

Before you begin

There are several hardware requirements for this procedure. You must have:

- One Patton 3224 unit
- A PC or a laptop with a serial port
- A DSL spider cable or patch panel with RJ-11 cable
- RJ45 to DB-9 adapter
- One straight-through Ethernet cable

Introduction

When following the steps in this procedure, it is assumed that you know how to access your device through both the console and the webpage. If you do not know how to do this, please refer to the quick start guide you received with your unit.

A TFTP server is used for backing up of configuration files, although this is not needed. If you are in need of a TFTP server, you can download SolarWinds for Windows which is a free TFTP server: <http://www.solarwinds.com/downloads/>

It is strongly recommended, if you are doing this for the first time, to set up this procedure as an isolated network so that it will not interfere with your network.

Follow these steps to set up the routed multi-link PPP connection:

- Restore to minimal configuration
- Removing the default IP addresses
- Setting an IP address
- Setting up the DSL link
- Setting up the modem
- Setting up PPP on the modem
- Setting up the modem routing table
- Saving the modem configuration
- Checking the link state
- Configuring PPP
- Checking the PPP state
- Setting up the 3224 routing table
- Saving your configuration

Restore to minimal configuration

To begin, make sure that your units do not contain a configuration. To do this you will need to restore to the minimal configuration. It is strongly recommended that you back up the configuration of your unit.

Backup Your Current Configuration

If you have a TFTP server setup you can copy the startup-config to the TFTP server by using the command:

```
(none)# copy startup-config tftp://<IP Address>/<filename>
```

The filename is what you want the configuration file to be named on your TFTP server.

Or, you can save the startup-config to Non -Volatile Random Access Memory (NV-RAM). NV-RAM is the location that the configuration file is stored in any router. To save the startup config to NVRAM, enter the command below (you can replace original-config with any name you like. It does not have to have the “-config” part) :

```
(none)# copy startup-config original-config
```

Now that you have backed up your configuration, you can restore the unit to the shipping-config or to the minimal-config. If you restore to the shipping-config, the configuration will be as it was when you first received the unit. If you restore to minimal-config, everything will be cleared, and there will only be default settings will be available.

Restore to Minimal Configuration

Enter the following command to restore to minimal-config from the CLI.

```
(none)# copy minimal-config startup-config
```

You will need to restart your unit for the changes to take affect:

```
(none)# reload
```

Removing the default IP addresses

A PPP or a MLPPP can be configured as a Bridge Control Protocol (BCP) interface. A BCP connection will bridge two networks together to appear as one.

If you want to configure a BCP, select a unit and change the IP address of that unit to **192.168.200.1**.

```
(none) login: admin
password:
(none)# configure
(none)[config]# interface ethernet eth0
(none)[eth-eth0]# no ip address 192.168.200.10
(none)[eth-eth0]# no ip address 192.168.1.10
```

The above commands remove the IP addresses that were previously assigned to the interface. It is possible to put more than one IP address on an interface. You will also need to disable the DHCP client on eth0.

```
(none)[eth-eth0]# no ip address dhcp
```

Setting an IP address

There are two ways to specify the netmask of an IP address. You can enter the IP address as shown below:

```
(none)[eth-eth0]# ip address 192.168.200.1/24
```

This notation is often referred to as slash notation. It is simply calculated by counting up the Binary bits.

```
/32 = 255.255.255.255
```

```
/24 = 255.255.255.0
```

```
/16 = 255.255.0.0
```

```
/8 = 255.0.0.0
```

Alternatively, you can enter the IP address as shown below:

```
(none)[eth-eth0]# ip address 192.168.200.1 netmask 255.255.255.0
```

Exit the interface:

```
(none)[eth-eth0]# exit
```

```
(none)[config]#
```

Setting up the DSL link

Select the DSL interface you want.

```
(none)[config]# interface.dsl 0
```

Define the number of timeslots desired. 36 timeslots will give you a link speed of 2.304 Mbps.

```
(none)[dsl-0]# set timeslot 36
```

You need to set the clocking of the link. If central is selected the 3224 will provide clock to the modem. If remote is selected then the 3224 will expect to receive clock from the modem.

```
(none)[dsl-0]# set type central
```

Set the annex type.

```
(none)[dsl-0]# set annex b
```

Enable the link.

```
(none)[dsl-0]# no shutdown
```

Setting up the modem

Now, you will have to setup the modem. A 3201 was used for this exercise but these instructions will also apply to the 3241.

1. Login with the name *superuser* and the password *superuser*.
2. Use the command **ip list interfaces** to find the current IP address. If it is not already set, configure the IP address to be on the same subnet as the 3224 with the following command:

```
ip set interface ip1 ipaddress 172.16.1.1
```

3. Now, using a computer plugged into the Ethernet of the modem, access the web GUI. Bring up the web page and click on **G.SHDSL > Configuration**. You will need to set it so that it can link up with the 3224. Use the following settings:
 - **Intended DSL Data Rate:** 2304
 - **Number of i Bit:** 0
 - **Annex Type:** Annex B
 - **Device Type:** Remote
 - **DSL Protocol:** hdlc
 - **Line Probe:** Disable
 - **Transmit Gain:** 0.0db
 - **Action:** Start
4. Click **Configure & Activate**.
5. Click **System Configuration > Save**. Then, click **Save Configuration**. The DSL link LED on your modem should now be lit.

Setting up PPP on the modem

1. Click **Services Configuration > WAN**. Delete what is there, if anything.
2. Click **Create new service**.
3. Select **PPP routed**, and click **Continue**.
 - Description: ppp-0
 - Interface: 1
 - WAN IP address: 192.168.254.1 255.255.255.255
4. Click **Create**.

Setting up the modem routing table

1. Click on **System Configuration > IP routes**.
2. Click **Create new Ip V4Route**.
 - Destination : 0.0.0.0
 - Gateway:
 - Netmask: 0.0.0.0
 - Cost: 1
 - Interface: ppp-0
3. Click **Update**.

Saving the modem configuration

1. Click **System Configuration > Save**.
2. Click **Save**.

Checking the link state

It is important to make sure that the physical link is up. If the link is not up, you will not be able to get PPP to work. The first line of output after the command shows that the link is up. **DSL 0 (hdlc0) is up** means that the link is enabled. **Link is up** means that the link between the 3224 and the modem is up.

```
(none)[dsl-0]# show
DSL 0 (hdlc0) is up, link is up
1 links in 11 attempts
21.5dB noise, 0.0dB far end atten.
Link active for 63 seconds
Terminal type is central (CO)
Speed is 2304kbps (36 timeslots)
Annex is B
General Errors
    0 LOS, 0 CRC, 0 DPLL
Rx Errors
    3 full, 0 empty
    1 slip
Tx Errors
    0 full, 0 empty
    0 slip, 0 stuff bits

(none)[dsl-0]#
```

Exit the interface.

```
(none)[dsl-0]# exit
(none)[config]#
```

Configuring PPP

Now that the link is up, PPP can be configured.

```
(none)[config]# interface ppp 0
```

The DSL interface needs to be bound to the PPP.

```
(none)[ppp-ppp0]# bind hdlc0
```

The PPP needs to be defined as a IPCP.

```
(none)[ppp-ppp0]# ncp ipcp
```

Enable the PPP.

```
(none)[ppp-ppp0]# no shutdown
```

Checking the PPP state

From the output below, you can see that the PPP link is up and should now pass traffic:

```
(none)[ppp-ppp0]# show
No Shutdown
Multilink: Disabled   Min-Initial-Frag-Size: None
Device(s):
hdlc0 (running)
Active
Holdoff:   5 seconds
LCP:
Echo-Failure: 5 Echo-Interval: 5 Max-Configure: 10 Max-Failure: 10
Max-Terminate: 3 Restart: 3 MRU: 1540 MTU: 1540
IPCP:
Local IP: 192.168.254.0
Actual Local IP: 192.168.254.0
Peer IP: 192.168.254.1
Actual Peer IP: 192.168.254.1
Max-Configure: 10 Max-Failure: 10 Max-Terminate: 3 Restart: 3
(none)[ppp-ppp0]#
```

There are several main states that the PPP can be in.

- **Dead** - The link has failed to connect and is in a state of waiting before trying to reestablish.
- **Establish** - The link is currently trying to establish.
- **Terminate** - The link is closing down the connection.
- **Running** - The link is up and running. You should be able to pass data.

Setting up the 3224 routing table

Although PPP is up, you will still be unable to pass traffic. This is because there is not a route in the routing table to get to the modem or back. Below is your current routing table. There is no route to 172.16.1.0.

```
(none)# show route
System Routing Table
Flags: C - dhCp, D - Dynamic, G - use Gateway, H - target is a host
R - userR, U - route is Up, S - System
+-----+-----+-----+-----+-----+-----+-----+
| Destination | Gateway | Netmask | Flags | Metric | TOS | Interface | Source |
+-----+-----+-----+-----+-----+-----+-----+
| 192.168.254.1 | * | 255.255.255.255 | UHS | 0 | 0 | ipcp0 | 192.168.254.0 |
| 192.168.200.0 | * | 255.255.255.0 | US | 0 | 0 | eth0 | 192.168.200.1 |
+-----+-----+-----+-----+-----+-----+-----+
(none)#
```

The 3224 does not know where the 172.16.1.0 network is. But the DSL interface on the modem does. 192.168.254.1 will be the gateway for 172.16.1.0.

```
(none)# configure route 172.16.1.0 netmask 255.255.255.0 gateway 192.168.254.1
```

Saving your configuration

To save your configuration, enter the following command:

```
(none)# copy running-config startup-config
```

Or, type:

```
(none)# write
```

Additional Information

For additional help or any questions, contact Patton Technical Support:

Contacting Patton

If you have any additional questions please feel free to contact Patton's Technical Support:

- E-mail support—e-mail sent to support@patton.com will be answered within 1 business day
- Telephone support—standard telephone support is available five days a week—from 8:00 am to 5:00 pm EST (1300 to 2200 UTC)—by calling +1 (301) 975-1007

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