

OVERVIEW

The Evolution Series PD25L has been designed for cost-critical Modem applications and discerning users who demand quality and reliability at an affordable price. This **25Mbps** capable L-band Modem offers full compliance with IESS-308, 309, 310, 314 & 315, plus a range of data interfaces including Ethernet. An optional integrated BUC / LNB power supply and high-stability 10MHz reference simplifies system architecture, and FSK control of the BUC is also available via the Modem. Core functions are implemented with programmable logic, which allows easy reconfiguration to the needs of the user, and provides future-proof flexibility.

EASE OF OPERATION

The Modem firmware and software is easily upgraded through an Ethernet management port, plus an innovative new menu structure makes configuration a simple procedure. Advanced user interfaces support the display of text in different languages for universal appeal, and a unique Web User Interface offers full remote control and in-depth performance analysis tools using Internet Explorer without special Monitor & Control software.

FEATURES

- ▶ MIL 188/165A compliant
- ▶ Field upgradeable feature set
- ▶ 4.8kbps to 2,048kbps in the base modem; options to 25Mbps
- ▶ RS422, X.21, V.35, RS232 interfaces; HSSI, Serial LVDS, Eurocom D/1, Quad E1, G.703 E1/E2/E3/T1/T2/T3 (options) and Ethernet, IP Acceleration (optional)
- ▶ BUC control via FSK (optional)
- ▶ Ethernet Bridging, plus Brouting (option)
- ▶ BPSK, QPSK, OQPSK, 8PSK (option) & 16QAM (option)
- ▶ Multi-rate 2nd Generation Turbo (TPC), Viterbi, TCM & Reed-Solomon FEC options
- ▶ 950 - 1950MHz L-Band in 100Hz steps
- ▶ Closed Network, Closed Network + ESC, IBS/SMS (option) and IDR (option)
- ▶ Drop and Insert to E1/T1 (option) with extended functions: RBS, CAS
- ▶ Built-in 1:1 Redundancy Controller
- ▶ Embedded web server accessed via standard web browser for management and remote control
- ▶ DC power to the LNB (standard), DC power to the BUC (optional)

REMOTE CONTROL & WEB INTERFACE

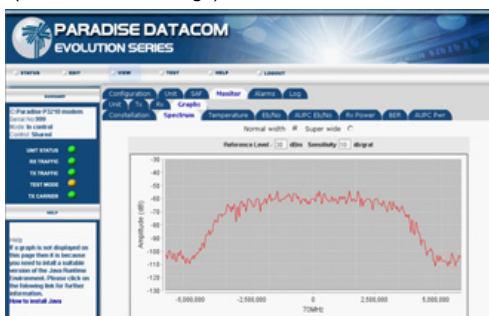
- ▶ 48V dc Primary Power input option
- ▶ Web User Interface available via embedded web server including (patent pending); Receive Spectrum Analyzer, Receive Constellation Monitor, BER Tester and graphing Eb/No, Rx Power, BER plus other parameters, using Internet Explorer
- ▶ Ethernet with embedded web server and SNMP network management support
- ▶ RS485 multi-drop addressable
- ▶ M&C via Satellite ESC channel for distant control of Modems and other devices
- ▶ RS232 for direct PC connection

Advanced ESC and Advanced Aux Option Specifications	
Parameter	Evolution Series Modem
ESC/Aux Port	A single port provides the interface for optional high rate async ESC (IBS/SMS option or Closed Net Plus ESC) or the Intelsat low rate async IBS ESC channel.
Electrical Interface	RS232, RS422 or RS485 external interfaces or internal link to remote M&C port (software selected). Other devices externally wired in parallel with M&C port can also be accessed remotely.
Async ESC Option	Closed Net Plus ESC Overhead scales to provide any user specified async ESC baud rate whatever the satellite data rate. ESC limit is approximately 70% of main channel rate, overhead varies from <0.5% to >70%.
	IBS Option High rate async data using from 1/32nd to 22/32nd of the IBS overhead, providing async baud rates from 0.2% to 5.1% of the terrestrial rate (e.g., up to >2400 baud at 64kbps). Includes modes compatible with the P300 and P400 Series, P230 & P1300/P1361 (using 20/32nd of the overhead).
IBS Aux Data Channel	With IBS option and Advanced Aux option: Intelsat low rate async ESC definition carried in bit 1 of TS32 providing a synchronous channel at 1/480th of the data rate, allowing up to one quarter of this rate for over-sampled async data. Compliant with Intelsat IESS-403 low rate ESC definition.

Ethernet Traffic	
Parameter	Evolution Series Modem
Standard (unaccelerated)	Throughput depends on traffic format – formats such as UDP that do not require acknowledgements run at up to the maximum data rate of the modem – unaccelerated TCP (which requires acknowledgements) will typically run up to 128kbps per connection, 80 Connections/Sec
PEP (TCP/IP acceleration) Option	Performance Enhancing Protocol (acceleration) for TCP/IP traffic - overcomes performance problems associated with TCP over satellite. Maximum throughput 8,448kbps
Traffic mode	Bridging (standard) for point-to-point operation Brouting (Option) for point-to-multipoint and satellite network plus non-satellite return. Mesh network support. User selectable bridge between Ethernet traffic and Ethernet M&C port.
DHCP	Dynamic Host Control Protocol allows modem IP address to be allocated dynamically from an external DHCP network server.
Header Compression	Compression of UDP and IP packet headers at data rates of up to 2Mbps.
IEEE 802.1p/q	IEEE 802.1p Quality of Service supporting the choice of strict priority queuing or fair weighting queuing.
	IEEE 802.1q VLAN support
IP Traffic card & options	Supports TCP acceleration with maximum throughput rates of 16,896kbps or 25Mbps (Option), subject to compatible options in the host modem. Supports up to 1000 concurrent TCP connections. Overcomes the inherent limitations of standard TCP/IP over satellite. Improves the bandwidth utilisation to approximately 90% of selected data rate, with acceleration on. Reduces the inefficiencies of the standard TCP slow start algorithm. Prevents unnecessary activation of TCP congestion control algorithm. Supports compression of UDP and IP packet headers at throughput rates up to 16,896kbps, subject to compatible options in the host modem. Dual RJ45 ports support 10/100/1000 BaseT Ethernet. Improves security by separating IP Traffic from Ethernet remote M&C on chassis. Can be operated in stand-alone, 1:1 or 1:N redundancy configuration.

Unique Web User Interface provides full Monitor & Control plus graphing of Eb/No, BER, Receive Power and other operating parameters, plus a Receive Constellation Monitor, Receive Spectrum Analyser and BER Tester for detailed signal analysis and performance validation via Internet Explorer. Logged graph data can be sent via email to any email address.

Built-in Spectrum Analyser for Receive Carrier, Adjacent Carrier and Super-Wide Monitoring (3 bandwidth settings).



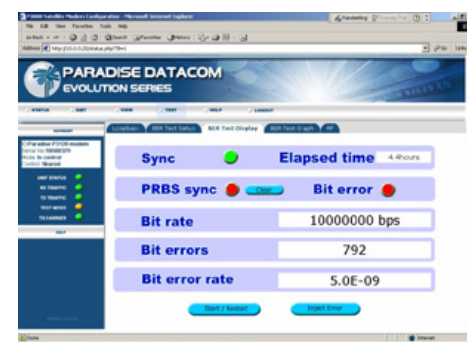
IDR Option Specifications	
Parameter	Evolution Series Modem
IDR ESC Audio	Two 32kbps ADPCM channels
Interface	4-wire 600Ω, +70dBm to -16dBm (programmable in 0.1dB steps).
Backward Alarms	Outputs: Four "form C" relays. Inputs: Four protected inputs, short to 0V to send alarm with matching summary Rx fail output. Alarm inputs software configurable for: a) All external patch, b) 1=Rx fail and 2-4 =external patch, c) 1=Rx fail and 2-4=OK, d) 1-4=Rx fail
ESC/Aux Ports	When the IDR option is fitted, independent ESC & Aux ports on the IDR option replace the single shared ESC/Aux port on the base unit.
ESC Port	RS232, RS422 or RS485 external interfaces or internal link to remote M&C port (software selected). No external cabling required between the ESC and M&C ports for M&C via ESC channel within overhead. Other devices externally wired in parallel with M&C port can also be accessed remotely. Provides clock, data and sync (octet timing) lines.
	IDR Synchronous access to 8kbps IDR ESC. With the Async ESC option, async ESC access to the 8kbps IDR ESC is provided giving up to a 9600 baud async channel
Others	IBS and Closed Net Plus ESC facilities as before installation of IDR option, but now on ESC port on IDR card not shared ESC/Aux port of base unit.
	Aux Port RS232 or RS422 (user selectable). Provides clock and data lines.
IDR	Provides 32 or 64kbps access in place of one or both audio ESC channels.
	IBS Intelsat low rate ESC mode as previously but now via Aux port on IDR card not shared ESC Aux port of base unit. IDR option also adds sync IBS mode, configurable to use between 1/32nd and 21/32nd of the IBS overhead providing a full sync Aux port at between 0.2% and 4.3% of the main data rate. Aux port provides satellite timing information for P1500 slave Frequency Standard when not configured for Aux data access.

Traffic Log Specifications	
Parameter	Evolution Series Modem
Capacity	Over 6000 entries
Entry Format	Fault message with time and date stamp. Separate entry when fault clears/changes.

AUPC Specifications	
Parameter	Evolution Series Modem
Modes of Operation	Monitor of distant Eb/No and BER only, full distant Eb/No maintenance. Unidirectional or Bi-directional operation.
Communication Link	Utilises asynchronous ESC channel on IBS/SMS, IDR and Closed Network plus ESC carriers (ESC from 300 baud, i.e., overheads down to less than 1%). Maximum data rate 10 Mbps
User Parameters	Target Eb/No, positive power offset, negative power offset

BERT Option Specifications	
Parameter	Evolution Series Modem
BER Channel	The BERT may operate through main traffic, ESC data or Aux data channels. Use of ESC & Aux data channels allows continuous real traffic BER performance monitoring whilst the modem carries traffic.
Test Patterns	2*11-1, 2*15-1, 2*20-1, selectable, compatible with common stand-alone BER testers.
Results	Display of error count and average BER.
Autolog	Automatic logging of average BER and other parameters at regular intervals.

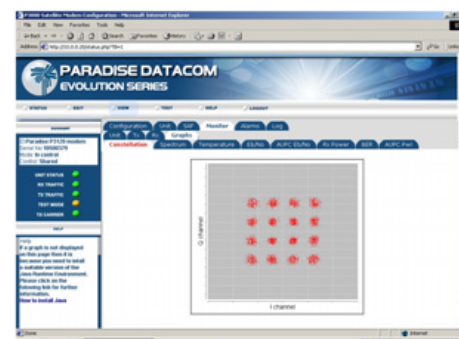
Simple to use BER Tester Option allows real time bit error measurements through traffic or ESC channel.



Common Specifications	
Parameter	Evolution Series Modem
Loop-backs	Interface Loop (Local and Remote) Framer Loop (Local) RS Loop (Local) FEC Loop (Local) Deframer/Framer Loop (Remote) Internal IF loopback (local, automatically matching Rx IF frequency to Tx)
Test Modes	Transmit CW (Pure Carrier) Transmit Alternate 1-0 Pattern Wideband spectrum analyzer display
Alarm Relays	4 Independent Change-Over Contacts: Unit Fault, Rx Traffic Fault Tx Traffic Fault, Deferred Alarm (backward alarm, BER or Eb/No below user set threshold)
Controller	Motorola PowerPC
Embedded Software	Revised embedded software may be downloaded into FLASH memory via Ethernet port with modem remaining in equipment rack.
Configuration Memories	20 configurations can be stored and recalled from the front panel or remote M&C. Memories can be labelled with text string to aid identification.
User Interface	Clear and intuitive operator interface with plain English dialogue (other languages supported). Graphic display, backlight, high contrast, wide angle LCD. 17 key tactile full keyboard.
Remote Monitor And Control	For multi-drop applications, RS485 interface. For direct to PC applications, RS232 interface (front panel selectable). M&C port may be directly internally linked to ESC port for "over-the-satellite" M&C without cabling. Ethernet (10/100 BaseT) via RJ45, embedded Web server, SNMP agent V1, V2c
Redundancy Features	1:1 redundancy controller built in. "Y" cables passively split data maintaining impedances. IF inputs/outputs are passively split/combined outside the units. Off-line unit tri-states data outputs and mutes Tx carrier.
Monitor	0-10V analogue output (Signal level, Eb/No, or Rx offset frequency) on Alarms & AGC connector Buffered constellation monitor port on Async ESC connector
Mechanical	1U chassis – 410mm deep, excluding front panel handles and rear panel connectors and fans.
Weight	3.5 kg
Power Supply	100-240VAC, +6%, -10%, 1A @100V, 0.4A @ 240V, 47-63Hz. Fused IEC connector (live and neutral fused). 48 Volts DC option
Safety	EN60950-1
EMC	EN55022 Class B (Emissions) EN55082 Part 1 (Immunity)
Environmental	Operating Temperature Range 0-50°C

BUC/LNB facilities	
Parameter	Evolution Series Modem
BUC Power Supply Options	Mains input, +48V DC 2A output (100W) to BUC via Tx IFL Mains input, +24V DC 4A output (100W) to BUC via Tx IFL Mains input, +48V DC 3.5A output (180W) to BUC via Tx IFL Mains input, +24V DC 6A output (180W) to BUC via Tx IFL +48V DC input, +48V DC 3.5A output (180W) to BUC via Tx IFL +48V DC input, +24V DC 6A output (180W) to BUC via Tx IFL +48V DC input, +48V DC 3.5A output (180W) to BUC via Tx IFL
LNB Power (standard)	+15/24V 0.5A DC to LNB via Rx IFL - user configurable
FSK Control Option	Requires a BUC Power Supply to be fitted. Allows monitor & control of a compatible BUC from the Modem, via the Tx IFL
10MHz Reference via IFL Option	10MHz may be provided via the Tx IFL to the BUC and via the Rx IFL to the LNB

Built-in Receive Constellation Display for channel diagnostics.



Evolution Series

PD25L L-Band Satellite Modem



Fully configurable - only pay for what you need!

Please select your Modem options and fax to your sales representative or directly to Paradise Datacom.

	Options	Description
PD25L L-Band Base Modem	✓	BPSK/QPSK/OQPSK 4.8kbps to 2,048kbps, 1bps variable rate, closed network modem. Ethernet 10/100 BaseT on RJ45 for M&C, unaccelerated Ethernet 10/100 Base T on RJ45 via traffic or overhead (Ethernet Bridging). Includes: Viterbi FEC, Rates 1/2, 3/4 & 7/8 with k=7 Intelsat Reed-Solomon Outer Codec to IESS 308 Advanced ESC: Variable rate Async channel for Closed Net plus ESC operation. AUPC: Automatic Uplink Power Control (operates through ESC channel) L-Band: 950-1950MHz in 100Hz steps, includes High Stability 4E-8 Internal Reference Remote Web Browser based monitoring tools (Spectrum Display, Constellation Monitor and link performance versus time) plus SMTP email client for status notification DHCP allowing IP address to be allocated dynamically via external DHCP network server Header compression of UDP and IP packet headers at data rates up to 2Mbps IEEE 802.1p QoS supporting choice of strict priority queuing or fair weighting queuing, IEEE 802.1q VLAN support
Adds Data Rates to 5Mbps	E	Extends base operation to 5Mbps
Adds Data Rates to 8,448kbps		Extends 5Mbps operation to 8,448kbps - requires 5Mbps option
Adds Data Rates to 25Mbps		Extends 8,448kbps operation to 25Mbps - requires 5Mbps & 8,448kbps options
IP Acceleration	R	TCP/IP Acceleration to 8,448kbps on base Ethernet port, subject to prevailing data rate limits - overcomes performance problems associated with TCP over satellite
Ethernet Bridging		Ethernet Bridging for Point-to-Multipoint operation when there is a non-satellite return path - can be used with base Ethernet port or IP Traffic card
Position 1 (must choose 1 option) hardware option	H	EIA 530 D25 DCE providing selectable RS422 / X.21 / V.35 / RS232, also balanced G.703 if G.703 option fitted
		IDR operation to IESS 308. Two audio ESC channels, synchronous 8kbps ESC, four from 'C' backward alarms & Async access to 8k sync channel
		Blank Panel
Position 2 (must choose 1 option) hardware option	N	Serial LVDS on D25
		EIA 530 D25 DCE providing selectable RS422 / X.21 / V.35 / RS232, also balanced G.703 if G.703 option fitted
		HSSI on HD50 50-way SCSI-2 connector
		IP Traffic card providing TCP acceleration to 16,896kbps, subject to prevailing data rate limits - requires either Blank Panel or EIA 530 in position 1
		Eurocom D/1 on D25 male - pin compatible with P300 Eurocom
		Eurocom D/1 / EIA530 on D25 female
		Quad E1 Multiplexer with 1 x RJ45 port enabled plus integral G.703 and Drop & Insert included - requires IBS/SMS satellite framing
Position 2 Quad E1 Mux options - only used with Quad E1 Mux card	I	Adds Port 2 with Drop & Insert to Quad E1 card - requires Quad E1 Mux in Position 2 plus data rate option to 5Mbps
		Adds Port 3 with Drop & Insert to Quad E1 card - requires Quad E1 Mux in Position 2 and Port 2 option plus 5Mbps and 8,448kbps data rate options
		Adds Port 4 with Drop & Insert to Quad E1 card - requires Quad E1 Mux in Position 2 with Port 2 option & Port 3 option plus 5Mbps and 8,448kbps data rate options
Position 2 IP Traffic card options	P	Adds TCP acceleration up to 25Mbps on IP Traffic card, subject to prevailing data rate limits - requires IP Traffic card in Position 2
		Adds UDP and IP Header Compression to RFC 3059 at throughput rates to 16,896kbps, subject to prevailing data rate limits - requires IP Traffic card in Position 2
Position 3 (must choose 1 option) hardware option	O	No BNC traffic interface
		2 x BNC sockets providing unbalanced G.703 75 ohm - requires G.703 option
Low Rate TPC 2nd Generation Turbo 8,448kbps maximum subject to prevailing data rate limits	U	Rates 5/16, 21/44, 0.493, 2/3, 3/4, 0.789, 7/8 Paradise (low latency) in BPSK, QPSK, OQPSK Rate 7/8 in QPSK, OQPSK Rate 0.93 Paradise in QPSK, OQPSK Rates 3/4, 7/8, 0.93 Paradise in 8PSK - requires 8PSK option Rates 3/4, 7/8, 0.93 Paradise in 16QAM - requires 16QAM option
		Rates 5/16, 21/44, 0.493, 2/3, 3/4, 0.789, 7/8 Paradise (low latency) in BPSK, QPSK, OQPSK Rate 7/8 in QPSK, OQPSK Rate 0.93 Paradise in QPSK, OQPSK Rates 3/4, 7/8, 0.93 Paradise in 8PSK - requires 8PSK option Rates 3/4, 7/8, 0.93 Paradise in 16QAM - requires 16QAM option
High Rate TPC 2nd Generation Turbo All data rates to 25Mbps subject to prevailing data rate limits	R	Rates 5/16, 21/44, 0.493, 2/3, 3/4, 0.789, 7/8 Paradise (low latency) in BPSK, QPSK, OQPSK Rate 7/8 in QPSK, OQPSK Rate 0.93 Paradise in QPSK, OQPSK Rates 3/4, 7/8, 0.93 Paradise in 8PSK - requires 8PSK option Rates 3/4, 7/8, 0.93 Paradise in 16QAM - requires 16QAM option
8PSK	Y	Rate 2/3 8PSK Pragmatic TCM to IESS 310 8PSK Turbo available - requires 2nd Generation Turbo FEC option
16QAM		16QAM - requires 2nd Generation Turbo FEC option
IBS / SMS		Satellite Framing to IESS 309 with low rate Intelsat ESC (to IESS 403) & High Rate IBS/SMS ESC
Audio Channels	O	P1348 Emulation mode for IBS 64kbps carrier (2xaudio) or 128kbps (2xaudio + 64kbps data) - requires IBS / SMS & IDR options
G.703		E1, T1, E2, T2 interfaces (hardware option) - requires either EIA 530 or BNC sockets for traffic
Drop / Insert	R	T1/E1 linear order Drop/Insert. Drop/Insert can operate with any interface, although G.703 is typically used (requires G.703 option if used in G.703 mode)
Extended D/I		Independent timeslot re-ordering on Tx & Rx. Signaling (E1 CAS & T1 RBS). Rx Partial Insert for multi-destinational working, Timeslot ID maintenance for N=1 to 31 with IBS / SMS or Closed Net plus ESC - requires Drop / Insert option
Advanced AUX	I	Variable rate synchronous Aux channel for IBS / SMS - requires IBS / SMS option; IDR 32/64kbps in place of one/both audio ADPCM ESC channels - requires IDR option
Custom		Custom RS Outer Codec values of n, k and interleaver depth. Custom IBS / SMS modes, allocation of overhead between ESC and Aux channels in IBS / SMS, custom backward alarms in IBS / SMS, and Closed Net plus ESC - requires IBS/SMS option. Custom IDR mode - requires IDR option.
PRBS Tester	T	Internal Bit Error Rate Tester (BERT) can run through main data channel, or ESC/Aux channels
OM-73		OM-73 Scrambling, symbol mapping and Viterbi compatibility
24V 100W BUC PSU	E	P3532 AC Input, 24V 100W DC to Tx BUC (hardware option)
48V 100W BUC PSU		P3531 AC Input, 48V 100W DC to Tx BUC (hardware option)
24V 180W BUC PSU		P3536 AC Input, 24V 180W DC to Tx BUC (hardware option)
48V 180W BUC PSU		P3535 AC Input, 48V 180W DC to Tx BUC (hardware option)
48V DC Input		48V DC Primary power input in place of 100-240V AC input (hardware option)
48V in & 24V BUC PSU		P3538 Floating 48V DC Input, 24V 180W DC to Tx BUC (hardware option)
48V in & 48V BUC PSU		P3537 Floating 48V DC Input, 48V 180W DC to Tx BUC (hardware option)
+48V in & 48V BUC PSU		P3539 +48V DC Input, +48V 180W DC to Tx BUC (hardware option)
FSK Control		Controls and monitors single-box Paradise Datacom BUC from the Modem - requires an ODU PSU (hardware option)
High Output 10MHz Reference		P3508 Increases Tx port 10MHz Reference level to +5dBm for interfacing to RFT 5000 Series BUC (hardware option)
Tx Only operation	S	Transmit functions only
Rx Only operation		Receive functions only

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