



Frame Relay Dial Backup with the TSU IQ

Introduction

ADTRAN's IQ performance monitoring DSU/CSUs provide disaster recovery protection for frame relay circuits. The units included in this series are the DSU IQ, TSU IQ, TSU IQ+, IQ Probe, and NxIQ module. This technical support note describes how to configure dial backup (DBU) between a host site and two remote sites. The units used in this example are TSU IQs with ISDN BRI DBU Cards.

Configuring dial backup for all IQ products is very similar with the exception of the NxIQ module. The NXIQ module requires an external terminal adapter such as the ISU 128 to handle the dialing functions; however, the PVC options are configured identically to other IQ products.

Before you begin

Each IQ unit will require an ISDN BRI DBU card (Part Number 1204.004L1). To perform this application the TSU IQs must be equipped with firmware revision 3.28 or later.

Network Description

Figure 1 is a diagram of the frame relay example network used in this technical support note. In this example the host site is Huntsville. Two Permanent Virtual Circuits (PVCs) originate from Huntsville. One circuit is routed to Atlanta and the other to Birmingham. The two Data Link Connection Identifiers (DLCIs) used by the host site to communicate with the remotes are 16 and 17. Atlanta and Birmingham are the two remote sites. They both use DLCI 20 for communication with Huntsville. Please remember that DLCIs only have local significance and are assigned by the Telephone Company (TELCO) when the frame relay network is built; therefore the DLCIs for your frame relay network will most likely be different from the ones used in this example.

TSU IQ Frame Relay Dial Backup Example Network

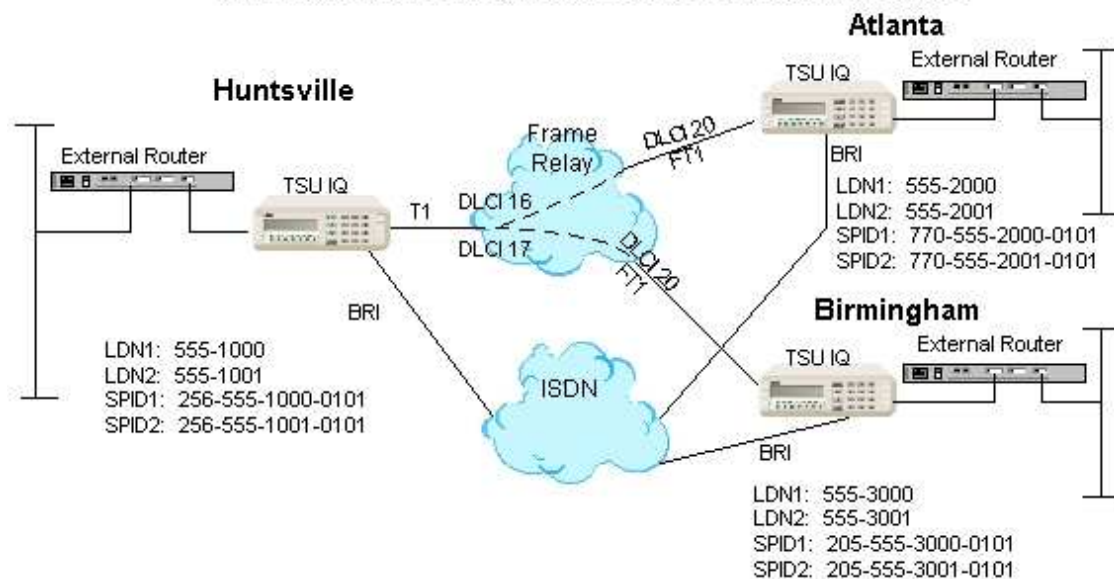


Figure 1

The remaining parameters shown in Figure 1 provide a description of the BRI lines that terminate into the three TSU IQs. The TELCO will provide Local Directory Numbers (LDNs) and Service Profile Identifiers (SPIDs) for each BRI line. In addition, you must know which type of Central Office (CO) ISDN switch is providing the ISDN service.

Dial Backup Parameters

From the **Main Menu** terminal screen, Figure 2, of the TSU IQ select option 1 for **Configuration** and press **<Enter>**. Next select option 3 for Dial Backup from the Configuration Menu shown in Figure 3 and press **<Enter>**. The resulting screen is displayed in Figure 4.



Figure 2



Figure 3



Figure 4

By default **Auto DBU** is *Enabled*. This allows the IQ unit to automatically dial the remote end when any of the **DBU Criteria** are met. This setting must also be enabled in order for the IQ unit to automatically answer inbound calls from other units.

DBU Options

From the **Configure Dial Backup** screen select option 2, **DBU Options**, and press <Enter>. A menu screen similar to Figure 5 is displayed. The default parameter values for this screen are shown.



Figure 5

For basic dial backup operation these parameters do not need to be altered from their default values. The **Beeper Option** allows the user to control the intermittent beep issued during dial backup. **Password Option** and **DBU Password** are security features that can be used to prevent the IQ unit from establishing dial backup with unknown units. **Daily Lockout Enabled** prevents the IQ unit from going into dial backup between the time frames specified by **Lockout Start** and **Lockout End**. With **Weekend Lock Enabled** no dial backup will occur from midnight Friday to midnight Sunday.

DBU Criteria

Press <Esc> once to get back to the **Configure Dial Backup** screen shown in Figure 4. Select option 3, **DBU Criteria**, and press <Enter>. The menu screen shown in Figure 6 is displayed. The default values for the parameters on this screen are shown.



Figure 6

1. Press 1 to select **With Network Failure** and press <Enter>. Press 2 followed by <Enter> to select Enable. This allows the IQ unit to enter dial backup in the event that the network T1 line goes into alarm. **With No LMI** is enabled by default. With this option enabled the IQ unit will go into dial backup when the frame relay signaling state is down.
2. Press 3 to select **With PVC Inactive** and press <Enter>. Press 2 followed by <Enter> to select Enable. This is a global setting that affects all of the PVCs in the IQs DLCI table. A PVC is advertised as Inactive by the frame switch in the CO when there is a problem at the remote end of the frame circuit. With this option enabled, the IQ unit will attempt to establish a dial backup call with the remote unit when its corresponding DLCI is advertised as Inactive.

Once these parameters have been configured properly the **DBU Criteria** screen should look exactly like Figure 7.



Figure 7

DBU Timers

Press <Esc> once to get back to the **Configure Dial Backup** screen shown in Figure 4. From this menu select option 4, **DBU Timers**, and press <Enter>. The **DBU Timers** screen shown in Figure 8 is displayed. The default parameter values are shown below.



Figure 8

For basic dial backup operation these parameters do not need to be altered from their default values. The **Fail Timer** programs the amount of time the IQ will wait once any of the DBU Criteria have been met before entering dial backup. Once the frame relay link has been reestablished on the network line, the **Restore Timer** sets the amount of time the IQ unit will wait before disconnecting the dial backup call. The **Redial Counter** programs the number of redial attempts performed if dial backup is not established on the first call. **Wait to Redial** defines the amount of time between redial attempts.

ISDN Options

Press <Esc> once to return to the **Configure Dial Backup** screen displayed in Figure 4. From this screen press 5 to select **ISDN Options** and press <Enter>. The screen shown in Figure 9 is now displayed. The default values for the parameters on this menu are shown.



Figure 9

1. Press 1 to select **Switch Type** and press <Enter>. A list of available switch types is displayed. The switch type selected here must match the TELCO CO switch providing the ISDN service. Select option 1 for *Lucent 5ESS*, 2 for *DMS100*, 3 for *National*, or 4 for *NEC* and press <Enter>. For the example network in Figure 1 we will assume the switch type for all three TSU IQ DBU Cards is National.
2. Press 2 to select **B-Channel Bit Rate** and press <Enter>. Select option 1 for *56kbps* or option 2 for *64kbps* and press <Enter>. Generally leave this value to its default of 64kbps unless your ISDN service only provides 56kbps.
3. To configure the **Number of B-Channels** on the BRI line, press 3 followed by <Enter>. Select 1 for single channel service or 2 for dual channel service and press <Enter>. If your TELCO has given you two SPIDs, you should set the **Number of B-Channels** to 2.

4. Select option 4 and press <Enter> to select SPID1. Enter the SPID assigned by the TELCO for the first B-channel and press <Enter>. For the example network in Figure 1, the proper SPID is entered here depending upon which TSU IQ is being configured.
5. Press 5 to select **SPID2** and press <Enter>. Enter the SPID assigned by the TELCO for the second B-channel and press <Enter>. Again, for the example network in Figure 1, the proper SPID is entered here depending upon which TSU IQ is being configured.
6. Select option 6, **LDN1**, and press <Enter>. Insert the Local Directory Number provided by the TELCO for the first B-Channel and press <Enter>. For the example network shown in Figure 1, the proper LDN is entered here depending upon which TSU IQ is being configured.
7. Press 7 to select **LDN2** and press <Enter>. Enter the Local Directory Number assigned to the second B-Channel by the TELCO and press <Enter>. Again, for the example network shown in Figure 1, the proper LDN is entered here depending upon which TSU IQ is being configured.

Sample screen shots of the **ISDN Options** screen for the Huntsville, Atlanta, and Birmingham TSU IQs are shown in Figures 10, 11, and 12, respectively.



Figure 10



Figure 11



Figure 12

Call Screening

Press <Esc> once to get back to the **Configure Dial Backup** menu shown in Figure 4. Select option 6, **Call Screening**, and press <Enter>. The menu shown in Figure 13 will be displayed. The default values for the parameters listed on this menu are shown.



Figure 13

It is not necessary to adjust these parameters from their default values for basic frame relay dial backup. With **Call Screening** enabled, the IQ unit will only accept incoming calls from calling parties matching one of the phone numbers configured for **Number 1** through **Number 5**.

Configuring PVC Options

The last step in setting up the TSU IQs for dial backup is configuring the **PVC Options**. From the **Main Menu** in Figure 2, press 1 to select **Configuration** and press <Enter>. From the **Configuration Menu** in Figure 3, press 2 to select **Network Port** and press <Enter>. The **Configure Network Port** menu is now displayed. From this menu select option 9, **PVC Options**, and press <Enter>. The **Configure PVC Parameters** menu shown in Figure 14 is now displayed.



Figure 14

1. Press 1 followed by <Enter> to select **DLCI**. Type in *16* and press <Enter>.
2. Press 2 to select **DBU DLCI** and press <Enter>. Type in *20* and press <Enter>.

Notice that the TELCO assigned DLCI of *16* for Huntsville's frame relay link to Atlanta is programmed in the **DLCI** field. The TELCO assigned DLCI of *20* for Atlanta's frame relay link to Huntsville is programmed in the **DBU DLCI** field. These two entries are critical for proper dial backup operation.

3. Select **DBU Phone Number** by pressing 3 followed by <Enter>. Type in *1770552000* and press <Enter>. The phone number that the Huntsville TSU IQ will dial to reach the Atlanta TSU IQ to establish a dial backup connection has now been programmed.
4. Press 5 followed by <Enter> to select **DBU On Inactive**. Select option 2 for Enabled and press <Enter>. This allows the Huntsville TSU IQ to dial out to the TSU IQ in Atlanta in the event that DLCI 16 is advertised as Inactive by the frame relay switch.

At this point all **PVC Parameters** have been configured for basic frame relay dial backup to Atlanta. The PVC entry for DLCI 16 on the Huntsville TSU IQ is shown in Figure 15. The remaining options are fine left at their default values. **DBU Call Order** allows each DLCI listed in the table to be prioritized in the event that multiple PVCs are lost at once. The IQ unit can only backup one PVC at a time. Dial backup will first be attempted on the PVC with the lowest **DBU Call Order** that meets the **DBU Criteria** settings. The **CIR**, **Sequence Number Checking**, and **Delay Measurement** are features not related to dial backup. For an explanation of these features, please refer to the TSU IQ User Manual.

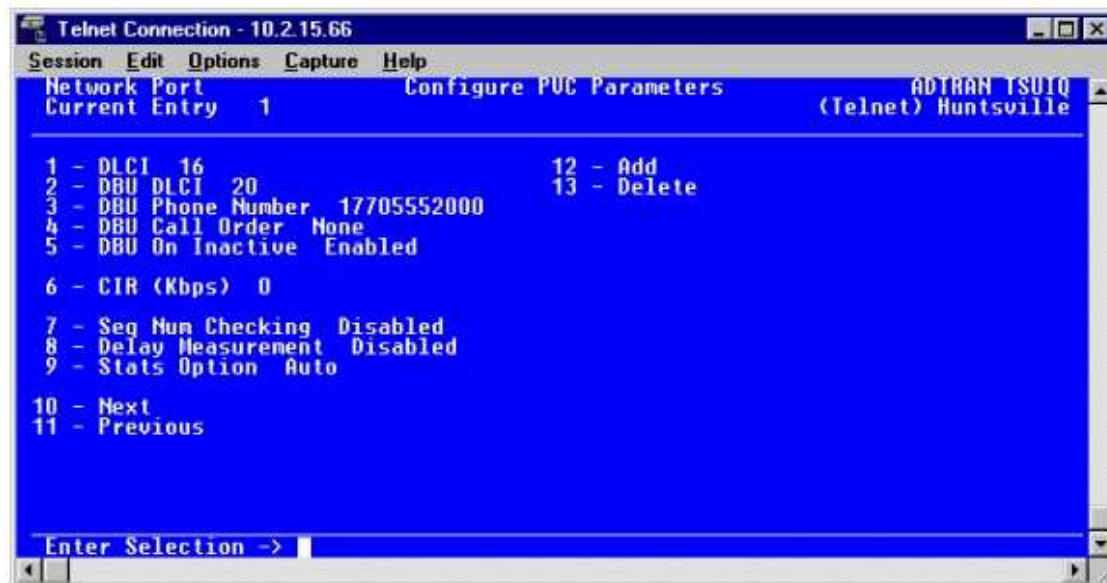


Figure 15

Huntsville TSU IQ (DCLI 17)

1. From the **Configure PVC Parameters** screen shown in Figure 15, select option 12, **Add**, and press **<Enter>**. This creates a new entry in the **Configure PVC Parameters** table. Note how the **Current Entry** located in the upper left corner of the screen changed from 1 to 2. With the exception of the **Current Entry** field, the new screen is shown in Figure 14.
2. Press 1 to select **DLCI** and press **<Enter>**. Type in *17* and press **<Enter>**.
3. Select **DBU DLCI** by pressing 2 followed by **<Enter>**. Type in *20* and press **<Enter>**.
4. Press 3 followed by **<Enter>** to select **DBU Phone Number**. Type in *12055553000* and press **<Enter>**.
5. Press 5 to select **DBU on Inactive** and press **<Enter>**. Select option 2 for *Enabled* and press **<Enter>**.

All necessary parameters for the Huntsville TSU IQ have now been configured for dial backup between Huntsville and Birmingham. The **Configure PVC Parameters** screen for DLCI 17 is shown in Figure 16.



Figure 16

Atlanta TSU IQ (DLCI 20)

1. From the **Configure PVC Parameters** screen shown in Figure 14, press option 1 for **DLCI** and press **<Enter>**. Type in *20* and press **<Enter>**. This is the DLCI that Atlanta uses for communication with Huntsville
2. Select option 2, **DBU DLCI**, and press **<Enter>**. Type in *16* and press **<Enter>**. Please note that this is the DLCI that the Huntsville TSU IQ uses to communicate with Atlanta.
3. Select **DBU Phone Number** by pressing 3 followed by **<Enter>**. Type in *12565551000* and press **<Enter>**.
4. Press 5 for **DBU on Inactive** and press **<Enter>**. Select option 2 for Enabled and press **<Enter>**.

Since there is only one PVC for Atlanta, there is no need to enter another entry into the PVC table. At this point the Atlanta TSU IQ is configured for basic dial backup to Huntsville. The **Configure PVC Parameters** screen is shown in Figure 17.



Figure 17

Birmingham TSU IQ (DLCI 20)

1. From the **Configure PVC Parameters** screen shown in Figure 14, press 1 followed by **<Enter>** to select **DLCI**. Type in *20* and press **<Enter>**. This is the DLCI used by the Birmingham TSU IQ to communicate with Huntsville.
2. Select **DBU DLCI** by pressing 2 followed by **<Enter>**. Type in *17* and press **<Enter>**. DLCI *17* is used by the Huntsville TSU IQ for communication with Birmingham.
3. Press 3 followed by **<Enter>** to select **DBU Phone Number**. Type in *12565551000* and press **<Enter>**.
4. Press 5 to select **DBU on Inactive** and press **<Enter>**. Select option 2 for *Enabled* and press **<Enter>**.

All necessary parameters for the Birmingham TSU IQ are configured for dial backup between Birmingham and Huntsville. The **Configure PVC Parameters** screen is shown in Figure 18.



Figure 18

Testing Dial Backup

1. The first step in testing dial backup is to verify that the D-channel on the BRI for each TSU IQ is up. No calls can be made over the BRI until the D-channel is active. The D-channel status on each TSU IQ can be determined by selecting option 2, **View Statistics**, and pressing <Enter> from the **Main Menu** shown in Figure 2. The **Statistics Menu** shown in Figure 19 will be displayed.

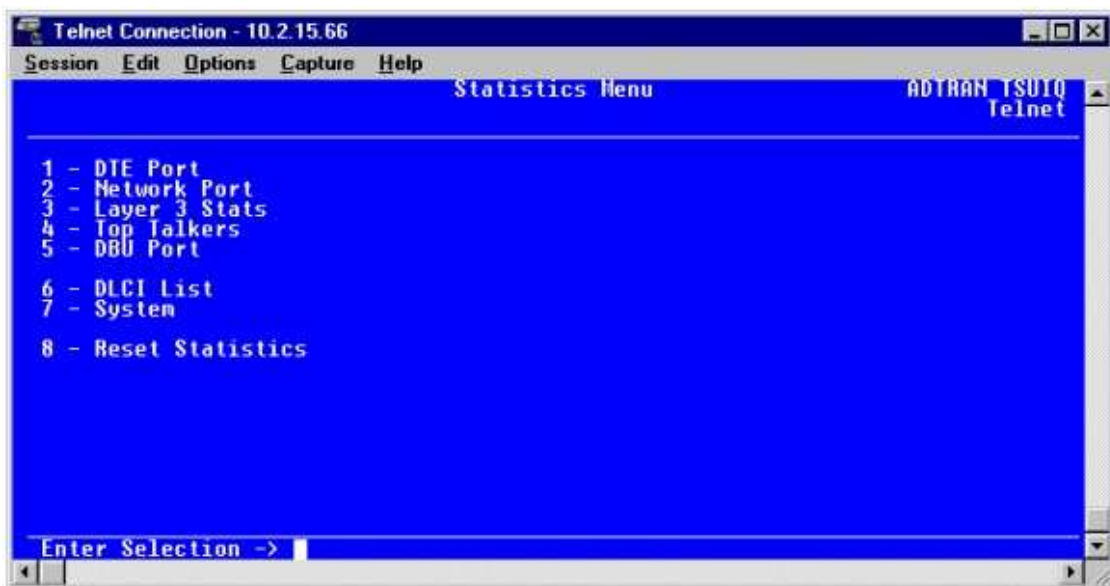


Figure 19

From the menu above, select **DBU Port** by pressing 5 followed by **<Enter>**. The statistics screen for the DBU Port, Figure 20, will be displayed.

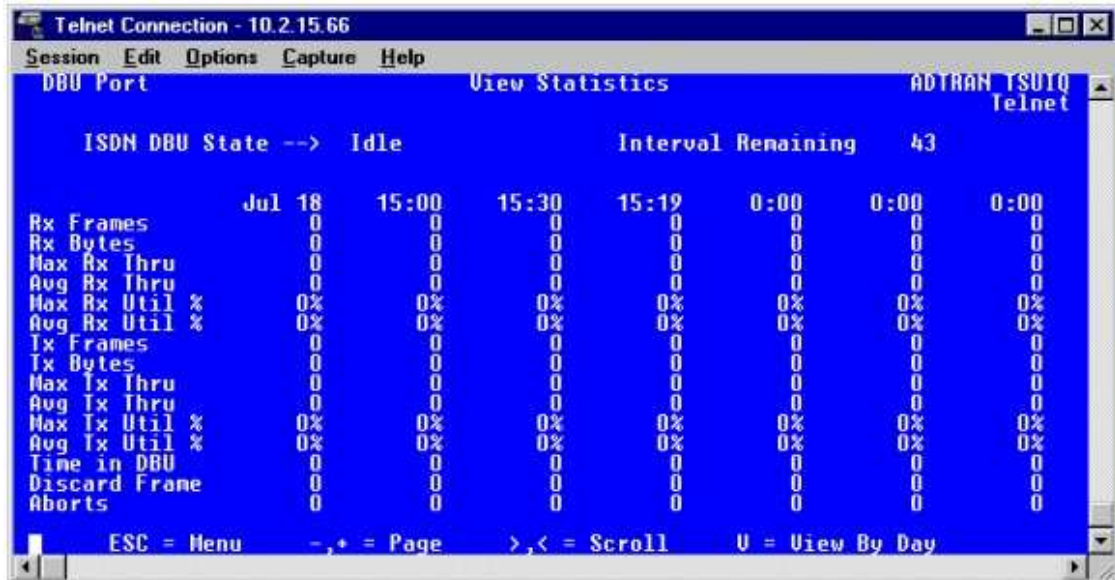


Figure 20

The BRI line connected to the TSU IQ is ready for service when the **ISDN DBU State** displayed in Figure 20 is *Idle*.

- From the **Main Menu** of the Atlanta TSU IQ shown in Figure 2, select option 2, **View Statistics**, and press **<Enter>**. Next press option 3, **Dial Backup**, and press **<Enter>**. The **DBU Statistics** screen shown in Figure 20 will be displayed. The **ISDN DBU State** should show *Idle*. Pull the network cable out of the network port of the TSU IQ. In about 10 seconds the IQ unit will begin dial backup. Watch the **ISDN DBU State** on the screen. In proper DBU operation, this statistic should progress from *Idle* to *Dialing* to *Connect* to *In DBU*. At this point the Atlanta TSU IQ is in dial backup with the Huntsville TSU IQ. A screen shot of a TSU IQ in dial backup mode is shown in Figure 21.

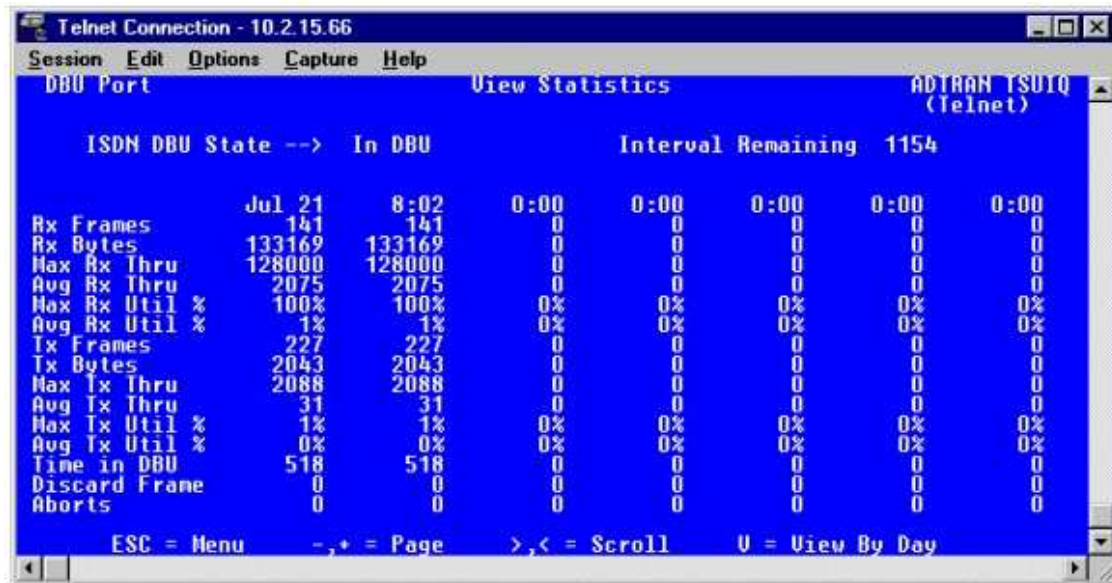


Figure 21

It is important to verify that data is passing between the two units. This can be done by viewing the **Rx Frames** and **Tx Frames** statistics on the DBU port. If these statistics are incrementing, the DTE equipment should be communicating with each other.

- To terminate dial backup mode, simply plug the network cable back into the network port of the Atlanta TSU IQ. In less than 120 seconds the **ISDN DBU State** should change to *Idle*. The **Rx Frames** and **Tx Frames** on the DBU Port statistics screen should stop incrementing.
- Steps 2 and 3 can be repeated for the Birmingham and Huntsville TSU IQs. Please bear in mind that even though the Huntsville TSU IQ has two entries in the **PVC Configuration Table**, only one PVC can be backed up during dial backup. The PVC that is backed up will be the first one in the **PVC Configuration Table** unless **DBU Call Order** is used.

Troubleshooting

Problem: ISDN DBU State shows *Open Loop*

If the state is shown as Open Loop, the D-channel is not active. Check the cable connecting the BRI port of the TSU IQ to the TELCO equipment. The ISDN BRI DBU card uses the middle pair of leads on the cable for communication. Verify the cable is straight through. Try a new cable.

If the problem still persists, contact your ISDN provider and have them test the line. Also verify with TELCO that the SPIDs programmed in the TSU IQ match the SPIDs TELCO has assigned to the BRI line.

Problem: DBU call not connecting

If the **ISDN DBU State** shown in Figure 20 is not progressing from *Dialing* to *Connect* to *In DBU*, the dial backup call is not connecting between the two IQ Units. Verify that the correct number of digits are entered for the **DBU Phone Number** field in the **Configure PVC Parameters** menu shown in Figure 14. In addition, make sure that the

remote IQ unit that is being called has an **ISDN DBU State** of *Idle* and is set to **Auto DBU Enabled**.

If 64k dial backup calls are not connecting, try connecting at 56k. In order to make this adjustment in both the host and remote unit, refer to the Dial Backup Parameters section of this technical note. If 56k dial backup calls are connecting, TELCO may not have your ISDN lines provisioned for 64k data calls.

Problem: Data is not passing after **ISDN DBU State** shows *In DBU*

Verify that the proper DLCIs have been entered for the **DLCI** and **DBU DLCI** fields in the **Configure PVC Parameters** menu shown in Figure 14. Also monitor the **Discard Frame** statistic for the DBU port shown in Figure 21 after the dial backup call has connected. If this statistic is incrementing, the ISDN line may have errors on it. Contact your ISDN provider and have them test the line.

If discarded frames are occurring on 64k dial backup calls, try placing a 56k call. Both the host and remote unit must be setup for 56k calls. Refer to the Dial Backup Parameters section of this technical note for help in configuring the IQ units. If 56k calls are not discarding frames and you have purchased 64k service, contact TELCO and notify them of the situation.