

Common Main Specifications	
Parameter	Evolution Series Modem
Modulation Scheme	QPSK, 8PSK, 16QAM, 16APSK
IF Frequency Range	50 - 90MHz & 100 - 180MHz
IF Frequency Resolution	100Hz
Traffic Interface - Options	IP Traffic card 10/100/1000 BaseT on RJ45 Quad ASI on 50 ohm BNC female
User Traffic Data Rate	To 80Mbps, maximum symbol rate of 40Msymbols/s
User Traffic Data Rate Resolution	1bps
Note: The combination of FEC Rate, Modulation scheme and Satellite Overhead limits the Traffic Data Rate Range in all modes.	
IF Connector type	BNC female
IF Impedance	50Ω & 75Ω, electronically selectable
Return Loss	18dB typical
Internal Frequency Reference - Ageing	<1ppm/yr
External Reference	Clocking Only: 1-10MHz in 1kHz steps. Clocking and RF Frequency: 10MHz, 0dBm±1dB

Modulator Specifications	
Parameter	Evolution Series Modem
Output Power Level	0 to -25dBm Continuously Variable in 0.1dB steps
Output Level Stability	±0.5dB, 0°C to 40°C
Transmit Filtering Selectable	DVB-S2 and Intelsat IESS compliant α = 0.35 α = 0.25 α = 0.20
Occupied Bandwidth	1.2 x Symbol Rate 1.13 x SR 1.1 x SR
Recommended Channel Spacing	1.4 x Symbol Rate 1.27 x SR 1.2 x SR
Phase Accuracy	±2° maximum
Amplitude Accuracy	±0.2dB maximum
Carrier Suppression	-30dBc minimum
Output Phase Noise	As IESS-308, nominally 3dB better.
Output Frequency Stability	<1ppm/yr
Harmonics	Better than -55dBc/ 4kHz in band
Spurious	Better than -55dBc/ 4kHz in band
Transmit On/Off Ratio	55dB minimum
External Transmit Inhibit	By external contact closure or by TTL signal applied to rear panel Alarms & AGC connector

Demodulator Specifications	
Parameter	Evolution Series Modem
Input Range	Minimum level -130dBm + 10 log symbol rate Range 50dB above min, limited to 0dBm max
Maximum Composite Signal	No more than 20dB above the level of the desired input signal up to a maximum of 0dBm
Frequency Acquisition Range	Selectable from ±1kHz to ±32kHz up to 10 Msps (1kHz steps) ±10kHz to ±250kHz above 10Msps (10kHz steps)
Acquisition Threshold	<5dB Es/No QPSK
Acquisition Time	At 9.6kbps, less than 1s at 6dB Es/No QPSK At 10 Mbps, less than 100ms at 6dB Es/No QPSK
Clock Tracking Range	±100ppm minimum
Receive Filtering Selectable	DVB-S2 and Intelsat IESS compliant α = 0.35, α = 0.25, α = 0.20
Performance Monitoring	Measured Eb/No (range 0-15dB, ±0.2dB). Measured Frequency Offset (100Hz resolution). Wanted signal level strength indicator centred on the middle of the Rx Input range.
AGC Output	Buffered direct AGC output for antenna tracking, etc.

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.

Data Rate Specifications			
Standard	Modulation	FEC Rates	Max Symbol Rate (Data Rate)
DVB-S	QPSK	1/2, 2/3, 3/4, 5/6, 7/8	40Msymbols/s
DVB-DSNG	8PSK 16QAM	2/3, 5/6, 8/9 3/4, 7/8	40Msymbols/s 40Msymbols/s
DVB-S2	QPSK 8PSK 16APSK	1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 2/3, 3/4, 4/5, 5/6, 8/9, 9/10	37.5Msymbols/s (45M TX) 37.5Msymbols/s (45M TX) 37.5Msymbols/s (45M TX)

Clocking and Buffering Specifications	
Parameter	Evolution Series Modem
Clock Integrity	Frequency Locked Loops give phase-hit immune operation even with poor clock sources such as routers, etc.
Tx Clocking	DVB-S/DSNG External or internal free-running for ASI; internal for IP
	DVB-S2 Internal free-running (tied to symbol rate)
Rx Clocking	DVB-S/DSNG Buffer Disable - Clock from Satellite
	DVB-S2 Buffer Disable - Clock from Satellite
Station Reference Inputs	75Ω BNC female Station Clock Connector, transformer isolated. 1MHz to 10MHz in 1kHz steps (accepts sinusoidal >0dBm or square-wave) 120Ω RS422 compatible input, 1MHz to 10MHz in 1kHz steps via Async ESC connector NB: When set to 10MHz, the station reference may replace internal reference to all internal circuitry. The unit automatically switches back to internal reference if the station reference fails.

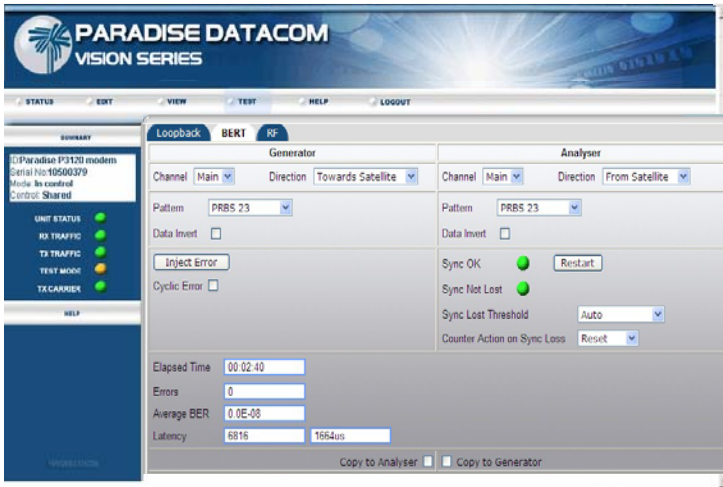
Ethernet Traffic Via P3714 IP Traffic Option card	
Parameter	Evolution Series Modem
Standard (unaccelerated) IP over DVB	Encapsulation of IP packets and Ethernet frames over DVB uses Multi Protocol Encapsulation (MPE) or Ultra Lightweight Encapsulation (ULE) protocols. IP card also provides support for IEEE 802.1p QoS (priority tagging) and IEEE 802.1q VLAN tagging. IP card throughput performance monitoring and diagnostics available via the Web User Interface
Traffic mode	Throughput depends on traffic format – formats such as UDP that do not require Acknowledgement run at up to the maximum data rate of the modem – unaccelerated TCP (which requires acknowledgements) will typically run at up to 128kbps per connection, 80 Connections/Sec Dual RJ45 ports support 10/100/1000 BaseT Ethernet. Improves security by separating IP Traffic from Ethernet remote M&C on chassis. Bridging (standard) for point-to-point operation and for point-to-multipoint operation. Routing (Option) for point-to-multipoint with satellite outband plus non-satellite return. Mesh network support. Can be operated in stand-alone, 1:1 or 1:N redundancy configuration.
DHCP	Dynamic Host Control Protocol allows modem IP address to be allocated dynamically from an external DHCP network server.
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
TCP Acceleration	Supports TCP acceleration with maximum throughput rates of 16,896kbps, 25Mbps (Option) or 55Mbps (Option), subject to compatible options in the host modem. Supports up to 5,000 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.
HTTP Acceleration	Prefetches webpage inline objects to reduce webpage download time.
Header Compression	Optional Robust Header Compression to RFC 3095 profile 2 (IP/UDP). Typical reduction in header size for IP/UDP is from 28 bytes to between 1 & 3 bytes. 1-way packet handling limit of 29,000 packets per second. 2-way packet handling limit of 22,000 packets per second. Includes Ethernet header compression which typically reduces the 14 byte Ethernet header to 1 byte.
Dynamic Routing	Optional Dynamic Routing, supports RIP, OSPF and BGP, plus 64 static routes.

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 (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). Ethernet (10/100 BaseT) via RJ45, embedded Web server, SNMP agent V1, V2c and V3
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.
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, 0.5A @ 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

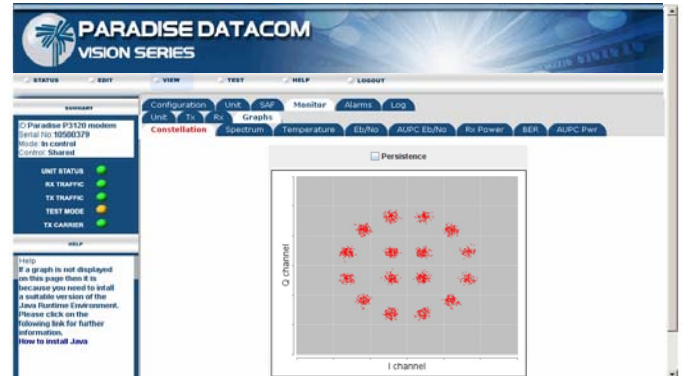
EZ-BERT Option Specifications	
Parameter	Evolution Series Modem
BER Channel	The BERT may replace main traffic data.
Test Patterns	2 ⁿ 11-1, 2 ⁿ 15-1, 2 ⁿ 20-1, and other test patterns selectable, compatible with common stand-alone BERT testers.
Results	Display of error count and average BER.
Autolog	Automatic logging of average BER and other parameters at regular intervals.

Web User Interface

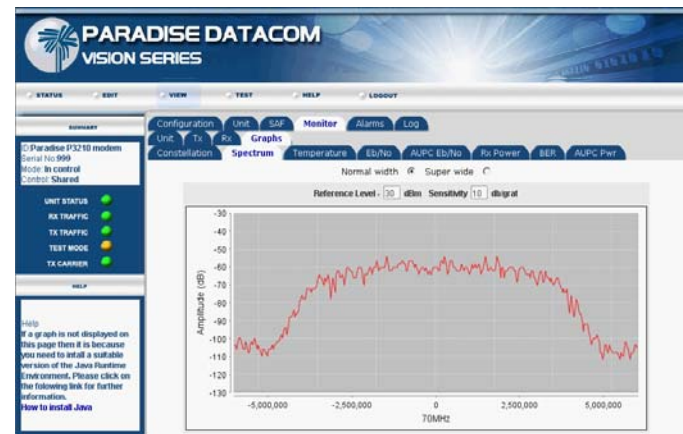
A unique Web User Interface provides full Monitor & Control plus graphing of Eb/No, BER, Receive Power and other operating parameters, plus a Receive Spectrum Analyser, Receive Constellation Monitor and BER Tester for detailed signal analysis and performance validation via Internet Explorer. Logged graph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



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

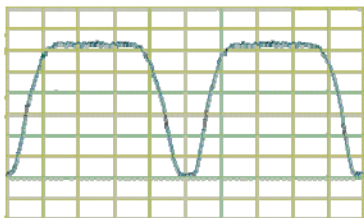


Built-in Receive Constellation Display for channel diagnostics.

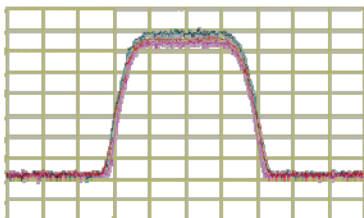


Built-in Spectrum Analyser for Receive Carrier, Adjacent Carrier and Super-Wide Monitoring (3 bandwidth settings).

Paired Carrier Operation

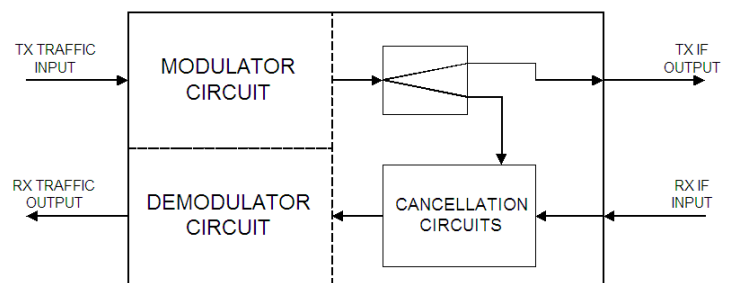


Paired Carrier Disabled



Paired Carrier Enabled
Can save 50% on space segment

PAIRED CARRIER MODEM SCHEMATIC



Paired Carrier technology allows both the uplink and downlink signals to occupy the same space segment. An adaptive self-interference cancellation technique removes the uplink signal components generated by the local terminal from the received signal off satellite, allowing demodulation of the far end signal.

Paired Carrier	
Parameter	VISION Series Modem
Paired Carrier	Transmit and receive carriers are overlaid on top of each other in the same space segment. Echo cancellation techniques are used in the demodulator to cancel the transmit carrier and extract the wanted receive carrier signal.
Paired Carrier data rate options	512kbps, 1024kbps, 2.5Mbps, 5Mbps, 10Mbps, 15Mbps, 20Mbps, 25Mbps, 40Mbps, 50Mbps, 60Mbps and 80Mbps traffic rate

Fully configurable - only pay for what you need!

Options	Description
PD80 IF Base Modem ✓ HERE	Filter roll-off factors: 20%, 25%, 35% Wideband IF: 50-90 MHz & 100-180MHz in 100Hz steps PID filtering and PID monitoring Remote Web Browser based monitoring tools (Spectrum Display, Constellation Monitor and link performance versus time) plus SMTP email client for status notification SMTP email client for status monitoring SNMP V1, V2c & V3 for Modem M&C DHCP allowing IP address to be allocated dynamically via external DHCP network server * Must select DVB options below
DVB-S TX	Transmit DVB-S compliant (to EN300421) to 40Msymbol/s. QPSK modulation, provides Viterbi FEC Rates 1/2, 2/3, 3/4, 5/6, 7/8 and Reed-Solomon Outer FEC
DVB-S RX	Receive DVB-S compliant (to EN300421) to 40Msymbol/s. QPSK modulation, provides Viterbi FEC Rates 1/2, 2/3, 3/4, 5/6, 7/8 and Reed-Solomon Outer FEC
DVB-DSNG TX	Transmit DVB-DSNG compliant to EN301210 to 40Msymbol/s. 8PSK and 16QAM modulation Includes DVB-S TX
DVB-DSNG RX	Receive DVB-DSNG compliant to EN301210 to 40Msymbol/s. 8PSK and 16QAM modulation Includes DVB-S RX
DVB-S2 CCM TX	Transmit DVB-S2 compliant to EN302307 to 37.5Msymbol/s with Constant Coding and Modulation (CCM) mode Includes DVB-S TX and DVB-DSNG TX
DVB-S2 CCM RX	Receive DVB-S2 compliant to EN302307 to 37.5Msymbol/s with Constant Coding and Modulation (CCM) mode Includes DVB-S RX and DVB-DSNG RX
Traffic Interface hardware options	IP Traffic card offering point-to-point and point-to-multipoint Ethernet Bridge. Includes Ethernet Brouting for Point-to-Multipoint operation when there is a non-satellite return path, also provides HTTP Acceleration by prefetching webpage inline objects to reduce webpage download time. Quad ASI card (restricted to single I/O in DVB-S2 CCM mode). Supports both 188 and 204 byte MPEG2 TS packets
IP Traffic card options	Adds TCP acceleration up to 16,896kbps for point to point operation using the IP Traffic card - requires IP Traffic card Adds TCP acceleration up to 25Mbps on IP Traffic card - requires IP Traffic card plus 16,896kbps acceleration option Adds TCP acceleration up to 55Mbps on IP Traffic card, subject to prevailing data rate limits - requires IP Traffic card and requires 16,896kbps plus 25Mbps acceleration options Adds Robust Header Compression to RFC 3059 profile 2 (IP/UDP) at throughput rates to 29pkpts/s (1-way), 22pkpts/s (2-way), includes Ethernet header compression - requires IP Traffic card Encapsulation of IP packets and Ethernet frames over DVB uses PXE, MPE or ULE protocols Adds Dynamic Routing: supports RIP, OSPF and BGP, plus 64 static routes - requires IP Traffic card
Quad ASI card option	Multistream ASI support, requires DVB-S2 and Quad ASI card
AUPC	Adds end-to-end AUPC operation only when IP Traffic used - requires TX and RX operation and IP Traffic card Adds self maintain AUPC operation for IP or ASI Traffic - requires TX and RX operation
EZ BERT - BER Tester	Internal Bit Error Rate Tester (BERT) operates through main data channel
48V DC Input	K3002 48V DC Primary power input in place of 100-240V AC input
FSK Control Option on IF (hardware option)	Allows monitor & control of a compatible Transceiver from the Modem, via the Tx IFL.
Paired Carrier (carrier re-use) <i>subject to prevailing modem data rate limits. Minimum occupied bandwidth limit of 150kHz, and maximum occupied bandwidth limit of 36MHz</i> SELECT YOUR	Paired Carrier Ready, allows carriers to be overlapped thereby reducing the required satellite bandwidth. (hardware option) - requires additional cumulative software options below depending upon data rate required Paired Carrier up to 512kbps traffic rate - requires Paired Carrier Ready option Extends Paired Carrier up to 1,024kbps traffic rate - requires 512kbps option Extends Paired Carrier up to 2.5Mbps traffic rate - requires 1024kbps option Extends Paired Carrier up to 5Mbps traffic rate - requires 2.5Mbps option Extends Paired Carrier up to 10Mbps traffic rate - requires 5Mbps option Extends Paired Carrier up to 15Mbps traffic rate - requires 10Mbps option Extends Paired Carrier up to 20Mbps traffic rate - requires 15Mbps option Extends Paired Carrier up to 25Mbps traffic rate - requires 20Mbps option Extends Paired Carrier up to 40Mbps traffic rate - requires 25Mbps option Extends Paired Carrier up to 50Mbps traffic rate - requires 40Mbps option Extends Paired Carrier up to 60Mbps traffic rate - requires 50Mbps option Extends Paired Carrier up to 80Mbps traffic rate - requires 60Mbps option

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