



## Overview

The DMD50 Universal Satellite Modem breaks new ground in flexibility, operation and cost. With standards including IDR, IBS and DVB, and covering data rates up to 52 Mbps, this 1RU duplex modem covers virtually all of your satellite IP, telecom, video and Internet applications. You can switch between spur-free 70/140 MHz operation to 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, such as 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 for immediate distribution, then configure on-site by the installer, allowing huge savings in time and dollars with just-in-time feature installation.

The DMD50's impressive remote accessibility surpasses all others in the field. Remote control via the RLLP (Radyne Link Level Protocol) or 10Base-T SNMP Ethernet or Web browser which 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 (M&C) functions on the big screen.

Supported by an extensive line of redundancy switches, converters, encoders and decoders, the DMD50 can be built into any satellite requirement. Compatibility with current modems, such as the DMD20, DMD2050, DMD2401 and DMD15, are maintained for seamless substitution and addition to your existing systems.

## Typical Users

- Telecom Service Providers
- Internet Service Providers
- Government & Military

## Common Applications

- G.703 Trunking
- IP Trunking

## Features

- BPSK/QPSK/OQPSK/8PSK/16-QAM operation  
2.4 kbps to 52 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

## Hardware Options

- Turbo FEC
- Sequential FEC
- DC input power 48 VDC
- High-stability reference

## Software Options

- Data rate upgrades
- L-Band operation
- IDR, IBS
- 8PSK
- 16-QAM
- Drop and insert
- DVB-S

## Interface Options

- Ethernet (10/100)
- Gigabit Ethernet (10/100/1000)
- HSSI interface
- HSSI/Ethernet
- HSSI/G.703 interface
- DVB ASI/SPI interface
- G.703/IDR/ESC

# Specifications

## DMD50 Performance

Modulation/FEC	Code Rate	$1 \times 10^{-5}$	$1 \times 10^{-6}$	$1 \times 10^{-7}$	$1 \times 10^{-8}$	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 - 14.1 Mbps
QPSK VIT	1/2	5.5 (5.1)	6.1 (5.7)	6.7 (6.2)	7.4 (6.8)	4.8 kbps - 28.3 Mbps
QPSK VIT	3/4	6.8 (6.3)	7.6 (7.0)	8.3 (7.7)	8.9 (8.4)	7.2 kbps - 42.4 Mbps
QPSK VIT	7/8	7.9 (7.2)	8.6 (7.9)	9.3 (8.6)	10.2 (9.4)	8.4 kbps - 49.5 Mbps
QPSK VIT RS	1/2	3.8 (3.4)	4.1 (3.6)	4.2 (3.8)	4.4 (4.0)	4.8 kbps - 25.1 Mbps
QPSK VIT RS	3/4	5.4 (4.7)	5.6 (4.9)	5.8 (5.1)	6.0 (5.3)	7.2 kbps - 37.7 Mbps
QPSK VIT RS	7/8	6.5 (6.0)	6.7 (6.4)	6.9 (6.7)	7.2 (7.1)	7.8 kbps - 44.0 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 - 20.0 Mbps
QPSK TPC	3/4	3.6 (3.2)	3.8 (3.4)	4.1 (3.7)	4.4 (4.0)	7.2 kbps - 20.0 Mbps
QPSK TPC	7/8	4.2 (3.9)	4.3 (4.0)	4.4 (4.1)	4.5 (4.2)	8.4 kbps - 20.0 Mbps
8PSK TRE	2/3	8.2 (6.4)	9.0 (7.2)	9.8 (8.1)	10.4 (8.9)	9.6 kbps - 52.0 Mbps
8PSK TRE R-S	2/3	6.3 (5.4)	6.5 (5.6)	6.7 (5.8)	6.9 (6.1)	8.9 kbps - 52.0 Mbps
8PSK TPC	3/4	6.0 (5.6)	6.3 (5.8)	6.5 (6.0)	6.7 (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
8PSK TPC	.750	7.1 (6.7)	7.2 (6.8)	7.3 (6.9)	7.4 (7.0)	20.0 Mbps - 52.0 Mbps
8PSK TPC	.875	7.3 (6.9)	7.4 (7.0)	7.5 (7.1)	7.6 (7.2)	20.0 Mbps - 52.0 Mbps
16-QAM VIT	3/4	10.7 (9.9)	11.5 (10.7)	12.4 (11.6)	13.3 (12.5)	14.4 kbps - 52.0 Mbps
16-QAM VIT	7/8	11.9 (11.1)	12.7 (11.9)	13.5 (12.7)	14.3 (13.5)	16.8 kbps - 52.0 Mbps
16-QAM VIT R-S	3/4	8.9 (8.3)	9.1 (8.6)	9.3 (8.8)	9.5 (9.1)	13.3 kbps - 52.0 Mbps
16-QAM VIT R-S	7/8	10.3 (9.9)	10.5 (10.2)	10.8 (10.4)	11.0 (10.7)	15.5 kbps - 52.0 Mbps
16-QAM 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
16-QAM 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
16-QAM TPC	.750	7.5 (7.1)	7.7 (7.4)	7.9 (7.6)	8.3 (8.0)	20.0 Mbps - 52.0 Mbps
16-QAM TPC	.875	8.3 (7.9)	8.4 (8.0)	8.5 (8.1)	8.6 (8.2)	20.0 Mbps - 52.0 Mbps

### Modulator

Modulation	BPSK, QPSK, and OQPSK (8PSK, 16-QAM 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: 14 dB minimum L-Band: 10 dB minimum
Output Power	0 to -25 dBm
Output Stability	IF: $\pm 0.5$ dB over frequency and temperature L-Band: $\pm 1.0$ dB over frequency and temperature
Output Spectrum	Meets IESS-308/309/310/DVB-S power spectral mask -55 dBc In-band (50 to 90 MHz, 100 to 180 MHz, 950 to 2050 MHz) -45 dBc Out-of-band
Spurious	
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/16-QAM 3/4, 7/8 Legacy Turbo rates: 0.495, 0.793
Outer Encoder Options	Reed-Solomon Intelsat (DVB optional) Custom (N, K) Reed-Solomon
Data Clock Source	Internal, external, RX recovered
Internal Stability	$1 \times 10^{-6}$ typical (optional to $5 \times 10^{-6}$ )

### 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 10Base-T/Remote RS-485/Terminal RS-232, Web browser

### DMD50 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 10/100Base-T, Gigabit Ethernet (10/100/1000), G.703 T3/E3/STS1, HSSI/Ethernet 4-Port 10/100Base-T, HSSI/G.703 T1/E1/T2/E2

### Demodulator

Demodulation	BPSK, QPSK, and OQPSK (8PSK, 16-QAM 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: 14 dB minimum L-Band: 10 dB minimum
Spectrum	Intelsat IESS-308/309/310/DVB-S compliant
Input Level	-55 to +10 dBm
Total Input Power	-5 dBm or +40 dBc (the lesser) 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) <20 Mbps BPSK 21/44 QPSK/OQPSK 1/2, 3/4, 7/8 8PSK/16-QAM 3/4, 7/8 Legacy rates: 0.495, 0.793 >20 Mbps 8PSK/16-QAM TPC 0.750 TPC 0.875
FEC	
Decoder Options	Reed-Solomon Intelsat (DVB-S optional) Custom (N, K) Reed-Solomon
Descrambler	CCITT V.35 or IBS (others optional)
Acquisition Range	Programmable $\pm 1$ kHz to $\pm 255$ kHz
Sweep Delay Value	100 msec to 6000 seconds in 100 msec steps

### IDR/ESC Interface (Optional)

G.703 T1 (DSX1)	1.544 Mbps, 100 Ohm balanced, AMI and B8ZS
G.703 E1	2.048 Mbps, 75 Ohm Unbalanced and 120 Ohm balanced, HDB3
G.703 T2 (DSX2)	6.312 Mbps, 75 Ohm Unbalanced and 110 Ohm balanced, B8ZS and B6ZS
G.703 E2	8.448 Mbps, 75 Ohm BNC, unbalanced, HDB3
G.703 E3	34.368 Mbps, 75 Ohm BNC, unbalanced, HDB3

### 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 & Physical

Prime Power	100 to 240 VAC, 50 to 60 Hz, 60 W maximum 48 VDC (optional)
Operating Temperature	0 to 50° C, 95% humidity, non-condensing
Storage Temperature	-20 to 70° C, 99% humidity, non-condensing
Dimensions (1RU) (height x width x depth)	1.75" x 19" x 19.5" (4.45 x 48.26 x 48.89 cm)
Weight	8.0 lbs (3.64 kg)



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