



DMD15

Universal IBS/IDR Satellite Modem



HIGHLIGHTS

- ▶ BPSK/QPSK/8PSK/16QAM Operation
- ▶ 9.6 Kbps to 5 Mbps, 1 bps Steps (DMD15A)
- ▶ 9.6 Kbps to 10 Mbps, 1 bps Steps (DMD15B)
- ▶ 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
- ▶ Industry-standard Universal Interface Module
- ▶ 50 to 180 MHz IF in 1 Hz Steps
- ▶ Optional L-Band IF

OVERVIEW

The Radyne DMD15 satellite modem offers the best features of a sophisticated programmable IBS/IDR and closed network modem, at an affordable price.

This versatile equipment package combines unsurpassed performance with numerous user-friendly front panel programmable functions. The DMD15 provides selectable functions for different services: Intelsat IDR and IBS, as well as closed networks. All of the configuration, monitor and control functions are available at the front panel. Operating parameters, such as variable data rates, FEC code rate, modulation type, IF frequencies, IBS/IDR framing and interface type can be readily set and changed at the front panel by earth station operations personnel.

Additionally, all functions can be accessed with a terminal or personal computer via a serial link for complete remote monitoring and control capability.

The DMD15 operates at all standard IBS and IDR data rates up to 8.448 Mbps. Selection of any data rate is provided over the range of 9.6 Kbps to 10 Mbps in 1 bps steps.

For applications requiring system redundancy, the DMD15 modem may be used with the Radyne RCS11 1:1 Redundancy Switch or the RCS20 M:N ($N \leq 9$) Redundancy Switch. An optional Internal Engineering Service Channel Unit is available to provide voice, data, and alarms for Intelsat IDR applications.

A full range of industry standard interfaces are available for the DMD15. Interface types are selectable from V.35, RS-232, RS-422/-449 and ITU G.703.

Available Options Include:

- OQPSK
- OM-73 Compatible
- 8PSK
- 16QAM
- Drop and Insert
- Internal Engineering Service Channel
- Async Overhead Channel
- Sequential Decoding
- Reed-Solomon FEC
- Turbo Product Code FEC
- Trellis FEC
- L-Band IF
- Analog AGC Voltage
- Internal Stability 1×10^{-7}
- DC Input Power 48 VDC



DMD15 Universal IBS/IDR Satellite Modem

SPECIFICATIONS

DMD15 System Data Rates

BPSK - 9.6 Kbps to 3.25 Mbps, Rate1/2
 QPSK/OQPSK - 19.2 Kbps to 6.5 Mbps, Rate 1/2
 QPSK/OQPSK - 28.8 Kbps to 9.75 Mbps, Rate 3/4
 QPSK/OQPSK - 33.6 Kbps to 10 Mbps, Rate 7/8
 8PSK - 256 Kbps to 10 Mbps, Rate 2/3
 16QAM - 38.4 Kbps to 10 Mbps, Rate 3/4
 16QAM - 44.8 Kbps to 10 Mbps, Rate 7/8
 BPSK - 19.2 Kbps to 6.5 Mbps, Uncoded
 QPSK - 38.4 Kbps to 10 Mbps, Uncoded

0.495 Turbo Codec:

BPSK - 9.6 Kbps to 2 Mbps
 QPSK/OQPSK - 19.2 Kbps to 4 Mbps
 8PSK - 256 Kbps to 4 Mbps
 16QAM - 256 Kbps to 4 Mbps

0.793 Turbo Codec:

BPSK - 15.2 Kbps to 3.2 Mbps
 QPSK/OQPSK - 30.4 Kbps to 6.312 Mbps
 8PSK - 256 Kbps to 6.312 Mbps
 16 QAM - 512 Kbps to 4 Mbps

Modulator

Modulation: BPSK and QPSK (OQPSK, 8PSK, 16QAM Optional)
 IF Tuning Range: 50 to 180 MHz in 1 Hz Steps
 Optional L-Band IF: 950 to 1750 MHz
 IF Impedance: 75 Ohms, 50 Ohms Optional
 L-Band, 50 Ohms
 IF Connector: BNC, L-Band, SMA
 IF Return Loss: 20 dB Minimum
 Output Power: -20 to +5.0 dB in 0.1 dB Steps (L-Band -5 to -30 dB)
 Output Accuracy: ±0.5 dB Over Frequency and Temperature (50 to 180 MHz)
 ±1.0 dB Over Frequency and Temperature (L-Band)
 Output Spectrum: Meets IESS 308/309/310 Power Spectral Mask
 Spurious: <-55 dBc in Any 4 kHz Band
 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
 Rate Sequential 1/2, 3/4, 7/8 (Optional)
 Trellis 2/3, 5/6 (Optional)
 Turbo Product Code (Optional)
 0.495 - (32,26) x (32,26) x (4,3)
 0.793 - (64,57) x (64,57)
 (Turbo Supported at all Modulation Types)
 Outer Encoder Options: Reed-Solomon INTELSAT Rates
 Data Clock Source: Internal, External, Rx Recovered
 Internal Stability: 1 x 10⁻⁶ Typical (Optional to 1 x 10⁻⁷)

Demodulator

Demodulation: BPSK and QPSK (OQPSK, 8PSK, 16QAM Optional)
 IF Tuning Range: 50 to 180 MHz in 1 Hz steps
 Optional L-Band IF: 950 to 1750 MHz
 IF Impedance: 75 Ohms, 50 Ohms (Optional)
 L-Band, 50 Ohms
 IF Connector: BNC, SMA (L-Band)
 IF Return Loss: 20 dB Minimum
 Spectrum: INTELSAT IESS 308/309/310 Compliant
 Input Level: -55 to -25 dBm
 Adjacent Channel Rejection Ratio: >+14 dBc
 Total Input Power: +10 dBm or +40 dBc (The Lesser)
 L-Band, -10 dBm or +35 dBc (The Lesser)

FEC: Viterbi, K=7 at 1/2, 3/4 and 7/8 Rate,
 Rate Sequential 1/2, 3/4, 7/8 (Optional)
 Trellis 2/3, 5/6 (Optional)
 Turbo Product Code (Optional)
 0.495 - (32,26) x (32,26) x (4,3)
 0.793 - (64,57) x (64,57)
 (Turbo Supported at all Modulation Types)
 Decoder Options: Reed-Solomon
 Descrambler: CCITT V.35 or IBS (Others Optional)
 Acquisition Range: Programmable ±1 kHz to ± 32 kHz
 Sweep Delay Value: 100 msec to 299.9 seconds in 100 msec Steps

Plesiochronous Buffer

Size: 2 msec to 32 msec
 Centering: Automatic on Overflow/Underflow
 Centering Modes: IBS: Integral Number of Frames
 IDR: Integral Number of Multiple Frames
 Clock: Transmit, External, Rx Recovered or SCT (Internal)

DMD15 Modem BER Performance

Typical E _b /N ₀	VIT 3/4	VIT 1/2	VIT w/R-S 3/4	Turbo 0.793	Turbo 0.495
3 dB	--	--	--	3 x 10 ⁻³	1 x 10 ⁻⁷
4 dB	--	6 x 10 ⁻⁵	2 x 10 ⁻⁴	1 x 10 ⁻⁸	<1 x 10 ⁻¹⁰
5 dB	1 x 10 ⁻⁴	2 x 10 ⁻⁶	1 x 10 ⁻⁸	<1 x 10 ⁻¹⁰	<1 x 10 ⁻¹⁰
6 dB	2 x 10 ⁻⁶	5 x 10 ⁻⁸	<1 x 10 ⁻¹⁰	<1 x 10 ⁻¹⁰	<1 x 10 ⁻¹⁰

Monitor and Control

Remote RS-485 / Terminal RS-232

DMD15 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, or SLC-96 for T1 and PCM30 (30 Channels) or
 PCM31 (31 Channels) for E1
 Time Slot Selection: n x 64 Contiguous or Arbitrary Blocks for Drop or Insert
 Time Slots: TS1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 16, 20, 24, 30
 Data Rates: 64, 128, 192, 256, 320, 384, 512, 640, 768, 960,
 1024, 1280, 1536, 1920 Kbps

Terrestrial Interfaces

A variety of standard interfaces are available for the DMD15 modem in stand-alone applications.

Universal Interface

Module (UIM): User Selectable RS-422/-449, V.35, T1(DSX1),
 T2 (DSX2), E1 (G.703), and E2 (G.703)
 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
 ITU V.35: Differential, Clock and Data Only
 RS-422/-449: All Rates, Differential, Clock/Data, DCE
 (Available 50 Ohm Options)
 RS-232: (DCE up to 200 Kbps)

Environmental

Prime Power: 100 to 240 VAC, 50 to 60 Hz, 1.0 A Maximum
 48 VDC Optional
 Operating Temperature: 0 to 50° C, 95% Humidity, Non-Condensing
 Storage Temperature: -20 to 70° C, 99% Humidity, Non-Condensing

Physical

Chassis Size: 19" x 22" x 1.75" (48.26 x 43.18 x 4.45 cm)
 Weight: 9.6 Pounds (4.3 Kg)
 Shipping Weight: 13.6 Pounds (6.2 Kg)

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