



DMD2401

VSAT/SCPC Satellite Modem



DMD2401 Satellite Modem

HIGHLIGHTS

- ▶ 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)
- ▶ BER Within 0.3 dB of Theoretical
- ▶ Accurate E_b/N_o , 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 ComStream 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 codec 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.

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SPECIFICATIONS

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	50-90 or 100-180 MHz (optional) 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, 50 ohm (optional)
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)
Differential Encoding	Selectable On or Off
Scrambler	Intelsat V.35, mode selectable

Demodulator Specifications

Frequency Range	50-90 or 100-180 MHz (optional) 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 ±255 kHz, 1 kHz steps
Reacquisition Range	±1 kHz to ±255 kHz, 1 kHz steps
IF Input Impedance	75 ohm, 50 ohm optional
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_o (Viterbi)	<u>Rate 1/2</u> <u>Rate 3/4</u> <u>Rate 7/8</u>
@ BER=10 ⁻⁵	5.1 6.2 7.5
@ BER=10 ⁻⁷	6.2 7.7 8.6
Typical E_b/N_o , @ 64 Kbps	
Sequential (optional)	<u>Rate 1/2</u> <u>Rate 3/4</u> <u>Rate 7/8</u>
@ BER=10 ⁻⁵	4.0 5.0 6.1
@ BER=10 ⁻⁷	4.9 5.9 7.4
Typical E_b/N_o , (Trellis 2/3, 8PSK)	
@ BER=10 ⁻⁵	7.2
@ BER=10 ⁻⁷	8.9

Note: E_b/N_o 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.
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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 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

Options

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 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 x 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	100-240 Vac, 50-60 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: 6340 Sequence Drive, San Diego, California 92121 USA Tel:+(1) 858.458.1800 Fax:+(1) 858.657.5404
3138 East Elwood Street, Phoenix, Arizona 85034 USA Tel:+(1) 602.437.9620 Fax:+(1) 602.437.4811
Latin America: 6413 Congress Avenue, Suite 220, Boca Raton, Florida, 33487 USA Tel:+(1) 561.988.1210 Fax:+(1) 561.988.8290
Europe/Middle East/Africa: Dunsfold Suite, 2nd Floor, Mill Pool House, Mill Lane, Godalming, Surrey, UK GU7 1EY Tel:+(44) 1483.421302 Fax:+(44) 1483.421303
China: Room 1501 Canway Building, 66 Lanlishi Road, Xicheng District, Beijing, 100045 Tel:+(86) 10 6 804.2542 Fax:+(86) 10 6 804.2524
Asia-Pacific: 15 McCallum Street, #12-04, NatWest Centre, Singapore, 069045 Tel:+(65) 325.1951 Fax:+(65) 325.1950
7th Floor Wisma Budi, J.L.H.R. Rasuna Said, Kav C-6 Jakarta, Indonesia 12940 Tel:+(62) 21.521.3295 Fax:+(62) 21.521.3343
Internet World Wide Web: <http://www.radynecomstream.com>

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