PARADISE DATACOM
A Teledyne Technologies Company

Vision Series
PD80
IF DVB S2 Satellite Modem

OVERVIEW

The Vision Series PD80 is an ***80Mbps*** Digital Video Broadcast (DVB) Satellite Modem, operating up to 40Msymbols/s in DVB-S2, DVB-S and DVB-DSNG modes. The Modem supports QPSK, 8PSK, 16QAM and 16APSK modulation and the Constant Coding and Modulation (CCM) mode of DVB-S2. ASI and Gigabit Ethernet interfaces are supported.

REMOTE CONTROL & WEB INTERFACE

- Web User Interface available via integral web server including; Receive Spectrum Analyser, Receive Constellation Monitor, BER Tester and graphing of Eb/No, Rx Power, BER plus other parameters, using a web browser
- Ethernet with embedded web server and SNMP network management support
- RS485 multi-drop addressable
- RS232 for direct PC connection

FEATURES

- DVB-S (EN 300 421), DVB-SNG (EN 301 210) and DVB-S2 (EN 302 307) operation up to 40Msps
- Built-in support for DVB-S2 Constant Coding and Modulation (CCM)
- Variable Coding and Modulation (VCM) and Adaptive Coding and Modulation (ACM) ready - requires just a software upgrade. Contact Customer Support for more details.
- IF Frequency range of 50 to 90MHz and 100 to 180MHz
- Paired Carrier carrier re-use (optional)
- Support for QPSK, 8PSK, 16QAM and 16APSK
- Inner Forward Error Correction (FEC) options of Viterbi[1], Trellis Code Modulation[1] (TCM) and Low Density Parity Code[2] (LDPC)
- Outer FEC options of concatenated Reed-Solomon[1] (RS) and Bose-Chaudhuri-Hocquenghem[2] (BCH)
- ASI and Gigabit Ethernet traffic options
- Rich internal IP feature set: dynamic routing, TCP Acceleration, HTTP Acceleration, Header Compression, Ethernet Bridge, DHCP, IEEE 802.1p QoS, IEEE 802.1q VLAN, FTP, Telnet, SMTP, SNMP, diagnostic graphs, and much more. IP over DVB encapsulation supports the use of both the Multi-Protocol Encapsulation (MPE) and Ultra Lightweight Encapsulation (ULE) standards
- Compact 1U chassis, 405mm deep

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Vision Series

PD80 DVB S2 IF Satellite Modem

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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, 0ºC to 40ºC		
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	±2º 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	Vision Series Modem
Throughput Performance	*The maximum modem throughput depends on IP traffic format and the features enabled. Bridged IP/UDP data can be processed up to the maximum data rate of the modem. Please seek assistance from Paradise Datacom in evaluating your particular requirements.*
Routing and Bridging	Bridging (standard). Basic routing with static routes (standard). Dynamic routing option: RIP V1 and V2; OSPF V2 and V3; BGP V4.
TCP Acceleration	Typical throughput level of 90% of link capacity. 5,000 concurrent accelerated TCP connection limit. TCP acceleration will run to the maximum data rate for the modem. Includes HTTP Acceleration (prefetches web page inline objects to reduce web page download times).
Header Compression	Robust Header Compression to RFC 3095 profile 2 (IP/UDP). Reduces Ethernet/IP/UDP header sizes typically by 90%. 1-way packet processing limit: 58,000 pps; 2-way limit: 44,000 pps. Also includes Ethernet header compression (compresses 14-byte Ethernet frame to typically one byte).
Traffic Shaping	Provides guaranteed throughput levels for specific IP streams, using standard Committed Information Rate and Burst Information Rate settings. Stream differentiation is by IP address, IEEE 802.1p priority class, Diffserv DSCP class or MPLS EXP field.
VLAN Support	IEEE 802.1q VLAN support (standard).
	IEEE 802.1p Quality of Service (packet prioritisation) using strict priority or fair weighting queuing.
IP over DVB Encapsulation/ Decapsulation	Supports MPE, ULE and Paradise PXE. Includes MPE air MAC address filtering.
DVB-S2 IP Multistreaming	Point-to-multipoint CCM and VCM multistreaming. VCM allows the FEC error correction to vary for each remote.
DVB-S2 ACM	Dynamically varies point-to-point FEC strength and throughput, maximising throughput for the actual link conditions.
DHCP, SNMP	DHCP (standard) for automatic allocation of M&C IP address. SNMP (standard) v1, v2c and v3.
Web Server	Standard. Embedded web server (standard) M&C interface.
IP Diagnostic Graphs	Standard. Shows throughput (bps, pps); dropped, errored packet counts.
Operating mode	Can be operated in stand-alone, 1:1 or 1:N redundancy configuration.

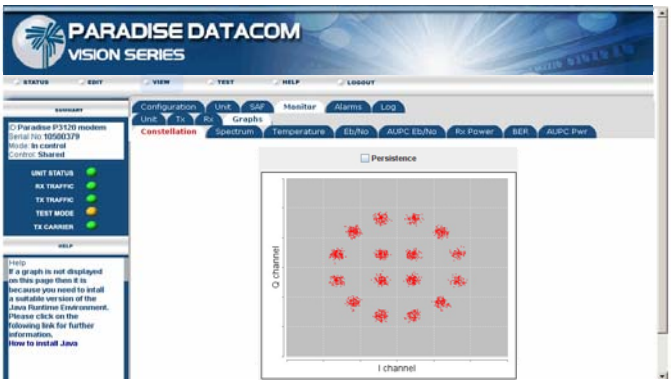
Common Specifications

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, backlit, 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 0-50ºC

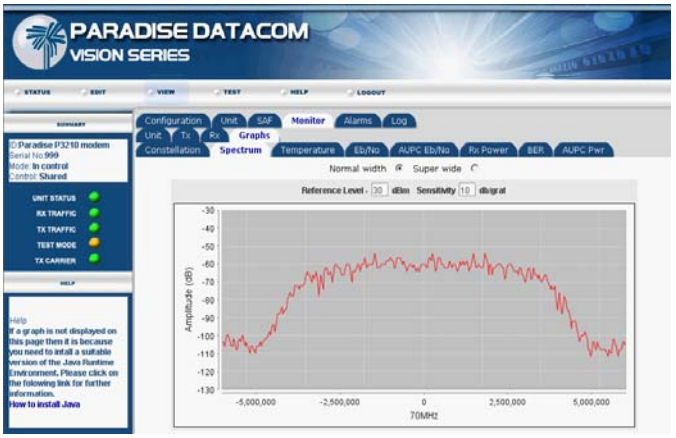
Web User Interface

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.

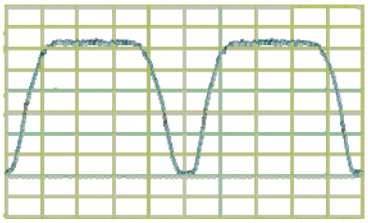


Built-in Receive Constellation Display for channel diagnostics.

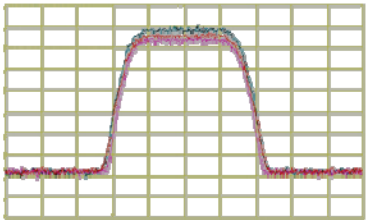


Built-in Spectrum Analyser for Receive Carrier, Adjacent Carrier and Super-Wide Monitoring (3 bandwidth settings).

Paired Carrier Operation

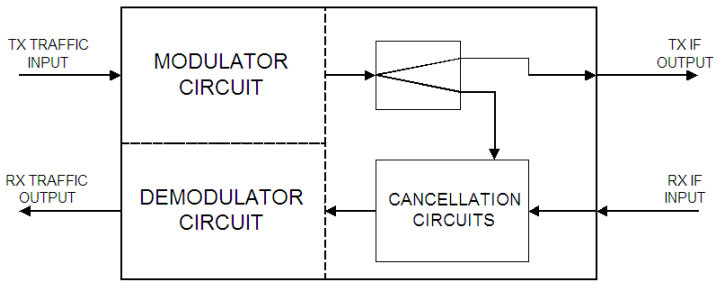


Paired Carrier Disabled



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, 80Mbps and 100Mbps traffic rate

Vision Series

PD80 DVB S2 IF Satellite Modem

Fully configurable - only pay for what you need!

	Options	Description
PD80 IF Base Modem	✓	**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 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	THERE	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 Includes DVB-S2 ACM Receive function; when used, requires the other end of the link to have DVB-S2 ACM Transmit.
DVB-S2 VCM Multistreaming		VCM point-to-multipoint multistreaming allows the FEC rate and modulation to be selected for individual remotes
DVB-S2 ACM Transmit Automatic Coding and Modulation	OPTIONS	DVB-S2 ACM Transmit - Automatic Coding and Modulation - requires DVB-S2 CCM TX When used, requires the other end of the link to have DVB-S2 CCM RX including DVB-S2 ACM Receive.
Traffic Interface hardware options		IP Traffic card offering point-to-point and point-to-multipoint Ethernet Bridge. Static Routing max 64 routes. Includes Ethernet Brouting for Point-to-Multipoint operation when there is an external return path. HTTP Acceleration by prefetching webpage inline objects to reduce webpage download time. Includes TCP Acceleration up to 16,896kbps for P-P and P-MP operation.
		Quad ASI card. Supports both 188 and 204 byte MPEG2 TS packets. Use of multiple ports is subject to other features purchased.
IP Traffic card options		Adds TCP acceleration up to 25Mbps on IP Traffic card - requires IP Traffic card
		Adds TCP acceleration up to 55Mbps on IP Traffic card, subject to prevailing data rate limits - requires IP Traffic card and requires 25Mbps acceleration option
		Adds Robust Header Compression to RFC 3059 profile 2 (IP/UDP) at throughput rates to 29kpkts/s (1-way), 22kpkts/s (2-way), includes Ethernet header compression - requires IP Traffic card
		Encapsulation of IP packets and Ethernet frames over DVB uses Paradise eXtreme Protocol (PXE), Multi Protocol Encapsulation (MPE) or Ultra Lightweight Encapsulation (ULE) protocols, includes Static Routing - up to 64 static routes
		Adds Dynamic Routing, supports RIP, OSPF and BGP includes Static Routing - up to 64 static routes
		Adds IP Traffic Shaping: Supports allocation of CIR and BIR plus priority for IP Streams identified by IP Address, Diffserv Class, IEEE 802.1p priority tag or MPLS EXP field
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
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) *subject to prevailing modem data rate limits. Minimum occupied band-width limit of 150kHz, and maximum occupied band-width limit of 36MHz*		P3603 - 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
		Extends Paired Carrier up to 100Mbps traffic rate - requires 80Mbps option
Ruggedisation		Adds extra ruggedisation for hostile environments