

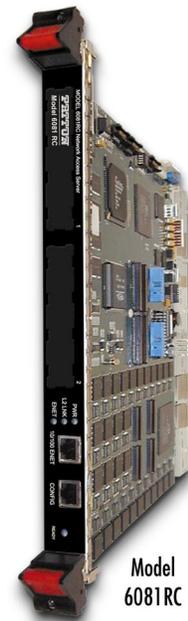
Model 3224 Diamond Edge **G.SHDSL IpDSLAM**

Model 6081RC EdgeRoute **Network Access Server**

Applications Guide



Model
3224



Model
6081RC

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Contents

About this guide	3
Audience.....	3
Structure.....	3
Typographical conventions used in this document.....	4
General conventions	4
Mouse conventions	4
1 Introduction	5
Overview	6
2 Physical layer configuration	9
Introduction	10
Physical layer characteristics.....	10
Configuring Model 3224 G.SHDSL parameters	11
Configuring Model 6081RC H.110 parameters	12
Defining H.110 channels	12
Defining H.110 ports, timeslots, and direction	13
3 Bridged data application	17
Introduction	18
Basic assumptions.....	20
Defaults.....	21
CPE configuration.....	22
Initiating bridged Ethernet data communications.....	22
Modifying the factory default configuration	22
Logging in using the factory-default IP address	23
Modifying the IP address for Ethernet interface A (optional)	24
Creating a bridge group	25
PPP channel configuration	27
Interface configuration	30
Alternate Interface Configuration for Model 6081RC	31
Verifying operation.....	32
Verifying bridged connection	32
4 VLAN bridged connection	35
Introduction	36
Attaching a VLAN ID to an Ethernet interface.....	36
Attaching a bridge interface to a VLAN module	37
5 Routed application using RIP	39
Introduction	40
Network diagram.....	40
3224/6081RC configuration	40
Ethernet port A IP address configuration	41

- Configuring G.SHDSL parameters (3224 only)41
- Configuring H.110 ports (6081RC only)41
- PPP global and channel configuration41
 - Global configuration41
 - PPP channel configuration43
- PPP options43
- LCP options43
- Multilink options44
- IP options44
- IPCP options44
- RIP configuration45
- General options configuration45
 - General45
 - RIP timers46
- 6 Configuring the remote site router (Model 3201) 47**
 - Introduction48
 - Ethernet port IP address configuration48
 - G.SHDSL layer configuration48
 - PPP layer configuration48
 - RIP configuration50
- 7 Verifying operation 53**
 - Introduction54
 - Verifying routed connection55
- 8 Contacting Patton for assistance 57**
 - Introduction58
 - Contact information58
 - Warranty Service and Returned Merchandise Authorizations (RMAs)58
 - Warranty coverage58
 - Out-of-warranty service58
 - Returns for credit58
 - Return for credit policy59
 - RMA numbers59
 - Shipping instructions59

About this guide

This guide describes configuring a Patton Electronics Models 3224 and 6081RC to operate in a variety of application scenarios.

Audience

This guide is intended for the following users:

- Operators
- Installers
- Maintenance technicians

Structure

This guide contains the following chapters:

- Chapter 1 describes the IpDSLAM and Network Access Server
- Chapter 2 describes the IpDSLAM and Network Access Server's physical layer configuration
- Chapter 3 describes configuring the IpDSLAM and Network Access Server for a bridged data application
- Chapter 4 describes configuring the IpDSLAM and Network Access Server for a VLAN bridged connection application
- Chapter 5 describes configuring the IpDSLAM and Network Access Server for a routed application using RIP
- Chapter 6 describes configuring the IpDSLAM and Network Access Server for a remote site router (Model 3201)
- Chapter 7 describes how to verify that the IpDSLAM and Network Access Server is operating properly
- Chapter 8 contains information on contacting Patton technical support for assistance

For best results, read the contents of this guide *before* you install the IpDSLAM and Network Access Server.

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
Futura bold type	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 **Introduction**

Chapter contents

Overview 6

Overview

The Patton Model 3224 (see [figure 1](#)) and ForeFront® Model 6081RC (see [figure 2](#)) share routing and bridging software platforms. The 3224 is a central site standalone device which connects and routes up to 24 G.SHDSL subscribers directly. The Model 6081RC is installed in Patton's ForeFront chassis system at a central site and routes/bridges DSL subscribers data when used in conjunction with Patton's model 3096RC(16-port G.SHDSL TDAC) and/or 3196RC (16-port iDSL T-DACS).

The Models 3224 IpDSLAM and 6081RC EdgeRoute Network Access Server powerful routing engines enable network engineers to deploy flexible bridged or routed applications. Routed links can be configured using Static, RIP (Routing Information Protocol), or OSPF (Open Shortest Path First) protocols. This guide addresses configuration steps needed for bridged data and routed applications.



Figure 1. Model 3224 IpDSLAM (Forest Green version shown)

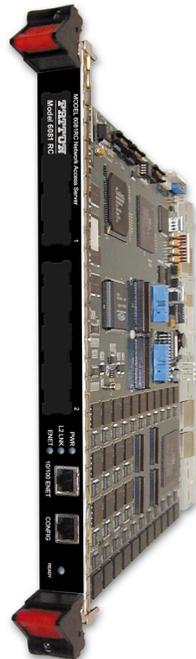


Figure 2. Model 6081RC

Figure 3 shows the factors that should be considered when configuring bridged or routed operation.

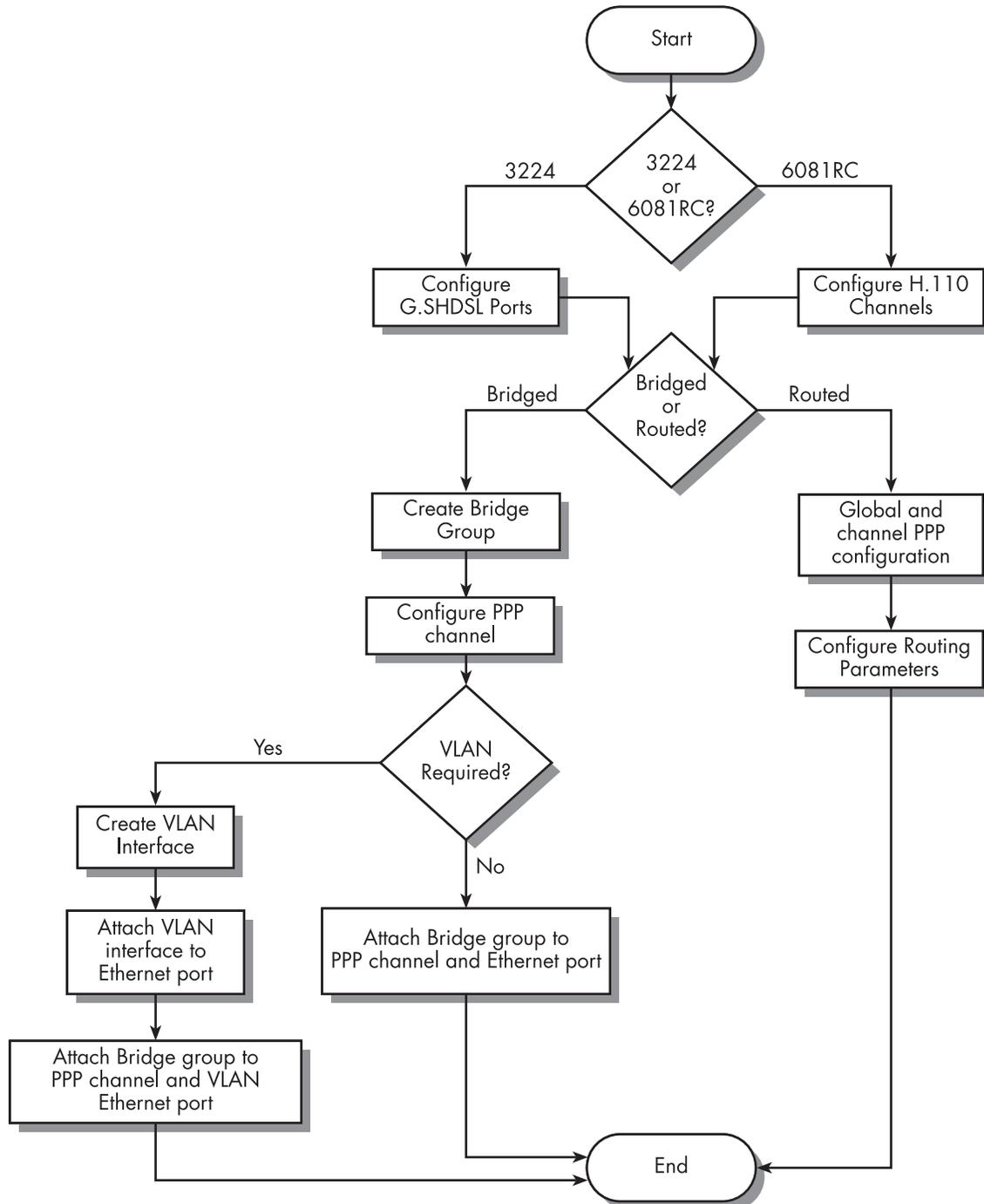


Figure 3. Bridged and routed configuration flow chart

Chapter 2 **Physical layer configuration**

Chapter contents

Introduction	10
Physical layer characteristics.....	10
Configuring Model 3224 G.SHDSL parameters	11
Configuring Model 6081RC H.110 parameters	12
Defining H.110 channels	13
Defining H.110 ports, timeslots, and direction	13

Introduction

The Models 3224 and 6081RC share routing and bridging software platforms, and both are central site devices.

The 3224 is equipped with 24 G.SHDSL ports running at speeds from 192kbps to 4.6Mbps. The G.SHDSL ports connect to customer premise G.SHDSL modem/routers such as the Patton Model 3201.

The Model 6081RC is mounted on a Patton Electronics ForeFront chassis (Models 6276, 6476, or 6676). The 6081RC connects to ForeFront function cards such as the 3096RC, 3196RC, 2616RC, or 6511RC via a mid-plane H.110 bus. In G.SHDSL applications, DSL frames carrying data from customer sites are terminated at the ForeFront chassis by a Model 3096RC; data is then passed to the model 6081RC via H.110 ports.

Physical layer characteristics

The Model 3224 has 24 G.SHDSL ports structured in nx64kbps timeslots from 192kbps to 4.6Mbps, and two 10/100base-T Ethernet ports.

The Model 6081RC has 32 H.110 ports (each port structured in 128 unidirectional 64kbps slots), and three 10/100base-T Ethernet ports.

This chapter contains the following sections that describe configuring the Model 3224 G.SHDSL ports and Model 6081RC H.110 ports:

- “Configuring Model 3224 G.SHDSL parameters” on page 11
- “Configuring Model 6081RC H.110 parameters” on page 12

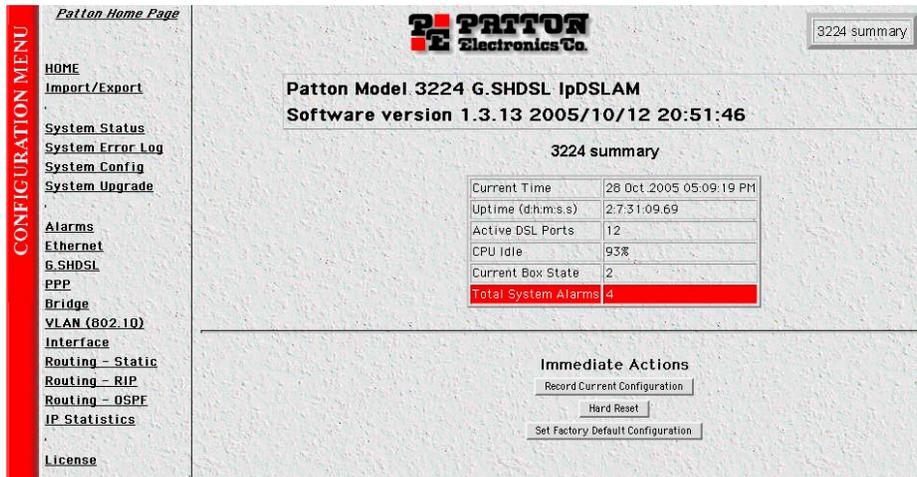


Figure 4. 3224 Web Management home page

Configuring Model 3224 G.SHDSL parameters

To modify the values of the G.SHDSL configurable parameters, do the following:

1. On the left side of the web management home page, in the configuration menu pane, click the *G.SHDSL* -> *G.SHDSL Configuration* hyperlink. The G.SHDSL status and configuration pages (see figure 5) will appear on your screen.

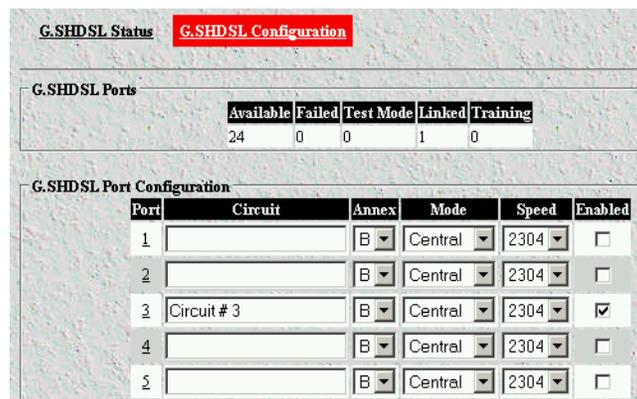


Figure 5. G.SHDSL Configuration page

2. Use the drop-down menus to select your desired values for the annex and/or speed parameters for each G.SHDSL port (enter configuration for port 3).
 - **Circuit #** - Use alphanumeric characters to enter a circuit description.
 - **Annex** – Select *Annex B* for this application
 - **Mode** – Select *Central* mode of operation
 - **Speed** – Select required speeds for this port.

- **Enabled** – Click on the check box to enable this port (port 3)
3. If you wish to disable any G.SHDSL ports that you don't intend to use, click the Enable check-box corresponding to the ports you wish to disable in order to remove the check-mark and disable that port.
 4. Scroll to the bottom of the page and click the **Submit** button to implement and save your changes. This completes the instructions for configuring Ethernet bridging applications.

Configuring Model 6081RC H.110 parameters

The Model 6081RC card routes/bridges data from H.110 and Ethernet ports. The 6081RC connect to the ForeFront chassis H.110 bus via mating mid-plane connectors.

There are 32 H.110 ports available on the ForeFront chassis H.110 bus, Each of the function cards (i.e., 6081RC, 3096RC, 6511RC, etc.) have access to all 32 ports on the bus.

Characteristics of the H.110 bus:

- The H.110 bus is partitioned into 32 ports.
- Each H.110 port can handle up to 128 timeslots, each timeslot is 64 kbps.
- H.110 timeslots are unidirectional, for a full duplex link timeslots need to be defined for each direction of transmission.
- H.110 port numbers between two cards must match.
- Direction of transmission between two cards must complement each other.

Figure 6 shows an H.110 bus interconnection connection between a 6081RC and a 3096RC. Two maps are necessary for a full duplex link; both maps must have the same number of timeslots in each direction. In addition, the 6081RC H.110 port should connect to a corresponding 3096RC H.110 port. Similarly, the H.110 directions between the 6081RC and the 3096RC maps should complement each other, for example timeslots in a “to H.110” port on the 6081RC, should go to timeslots in a “from H.110” port on the 3096RC.

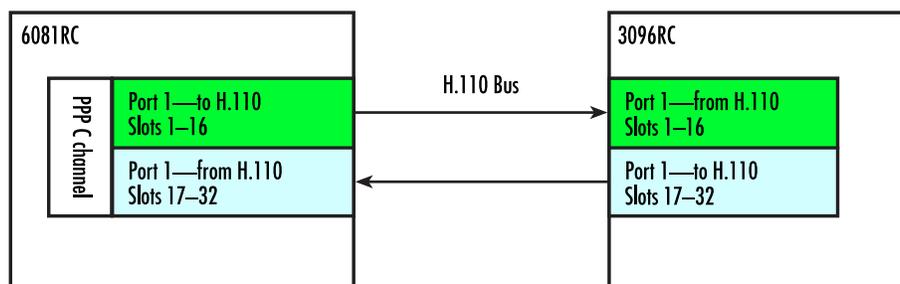


Figure 6. H.110 port correspondence and direction

Defining H.110 channels

From the standpoint of the 6081RC, H.110 ports and timeslot are assigned to PPP channels. To configure H.110 channels, do the following:

1. Click on the H.110 link in the Configuration Menu pane (see figure 4 on page 11) to display the H.110 Channel Configuration page (see figure 7).

Channel	Description	To H110	From H110	Delete

Figure 7. H110 Channel Configuration page

2. Type a description for the channel (in [figure 7](#), the description would be *Location1*). This description will be associated with a PPP channel defined later in this procedure).
3. Click on the **Add Channel** button to create the new channel.

Channel	Description	To H110	From H110	Delete
1	Location1	0	0	<input checked="" type="checkbox"/>

Figure 8. H.110 Channel Configuration window

4. Click on the channel number hyperlink in the Channel column (in [figure 8](#), you would click on channel 1) to refresh the page and cause information about the newly created channel to appear. Channels will be numbered (starting with 1) in the order they are entered.

Note If you want to delete a channel configuration from the listing, click the Delete check box for the channel you want removed, then click the **Delete Channel(s)** button.

Note If a bridged or routed PPP link is active on this channel, deactivate the PPP link before deleting the H.110 channel.

Defining H.110 ports, timeslots, and direction

1. Click on the channel number hyperlink in the H.110 Channel Configuration page to go to the H.110 Settings channel timeslot mapping page (see [figure 9](#)). The page displays the channel number, description, and places to add a timeslot map. This page provides several buttons for navigating through stored bridge configuration:
 - The **Refresh Page** button forces the 6081RC to display changes made since the previous refresh cycle
 - The **First Channel** button displays the configuration for the first channel in the H110 Channel Configuration page listing of channels (see [figure 9](#)).

H.110 Settings: Channel 1 - (Location1)

Refresh Page

First Channel Previous Channel Next Channel Last Channel

Settings

Description: Location1

Reset Submit

Add Map

Port	Starting Timeslot	Length	Direction
1	1	32	To H110

Delete

Port	Timeslot	Total	Direction	Delete

Delete Map(s)

Figure 9. Channel timeslot mapping page

- The **Previous Channel** button displays the configuration for the channel previous to the one currently displayed
- The **Next Channel** button displays the configuration for the channel following the one currently displayed
- The **Last Channel** button displays the configuration for the last channel in the H110 Channel Configuration page listing of channel (see [figure 9](#) on page 14).
- The **Reset** button cancels changes made to a channel configuration.
- The **Submit** button saves changes made to a channel configuration.

Enter configuration parameters for a channel as follows:

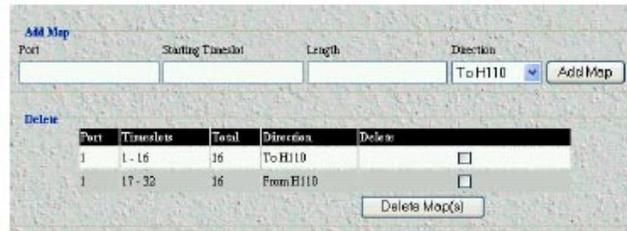
1. Enter a port number (H.110 bus port numbers range from 1 to 32) in the Port text box.
2. Enter the Starting Timeslot—each H.110 port can handle up to 128 slots (for example, if timeslots 1–16 will be used, enter 1 in this text box).
3. Enter the length of the channel in number of timeslots (for example, if the range of timeslots is from 1–16, enter 16 timeslots in this text box).
4. Select to H.110 from the Direction pop-up menu. Each link in the H.110 bus should be duplex, define the direction of transmission “to H.110” or “from H.110”.
5. Click the **Add Map** button to enter the H.110 map. This will be the map that will connect port 1 in the 6081RC to the “From H.110” direction.
6. Enter 1 in the Port text box (port 1).

Note Any other available port (from 1-32) could be selected as long as it matches a 3096RC port.

7. Enter the Starting Timeslot—for example if using timeslots 17–32, enters 17 in this text box).
8. Enter the length in number of timeslots in the Length text box.
9. Select *To H.110* from the Direction pop-up menu.
10. Click the **Add Map** button to save changes.

Note If you want to delete a map configuration from the listing, click the Delete check box for the map you want removed, then click the Delete Map(s) button.

Once both maps for a channel have been entered, the H.110 Settings page will display the map information as shown in [figure 10](#).



The screenshot shows the 'Add Map' section with input fields for Port, Starting Timeslot, Length, and Direction (set to 'To H110'), and an 'Add Map' button. Below is a 'Delete' section with a table of existing maps and a 'Delete Map(s)' button.

Port	Timeslots	Total	Direction	Delete
1	1 - 16	16	To H110	<input type="checkbox"/>
1	17 - 32	16	From H110	<input type="checkbox"/>

Figure 10. H.110 Settings page showing map information for new channel

Chapter 3 **Bridged data application**

Chapter contents

Introduction	18
Basic assumptions	20
Defaults	21
CPE configuration	22
Initiating bridged Ethernet data communications	22
Modifying the factory default configuration	22
Logging in using the factory-default IP address	23
Modifying the IP address for Ethernet interface A (optional)	25
Creating a bridge group	26
PPP channel configuration	28
Interface configuration	31
Alternate Interface Configuration for Model 6081RC	32
Verifying operation	33
Verifying bridged connection	33

Introduction

In bridged Ethernet applications, the IpDSLAM, and EdgeRoute Network Access Server incorporated in Patton ForeFront system, function as an Ethernet hub for interconnecting G.SHDSL access lines and an Ethernet LAN. Functioning as a hub, they deliver data traffic to and from all interfaces (Subscriber ports and one Ethernet LAN interface) by means of Ethernet bridging at the data link layer—layer 2 of the Open Systems Interconnection (OSI) model. The IpDSLAM and EdgeRoute Network Access Server use bridging control protocol (BCP) to provide the bridging function. The IpDSLAM and EdgeRoute Network Access Server use point-to-point protocol (PPP) for data delivery across the G.SHDSL links, by encapsulating each BCP datagram in a PPP frame.

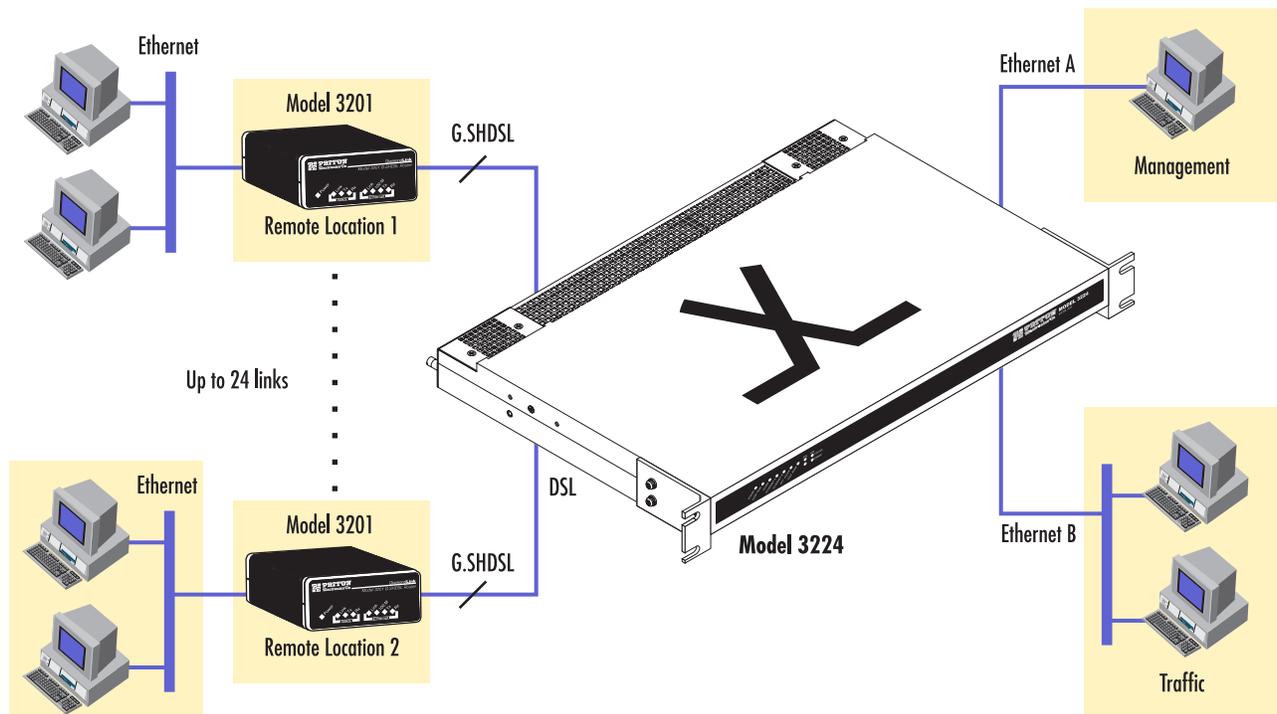


Figure 11. Model 3224 bridged data application diagram

In general, network engineers may find the Ethernet bridging configuration useful for any data communication system requiring long-range connections between remote devices and an Ethernet LAN at a central location. (See [figure 11](#) for Model 3224 bridged data application diagram and [figure 12](#) on page 19 for the Model 6081RC diagram.) As a more specific example, a bridged Ethernet solution may be used when implementing such a real-world application as Internet Service for small and home based businesses. In such a scenario, mini LANs supporting from 1 to 50 users would be connected via a G.SHDSL line to the IpDSLAM, and EdgeRoute Network Access Server (using 3096RC cards), which would then provide bridged communications with servers and Internet gateways connected to the main LAN.

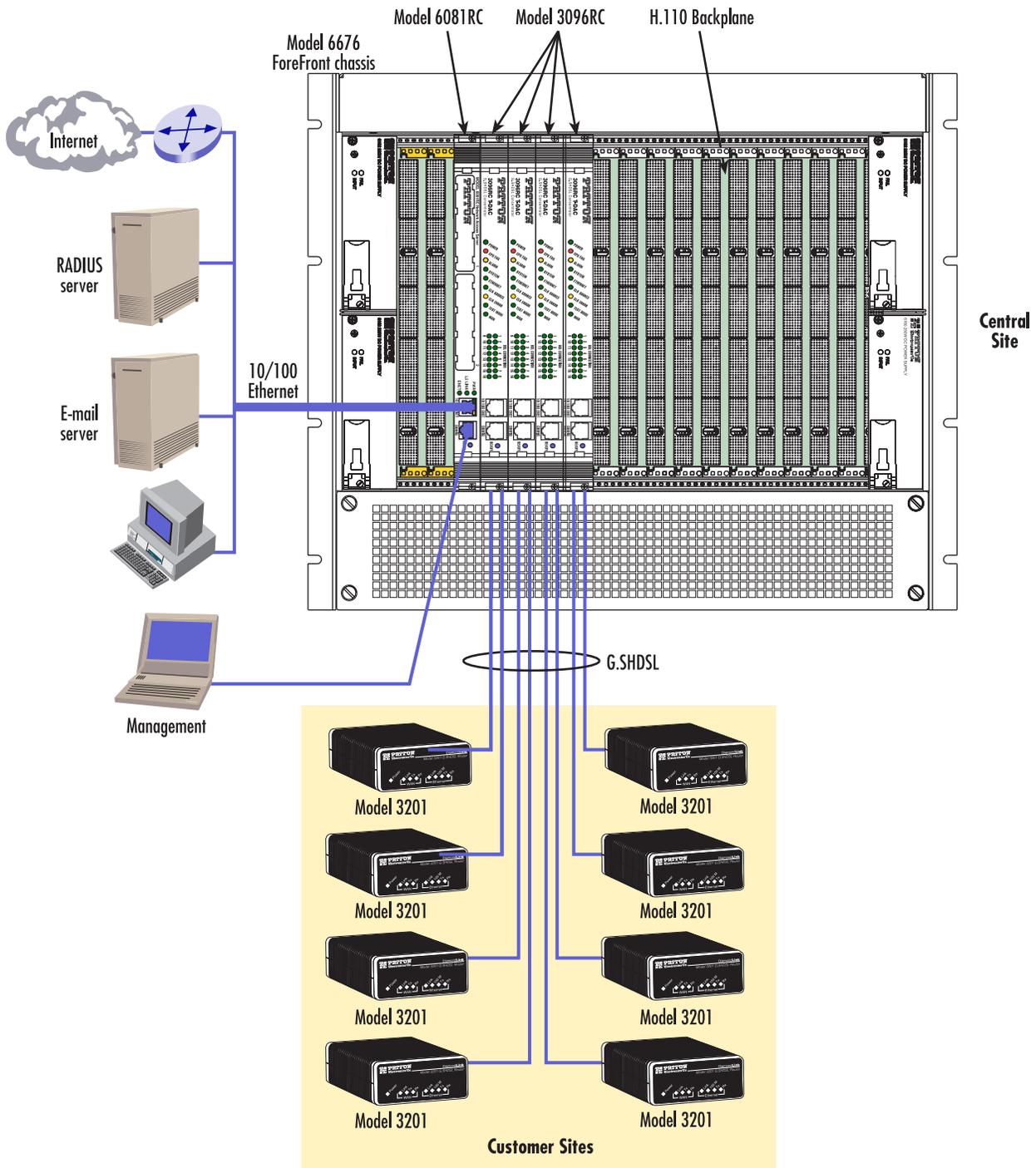


Figure 12. Model 6081RC bridged data application diagram

Basic assumptions

The bridged Ethernet network is based on the following basic assumptions:

- **Ethernet Interface A (Rear panel 3224, front panel 6081RC)**
 - You will connect a management workstation (such as a PC) to the IpDSLAM or EdgeRoute Network Access Server Ethernet Interface A.
 - You will use the management workstation on Interface A to configure the IpDSLAM or EdgeRoute Network Access Server using a web browser.

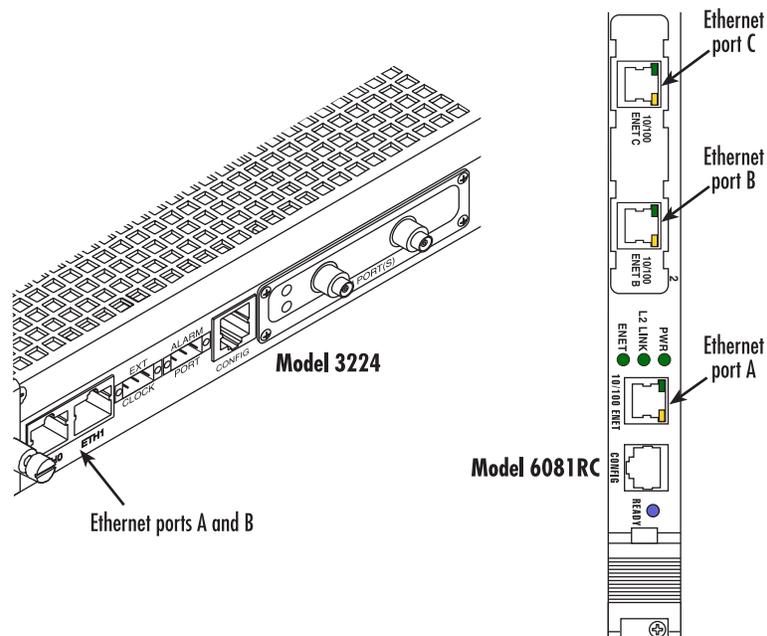


Figure 13. Port connectors

Note Your workstation must reside within the same IP subnetwork as Ethernet Interface A in order to connect to the IpDSLAM or EdgeRoute Network Access Server management interface via the factory-default IP address, which is 198.168.200.98. In other words, the first three octets of your workstation's IP address *must be* 198.168.200.

Note Once the IpDSLAM or EdgeRoute Network Access Server have been configured for operation, you may wish to connect Ethernet Port A to the LAN. Doing so offers the following advantages:

- **Remote management**—you can log in to the IpDSLAM and EdgeRoute Network Access Server management interface remotely using any workstation connected to the LAN and standard http browser.
- **Multiple operators**—two or more operators can manage the IpDSLAM and EdgeRoute Network Access Server, at the same time or at different times, using multiple workstations on the LAN.

Before moving Ethernet Port A to the LAN, you must first assign an IP address to Ethernet Port A that has the same network number as the LAN. For further instructions, see section “[Modifying the IP address for Ethernet interface A \(optional\)](#)” on page 24.

- **Ethernet Interface B (front Panel, Model 3224, front panel PMC module 6081RC)**
 - You will connect the IpDSLAM or EdgeRoute Network Access Server Ethernet Port B to an Ethernet LAN.

Note This procedure assumes that the Model 6081RC is equipped with a PMC card which presents Ethernet port B on the front panel of the unit. Units not equipped with a PMC card have both Ethernet ports B and C internally connected to the ForeFront Chassis midplane.

It’s possible to use the model 6081RC Ethernet port A simultaneously for bridging and management (see section “[Alternate Interface Configuration for Model 6081RC](#)” on page 31 for details.)

- All traffic on Ethernet Port B will be delivered via Ethernet bridging at layer 2 of the OSI model.
- No IP address will be needed by or assigned to Ethernet Port B.

Defaults

The bridged Ethernet configuration described in section “Basic assumptions” operates using the 3224 default values. For the Model 6081RC, the operator must configure H.110 port parameters and create PPP transport and bridge groups.

- **Ethernet Interface A**—By factory default the IP address assigned to Ethernet interface A for both model 3224 and 6081RC is *192.168.200.98/24* (the designation */24* indicates the IP address has a netmask of 255.255.255.0)
- **Ethernet Interface B**—By factory default Ethernet interface B for both 3224 and 6081RC is not assigned an IP address. In bridged data application, because this Ethernet interface is intended to handle bridged traffic only, no IP address is needed
- **Ethernet Interface C (6081RC only)**—By factory default Ethernet interface C in the 6081RC is not assigned an IP address. This Ethernet interface is not used in this particular application

Transport Defaults 3224:

- **3224 G.SHDSL ports 1-24**—All 24 G.SHDSL ports are factory configured with the following defaults:
 - PPP Mode = *BCP* (bridging control protocol)
 - G.SHDSL Annex = *B*—Annex B is typically used in most countries, while Annex A is used in North America
 - G.SHDSL speed = *2.034*—This setting corresponds to a speed of 2.304 Mbps
 - Enable = *checked*—This value enables the Ethernet bridging function on the port

Transport Defaults 6081RC:

- **6081RC H.110 ports 1-32** - Factory default un-configured – operator must define H.110 ports and PPP channels.
 - PPP Mode (BCP, IPCP) = *un-configured*—Operator must define PPP/H.110 channels.
 - Bridge group = *un-configured*—Operator must first define bridge group, and then attach all ports (Ethernet, H.110) for bridging.
 - H.110 ports = *un-configured*
 - H.110 port speed = *un-configured*
 - Defined

CPE configuration

The Patton Model 3201 Router Modems used in the Bridged Ethernet network described above must be factory-configured in CP mode (as opposed to CO mode). If any Model 3201 used in this network is factory-configured in CO mode, you must re-configure the device for CP mode. For more information on configuring the Model 3201, refer to the Model 3201 Getting Started Guide or Administrator's Reference Guide that shipped with the device.

Initiating bridged Ethernet data communications

Once you have made the connections shown in figure 1 on page 3, you need only power up the IpDSLAM and the connected Model 3201 CPE devices for the bridged Ethernet network to begin operation and start carrying data traffic. The rest of this section describes the procedures for modifying the IpDSLAM's factory default configuration for bridged data application.

Modifying the factory default configuration

Modifying the IpDSLAM's factory-default configuration comprises the following major tasks:

- Modifying the IP Address for Ethernet Interface A (if desired) (see section “[Modifying the IP address for Ethernet interface A \(optional\)](#)” on page 24)
- Configuring the G.SHDSL port(s) (Model 3224) (see section “[Configuring Model 3224 G.SHDSL parameters](#)” on page 11)
- Configuring H.110 parameters (Model 6081RC) (see section “[Configuring Model 6081RC H.110 parameters](#)” on page 12)
- Creating a bridge group (see section “[Creating a bridge group](#)” on page 25)

- Configuring the PPP/BCP channel (see section “PPP channel configuration” on page 27)
- Testing bridged data operation (see section “Verifying operation” on page 32)

Logging in using the factory-default IP address

Your workstation must reside within the same IP subnetwork as Ethernet Interface A in order to connect to the IpDSLAMs management interface via the factory-default IP address, which is 198.168.200.98. That is, the first three octets of your workstation’s IP address *must be 198.168.200*. Using a workstation connected to the IpDSLAM’s Ethernet Interface A, do the following:

1. Power up the workstation and open a standard HTTP browser (such as Microsoft Internet Explorer or Netscape Navigator).
2. In your browser’s address field, enter 192.168.200.98 (the default IP address for the IpDSLAM’s Ethernet Interface A), then press the <enter> key. The login popup window (see figure 14) will appear on your screen.



Figure 14. Login window

3. In the login popup window, enter *superuser* for user name and *superuser* for password, then click the OK button. The IpDSLAM’s Web management home page (see figure 15) displays.

Figure 15. 3224 Web Management home page

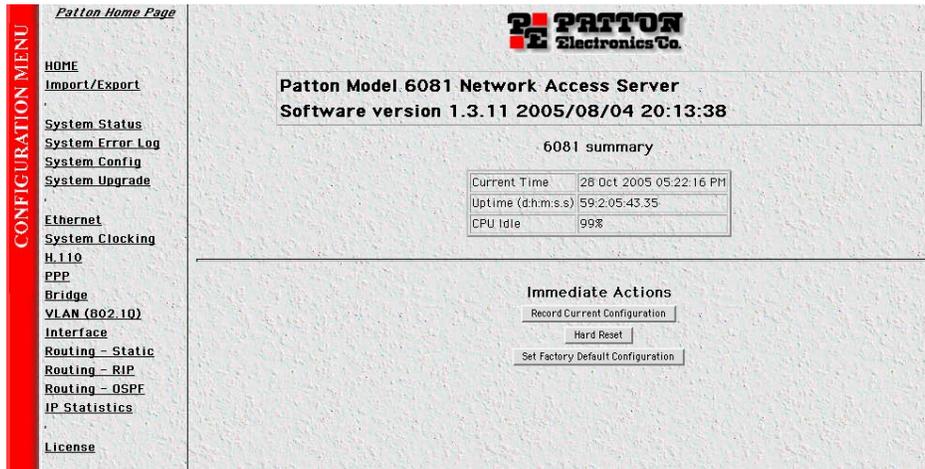


Figure 16. 6081RC Web Management home page

Modifying the IP address for Ethernet interface A (optional)

You may wish to connect Ethernet Port A to the LAN in order to enable remote management and multiple operator capabilities described below:

- **Remote management**—You can log in to Ethernet port A remotely using any workstation connected to the LAN and standard HTTP browser.
- **Multiple operators**—Two or more operators can manage the Model 3224 or Model 6081RC, at the same time or at different times, using multiple workstations on the LAN.

Before connecting Ethernet Port A to the LAN, you must first assign an IP address to Ethernet Port A that has the same network number as the LAN. To modify the IP address, do the following:

1. On the menu pane at the left side of the web management home page (see [figure 15](#)), click the *Interface* hyperlink. The Interface Configuration window will appear (see [figure 17](#)).



Figure 17. Interface configuration window

2. Use the drop down menu to select *Ethernet A*. Enter the new IP address for Ethernet A in the IP Address field for Interface A. The new IP address must have the same network number as the Ethernet LAN to which you intend to connect Interface A.
3. In the NetMask field for Interface A, enter the netmask for the new IP address you have chosen.

Interface Configuration					
Interface	Enable	IP Address	Netmask	Bridge Group	Bridged
BCP 1	<input type="checkbox"/>			- Select One -	<input type="checkbox"/>
BCP 3	<input checked="" type="checkbox"/>			Bridge 1 - Site1	<input checked="" type="checkbox"/>
					<input type="checkbox"/>
Bridge 1	<input checked="" type="checkbox"/>				
Ethernet A	<input checked="" type="checkbox"/>	192.168.200.98	255.255.255.0	- Select One -	<input type="checkbox"/>
Ethernet B	<input checked="" type="checkbox"/>			Bridge 1 - Site1	<input checked="" type="checkbox"/>
Loopback	<input checked="" type="checkbox"/>	127.0.0.1	255.0.0.0		

Figure 18. Interface configuration window

- In the Interface Configuration table, place a checkmark in the box next to *Ethernet A* (see [figure 18](#)).
- Click the **Submit** button (see [figure 18](#)).
- To save the new values, click the configure button corresponding to Interface A (to the right of the Net-Mask field).

Note After re-defining the IP address for Ethernet Interface A for connection to an Ethernet LAN, your workstation will lose connection to the Ethernet port A. Disconnect your workstation and connect Interface A to the Ethernet LAN, you can then log in to the management interface from a workstation connected to the LAN using a web browser and the new IP address just assigned to Interface A.

Creating a bridge group

In order for the 3224 or the 6081RC to bridge data from and to several ports is necessary to create a bridge group.

Do the following to configure bridge groups:

- Click the *Bridge* link in the Configuration Menu pane (see [figure 3](#) on page 6) to display the Bridge Configuration page (see [figure 11](#)).

Bridge Configuration		
Add Bridge		
Description	<input type="text" value="Site1"/>	<input type="button" value="Add Bridge"/>
Bridges		
ID	Description	Delete
<input type="button" value="Delete Bridge(s)"/>		

Figure 19. Bridge Configuration page

- Type the name of the bridge group (*Site 1* in the example shown in [figure 19](#)) to create a new bridge that will link DSL or H.110 ports and Ethernet port B.

Bridge Configuration

Add Bridge

Description

Bridges

ID	Description	Delete
Bridge 1	Site1	<input type="checkbox"/>

Figure 20. Bridge Configuration window showing new bridge

- Click the **Add Bridge** button (see [figure 19](#)), to display the new bridge as shown in [figure 20](#).

Note If you want to delete a bridge configuration from the listing, click the Delete check box for the bridge you want removed, then click the **Delete Bridge(s)** button.

Bridge Configuration Options: Bridge 1 - Site1

Bridge Options

Description

Ageing Time

Garbage Collection Interval

Spanning Tree Options

Enable Spanning Tree

Priority

Forward Delay

Hello Time

Max Message Age

Figure 21. Bridge Configuration Options

- Now that the bridge group has been created, click on *Bridge 1* group ID hyperlink, this action will take you to the Bridge 1 Configuration page (see [figure 21](#)). This page provides several buttons for navigating through stored bridge configuration:
 - The **Refresh Page** button forces the 3224 or 6081RC to display changes made since the previous refresh cycle
 - The **First Bridge** button displays the configuration for the first bridge in the Bridge Configuration page listing of bridges (see [figure 19](#) on page 25).
 - The **Previous Bridge** button displays the configuration for the bridge previous to the one currently displayed
 - The **Next Bridge** button displays the configuration for the bridge following the one currently displayed
 - The **Last Bridge** button displays the configuration for the last bridge in the Bridge Configuration page listing of bridges (see [figure 19](#) on page 25)
 - The **Reset** button cancels changes made to a bridge configuration.

- The **Submit** button saves changes made to a bridge configuration.
5. Type a short description for Bridge 1 in the Description text box.
 6. Aging time is the number of seconds a MAC-address will be held in the forwarding database after receiving a packet from this MAC address. The entries in the forwarding database are periodically timed out to ensure they won't stay around forever. If desired, type a value (in seconds) for the forwarding table aging time in the Aging Time box. The default value for this setting is 300 seconds (5 minutes).
 7. The 3224 and 6081RC periodically check the forwarding database for timed-out entries which are then deleted. The Garbage Collection Interval is the time (in seconds) that between each checks of the forwarding database.
 8. Spanning tree is a link management protocol that provides path redundancy while preventing undesirable loops in the network. For a Layer 2 Ethernet or Token Ring network to function properly, only one active path must exist between two stations. Spanning-tree operation is transparent to end stations, which cannot detect whether they are connected to a single LAN segment or a switched LAN of multiple segments.

If you will not be enabling Spanning Tree options, go to step 9. Otherwise, click the Enable Spanning Tree box to activate Spanning Tree Options. The following options are available for configuration:

- **Priority:** The switch with the highest bridge priority (the lowest numerical priority value) is elected as the spanning-tree root switch, which is the logical center of the spanning-tree topology in a switched network. If all switches are configured with the default priority (32768), the switch with the lowest MAC address in the Layer 2 network becomes the root switch. Under some circumstances, traffic patterns may require that a different switch be assigned as the root switch than that which was chosen by default. Increasing the priority by typing a number in the Priority box that is less than the default 32768 value forces the switch to become the root switch.
 - **Forward Delay:** This value is the time a port will remain in the listening and learning states before entering the forwarding state.
 - **Hello Time:** The amount of time a port will remain in the listening and learning states before entering the forwarding state.
 - **Max Message Age:** The length of time the switch will store protocol information received on a port.
9. Once all options have been entered, click the **Submit** button to save changes.

PPP channel configuration

The Models 3224 and 6081RC generate PPP channels to transport bridged (BCP) or routed (IPCP) data to and from subscriber's premises.

In the case of the Model 3224, PPP channels are created automatically and each channel is assigned to a G.SHDSL port. For example PPP channel 1 is assigned to G.SHDSL port 1, PPP channel 2 is assigned to G.SHDSL port 2, etc.

In the case of the 6081RC, a PPP channel is generated automatically only when the operator creates a H.110 channel. When an H.110 channel is created, it automatically receives a sequential ID number starting at 1. Consequently, the corresponding PPP channel is also assigned the same ID number. For example, PPP Channel 3 is attached to H.110 channel 3.

Additionally, if a PPP channel is to transport bridged data a BCP interface is created (see section “[Interface configuration](#)” on page 30), the BCP interface also takes the PPP channel number, for example BCP3 interface corresponds to PPP channel 3, which in turn is attached to H.110 channel 3 (6081RC) or to the G.SHDSL port 3. The same is true for routed connections (IPCP).

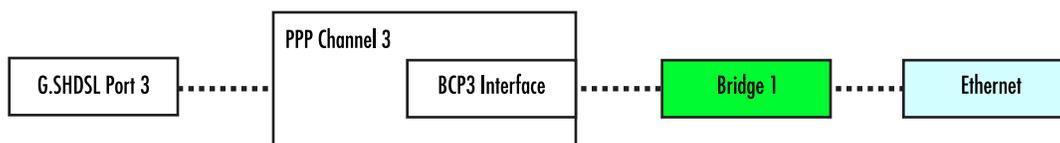


Figure 22. Model 3224 bridged PPP channel and interfaces

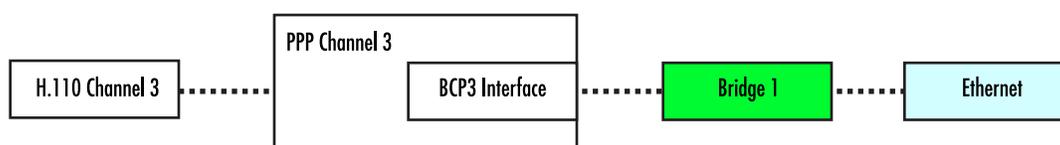


Figure 23. Model 6081RC bridged PPP channel and interfaces

The PPP channel configuration page allows assignment of bridged or routed sessions to DSL or H.110 ports, as well as definition of PPP link parameters such as MRU, retry times, authentication, etc.

1. The PPP page displays PPP channel status information, in addition it offer links for global, multilink, and radius configuration pages.

There are two ways to access a PPP channel configuration page: by clicking on the channel number in the status window, and the other way is by clicking on the Configuration option at the top of the main PPP page. In this application, we will access the PPP channel configuration page by clicking on the channel number in the status window.

Click on the *PPP* link in the Configuration Menu pane (see [figure 15](#) on page 23) to display the PPP Configuration page (see [figure 24](#)).

Channel	Transport	Phase	Protocol	Enabled	MLPPP
1	G.SHDSL 1	n/a	n/a	no	n/a
2	G.SHDSL 2	n/a	n/a	no	n/a
3	G.SHDSL 3	Running	BCP	yes	n/a
4	G.SHDSL 4	n/a	n/a	no	n/a
5	G.SHDSL 5	n/a	n/a	no	n/a
6	G.SHDSL 6	n/a	n/a	no	n/a
7	G.SHDSL 7	n/a	n/a	no	n/a

Figure 24. PPP Configuration page

2. Click on one of the hyperlinks in the Channel column to display the PPP Options page for the selected channel. The PPP Channel Options page allows the operator to configure BCP or IPCP options for the channel. This page also provides several buttons for navigating through all PPP channels.
 - The **Refresh Page** button forces the 3224 or 6081RC to display changes made since the previous refresh cycle

- The **First Port** button displays the configuration for the first port in the H.110 Channel Configuration page listing of channels (see [figure 24](#)).
- The **Previous Port** button displays the configuration for the port previous to the one currently displayed
- The **Next Port** button displays the configuration for the port following the one currently displayed
- The **Last Port** button displays the configuration for the last port in the H.110 Channel Configuration page listing of channels (see [figure 24](#))
- The **Reset** button cancels changes made to a port configuration.
- The **Submit** button saves changes made to a port configuration.

Figure 25. PPP Options page

3. Under the heading **PPP Options**, select one of the following network-control protocols (NCP) from the Mode menu:
 - **BCP** (bridge control protocol)
 - **IPCP** (Internet protocol control protocol)

Note Since this section is about configuring for bridged PPP, you would select the **BCP** option.

4. Click on the **Enable** button below the Mode menu to enable the NCP.
5. Click on the *Passive* checkbox if you want the particular PPP channel to wait for the remote PPP device linked to this channel to initiate PPP channel negotiation. If box is unchecked, this PPP channel will initiate negotiation to establish a PPP session with remote device. Normally this box should be checked.
6. Under **BCP Options**, select the bridge group that the PPP channel will be attached to (for this example select *Bridge 1*) and check the **Bridged** box located just above the drop-down menu.

7. Configure LCP options as needed or accept the default settings. Do not configure IP and IPCP options.
8. Click on the **Submit** button to save changes.
9. Repeat the PPP channel configuration steps 1 through 7 for other channels as needed.

Once all parameters have been configured, the PPP Status page should display the information shown in [figure 26](#).

Channel	Transport	Phase	Protocol	Enabled	MLPPP
1	G.SHDSL 1	n/a	n/a	no	n/a
2	G.SHDSL 2	n/a	n/a	no	n/a
3	G.SHDSL 3	Running	BCP	yes	n/a
4	G.SHDSL 4	n/a	n/a	no	n/a
5	G.SHDSL 5	n/a	n/a	no	n/a
6	G.SHDSL 6	n/a	n/a	no	n/a
7	G.SHDSL 7	n/a	n/a	no	n/a

Figure 26. PPP Status page

At this point the 3224 or 6081RC will start negotiating PPP/BCP connections with a remote peer. The Status window will turn yellow, indicating that negotiation is in progress.

10. Attach a defined bridge to an Ethernet port, so that traffic bridged from the remote CPEs is forwarded to the LAN attached to the 3224 or 6081RC.

Note Bridge 1 can be attached to any physical interface including back-plane Ethernet ports or other H.110 ports.

Interface configuration

The Interface Configuration page (see [figure 27](#)) displays all interfaces (physical and logical) previously defined. In this example, PPP interface BCP 3 (channel 3) and corresponding bridge *Bridge 1 - site1*, Ethernet A, Ethernet B, and a Loopback interface (default) are shown.

Interface	Enable	IP Address	Netmask	Bridge Group	Bridged
BCP 1	<input type="checkbox"/>			- Select One -	<input type="checkbox"/>
BCP 3	<input checked="" type="checkbox"/>			Bridge 1 - Site1	<input checked="" type="checkbox"/>
Bridge 1	<input checked="" type="checkbox"/>				<input type="checkbox"/>
Ethernet A	<input checked="" type="checkbox"/>	192.168.200.98	255.255.255.0	- Select One -	<input type="checkbox"/>
Ethernet B	<input checked="" type="checkbox"/>			Bridge 1 - Site1	<input checked="" type="checkbox"/>
Loopback	<input checked="" type="checkbox"/>	127.0.0.1	255.0.0.0		<input type="checkbox"/>

Submit

Figure 27. Interface Configuration Page

To activate a bridged link from customer sites (BCP) between the remote CPEs and the 3224 or 6081RC bridge, do the following:

1. Click the check boxes in the Enable column to add a check to the BCP 3 and Bridge entries in the Interface column (see [figure 27](#)).
2. In the BCP 3 row (see [figure 27](#)), use the drop down menu under the Bridge Group column to select the *Bridge 1 – Site 1* option. Under the Bridged column, place a checkmark on the box corresponding to BCP3.
3. Click on the **Submit** button to save changes.

At this time, a PPP/BCP connection between the 3224 or 6081RC and the remote CPEs may have been established (check this by clicking on the PPP main menu option), each PPP connection will be displayed in color code, the color green meaning that a connection has been established. However, there is not yet a connection between the PPP/BCP modules and the Ethernet port (that is, the bridge module does not have a path to the Ethernet port and therefore no bridged data can be sent to the LAN). To activate a connection between the bridge module and the front panel Ethernet interface (Ethernet B), do the following:

1. In the Ethernet B row (see [figure 27](#) on page 30), click to add a checkmark on the box under the Enabled column.
2. In the Ethernet B row, locate the drop down menu under Bridge Group (see [figure 27](#) on page 30), select *Bridge 1-Site1*
3. Place a checkmark under the bridged column to enable bridged data to Ethernet B.
4. Click on the **Submit** button at the bottom of the screen.

Alternate Interface Configuration for Model 6081RC

If your Model 6081RC is not equipped with a PMC card presenting Ethernet port B on the front panel of the unit, Ethernet port A can be simultaneously used for bridging and management.

To activate a connection between the bridge module and the front panel Ethernet interface (Ethernet A), do the following:

1. In the IP Address Configuration section of the Interface Configuration page (see [figure 28](#)), select *Bridge 1* from the Interface menu.

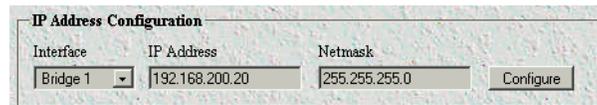


Figure 28. IP Address Configuration section of the Interface Configuration page

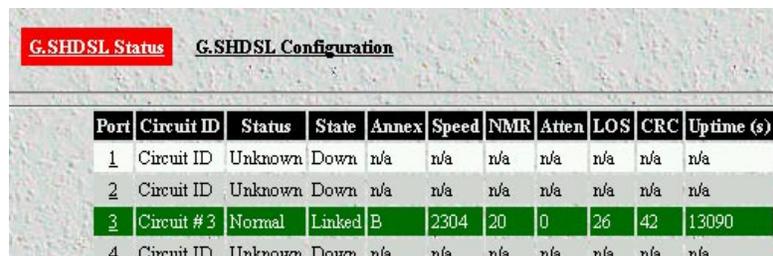
2. Type an IP address of **192.168.200.20** and a Netmask of **255.255.255.0** (this will be the new management address for the 6081RC). Click on the **Configure** button.
3. In the Ethernet A row, under the Bridge Group column, select *Bridge 1 – Location1&2* from the menu, then click to add a checkmark to the box under the Bridged column. This action attaches Ethernet Port A to the bridge group.
4. In the BCP 3 row, use the drop down menu under the Bridge Group column to select *Bridge 1 – Site 1* option. Under the Bridged column, place a checkmark in the box corresponding to BCP3.
5. Click the **Submit** button to activate changes on this page.

Note At this time, the 6081RC management web server can only be accessed via Bridge 1 IP addresses 192.168.200.20. It may take a several minutes for the card to respond to management commands after this change.

Verifying operation

Before any testing can be performed verify operation of the DSL, PPP, and bridging modules. To verify the operation of the 3201 and 3224/6081RC in this application go to the 3224 configuration pages:

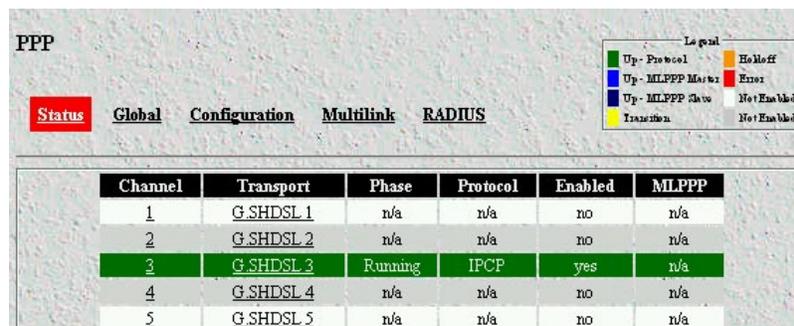
- To view the G.SHDSL ports on the Model 3224, click on the *G.SHDSL* link on the Configuration menu pane. Verify that the DSL port 3 is up and linked to the remote unit.



Port	Circuit ID	Status	State	Annex	Speed	NMR	Atten	LOS	CRC	Uptime (s)
1	Circuit ID	Unknown	Down	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Circuit ID	Unknown	Down	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3	Circuit #3	Normal	Linked	B	2304	20	0	26	42	13090
4	Circuit ID	Unknown	Down	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Figure 29. G.SHDSL Status page

- Click on the *PPP link* and verify that the PPP channel 3 is up and running



Channel	Transport	Phase	Protocol	Enabled	MLPPP
1	G.SHDSL 1	n/a	n/a	no	n/a
2	G.SHDSL 2	n/a	n/a	no	n/a
3	G.SHDSL 3	Running	IPCP	yes	n/a
4	G.SHDSL 4	n/a	n/a	no	n/a
5	G.SHDSL 5	n/a	n/a	no	n/a

Figure 30. PPP status page

Verifying bridged connection

To verify the bridged connection between the 3224/6081RC and the remote device (3201) use a PC or terminal at the customer site to ping a PC or terminal attached to the LAN port (Ethernet B) of the Model 3224 or 6081RC.

For example, if a PC or terminal at the remote site uses IP address 192.168.200.20, enter the following command at the PC attached to the model 3201: **ping 192.168.200.20**, the remote computer should respond with a ping reply.

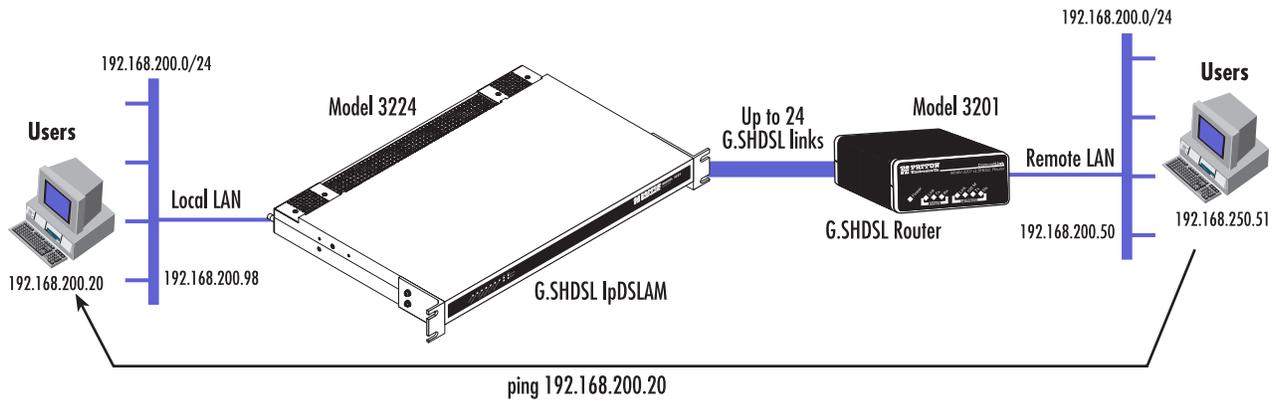


Figure 31. Testing the bridged connection

You can also use visual PPP connection on status pages at the 3224/6081.

Chapter 4 **VLAN bridged connection**

Chapter contents

Introduction.....	36
Attaching a VLAN ID to an Ethernet interface.....	36
Attaching a bridge interface to a VLAN module.....	37

Introduction

The Models 3224 and 6081RC support vLAN (802.1Q) connections between remote users and a central location. To create a VLAN connection for bridged PPP connections, each PPP connection is attached to a bridge connected to a separate virtual Ethernet interface. Finally, each virtual interface is attached to a physical Ethernet port as shown in [figure 32](#).

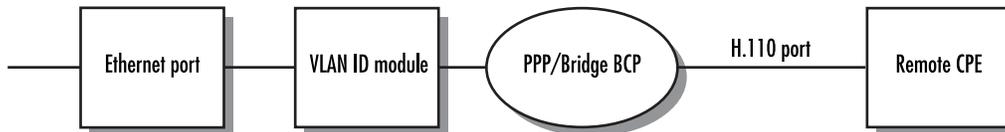


Figure 32. VLAN connection diagram

Packets arriving from the remote CPE will be tagged with VLAN information and sent to the Ethernet port. VLAN packets received from the LAN by the Ethernet port of the 3224 or 6081RC and corresponding to the remote CPE, will be stripped of VLAN information and passed to the bridge module for transmission to the remote CPE.

To create VLAN connections, do the following:

1. On the model 3224, Configure G.SHDSL Channels (see section “[Configuring Model 3224 G.SHDSL parameters](#)” on page 11 for details). On the Model 6081RC, configure H.110 channels (see section “[Configuring Model 6081RC H.110 parameters](#)” on page 12” for details)
2. Create a bridge group (see section “[Creating a bridge group](#)” on page 25).
3. Configure PPP channel parameters (see section “[PPP channel configuration](#)” on page 27).
4. Attach a VLAN ID to an Ethernet interface (see section “[Attaching a VLAN ID to an Ethernet interface](#)” on page 36).
5. Attach the bridge/PPP to the VLAN module (see section “[Attaching a bridge interface to a VLAN module](#)” on page 37).

Attaching a VLAN ID to an Ethernet interface

Once a bridge group and PPP channel has been configured, do the following:

1. Click the *VLAN(8021Q)* link in the Configuration Menu pane (see [figure 3](#) on page 6) to display the VLAN (802.1Q) Configuration page (see [figure 33](#)).

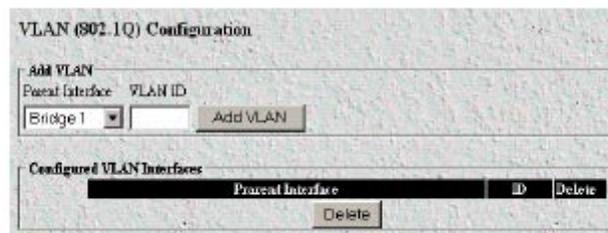


Figure 33. VLAN (802.1Q) Configuration page

2. In the Add VLAN section (see [figure 33](#) on page 36), select the interface that will process VLAN packets from the Parent Interface menu.
3. In the VLAN ID text box, type the desired number for this VLAN (up to 4096 with no reserved VLAN numbers).
4. Click the **Add VLAN** button. Configured VLANs are displayed as shown in [figure 34](#).



Figure 34. Configured VLAN Interfaces section of VLAN (802.1Q) Configuration page

Attaching a bridge interface to a VLAN module

Once the desired VLAN has been created, it is necessary to attach it to a bridge group as follows:

1. Click the *Interface* link in the Configuration Menu pane (see [figure 3](#) on page 6) to display the Interface page (see [figure 35](#)).

Interface	Enable	IP Address	Network	Bridge Group	Bridged
BCP 1	<input checked="" type="checkbox"/>			Bridge 3 -vlan bridge	<input checked="" type="checkbox"/>
BCP 2	<input checked="" type="checkbox"/>			Bridge 3 -vlan bridge	<input checked="" type="checkbox"/>
Bridge 1	<input type="checkbox"/>			-- Select One --	<input type="checkbox"/>
Ethernet B	<input checked="" type="checkbox"/>			-- Select One --	<input type="checkbox"/>
Ethernet B VLAN 1000	<input checked="" type="checkbox"/>			Bridge 3 -vlan bridge	<input checked="" type="checkbox"/>

Figure 35. Interface page

2. Locate the Ethernet port that has the VLAN ID created in section [“Attaching a VLAN ID to an Ethernet interface”](#) on page 36 and click to place a checkmark on the box in the Enabled column. Select the desired bridge group from the menu in Bridge Group column (this bridge group should correspond to the remote CPE for which a VLAN is required), then click to place a checkmark on the box in the Bridged column.
3. Click the **Submit** button at the bottom of the screen.

Chapter 5 **Routed application using RIP**

Chapter contents

Introduction	40
Network diagram.....	40
3224/6081RC configuration	40
Ethernet port A IP address configuration	41
Configuring G.SHDSL parameters (3224 only)	41
Configuring H.110 ports (6081RC only)	41
PPP global and channel configuration	41
Global configuration	41
PPP channel configuration	43
PPP options	43
LCP options	43
Multilink options	44
IP options	44
IPCP options	44
RIP configuration	45
General options configuration	45
General	45
RIP timers	46

Introduction

The 3224 and 6081RC include powerful routing engines which enable network engineers to implement flexible bridged or routed applications. Routed links can be configured using Static, RIP (Routing Information Protocol), or OSPF (Open Shortest Path First) protocols. This applications document addresses configuration steps needed for routed links using RIP.

Network diagram

The RIP Application can be implemented using either a Model 3224 or 6081RC, at a central location (Central Office or ISP location), while remote locations use Patton's Model 3201.

Up to 24 remote sites can be connected via DSL lines when using the Model 3224, and up to 128 customer connections are possible using one 6081RC in combination with 3096RC cards. For the purpose of this application it is assumed that the 3224 or 6081RC reside in a different network than the 3201s at remote locations.

Customer data at remote locations is routed by the corresponding 3201 and sent via the DSL link to the central location. The central site model 3224/6081RC routes received data from incoming DSL (3224) or H.110 ports (6081RC) and route to Ethernet port A (IP address 192.168.200.98). Remote users reaching the central LAN via DSL links can now access e-mail servers, web hosting servers, or an Internet gateway.

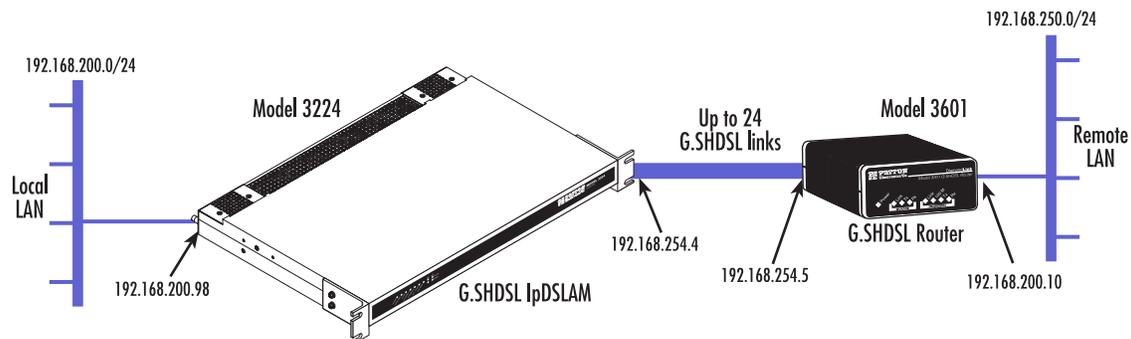


Figure 36. Routed connection diagram

3224/6081RC configuration

Configuring the 3224 or 6081RC for this application includes the following steps:

1. Ethernet port A IP address configuration (see section “[Ethernet port A IP address configuration](#)” on page 41)
2. Configuring G.SHDSL Parameters (3224 only) see section “[Configuring G.SHDSL parameters \(3224 only\)](#)” on page 41)
3. Configuring H.110 ports (6081RC only) see section “[Configuring H.110 ports \(6081RC only\)](#)” on page 41)
4. Configure PPP global and channel configuration (see section “[PPP global and channel configuration](#)” on page 41)
5. Configure RIP (see section “[RIP configuration](#)” on page 45)
6. Testing the link (see chapter 7, “[Verifying operation](#)” on page 53)

Ethernet port A IP address configuration

Follow the *Model 3224 Installation Guide* or *Model 6081RC Installation Guide* to change IP address (if needed) via CLI or use the web browser as follows:

1. Click on the *Interface* link in the Configuration Menu pane (see [figure 15](#) or [figure 16](#) on page 24) to display the Interface Configuration page (see [figure 20](#)).
2. At the interface configuration page, use the drop down menu and select Ethernet A. Enter the new IP address and corresponding netmask, and click on the Configure button.

IP Address Configuration		
Interface	IP Address	Netmask
Ethernet A	192.168.200.98	255.255.255.0

Figure 37. Ethernet A configuration window

Configuring G.SHDSL parameters (3224 only)

See section “Configuring Model 3224 G.SHDSL parameters” on page 11.

Configuring H.110 ports (6081RC only)

See section “Configuring Model 6081RC H.110 parameters” on page 12.

PPP global and channel configuration

The Model 3224 and 6081RC PPP Configuration page is accessed from the main menu. Click on the *PPP* link in the Configuration Menu pane to reach the PPP page (see [figure 38](#)).

Channel	Transport	Phase	Protocol	Enabled	MLPPP
1	G.SHDSL 1	n/a	n/a	no	n/a
2	G.SHDSL 2	n/a	n/a	no	n/a
3	G.SHDSL 3	n/a	n/a	no	n/a
4	G.SHDSL 4	n/a	n/a	no	n/a
5	G.SHDSL 5	n/a	n/a	no	n/a
6	G.SHDSL 6	n/a	n/a	no	n/a

Figure 38. PPP status and configuration page

The PPP status window provides at-a-glance view of PPP channel/transport status, as well as links to *Global*, *Configuration*, *Multilink*, *Channel*, and *G.SHDSL (3224)* or *H.110 (6081RC)* configuration pages.

Global configuration

Before configuring a PPP channel, it is necessary to create a pool of IP addresses. Addresses from this pool will be later assigned automatically or manually by the user, to the local and remote PPP links (these are WAN IP addresses for the PPP interfaces at each end of the link).

To enter an IP address pool do the following:

1. Click on the *Global* link at the top of the page.
2. Enter the IP address pool information in IP Options, IP Address Pool window,
3. Use IP Address 192.168.254 in this example. The 3224/6081RC will grab two consecutive addresses beginning at 192.168.254.0 from this pool for each PPP channel connection, one for the local PPP interface and one for the remote PPP interface.
4. Leave all other settings for PPP, BCP, LCP and IPCP in this page in their default states.
5. Click on the **Submit** button.

The screenshot shows the 'Global' configuration page for PPP. The page has a navigation bar with 'Status', 'Global', 'Configuration', 'Multilink', and 'RADIUS'. The 'Global' tab is selected. The configuration is divided into several sections:

- PPP Options:** Holdoff Interval: 30, Passive:
- BCP Options:** BCP MAC Prefix: 02:A0:BA:32:24:XX
- IP Options:** IP Address Pool: 192.168.254:XXX, Peer Proxy ARP:
- LCP Options:** LCP Echo Failure: 10, LCP Echo Interval: 5, LCP Max Configure: 10, LCP Max Failure: 10, LCP Max Terminate: 3, LCP Restart: 3
- IPCP Options:** IPCP Accept Local IP Address: , IPCP Accept Remote IP Address: , IPCP Max Configure: 10, IPCP Max Failure: 10, IPCP Max Terminate: 3, IPCP Restart: 3

Figure 39. PPP Global Configuration Page

The PPP configuration page matches PPP channels to G.SHDSL transports (ports) or H.110 ports; the Model 3224 assigns only one PPP channel per DSL connection (transport). For instance *PPP Channel 1* will correspond to G.SHDSL port 1.

PPP channel configuration

PPP channel numbers correspond to DSL Ports (transports). To configure a PPP channel, simply click on the channel number. Selection of a channel link will take you to the PPP channel options page. The following picture shows setting for *PPP Channel 3*.

Figure 40. PPP Channel Configuration Plan

The PPP Channel Options page contains five fields corresponding to PPP options, LCP (Link Control Protocol) options, Multilink options, IP Options, and IPCP (Internet Protocol Control Protocol) options.

PPP options

The PPP options section offers choices for BCP and IPCP. For routed connections select the IPCP option by clicking on the box corresponding to the IPCP option.

Next check the box corresponding to the Enabled option.

This window also offers the option for passive or active PPP. Leave the Passive box unchecked (active PPP mode) to allow the 3224 to immediately start sending PPP configuration frames to the device connected to this channel. Check the Passive box only if you would like the 3224/6081RC to wait for the remote device to start sending PPP negotiation frames.

LCP options

LCP packets establish, maintain, and tear down a PPP session.

1. LCP Echo Failure—Use default. Number of outstanding consecutive echo requests sent by this device and not answered by the remote device before assuming the remote peer is dead and connection is terminated. Default is 10.
2. LCP Echo Interval—Use default. Time between echo requests send to the remote device. Default is 5 seconds
3. LCP Max Configure—Use default. The maximum number of Configure-Request packets sent without receiving a valid Configure-Ack, Configure-Nak or Configure-Reject before assuming that the peer is unable to respond. Max-Configure should use the default of ten 10 transmissions.

4. LCP Max Terminate—Use default. Indicates the number of Terminate-Request packets sent without receiving a Terminate-Ack before assuming that the peer is unable to respond. Max-Terminate should use the default of two transmissions.
5. LCP Max Failure—Use default. Number of LCP configure-nak responses to send before responding with LCP configure-reject. This is to avoid endless negotiations that are obviously not leading to an agreement. The 3224/6081RC defaults to 10.
6. LCP Restart—Use default. The Restart timer is used to time transmissions of Configure-Request and Terminate-Request packets. Expiration of the Restart timer causes a Timeout event, and retransmission of the corresponding Configure-Request or Terminate-Request packet. LCP Restart should use the default to three seconds.

Multilink options

Not used for this application.

IP options

IP options allow assignment of an IP address for the local PPP interface. PPP/IPCP negotiation requires IP addresses for the local and far end link; these addresses can be entered manually or left open for negotiation by the IPCP layer. The IP addresses have local significance only (between the local and remote ends of the PPP link).

1. Local IP Address—Use default IP address assigned by the 3224 from the IP global pool
2. Remote IP Address—Use default IP address assigned by the 3224/6081RC from the IP global pool
3. Peer Proxy ARP—Check this option to allow the 3224/6081RC to respond to address resolution protocol requests on behalf of all IP addresses belonging to PPP users.

IPCP options

In some instances the local and remote devices may allow to negotiate IP addresses for the PPP/IPCP session. In most cases with the 3224/6081RC both the local and remote IP addresses will be preconfigured.

1. IPCP Accept Local IP Address—Use default. Check this box only if the 3224/6081RC will be allowed to accept a local IP address assigned by the remote device.
2. IPCP Accept Remote IP Address—Use default. Check this box only if the 3224/6081RC will accept address taken (or assigned manually at the remote end) by the remote device.
3. IP Max Configure—Use default. The maximum number of Configure-Request packets sent without receiving a valid Configure-Ack, Configure-Nak or Configure-Reject before assuming that the peer is unable to respond. Max-Configure should use the default of 10 transmissions.
4. IP Max Terminate—Use default. Number of Terminate-Request packets sent without receiving a Terminate-Ack before assuming that the peer is unable to respond. The 3224/6081RC default is three transmissions.
5. IP Max Failure—Use default. Maximum number of IP configure-nak responses to send before responding with LCP configure-reject. This is to avoid endless negotiations that are obviously not leading to an agreement. The 3224/6081RC defaults to 10.

6. IPCP Restart—Use default. The Restart timer is used to time transmissions of Configure-Request and Terminate-Request packets. Expiration of the Restart timer causes a Timeout event, and retransmission of the corresponding Configure-Request or Terminate-Request packet. IPCP Restart should use the default of three seconds.
7. Click on the **Submit** button at the bottom of the screen once all settings have been entered.

RIP configuration

1. Click on the Routing—RIP menu option in the Configuration Menu pane to display the Routing - RIP configuration page (See [figure 41](#))
2. The RIP page allows configuring options for General (global) and Network options.

General options configuration

The General Configurations option includes the following sections (see [figure 41](#)):

- General
- RIP Timers
- Route Redistribution

The screenshot shows the 'Routing - RIP' configuration page. At the top, there are two tabs: 'General' (selected) and 'Network'. Below the tabs, the page is divided into three main sections:

- General:** Contains checkboxes for 'Enable RIP routing' (checked), 'RIP all Networks' (checked), and 'Announce Default Route' (checked). It also has a radio button for 'RIP Version' set to '2'.
- Rip Timers:** Contains input fields for 'Update' (30), 'Information Timeout' (180), and 'Garbage Collection' (120).
- Route Redistribution:** Contains a 'Default Metric' input field (1) and a table with columns 'Source', 'Enable', and 'Metric'. The table has three rows: 'OSPF', 'Connected', and 'Static', each with an 'Enable' checkbox and a 'Metric' input field.

At the bottom of the page, there are 'Reset' and 'Submit' buttons.

Figure 41. Routing—General Configuration options

General

The General configuration window offers the following configuration options:

1. Enable RIP Routing—Check this box to enable RIP
2. RIP all Networks—Check to RIP all networks attached to the 3224 or 3081RC
3. Rip Version—Select version 2
4. Announce Default Route—Check this box to allow the 3224/6081RC to announce default route.

RIP timers

1. Update—Use default of 30 seconds. Every 30 seconds, the output process is instructed to generate a complete response to every neighboring gateway.
 - Timeout—Use default of 180 seconds. The timeout is initialized when a route is established, and any time an update message is received for the route. If 180 seconds have passed since the last time the timeout was initialized, the route is considered to have expired, and route deletion process is started.
 - Garbage Collection—Use default of 120 seconds. Deleted routes (due to timeout) are retained in the table for a short time, so that neighbors can be notified that the route has been dropped. Upon expiration of the garbage-collection timer, the route is finally removed from the tables.
 - Route Redistribution: Default Metric—Use default 1. Metrics used when redistributing routes.
2. Click on the **Submit** button at the bottom of the screen once all settings have been entered.

Chapter 6 **Configuring the remote site router (Model 3201)**

Chapter contents

Introduction	48
Ethernet port IP address configuration	48
G.SHDSL layer configuration	48
PPP layer configuration	48
RIP configuration	50

Introduction

The following example uses a Model 3201 as the remote site router. Configuring the Model 3201 for RIP application will involve the following steps:

- Ethernet port IP address configuration
- Ethernet Port IP Address Configuration
- G.SHDSL Layer Configuration

Ethernet port IP address configuration

Since this is a routed connection, the 3201 will most likely reside in a different network than the 3224 or 6081RC. Assign IP address 192.168.254.10 for the Ethernet interface of the model 3201 either through the console port or the web interface (refer to the *Model 3201 User Guide* for more information)

G.SHDSL layer configuration

The 3201 ships from the factory set to operate in Remote (slave) mode, while the 3224 and 6081RC operate always in Central mode (master), in this arrangement, the 3201 will accept (during link negotiation phase) G.SHDSL configuration—such as speed—from the Model 3224. The only setting that is not accepted by the 3201 during link negotiation is annex mode. Configure the annex mode manually for annex B to match annex mode on the Model 3224, otherwise the two units will not link up.

PPP layer configuration

1. Click on the Services Configuration in the Configuration Menu pane to reach the WAN Services Connections page. In the WAN connections menu page, click on the *Create a new service* link.

Patton Home Page

3201 CONFIGURATION MENU

- Home
- System Status
- System Configuration
- Services Configuration
 - LAN
 - WAN
 - IP routes
 - DHCP server
 - DHCP relay
 - IP Services
 - Security
 - SNTP client
- Ethernet
- G.SHDSL

WAN connections

WAN services currently defined:

Service Name	IP/Bridge Interface Name	Description	Creator		
ppp-0	ppp-0	subscriber 666	WebAdmin	Edit...	Delete...

Create a new service...

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Figure 42. 3201 WAN Connections Configuration page

2. At this page, select the PPP routed service and click on the **Continue** button.

- At the Options window (see [figure 43](#)), enter a creator name and description for the routed link.

Options	
Name	Value
Creator:	WebAdmin
Description:	ppp1
<input type="button" value="Create"/> <input type="button" value="Reset"/>	

Figure 43. WAN Connection Options page

- Click on *Edit PPP* to edit the PPP link options. Some fields will be filled by values negotiated by this router and the 3224/6081RC, while some other values will be assigned PPP default values. Leave these values in their default state, change only if you are knowledgeable on PPP.

Name	Value
Server:	false
Create Route:	true
Subnet Mask:	255.255.255.255
Lcp Max Configure:	10
Lcp Max Failure:	10
Lcp Max Terminate:	10
Dialin Auth:	none
Dialout Username:	
Dialout Password:	
Confirmation Password:	
Dialout Auth:	none
MRU:	1500
Ip Addr From IPCP:	true
Use Ip Addr From IPCP:	true
Discover Primary DNS:	true
Discover Secondary DNS:	true
Give DNS to Relay:	true

Figure 44. PPP link edit page

5. At this time, both the 3224/6081RC and 3201 should be negotiating a PPP/IPCP link. To view the status of the 3201 PPP link, refresh the Edit PPP page and look at the Connect State field.
6. Click on the *Edit IP interface* link to verify the 3201 has obtained a WAN IP address from the 3224/6081RC. Leave all options in their default state.

Name	Value
Ipaddr:	192.168.254.5
Mask:	255.255.255.255
Dhcp:	false
MTU:	1500
Name:	ppp-0
Enabled:	true
Layer2Session:	

Figure 45. Edit IP interface page

RIP configuration

To configure RIP version, do the following:

1. Click on the *Edit RIP Versions* link.
2. Select *True* for *Version 2 (V2) Accept* and *Send* options.
3. Click on the **Create** button to make the changes effective.

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

Create Reset

Figure 46. RIP Configuration Options window

4. Go to the main menu and click on *Configuration -> IP Routes* to reach the Routing Configuration page.

Valid	Destination	Gateway	Netmask	Delete?
✓	0.0.0.0	192.168.254.4	0.0.0.0	<input type="checkbox"/>

Update Reset

[Advanced Options...](#)

[Create new Ip V4Route...](#)

Figure 47. Route Configuration page

5. At the Route Configuration page, enter Destination, Gateway, and Netmask information as shown above.
6. Click on the **Update** button.

Note The Gateway address in the example above points to the address for DSL port 3. In normal deployments, you will have to add a WAN gateway address for each of the DSL links up to 24. To add routes, click on the *Create new Ip V4Route* link.

This concludes RIP configuration for the Model 3201.

Chapter 7 **Verifying operation**

Chapter contents

Introduction	54
Verifying routed connection	55

Introduction

Before any testing can be performed, verify operation of the DSL(3224 only), PPP, and routing modules. To verify the operation of the 3201 and 3224/6081RC in this application, go to the 3224 configuration pages.

1. For the 3224, click on the *G.SHDSL* link in the Configuration Menu pane and verify that DSL port 3 is up and linked to the remote unit (shown in green in [figure 48](#)).

Port	Circuit ID	Status	State	Annex	Speed	NMR	Atten	LOS	CRC	Uptime (s)
1	Circuit ID	Unknown	Down	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2	Circuit ID	Unknown	Down	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3	Circuit #3	Normal	Linked	B	2304	20	0	26	42	13090
4	Circuit ID	Unknown	Down	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Figure 48. G.SHDSL Status page

2. Click on the *PPP* link in the Configuration Menu pane, and verify that PPP channel 3 is up and running (shown in green in [figure 49](#)).

Channel	Transport	Phase	Protocol	Enabled	MLPPP
1	G.SHDSL 1	n/a	n/a	no	n/a
2	G.SHDSL 2	n/a	n/a	no	n/a
3	G.SHDSL 3	Running	IPCP	yes	n/a
4	G.SHDSL 4	n/a	n/a	no	n/a
5	G.SHDSL 5	n/a	n/a	no	n/a

Figure 49. PPP Status Page

3. Click on the *3224/6081RC Routing – Static* link in the Configuration Menu pane to verify routes.

Destination	Mask	Next Hop	Interface	Protocol	Age	Metric
127.0.0.0	255.0.0.0	0.0.0.0	Loopback	local	0	0
192.168.200.0	255.255.255.0	0.0.0.0	Ethernet A	local	0	0
192.168.250.0	255.255.255.0	192.168.254.5	Unknown	rip	0	0
192.168.254.5	255.255.255.255	0.0.0.0	Unknown	local	0	0

Figure 50. IP Routing table

Verifying routed connection

To verify the operation of the router modules use a PC or terminal at the customer site to ping a PC or terminal attached to the LAN port (Ethernet A) of the Model 3224/6081RC.

For example, if the PC or terminal at the remote site uses IP address 192.168.200.20, enter the following command at the PC attached to the model 3201: **ping 192.168.200.20**, the remote computer should respond with a ping reply.

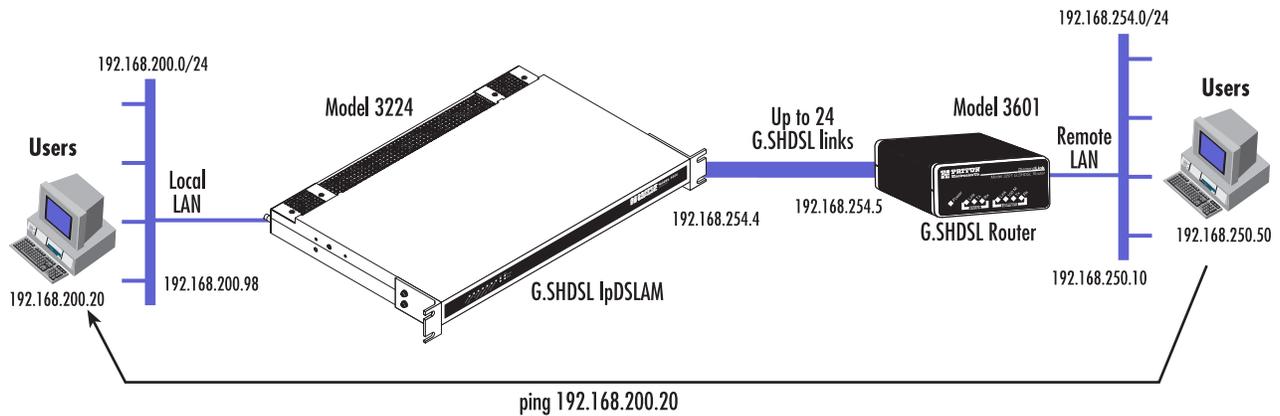


Figure 51. Testing the routed connection

Chapter 8 **Contacting Patton for assistance**

Chapter contents

Introduction	58
Contact information	58
Warranty Service and Returned Merchandise Authorizations (RMAs)	58
Warranty coverage	58
Out-of-warranty service	58
Returns for credit	58
Return for credit policy	59
RMA numbers	59
Shipping instructions	59

Introduction

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 RAS 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.
- E-mail support—e-mail sent to support@patton.com will be answered within 1 business day
- Telephone support—standard telephone support is available Monday through Friday, from 8:00 A.M. to 5:00 P.M. EST (8:00 to 17:00 UTC-5), Monday through Friday 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
- By calling +1 (301) 975-1000 and speaking to a Technical Support Engineer
- By sending an e-mail to 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.

