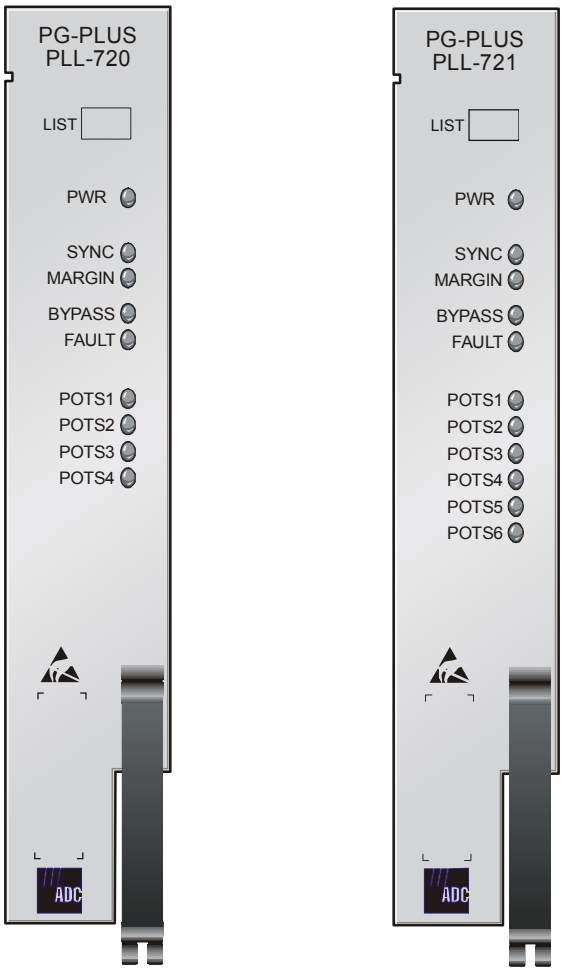
PG-PLUS

TECHNICAL PRACTICE



4 POTS/6 POTS

CENTRAL OFFICE LINE UNIT

Model	List	CLEI Code
PLL-720	2	S9L1AADA~~
PLL-721	2	S9L1ABDA~~

Revision History of This Practice

Revision	Release Date	Revisions Made
01	December 15, 2000	Initial Release
02	February 6, 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 55. 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® PLL-720, PLL-721 List 2's, PAU-710 List 4B, provide interface with the respective RT for four and six POTS subscribers.

DESCRIPTION AND FEATURES

A PG-Plus application, consisting of one COTS, one COLU and one RT, (see Figure 1) provides bidirectional transport of multiple DS0, over a single, unconditioned wire pair using HDSL technology. 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.

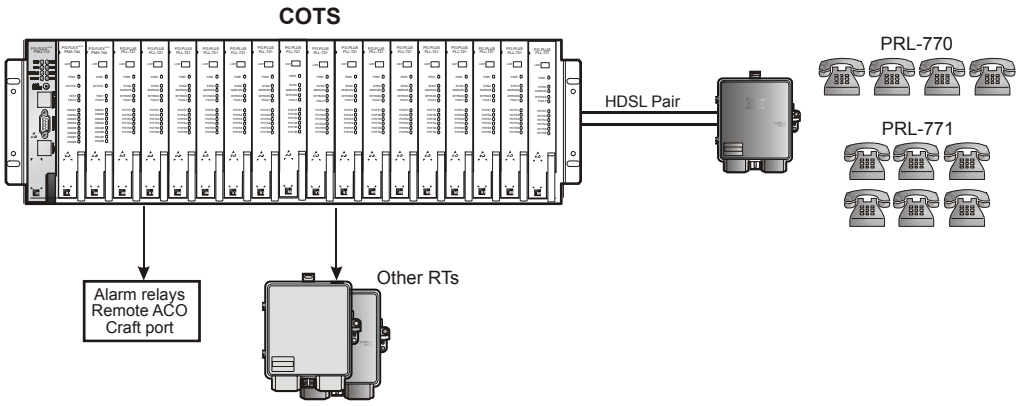


Figure 1. *Typical PG-Plus Application*

The COLU uses ADC 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. The COLU operates in the standalone mode with no other COTS circuit cards required. Advanced features such as performance monitoring, alarm reporting, and testing require the addition of the PG-Plus PAU or PMU. Line power is provided to the RT by the COLU.

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 RT on the HDSL pair. To obtain maximum reach, the HDSL line to the RT is operated at the minimum rate to support the payload.

METALLIC FALLBACK

Metallic fallback provides a direct connection from the CO to one subscriber under fault conditions. Service is provided to the first POTS subscriber on the affected system. At the RT, the system exits metallic fallback and attempts to synchronize if either the first 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, the system begins HDSL synchronization acquisition.

Relays in the COLU and RT provide a path for SDT and metallic fallback operation. These relays are used to establish a circuit to POTS # 1 during fault conditions and to provide for drop testing of the selected subscriber line from the CO location.

SPECIFICATIONS

Function	PLL-720 4 POTS	PLL-721 6 POTS
System		
Resistive Signature	Tip to Ground 162 K	Tip to Ground 162 K
	Ring to Ground 453 K	Ring to Ground 453 K
Power Supply		
Voltage Safety	A2 compliant per GR-1089-CORE	A2 compliant per GR-1089-CORE
Input Voltage	-42 Vdc to -56.5 Vdc	-42 Vdc to -56.5 Vdc
HDSL Line		
Output Voltage	± 140 Vdc maximum	± 140 Vdc maximum
Output Power	27 Watts maximum	27 Watts maximum
HDSL Line Code	2B1Q	2B1Q
HDSL Line Rate	130.6 K symbols/sec (261.3 Kbps)	196 K symbols/sec (392 Kbps)
HDSL Reach	26 AWG - 15.0 kft (4.75 km)	26 AWG - 12.5 kft (3.81 km)
	24 AWG - 21.7 kft (6.61 km)	24 AWG - 18.0 kft (5.48 km)
	22 AWG - 31.2 kft (9.51 km)	22 AWG - 25.2 kft (7.68 km)
	19 AWG - 49.7 kft (15.1 km)	19 AWG - 37.8 kft (11.5 km)
Maximum Line Attenuation	45.9 dB at 65 kHz	41.6 dB at 98 kHz
POTS		
Analog Impedance	900Ω	900Ω
DC On-hook Resistance	4 MΩ minimum	4Ω minimum
DC Off-hook Resistance	1000Ω maximum	1000Ω maximum
COTS Input Impedance	0.9 REN @ 20 Hz maximum	0.9 REN @ 20 Hz maximum
COTS Ring Detection	65 Vrms minimum @ 15 to 50 Hz	65 Vrms minimum @ 15 to 50 Hz
Environment		
Operating Temperature	-40° F to +150° F (-40° C to +65° C)	-40° F to +150° F (-40° C to +65° C)
Operating Humidity	5% to 95% noncondensing	5% to 95% noncondensing
Altitude	-200 ft. to 13,000 ft. (-60m to 4,000m)	-200 ft. to 13,000 ft. (-60 m to 4,000 m)
Vibration	NEBS	NEBS
ESD	Per GR-1089-CORE	Per GR-1089-CORE
Power and Lightning	Per GR-1089-CORE	Per GR-1089-CORE
Human Safety	UL 1950 for Restricted Access	UL 1950 for Restricted Access
Emissions Radiation and Immunity	Per GR-1089-CORE for class A equipment	Per GR-1089-CORE for class A equipment
Connector	50 gold-plated card edge fingers	50 gold-plated card edge fingers
Dimensions		
Height	5.5 in. (14.0 cm.)	5.5 in. (14.0 cm.)
Width	1.1 in. (2.8 cm.)	1.1 in. (2.8 cm.)
Depth	10.25 in. (26.0 cm.)	10.25 in. (26.0 cm.)
Weight	2.0 lbs. (0.9 kg.)	2.0 lbs. (0.9 kg.)

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 1. *Power Consumption and Heat Dissipation*

Power	4 POTS COLU Slot	19-inch COTS*	23-inch COTS†	6 POTS COLU Slot	19-inch COTS‡	23-inch COTS**
Maximum Heat Dissipation						
HDSL Line Power Off	2.8 W	33.6 W	44.8 W	3.1 W	37.2 W	49.6 W
HDSL Line Power On	5.0 W	60 W	80 W	6.5 W	78 W	104 W
Maximum Power Consumption						
HDSL Line Power Off	3.0 W	36 W	48 W	3.1 W	37.2 W	49.6 W
HDSL Line Power On	27.8 W	333.6 W	444.8 W	31.25 W	375 W	500 W
Maximum Current Drain						
HDSL Line Power Off	71 mA	0.852 A	1.14 A	73 mA	0.875 A	1.17 A
HDSL Line Power On	654 mA	7.85 A	10.5 A	735 mA	8.82 A	11.76 A

(*) The PCS-718 List 1 is shown as loaded with one PMU-712, two PMX-744, and 12 PLL-720s.
(†) The PCS-719 List 1 is shown as loaded with one PMU-712, two PMX-744, and 16 PLL-720s.
(‡) The PCS-718 List 1 is shown as loaded with one PMU-712, two PMX-744, and 12 PLL-721s
(**) The PCS-719 List 1 is shown as loaded with one PMU-712, two PMX-744, and 16 PLL-721s.

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:

- HDSLNoise margin, insertion loss, ES, UAS
- InterfaceES and UAS seconds
- Major Alarm RelayForm-C relay contacts (NO, NC, C). Fail-safe operation

Performance Parameters

Based on the monitored parameters, the COLU derives the following performance parameters:

- MAR – A measure of the ratio of signal power to noise power, in 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 "System Alarm Types Screen" on page 37 and the severity of the alarm at the "System Alarm Types Screen" on page 37. View the results of these settings at the "Main Summary Screen" on page 18
- LOSW – The COLU 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 Alarm Thresholds Screen" on page 39. View the results of these settings at the "HDSL Summary Screen" on page 21.
- 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 "System Alarm Types Screen" on page 37, and at the "From the CONFIG submenu you can perform the following tasks:" on page 33 set the severity of the alarm. View the results of these settings at the "HDSL Summary Screen" on page 21.
- 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 "System Alarm Types Screen" on page 37 and at the "System Alarm Types Screen" on page 37 set the severity of the alarm. You can view the results of these settings at the "HDSL Summary Screen" on page 21.

Alarms

The COLU generates 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 16.

- 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 is 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 37 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 30

- 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

LED DESCRIPTIONS

Table 2 describes the LED shown on the front panel, where *n* equals the POTS line. For further details on the LED activities, refer to "Initialization Sequence" on page 8 and the "COLU and RT Fault Indicators" on page 53.

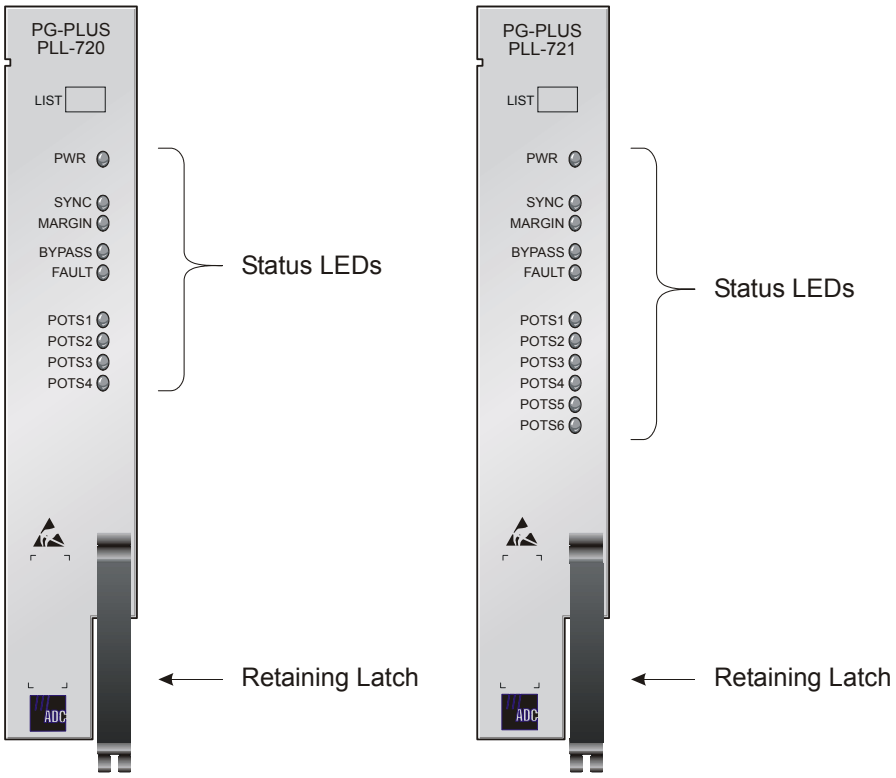


Figure 2. *Front Panel LEDs*

Table 2. *LED Descriptions*

LED	Color	State	Mode
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	COLU is in Metallic Fallback, unless provisioned Disable.
		On, and POTS*n* flashing	SDT is occurring on POTS*n*.
MARGIN	Yellow	On	COLU HDSL margin is equal to or below the threshold value
		Flashing	RT HDSL margin is equal to or below the threshold value.
BYPASS	Yellow	On	COLU is in Metallic Fallback, unless provisioned Disable.
		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 "HDSL History Screen" on page 30.
   - 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 "HDSL History Screen" on page 30.
   - The SYNC LED flashes for approximately 6 seconds, then remains off.
   - A DSL PFO alarm is indicated on the "HDSL History Screen" on page 30.
   - 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 47):

- 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.

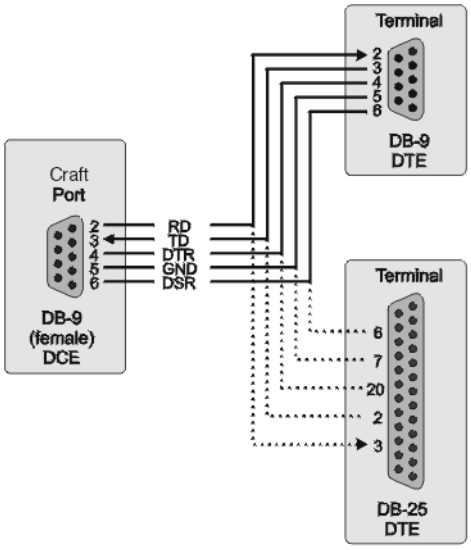


Figure 3. *Craft Port to Terminal Connections*

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.

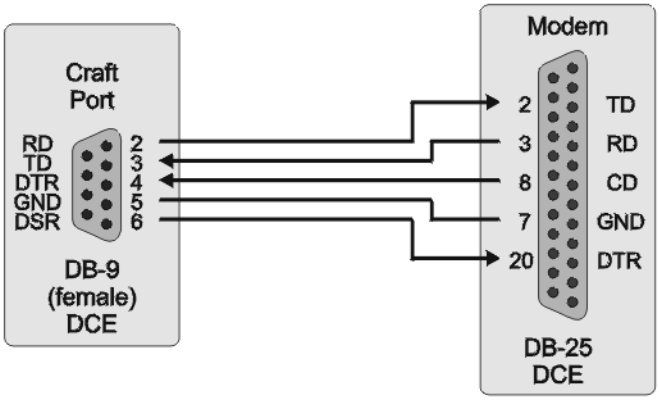


Figure 4. *Craft Port to Modem Connections*

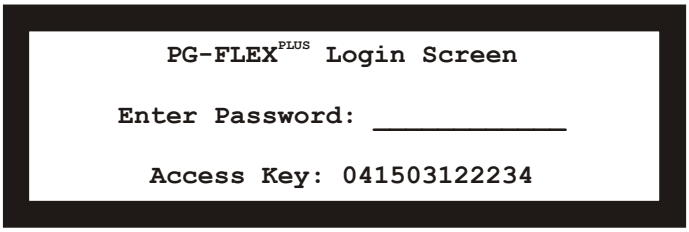
The craft port supports a VT-100 terminal. The VT-100 terminal allows real time updating of information displayed on the screen, rather than requiring the technician to press the **ENTER** key to refresh the screen. Configure the VT-100 terminal as shown in Table 3.

Table 3. *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

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:



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.

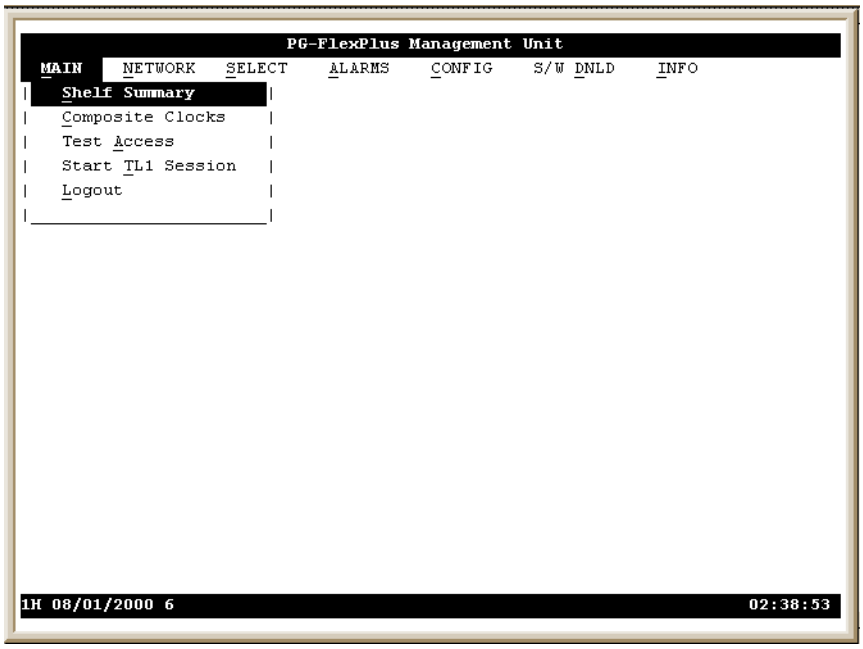
If the password has been changed and you do not know the new password, contact ADC Technical Support (see "Technical Support" on page 55) while at the terminal. They will provide you a temporary password that is based on the Access Key number displayed on the Logon screen. The Access Key changes whenever 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.

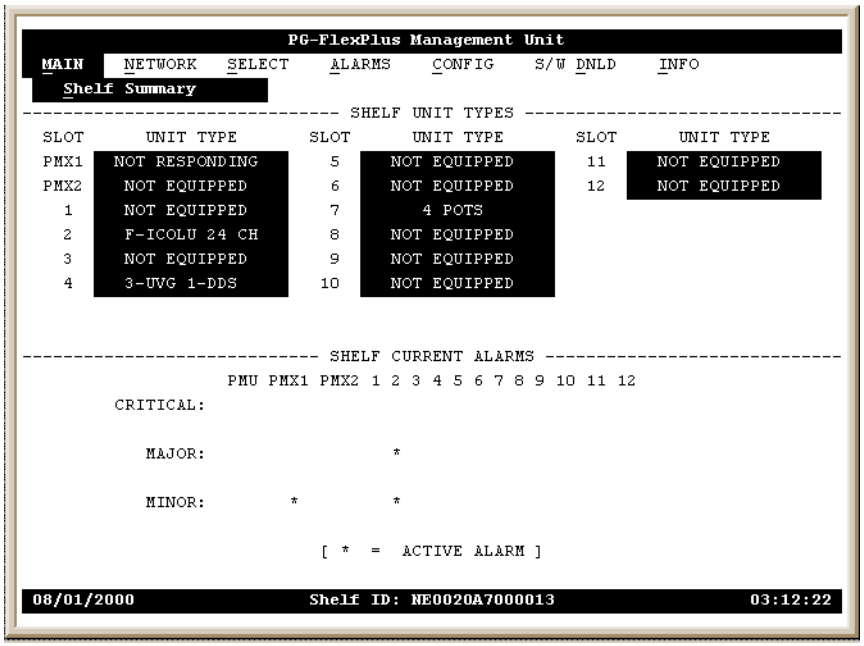
Then the PMU or PAU main menu screen displays:

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.

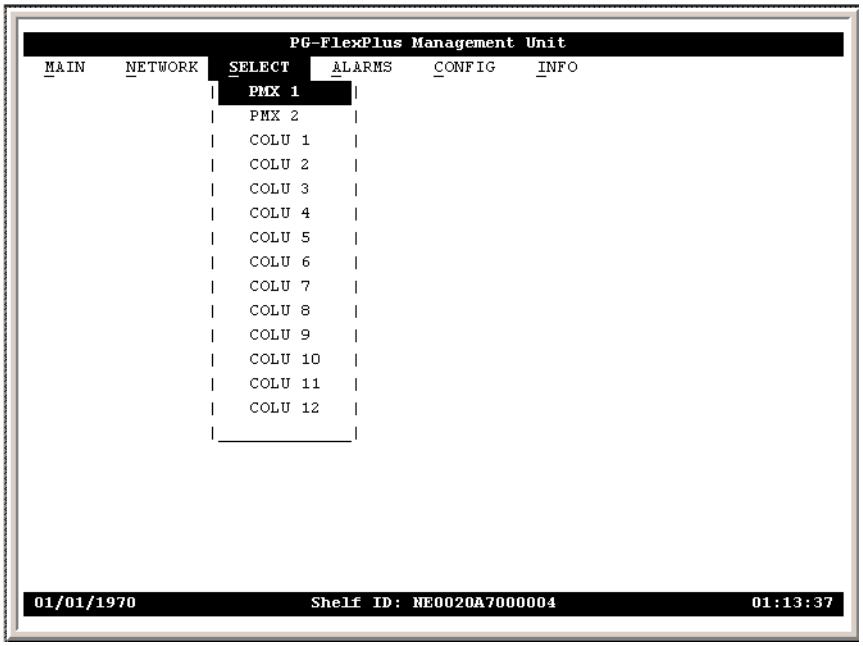


b. Select *Shelf Summary* and press **ENTER** to display the inventory of the COLUs installed in the COTS. Note the slot number of the desired COLU, then press **ESC** to return to the PMU main screen.



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 COTS, and 16 for the 23-inch COTS.

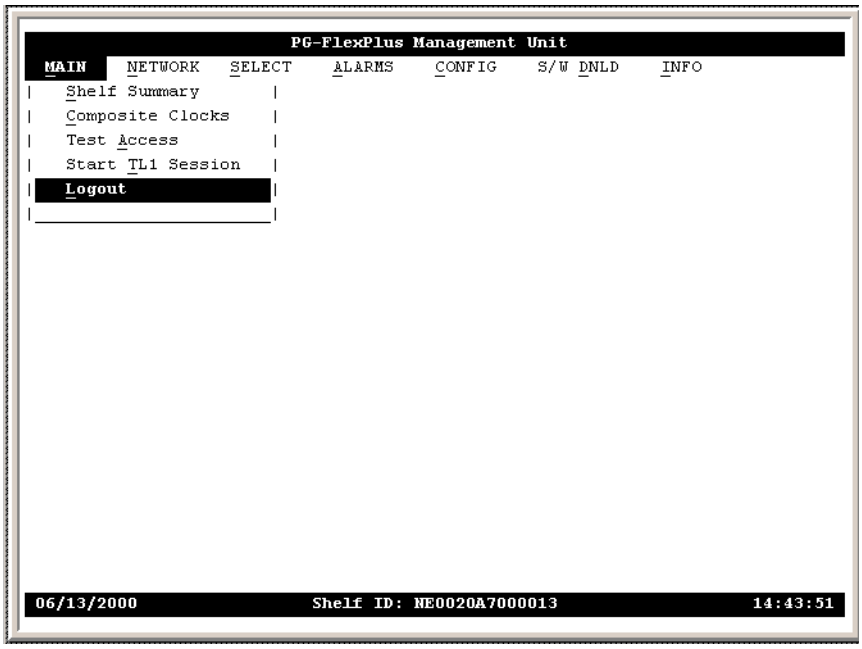


6. Select the slot number for the COLU you installed and press **ENTER** to view the first screen.

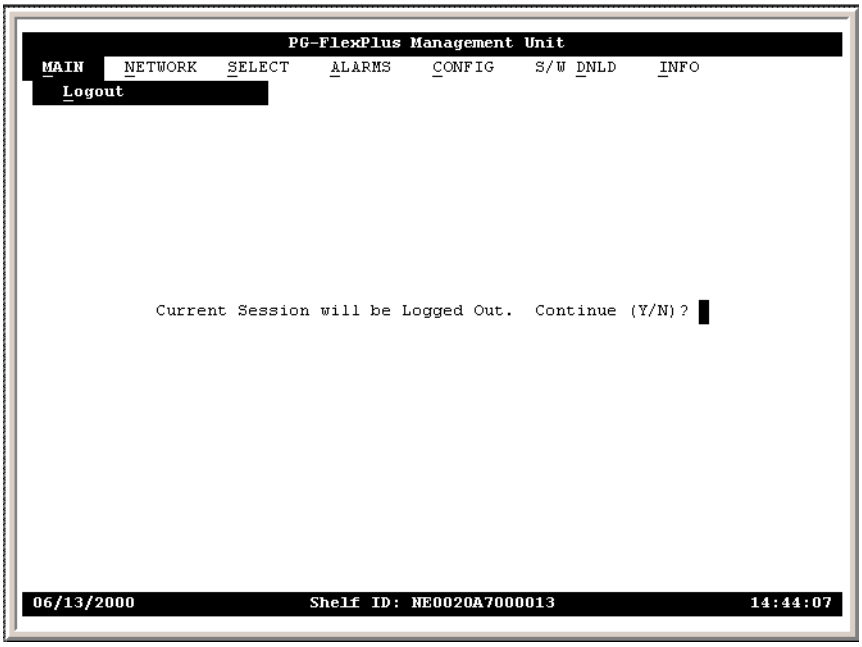
LOGGING OFF

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.

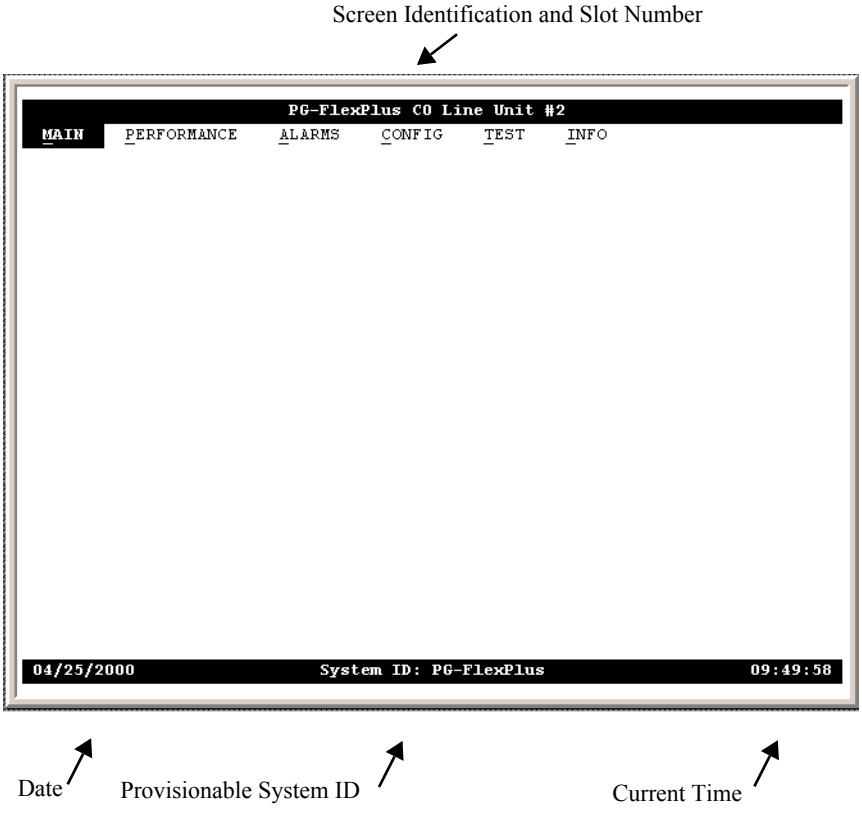
COLU MAIN SCREEN

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 "From the CONFIG submenu you can perform the following tasks:" on page 33).



COLU Menu Bar Selections

Table 4 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 4. *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.

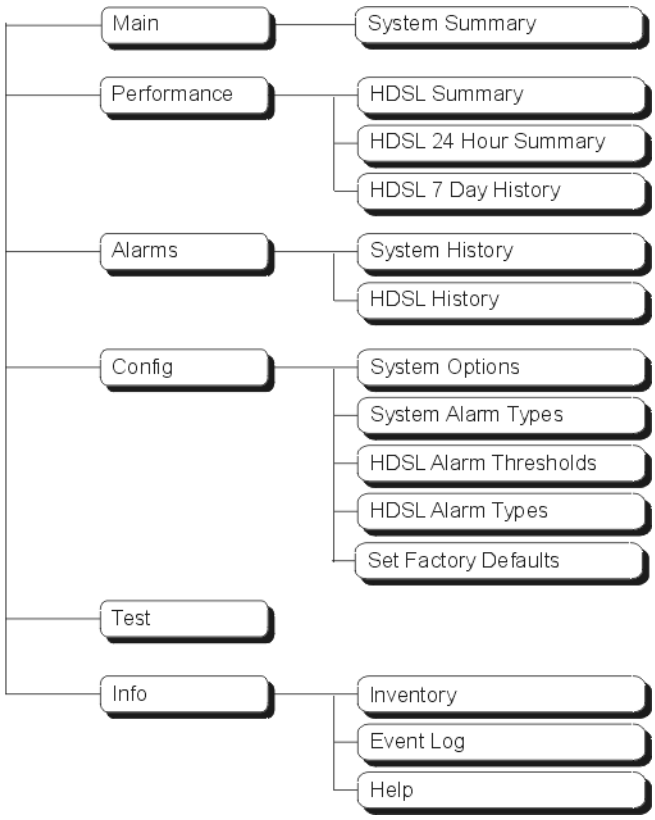
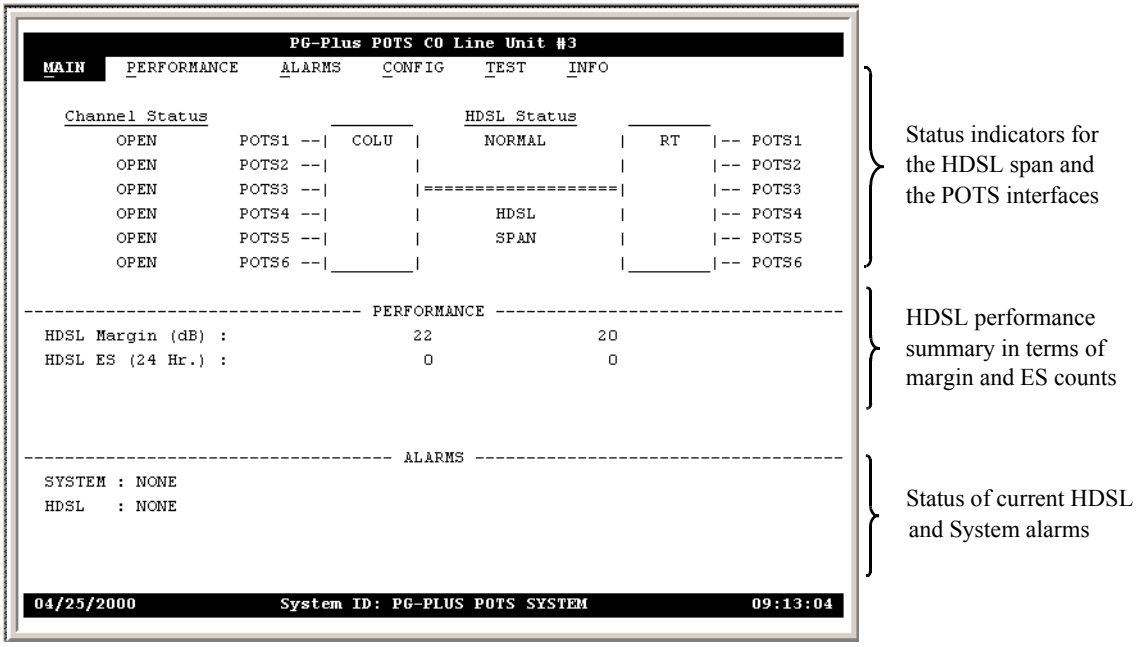


Figure 5. *Menu Tree*

Main Summary Screen

This screen details the performance condition of the COLU and RT. Table 5 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.

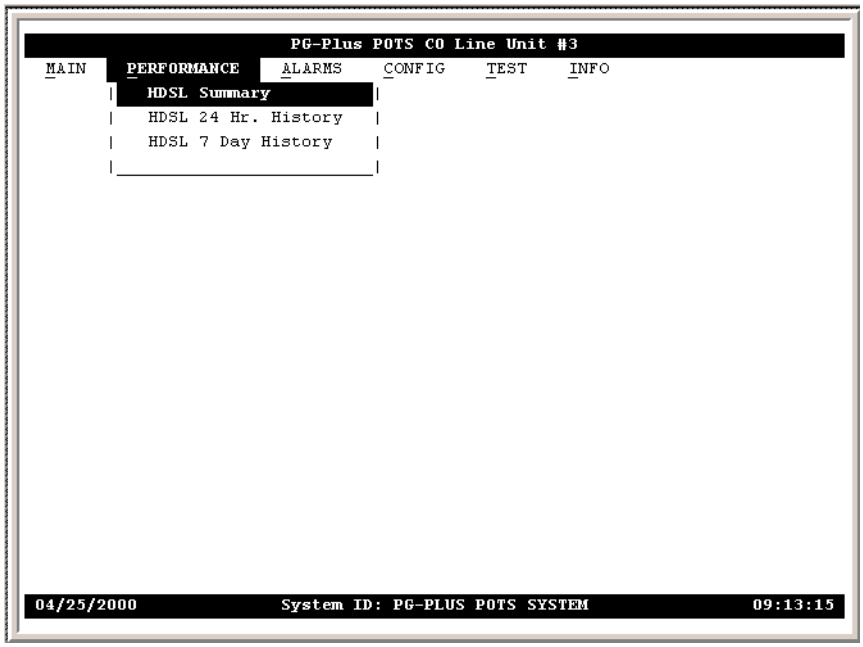
Table 5. *System Status*

Status	Description
System Status	
IN SYNC	No CO battery detected, Line Status Open. This status does not change except for Test status
OUT OF SYNC	CO battery detected and line is Onhook at RTs
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.

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:

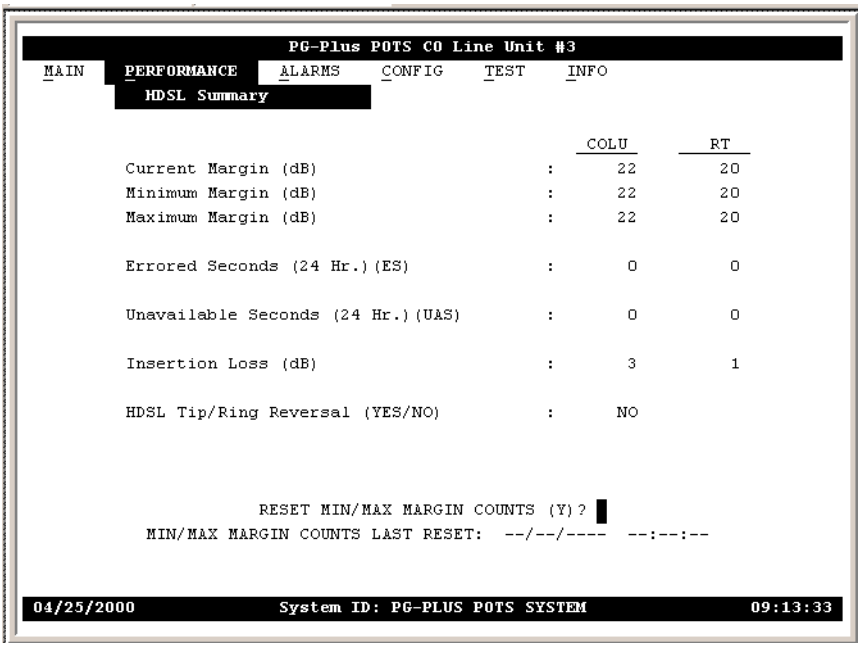
Submenu	Allows you to ...
HDSL Summary	view the HDSL performance summary and status.
HDSL 24 Hour History	view the last 24 hours of HDSL performance history in 15 minute intervals.
HDSL 7 Day History	view the last seven days of performance history plus the current day's accumulated performance history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

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

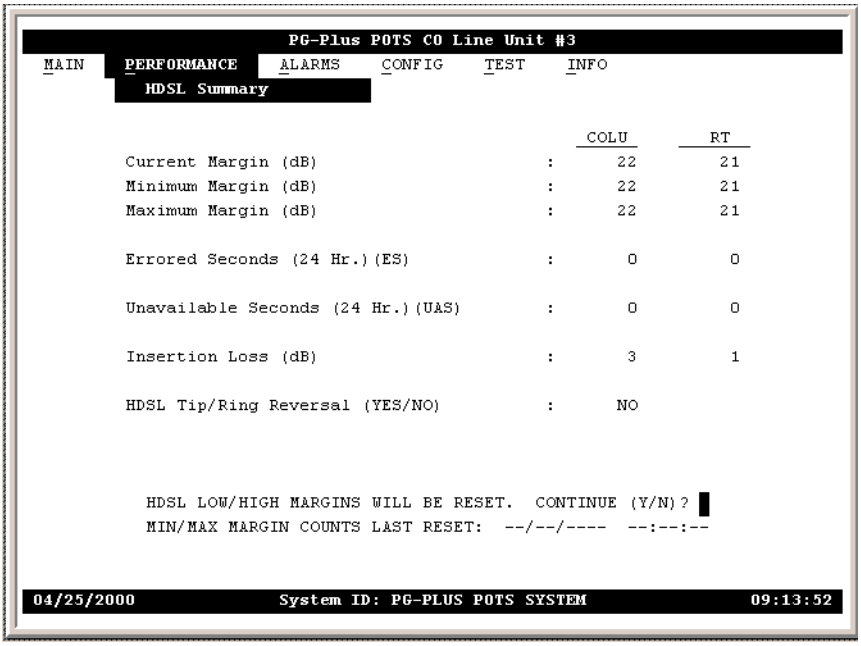
HDSL Summary Screen

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.

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

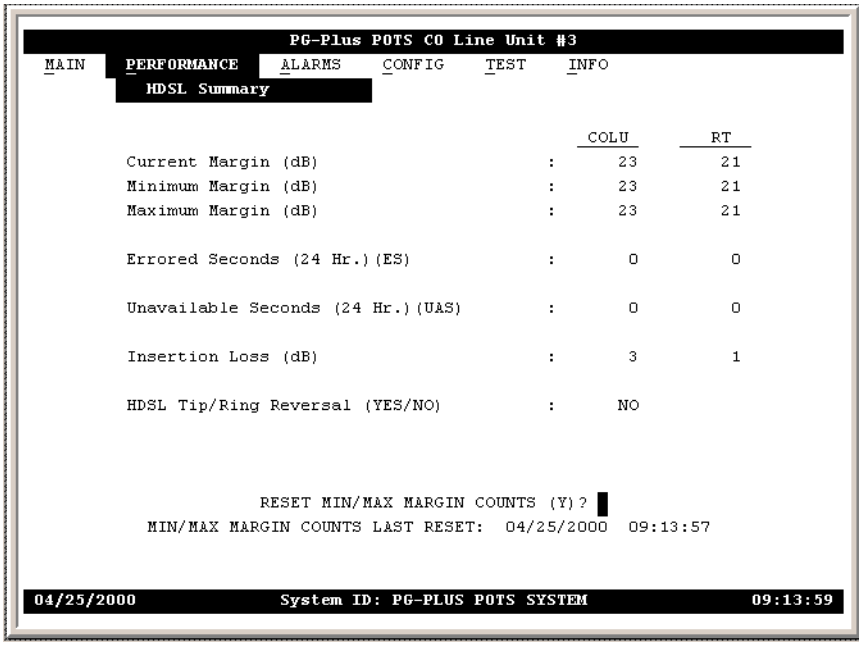


2. You can perform the following tasks:
   a. To reset the minimum and maximum margins to the current margin values for the COLU, press **Y** at the `RESET MIN/MAX MARGIN COUNTS(Y/N)?` prompt. At the `HDSL MIN/MAX MARGINS WILL BE RESET. CONTINUE(Y/N)?` prompt, you have the following options:



a.1. 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.



a.2. To retain the existing minimum and maximum margins, press **N**.

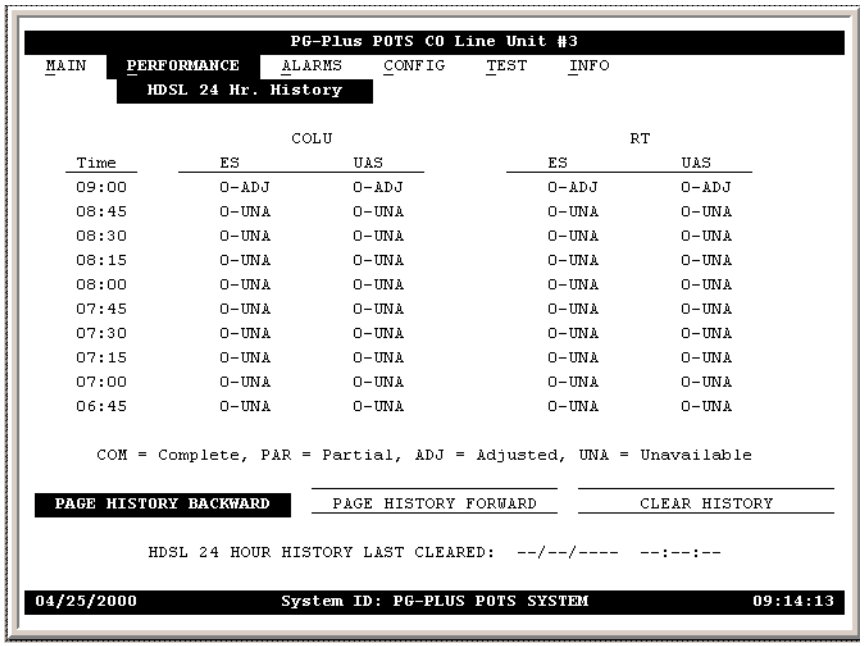
a.3. To return to the screen, press **ESC**.

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

HDSL 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.

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

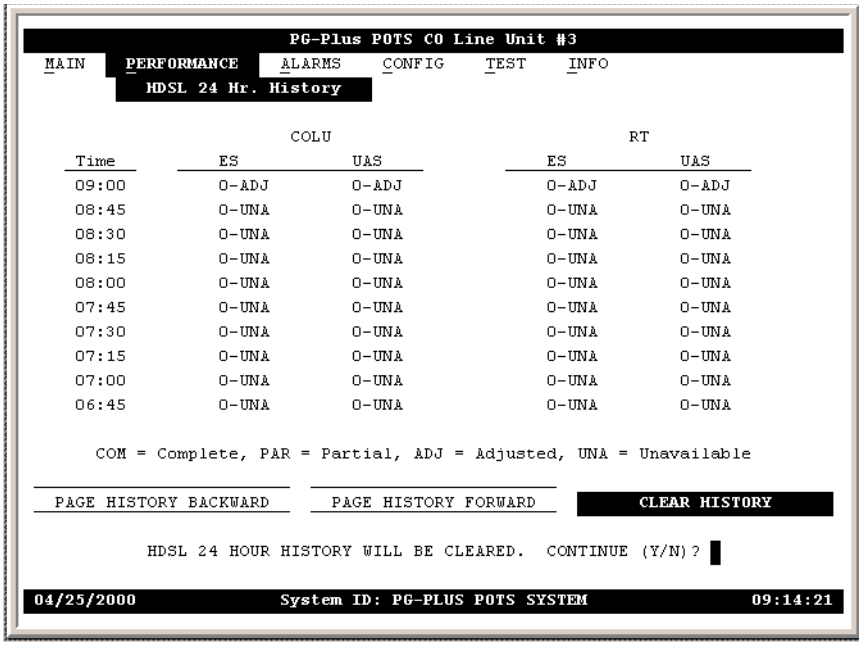


The current day performance information shows the performance since the previous midnight. At midnight of every day, the current day performance history is moved to the previous day's history and the current day performance information is cleared. The COLU derives the ES and UAS performance parameters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

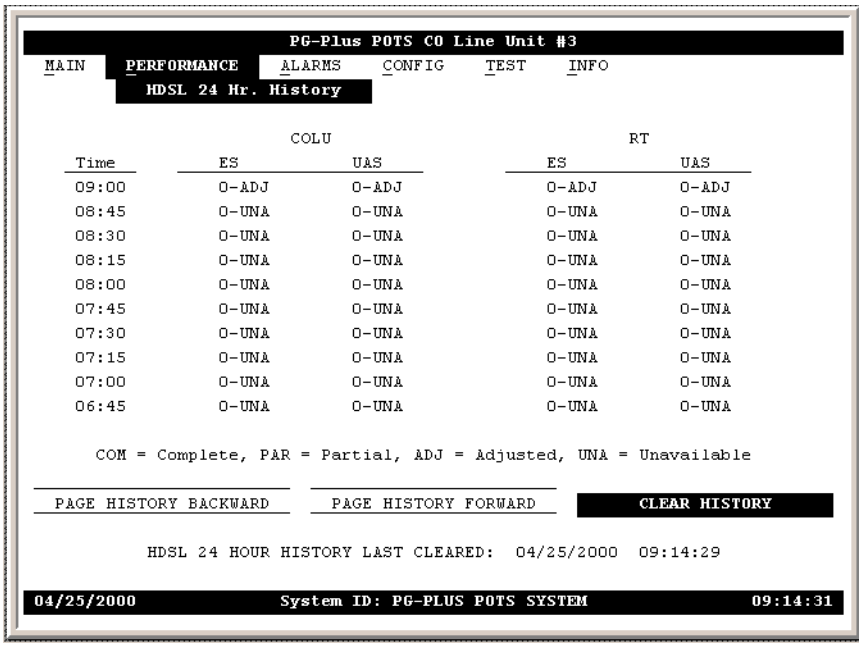
- COM (Complete): Data is saved in the history register for this interval.
- PAR (Partial): Data is being collected for this interval.
- ADJ (Adjusted): The time or date has been changed on the system during this interval.
- UNA (Unavailable): Data has not been collected for this interval.

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.

b.1. To clear the 24-hour history, press **Y**.The time and date that the history was last cleared is updated.

b.2. To retain the current history, press **N**.

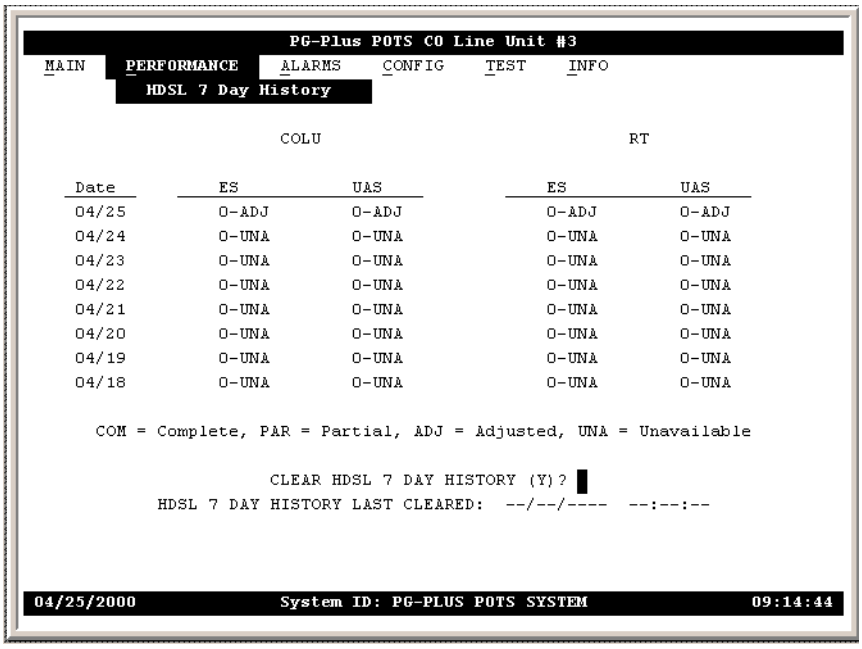
b.3. To return to the screen, press **ESC**.

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.

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

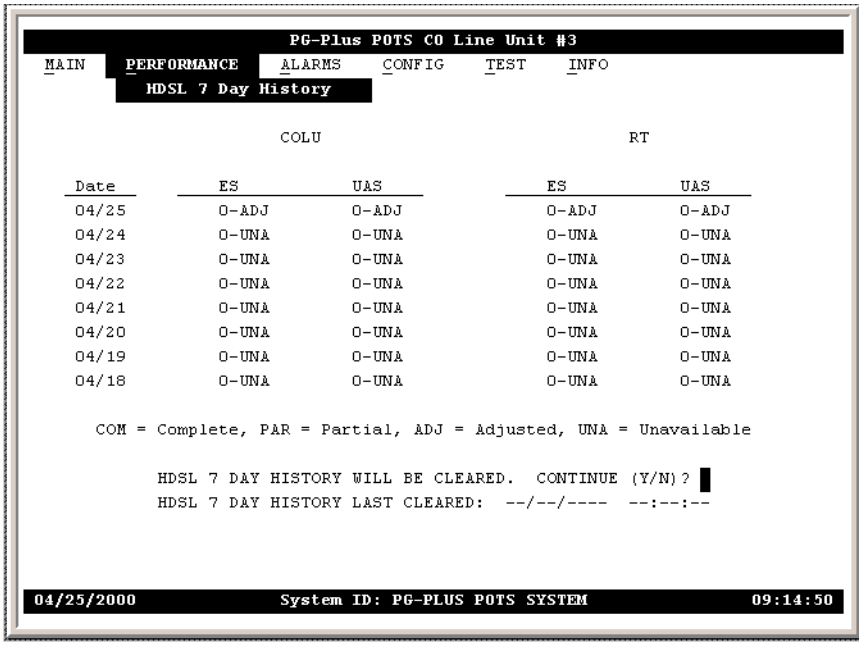


The current day performance information shows the performance since the previous midnight. At midnight of every day, the current day performance history is moved to the previous day's history and the current day performance information is cleared. The COLU derives the ES and UAS performance parameters 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.

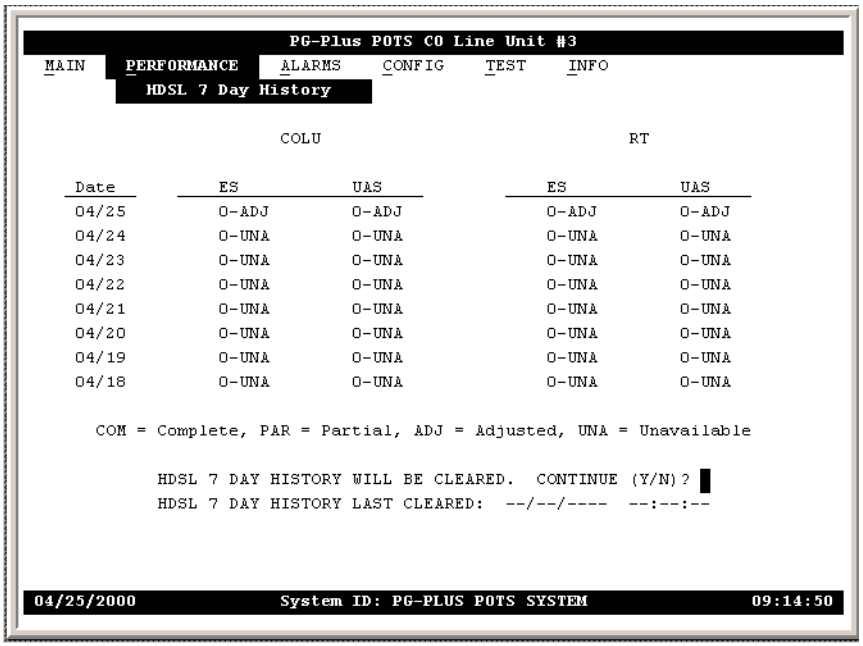
2. You can perform the following tasks:

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.

a.1. 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.

a.2. To retain the current history, press **N**.

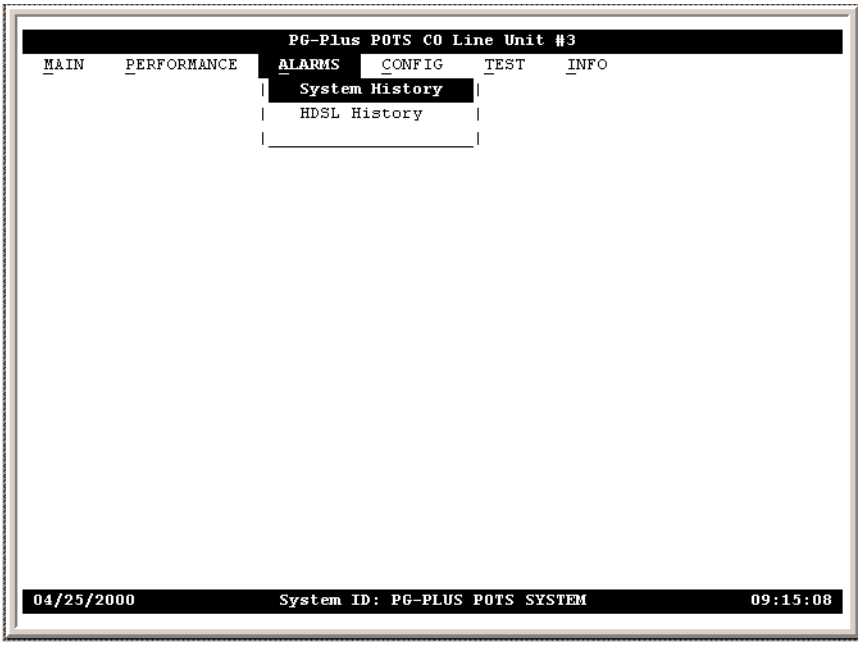
a.3. To return to the screen, press **ESC**.

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

ALARMS SUBMENU

The COLU detects and reports HDSL, POTS, and System related alarmed events to the PAU/PMU (if present). Only events provisioned for Major or Minor notification types are reported. Select *Alarms* at the menu bar and press **ENTER** to view the submenu.

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



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

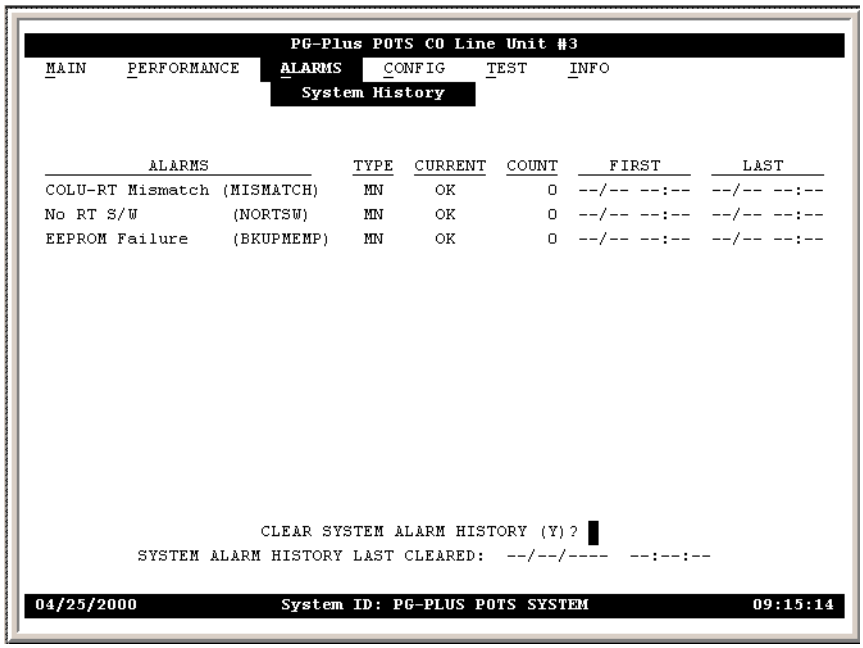
Submenu	Allows you to ...
System History	view the system history.
HDSL History	view the last 24 hours of HDSL performance history in 15 minute intervals.

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

System History Screen

The system history maintained on the COLU contains the status of the COLU-RT match, the presence of RT software, and the condition of the EEPROM (see Table 6). Here you see the results of the alarms set at the Configuration submenu "HDSL Alarm Types Screen" on page 42.

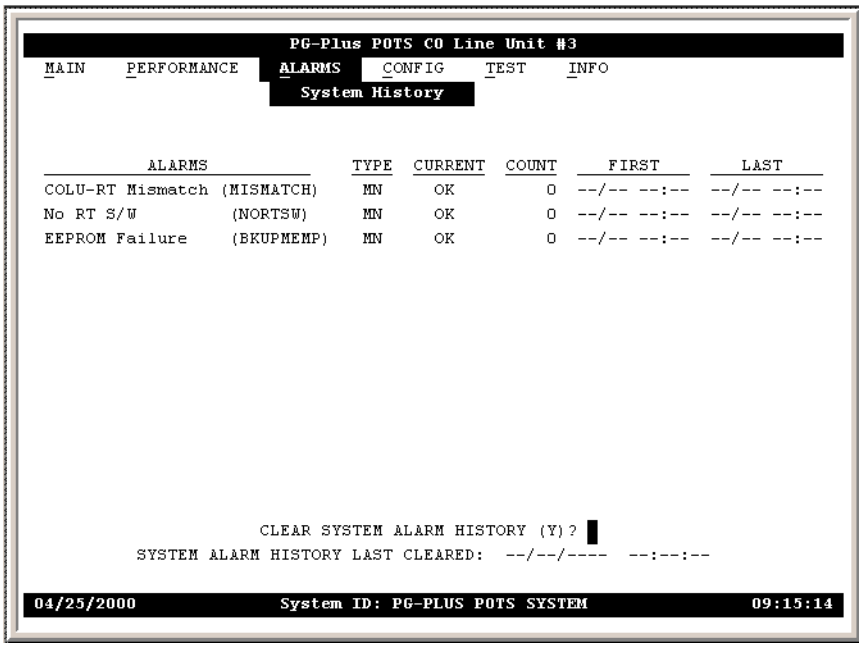
1. At the *ALARMS* submenu, select *System History*, and press **ENTER** to view the screen.



If there are no active alarms, the status OK appears in the Current column.

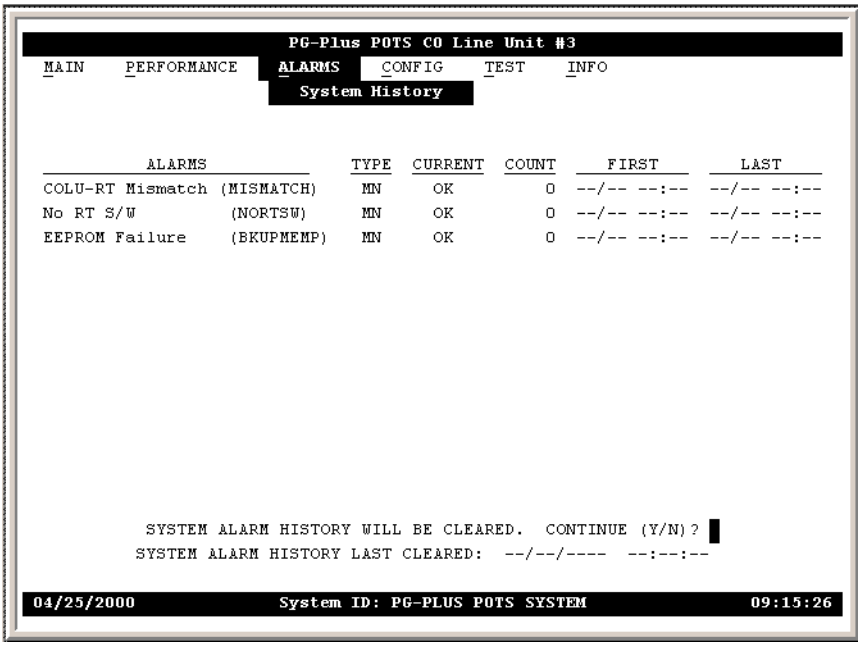
2. You can perform the following tasks:

a. To clear the system 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:



Clearing the alarm history clears the RT and the COLU alarm history, whether you clear it from the COLU or the RT page of the history screen. If there is an active alarm, then the count is set to 1 and the value in the LAST date and time field is set to the FIRST date and time field.

a.1. To clear the system alarm history, press `Y`.



– all system history 24-hour interval registers are set to zero.

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

a.2. To retain the current history, press **N**.

a.3. To return to the screen, press **ESC**.

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

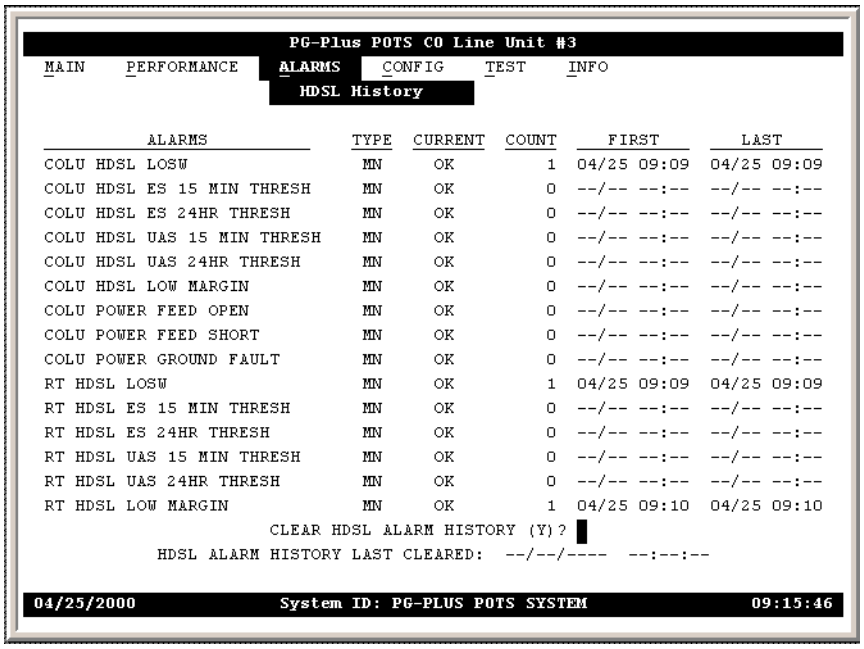
Table 6. *System History Alarms Screen*

Alarm	Description	Default
COLU-RT Mismatch	Incompatible COLU and RT units installed.	MN
No RT S/W	The RT does not have software installed.	MN
EEPROM Failure	The EEPROM has failed.	MN

HDSL History Screen

The HDSL history maintained on the COLU 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 (see Table 7). Here you see the results of the alarms set at the Configuration submenu "HDSL Alarm Types Screen" on page 42.

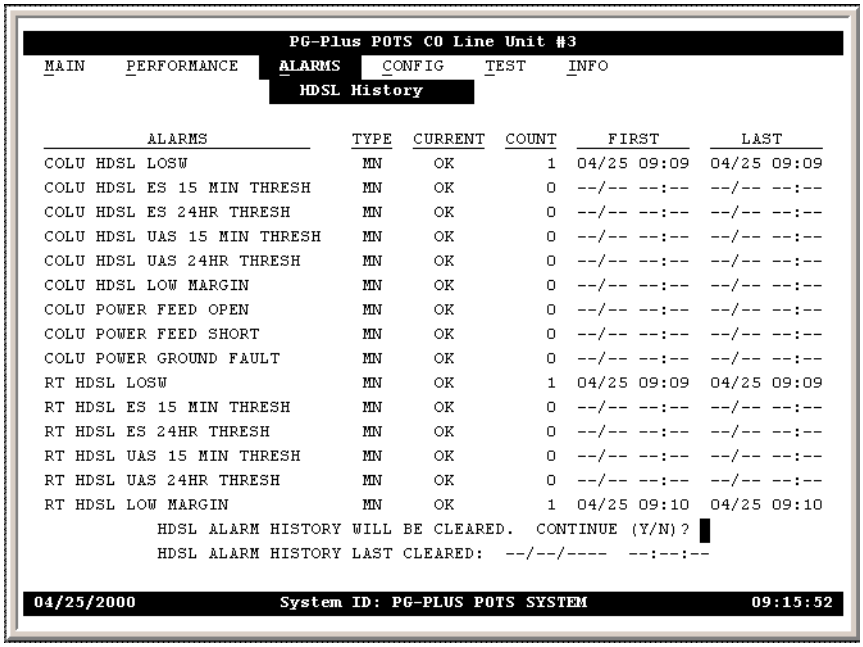
1. At the *ALARMS* submenu, select *HDSL History*, and press **ENTER** to view the screen.



If there are no active alarms, the status OK appears in the CURRENT column.

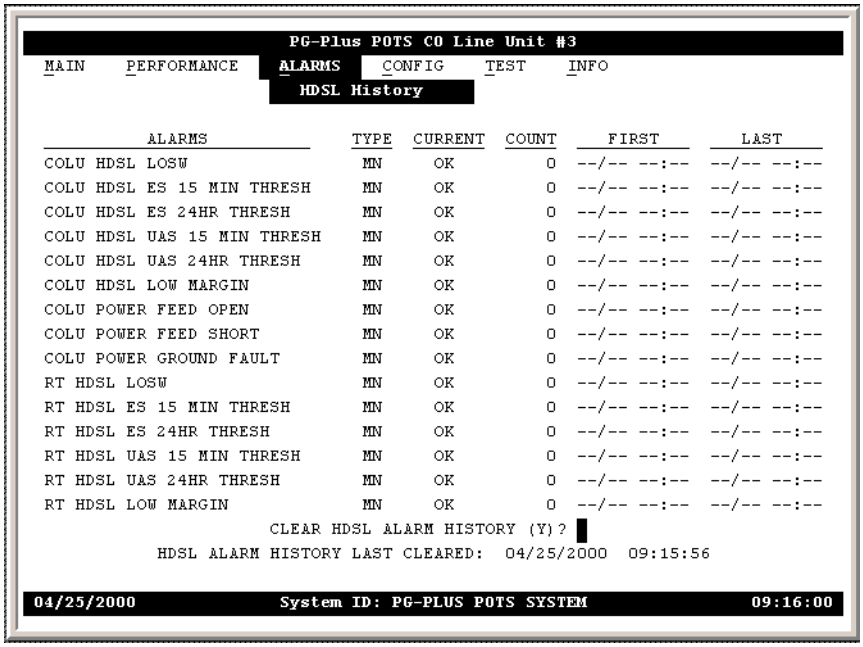
2. You can perform the following tasks:

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



Clearing the alarm history clears the RT and the COLU alarm history, whether you clear it from the COLU or the RT page of the history screen. If there is an active alarm, the count is set to 1 and the value in the LAST date and time field is set to the FIRST date and time field.

a.1. To clear the current history, press `Y`.



- all HDSL history 24-hour interval registers are set to zero.
- the time and date that the history was last cleared is updated.

a.2. To retain the current history, press **N**.

a.3. To return to the screen, press **ESC**.

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

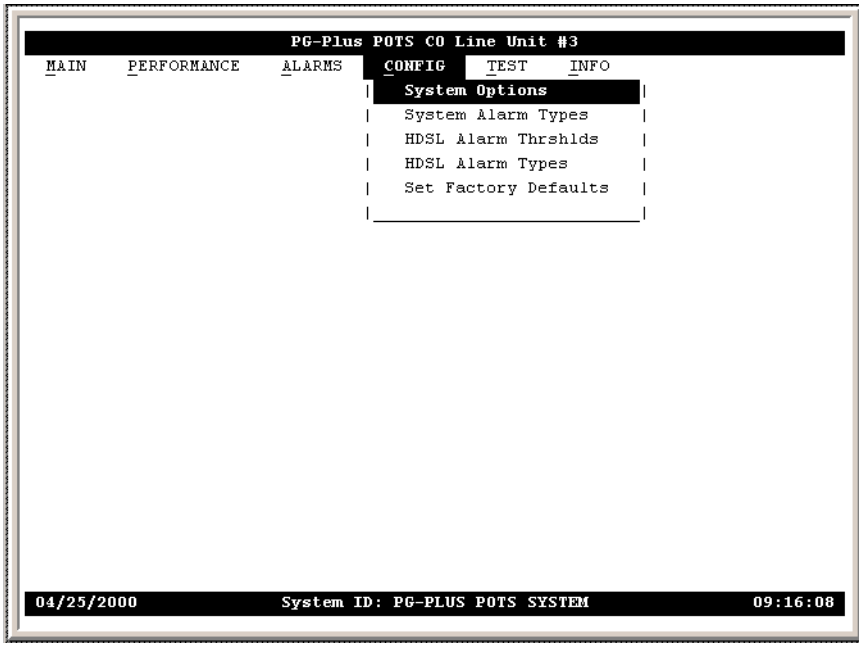
Table 7. *HDSL History Alarms*

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

Provides access to system provisioning screens, and an easy means of resetting all options to factory defaults.

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



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

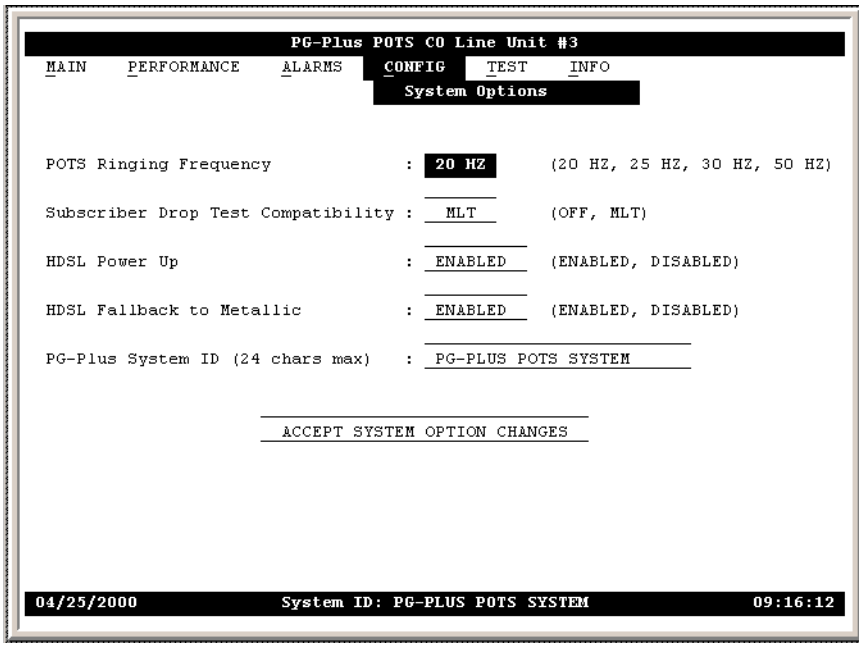
Submenu	Allows you to ...
System Options	provision system options.
System Alarm Types	provision COLU alarm types.
HDSL Alarm Thresholds	provision HDSL alarm thresholds.
HDSL Alarm Types	provision HDSL alarm types.
Set Factory Defaults	reset the provisionable items to the original factory settings.

3. Press ESC to return to the main screen.

System Options Screen

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

1. At 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.

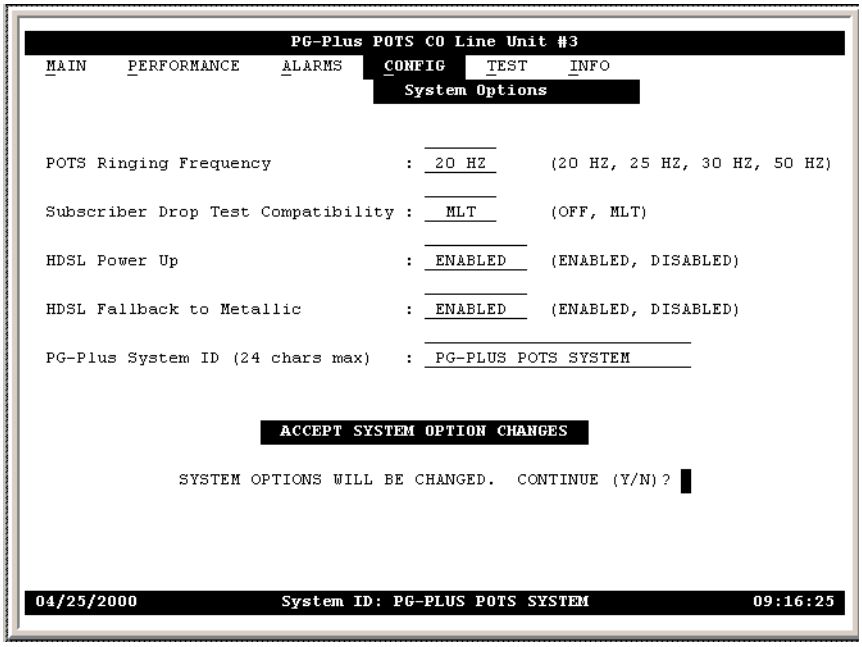
b. To change the Subscriber Drop Test Compatibility value, select the field, and press **SPACEBAR** to toggle to the desired value, or use a directional key to move to the next option.

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

d. To change the HDSL Fallback to Metallic value, select the field, and press **SPACEBAR** to toggle to the desired value, or use a directional key to move to the next option.

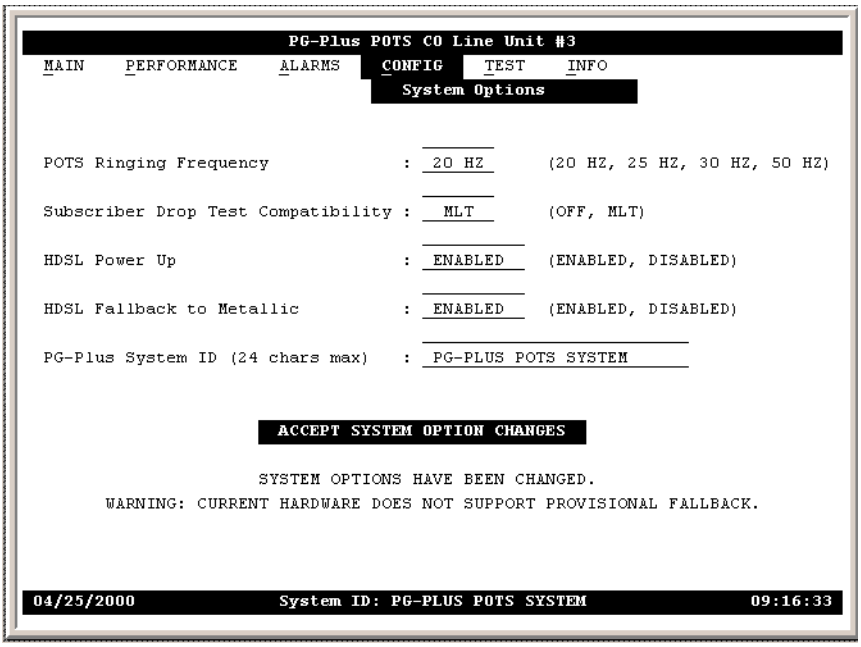
e. To change the PG-Plus System ID, move to the field and type in a unique System ID name.

f. 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:



f.1. To accept the system option changes, press **Y**.

If you have a List 1 POTS RT attached to this COLU, the following error message displays.



f.2. To retain the current system options, press **N**.

f.3. To return to the screen, press **ESC**.

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

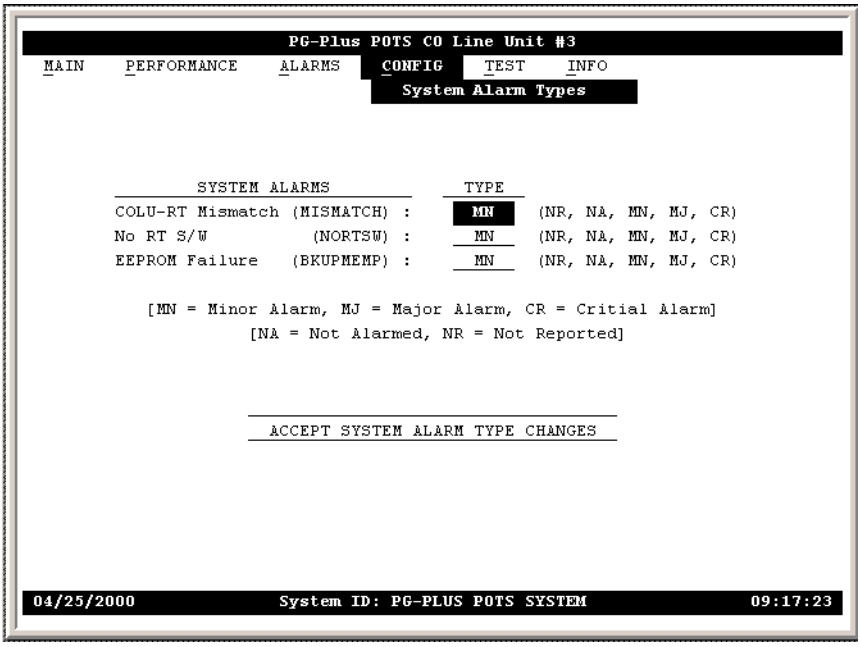
Table 8. *System Options Configuration Fields*

Options	Description	Default
POTS Ringing Frequency	20 Hz 25 Hz 30 Hz 50 Hz.	The ringing frequency sent from the RT to the subscriber.
Subscriber Drop Test Compatibility	OFF	System will not initiate nor operate with MLT loop test systems.
	MLT	The system will initiate and operate with MLT loop test systems.
HDSL Power Up	Enabled	In Metallic Fallback the system attempts to power up the HDSL line every five minutes or anytime the HDSL pair is shorted for two seconds and then opened. .
	Disabled	inhibits the power-up sequence under any circumstances and the system remains in Metallic Fallback
HDSL Fallback to Metallic	Enabled	The system provides fallback to metallic operation on POTS channel 1 during system failures.
	Disabled	The system provides no metallic connection during system failures.
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.

System Alarm Types Screen

Allows the provisioning of the alarm types of all system alarms. Table 9 shows the System Alarm fields and their default settings. You can view the results of these settings from the "Main Summary Screen" on page 18.

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



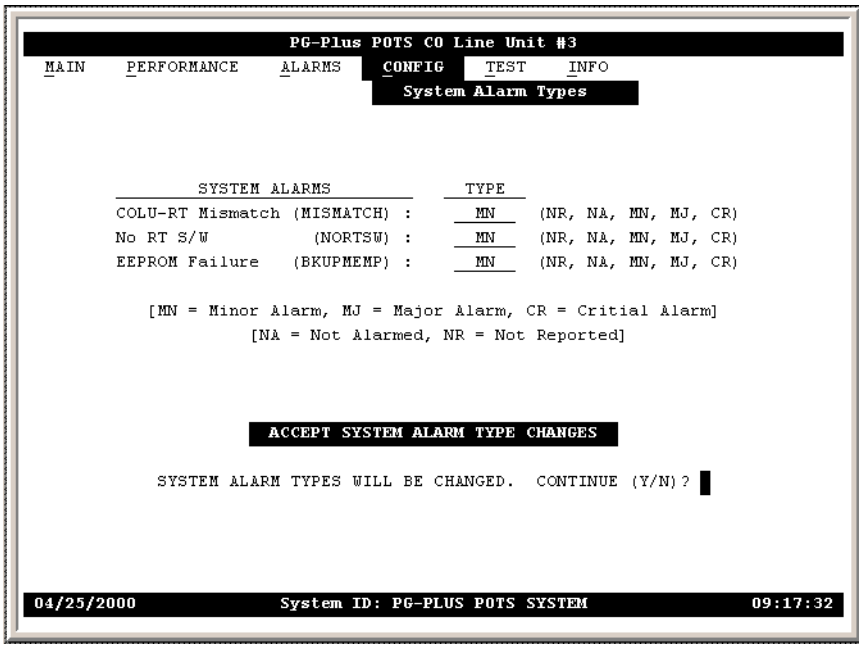
2. You can perform the following tasks:

   a. To change the COLU-RT MISMATCH value, select the field, and press the **SPACEBAR** to toggle to the desired value, or use a directional key to move to the next option.

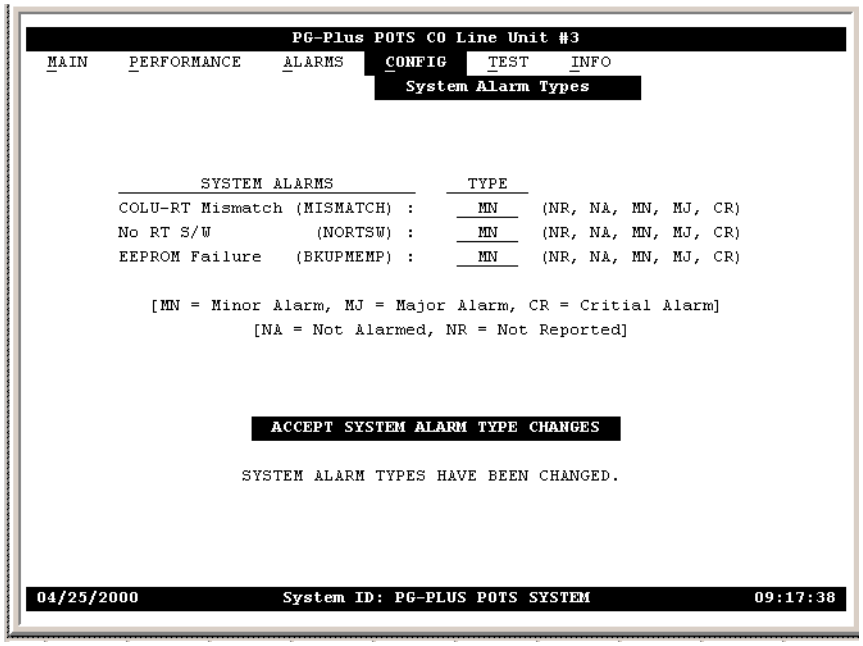
   b. To change the No RT S/W value, select the field, and press **SPACEBAR** to toggle to the desired value, or use a directional key to move to the next option.

   c. To change the EEPROM Failure value, select the field, and press **SPACEBAR** to toggle to the desired value, or use a directional key to move to the next option.

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:



d.1. To accept the system option changes, press **Y**.



d.2. To retain the current system options, press **N**.

d.3. To return to the screen, press **ESC**.

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

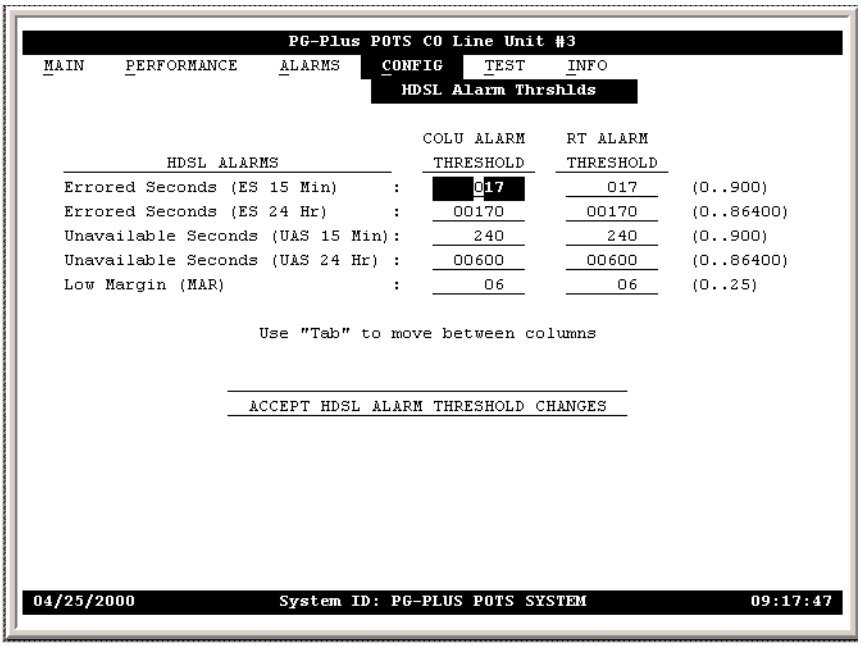
Table 9. *System Alarm Types*

Alarm	Value	Description	Default
COLU-RT Mismatch (MISMATCH)	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 S/W (NORTSW*A)*	NR, NA, MN, MJ, CR	RT has no application software and is awaiting software download.	MN
EEPROM Failure (BKUPMEMP)	NR, NA, MN, MJ, CR	EEPROM failure.	MN

HDSL Alarm Thresholds Screen

Provides a means to provision the threshold crossing values for the 24-hour ES count and low margin dB. Table 10 lists the fields of the HDSL alarm thresholds and the default factory values.

1. At 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.

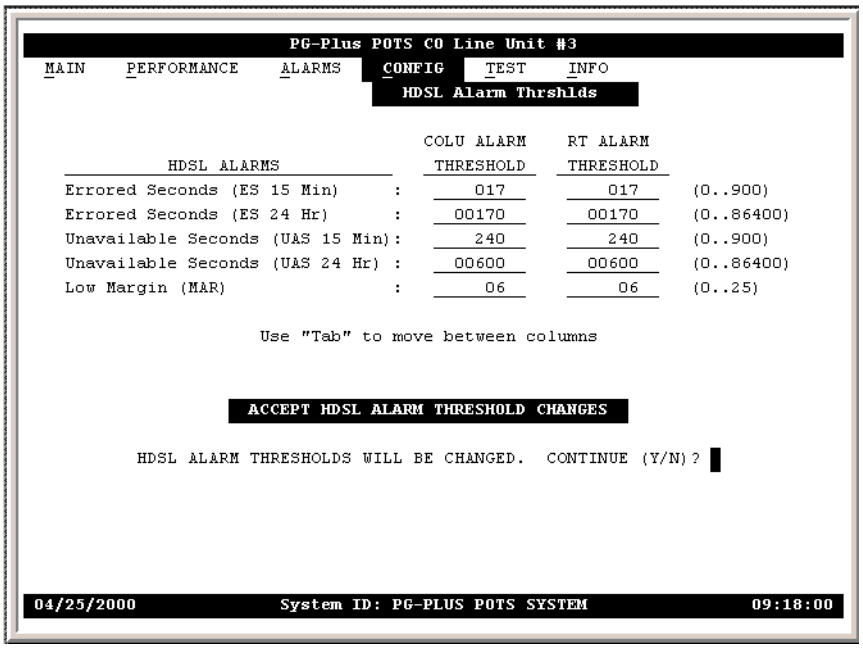
g. To set the 24-hour errored seconds threshold for the RT, select the Errored Seconds (ES 24 Hr) field in the RT ALARM THRESHOLD column, and type in the desired value.

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.

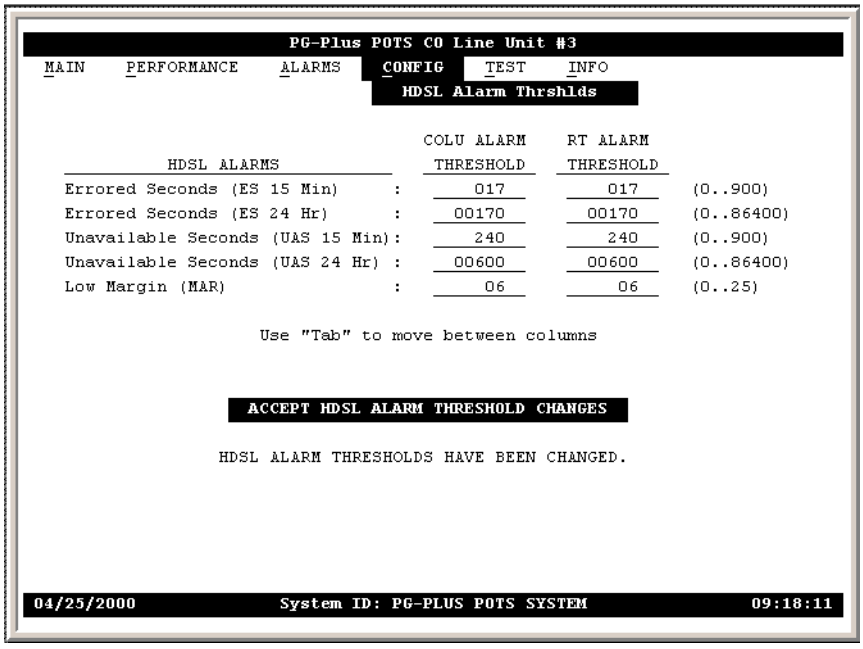
i. To set the 24-hour unavailable seconds threshold for the RT, select the Unavailable Seconds (UAS 24 Hr) field in the RT ALARM THRESHOLD column, and type in the desired value.

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



k.1. To accept the system option changes, press **Y**.



k.2. To retain the current system options, press **N**.

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

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

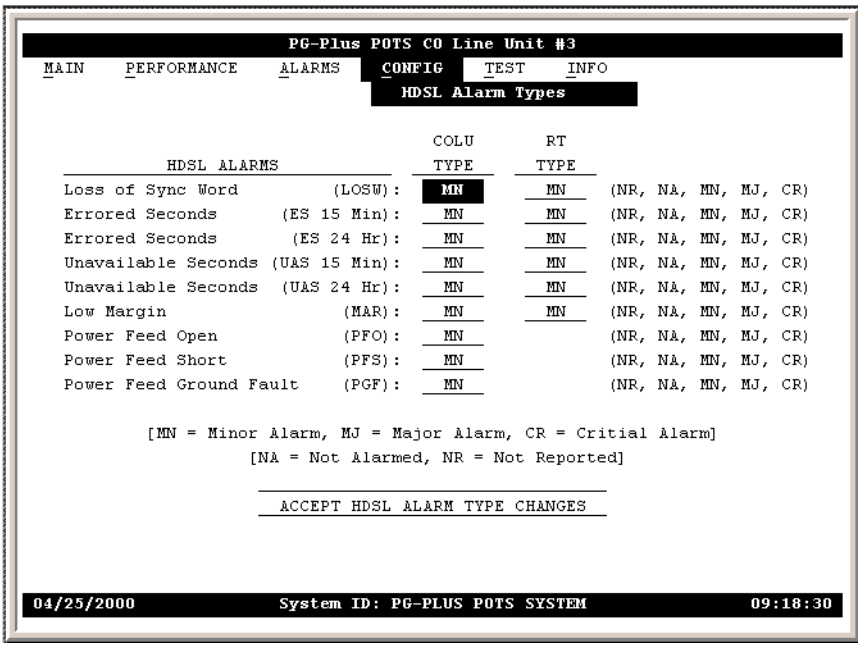
Table 10. *HDSL Alarm Threshold Fields*

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 Alarm Types Screen

Allows the provisioning of the alarm types for all HDSL Alarms.Table 10 lists the Alarm Reports and Table 12 shows the HDSL Alarms, the possible alarm Types, and the default factory settings. You can view the results of these settings from the "HDSL History Screen" on page 30.

1. At the *CONFIG* submenu, select *HDSL Alarm Types*, 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 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.

c. 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.

d. 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.

e. 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.

f. 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.

g. 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.

h. 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.

i. 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.

j. 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.

k. 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.

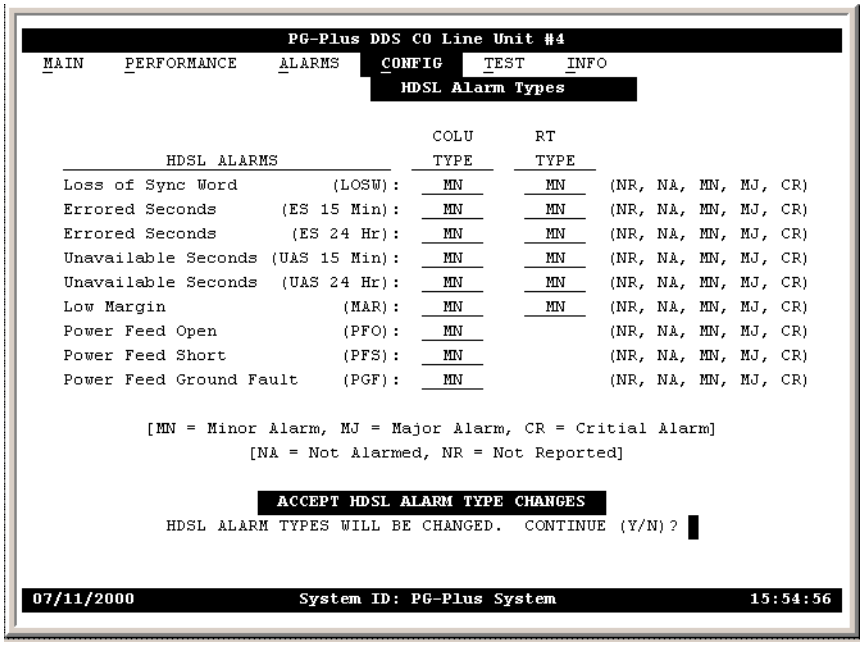
l. To change the value of the RT alarm Unavailable Seconds (UAS 24 Hr), select the field in the RT TYPE column, press the **SPACEBAR** to toggle to the desired value, or press a directional key to move to the next option

m. 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.

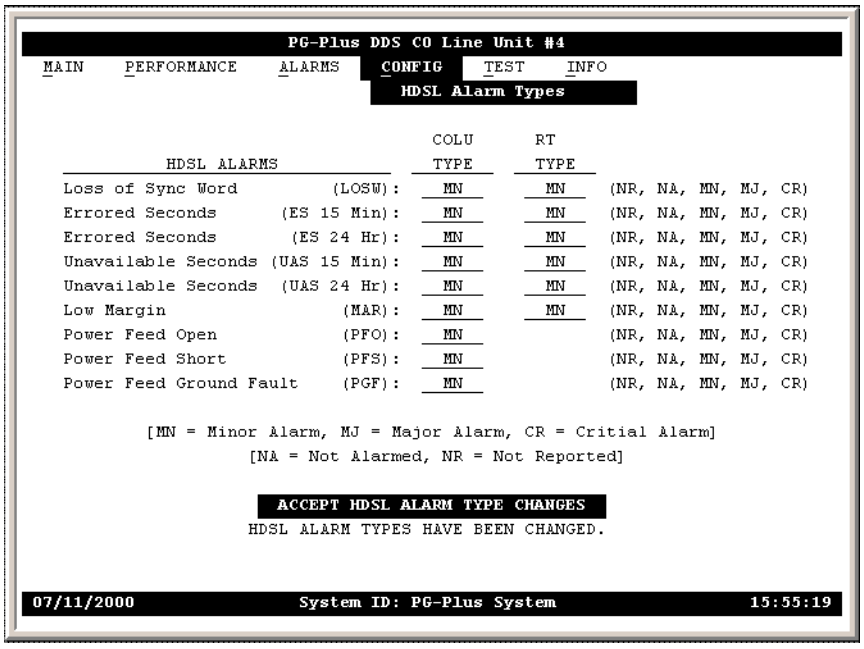
n. To change the value of the RT alarm Errored Seconds (ES 24 Hr), select the field in the RT TYPE column, and press the **SPACEBAR** to toggle to the desired value.

o. 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

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:



p.1. To accept the system option changes, press **Y**.



p.2. To retain the current system options, press **N**.

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

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

Table 11. *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 12. *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

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

1. At the *CONFIG* submenu, select *Set Factory Defaults*, and press **ENTER** to view the screen.

2. You have the following options:

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

a. To set the configuration data to the factory defaults, press **Y**.

b. To retain the current system options, press **N**.

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

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

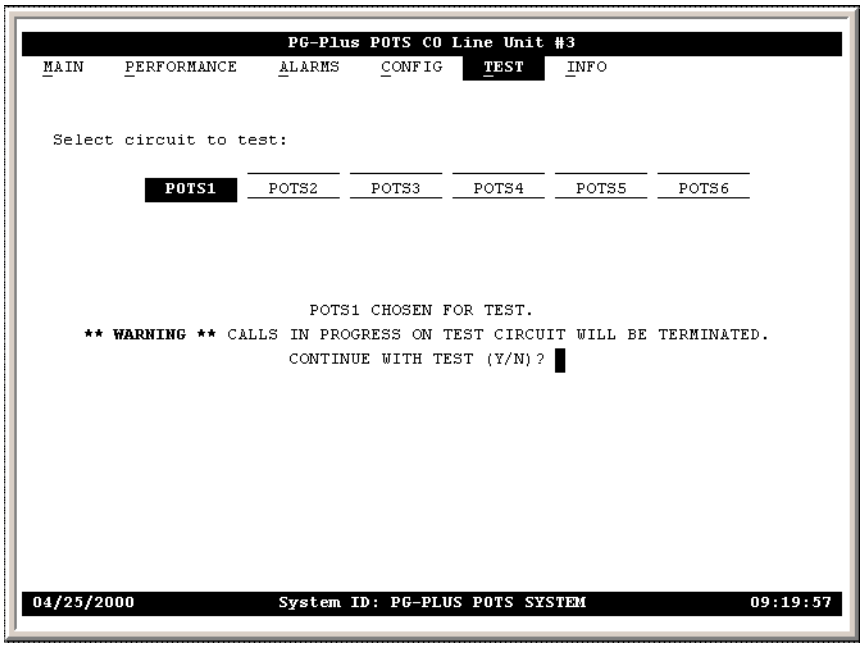
TEST SUBMENU

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:

a. To test a circuit, select the desired circuit and press **ENTER**.

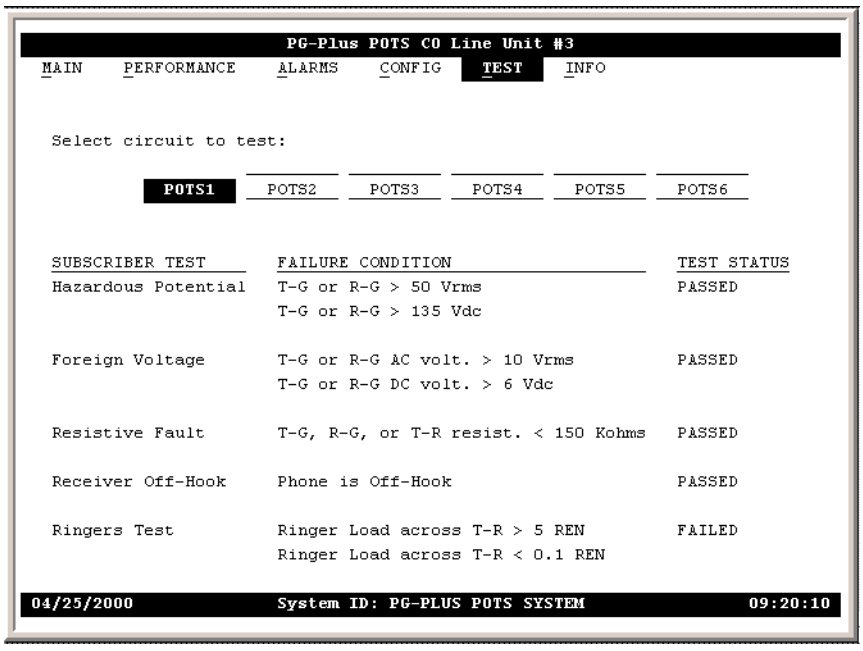


b. The message POTS-1 CHOSEN FOR TEST. CALLS IN PROGRESS ON TEST CIRCUIT WILL BE TERMINATED is displayed. At the `CONTINUE WITH TEST(Y/N)?` prompt, you have the following options:

b.1. To continue with the test, press **Y**. A Test In Progress `message` displays on the screen throughout the test.

Performing a SDT on one of the POTS channel interrupts service on the line under test. The remaining lines on the PG-Plus system remains in service.

When the tests are complete, the Drop Tests Results screen displays. The results contains Subscriber Test, Failure Condition, and Test Status. Tests are performed in the order of display. If a test fails, the remaining tests are not performed (as per TR-909). It takes approximately seven to eight seconds for all tests to complete.



b.2. To retain the current system options, press **N**.

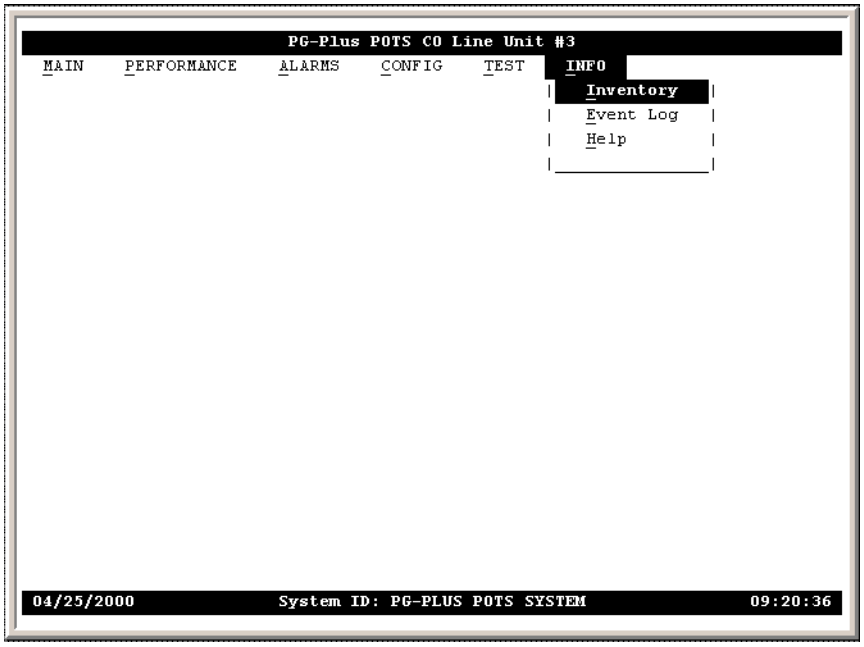
b.3. Press **ESC** to return to the main screen.

3. 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.

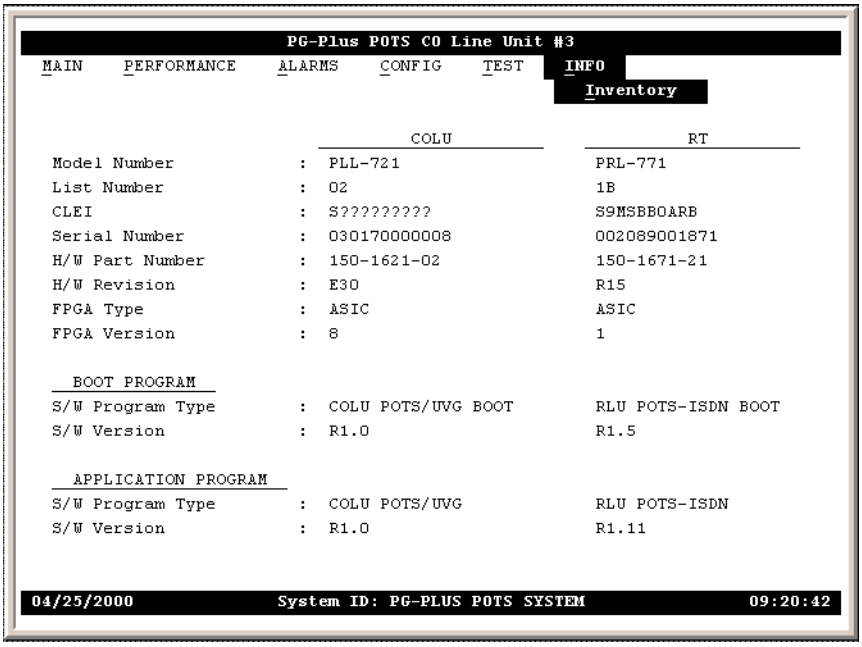


2. Press **ESC** to return to the main screen.

Inventory Screen

Displays all the critical information about the COLU and RT.

1. At the *INFO* submenu, select *Inventory*, and press **ENTER** to view the screen.

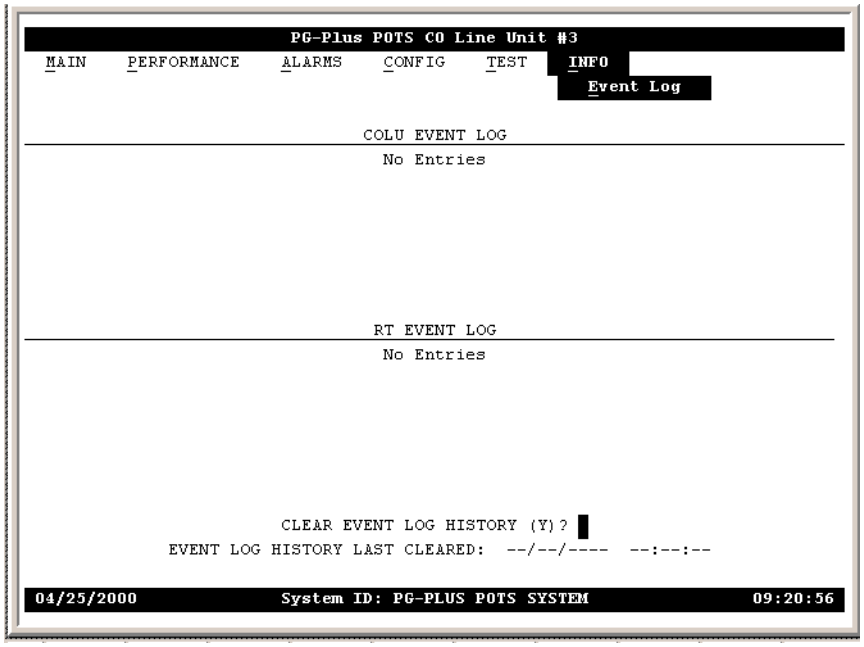


2. Press **ESC** to return to the main screen.

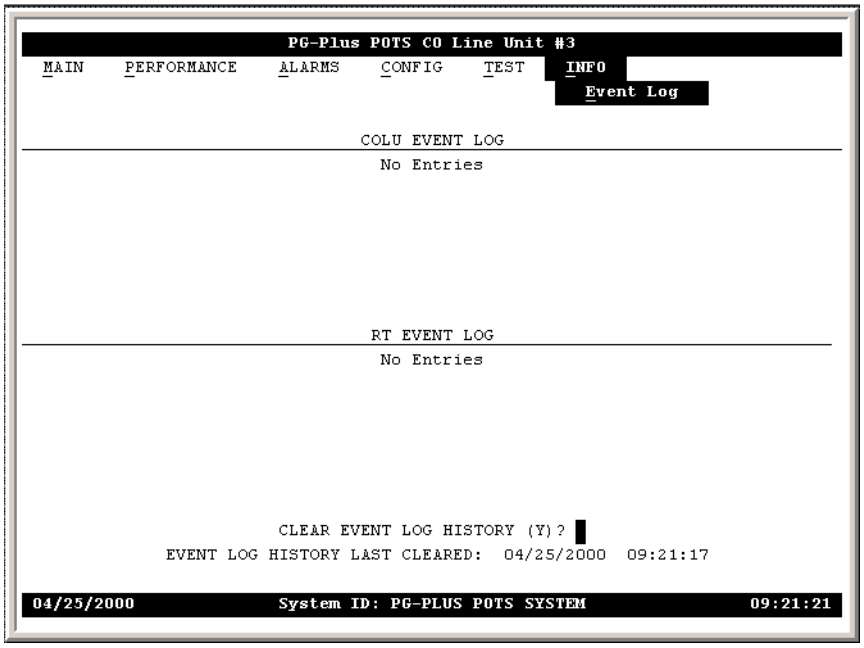
COLU Event Log

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:



2. You can perform the following tasks:
   a. To clear the alarm history information, at the `CLEAR EVENT LOG HISTORY(Y)` prompt, you have the following options:
      a.1. To clear the event log history, press **Y**.



a.2. To retain the current system options, press N.

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

3. Press ESC to return to the main screen.

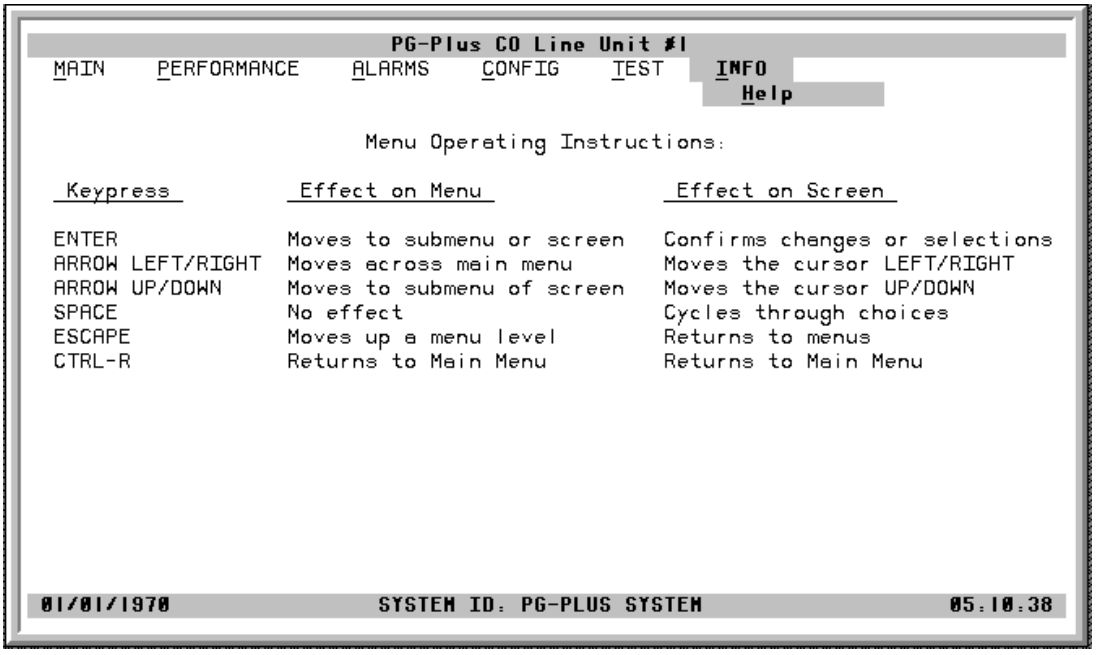
Table 13. *COLU Event Log*

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.

Help Screen

Provides information on using the screens and menus. The Help screen also lists the ADC Customer Support and Bulletin Board telephone numbers.

1. At the *INFO* submenu, select *Help*, and press ENTER to view the screen.



2. Press ESC to return to the main screen.

FAULT ISOLATION

COLU AND RT FAULT INDICATORS

At the CO, you can use the Craft interface to initiate a SDT to determine the cause of any of the following problems. The SDT 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 indicated by the COLU LEDs.

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	On	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 or the RT or both.
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 interface to initiate a SDT to determine the cause of any of the following problems. 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.

Conditions	Causes	Procedures
no dialtone, cannot dial	Short-circuit or open-circuit	**1** At the CO using the Craft interface, 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 interface, 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
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
		• otherwise, 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

ACO	Alarm Cut-off
AWG	American Wire Gauge
BER	Bit Error Ratio
CEV	Controlled Environmental Vault
CO	Central Office
COLU	PG-Plus Central Office Line Unit
COTS	PG-Plus Central Office Terminal Shelf
CPE	Customer Premises Equipment
CR	Critical
dB	decibels
ES	Errored Seconds Count
FCC	Federal Communications Commission
HDSL	High Bit-rate Digital Subscriber Line
LCFO	Loop Current Feed Open
LED	Light Emitting Diode
LOSW	Hdsl Loss Of Sync Word
mA	Milli-amps
mV_{pp}	Milli-volts Peak-to-peak
MAR	Hdsl Line Margin
MISPWRA	Power A Missing
MISPWRB	Power B Missing
MJ	Major
MLT	Mechanized Loop Test
MN	Minor
NA	Not Alarmed
NORLUSW	No Rt Software
NR	Not Reported
NT1	Network Termination Type-1
PAU	PG-Plus Alarm Unit
PFO	Power Feed Open
PFS	Power Feed Short
PGF	Power Feed Ground Fault
PMX	PG-Plus Multiplexer Unit
POTS	Plain Old Telephone Service
RLU	PG-Plus Remote Line Unit
RMA	Return Material Authorization
RT	PG-Plus Remote Terminal
SDT	Subscriber Drop Testing
SES	Severely Errored Seconds
SYNC	Synchronization
UAS	Unavailable Seconds Count

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