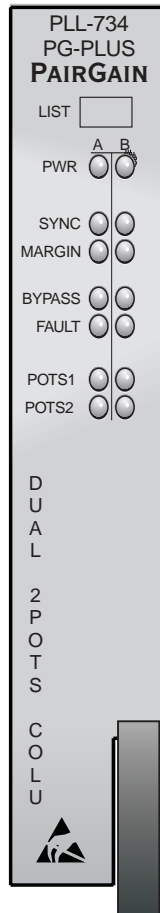

PG-PLUS

DUAL 2 POTS CENTRAL OFFICE LINE UNIT

Model	List Number	Part Number	CLEI Code
PLL-734	1	150-1634-01	S9L1APBAAA



**PAIRGAIN TECHNOLOGIES, INC.
ENGINEERING SERVICES TECHNICAL PRACTICE**



SECTION 950-734-100-01

Revision History of This Practice

Revision	Release Date	Revisions Made
01	December 18, 1998	Initial Release

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USING THIS TECHNICAL PRACTICE

Two types of messages, identified by icons, appear in the text:



Notes contain information about special circumstances.



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

INSPECTING YOUR SHIPMENT

Upon receipt of the equipment:

- Unpack each container and visually inspect it for signs of damage. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company and to PairGain. 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 PairGain as described in the Warranty. If you must store the equipment for a prolonged period, store the equipment in its original container.

ABBREVIATIONS

ACO	Alarm Cut-Off	MLT	mechanized loop testing
AWG	American Wire Gauge	MN	Minor
BER	Bit Error Ratio	MISMATCHn	COLU-RLU Mismatch
CEV	Controlled Environmental Vault	NA	Not Alarmed
CO	Telco Central Office	NORLUSWn	NO n -RT Software
COLU	Central Office Line Unit	NR	Not Reported
COTS	Central Office Terminal Shelf	PAU	PG-Plus Alarm Unit
CPE	Customer Premises Equipment	PFO	Power Feed Open
CR	Critical	PFS	Power Feed Short
DAML		PGF	Power Feed Ground Fault
ES	Errored Seconds	PMU	PG-Plus Management Unit
HDSL	High-bit-rate Digital Subscriber Line	PMX	PG-Plus Multiplexer Unit
LCFO	Line Current Feed open	POTS	Plain Old Telephone Service
LED	Light Emitting Diode	RLU	Remote Line Unit
LOSW	HDSL Loss of SYNC Word	RMA	Return Materials Authorization
mA	milli-Amps	RT	Remote Terminal enclosure for the RLU
mV_{pp}	peak-to-peak	SDT	Subscriber Drop Test
MAR	HDSL Line Margin	SYNC	Synchronization
MISPWRn	Power n Missing	UAS	Unavailable Seconds counts
MJ	Major		

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PRODUCT OVERVIEW

This practice describes the PairGain® PG-Plus™ PLL-734 List 1, a COLU that provides interfaces to two POTS RTs (PRL-784) for four POTS subscribers.

DESCRIPTION AND FEATURES

A PG-Plus application (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. A typical application of a PG-Plus system consists of:

- One COTS
- One COLU
- Two RTs

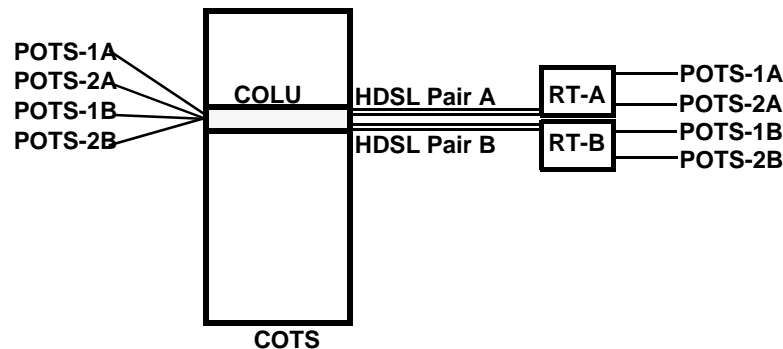


Figure 1. Typical PG-Plus Application

The COLU can be installed in the PCS-718 or the PCS-719 COTS. The COLU operates in standalone mode with no other COTS circuit cards required. Advanced features such as performance monitoring, alarm reporting, and testing require the addition of the PAU or the PMU. Line power is provided to the RT by the COLU.

Metallic fallback provides a direct connection from the CO to one subscriber under fault conditions. Provisional 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 five 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

PG-Plus offers extended reach beyond Traditional DAML using proven HDSL technology. The application specifications are detailed in the following sections.

System

Resistive Signature Tip to Ground 162 K; Ring to Ground 453 K

Power Supply

Input Voltage -42 Vdc to -56.5 Vdc

HDSL Line

Output Voltage ± 140 Vdc (maximum)
 Output Power 27 W (maximum)
 Voltage Safety A2 compliant per GR-1089-CORE
 HDSL Line Code 2B1Q
 HDSL Line Rate 65.3 K symbols/sec (130 K b/sec)
 HDSL Reach 18.0 kft, 26 AWG (.40 mm); 25.5 kft, 24 AWG (.51 mm);
 36.5 kft, 22 AWG (.64 mm); 62.0 kft, 19 AWG (.91 mm)
 Maximum Line Attenuation 46.4 dB at 33 kHz

POTS

Analog Impedance 900 Ω
 Supported Subscriber Drop 100 Ω plus 430 Ω for handset
 DC On-hook Resistance 500 K Ω (minimum)
 DC Off-hook Resistance 1150 Ω (maximum)
 COTS Input Impedance 0.9 REN @ 20 Hz (maximum)
 COTS Ring Detection 65 Vrms (minimum) @ 15 to 50 Hz

Environment

Operating Temperature -40°F to +150°F; -40°C to +65°C
 Operating Humidity 5 percent to 95 percent noncondensing
 Altitude -60 m to 4,000 m; -200 ft. to 13,000 ft.
 Vibration NEBS
 ESD Per GR-1089-CORE
 Power and Lightning Per GR-1089-CORE
 Human Safety UL 1950 for Restricted Access
 Emissions Radiation and Immunity Per GR-1089-CORE for class A equipment

Connector

50 gold-plated card edge fingers

Dimensions

Height 5.5 inches, 13.97 cm
 Width 1.1 inches, 2.79 cm
 Depth 10.25 inches, 26 cm
 Weight 1.0 lbs., .45 kg.

POWER CONSUMPTION AND HEAT DISSIPATION

The three most important power demands of a COLU on the COTS power supply are its maximum power consumption, heat dissipation, and current drain. [Table 1](#) lists the power consumption and heat dissipation for the COLU, on a per slot and per COTS basis.



The worst case conditions under which these parameters are measured include a 18,000 ft., 26 AWG loop, a fully loaded COTS, and a -42.5 Vdc COTS battery voltage. The remote is assumed to be ringing one line with a load of 5 REN, with the second line off hook on both RTs. Loop current sink at the COTS is assumed to be 23 mA. Loop current feed higher than 23 mA restricts the number of COTS in a bay due to heating.

Table 1. Power Consumption and Heat Dissipation

Power	COLU Slot	COTS	
		19-inch	23-inch
Maximum Heat Dissipation			
HDSL Line Power Off	3.0 W	36 W	48 W
HDSL Line Power On	7.1 W	85.2 W	113.6 W
Maximum Power Consumption			
HDSL Line Power Off	3.0 W	36 W	48 W
HDSL Line Power On	30.1 W	361.2 W	481.6 W
Maximum Current Drain			
HDSL Line Power Off	71 mA	0.852 A	1.14 A
HDSL Line Power On	709 mA	8.50 A	11.35 A

Maximum Heat Dissipation

The maximum heat dissipation measures the power converted into heat that is built up within the COLU. It contributes to the total heat generated in the space around the COLU. This conversion factor is used to determine the maximum number of fully loaded COTS per bay that will not exceed the maximum allowable power dissipation density in Watts per square foot.

In CO locations, the maximum heat dissipation for open-faced, natural convection-cooled mountings is limited to 134.7 W per square foot per Section 4.1.4 of the NEBS standard GR-63-CORE. The footprint of a standard 16-slot, 23-inch COTS is 7.042 square foot. The maximum bay dissipation is therefore limited to 948.6 W. At 113.6 W per COTS, this limits the number of fully loaded COTS to eight per bay with a heat baffle above each COTS.



This is a worst case situation in that it assumes the entire CO is subjected to the maximum power density. Conditions other than worst case would permit increasing the number of COTS per bay without jeopardizing the CO thermal integrity. Due to the chimney effect, PairGain recommends you install one heat-dissipating baffle between every COTS. This action would prevent exceeding the rated operating temperature of the COLU units.

Thermal Loading Limitations

The thermal loading limitations imposed when using the COLU in a CEV or other enclosures are determined by applying the COLU power parameters to the manufacturer's requirements for each specific housing.

Maximum Power Consumption

The maximum power consumption is the total power that the COLU consumes or draws from its -48 Vdc COTS power source. This parameter is needed when the COLU is located remotely from its serving CO. It determines the battery capacity required to maintain an 8-hour standby battery reserve for emergency situations. This limits the maximum number of line units in an RT.

Maximum Current Drain

The maximum current drain is the maximum current drawn from the COTS power supply when it is at its minimum voltage (-42.5 Vdc). This determines the COTS fusing requirements.

MONITORING, HISTORY AND DIAGNOSTICS

COLUs provide extensive real-time, nondisruptive monitoring of HDSL transmission performance parameters for all units in a circuit. You can select threshold settings for the performance monitoring measurements at the appropriate COLU screen. These settings cause alarms to be activated at the designated threshold setting. The user interface ports performance is also monitored. Monitored parameters include the following:

- 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 status display of the console continuously updates the margin value. You can set the high and low values of this parameter for the COLU and the RT at the “[HDSL Summary Screen](#)” on page 17 and the severity of the alarm at the “[System Alarm Types Screen](#)” on page 25. View the results of these settings at the “[COLU Summary Screen.](#)”
- 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 Alarm Types Screen](#)” on page 28. View the results of these settings at the “[HDSL Summary Screen](#)” on page 17.
- 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 Alarm Thresholds Screen](#)” on page 27 and at the “[HDSL Alarm Types Screen](#)” on page 28 set the severity of the alarm. View the results of these settings at the “[HDSL Summary Screen](#)” on page 17.
- 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 Alarm Thresholds Screen](#)” on page 27 and at the “[HDSL Alarm Types Screen](#)” on page 28 set the severity of the alarm. View the results of these settings at the “[HDSL Summary Screen](#)” on page 17.

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 Menu Bar Selections.”](#)

- MAR
- ES
- LOSW
- PFO
- PFS
- PGF
- MISMATCH_n
- NORLUSW
- MISPWRA
- MISPWRB

Alarm Types

At the [“System Alarm Types Screen,”](#) you can set the alarm values to MN, MJ, CR, NA, and NR.

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.”](#)

- **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

LEDs DESCRIPTIONS

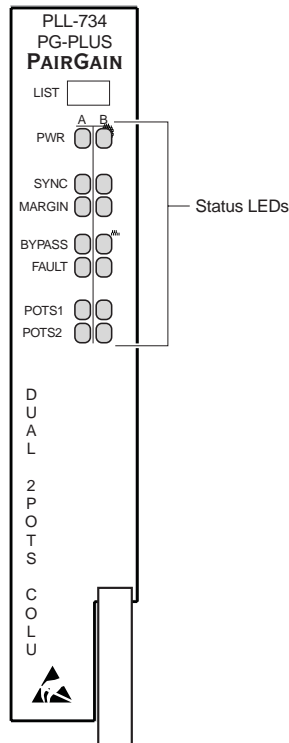


Figure 2. LEDs on Front Panel

Table 2 describes the LEDs, shown on the front panel, in which n equals the POTS line. If you have installed two RTs then both LEDs columns light in the manner described.

Table 2. Front Panel LEDs Descriptions

LEDs	Mode	Description
PWR	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 the dc 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	On	HDSL is in synchronization between COLU and RTs.
	Flashing	COLU and RTs are attempting to synchronize.
MARGIN	On	MAR below preset value, or COLU and RTs MARs are below preset values.
	Flashing	RTs Margins are below the preset value.
BYPASS	On	COLU is in Metallic Fallback, unless provisioned Disable.
	On, and POTS n Flashing	SDT is occurring on POTS n .
FAULT	On	COLU has a fault.
	Flashing	Alarm condition exists on the COLU.
POTS n	On	Channel is off-hook.
	Flashing with Ring Cadence	Channel is ringing.

For further details on the LEDs activities, refer to “Initialization Sequence” on page 8 and the “COLU and RT Fault Indicators” on page 35.

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.

INSTALLATION AND TEST

The following sections describe the tools and procedures for installing and testing the COLU.

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 (see [Figure 3](#)).
- 3 Engage the retaining latch to hold the card in place.

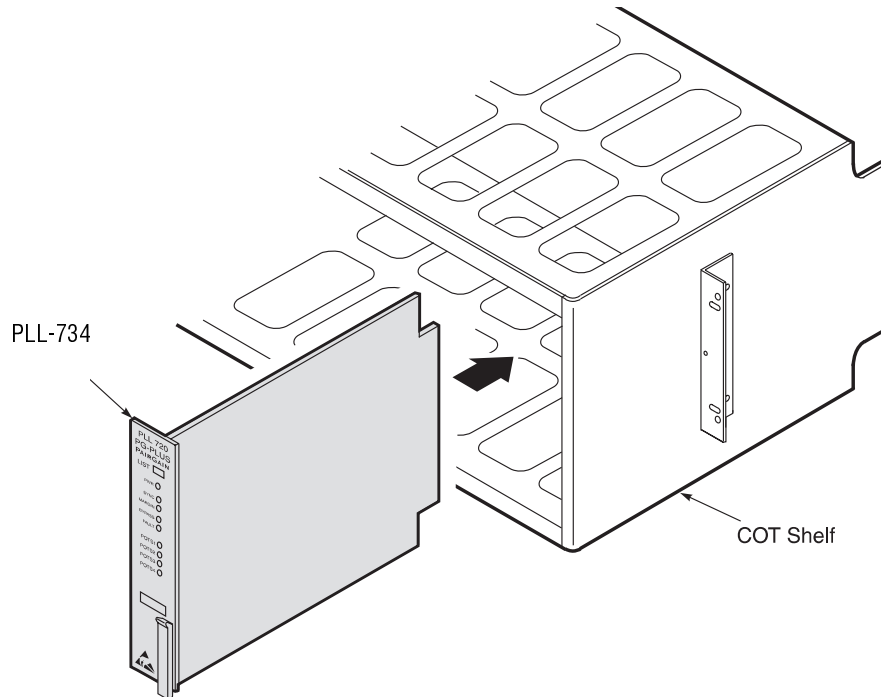


Figure 3. Installing the Card into a Shelf

INITIALIZATION SEQUENCE

When the COLU is correctly seated in the COTS, the following events occur in the order listed below:

- If only one RT is connected to the COLU, only one column's Status LED is On, the other Status LED is Flashing.
- If two RTs are connected to the COLU, the A and B Status LEDs are On simultaneously.

After installing the COLU, the following events occur:

- All LEDs briefly blink On and then Off, with the exception of the PWR and FAULT LEDs that remain Flashing.
- After about 5 seconds, the COLU applies power and goes into start-up mode. If an RT is present and no PGFs or PFOs are detected, the PWR LED is On green. If the line is Offhook, the HDSL power is not applied until it goes Onhook for at least 3 seconds. There is a 5-second delay before turning on the HDSL power.
- After applying the HDSL power, the tests for overload or underload conditions are performed. If the HDSL line power is normal, the PWR LED is On and HDSL start-up is initiated.

- As the COLU continues with start-up mode, the SYNC LED Flashes indicating the HDSL line is attempting to acquire synchronization. When complete, the SYNC LED is On. It takes approximately 2 to 3 minutes from the system power-up until synchronization is achieved. If the first HDSL synchronization attempt fails, then the system is powered down and put into the Metallic Fallback state and the BYPASS LED is On yellow. The COLU attempts to synchronize every 5 minutes until synchronization is achieved. If it fails, it returns to Metallic Fallback.
- MARGIN LED is On yellow indicating the COLU signal-to-noise ratio is equal to or below the selected signal-to-noise ratio threshold on the COLU. The MARGIN LED Flashes if the signal-to-noise ratio of the HDSL line is equal to or below the selected signal-to-noise ratio threshold on the RT.

SUBSCRIBER DROP TESTS

- Initiate a test by applying a test voltage on the Tip at the COLU through an MLT set
- With the VT-100 Terminal connected to the PAU or 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 reported to the PAU or the PMU and presented as TA-909 resistive signatures.

ADMINISTRATION

Performance monitoring is built into PG-Plus applications. You can access the VT-100 port of the PAU or the PMU to review performance measurements that provide an indication of the quality of transmission to the subscriber. You can perform system administration functions, such as alarm checking and clearing, configuration changes, performance monitoring, and testing for the COLU through the COLU screens.

Connect a VT-100 terminal is connected to the RS-232 interface on the front panel of either the PAU or the PMU to access the COLU screens. If the system does not respond, verify the following values are present:

- VT-100 terminal Hardware Flow Control is set to On
- XON/XOFF is enabled
- ASYNC parameters: Data = 8, Parity = None, Start/Stop = 1.

For further information on connecting a terminal and accessing the screens refer to the PAU or the PMU or the PAU or the PMU Technical Practice.



The factory defaults given in this document are standard factory defaults. You may have a customized version of the product, in which case, refer to the PG-Plus Customized Factory Defaults for the values appropriate to the product version you have.

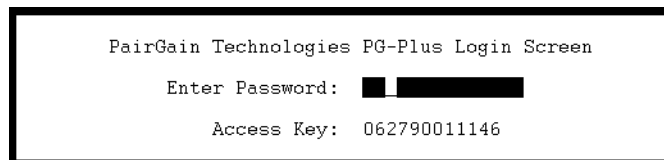
CONVENTIONS USED IN THIS DOCUMENT

Some screenshots in this document come from a prototype setup and may appear slightly different from what you see on your Craft interface screen. The basic information and contents should be similar. This document uses the following conventions for menus and shortcuts:

Example	Describes
<i>menu</i>	name of menu item
<i>submenu</i>	name of submenu item
<i>prompts</i>	the place where you answer yes or no or type some other response
error	the name of what's wrong
error text	an explanation of what's wrong
xxxx	a variable, such as POTS unit 1 in a 6 POTS unit

LOGGING ON

- 1 Press **SPACEBAR** several times to activate the Autobaud feature. Supported baud rates are 1200, 2400, 4800, 9600, and 38400. The Logon Password screen displays.



- 2 Type the default password and press **ENTER** to view the PAU or PMU Main Menu bar.



password#1 is the factory-default password. If you establish a different password, you must type the new password at a subsequent log on.

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

If the system does not respond, verify that the Hardware Flow Control of the VT-100 terminal is set to On.

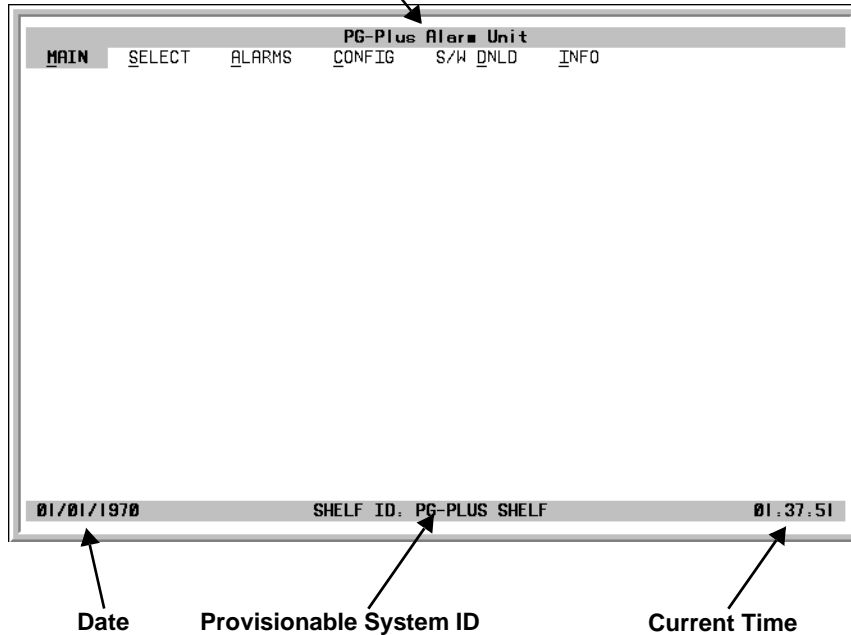
LOGGING OFF

If you must leave your VT-100 terminal unattended for any length of time, 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. Log out by choosing Quit from the menu bar or by disconnecting the cable connecting the console to the PAU/PMU.

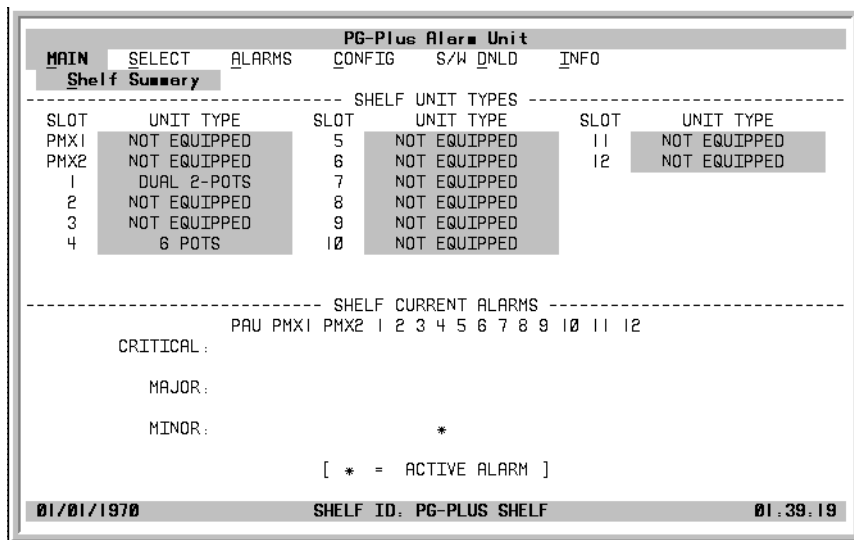
PAU OR PMU MAIN SCREEN

The first screen displays with the COTS Main menu bar. The screens are identified by the COTS slot number at the top of each screen. The provisionable System ID string displays at the bottom center, the date displays at the lower left of the screen, and the time in military format displays at the lower right of the screen.

Screen Identification and Slot Number

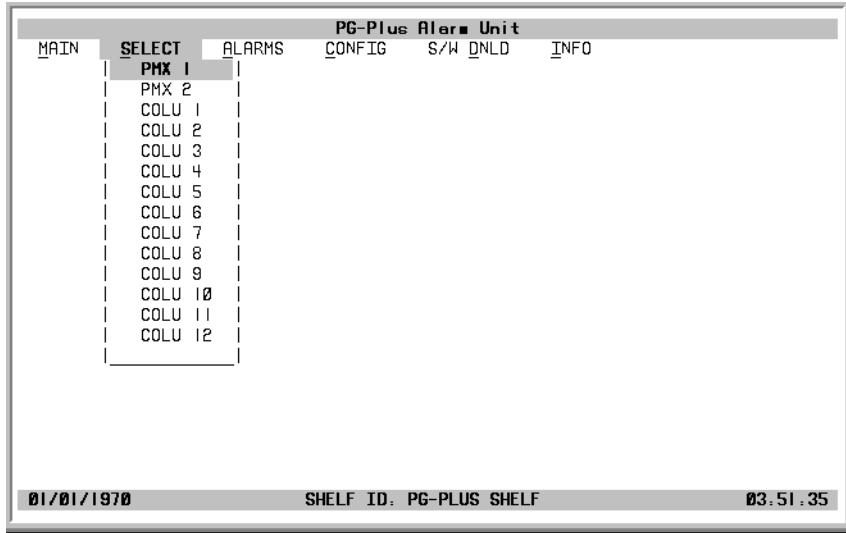


- 1 To access a specific COLU when you do not know the slot number, press **ENTER** to view the COTS Shelf Summary screen. Note the slot number of the desired COLU. There may be more than one of the COLU type you are installing.



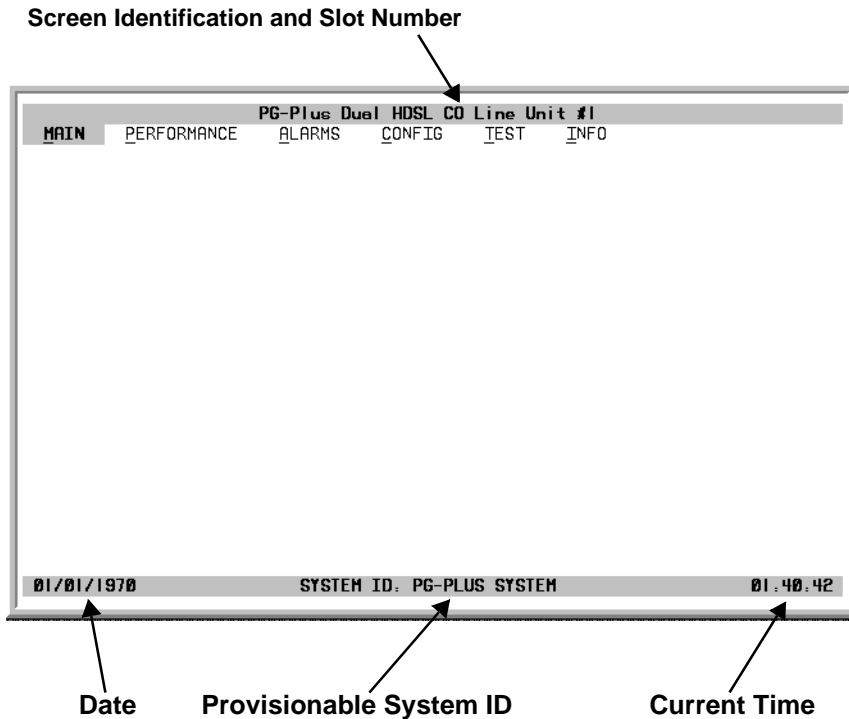
- 2 Press **ESC** to return to the COLU Main menu bar.

- 3 Scroll to the *Select* option and press **ENTER** to access the submenu.
- 4 Scroll to the slot number noted above and press **ENTER**.



COLU MAIN MENU

When you select the COLU from the PAU or PMU Select option, the COLU Main menu displays. You can perform any of the functions listed in [Table 3](#) from this screen.



Navigational Methods

The following keyboard keys are your means to navigate through the menus and screens:

A - Z keys	Selects and executes an underlined or highlighted menu item.
←	Moves left across main menu. Moves the cursor to the left.
→	Moves right across main menu. Moves the cursor to the right.
↑	Moves up the submenu selection. Moves the cursor up the screen items.
↓	Moves down the submenu selection. Moves the cursor down the screen items.
CTRL + R	Returns to the PAU or PMU Main screen. The PairGain banner appears briefly and then the Main menu bar displays.
SPACEBAR	No effect. At COLU screen cycles through choices.
ESC	Exits the current screen and returns to the previous screen. Selection changes made on the current screen are discarded. Press ESC in a text field to cancel the text entry and restore the old value.
ENTER	Moves to submenu or screen selected. At the screen, it submits all selection changes on the current screen and makes them effective in the system.

COLU Menu Bar Selections

Table 3 describes the menus and submenus selectable from the COLU menu bar.

Table 3. Menu Bar Selections

Select underlined alpha character	To View or Change:
<u>M</u>ain	Circuit configuration Performance summary information Alarm summary information
<u>P</u>erformance	HDSL Summary Reset the minimum and maximum margin values Date and time of the last reset of the minimum and maximum margin values Information on HDSL span, 24-hours of performance history including ES, UAS, and validity of values HDSL History screens 7-day history of insertion loss and Tip and Ring reversal
<u>A</u>larms	HDSL History, detailing the number of times each alarm occurred, time and date of first and last occurrence, provisioned notification type, and current status System alarm history HDSL A and B history
<u>C</u>onfig	Options such as SDT, HDSL Periodic Power Up, and System ID Alarm types of System alarms Threshold crossing values for the 24-hour ES count and low margin dB level Factory defaults
<u>T</u>est	Test subscriber drop by either of two methods Results including hazardous voltages, foreign voltages, resistive faults, and CPE termination status
<u>I</u>nf	Summary of navigational methods COLU Event Log RT Event Log Help Display of registration and inventory information to track product manufacturing, configuration, and revision state

COLU Summary Screen

This screen details the performance condition of the COLU and RT. [Table 4](#) defines the conditions that appear in the Channel and HDSL Status fields.

- 1 Select *Main* from the menu bar and press **ENTER** to view the COLU Summary screen.

The screenshot shows the COLU Summary screen for 'PG-Plus Dual HDSL CO Line Unit #1'. The menu bar includes MAIN, PERFORMANCE, ALARMS, CONFIG, TEST, and INFO. The Channel Status section shows four 'OPEN' entries for POTS-1A, POTS-2A, POTS-1B, and POTS-2B. The HDSL Status section shows 'NORMAL' for both RLU-A and RLU-B. The Performance section lists HDSL-A and B margins (20 dB) and ES counts (0). The Alarms section shows 'NONE' for SYSTEM, HDSL-A, and HDSL-B. The footer displays '01/01/1970', 'SYSTEM ID: PG-PLUS SYSTEM', and '01.41.43'. Brackets on the right side of the screen group these sections into three categories: 'Status indicators for the HDSL span and the POTS interfaces', 'HDSL performance summary in terms of margin and ES count', and 'Status of current HDSL and System alarms'.

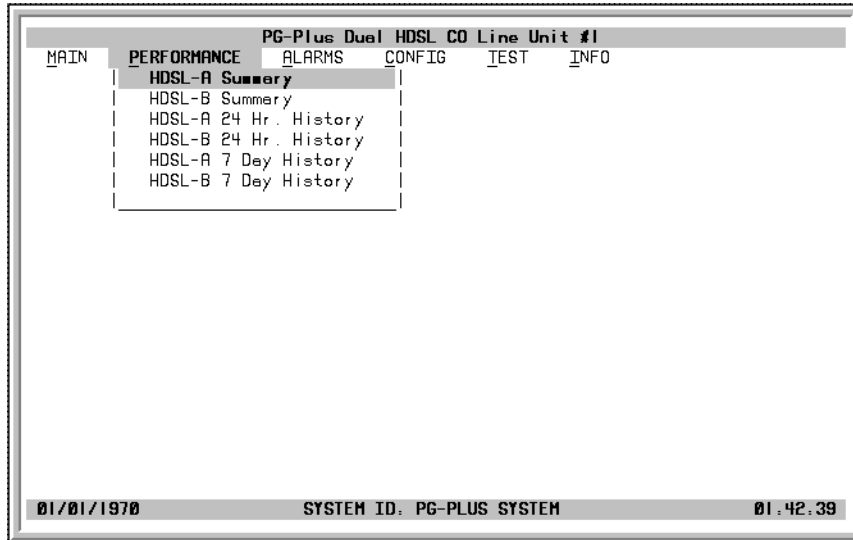
- 2 Press **ESC** to move up a menu level, or **CTRL+R** to return to the PAU/PMU Main menu. Refer to the Performance and Alarms screens for a detailed description of data displayed in these areas.

Table 4. System Status

State	Description
Channel Status	
Open	No CO battery detected, Line Status Open. This status does not change except for Test status
Idle	CO battery detected and line is Onhook at RTs
Ringing	Line is ringing
Reversed	CO battery is detected with Tip and Ring reversed
Busy	Line is Offhook at RTs
Test	Line is under SDT or line is connected to PMU Test Access port
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
HDSL Status	
HDSL Link Down	HDSL link is down and System is not in Metallic Fallback
Metallic Fallback	HDSL link is down and System is in Metallic Fallback
Start-up	System in start-up mode where the HDSL link is acquiring synchronization
Normal	System running normal where the HDSL link is synchronized and speech and signaling data are flowing between the COLU and the RTs

PERFORMANCE SUBMENU

The Performance submenu provides access to the COLU performance screens. In the following screens you may see the A RT, B RT or both A RT and B RT screens as an example.



HDSL Summary Screen

The following screen depicts an HDSL performance summary in terms of the margin and ES count. Use the available options to reset the minimum and maximum margin values for the selected RT and COLU.

- 1 Select *Performance* and press **ENTER** to display the submenu.
- 2 Scroll to the *HDSL Summary* option for the either RT, A or B, and press **ENTER** to view the screen. The date and time of the last reset of the margin values for the selected RT display at the bottom of the screen.

PG-Plus Dual HDSL CO Line Unit #1			
MAIN	PERFORMANCE	ALARMS	CONFIG TEST INFO
HDSL-B Summary			
		COLU	RLU
Current Margin (dB)	:	20	20
Minimum Margin (dB)	:	20	20
Maximum Margin (dB)	:	20	21
Errored Seconds (24 Hr.)(ES)	:	0	0
Unavailable Seconds (24 Hr.)(UAS)	:	0	0
Insertion Loss (dB)	:	0	1
HDSL Tip/Ring Reversal (YES/NO)	:	YES	
RESET MIN/MAX MARGIN COUNTS (Y)?			
MIN/MAX MARGIN COUNTS LAST RESET: 01/01/1970 01:46:29			
01/01/1970		SYSTEM ID: PG-PLUS SYSTEM 01.47.31	

- 3 Type **Y** at the Reset MIN/MAX Margin Counts prompt to reset the values.
- 4 If you chose to reset the values, type **Y** when the system asks for confirmation.
- 5 Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

HDSL 24-Hour History Screen

The following screen shows twenty-four hours backwards from the current time of HDSL performance history for the COLU and the selected RT that includes ES counts, UAS counts, and the validity of the values.

- 1 Select *Performance* from the menu bar and press **ENTER** to display the submenu.
- 2 Scroll to the *HDSL 24 Hr. History* option and press **ENTER** to view the screen.

PG-Plus Dual HDSL CO Line Unit #1					
MAIN	PERFORMANCE	ALARMS	CONFIG	TEST	INFO
HDSL-B 24 Hr. History					
Time	COLU		RLU		
	ES	UAS	ES	UAS	
01:45	0-PAR	0-PAR	0-PAR	0-PAR	
01:30	0-COM	0-COM	0-COM	0-COM	
01:15	0-COM	0-COM	0-COM	0-COM	
01:00	0-COM	0-COM	0-COM	0-COM	
00:45	0-COM	0-COM	0-COM	0-COM	
00:30	0-COM	0-COM	0-COM	0-COM	
00:15	0-COM	0-COM	0-COM	0-COM	
00:00	0-ADJ	0-ADJ	0-ADJ	0-ADJ	
23:45	0-UNA	0-UNA	0-UNA	0-UNA	
23:30	0-UNA	0-UNA	0-UNA	0-UNA	

COM = Complete, PAR = Partial, ADJ = Adjusted, UNA = Unavailable

PAGE HISTORY BACKWARD PAGE HISTORY FORWARD CLEAR HISTORY

01/01/1970 SYSTEM ID. PG-PLUS SYSTEM 01.49.51

The current 15-minute interval information shows the real-time updates. The COLU derives the COLU and RT ES and UAS performance parameters, which have the valid field values of:

- Unavailable: The system has not run long enough to fill this register.
- Partial: Data is being collected for this register.
- Complete: Data is saved in the history register for the complete interval.
- Adjusted: The time or date has been changed on the system during the interval.

- 3 Highlight a paging button and press **ENTER** to scroll through all ninety-six 15-minute intervals.
- 4 Highlight the Clear History button and press **ENTER** to clear the history.



If there are active alarms associated with the current 15-minute and 24-hour performance history information, those alarms become inactive when the 24-hour performance history is cleared. The date and time the 15-minute and 24-hour performance history was last cleared appears at the bottom of the screen.

- 5 Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

HDSL 7-day History Screen

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

- 1 Select *Performance* from the menu bar and press **ENTER** to display the submenu.
- 2 Scroll to the *HDSL 7 Day History* option and press **ENTER** to view the screen:

PG-Plus Dual HDSL CO Line Unit #1					
MAIN	PERFORMANCE	ALARMS	CONFIG	TEST	INFO
HDSL-A 7 Day History					
COLU			RLU		
Date	ES	UAS	ES	UAS	
01/01	0-ADJ	0-ADJ	0-ADJ	0-ADJ	
12/31	0-UNA	0-UNA	0-UNA	0-UNA	
12/30	0-UNA	0-UNA	0-UNA	0-UNA	
12/29	0-UNA	0-UNA	0-UNA	0-UNA	
12/28	0-UNA	0-UNA	0-UNA	0-UNA	
12/27	0-UNA	0-UNA	0-UNA	0-UNA	
12/26	0-UNA	0-UNA	0-UNA	0-UNA	
12/25	0-UNA	0-UNA	0-UNA	0-UNA	

COM = Complete, PAR = Partial, ADJ = Adjusted, UNA = Unavailable

CLEAR HDSL 7 DAY HISTORY (Y)?

01/01/1970 SYSTEM ID. PG-PLUS SYSTEM 01.50.43

The COLU derives the ES and UAS performance parameters for both the COLU and the selected RT with the valid field values of Unavailable, Partial, Complete, and Adjusted.

- 3 At the Clear HDSL 7 day History prompt, type **Y** to clear the 7-day history information. The current day performance information shows real-time updates. At midnight of every day, the current day performance information is moved into the previous day slot and the current day performance information is cleared.

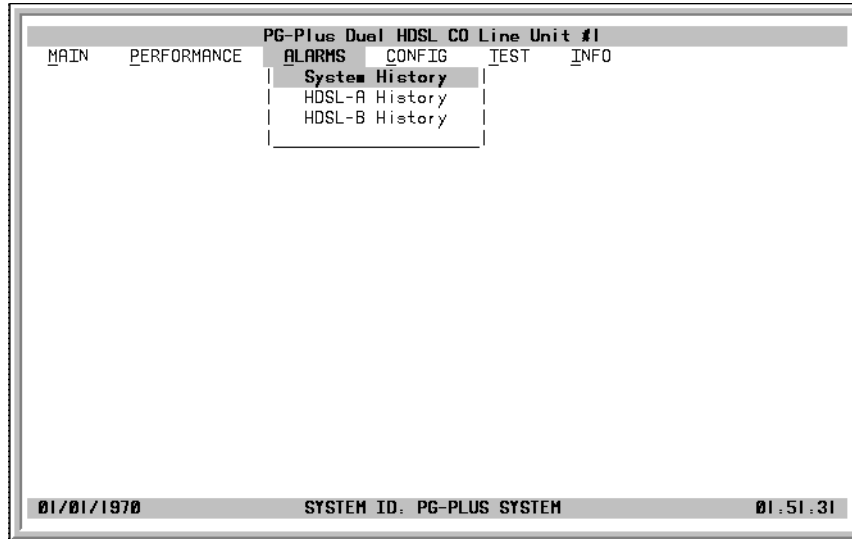


Clearing the 7-day performance history does not clear the current day performance information. The current day performance information may only be cleared through the HDSL 24-hour performance history screen. The date and time that the 7-day performance history was last cleared appears at the bottom of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

- 4 Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

ALARMS SUBMENU

The COLU detects and reports HDSL, POTS, and System related alarmed events to the PAU-710 (if present). Select *Alarms* at the menu bar and press **ENTER** to display the submenu.



System History

This screen shows the system alarm history. If no alarms are present, the word OK displays. At this screen you see the results of the alarms set at the Configuration “System Alarm Types Screen” on page 25.

- 1 Select *Alarms* from the menu bar and press **ENTER** to display the submenu.
- 2 Scroll to the *System History* option and press **ENTER** to view the screen.

PG-Plus Dual HDSL CO Line Unit #1						
MAIN		PERFORMANCE	ALARMS	CONFIG	TEST	INFO
System History						
ALARMS	TYPE	CURRENT	COUNT	FIRST	LAST	
Power A Missing (MISPHRA)	NA	OK	0	--/--	--/--	----
Power B Missing (MISPHRB)	NA	OK	0	--/--	--/--	----
COLU-RLU A Mismatch(MISMATCHA)	MN	OK	0	--/--	--/--	----
No RLU A S/W (NORLUSWB)	MN	OK	0	--/--	--/--	----
COLU-RLU B Mismatch(MISMATCHB)	MN	OK	0	--/--	--/--	----
No RLU B S/W (NORLUSWB)	MN	OK	0	--/--	--/--	----
EEPROM FAILURE (BKUPMEMB)	MN	OK	0	--/--	--/--	----

CLEAR SYSTEM ALARM HISTORY (Y)?

SYSTEM ALARM HISTORY LAST CLEARED: --/--/---- --:--:--

01/01/1970 **SYSTEM ID: PG-PLUS SYSTEM** **01:53:21**

- 3 At the Clear System Alarm History prompt, type **Y** to clear the history information, or **N** to leave the history as is. The current information shows real-time updates. At midnight of every day, the current information is moved into the previous day slot and the current system alarm history information is cleared.



Clearing the system alarm history does not clear the current alarms.

- 4 Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

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. If no alarms are present, the word OK displays. At this screen you view the results of the alarms set at the Configuration “HDSL Alarm Types Screen” on page 28.

- 1 Select *Alarms* from the menu and press **ENTER** to display the submenu.
- 2 Scroll to the *HDSL A History* option and press **ENTER** to view the screen.

PG-Plus Dual HDSL CO Line Unit #1						
MAIN	PERFORMANCE	ALARMS	CONFIG	TEST	INFO	
HDSL-A History						
ALARMS	TYPE	CURRENT	COUNT	FIRST	LAST	
COLU HDSL LOSW	MN	OK	1	01/01 00:00	01/01 00:00	
COLU HDSL ES 15 MIN THRESH	MN	OK	0	--/-- --:--	--/-- --:--	
COLU HDSL ES 24HR THRESH	MN	OK	0	--/-- --:--	--/-- --:--	
COLU HDSL UAS 15 MIN THRESH	MN	OK	0	--/-- --:--	--/-- --:--	
COLU HDSL UAS 24HR THRESH	MN	OK	0	--/-- --:--	--/-- --:--	
COLU HDSL LOW MARGIN	MN	OK	0	--/-- --:--	--/-- --:--	
COLU POWER FEED OPEN	MN	OK	0	--/-- --:--	--/-- --:--	
COLU POWER FEED SHORT	MN	OK	0	--/-- --:--	--/-- --:--	
COLU POWER GROUND FAULT	MN	OK	0	--/-- --:--	--/-- --:--	
RLU HDSL LOSW	MN	OK	1	01/01 00:00	01/01 00:00	
RLU HDSL ES 15 MIN THRESH	MN	OK	0	--/-- --:--	--/-- --:--	
RLU HDSL ES 24HR THRESH	MN	OK	0	--/-- --:--	--/-- --:--	
RLU HDSL UAS 15 MIN THRESH	MN	OK	0	--/-- --:--	--/-- --:--	
RLU HDSL UAS 24HR THRESH	MN	OK	0	--/-- --:--	--/-- --:--	
RLU HDSL LOW MARGIN	MN	OK	1	01/01 00:01	01/01 00:01	

CLEAR HDSL ALARM HISTORY (Y)?

HDSL ALARM HISTORY LAST CLEARED: --/--/--:--

01/01/1970 **SYSTEM ID. PG-PLUS SYSTEM** **01.54.03**

- 3 Type **Y** at the Clear HDSL A Alarm History? prompt to clear the information.



Clearing the alarm history clears the RT and the COLU alarm history, regardless of 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.

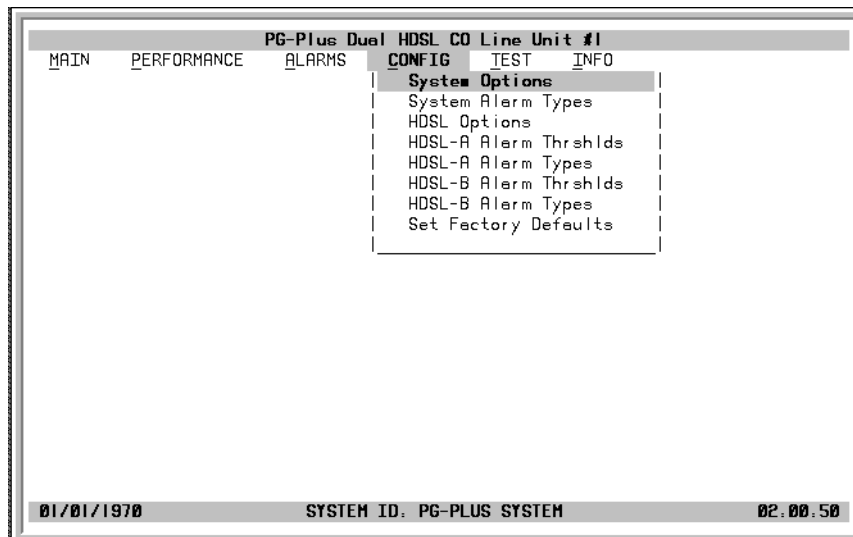
- 4 Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

Table 5. HDSL Alarms

Alarm	Alarm Description	Default
COLU HDSL LOSW	COLU and A and B RTs cannot synchronize and are out of service	MN
COLU HDSL 15 MIN-ES	Alarm threshold reached or exceeded	MN
COLU HDSL 24 HR-ES	Alarm threshold reached or exceeded	MN
COLU HDSL 15 MIN-UAS	Alarm threshold reached or exceeded	MN
COLU HDSL 24 HR-UAS	Alarm threshold reached or exceeded	MN
COLU HDSL Low Margin	Margin reached or below the current threshold value	MN
COLU PFO	COLU cannot power the RTs due to an open circuit	MN
COLU PFS	COLU cannot power the RTs due to a short circuit.	MN
COLU PGF	COLU cannot power the RTs due to HDSL Tip or Ring Fault to GND	MN
RT HDSL LOSW	COLU and A and B RTs cannot synchronize and are out of service	MN
RT HDSL 15 MIN-ES	Alarm threshold reached or exceeded	MN
RT HDSL 24 HR-ES	Alarm threshold reached or exceeded	MN
RT HDSL 15 MIN-UAS	Alarm threshold reached or exceeded	MN
RT HDSL 24 HR-UAS	Alarm threshold reached or exceeded	MN
RT HDSL Low Margin	Margin reached or below the current threshold value	MN

CONFIGURATION SUBMENU

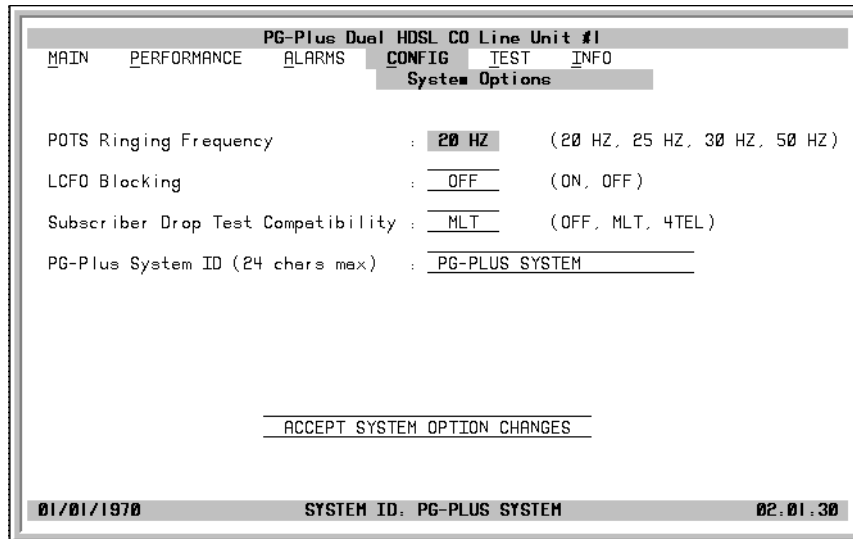
Provides access to system provisioning screens, and an easy means of resetting all options to factory defaults. All system provisioning options can be saved in nonvolatile memory.



System Options Screen

System Options screen allows the provisioning of options such as ringing frequency, LCFO blocking, SDT, and a System ID. Table 6 shows the configured system option and the factory default value.

- 1 Select *CONFIG* from the menu and press **ENTER** to display the submenu.
- 2 Scroll to the *System Options* line and press **ENTER** to view the screen.



- 3 Highlight the desired field and press **SPACEBAR** to toggle to the desired value, or use a directional key to move to the next option.
- 4 Press **TAB** to move to the Accept System Option Changes button, and press **ENTER** to accept the changes.
- 5 Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

Table 6. System Options Configuration Fields

Options	Description	Default
POTS Ringing Frequency	The ringing frequency sent from the RT to the subscriber. Possible values include 20 Hz, 25 Hz, 30 Hz, and 50 Hz.	20 Hz
LCFO Blocking	When turned on, this feature blocks Loop Current Feed Open (LCFO) signalling from being sent to the RT. When activated, LCFO blocking maintains battery feed at the RT during an LCFO event.	Off
SDT Compatibility	Specifies whether the PG-Plus initiates and operates with MLT or 4TEL loop test systems. Select the test type according to the loop testing system in use. Possible values include Off, MLT, and 4TEL. Craft initiated SDTs work in any selection.	Off
PG-Plus System ID	Configurable identification string for system. This string can be up to 24 characters. Because the System ID is visible at every COLU screen, it is easy to know which COLU screens are displayed. There are no special rules for changing the System ID. Any printable character, including space, is valid.	PG-Plus System

System Alarm Types Screen

Allows the provisioning of the alarm types of all system alarms including incompatible COLU and RT, No RT Software, and input power missing. Table 7 shows the System Alarm fields and the default settings. You can view the results of these settings from the “System History” on page 21.

- 1 Select *CONFIG* from the menu and press **ENTER** to display the submenu.
- 2 Scroll to the *System Alarm Types* option and press **ENTER** to view the screen.

PG-Plus Dual HDSL CO Line Unit #1		
MAIN	PERFORMANCE	ALARMS
		CONFIG
		TEST
		INFO
System Alarm Types		
SYSTEM ALARMS		
COLU-RLU A Mismatch (MISMATCHA):	MN	(NR, NA, MN, MJ, CR)
No RLU A S/W (NORLUSWA):	MN	(NR, NA, MN, MJ, CR)
COLU-RLU B Mismatch (MISMATCHB):	MN	(NR, NA, MN, MJ, CR)
No RLU B S/W (NORLUSWB):	MN	(NR, NA, MN, MJ, CR)
Power A Missing (MISPWRA):	NA	(NR, NA, MN, MJ, CR)
Power B Missing (MISPWRB):	NA	(NR, NA, MN, MJ, CR)
EEPROM Failure (BKUPMEMP):	MN	(NR, NA, MN, MJ, CR)
[MN = Minor Alarm, MJ = Major Alarm, CR = Critical Alarm]		
[NA = Not Alarmed, NR = Not Reported]		
ACCEPT SYSTEM ALARM TYPE CHANGES		
01/01/1970	SYSTEM ID: PG-PLUS SYSTEM	02.02.29

- 3 With the COLU RT Mismatch line highlighted, use the **SPACEBAR** to toggle to the desired value for the Alarm Type, then press a directional keys to move to the next option.
- 4 When you have made all the desired changes, press a directional keys to move to the Accept System Alarm Types Changes button, and press **ENTER** to accept the changes.
- 5 Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

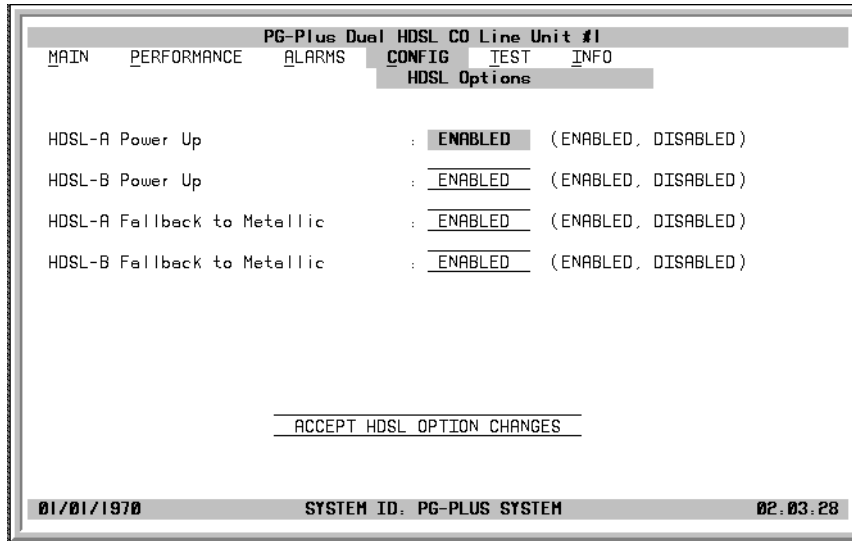
Table 7. System Alarm Types

Alarms	Description	Default
MISMATCH n	Incompatible COLU and RT units have been installed. For example, a Dual 2 POTS COLU has been connected to a 2 ISDN RT.	MN
NORLUSW n	RT has no application software and is awaiting software download.	MN
MISPWRA	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
MISPWRB	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
BKUPMEMP	EEPROM Failure	MN

HDSL Options Screen

Allows the provisioning of HDSL options such as Periodic Power Up and Metallic Fallback. Table 8 shows the configured system option for both A and B RTs.

- 1 Select *CONFIG* from the menu and press **ENTER** to display the submenu.
- 2 Scroll to the *HDSL Options* line and press **ENTER** to view the screen.



- 3 Highlight the Channel 1 RLU Transmit Level line, press **SPACEBAR** to toggle to the desired value
- 4 Press a directional key to move to the next option. Continue until you have made all the desired changes.
- 5 Press a directional key to move to the *Accept Channel Option Changes* button, and press **ENTER** to accept the changes.
- 6 Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

Table 8. HDSL Options Configuration Fields

Options	Description	Default
HDSL Periodic Power Up	When <i>ENABLED</i> , PG-Plus attempts to power up the HDSL line every five minutes or anytime the HDSL pair is shorted for three seconds and then opened. Setting to <i>DISABLED</i> inhibits the power-up sequence under any circumstances.	Enabled
HDSL Metallic Fallback	When enabled, the system provides fallback to metallic operation on POTS channel 1 during system failures. When disabled, the system provides no metallic connection during system failures.	Enabled

HDSL Alarm Thresholds Screen

Provides a means to provision the threshold crossing values for the 15 minute and 24-hour ES and UAS counts and low margin dB for both A and B RTs. [Table 9](#) lists the fields of the HDSL Alarm Thresholds and the default factory values.

- 1 Select *CONFIG* from the menu bar and press **ENTER** to display the submenu.
- 2 Scroll to the *HDSL Alarm Thrshlds* line and press **ENTER** to view the screen.

PG-Plus Dual HDSL CO Line Unit #1			
MAIN	PERFORMANCE	ALARMS	CONFIG TEST INFO
HDSL-A Alarm Thrshlds			
HDSL ALARMS	COLU ALARM THRESHOLD	RLU ALARM THRESHOLD	
Errored Seconds (ES 15 Min)	017	017	(0.900)
Errored Seconds (ES 24 Hr)	00170	00170	(0.86400)
Unavailable Seconds (UAS 15 Min)	240	240	(0.900)
Unavailable Seconds (UAS 24 Hr)	00600	00600	(0.86400)
Low Margin (MAR)	06	06	(0.25)
Use "Tab" to move between columns			
ACCEPT HDSL ALARM THRESHOLD CHANGES			
01/01/1970		SYSTEM ID. PG-PLUS SYSTEM	
		02.04.19	

- 3 With the desired field highlighted, press **SPACEBAR** to toggle to the correct value for that field, then press **TAB** to move to the next option. Continue until you have made all desired changes
- 4 Use a directional key to move to the *Accept HDSL Alarm Thresholds Changes* button, press **ENTER** to accept the changes or press **ESC** to return to the Main Menu with the values unchanged.
- 5 Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

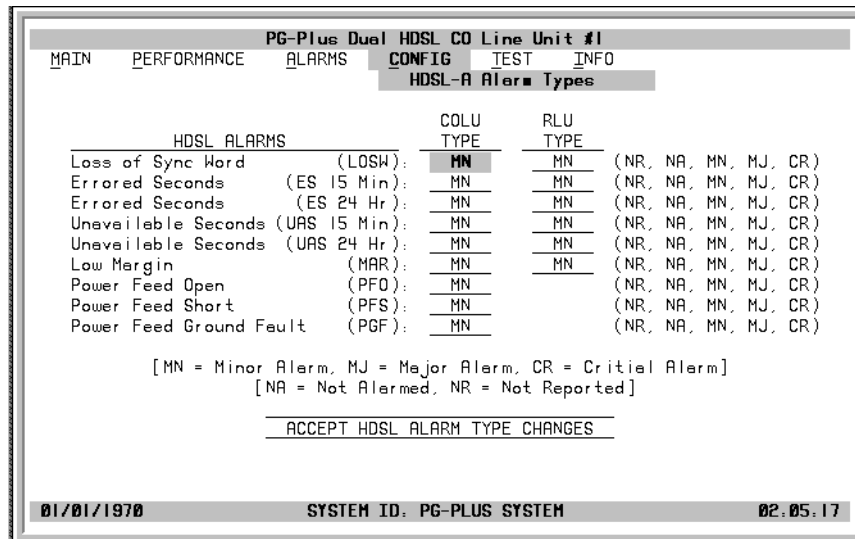
Table 9. HDSL Alarm Threshold Fields

Thresholds	Description	Defaults
MAR	Value at which alarm is set active if margin drops equal to or less than this threshold. Possible HDSL low margin threshold values include any values from 0 through 15.	6
ES-15 MIN	Value for the HDSL 15 minute interval ES alarm. Possible threshold values include any number from 0 to 900.	17
ES -24 HR	Value for the HDSL 24 hour interval ES alarm. Possible threshold values include any number from 0 to 86400.	170
UAS-15 MIN	Threshold value for the HDSL 15 minute interval UAS alarm. Possible threshold values include any number from 0 to 900.	240
UAS-24 HR	Threshold value for the HDSL 24 hour interval UAS alarm. Possible values include any number from 0 to 86400.	170

HDSL Alarm Types Screen

Allows the provisioning of the alarm types for all HDSL Alarms for both A and B RTs. [Table 10](#) lists the Alarm Reports and [Table 11](#) 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 22.

- 1 Select *CONFIG* from the menu and press **ENTER** to display the submenu.
- 2 Scroll to the *HDSL Alarm Types* option and press **ENTER** to view the screen.



- 3 At the LOSW field in the COLU Type column, press **SPACEBAR** to toggle to the desired value and a directional key to move to the RT Type column. Continue until you have made all the desired changes.
- 4 Move to the Accept HDSL Alarm Type Changes button, and press **ENTER** to accept the changes.
- 5 Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

Table 10. Alarm Reports

Settings	PAU/PMU Reports	Fault LED Affected	Main Summary Listing	Alarm History Updated
CR/MJ/MN	Yes	Yes	Yes	Yes
NA	No	No	No	No
NR	No	Yes	Yes	Yes

Table 11. HDSL Alarms

Types	Description	Defaults
LOSW	HDSL link has lost synchronization.	MN
ES -15 MIN	Active if the 15 minute ES count equals or exceeds the threshold in the current 15 minute interval.	MN
ES-24 HR	Active if the count equals or exceeds the threshold in the current 24 hour interval.	MN
UAS-15 MIN	Active if the count equals or exceeds the threshold in the current 15 minute interval.	MN
UAS-24 HR	Active if the count equals or exceeds the threshold in the current 24 hour interval.	MN
MAR	Active if the margin equals or drops below the threshold.	MN

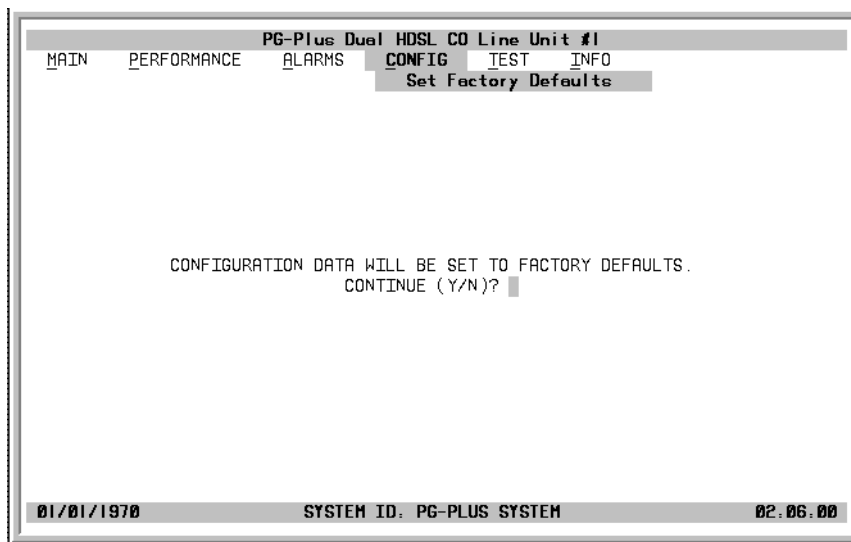
Table 11. HDSL Alarms (Cont.)

Types	Description	Defaults
PFO	Open circuit detected on the HDSL span.	MN
PFS	Short circuit detected on the HDSL span.	MN
PGF	Ground fault condition detected on the HDSL span.	MN

Set Factory Defaults Screen

Sets all configuration data back to factory default values.

- 1 Select *CONFIG* from the menu and press **ENTER** to display the submenu.
- 2 Scroll to *Set Factory Defaults* line and press **ENTER**.



- 3 Type **Y** in the field after the *Continue?* prompt to reset the system to the Factory Default values, or **N** to maintain the current configuration defaults.



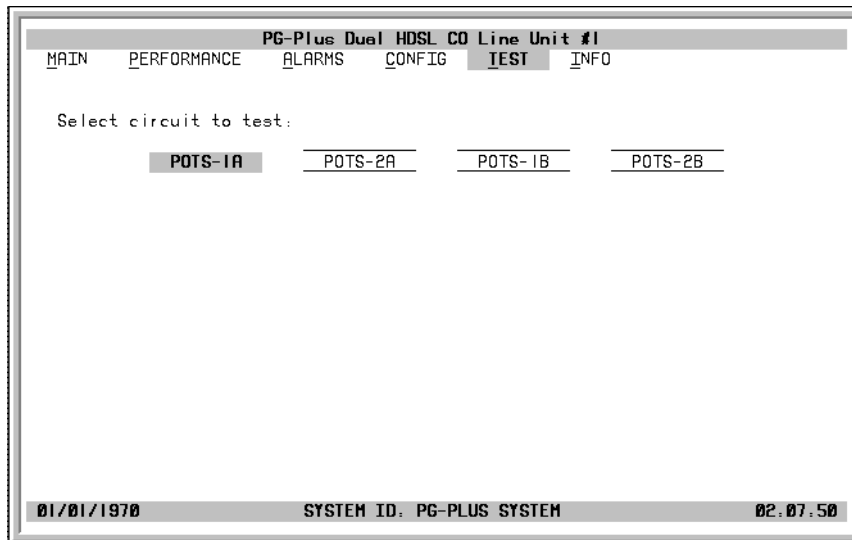
If you have custom factory defaults, then these custom defaults will be restored if you select Set Factory Defaults.

- 4 Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

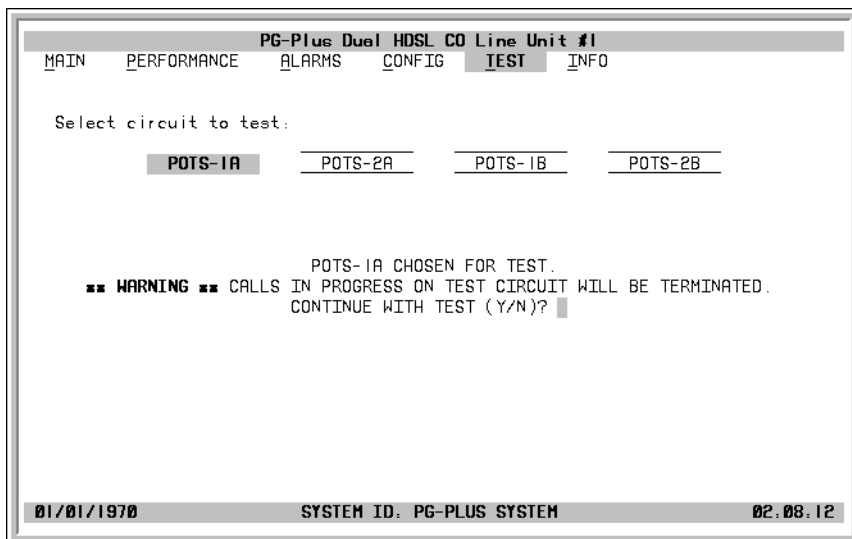
TEST SUBMENU

PG-Plus supports 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 Select *TEST* from the menu and press **ENTER** to display the submenu.
- 2 Use the **TAB** key to move to the desired circuit to test and press **ENTER**.



When you have selected a channel for the test, a confirmation message and a warning display.



- 3 To continue with the test type **Y**, or type **N** to halt the test. 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.

Upon tests completion, the SDT Results screen displays. The results contain 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 7 to 8 seconds for all tests to complete.

PG-Plus Dual HDSL CO Line Unit #1					
MAIN	PERFORMANCE	ALARMS	CONFIG	TEST	INFO
Select circuit to test:					
POTS-1A		POTS-2A		POTS-1B	
POTS-2B					
SUBSCRIBER TEST	FAILURE CONDITION	TEST STATUS			
Hezardous Potential	T-G or R-G > 50 Vrms T-G or R-G > 135 Vdc	PASSED			
Foreign Voltage	T-G or R-G AC volt. > 10 Vrms T_G or R-G DC volt. > 6 Vdc	PASSED			
Resistive Fault	T-G, R-G, or T-R resist. < 150 Kohms	PASSED			
Receiver Off-Hook	Phone is Off-Hook	PASSED			
Ringers Test	Ringer Load across T-R > 5 REN Ringer Load across T-R < 0.1 REN	PASSED			
01/01/1970		SYSTEM ID: PG-PLUS SYSTEM		00:06:36	

- 4 Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

INFORMATION SUBMENU

Provides technical information about the COLU and contact information for PairGain Technologies, Inc.

- 1 Select *INFO* from the menu and press **ENTER** to display the submenu.

PG-Plus Dual HDSL CO Line Unit #1					
MAIN	PERFORMANCE	ALARMS	CONFIG	TEST	INFO
Inventory COLU					
Inventory RLU(=)					
COLU Event Log					
RLU Event Logs					
Help					
01/01/1970		SYSTEM ID: PG-PLUS SYSTEM		00:07:12	

- 2 Select the desired subject to view the associated screen.

COLU Inventory Screen

Displays all the critical information about the COLU and both RTs, if both are installed. Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

```

PG-Plus Dual HDSL CO Line Unit #1
MAIN PERFORMANCE ALARMS CONFIG TEST INFO
Inventory COLU

COLU
Model Number      : PLL-734
List Number       : 01
CLEI              : S9LIAPBAAA
Serial Number     : 012738000409
H/W Part Number   : 150-1634-01
H/W Revision      : e34
FPGA Type         : FPGA-30
FPGA Version      : 12

BOOT PROGRAM
S/W Program Type  : COLU DUAL 2POTS BOOT
S/W Version       : E1.0.1.4

APPLICATION PROGRAM
S/W Program Type  : COLU DUAL 2POTS
S/W Version       : E1.0.1.7

01/01/1970          SYSTEM ID: PG-PLUS SYSTEM          00.07.39
    
```

RTs Inventory Screen

Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

```

PG-Plus Dual HDSL CO Line Unit #1
MAIN PERFORMANCE ALARMS CONFIG TEST INFO
Inventory RLU(s)

RLU-A          RLU-B
Model Number   : PRL-784          PRL-784
List Number    : 1B              1B
CLEI           : S9MSCLAARA       S9MSCLAARA
Serial Number   : 032728000471    032728000472
H/W Part Number : 150-1684-21     150-1684-21
H/W Revision    : E33             E33
FPGA Type      : FPGA-15         FPGA-15
FPGA Version    : 10             10

BOOT PROGRAM
S/W Program Type : RLU 2POTS BOOT   RLU 2POTS BOOT
S/W Version      : E1.0.1.4        E1.0.1.4

APPLICATION PROGRAM
S/W Program Type : RLU 2POTS        RLU 2POTS
S/W Version      : E1.0.1.5        E1.0.1.5

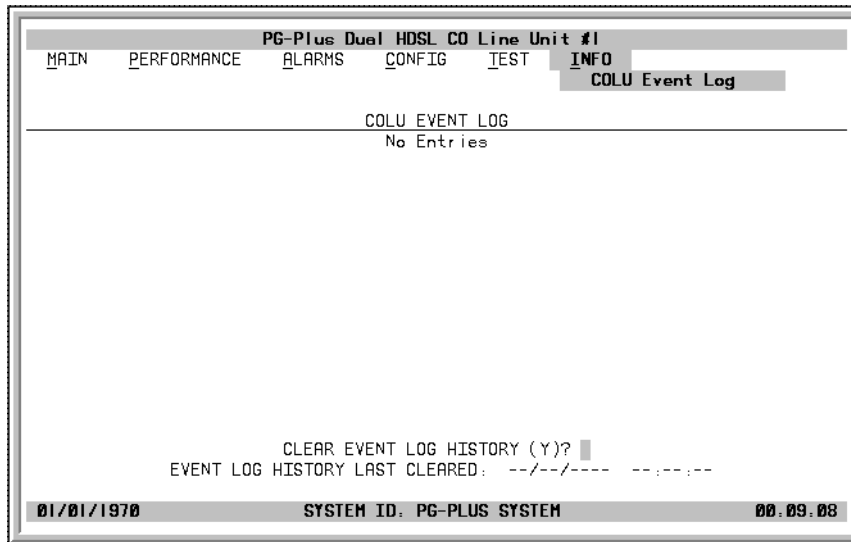
01/01/1970          SYSTEM ID: PG-PLUS SYSTEM          00.08.34
    
```

COLU Event Log

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

- **MEMVER** A provisioning database conversion occurred when a software download occurred. MEMVER is informational only. This Event is cleared if you reseal 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.

Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.

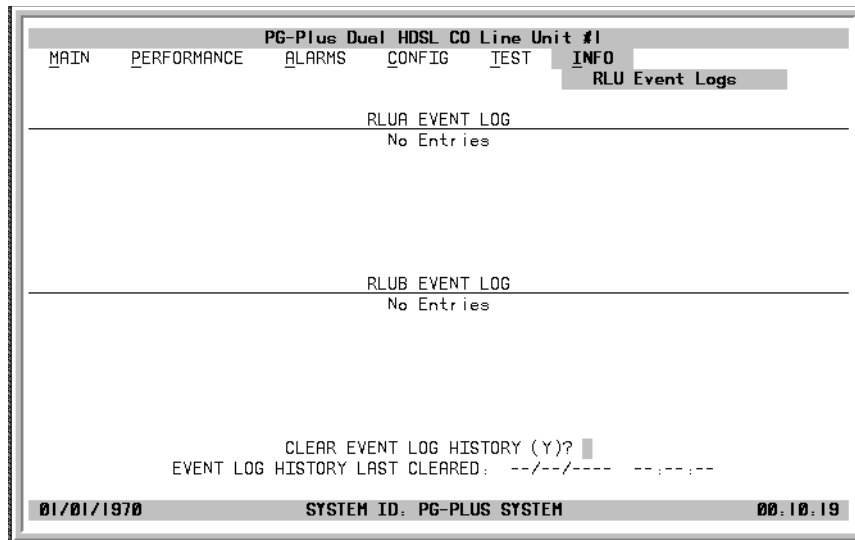


RT Event Log

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

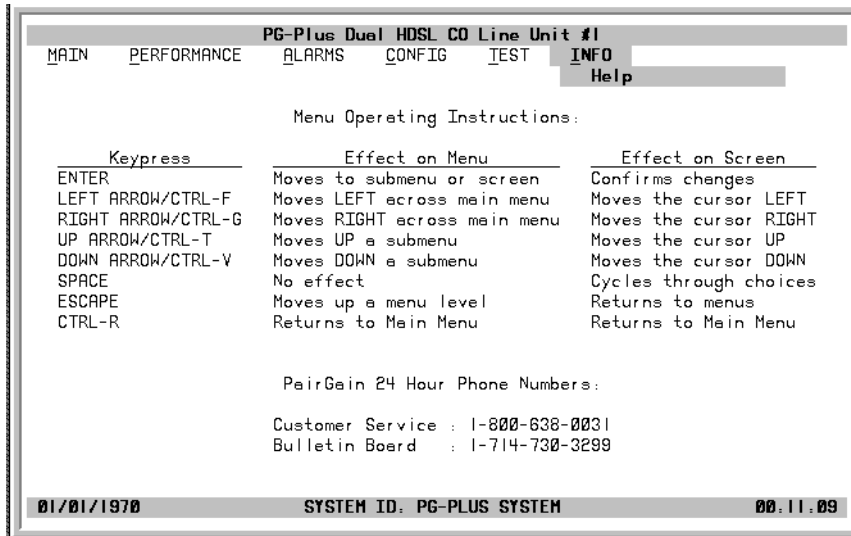
- **MEMVER** A provisioning database conversion occurred when a software download occurred. MEMVER is informational only. This Event is cleared if you reseal the COLU, however it is not required. No customer action is required.
- **MEMCHK** The provisioning factory defaults were restored due to a corrupted 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.

Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.



Help Screen

Provides information on using the PAU-710 screens and menus. The Help screen also lists the PairGain Customer Support and Bulletin Board telephone numbers. Press **ESC** to move up a menu level, or **CTRL + R** to return to the PAU/PMU Main menu.



FAULT ISOLATION

The following sections detail the fault isolation procedures. For sections that indicate a condition such as “distance limitation exceeded”, refer to the section “Specifications” on page 2 for the correct values.

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 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 indicated by the COLU LEDs.

No LEDs On

- processor in the COLU stopped
 - 1 Remove and re-insert the COLU.
 - 2 At the Craft interface, go to the COLU Main Screen to view the Performance report to verify that no alarms exist. If you cannot view the COLU Main Screen, a communication error exists indicating a faulty COLU.
 - 3 If the LEDs do not illuminate, replace the COLU.

PWR LED Off

- no input power
- on-board fuse is blown on COLU
 - 1 Check input power at COTS backplane with COLU removed.
 - 2 If power is present at COTS backplane, replace the COLU.

PWR LED**Flashing**

- HDSL line open
- an overload exists
- HDSL line Ground Fault Tip or Ring
 - 1 Check line continuity and resistance.
 - 2 COLU power supply or the RT may be faulty.

Fault LED On

- indicates an existing alarm condition on the COLU
 - 1 At the Craft 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 you cannot view the COLU Main Screen, a communication error exists.
 - 2 Remove and re-insert the COLU.
 - 3 If the communication error still exists, replace the COLU.

Margin LED On

- distance limitation exceeded
- fault in HDSL line.
- faulty COLU
 - 1 At the Craft 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 LED**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 COLU and/or the RT.

SYNC LED Off

- HDSL line has lost synchronization
- distance limitation may have been exceeded
- faulty COLU
 - 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 COLU and/or the RT.

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.

No dialtone, can not dial

- Short-circuit or open-circuit
- faulty COLU or RT
 - 1 At the CO using the Craft screen, select TEST menu option, and view the test results. The tests run are for Hazardous Potential, Foreign Voltage, Resistive Fault, and CPE Termination.
 - 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 Specification table)
- faulty RT or COLU
 - 1 At the CO, using the Craft interface, go to the COLU Main Screen to verify the correct operation of the COLU. Check the front panel LEDs for flashing while line is ringing. If you cannot view the COLU Main Screen, a communication error exists indicating a faulty COLU. Remove and re-insert the 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 RTs, check for ringing 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 RTs.
 - 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
- loop length too long
- faulty RT
 - 1 If phone stops ringing when using a butt-in set at the subscriber location, the subscriber's station internal resistance is too high. Replace phone.
 - 2 If phone does not stop ringing when using a butt-in set at the subscriber location, one or both of these conditions exist:
 - loop length is too long (refer to Specification table)
 - or the RT is faulty.

Can not hear, can not be heard

- subscriber problem
- faulty COLU or RT
 - 1 Open the RJ-11 test jack at the RT. If audible level is acceptable, the problem is with subscriber equipment.
 - 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

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

Telephone: (800) 638-0031 or (714) 832-9922
Fax: (714) 832-9924

During normal business hours (8:00 AM to 5:00 PM, Pacific Time, Monday through Friday, excluding holidays), technical assistance calls are normally answered directly by a Customer Service Engineer. At other times, a request for technical assistance is handled by an on-duty Customer Service Engineer through a callback process. This process normally results in a callback within 30 minutes of initiating the request.

In addition, PairGain maintains a computer bulletin board system for obtaining current information on PairGain products, product troubleshooting tips and aids, accessing helpful utilities, and for posting requests or questions. This system is available 24 hours a day by calling (714) 730-2800. Transmission speeds up to 28.8 kbps are supported with a character format of 8-N-1.

WARRANTY

PairGain Technologies warrants this product to be free of defects and to be fully functional for a period of 60 months from the date of original shipment, given correct customer installation and regular maintenance. PairGain will repair or replace any unit without cost during this period if the unit is found to be defective for any reason other than abuse or incorrect use or installation.

Do not try to repair the unit. If it fails, replace it with another unit and return the faulty unit to PairGain for repair. Any modifications of the unit by anyone other than an authorized PairGain representative voids the warranty.

If a unit needs repair, call PairGain for a Return Material Authorization (RMA) number and return the defective unit, freight prepaid, along with a brief description of the problem, to:

PairGain Technologies, Inc.
14352 Franklin Avenue
Tustin, CA 92780
ATTN: Repair and Return Dept.
(800) 638-0031

PairGain continues to repair faulty modules beyond the warranty program at a nominal charge. Contact your PairGain sales representative for details and pricing.

FCC COMPLIANCE

This unit complies with the limits for Class A digital devices 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, can cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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

- Cabling
- Correct connections
- Grounding

MODIFICATIONS

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by PairGain Technologies, Inc. may void the user's authority to operate the equipment.

All wiring external to the products should follow the provisions of the current edition of the National Electrical Code.

Corporate Office

14402 Franklin Avenue
Tustin, CA 92780

Tel: (714) 832-9922

Fax: (714) 832-9924

For Technical Assistance:

(800) 638-0031

