



DESCRIPTION

Datum Systems' latest satellite modem implementation represents state of the art enhancements to the popular PSM-4900 series of modems at the industry's lowest price. The PSM-500L, or "M500L" uses Datum Systems' proprietary techniques of direct modulation and demodulation to completely eliminate transmit and receive IF sections and their associated filters. Sophisticated digital signal processing eliminates all on board physical adjustments and provides performance within 0.3 dB of theoretical. Direct Digital Synthesis (DDS) of the transmit, receive and data rate synthesizers allow settings to 1 Hz and 1 bps respectively. The L-Band M500L is optimized for low cost, high performance VSATs and small stations while the companion M500S, 70 MHz IF version is ideal for hub stations. The M500 series adds 8PSK, 16QAM, Reed-Solomon and a built-in multiplexer to the PSM-4900 series.

The M500L is unmatched by any other modem in its class for fast acquisition, BER performance and power/bandwidth optimization. It uses dedicated DSP for extremely fast acquisition over a programmable range.

The PSM-500L is available in 3 upgradeable versions offering the latest modulation, coding and FEC technology plus data rates to precisely meet your needs. The transmit and receive can independently use BPSK, QPSK, OQPSK, 8PSK and 16QAM modulation at any data rate or configuration settings. Reed-Solomon, IBS multiplexer, AUPC and remote modem control channels are built-in Sophisticated TPC and other FEC options are available.

The full front panel provides a backlit LCD display, full keypad and LED indicators for monitor and control of all modem parameters.

FEATURES

- ◆ BPSK, QPSK, OQPSK, 8PSK, 16QAM.
- ◆ L-Band Transmit allows use with Low Cost Block Up-Converters (BUC).
- ◆ BUC power/Reference from modem.
- ◆ Low cost receive by connecting an LNB directly to the L-Band IF input.
- ◆ LNB power/Reference from modem.
- ◆ Programmable receive acquisition/tracking range.
- ◆ Typical DSP acquisition time of 315 mseconds at 9.6 kbps QPSK, 71 mseconds at 64 kbps QPSK.
- ◆ Viterbi and Reed-Solomon FEC standard, TPC optional. BER vs. Eb/No performance within 0.3 dB of theoretical. 10⁻⁷ BER at 6.0 dB Eb/No (2.8 dB with TPC, 3.5 dB with Reed-Solomon codec).
- ◆ DDS transmit and receive frequency setting in 1 Hz increments.
- ◆ Programmable Interface type.
- ◆ Low power, light weight 1 U case.
- ◆ Built-in IBS Multiplexer with overhead channel, AUPC and Remote Modem Control.
- ◆ Built-in BER Test Set.
- ◆ DDS setting of transmit and receive data rates from 1.2 kbps to 20 Mbps in 1 bps increments.
- ◆ Viterbi FEC codec programmable to rate 1/2, 3/4, 5/6, 7/8 and disabled.
- ◆ 55 dB AGC range with -5 dBm composite input power.
- ◆ Fully programmable from either front panel or remote command without jumpers.
- ◆ Built-in 1:1 Redundancy.
- ◆ Designed to use internal or external G.703 and Ethernet interfaces.
- ◆ 8 User stored and recallable configurations. Automatic Recovery of stored configurations.

SPECIFICATIONS (Preliminary)

Parameter	PSM-500L
Operating Modes, all programmable:	Receive and Transmit Continuous (SCPC), Optional TX Burst.
Transmit IF Frequency Range:	950 to 1750 MHz in 1 Hz Steps.
Receive IF Frequency Range:	950 to 1900 MHz in 1 Hz Steps.
Transmit Output Power: (50 Ω Type N) Return Loss	+5 to -35 dBm, programmable in 0.1 dB steps 14 dB typical, 10 dB minimum.
Transmit Output Phase Noise:	Better than IESS-308/309 by 6 dB typical, 4 dB minimum.
Transmit Output Level Stability/Accuracy:	±0.5 dB, 0 ~ 50°C, accurate ±0.5 dB, 950 ~ 1750 MHz at 25°C
Transmit Output Spurious/Harmonics:	<-50 dBc / <-50 dBc up to -10 dBm, <-40 dBc @ + 5 dBm out
Receive Carrier Level In (75 Ω Type F): Return Loss	-20 to -70 dBm, scales to -101 at lower data rates. Formula is: minimum = 10log(symbol rate)-135dBm 10 dB minimum.
Maximum Composite Receive Input Power	-5 dBm or +40 dBc whichever is lower power
Receive Demodulator Phase Noise:	Better than IESS-308/309 by 4 dB minimum, 6 dB typical.
Receive Acquisition Range:	Programmable from ± 100 Hz to ± 1.25 MHz
Transmit BUC Power: (via DIN plug on rear). Voltage and Current monitor at Front Panel. Transmit BUC Reference:(can be disabled).	Nominal 24VDC, 96 Watts (Or 12/36/48 VDC). Maximum 60 Vdc / 6 A, up to 250 W. Max/Min V and current alarms limits settable. 10 MHz at nominal +3 dBm from internal or external reference.
Receive LNB Power: (can be disabled). Current monitor at Front Panel. Receive LNB Reference: (can be disabled).	Selectable +13/+18 VDC at <500mA. Max/Min current alarms limits settable. 10 MHz at nominal -3 dBm internal or external reference.
Frequency Reference (Internal) Stability/Aging L-Band Reference Phase Noise External:	1 x 10 ⁻⁸ OCXO. 2 x 10 ⁻⁷ /year aging (L-Band). -110 dBc at 10 Hz - 130 dBc at 100 Hz -140 dBc at 1 kHz -150 dBc at 10 kHz -155 dBc at 100 kHz External reference input on rear panel for 1, 5, 9, or 10 MHz. Internal OCXO phase locks to external input.
Modulation and Demodulation: M505L: M511L: M523L	Programmable for BPSK, QPSK, OQPSK, independently Adds 8PSK and 8APSK with Trellis Code Modulation Adds 16QAM and 16APSK to the M511 modes
Forward Error Correction: Standard Concatenated Reed-Solomon:	Viterbi standard. k=7. 4 or 16k block Turbo Product Codes optional. n=126, k=112, t=7 or n=219, k=201,t=9 or programmable, depth of 4 or 8
FEC (Viterbi or TPC) Rates Selectable:	1/2, 3/4, 7/8 or disabled. Rate 5/6 in Viterbi only, Rate 2/3 in 8PSK mode.
Data Rates Minimum, all modems at FEC rate: (without IBS mux or R-S option)	1.2 kbps rate 1/2 BPSK, 2.4 kbps, rate 3/4 or 7/8 BPSK 2.4 kbps rate 1/2, 4.8 kbps rate 3/4 or 7/8 QPSK or OQPSK 9.6 kbps all rates 8PSK, 19.2 kbps all rates 16QAM
Data Rates Maximum - M505L M511L: M523L (without IBS mux or R-S option) Note – Max rate may be limited by interface	5 Mbps, all modulation modes and FEC rates. 10 Mbps all modulation modes and FEC rates – see Note below 20 Mbps all modulation modes and FEC rates. – see Note below Note: Maximum rate limit of 7.38 Mbps, BPSK, rate 1/2; M523 Maximum rate limit of 14.76 Mbps, QPSK, rate 1/2, 19.68 Mbps 8PSK rate 2/3
IBS Multiplex (Standard Built-In)	IBS framing supporting enhanced buffered RS-232/485 overhead channel, AUPC, remote modem control and variable overhead.
Data Rate Selection: Transmit & Receive:	Programmable in 1bps increments. Accurate to 2 x 10E-12 (relative to reference).
Receive Data FIFO Buffer: Plesiochronous or Doppler Elastic Store	4 bits to 524,280 bits, programmable in 1 bit increments, or in delay time.
Data Interface (All synchronous).	RS-449/422 or V.35 or EIA-530 or RS-232 electronically selectable at DB-37 connector. DB25 and V.35 (M34) adaptors available.
BER Performance: with Viterbi FEC 1/2 rate: 1/2 rate Viterbi +R-S Concatenated FEC: 3/4 rate Viterbi +R-S Concatenated FEC: 1/2 rate Turbo Product Codes FEC: 3/4 rate Turbo Product Codes FEC:	10-7 at 6.0 dB Eb/No, 10-5 at 4.8 dB 10-7 at 3.7 dB, 3.5 dB typical (n=126, k=112) 10-7 at 4.7 dB, 4.5 dB typical 10-7 at 3.0 dB, 2.8 dB typical 10-7 at 3.7 dB, 3.5 dB typical
Fast Receive Lock Performance at FEC rate 1/2, 6.0 dB Eb/No, +/-30kHz acquisition range: (Average)	315 msecond at 9.6 kbps QPSK or 175 msecond at 9.6 kbps BPSK. 71 msecond at 64 kbps. QPSK
Front Panel Control:	LCD display and keypad provide full status and programmability.
Remote Control: Terminal Mode: Packet Mode:	Full screen live display and interactive control of all operating parameters and status. Command packet driven RS-232/485 control and reporting of all parameters and status.
Case Dimensions:	Rack mount @ 1 RU (19"W X 14"D X 1.75"H.)
Input Power Requirements (without BUC):	90 to 264 VAC, 50/60 HZ, Approx. 40 Watts, 60 Watts maximum, fully loaded including LNB power.
Operating Conditions:	0 to 50° C, to 95% humidity, non-condensing.