers handle the situation dynamically, opening the secondary sessions only when appropriate. The triggers work without needing to understand the application protocol or reading the payload of the packet, although this does happen when using NAT.

Triggering allows you to set up a trigger for different application protocols that use multiple sessions. The timeout between sessions and whether or not session chaining are allowed are configurable. Session chaining is not needed for FTP but is for NetMeeting.

See Chapter 7, “NAT (Network Address Translation)” on page 92.

## Configuring the router

---

The configuration of security assumes that the 3201/Router modem already has a valid IP address for the Ethernet port so that the user may access the modem via the web page. If the IP address is still the factory default, go to the section in Chapter 3 entitled IP Address Quick Start Modification.

In this example the WAN transport between the two 3201/Router modems will be IPoA.

1. Click on **WAN Connections** under Configuration on the 3201's Menu.
2. Click on **Create a New Service**.
3. Select **IPoA Routed** and click on the **Configure** button.
4. For this example, enter **IPoA Security Firewall** in the Description field.
5. VPI remains at 0. Change VCI to be 100.
6. Click on **WAN IP address** and enter 192.168.101.1 in the adjacent box. The default IP mask is 255.255.255.0.
7. Click on **Apply**.

The next step in configuring the router is adding the default gateway route. Since the WAN IP address of the 3201 modem at the CO site is 192.168.101.2, this will be the gateway for the 3201 modem at the CPE site, the modem we are currently configuring.

1. Click on **IP Routes** under Configuration on the 3201 modem's Menu.
2. Click on **Create a New IP Route**.
3. Enter *192.168.101.2* in the box adjacent to Gateway.
4. Leave Destination and Netmask both as *0.0.0.0* because this is the gateway default route.
5. Click on **Create** and the route will be entered.
6. The default gateway can be verified by clicking on **IP Routes** under Status in the menu.

## Configuring the security interfaces

The interfaces and routes have been configured on the 3201 Router modem which will function as the firewall. The Ethernet side of the 3201 will be configured to be an internal security interface whereas the WAN side is configured as an external security interface since it is on "public" side of the modem connection.

1. Click on **Security** under Configuration on the 3201 modem's menu.
2. Under Security Interfaces, click on **Add Interface**.
3. Select Name of the WAN port (*ipoa-0*) and Interface Type to be *external*. Click on **Apply**.

4. Add one more security interface by repeating step 2.
5. Select Name of the LAN port (*ip1*) and Interface Type to be *internal*. Click on **Apply**.

Now the Firewall policies will be added between the security interfaces. Only one Firewall policy, called *etoi*, is added between the external and internal interfaces.

1. Under Policies, Triggers and Intrusion Devices on the Security page, click on **Firewall Policy Configuration**.
2. In the Current Firewall Policies page, click on **New Policy**.

3. Select the parameters so the policy applies **between interface of types: external internal**.  
Also **Validators will block traffic**. This blocks all hosts.
4. Click on **Apply**.

### Deleting a Firewall Policy

To delete a Firewall Policy, follow these Command Line Interface (CLI) commands via the Console port.

```
→ firewall list policies
```

Firewall Policies:

ID	Name	Type 1	Type 2	Validator Allow Only
1	item0	external	internal	false

→ firewall delete policy item0

The firewall policy named *item0* is now deleted.

## Enabling the Firewall

At this point, both security and the firewall can be enabled and the network is secure. All the interfaces which have been defined are protected: all traffic blocked between the internal and external interfaces.

1. Return to the Security page.
2. Under Security State select **Enabled for Security** and click on **Change State**.
3. Then select **Enabled for the Firewall** and click on **Change State**.

The network is now secure. All the interfaces which have been defined are protected and all traffic is blocked between different the different interface types. That is, all traffic is blocked between the external and internal interfaces.

The next section describes how to configure the Firewall for allowing certain types of data transfer to occur between the PC's on different networks.

## Firewall Portfilters

Next, we configure the Firewall to permit certain types of data transfer between the PCs on the different networks. This is done by the implementation of Firewall portfilters. Portfilters are individual rules that determine what kind of traffic can pass between two interface types.

For the Transport Type below, the different types are:

Transport Type	Abbreviation
1	ICMP
2	IGMP
3	GGP
4	IP
6	TCP
8	EGP
9	IGP
17	UDP
46	RSVP
47	GRE
89	OSPF/IGP
92	MTP

Transport Type	Abbreviation
94	IPIP

To allow pings between the two PCs:

1. From the Configuration Menu, > Configuration > Security > Firewall Policy Configuration > Port Filters > Add Raw IP Filter
2. Enter *1* (for ICMP) in Transport Type.
3. Both Inbound and Outbound should be allowed.
4. Click on **Apply**.

Transport	Direction	
Type	Inbound	Outbound
1	Allow	Allow

Apply

You can now ping between the two networks

## Security Triggers

Security triggers are used to allow an application to open a secondary port in order to transport data. The most common example is FTP. This procedure is to set up a trigger on the Firewall to have an FTP session from PC A to PC B, but not the reverse.

1. First, create an outbound-only portfilter for FTP and add it to the item0 policy.
2. Following the path given in step 1 for the ping portfilter, click on **Add TCP Filter**.
3. The Port Range is entered as *21* for both Start and End.
4. Set Inbound as **Block**, but Outbound as **Allow**.
5. Click on **Apply**.

Transport	Port Range		Direction	
Type	Start	End	Inbound	Outbound
TCP	21	21	Block	Allow

Apply



After configuring the FTP portfilter, you can open an ftp session from Remote to Local, however you can issue ftp commands (e.g., login, cd, etc.) but transfer data (e.g., ls, dir, get, put commands). The portfilter allows an ftp control channel but does not allow the use of a secondary data channel for passing data by ftp.

To enable the ftp data channel, add a trigger which will open a secondary channel only when data is being passed. This prevents the need to open too many ports which offer a security risk.

1. From the Configuration Menu, > Configuration > Security > Firewall Trigger Configuration > New Trigger.
2. Set the parameters as follows:
  - Transport Type = tcp
  - Port Number Start = 21
  - Port Number End = 21
  - Allow Multiple Hosts = Block
  - Max Activity Interval = 3000
  - Enable Session Chaining = Block
  - Enable UDP Session Chaining = Block
  - Binary Address Replacement = Block
  - Address Translation Type = none
3. Click on **Apply**.

Transport Type	Port Number Start	Port Number End	Allow Multiple Hosts	Max Activity Interval	Enable Session Chaining	Enable UDP Session Chaining	Binary Address Replacement	Address Translation Type
tcp	21	21	Block	3000	Block	Block	Block	none

Apply

You should now be able to use ftp commands to pass data between Remote and Local.

## Intrusion Detection System (IDS)

The security feature in the 3201 Router modem provides protection from a number of attacks. Some attacks cause a host to be blacklisted (i.e., no traffic from that host is accepted under any circumstances) for a period of time. Other attacks are simply logged. The subsequent table is a summary of the attacks detected.

Table 4:

Attack Name	Protocol	Attacking Host Blacklisted?
Ascend Kill	UDP	yes
Echo/Chargen	UDP	no
Echo Scan	UDP	yes

Table 4:

Attack Name	Protocol	Attacking Host Blacklisted?
WinNuke	TCP	yes
Xmas Tree Scan	TCP	yes
IMAP SYN/FIN Scan	TCP	yes
Smurf	ICMP	If victim protection set
SYN/FIN/RST Flood	TCP	If scanning threshold exceeded
Net Bus Scan	TCP	yes
Back Orifice Scan	UDP	yes

1. To enable IDS, click on Enabled for “Intrusion Detection Enabled” on the “Security Interface Configuration” page. Then click on **Change State(s)**.
2. Click on **Configure Intrusion Detection**.
3. You may choose which of the parameters to configure and for which value.

- Use Blacklist:Default = 10 minutes when enabled.

If IDS has detected an intrusion an external host, access to the network is denied for ten minutes.

- Use Victim Protection:Default = Disabled.

Enables Victim Protection. Victim Protection protects the victim from an attempted spoofing attack. Web spoofing allows an attacker to create a ‘shadow’ copy of the world wide web (WWW). All access to the shadow Web goes through the attacker’s machine, so the attacker can monitor all of the victim’s activities and send false data to or from the victim’s machine. When enabled, packets destined for the victim host of a spooking style attack are blocked.

- DOS Attack Block Duration:Default = 1800 seconds (30 minutes).

A Denial of Service (DOS) attack is an attempt by an attacker to prevent legitimate users from using a service. If a DOS attack is detected, all suspicious hosts are blocked by the firewall for a set time limit

- Scan Attack Block Duration:Default = 86400 seconds

Sets the duration for blocking all suspicious hosts. The firewall detects when the system is being scanned by a suspicious host attempting to identify any open ports.

- Victim Protection Block Duration:Default = 600 seconds (10 minutes).

Sets the duration of the block in seconds.

- Maximum TCP Open Handshaking Count:Default = 100

Sets the maximum number of unfinished TCP handshaking sessions per second that are allowed by a

firewall before a SYN Flood is detected. SYN Flood is a DOS attack. When establishing normal TCP connections, three packets are exchanged: (1) A SYN (synchronize) packet is sent from the host to the network server. (2) A SYN/ACK packet is sent from the network server to the host. (3) An Ack (acknowledge) packet is sent from the host to the network server. If the host sends unreachable source addresses in the SYN packet, the server sends the SYN/ACK packets to the unreachable addresses and keeps resending them. This creates a backlog queue of unacknowledged SYN/ACK packets. Once the queue is full, the system will ignore all incoming SYN request and no legitimate TCP connections can be established.

- Once the maximum number of unfinished TCP handshaking sessions is reached, an attempted DOS attack is detected. The firewall blocks the suspected attacker for the time limit specified in the DOS Attack Block Duration parameter.
- Maximum Ping Count:Default = 15

Sets the maximum number of pings per second that are allowed by the firewall before an Echo Storm is detected. Echo Storm is a DOS attack. An attacker sends oversized ICMP datagrams to the system using the 'ping' command. This can cause the system to crash, freeze, or reboot, resulting in denial of service to legitimate users.

- Maximum ICMP Count:Default = 100

Sets the maximum number of ICMP packets per second that are allowed by the firewall before an ICMP Flood is detected. An ICMP Flood is a DOS attack. The attacker tries to flood the network with ICMP packets in order to prevent transmission of legitimate network traffic.

4. After selecting the chosen parameters, click on **Apply**.

## Chapter 7 NAT (Network Address Translation)

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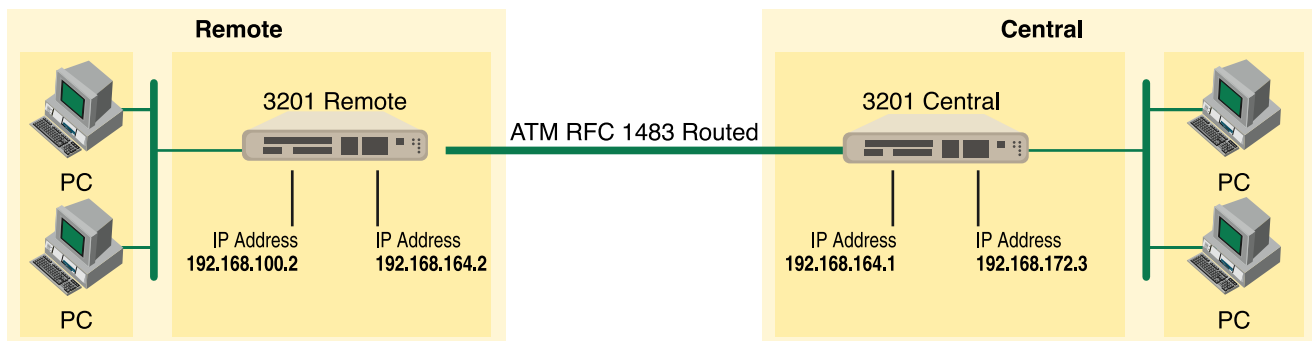
## Introduction

Network Address Translation (NAT) provides unlimited local host addresses, enabling users to connect to the Internet without having to provide a new address for each and every host. An encryption capability helps keep actual addresses confidential. This chapter describes how to configure for NAT.

## Creating an Ethernet Transport

1. From Console on the Remote unit configure the following:

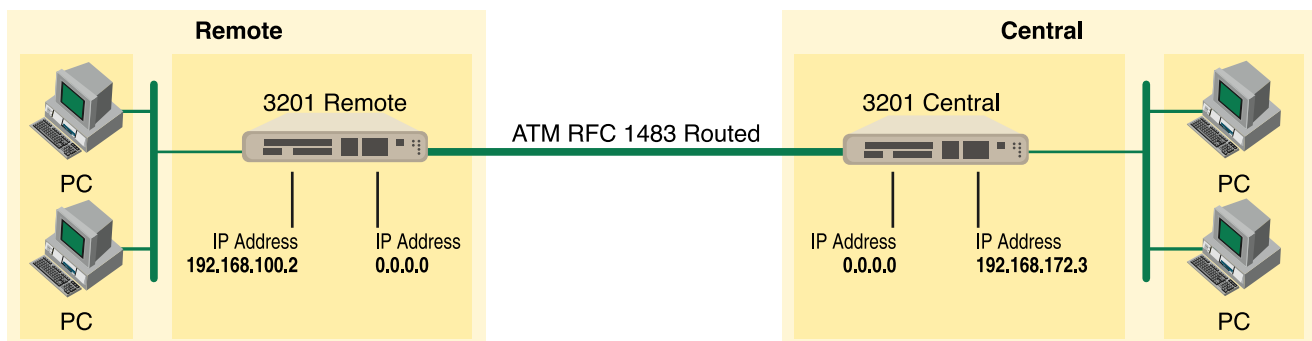
```
→ ip set interface ip1 ipaddress 192.168.100.11 255.255.255.0
→ system config save
```



2. From Console on the Central unit configure the following:

```
→ ip set interface ip1 ipaddress 209.49.110.130 255.255.255.0
→ system config save
```

Now you should be able to reach the unit through the Ethernet port from the local side using Telnet or the WWW interface. This instructions in this procedure are intended for the WWW interface.



## Creating a DSL Link

You will need the following to create a DSL link:

- One Model 3201 unit configured as *Remote*
- One Model 3201 unit configured as *Central*

- DSL data rates should be the same for Remote and Central units

### Central Side Configuration

From the WWW interface, do the following:

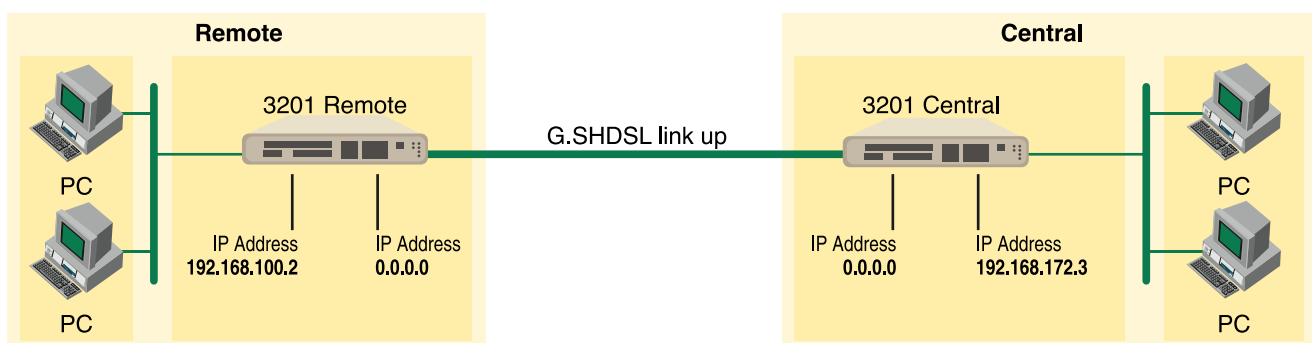
1. Click on **GSHDSL**.
2. Click on **Configuration**.
3. Change the intended DSL Data Rate to the maximum rate desired.
4. Change *Terminal Type* to **Central**.
5. Scroll to the bottom of the page and click on **Configure**.
6. Click on **(GSHDSL) Action**.
7. Set to start and click on **Action**.
8. Save the configuration.

### Remote Side Configuration

From the WWW interface, do the following:

1. Click on **GSHDSL**.
2. Click on **Configuration**.
3. Change the intended DSL Data Rate to the maximum rate desired.
4. Scroll to the bottom of the page and click on **Configure**.
5. Save the configuration.

Confirm that the DSL link is working properly by verifying that the DSL WAN LED is lit.



## Creating an ATM Routable Link

---

Now that you have a DSL link, do the following to configure a WAN service.

### **Remote side configuration**

From the WWW interface:

1. Click **Configuration**.
2. Click **Create a new service**.
3. Enable **RFC 1483 routed**.
4. Click **Configure**.
5. Type a description of the DSL Link.
6. Type in the IP address *192.168.164.2*.
7. Click **Apply**.
8. Save the configuration.

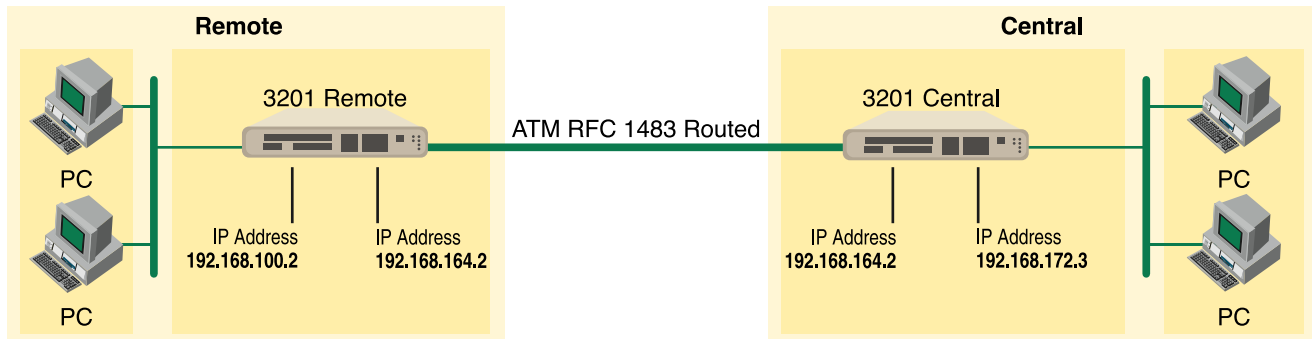
### **Central side configuration**

From the WWW interface:

1. Click **Configuration**.
2. Click **Create a new service**.
3. Enable **RFC 1483 routed**.
4. Click **Configure**.
5. Type a description of the DSL Link.
6. Type in the IP address *192.168.164.1*.
7. Click **Apply**.
8. Click **G.SHDSL**.

9. Click **Action**.

10. Save the configuration.



Do the following to confirm that the ATM link is working properly:

- Verify that the DSL WAN LED is lit.
- Ping the Remote unit from the Central Console  
→ ip ping 192.168.164.2
- Ping the Central unit from the Remote Console  
→ ip ping 192.168.164.1

## Creating a route for Remote and Central PCs

Do the following to create a route for the Remote and Central PCs:

### Remote side configuration

From the WWW interface:

1. Click **Configuration**.
2. Click **IP routes**.
3. Create new IP V4 Route.
4. Add Gateway *192.168.164.1*.
5. Click **OK**.

### Central side configuration

From the WWW interface:

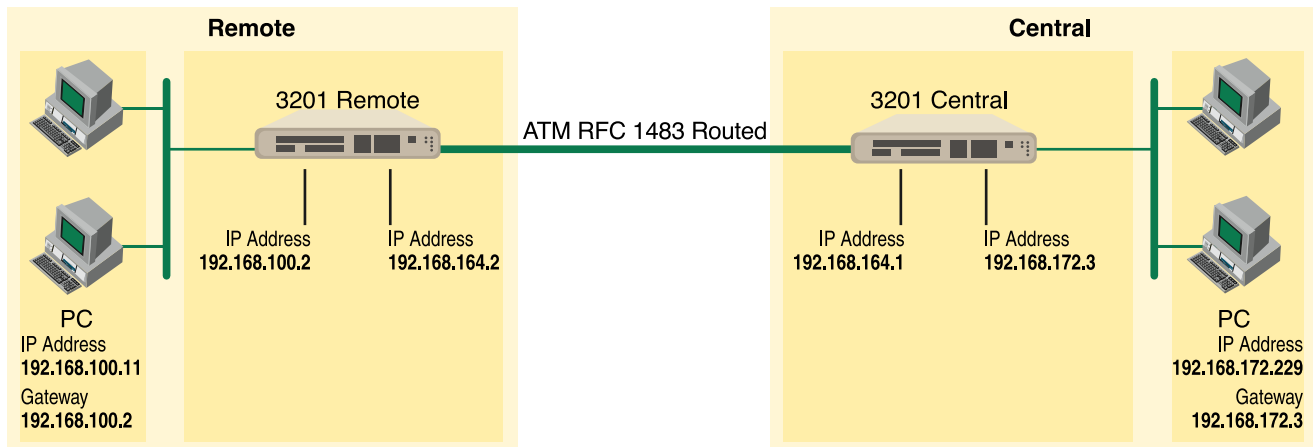
1. Click **Configuration**.
2. Click **IP routes**.
3. Create new IP V4 Route.
4. Add Gateway *192.168.164.2*.



5. Click **OK**.

Do the following to confirm that the new route is working properly:

- Verify that the DSL WAN LED is lit.
- Ping the Remote unit from the Central Console  
→ ip ping 192.168.100.11
- Ping the Central unit from the Remote Console  
→ ip ping 192.168.172.229



**Note** It is important to understand that for PCs to be able to send IP traffic to different networks there must be routes in place. For example, the Remote PC has a gateway of 192.168.164.30 and it will successfully send out IP traffic over the DSL link to the CENTRAL Network side. Central Computer has 209.49.110.130 gateway address and it will successfully send out all IP traffic over DSL link to the REMOTE Network side. In this case all traffic that is not local to the network will be sent out the gateway interface.

### Security Interface Configuration

---

**Security State**  
 Security: Enabled  
 Firewall:  Enabled  Disabled  
 Intrusion Detection Enabled:  Enabled  Disabled

---

**Security Level**  
 Security Level: none

---

**Security Interfaces**

Name	Type	NAT	
ip1	internal	May be configured on external or DMZ interfaces	Delete Interface: <input type="button" value="0"/>
ipoa-0	external	<input type="button" value="Disable NAT to internal interfaces"/> <input type="button" value="Advanced NAT Configuration: 0"/>	Delete Interface: <input type="button" value="0"/>

## NAT Configuration

From the WWW interface:

1. Click **Security**.
2. Enable Security, then click the Web browser's refresh button to display the change.
3. Under Security interfaces, add your internal and external interfaces based on where you want NAT to be applied. For example, NAT could be applied to the public routable address 192.168.172.3 (the address of the Ethernet interface on the Central 3201).
4. Add *ip1* as external interface.
5. Add *rfc1483-0* as internal interface.
6. Enable *NAT* to internal interfaces.

This should NAT all IP traffic that is being sent (from the internal side of this network) out the Ethernet port on the 3201 Central unit.

**Note** Once you enable NAT on the Ethernet (external) port, you will be unable to manage this device from the Ethernet IP address. Do the following at the Remote side of the network to make it so you can manage this device from the Ethernet IP address.

1. Access the web page using the WAN IP address of the Central 3201.
2. Click Security. You will see Security Interfaces.
3. Click Advanced NAT Configuration.
4. Click Add Reserved Mapping.
5. Add Internal IP Address: 192.168.164.1.
6. Change Transport Type to TCP.

7. Add Port Number 80.

You should be able to reach the web interface from the Central side using the Ethernet IP address.

# Chapter 8 **Monitoring Status**

## **Chapter contents**

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## Status LEDs

The LEDs indicate the status of the Power, the WAN (DSL) inter-modem link, and the Ethernet connection. All LED indicators will present the same looking profile (e.g., clear) when unlit due to being single color, water clear, high-efficient Yellow LEDs.

Table 5. Status LED descriptions

<b>Power</b>	Yellow		<i>ON</i> indicates that power is applied. <i>off</i> indicates that no power is applied. <i>2 Hz flash</i> occurs during POST <i>1 Hz flash</i> occurs for non-fatal error. <i>8 Hz flash</i> on <b>all LEDs</b> for fatal POST outcome or critical error.
<b>WAN (DSL)</b>	Link	Yellow	<i>Solid yellow</i> : connected <i>2 Hz flash</i> : training <i>8 Hz flash</i> : DSL error <i>No indication</i> : no signal detected.
	TX	Yellow	<i>Flashing</i> : when transmitting data from the unit to the WAN.
	RX	Yellow	<i>Flashing</i> : when receiving data from the WAN to the unit.
<b>Ethernet</b>	Link	Yellow	<i>On</i> : Ethernet is linked.
	100M	Yellow	<i>On</i> : 100 Mbps Ethernet is selected.
	TX	Yellow	<i>Flashing</i> : when data is transmitted from the unit to the LAN.
	RX	Yellow	<i>Flashing</i> : when data is received from the LAN.

# Chapter 9 **Diagnostics and Software Upgrades**

---

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## Ping

The ping command is executed from the Command Line Interface (CLI). Ping in the 3201/3241 is executed from the “ip” command. Here is the ping format followed by a valid response.

```
ip ping 192.168.100.11
ping: PING 192.168.100.11: 32 data bytes
ping: 40 bytes from 192.168.100.11: seq=0, ttl=128, rtt<10ms
```

→

## Software Upgrades

Software upgrades are required in two scenarios. First, for new features. Second, for standard software upgrades (at an additional cost).

For standard software upgrades, which are at no charge, contact [upgrades.patton.com](http://upgrades.patton.com) for the location of the new firmware and follow these instructions.

1. Get the firmware image from Patton and save on your PC. It is a .tar file and MUST NOT be unzipped!
2. Login to the 3201’s web page on the browser.
3. Click on > System, then > Upgrade
4. Locate the firmware image on this web page.
5. Click on Upgrade.
6. Wait until the upgrading is complete, and then restart the 3201.
7. It is now ready to use with the new firmware.

If you encounter problems with the firmware upgrade, do the following to upload software image into the Patton 3201/3241 via TFTP. .

**Note** The Patton 3201/3241 products have a TFTP server built-in, a TFTP client will be require on the user side to connect to the TFTP server

## Configuration

The Patton products are configured as a TFTP server with the default IP address 192.168.200.10.

### Procedure

1. Go to [Upgrade.patton.com](http://Upgrade.patton.com) and download the software upload package. The package contains the following files:
  - Tftplock.key
  - Tftpupdt.beg
  - Image
  - Npimage

- Key
  - Initbun
  - Im.conf
  - Tftpupdt.rbt
  - Tftpupdt.end
  - Script.bat
2. Connect the control (console) port of the unit to a PC.
  3. Connect the Ethernet port to the appropriate device where the upload package will be stored.
  4. On a Window 2000 or WinXP machine, open a Command Prompt and run *script.bat*. (The script will connect to the default 192.168.200.10 IP address). If using Win9x, a TFTP client will be needed.
  5. The TFTP process takes about 90 seconds, the unit will reboot automatically when done.



# Chapter 10 **Contacting Patton for assistance**

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- Warranty Service and Returned Merchandise Authorizations (RMAs) ..... 106
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## Introduction

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This chapter contains the following information:

- “Contact information”—describes how to contact PATTON technical support for assistance.
- “Warranty Service and Returned Merchandise Authorizations (RMAs)” —contains information about the warranty and obtaining a return merchandise authorization (RMA).

## Contact information

---

Patton Electronics offers a wide array of free technical services. If you have questions about any of our other products we recommend you begin your search for answers by using our technical knowledge base. Here, we have gathered together many of the more commonly asked questions and compiled them into a searchable database to help you quickly solve your problems.

- Online support—available at [www.patton.com](http://www.patton.com).
- E-mail support—e-mail sent to [support@patton.com](mailto:support@patton.com) will be answered within 1 business day
- Telephone support—standard telephone support is available 5 days a week, from 8:00am to 5:00pm EST by calling +1 (301) 975-1007

## Warranty Service and Returned Merchandise Authorizations (RMAs)

---

Patton Electronics is an ISO-9001 certified manufacturer and our products are carefully tested before shipment. All of our products are backed by a comprehensive warranty program.

**Note** If you purchased your equipment from a Patton Electronics reseller, ask your reseller how you should proceed with warranty service. It is often more convenient for you to work with your local reseller to obtain a replacement. Patton services our products no matter how you acquired them.

### Warranty coverage

Our products are under warranty to be free from defects, and we will, at our option, repair or replace the product should it fail within one year from the first date of shipment. Our warranty is limited to defects in workmanship or materials, and does not cover customer damage, lightning or power surge damage, abuse, or unauthorized modification.

### *Out-of-warranty service*

Patton services what we sell, no matter how you acquired it, including malfunctioning products that are no longer under warranty. Our products have a flat fee for repairs. Units damaged by lightning or other catastrophes may require replacement.

### *Returns for credit*

Customer satisfaction is important to us, therefore any product may be returned with authorization within 30 days from the shipment date for a full credit of the purchase price. If you have ordered the wrong equipment or you are dissatisfied in any way, please contact us to request an RMA number to accept your return. Patton is not responsible for equipment returned without a Return Authorization.

### *Return for credit policy*

- Less than 30 days: No Charge. Your credit will be issued upon receipt and inspection of the equipment.
- 30 to 60 days: We will add a 20% restocking charge (crediting your account with 80% of the purchase price).
- Over 60 days: Products will be accepted for repairs only.

### **RMA numbers**

RMA numbers are required for all product returns. You can obtain an RMA by doing one of the following:

- Completing a request on the RMA Request page in the *Support* section at [www.patton.com](http://www.patton.com)
- By calling +1 (301) 975-1007 and speaking to a Technical Support Engineer
- By sending an e-mail to [returns@patton.com](mailto:returns@patton.com)

All returned units must have the RMA number clearly visible on the outside of the shipping container. Please use the original packing material that the device came in or pack the unit securely to avoid damage during shipping.

### *Shipping instructions*

The RMA number should be clearly visible on the address label. Our shipping address is as follows:

#### **Patton Electronics Company**

RMA#: xxxx

7622 Rickenbacker Dr.

Gaithersburg, MD 20879-4773 USA

Patton will ship the equipment back to you in the same manner you ship it to us. Patton will pay the return shipping costs.

## Appendix A **Compliance information**

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## Compliance

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### **EMC**

- FCC Part 15, Class A
- EN55022, Class A
- EN55024

### **Safety**

- UL 60950-1/CSA C22.2 N0. 60950-1
- IEC/EN60950-1
- AS/NZS 60950-1

### **PSTN Regulatory**

- FCC Part 68
- CS-03
- AS/ACIF S043:2003

## **FCC Part 68 (ACTA) Statement**

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This equipment complies with Part 68 of FCC rules and the requirements adopted by ACTA. On the bottom side of this equipment is a label that contains—among other information—a product identifier in the format *US: AAAEQ##TXXXX*. If requested, this number must be provided to the telephone company.

The method used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA.

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.

## **Radio and TV Interference (FCC Part 15)**

---

This equipment generates and uses radio frequency energy, and if not installed and used properly—that is, in strict accordance with the manufacturer's instructions—may cause interference to radio and television reception. This equipment has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reason-

able protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the equipment causes interference to radio or television reception, which can be determined by disconnecting the cables, try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna, and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

## Industry Canada Notice

---

This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

This Declaration of Conformity means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction. Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above condition may not prevent degradation of service in some situations. Repairs to some certified equipment should be made by an authorized maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment. Users should ensure for their own protection that the ground connections of the power utility, telephone lines and internal metallic water pipe system, are connected together. This protection may be particularly important in rural areas.

## CE Declaration of Conformity

---

We certify that the apparatus identified in this document conforms to the requirements of Council Directive 1999/5/EC on the approximation of the laws of the member states relating to Radio and Telecommunication Terminal Equipment and the mutual recognition of their conformity.

The safety advice in the documentation accompanying this product shall be obeyed. The conformity to the above directive is indicated by the CE sign on the device.

## Authorized European Representative

---

D R M Green

European Compliance Services Limited.

Avalon House, Marcham Road

Abingdon,

Oxon OX14 1UD, UK

## Appendix B **Specifications**

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## General Characteristics

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- Compact low-cost plug-and-play router
- 10/100 Ethernet
- Unlimited host support.
- Comprehensive hardware diagnostics, works with any operating system, easy maintenance and effortless installation.
- Plug-and-Play operation for fast and seamless turn-up with pre-configured WAN and LAN options.
- Built-in web configuration.
- Simple software upgrade using FTP into FLASH memory.
- Eight front panel LEDs indicate Power, DSL WAN, Ethernet LAN speed and status.
- Convenient and standard RJ connectors for Ethernet, Line, and Console.
- External UI, 120 VAC, 230 VAC, or 48 VDC Power Supply Options. UI are standard and included in price of unit. 120/230 VAC and 48 VDC are extra charge options.
- Field Factory Default Option.
- Standard 1 year warranty.

## G.SHDSL Characteristics (Model 3201/3241)

---

- 2.3 Mbps speed (Model 3201) over 2 wire.
- 4.6 Mbps speed (Model 3241) over 2 wire.
- DTE Rates 192 kbps to 2.32 Mbps operation.
- Distance from 30,000 ft (9,144 m) at 192 kbps to 16,400 ft (5,000 m) at 2.3 Mbps on 24 AWG (0.5 mm) wire
- Annex A (ANSI), Annex B (ETSI) PSD selection.
- 2 wire support per ITU G.991.2 and ETSI TS 101524 with G.994.1 handshake.
- When connecting two routers and modems in a point-to-point application, one modem must be set for central mode, the other for remote mode.
- EOC Management channel for remote end-to-end management.

## Ethernet

---

- Auto-sensing Full-Duplex 10Base-T/100Base-TX Ethernet.
- Standard RJ-45 and built-in MDI-X cross-over switch.
- IEEE 802.1d transparent learning bridge up to 1,024 addresses and Spanning Tree.



## Protocol Support

---

- Complete internetworking with IP (RFC 741), TCP (RFC 793), UDP (RFC 768), ICMP (RFC 950), ARP (RFC 826).
- IP Router with RIP (RFC 1058), RIPv2 (RFC 2453),
- Up to 64 static routes with user selectable priority over RIP/OSPF routes.
- Built-in Ping and Traceroute facilities.
- Integrated DHCP Server (RFC 2131). Selectable general IP leases and user specific MAC/IP pairings. Selectable lease period.
- DHCP relay agent (RFC 2132/RFC 1542) with 8 individual address pools.
- DNS Relay with primary and secondary Name Server selection.
- NAT (RFC 3022) with Network Address Port Translation (NAPT) for cost-effective sharing of a single DSL connection. Integrated Application Level Gateway with support for over 80 applications.
- NAT MultiNat with 1:1 mapping.
- NAT Many:1.
- NAT Many:Many mapping .
- NAT Port/IP redirection and mapping.
- uPNP controlled device for seamless networked device interconnectivity and Windows XP integration.

## PPP Support

---

- Point-to-Point Protocol over HDLC
- PPPoA (RFC 2364) Point-to-Point Protocol over ATM.
- PPPoE (RFC 2516) Client for autonomous network connection. Eliminates the requirement of installing client software on a local PC and allows sharing of the connection across a LAN.
- User configurable PPP PAP (RFC 1661) or CHAP (RFC 1994) authentication.
- PPP BCP (RFC 1638) support for bridged networking support.

## ATM Protocols

---

- Multiprotocol over ATM AAL5 and Multiprotocol Bridged encapsulation RFC 2684 (Formerly RFC 1483) and RFC 1577 Classical IP over ATM. Default RFC-1483 route mode. Logical Link Control (LLC)/ Subnetwork Access Protocol (SNAP) encapsulation. Default VC mux mode.
- ATM UNI 3.0, 3.1, and 4.0 signaling ATM QoS with UBR, CBR, nrt-VBR, and rt-VBR and per-VC queuing and shaping. IISP V.1.0 Q.2931 UNI L3 and Q.2971 UNI L3 support.
- LAN Emulation Client (LEC) V.1 with LEC via PVC or ILMI connection.
- Peak cell rate shaping on a per-VCC basis up to 32 active VCCs across VPI 0-255, VCI 0-65525. Single default PVC: 8/35 with PCR=5,500 cells.
- I.610 OAM network management including AIS/RDI, loop-back and performance monitoring.

- Enhanced ILMI 4.0 for auto-configuration of ATM PVCs.
- FRF.12 Frame Relay Fragmentation support, LMI For Frame Relay PVC Link Management, FRF.5 Frame Relay to ATM Network internetworking, and FRF.8 Frame Relay to ATM Service Internetworking.

## Management

---

- User selectable ATM, PPP, or Frame Relay WAN datalink connection.
- Web-Based configuration via embedded web server
- CLI menu for configuration, management, and diagnostics.
- Local/Remote CLI (VT-100 or Telnet).
- SNMPv1 (RFC 1157) MIB II (RFC 1213)
- Quick Start Setup runs through common options to simplify circuit turn-up.
- Logging via SYSLOG, and VT-100 console. Console port set at 9600 bps 8/N/1 settings no flow control.
- EOC access for End-To-End management, configuration, and control.

## Security

---

- Packet filtering firewall for controlled access to and from LAN/WAN. Support for 255 rules in 32 filter sets. 16 individual connection profiles.
- DoS Detection/protection. Intrusion detection, Logging of session, blocking and intrusion events and Real-Time alerts. Logging or SMTP on event.
- Password protected system management with a username/password for console and virtual terminal. Separate user selectable passwords for SNMP RO/RW strings.
- Access list determining up to 5 hosts/networks which are allowed to access management system SNMP/HTTP/TELNET.
- Logging or SMTP on events: POST, POST errors, line/DSL, PPP/DHCP, IP.

## Compliance Standard Requirements

---

- FCC part 15 Class A (US EMC)
- CE per RTTE 99/5/EC (EMC & LVD)
- FCC Part 68 ( – US Permission to connect)
- IC-CS03 (Canadian Permission to connect)
- Safety – EN60950

### *Australia Specific*

- TS016 (E1 Telecom)
- AZ/NZS 3260 Safety)
- AZ/NZS 35-48 EMC

## Dimensions

5.5in x 4.2in x 1.5in (13.9cm x 10.6cm x 3.9cm)

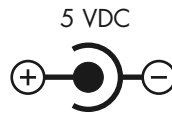
## Power and Power Supply Specifications

The 3201 may come with either an AC or DC power supply.

- The supply's connection to the 3201 is a 2.5 mm barrel receptacle with the center conductor positive.
- There is one fuse in the equipment rated at 250V, 500 mA, 2 sec.
- Model 3201's Rated voltage: 5 VDC
- Model 3201's Rated current: 1 A DC

External AC universal power supply

- Output from power supply: 5 VDC, 2A



- Input to power supply: universal input 100 – 240 VAC 50/60 Hz 0.3A



An approved external power supply that incorporates a disconnect device must be used and positioned within easy reach of the operator's position



Connect the equipment to a 5 VDC source that is electrically isolated from the ac source. The 5 VDC source is to be reliably connected to earth.

- External 48 VDC power supply
  - Input
    - Rated voltage: 36–60 VDC
    - Rated current: 0.25 A DC
    - 3-pin locking connector, 3.5 mm pitch
    - Reverse polarity protection
    - Transient over-voltage protection, 100 VDC at 2 ms
  - Output
    - Rated voltage: 5 VDC  $\pm$  5%, 5W
    - Rated current: 1 A DC
    - 6-inch cable terminated with 2.5 mm barrel plug, center positive



Connect the equipment to a 36–60 VDC source that is electrically isolated from the AC source. The 36–60 VDC source is to be reliably connected to earth.

- Isolation 500 VDC
- Environment 0–50°C; 5–95% relative humidity, non-condensing
- Size 3.0 x 1.63 x 0.75 in. (76 x 42 x 19 mm)

## Appendix C **Cable Recommendations**

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## **DSL Cable**

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10 foot (3 m), RJ-11/RJ-11 (refer to “RJ-11 non-shielded port” on page 120)

## **Ethernet Cable**

---

Ethernet cable (P/N 10-2500) (refer to “RJ-45 shielded 10/100 Ethernet port” on page 120)

## **Adapter**

---

EIA-561 to DB-9 (P/N 16F-561) (refer to “RJ-45 non-shielded RS-232 console port (EIA-561)” on page 120)

## Appendix D **Physical Connectors**

---

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## RJ-45 shielded 10/100 Ethernet port

Assuming the MDI-X switch is in the out position.

Pin No.	Signal Direction	Signal Name
1	Output	TX+
2	Output	TX-
3	Input	RX+
4		
5		
6	Input	RX-
7		
8		

## RJ-11 non-shielded port

Single twisted-pair (TP) for full-duplex transmission. The signals are not polarity sensitive.

Pin No.	Signal Direction	Signal Name
1		
2	In/Out	Tip
3	In/Out	Ring
4		

## RJ-45 non-shielded RS-232 console port (EIA-561)

Pin No.	Signal Direction	Signal Name
1	Out	DSR
2	Out	CD
3	In	DTR
4	-	Signal Ground
5	Out	RD
6	In	TD
7	Out	CTS
8	In	RTS

## Power input

2.5 mm barrel plug/jack



# Appendix E **Command Line Interface (CLI) Operation**

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## Introduction

---

The modem configuration and status can also be view and modified through the console, which is accessible through the RS-232 serial port or through a Telnet session over Ethernet.

## CLI Terminology

---

In order to use the CLI commands, you need to understand the following CLI terms:

- **Transport:** A transport is a layer 2 session and everything below it. You can create a transport and attach it to a bridge or router so that data can be bridged or routed via the attached transport. The CLI supports the following transports:
  - PPPoA: Point-to-Point Protocol over ATM
  - PPPoE: Point-to-Point Protocol over Ethernet
  - Frame Relay
  - RFC1483
  - IPoA: IP over ATM
  - PPPoH: Point-to-Point over HDLC
  - Ethernet
- **Interface:** bridges and routers both have interfaces. A single transport is attached to a bridge or router via an interface.
- **Object:** an object is anything that you can create and manipulate as a single entity, for example, interfaces, transports, static routes and NAT rules.
- **List:** Objects are numbered entries in a list. For example, if you have created more than one ethernet transport, the following command:

```
ethernet list transports
```

produces a list of numbered transport objects:

- ID Name Port
- 1 eth2 ethernet
- 2 eth1 ethernet

### **Local (VT-100 emulation)**

A connection is made with the DB9-RJ45 adapter and an RJ45-RJ45 straight-through cable. Set the data rate to 9,600 baud, 8 data bits, one stop bits, and no parity. You may use a dumb terminal or a VT-100 emulation such as HyperTerminal.

### **Remote (Telnet)**

Establishing a Telnet session displays the same CLI configuration and status parameters on the display.

## Using the Console

The console commands needed for the various modes of operation are described in later sections. In this subsection are the most basic commands needed for console operation.

By entering “?” all the high level commands (the keywords) are seen.

By entering a keyword followed by a space and “?” the options available will print immediately without pressing enter. The previously entered commands are reprinted on the next lines. For example:

```
→ ethernet ?[After typing the "?" you will not see the "?"]
  add
  delete
  set
  show
  list
  clear
→ ethernet
```

Then you may enter one of the keywords on the displayed list followed by a space and “?”

To continue our example:

```
→ ethernet list ?
  ports
  transports
→ ethernet list
```

Then

```
→ ethernet list transports ?
→ ethernet list transports <enter>
```

```
Ethernet transports:
  ID | Name | Port
-----|-----|-----
  1 | eth1 | ethernet
-----|-----|-----
```

→

Another example shows when the user must provide a parameter.

```
→ ip ?
  list
  clear
  add
  delete
  set
  attach
  attachbridge
  detach
  show
  interface
  ping
→ ip interface ?
  <name>
```

The <name> of the interface. In this instance the interface name is ip1. It is important that you do the “?” inquiry to determine whether additional parameters follow.

```

→ ip interface ip1 ?
    add
    delete
    clear
    list
→ ip interface ip1 list ?
    secondaryipaddresses
→ ip interface ip1 list secondaryipaddresses ?
ip interface ip1 list secondaryipaddresses <enter>

Secondary IP addresses for interface: ip1
ID | IP Address
----|-----
-----|-----

```

In this example there was not a secondary IP address. Now save the entire configuration in nonvolatile FLASH memory with the following command.

```
→ system config save
```

Wait for the message that says “Configuration Saved”, then reboot the modem with this command.

```
→ system restart
```

## Administering user accounts

As admin user you can administer user accounts. This section summarizes the CLI commands which can be used to administer user accounts.

### Adding new users

To add a new user username, use the command: *system add user < username > <“Comment”>*

```
system add login user < username > <“Comment”>
```

The first command creates a user who can access the system via a dialin connection using PPP for example. The second command creates a user who can login to the system.

For example, the commands:

```
system add user fred “user with dialin access”
```

```
system add login joe “user with login access”
```

creates two new users called fred and joe. The accounts are created with no passwords. To view details about the new users, enter:

```
system list users
```

The following information is returned:

```
Users:
May May Access
  ID | Name   | Conf.   | Dialin  | Level   | Comment
-----|-----|-----|-----|-----|-----
  1 | fred   | disabled| ENABLED | default | user with dialin access
  2 | joe    | ENABLED | disabled| default | user with login access
  3 | admin  | ENABLED | disabled| superuser | Default admin user
-----|-----|-----|-----|-----|-----
```

### Setting user passwords

To change the password for the user you are currently logged in as, use the command:

```
user password
```

Enter the new password twice as prompted:

```
Enter new password: ***
Again to verify: ***
→
```

**Note** No check is made for any current password which may have been set for the user.

If you wish to change the password for another user, enter the command:

```
user change <username>
```

This command logs you into the system as another user. You can then use the user password command to change the password for this user.

**Note** Changing to another user means that you lose all superuser privileges.

**Note** Only superusers can use the user change command.

### Changing user settings

To change any of the default settings for a user, use the following commands. For example, to change the settings for user fred:

```
system set user fred access {default|engineer|superuser}
system set user fred maydialin {enabled|disabled}
system set user fred mayconfigure {enabled|disabled}
```

For example, to change the security level for fred, enter:

```
system set user fred access engineer
```

**Note** Only superusers can use the user change command.

### Controlling login access

To set user login access for user username, use the command (all on one line):

```
system set login < username > access {default|engineer|superuser}
```

### Controlling user access

To set user access for user username, use the command (all on one line):

```
system set user < username > access {default|engineer|superuser}
```

### G.SHDSL Commands:

Command format: 'gshdsl Action Attribute Value'

- Action – Two types of actions are available: 'set' or 'show'
- Set – set attributes with a value.
- Show – get information from the box
- Attribute – The name of the attributes to access.
- Value – The new value for the attribute (Set command only)

**Example:** To read the attribute 'Version': gshdsl show Version

To set data rate to 256K (4 \* 64K): gshdsl set DSLRateTS

To set terminal type to CPE mode: gshdsl set terminal remote

To show the current terminal type: gshdsl show terminal

Attribute	Type	Value	Description
Version	RO	-	The version number of the DSL driver
Platform	RO	-	The platform name of the unit e.g. 3201 or 3201
ModemState	RO	Idle Deactivated Norm Oper In-Progress	Show the state of the handshaking process: Idle – The DSL chip is in idle state Deactivated – The DSL chip is deactivated Normal Operation – The DSL chip is in operating (Link established) In-Progress – Handshaking in process
DSLRateTS	RW	3-36	Data rate N number N=3-36. e.g. 256K data rate is N=4. The composite data rate is the chosen number N times 64 kbps. E.g., 32 x 64 kbps = 2.048 Mbps.
DataRateI	RW	0-7	This attribute controls the size of the overhead channel. Valid input is 0-7. Default value is 0. (!!Keep it as 0)
terminal	RW	Central Remote	Central – CO unit Remote – CPE unit
Interface	RW	Hdlc	Utopia – Data will be packaged in ATM cell format and send through the UTOPIA interface of the processor Hdlc – Data will be packaged in HDLC frame and send through the PCM Bus
Action	WO	Start Deactivate	Start – Command the box to configure the DSL chip and start the handshaking process Deactivate – Command the box to disconnect and deactivate the DSL link.

### To establish the DSL link

1. One unit needs to be set to CO (central) and the other unit as CP (remote)
2. The Data rate of the 2 units have to be the same (DatarateN)

3. The interface type needs to be the same to pass data (Interface)
4. Issue the 'Action' command to start the handshaking process (Action Start)

**Example:** To set up the units to run at 2.048Mbps using ATM interface.

For CO (central) unit

```
→ gshdsl set terminal central
→ gshdsl set interface utopia
→ gshdsl set dataRateN 32
→ gshdsl set dataRateI 0
→ gshdsl set Action Start
```

For CPE (remote) unit

```
→ gshdsl set terminal remote
→ gshdsl set interface utopia
→ gshdsl set dataRateN 32
→ gshdsl set dataRateI 0
→ gshdsl set Action Start
```

Default Setting of the unit

Terminal:	Remote
Interface:	Hdlc
DataRateN:	24
DataRateI:	0