



Our latest generation high performance 70/140 MHz Satellite Modem, the PSM-500, is the industry's most sophisticated modem in its class. The PSM-500 is unmatched by any other modem for BER performance, fast acquisition, low latency and total power/bandwidth optimization.

PSM-500 Highlights

- New Flexible LDPC with Multiple Block Sizes
- 1.2 kbps to 29.5 Mbps, 1 bps steps
- BPSK/QPSK/OQPSK/8PSK/8QAM/16QAM
- Viterbi, TCM, Reed Solomon, Turbo Product Codes
- Most TPC Code Rates and Block Sizes Available
- Compatible with other Modem Manufacturers
- Ethernet IP Data Interface with Linux based SnIP provides Bridge or Router IP Modes
- Easy Feature Upgrades by Key Codes
- Lowest Latency, <15 ms at 64 kbps $\frac{3}{4}$ QPSK
- Standard IBS Multiplexer, Async Overhead Channel, AUPC and Remote Modem Control
- Typical acquisition time of 315 ms at 9.6 kbps QPSK, 71 ms at 64 kbps QPSK.
- Tx Output Power Range of 40 dB, +5 to -35 dBm
- Optional Ethernet Remote Control Interface
- Legacy PSM-4900 Compatible
- Built-in 1:1 Redundancy

FEC Options

FEC types include Viterbi, Trellis, Reed Solomon, Turbo Product Codes (both 4K & 16K block sizes) and the most Flexible LDPC on the market today.

In addition, the PSM-500 has the largest selection of code rates and block sizes. Available LDPC block sizes include 256, 512, 1k, 2k, 4k, 8k & 16k.

Performance

Sophisticated digital signal processing eliminates all on board physical adjustments and provides performance within 0.3 dB of theoretical. Datum's unique DSP design also delivers the world's fastest SCPC carrier acquisition.

Backward Compatibility

Datum System's PSM-500 implementation represents state of the art enhancements to the popular legacy PSM-4900 series of modems, while being completely backward compatible.

Key Enabled Upgrades

The PSM-500 can be upgraded via front panel key codes. Upgrades are simple to implement and are available in preconfigured feature versions, which offer a variety of options for modulation, FEC and data rates up to 29.5Mbps.

Redundancy

M500 series modems come with a built-in 1:1 redundancy feature that can be enabled through the front panel and requires only a few external cables and power splitters.

Front Panel & Diagnostics

The modem front panel provides a backlit LCD display, full keypad and LED indicators for monitor and control of all modem parameters. The PSM-500 also has advanced monitor and BERT functions available to the user for quick field diagnostics.



Specifications

PSM-500 IF Satellite Modem *back panel*

PSM-500** Series Value Configurations:

** (S = 70 MHz, N = 140 MHz Bands)

- M505 - BPSK/QPSK/OQPSK up to 5 Mbps (PSM-4900 Compatible)
- M511 - Adds 8PSK/8QAM to M505 Series & Data Rates up to 10 Mbps
- M523 - Adds 16QAM to M511 Series & Data Rates up to 29.52 Mbps

System Specifications:

Operating Modes: Rx and Tx Continuous (SCPC), Optional Tx Burst
 IF Tuning Range: 50 to 90 or 100 to 180 MHz, in 1 Hz Steps
 Data Rate Selection: 1 bps steps
 Data Rate Minimum: 1.2 kbps rate 1/2 BPSK
 Data Rate Maximum: 29.52 Mbps rate 3/4 8PSK
 Data Rate Accuracy: Accurate to 2×10^{-12} of relative clock reference
 Symbol Rate Range: 2.4 kbps to 14.76 Msps in 1 bps step sizes
 Available Modulation: BPSK, QPSK, OQPSK, 8PSK, 8QAM, 16QAM
 Available TPC Modes: M5 Full, Short & Legacy, Comtech and Advanced
 Concatenated RS: Selectable N & K, IESS 308/309/310 and CT Comp
 Reed Solomon Depth: 4, 8 or 16

FEC and Code Rates:

FEC	Code Rates
Viterbi	1/2, 3/4, 5/6, 7/8 (k = 7)
Trellis	2/3
TPC-4K	1/2, 3/4, 7/8, 0.95, 21/44
TPC-16K	1/2, 3/4, 7/8, 0.922, 0.453
LDPC	1/2, 2/3, 3/4, 14/17, 7/8, 10/11, 16/17

PSM500 Typical 1×10^{-8} BER Performance @ EB/N0

Selected Code Rates	1/2	2/3	3/4	7/8	0.922
Viterbi					
QPSK	5.7		6.7	7.7	
Viterbi + RS					
QPSK	2.9		4.1	5.3	
Trellis + RS		5.7			
8PSK					
Turbo (TPC)					
QPSK	2.3		2.8	4.0	4.9
8PSK			6.8	7.9	
8QAM			4.8	6.1	7.2
16QAM	5.1		6.0	7.5	8.5
LDPC - 16k					
QPSK	1.40	2.10	2.70	3.90	
8PSK			5.08	6.65	
8QAM	3.21	4.11	4.80	6.05	
16QAM	3.73	5.00	5.85	7.40	
LDPC - 4k					
QPSK	1.71	2.47	3.13	4.30	
8PSK		4.51	5.55	7.20	
8QAM	3.65	4.53	5.32	6.65	
16QAM	4.18	5.48	6.37	7.84	

* Guaranteed BER Performance is within 0.2 db of Typical

Modulator:

Transmit Output Power: +5 to -35 dBm in 0.1 dB steps (max +3 dBm @ 50 Ω)
 IF Tx Impedance: 75Ω or 50Ω selectable from Front Panel (BNC)
 Return Loss: 20 dB minimum
 Output Phase Noise: Better than IESS-308/309 by 6 dB typical, 4 dB min
 Level Stability: ±0.5 dB, 0 - 50° C
 Level Accuracy: ±0.5 dB, 50 ~ 90 MHz or 100 ~ 140 MHz at 25°C
 Output Spurious: < -55 dBc/4 kHz, Typical < - 65 dBc/4 kHz
 Carrier on/ off Isolation: > 60 dB

Scrambler Types: IBS, V.35, IESS, TPC, RS, LDPC, EFD
 Data Clock Sources: Internal, Terminal Timing, External, Rx Recovered
 Internal Stability: 2×10^{-6} TCXO (Standard)
 External Reference: 1, 5, 9, or 10 MHz input on rear panel

Demodulator:

Rx Carrier Input Range: -20 to -60 dBm, scales to -84 dBm at lower rates (minimum = $10 \log(\text{symbol rate}) - 120 \text{ dBm}$)
 IF Tx Impedance: 75Ω or 50Ω selectable from Front Panel (BNC)
 Return Loss: 20 dB minimum
 Max Composite Input: +15 dBm or +40 dBc, whichever is lower power
 Input Phase Noise: Better than Intelsat by 6 dB typical, 4 dB min
 Rx Acquisition Range: Programmable from ± 100 Hz to ± 1.25 MHz

Fast Receive Lock Performance:

Example: FEC 1/2, EB/N0 = 6.0 dB, Acquisition Range of ± 30 kHz

- 315 ms at 9.6 kbps QPSK
- 175 ms at 9.6 kbps BPSK
- 71 ms at 64 kbps QPSK

Descrambler Types: IBS, V.35, IESS, TPC, RS, LDPC, EFD

Plesiochronous or Doppler Buffer Store:

Receive Buffer Range: 4 bits to 524,280 bits, in 1 bit steps or in time
 Receive Clock Options: Internal, External, Mod Clock, Receive Clock

Terrestrial Interfaces:

Standard Synchronous: Serial RS232, RS422, V.35, EIA-530(A)

Optional: HSSI
 Ethernet IP 10/100 Base-T, available in Bridge or Router modes with SnIP (Linux Operating Sys)

Multiplexer and Overhead Features:

IBS Multiplexer: Built-in IBS Overhead Channel with standard and enhanced variable rate RS232 and RS485.
 Supports Automatic Uplink Power Control (AUPC), Remote Modem Control Interface and 2 Form-C Backward Alarms

Monitor and Control:

Front Panel: LCD and Keyboard for easy control and status
 Terminal Mode: Full screen interactive display of all parameters
 Remote Packet Mode: Packet driven RS232/RS485 control and status
 Optional Web Browser: Available through the Ethernet Interface SnIP

Diagnostics:

Loopback Modes: IF, bi-directional terr and sat data loopbacks
 BER Test Pattern: 2047 or 2^{23-1}
 BERT: Built-in bi-directional bit error rate test set
 Carrier: Pure carrier and sideband
 Form C Relays: Assignable faults to Form C rear alarm connector

Environmental and Physical:

Prime Power Input: 90 to 264 VAC, 50/60 Hz, < 30 watts
 Operating Conditions: 0 to 50°C, to 95% humidity, non-condensing
 Storage Temperature: - 20 to +70° C, 99% humidity, non condensing

Size: Rack mount - 1 RU (19"W x 12"D x 1.75"H)
 Weight: Approximately 6.5 lbs fully configured

Certifications and Compliance:

CE Certified for: EN55022 Class B (Emissions)
 EN50082-1 Part 1 (Immunity)
 EN60950 (Safety)



RoHS Compliant: Meets RoHS lead-free standards