
HP Router Configuration Examples

Overview

This paper shows you how to configure your HP (non-IOS) router for some typical, simple applications. It includes examples for the following network configurations:

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Each of the above examples assumes that you are using A.09.7x router software. If you are using another version of router software, the configuration steps and the parameter names may differ slightly.

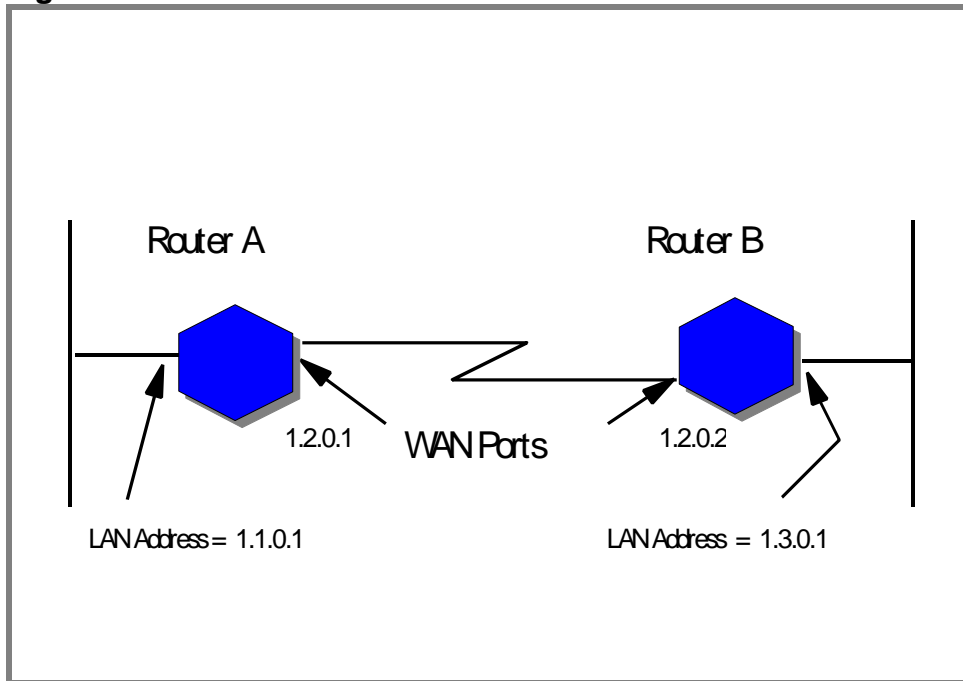
Working Assumptions

This paper makes the following assumptions:

10. You have a terminal connection to the router. For more information on establishing terminal connections, refer to your router's installation guide.
11. You understand the Quick Configuration Editor, which is used for each of the examples. For more on how to use the Quick Configuration Editor, see your router's manuals.
12. You can use the Configuration Editor. The Configuration Editor is used to configure those parameters not available through the Quick Configuration Editor. For more information on the Configuration Editor, see your router's manuals.

IP Routed Leased Line Network

Figure 1



Example IP Leased Line Network

- ↳ See figure 1 Router A
- ↳ This example is RIP-based routing.
 - ✓ Disable bridging for each port. See Configuration 1.
 - ✓ Configure LAN port IP address **1.1.0.1**
 - ✓ Configure Subnet mask **255.255.0.0**
 - ✓ Configure WAN port IP address **1.2.0.1**
 - ✓ Configure WAN port Subnet mask **255.255.0.0**
 - ✓ Configure the WAN Port to **HP**.

Only "HP" and "PPP" should be used for leased lines. "HP" refers to the proprietary HDLC protocol used in HP (non-IOS) router to HP (non-IOS) router communication. "PPP" refers to the Point to Point Protocol RFC standard. PPP provides interoperability with other types of routers, for example IOS routers. Either "HP" or "PPP" may be chosen in HP to HP networks. The "HP" protocol allows for Auto (automatic) configuration of WAN port parameters, while PPP does not.
 - ✓ Configure WAN Port Parameter for **Auto Aut**.

Auto Aut means automatic LLC and DCE/DTE selection. To explicitly configure these parameters, choose LLC1 or LLC2 and DCE or DTE. An example would be LLC1 DCE. LLC type, LLC1 or LLC2, must be the same on both routers. The DCE/DTE setting must be different on the two routers. For example, if Router A is set to DCE, then Router B must be set to DTE.
- ↳ Save configuration and exit.

- ↳ See Figure 1 Router B
 - ✓ Disable bridging for each port. This must be the same as Router A. See Configuration 2.
 - ✓ Configure LAN port IP address **1.3.0.1**
 - ✓ Configure Subnet mask **255.255.0.0**
 - ✓ Configure WAN port IP address **1.2.0.2**
 - ✓ Configure WAN port Subnet mask **255.255.0.0**
 - ✓ Configure the WAN Port to **HP**.
Same clarification as above.
 - ✓ Configure WAN Port Parameter for **Auto Aut**.
Same clarification as above.
- ↳ Save configuration and exit.

Configuration 1

System name: ROUTER_A						
IP host-only: NO		SNMP enabled: YES		Inbound Telnet enabled: YES		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	<u>Enab</u>	<u>Address</u>	<u>Subnet Mask</u>	<u>Network</u>	<u>Conf</u>	<u>Parameters</u>
Ethernet 1		1.1.0.1	255.255.0.0			
WAN 1		1.2.0.1	255.255.0.0		HP	AUTO AUT

Example Quick Configuration Screen Router A

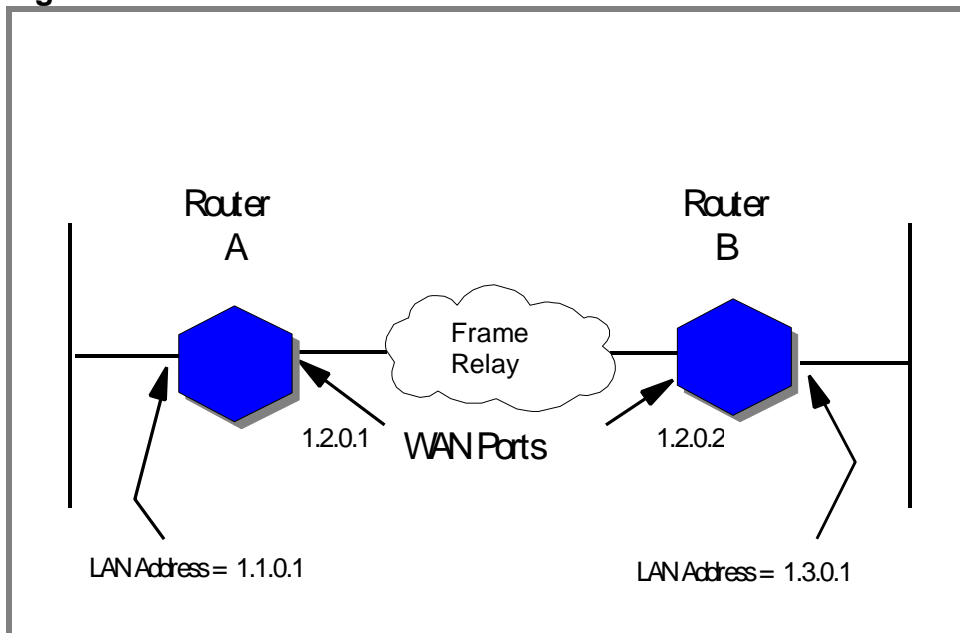
Configuration 2

System name: ROUTER_B						
IP host-only: NO		SNMP enabled: YES		Inbound Telnet enabled: YES		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	<u>Enab</u>	<u>Address</u>	<u>Subnet Mask</u>	<u>Network</u>	<u>Conf</u>	<u>Parameters</u>
Ethernet 1		1.3.0.1	255.255.0.0			
WAN 1		1.2.0.2	255.255.0.0		HP	AUTO AUT

Example Quick Configuration Screen Router B

IP Routed Frame Relay Network, 2-sites

Figure 2



Example IP Frame Relay Network

- ↳ See Figure 2 Router A.
- ↳ This example is RIP based routing.
 - ✓ Disable bridging for each port. See Configuration 1.
 - ✓ Configure LAN port IP address **1.1.0.1**
 - ✓ Configure Subnet mask **255.255.0.0**
 - ✓ Configure WAN port IP address **1.2.0.1**
 - ✓ Configure Subnet mask **255.255.0.0**
 - ✓ Configure the WAN Port Conf to **FR**.
 - ✓ Configure other WAN Port Parameters only if your carrier requires a management type other than LMI, the default. To do so use hot key /C (Edit circuit parms) from the Port Conf field and select the appropriate Management Type. See Configuration 3.
- ↳ Save configuration and exit.
- ↳ See Figure 2 Router B
 - ✓ Disable bridging for each port. Must be the same as Router A. See Configuration 2.
 - ✓ Configure LAN port IP address **1.3.0.1**
 - ✓ Configure Subnet mask to **255.255.0.0**
 - ✓ Configure WAN port IP address to **1.2.0.2**
 - ✓ Configure Subnet mask to **255.255.0.0**
 - ✓ Configure the WAN Port Conf to **FR**.
 - ✓ Configure other WAN Port Parameters only if your carrier requires a management type other than LMI, the default. To do so use hot key /C (Edit circuit parms) from the Port Conf field and select the appropriate Management Type. See Configuration 3.
- ↳ Save configuration and exit.

Configuration 1

System name: ROUTER_A						
IP host-only: NO		SNMP enabled: YES		Inbound Telnet enabled: YES		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	Enab	Address	Subnet Mask	Network	Conf	Parameters
Ethernet 1		1.1.0.1	255.255.0.0			
WAN 1		1.2.0.1	255.255.0.0		FR	

Example Quick Configuration Screen Router A

Configuration 2

System name: ROUTER_B						
IP host-only: NO		SNMP enabled: YES		Inbound Telnet enabled: YES		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	Enab	Address	Subnet Mask	Network	Conf	Parameters
Ethernet 1		1.3.0.1	255.255.0.0			
WAN 1		1.2.0.2	255.255.0.0		FR	

Example Quick Configuration Screen Router B

Configuration 3

```
===== SESSION 1 - MGR MODE =====
Configuration Editor
Circuit Name : WAN1                      Auto Enable : Yes
Quality of Service : LLC 1 (datagram)     Circuit Type : Frame Relay

DLCI Encoding Type:      Q922             DLCI Encoding length : TWO BYTES
Maximum packet size : 1600               Provide InARP : No
Max Link Latency (ms) (0=none) : 1000    Management Type : LMI [a]

Poll Interval (seconds) : 10             Intervals between Full Polls : 6
Monitored Events : 4                     Events for Error : 3
Alarm Timer : 10

1. Permanent Virtual Circuits (0) [b]
2. Multicast Support (0)
3. Bandwidth Reservation (0)

Enter Selection (0 for Previous Menu) : ____
```

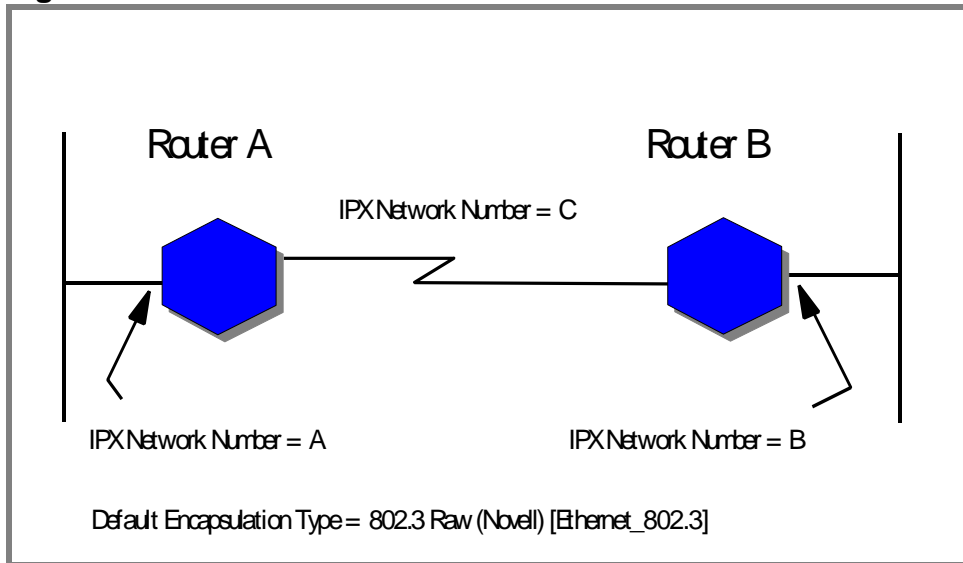
Example Circuit Parameters Screen for Either Router

[a] Management Type options are: LMI, ANSI Annex D, CCITT Annex A, UNSUPPORTED, LMI Switch, Annex D Switch, or Annex A Switch.

[b] Do not configure any Permanent Virtual Circuits unless the management type is UNSUPPORTED or a switch type.

IPX Routed Leased Line Network

Figure 3



Example IPX Leased Line Network

↳ See Figure 3 Router A

- ✓ Disable bridging for each port. See Configuration 1.
- ✓ Configure LAN port IPX Network Number to **A**.

The default frame type chosen by quick configuration is '802.3 Raw (Novell)', which Novell calls Ethernet_802.3. To change the frame type go back to the IPX Network field just entered and use the Hot Key, /E (Edit other IPX parms).

- ✓ Configure WAN port IPX Network Number to **C**
- ✓ Configure the WAN Port Conf to **HP**.

Only "HP" and "PPP" should be used for leased lines. "HP" refers to the proprietary HDLC protocol used in HP (non-IOS) router to HP (non-IOS) router communication. "PPP" refers to the Point to Point Protocol RFC standard. PPP provides interoperability with other types of routers, for example IOS routers. Either "HP" or "PPP" may be chosen in HP to HP networks. The "HP" protocol allows for Auto (automatic) configuration of WAN port parameters, while PPP does not.

- ✓ Configure WAN Port Parameters for **AUTO AUT**.

Auto Aut means automatic LLC and DCE/DTE selection. To explicitly configure these parameters, choose LLC1 or LLC2 and DCE or DTE. An example would be LLC1 DCE. LLC type, LLC1 or LLC2, must be the same on both routers. The DCE/DTE setting must be different on the two routers. For example, if Router A is set to DCE, then Router B must be set to DTE

↳ Save configuration and exit.

- See Figure 3 Router B
 - ✓ Disable bridging for each port. This must be the same as Router A. See Configuration 2.
 - ✓ Configure LAN port IPX Network Number to **B**.
Same clarification as above.
 - ✓ Configure WAN port IPX Network Number to **C**
Same clarification as above.
 - ✓ Configure the WAN Port Conf to **HP**.
Same clarification as above.
 - ✓ Configure WAN Port Parameter for **Auto Aut**.
Same clarification as above.
- Save configuration and exit.

Configuration 1

System name: ROUTER_A						
IP host-only: NO		SNMP enabled: Yes		Inbound Telnet enabled: Yes		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	Enab	Address	Subnet Mask	Network	Conf	Parameters
Ethernet 1				A		
WAN 1				C	HP	AUTO AUT

Example Quick Configuration Screen Router A

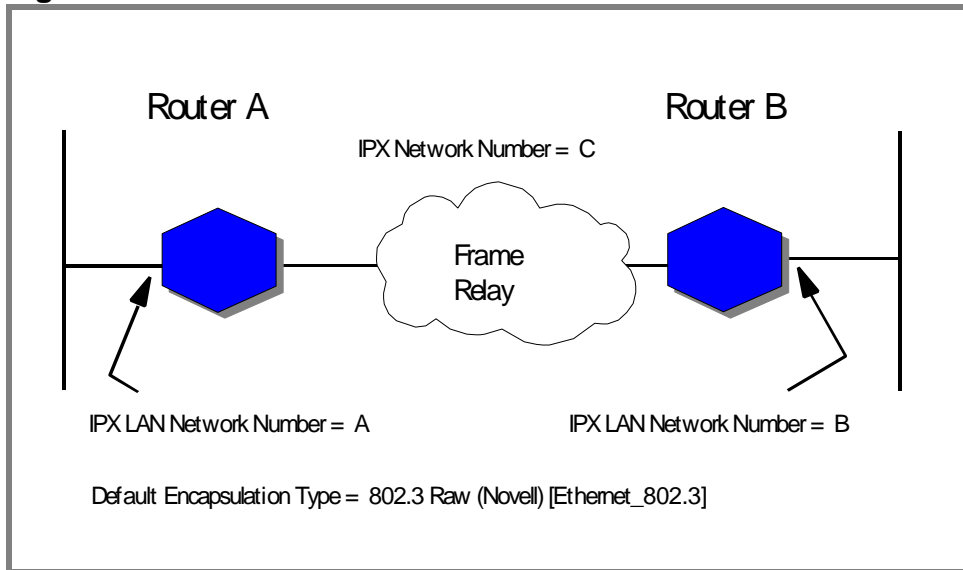
Configuration 2

System name: ROUTER_B						
IP host-only: NO		SNMP enabled: Yes		Inbound Telnet enabled: Yes		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	Enab	Address	Subnet Mask	Network	Conf	Parameters
Ethernet 1				B		
WAN 1				C	HP	AUTO AUT

Example Quick Configuration Screen Router B

IPX Routed Frame Relay Network, 2-sites

Figure 4



Example IPX Frame Relay Network

↳ See Figure 4 Router A

✓ Disable bridging for each port. See Configuration 1.

✓ Configure LAN port IPX Network Number to **A**.

The default frame type chosen by quick configuration is '802.3 Raw (Novell)', which Novell calls Ethernet_802.3.

To change the frame type go back to the IPX Network field just entered and use the Hot Key /E (Edit other IPX parms).

✓ Configure WAN port IPX Network Number to **C**

✓ Configure the WAN Port to **FR**.

✓ Configure other WAN Port Parameter only if your carrier requires a management type other than LMI, the default. To do so use hot key /C (Edit circuit parms) from the Port Conf field and select the appropriate Management Type. See Configuration 3.

↳ Save configuration and exit.

↳ See Figure 4 Router B

✓ Disable bridging for each port. Must be the same as Router A. See Configuration 2.

✓ Configure LAN port IPX Network Number **B**.

Same clarification as above.

✓ Configure WAN port IP Network Number to **C**

Same clarification as above.

✓ Configure the WAN Port to **FR**.

✓ Configure other WAN Port Parameter only if your carrier requires a management type other than LMI, the default. To do so use hot key /C (Edit circuit parms) from the Port Conf field and select the appropriate Management Type. See Configuration 3.

↳ Save configuration and exit.

Configuration 1

System name: ROUTER_A						
IP host-only: NO		SNMP enabled: Yes		Inbound Telnet enabled: Yes		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	Enab	Address	Subnet Mask	Network	Conf	Parameters
Ethernet 1				A		
WAN 1				C	FR	

Example Quick Configuration Screen Router A

Configuration 2

System name: ROUTER_B						
IP host-only: NO		SNMP enabled: Yes		Inbound Telnet enabled: Yes		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	Enab	Address	Subnet Mask	Network	Conf	Parameters
Ethernet 1				B		
WAN 1				C	FR	

Example Quick Configuration Screen Router B

Configuration 3

```

===== SESSION 1 - MGR MODE =====
Configuration Editor
Circuit Name : WAN1                               Auto Enable : Yes
Quality of Service : LLC 1 (datagram)             Circuit Type : Frame Relay

DLCI Encoding Type: Q922                          DLCI Encoding length : TWO BYTES
Maximum packet size : 1600                       Provide InARP : No
Max Link Latency (ms) (0=none) : 1000           Management Type : LMI [a]

Poll Interval (seconds) : 10                     Intervals between Full Polls : 6
Monitored Events : 4                             Events for Error : 3
Alarm Timer : 10
1. Permanent Virtual Circuits (0) [b]
2. Multicast Support (0)
3. Bandwidth Reservation (0)

Enter Selection (0 for Previous Menu) : ____

```

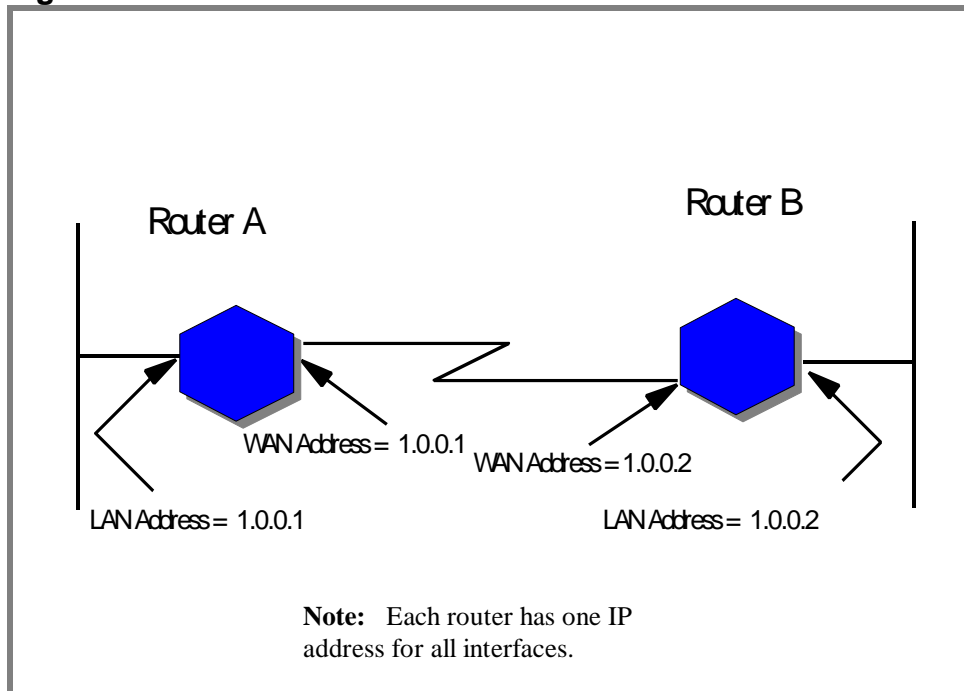
Example Circuit Parameters Screen for Either Router

[a] Management Type options are: LMI, ANSI Annex D, CCITT Annex A, UNSUPPORTED, LMI Switch, Annex D Switch, or Annex A Switch.

[b] Do not configure any Permanent Virtual Circuits unless the management type is UNSUPPORTED or a switch type.

Bridging and SNMP with Leased Line (Host-Only mode)

Figure 5



Example Bridging and SNMP with Leased Line Network

- ↳ See Figure 5 Router A
- ↳ This example is host-only mode (that is, bridging).
 - ✓ Enable host-only mode. See Configuration 1.
 - ✓ Enable SNMP and Telnet
 - ✓ Enable bridging for each port.
 - ✓ Configure LAN port IP address **1.0.0.1**
 - ✓ Configure Subnet mask to **255.255.0.0**
 - ✓ Configure WAN port IP address to **1.0.0.1**
 - ✓ Configure WAN port Subnet mask to **255.255.0.0**
 - ✓ Configure the WAN Port Conf to **HP**.

Only "HP" and "PPP" should be used for leased lines. "HP" refers to the proprietary HDLC protocol used in HP (non-IOS) router to HP (non-IOS) router communication. "PPP" refers to the Point to Point Protocol RFC standard. PPP provides interoperability with other types of routers, for example IOS routers. Either "HP" or "PPP" may be chosen in HP to HP networks. The "HP" protocol allows for Auto (automatic) configuration of WAN port parameters, while PPP does not.
 - ✓ Configure WAN Port Parameter for **Auto Aut**.

Auto Aut means automatic LLC and DCE/DTE selection. To explicitly configure these parameters, choose LLC1 or LLC2 and DCE or DTE. An example would be LLC1 DCE. LLC type, LLC1 or LLC2, must be the same on both routers. The DCE/DTE setting must be different on the two routers. For example, if Router A is set to DCE, then Router B must be set to DTE.
- ↳ Save configuration and exit.

- ↳ See Figure 5 Router B
 - ✓ Enable host-only mode. See Configuration 2.
 - ✓ Enable SNMP and Telnet
 - ✓ Enable bridging for each port.
 - ✓ Configure LAN port IP address **1.0.0.2**
 - ✓ Configure Subnet mask to **255.255.0.0**
 - ✓ Configure WAN port IP address to **1.0.0.2**
 - ✓ Configure WAN port Subnet mask to **255.255.0.0**
 - ✓ Configure the WAN Port to **HP**.
 - Same clarification as above.
 - ✓ Configure WAN Port Parameter for **Auto Aut**.
 - Same clarification as above.
- ↳ Save configuration and exit.

Configuration 1

System name: ROUTER_A						
IP host-only: YES		SNMP enabled: YES		Inbound Telnet enabled: YES		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	<u>Enab</u>	<u>Address</u>	<u>Subnet Mask</u>	<u>Network</u>	<u>Conf</u>	<u>Parameters</u>
Ethernet 1	YES	1.0.0.1	255.255.0.0			
WAN 1	YES	1.0.0.1	255.255.0.0		HP	AUTO AUT

Example Quick Configuration Screen Router A

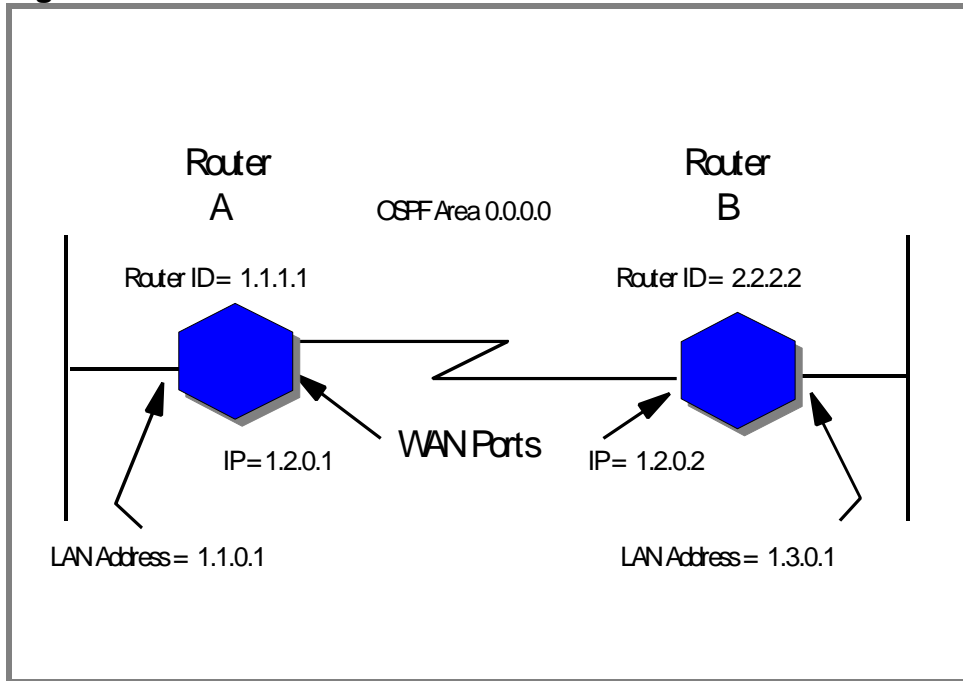
Configuration 2

System name: ROUTER_B						
IP host-only: YES		SNMP enabled: YES		Inbound Telnet enabled: YES		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	<u>Enab</u>	<u>Address</u>	<u>Subnet Mask</u>	<u>Network</u>	<u>Conf</u>	<u>Parameters</u>
Ethernet 1	YES	1.0.0.2	255.255.0.0			
WAN 1	YES	1.0.0.2	255.255.0.0		HP	AUTO AUT

Example Quick Configuration Screen Router B

IP Single Area OSPF Routed Network

Figure 6



Example Single Area OSPF Network

- ↳ See Figure 6 Router A
- ↳ This example is OSPF based routing only.
 - ✓ Enable SNMP and Telnet.
 - ✓ Disable bridging for each port. See Configuration 1.
 - ✓ Configure LAN port IP address **1.1.0.1**
 - ✓ Configure Subnet mask **255.255.0.0**
 - ✓ Return to previous IP field and hot key using /E (Edit other IP parms) to turn off RIP Listen and RIP Supply. See Configuration 3.
 - ✓ Configure WAN port IP address **1.2.0.1**
 - ✓ Configure WAN port Subnet mask **255.255.0.0**
 - ✓ Return to previous IP field and hot key using /E (Edit other IP parms) to turn off RIP Listen and RIP Supply. See Configuration 3.
 - ✓ Return to an IP configuration field and hot key /G to edit IP global parms. (Configuration 4).
 - ✓ Create an OSPF record (4 and press Enter). See Configuration 5.
 - ✓ Create a backbone Area record as shown in Configuration 6. See Configuration 7 for non-backbone area record.
 - ✓ Create INTERFACES record as shown in Configuration 8.
 - ✓ Create Interface Definition record. See Configuration 9.
 - ✓ Press return to select Broadcast as the Interface Type. Then fill in the IP Address of the Ethernet interface and its Metric value.
 - ✓ Add Broadcast Definition record. See Configuration 10.

- ✓ Return to Area record screen (Configuration 6) and select menu item 2. Then use the cursor key to select Add to configure WAN Interface record. See Configuration 8.
- ✓ Use cursor key and press enter to select Point-to-Point as the Interface Type. Then fill in the IP Address for the WAN interface and its Metric value.
- ✓ Create Point-to-Point Definition record.
- ✓ Return to Quick Configuration Editor.
- ✓ Configure the WAN Port Conf to **HP**.
 - Only “HP” and “PPP” should be used for leased lines. "HP" refers to the proprietary HDLC protocol used in HP (non-IOS) router to HP (non-IOS) router communication. "PPP" refers to the Point to Point Protocol RFC standard. PPP provides interoperability with other types of routers, for example IOS routers. Either “HP” or “PPP” may be chosen in HP to HP networks. The "HP" protocol allows for Auto (automatic) configuration of WAN port parameters, while PPP does not.
- ✓ Configure WAN Port Parameters for **Auto Aut**.
 - Auto Aut means automatic LLC and DCE/DTE selection. To explicitly configure these parameters, choose LLC1 or LLC2 and DCE or DTE. An example would be LLC1 DCE. LLC type, LLC1 or LLC2, must be the same on both routers. The DCE/DTE setting must be different on the two routers. For example, if Router A is set to DCE, then Router B must be set to DTE
- ↳ Save configuration and exit.
- ↳ See Figure 6 Router B
 - ✓ Enable SNMP and Telnet.
 - ✓ Disable bridging for each port. This must be the same as Router A. See Configuration 1.
 - ✓ Configure LAN port IP address **1.3.0.1**
 - ✓ Configure Subnet mask **255.255.0.0**
 - ✓ Return to previous IP field and hot key using /E (Edit other IP parms) to turn off RIP Listen and RIP Supply. See Configuration 3.
 - ✓ Configure WAN port IP address to **1.2.0.2**
 - ✓ Configure WAN port Subnet mask to **255.255.0.0**
 - ✓ Return to previous IP field and hot key using /E (Edit other IP parms) to turn off RIP Listen and RIP Supply. See Configuration 3.
 - ✓ Return to an IP configuration field and hot key /G to edit IP global parms. (Configuration 4).
 - ✓ Create an OSPF record (choose 4 and press Enter). See Configuration 5.
 - ✓ Create a backbone Area record as shown in Configuration 6. See Configuration 7 for non-backbone area record.
 - ✓ Create INTERFACES record as shown in Configuration 8.
 - ✓ Add an Interface Definition record. See Configuration 9.
 - ✓ Press return to select Broadcast as the Interface Type. Then fill in the IP Address of the Ethernet interface and its Metric value.
 - ✓ Add Broadcast Definition record. See Configuration 10.
 - ✓ Return to Area record screen (Configuration 6) and select menu item 2. Then use the cursor key to select Add to configure WAN Interface record. See Configuration 8.
 - ✓ Use cursor key and press enter to select Point-to-Point as the Interface Type. Then fill in the IP Address for the WAN interface, and the Metric value.
 - ✓ Create Point-to-Point Definition record.
 - ✓ Return to the Quick Configuration Editor.
 - ✓ Configure the WAN Port Conf to **HP**. See WAN Port note above for router A.
 - ✓ Configure WAN Port Parameters for **Auto Aut**. Read Auto Aut note for router A above.
- ↳ Save configuration and exit.

Configuration 1

System name: ROUTER_A						
IP host-only: NO		SNMP enabled: YES		Inbound Telnet enabled: YES		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	<u>Enab</u>	<u>Address</u>	<u>Subnet Mask</u>	<u>Network</u>	<u>Conf</u>	<u>Parameters</u>
Ethernet 1		1.1.0.1	255.255.0.0			
WAN 1		1.2.0.1	255.255.0.0		HP	AUTO AUT

Example Quick Configuration Screen Router A

Configuration 2

System name: ROUTER_B						
IP host-only: NO		SNMP enabled: YES		Inbound Telnet enabled: YES		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	<u>Enab</u>	<u>Address</u>	<u>Subnet Mask</u>	<u>Network</u>	<u>Conf</u>	<u>Parameters</u>
Ethernet 1		1.3.0.1	255.255.0.0			
WAN 1		1.2.0.2	255.255.0.0		HP	AUTO AUT

Example Quick Configuration Screen Router B

Configuration 3

```
===== SESSION 1 - MGR MODE =====
Configuration Editor
Internet Address : 1.1.0.1
Subnet Mask    : 255.255.0.0
Circuit Group  : WAN1G
Receive Broadcast : Network and Subnet
Transmit Broadcast : All Ones

Address Resolution : ARP & HP Probe
Normal ARP       : Yes
Proxy ARP        : Yes
Host Cache       : No
UDP Checksum Off : No

Address Mask Reply : No
MTU Discovery Option : No
Load Balancing    : No

RIP Supply      : No
RIP Listen      : No
Default Route Supply : No
Default Route Listen : No
Poisoned Reverse/Split Horizon : Poison
RIP Interface Cost : 1
ASB Flood       : No
Source Route (Token Ring) : No
Send ICMP Redirects : Yes

1. Traffic Filters (0)
2. Traffic Priority (0)
3. UDP Broadcast Routing Dest Port Number(s) (0)
Enter Selection (0 for Previous Menu) : ____
```

Example Network Interface Definition Screen Router A

Configuration 4

```
===== SESSION 2 - MGR MODE =====
Configuration Editor
Auto Enable : Yes                Global Broadcast      : Yes
RIP Network Diameter : 15        Mode                  : Router/Host
Management Priority : Low         Non Local ARP Source  : Drop and Log
                                   Suppress Authentication Traps : Yes

1. Lists (0)
2. Network Interface Definitions (2)
3. Static Routes (0)
4. OSPF (0)
5. EGP Configuration (0)
6. TCP Configuration (1)
7. TFTP Configuration (1)
8. Time Protocol Configuration (0)
9. BOOTP Configuration (0)
10. Import Route Filters (0)
11. Export Route Filters (0)
Enter Selection (0 for Previous Menu) : 4__
No OSPF record(s) found
Do you wish to add OSPF record(s)? Yes
```

Example of Global IP Parameters Screen

Configuration 5

```
===== SESSION 1 - MGR MODE =====
Configuration Editor
Auto Enable : Yes
Router ID : 1.1.1.1      [a]   Note: Enter 2.2.2.2 for Router B.
AS Boundary : No        [b]   Set this to Yes, if using with RIP or static routes
SPF Hold Down Timer : 1

1. AREAS (0)

Enter Selection (0 for Previous Menu) : 1__
```

Example of OSPF Record Screen on Router A

[a] Router IDs are unique for each router within an area.

[b] This will be Yes if the routing pool will include routes learned via RIP, EGP, or configured manually (static routes).

Configuration 6

```
===== SESSION 1 - MGR MODE =====
Configuration Editor

Area ID : 0.0.0.0                               Note: 0.0.0.0 always represents the backbone

Authentication Type : No Authentication          [a]

1. NETWORKS (0)
2. INTERFACES (0)                               [b]
3. VIRTUAL LINKS (0)

Enter Selection (0 for Previous Menu) : 2__
```

Example of Area Record Screen for Backbone Router

Configuration 7

```
===== SESSION 1 - MGR MODE =====
Configuration Editor

Area ID : 1.0.0.0                               Note: Can be any number other than 0.0.0.0

Authentication Type : No Authentication          [a]
Stub Area : No                                  [c]

1. NETWORK SUMMARIES (0)
2. INTERFACES (0)                               [b]

Enter Selection (0 for Previous Menu) : 2__
```

Example of Area Record Screen for Non-Backbone Router

Configuration 8

```
===== SESSION 1 - MGR MODE =====
Configuration Editor

Circuit Group Name : ETHER1G                    Note: Use WAN1G on the WAN port.
Password :                                       [a]

1. Interface Definition (0)

Enter Selection (0 for Previous Menu) : 1__
No Interface Definition record(s) found
Do you wish to add Interface Definition record(s)? Yes
```

Example of Interface Record Screen

[a] If Authentication Type is set to "Simple Password" enter password in Interface Record.

[b] All interfaces using OSPF should be entered via this option

[c] Stub Area can be set to Yes to prevent this router from learning of external routes. In OSPF, external routes are those not learned through the OSPF protocol, for example learned via RIP, EGP, or static configuration.

Configuration 9

```
===== SESSION 1 - MGR MODE =====  
Configuration Editor  
  
Interface Type : Broadcast                               Note: Use Point-to-Point for a Leased Line WAN.  
  
IP Address : 1.1.0.1                                   Note: Enter 1.2.0.1 for the WAN port of router A  
Metric : 10                                           [a]  
1. Broadcast Definition (0)  
  
Enter Selection (0 for Previous Menu) : 1__  
No Broadcast Definition record(s) found  
Do you wish to add Broadcast Definition record(s)? Yes
```

Example of Interface Definition Record Screen

Configuration 10

```
===== SESSION 1 - MGR MODE =====  
Configuration Editor  
Hello Interval : 10                                   [b]  
Dead Interval : 40  
Retransmit Interval : 10  
Priority : 1  
  
Hit Return to Continue
```

Example of Broadcast Definition Record Screen

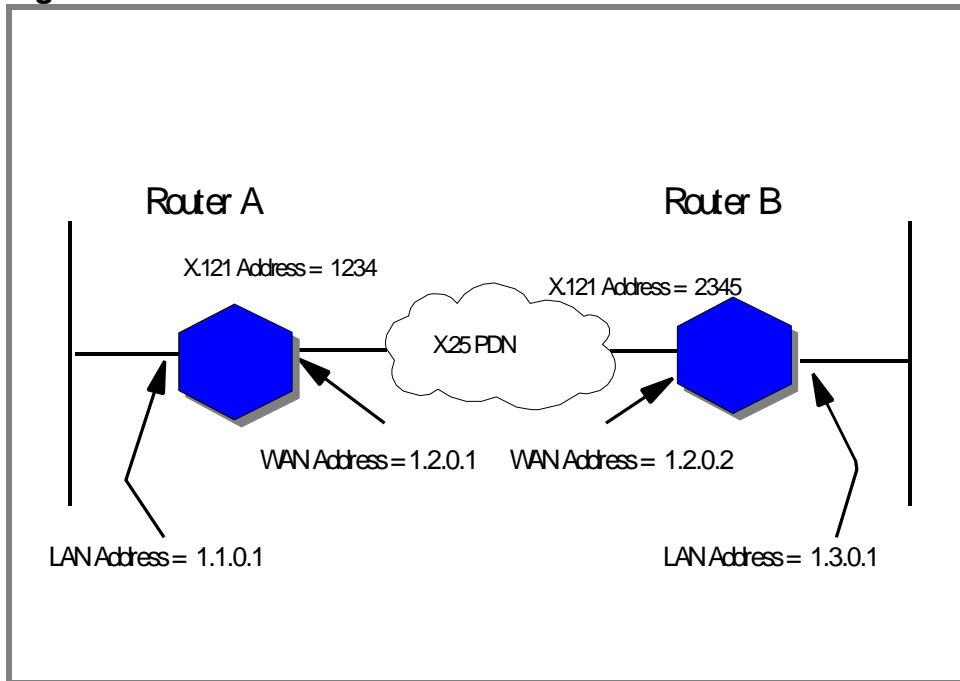
[a] The OSPF standard does not specify Metric values. For an example scheme based on link speed, see the table below, taken from the "HP Routing Services and Applications, Technical Reference Guide," Part Number 5962-8770E, 1994, page 3-74:

<u>Link Speed</u>	<u>Metric</u>
100 Mbit/s	3
10 Mbit/s	10
4 Mbit/s	15
2.048 Mbit/s	32
1.544 Mbit/s	40
768 Mbit/s	75
512 Mbit/s	85
256 Mbit/s	95
128 Mbit/s	100
64 Mbit/s	105
56 Mbit/s	110
38.4 Mbit/s	120
19.2 Mbit/s	150
9.6 Mbit/s	200

[b] The default values for Point-to-Point are: Hello Interval = 15, Dead Interval = 60, Retransmit Interval = 10. For Point-to-Point configurations, Priority is not configured.

IP Routed X.25 PDN Network

Figure 7



Example IP PDN Network

- ↳ See Figure 7 Router A
- ↳ This example is RIP based routing.
 - ✓ Disable bridging for each port. See Configuration 1.
 - ✓ Configure LAN port IP address **1.1.0.1**
 - ✓ Configure Subnet mask **255.255.0.0**
 - ✓ Configure WAN port IP address **1.2.0.1**
 - ✓ Configure WAN port Subnet mask **255.255.0.0**
 - ✓ Hot Key (/ E) and change address resolution to **PDN**.
 - ✓ Configure the WAN Port to **LAPB**.
 - ✓ Configure WAN Port Parameter for **PDN**.
 - ✓ Hot Key (/ L) to input local (X.121) address of **1234**. See Configuration 3.
 - ✓ Map IP address **1.2.0.2** to **2345**. See Configuration 4.
 - ✓ Select broadcast **Yes** (for RIP)
 - ✓ Return to quick configuration
- ↳ Save configuration and exit.
- ↳ See Figure 7 Router B
 - ✓ Disable bridging for each port. This must be the same as Router A. See Configuration 2.
 - ✓ Configure LAN port IP address **1.3.0.1**
 - ✓ Configure Subnet mask **255.255.0.0**
 - ✓ Configure WAN port IP address **1.2.0.2**
 - ✓ Hot Key (/ E) and change address resolution to **PDN**.
 - ✓ Configure WAN port Subnet mask **255.255.0.0**
 - ✓ Configure the WAN Port to **LAPB**.

- ✓ Configure WAN Port Parameter for **PDN**.
 - ✓ Hot Key (/ L) to input local (X.121) address of **2345**. See Configuration 3.
 - ✓ Input IP address mapping **1.2.0.1** mapped to **1234**. See Configuration 4.
 - ✓ Select broadcast Yes (for RIP)
- ↳ Save configuration and exit.

Configuration 1

System name: ROUTER_A						
IP host-only: NO		SNMP enabled: YES		Inbound Telnet enabled: YES		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	Enab	Address	Subnet Mask	Network	Conf	Parameters
Ethernet 1		1.1.0.1	255.255.0.0			
WAN 1		1.2.0.1	255.255.0.0		LAPB	PDN

Example Quick Configuration Screen Router A

Configuration 2

System name: ROUTER_B						
IP host-only: NO		SNMP enabled: YES		Inbound Telnet enabled: YES		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	Enab	Address	Subnet Mask	Network	Conf	Parameters
Ethernet 1		1.3.0.1	255.255.0.0			
WAN 1		1.2.0.2	255.255.0.0		LAPB	PDN

Example Quick Configuration Screen Router B

Configuration 3

```

===== SESSION 1 - MGR MODE =====
Configuration Editor
Lower Circuit Name : WAN1

Max Queue Size : 10           MTU Size : 590
Upper Circuit Name : WAN1U     Local DTE Address : 1234  Note: This entry is 2345
                                on Router B.

Closed User Group : No

1. X.25 Address Map (0)

Enter Selection (0 for Previous Menu) : 1__

No X.25 Address Map record(s) found
Do you wish to add X.25 Address Map record(s)? Yes

```

Example Quick Configuration Screen Router B

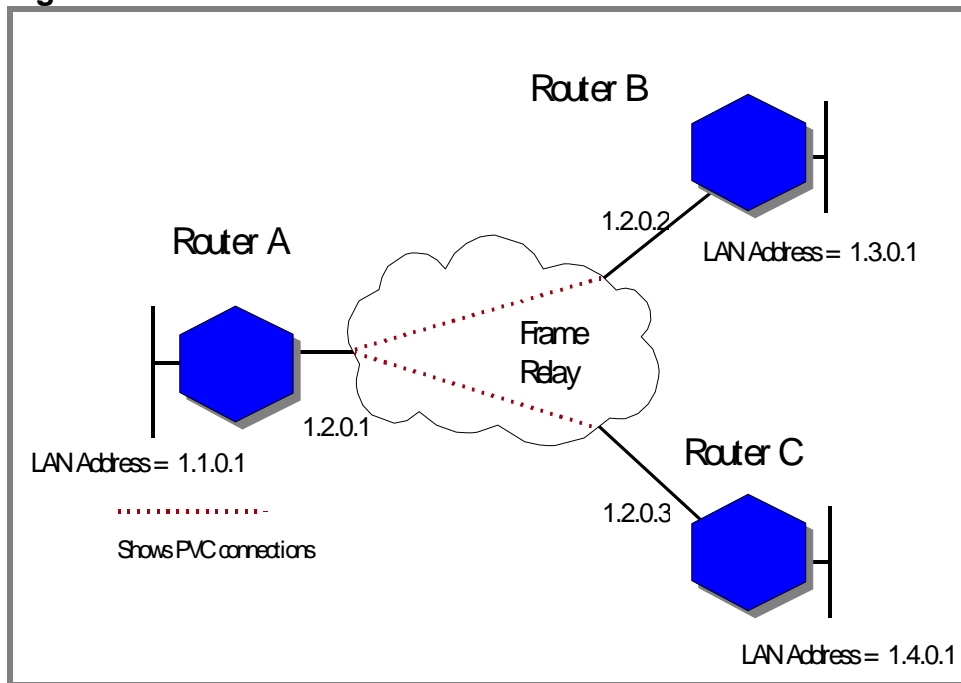
Configuration 4

```
===== SESSION 1 - MGR MODE =====  
Configuration Editor  
IP Address : 1.2.0.2                    X.121 Address : 2345                    Note: These entries are  
Broadcast : Yes                        Max Conns : 2                         1.2.0.1 and 1234 on  
Min Idle Time (secs) : 10              Max Idle Time (secs) : 120           Router B.  
Call Retry Time (secs) : 60  
Flow Ctrl : Deflt  
  
Hit Return to Continue
```

Example X.25 Address Map Record for Router A

IP Routed Network with Frame Relay WAN, Star

Figure 8



Example IP Frame Relay Star Network

- See figure 8 Router A and Configuration 1.
- This example is RIP based routing.
 - ✓ Disable bridging for each port.
 - ✓ Configure LAN port IP address **1.1.0.1**
 - ✓ Configure Subnet mask **255.255.0.0**
 - ✓ Configure WAN port IP address **1.2.0.1**
 - ✓ Configure WAN port Subnet mask **255.255.0.0**
 - ✓ Hot Key (/ E) to edit WAN IP parameters. See Configuration 4.
 - ✓ Configure Poisoned Reverse/Split Horizon to **None**. See Configuration 4.
 - ✓ Configure the WAN Port Conf to **FR**.
 - ✓ Hot Key (/ E) if necessary. Configure Management Type only if LMI (the default) is not the Local Management Interface required by your carrier.
- Save configuration and exit.
- See figure 8 Router B and Configuration 2.
 - ✓ Disable bridging for each port.
 - ✓ Configure LAN port IP address **1.3.0.1**
 - ✓ Configure Subnet mask **255.255.0.0**
 - ✓ Configure WAN port IP address **1.2.0.2**
 - ✓ Configure WAN port Subnet mask **255.255.0.0**
 - ✓ Configure the WAN Port to **FR**.
 - ✓ Hot Key (/ E) if necessary. See clarification above.
- Save configuration and exit.
- See figure 8 Router C

- ✓ Disable bridging for each port.
- ✓ Configure LAN port IP address **1.4.0.1**
- ✓ Configure Subnet mask **255.255.0.0**
- ✓ Configure WAN port IP address **1.2.0.3**
- ✓ Configure WAN port Subnet mask **255.255.0.0**
- ✓ Configure the WAN Port to **FR**.
- ✓ Hot Key (/ E) if necessary. See clarification above.

↳ Save configuration and exit.

Configuration 1

System name: ROUTER_A						
IP host-only: NO		SNMP enabled: YES		Inbound Telnet enabled: YES		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	<u>Enab</u>	<u>Address</u>	<u>Subnet Mask</u>	<u>Network</u>	<u>Conf</u>	<u>Parameters</u>
Ethernet 1		1.1.0.1	255.255.0.0			
WAN 1		1.2.0.1	255.255.0.0		FR	

Example Quick Configuration Screen Router A

Configuration 2

System name: ROUTER_B						
IP host-only: NO		SNMP enabled: YES		Inbound Telnet enabled: YES		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	<u>Enab</u>	<u>Address</u>	<u>Subnet Mask</u>	<u>Network</u>	<u>Conf</u>	<u>Parameters</u>
Ethernet 1		1.3.0.1	255.255.0.0			
WAN 1		1.2.0.2	255.255.0.0		FR	

Example Quick Configuration Screen Router B

Configuration 3

System name: ROUTER_C						
IP host-only: NO		SNMP enabled: YES		Telnet enabled: YES		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	<u>Enab</u>	<u>Address</u>	<u>Subnet Mask</u>	<u>Network</u>	<u>Conf</u>	<u>Parameters</u>
Ethernet 1		1.4.0.1	255.255.0.0			
WAN 1		1.2.0.3	255.255.0.0		FR	

Example Quick Configuration Screen Router C

Configuration 4

===== SESSION 1 - MGR MODE =====

Configuration Editor

Internet Address : 1.2.0.2

Subnet Mask : 255.255.0.0

Circuit Group : WAN1G

Receive Broadcast : Network and Subnet

Transmit Broadcast : All Ones

Address Resolution : ARP & HP Probe

Normal ARP : Yes

Proxy ARP : Yes

Host Cache : No

UDP Checksum Off : No

RIP Supply : Yes

RIP Listen : Yes

Default Route Supply : No

Default Route Listen : No

Poisoned Reverse/Split Horizon : None 

RIP Interface Cost : 1

Address Mask Reply : No

MTU Discovery Option : No

Load Balancing : No

ASB Flood : No

Source Route (Token Ring) : No

 Note: This parameter can be left at Poison for Routers B and C.

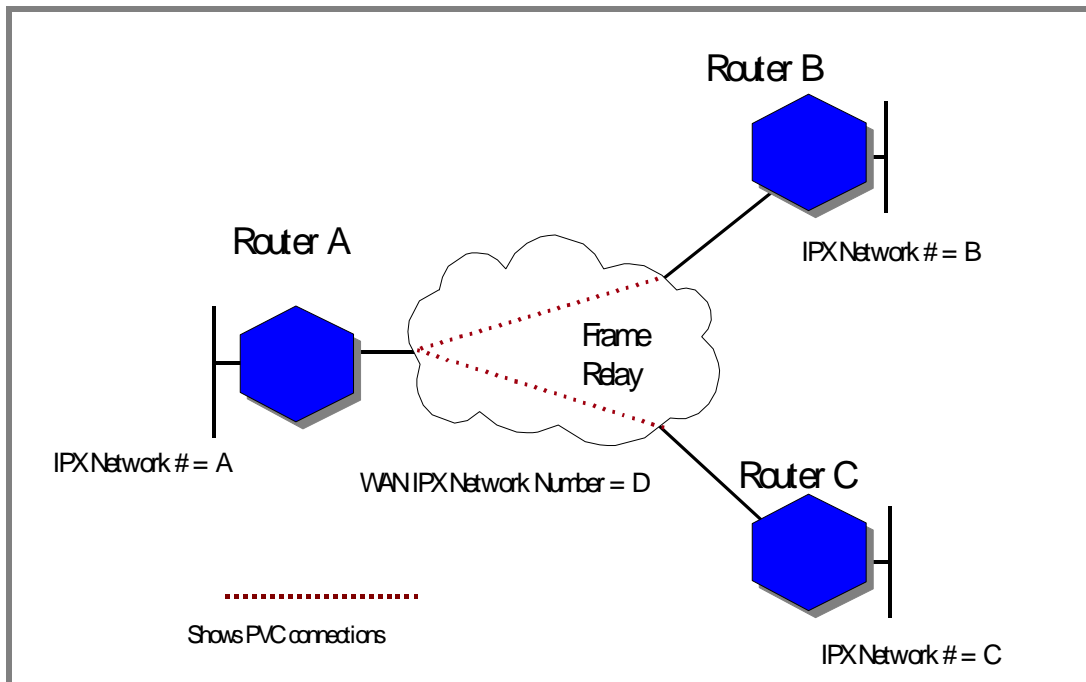
1. Traffic Filters (0)

Enter Selection (0 for Previous Menu) : _____

Example Full Configuration Screen of IP for Frame Relay on Router A

IPX Routed Network with Frame Relay WAN, Star

Figure 9



Example IPX Frame Relay Star Network

- ↳ See figure 9 Router A
- ↳ This example is RIP based routing.
 - ✓ Disable bridging for each port.
 - ✓ Configure LAN port IPX Network Number to **A**.
The default frame type chosen by quick configuration is '802.3 Raw (Novell)', which Novell calls Ethernet_802.3. To change the frame type go back to the IPX Network field just entered and use the Hot Key /E (Edit other IPX parms).
 - ✓ Configure WAN port IPX address to **D**
See clarification above.
 - ✓ Hot Key (/ E) to configure RIP and SAP split horizon to **No**. No need to do this step on routers B and C. See Configuration 4.
 - ✓ Configure the WAN Port Conf to **FR**.
 - ✓ Hot Key (/ E) if necessary. Configure WAN Port Parameter only if LMI, the default, is not the Local Management Interface required by the carrier.
- ↳ Save configuration and exit.
- ↳ See figure 9 Router B
 - ✓ Disable bridging for each port.
 - ✓ Configure LAN port IPX address **B**.
See clarification above.
 - ✓ Configure WAN port IPX address to **D**
See clarification above.
 - ✓ Configure the WAN Port Conf to **FR**.
 - ✓ Hot Key (/ E) if necessary. See clarification above.

- Save configuration and exit.
- See figure 9 Router C
 - ✓ Disable bridging for each port.
 - ✓ Configure LAN port IPX address **C**.
See clarification above.
 - ✓ Configure WAN port IP address to **D**
See clarification above.
 - ✓ Configure the WAN Port to **FR**.
 - ✓ Hot Key (/ E) if necessary. See clarification above.
- Save configuration and exit.

Configuration 1

System name: ROUTER_A						
IP host-only: NO		SNMP enabled: Yes		Inbound Telnet enabled: Yes		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	Enab	Address	Subnet Mask	Network	Conf	Parameters
Ethernet 1				A		
WAN 1				D	FR	

Example Quick Configuration Screen Router A

Configuration 2

System name: ROUTER_B						
IP host-only: NO		SNMP enabled: Yes		Inbound Telnet enabled: Yes		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	Enab	Address	Subnet Mask	Network	Conf	Parameters
Ethernet 1				B		
WAN 1				D	FR	

Example Quick Configuration Screen Router B

Configuration 3

System name: ROUTER_C						
IP host-only: NO		SNMP enabled: Yes		Inbound Telnet enabled: Yes		
	Brg	DoD IP	DoD IP	IPX	Port	WAN Port
	Enab	Address	Subnet Mask	Network	Conf	Parameters
Ethernet 1				C		
WAN 1				D	FR	

Example Quick Configuration Screen Router C

Configuration 4

```
===== SESSION 1 - MGR MODE =====  
Configuration Editor  
  
Network Number : D  
RIP Supply : Yes  
RIP Interface Cost : 1  
WAN SAP Period (mins) : 1  
Deliver NETBIOS Bcasts to net : Yes  
SAP driven RIP supply : No  
Random load balancing : No  
  
Circuit Group : WAN1G  
RIP Listen : Yes  
Encapsulation type : 802.3 Raw (Novell)  
Accept NETBIOS Bcasts from net : Yes  
Source Route (Token Ring) : No  
RIP and SAP split horizon : No  
IPXWAN : No  
  
Note: This parameter can be left at  
Yes for Routers B and C.  
  
1. SAP Network Level Filter Definitions (0)  
2. SAP Server Level Filter Definitions (0)  
3. NETBIOS Broadcast Static Routes (0)  
4. Traffic Filters (0)
```

Example Full Configuration Screen for Frame Relay on Router A