

Before you begin

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

- One Patton 6081 unit
- A Patton 3096, 3196, or 2616 unit
- A PC or a laptop with a serial port
- A DSL spider cable or patch panel with RJ-11 cable, a T1/E1 spider cable or, a T1/E1 patch panel with T1/E1 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.

This document uses a 3096. It is not imperative to use a 3096. You may be using a different card. The concepts will all be the same although the commands may not be. This document is also using an E1 connected to the 3069. You may be using a DSL link. The 3096 will terminate the DSL or T1/E1 then send it to the 6081. The 6081 will not know what type of link it was, just how many timeslots there are.

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 H110 mappings on the 3096
- Setting up HDLC over the H110
- Configuring PPP
- Checking the PPP state
- Setting up the 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

Your units will have an IP address of 192.168.200.10 on Ethernet port 0/0 (eth0). However, both of the units have the same IP address.

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

Because you are setting up a BCP, you will need a bridge group. Follow the commands below to set up the bridge group:

```
(none)[config]# interface bridge br0
(none)[bridge(br0)]# no shutdown
(none)[bridge(br0)]# attach eth0
```

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 H110 mappings on the 3096

The 6081 communicates with the other ForeFront cards over the H110 backplane. The mappings will have to line up with those in the 3096.

The H110 connects to every card in the chassis. It is divided up into streams. Each stream has 128 timeslots in it. To create a connection from one card to another you map connections over the H110.

Dev Type A:	Dev Num A:	Dev Slots A:	Dev Type B:	Dev Num B:	Dev Slots B:
t1-e1(1)	ports 1	1-31	toH110(5)	ports 1	32-62
			fromH110(6)	ports1	1-31

The first three options deal with the link that will be sent across the H110.

- **Dev Type A:** is the originating interface type. This is usually DSL or T1/E1.
- **Dev Num A:** is the interface number.
- **Dev Slots A:** is the number of timeslots the interface has.

The rest of the options deal with where the link is going. There are two of these. One for Transmit and one for Receive.

- **Dev Type B:** Is the type of connection it is going to. This can be another DSL or T1/E1 port, or it can be the H110.
- **Dev Num B:** Is the number of the port or stream that it will be mapped to.
- **Dev Slots B:** Is the number of timeslots that are needed. It is almost always the same number of timeslots as the original connection.

Setting up HDLC over the H110

The timeslots need to be the opposite of those on the other side. If the 3096 is receiving on stream 1 timeslots 1-31 then the 6081 must transmit on stream 1 timeslots 1-31. Because the H110 encompasses the entire chassis once a stream and timeslot range has been used it can not be used again. Mappings can not be used a second time and you can not transmit and receive on the same stream and timeslot section.

```
(none)[config]# hdlc 0
(none)[hdlc-hdlc1]# tx stream 1 timeslots 1 count 31
(none)[hdlc-hdlc1]# rx stream 1 timeslots 32 count 62
```

The mappings can be checked by using the command:

```
(none)[hdlc-hdlc1]# show
Direction  Stream  Timeslot  Length
-----
Tx          1       1         31
Rx          1       32        62
```

Exit the interface:

```
(none)[hdlc-hdlc1]# exit
(none)[config]#
```

Configuring PPP

```
(none)[config]# interface ppp ppp0
```

Bind the HDLC interface to the PPP.

```
(none)[ppp-ppp0]# bind hdlc1
```

Set the PPP for BCP.

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

Enable the link.

```
(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 routing table

The modem or router that is terminating the DSL or T1/E1 should have the 6081 set to be its gateway. You should have a route that says route 0.0.0.0 netmask 0.0.0.0 to 192.168.200.1. The modem or router should also be on a different network than the 6081. Give the modem an IP address of 172.16.1.1.

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 6081 does not know where the 172.16.1.0 network is, but the E1 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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