DMD20 LBST L-Band Satellite Modem and ODU Driver

Satellite Modems

Overview

The DMD20 LBST L-Band 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.

DMD20 LBST now offers DoubleTalk® Carrier-in-Carrier® bandwidth compression. DoubleTalk Carrier-in-Carrier, based on patented "Adaptive Cancellation" technology, allows transmit and receive carriers of a duplex link to share the same transponder space. DoubleTalk Carrier-in-Carrier is complementary to all advances in modem technology, including advanced FEC and modulation techniques. As these technologies approach theoretical limits of power and bandwidth efficiency, DoubleTalk Carrier-in-Carrier utilizing advanced signal processing techniques provides a new dimension in bandwidth and power efficiency.

The extensive list of software options allows for configuring 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 Product Code (TPC), interface expansion, high-stability and DC operation complete the modem's dynamic feature coverage.

This modem can be stocked at its minimum configuration (and cost) locally for immediate distribution. Then configure on-site, allowing huge savings in time and dollars with just-in-time feature installation.

The DMD20 LBST's remote control via the RLLP (Radyne Link Level Protocol) 10Base-T SNMP Ethernet or web browser interfaces, include control of all the modem's features plus software maintenance. Additionally, the two-line backlit LCD can be supplemented with terminal software or a standard web browser running on a PC or laptop. The modem presents its entire monitor and control functions on the big screen.

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

The DMD20 LBST FSK Communications Link allows the full use of all supported smart BUCs monitor and control parameters. From the front panel, a quick status will be displayed, and the most commonly used control parameters can be modified.

Additionally, the FSK Communications Link will be accessed by the DMD20 LBST terminal port, remote port, and the Ethernet port (Web browser/SNMP). From any of these connections, the operator can issue any valid ASCII command or request to the smart BUC. Multiple ports can be used simultaneously without affecting the performance of the system.

Carrier-in-Carrier® is a Registered Trademark of Comtech EF Data
DoubleTalk® is a Registered Trademark of Raytheon Applied Signal Technology

Typical Users

- Mobile Network Operators
- Government & Military

Common Applications

- Satellite Mobile Backhaul
- G.703
- IP Trunking

Features

- DoubleTalk Carrier-in-Carrier bandwidth compression
- Web browser interface
- FSK M&C channel for smart BUCs
- Integrated 10 MHz high-stability reference
- Programmable 13, 15, 18, or 20 VDC for LNB
- Optional 24 or 48 VDC for up to 10 W BUC
- 950 to 2050 MHz L-Band TX/RX operation
- BPSK/QPSK/OQPSK/8PSK/8-QAM/16-QAM operation
- 2.4 kbps to 20 Mbps, 1 bps steps
- Configuration, monitor and control features full user-programmable
- FEC - Viterbi, Reed-Solomon, Sequential, Trellis, TPC, Low Density Parity Check Code (LDPC)
- 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
- Standard features include: Reed-Solomon, Asynchronous Overhead, automatic uplink power control and CM701 compatible satellite control channel

Hardware Options

- DoubleTalk Carrier-in-Carrier
- LDPC FEC
- Turbo FEC
- Sequential FEC
- DC input power 48 VDC
- High-stability reference

Software Options

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

Interface Options

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

Specifications

Published specifications reflect the maximum DMD20 LBST performance. Each DMD20 LBST can be configured to customer requirements via hardware / software options applied at the factory or in the field.

DMD20 LBST Performance

Modulation/FEC	Code Rate	1×10^{-5}	1×10^{-6}	1×10^{-7}	1×10^{-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 – 10.0 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
16-QAM 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
16-QAM 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
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 – 20.0 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 – 20.0 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

Modulator

Modulation	BPSK, QPSK, and OQPSK (8PSK, 8-QAM & 16-QAM optional)
L-Band Tuning Range	950 to 2050 MHz in 1 Hz steps
Impedance	50 Ohm
Connector	Type N female
Return Loss	10 dB minimum
Output Power	0 to -25 dBm
Output Accuracy	±1.0 dB over frequency and temperature
Output Spectrum	Meets IESS-308/309/310 power spectral mask (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)
FEC	Viterbi, K=7 at 1/2, 3/4 and 7/8 Trellis 2/3 Sequential 1/2, 3/4 and 7/8 (optional) Turbo Product Code (optional) BPSK: 21/44 QPSK/OQPSK: 1/2 (21/44), 3/4, 7/8 8PSK/8-QAM, 16-QAM: 3/4, 7/8 Legacy Turbo Rates: 0.495, 0.793 (optional) 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 (DVB-S optional) Custom (N, K) Reed-Solomon (optional)
Data Clock Source	Internal, external, RX recovered
Internal Stability	5×10^{-8}
BUC DC Voltage	BUC 24 V @ 4 A maximum BUC 48 V (optional)
BUC Reference	10 MHz, 3 dBm ± 3 dB
BUC FSK	710/590 KHz Nominal (optional)

Demodulator

Demodulation	BPSK, QPSK, and OQPSK (8PSK, 8-QAM & 16-QAM optional)
L-Band Tuning Range	950 to 2050 MHz in 1 Hz steps
Impedance	50 Ohm
Connector	Type N female
Return Loss	10 dB minimum
Spectrum	Intelsat IESS-308/309/310 compliant (DVB-S optional)
Input Level	10 x log (symbol rate) – 100, ± 12 dBm
FEC	Viterbi, K=7 at 1/2, 3/4 and 7/8 Trellis 2/3 Sequential 1/2, 3/4 and 7/8 (optional) Turbo Product Code (optional) BPSK: 21/44 QPSK/OQPSK: 1/2 (21/44), 3/4, 7/8 8PSK/8-QAM, 16-QAM: 3/4, 7/8 Legacy Turbo Rates: 0.495, 0.793 (optional) LDPC (optional) BPSK: 1/2 QPSK/OQPSK: 1/2, 2/3, 3/4 8PSK/8-QAM: 2/3, 3/4 16-QAM: 3/4
Total Input Power:	-10 dBm or +40 dBc (the lesser) @ 64 kbps, symbol rate dependent

Decoder Options	Reed-Solomon Intelsat (DVB-S optional) Custom (N, K) Reed-Solomon (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
LNB Reference	10 MHz, 3 dBm ± 3 dB
LNB DC Voltage	13, 15, 18, 20 VDC (750 mA maximum), programmable

DoubleTalk Carrier-in-Carrier

Delay Range	0 to 300 ms
Power Spectral Density Ratio (Interferer to Desired)	BSPK/OQPSK/QPSK/8PSK/8-QAM: –7 dB to +10 dB 16-QAM: -7 dB to +7 dB
Maximum Symbol Rate Ratio	3:1 (TX:RX or RX:TX)
Eb/No Degradation	0 dB power spectral density ratio BPSK/QPSK/OQPSK: 0.6 dB 8-QAM: 0.7 dB 8PSK: 0.8 dB 16-QAM: 0.9 dB
Satellite Restrictions	Satellite in "loop-back" mode (i.e., the transmit station can receive itself) "Non-processing" satellite (i.e., does not demodulate or remodulate the signal)

Plesiochronous Buffer

Size	0 msec 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

- DVB ASI/SPI
- HSSI
- Ethernet 4 Port 10/100Base-T
- HSSI/Ethernet 4 Port 10/100Base-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 & Physical

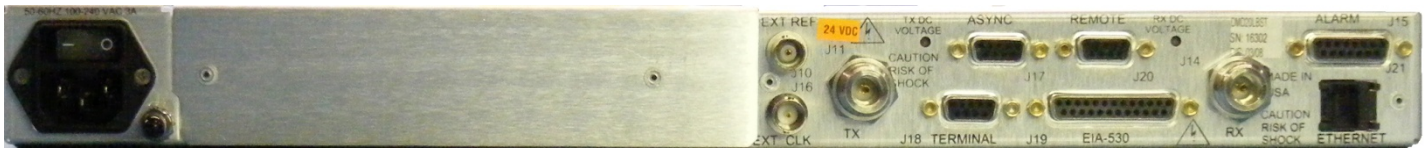
Prime Power	100 to 240 VAC, 50 to 60 Hz, 150 W maximum with 10 W BUC
Operating Temperature	0 to 50°C, 95% humidity, non-condensing
Storage Temperature	-20 to 70°C, 99% humidity, non-condensing
Dimensions (height x width x depth)	1.75" x 19" x 19.5" (4.45 x 48.26 x 48.89 cm)
Weight	8.5 lbs (3.83 kg)

Monitor and Control

Remote RS-485/Terminal RS-232/Ethernet 10Base-T, Web browser	
FSK	CODAN/TERRASAT smart BUCs

DMD20 LBST 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



DMD20 LBST Rear Panel

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