

Satellite Modem Router Programmable SCPC/TDMA 70MHz (TX) – L-Band (RX)



INTRODUCTION

VIPERSAT Networks' SMR5000HL offers state of the art performance and reliability in a sophisticated, programmable, cost effective 1RU modem and IP Router. The SMR5000HL uses VIPERSAT Networks' proprietary technique of integrating the SDMS Star Data Management System into the M5000 modem, completely eliminating external serial port cabling, allowing the user to connect a 10BaseT LAN/WAN directly to the unit.

SMR5000HL's integrated modem/router and communications controller operates as a hub or remote utilizing SCPC, TDM/SCPC, STDMA, FDMA and circuit switch control and management, offering flexibility and control of private satellite networks. The SMR5000HL is designed to connect low- to high-speed data link connections between Ethernet LAN to WAN networks, providing a variety of communications services to our customers.

The Ethernet port connection and configurations provide simplicity, while the 70MHz/L-Band entrance link standardizes on low cost VSAT technology. The unit is completely configurable from the front panel, or managed via the network LAN using IP communication protocols, allowing full network control and management through the data network.

The modem provides digital signal processing, eliminating virtually all on board adjustments, providing 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 SMR5000HL is capable of performing as LAN to LAN, or LAN to WAN IP Routing functions, sending a single broadcast satellite (TDM) link to multiple receive VSAT remote site terminals. Each remote can transmit a separate return path as either SCPC or STDMA (transmit burst mode) links. The transmit return carriers can be switched independently and dynamically between either SCPC or STDMA burst modes. The SMR5000HL also provides a complete return path solution for Digital Video Broadcast (DVB) system downstream.

ROUTER FEATURES

- RISC, Integrated Communication Control Processor (ICCP)
- Telnet Communications and Configuration
- Fully Integrated Network Management System
- TFTP Single or VLOAD Unicast Software Uploads (Upgrading software version changes)
- Flash Memory Storage, Remotely Configurable
- System Memory, 16 Mbytes
- 10BaseT 10 Mbps Ethernet LAN/ISP Interface
- Multiple Subnets
- IP LAN to LAN or LAN to WAN Networks
- Unit Cascade Expansion
- Broadcast Data Transmission Filtering, IP Multicast, Firewall, IGMP
- Firewall Filtering
- Broadcast Filter Selection, Star or Virtual Star Mesh
- Multi-Protocol Support
- DAMA Control Functions for Private Videoconferencing or High-Speed Data Linking
- Single Hop On Demand functions, (SHOD)
- IP Voice Packet Priority
- Upstream Switched Bandwidth Management (MABOD)
- Dynamic Power Control (DPC), Rain Fade & DAMA Links
- DVB upstream routed return gateway
- Complete carrier management
- Multiple Access, SCPC, STDMA, Dynamically Switchable

MODEM FEATURES

- Low cost receive by connecting an LNB directly to the L-Band IF input
- BPSK or QPSK operation.
- SCPC or VSAT remote mode (Burst modulation)
- Programmable receive acquisition/tracking range
- Typical DSP acquisition time of 315 ms at 9.6 kbps QPSK, 100 ms at 64 kbps QPSK
- BER vs. E_b/N_0 performance within 0.3 dB of theoretical. 10^{-7} BER at 6.0 dB E_b/N_0 (2.9 dB E_b/N_0 with Reed-Solomon codec)
- DDS transmit and receive frequency setting in 1 Hz increments
- Built-in BER Test Set
- Programmable Interface type
- Low power, light weight 1U case
- DDS setting of transmit and receive data rates from 1.2 kbps to 4.92 Mbps in 1 bps increments
- Optional IBS multiplexer and Reed-Solomon codec available. Provides fully integrated AUPC
- Optional Turbo Product Codes (TPC) available
- 40 dB AGC range with +15 dBm composite input power
- Fully programmable from either front panel or remote command without jumpers
- Accurate E_b/N_0 and Symbol Error Rate display
- 8 User recallable configurations
- LNB power/Reference from mode

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SYSTEM SPECIFICATIONS

Operating Modes, all programmable:	Receive and Transmit Continuous (SCPC) Optional Transmit Burst (STDMA)
IF Transmit Frequency Range:	50 to 90 MHz
L-Band Receive Frequency Range:	950 to 1900 MHz
Transmit Output Power: (Programmable 50 or 75 Ω)	+5 to -35 dBm, programmable in 0.1 dB steps (max. +3 dBm @ 50 Ω)
Receive Carrier Power In (75 Ω):	-30 to -75 dBm, scales to -99 at lower rates
Maximum Composite Receive Input Power	+15 dBm or +40 dBc whichever is lower power
Transmit/Receive Frequency Setting:	1 Hz steps
Receive Acquisition Range:	Programmable from ± 100 Hz to ± 1.25 MHz
Receive LNB Power: (can be disabled)	+13/+18 VDC at <500mA
Receive LNB Reference: (can be disabled)	10 MHz from internal or external reference
Frequency Reference:	Internal 2.0 ppm oscillator. 1ppm optional. External reference input on rear panel for 1, 5, 9, or 10 MHz
Modulation and Demodulation:	Programmable for BPSK or QPSK independently
Forward Error Correction:	Viterbi. k=7, n=126, k=112, t=7 or
Optional Concatenated Reed-Solomon:	n=225, k=205, t=10 or programmable
FEC Rates Selectable:	1/2, 3/4 or 7/8
Data Rates Programmable at FEC rate 1/2: (without IBS mux or R-S option)	1.2 kbps to 1,230 kbps BPSK, 2.4 kbps to 2,460 kbps QPSK
Data Rates Programmable at FEC rate 3/4 or 7/8 (without IBS mux or R-S option)	2.4 kbps to 2,460 kbps BPSK, 4.8 kbps to 4,920 kbps QPSK
Data Rate Selection: Transmit & Receive:	Programmable in 1bps increments. Accurate to 2×10^{-12} (relative to reference)
Receive Data FIFO Buffer: (Doppler Elastic Store)	4 bits to 131,070 bits, programmable in 1 bit increments, or in delay time
Network Modes	IP Routed
Protocol Support	HDLC, TCP/IP, UDP, HTTP and Proprietary MS ³
Customer Data Interface	10BaseT - RJ45
BER Performance: with Viterbi FEC 1/2 rate: 1/2 rate Viterbi +R-S Concatenated FEC: 3/4 rate Viterbi +R-S Concatenated FEC:	10 ⁻⁵ at 4.8 dB Eb/No, 10 ⁻⁷ at 6.0 dB 10 ⁻⁷ at 3.4 dB (n=126, k=112) 10 ⁻⁷ at 4.5 dB
Turbo Product Codes FEC:	TPC Block decoder Rate 1/2 Coding Gain of 8.1 dB @ BER of 10 ⁻⁵ Rate 1/2 Coding Gain of 8.7 dB @ BER of 10 ⁻⁷
Fast Receive Lock Performance at FEC rate 1/2, 6.0 dB Eb/No, +/-30kHz acquisition range:	340 ms at 9.6 kbps QPSK or 250 ms at 9.6 kbps BPSK 120 ms 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 router operating parameters and status
Packet Mode:	Command driven RS 485 network M&C of all modem and router parameters
Environmental and Physical	
Case Dimensions:	Rack mount @ 1 RU (19" W X 12" D X 1.75" H)
Input Power Requirements:	90 to 264 VAC, 50/60 Hz, Approx. 30W
Operating Conditions:	0 to 50° C, to 95% humidity, non-condensing

SMR5000HL Rear Panel Interface Connections



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