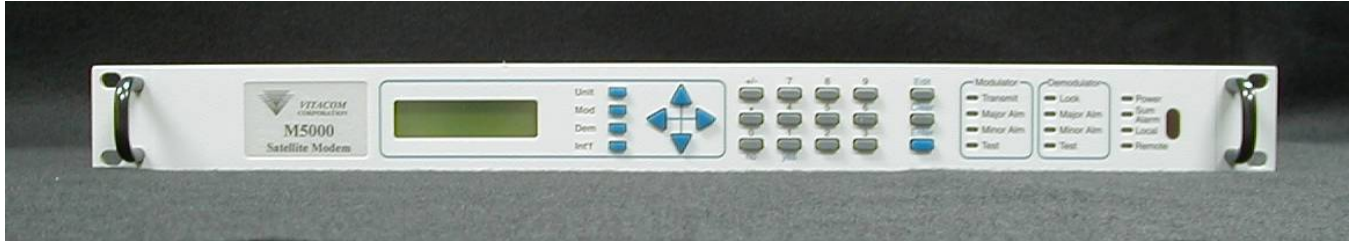


# M-511 SATELLITE MODEM



## Description

The Datum Systems M511 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 M511 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 M511 is the latest design based on the extremely successful and reliable PSM4900 line of modems.

The BER vs. Eb/No performance is unmatched by any other modem in its class.

The M511 comes standard with Viterbi and Reed-Solomon FEC. Optional turbo products code can also be purchased for improved BER vs Eb/No performance.

The M511 includes BPSK, QPSK, OQPSK, and 8PSK, modulations. The unit can be field-upgraded to 16QAM.

The M511 has the most sophisticated receive acquisition and tracking system on the market, improving on even the PSM4900. It offers extremely fast DSP acquisition over a programmable range of +/- 100 Hz to +/- 1.25 MHz.

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

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## Features

- BPSK, QPSK, OQPSK and 8PSK operation.
- 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.
- DDS setting of transmit and receive frequency from 50 to 90 MHz 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 10.0 Mbps in 1 bps increments.
- Viterbi FEC codec programmable to rate 1/2, 3/4, 5/6, 7/8, and disabled.
- 40 dB AGC range with +15 dBm composite input power.
- Fully programmable from either front panel or remote command without jumpers.
- Accurate Eb/No and Symbol Error Rate display.
- Built-in 1:1 Redundancy.
- 8 User Storable and recallable configurations. Automatic Configuration Recovery.
- Optional 140 MHz IF



# M-511 MODEM SPECS

## **Operating Modes, all programmable**

- Receive and Transmit Continuous (SCPC)
- Optional Transmit Burst (VSAT)

## **IF Frequency Range, Tx and Rx, Independent**

50 to 90 MHz (optional 100 to 180 MHz on special order)

## **Transmit Output Power: (Programmable 50 or 75 $\Omega$ )**

+5 to -35 dBm, programmable in 0.1 dB steps  
(max. +3 dBm @ 50 $\Omega$ ), 20 dB min return loss

## **Transmit Output Level Stability/Accuracy**

+/- 0.5 dB stability, 0 to 50 deg C  
+/- 0.5 dB accuracy, 50 to 90 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, Programmable (50 or 75 $\Omega$ )**

-20 to -60 dBm, scales to -84 at lower rates, 10 dB min RL

## **Maximum Composite Receive Input Power**

+15 dBm or +40 dBc whichever is lower power

## **Tx/Rx Frequency Setting (independent)t: 1 Hz steps**

## **Receive Acquisition Range: +/- 100 Hz to +/- 1.25 MHz**

## **Frequency Reference**

Internal 2 x 10<sup>-6</sup> oscillator. Ext reference input on rear panel.

## **Modulation and Demodulation (independent)**

Programmable for BPSK, QPSK, OQPSK, 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.

## **Data Rate Selection, Transmit & Receive**

1bps increments. Accurate to 2x10<sup>-12</sup> (rel to reference).

## **Data Rates**

Max: 10 Mbps except 7.38 Mbps BPSK R 1/2,  
Min: 1.2 kbps R 1/2, 2/4 kbps R 3/4 or 7/8 BPSK  
2.4 kbps R 1/2, 4.8 kbps R 3/4 or 7/8 QPSK or OQPSK  
9.6 kbps 8PSK

## **IBS Multiplex Built-in**

IBS framing supporting enhanced fully buffered RS-232/485 overhead channel, AUPC, remote modem control and Variable overhead.

## **FEC Rates Selectable**

R 1/2, 3/4, 7/8, or disabled, R 5/6 in Viterbi only.  
R 2/3 in 8PSK mode.

## **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:**

1/2 rate Viterbi, 10<sup>-5</sup> at 4.8 dB Eb/No, 10<sup>-7</sup> at 6.0 dB  
1/2 rate Viterbi +R-S FEC: 10<sup>-7</sup> at 3.7 dB, 3.5 dB typ  
3/4 rate Viterbi +R-S FEC: 10<sup>-7</sup> at 4.7 dB, 4.5 dB typ  
1/2 Rate Turbo FEC: 10<sup>-7</sup> at 3.0 dB, 2.8 dB typ  
3/4 Rate Turbo FEC: 10<sup>-7</sup> at 3.7 dB, 3.5 dB typ

## **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  
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: 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 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

