Overview
The 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!

DMD20 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 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 Product Code (TPC), Low Density Parity Check Code (LDPC), 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, 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 the RLLP (Radyne Link Level Protocol), Ethernet 10Base-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 an extensive line of redundancy switches, converters, encoders and decoders, the DMD20 can be built into any satellite requirement. The DMD20 is compatible with DMD15, DMD50, CM701, MD2401 and CDM-600.

Typical Users
- Mobile Network Operators
- Government & Military

Common Applications
- Satellite Mobile Backhaul
- G.703 Trunking
- IP Trunking

Features
- DoubleTalk Carrier-in-Carrier bandwidth compression
- BPSK/QPSK/OQPSK/8-QAM/16-QAM operation
- 2.4 kbps to 20 Mbps, 1 bps steps
- FEC - Viterbi, Reed-Solomon, Sequential, Trellis, TPC, LDPC
- 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, satellite control channel and automatic uplink power control
- SCPC / MCPC Links

www.comtechefdata.com
## Specifications

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

<table>
<thead>
<tr>
<th>Modulation/FEC</th>
<th>Code Rate</th>
<th>1 x 10⁻³</th>
<th>1 x 10⁻⁷</th>
<th>1 x 10⁻⁹</th>
<th>Data Rate Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>8PSK VIT</td>
<td>1/2</td>
<td>5.5 (5.1)</td>
<td>6.1 (5.7)</td>
<td>6.7 (6.2)</td>
<td>2.4 kbps - 5.0 Mbps</td>
</tr>
<tr>
<td>QPSK VIT</td>
<td>1/2</td>
<td>5.5 (5.1)</td>
<td>6.1 (5.7)</td>
<td>6.7 (6.2)</td>
<td>4.8 kbps - 10.0 Mbps</td>
</tr>
<tr>
<td>QPSK VIT</td>
<td>3/4</td>
<td>6.8 (6.3)</td>
<td>7.6 (7.0)</td>
<td>8.3 (7.7)</td>
<td>7.2 kbps - 15.0 Mbps</td>
</tr>
<tr>
<td>QPSK VIT</td>
<td>7/8</td>
<td>7.9 (7.2)</td>
<td>8.6 (7.9)</td>
<td>9.3 (8.6)</td>
<td>8.4 kbps - 17.5 Mbps</td>
</tr>
<tr>
<td>QPSK VIT RS</td>
<td>1/2</td>
<td>3.8 (3.4)</td>
<td>4.1 (3.6)</td>
<td>4.2 (3.8)</td>
<td>4.4 (4.0)</td>
</tr>
<tr>
<td>QPSK VIT RS</td>
<td>3/4</td>
<td>5.4 (4.7)</td>
<td>5.6 (4.9)</td>
<td>5.8 (5.1)</td>
<td>6.0 (5.3)</td>
</tr>
<tr>
<td>QPSK VIT RS</td>
<td>7/8</td>
<td>6.5 (6.0)</td>
<td>6.7 (6.4)</td>
<td>6.9 (6.7)</td>
<td>7.2 (7.1)</td>
</tr>
<tr>
<td>QPSK SEQ</td>
<td>1/2</td>
<td>5.6 (5.1)</td>
<td>5.9 (5.4)</td>
<td>6.3 (5.8)</td>
<td>6.7 (6.2)</td>
</tr>
<tr>
<td>QPSK SEQ</td>
<td>3/4</td>
<td>6.1 (5.6)</td>
<td>6.5 (6.1)</td>
<td>7.0 (6.5)</td>
<td>7.4 (6.9)</td>
</tr>
<tr>
<td>QPSK SEQ</td>
<td>7/8</td>
<td>6.9 (6.4)</td>
<td>7.4 (6.9)</td>
<td>7.9 (7.4)</td>
<td>8.4 (7.9)</td>
</tr>
<tr>
<td>QPSK TPC</td>
<td>1/2</td>
<td>2.7 (2.4)</td>
<td>2.9 (2.6)</td>
<td>3.1 (2.8)</td>
<td>3.3 (3.0)</td>
</tr>
<tr>
<td>QPSK TPC</td>
<td>3/4</td>
<td>3.6 (3.2)</td>
<td>3.8 (3.4)</td>
<td>4.1 (3.7)</td>
<td>4.4 (4.0)</td>
</tr>
<tr>
<td>QPSK TPC</td>
<td>7/8</td>
<td>4.2 (3.9)</td>
<td>4.3 (4.0)</td>
<td>4.4 (4.1)</td>
<td>4.5 (4.2)</td>
</tr>
<tr>
<td>8PSK TRE</td>
<td>2/3</td>
<td>7.8 (6.4)</td>
<td>8.7 (7.2)</td>
<td>9.5 (8.1)</td>
<td>10.2 (8.9)</td>
</tr>
<tr>
<td>8PSK TRE RS</td>
<td>2/3</td>
<td>5.8 (5.4)</td>
<td>6.2 (5.8)</td>
<td>6.5 (5.8)</td>
<td>6.7 (6.1)</td>
</tr>
<tr>
<td>8PSK TPC</td>
<td>3/4</td>
<td>6.0 (5.6)</td>
<td>6.2 (5.8)</td>
<td>6.4 (6.0)</td>
<td>6.8 (6.3)</td>
</tr>
<tr>
<td>8PSK TPC</td>
<td>7/8</td>
<td>6.9 (6.5)</td>
<td>7.0 (6.6)</td>
<td>7.1 (6.7)</td>
<td>7.2 (6.8)</td>
</tr>
<tr>
<td>16-QAM VIT</td>
<td>3/4</td>
<td>10.7 (9.9)</td>
<td>11.5 (10.7)</td>
<td>12.4 (11.6)</td>
<td>13.3 (12.5)</td>
</tr>
<tr>
<td>16-QAM VIT</td>
<td>7/8</td>
<td>11.9 (11.1)</td>
<td>12.7 (11.9)</td>
<td>13.5 (12.7)</td>
<td>14.3 (13.5)</td>
</tr>
<tr>
<td>16-QAM VIT RS</td>
<td>3/4</td>
<td>8.9 (8.3)</td>
<td>9.1 (8.6)</td>
<td>9.3 (8.8)</td>
<td>9.5 (9.1)</td>
</tr>
<tr>
<td>16-QAM VIT RS</td>
<td>7/8</td>
<td>10.3 (9.9)</td>
<td>10.5 (10.2)</td>
<td>10.8 (10.4)</td>
<td>11.0 (10.7)</td>
</tr>
<tr>
<td>16-QAM TP</td>
<td>3/4</td>
<td>7.0 (6.7)</td>
<td>7.4 (7.1)</td>
<td>7.8 (7.5)</td>
<td>8.2 (7.9)</td>
</tr>
<tr>
<td>16-QAM TP</td>
<td>7/8</td>
<td>8.0 (7.6)</td>
<td>8.1 (7.7)</td>
<td>8.2 (7.8)</td>
<td>8.3 (7.9)</td>
</tr>
</tbody>
</table>

**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 & Control**

- **Ethernet 10Base-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:** AML or B8ZS for T1 and HD3B for E1
- **Framing:**
  - D4, ESF and PCM30 (PCM30C) or PCM31 (PCM31C) for E1
- **Time Slot Selection:** n x 64 contiguous or arbitrary blocks for drop or insert
- **D0 open network satellite overhead:** 6.6%
- **Time Slots:** TS1, 2, 3, 4, 5, 6, 10, 12, 15, 16, 20, 24, 30, 31
- **Efficient D0 closed network, satellite overhead:** 0.4%
- **Time Slots:** 1-31 Any combination

**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**
Demodulator

Demodulation | BPSK, QPSK, and OQPSK (8PSK, 8-QAM & 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: 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 (optional)
Trellis 2/3
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
Q-PSK/OQPSK: 1/2, 2/3, 3/4
8PSK/8-QAM: 2/3, 3/4
16-QAM: 3/4

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 ±55 kHz

Sweep Delay Value | 100 msec to 6000 seconds in 100 msec steps

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)

Physical & Environmental

Dimensions | 1.75” x 19” x 16” (4.45 x 48.26 x 40.64 cm)
Weight | 6.5 lbs (3.0 kg)
Prime Power | 100 to 240 VAC, 50 to 60 Hz, 40 W max. 48 VDC (optional)
Operating Temperature | 0 to 50°C, 95% humidity, non-condensing
Storage Temperature | -20 to 70°C, 95% humidity, non-condensing

DoubleTalk Carrier-in-Carrier

Delay Range | 0 to 300 ms
Power Spectral Density Ratio (Interferer to Desired) | BPSK/QPSK/QPSK/8PSK/8-QAM: -7 db to +10 dB
8-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)

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

Connectors

BNC: 75 Ohm
SMA: 50 Ohm (L-Band)

DMD20 Rear Panel