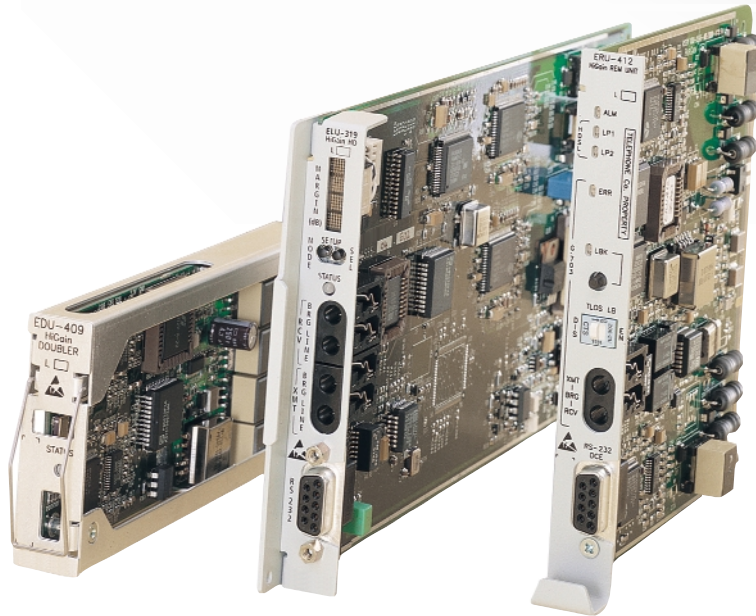


## HiGain E1 Access Solutions

Efficient E1 Access From  
The Industry leader



A widely deployed replacement for repeatered E1, HiGain® E1 brings the highest level of performance, ease of deployment and cost efficiency to the HDSL market. The HiGain E1 product family consists of line units, remote units, doublers and enclosures that are optimized to make HDSL less costly to deploy. HiGain E1 maintains full compatibility and interoperability with legacy HiGain products and systems, allowing you to protect your current investment in HDSL, while benefiting from our latest technology developments.

HiGain E1 is a complete HDSL system that allows for the transmission of the 2.048 Mbps G.703 E1 data in place of the traditional repeatered G.703 E1 carrier systems. This solution operates over a two-pair unconditioned copper loop and provides a reach of 4.4 km (0.51 mm wire) per span. HiGain has the ability to accommodate four spans for a total reach of 17.6 km (0.51 mm wire).

### Features:

- 4-span reach (17.6 km on 0.51 mm or 22.8 km on 0.6 mm)
- 4-span line powering (3 doublers/1 remote)
- Low power consumption/heat dissipation
- Low voltage (<140 VDC) powering of up to two spans (one doubler)
- Advanced ground fault detection with special alarm
- Safest line powering
- Inventory screen
- Ultra-low system delay
- Ultra-low wander (Stratum 1 clock capable)
- Loopback activation from the remote unit
- Full compatibility with the installed base of HiGain systems



# Description

## Significant Cost And Performance Benefits

### Low Deployment Costs

- Low power dissipation (5W-ELU, 3W-EDU, 3W-ERU) allows more systems to be deployed from the central office (CO)
- A compact design allows more doublers and remote units to be installed in existing enclosures
- Backward compatibility means your existing investment is preserved
- Systems can be configured without the cost of separate control, maintenance, and power units

### The Solution With A Future

- The industry's longest reach means that you can extend the performance and reliability advantages of HDSL to encompass more users
- The functionality of HiGain E1 enables you to accommodate emerging applications

### Performance

- High-performance SDH interoperability is enabled through the ability to carry Stratum 1 clock
- Ultra-low system delay and reduced jitter and wander enhance system performance

### Easy System Monitoring

- Detailed front-panel displays eliminate the need for separate monitoring units or maintenance terminals
- Comprehensive status and operating information is available on both line and remote units
- Front-panel jacks allow for quick troubleshooting with existing test sets

### Management

- Systems are fully network manageable
- TAO users can use a dial-up network for both provisioning and autonomous alarm reporting

### Reliability

- Proven MTBF in excess of 120 years reduces the overall maintenance costs

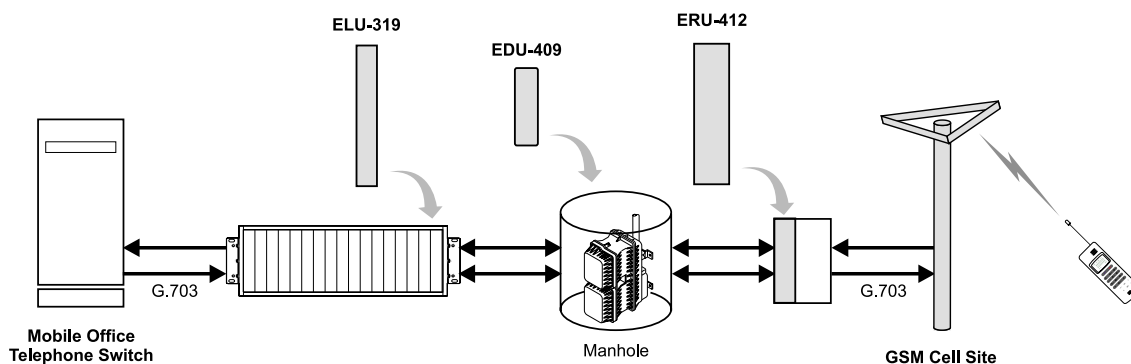


Figure 1: HiGain E1 Application

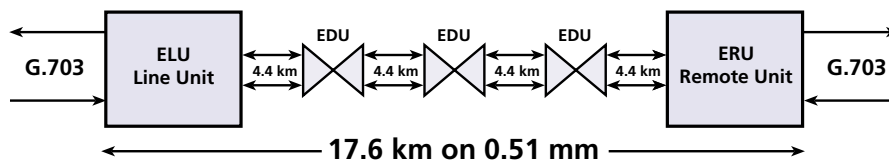


Figure 2: 4-Span, Line Powered



# Description

## HiGain E1 Line Units

The HiGain E1 line unit (ELU) extends the fastest HDSL deployment with full G.703 E1 transport at 2.048 Mbps. This high-density line unit offers full compatibility and interoperability with HiGain products and systems. The CO side uses an E1 line unit (ELU) that can be installed either on existing CO shelves, or in ADC's HiGain managed shelves (HMS) or HiGain CO shelves (HCS). In addition, ADC makes a number of shelves for deploying line units in remote or customer premise environments.



### Ordering Information

Model	Application
ELU-319, L5E	Line unit with G.703, 75 Ω interface, "3192" mechanics
ELU-319, L6E	Line unit with G.703, 120 Ω interface, "3192" mechanics

## HiGain E1 Doubler Units

The addition of the HiGain E1 doubler unit allows HiGain systems to be used for applications at greater distances, increasing the range by a factor of two (8.8 km), three (13.2 km) or four (17.6 km) on 0.51 mm cable. HiGain E1 doubler units (EDU) can be deployed in the existing repeater enclosures, or in a HiGain remote enclosure for higher deployment density and lower deployment costs. EDUs are designed to plug into enclosures for both above and below ground installations.



### Ordering Information

Model	Application
EDU-409, L1	Micro doubler unit, single-slot, "239" mechanics

## HiGain E1 Remote Units

ADC's HiGain E1 remote units (ERU) are designed to install in a variety of remote enclosures, both indoor and outdoor, or existing remote mountings on or near customer premises. They operate as slaves to the HiGain line unit and incorporate loopback functions and LED indications for simple installation and maintenance. The HiGain E1 remote units (ERU) provide a G.703 interface to the customer.



### Ordering Information

Model	Application
ERU-412, L1E	Remote terminal, line powered, G.703, 75 Ω, "200" mechanics
ERU-412, L2E	Remote terminal, line powered, G.703, 120 Ω, "200" mechanics

# Specifications

The following specifications are applicable to HiGain E1 products when they are used as a complete end-to-end system.

HDSL Transmission	Line Code: 1040 kbps 2B1Q Transmission: dual-duplex Media: two non-loaded, two-wire metallic cable pairs Output Signal: +13.5 dBm $\pm$ 0.5 dB into 135 $\Omega$ Impedance: 135 $\Omega$ Maximum Provisioning Loss: 35 dB at 260 kHz, 135 $\Omega$
G.703 Interface (CO and Remote Sides)	Impedance: 75 $\Omega$ (ELU-319, L5E) or 120 $\Omega$ (ELU-319, L6E) Line Rate: 2.048 Mbps $\pm$ 200 bps Line Format: HDB3 Frame Format: unframed
System	One-way E1 delay: <200 $\mu$ s (ELU and ERU) + <80 $\mu$ s EDU Wander (looped): 0.3 UI max (1 UI = 488 ns) Wideband Jitter (looped): 0.2 UI max Narrowband Jitter (looped): 0.1 UI max
Reach	Each Span: 3.3 km on 0.4 mm or 4.4 km on 0.51 mm Number of Spans: 4 line powered
G.703 Test Access	CO Side: "210" Bantam Jacks: bridging, splitting/line, splitting/drop Remote Side: "210" Bantam Jacks: bridging (monitor and test)
Alarms	Fuse Open: LLOS, RLOS, LOSW, BER, margin, power feed short or ground
Loopbacks	Direction: NI, CI HiGain: activated from craft port (ELU and ERU), system options buttons (ELU) or loopback button (ERU)
User Interfaces	Craft Port: RS-232 (DCE) at the line and remote unit Front Panel: four-character display, status LED, system options buttons at the line unit, status LEDs at the remote unit
Provisionable Options	Power feed mode, BER alarm threshold, loopback timeout, alarm disable
Line Powering	Modes: low, auto, high, disable Line Voltage: $\leq$ 140 VDC or $\pm$ 112 VDC
Power	CO Supply: -48 VDC (nom.) (-42.5 VDC to -56.5 VDC)
Environmental (Operating)	Humidity: 5% to 95% (non-condensing) Temperature: -40° C to 70° C
Regulatory Compliance	CE mark, UL 1459, CSA, FCC Rules Part 15 Class A, CISPR-A
Compatible HiGain Products	HCS-402 L3: CO shelf (2 HLUs), "220/ 3192/DDM+" mechanics HHS-319: horizontal shelf (3 HLUs), "3192" mechanics HMS-308: managed shelf (8 HLUs), "3192" mechanics HMS-318 L2: managed shelf (19", 22 HLUs), "3192" mechanics HRE-204: remote enclosure, "200" mechanics, 4-slot HRE-420: remote enclosure, "400" mechanics, single-slot HRE-422: remote enclosure, "400" mechanics, two-slot HRE-454: remote enclosure, "400" mechanics HRE-458: doubler enclosure, "239/ISDN" mechanics, 10-slot, outdoor HRE-602: doubler enclosure, "239/ISDN" mechanics, single-slot, outdoor HRE-819: doubler enclosure, "239/ISDN" mechanics, 12-slot, outdoor HUS-340: universal shelf (19", 3 HLUs), "400" mechanics



## Web Site: [www.adc.com](http://www.adc.com)

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