

# DMD1050T L-Band Satellite Modem Board

Satellite Modems



## Overview

The DMD1050T L-Band Satellite Modem board offers a complete modem with FIPS certified TRANSEC on a compact PCB daughter board. The embedded TRANSEC capability is fully compatible with the TRANSEC capabilities in Comtech EF Data's DMD2050E and SLM-5650A Satellite Modems. The compact size is engineered to be a drop-in replacement option for the TDMA modem card in many current fly-away terminals. The conductively cooled design enables fly-away terminal vendors to meet demanding outdoor environment requirements without the need for fans or custom heat sinking design. With standards including MIL-STD-188-165A, IESS-308, -309, -310, -314/315 and DVB, and covering data rates up to 20 Mbps, the DMD1050T covers virtually all your satellite IP, telecom, video and Internet applications.

The extensive list of integrated hardware and software options give you the ability to integrate the modem on many platforms and provide an upgrade path for future networks. Options may be purchased with the product or easily upgraded in the field through the web browser or terminal port.

The DMD1050T has an impressive remote accessibility line-up. Remote control via serial RS-232, 10Base-T SNMP Ethernet or web browser interfaces allow for monitor and control of all the modem's features.

Both serial and bridged mode Ethernet interface compatibility with current modems, such as the CDM-570A, CDM-570AL, CDM-570, CDM-570L, CDM-625A, CDM-625, DMD20, DMD50, DMD2050, DMD2050E, and SLM-5650A are maintained for seamless substitution and addition to your existing systems.

The DMD1050T modem board integrates supporting hardware for BUC and LNB. Interconnects allow the user to supply external voltages and 10 MHz Reference for BUC and LNB.

Published specifications reflect the maximum DMD1050T performance. Each DMD1050T can be configured to customer requirements via hardware / software options applied at the factory or in the field.

## Features

- MIL-STD-188-165A compliant
- Compact size 1.442" x 6.675" x 9.125" (mounting holes aligned with competing TDMA modem card)
- Conductively cooled design
- TRANSEC Module, FIPS-140-2 Level 2 certified
- 950 to 2050 MHz L-Band TX/RX
- Built in MIL-188-114A and Ethernet data interfaces
- BPSK/QPSK/OQPSK/8PSK/8QAM/16-QAM modulation
- 2.4 kbps to 20 Mbps, 1 bps steps
- FEC – Viterbi, Reed-Solomon, Sequential, Trellis, Turbo
- Product Code (TPC) and Low Density Parity Check (LDPC)
- Direct Sequence Spread Spectrum (Tx Only)
- Optional 10 MHz high-stability reference
- Input connectors for BUC and LNB voltages
- Excellent spurious performance
- Fully compliant with IESS-308/309/310/314/315
- Optional DVB to EN301-210 and EN300-421
- Standard features include: Reed-Solomon, Asynchronous Overhead and Automatic Uplink Power Control
- M&C options include SNMP, Web browser & RS-232 terminal ports

## Software Options

- Data Rate upgrades
- 8PSK
- IDR, IBS framing
- LDPC FEC
- TPC FEC
- 16QAM
- DVB-S

## Typical Users

- Government & Military

## Common Applications

- Communications at-the-Pause
- Communications on-the-Move
- Flyaway Communications
- Integrated Satellite Terminal Communications

# Specifications

## DMD1050T BER Performance

Mod / FEC	Code Rate	BW Eff. (bit/sym)	Eb/No Guaranteed (Typical)				Data Rate Range (kbps)
			10 <sup>-5</sup>	10 <sup>-6</sup>	10 <sup>-7</sup>	10 <sup>-8</sup>	
<b>Legacy Modes</b>							
BPSK VIT	1/2	0.50	5.5 (5.1)	6.1 (5.7)	6.7 (6.2)	7.4 (6.8)	2.4 – 5,000
QPSK VIT	1/2	1.00	5.5 (5.1)	6.1 (5.7)	6.7 (6.2)	7.4 (6.8)	4.8 – 10,000
QPSK VIT	3/4	1.50	6.8 (6.3)	7.6 (7.0)	8.3 (7.7)	8.9 (8.4)	7.2 – 15,000
QPSK VIT	7/8	1.75	7.9 (7.2)	8.6 (7.9)	9.3 (8.6)	10.2 (9.4)	8.4 – 17,500
QPSK VIT R-S	1/2	0.92	3.8 (3.4)	4.1 (3.6)	4.2 (3.8)	4.4 (4.0)	4.8 – 8,880
QPSK VIT R-S	3/4	1.38	5.4 (4.7)	5.6 (4.9)	5.8 (5.1)	6.0 (5.3)	7.2 – 13,300
QPSK VIT R-S	7/8	1.61	6.5 (6.0)	6.7 (6.4)	6.9 (6.7)	7.2 (7.1)	7.8 – 15,500
QPSK SEQ	1/2	1.00	5.6 (5.1)	5.9 (5.4)	6.3 (5.8)	6.7 (6.2)	4.8 – 2,048
QPSK SEQ	3/4	1.50	6.1 (5.6)	6.5 (6.1)	7.0 (6.5)	7.4 (6.9)	7.2 – 2,048
QPSK SEQ	7/8	1.75	6.9 (6.4)	7.4 (6.9)	7.9 (7.4)	8.4 (7.9)	8.4 – 2,048
8PSK TRE	2/3	2.00	7.8 (6.4)	8.7 (7.2)	9.5 (8.1)	10.2 (8.9)	9.6 – 20,000
8PSK TRE R-S	2/3	1.84	5.8 (5.4)	6.2 (5.6)	6.5 (5.8)	6.7 (6.1)	8.9 – 18,300
<b>TPC Modes</b>							
BPSK TPC	5/16	0.31	2.5 (2.3)	2.7 (2.5)	2.9 (2.7)	3.1 (2.9)	2.4 – 3,125
BPSK TPC	21/44	0.48	2.7 (2.4)	2.9 (2.6)	3.1 (2.8)	3.3 (3.0)	2.4 – 4,773
QPSK TPC	21/44	0.95	2.7 (2.4)	2.9 (2.6)	3.1 (2.8)	3.3 (3.0)	4.3 – 9,545
QPSK TPC	3/4	1.50	3.6 (3.2)	3.8 (3.4)	4.1 (3.7)	4.4 (4.0)	6.7 – 15,000
QPSK TPC	7/8	1.75	4.2 (3.9)	4.3 (4.0)	4.4 (4.1)	4.5 (4.2)	7.8 – 17,500
8PSK TPC	3/4	2.25	6.0 (5.6)	6.3 (5.8)	6.5 (6.0)	6.7 (6.3)	10.8 – 20,000
8PSK TPC	7/8	2.63	6.9 (6.5)	7.0 (6.6)	7.1 (6.7)	7.2 (6.8)	12.6 – 20,000
16-QAM TPC	3/4	3.00	7.0 (6.7)	7.4 (7.1)	7.8 (7.5)	8.2 (7.9)	14.4 – 20,000
16-QAM TPC	7/8	3.50	8.0 (7.6)	8.1 (7.7)	8.2 (7.8)	8.3 (7.9)	16.84 – 20,000
<b>LDPC Modes</b>							
BPSK LDPC /x16 DSSS	1/32	0.03	-10.0 (-10.3)	-9.9 (-10.2)	-9.8 (-10.1)	-9.7 (-10.0)	0.15 – 844
BPSK LDPC /x8 DSSS	1/16	0.06	-7.0 (-7.3)	-6.9 (-7.2)	-6.8 (-7.1)	-6.7 (-7.0)	0.3 – 1,688
BPSK LDPC /x4 DSSS	1/8	0.13	-4.0 (-4.3)	-3.9 (-4.2)	-3.8 (-4.1)	-3.7 (-4.0)	0.6 – 3,377
BPSK LDPC /x2 DSSS	1/4	0.25	-1.0 (-1.3)	-0.9 (-1.2)	-0.8 (-1.1)	-0.7 (-1.0)	1.2 – 6,753
BPSK LDPC	1/2	0.50	2.0 (1.7)	2.1 (1.8)	2.2 (1.9)	2.3 (2.0)	2.4 – 13,506
QPSK LDPC	1/2	1.00	2.0 (1.7)	2.1 (1.8)	2.2 (1.9)	2.3 (2.0)	4.8 – 20,000
QPSK LDPC	2/3	1.33	2.3 (2.0)	2.4 (2.1)	2.5 (2.2)	2.6 (2.3)	6.4 – 20,000
QPSK LDPC	3/4	1.50	3.0 (2.6)	3.1 (2.7)	3.2 (2.8)	3.3 (3.0)	7.2 – 20,000
8-QAM LDPC	2/3	2.00	4.6 (4.2)	4.7 (4.3)	4.8 (4.4)	4.9 (4.5)	9.6 – 20,000
8-QAM LDPC	3/4	2.25	5.6 (5.2)	5.7 (5.3)	5.8 (5.4)	5.9 (5.5)	10.8 – 20,000
16-QAM LDPC	3/4	3.00	6.8 (6.2)	6.9 (6.4)	7.0 (6.6)	7.1 (6.8)	14.4 – 20,000

### Modulator

Modulation	BPSK, QPSK, and OQPSK (8PSK/8-QAM, 16-QAM optional), DSSS x2, x4, x8, x16 with LDPC
L-Band Tuning Range	950 to 2050 MHz in 1 Hz steps
Impedance	50 Ohm
Connector	SMA (50 ohm) or F-Type (75 ohm) female
Return Loss	10 dB minimum
Output Power	0 to -25 dBm
Output Accuracy	±1.0 dB Over frequency and temperature
Output Spectrum	Selectable, Meets MIL-188-165A and Intelsat IESS-308-309-310 compliant (DVB-S optional)
Spurious	-55 dBc In-band -45 dBc Out-of-band
Harmonics	-45 dBc
On/Off Power Ratio	>60 dB
Scrambler	CCITT V.35 or IBS (others optional) Viterbi, K = 7 at 1/2, 3/4 and 7/8 Trellis 2/3
FEC	Turbo Product Code & LDPC optional BPSK 5/16, 21/44 QPSK/OQPSK 21/44, 3/4, 7/8 8PSK/16-QAM 3/4, 7/8
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> standard, ± 5x10 <sup>-8</sup> optional
BUC DC Current	4 Amps maximum (externally supplied)
BUC Internal Reference	10 MHz, 3 dBm ± 3 dB

### Demodulator

Demodulation	BPSK, QPSK, and OQPSK (8PSK, 16-QAM optional)
L-Band Tuning Range	950 to 2050 MHz in 1 Hz steps
Impedance	50 or 75 Ohm
Connector	SMA (50 ohm) or F-Type (75 ohm) female

Return Loss	10 dB minimum
Spectrum	Selectable, meets MIL-188-165A and Intelsat IESS-308/309/310 compliant (DVB-S optional)
Input Level	-55 to +10 dBm
Total Input Power	+20 dBm or +40 dBc (the lesser)
FEC	Viterbi, K = 7 at 1/2, 3/4 and 7/8 Rate Sequential 1/2, 3/4, 7/8 (optional) Trellis 2/3 Turbo Product Code & LDPC optional BPSK 5/16, 21/44 Custom (N, K) Reed-Solomon QPSK/OQPSK 21/44, 3/4, 7/8 8PSK/16-QAM 3/4, 7/8
Decoder Options	Reed-Solomon Intelsat (DVB-S optional)
Descrambler	CCITT V.35 or IBS (others optional)
Acquisition Range	Programmable ± 1 kHz to ± 255 kHz
Sweep Delay Value	100 msec to 9000 msec. in 100 msec steps
LNB DC Current	750 mA maximum (externally supplied)
LNB Internal Reference	10 MHz, 3 dBm ± 3 dB

### Plesiochronous Buffer

Size	0 ms to 64 msec
Centering	Automatic on underflow or overflow
Centering Modes	IBS: Integral number of frames IDR: Integral number of multi-frames
Clock	Transmit, external, RX recovered or SCT (internal)

### Terrestrial Interfaces

MIL STD 188-114A	Differential, all rates, clock/data, DCE
Ethernet 10/100Base-T	2 Port Ethernet switch/bridge

### Monitor & Control

Remote RS-485/Terminal RS-232/Ethernet 10Base-T, (SNMP & Web browser)



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