

DMD1050TS L-Band Satellite Modem Board

Satellite Modems

Overview

The DMD1050TS is Comtech's latest generation modem board set targeted to critical government and military applications.

The DMD1050TS L-Band Satellite Modem board is designed to comply with the widest possible range of U.S. Government and commercial standards and is compatible with the largest number of satellite modems in the industry. It is fully compliant with MIL-STD-188-165A, fully complies with STANAG 4486 Edition 3 (EBEM), as well as the IESS-315 commercial standards at data rates up to 37 Mbps.

The DMD1050TS 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 DMD1050TS also inter-operates with the ViaSat MD1366 EBEM modem.

The extensive list of integrated hardware and software options allows the user 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 DMD1050TS 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, SLM-5650A and MD1366 is maintained for seamless substitution and addition to your existing systems.

The DMD1050TS modem board integrates supporting hardware for BUC and LNB. Interconnects allow the user to supply external voltages and 10 MHz Reference for the LNB and 10 MHz Reference for the BUC.

Published specifications reflect the maximum DMD1050TS performance. Each DMD1050TS can be configured to customer requirements via hardware / software options applied at the factory or in the field.

Features

- MIL-STD-188-165A compliant (Modem Type I, II, IV)
- STANAG 4486 Edition 3 (EBEM)
- 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, 8-QAM, 16-QAM, 16APSK
- 2.4 kbps to 37 Mbps, 1 bps steps
- FEC – LDPC, TPC, 165B Turbo, Viterbi, Reed Solomon, & Trellis
- Ethernet Flow Control & Quality of Service (QoS)
- Information Throughput Adaption (ITA)
- Optional 10 MHz high-stability reference
- Input connectors for pass-through 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
- Wide input voltage range (18 - 36 VDC)

Software Options

- Data Rate upgrades
- 8PSK
- STANAG 4486 Edition 3 (EBEM)
- LDPC FEC
- TPC FEC
- 16QAM



Typical Users

- Government & Military

Common Applications

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



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Specifications

Modulator

Modulation	BPSK, QPSK, OQPSK, 8PSK, 8-QAM, 16-QAM, 16APSK
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	Meets MIL-188-165A
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)
FEC	Viterbi, K = 7: 1/2, 3/4 and 7/8 Trellis: 2/3 Turbo Product Code (optional) BPSK 5/16, 21/44 QPSK/OQPSK 21/44, 3/4, 7/8 8PSK/16-QAM 3/4, 7/8 STANAG 4486 Ed. 3 Turbo Codes BPSK: 2/3, 3/4, 7/8, 19/20 QPSK: 1/2, 2/3, 3/4, 7/8, 19/20 8PSK/16APSK: 1/2, 2/3, 3/4, 7/8, 19/20 LDPC (optional) BPSK: 1/2 QPSK/OQPSK: 1/2, 2/3, 3/4 8PSK/8-QAM: 2/3, 3/4 16-QAM: 3/4
Outer Encoder Options	Reed-Solomon Intelsat, Custom (N, K) Reed-Solomon (optional)
Data Clock Source	Internal, External, RX recovered
Internal Stability	± 5x10 ⁻⁸ standard
BUC Internal Reference	10 MHz, 3 dBm ± 3 dB

Physical & Power

Dimensions	1.442" x 6.675" x 9.125"
Weight	<4 lbs
Input Voltage	18-36 VDC
Power Consumption	<42 W
BUC DC Current	2 Amps maximum (SMA) or 4 Amps maximum (F-Type) (externally supplied)
LNB DC Current	750 mA maximum (externally supplied)
Cooling	Conduction
Temperature	Operating: 0 to 60 °C Storage: -40 to 70 °C

Demodulator

Demodulation	BPSK, QPSK, OQPSK, 8PSK, 8-QAM, 16-QAM, 16APSK
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	Meets MIL-188-165A
Input Level	-55 to +10 dBm
Total Input Power	+20 dBm or +40 dBc (the lesser)
FEC	Viterbi, K = 7: 1/2, 3/4 and 7/8 Trellis: 2/3 Turbo Product Code (optional) BPSK 5/16, 21/44 QPSK/OQPSK 21/44, 3/4, 7/8 8PSK/16-QAM 3/4, 7/8 STANAG 4486 Ed. 3 Turbo Codes BPSK: 2/3, 3/4, 7/8, 19/20 QPSK: 1/2, 2/3, 3/4, 7/8, 19/20 8PSK/16APSK: 1/2, 2/3, 3/4, 7/8, 19/20 LDPC (optional) BPSK: 1/2 QPSK/OQPSK: 1/2, 2/3, 3/4 8PSK/8-QAM: 2/3, 3/4 16-QAM: 3/4
Decoder Options	Reed-Solomon Intelsat
Descrambler	CCITT V.35 or OM73
Acquisition Range	Programmable ± 1 kHz to ± 255 kHz
Sweep Delay Value	100 msec to 9000 msec. in 100 msec steps
LNB Internal Reference	10 MHz, 3 dBm ± 3 dB

Plesiochronous Buffer

Size	0 ms to 64 msec
Centering	Automatic on underflow or overflow
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)

Mechanical and Thermal integration packages available upon request

DMD1050TS BER Performance

Mod / FEC	Code Rate	BW Eff. (bit/sym)	Eb/No Guaranteed (Typical)				Data Rate Range (kbps)
			10 ⁻⁵	10 ⁻⁶	10 ⁻⁷	10 ⁻⁸	
Legacy Modes							
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
8PSK TRE	2/3	2.00	8.2 (6.4)	9.0 (7.2)	9.8 (8.1)	10.4 (8.9)	9.6 – 20,000
8PSK TRE R-S	2/3	1.84	6.3 (5.4)	6.5 (5.6)	6.7 (5.8)	6.9 (6.1)	8.9 – 18,300
TPC Modes							
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)	10.0 – 20,000
8PSK TPC	7/8	2.63	6.9 (6.5)	7.0 (6.6)	7.1 (6.7)	7.2 (6.8)	11.6 – 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)	13.3 – 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)	15.5 – 20,000
STANAG 4486 Edition 3 Turbo Modes							
BPSK 4486 Turbo	1/2	0.497	1.8 (1.4)	1.9(1.5)	2.0 (1.6)	2.1 (1.7)	64 – 4,965 ⁽¹⁾
BPSK 4486 Turbo	2/3	0.656	2.6 (2.2)	2.65 (2.25)	2.7 (2.3)	2.8 (2.4)	64 – 6,614 ⁽¹⁾
BPSK 4486 Turbo	3/4	0.737	3.1 (2.7)	3.15 (2.75)	3.2 (2.8)	3.3 (2.9)	64 – 7,436 ⁽¹⁾
BPSK 4486 Turbo	7/8	0.860	4.2 (3.8)	4.3 (3.9)	4.4 (4.0)	4.5 (4.1)	64 – 8,673 ⁽¹⁾
BPSK 4486 Turbo	19/20	0.933	5.9 (5.5)	6.0 (5.6)	6.1 (5.7)	6.2 (5.8)	64 – 9,412 ⁽¹⁾
QPSK 4486 Turbo	1/2	0.982	1.8 (1.4)	1.9 (1.5)	2.0 (1.6)	2.1 (1.7)	64 – 9,905 ⁽¹⁾
QPSK 4486 Turbo	2/3	1.307	2.6 (2.2)	2.65 (2.25)	2.7 (2.3)	2.8 (2.4)	64 – 13,180 ⁽¹⁾
QPSK 4486 Turbo	3/4	1.464	3.1 (2.7)	3.15 (2.75)	3.2 (2.8)	3.3 (2.9)	64 – 14,811 ⁽¹⁾
QPSK 4486 Turbo	7/8	1.710	4.2 (3.8)	4.3 (3.9)	4.4 (4.0)	4.5 (4.1)	64 – 17,253 ⁽¹⁾
QPSK 4486 Turbo	19/20	1.856	5.9 (5.5)	6.0 (5.6)	6.1 (5.7)	6.2 (5.8)	64 – 18,716 ⁽¹⁾
8PSK 4486 Turbo	1/2	1.468	3.5 (3.1)	3.6 (3.2)	3.7 (3.3)	3.9 (3.5)	256 – 14,811 ⁽¹⁾
8PSK 4486 Turbo	2/3	1.953	5.0 (4.6)	5.1 (4.7)	5.2 (4.8)	5.3 (4.9)	256 – 19,691 ⁽¹⁾
8PSK 4486 Turbo	3/4	2.192	6.0 (5.6)	6.1 (5.7)	6.2 (5.8)	6.3 (5.9)	256 – 22,119 ⁽¹⁾
8PSK 4486 Turbo	7/8	2.551	7.2 (6.8)	7.3 (6.9)	7.5 (7.1)	7.9 (7.5)	256 – 25,746 ⁽¹⁾
8PSK 4486 Turbo	19/20	2.767	9.5 (9.1)	9.6 (9.2)	9.7 (9.3)	9.8 (9.4)	256 – 27,911 ⁽¹⁾
16APSK 4486 Turbo	1/2	1.953	4.7 (4.3)	4.8 (4.4)	4.9 (4.5)	5.0 (4.6)	256 – 19,691 ⁽¹⁾
16APSK 4486 Turbo	2/3	2.593	6.5 (6.0)	6.6 (6.1)	6.7 (6.2)	6.8 (6.3)	256 – 26,150 ⁽¹⁾
16APSK 4486 Turbo	3/4	2.910	7.4 (7.0)	7.5 (7.1)	7.6 (7.3)	7.7 (7.3)	256 – 29,356 ⁽¹⁾
16APSK 4486 Turbo	7/8	3.382	8.5 (8.4)	8.7 (8.5)	8.8 (8.6)	8.9 (8.7)	256 – 34,145 ⁽¹⁾
16APSK 4486 Turbo	19/20	3.670	10.5 (10.2)	10.7 (10.4)	10.8 (10.5)	10.9 (10.6)	256 – 37,008 ⁽¹⁾
LDPC Modes							
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

⁽¹⁾ Max STANAG rates reflect the maximum user payload with the embedded channel enabled, this is either Ethernet or mixed mode with the serial MIL-STD-188-114A is limited to 20 Mbps



2114 West 7th Street, Tempe, Arizona 85281 USA
 Voice: +1.480.333.2200 • Fax: +1.480.333.2540 • Email: sales@comtechefdata.com

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