



# DMD20

## Universal Satellite Modem



### HIGHLIGHTS

- ▶ BPSK/QPSK/OQPSK/8PSK/16 QAM Operation
- ▶ 2.4 Kbps to 20 Mbps, 1 bps Steps
- ▶ FEC - Viterbi, Reed-Solomon, Sequential, Trellis, Turbo Product Code
- ▶ Configuration, Monitor and Control Features Fully User-Programmable
- ▶ Excellent Spurious Performance
- ▶ Fully Compliant with IESS 308/309/310/314/315
- ▶ Optional DVB to EN301-210 and EN300-421
- ▶ Industry-standard Universal Interface Module
- ▶ Fast Acquisition
- ▶ 50 to 90 MHz and 100 to 180 MHz IF, and 950 to 2050 MHz L-Band in 1 Hz Steps
- ▶ Standard Features Include: Reed-Solomon, Asynchronous Overhead, Automatic Uplink Power Control (AUPC), and CM701 compatible Satellite Control Channel

### OVERVIEW

Radyne's new DMD20 Satellite Modem breaks new ground in flexibility, operation and cost. With standards including IDR, IBS and DVB, and covering data rates up to 20 Mbps, this 1RU duplex modem covers virtually all your Satellite IP, Telecom, Video and Internet applications. Switch between spur-free 70/140 MHz operation and L-Band without any configuration changes. It's all in the same box!

The extensive list of software options allows for budgeting the modem for today's needs while covering tomorrow's plans. These options can be purchased and then activated in seconds via the front panel.

Additional hardware options like Turbo, Interface Expansion, High Stability and DC operation complete the modem's dynamic feature coverage.

Stock this modem at its minimum configuration (and cost) locally at your warehouse for immediate distribution. Then configure on-site, allowing huge savings in time and dollars with just-in-time feature installation.

The DMD20's impressive remote accessibility surpasses all others in the field. Remote control via Radyne's trusted RLLP (Radyne Link Level Protocol), Ethernet 10 Base-T (SNMP and Web Browser) includes control of all the modem's features plus software maintenance. Additionally, the two-line backlit LCD can be supplemented with terminal software running on a PC or laptop. The modem now presents its entire monitor and control functions on the big screen.

Supported by Radyne's extensive line of redundancy switches, converters, encoders and decoders, the DMD20 can be built into any satellite requirement. Compatibility with current modems, such as Radyne's DMD2401 and DMD15, are maintained for seamless substitution and addition to your existing systems.

#### Hardware Options:

- Turbo FEC
- Sequential FEC
- DC Input Power 48 VDC
- High-Stability Reference

#### Interface Options:

- Ethernet 10/100
- HSSI Interface
- HSSI/Ethernet
- HSSI/G703 Interface
- DVB ASI/SPI Interface
- G703/IDR/ESC

#### Software Options:

- Data Rate Upgrades
- L-Band Operation
- IDR, IBS
- 8PSK
- 16QAM
- Drop and Insert
- DVB-S



# DMD20 Universal Satellite Modem

## SPECIFICATIONS

### DMD20 BER Performance Guaranteed (Typical) at BERs shown:

Modulation/ FEC	Code Rate	1 x 10 <sup>-5</sup>	1 x 10 <sup>-6</sup>	1 x 10 <sup>-7</sup>	1 x 10 <sup>-8</sup>	Data Rate Range
BPSK VIT	1/2	5.5 (5.1)	6.1 (5.7)	6.7 (6.2)	7.4 (6.8)	2.4 Kbps - 5.0 Mbps
QPSK VIT	1/2	5.5 (5.1)	6.1 (5.7)	6.7 (6.2)	7.4 (6.8)	4.8 Kbps - 10.0 Mbps
QPSK VIT	3/4	6.8 (6.3)	7.6 (7.0)	8.3 (7.7)	8.9 (8.4)	7.2 Kbps - 15.0 Mbps
QPSK VIT	7/8	7.9 (7.2)	8.6 (7.9)	9.3 (8.6)	10.2 (9.4)	8.4 Kbps - 17.5 Mbps
QPSK VIT R-S	1/2	3.8 (3.4)	4.1 (3.6)	4.2 (3.8)	4.4 (4.0)	4.8 Kbps - 8.88 Mbps
QPSK VIT R-S	3/4	5.4 (4.7)	5.6 (4.9)	5.8 (5.1)	6.0 (5.3)	7.2 Kbps - 13.33 Mbps
QPSK VIT R-S	7/8	6.5 (6.0)	6.7 (6.4)	6.9 (6.7)	7.2 (7.1)	7.8 Kbps - 15.55 Mbps
QPSK SEQ	1/2	5.6 (5.1)	5.9 (5.4)	6.3 (5.8)	6.7 (6.2)	4.8 Kbps - 2.048 Mbps
QPSK SEQ	3/4	6.1 (5.6)	6.5 (6.1)	7.0 (6.5)	7.4 (6.9)	7.2 Kbps - 2.048 Mbps
QPSK SEQ	7/8	6.9 (6.4)	7.4 (6.9)	7.9 (7.4)	8.4 (7.9)	8.4 Kbps - 2.048 Mbps
QPSK TPC	1/2	2.7 (2.4)	2.9 (2.6)	3.1 (2.8)	3.3 (3.0)	4.8 Kbps - 9.54 Mbps
QPSK TPC	3/4	3.6 (3.2)	3.8 (3.4)	4.1 (3.7)	4.4 (4.0)	7.2 Kbps - 15.0 Mbps
QPSK TPC	7/8	4.2 (3.9)	4.3 (4.0)	4.4 (4.1)	4.5 (4.2)	8.4 Kbps - 17.5 Mbps
8PSK TRE	2/3	7.8 (6.4)	8.7 (7.2)	9.5 (8.1)	10.2 (8.9)	9.6 Kbps - 20.0 Mbps
8PSK TRE R-S	2/3	5.8 (5.4)	6.2 (5.6)	6.5 (5.8)	6.7 (6.1)	8.9 Kbps - 18.3 Mbps
8PSK TPC	3/4	6.0 (5.6)	6.2 (5.8)	6.4 (6.0)	6.8 (6.3)	10.8 Kbps - 20.0 Mbps
8PSK TPC	7/8	6.9 (6.5)	7.0 (6.6)	7.1 (6.7)	7.2 (6.8)	12.6 Kbps - 20.0 Mbps
16QAM VIT	3/4	10.7 (9.9)	11.5 (10.7)	12.4 (11.6)	13.3 (12.5)	14.4 Kbps - 20.0 Mbps
16QAM VIT	7/8	11.9 (11.1)	12.7 (11.9)	13.5 (12.7)	14.3 (13.5)	16.8 Kbps - 20.0 Mbps
16QAM VIT R-S	3/4	8.9 (8.3)	9.1 (8.6)	9.3 (8.8)	9.5 (9.1)	13.3 Kbps - 20.0 Mbps
16QAM VIT R-S	7/8	10.3 (9.9)	10.5 (10.2)	10.8 (10.4)	11.0 (10.7)	15.5 Kbps - 20.0 Mbps
16QAM TPC	3/4	7.0 (6.7)	7.4 (7.1)	7.8 (7.5)	8.2 (7.9)	14.4 Kbps - 20.0 Mbps
16QAM TPC	7/8	8.0 (7.6)	8.1 (7.7)	8.2 (7.8)	8.3 (7.9)	16.84 Kbps - 20.0 Mbps

### Modulator

Modulation:	BPSK, QPSK, and OQPSK (8PSK, 16QAM Optional)
IF Tuning Range:	50 to 90 and 100 to 180 MHz in 1 Hz Steps
L-Band Tuning Range:	950 to 2050 MHz in 1 Hz Steps
Impedance:	IF: 75 Ohm (50 Ohm Optional) L-Band, 50 Ohm
Connector:	BNC, 75 Ohm SMA, 50 Ohm, L-Band
Return Loss:	IF: 20 dB Minimum L-Band, 14 dB Minimum
Output Power:	0 to -25 dBm
Output Stability:	IF: ±0.5 dB Over Frequency and Temperature L-Band: ±1.0 dB Over Frequency and Temperature
Output Spectrum:	Meets IESS 308/309/310/DVB-S Power Spectral Mask
Spurious:	-55 dBc In-Band (50 to 90 MHz, 100 to 180 MHz, 950 to 2050 MHz) -45 dBc Out-of-Band
On/Off Power Ratio:	>60 dB
Scrambler:	CCITT V.35 or IBS (Others Optional)
FEC:	Viterbi, K=7 at 1/2, 3/4 and 7/8 Trellis 2/3 Turbo Product Code (Optional) BPSK 21/44 QPSK/OQPSK 1/2, 3/4, 7/8 8PSK/16QAM 3/4, 7/8 Legacy Turbo Rates: 0.495, 0.793
Outer Encoder Options:	Reed-Solomon INTELSAT (DVB Optional) Custom (N, K) Reed-Solomon (Optional)
Data Clock Source:	Internal, External, Rx Recovered
Internal Stability:	1 x 10 <sup>-6</sup> Typical (Optional to 5 x 10 <sup>-8</sup> )

### Demodulator

Demodulation:	BPSK, QPSK, and OQPSK (8PSK, 16QAM Optional)
IF Tuning Range:	50 to 90 and 100 to 180 MHz in 1 Hz Steps
L-Band Tuning Range:	950 to 2050 MHz in 1 Hz Steps
Impedance:	IF: 75 Ohm (50 Ohm Optional) L-Band: 50 Ohm
Connector:	BNC: 75 Ohm SMA: 50 Ohm (L-Band)
Return Loss:	IF: 20 dB Minimum L-Band: 14 dB Minimum

Spectrum:	INTELSAT IESS 308/309/310/DVB-S Compliant
Input Level:	10 x log (Symbol Rate) - 100, ±12 dB
Total Input Power:	-10 dBm or +40 dBc (The Lesser) @ 256 Kbps
FEC:	Viterbi, K=7 at 1/2, 3/4 and 7/8 Rate, Rate Sequential 1/2, 3/4, 7/8 (Optional) Trellis 2/3 Turbo Product Code (Optional) BPSK 21/44 QPSK/OQPSK 1/2, 3/4, 7/8 8PSK/16QAM 3/4, 7/8 Legacy Turbo Rates: 0.495, 0.793
Decoder Options:	Reed-Solomon INTELSAT (DVB Optional) Custom (N, K) Reed-Solomon CCITT V.35 or IBS (Others Optional)
Descrambler:	CCITT V.35 or IBS (Others Optional)
Acquisition Range:	Programmable ±1 kHz to ±255 kHz
Sweep Delay Value:	100 msec to 6000 seconds in 100 msec Steps

### Plesiochronous Buffer

Size:	0 msec to 64 msec
Centering:	Automatic on Overflow/Underflow
Centering Modes:	IBS: Integral Number of Frames IDR: Integral Number of Multi-Frames
Clock:	Transmit, External, Rx Recovered or SCT (Internal)

### Monitor and Control

Ethernet 10 Base-T/Remote RS-485/Terminal RS-232, Web Browser

### DMD20 Drop and Insert (Optional)

Terrestrial Data	1.544 Mbps or 2.048 Mbps, G.732/733
Line Coding	AMI or B8ZS for T1 and HDB3 for E1
Framing	D4, ESF and PCM30 (PCM 30C) or PCM31 (PCM 31C) for E1
Time Slot Selection	n x 64 contiguous or arbitrary blocks for Drop or Insert.
D&I Open Network Satellite Overhead	6.6%
Time Slots	TS1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 16, 20, 24, 30, 31
EFFICIENT D&I Closed Network, Satellite Overhead	0.4%
Time Slots:	1-31 Any Combination

### Terrestrial Interfaces

DVB, ASI/SPI, HSSI, Ethernet 4 Port 10/100 Base-T,  
HSSI/Ethernet 4 Port 10/100 Base-T, HSSI/G703 T1/E1/T2/E2

### IDR/ESC Interface (Optional)

G.703 T1 (DSX1):	1.544 Mbps, 100 Ohm Balanced, AMI and B8ZS Line Codes
G.703 E1:	2.048 Mbps, 75 Ohm Unbalanced and 120 Ohm Balanced, HDB3
G.703 T2 (DSX2):	6.312 Mbps, 75 Ohm Unbalanced, B8ZS Line Code and 110 Ohm Balanced, B6ZS Line Code
G.703 E2:	8.448 Mbps, 75 Ohm BNC, Unbalanced, HDB3 Line Code

### IBS/Synchronous Interface (Standard)

RS-422/-530:	All Rates, Differential, Clock/Data, DCE
ITU V.35:	All Rates, Differential, Clock/Data, DCE
RS-232:	(DCE up to 200 Kbps)

### Environmental

Prime Power:	100 to 240 VAC, 50 to 60 Hz, 40 Watts Maximum 48 VDC (Optional)
Operating Temperature:	0 to 50° C, 95% Humidity, Non-Condensing
Storage Temperature:	-20 to 70° C, 99% Humidity, Non-Condensing

### Physical

Size:	19" x 1.75" x 16" Deep (48.26 cm x 40.64 cm x 4.45 cm)
Weight:	6.5 Pounds (3.0 Kg)

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