

# DATUM SYSTEMS

PRECISION SATELLITE MODEMS

PRODUCT PRESENTATION SHEET

## MODEM PSM-500L L-BAND SATELLITE MODEM



### Key Highlights

- *FlexLDPC* Multi Block Sizes & Code Rates
- External BUC Power Flexibility
- High Stability 10 MHz Reference
- 1.2 kbps to 29.5 Mbps
- BPSK/QPSK/OQPSK/8PSK/8QAM/16QAM
- TPC, Viterbi, TCM, Reed Solomon
- Most FEC Types and Modcods
- Ethernet IP Interface
- Bridge and Router Modes, QoS
- SCPS - TCP/IP Acceleration
- Lowest Latency, <15 ms at 64 kbps  $\frac{3}{4}$  QPSK
- Typical acquisition time, 71 ms at 64 kbps
- Async Channel, AUPC
- Remote Modem Control Channel
- Tx Output of 40 dB, +5 to -35 dBm
- Optional SNMP Remote Interface
- Web Browser GUI

### Applications

- Cellular Backhaul
- Enterprise
- IP Networks
- On-the-Move
- Bandwidth on Demand

### Architectures

- Point-to-point
- Point-to-Multipoint
- Mesh
- Multicasting
- UniDirectional

Datum Systems offers highly versatile and efficient satellite modems. Our high performance L-Band Satellite Modem, the PSM-500L, is the industry's most reliable & flexible modem in its class with multiple external BUC supply options for easy field configurability. The PSM-500L is unmatched by any other modem for its BER performance, fast acquisition, low latency and total power/bandwidth optimization.

**Advanced *FlexLDPC*** – With unparalleled configuration flexibility and superior coding gain, *FlexLDPC* takes FEC technology innovation to the next level, bringing strong economic advantages to satellite service providers and their customers. Granular code rates and block sizes get you the most out of your available satellite bandwidth and spectral power, while keeping processing latency at the desired level.

**SCPS TCP/IP Acceleration** – Datum Systems provides an embedded protocol acceleration option based on the Space Communication Transport Specification (SCPS-TP). Our integrated optimization software provides increases in IP packet throughput over TCP/IP links via our Ethernet IP interface option.

**BUC/LNB Power & Reference** – The PSM-500L provides an optional external BUC capability for maximum power flexibility, swappable voltage and power options. LNB power is standard from an integrated power supply. A High Stability 10 MHz reference is also provided through the modem Transmit (N-Type) and Receive (F-Type) connections at the rear. Reference, BUC and LNB power may be disabled via the front panel. Front panel voltage and current measurements are available for BUC and LNB monitoring.

**Easy Feature Unlocks** – The PSM-500LT can be easily upgraded via front panel key codes. Upgrades are simple to implement and are available in preconfigured software versions, offering a variety of options for modulation, FEC and data rates up to 29.5Mbps.

**Redundancy** Built-in 1:1 redundancy comes standard on the PSM-500LT and supports BUC/LNB power and reference switching. It can be enabled through the front panel and requires only a few external cables and power splitters.



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**System Specifications:**

Operating Modes: Rx and Tx Continuous (SCPC), Optional Tx Burst  
 Tx Tuning Range: 950 to 1750 MHz, in 1 Hz Steps  
 Rx Tuning Range: 950 to 1900 MHz, in 1 Hz Steps  
 Data Rate Selection: 1 bps increments  
 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 x 10<sup>-12</sup> of relative clock reference  
 Symbol Rate Range: 2.4 ksp/s to 14.76 Msp/s 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 Options:  
 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  
 FlexLDPC 1/2, 2/3, 3/4, 14/17, 7/8, 10/11, 16/17

FlexLDPC™	Typical Eb/No for 1E-8 BER				Delay @ 64kbps
	QPSK	8PSK	8QAM	16QAM	
LDPC-1/2-2k	2.04 dB	n/a	3.80 dB	4.48 dB	49.6 ms
LDPC-1/2-4k	1.73 dB	n/a	3.44 dB	4.16 dB	98.0 ms
LDPC-1/2-8k	1.52 dB	n/a	3.19 dB	3.92 dB	195.0 ms
LDPC-1/2-16k	1.38 dB	n/a	3.04 dB	3.76 dB	388.6 ms
LDPC-2/3-2k	2.77 dB	4.88 dB	4.68 dB	5.85 dB	44.4 ms
LDPC-2/3-4k	2.46 dB	4.53 dB	4.36 dB	5.46 dB	87.5 ms
LDPC-2/3-8k	2.23 dB	4.28 dB	4.09 dB	5.19 dB	173.7 ms
LDPC-2/3-16k	2.09 dB	4.14 dB	3.91 dB	5.01 dB	346.1 ms
LDPC-3/4-2k	3.52 dB	5.97 dB	5.51 dB	6.78 dB	41.9 ms
LDPC-3/4-4k	3.14 dB	5.56 dB	5.11 dB	6.37 dB	82.4 ms
LDPC-3/4-8k	2.89 dB	5.27 dB	4.83 dB	6.07 dB	163.1 ms
LDPC-3/4-16k	2.72 dB	5.07 dB	4.63 dB	5.87 dB	325.0 ms
LDPC-7/8-2k	4.96 dB	7.89 dB	6.98 dB	8.48 dB	38.1 ms
LDPC-7/8-4k	4.32 dB	7.21 dB	6.40 dB	7.84 dB	74.6 ms
LDPC-7/8-8k	4.00 dB	6.86 dB	6.05 dB	7.51 dB	147.3 ms
LDPC-7/8-16k	3.90 dB	6.66 dB	5.87 dB	7.32 dB	293.6 ms
LDPC-10/11-2k	5.63 dB	8.73 dB	7.68 dB	9.37 dB	37.0 ms
LDPC-10/11-4k	5.00 dB	7.99 dB	7.02 dB	8.63 dB	72.3 ms
LDPC-10/11-8k	4.58 dB	7.51 dB	6.60 dB	8.18 dB	143.0 ms
LDPC-10/11-16k	4.40 dB	7.33 dB	6.35 dB	7.95 dB	284.5 ms

Guaranteed Eb/No is 0.2 dB > Typical

**Modulator:**

Transmit Output Power: +5 to -35 dBm in 0.1 dB steps (max +3 dBm @ 50Ω)  
 IF Tx Impedance: 50Ω (Type N)  
 Return Loss: 14 dB typical, 10 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, MHz at 25°C  
 Level Accuracy: Accurate ±0.5 dB, 950 ~ 1750  
 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: 1 x 10<sup>-8</sup> OCXO (Standard)  
 External Reference: 1, 2, 5 or 10 MHz input on rear panel

Transmit BUC Power: Nominal 24 VDC, 100 Watts (Or 12/36/48 VDC)  
 Max 60 VDC/6A up to 250 Watt  
 Transmit BUC Reference: 10 MHz at nominal - 3 dBm internal or external  
 Reference Stability: 1 x 10<sup>-8</sup> OCXO, 2 x 10<sup>-7</sup>/year aging (L-Band)  
 Reference Phase Noise: -110 dBc @ 10 Hz, -130 dBc @ 100 Hz, -140 dBc @ 1 kHz,  
 -150 dBc @ 10 kHz, -155 dBc @ 100 kHz

**Demodulator:**

Rx Carrier Input Range: -20 to -70 dBm, scales to -101 dBm at lower rates r  
 (minimum = 10 log(symbol rate) - 135 dBm)  
 IF Tx Impedance: 75Ω Type F -Connector  
 Return Loss: 10 dB minimum  
 Max Composite Input: -5 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  
 Descrambler Types: IBS, V.35, IESS, TPC, RS, LDPC, EFD

**Fast Receive Lock Performance:**

Example: FEC 1/2, EB/NO = 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

**Plesiochronous or Doppler Buffer Store:**

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

**Terrestrial Interfaces:**

Standard Synchronous: Serial RS232, RS422, V.35, V.36, EIA-530(A)  
 Optional: HSSI  
 Ethernet IP 10/100 Base-T (Bridge & Router, QoS)  
 SCPS TCP/IP Acceleration (Software Only)  
 -Supports Up to 5 Mbps Aggregate throughput and 200 Continuous Sessions

**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  
 SNMP 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, -48 VDC (HW Option), < 30 watts,  
 220 Watts Max fully loaded including internal BUC and LNB power

External BUC Supply: Input 115/230 VAC, 50 / 60 Hz

BUC Power Options:  
 (1) 24 VDC @ 96 Watts, 4A max  
 (2) 24 VDC @ 150 Watts, 5.4A max  
 (3) 48 VDC @ 150 Watts, 3.2A max  
 (4) 48 VDC @ 240 Watts, 5A max

LNB Output Power: Selectable: Off, 13 or 18 VDC

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 7 lbs fully configured

**Certifications and Compliance:**

CE Certified for: EN55022 Class B (Emissions)  
 EN50082-1 Part 1 (Immunity)  
 Can/CSA C222 No. 950-95 (Safety)  
 UL-1950 (Safety)

RoHS Compliant: Meets RoHS lead-free standards

