M511L SATELLITE MODEM

Description

The Datum Systems M511L satellite modem supplied by Vitacom offers state of the art performance and reliability with the best features of a sophisticated programmable modem, all at the industry’s lowest price. The M511L forms the basis for a complete low-cost earth station when combined with a BUC, LNB, antenna, and cabling.

In addition to the signal, the transmit cable multiplexes on the BUC power and 10 MHz reference. On the receive side, the receive cable includes the received signal, LNB power, and LNB 10 MHz reference.

The M511L uses 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 M511L comes standard with Viterbi and Reed-Solomon FEC. Optional turbo products code can also be purchased for improved BER vs Eb/No performance.

The M511L includes BPSK, QPSK, OQPSK, and 8PSK modulations. The unit can be field-upgraded to 16QAM modulations.

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, and 8PSK operation.
- Signal, BUC Power, and 10 MHz reference muxed onto transmit cable. Power and 10 MHz reference can be turned on/off.
- Signal, LNB Power, and 10 MHz reference muxed onto receive cable. Power and 10 MHz reference can be turned on/off.
- 96 Watt BUC power supply supplied with modem.
- 1x10-8 10 MHz reference standard.
- 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.
- DDS setting of transmit and receive frequencies 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.
- DDS setting of transmit and receive data rates from 1.2 kbps to 10.0 Mbps in 1 bps increments.
- Viterbi FEC codec programmable to rate ½, ¾, 5/6, 7/8, and disabled. R 2/3 in 8PSK mode.
- 55 dB AGC range with +5 dBm comp input power.
- Fully programmable from either front panel or remote command without jumpers.
- Built-in 1:1 Redundancy.

1340 Charleston Road, Mountain View, CA 94043
tel: 650-967-6247 • fax: 650-967-6246 • http://www.vitacom.com
**M511L MODEM SPECS**

**Operating Modes, all programmable**
- Receive and Transmit Continuous (SCPC)
- Optional Transmit Burst (VSAT)

**IF Frequency Range, Tx and Rx, Independent**
Transmit: 950-1750 MHz in 1 Hz Steps
Receive: 950-1900 MHz in 1 Hz Steps

**Transmit Output Power: (50 \( \Omega \) Type N)**
+5 to -35 dBm, programmable in 0.1 dB steps
Return Loss 14 dB typ, 10 dB min

**Transmit Output Level Stability/Accuracy**
+/- 0.5 dB stability, 0 to 50 deg C
+/- 0.5 dB accuracy, 950-1750 mHz, 25 deg C

**Transmit Output Spurious/Harmonics**
< -50 dBc up to -10 dBm out, <= -40 dBc up to +5 dBm out

**Transmit and Receive Phase Noise**
Better than IESS308/309 by 4 dB min, 6 dB typ

**Receive Carrier Level In, 75 \( \Omega \) Type-f**
-20 to -70 dBm, scales to -101 dBm at lower rates
Return Loss: 10 dB min

**Maximum Composite Receive Input Power**
-5 dBm or +40 dBc whichever is lower power

**Receive Acquisition Range**
Programmable from ± 100 Hz to ± 1.25 MHz

**Transmit BUC Power (via DIN plug on rear)**
24 VDC, 4 A External Supply provided standard
Optional higher voltage and current supplies
Max voltage: 60 volts, max current 6A, max pwr 250 W
Voltage and current monitered via front panel
Min/max voltage and current limits settable
BUC power can be disabled

**Receive LNB Power**
Selectable +13/+18V at 500 mA max
Min/max current limit alarm settable
LNB power can be disabled

**Frequency Reference**
External reference input on rear panel for 1, 5, 9, or 10 MHz.

**Modulation and Demodulation (independent)**
Programmable for BPSK, QPSK, OQPSK or 8PSK

**Forward Error Correction**
Viterbi k=7 and concatenated Reed-Solomon, n=126, K=112, t=7 or n=219, k=201, t=9 or programmable
With depth of 4 or 8. Optional 4k or 16k turbo.

**FEC Rates Selectable**
R ½, ¾, 7/8, or disabled, R 5/6 in Viterbi only.
R 2/3 in 8PSK

**Data Rates**
10 Mbps maximum except 7.38 Mbps BPSK R 1/2
1.2 kbps min R ½, 2.4 kbps min R ¾ or R 7/8 BPSK
2.4 kbps min R ½, 4.8 kbps min R ¾ or R 7/8 QPSK OQPSK
9.6 kbps min 8PSK

**IBS Multiplex Built-in**
IBS framing supporting enhanced fully 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).

**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:**
½ rate Viterbi, 10-5 at 4.8 dB Eb/No, 10-7 at 6.0 dB
½ rate Viterbi +R-S FEC: 10-7 at 3.7 dB, 3.5 dB typ
¾ rate Viterbi +R-S FEC: 10-7 at 4.7 dB, 4.5 dB typ
½ Rate Turbo FEC: 10-7 at 3.0 dB, 2.8 dB typ
¾ Rate Turbo FEC: 10-7 at 3.7 dB, 3.5 dB typ

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**M511L MODEM SPECS**

*Fast Receive Lock Performance at FEC rate ½, 6.0 dB*  
*Eb/No, +/-30kHz acquisition range, (Average)*  
315 msec at 9.6 kbps QPSK or  
175 msec at 9.6 kbps BPSK  
71 msec at 64 kbps QPSK

*Receive Data FIFO Buffer*  
Plesiochronous or Doppler Elastic Store  
4 bits to 524,280 bits, programmable in 1 bit increments,  
or in delay time.

*Front Panel Control*  
LCD display and keypad provide full status and  
programmability.

*Remote Control*  
Terminal Mode: Full screen live display and interactive control of all operating parameters and status.  
Packet Mode: Command driven RS-232/485/IrDA control and reporting of all parameters and status.

*Case Dimension and Weights*  
Rack mount @ 1 RU (19"W X 14"D X 1.75"H.),  6.5 lbs

*Input Power Requirements*  
90 to 264 VAC, 50/60 HZ, Approx. 40 Watts.  
60 Watts max fully loaded

*Operating Conditions*  
0 to 50° C, to 95% humidity, non-condensing