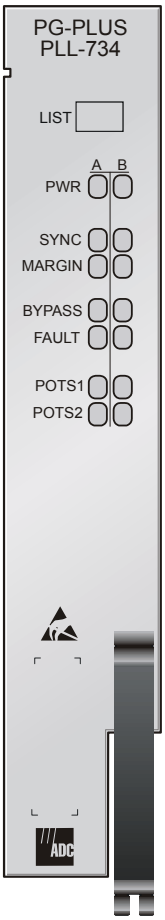
PG-PLUS
TECHNICAL PRACTICE



DUAL 2 POTS
CENTRAL OFFICE LINE UNIT

Model	List	CLEI Code
PLL-734	2	S9L1APBA~~

Revision History of This Practice

Revision	Release Date	Revisions Made
01	August 9, 2000	Initial Release
02	January 28, 2002	Release to rebrand document to comply with ADC standards
03	January 6, 2003	Updated Product Support Information

USING THIS PRACTICE

Three types of messages, identified by icons, appear in the text.

Notes indicate information about special circumstances.

Cautions indicate the possibility of equipment damage or the possibility of personal injury.

Electrostatic Discharge (ESD) susceptibility symbols indicate that a device or assembly is susceptible to damage from electrostatic discharge.You must wear an antistatic wrist strap connected to the appropriate ground connection prior to performing installation procedures. You must also observe normal ESD precautions when handling electronic equipment. Do not hold electronic plugs by their edges. Do not touch components or circuitry.

INSPECTING YOUR SHIPMENT

Upon receipt of the equipment:

- Unpack each container and visually inspect the contents 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.
- Check the packing list to ensure complete and accurate shipment of each listed item. If the shipment is short or irregular, contact ADC as described in "Returns" on page 67. If you must store the equipment for a prolonged period, store the equipment in its original container.

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OVERVIEW

The PG-Plus® COLU, PLL-734 List 2, provides interfaces to two 2 POTS RT, PRL-784, for four POTS subscribers.

DESCRIPTION AND FEATURES

Using existing cable, PG-Plus provides for higher bandwidth needs of residential and business customers by providing multiple POTS interfaces on a single HDSL twisted-pair wire. A typical application of a PG-Plus system consists of one COTS, one COLU, and two RTs (see Figure 1).

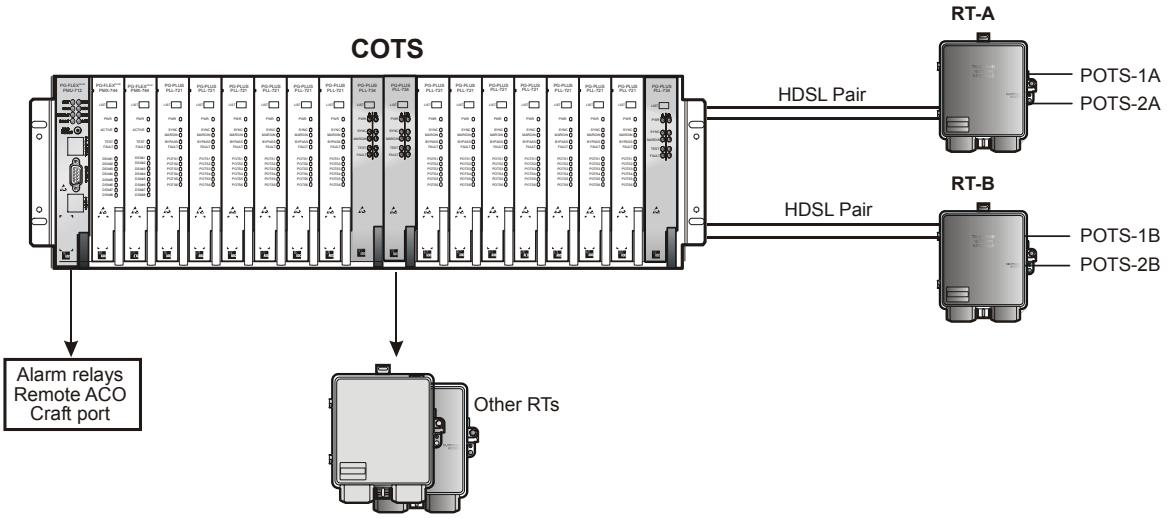


Figure 1. *Typical PG-Plus Application*

The COLU uses ADC's HDSL technology to provide digital transmission without the need for repeaters, loop conditioning, or pair selection. The COLU can be installed in the PCS-718 19-inch or the PCS-719 23-inch COTS. Line power is provided to the RTs by the COLU. Advanced features, performance monitoring, alarm reporting, and testing require a PMU be installed.

The COLU performs the interface functions between the analog POTS circuits of the CO switching system by mapping one POTS line onto one DS0 for transmission to the RTs on the HDSL pair. To obtain maximum reach, the HDSL line to the RT is operated at the minimum rate to support the payload.

HDSL Transmission

The PAU-710 uses ADC's HDSL 2B1Q technology to transport 2 DS0s, plus signalling, over one copper pair to each RT. The HDSL circuits can be used without pair selection. Adaptive equalization, scrambling, and a four-level 2B1Q line coding scheme are used to maximize distance and minimize crosstalk.

Table 1 shows the maximum distance between the COTS and RT for various wire gauges. These distances are shown for a cable temperature of 68º F (20º C). As the temperature of the cable increases, the distance decreases.

Table 1. *HDSL Distances*

Wire Gauge	HDSL Distance (6 dB Margin / 46.4 dB Loss / 33 kHz)	Analog Impedence (900 Ω)
26 AWG (0.40 mm)	18.0 kft (2.8 km)	6.3 kft (1.9 km)
24 AWG (0.51 mm)	25.5 kft (3.8 km)	10.2 kft (3.1 km)
22 AWG (0.64 mm)	36.5 kft (5.0 km)	16.3 kft (5.0 km)
19 AWG (0.91 mm)	62.0 kft (7.0 km)	32.9 kft (10.0 km)

Metallic Fallback

Metallic fallback provides a direct connection from the CO to one subscriber under fault conditions. Service is provided to the subscriber assigned to the first POTS line in the affected COLU. At the COLU, the system exits metallic fallback and attempts to synchronize if either POTS or the HDSL Tip to Ring pair is shorted for at least 3 seconds, and then released for at least 3 seconds. Otherwise, the COLU checks for the presence of an RT every 5 minutes. If an RT is present and POTS line 1 is on-hook, the system begins HDSL synchronizationn.

Power Consumption and Heat Dissipation

The worst case conditions under which these parameters are measured include a 15,000 ft., #26 AWG loop, a fully loaded COTS, a -42.5 Vdc COTS battery voltage and a 40° C outdoor temperature.

Table 2. *Power Consumption and Heat Dissipation*

Power	COLU Slot	19-inch COTS*	23-inch COTS†
Maximum Heat Dissipation			
HDSL Line Power Off	5.0 W	50.0 W	60.0 W
HDSL Line Power On	16.5 W	119.0 W	152.0 W
Maximum Power Consumption			
HDSL Line Power Off	5.0 W	50.0 W	60.0 W
HDSL Line Power On	98.0 W	625.0 W	822.0 W
Maximum Current Drain			
HDSL Line Power Off	0.1 A	1.2 A	1.4 A
HDSL Line Power On	1.9 A	11.9 A	15.8 A

(*) The PCS-718 List 1 is shown as loaded with one PMU-712, two PMX-744, and 12 PLL-726s.
(†) The PCS-719 List 1 is shown as loaded with one PMU-712, two PMX-744, and 16 PLL-726s.

Monitoring, History, and Diagnostics

The COLU provides real-time, nondisruptive monitoring of HDSL transmission performance parameters for all units in a circuit. You can set threshold values for the performance monitoring measurements at the appropriate COLU screen. Alarms are activated at the designated threshold setting. The user interface ports performance is also monitored. Monitored parameters include:

- HDSL — Noise margin, insertion loss, ES, UAS
- Interface — ES and UAS seconds
- Major Alarm Relay — Form-C relay contacts (NO, NC, C). Fail-safe operation

Performance Parameters

Based on the monitored parameters, the COLUs derive the following performance parameters:

- MAR — A measure of the ratio of signal power to noise power, in decibels (dB), at a receiver point. A value of 0 dB means that the predicted transmission BER is equal to 10^{-7}, a value of 6 dB means the predicted transmission BER is equal to 10^{-10}. The Main menu option Status Summary displays continuous updates of the margin value. You can set the high and low values of this parameter for the COLU and the RT at the "HDSL A or B Summary Screen" on page 24 and the severity of the alarm at the "System Alarm Types Screen" on page 40. View the results of these settings at the See "Main Summary Screen" on page 21.
- LOSW — The COLU has detected an error in one or more bits in five consecutive HDSL SYNC words. Five consecutive SYNC words must be received without error to clear this condition. A LOSW condition generally indicates the loop is down, thus data cannot be transmitted. The COLU uses this parameter to derive UAS performance parameter. You can set the severity of the alarm at the "HDSL A and B Alarm Types Screen" on page 49. View the results of these settings at the "HDSL A or B Summary Screen" on page 24.
- HDSL ES — An interval of 1 second during which at least one CRC is detected at the incoming HDSL port. You can set the value of this parameter for the COLU and the RT at the "HDSL A and B Alarm Thresholds Screen" on page 46, and at the "HDSL A and B Alarm Types Screen" on page 49 set the severity of the alarm. View the results of these settings at the "HDSL A or B Summary Screen" on page 24.
- HDSL UAS — An interval of 1 second during which a loop is down. You can set the value of this parameter for the COLU and the RT at the "HDSL A and B Alarm Thresholds Screen" on page 46 and at the "HDSL A and B Alarm Types Screen" on page 49 set the severity of the alarm. You can view the results of these settings at the "HDSL A or B Summary Screen" on page 24.

Alarms

The COLUs generate alarms for problem conditions on the HDSL transmission facility and at the application interface. You can view the alarm status from the "COLU Main Screen" on page 18.

- MAR — The margin default value or a value you selected has been reached, or the unit is below the current threshold value set.
- ES — The errored seconds are measured by both 15-minute or 24-hour thresholds. The threshold has been reached or exceeded if an alarm exists.
- UAS — The unavailable seconds are measured by both 15-minute or 24-hour thresholds. The threshold has been reached or exceeded if an alarm exists.
- PFO — The COLU cannot power the RTs due to an open circuit.

- PFS — The COLU cannot power the RTs due to a short circuit.
- PGF — The COLU cannot power the RTs due to HDSL Tip or Ring Fault to GND.
- LOSW — If the alarm is on the COLU, then the COLU cannot synchronize with the A or B RT, then both the COLU and the A or B RT are out of service. If the alarm is on the RTs, then the A or B RTs cannot synchronize with the COLU, and the COLU and either RT A or B are out of service.
- MISPWR*n* — Power supply *n* is missing (where *n is* A or B).
- MISMATCH*n* — Incompatible RT*n* unit has been installed (where *n is* A or B). For example, a COLU List 1 has been connected to a 2 ISDN RT.
- NORTSW*n* — RT*n* has no application software and is awaiting software download (where *n is* A or B).

Alarm Types

At the "System Alarm Types Screen" described on page 40 you can set the alarm to any of these values:

- Critical (CR) — Alarms of this value are reported to the PMU or PAU, the Fault LED is lighted, and the alarm history page is updated.
- Major (MJ) — Alarms of this value are reported to the PMU or PAU, the Fault LED is lighted, and the alarm history page is updated.
- Minor (MN) — Alarms of this value are reported to the PMU or PAU, the Fault LED is lighted, and the alarm history page is updated.
- Not Alarmed (NA) — Alarms of this value are not reported to the PMU or PAU, the Fault LED is not lighted, and the alarm history page is not updated.
- Not Reported (NR) — Alarms of this value are not reported to the PMU or PAU, the Fault LED is lighted, and the alarm history page is updated.

History

Current cumulative counts of the past 24 hours and historical data in the form of a 24-hour history (in 15-minute increments) and a 7-day history (in 24-hour increments) are available to assist you in identifying problem sources. You can view the HDSL history from the "HDSL History Screen" on page 33

- HDSL Interface — 24-Hour (15-minute intervals) and 7-Day (24-hour intervals) for ES and UAS
- Alarm — Time stamp of first and last occurrence, number of occurrences for all enabled alarms

SPECIFICATIONS

System

Line Interface	two-pair, 130 Kbps 2B1Q transmission format
Resistive Signature	162 K Tip to Ground; 453 K Ring to Ground

Power Supply

Input Voltage	-42 Vdc to -56.5 Vdc

HDSL Line

Output Voltage	± 140 Vdc (maximum)
Output Power	27 W (maximum)
HDSL Line Code	2B1Q
HDSL Line Rate	65.3 K symbols/sec (130 Kbps)

POTS

Analog Impedance	900 Ω
Supported Subscriber Drop	100 Ω plus 430 Ω for handset
COTS Ringer Load	0.9 REN @ 20 Hz (maximum)
COTS Ringer Detection	65 Vrms (minimum) @ 15 to 50 Hz

Compliance

Voltage Safety	A2 compliant per GR-1089-CORE
Vibration	NEBS
ESD	Per GR-1089-CORE
Power and Lightning	Per GR-1089-CORE
Human Safety	UL 1950 for Restricted Access
Signal Characteristics	TR-NWT-001210, Generic Requirements for HDSL Systems
Emissions Radiation and Immunity	Per GR-1089-CORE for Class A equipment

Environment

Operating Temperature	-40° F to +150° F (-40° C to +65° C)
Operating Humidity	5% to 95% noncondensing
Altitude	-60 m to 4,000 m (-200 ft. to 13,000 ft.)

Physical Characteristics

Height	5.5 in. (14.0 cm.)
Width	1.1 in. (2.8 cm.)
Depth	10.3 in. (26.2 cm.)
Weight	1.0 lb. (0.5 kg.)

LED DESCRIPTIONS

Table 3 describes the LEDs shown on the front panel, where *n* equals the POTS line. If you have installed two RTs then both LED columns light in the manner described.

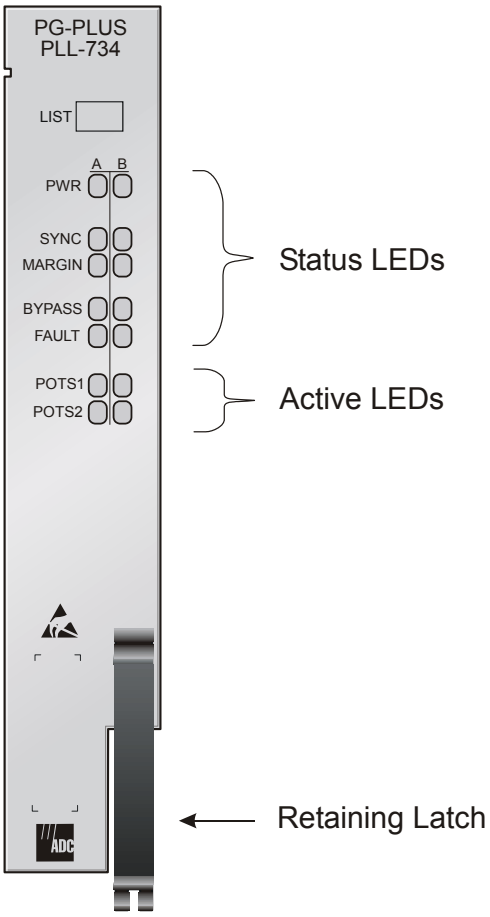


Figure 2. *LED on Front Panel*

For further details on the LED activities, refer to "Initialization Sequence" on page 9 and the "COLU and RT Fault Indicators" on page 64.

All alarms in the PG-Plus application are suppressed when initially installed and powered up. Any alarms that are generated during this process are suppressed. When the HDSL is synchronized and the COLU and RT margin has cleared; outstanding alarms that have been suppressed are made active and reported to the PAU or the PMU, based upon their provisioned types.

Table 3. *LED Descriptions*

LED	Color	State	Description
PWR	Green	On, all other LEDs flashing at 1 Hz	Running in Boot Mode due to invalid Application Program.
		On, POTS*n* LEDs On, all other LEDs running downward at 1 Hz	Active software download of the COLU.
		On, POTS*n* LEDs On, all other LEDs running upward at 1 Hz	Active software download of the RT connected to the COLU.
		On	COLU is powered and power provided to the HDSL pair is normal.
		Flashing	One battery feed is missing or a battery feed fuse on the COLU is blown.
		On, and FAULT flashing	DC power provided to the HDSL pair is out of normal range.
SYNC	Green	On	HDSL is in synchronization between COLU and RT.
		Flashing	COLU and RT are attempting to synchronize.
MARGIN	Yellow	On	COLU margin is below preset value.
		Flashing	RT margin is below the preset value.
BYPASS	Yellow	On	COLU is in Metallic Fallback, unless provisioned Disable.
		On, and POTS*n* flashing	SDT is occurring on POTS*n*.
FAULT	Red	On	COLU has a fault.
		Flashing	Alarm condition exists on the COLU.
POTS*n*	Green	On	Channel is off-hook.
		Flashing (following Ring Cadence)	Channel is ringing.

INSTALLATION AND TEST

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

The following procedure assumes that an RT is installed in the system and all wiring between the CO and the RT has been completed and verified.

REQUIRED TOOLS AND TEST EQUIPMENT

No tools are required to install the COLU. For testing, the following tools may be utilized:

- Telephone test set
- Optional, PSU-795 List 1 COTS Continuity Test Card, part number 150-1695-01

INSTALLING THE COLU

You can install the COLU in any slot except the three positions labeled COMMON, MUX 1, and MUX 2. Refer to the cabling tables provided in the COTS documentation for slot and telco cabling assignment.

1. Open the retaining latch on the front of the COLU.
2. Insert the COLU into the card guides in a vacant slot in the COTS that corresponds to the location of the wiring from the CO switch.
3. Engage the retaining latch to hold the card in place.

INITIALIZATION SEQUENCE

The COLU continuously attempts to power up the RTs until end-to-end HDSL synchronization is established. If the COLU is unable to establish synchronization, it powers down the loops and waits 5 minutes before re-trying.

The COLU initialization and power up sequence described below assumes that the HDSL and auxiliary power pairs are wired from the COTS and terminated at the RTs. It also assumes the COTS has been wired to CO battery, the bay fuses are installed, and the RTs are installed.

1. When the COLU is installed with power applied to the COTS, all LEDs turn on for about 1 second then go off, except for the PWR LED.
2. After approximately 5 to 19 seconds, the PWR LED flashes.

To prevent the COLU from attempting to power up simultaneously, there is a 2 second delay between each system in the COTS. For example, a COLU installed in slot 4 will power up 2 seconds after the COLU installed in slot 2, and a COLU installed in slot 12 will power up 10 seconds after the COLU installed in slot 2. This delay is dependent on the COTS slot in which the COLU is installed, rather than on the number of COLUs already installed in the COTS.

3. The COLU attempts to power up the RTs. Depending on the condition of the HDSL pair, one of the following occurs:
   - **a.** The pair is open between the COLU and RTs:
     - The PWR LED flashes for approximately 12 seconds, then remains on.
     - The SYNC LED flashes for approximately 6 seconds, then remains off.
     - A DSL PFO alarm is indicated on the "System History Screen" on page 31.
     - The COLU waits 1 minute, then goes back to step 3.
   - **b.** One, or more, pairs are shorted or grounded between the COLU and RTs:
     - The PWR LED flashes for approximately 12 seconds, then remains on.
     - A DSL PFS alarm is indicated on the "System History Screen" on page 31
     - The SYNC LED flashes for approximately 6 seconds, then remains off.
     - A DSL PFO alarm is indicated on the "System History Screen" on page 31
     - The COLU waits 1 minute, then go back to step 3.
   - **c.** All pairs are good, and all correctly wired between the COLU and RTs:
     - The PWR LED flashes for approximately 12 seconds, then remains on.
     - The SYNC LED flashes and the COLU attempts to synchronize with the RTs. One of the following occurs:
       - The COLU does not detect, or is unable to synchronize with, an RTs:

         The SYNC LED flashes for approximately 1 minute, then remains off.

         The COLU waits 1 minute, then goes back to step 3.
       - The COLU detects, and is able to synchronize with, an RTs:

         The COLU waits 1 minute, then goes back to step 3.

- The COLU detects, and is able to synchronize with, an RTs:

  Within 1 minute, the SYNC LED remains on and the COLU establishes synchronized HDSL communications with the RTs. Assuming the HDSL margins are above alarm thresholds, and there are no subscriber drop tests or other alarms or faults in the system, the COLU LEDs are in the following states:

  PWR is on

  SYNC is on

  MARGIN is off

  TEST is off

  ALARM is off

  FAULT is off

It may take up to 4 minutes before end-to-end synchronization is established.

SUBSCRIBER DROP TESTS

You can perform this function in one of two ways (see "Test Submenu" on page 54):

- Initiate a test by applying +116 V on the Tip side of the POTS circuit at the COLU through a loop test system.
- With the VT-100 terminal connected to the PMU maintenance port, select the *Subscriber Drop Test* feature from the Test menu. Relays on the RT provide a path for performing a SDT. The results are displayed on the VT-100 terminal and presented as TA-909 resistive signatures on the COLU Tip and Ring.

ADMINISTRATION

With a VT-100 terminal, you can access the craft port of the PMU or the PAU to review system administration functions, such as alarm checking and clearing, configuration changes, performance monitoring, and testing the PG-Plus through the craft terminal screens.

CONNECTING TO A TERMINAL OR MODEM

Connections between the craft port and a VT-100 terminal are shown in Figure 3 for both DB-9 and DB-25 connectors. Although a cable can be used that connects only the transmit (TD), receive (RD), and ground (GND) signals, the craft port does not automatically log off when the VT-100 terminal is unplugged. Using a cable that also connects the Data Terminal Ready (DTR) signal ensures automatic log off when the VT-100 terminal is unplugged.

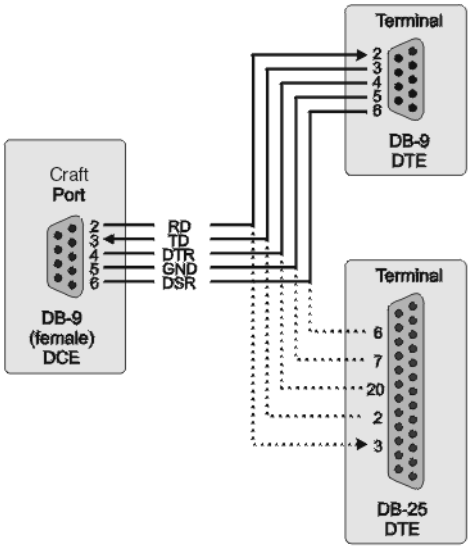


Figure 3. *Craft Port to Terminal Connections*

When connecting the port to a modem, use a null modem cable. The wiring for this cable is shown in Figure 4. Ensure that the modem's Carrier Detect (CD) and DTR functions are enabled. This allows the modem connection to terminate correctly when the Alarm or PGTC Interface unit drops Data Set Ready (DSR), and the unit logs off when the modem drops Carrier Detect.

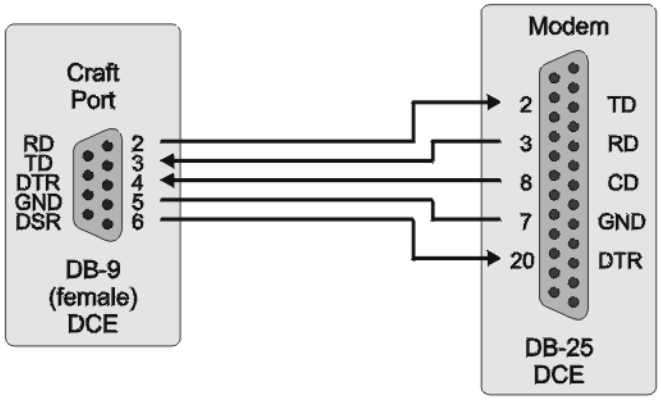


Figure 4. *Craft Port to Modem Connections*

The craft port supports a VT-100 terminal. The VT-100 terminal allows real time updating of information displayed on the screen, rather than requiring the technician to press the **ENTER** key to refresh the screen. Configure the VT-100 terminal as shown in Table 4.

Table 4. *Modem Settings*

Data	
Bits	8
Stop bits	1
Parity	None
Baud Rate	
Autobaud	1.2 kb/s
	2.4 kb/s
	4.8 kb/s
	9.6 kb/s
	14.4 kb/s
	19.2 kb/s
	28.8 kb/s
	38.4 kb/s
Hardware Flow Control	Off
Software Flow Control XON/XOFF	Enabled

NAVIGATIONAL METHODS

The following keys are used to navigate through the menus and screens:

Keypress	Effect on Menu	Effect on Screen
ENTER	Moves to submenu or screen selected.	Invokes selected response to prompt.
← or CTRL-F	Moves left across Main menu.	Moves the cursor to the left.
→ or CTRL-G	Moves right across Main menu.	Moves the cursor to the right.
↑ or CTRL-T	Moves up the submenu selection.	Moves the cursor up.
↓ or CTRL-V	Moves down the submenu selection.	Moves the cursor down.
TAB	No effect.	Moves to the next field on all other submenu screens.
SPACE	No effect.	Cycle through the field options.
ESC	Moves up a menu level. From the Main menu, the Logout screen is displayed.	Returns to Main menu without accepting changes.
CTRL-R	Returns to the main menu.	The banner briefly appears and then the main menu bar displays.
A - Z keys	Selects an underlined or highlighted menu item.	A screen entry is made.

LOGGING ON

1. After connecting the VT-100 terminal to the PMU or PAU, press the SPACEBAR several times to start the autobaud feature.The Logon Password screen displays:

```
PG-PLUS Login Screen

Enter Password: _____________

Access Key: 041503122234
```

2. Type the correct password and press ENTER.

The factory default password is password#1**. If you establish a different password, type the new password at subsequent log ons.**

Passwords are not case sensitive. Passwords must use at least 6, and no more than 10, printable characters, and must contain at least 1 alpha, 1 numeric, and 1 special character.

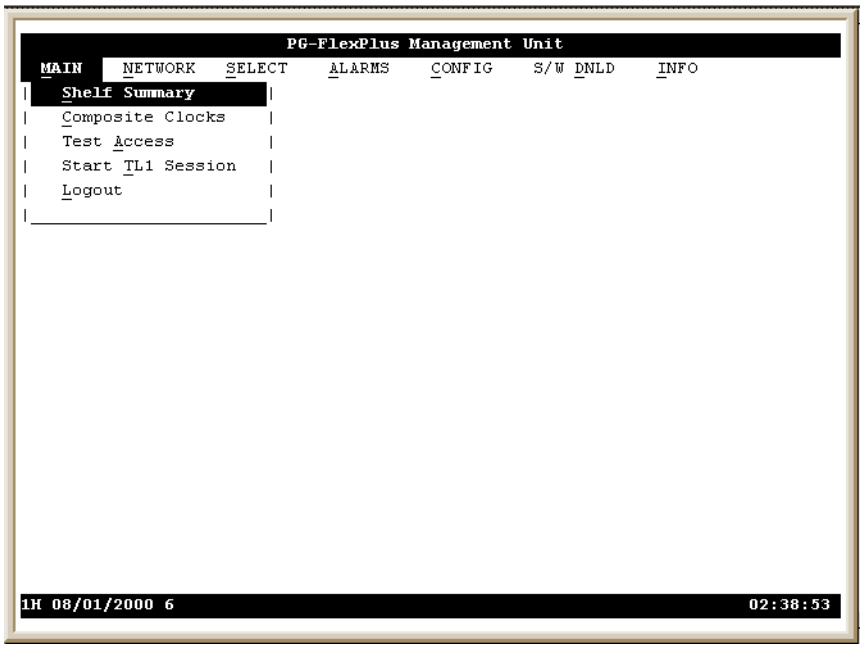
If the password has been changed and you do not know the new password, contact ADC Technical Support (see "Technical Support" on page 67) while at the terminal. They will provide you a temporary password that is based on the Access Key number displayed on the Logon screen. The Access Key changes whenever you change the password in the PAU, or when you use the temporary password in the PAU or PMU, so you should be at the terminal when you contact Technical Support. When you use the temporary password, the password previously stored in the PAU or PMU is set to the factory default of password#1 **and the temporary password will no longer be valid.**

3. The ADC banner displays briefly.

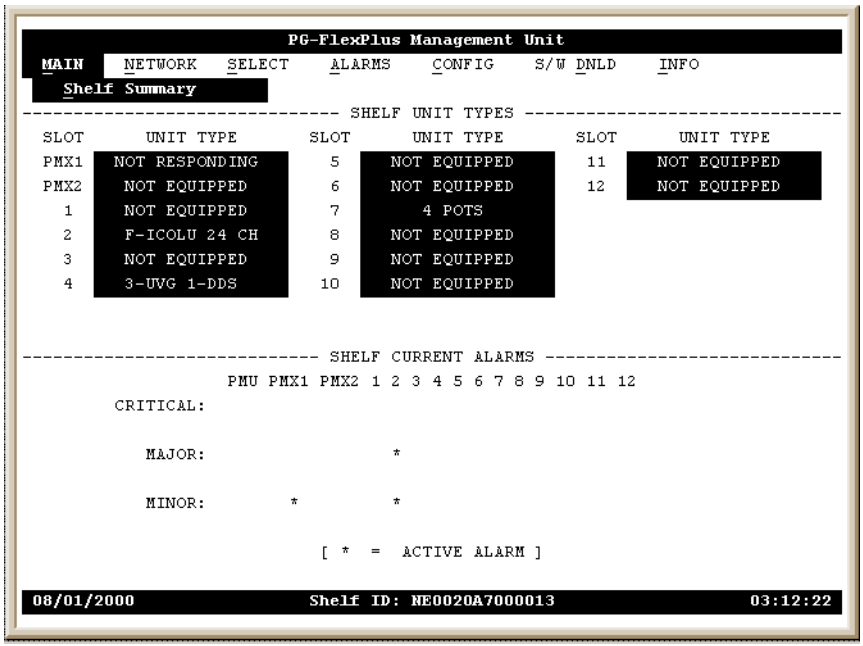
Then the PMU or PAU main menu screen displays:

4. If you know the slot number in which the COLU is installed, go to the next step. If you do not know the slot number:

   a. From the PMU or PAU main screen select *Main*, and press **ENTER** to view the submenu.

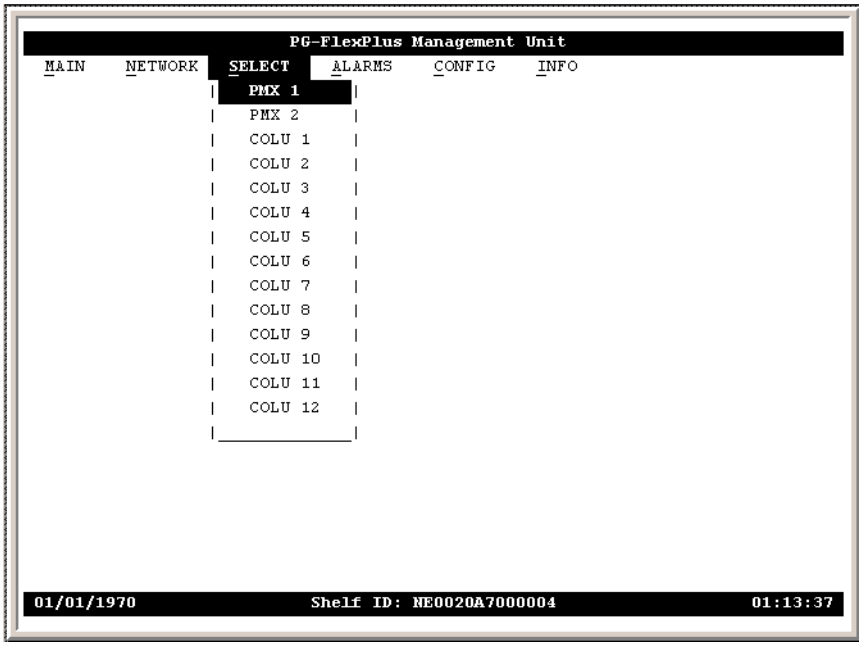


   b. Select *Shelf Summary* and press **ENTER** to display the inventory of the COLUs installed in the COTS. Note the slot number of the desired COLU, then press **ESC** to return to the PMU main screen.



   c. Continue with step 5.

5. From the PMU or PAU main screen, select the menu option *Select* and press **ENTER** to view the COTS slot list. The number of slots shown in the Select submenu depend on the size of the PG-Plus COTS; the number is 12 for the 18-inch shelf, and 16 for the 23-inch shelf.

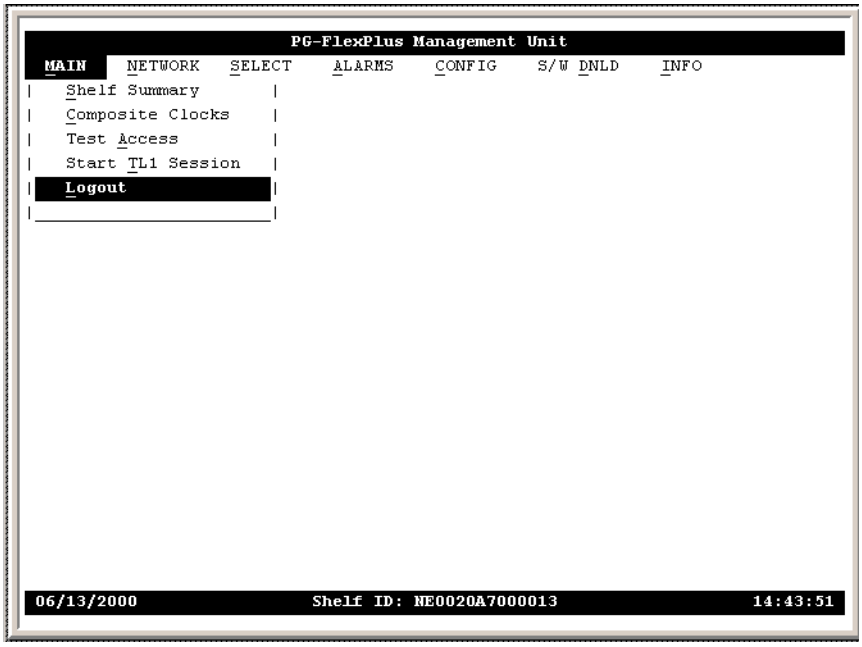


6. Select the slot number for the COLU you installed and press **ENTER** to view the first screen of the selected COLU.

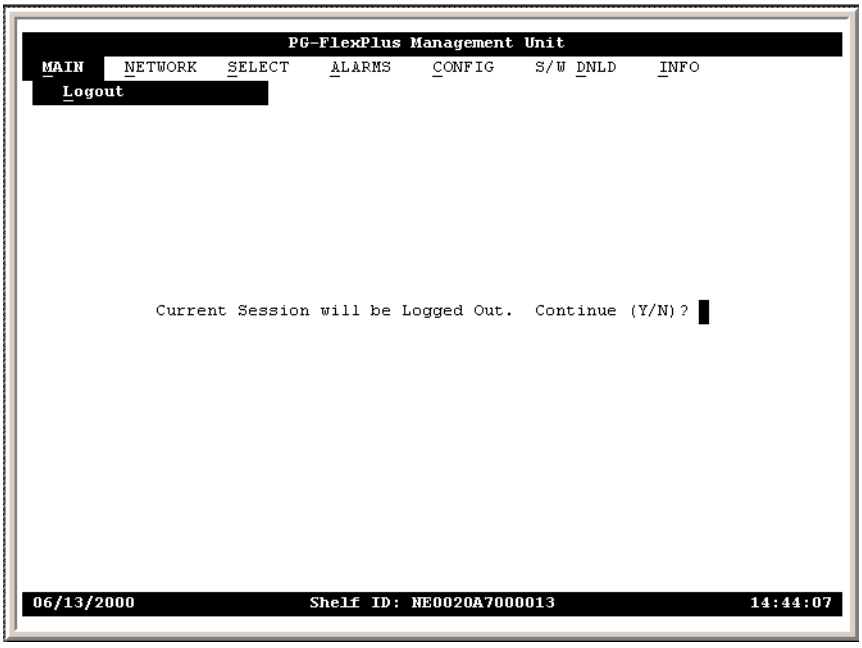
LOGGING OFF

If you must leave your VT-100 terminal unattended, it is good practice to log out until you are ready to resume work. This prevents unauthorized persons from inadvertently changing any of your operating parameters.

1. From the PAU or PMU main screen (the PMU is shown here), select *Main* and press **ENTER** to display the submenu.
2. Select *Logout* and press **ENTER**.



3. At the `Current Session will be Logged Out. Continue (Y/N)?` prompt, you have the following options:
   a. To continue with the logout, type **Y** and press **ENTER**.



   b. To terminate the logout and return to the screens, press **N**. The ADC banner displays.
4. Press **ESC** to return to the main screen.

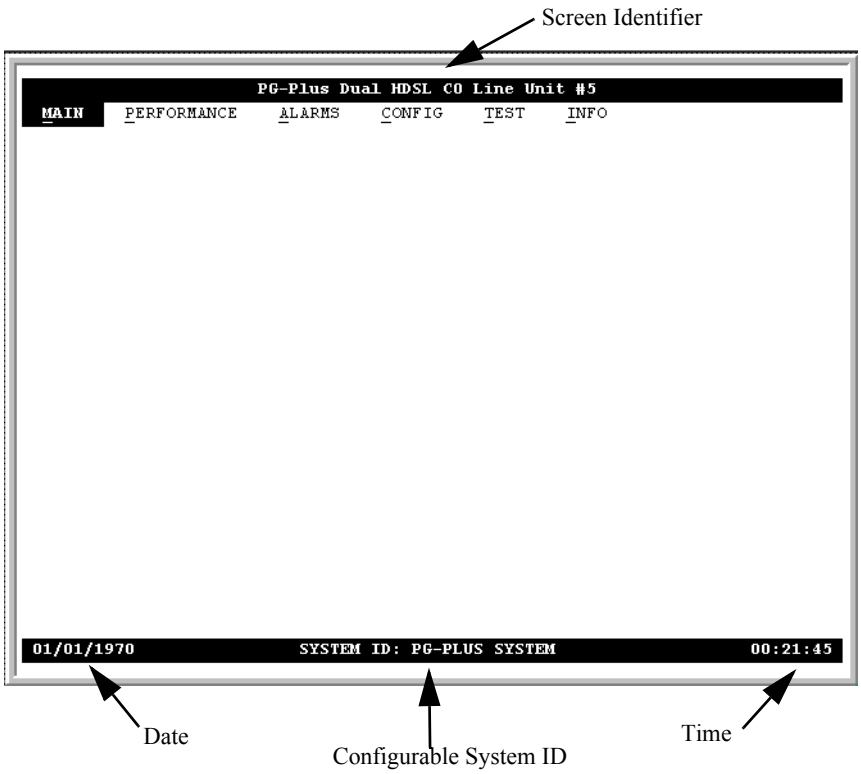
COLU MAIN SCREEN

The main screen provides access to the PAU-710 functions through the menu items. The date and times displayed are the default values for the system.

The date and time for the COTS is set from the PMU or PAU. To change the date and time to the local date and time, use the Date and Time option on the CONFIG menu option.

The elements of the COLU main screen are:

- Screen Identifier and COTS slot number.
- Menu bar - these are your access to the COTS monitoring, configuration, and control screens.
- Date and Time - The date and time are in opposite lower corners. If your system does not have a configured PMU installed, the factory default date and time displays.
- System ID - The identifying name for the COTS. You can configure the COLU name to one applicable to your site (see "System Options Screen" on page 37).



COLU Menu Bar Selections

Table 5 describes the submenus that can be selected from the COLU menu bar.

Press the underlined key to go directly to the selected menu bar item.

Table 5. *COLU Menu Bar Selections*

Submenu	To View or Change...
MAIN	System status and channel information.
PERFORMANCE	HDSL status and performance monitoring information.
ALARMS	Alarm status, history and fault information.
CONFIG	System configuration.
TEST	Subscriber drop testing and ISDN loopback testing.
INFO	Inventory information and on-line help.

COLU Menu Structure

Figure 5 illustrates the menu structure of the COLU.

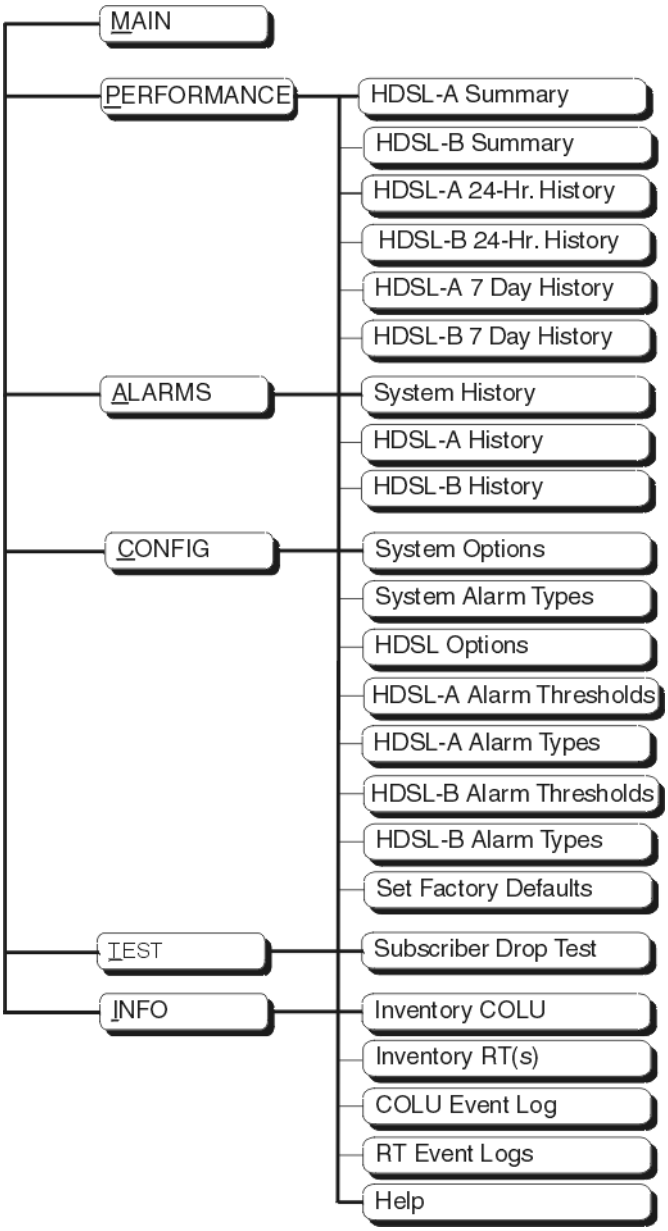
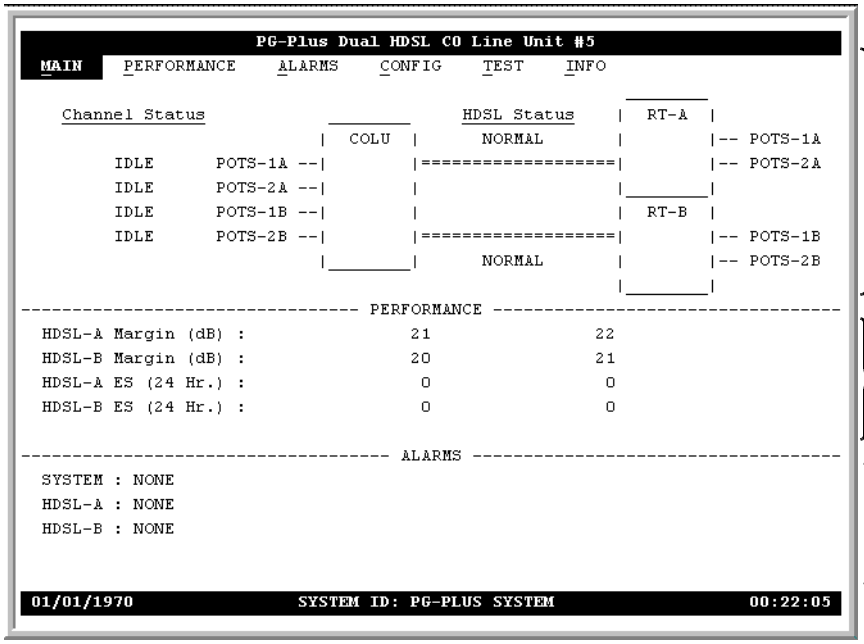


Figure 5. *Menu Tree*

Main Summary Screen

This screen details the performance condition of the COLU and RT. Table 6 defines the conditions that appear in the Channel and HDSL Status fields.

1. At the COLU main screen, select *MAIN* and press **ENTER** to view the Summary screen.



2. Press **ESC** to return to the main screen. Refer to the Performance and Alarms screens for a detailed description of data displayed in these areas.

Table 6. *System Status*

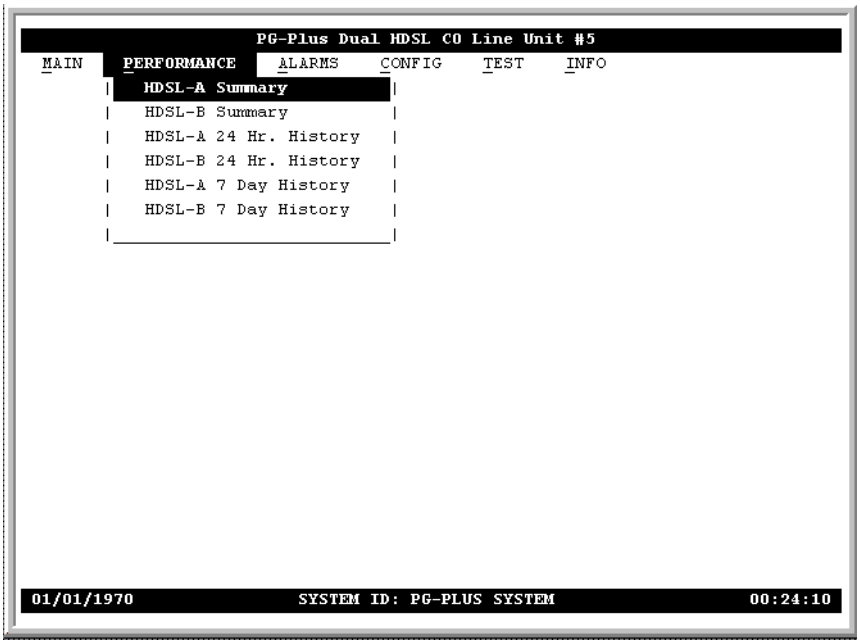
State	Description
System Status	
IN SYNC	The payload is synchronized between the COLU and RT.
OUT OF SYNC	The payload is not synchronized between the COLU and RT.
HDSL Status	
HDSL LINK DOWN	HDSL link is down and System is not in Metallic Fallback.
NORMAL	HDSL link is synchronized.
START-UP	HDSL link is acquiring synchronization.
METALLIC FALLBACK	HDSL link is down and System is in Metallic Fallback
Alarm Status	
HDSL	Summary of alarms associated with HDSL link.
SYSTEM	Summary of alarms within the system.
Channel Status	
BUSY	Line is off-hook at RT.
FRAMED	The DSL startup sequence is complete, but end-to-end transparency has not been established.
IDLE	CO battery detected and line is on-hook at RT.
LOS	Loss of signal.
N/A	Not applicable.
OPEN	No CO battery detected, Line Status Open. This status does not change except for Test status.
IDLE	CO battery detected and line is on-hook at RT
RINGING	Line is ringing.
RINGGND	Ring ground detected at the RT.
REVERSED	CO battery is detected with Tip and Ring reversed.
TEST	Testing being done on line.
Channel Status for POTS during Metallic Fallback and HDSL Startup	
N/A	Invalid until HDSL is in SYNC, or if Metallic Fallback has been disabled
METALLIC FALLBACK	POTS #1 line status when system is in Metallic Fallback, if Metallic Fallback has been enabled

PERFORMANCE SUBMENU

These screens provide access to the COLU HDSL performance screens.

In the following screens you may see the A Remote Terminal, the B Remote Terminal, or both the A and B Remote Terminals screens shown as examples. The screen contents are identical. However, in a working system, the values displayed on the HDSL A screens may differ from the HDSL B screens.

1. At the COLU main screen, select *PERFORMANCE*, and press **ENTER** to view the submenu.



2. From the *PERFORMANCE* submenu you can perform the following tasks:

Submenu	Allows you to ...
HDSL A Summary	view the HDSL performance summary and status for the A RT.
HDSL B Summary	view the HDSL performance summary and status for the B RT.
HDSL A 24 Hour History	view the last 24 hours of HDSL performance history in 15 minute intervals for the A RT.
HDSL B 24 Hour History	view the last 24 hours of HDSL performance history in 15 minute intervals for the B RT.
HDSL A 7 Day History	view the last seven days of performance history plus the current day's accumulated performance history in 24 hour intervals for the A RT.
HDSL B 7 Day History	view the last seven days of performance history plus the current day's accumulated performance history in 24 hour intervals for the B RT.

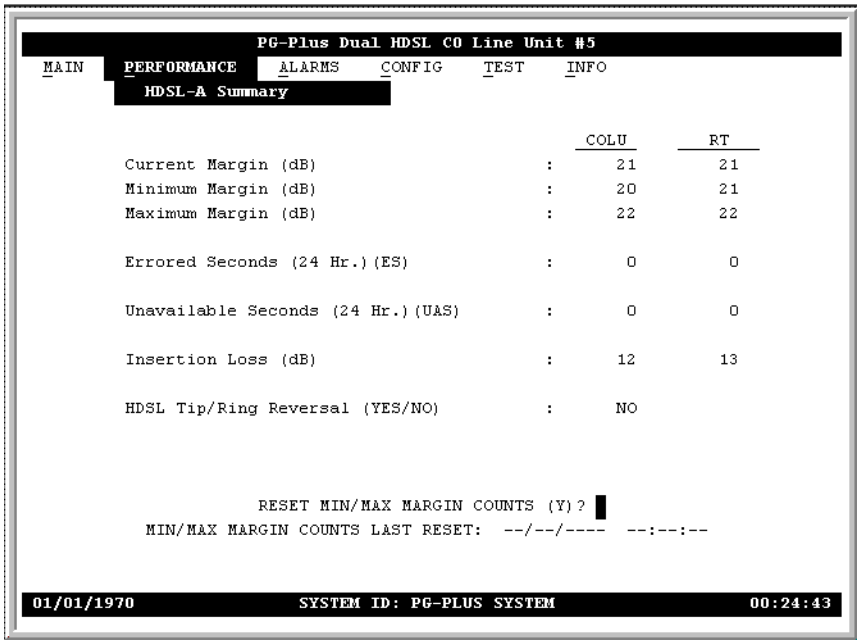
3. Press **ESC** to return to the main screen.

HDSL A or B Summary Screen

This screen depicts an HDSL performance summary in terms of the margin and UAS and ES count, insertion loss, and the Tip and Ring connection state. Use the available options to reset the minimum and maximum margin counts.

In the following screens you may see the A Remote Terminal, the B Remote Terminal, or both the A and B Remote Terminals screens shown as examples.

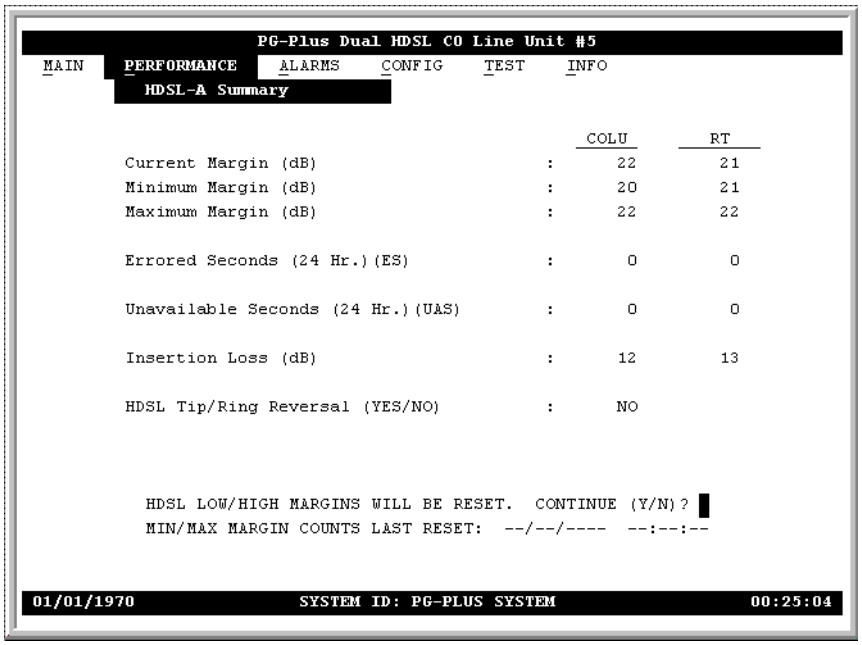
1. From the *Performance* submenu, select *HDSL-A Summary* for either the A RT, and press **ENTER** to view the screen.



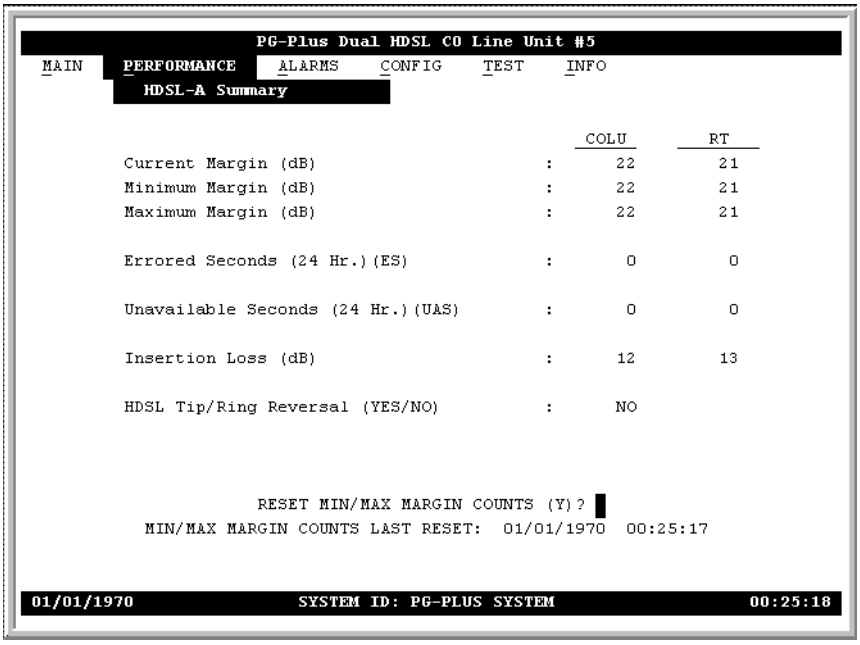
2. You can perform the following tasks:

a. To reset the minimum and maximum margins to the current margin values for the COLU, press **Y** at the `RESET MIN/MAX MARGIN COUNTS(Y/N)?` prompt. At the `HDSL MIN/MAX MARGINS WILL BE RESET. CONTINUE(Y/N)?` prompt, you have the following options:

- To reset the margins, press **Y**.



- The minimum and maximum margins are set to the current margins
- The time and date that the margins were last set are updated.



- To retain the existing minimum and maximum margins, press **N**.
- To return to the screen, press **ESC**.

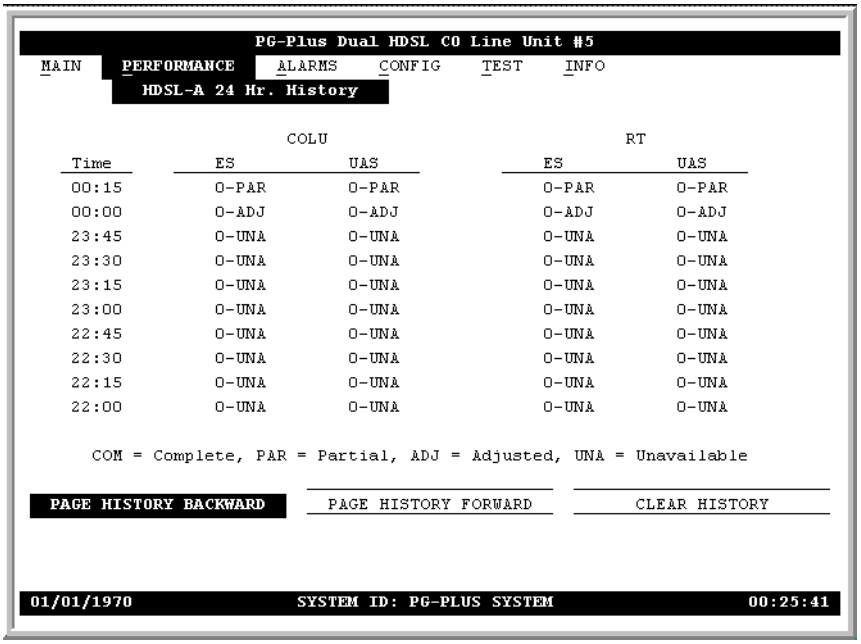
3. Press **ESC** to return to the main screen.

HDSL A and B 24-Hour History Screen

This screen shows the previous 24-hours of HDSL performance history in 15-minute intervals. The performance history data displayed includes ES counts, UAS counts, and the validity of the counts.

In the following screens you may see the A Remote Terminal, the B Remote Terminal, or both the A and B Remote Terminals screens shown as examples.

1. From the *Performance* submenu, select *HDSL 24 Hr. History* for either RT, and press **ENTER** to view the screen.

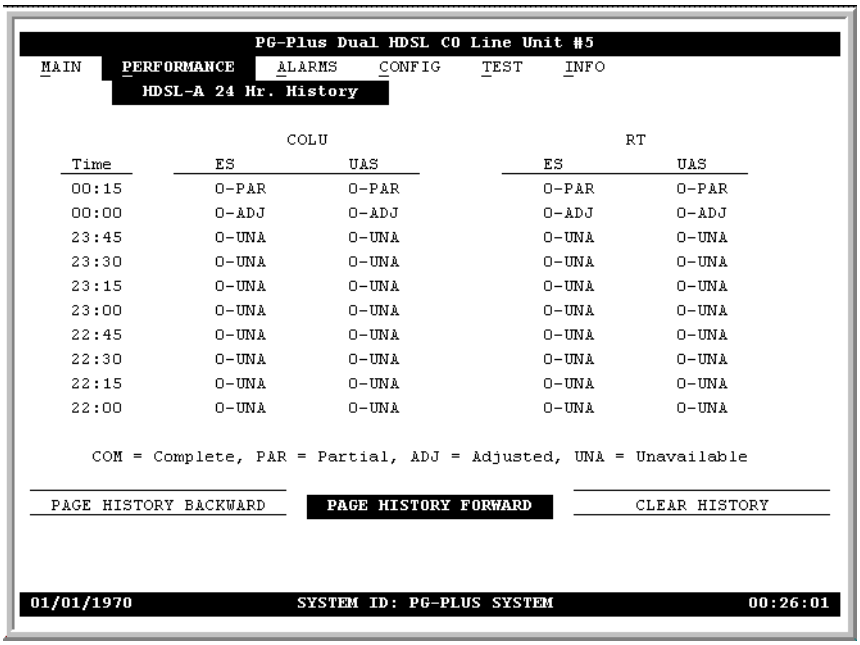


The current day performance information shows the performance since the previous midnight. At midnight of every day, the current day performance history is moved to the previous day's history and the current day performance information is cleared. The COLU derives the ES and UAS performance parameters for both the COLU and the RT, which have the valid field values of:

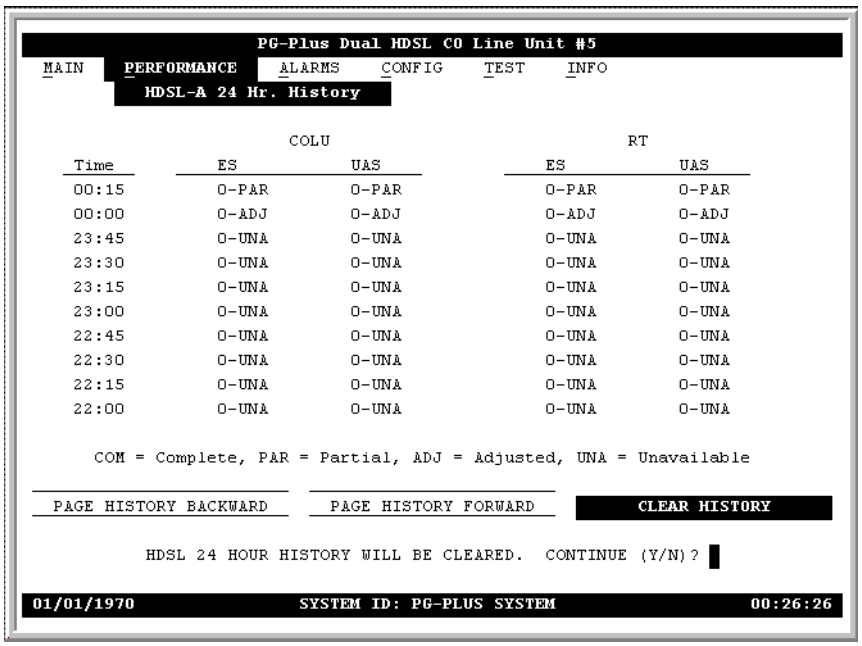
- COM (Complete): Data is saved in the history register for this interval.
- PAR (Partial): Data is being collected for this interval.
- ADJ (Adjusted): The time or date has been changed on the system during this interval.
- UNA (Unavailable): Data has not been collected for this interval.

2. You can perform the following tasks:

a. To scroll through all intervals, select either PAGE HISTORY FORWARD or PAGE HISTORY BACKWARD and press **ENTER**.



b. To clear the history, select CLEAR HISTORY and press **ENTER**. At the `HDSL 24 HOUR HISTORY WILL BE CLEARED. CONTINUE(Y/N)?` prompt, you have the following options:



If there is an active 15-minute ES or UAS alarm, this alarm becomes inactive when the 24-hour performance history is cleared.

- To clear the 24-hour history, press **Y**.The time and date that the history was last cleared is updated.
- To retain the current history, press **N**.
- To return to the screen, press **ESC**.

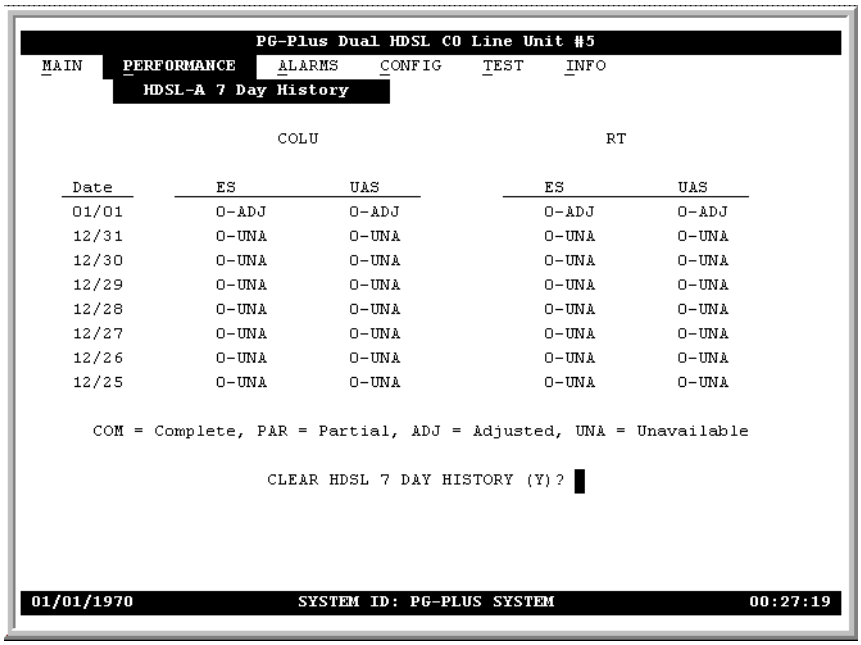
3. Press **ESC** to return to the main screen.

HDSL 7-day History Screen

This screen displays the last seven days of performance history, plus the current day's accumulated performance information of the COLU and the two RTs. The information displayed includes ES counts, UAS counts, and the validity of the values.

In the following screens you may see the A Remote Terminal, the B Remote Terminal, or both the A and B Remote Terminals screens shown as examples.

1. From the *PERFORMANCE* submenu, select *HDSL 7 Day History*, and press **ENTER** to view the screen.

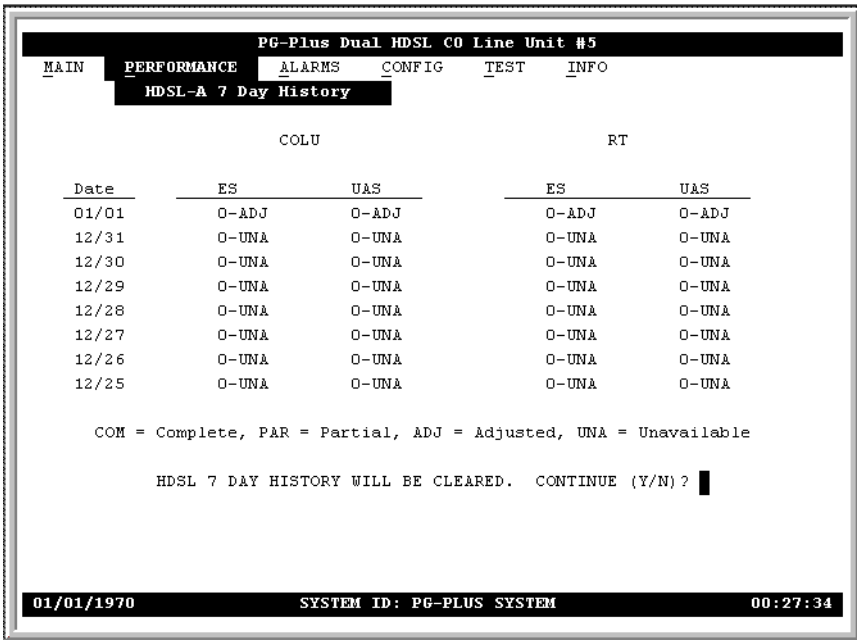


The current day performance information shows the performance since the previous midnight. At midnight of every day, the current day performance history is moved to the previous day's history and the current day performance information is cleared. The COLU derives the ES and UAS performance parameters for both the COLU and the RT, which have the valid field values of:

- COM (Complete): Data is saved in the history register for this interval.
- PAR (Partial): Data is being collected for this interval.
- ADJ (Adjusted): The time or date has been changed on the system during this interval.
- UNA (Unavailable): Data has not been collected for this interval.

2. You can perform the following tasks:

a. To clear the 7-day history information, at the `CLEAR HDSL 7 DAY HISTORY (Y)?` prompt, type **Y**. At the `HDSL 7 DAY HISTORY WILL BE CLEARED. CONTINUE(Y/N)?` prompt, you have the following options:



Clearing the 7-day performance history does not clear the current day performance information. The current day performance information can only be cleared through the HDSL 24-hour performance history screen. The date and time that the 7-day performance history was last cleared appears at the bottom of the screen.

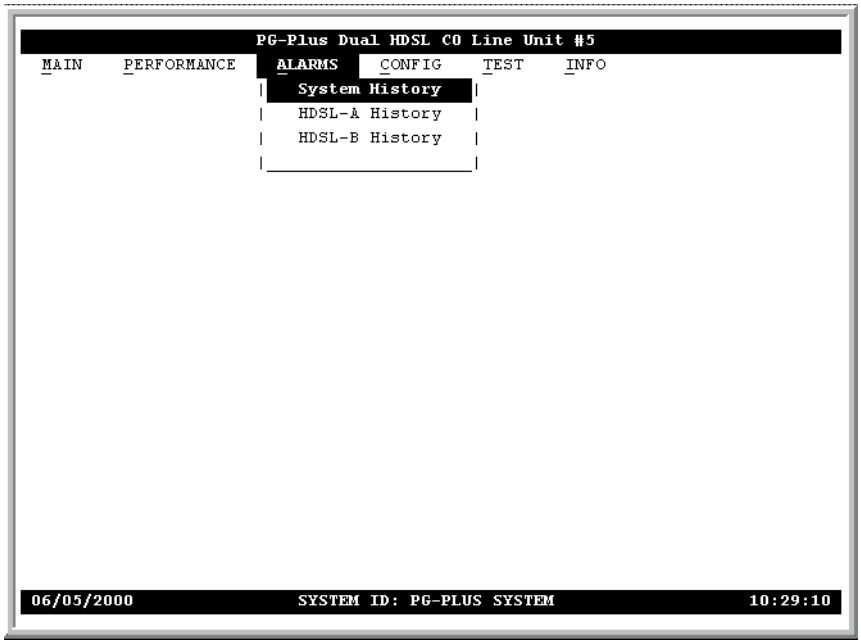
- To clear the 7-day history, press **Y**.
  - all HDSL 7 day history 24-hour interval registers are set to zero.
  - the time and date that the history was last cleared is updated.
- To retain the current history, press **N**.
- To return to the screen, press **ESC**.

3. Press **ESC** to return to the main screen.

ALARMS SUBMENU

The Alarms submenu provides access to the alarms status and system related alarmed events. Only events provisioned for Critical, Major, or Minor notification are reported

1. From the COLU main screen, select *ALARMS*, and press **ENTER** to view the submenu.



2. From the *ALARMS* submenu you can perform the following tasks:

Submenu	Allows you to view...
System History	COLU and RT alarm history.
HDSL A History	HDSL alarm history.
HDSL B History	HDSL alarm history.

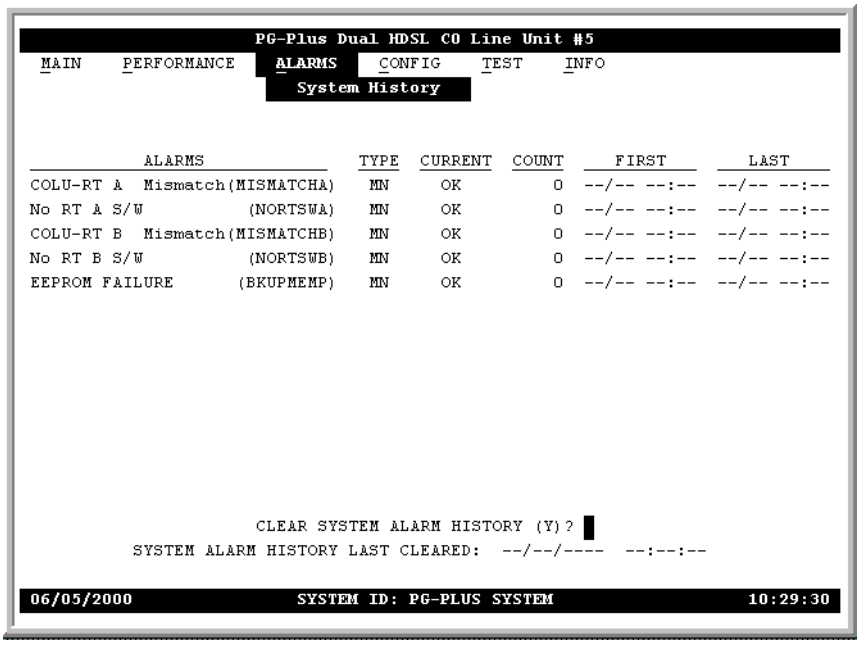
3. Press **ESC** to return to the main screen.

System History Screen

This screen shows the system alarm history. It contains a count of the number of times each alarm occurred, the time and date of the first and last occurrence, the provisioned notification type, and the current status. At this screen you see the results of the alarms set at the Configuration "System Alarm Types Screen" on page 40.

In the following screens you may see the A Remote Terminal, the B Remote Terminal, or both the A and B Remote Terminals screens shown as examples.

1. From the *ALARMS* submenu, select *System History*, and press **ENTER** to view the screen.

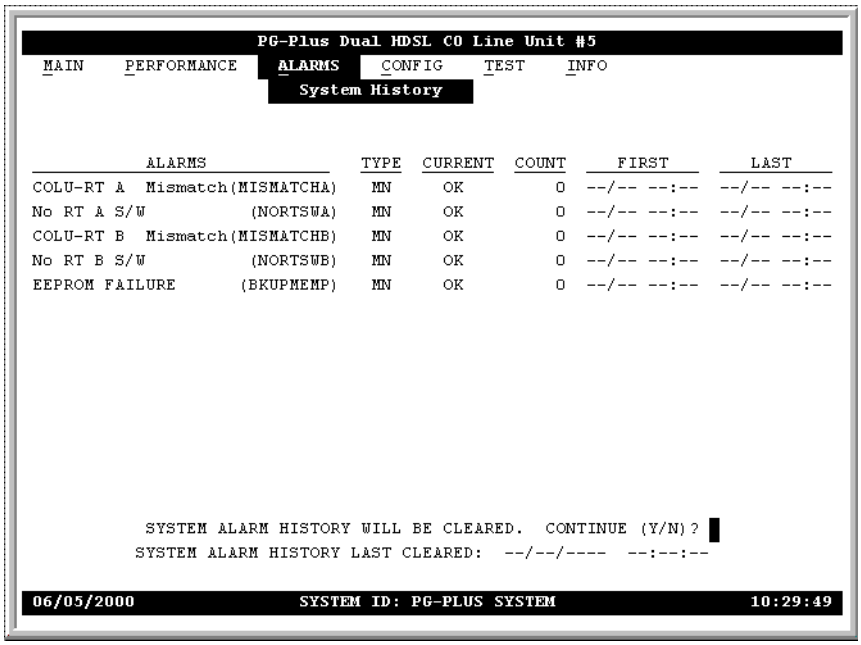


The status OK displays in the Current column when the alarm is not present. The status Active displays when an alarm is present (see Table 7 on page 35). A description of the Alarm types reported is provided in Table 9 on page 42.

2. You can perform the following tasks:

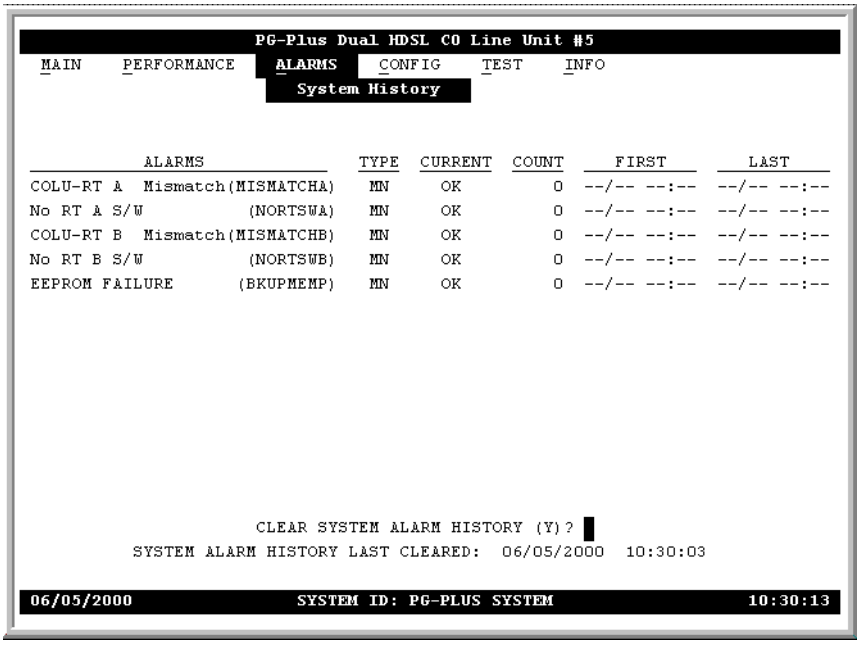
a. To clear the history information, at the `CLEAR SYSTEM ALARM HISTORY(Y)` prompt, type **Y**. At the `SYSTEM ALARM HISTORY WILL BE CLEARED. CONTINUE (Y/N)?` prompt, you have the following options:

- To clear the system history, press **Y**. Clearing the system alarm history clears the RT and the COLU alarm histories, excluding the current alarms.



– the Count is set to zero. If there is an active alarm, then the Count is set to 1 and the value in the Last field is set to the First field.

– the time and date that the history was last cleared is updated.



- To retain the current history, press **N**.
- To return to the screen, press **ESC**.

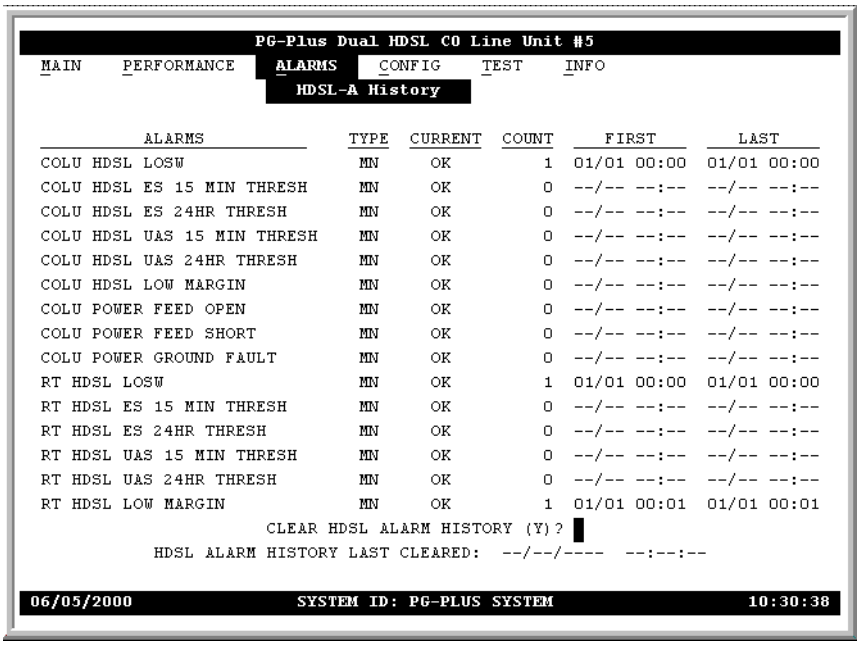
3. Press **ESC** to return to the main screen.

HDSL History Screen

This screen displays the HDSL history maintained on the COLU. It contains a count of the number of times each alarm occurred, the time and date of the first and last occurrence, the provisioned notification type, and the current status. At this screen you see the results of the alarms set at the Configuration "HDSL A and B Alarm Types Screen" on page 49.

In the following screens you may see the A Remote Terminal, the B Remote Terminal, or both the A and B Remote Terminals screens shown as examples.

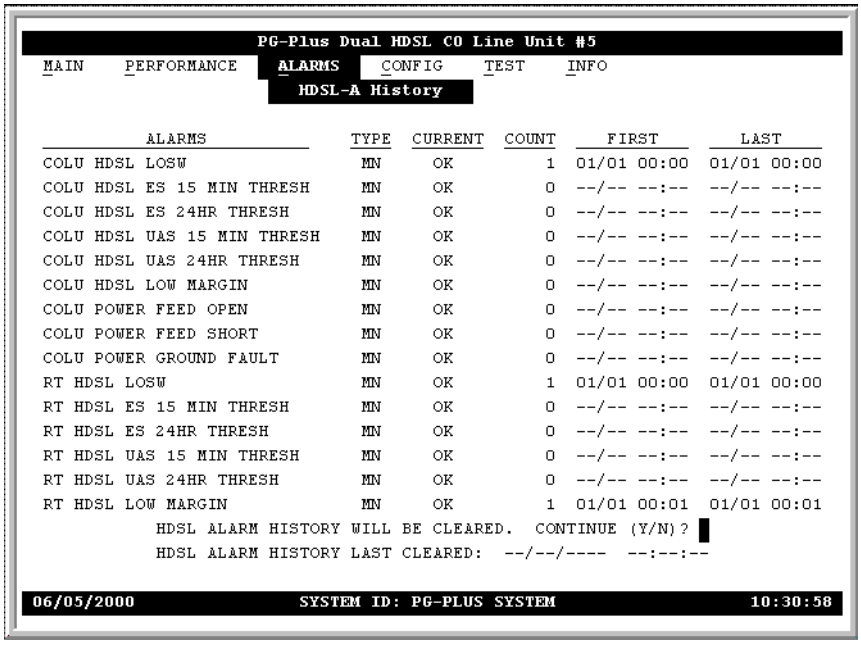
1. From the *ALARMS* submenu, select *System History* for either the A or B RT, and press **ENTER** to view the screen.



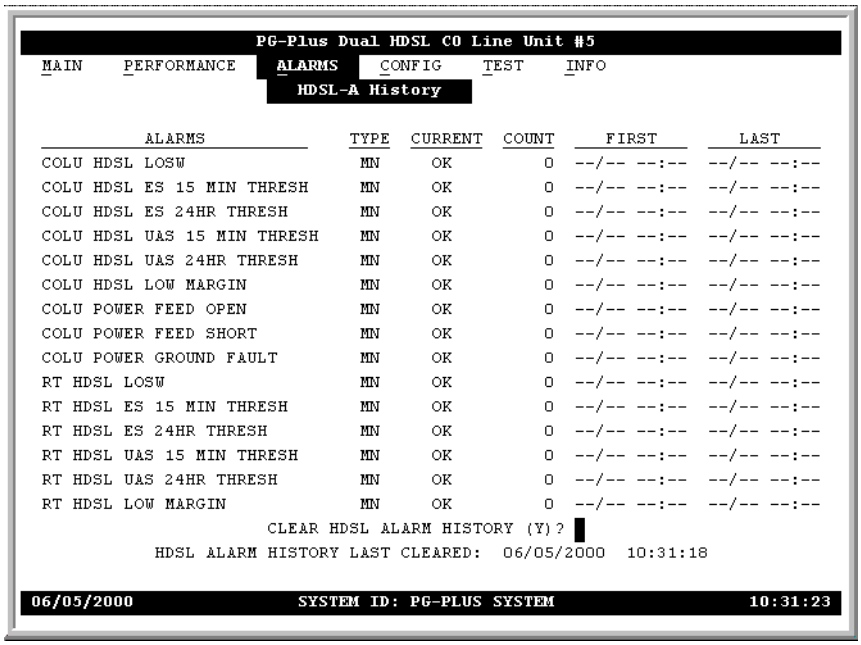
The status OK displays in the Current column when the alarm is not present. The status Active displays when an alarm is present (see Table 7 on page 35). A description of the Alarm types reported is provided in Table 9 on page 42.

2. You can perform the following tasks:

a. To clear the alarm history information, at the `CLEAR HDSL-A ALARM HISTORY(Y)?` prompt, type **Y**. At the `HDSL ALARM HISTORY WILL BE CLEARED. CONTINUE (Y/N)?` prompt, you have the following options:



- To clear the system history, press **Y**. The time and date that the history was last cleared is updated.



- To retain the current history, press **N**.
- To return to the screen, press **ESC**.

3. Press **ESC** to return to the main screen.

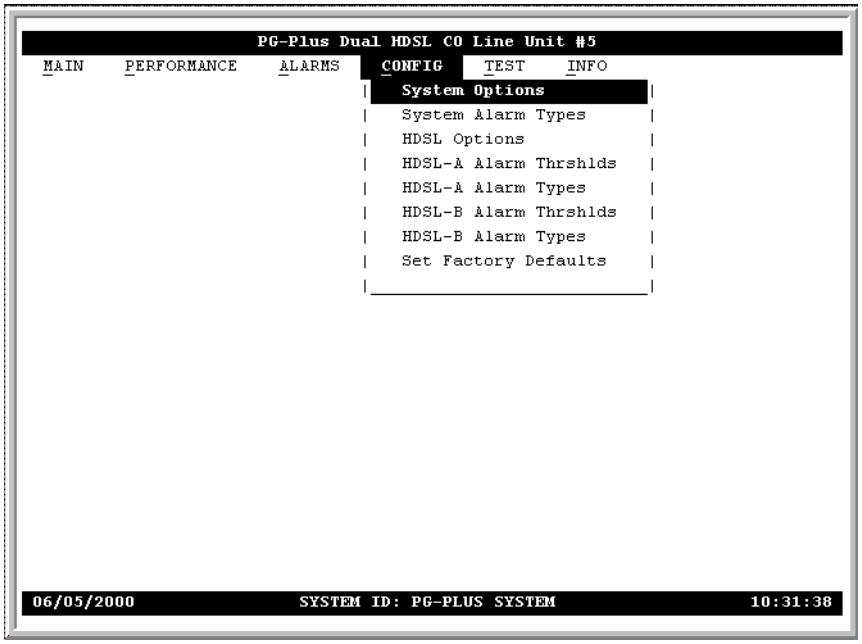
Table 7. *HDSL Alarms*

Alarm	Values	Alarm Description	Default
COLU HDSL LOSW	CR, MJ, MN, NA, NR	COLU cannot synchronize with the RT and is out of service	MN
COLU HDSL ES 15 MIN THRESH	CR, MJ, MN, NA, NR	HDSL 15-minute errored second alarm threshold reached or exceeded	MN
COLU HDSL ES 24HR THRESH	CR, MJ, MN, NA, NR	HDSL 24-hour errored second alarm threshold reached or exceeded	MN
COLU HDSL UAS 15 MIN THRESH	CR, MJ, MN, NA, NR	HDSL 15-minute errored second alarm threshold reached or exceeded	MN
COLU HDSL UAS 24HR THRESH	CR, MJ, MN, NA, NR	HDSL 24-hour errored second alarm threshold reached or exceeded	MN
COLU HDSL LOW MARGIN	CR, MJ, MN, NA, NR	Margin at or below the current threshold value	MN
COLU POWER FEED OPEN	CR, MJ, MN, NA, NR	COLU cannot power the RT due to an open circuit	MN
COLU POWER FEED SHORT	CR, MJ, MN, NA, NR	COLU cannot power the RT due to a short circuit.	MN
COLU POWER GROUND FAULT	CR, MJ, MN, NA, NR	COLU cannot power the RT due to HDSL Tip or Ring Fault to GND	MN
RT HDSL LOSW	CR, MJ, MN, NA, NR	COLU cannot synchronize with the RT and is out of service	MN
RT HDSL ES 15 MIN THRESH	CR, MJ, MN, NA, NR	HDSL 15-minute errored second alarm threshold reached or exceeded	MN
RT HDSL ES 24HR THRESH	CR, MJ, MN, NA, NR	HDSL 24-hour errored second alarm threshold reached or exceeded	MN
RT HDSL UAS 15 MIN THRESH	CR, MJ, MN, NA, NR	HDSL 15-minute unavailable second alarm threshold reached or exceeded	MN
RT HDSL UAS 24HR THRESH	CR, MJ, MN, NA, NR	HDSL 24-hour unavailable second alarm threshold reached or exceeded	MN
RT HDSL LOW MARGIN	CR, MJ, MN, NA, NR	Margin at or below the current threshold value	MN

CONFIGURATION SUBMENU

The Configuration submenu provides access to system provisioning screens, and an easy means of resetting all options to factory defaults.

1. From the COLU main screen, select *CONFIG*, and press **ENTER** to view the submenu.



2. From the *CONFIG* submenu you can perform the following tasks:

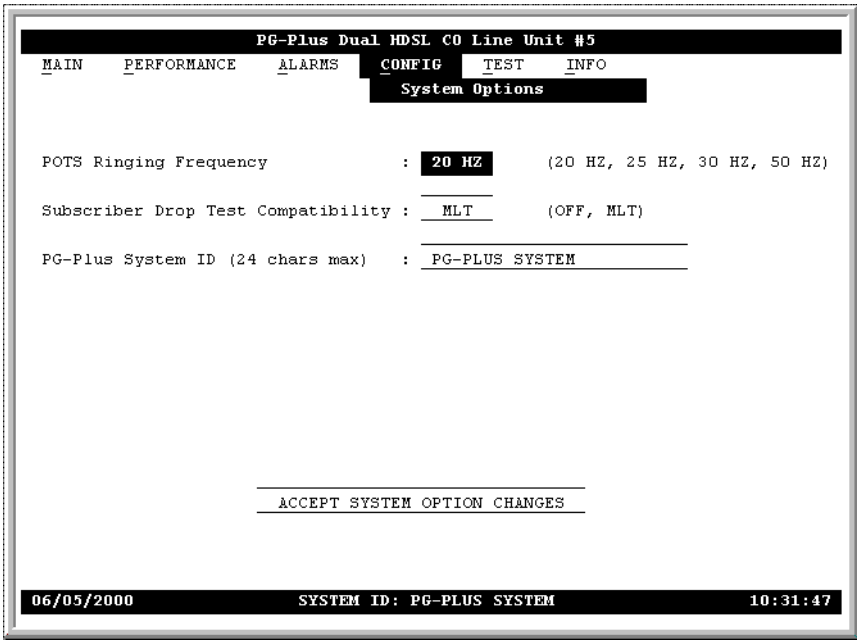
Submenu	Allows you to ...
System Options	provision system options.
System Alarm Types	provision COLU alarm types.
HDSL Options	provision HDSL options.
HDSL A Alarm Thresholds	provision HDSL alarm thresholds.
HDSL A Alarm Types	provision HDSL alarm types.
HDSL B Alarm Thresholds	provision HDSL alarm thresholds.
HDSL B Alarm Types	provision HDSL alarm types.
Set Factory Defaults	reset the provisionable items to the original factory settings.

3. Press **ESC** to return to the main screen.

System Options Screen

This screen allows the provisioning of options such as ringing frequency, SDT, and a System ID. Table 8 shows the configured system option and the factory default value.

1. From the *CONFIG* submenu, select *System Options* and press **ENTER** to view the screen.



2. You can perform the following tasks:

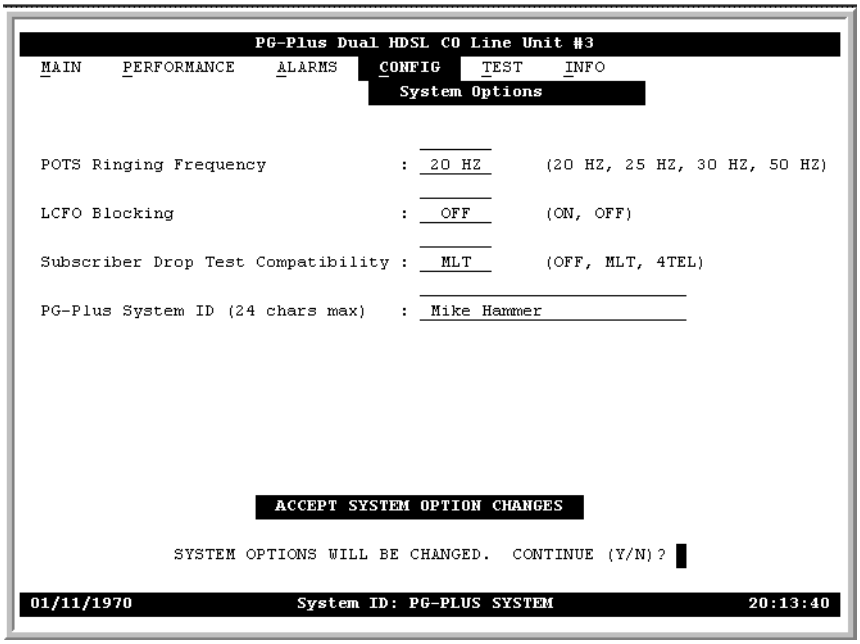
   a. To change the POTS Ringing Frequency, select the field, and press **SPACEBAR** to toggle to the desired value, or use a directional key to move to the next option.

   b. To change the Subscriber Drop Test Compatibility, select the field, and press **SPACEBAR** to toggle to the desired value, or use a directional key to move to the next option.

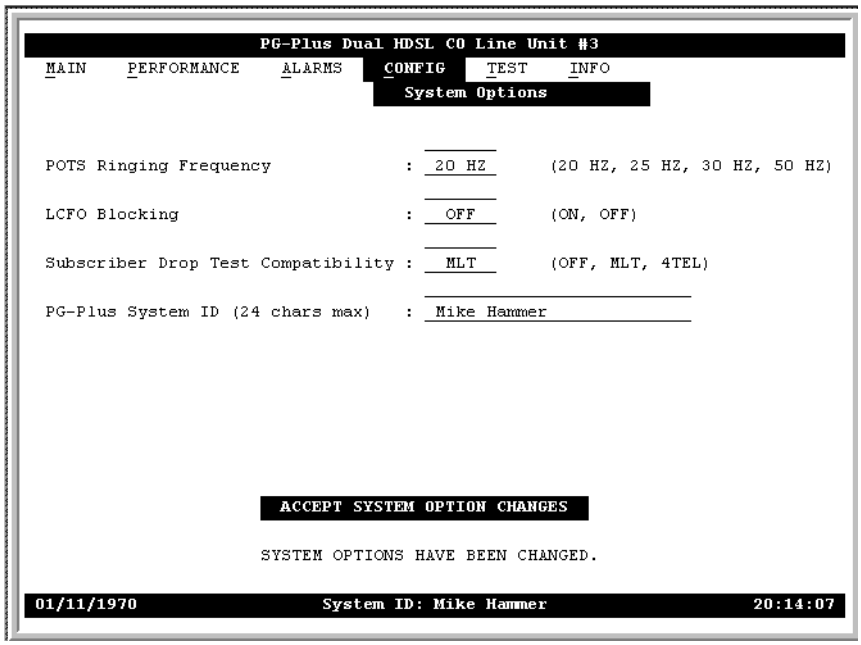
c. To change the PG-Plus System ID, move to the field and type in a unique System ID name.

d. To accept the changes, select the ACCEPT SYSTEM OPTION CHANGES button, and press **ENTER**. At the `SYTEM OPTIONS WILL BE CHANGED. CONTINUE (Y/N)?` prompt, you have the following options:

- To accept the system option changes, press **Y**.



– The system options are changed.



- To retain the current system options, press **N**.
- To return to the screen, press **ESC**.

3. Press **ESC** to return to the main screen.

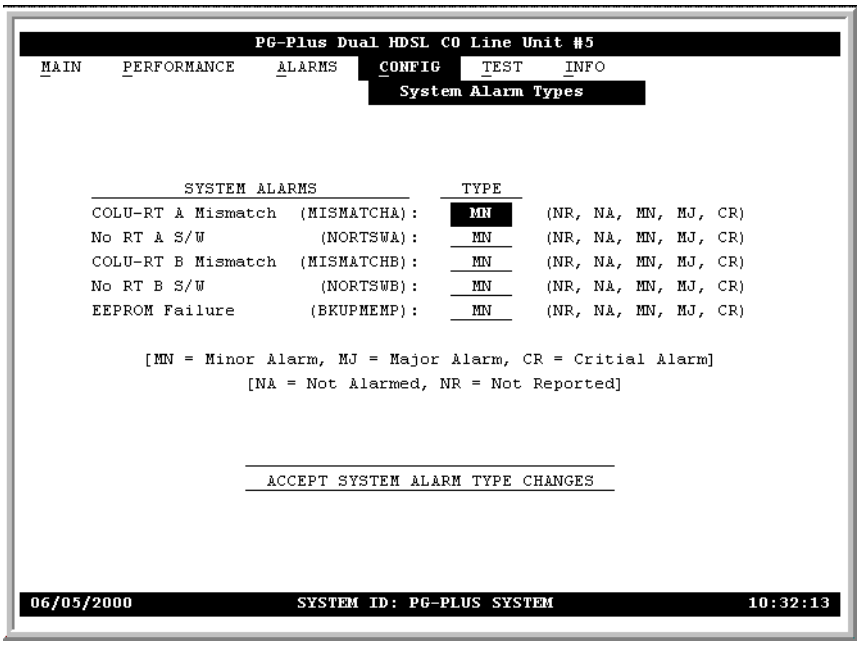
Table 8. *System Options Configuration Fields*

Option	Value	Description	Default
POTS Ringing Frequency	20 Hz 25 Hz 30 Hz 50 Hz.	The ringing frequency sent from the RT to the subscriber.	20 Hz
Subscriber Drop Test Compatibility	OFF	System will not initiate nor operate with MLT loop test systems.	Off
	MLT	The system will initiate and operate with MLT loop test systems.	
PG-Plus System (24 chars max)	This string can be up to 24 characters, can be any printable character, including space.	Configurable identification string for system. There are no special rules for changing the System ID.	PG-PLUS SYSTEM

System Alarm Types Screen

This screen allows the provisioning of the types of all system alarms. Table 9 shows the System Alarm fields and the default settings. You can view the results of these settings from the "System History Screen" on page 31.

1. From the *CONFIG* submenu, select *System Alarm Types* and press **ENTER** to view the screen.



2. You can perform the following tasks:

a. To change the COLU-RT A Mismatch alarm type, select the desired field, press **SPACEBAR** to toggle to the desired value.

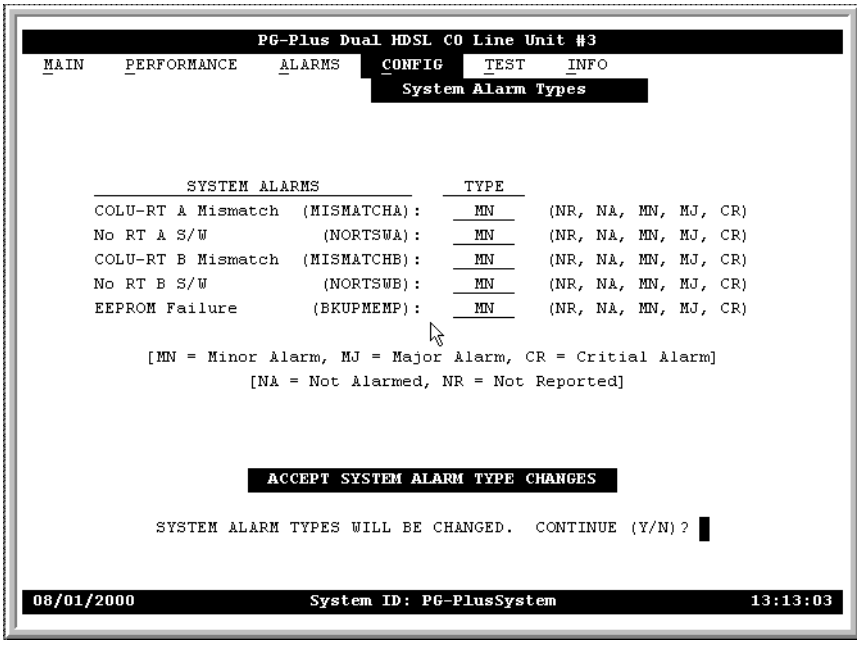
b. To change the No RT A S/W alarm type, select the desired field, press **SPACEBAR** to toggle to the desired value.

c. To change the No COLU-RT B Mismatch alarm type, select the desired field, press **SPACEBAR** to toggle to the desired value.

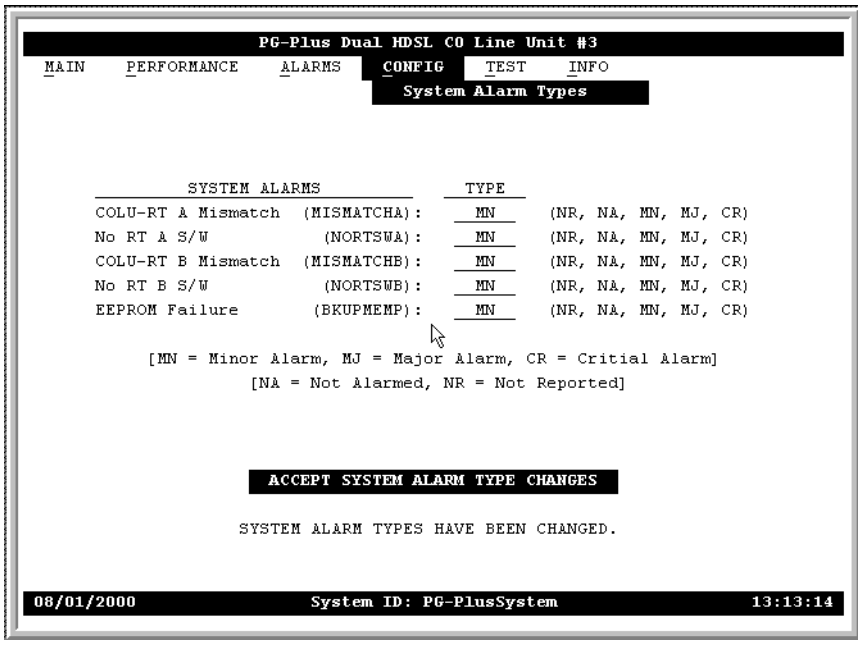
d. To change the No RT B S/W alarm type, select the desired field, press **SPACEBAR** to toggle to the desired value.

e. To change the EEPROM Failure alarm type, select the desired field, press **SPACEBAR** to toggle to the desired value.

- To accept the changes, select the ACCEPT SYSTEM ALARM TYPE CHANGES button, and press ENTER At the SYTEM ALARM TYPES WILL BE CHANGED. CONTINUE (Y/N)? prompt, you have the following options:



  - To accept the system alarm type changes, press Y. The system alarm types are changed.



- To retain the system alarm types, press N.
- To return to the screen, press ESC.

3. Press ESC to return to the main screen.

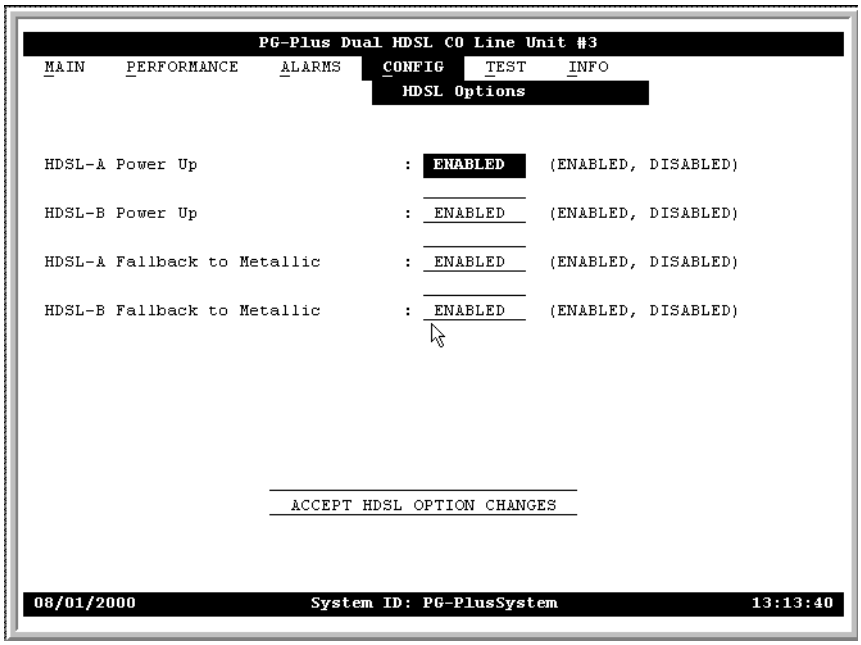
Table 9. *System Alarm Types*

Alarm	Value	Description	Default
COLU-RT A Mismatch (MISMATCHA)	NR, NA, MN, MJ, CR	Incompatible COLU and RT units have been installed. For example, a Dual 2 POTS COLU has been connected to a 2 ISDN RT.	MN
No RT A S/W (NORTSW*A)*	NR, NA, MN, MJ, CR	RT has no application software and is awaiting software download.	MN
COLU-RT B Mismatch (MISMATCHB)	NR, NA, MN, MJ, CR	COLU detected missing A -48 Vdc power source. If power is verified at the unit, then the unit must be replaced, because it has a blown fuse.	NA
No RT B S/W (NORTSWB)	NR, NA, MN, MJ, CR	COLU detected missing B -48 Vdc power source. If power is verified at the unit, then the unit must be replaced, because it has a blown fuse.	NA
EEPROM Failure (BKUPMEMP)	NR, NA, MN, MJ, CR	EEPROM failure.	MN

HDSL Options Screen

Allows the provisioning of HDSL options such as Periodic Power Up and Metallic Fallback. Table 10 shows the configured system option for both A and B RTs.

1. From the *CONFIG* submenu, select *HDSL Options* and press **ENTER** to view the screen.

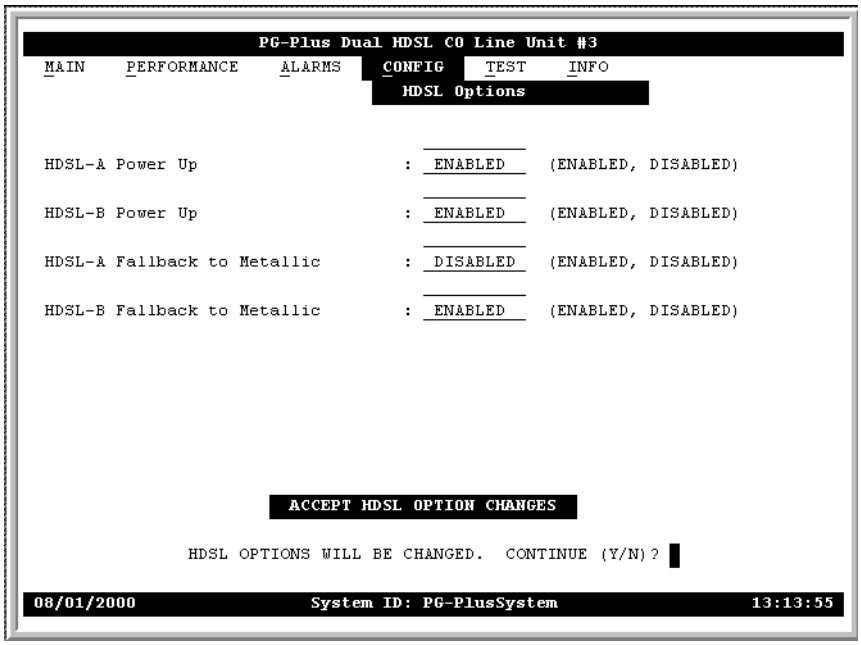


2. You can perform the following tasks:

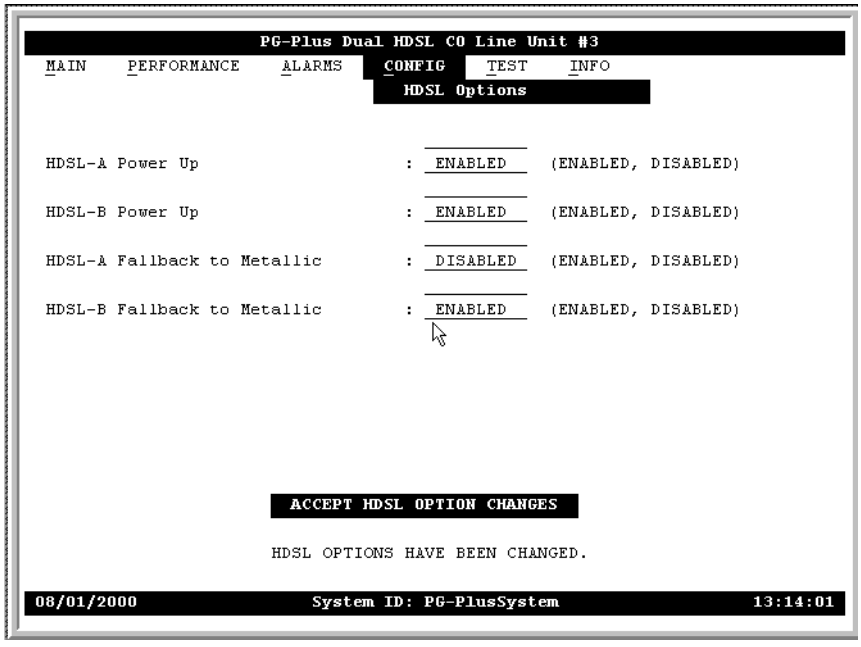
   a. To change the value for HDSL-n Power Up, select the field and press **SPACEBAR** to toggle to the desired value, or use a directional key to move to the next option.

   b. To change the value for HDSL-n Fallback to Metallic, select the field and press **SPACEBAR** to toggle to the desired value.

c. To accept the changes, select the ACCEPT CHANNEL OPTION CHANGES button, and press **ENTER**. At the `CHANNEL OPTIONS WILL BE CHANGED. CONTINUE(Y/N)?` prompt, you have the following options:



- To change the threshold values, press **Y**. All current values are set to the desired values.



- To retain the existing threshold values, press **N**.
- To return to the screen, press **ESC**.

3. Press **ESC** to return to the main screen.

Table 10. *HDSL Options Configuration Fields*

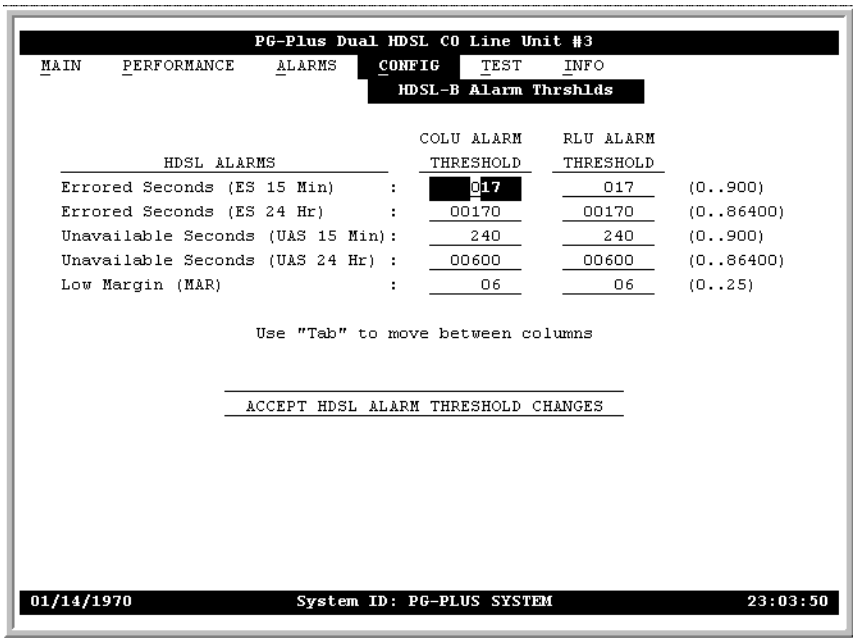
Option	Values	Description	Default
HDSL-A Power Up	ENABLED	When ENABLED, PG-Plus attempts to power up the HDSL line every 5 minutes or anytime the HDSL pair is shorted for 3 seconds and then opened.	ENABLED
	DISABLED	Setting to DISABLED inhibits the power-up sequence under any circumstances.	
HDSL-B Power Up	ENABLED	When ENABLED, PG-Plus attempts to power up the HDSL line every 5 minutes or anytime the HDSL pair is shorted for 3 seconds and then opened.	ENABLED
	DISABLED	Setting to DISABLED inhibits the power-up sequence under any circumstances.	
HDSL-A Fallback to Metallic	ENABLED	When ENABLED, the system provides fallback to metallic operation on POTS channel 1 during system failures.	ENABLED
	DISABLED	When DISABLED, the system provides no metallic connection during system failures.	
HDSL-B Fallback to Metallic	ENABLED	When ENABLED, the system provides fallback to metallic operation on POTS channel 1 during system failures.	ENABLED
	DISABLED	When DISABLED, the system provides no metallic connection during system failures.	

HDSL A and B Alarm Thresholds Screen

Provides a means to provision the threshold crossing values for the15 minute and 24-hour ES and UAS counts and low margin dB for both A and B RTs.

In the following screens you may see the A Remote Terminal, B Remote Terminal, or both A and B Remote Terminals screens as an example. Table 11 lists the fields of the HDSL Alarm Thresholds and the default factory values.

1. From the *CONFIG* submenu, select *HDSL Alarm Thrshlds* and press **ENTER** to view the screen.

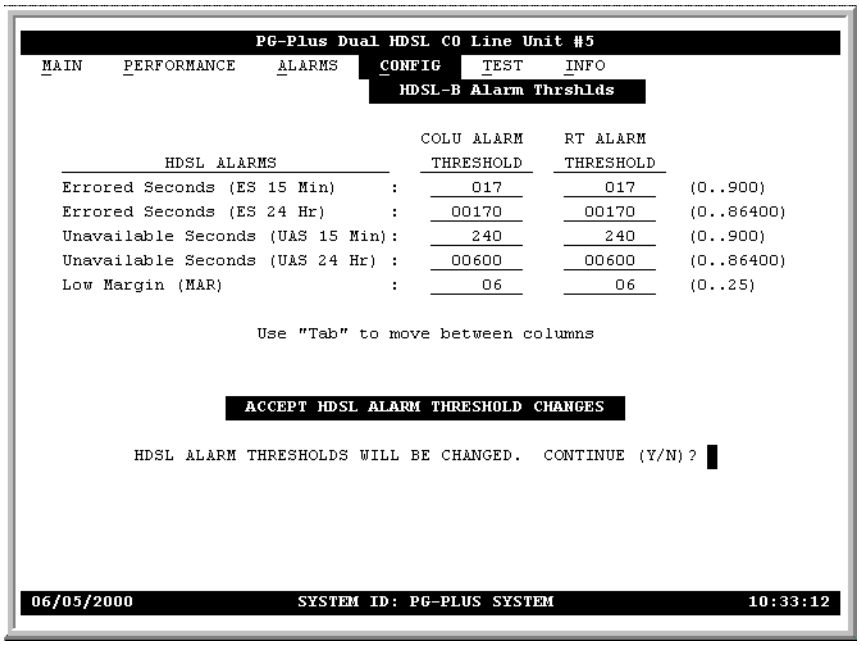


2. You can perform the following tasks:

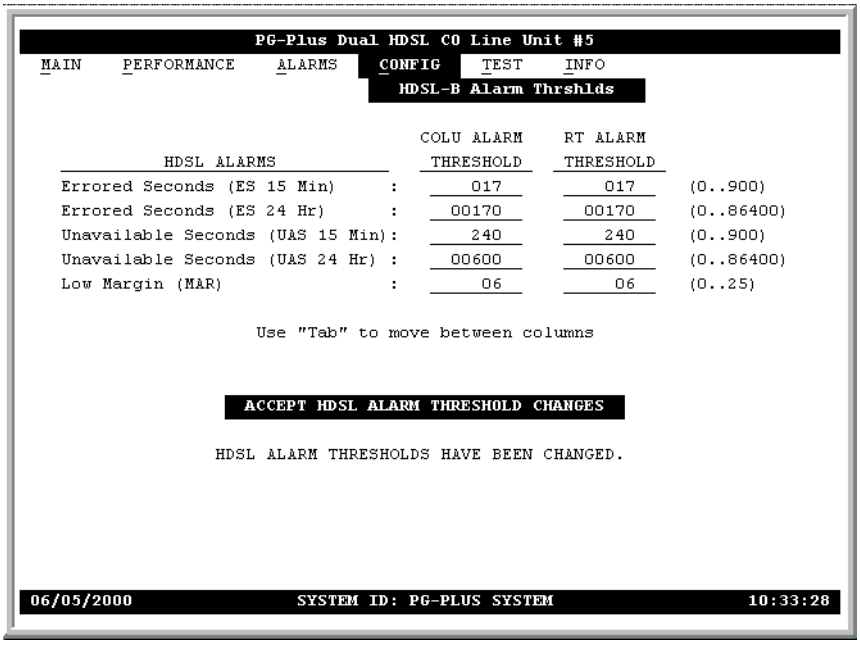
- **a.** To set the 15-minutes errored seconds threshold for the COLU, select the Errored Seconds (ES 15 Min) field in the COLU ALARM THRESHOLD column, and type in the desired value.
- **b.** To set the 24-hour errored seconds threshold for the COLU, select the Errored Seconds (ES 24 Hr) field in the COLU ALARM THRESHOLD column, and type in the desired value.
- **c.** To set the 15-minutes unavailable seconds threshold for the COLU, select the Unavailable Seconds (UAS 15 Min) field in the COLU ALARM THRESHOLD column, and type in the desired value.
- **d.** To set the 24-hour unavailable seconds threshold for the COLU, select the Unavailable Seconds (UAS 24 Hr) field in the COLU ALARM THRESHOLD column, and type in the desired value.
- **e.** To set the low margin threshold for the COLU, select the Low Margin (MAR) field in the COLU ALARM THRESHOLD column, and type in the desired value.
- **f.** To set the 15-minutes errored seconds threshold for the RT, select the Errored Seconds (ES 15 Min) field in the RT ALARM THRESHOLD column, and type in the desired value.
- **g.** To set the 24-hour errored seconds threshold for the RT, select the Errored Seconds (ES 24 Hr) field in the RT ALARM THRESHOLD column, and type in the desired value.
- **h.** To set the 15-minutes unavailable seconds threshold for the RT, select the Unavailable Seconds (UAS 15 Min) field in the RT ALARM THRESHOLD column, and type in the desired value.
- **i.** To set the 24-hour unavailable seconds threshold for the RT, select the Unavailable Seconds (UAS 24 Hr) field in the RT ALARM THRESHOLD column, and type in the desired value.

j. To set the low margin threshold for the RT, select the Low Margin (MAR) field in the RT ALARM THRESHOLD column, and type in the desired value.

k. Select the ACCEPT HDSL ALARM THRESHOLD CHANGES button, and press **ENTER**. At the `HDSL ALARM THRESHOLDS WILL BE CHANGED. CONTINUE(Y/N)?` prompt, you have the following options:



- To change the threshold values, press **Y**. A message displays confirming that the values are set to the desired values.



- To retain the existing threshold values, press **N**.
- To return to the screen, press **ESC**.

3. Press **ESC** to return to the main screen.

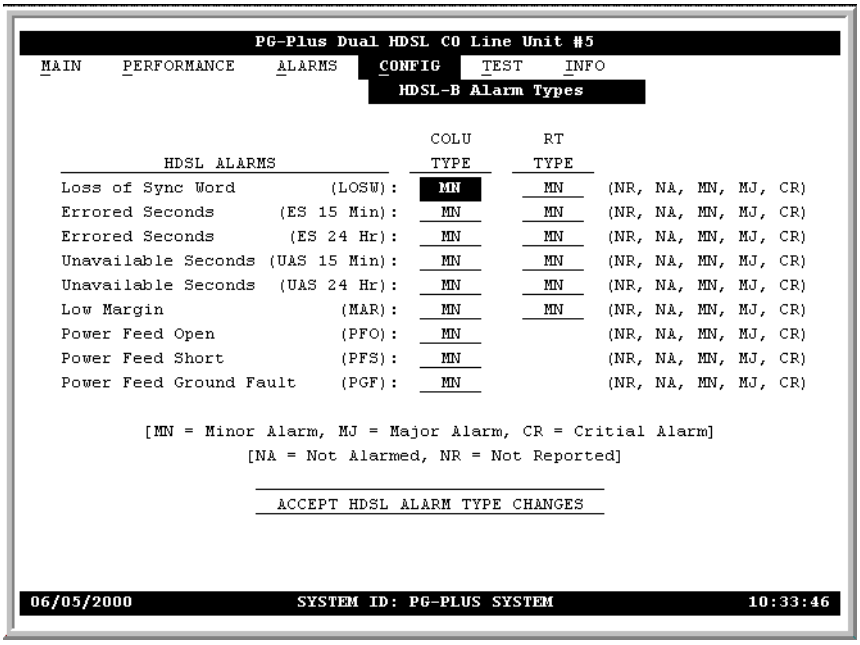
Table 11. *HDSL Alarm Thresholds*

Threshold	Values	Description	Default
Errored Seconds (ES 15 Min)	0 to 900	Value for the HDSL 15 minute interval ES alarm.	17
Errored Seconds (ES 24 Hr)	0 to 86400	Value for the HDSL 24 hour interval ES alarm.	170
Unavailable Seconds (UAS 15 Min)	0 to 900	Threshold value for the HDSL 15 minute interval UAS alarm.	240
Unavailable Seconds (UAS 24 Hr)	0 to 86400	Threshold value for the HDSL 24 hour interval UAS alarm.	600
Low Margin (MAR)	0 to 25	Value at which alarm is set active if margin drops equal to or less than this threshold.	06

HDSL A and B Alarm Types Screen

This screen allows the provisioning of the alarm types for all HDSL Alarms for both A and B RTs. In the following screen you may see the A Remote Terminal, B Remote Terminal, or both A and B Remote Terminals screens as an example. Table 12 lists the Alarm Reports and Table 13 shows the HDSL Alarms, the possible alarm Types, and the default settings. View the results of these settings at the "HDSL History Screen" on page 33.

1. From the *CONFIG* submenu, select *HDSL Alarm Types* option and press **ENTER** to view the screen.



2. You can perform the following tasks:

   a. To change the value of the COLU alarm Loss of Sync Word, select the field in the COLU TYPE column, and press the **SPACEBAR** to toggle to the desired value.

   b. To change the value of the RT alarm Loss of Sync Word, select the field in the RT TYPE column, and press the **SPACEBAR** to toggle to the desired value.

   c. To change the value of the COLU alarm Errored Seconds (ES 15 Min), select the field in the COLU TYPE column, and press the **SPACEBAR** to toggle to the desired value.

   d. To change the value of the RT alarm Errored Seconds (ES 15 Min), select the field in the RT TYPE column, and press the **SPACEBAR** to toggle to the desired value.

   e. To change the value of the COLU alarm Errored Seconds (ES 24 Hr), select the field in the COLU TYPE column, and press the **SPACEBAR** to toggle to the desired value.

   f. To change the value of the RT alarm Errored Seconds (ES 24 Hr), select the field in the RT TYPE column, and press the **SPACEBAR** to toggle to the desired value.

   g. To change the value of the COLU alarm Unavailable Seconds (UAS 15 Min), select the field in the COLU TYPE column, and press the **SPACEBAR** to toggle to the desired value.

   h. To change the value of the RT alarm Unavailable Seconds (UAS 15 Min), select the field in the RT TYPE column, and press the **SPACEBAR** to toggle to the desired value.

   i. To change the value of the COLU alarm Unavailable Seconds (UAS 24 Hr), select the field in the COLU TYPE column, and press the **SPACEBAR** to toggle to the desired value.

j. To change the value of the RT alarm Unavailable Seconds (UAS 24 Hr), select the field in the RT TYPE column, press the **SPACEBAR** to toggle to the desired value, or press a directional key to move to the next option

k. To change the value of the COLU alarm Low Margin (MAR), select the field in the COLU TYPE column, press the **SPACEBAR** to toggle to the desired value, or press a directional key to move to the next option.

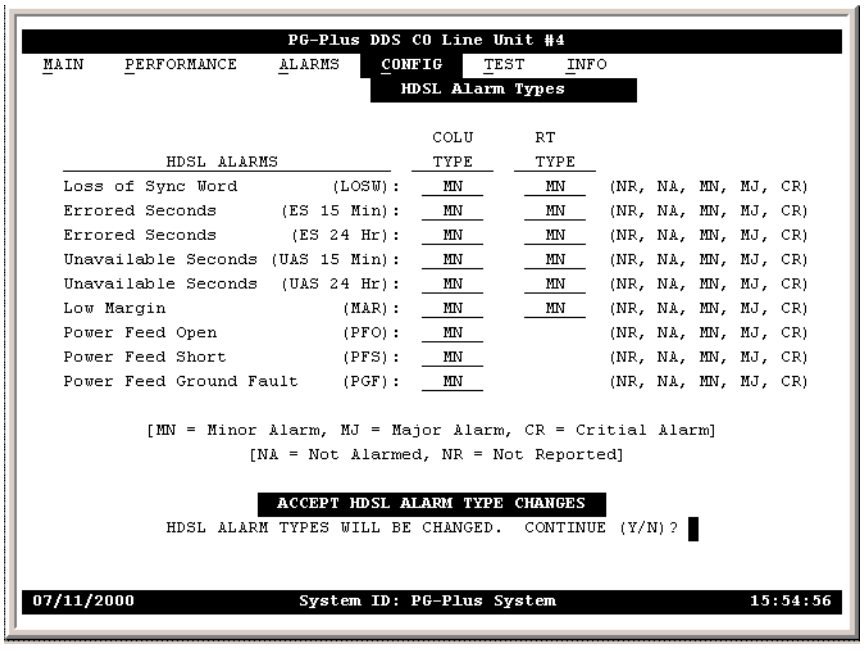
l. To change the value of the RT alarm Low Margin (MAR), select the field in the RT TYPE column, press the **SPACEBAR** to toggle to the desired value, or press a directional key to move to the next option

m. To change the value of the COLU alarm Power Feed Open (PFO), select the field in the COLU TYPE column, press the **SPACEBAR** to toggle to the desired value, or press a directional key to move to the next option.

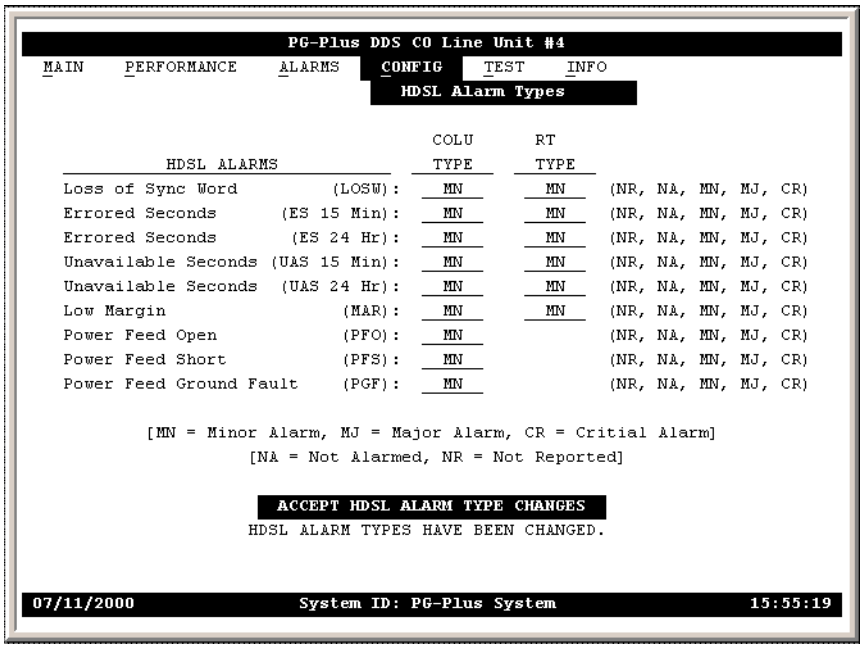
n. To change the value of the COLU alarm Power Feed Short (PFS), select the field in the COLU TYPE column, press the **SPACEBAR** to toggle to the desired value, or press a directional key to move to the next option.

o. To change the value of the COLU alarm Power Feed Ground Fault (PGF), select the field in the COLU TYPE column, press the **SPACEBAR** to toggle to the desired value, or press a directional key to move to the next option.

p. To accept the changes, select the ACCEPT HDSL ALARM TYPE CHANGES button, and press **ENTER**. At the `HDSL ALARM TYPES WILL BE CHANGED. CONTINUE(Y/N)?` prompt, you have the following options:



- To accept the changes to the alarm types, press **Y**. A message confirms that the HDSL Alarm Types have been changed.



- To retain the current alarm types, press **N**.
- To return to the screen, press **ESC**.

3. Press **ESC** to return to the main screen.

Table 12. *Alarm Reports*

Settings	Reported	Fault LED Lit	Main Summary Listing	History Updated
CR Critical	Yes	Yes	Yes	Yes
MJ Major	Yes		Yes	Yes
MN Minor	Yes		Yes	Yes
NA Not Applicable	No	No	No	No
NR Not Reported	No	Yes	Yes	Yes

Table 13. *HDSL Alarm Types*

Type	Values	Description	COLU Default	RT Default
Loss of Sync Word (LOSW)	NR, NA, MN, MJ, CR	HDSL link has lost synchronization.	MN	MN
Errored Seconds (ES -15 Min)	NR, NA, MN, MJ, CR	Active if the 15 minute ES count equals or exceeds the threshold in the current 15 minute interval.	MN	MN
Errored Seconds (ES-24 Hr)	NR, NA, MN, MJ, CR	Active if the count equals or exceeds the threshold in the current 24 hour interval.	MN	MN
Unavailable Seconds (UAS-15 Min)	NR, NA, MN, MJ, CR	Active if the count equals or exceeds the threshold in the current 15 minute interval.	MN	MN
Unavailable Seconds (UAS-24 Hr)	NR, NA, MN, MJ, CR	Active if the count equals or exceeds the threshold in the current 24 hour interval.	MN	MN
Low Margin (MAR)	NR, NA, MN, MJ, CR	Active if the margin equals or drops below the threshold.	MN	MN
Power Feed Open (PFO)	NR, NA, MN, MJ, CR	Open circuit detected on the HDSL span.	MN	
Power Feed Short (PFS)	NR, NA, MN, MJ, CR	Short circuit detected on the HDSL span.	MN	
Power Feed Ground Fault (PGF)	NR, NA, MN, MJ, CR	Ground fault condition detected on the HDSL span.	MN	

Set Factory Defaults Screen

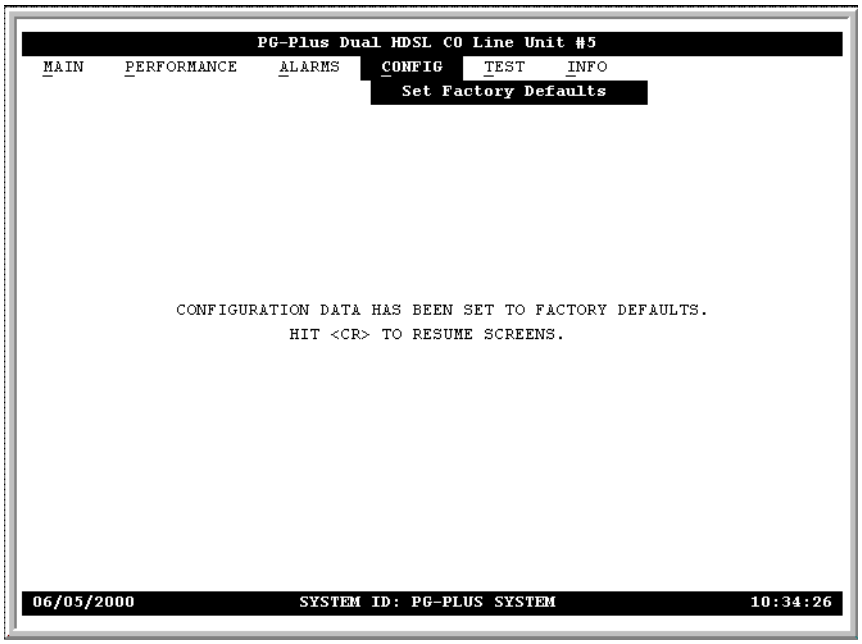
This screen allows setting all configuration data back to factory default values.

1. From the *CONFIG* submenu, select *Set Factory Defaults* line and press **ENTER**.

If you have custom factory defaults, then these custom defaults will be restored if you select Set Factory Defaults.

2. At the `CONFIGURATION DATA WILL BE SET TO FACTORY DEFAULTS. CONTINUE(Y/N)?` prompt, you have the following options:

a. To accept the configuration data changes, press **Y**. Press **ENTER** to return to the screens.



b. To retain the configuration data values, press **N**.

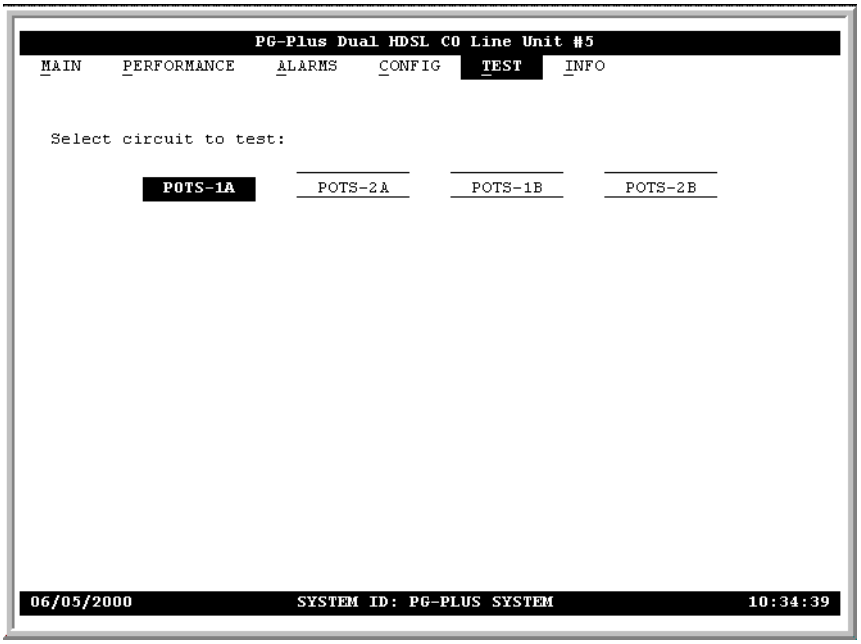
c. To return to the screen, press **ESC**.

3. Press **ESC** to return to the main screen.

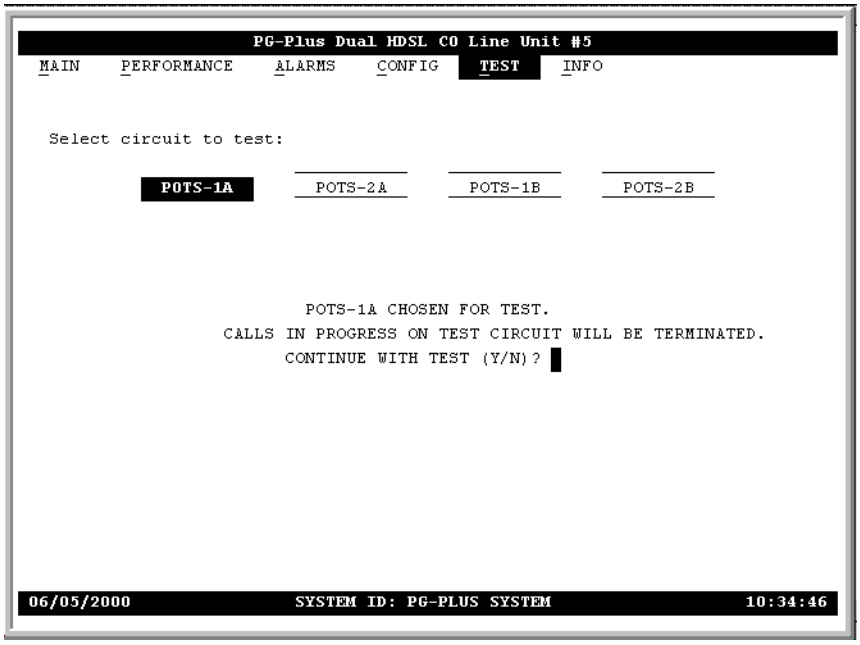
TEST SUBMENU

This screen allows testing of a subscriber drop by selecting it from the TEST menu. The relays in the COLU and RT provide a path for performing a SDT.

1. From the COLU main screen, select *TEST* to view the submenu.

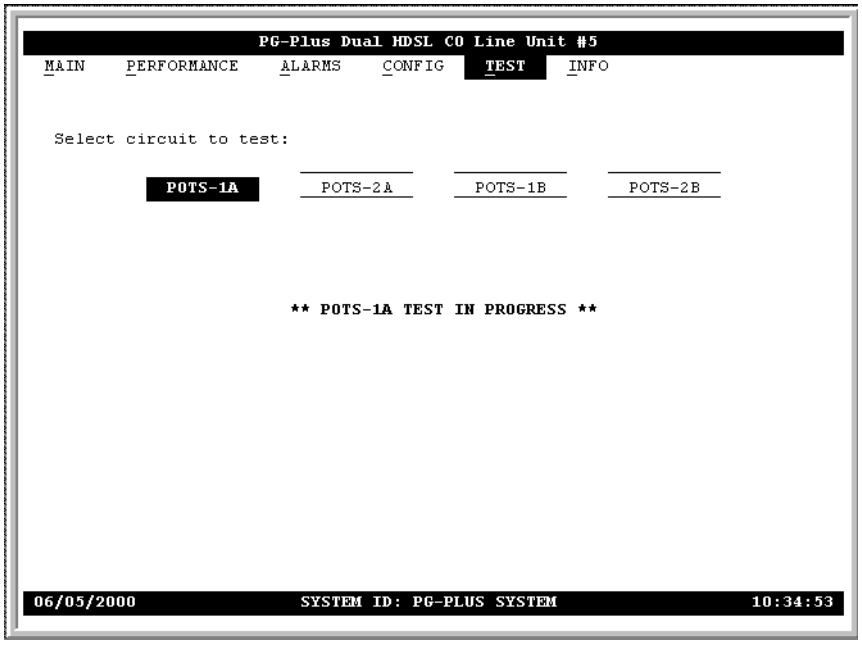


2. You can perform the following tasks:
3. To test a circuit, select the desired circuit and press **ENTER**.

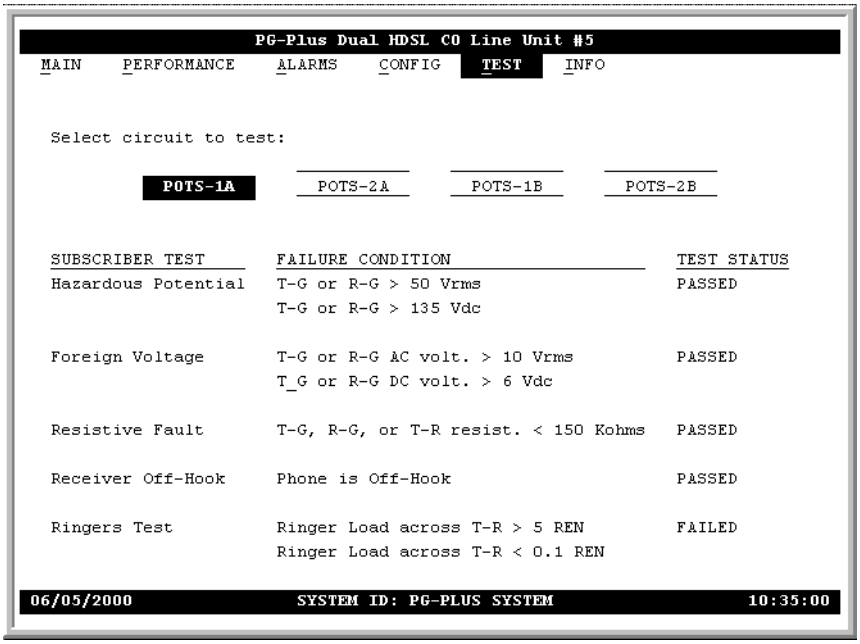


4. The message POTS-1A CHOSEN FOR TEST. CALLS IN PROGRESS ON TEST CIRCUIT WILL BE TERMINATED is displayed. To continue with the test, press **Y** at the `CONTINUE WITH TEST (Y/N)?` prompt.

- A POTS-1A `TEST IN PROGRESS MESSAGE` displays on the screen:



When tests are completed, the SDT results screen displays. If a test fails, the remaining tests are not performed (as per TR-909). It takes approximately 7 to 8 seconds for all tests co complete.



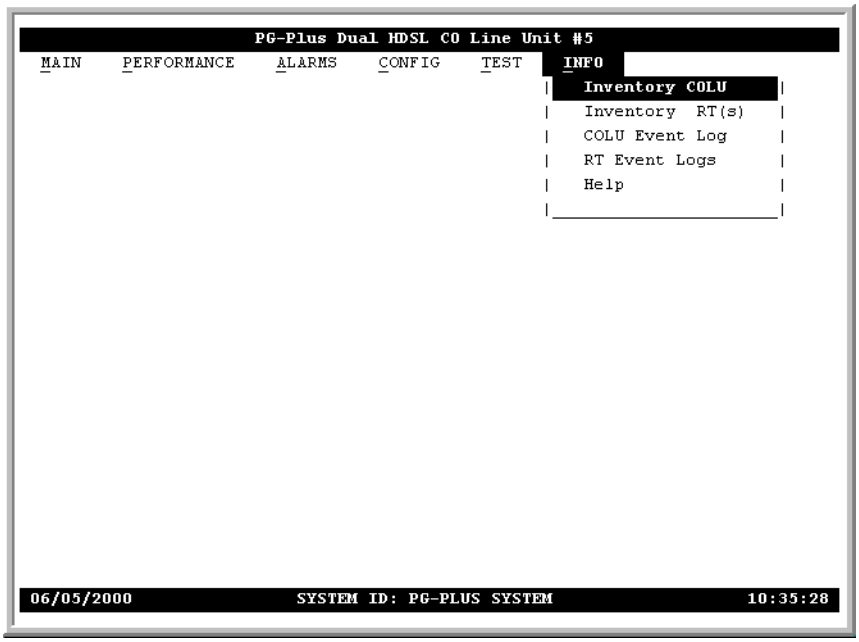
- To escape from the test, press **N**.
- To return to the screen, press **ESC**.

5. Press **ESC** to return to the main screen.

INFORMATION SUBMENU

The Information submenu provides access to the technical information about the system and contact information for this product.

1. From the COLU main screen, select *INFO* and press **ENTER** to display the submenu.



2. From the *INFO* submenu you can perform the following tasks:

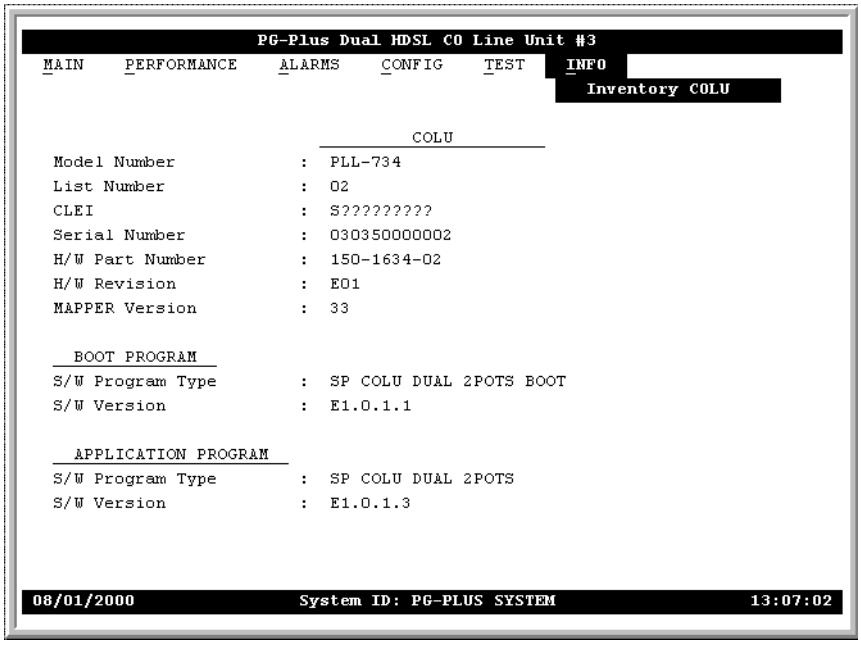
Submenu	Allows you to ...
Inventory COLU	view card information.
Inventory RTs	view RTs information.
COLU Event Log	view the COLU event log.
RTs Event Log	view the RT event log.
Help	view navigation methods.

3. Press **ESC** to return to the main screen.

COLU Inventory Screen

This screen displays product identification information, manufacturing data, software versions, and the hardware revisions for the COLU.

1. From the *INFO* submenu, select *Inventory COLU* and press **ENTER**.

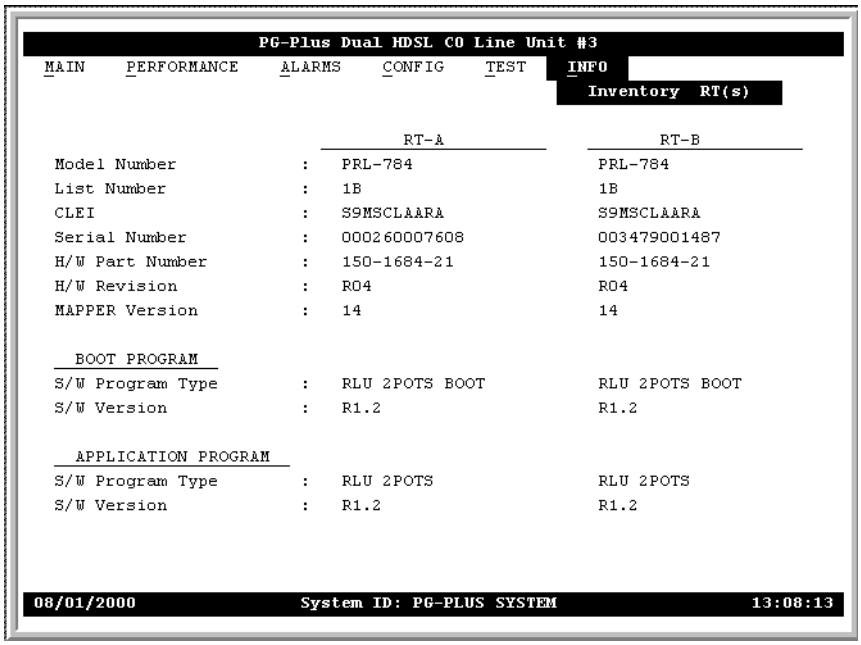


2. Press **ESC** to return to the main screen.

RTs Inventory Screen

This screen displays product identification information, manufacturing data, software versions, and the hardware revisions for the RTs.

1. From the *INFO* submenu, select *Inventory RT(s)* and press **ENTER**.



2. Press **ESC** to return to the main screen.

COLU Event Log

This screen provides information on events that occurred but are not Alarmed events. The two Events that can be logged are:

1. From the I*NFO* submenu, select *Event Log* and press **ENTER** to view the screen:

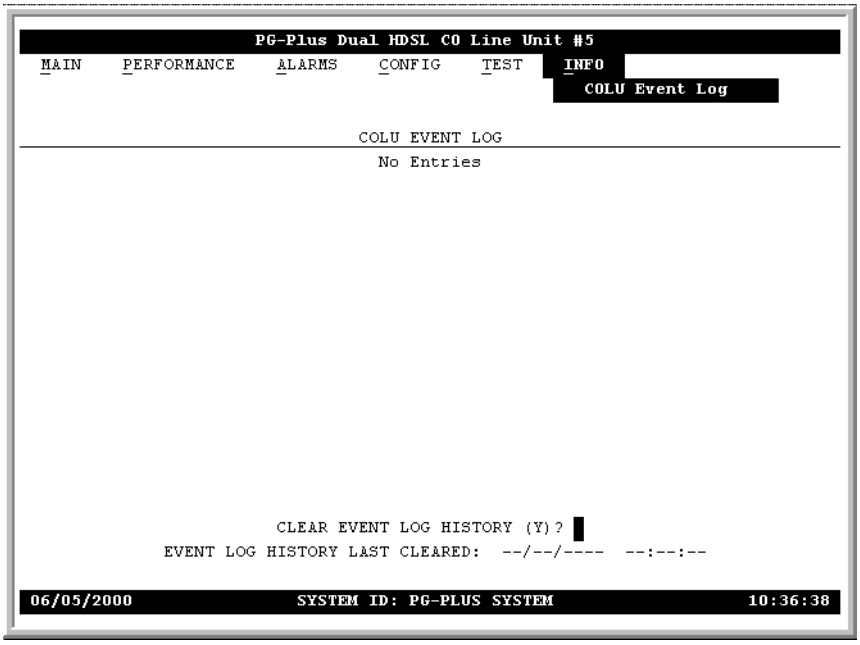
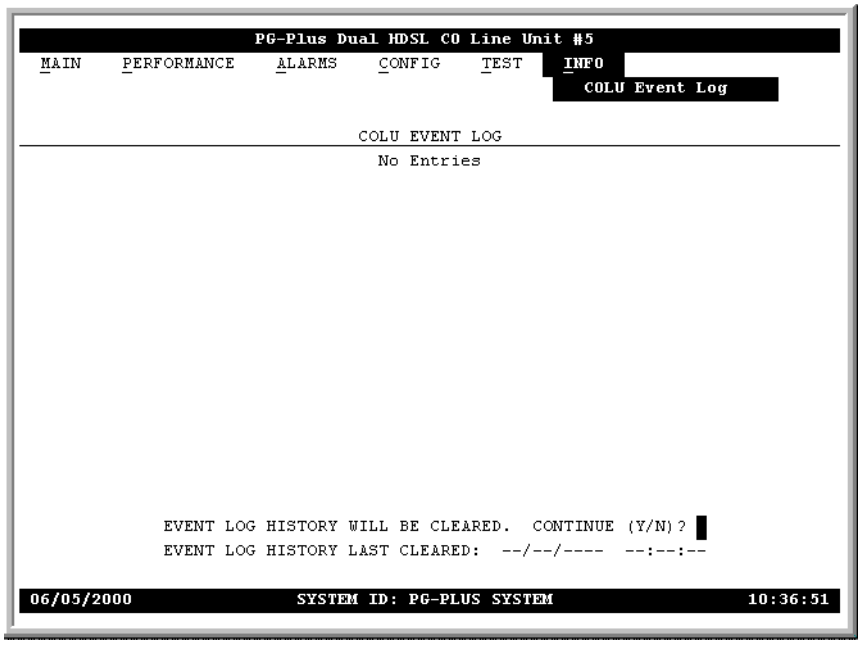


Table 14. *COLU Event Log*

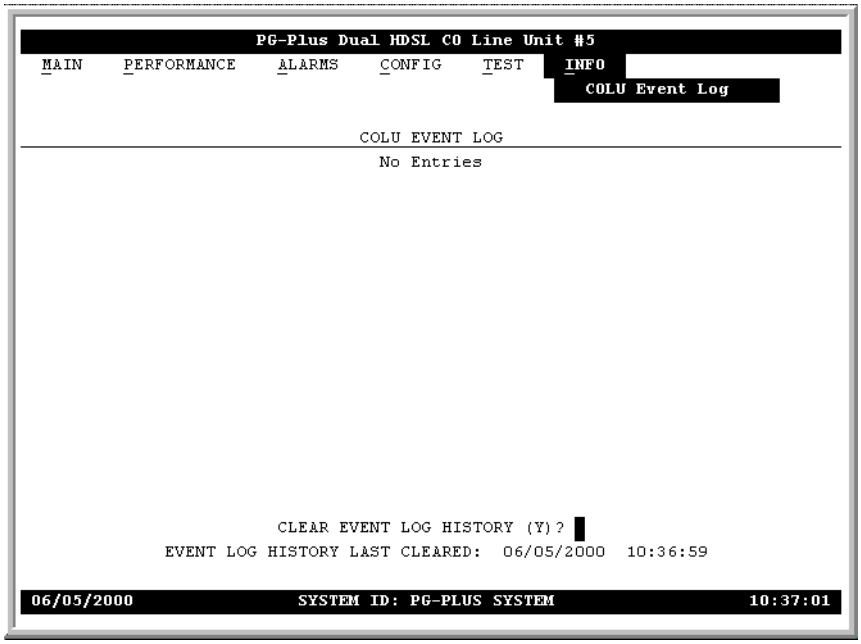
Event	Description	Action Required
MEMVER	A provisioning database conversion occurred when a software download occurred. MEMVER is informational only. This event is cleared if you reseat the COLU, however it is not required.	No customer action is required.
MEMCHK	The provisioning factory defaults were restored due to a corrupted database. MEMCHK is informational only. To clear the MEMCHK alarm, go to the CONFIG submenu option *Set Factory Defaults* and Accept the Set Factory Defaults prompt.	No customer action is required.

2. You can perform the following tasks:

a. To clear the alarm history information, at the `CLEAR EVENT LOG HISTORY(Y)` prompt, type **Y**. At the `EVENT LOG HISTORY WILL BE CLEARED. CONTINUE (Y/N)?` prompt, you have the following options:



- To clear the history, press **Y**. The time and date that the history was last cleared is updated.



- To retain the current history, press **N**.
- To return to the screen, press **ESC**.

3. Press **ESC** to return to the main screen.

RT Event Log

This screen provides information on events that occurred but are not alarmed (see Table 15).

1. From the *INFO* submenu, select *RT Event Logs* and press **ENTER**.

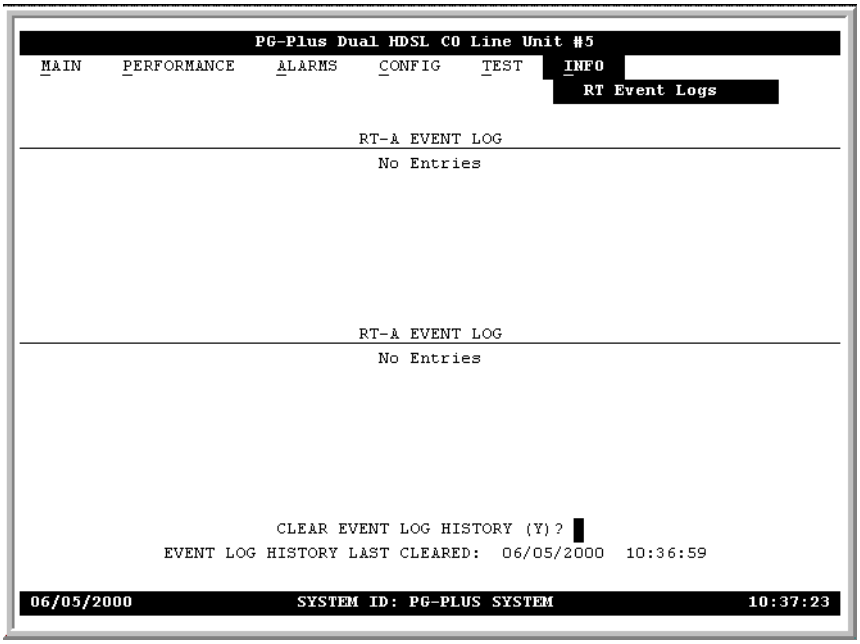
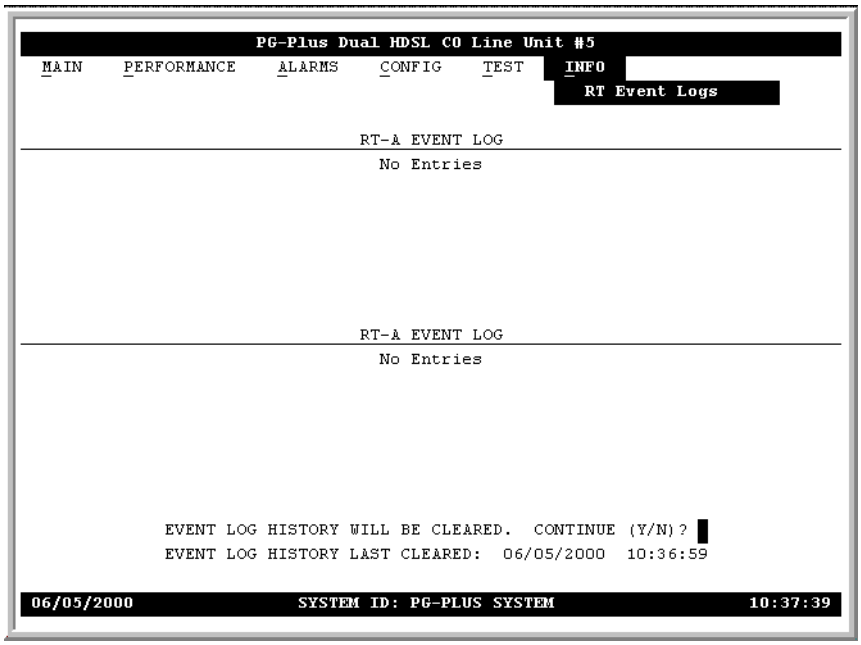


Table 15. *RT Event Log*

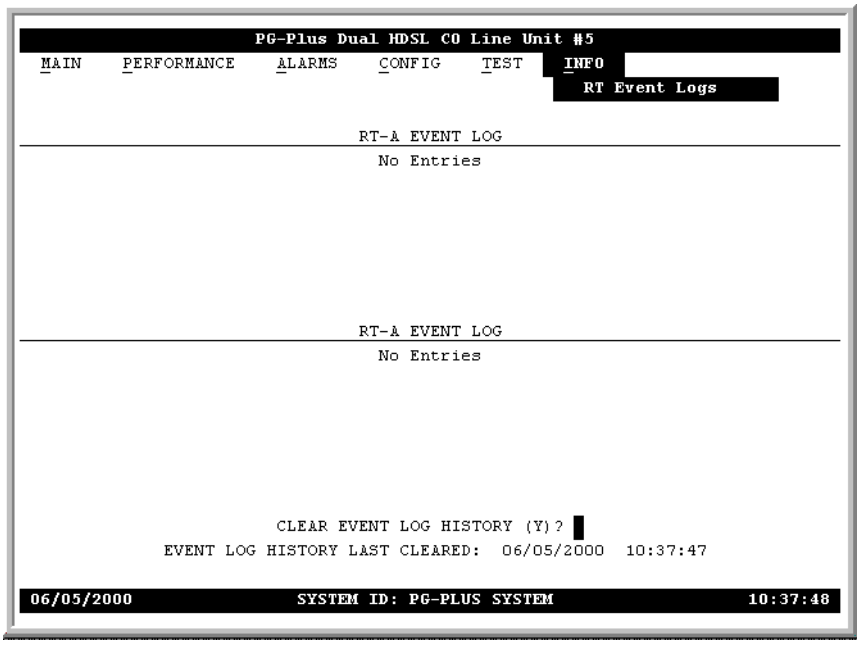
Event	Description	Action Required
MEMVER	A provisioning database conversion occurred when a software download occurred. MEMVER is informational only. This event is cleared if you reseat the COLU, however it is not required.	No customer action is required.
MEMCHK	The provisioning factory defaults were restored due to a corrupted database. MEMCHK is informational only. To clear the MEMCHK alarm, go to the CONFIG submenu option *Set Factory Defaults* and Accept the Set Factory Defaults prompt.	No customer action is required.

2. You can perform the following tasks:

a. To clear the alarm history information, at the `CLEAR HDSLn ALARM HISTORY(Y)` prompt, type **Y**. At the `EVENT LOG HISTORY WILL BE CLEARED. CONTINUE (Y/N)?` prompt, you have the following options:



- To clear the history, press **Y**. The time and date that the history was last cleared is updated.



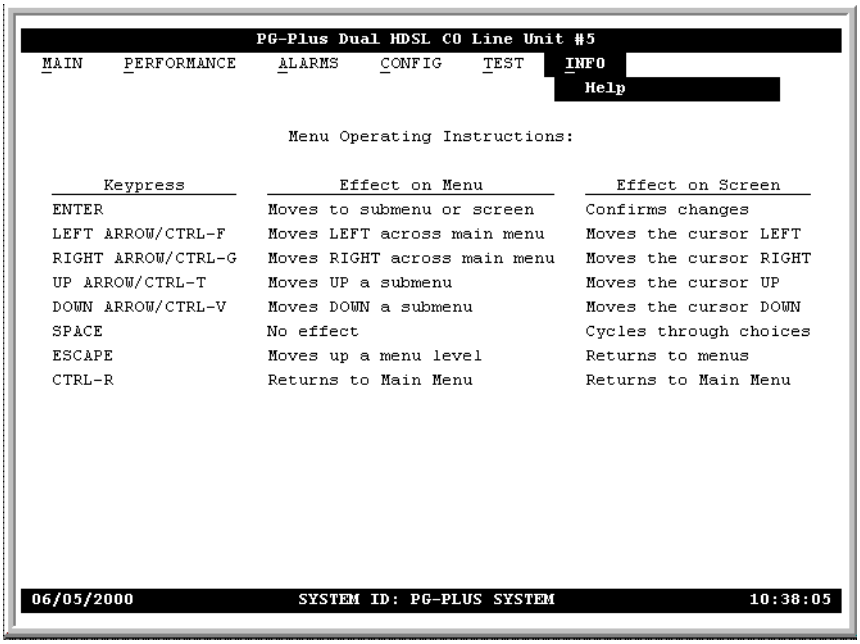
- To retain the current history, press **N**.
- To return to the screen, press **ESC**.

3. Press **ESC** to return to the main screen.

Help Screen

This screen provides navigational methods for moving about the screens.

1. From the *INFO* submenu, select *Help* and press **ENTER**.



2. Press **ESC** to return to the main screen.

FAULT ISOLATION

COLU AND RT FAULT INDICATORS

At the CO, you can use the VT-100 terminal to initiate a SDT to determine the cause of any of the following problems. At the customer site, the following sections provide procedures for isolating faults, based on subscriber reports (see Table 16).

Table 16. *COLU and RT Fault Indicators*

LED	Mode	Condition	Procedure
None	On	processor in the COLU stopped	**1** Remove and re-insert the COLU. **2** At the VT-100 interface, go to the COLU main screen to view the Performance report to verify that no alarms exist. If the COLU main screen cannot be viewed, a communication error exists, indicating a faulty COLU. **3** If the LEDs do not illuminate, replace the COLU.
Fault	Flashing	indicates an existing alarm condition on the COLU	**1** At the VT-100 interface, go to the COLU main screen to view the Performance report to determine the cause of the alarm. Correct the condition, if possible. If the COLU main screen cannot be viewed, a communication error exists. **2** Remove and re-insert the COLU. **3** If the communication error still exists, replace the COLU.
Margin	On	distance limitation exceeded fault in HDSL line faulty COLU	**1** At the VT-100 interface, go to the COLU main screen to view the Performance report to verify that no alarms exist. **2** Initial installation, check engineering records for distance between COTS and RT. **3** If existing installation, measure loss of HDSL line to ensure that the maximum attenuation value has not been exceeded. **4** Replace COLU and/or the RT.
Margin	Flashing	distance limitation exceeded fault in HDSL line faulty RT	**1** Initial installation, check engineering records for distance between COTS and RT. **2** If existing installation, measure loss of HDSL line to ensure that the maximum attenuation value has not been exceeded. **3** Replace the COLU or the RT or both.
SYNC	Off	HDSL line has lost synchronization distance limitation may have been exceeded COLU is faulty	**1** Initial installation, check engineering records for distance between COTS and RT. **2** If existing installation, measure loss of HDSL line to ensure that the maximum attenuation value has not been exceeded. **3** Replace the COLU or the RT or both.
PWR	Off	no input power on-board fuse is blown on COLU	**1** Ground fault condition exists. **2** Check input power at COTS backplane with COLU removed. **3** If power is present at COTS backplane, replace the COLU.
PWR	Flashing	HDSL line open an overload exists	**1** Check line continuity and resistance. **2** COLU power supply or RT may be faulty.

SUBSCRIBER REPORTED FAULTS

At the CO, you can use the craft terminal to initiate a SDT to determine the cause of any of the following problems (see Table 17). The SDT test performs Hazardous Potential, Foreign Voltage, Resistive Faults, Receiver Off-Hook, and Ringers Tests. At the customer site, the following sections provide procedures for isolating faults, based on subscriber reports.

Table 17. *Subscriber Reported Faults*

Conditions	Causes	Procedures
no dialtone, cannot dial	Short-circuit or open-circuit	**1** At the CO using the craft terminal, select *TEST* option, and view the test results. The tests run are for Hazardous Potential, Foreign Voltage, Resistive Fault, and CPE Termination.
	Faulty COLU or RT	**2** At the RT, lift the subscriber pair at the RT by opening the RJ-11 connector on the Integrated Protector Module. If dialtone is present at the RT and calls can be placed, the fault is in the subscriber side. Check for shorts or opens towards the subscriber or on the customer premise.
		3 If dialtone is not present with the RJ-11 test connector lifted, lift the jumper in the CO between the CO switch and the COTS. If dialtone is present at the switch, replace the COLU.
		4 If after replacing the COLU the dialtone is still not present, the fault is in the RT. Replace the RT.
Phone does not ring	High-resistance short on subscriber drop (REN load exceeded, see Specifications)	**1** At the CO, using the craft terminal, go to the COLU main screen to verify the correct operation of the COLU. If you cannot view the COLU main screen, a communication error exists indicating a faulty COLU. Remove and re-insert the COLU.
	faulty RT or COLU	**2** Go to the *Test* option, and select the desired circuit to test.
		3 View the SDT results. Refer to the Test submenu section for specific results.
		4 At the RT, check for ringing at the RT with the RJ-11 test jack open. If ringing is not present, check for ringing on another line terminated on the same RT. If ringing is present on other lines, check for high-resistance shorts on the subscriber drop. If no high resistance shorts, replace the RT.
		5 If ringing is not present on another circuit terminated on the RT, lift the jumper between the CO switch and the COTS. If ringing is present, replace the COLU. If ringing is not present, the fault is in the switch.
Phone does not stop ringing	faulty subscriber station instrument	**1** If phone stops ringing when using a butt set at the subscriber location, the subscriber's station internal resistance is too high. Replace phone.
	loop length too long	**2** If phone does not stop ringing when using a butt set at the subscriber location, one or both of these conditions exist:
	faulty RT	• loop length is too long (refer to Specifications)
		• or the RT is faulty

Table 17. *Subscriber Reported Faults*

Conditions	Causes	Procedures
Cannot hear, cannot be heard	subscriber problem	**1** Open the RJ-11 test jack at the RT. If audible level is acceptable, the problem is with subscriber equipment.
	faulty COLU or RT	**2** If audible level is too low at the RT with the RJ-11 test jack lifted, lift the jumper in the CO between the CO switch and the COTS. • If audible level is acceptable, replace the COLU or RT • If the problem is not in the COLU or the RT, then the problem is in the CO switch

PRODUCT SUPPORT

TECHNICAL SUPPORT

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

Telephone:	800.366.3891 The 800 telephone support line is toll-free in the U.S. and Canada.
Email:	wsd_support@adc.com
Knowledge Base:	http://adc.com/Knowledge_Base/index.jsp
Web:	www.adc.com

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: 800.366.3891
   - 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, Inc.
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 CLASS A COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the use will be required to correct the interference at his own expense.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by ADC voids the user's warranty.

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

ACRONYMS

2B1Q	2 Binary, 1 Quarternary; A line code in which each 2 bits of the binary data stream are combined into a single symbol of the quaternary line signal.
ACO	Alarm Cut-Off
AWG	American Wire Gauge
BER	Bit Error Ratio
CEV	Controlled Environment Vault
CO	Central Office
COLU	Central Office Line Unit
COTS	Central Office Terminal Shelf
CPE	Customer Premise Equipment or Customer Provided Equipment
CR	Critical
DAML	Digital Added Main Line
ES	Errored Seconds
ESD	Electrostatic Discharge
FCC	Federal Communications Commission
HDSL	High-bit-rate Digital Subscriber Line
IDLC	Integrated Digital Loop Carrier
LCFO	Line Current Feed open
LED	Light Emitting Diode
LOSW	HDSL Loss of SYNC Word
MAR	HDSL Line Margin
MLT	Mechanized Loop Testing
NEBS	Network Equipment Building System
NR	Not Reported
PAU	PG-Plus Alarm Unit
PCM	Pulse Code Modulation
PFO	Power Feed Open
PFS	Power Feed Short
PGF	Power Feed Ground Fault
PMU	PG-Plus Management Unit
PMX	PG–Plus Multiplexer Unit
POTS	Plain Old Telephone Service
REN	Ringer Equivalence
RMA	Return Material Authorization
RT	Remote Terminal
SDT	Subscriber Drop Test
SES	Severely Errored Seconds
SYNC	Synchronization
UAS	Unavailable Seconds

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