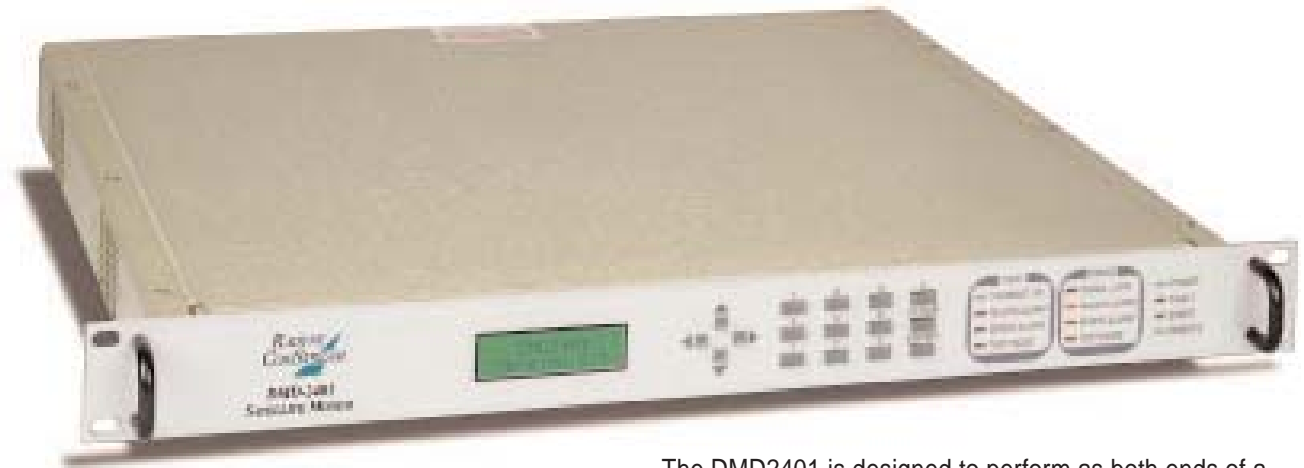




# DMD2401

## VSAT/SCPC Satellite Modem



### HIGHLIGHTS

- ▶ 50 to 180 MHz in 1 Hz Steps
- ▶ Low Cost
- ▶ Light Weight, Low Profile
- ▶ BPSK, QPSK and OQPSK Operation (8PSK Optional)
- ▶ 4.8 to 5000 Kbps
- ▶ One Bit-Per-Second Steps
- ▶ 1/2, 3/4, and 7/8 Rate Viterbi
- ▶ 1/2, 3/4, and 7/8 Rate Sequential (Optional)
- ▶ 21/44, 1/2, 3/4, 7/8, 0.495 and 0.793 Rate Turbo Product Code (Optional)
- ▶ Accurate  $E_b/N_0$ , Symbol Error Rate and Bit Error Rate Display
- ▶ IBS or IDR Framing (Optional)
- ▶ Drop and Insert (Optional)
- ▶ Automatic Uplink Power Control (AUPC) (Optional)
- ▶ 2/3 Trellis 8PSK (Optional)

### OVERVIEW

The Radyne DMD2401 Satellite Modem offers the best features of a sophisticated programmable modem, at an affordable price.

Digital microprocessor control eliminates virtually all on-board adjustments. Direct Digital Synthesis (DDS) of the IF and data rate synthesizers allow settings to one Hertz and one bit-per-second, respectively. These features ensure that the modem will perform over years of service without degradation.

The DMD2401 is designed to perform as both ends of a satellite Single Channel Per Carrier (SCPC) link or as the VSAT remote site modem in a TDMA hub system.

The DMD2401 is perfect for mesh or star topology networks. The modulator and demodulator operate independently using BPSK, QPSK, OQPSK or 8PSK (optional) modulation in either SCPC or VSAT modes.

The DMD2401 is also the ideal VSAT modem for use in a point-to-point frame relay hybrid network. Other applications include FDMA, telephony, video conferencing, long distance learning, paging and news gathering.

Selection of any data rate is provided over the following ranges:

- 4.8 Kbps to 1250 Kbps BPSK
- 9.6 Kbps to 4375 Kbps QPSK
- 9.6 Kbps to 4375 Kbps OQPSK
- 64 Kbps to 5000 Kbps 8PSK (optional)

The DMD2401 is programmable from the front panel. The program menu was specifically designed for ease of use to quickly put the modem online and to input network changes. The modem can also be monitored and controlled through the RS-485 or RS-232 serial control channel.

Available options for the DMD2401 include a low data rate asynchronous serial overhead channel for remote monitor and control. Additionally, a Reed-Solomon or Turbo Product code is available for applications requiring bit error rates of  $10^{-10}$ .

All of the configuration, monitor and control functions are available at the front panel. Operating parameters, such as variable data rates, FEC code rate, modulation type, IF frequencies, IBS/IDR framing and interface type can be readily set and changed at the front panel by earth station operations personnel.



# DMD2401 VSAT/SCPC Satellite Modem

## SPECIFICATIONS

### GENERAL

#### Transmit and Receive Data Rates

DMD2401:	BPSK - 4.8 to 1250 Kbps, Rate 1/2
	QPSK - 9.6 to 2500 Kbps, Rate 1/2
	QPSK - 9.6 to 3750 Kbps, Rate 3/4
	QPSK - 9.6 to 4375 Kbps, Rate 7/8
	OQPSK - 9.6 to 2500 Kbps, Rate 1/2
	OQPSK - 9.6 to 3750 Kbps, Rate 3/4
	OQPSK - 9.6 to 4375 Kbps, Rate 7/8
	8PSK - 64 to 5000 Kbps, Rate 2/3 (Optional)
Data Rate Setting:	Selectable in 1 bps Steps

#### Modulator Specifications

Frequency Range:	50 to 90 and 100 to 180 MHz Standard in 1 Hz Steps
Frequency Stability:	±1.0 ppm (88 Hz at 88 MHz)
Level Control:	-5 to -30.0 dBm, 0.1 dB Steps
Level Stability:	±0.5 dB From 0 to 50°C
Impedance:	75 Ohm or 50 Ohm Software Selectable
Return Loss:	20 dB Minimum
Output Off Isolation:	>60 dB
Spurious Output:	<-55 dBc From 2 to 200 MHz
FEC:	1/2, 3/4, and 7/8 Viterbi, K=7 1/2, 3/4, and 7/8 Sequential (Optional) 0.495 and 0.793 TPC (Optional)
Scrambler:	Intelsat V.35, Mode Selectable

#### Demodulator Specifications

Frequency Range:	50 to 90 and 100 to 180 MHz Standard in 1 Hz Steps
Input Carrier Range:	-65 to -40 dBm (Symbol Rate < 64 kHz) -50 to -30 dBm (Symbol Rate > 640 kHz)
Acquisition/Tracking:	±1 kHz to ±32 kHz, 1 kHz Steps
Reacquisition Range:	±1 kHz to ±32 kHz, 1 kHz Steps
IF Input Impedance:	75 Ohm or 50 Ohm Software Selectable
Return Loss:	20 dB Minimum
FEC	1/2, 3/4, and 7/8 Viterbi, K=7 1/2, 3/4, and 7/8 Sequential (Optional)

Typical $E_b/N_0$ (Viterbi)		Rate 1/2	Rate 3/4	Rate 7/8		
@ BER=10 <sup>-5</sup>		5.1	6.3	7.5		
@ BER=10 <sup>-7</sup>		6.2	7.7	8.6		
Typical $E_b/N_0$ (Sequential)		Rate 1/2	Rate 3/4	Rate 7/8		
@ BER=10 <sup>-5</sup>		5.1	5.6	6.4		
@ BER=10 <sup>-7</sup>		6.5	6.5	7.4		
Typical $E_b/N_0$ (8PSK Trellis)		Rate 2/3				
@ BER=10 <sup>-5</sup>		6.4				
@ BER=10 <sup>-7</sup>		8.1				
Typical $E_b/N_0$ (Turbo)		Rate 1/2	Rate 3/4	Rate 7/8	Rate 0.495	Rate 0.793
		<u>(21/44)</u>				
B/O/QPSK @ BER=10 <sup>-5</sup>		2.4	3.2	3.9	2.5	3.4
@ BER=10 <sup>-7</sup>		2.8	3.7	4.1	2.7	3.8
8PSK @ BER=10 <sup>-5</sup>		---	5.6	6.7	---	5.9
@ BER=10 <sup>-7</sup>		---	6.0	7.5	---	6.4

Note:  $E_b/N_0$  typical values include effect of using differential encoding and V.35 scrambler.

Descrambler:	Intelsat V.35, Mode Selectable
Data Buffering:	8 Bits to 262,144 Bits in 8-Bit Steps

### Alarms

Summary Alarms	Two separate form-C contacts available at the rear panel. Each provides a summary alarm of fault conditions.
----------------	--

### Front Panel LED Indicators

Unit	Power Alarm Event Remote
Demodulator	Signal Lock Major Alarm Minor Alarm Test Mode
Modulator	Transmit On Major Alarm Minor Alarm Test Mode

### Monitor and Control

All operating parameters can be monitored and controlled via the front panel display/keypad or the RS485 or RS232 serial control channel in either terminal or command modes. The following modem parameters may be controlled and/or monitored:

Transmit and Receive Frequencies
Transmit and Receive Offsets
Modulator Power Level
Modulator On/Off
Modulator/Demodulator Modulation (BPSK, QPSK, OQPSK or Optional 8PSK)
Modulator/Demodulator Data Rates (1 bps Steps)
Modulator/Demodulator Code Rates (1/2, 3/4, 7/8; Optional 0.495 and 0.793 TPC, and 2/3 8PSK)
Modulator/Demodulator Differential Decoders (On/Off)
Modulator/Demodulator Scrambler (On/Off)

### Terrestrial Interfaces

T1 (DSX1)	1.544 Mbps, 100 Ohm and B8ZS
E1 (G.703)	2.048 Mbps, 75 and 120 Ohm, HDB3
ITU V.35	All Rates, Differential, Clock/Data, DCE
RS-422/-449	All Rates, Differential, Clock/Data, DCE
Universal Interface	Optionally Available

### Options

Turbo Product Codec	
Concatenated Codec	A Reed-Solomon Codec is Available
Asynchronous Channel	Asynchronous overhead channel for remote control and order-wire applications.
IDR	Per IESS 308
IBS	Per IESS 309
8PSK	Per IESS 310
Drop and Insert	(Optional)
Terrestrial Data	1.544 Mbps or 2.048 Mbps, G.732/733
Line Coding	B8ZS and AMI for T1 and HDB3 for E1
Framing	D4, ESF for T1 and PCM30 (Channel Associated Signaling) or PCM31 (Signaling disabled) for E1
Time Slot Selection	$n \times 64$ Contiguous or Arbitrary Blocks for Drop and Insert
Data Rates	64, 128, 192, 256, 320, 384, 512, 640, 768, 960, 1024, 1280, 1536, 1920 kbps

### Environmental

Prime Power	100 to 240 VAC, 50 to 60 Hz, 1.0 A (IEC 3-Pin Power Connector With Switch)
Operating Temp.	0 to 50°C, 95% Humidity, Noncondensing
Storage Temp.	-20 to 70°C, 99% Humidity, Noncondensing

### Physical

Chassis size	19 x 17 x 1.75 inches (48.26 x 43.2 x 4.45 cm)
Weight	8 pounds (3.6 Kg)
Shipping Weight	10 pounds (4.5 Kg)

**U.S.A./Canada:** 3138 East Elwood Street, Phoenix, Arizona 85034 USA Tel: +(1) 602.437.9620 Fax: +(1) 602.437.4811  
7330 Trade Street, San Diego, California 92121 USA Tel: +(1) 858.458.1800 Fax: +(1) 858.657.5400

**Europe/Middle East/Africa:** Charwell House, Wilsom Road, Alton, GU34 2PP, United Kingdom Tel: +(44) 1420.540.233 Fax: +(44) 1420.540.232

**Latin America:** 6340 Sequence Drive, San Diego, California 92121 USA Tel: +(1) 858.458.1800 Fax: +(1) 858.657.5400

**China:** Room 405, Building B, Heqiao Mansion, No. 8 Guanghua Road, Chaoyang District, Beijing 100026 China Tel: +(86) 10.658.31975 Fax: +(86) 10.658.31974

**Asia-Pacific:** 15 McCallum Street, #12-04, NatWest Centre, Singapore 069045 Tel: +(65) 6225.4016 Fax: +(65) 6325.1950

Jl M.T. Haryono Kav 25, Jakarta, Indonesia 12820 Tel: +(62) 21.521.3733 Fax: +(62) 21.252.0142

www.radn.com

Prices, specifications, and product availability subject to change without notice. All trademarks acknowledged.

© Copyright 2005 Radyne ComStream Corporation. All rights reserved.

ML-0001D1-03-05

