



# DM240XR

## Digital Video Broadcast Modulator



### HIGHLIGHTS

- ▶ DVB-S and DVB-S2 Ready
- ▶ DVB-S2 Data Rates up to 190 Mbps
- ▶ DVB-S2 CM, VCM & ACM Support
- ▶ DVB-S Data Rates up to 238 Mbps
- ▶ QPSK, 8PSK, 16QAM, 16APSK, 32APSK Operation
- ▶ Powerful LDPC with BCH Coding
- ▶ Auto EQ™ Group Delay and Amplitude Equalization
- ▶ Frequency-Agile 50 to 90, 100 to 180, and 950 to 2050 MHz
- ▶ ETSI EN 302 307 (DVB-S2), ETSI EN 301 210 (DVB-S)
- ▶ ETSI EN 300 421, and ITU-1294 System B (DSS)
- ▶ Built-in ASI Data Interface
- ▶ Monitor Port Available
- ▶ Web Browser User Interface

### DVB PERFORMANCE

The DM240XR is DVB-S2 ready and can easily be upgraded in the field. The DM240XR provides a comprehensive set of advanced S2 features. The DM240XR extends its dominance in broadcast applications through increased data rate capability and the addition of 16APSK and 32APSK support. Proven performance operating near Shannon's limit offers results with 30% better bandwidth efficiencies and carrier to noise figures below the noise floor.

The DM240XR includes the ability to select the output frequency of 70/140 MHz or L-Band operation without any hardware modifications. The modulator offers a frequency agile IF output from 50 to 90 MHz, 100 to 180 MHz and 950 to 2050 MHz in 100 Hz steps. The DM240XR offers high data rates (up to 190 Mbps for the DVB-S2 and 238 Mbps for the DVB-S) and the most flexible modulation schemes available (QPSK, 8PSK, 16QAM, 16APSK and 32APSK).

The DM240XR AutoEQ feature supports Amplitude and Group Delay equalization over the satellite system. When installed, AutoEQ offers the ability to compensate the overall

system Group Delay and Amplitude Flatness by pre-correcting the Uplink Carrier. This eliminates the need for external Group Delay/Amplitude Equalizers. The AutoEQ will operate over the full transponder from a symbol rate of 10.1 Msps to 38 Msps.

The DM240XR offers the flexibility to support up to three different data interfaces. The XR has a built-in ASI interface along with the Plug-In Interface Card (PIIC) system which allows for the selection of two additional data interfaces that can be easily upgraded in the field. Supported interfaces include DVB-ASI, HSSI, RS422, M2P/DVB, LVDS M2P/DVB and Ethernet (Pro-MPEG CoP 3 and Bridge modes).

The powerful onboard Monitor and Control (M&C) processor has the unique capability to upgrade features via the front panel or Web interface. Features can be added to the installed equipment base with extreme ease, allowing enhancements with changes in service while lowering initial installation budgets.

Remote interfacing can be achieved through one of three onboard connections: Ethernet (Web or SNMP), RS-485, or RS-232. Additionally, FTP capability for firmware upgrades allows a quick, reliable method to update installed systems. The front panel offers push-button control of all features and a backlit LCD display.

The DM240XR supports various redundancy schemes. The Built-In PIIC system supports 1:1 data redundancy, allowing the user to set data interface priorities. The RCS11 is a 1RU chassis providing superior system reliability that offers 1:1 redundancy control for both IF and data. The RRS11 or STS11 supports 1:1 redundancy for IF or L-band signals. The DM240XR interoperates with the RRS11/STS11 supplying digital logic and voltage to the redundancy unit.

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## SPECIFICATIONS

### IF Interface

Tx IF:	50 to 180 MHz (70/140 MHz) 950 to 2050 MHz L-Band
IF Step Size:	100 Hz
Frequency Stability:	3 ppm
Power Output:	0 to -25 dBm
Power Step Size:	0.1 dB
Power Output Accuracy:	± 1.0 dB
Power Output Stability:	± 0.5 dB
Carrier Mute:	-55 dB
Spurious:	-55 dBc, In-Band -45 dBc, Out-of-Band
Output Impedance:	75 Ohm (70/140 MHz), 50 Ohm (L-Band)
Return Loss:	20 dB (70/140 MHz) 14 dB (L-Band)
Phase Noise:	1 kHz -73 dBc 10 kHz -83 dBc 100 kHz -100 dBc 1 MHz -120 dBc
Output Connector:	BNC Female (70/140 MHz), SMA Female (L-Band)
IF Monitor:	SMA Female
External Reference:	1, 2, 5, 10 MHz better than ±1 ppm, 1.5 to 10 Vp-p, 50 Ohms

### Baseband (DVB-S) Per ETSI EN 301-210

Data Rate:	1 to 238 in 1 bps steps
Symbol Rate:	1-68 Msps Maximum
Inner FEC Code:	PTCM (8PSK, 16QAM), QPSK (Viterbi)
Code Rates:	QPSK 1/2, 2/3, 3/4, 5/6, 7/8 8PSK 2/3, 5/6, 8/9 16 QAM 3/4, 7/8
Outer Code:	Reed-Solomon (204, 188, T=8)
Interleaving:	Convolutional, I=12
Data Scrambling:	Per EN 300-421
Terrestrial Framing:	204, 188, None

### Baseband (DVB-S2) Per ETSI EN 302 307

Modulation Types:	QPSK, 8PSK, 16APSK, 32APSK
DVB Modes:	CCM, ACM, VCM
Data Rate:	1 to 80 Mbps in 1 bps steps (QPSK) 2 to 118 Mbps in 1 bps steps (8PSK) 2.6 to 160 Mbps in 1 bps steps (16APSK) 3.5 to 190 Mbps in 1 bps steps (32APSK)
Symbol Rate:	1 to 45 Msps Maximum
Terrestrial Framing:	188 (1 Sync Byte, 187 Payload Bytes)
Block Size:	64800 bits, 16200 bits
FEC Code:	BCH + LDPC
Interleaver:	Block Interleaver, Per ETSI EN 302 307 QPSK: 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Code Rates:	8PSK: 2/3, 3/4, 3/5, 5/6, 8/9, 9/10 16APSK: 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 32APSK: 3/4, 4/5, 5/6, 8/9, 9/10
Baseband Roll-Off:	Square Root Raised Cosine 0.20, 0.25, 0.35
Terrestrial Input Clock Accuracy:	Better Than 400 ppm
Test Pattern:	Internal 2 <sup>15</sup> -1 and 2 <sup>23</sup> -1 Pseudo-Random Number Generator
Internal Clock Source Stability:	10 ppm

### Monitor and Control

Interface:	Serial RS-485 (Remote) and RS-232 (Terminal), Ethernet 10/100 BaseT (SNMP V1/V2 and Web Browser)
Parameters Controlled:	<ul style="list-style-type: none"> <li>• Test Modes</li> <li>• IF Frequency</li> <li>• IF Output Level</li> <li>• IF Output On/Off</li> <li>• Data Rate</li> <li>• Symbol Rate</li> <li>• Clock Polarity</li> <li>• Data Polarity</li> </ul> <ul style="list-style-type: none"> <li>• Inner Code Rate</li> <li>• Modulation</li> <li>• Rolloff</li> <li>• Pilot Symbols</li> <li>• Gold Code Seq</li> <li>• Terr Framing</li> <li>• Sat Framing</li> </ul>
Parameters Monitored:	<ul style="list-style-type: none"> <li>• Faults (Current &amp; Latched Alarms)</li> <li>• Supply Voltages</li> </ul>

### Optional Interfaces (Plug-In Interface Card)

Serial:	DVB-ASI, G703, HSSI
Parallel:	RS-422 (M2P, DVB), LVDS (M2P, DVB), DSS
Ethernet:	100/1000 BaseT (PRO-MPEG COP3/R2 & BRIDGE Mode)
AutoEQ™:	Amplitude and Group Delay Equalization

### Environmental

Prime Power:	100 - 240 VAC, 50 - 60 Hz, 40 Watts Maximum
Operating Temperature:	0 to 50°C
Operating Humidity:	Up to 95%, Non-Condensing
Storage Temperature:	-20 to 70°C
Storage Humidity:	Up to 99%, Non-Condensing

### Physical

Size:	10 pounds (4 Kg)
Weight:	19" W x 17" D x 1.75" H 48.3 x 43.2 x 4.45 (cm)

### Configuration Series DVB-S

Series 100:	1 - 10 Msps, QPSK
Series 200:	1 - 45 Msps, QPSK
Series 300:	1 - 45 Msps, QPSK/8PSK
Series 400:	1 - 68 Msps, QPSK/8PSK/16QAM

### Configuration Series DVB-S2

Series 100:	1 to 10 Msps, QPSK
Series 200:	1 to 45 Msps, QPSK
Series 300:	1 to 45 Msps, QPSK/8PSK
Series 400:	1 to 45 Msps, QPSK/8PSK/16APSK
Series 500:	1 to 45 Msps, QPSK/8PSK/16APSK/32APSK



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