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
- Std and Adv Ethernet IP Interfaces
- Bridge and Router Modes, QoS
- SCPS - TCP/IP Acceleration
- Dual G.703/E1, Full/Fractional D&I (N X 64)
- Lowest Latency, <15 ms at 64 kbps ¾ 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 configurablility. 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 Stability10 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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DATUM SYSTEMS, INC
15 GREAT OAKS BLVD
SAN JOSE, CA 95119

WWW.DATUMSYSTEMS.COM
TEL: (408) 365-9745
FAX: (408) 365-0471

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 –12 of relative clock reference
Symbol Rate Range:	2.4 ksps 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 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

Moddulator:

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 –8 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 10-8 OCXO, 2 x 10-7/ 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 ½, 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

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 Advaned Ethernet IP, GigE, High PPS Throughput, Vyatta Bridge/Router Dual G.703/E1 (D&I), Dual Bal Inputs (RJ-45), UnBal (BNC) Opt Full E1, PCM-30 (CAS), PCM-31 (CCS), N X 64, N = 1 to 31 Time Slots

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:: (Uses DIN Connector) (PFC Optional)	(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

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