Article ID: 1390

Q&A

How do I setup an Atlas 550/800 Plus/810 Plus for voice compression and IP over frame relay?

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A:

Introduction

The ATLAS Voice Compression Module combines with other ATLAS components to allow voice and fax traffic to share the same lines as data and LAN traffic. A single Voice Compression Module simultaneously compresses up to 30 channels for the ATLAS 550 and up to 32 channels for the ATLAS 800^{PLUS}/810^{PLUS} for transmission over public or private frame relay networks or dedicated leased lines. Voice and data traffic integration yields a dramatic reduction in communication expenses.

The ATLAS 800^{PLUS}/810^{PLUS} Voice Compression Module (VCOM) occupies a single slot in the chassis and is available in 8, 16, 24, and 32-channel configurations. A single ATLAS 800^{PLUS}/810^{PLUS} system with multiple Voice Compression Modules installed can simultaneously compress up to 64 channels of voice. The ATLAS 550 Voice Compression Module is a plug-on board for a user interface module occupying a single slot and is available in 4, 8, 16, and 24-channel configurations. A single ATLAS 550 system with multiple Voice Compression Modules installed can simultaneously compress up to 30 channels of voice.

The ATLAS Voice Compression Module interoperates with ADTRAN's Frame Relay Access Device (FRAD) products, such as the Express 5200/5210 or ATLAS 550, when the FRADs are equipped with FXS or FXO cards. Channelized T3, T1, Primary Rate ISDN (PRI), or Basic Rate ISDN (BRI) circuits provide network access to the ATLAS Voice Compression Module.

The ATLAS Voice Compression Module automatically detects fax transmissions and locally demodulates the fax, sending the baseband component of the fax over the link.

Before You Begin

Before configuring the ATLAS 550/800^{PLUS}/810^{PLUS} and Express 5200/5210s, the following information must be obtained from the frame relay service provider:

1. Frame relay signaling method (Annex D, Annex A, or LMI)
2. Data Link Connection Identifiers (DLCI) for each site

You must also have an ATLAS 800^{PLUS}/810^{PLUS} with active frame relay software and a VCOM module. The ATLAS 550 comes with the frame relay software already active, but will also require a VCOM plug-on module.

Overview

This technical note shows the configuration for a host ATLAS 800PLUS that provides IP data and compressed voice traffic to two remote Express 5210s with dual FXS cards over frame relay. The host ATLAS will direct IP data to its internal router and switch voice to the Private Branch Exchange (PBX). The remote Express 5210 will direct IP data to an external router and switch voice to the appropriate FXS port. The network diagram shown in Figure 1 will be used as an example.

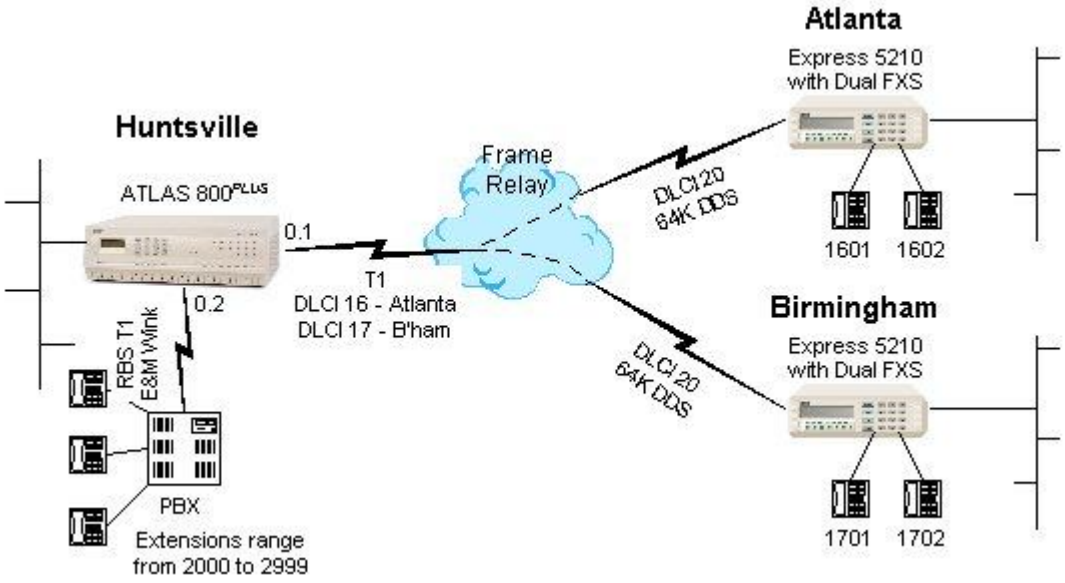

Figure 1

Configuration

Configuring System Timing

Under **System Config**, configure **Primary Timing Source** to take timing from the frame relay network. **Backup Timing Source** may be left as *Internal* which is the default. In the example network of Figure 1, the frame relay line is connected to Slot 0, Port 1. Therefore, the timing will be configured as shown in Figure 2 below.

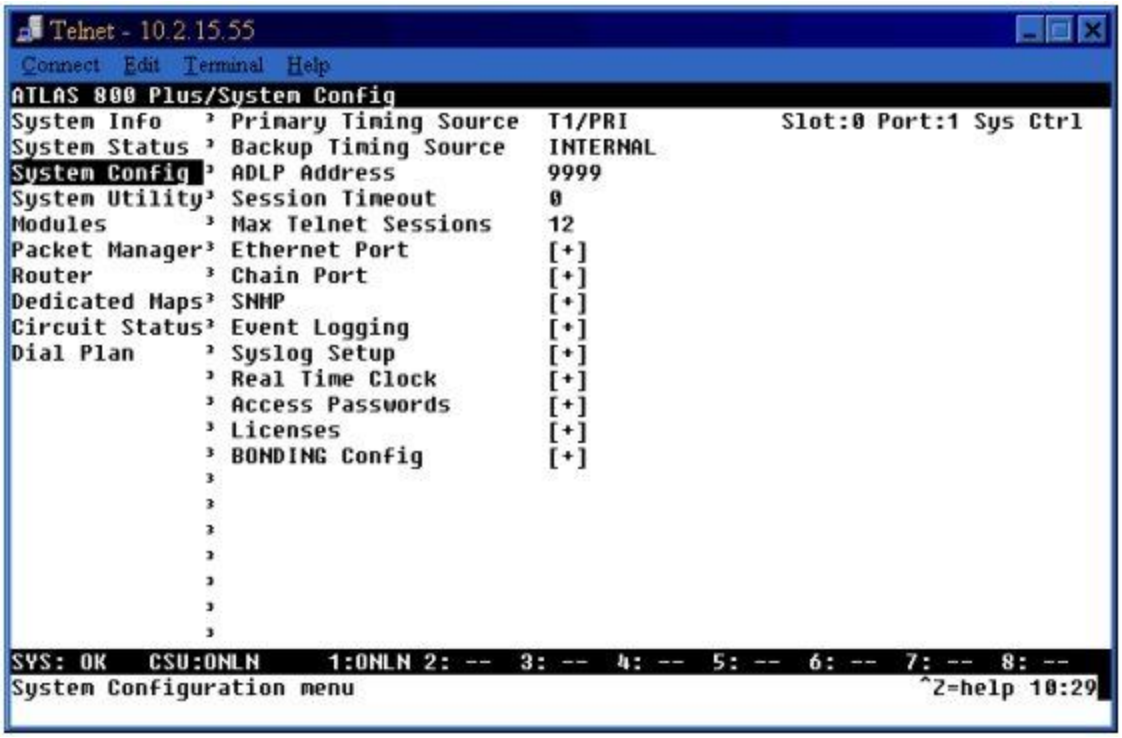

Figure 2

Configuring Packet Endpoints

The ATLAS uses **Packet Endpoints** to terminate frame relay connections.

1. From the main menu go to **Packet Manager/Packet Endpnts/Config**.
2. Press the right arrow. A new entry will automatically be created. If an entry already exists, highlight the line item number and press the '**I**' key to insert a new entry. The '**D**' key may be used to delete an entry.
3. Change the **Endpnt Name** to reflect something meaningful. In Figure 3, the **Endpnt Name** is *FR*.
4. Change the Protocol to Frame Relay.
5. Press <enter> on the **[+]** symbol in the **Config** column.

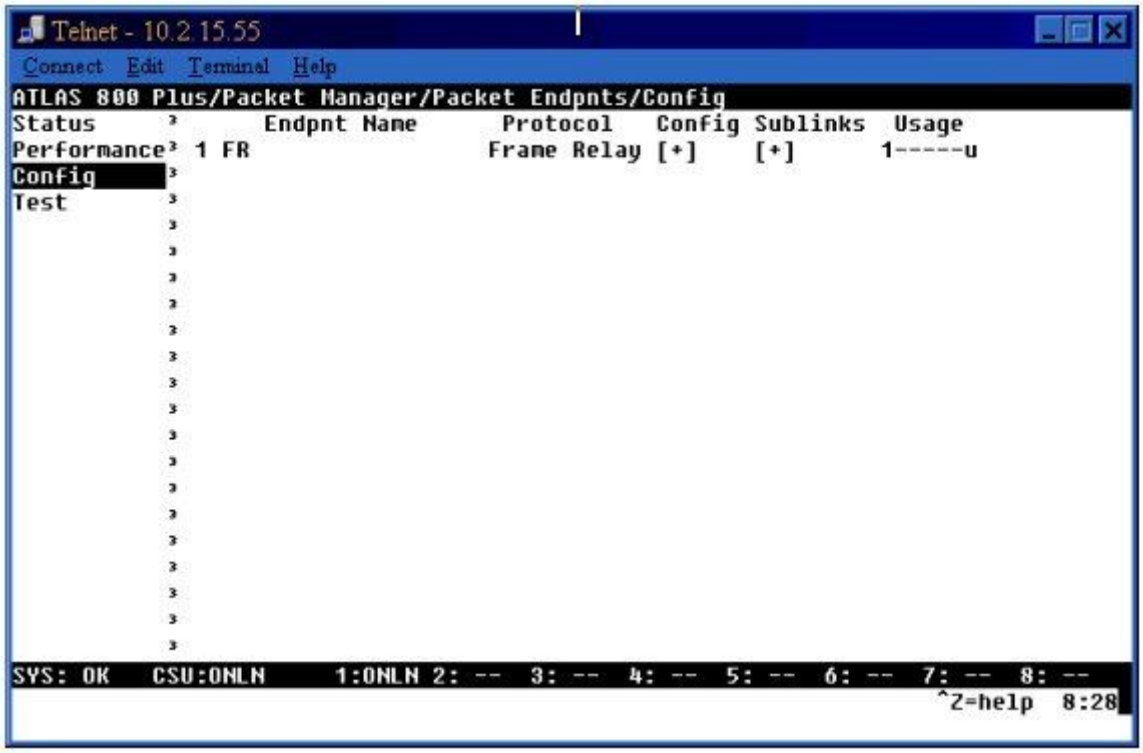

Figure 3

6. Change the **Signaling Role** to **User**. This tells the ATLAS that the endpoint will be connected to a Telco-provided frame relay service.
7. Select the proper **Signaling Type** as provided by the frame relay service provider. This sets the frame relay signaling type for this endpoint only and is independent of other interfaces on the ATLAS. See Figure 4.
8. Leave the remaining options set to the default values and use the left arrow key to go back to the previous screen.

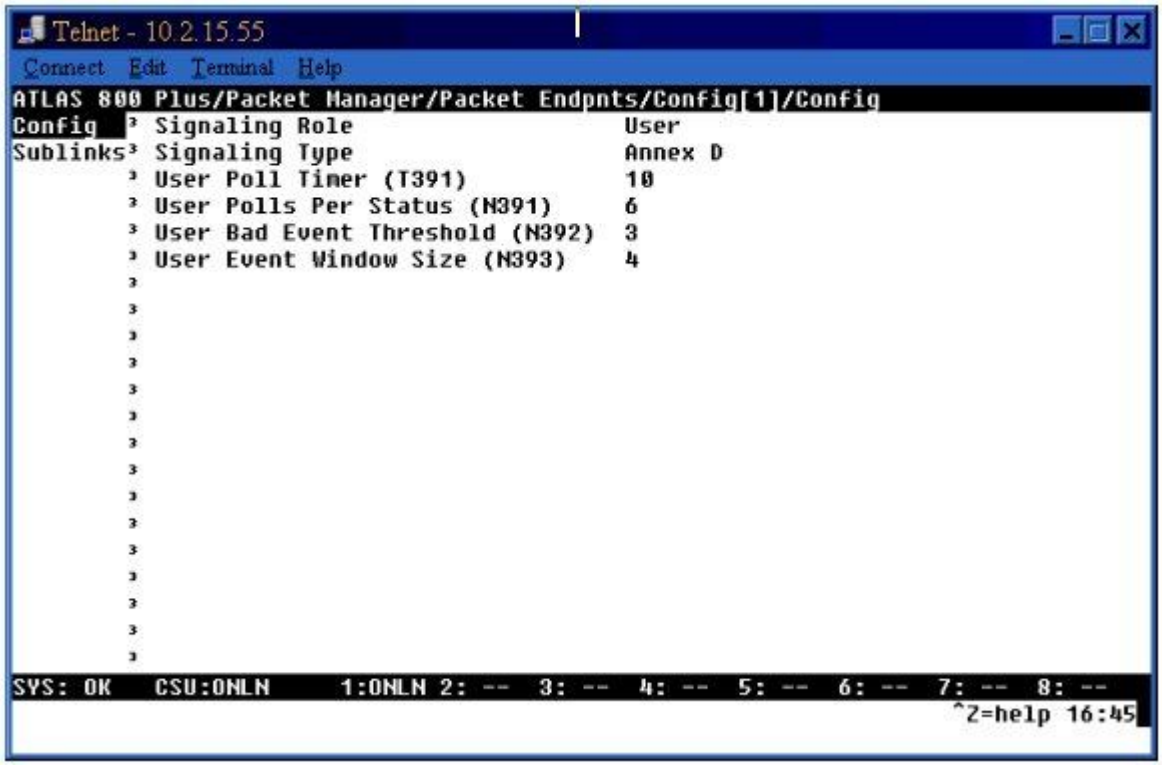

Figure 4

9. Press <enter> on the **[+]** symbol in the Sublinks column.
10. Create a new entry for each Permanent Virtual Circuit (PVC) on this frame relay line.
11. Name the sublink after the remote site to which you are connecting.
12. Set the **DLCI** to access that remote site. Configure the **DLCI** field to the local **DLCI** number the ATLAS should use to access that remote site. See Figure 5.
13. Set the **QOS** and **Burst** for each PVC. These fields limit the amount of bandwidth that data traffic will consume, so that voice traffic will have enough bandwidth to be transmitted in a time-sensitive manner. **QOS** represents the bandwidth in Kbps to be used by this PVC for data traffic. It is a guaranteed bandwidth for that PVC. A value of zero **QOS** means that data traffic on this PVC will not be limited. **Burst** represents the bandwidth in Kbps that the data traffic can burst up to. A value of zero **Burst** means that the bursting of data traffic above the **QOS** will not be limited. For more information on**QOS** and **Burst**, highlight these fields and press **Ctrl-A**. Figure 5 shows that the *Atlanta* and *B'ham* sublinks have been configured for a **QOS** of 52 and a **Burst** of 54. This means that the data traffic will consume a maximum of 54Kbps on each PVC.

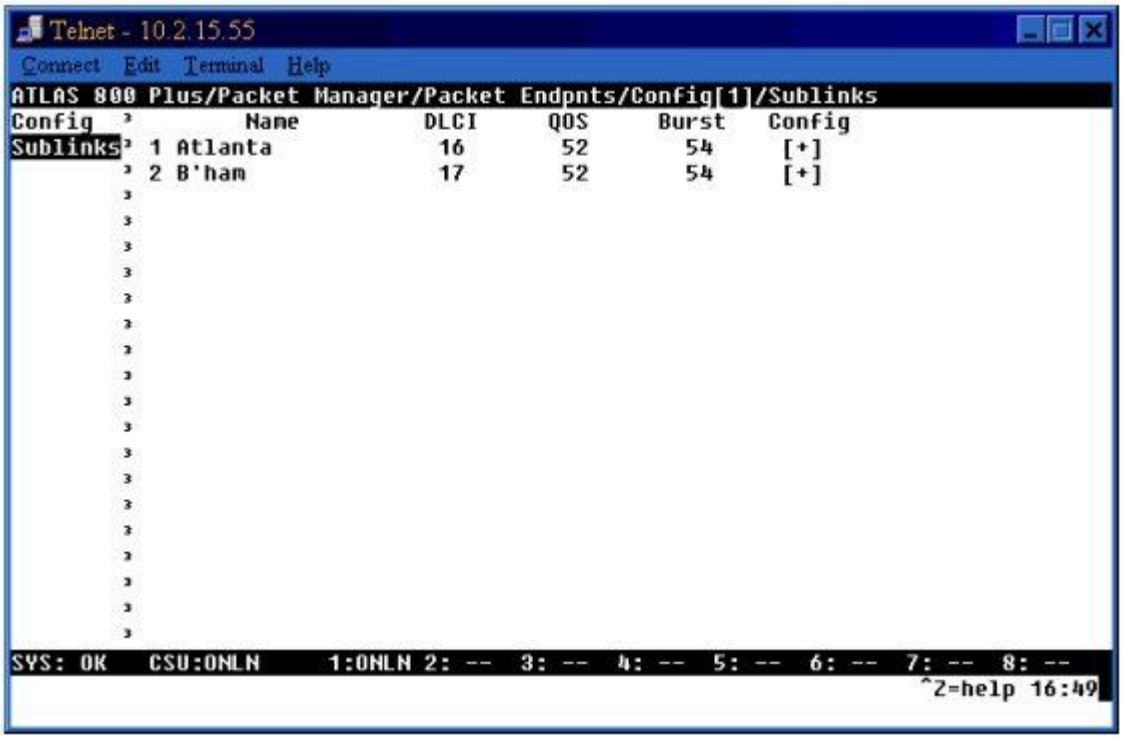

Figure 5

14. Press <enter> on **Config** then change the **Fragmentation Threshold** to 220. This field tells the ATLAS what packet size to use for each fragment. The far end Express 5210 will also be fragmenting the packets it transmits to a size of 220. Fragmentation of the packets allows packets to be transmitted quickly instead of having the long delay associated with a large packet. Whenever an application consists of data along with compressed voice, it is necessary to turn on fragmentation. See Figure 6.
15. Repeat steps 10 through 14 for the remaining sublinks.

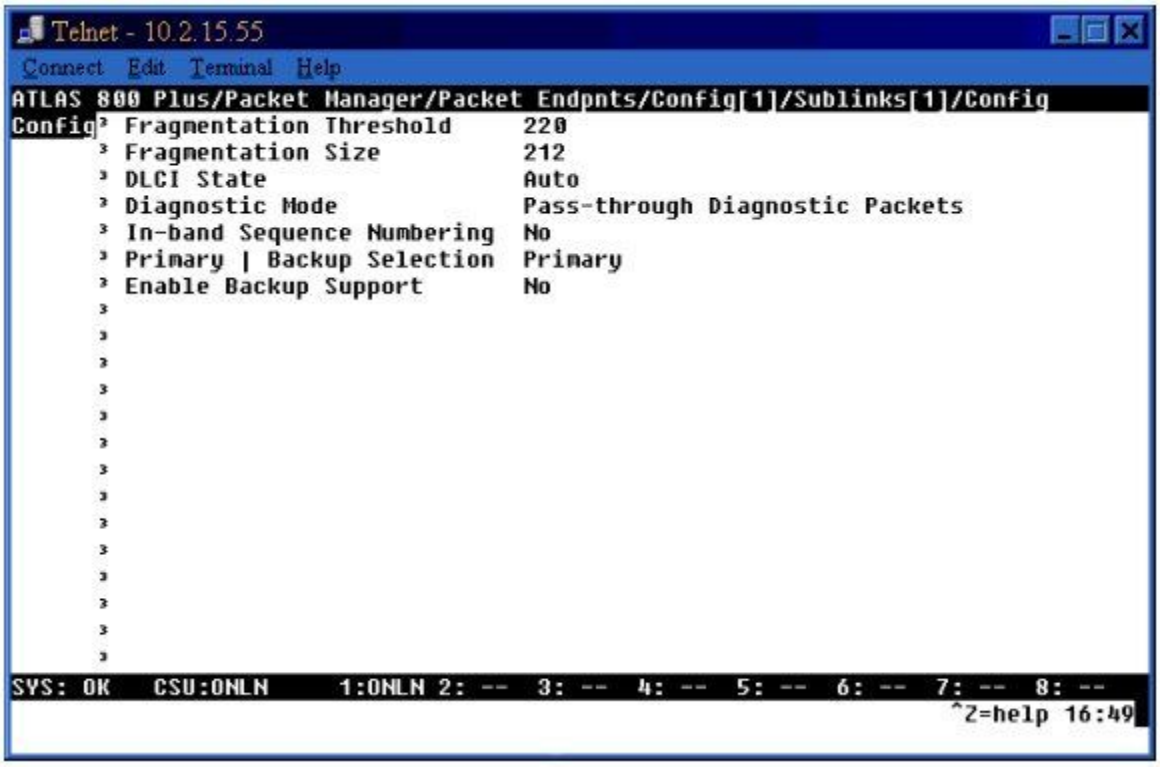

Figure 6

Configuring Packet Connects

After the packet endpoint is created and configured with the appropriate DLCIs, the endpoint needs to be linked. In this example, we will be using the ATLAS' internal router. This configuration will require a packet connect from the endpoint, *Atlanta* sublink, to the internal router, as well as a packet connect from the endpoint, *Birmingham* sublink, to the internal router (see Figure 7).

1. From the main menu, go to **Packet Manager/Packet Connects**.
2. Create a new entry.
3. Press <enter> on **FROM: PEP** and select the packet endpoint which is terminating the frame relay line.
4. Press <enter> **Sublink** and select the first sublink on that endpoint.
5. Press <enter> on **TO: PEP** and select *Router*. Notice that *Not Used* now appears in the corresponding **Sublink** field.
6. Press <enter> on **Protocol** and select *IP*.
7. Repeat steps 2 through 6 for each remaining sublink on the endpoint.

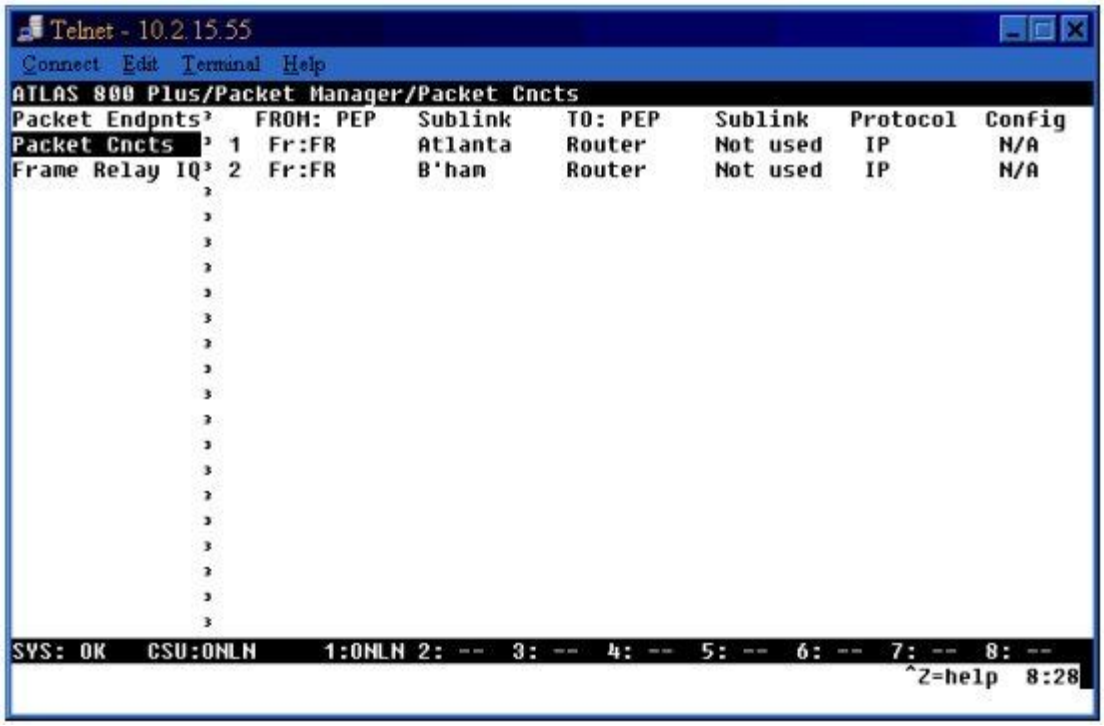

Figure 7

If implementing an application that does not use the internal router, an additional packet endpoint would need to be created for the external router, then a packet connect would be required between the primary frame relay endpoint and the external router endpoint.

Configuring Dedicated Maps

Now that the packet endpoint has been created and linked, the endpoint must be mapped to a physical port on the ATLAS.

1. From the main menu, go to **Dedicated Maps/Create-Edit Maps**.
2. Press <enter> on the **[Cncts=#]** option for Map 1. (# refers to the number of entries you have in the map.)
3. Insert a new entry into the map.
4. Under the **From Slt** and **Port** column, select the slot and port to which the frame relay circuit will be connected.
5. Under **To Slt**, select *PktEndpt*.
6. Under **To Prt/Pep**, select the packet endpoint created earlier which will terminate the frame relay circuit. See Figure 8.

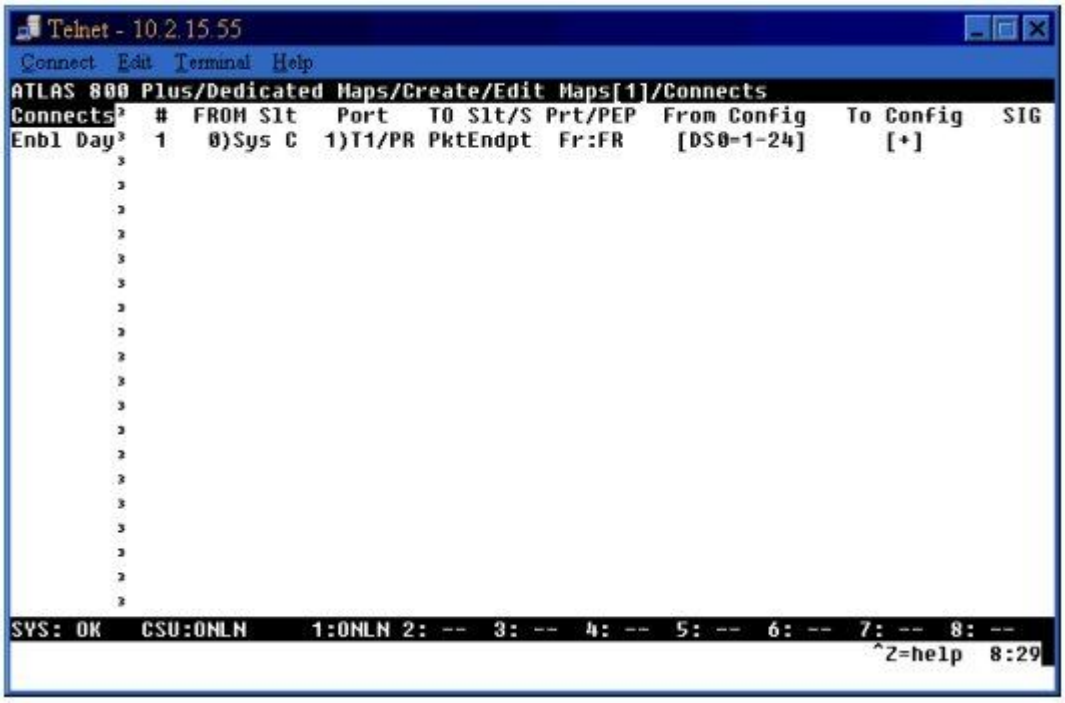

Figure 8

7. Press <enter> on the **From Config** option and the menu in Figure 9 will be displayed.

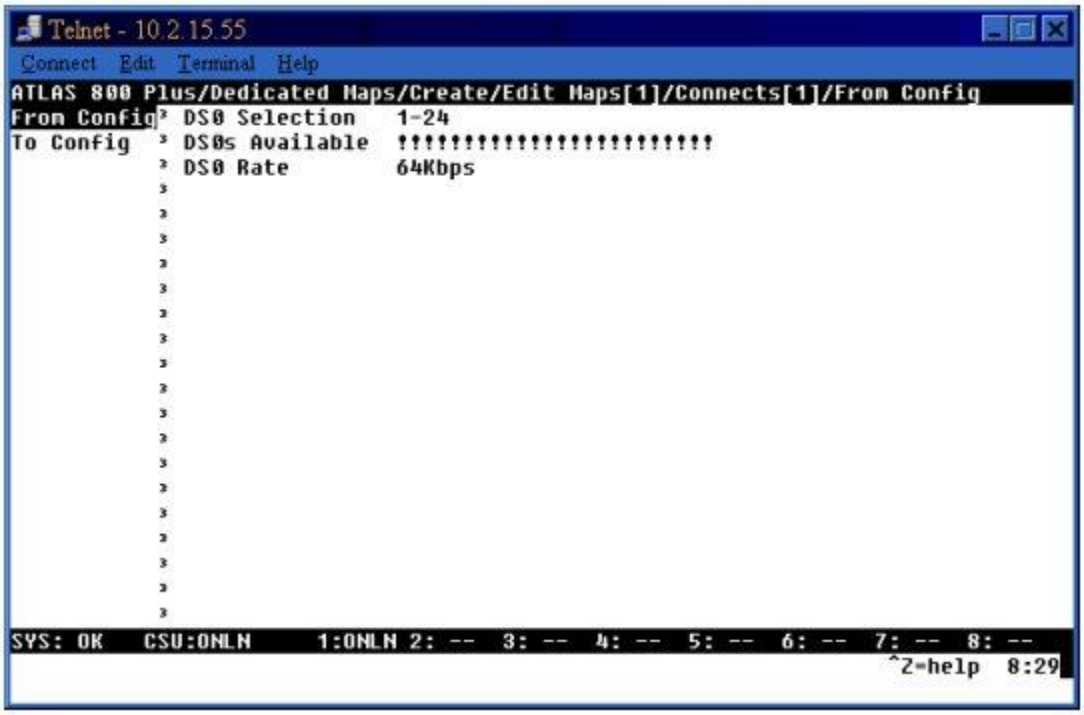

Figure 9

8. Press <enter> on **DS0 Selection** and change it to reflect the number of channels used for the frame relay connection. In the example network of Figure 1, all 24 channels will be used so 1-24 is entered in the **DS0 Selection** menu field.

Configuring the Router

For the example network in Figure 1, we will be using Inverse Address Resolution Protocol (**IARP**) in conjunction with Version 2 (V2) of the Routing Information Protocol (**RIP**) to dynamically learn and maintain the routing tables. **IARP** enables the router to learn the IP subnet on the far end of the PVC. The alternative to using **IARP** is using **Far End Address** which allows you to specify the IP subnet on the far end of the PVC. RIP V2 enables the router to advertise the IP subnets that it knows about to the routers at the far end, as well as receive routes that the far end routers advertise that they know about.

1. From the **Main Menu**, go to **Router/IP/Interfaces**. If you have a telnet session up, then the Ethernet port, **EN0 IP**, will already be configured with the **Address** and **Subnet Mask**.
2. In the example we will be using **IARP** and **RIP** on the frame relay connection to learn and maintain the **Routes** table. So for each DLCI listed in the **Interfaces** table, *FR (DLCI 16)* and *FR (DLCI 17)*, change **IARP** to *Enabled*. See Figure 10.

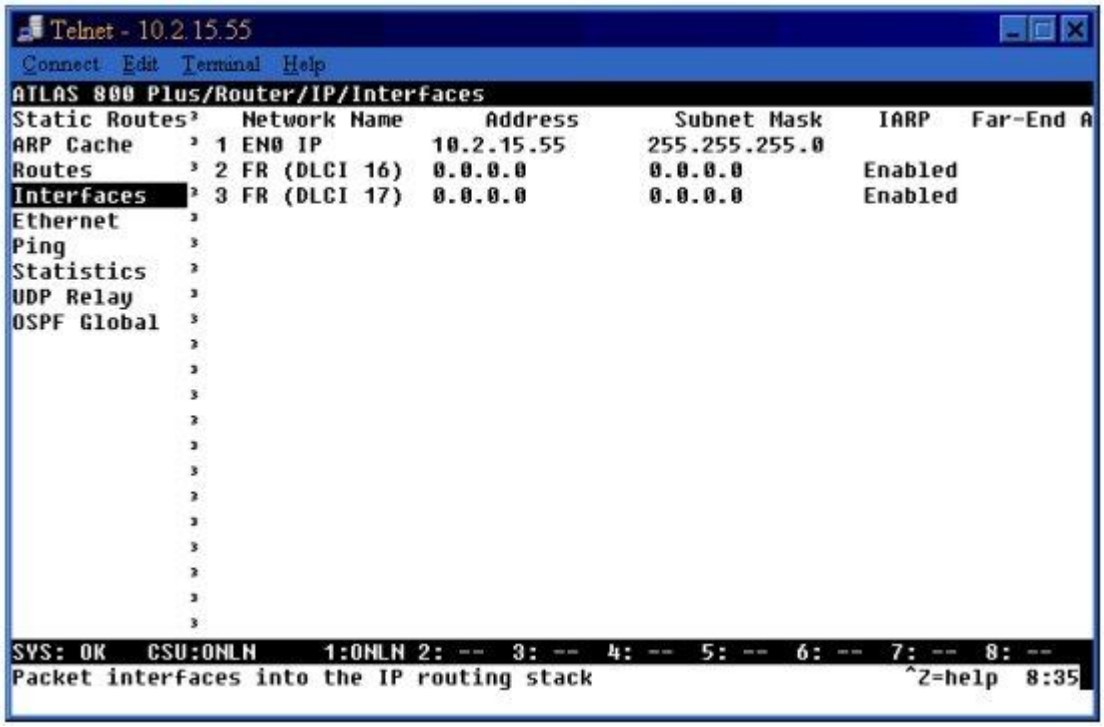

Figure 10

3. To enable **RIP** on *DLCI 16* and *DLCI 17*, use the right arrow key to navigate to the **RIP** column for each DLCI and press <enter> on the **[+]** symbol. Change **Mode** to *Tx* and *Rx*, then change **Protocol** to *V2*. See Figure 11.

Figure 11

4. Once the **IARP** and **RIP** packets have exchanged, you will then be able to see the updated routing table in the **Routes** menu.

Configuring Dial Plan

The **Dial Plan** will contain the configuration necessary to compress and uncompress the voice as well as route the voice calls based on the digits dialed.

1. From the **Main Menu**, go to **Dial Plan/User Term**.
2. Create a new entry.
3. Under **Slot/Svc**, select *PktVoice*.
4. Under **Port/PEP**, select the packet endpoint for the frame relay connection. For the example, the packet endpoint will be *FR*.
5. Press <enter> on **In#Accept** and configure the extension number for calls which should be routed to the remote site. This is the field in which phone numbers are assigned to each remote phone. For the Atlanta remote, the phone numbers will be 1601 for Line 1and 1602 for Line 2. For the Birmingham remote, the phone numbers will be 1701 for Line 1 and 1702 for Line 2. See Figure 12.

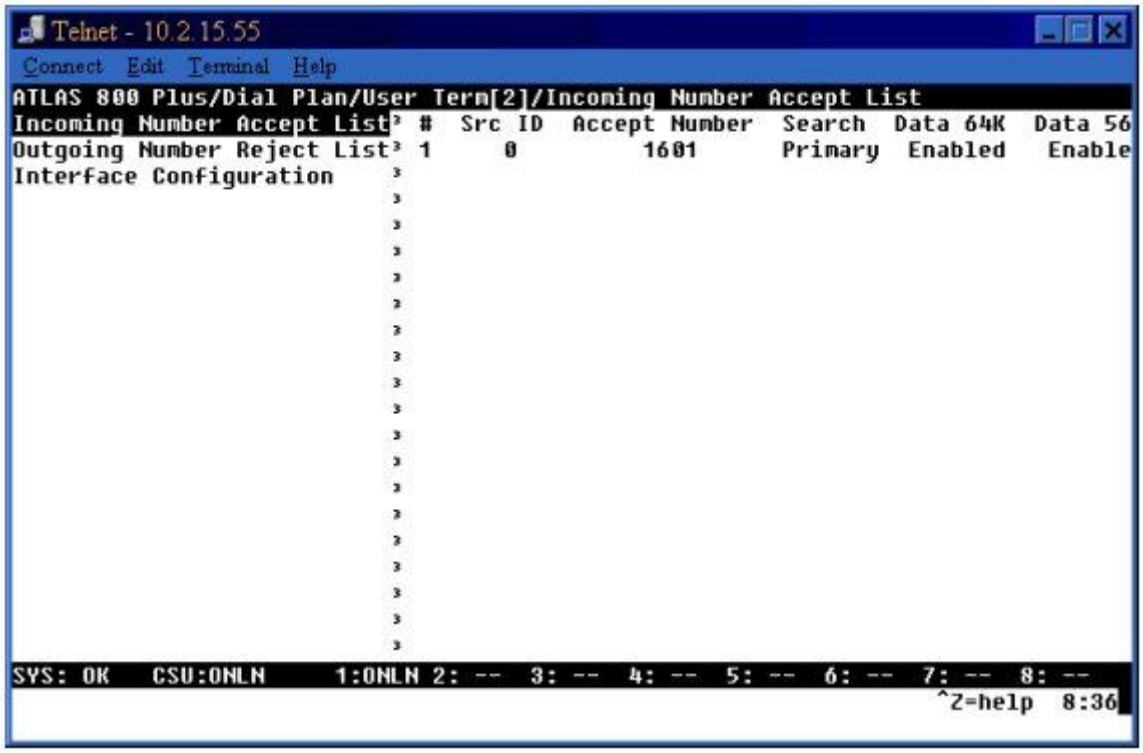

Figure 12

6. Press <enter> on **Ifce Config** to configure the specific options for this connection.
7. Press <enter> on **DLCI** and select the appropriate sublink for this specific connection.
8. Press <enter> on **Voice Port** and enter a value of 1. This option is used to send information to the remote site regarding which physical phone port to send the call to. **Voice Port** numbers must match on both the host and remote site. For example, FXS port L1 on an Express 5200 or 5210 corresponds to **Voice Port** *1* on the ATLAS, and FXS port L2 corresponds to **Voice Port** *2*.
9. **Conflict Report** is a status field that will display **OK** once the interface is configured and not in conflict with another entry.
10. **Voice Compression** sets the compression algorithm used across the frame relay link. It must match at both the host and remote site.
11. **Silence Suppression** is used to conserve bandwidth during an active call by not sending frames across the frame relay link when no one is talking.
12. **Signaling Method** must always be configured for *Loop Start* when connecting to an Express 5200 or 5210 with an FXS card.
13. When *Enabled*, **Direct Inward Dialing** will send digits out the interface. This option should be *Disabled* when connecting to an Express 5200 or 5210 since these devices do not look for digits in order to switch the incoming voice call to the appropriate port. The Express 5200 and 5210 use the voice port number instead of the dialed digits to route the call. See Figure 13.

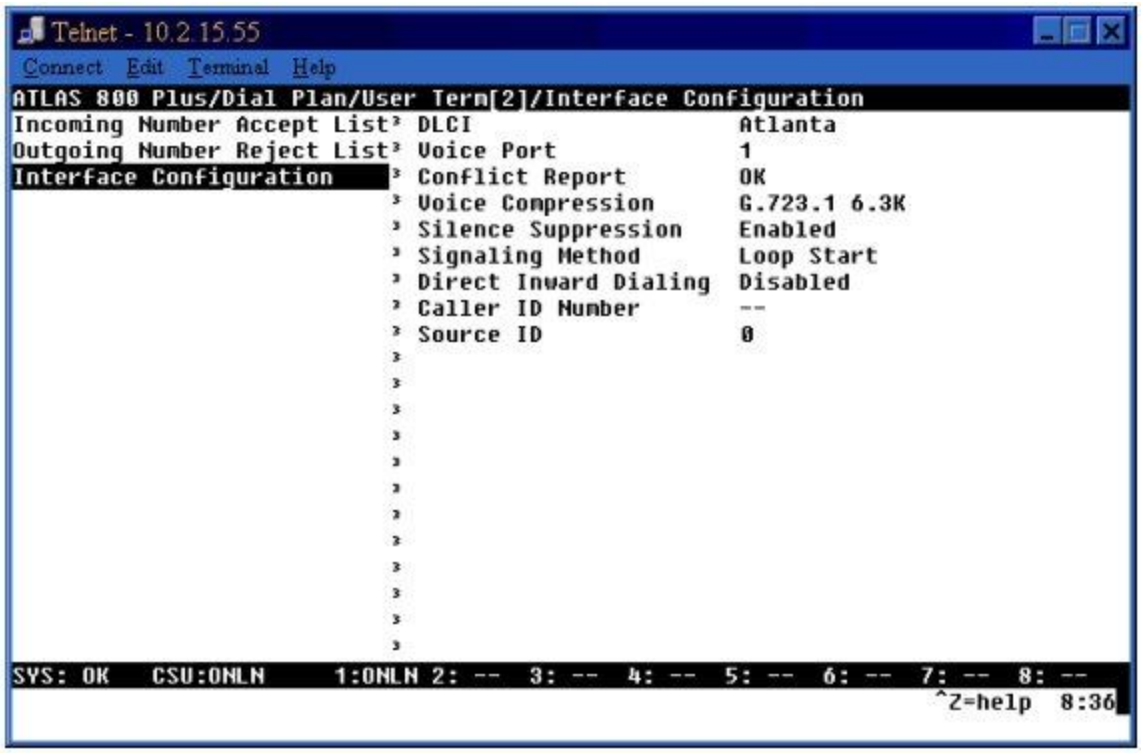

Figure 13

14. Go to the **User Term** menu again. Notice the contents of the **Ifce Config** option which is in the format of *"DLCI.VoicePort"*. This allows the user to see the **DLCI** and **Voice Port** that a call will be routed to when the **In#Accept** digits are dialed. See Figure 14.
15. Repeat steps 2 through 14 for each phone at the remote sites. For the example there should be 4 *PktVoice* entries representing the following phones:

    1) DLCI 16, Voice Port 1 - Atlanta remote, Line 1 ext. 1601
    2) DLCI 16, Voice Port 2 - Atlanta remote, Line 2 ext. 1602
    3) DLCI 17, Voice Port 1 - Birmingham remote, Line 1 ext. 1701
    4) DLCI 17, Voice Port 2 - Birmingham remote, Line 2 ext. 1702

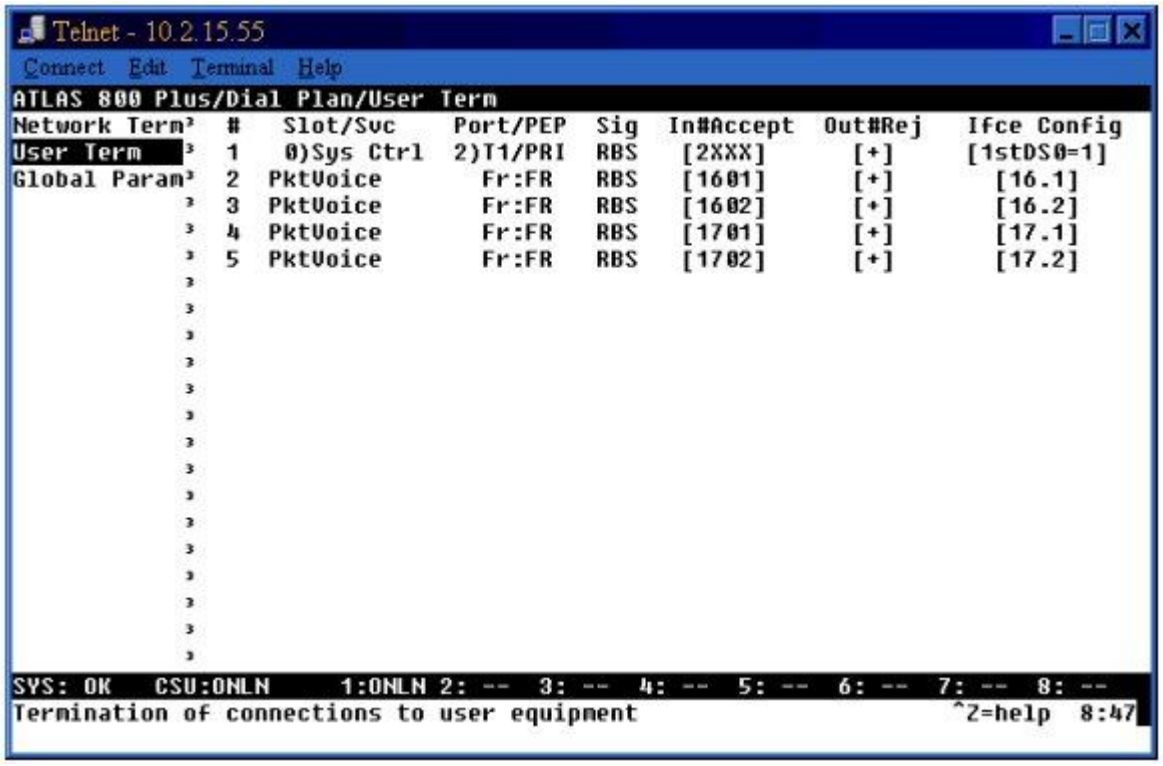

Figure 14

16. Now that the entries are complete for the frame relay connection, the connection to the PBX must be configured. Create another entry in the **User Term**.
17. Under **Slot/Svc** and **Port/PEP**, select the slot and port which is connected to the PBX. For the example network, this will be slot 0, port 2. See Figure 14.
18. Press <enter> on **Sig** and select the appropriate signaling for the PBX. For the example network, the PBX is doing robbed bit signaling so we will select *RBS*. See Figure 14.
19. Press <enter> on **In#Accept** and configure the extension number for calls which should be routed to the PBX. For the example network in Figure 1, the PBX extensions consist of numbers which range from 2000 to 2999, so the **In#Accept** entry is *2XXX*. The 'X' is a wildcard representing any digit 0 through 9. For more information on wildcards, highlight the **In#Accept** field and press **Ctrl-A**. See Figure 15.

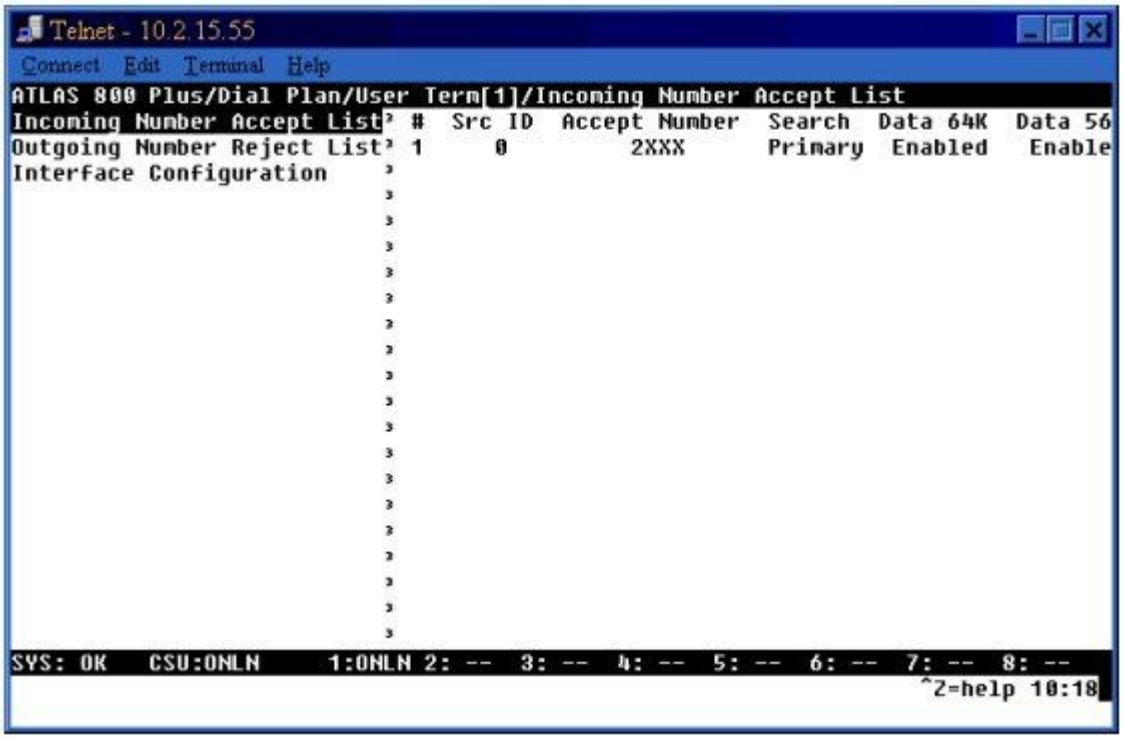

Figure 15

20. Go to **Ifce Config**. Configure the channel mappings. The example network is using all 24 channels on the T1 between the ATLAS and the PBX, therefore **First DS0** is *1* and **Number of DS0s** is *24*.
21. Press <enter> on **Signaling Method** and select the appropriate RBS signaling which matches the PBX. The example network's PBX is using *E&M* Wink so the ATLAS will be configured accordingly. See Figure 16.
22. Since the PBX will need to receive digits so that it may switch the incoming call to the appropriate port, the ATLAS will need to be configured to send digits to the PBX on that T1. This is accomplished by pressing <enter> on **Direct Inward Dialing** and selecting *Enabled*. The number of digits to be sent to the PBX must also be configured. In the example, 4-digit extensions are being used, therefore **DID Digits Transferred** must be set to *4*. See Figure 16.

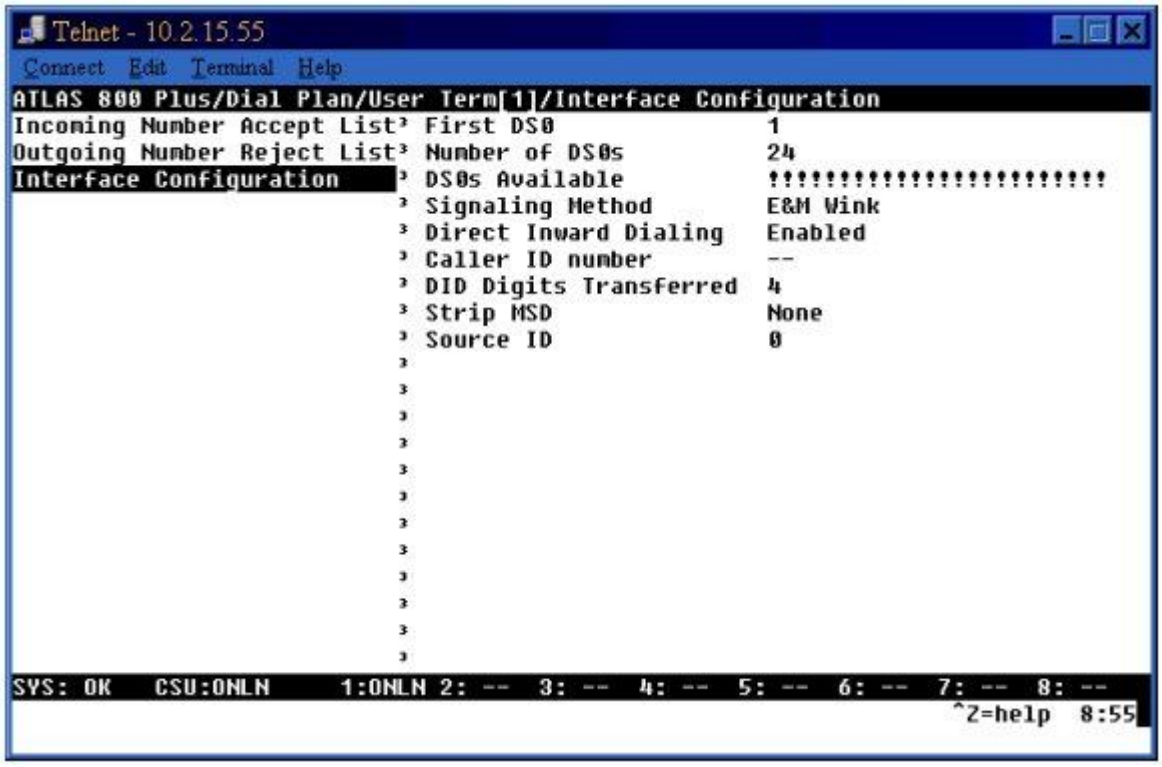

Figure 16

Configuring the Remote Express 5210

On the remote Express 5210s, IP data will be directed to the 10BaseT Ethernet port while the voice will be switched to the appropriate FXS port.

Configuring the Network Port on the Express 5210

1. Using a PC connected to the Control Port, login to the unit using the default password of "adtran".
2. From the **Main Menu**, go to **Configuration**, **Network Port**, then press <enter> on **Physical Layer Options**. Press <enter> on **Loop Rate** and change the option from *Auto* to the actual rate of the DDS line being provided by Telco. In the example network in Figure 1, the **Loop Rate** is *64K*. See Figure 17.

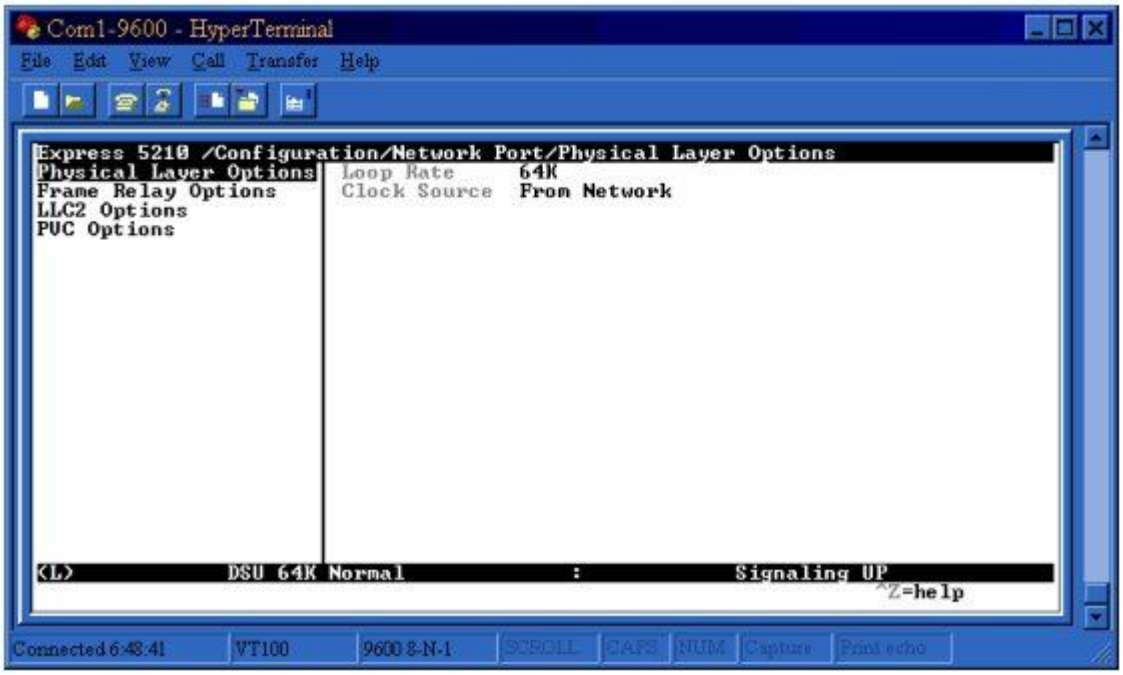

Figure 17

3. Return to the previous menu, go to **Frame Relay Options**, then press <enter> on **Signal Type**. Select the appropriate **Signal Type**, either **ANSI T1.617-D** or **LMI**, to match what the frame relay provider is using on their frame relay switch. In the example network, we will be using **ANSI T1.617-D** frame relay signaling. The remaining options should be left as their default values. See Figure 18.

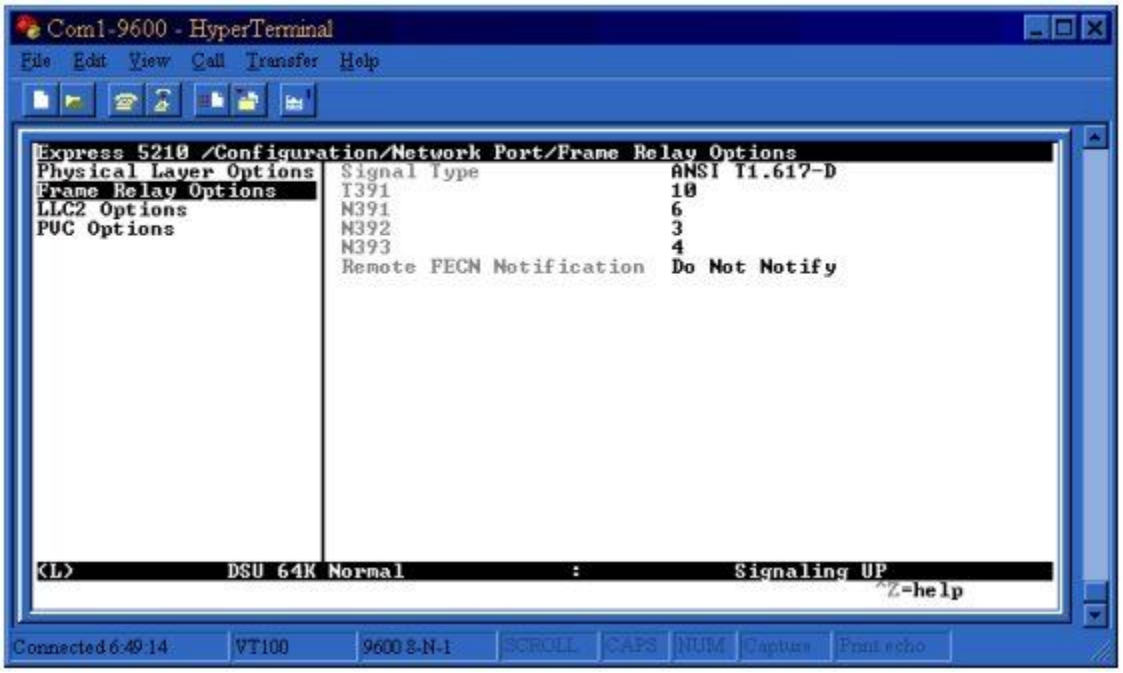

Figure 18

4. Return to the previous menu, then go to **PVC Options**. Create a new entry and enter the remote site's locally significant **DLCI** number for the DLCI option. For the example network in Figure 1, the DLCI should be 20. If the Committed Information Rate (**CIR**) is known for this PVC, enter the value in the **CIR** option field. For the example network, a **CIR** value of 16Kbps will be used. See Figure 19.

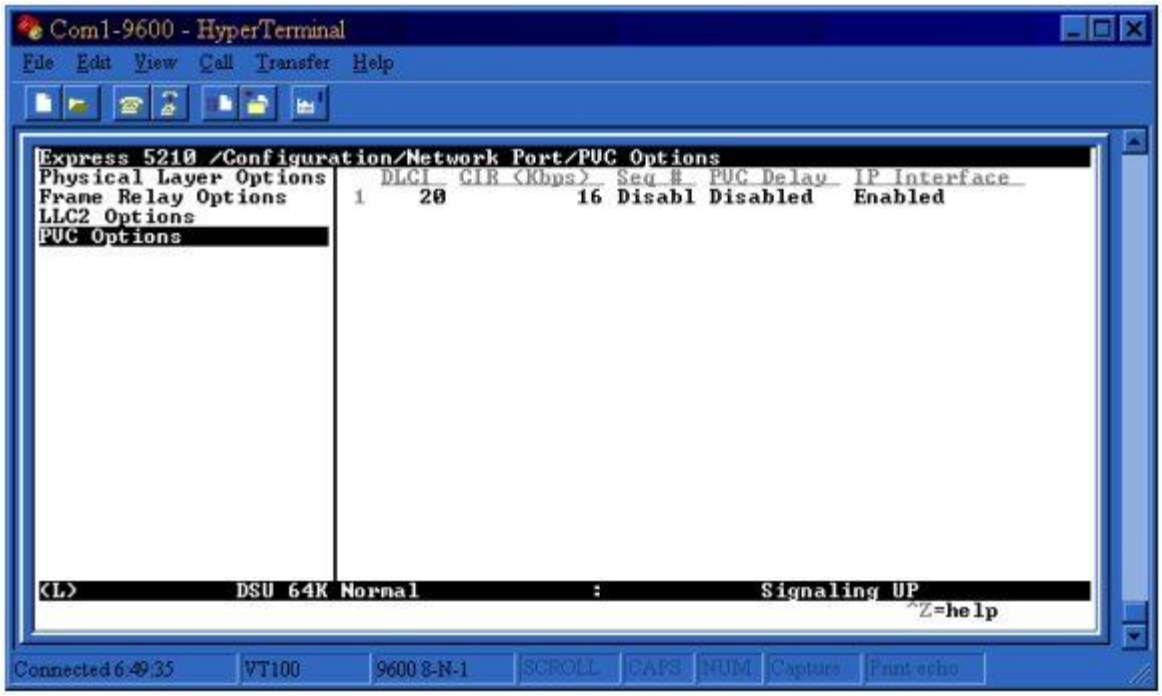

Figure 19

Configuring Voice on the Express 5210

1. From the main menu, go to **Configuration**, then press <enter> on **FXS Options**. Verify that the **Mode** is *Direct*. The **Mode** must be *Direct* to work with the ATLAS. See Figure 20.

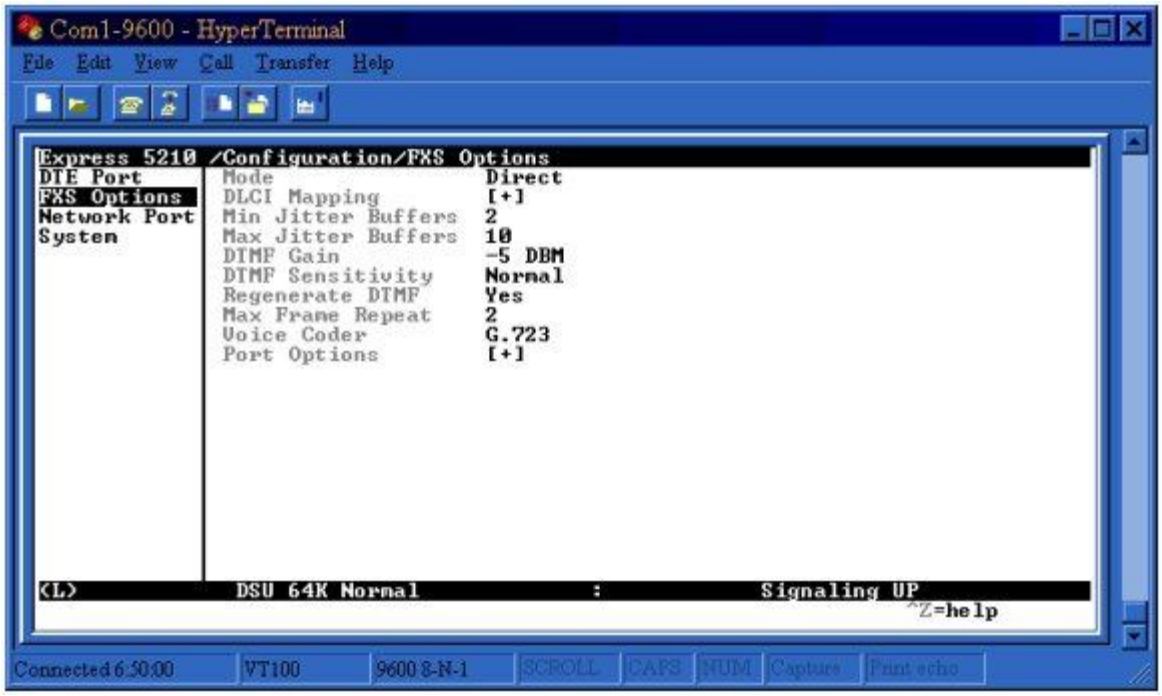

Figure 20

2. Press <enter> on **DLCI Mapping**. The DLCI entered for L1 and L2 should be the remote site's locally significant DLCI. For the example network in Figure 1, the DLCI for both voice ports is 20, as shown in Figure 21.

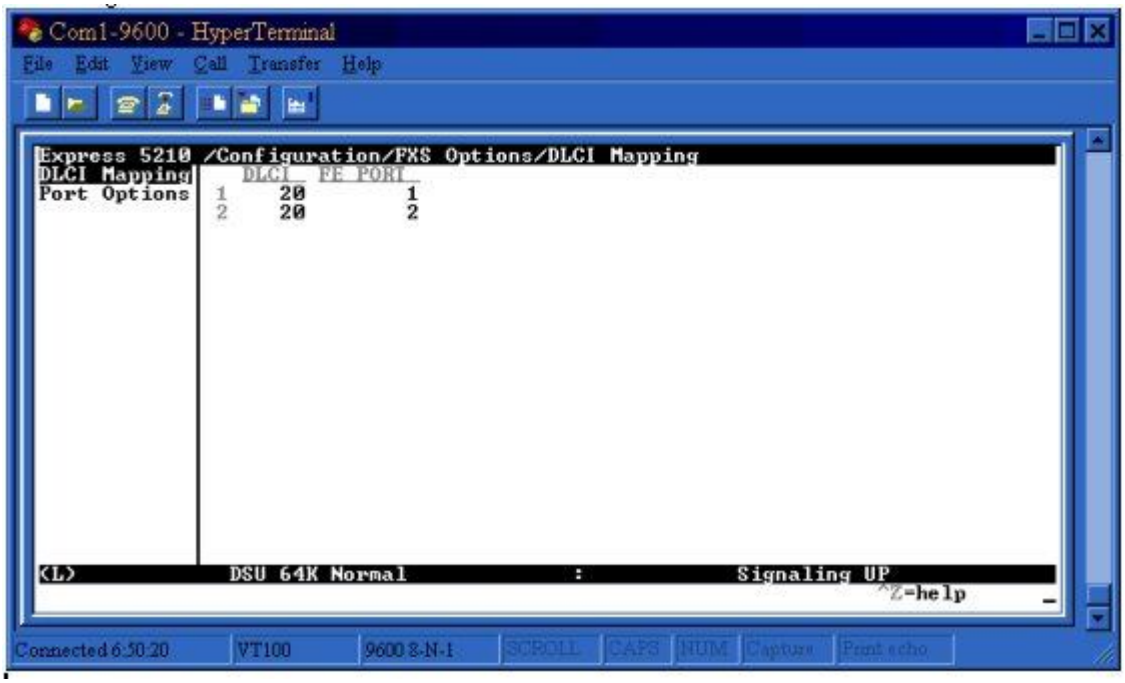

Figure 21

3. Return to the previous menu. Verify that the **Voice Coder** option matches the **Voice Compression** option on the host ATLAS. See Figure 20.
4. Return to the main menu. The unit will prompt you to save the changes made. Press 'Y' to confirm the save.

Configuring the Router on the Express 5210

The Express 5210 router is very similar to the ATLAS router. The router menu structures will look the same.

1. From the Main Menu, go to **IP Setup/IP/Interfaces**. Press <enter> on the **Address** field for the **EN0 IP** entry and enter the IP address for the Ethernet port. Press <enter> on the **Subnet Mask** field for the **EN0 IP** entry and enter the subnet mask for the Ethernet port. See Figure 22.

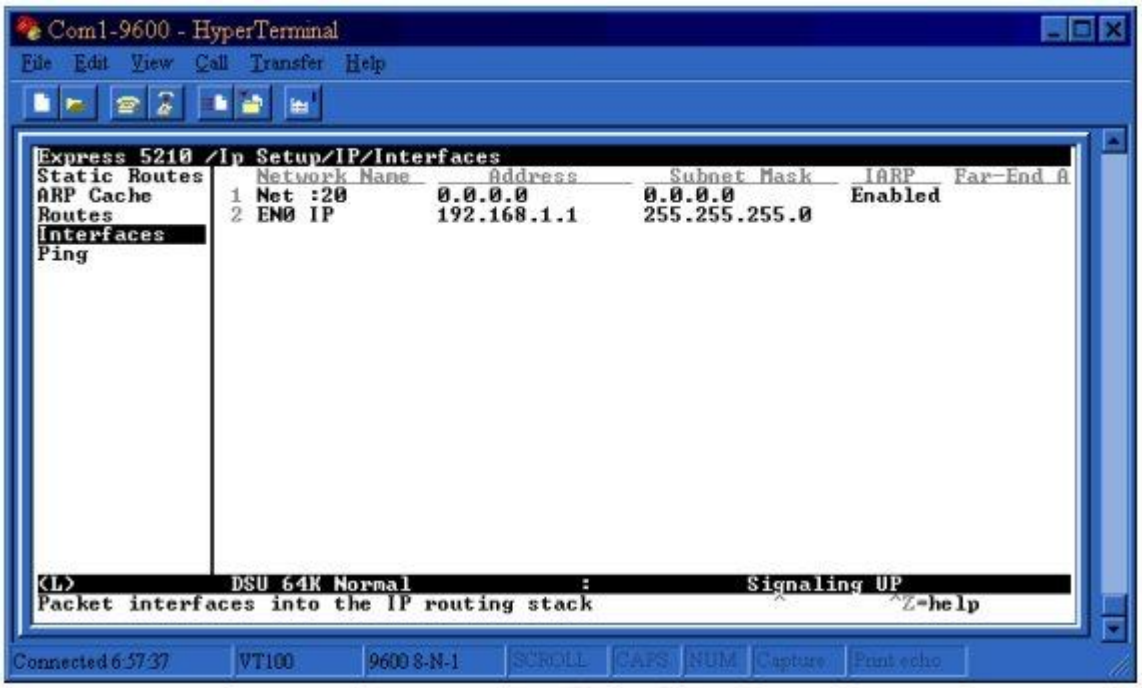

Figure 22

2. In the example network of Figure 1, **IARP** and **RIP** will be used on the frame relay connection to learn and maintain the Routes table. For the DLCI listed in the Interfaces table, *Net :20*, change **IARP** to *Enabled*. See Figure 22.
3. To enable **RIP** on *Net :20*, use the right arrow key to navigate to the **RIP** column and press <enter> on the **[+]** symbol. See Figure 23. Change **Mode** to *Tx* and *Rx*, then change **Protocol** to *V2*. See Figure 24.

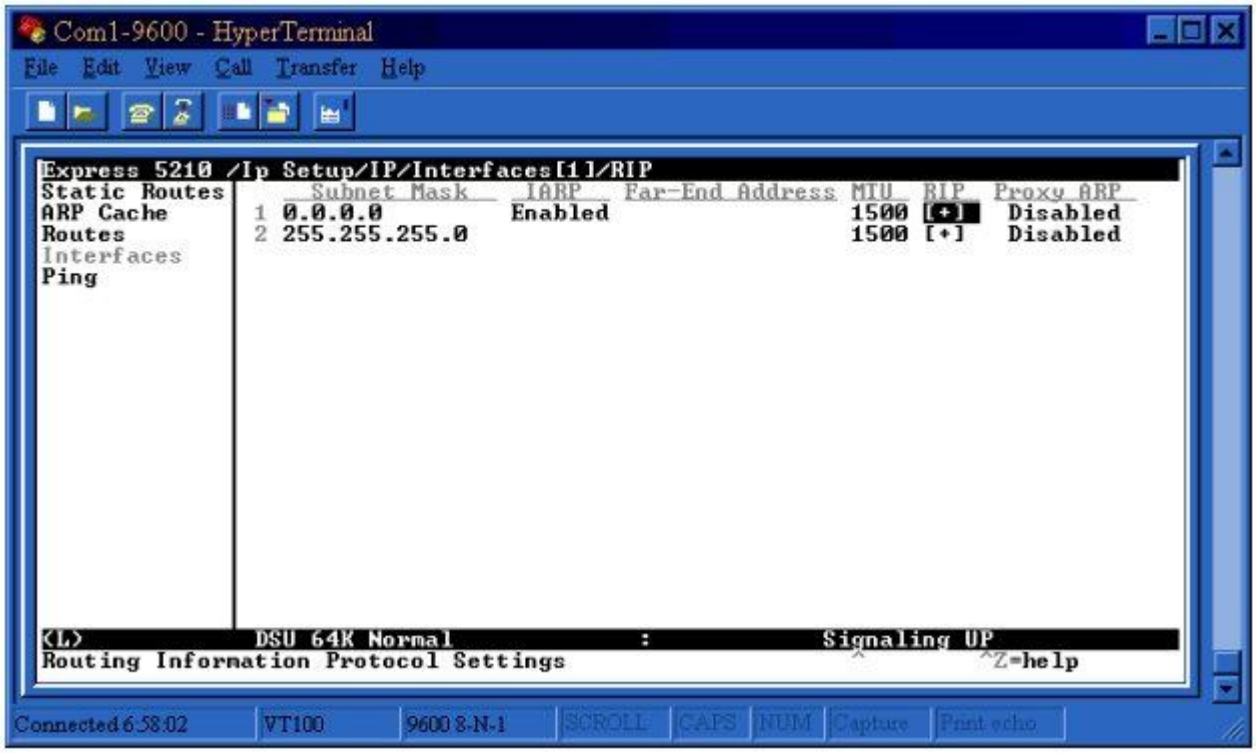

Figure 23

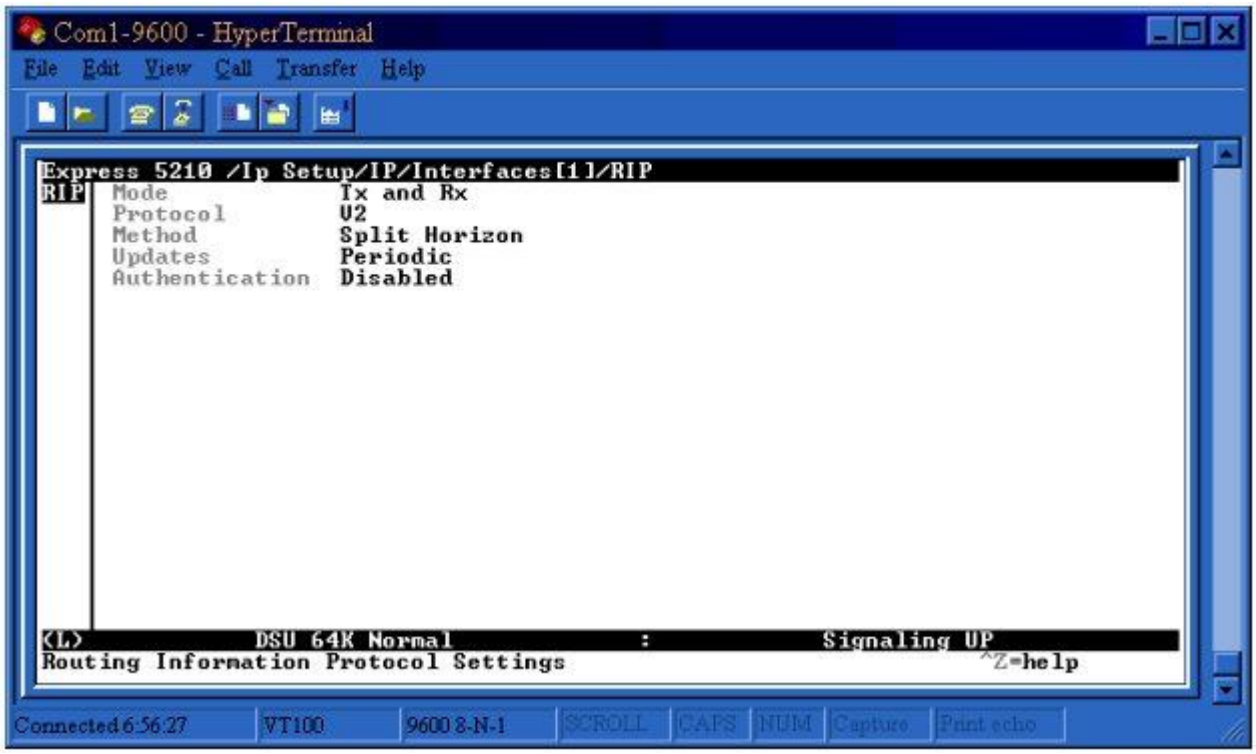

Figure 24

Sample Configuration Files

The sample configuration files (see below) are examples of the application described in this note. These files may not contain all the configuration options needed for your specific application and are not meant to be used as a working configuration for a live network.

WARNING: Loading these sample configuration files will overwrite any existing configuration on your ATLAS product.

NOTE: Prior to loading a configuration file to the ATLAS, disengage any modules currently installed in the ATLAS. The configuration file may contain modules configured in certain slots which conflicts with modules installed in your ATLAS. If a configuration file is loaded onto an ATLAS in which the configured modules do conflict with installed modules, then the portion of the configuration relating to those modules ports will not be loaded.

Download the configuration

1. Download the appropriate configuration bundle below according to which ATLAS product you have.

   ATLAS 550 Vcom550.exe
   ATLAS 800PLUS Vcom800p.exe
   ATLAS 810PLUS Vcom810p.exe

2.
3. Save the executable file to an empty folder on your PC's hard drive.
4. Browse the folder where the file is saved. Execute the file by double clicking on it.
5. The configuration file and a readme.txt file will be automatically extracted to the **c:\adtnutil** folder on your computer.
6. Please refer to the readme.txt file for full instructions on downloading the configuration file to the ATLAS unit.

If you experience any problems using your ADTRAN product, please contact ADTRAN Technical Support.