PG-FLEX
24 CHANNEL
REMOTE TERMINAL LINE UNIT

Model	List	CLEI Code
FRL-742	3C	VARHCFPC~~

SECTION SCP-FRL742-033-03H

REVISION HISTORY OF THIS PRACTICE

Revision	Release Date	Revisions Made
01	February 24, 1998	Initial Release
02	March 23, 2001	Second release to update section number, CLEI code, bar code and part number
03	November 6, 2001	Third release to update the document to comply with the new copyright statement, proprietary information, and to replace the front cover and face plate illustrations.

USING THIS TECHNICAL PRACTICE

Identified by icons, two types of messages appear in the text:

Notes describe special circumstances.

Cautions indicate the possibility of equipment damage or personal injury.

TABLE OF CONTENTS

PRODUCT OVERVIEW

This section describes the product features and front panel for the PG-Flex® FRL-742 List 4C Remote Terminal (RT) line units.

DESCRIPTION AND FEATURES

The PG-Flex FRL-742 List 3C Remote Terminal (RT) line unit is the remote end of the PG-Flex subscriber carrier system and resides in a RT enclosure. The FRL-742 line unit carries up to 24 subscriber channels between a COT and an RT. The FRL-742 line unit provides access through the Craft port to display system options, performance, and status using an ASCII terminal.

The FRL-742 RT line unit uses High-bit-rate Digital Subscriber Line (HDSL) 2B1Q technology to provide the equivalent of 1.544 Mbps digital transmission rate, plus signaling, over two copper pair wires. The HDSL line can include unterminated bridge taps. The technology is implemented without:

- using repeaters
- loop conditioning
- pair selection

The FRL-742 line unit supports PG-Flex doublers to extend the range of a PG-Flex subscriber carrier system to 24 kft (7.3 km) of 24 AWG or 18 kft (5.4 km) of 26 AWG loops. Two doublers can triple the range to 36 kft (10.9) of 24 AWG or to 27 kft (8.2 km) of 26 AWG loops.

The FRL-742 RT line unit is compatible with Mechanized Loop Testing (MLT) and Pair Gain Test Controller (PGTC) when an FP1-729 List 1 PGTC Interface Unit is installed in the COT shelf. It also supports:

- 24 subscriber channels in the RT
- PG-Flex doublers in systems transporting POTS and ISDN circuits
- 4Tel compatible Loop Test Systems
- ISDN channel units
- loop start/ground start channel units

FRONT PANEL

Figure 1 shows the FRL-742 front panel. Table 1 lists the indicators and states for the FRL-742 front panel LEDs.

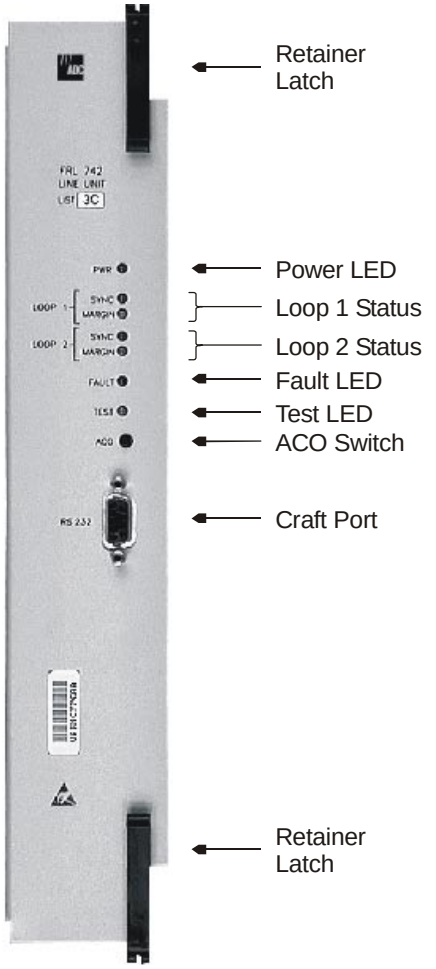

Figure 1. *FRL-742 List 3C Front Panel*

Table 1. *FRL-742 Front Panel LEDs*

LED	LED State	Indicates
PWR	Solid Green	Power applied and line feed operating normally.[a]
	OFF	Not receiving power from COLU.
LOOP 1 SYNC	Solid Green	HDSL line 1 is in sync between the COT and RT.
	Flashing Green	HDSL line 1 is attempting to sync between COT and RT.
	OFF	HDSL line 1 does not detect an active CO Line Unit.
LOOP 1 MARGIN	Solid Yellow	HDSL line 1 is below present margin threshold.
	OFF	HDSL line 1 margin is above the preset margin threshold.
LOOP 2 SYNC	Solid Green	HDSL line 2 is in sync between the COT and RT.
	Flashing Green	HDSL line 2 is attempting to sync between COT and RT.
	OFF	HDSL line 2 does not detect an active CO line unit.
LOOP 2 MARGIN	Solid Yellow	HDSL line 2 is below present margin threshold.
	OFF	HDSL line 2 margin is above the preset margin threshold.
TEST	Blinking Yellow	A subscriber test connection has been established.
	OFF	No tests active in system.
FAULT	Solid Red	Fault in the system.
	OFF	No faults are detected in system.

a Power LED goes out after approximately 2 minutes to conserve power.

SPECIFICATIONS

Electrical Characteristics

RT Power Supply Input Voltage	-65 to -130 Vdc (Line 1) +65 to +130 Vdc (Line 2)
RT Power Supply Input Power	Less than 40 Watts

Environmental

Operating Elevation	-200 ft to 13,000 ft (-60 m to 4,000 m)
Operating Temperature & Humidity	-40° F to +150° F (-40° C to +65° C) 5% to 95% (non-condensing)

Physical

Height:	12.00 in.	(30.5 cm)
Width:	2.25 in.	(5.7 cm)
Depth:	4.50 in.	(11.4 cm)
Weight	1.4 lb.	(0.6 kg)

FUNCTIONAL DESCRIPTION

This section describes the applications and operation capabilities of the FRL-742 List 3C.

APPLICATIONS

PG-Flex is a small-capacity, universal subscriber carrier system supporting up to 24 DS0 channels including both Plain Old Telephone Service (POTS) and Integrated Services Digital Network (ISDN) services. The system is based on HDSL transmission technology. Remote power is supplied from the Central Office (CO).

A PG-Flex system is comprised of one line unit and one (or more) channel units at both the CO and the RT (Figure 2). Line units and channel units can be hot-swapped without affecting other systems in the same shelf. The POTS channel units use a Pulse Code Modulation (PCM) encoding scheme and supports high-speed modem and group 3 facsimile operation on all channels.

The CO-side of a PG-Flex system mounts into a COT shelf and supports up to four systems. An alarm unit or Pair Gain Test Controller (PGTC) interface unit (common to all systems installed in the shelf) provides an interface for maintenance alarm relays and metallic access to the remote subscriber lines.

The remote side of a PG-Flex system mounts into an FRE-765 RT enclosure. The RT enclosure supports one system, which includes one line unit and up to three channel units. The channel units must be the same type of card as the channel units installed at the CO.

PG-Flex uses HDSL transmission technology over two unconditioned copper pairs. Power is supplied from the CO to the RT over the HDSL transmission lines. The maximum distance (without doublers) from the CO to the RT is 12.3 kft (3.7 km) using 24 AWG cable (0.5 mm).

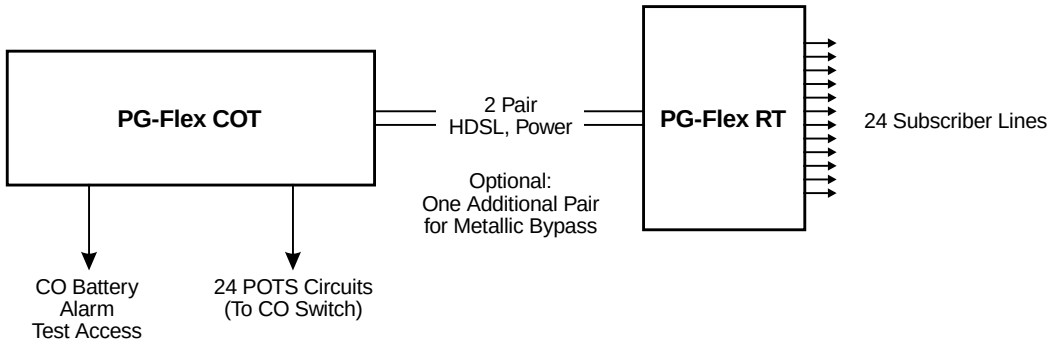

Figure 2. *Typical PG-Flex Configuration*

HDSL Transmission

PG-Flex uses HDSL transmission technology between the COT and RT. This technology provides up to 24 DS0s, plus signaling, over two copper pairs without using repeaters, loop conditioning, or pair selection. Adaptive equalization, scrambling, and a four-level 2B1Q line coding scheme increase range and minimize crosstalk.

The line interface is a two-pair, 784-kbps full-duplex 2B1Q transmission format. The dual HDSL lines provide 24 channels at 64 kbps, with signaling and an operations channel for management control. The signal characteristics on the carrier pairs comply with TR-NWT-001210, Generic Requirements for High-bit-rate Digital Subscriber Line (HDSL) Systems.

Table 2 shows the maximum distance between the COT and the RT for various gauge wire. Because of HDSL transmission technology, the HDSL lines require no special conditioning and may include unterminated bridge taps, but cannot include load coils.

Table 2. *PG-Flex Distances*

	Loop Length	
Wire Gauge	**24 Channel System**	**DC Resistance**
26 AWG (0.4 mm)	9.0 kft (2.8 km)	750 Ω
24 AWG (0.5 mm)	12.3 kft (3.8 km)	638 Ω
22 AWG (0.6 mm)	16.1 kft (5.0 km)	521 Ω
19 AWG (0.9 mm)	22.8 kft (7.0 km)	367 Ω

Subscriber Drop Testing

For subscriber drop testing from the central office, PG-Flex is able to select and connect any subscriber drop to a metallic bypass test pair at the RT. PG-Flex extends this connection back to the COT where it switches onto the test access bus or to the corresponding subscriber line on the COT channel card.

Test access is performed from the subscriber's COT. Refer to the FLL-712 CO line unit technical practice for more information.

OPERATIONAL CAPABILITIES

The FRL-742 RT line unit provides the following functions for each 24-channel system:

- power supply
- HDSL line transceivers
- front-panel status indicators
- alarm cut-off switch (used to perform a lamp test)
- RS-232 Maintenance Interface (DCE)
- line and drop test circuits
- MLT/PGTC loop test system compatibility
- 4Tel loop test system compatibility

Figure 3 shows a block diagram of the FRL-742. The COT line unit powers the remote terminal. During power-up, the system checks the HDSL lines for hazardous voltages or other line faults that might affect the system. If a fault condition is detected, the system stops the power-up sequence and the LED indicators on the front panel indicate a line fault problem.

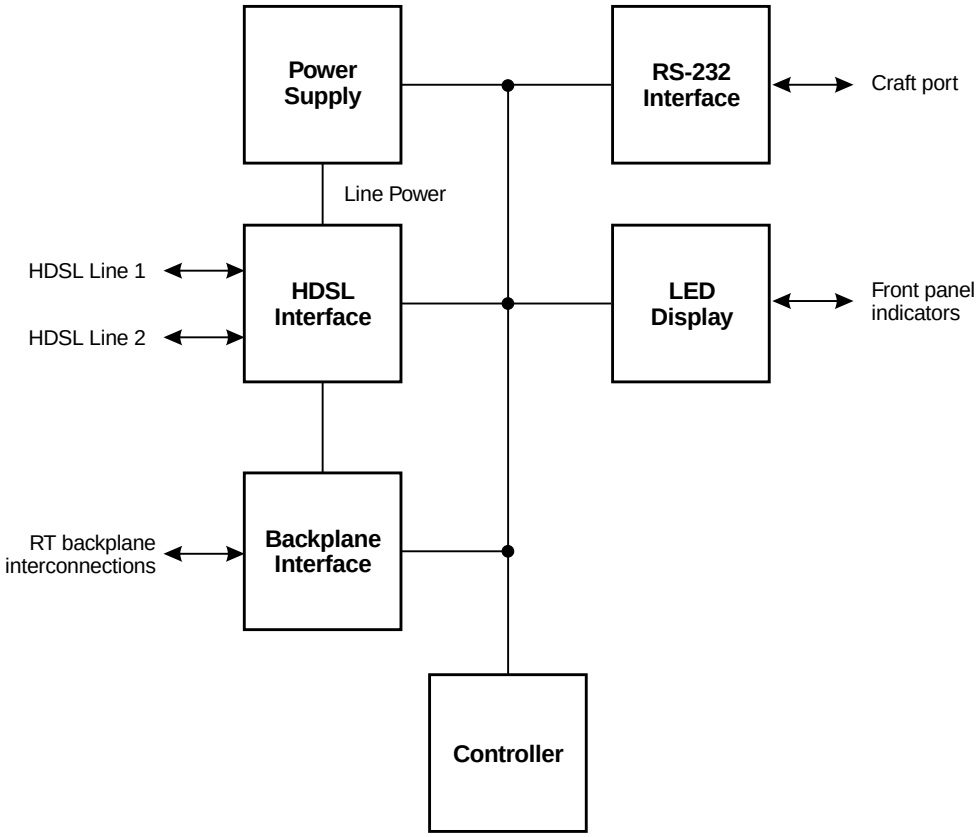

Figure 3. *FRL-742 RT Line Unit Block Diagram*

INSTALLATION AND VIEWING THE SYSTEM STATUS

This section describes how to unpack, install, and view the status of the FRL-742 List 3C system.

UNPACKING

Upon receipt of the equipment, proceed as follows:

1 Unpack each container and visually inspect it for signs of damage. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company and to ADC. Order replacement equipment if necessary.

2 Check the contents versus the packing list to ensure complete and accurate shipment. If the shipment is short or irregular, contact ADC as described in the Product Support section. For prolonged storage periods, use the equipment's original container.

INSTALLATION

Observe normal electrostatic discharge precautions when handling electronic equipment. Do not hold electronic plugs by their edge. Do not touch components or circuitry.

An FPI-729 PGTC interface unit or an FAU-728 List 2 alarm unit must be installed at all times when ISDN channel units are installed. These units provide the composite clock reference source for the ISDN channel units and are required for normal operation of the ISDN channel units. Removing the FPI-729 or FAU-728 List 2 during an ISDN call will terminate the call.

The following procedure assumes that an FLL-712 is installed in the system.

To install the FRL-742 and verify operation:

1 Insert the FRL-742 RT line unit into the RT enclosure and verify:

- **a** All LEDs turn on for about 1/2 second, then scan from top to bottom.
- **b** PWR LED remains on.
- **c** After a few seconds, SYNC LEDs for Line 1 and Line 2 begin to flash (both COT and RT).
- **d** Within 35 seconds, SYNC LEDs for Line 1 and Line 2 remain on.

2 Verify the following front panel indications after the system powers up and establishes HDSL synchronized communications, and when no calls are in progress:

- **a** PWR is on
- **b** LOOP 1 SYNC is on
- **c** LOOP 1 MARGIN is off
- **d** LOOP 2 SYNC is on
- **e** LOOP 2 MARGIN is off
- **f** TEST is off

g FAULT is off

TERMINAL MANAGEMENT

The terminal management function at the RT allows a technician to display information about the PG-Flex system using an ASCII terminal (or modem with a null modem cable) connected to the Craft port. With this function, the technician can:

- view system status
- view system options
- monitor performance
- obtain an inventory report

Connecting the FRL-742 to an ASCII Terminal or Modem

Figure 4 shows the pinouts for connecting the FRL-742 standard RS-232 (DB-9) Craft port to an ASCII terminal.

The FRL-742 line unit will not automatically log off when a terminal is unplugged from the Craft port unless the DTR signal is connected between the terminal and the RS232 Craft port. Technicians must manually log off the line unit before unplugging from the port. Otherwise, the line unit remains logged in, and the terminal session continues.

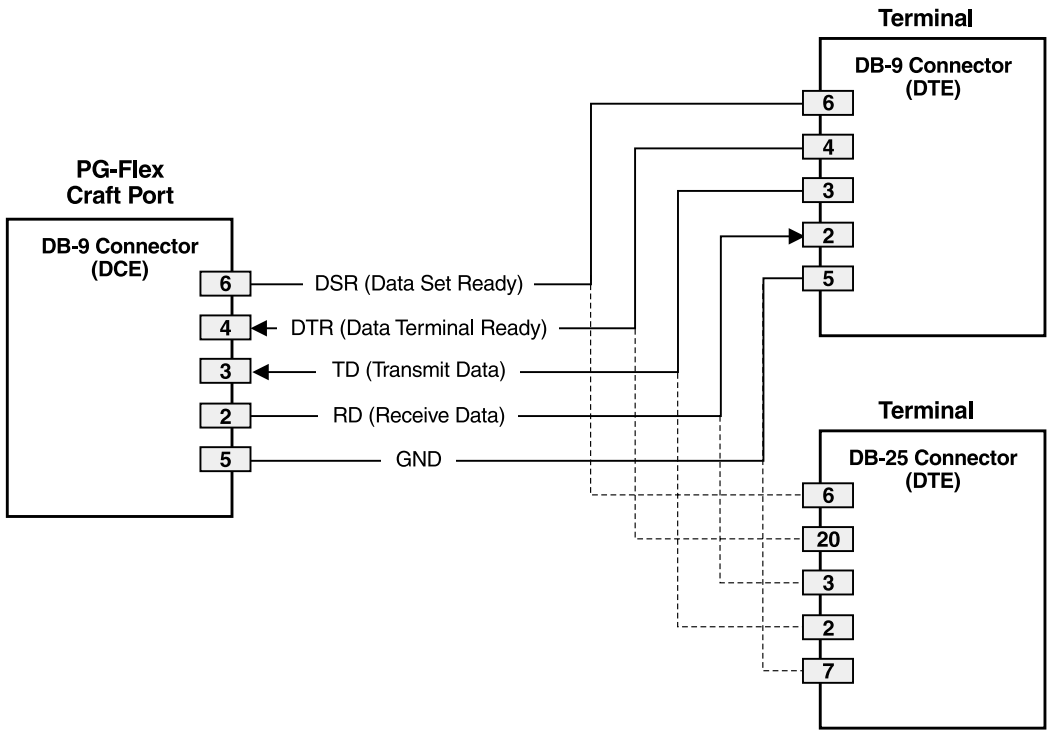

Figure 4. *Connecting the FRL-742 to an ASCII Terminal*

Figure 5 shows the pinouts for connecting the FRL-742 to a modem using a null-modem cable. Using Data Carrier Detect (DCD) from the modem ensures that the FRL-742 line unit logs off if the carrier signal disappears.

When configuring a modem, ensure that either the DIP switches or the software configuration is set off for Carrier Detect (CD) override. This causes the modem to send a CD signal when it connects with another modem and to drop CD when it disconnects. If CD override is set on, the FRL-742 connection will not log out properly when disconnected.

Therefore, set Data Terminal Ready (DTR) override to off so a modem call will terminate properly when the FRL-742 drops DSR (which is null-modemed to DTR input on the modem).

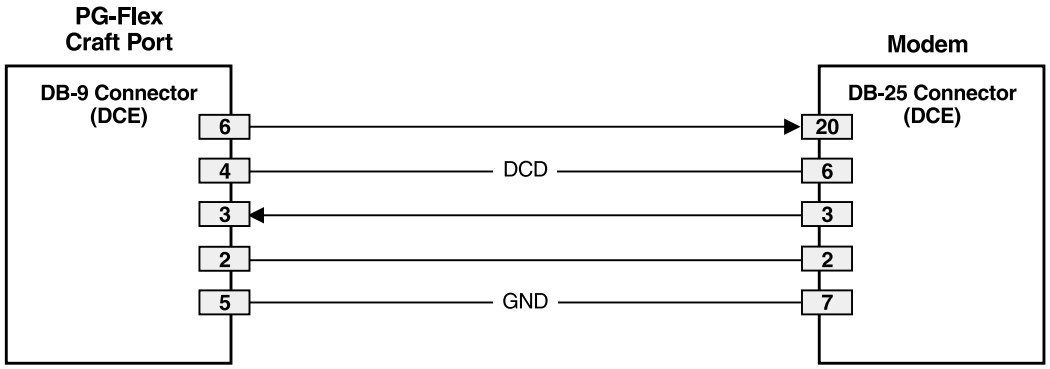

Figure 5. *Connecting the FRL-742 to a Modem*

The connection is set up as:

- DCE with 8 data bits
- 1 stop bit
- no parity
- 1200 to 9600 baud (9600 recommended)

The protocol requires DTR active from the terminal to prevent automatic log off.

VIEWING THE SYSTEM STATUS

While system configuration can only occur through the COT, the system settings can still be viewed through the terminal management system of the RT. The following sections provide a walk-through of the screens and menus available for system monitoring.

Some screens will differ depending on whether channel units are installed in a 19-inch or 23-inch shelf. A 19-inch shelf has two systems, each with one to six channel units. A 23-inch shelf has four systems, each with one to three channel units. The example screens, where appropriate, show only a 23-inch shelf with three channel units.

Menus and Display Structure

Figure 6 shows the menu structure of the terminal management system.

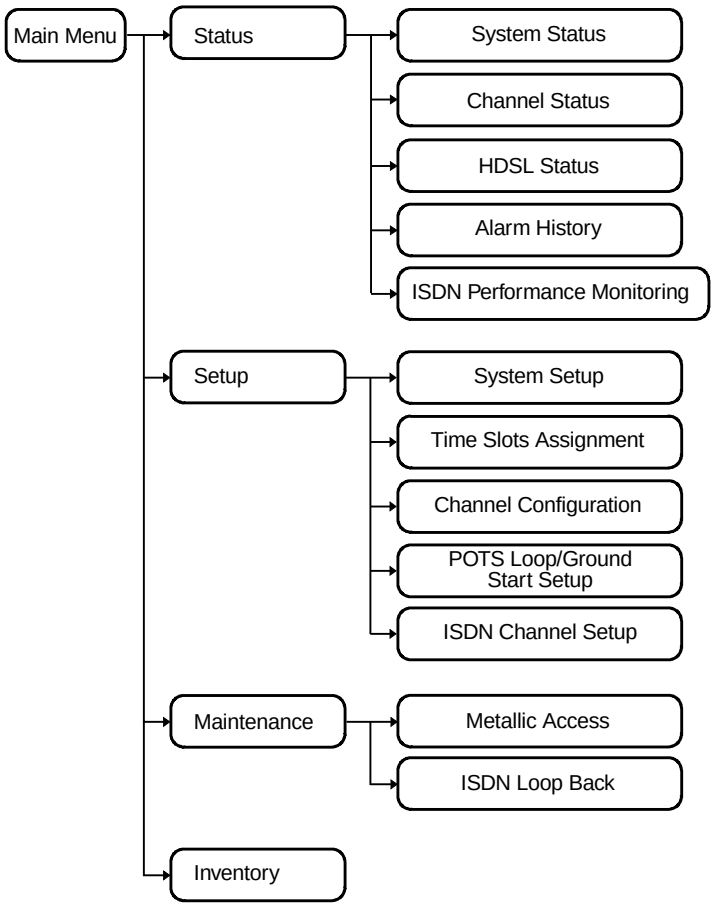

Figure 6. *Terminal Menu and Display Structure*

Power-Up and Connection Screen

After connecting the ASCII terminal to the FRL-742 line unit, press the Spacebar several times to start the autobaud feature. Autobaud covers transmission rates of 1,200, 2,400, 4,800 and 9,600 bps only.

The Power-Up and Connection screen appears:

```
[RT] Ready
```

Press **ENTER** to display the Main Menu.

Main Menu

The Main Menu allows the user at the RT to view a PG-Flex system, test procedures, and status information:

```
08-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         12:41:44
                      SYSTEM ID: List 3C - Tech Pubs       SYSTEM: 1

   CURRENT STATUS: OK                                      LOGGED IN: RT
   ALARMING TERMINAL: NONE


                                  MAIN MENU
------------------------------------------------------------------------------

                                A) STATUS

                                B) SETUP

                                C) MAINTENANCE

                                D) INVENTORY

                                    Q)uit


     [RT] ENTER COMMAND>
```

Table 3 describes the functions associated with these four main menu options (**A** through **D**).

Table 3. *Main Menu Options*

Main Menu Option	Function
A) Status	• System Status shows the equipment installed in the system and the current status (in alarm or not) of the equipment. • Channel Status shows the current status of all channels in the system. Each channel has a status condition. Status conditions vary for the different types of channel cards. Examples of status are: IDLE: channel is not off-hook or ringing RING: channel is ringing BUSY: channel is off-hook OPEN: no connection to CO switch TEST: in test mode TREQ: 116 Vdc test request SERR: PCM bus frame sync error FIDL: forced idle TDSB: time slots disabled RBAT: reverse battery ****: unknown • HDSL Status shows the status of the HDSL span, listing either a 24-hour or 7-day performance history. • Alarm History displays the status history of COT, RT, and span alarms. • ISDN Performance Monitoring Menu displays PM error count and PM threshold for a specific ISDN card and channel.
B) Setup	View the current setup: • System Setup • Time Slots Assignment (view only) • Channel Configuration • POTS Loop/Ground Start Setup • ISDN Channel Setup
C) Maintenance	View metallic access connection to a subscriber circuit or view an ISDN loop back test for a PG-Flex system. Metallic Access includes: COT bridging, COT looking in, COT looking out, RT looking out, RT looking in, RT bridging, and subscriber bypass. ISDN loopback testing includes the ability to switch between COT and RT loopback and change the loopback mode for each card and channel.
D) Inventory	View manufacturing information and version information for all the units in the system (except the FAU/FPI unit). At the CO line unit terminal or the RT line unit terminal, the command displays all units in the system.
Q) Quit	Logs out the user.

View PG-Flex System Status

At the Main Menu, type **A** and then press **ENTER**. The Status Menu appears:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:12:20
                      SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1

   CURRENT STATUS: OK LOGGED IN: RT
   ALARMING TERMINAL: NONE


                                  STATUS MENU
-------------------------------------------------------------------------------

                        A) SYSTEM STATUS
                        B) CHANNEL STATUS
                        C) HDSL STATUS
                        D) ALARM HISTORY
                        E) ISDN PERFORMANCE MONITORING


                         CTRL-X) Main Menu    e(X)it


[RT] ENTER COMMAND>
```

System Status

1 Type **A** again and press **ENTER**. The System Status displays:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:12:28
                      SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1

                               SYSTEM STATUS
-------------------------------------------------------------------------------
  LOCATION    LINE UNIT      CU1     CU2     CU3
-------------------------------------------------------------------------------
     COT      24-CH T1      POTG8    ---    ISDN4
     RT       24-CH T1      POTG8    ---    ISDN4    ---


   ! - ACTIVE ALARM(S): NONE




                         CTRL-X) Main Menu    e(X)it



     [RT] ENTER COMMAND>
```

2 Type **X** and then **ENTER** to return to the Status Menu.

Channel Status

1 To view Channel Status, type **B** and press **ENTER**:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:12:54
                      SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1

                               RT CHANNEL STATUS
--------------------------------------------------------------------------------
                   CU1       CU2       CU3       CU4
   Channel  RT  (POTG8)    (---)    (ISDN4)    (---)
--------------------------------------------------------------------------------
         1         IDLE       -        TDSB       -
         2         IDLE       -        TDSB       -
         3         IDLE       -        ACTV       -
         4         IDLE       -        TDSB       -
         5         IDLE       -         -         -
         6         IDLE       -         -         -
         7         IDLE       -         -         -
         8         IDLE       -         -         -

A) TOGGLE BETWEEN COT AND RT CHANNEL STATUS

                          CTRL-X) Main Menu    e(X)it
```

2 Option **A** shows the COT channel status. Type **X** to return to the Status Menu.

HDSL Status

1 At the Status Menu, type **C** and press **ENTER** to view the HDSL Status Menu:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:13:12
                      SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1

                                 HDSL STATUS
--------------------------------------------------------------------------------
   ALARMS: NONE
--------------------------------------------------------------------------------
                       COT HDSL-1   COT HDSL-2    RT HDSL-1    RT HDSL-2
                        mn/cr/mx     mn/cr/mx     mn/cr/mx     mn/cr/mx
     MARGIN (db):       12/13/14     13/15/15     10/11/13     10/11/13
     PULSE ATTN (db):      30           30           31           32
     PPM OFFSET (ppm):      0            0           10           10
     24 HOUR ES:            0            0            0            0
     24 HOUR UAS:           0            0            0            0
--------------------------------------------------------------------------------
         LAST CLEARED: OCT 22, 14:38
--------------------------------------------------------------------------------

                        A) 24-HOUR PERFORMANCE HISTORY
                        B) 7-DAY PERFORMANCE HISTORY

                         CTRL-X) Main Menu    e(X)it

     [RT] ENTER COMMAND>
```

2 Choose options **A** or **B** for either a 24-hour or 7-day performance history. Type **X** and press **ENTER** to return to the Status Menu.

Alarm History Menu

This menu enables the technician to view both the COT and RT shelf alarm histories.

1 At the Status Menu, type **D** and press **ENTER**:

```
 23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:13:58
SYSTEM ID: List 3C - Tech Pubs                                  SYSTEM: 1

                              SYSTEM ALARM HISTORY
 ------------------------------------------------------------------------------
  LAST CLEARED: OCT 22 14:39
 ------------------------------------------------------------------------------

                            A) COT SHELF ALARM HISTORY

                            B) RT  SHELF ALARM HISTORY


                           CTRL-X) Main Menu    e(X)it




[RT] ENTER COMMAND>
```

2 To return to the Status Menu, type **X** and press **ENTER**.

ISDN Performance Monitoring Menu

1 Select option **E** at the Status Menu:

```
 23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:14:30
SYSTEM ID: List 3C - Tech Pubs                                  SYSTEM: 1

ISDN PERFORMANCE MONITORING MENU
 ------------------------------------------------------------------------------

                    Press ESCAPE to return to previous menu









    Enter Card and Channel (CARD,CHANNEL): 3,3
```

2 Enter the card and channel numbers, separated by a comma as shown in the screen and press **ENTER**. The second Performance Monitoring Menu displays:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:14:34
SYSTEM ID: List 3C - Tech Pubs                                       SYSTEM: 1

ISDN PERFORMANCE MONITORING MENU
 ------------------------------------------------------------------------------
     INTERIM PATH ENABLED   CARD:3   CHANNEL:3
 ------------------------------------------------------------------------------

                         A) SELECT NEW CARD AND CHANNEL

                         B) PM ERROR COUNT

                         C) PM THRESHOLD/ALERT INFO


                          CTRL-X) Main Menu    e(X)it


[RT] ENTER COMMAND>
```

3 Type **B** and press **ENTER**. The Performance Monitoring Error Count displays.

```
 23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:14:52
SYSTEM ID: List 3C - Tech Pubs                                   SYSTEM: 1
                                PM ERROR COUNT
 ------------------------------------------------------------------------------
     INTERIM PATH ENABLED   CARD:3   CHANNEL:3
 ------------------------------------------------------------------------------
 RT                          CUSTOMER/NETWORK
             Hourly ES   Hourly SES    Hourly BE     Daily ES    Daily SES
 PREVIOUS      0/    0     0/    0      0/    0      0/    0      0/    0
 CURRENT       0/    0     0/    0      0/    0      0/    0      0/    0
 ------------------------------------------------------------------------------
     LAST CLEARED: OCT 22, 14:40
 ------------------------------------------------------------------------------
                         A) SELECT NEW CARD AND CHANNEL
                         B) 8-HOUR PM ES COUNT HISTORY


                          CTRL-X) Main Menu    e(X)it



[RT] ENTER COMMAND>
```

4 Type **A** to view another card and channel. Type **B** to see the last eight hours of errored seconds:

```
 23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:15:04
SYSTEM ID: List 3C - Tech Pubs                                      SYSTEM: 1
8-HOUR PM ES COUNT HISTORY
 ------------------------------------------------------------------------------
     INTERIM PATH ENABLED   CARD:3   CHANNEL:3
 ------------------------------------------------------------------------------
                                  CUSTOMER/NETWORK
 HOUR                    RT       <<Hourly ES>>
 ------------------------------------------------------------------------------
  3:00                   0/    0
  4:00                   0/    0
  5:00                   0/    0
  6:00                   0/    0
  7:00                   0/    0
  8:00                   0/    0
  9:00                   0/    0
 10:00                   0/    0

                         A) SELECT NEW CARD AND CHANNEL


                          CTRL-X) Main Menu    e(X)it

[RT] ENTER COMMAND>
```

5 Type **X** and press **ENTER**, then repeat. At the ISDN Performance Monitoring Menu, type **C** to display the PM Threshold/Alert Info Menu:

```
 23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:15:54
SYSTEM ID: List 3C - Tech Pubs                                  SYSTEM: 1
PM THRESHOLD/ALERT INFO
 ------------------------------------------------------------------------------
     INTERIM PATH ENABLED   CARD:3   CHANNEL:3
 ------------------------------------------------------------------------------
 RT                           CUSTOMER/NETWORK
                         Hourly ES    Hourly SES   Daily ES     Daily SES
 Threshold Count            40           10          100          25
 Threshold Exceeded      no/no        no/no        no/no        no/no
 Threshold Cross Alarm   dis/dis      dis/dis      dis/dis      dis/dis

                         A) SELECT NEW CARD AND CHANNEL


                          CTRL-X) Main Menu    e(X)it









     [RT] ENTER COMMAND>
```

6 Type **CTRL** + **X** and return to the Main Menu.

View PG-Flex System Setup Menus

At the Main Menu, type **B** and then press **ENTER**. The Setup Menu displays:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:16:50
                      SYSTEM ID: List 3C - Tech Pubs        SYSTEM: 1

   CURRENT STATUS: OK LOGGED IN: RT
   ALARMING TERMINAL: NONE



                                  SETUP MENU
------------------------------------------------------------------------------

                       A) SYSTEM SETUP
                       B) TIME SLOTS ASSIGNMENT
                       C) CHANNEL CONFIGURATION
                       D) POTS LOOP/GROUND START SETUP
                       E) ISDN CHANNEL SETUP


                         CTRL-X) Main Menu    e(X)it



     [RT] ENTER COMMAND>
```

System Settings Menu

1 To view the system settings (see Table 4), type **A** and then press **ENTER**:

```
23-OCT-98 ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:16:54
                     SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1
                               SYSTEM SETTINGS
------------------------------------------------------------------------------
     SYSTEM DATE:  .   .   .   .   .   23-OCT-98
     SYSTEM TIME:  .   .   .   .   .   11:16:54
     SYSTEM ID:    .   .   .   .   .   List 3C - Tech Pubs
     AUTO LOGOUT TIME (min.):  .   .   DISABLED    (DISABLED,5,30,60)
     METERED TONE FREQUENCY (kHz): .   DISABLED    (DISABLED,12,16)
     RING FREQUENCY (Hz):  .   .   .   20          (20,25,30)
     HDSL ES ALARM THRESHOLD:  .   .   17          (DISABLED,17,170)
     HDSL MARGIN THRESHOLD:    .   .   7           (0-15,0=DISABLED)
     ALARM ON HDSL THRESHOLD:  .   .   ENABLED     (DISABLED,ENABLED)
     LOCAL LOOP LENGTH:    .   .   .   LONG        (SHORT,LONG)
     ALARM ON CONFIGURATION:   .   .   MINOR       (DISABLED,MINOR,MAJOR)
     ALARM ON INSUFFICIENT TIMESLOT:   ENABLED     (DISABLED,ENABLED)
     ALARM ON ISDN PM THRESHOLD:   .   ENABLED     (DISABLED,ENABLED)


                        CTRL-X) Main Menu    e(X)it



     [RT] ENTER CHOICE>
```

2 Type **X** to return to the Setup Menu.

Table 4. *System Settings Menu Options*

Parameter	Default Value	Description
System Date	01-JAN-00	System date. (This product meets or exceeds the current technical quality requirements for Year 2000 compliance and properly processes dates up to and beyond December 31, 1999.)
System Time	00:00:00 at power on	System (military) time (hh:mm:ss). The System Time is set individually for each PG-Flex system. The time setting is lost whenever the system shelf loses power or the COLU or RTLU module is removed and reinserted.
	**All the parameters discussed in the remainder of this table are stored in the CO line unit card NVRAM and normally will not change when power is cycled or cards are removed and reinserted.**	
System ID	(all spaces)	Indicates the physical location of the PG-Flex system (CO or RT terminal) through any mixture of up to 24 total alphanumeric characters. Each PG-Flex system has a unique, user-programmable System ID. The default for System ID is “blank” (all spaces). If the CO line unit is replaced, reenter the appropriate system ID.
Auto Logout Time	DISABLED	The system automatically logs out after a time determined by this parameter: • DISABLED: The user is never automatically logged out. • 5: 5 minutes. • 30: 30 minutes. • 60: 60 minutes.
	**If the user leaves the system without logging out, and if Auto Logout Time is "DISABLED," the next person who accesses the system can do so without logging on and does not need a password.**	
Metered Tone Frequency	12	Meter tones are used for out-of-band signaling with coin telephones, typically in international markets. A special channel card is required to support this function.
Ring Frequency	20	Determines the frequency of the ringing voltage on the subscriber line: • 20: 20 Hz. • 25: 25 Hz. • 30: 30 Hz.
HDSL ES Alarm Threshold	DISABLED	The number of Error Seconds required before a minor alarm is generated (dependent on the setting of the Alarm on HDSL Threshold parameter). The count of Error Seconds is reset to zero when the reset function is used on the HDSL Performance History status screen. • DISABLED: No minor alarm is generated, regardless of the number of error seconds. • 17: A minor alarm is generated after 17 error seconds. • 170: A minor alarm is generated after 170 error seconds.
HDSL Margin Threshold	4	If the HDSL margin attains a value equal to or less than the setting for this parameter, a minor alarm is generated (determined by the Alarm setting on HDSL Threshold parameter). A default setting of 4 indicates that a minor alarm will occur when the HDSL margin is 4 dB. The HDSL Margin Threshold can be set between 1 dB and 15 dB.

Table 4. *System Settings Menu Options*

Parameter	Default Value	Description
Alarm on HDSL Threshold	DISABLED	Controls whether a minor alarm is generated if the HDSL ES Alarm Threshold or HDSL Margin Threshold is exceeded. • DISABLED: A minor alarm does not occur when the HDSL ES Alarm Threshold or HDSL Margin Threshold is exceeded. • ENABLED: A minor alarm occurs when the HDSL ES Alarm Threshold or HDSL Margin Threshold is exceeded.
Local Loop Length	Long	Determines the length of subscriber loop supported by PG-Flex and affects all subscriber loops within a single PG-Flex system. The loop length affects the total power required by the PG-Flex system: the shorter the loop, the less the power required. • LONG: The PG-Flex system can support subscriber loops with a line resistance of 530 Ω or less. • SHORT: The PG-Flex system can support subscriber loops with a line resistance of 400 Ω or less. For most applications, the power saved by the SHORT setting is relatively insignificant; therefore, select the default value (LONG) in most cases.
Alarm on Configuration	DISABLED	Each channel card in a PG-Flex system must have a corresponding channel card type at the opposite node. A mismatch condition results when a card does not have the correct corresponding card at the other end due to channel unit removal, type mixing, or failure. If a mismatch condition exists between the CO and RT, replace the corresponding channel unit with a matching channel unit. • DISABLED: A minor alarm does not occur if there is a mismatch of channel units. • ENABLED: A minor alarm occurs if there is a mismatch of channel units.
Alarm on Insufficient Time Slot	DISABLED	The system can generate a minor alarm if more circuits are enabled than there are time slots available. (This could occur when enabling ISDN circuits without first disabling a sufficient number of POTS circuits to ensure that there are enough time slots available to support the ISDN circuits.) • DISABLED: A minor alarm does not occur if more circuits have been enabled than there are available time slots. • ENABLED: A minor alarm occurs if more circuits have been enabled than there are available time slots.
Alarm on ISDN PM Threshold	DISABLED	This parameter determines whether a minor alarm occurs if any of the PM thresholds are exceeded. • DISABLED: A minor alarm does not occur if any of the ISDN PM thresholds are exceeded. • ENABLED: A minor alarm occurs if any of the ISDN PM thresholds are exceeded.

Time Slots Assignment

1 At the Setup Menu, type **B** and then press **ENTER** to view the time slots channel assignment:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:17:10
                      SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1
                            TIME SLOTS ASSIGNMENT
-------------------------------------------------------------------------------
 TIME    CHANNEL     TIME    CHANNEL     TIME    CHANNEL     TIME    CHANNEL
 SLOT  ASSIGNMENT    SLOT  ASSIGNMENT    SLOT  ASSIGNMENT    SLOT  ASSIGNMENT
-------------------------------------------------------------------------------
   1:   CU3  CH3       7:   CU1  CH4      13:     ----        19:     ----
   2:   CU3  CH3       8:   CU1  CH5      14:     ----        20:     ----
   3:   CU3  CH3       9:   CU1  CH6      15:     ----        21:     ----
   4:   CU1  CH1      10:   CU1  CH7      16:     ----        22:     ----
   5:   CU1  CH2      11:   CU1  CH8      17:     ----        23:     ----
   6:   CU1  CH3      12:     ----       18:     ----        24:     ----
-------------------------------------------------------------------------------

                         CTRL-X) Main Menu    e(X)it




    [RT] ENTER COMMAND>
```

The system automatically generates these values. However, cycling power to the system or hot plugging a new channel unit can change these values.

Because PG-Flex is a universal subscriber carrier system, the specific time slot assigned to a channel is irrelevant—this screen is provided for informational purposes only.

2 Type **X** to return to the Setup Menu.

Channel Configuration Menu

1 To view Channel Configuration, type **C** at the Setup Menu:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:17:20
                      SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1

                             CHANNEL CONFIGURATION
--------------------------------------------------------------------------------
                   CU1       CU2       CU3
   Channel COT  (POTG8)    (---)    (ISDN4)
             RT  (POTG8)    (---)    (ISDN4)    (---)
--------------------------------------------------------------------------------
         1          ON        -      DISABLED
         2          ON        -      DISABLED
         3          ON        -         ON
         4          ON        -      DISABLED
         5          ON        -         -
         6          ON        -         -
         7          ON        -         -
         8          ON        -         -

                           13 Time slots Available

                         CTRL-X) Main Menu    e(X)it


     [RT] ENTER COMMAND>
```

Table 5 describes the channel configuration options.

Table 5. *Channel Configuration Options*

Parameter	Default Value	Function
Channel Configuration	ENABLED	Each channel is individually enabled or disabled through the COLU. This configuration is stored in both the COLU and the COCU. If any one card (COLU, RTLU, COCU, or RTCU) is removed, replaced, or reinserted, the Channel Configuration will automatically be preserved. The values can be set to one of the following parameters: • DISABLED: The selected channel is disabled. • ENABLED: The selected channel is enabled.

2 Type **X** and press **ENTER** to return to the Setup Menu.

POTS Ground/Loop Start Menu

1 Type **D** at the Setup Menu and press **ENTER**:

```
23-OCT-98 ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:17:42
                     SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1

                    POTS GROUND/LOOP START CONFIGURATION
--------------------------------------------------------------------------------
                   CU1       CU2       CU3
   Channel COT  (POTG8)    (---)    (ISDN4)
             RT  (POTG8)    (---)    (ISDN4)    (---)
--------------------------------------------------------------------------------
          1         LOOP       -        N/A
          2         LOOP       -        N/A
          3         LOOP       -        N/A
          4         LOOP       -        N/A
          5         LOOP       -         -
          6         LOOP       -         -
          7         LOOP       -         -
          8         LOOP       -         -



   CTRL-X) Main Menu   e(X)it >


[RT] ENTER COMMAND>
```

2 Type **X** and press **ENTER** to return to the Setup Menu.

ISDN Channel Setup Menu

1 At the Setup Menu, type **E** and then press **ENTER** to view ISDN channel setup:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:18:02
                      SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1

                               ISDN CHANNEL SETUP
--------------------------------------------------------------------------------


                   Press ESCAPE to return to previous menu









   Enter Card and Channel To Setup (CARD,CHANNEL): 3,3
```

If no ISDN cards are installed in the PG-Flex system, the display will indicate such and not continue to the ISDN Channel Setup menu.

2 Type the card number followed by a comma, then type the channel number for the ISDN module you want to view and press **ENTER**. The ISDN Channel Setup Menu appears:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:18:06
                      SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1

                               ISDN CHANNEL SETUP
-------------------------------------------------------------------------------
   CARD:3    CHANNEL:3
-------------------------------------------------------------------------------
     PM Mode:  .   .   .   .   .   .   Int. Path   (Int. Path,Int. Segmented)
     eoc Mode: .   .   .   .   .   .   Normal      (Normal, Transparent)
     B1 <-> B2 Swap:   .   .   .   .   Normal      (Normal, Swap)
     Sealing Current:  .   .   .   .   On          (Off, On)
     Zero Byte Substitution:   .   .   Off         (Off, Enabled)

                          S)ELECT NEW CARD AND CHANNEL

                          CTRL-X) Main Menu    e(X)it









     [RT] ENTER CHOICE>
```

Table 6 describes the ISDN channel unit configuration parameters:

The options in Table 6 listed in bold type are the default settings.

Table 6. *ISDN Channel Unit Configuration Parameters*

Parameter	Description	Options
PM Mode	Method of performance monitoring.	**Interim** Performance monitoring: Considers the channel as one path and collects the end-to-end error rate for the entire transport path. Segmented Performance monitoring: Considers the channel as separate sections and individually collects error rates for each DSL loop.
eoc mode	How ISDN eoc messages are handled by the PG-Flex system.	**Normal** ISDN: eoc messages are decoded and re-transmitted within the PG-Flex system. Transparent ISDN: eoc messages are not decoded and are passed through the PG-Flex system transparently.
B1<->B2 Swap	Whether the B channels are swapped between the PG-Flex CO ISDN “U” interface and the RT ISDN “U” interface. The “D” signaling channel is unaffected by this parameter.	**Normal** ISDN: Channels “B1” and “B2” at the CO ISDN “U” interface are routed to channels “B1” and “B2” at the RT ISDN “U” interface. Swap ISDN: Channels “B1” and “B2” at the CO ISDN “U” interface are routed to channels “B2” and “B1” at the RT ISDN “U” interface.

Table 6. *ISDN Channel Unit Configuration Parameters*

Parameter	Description	Options
Sealing Current	Whether sealing current is applied to the ISDN subscriber loop.	**Off:** No sealing current is applied to the ISDN subscriber loop. On: A constant current of approximately 5 MA flows in the ISDN subscriber loop at all times.
Zero Byte Substitution	How ISDN eoc messages are handled by the PG-Flex system.	**Off:** The PG-Flex system passes all data through without any special encoding. On: The PG-Flex system will use a ZBS code to prevent long string of zeros in the data.

3 To view another ISDN channel unit and channel, type **S** and press **ENTER**.

4 Type the channel unit number followed by a comma, then type the channel for another ISDN channel unit. For example, type "2, 3" for ISDN card number 2 on channel 3. Press **ENTER** again.

View Maintenance Tests

The following paragraphs describe how to view the metallic access and test options of a PG-Flex system.

From the Main Menu, type **C** and then press **ENTER** to access the Maintenance Menu:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:18:38
                      SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1

   CURRENT STATUS: OK                                        LOGGED IN: RT
   ALARMING TERMINAL: NONE



                               MAINTENANCE MENU
------------------------------------------------------------------------------

                              A) METALLIC ACCESS

                              B) ISDN LOOPBACK


                          CTRL-X) Main Menu    e(X)it







     [RT] ENTER COMMAND>
```

Metallic Access

A metallic access connection to a subscriber circuit can be viewed through the Metallic Access Menu. From the Maintenance Menu, type **A** then press **ENTER**. The Metallic Access Menu displays:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:18:46
                      SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1

   CURRENT STATUS: OK                                          LOGGED IN: RT
   ALARMING TERMINAL: NONE


                              METALLIC ACCESS MENU
------------------------------------------------------------------------------
                         COT - BRIDGING
                         COT - LOOKING IN
                         COT - LOOKING OUT
                         RT  - LOOKING OUT
                         RT  - LOOKING IN
                         RT  - BRIDGING
                         SUBSCRIBER BYPASS


                         CTRL-X) Main Menu    e(X)it



     [RT] ENTER COMMAND>
```

Table 7 defines the functions of the Metallic Access Menu parameters.

Table 7. *Metallic Access Menu Options*

Parameter	Function
COT - Bridging	Monitors a subscriber circuit connection between the switch and the specified CO channel unit Tip/Ring pair.
COT - Looking In	Verifies the connection between the switch and the specified channel unit Tip/Ring pair. The channel under test is disconnected from the switch for this function. The technician will be able to verify connectivity of the channel under test back to the switch.
COT - Looking Out	Stimulates the subscriber connection through the CO channel unit. The switch is disconnected from PG-Flex for this function.
RT - Looking In	Monitors the subscriber circuit at the RT channel unit Tip/Ring pair with the subscriber terminal equipment disconnected.
RT - Looking Out	Verifies the channel the subscriber drop off with the RT channel unit disconnected.
RT - Bridging	Monitors the connection between the RT channel unit and the subscriber terminal equipment.
Subscriber Bypass	Provides a metallic connection from the switch to the subscriber's terminal equipment for the selected channel, bypassing the PG-Flex carrier transport. This is the only access connection that can be maintained after the technician logs off the Craft port.

ISDN Loopback Tests

View ISDN loop back tests starting at the Maintenance Menu.

1 Type **B** and then press **ENTER**. The ISDN Loopback Menu displays:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:19:14
                      SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1

                              ISDN LOOPBACK MENU
--------------------------------------------------------------------------------
RT LOOPBACK MAP     CARD:3
--------------------------------------------------------------------------------
LOOPBACK             CH1           CH2           CH3           CH4
--------------------------------------------------------------------------------
B1 DSL              normal        normal        normal        normal
B2 DSL              normal        normal        normal        normal
2B+D DSL            normal        normal        normal        normal
B1 DC               normal        normal        normal        normal
B2 DC               normal        normal        normal        normal
2B+D DC             normal        normal        normal        normal

                         P)revious Card  or  N)ext Card

                           CTRL-X) Main Menu  e(X)it



     [RT] ENTER COMMAND>
```

2 Type **CTRL** + **X** to return to the Main Menu.

View System Inventory

This option allows viewing of manufacturing and version information for all the units in the system (except the FAU/FPI unit). At the RT line unit terminal, this function displays all units in the system.

At the Main Menu prompt, type **D**. Press **ENTER** to display the system inventory:

```
23-OCT-98        ADC TECHNOLOGIES INC., PG-FLEX TERMINAL         11:20:02
                      SYSTEM ID: List 3C - Tech Pubs                SYSTEM: 1

                                  INVENTORY
--------------------------------------------------------------------------------
 LOC  SLOT    MODEL    LIST  ISSUE     TYPE      S/W     P1 TAG     CLEI CODE
--------------------------------------------------------------------------------
 COT  LU     FLL-712   3C      1     24-CH T1    4.7   2658001750   VACHDFNCAA
 COT  CU1    FLC-703    4      1       POTG8     1.3   0408001530   VACHCHGCAA
 COT  CU3    FLC-706    1      1       ISDN4     1.6   0208000345   VACHEGJCAA
 RT   LU     FRL-742   3C      1     24-CH T1    4.7   2658001762   VARHCFPCAA
 RT   CU1    FRC-753    4      1       POTG8     1.3   0548002737   VARHCKGCAA
 RT   CU3    FRC-756    1      1       ISDN4     1.6   1598002441   VARHEJJCAA

                       CTRL-X) Main Menu    e(X)it



     [RT] ENTER COMMAND>
```

TROUBLESHOOTING

Table 8 provides troubleshooting procedures based on indications displayed by the FRL-742 front panel indicators.

Table 8. *FRL-742 RT Line Unit Troubleshooting*

Indication	Problem	Action
PWR LED off	One or both HDSL lines are not connected between the COT and RT. Verify the connections at the RT and COT.	Measure 130 Vdc to 250 Vdc between HDSL_T and HDSL_T on the RT enclosure backplane. On the COT shelf backplane, measure -65 to -130 Vdc, ±10% between HDSL_T1 and chassis ground and +65 Vdc to +130 Vdc between HDSL_T2 and chassis ground.
	COT line unit fuse F1 has blown.	Replace the fuse.
	RT line unit power supply has failed.	Replace RT line unit.
	COT HDSL power supply has failed.	Replace COT line unit.
LOOP 1 (2) SYNC LED flashing or off	The HDSL line is attempting to synchronize with the CO unit or cannot detect the HDSL signal from the CO unit. This is usually an indication that there is a problem with the HDSL circuit between the COT and RT (assuming the FAULT LED is *off*).	Verify the HDSL circuits are terminated properly and with the correct orientation. Measure the loop resistance of each HDSL circuit (shorting the pair at the far end). The loop resistance must be less than that shown in Table 1.
	COLU and RTLU incompatible (that is, one is a T1 version and the other is an E1 version).	Install compatible versions of the COLU and RTLU (that is, install both COLU and RTLU as T1 or E1 versions).
LOOP 1 (2) MARGIN LED on	The HDSL line margin level is below a preset level.	See the previous discussion on the SYNC LED *flashing* or *off*.
FAULT LED on	Faulty FRL-742 RT line unit.	Replace the RT line unit.

PRODUCT SUPPORT

This section provides technical support, certification, and warranty information.

TECHNICAL SUPPORT

Technical Assistance is available 24 hours a day, 7 days a week by contacting ADC Customer Service Engineering group at:

Telephone:	(800) 638-0031 or (714) 832-3222 The 800 number telephone support line is toll-free in the U.S. and Canada
Fax:	(714) 730-2400
Email	wsd_support@adc.com

WORLD WIDE WEB

ADC product and company information can be found at http://www.adc.com using any Web browser.

LIMITED WARRANTY

Product warranty is determined by your service agreement. Refer to the ADC Warranty/Software Handbook for additional information, or contact your sales representative or Customer Service for details.

RETURNS

To return equipment to ADC:

1. Locate the number of the purchase order under which the equipment was purchased. To obtain a return authorization number, you need to provide the original purchase order number to ADC's Return Material Authorization (RMA) Department.
2. Call or write ADC's RMA Department to ask for an RMA number and any additional instructions. Use the telephone number, fax number or email address listed below:
   - Telephone: 800.370.9670
   - Fax: 714.832.9923
   - Email Address: rma@adc.com
3. Include the following information, in writing, along with the equipment you are returning:
   - Company name and address.
   - Contact name and telephone number.
   - The shipping address to which ADC should return the repaired equipment.
   - The original purchase order number.

- A description of the equipment that includes the model and part number of each unit being returned, as well as the number of units that you are returning.
- The reason for the return. For example:
  - The equipment needs an ECO/ECN upgrade.
  - The equipment is defective.

If the equipment is defective, please tell us what you observed just before the equipment malfunctioned. Be as detailed in your description as possible.

  - If there is another reason for returning the equipment, please let us know so we can determine how best to help you.

4. Pack the equipment in a shipping carton.

5. Write ADC's address and the RMA Number you received from the RMA Department clearly on the outside of the carton and return to:

ADC DSL Systems, Incorporated
14352 Franklin Ave.
Tustin, CA 92780-7013

Attention: RMA (Number)

All shipments are to be returned prepaid. ADC will not accept any collect shipments.

FCC COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Refer to the installation section of the appropriate instruction manual for the unit you are installing to obtain information on:

- cabling
- proper connections
- grounding
- line powering

All wiring external to the product(s) should follow the provisions of the current edition of the National Electrical Code or local standards.

ABBREVIATIONS AND GLOSSARY

ABBREVIATIONS

AWG	American Wire Guage
CO	Central Office
COT	Central Office Terminal
DTR	Data Terminal Ready
HDSL	High-bit-rate Digital Subscriber Line
ISDN	Integrated Services Digital Network
LU	Line Unit
MLT	Mechanized Loop Testing
PBX	Private Branch Exchange
PCM	Pulse Code Modulation
PGTC	Pair Gain Test Controller
POTS	Plain Old Telephone Service
PPM	Pulse Position Modulation
RMA	Return Material Authorization
RT	Remote Terminal

GLOSSARY

Margin	The excess signal to noise ratio, at either the COT or RT, relative to a 10^{-7} Bit Error Rate. *cr* is the current margin, *mn* is the minimum margin since last cleared, *mx* is the maximum value since cleared, and N/A means Not Available. The normal range of a typical margin is from 22 to 6 dB.
Pulse Attenuation	The attenuation of the 2B1Q pulse from the distant end. PG-Flex operates with pulse attenuations in excess of 30 dB. This value is related to the cable pair's 196-kHz loss. The pulse attenuation is a more direct indication of the loop attenuation to the 2B1Q signal than the 196-kHz loss. The normal range of pulse attenuation is from 1 to 32 dB.
PPM	The relative offset of the crystal oscillator in the RT line unit from the COT line unit's crystal oscillator. Any value between -64 and +64 is adequate. Values outside this range indicate out of tolerance components or excessive temperature drift of critical components.
HDSL 24 Hour ES	The number of 1-second intervals that contained at least one CRC error. This value is a running total of errored seconds (ES) for the last 24 hours.
HDSL 24 Hour UAS	The number of (unavailable) seconds the HDSL loop was out of synchronization.

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