
HIGAIN LINE UNIT

QUICK INSTALLATION GUIDE

Model	List Number	Part Number	CLEI Code
HLU-319	5C	150-1140-53	T1L2B27AAA



PAIRGAIN TECHNOLOGIES, INC.
ENGINEERING SERVICES



SECTION 350-319-153-01

Revision History of This Practice

Revision	Release Date	Revisions Made
01	April 30, 1999	Initial Release

USING THIS MANUAL

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.

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TABLE OF CONTENTS

Overview	1
Product Description	1
Compatibility	4
Installation	5
Provisioning	6
Navigation Keys.....	6
Selecting an Option.....	7
Loopbacks	8
Specifications	9
Product Support	11
Technical Support	11
BBS	11
World Wide Web	12
Documentation	12
Returns	12
Abbreviations	14
Certification and Warranty	15

LIST OF FIGURES

Figure 1. HLU-319 List 5C Front Panel2

Figure 2. Installing the HLU-3195

Figure 3. Loopback Functions with Doublers8

Figure 4. HLU-319 Card-Edge Connector Pinouts10

LIST OF TABLES

Table 1. Front Panel Features3

Table 2. Status LED.....3

Table 3. Navigational Keys on the Maintenance Terminal6

OVERVIEW

The PairGain® HiGain® Model HLU-319 List 5C is the Central Office (CO) side of a repeaterless T1 transmission system. It is used in conjunction with a HiGain Remote Unit (HRU) or HiGain Doubler Unit(s) (HDU) to provide a complete HiGain High-bit-rate Digital Subscriber Line (HDSL) system.

The CSA includes loops up to 12,000 feet (3658m) of 24 AWG or 9,000 feet (2743m) of 26 AWG, including bridged taps. The HiGain system uses HDSL transmission technology as recommended by Bellcore TA-TSY-001210. The HiGain system complies with GR-63-CORE, TR-TSY-000499, and GR-1089-CORE.

The HLU-319 List 5C supports Digital Data Service (DDS) loopback commands and has special features as described in the technical practice for the unit (see [“Documentation” on page 12](#)).

PRODUCT DESCRIPTION

The HLU-319 List 5C front panel features are shown in [Figure 1 on page 2](#) and described in [Table 1 on page 3](#).

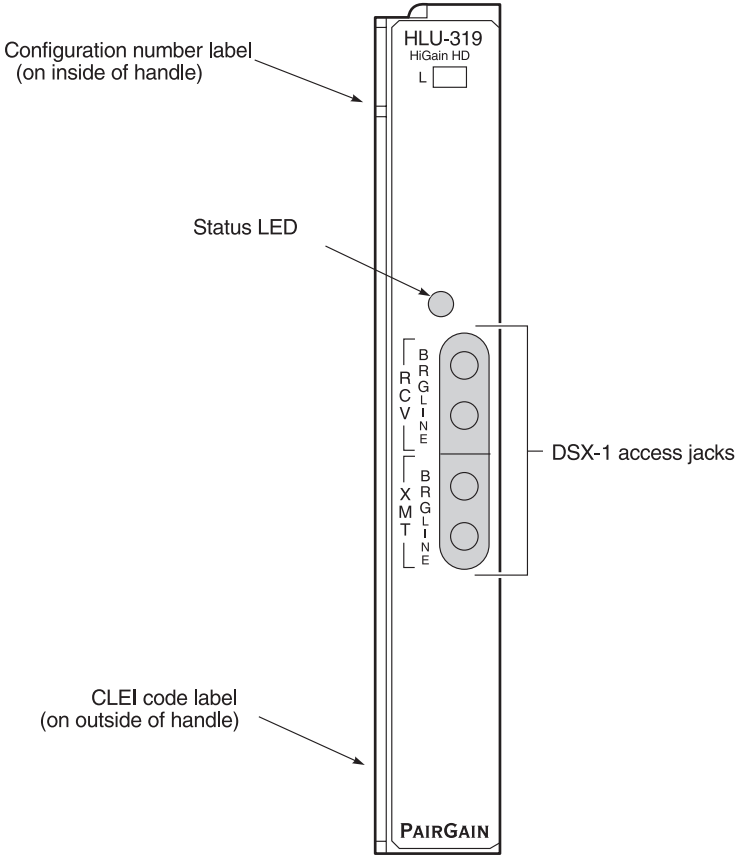


Figure 1. HLU-319 List 5C Front Panel

Table 1. *Front Panel Features*

Front Panel Feature	Function
List number	Identifies a specific version of the HLU-319.
Status LED	See Table 2 for status descriptions.
DSX-1 access jacks	
Line	Provides splitting jack access to and from the HDSL line at the DSX-1 interface. Breaks the Transmit (XMT) and Receive (RCV) paths to permit test signal insertion and retrieval.
BRG	Provides non-intrusive bridging jack access to (XMT) and from (RCV) the HDSL span at the DSX-1 interface. Allows the two T1 payloads to be monitored.
CLEI and bar code labels (on the inside of the handle)	Provides the human-readable Common Language Equipment Identifier (CLEI) code number and the Equipment Catalog Item (ECI) bar code number.
Configuration number (on the outside of the handle)	<p>Contains either a five or six-digit warranty configuration number or a stand-alone two or three-digit configuration number as follows:</p> <ul style="list-style-type: none"> Digit 1 - Last digit of shipment year Digits 2 and 3 - Shipment month Digits 4, 5, and 6 - Configuration number <p>The configuration number can also be found on a small bar label that also contains the Julian date code and part number. This gummed label may be attached to the PC board or to the front panel.</p>

Table 2 describes the status LED.

Table 2. *Status LED*

LED Status	Description
Green	Normal operation
Flashing green	HDSL acquisition
Red	Fuse Alarm
Flashing red	System alarm
Yellow	Self Test is in process or an HLU Customer Remote Loopback (CREM) or a Network Local Loopback (NLOC) is in effect.
Flashing yellow	HLU is in an Armed state

COMPATIBILITY

The HLU-319 List 5C is compatible with the following T1 repeater shelves and associated equipment:

- PairGain HMS-357 Wideband 3190 (28-slot, 23-inch shelf)
- PairGain HMS-317 (28-slot, 23-inch shelf)
- PairGain HMS-318 (22-slot, 19-inch shelf)
- PairGain HHS-319 (3-slot, 19-inch horizontal shelf)
- PairGain HMS-308 (8-slot remote enclosure)
- Charles Ind. #3192 (28-slot connectorized)
- Charles Ind. #3192-9F Alarm Card
- Charles Ind. #3192-WR (28-slot wire wrap)
- Charles Ind. #343-00 (12-slot to 14-slot wire wrap)
- Charles Ind. #319-02 (22-slot connectorized)
- Charles Ind. #319-04 (22-slot wire wrap)
- Charles Ind. #340-00 (9-slot to 11-slot wire wrap)
- Larus #1185 (28-slot connectorized)
- Larus #1184 Alarm Card



The Charles Ind. 343-00 and 340-00 shelves do not support the HLU-319 System Alarm output on pin H. Also, if slots 1 and 2 of these shelves are wired for the 3408 Fault Locate unit, they must be rewired to accept the HLU-319.

INSTALLATION



Upon receipt of the equipment, 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 Technologies.

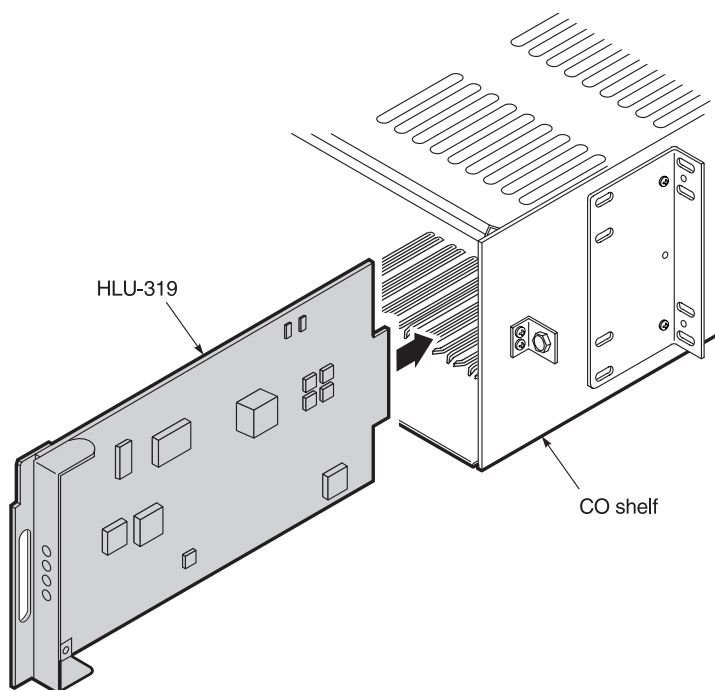


Figure 2. Installing the HLU-319

- 1 Slide the HLU-319 into the card guides for the desired slot, then push the unit in until it touches the backplane card-edge connector.
- 2 Place your thumbs on the HLU-319 front panel and push the HLU into the card guides until the card is properly seated.
- 3 Configure the HLU according to the instructions in “[Provisioning](#)”.

PROVISIONING



The maintenance terminal screens cannot be accessed through the HLU-319 List 5C, as this model does not provide a craft port. View these maintenance terminal screens through the HiGain Management Unit (HMU) or OS port located on the rear of the HiGain shelf or WBS-3190.

The HLU-319 List 5C contains Non-volatile Random Access Memory (NVRAM) which stores the system option settings. System settings are retained if shelf power is lost or if the HLU-319 is unplugged. [No Dual In-line Package (DIP) switch or jumper settings are required.]



If using the Microsoft Windows terminal emulation program, deselect **Show Scroll Bars** and **Use Function, Arrow, and Ctrl Keys for Windows** from the Settings Terminal Preference menu.

NAVIGATION KEYS

Table 3 lists keys you can use on the maintenance terminal to navigate within the Maintenance Terminal screens.

Table 3. *Navigational Keys on the Maintenance Terminal*

Key	Function
U	Updates a report.
C	Clears a report.
S	Selects the next Span Status screen, or 1 , 2 , 3 , 4 , or 5 will access span directly (for doubler applications).
P	Selects the previous page of a report.
N	Selects the next page of a report.
E	Exits the current screen.

SELECTING AN OPTION

To select an option within the Maintenance Terminal screens, you can:

- Press the key indicated to the left of the selection.
- Press the letter in parenthesis of the parameter to be changed.

An invalid entry produces the following message and identifies the name of a field where the invalid entry occurred:

```
> error
```

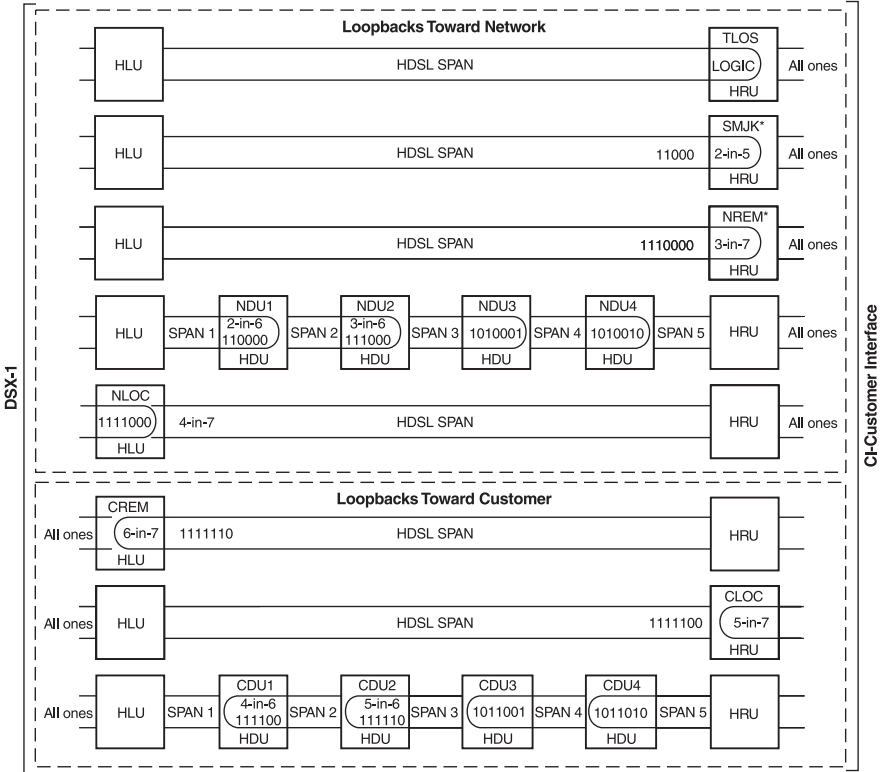
This happens only for margin alarm threshold or DSO blocking.



For complete details on the HLU Maintenance Terminal screens, refer to the technical practice for the HLU-319 List 5C (see “[Documentation](#)” on page 12.)

LOOPBACKS

Figure 3 shows loopback functions with doublers.



* Set the SAIS option to ENA to send the AIS (all ones) pattern to the CI during SmartJack loopback, NREM, and TLOS. Use the 3-in-5 code to loop down.

Figure 3. Loopback Functions with Doublers

SPECIFICATIONS

Maximum Power Consumption and Heat Dissipation

The maximum power consumption and heat dissipation varies with the type of remote and doubler units in the system as well as the CPE power setting. See the “HLU-319 List 5C Technical Practice” (150-319-153-xx) for the maximum power consumption and heat dissipation for your system. (See “[Documentation](#)” on page 12 of this quick installation guide.)

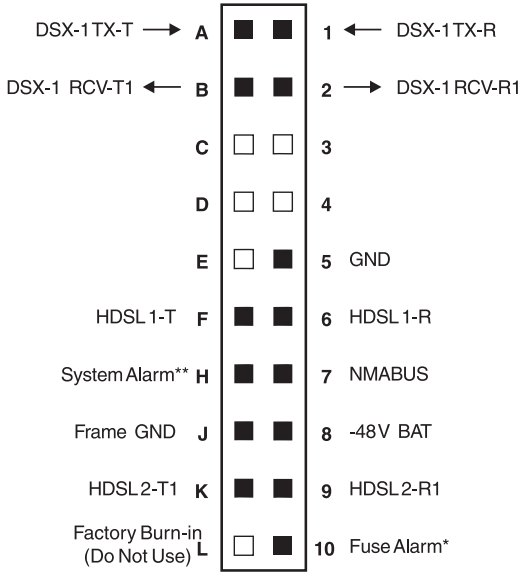
Mounting

Synchronous Transport Signal (STS) high-density slot

Dimensions

Height:	4.75 in. (12.1 cm)
Width:	0.625 in (1.59 cm)
Depth:	10 in. (25.4 cm)
Weight:	8 oz. (.23 kg.)

The HLU-319 card-edge connector pinouts are shown in Figure 4. Active pins are shown in black.



* Fuse Alarm
 Normal = Floating (0 to -60 Vdc Maximum)
 Activated = -48 Vdc, 10 mA Maximum

** System Alarm
 Normal = Floating (+5 to -60 Vdc Maximum)
 Activated = +5 V, 10 mA Maximum

Figure 4. HLU-319 Card-Edge Connector Pinouts

PRODUCT SUPPORT

PairGain Customer Service Group provides expert pre-sales and post-sales support and training for all its products.

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 The 800 telephone support line is toll-free in the U.S. and Canada.
Fax:	(714) 832-9924
Email	support@pairgain.com

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.

BBS

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.

WORLD WIDE WEB

PairGain product and company information can be found at <http://www.pairgain.com> using any Web browser.

DOCUMENTATION

The HLU-319 List 5C has a complete technical practice, Section number 150-319-155-xx, that you can download from the PairGain Technical Manuals Web page at: www.pairgain.com. A password is required. If you do not have a password, contact your PairGain sales representative.

If you have any comments on any PairGain documentation, send e-mail to technical_publications@pairgain.com. Type the product name and the section number of the document in the subject area of the email message.

RETURNS

To return equipment to PairGain:

- 1 Locate the number of the purchase order under which the equipment was purchased. You will need to provide this number to PairGain Customer Service to obtain a return authorization.
- 2 Call or write PairGain Customer Service to ask for a Return Material Authorization (RMA) number and any additional instructions. Use the telephone or fax number listed below:
 - Telephone: (800) 370-9670
 - Fax: (714) 730-2961
- 3 Include the following information, in writing, along with the equipment you are returning:
 - Company name, address, and the name of a person PairGain can contact regarding this equipment.
 - The purchase order number provided to Customer Service when the RMA number was requested.

- A description of the equipment, as well as the number of units that you are returning. Be sure to include the model and part number of each unit.
 - The shipping address to which PairGain should return the repaired equipment.
 - The reason for the return, for example:
 - The equipment needs an ECO/ECN upgrade.
 - The equipment is defective.
- 4** Pack the equipment in a shipping carton.
- 5** Write PairGain's address and the RMA number you received from Customer Service clearly on the outside of the carton:

PairGain Technologies, Inc.
14352 Franklin Ave.
Tustin, CA 92780-7013

Attention: **CRF RMA (Number)**

ABBREVIATIONS

CI	Customer Interface	HMU	HiGain Management Unit
CLEI	Common Language Equipment Interface	HRE	HiGain Remote Enclosure
CO	Central Office	HRU	HiGain Remote Unit
CREM	Customer Remote Loopback	LED	Light Emitting Diode
DDS	Digital Data Service	NLOC	Network Local Loopback
DIP	Document Image Processing	NVRAM	Non-volatile Random Access Memory
DSX-1	DS-1 Cross-connect frame	RCV	Receive
ECI	Equipment Catalog Item	RMA	Return Material Authorization
HDSL	High-bit-rate Digital Subscriber Line	STS	Synchronous Transport System
HDU	HiGain Doubler Unit	XMT	Transmit
HLU	HiGain Line Unit	ZBTS	Zero Byte Timeslot
HMS	HiGain Management Shelf		

CERTIFICATION AND WARRANTY

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 this manual for guidance on: Cabling, correct connections, grounding.

UL LISTING

The HLU-319 List 5C is listed with the Underwriter Laboratory.

Use caution when installing or modifying telephone lines. Dangerous voltages may be present. Do not install telephone wiring during a lightning storm. Always disconnect telephone lines and power connections from wall outlets before servicing or disassembling this equipment.

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

WARRANTY

PairGain Technologies warrants this product to be free of defects and to be fully functional for a period of 60 month from the date of original shipment, given correct customer installation and regular maintenance. PairGain will repair or replace at Pairgain's option 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.

MODIFICATIONS

Any changes or modifications made to this device that are not expressly approved by PairGain Technologies, Inc. may void the user's warranty.

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

