Description

The MDM6000 High Speed Satellite IP Modem is a versatile next generation modem optimized for a wide range of applications such as cellular backhauling, IP trunking and fiber restoration. The MDM6000 modem is typically installed at both ends of a point-to-point satellite link or at the remote sites of a star network. The MDM6000 High Speed is identical to the regular MDM6000 with the addition of an external packet processor that handles encapsulation, decapsulation, shaping and QoS to achieve even higher pps performance than those offered by the regular MDM6000. Up to 800 kpps can be handled by a single modem. The modem is in full compliance with the DVB-S2 and DVB-S2X standards, achieving the highest possible efficiency at maximum service availability.

Efficiency at the Core

The Newtec MDM6000 High Speed Satellite Modem combines a number of innovative elements to improve current market available efficiencies, thereby lowering the overall Total Cost of Ownership. New modulation and Forward Error Correction (FEC) codes up to 256APSK in the DVB-S2X standard in combination with innovative technologies such as 133 MBaud, Clean Channel Technology®, Bandwidth Cancellation (BWC), Automatic Uplink Power Control (AUPC), FlexACM®, QoS, Shaping and Equalink® 3 are embedded in the modem and bring the satellite link to full efficiency.

Depending on the application, the Newtec MDM6000 High Speed Satellite Modem can be used in conjunction with the Newtec HUB6000 Satellite Hub. The performance can be increased even more by adding Newtec’s network optimization technologies, such as acceleration, compression and bandwidth management.

Optimal Availability

Newtec’s auto-adaptive technology FlexACM is incorporated in the MDM6000 modem and deals with fading conditions (rain, dust, interference) and inclined orbit satellites. Thanks to FlexACM, fading will no longer interrupt the transmission between the hub and remote sites nor result in loss of data. The maximum possible throughput can be achieved at all times. Additionally, the Automatic Uplink Power Control mechanism ensures maximum use of the link budget at all times.

Flexibility and Scalability Matching Market’s Business Models

The MDM6000 Satellite Modem provides a scalable and flexible platform which allows customers to grow their business depending on their application and investment plan. The modem comes with all features that can be unlocked by means of a very granular licensing scheme depending on the needs as the business grows.

All modulation modes and maximum symbol rate are always available, the capability of the modem is determined by its IP throughput license with rates as low as 20 Mbps up to 425 Mbps in very granular steps. This makes the MDM6000 suitable for either medium to high speed links requiring a high number of pps.

The built-in bandwidth canceller completely operates in the digital domain providing unsurpassed performance with the lowest possible residual cancellation noise resulting in the highest spectral efficiency. Non-linear post compensation (NLPC) performs real-time analysis of the complete received spectrum and reduces intermodulation interference that affects the demodulated carrier. Fractional licensing of the bandwidth cancellation option allows for cost-effective redundant setups.

A built-in spectrum analyzer and constellation diagram viewer facilitate debugging and monitoring.

The MDM6000 High Speed Satellite Modem can be easily monitored and controlled via a comprehensive front panel menu, CLI, advanced web GUI and via SNMP protocol. This enables easy integration into any industry-standard EMS/NMS system.
Support Services for your Professional Equipment

Care Pack Basic and Care Pack Enhanced are the Newtec service and support packages protecting your Newtec equipment over a three-year period.

Architecture

The MDM6000 High Speed Satellite Modem can be used at both ends of a point-to-point network or at the remote site of a star network. Depending on the configuration, the unit can be used as a modulator, demodulator or modem.

Related Products

- **HUB6000** Satellite Hub
- **MDM6100** Broadcast Satellite Modem
- **USS02x2** Redundancy Switch
- **FRC07x0** Frequency Converters Portfolio

Related Bandwidth Efficiency Technologies

- Clean Channel Technology
- Equalink 3
- DVB-S2X
- FlexACM
- Bandwidth Cancellation

Key Features

- Very granular rate licensing scheme with rates from 20 Mbps up to 425 Mbps bidirectional
- Suitable for low, medium and high speed applications, baudrates up to 133 Mbaud to handle all common transponder sizes
- Clean Channel Technology for additional bandwidth efficiency gains by allowing optimal carrier spacing
- DVB-S2, DVB-S2X (QPSK up to 256APSK)
- Newtec S2 Extensions (up to 64APSK) for closed network operation
- Default IF and L-band on TX and RX for ease of operation
- Optional Equalink 3 for linear and non-linear pre-distortion
- Reduce impact of RF Interferences (RFI) by enabling DVB RF Carrier ID (DVB-CID)
- All MODCODs and baudrates default enabled for flexible and optimal operation of the network

- Intelligent Uplink Power Control
- NLPC (non-linear post compensation) for intermod removal
- FlexACM for adaptive environments like variable interferences from rain and dust or for inclined orbit operation
- Standard GSE encapsulation for minimal overhead
- Support for MPE, ULE and XPE for working with legacy equipment
- Adaptive traffic shaping and bandwidth management allowing maximal SLA adherence even in case of ACM
- Advanced Quality of Service (QoS) for better customer experience
- Built-in spectrum analyzer and constellation diagram viewer
- Easy operation through secure front panel, SNMP, HTTP and CLI interfaces
- Modified OpenAMIP support to interwork with stabilized antennas from different vendors

Specifications

- **TX**: DVB-S2/DVB-S2X or S2 Extensions
- **RX**: DVB-S2/DVB-S2X or S2 Extensions

- Intelligent Uplink Power Control
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- FlexACM for adaptive environments like variable interferences from rain and dust or for inclined orbit operation
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- **Clean Channel Technology**
- **Equalink 3**
- **DVB-S2X**
- **FlexACM**
- **Bandwidth Cancellation**

- **Newtec HUB**
- **NEWTEC MODEM**
- **INTERNET BACKBONE**

- **SITE 1**
- **SITE 2**

- **TX**: DVB-S2/DVB-S2X or S2 Extensions
- **RX**: DVB-S2/DVB-S2X or S2 Extensions

- **Point-to-point**

- **NEWTEC MODEM**
- **INTERNET BACKBONE**

- **SITE 1**
- **SITE 2**
- **SITE 3**
- **SITE 4**
- **SITE 5**

- **3G/4G/LTE TRUNK**
- **ISP**
- **TELECOM SERVICES**
- **WIMAX**
- **DISASTER RECOVERY/BACK-UP**

- **Point-to-multipoint**
Input Interfaces

- Auto switching 10/100/1000 Base-T Ethernet interfaces
- GSE Encap/Decap performance
  - Imx (avg 340 byte)
- TX only: 425 Mbps
- RX only: 425 Mbps
- TX + RX: 850 Mbps
- Max PPS (46 byte)
- TX only: 400 kbps
- RX only: 425 Mbps
- RX + TX: 800 kbps
- Maximum Data Rate
  - 425 Mbps simplex, 850 Mbps duplex
- Layer 2 bridge function: Ethernet over satellite (IPv6/VLAN/MPLS compatible)
- Layer 3 static router function: IPv4 packets over satellite
- Supports Jumbo frames (9216 bytes)
- Up to 100 routes
- Advanced QoS features
  - Adaptive Traffic Shaping on bitrate or symbole rate according to PRR/CIR
  - Flexible traffic classification on VLAN/MPLS/ IPv6
- GSE, MPE, XPE or ULE Encapsulation/
  - Decapsulation of IP/Ethernet frames in DVB-S2, DVB-S2X and S2 Extensions
- Data filtering (downlink): Up to 64 receive filters

Modulation and Demodulation

SUPPORTED MODULATION SCHEMES AND FEC

- DVB-S2 (acc. ETSI EN 302 307 v1.2.1 for DVB-S2)
  - Outer/Inner FEC: BCH/LDPC
  - 52 MODCODs (short & normal frames):
    - QPSK: from 1/4 to 9/10
    - BPSK: from 3/5 to 9/10
    - 16APSK: from 2/3 to 9/10
    - 32APSK: from 3/4 to 9/10
  - Neutec's S2 Extensions
    - Outer/Inner FEC: BCH/LDPC
    - 54 MODCODs:
      - QPSK: from 45/180 to 144/180
      - BPSK: from 80/180 to 150/180
      - 16APSK: from 90/180 to 162/180
      - 64APSK: from 90/180 to 162/180
    - 29 Linear MODCODs:
      - 8PSK-L: from 80/180 to 120/180
      - 16APSK-L: from 80/180 to 162/180
      - 64APSK-L: from 90/180 to 162/180
  - DVB-S2X standard
    - Outer/Inner FEC: BCH/LDPC
    - 53 MODCODs (normal frames):
      - QPSK: from 1/4 to 9/10
      - BPSK: from 3/5 to 9/10
      - 16APSK: from 32/45 to 9/10
      - 64APSK: from 11/15 to 5/6
      - 128APSK: 3/4, 7/9
      - 256APSK: 32/45, 3/4
      - 13 Linear MODCODs (normal frames):
        - QPSK: from 5/9, 26/45
        - 16APSK-L: from 1/2 to 2/3
        - 32APSK-L: 2/3, 26/45
        - 256APSK-L: from 29/45 to 11/15
    - 41 MODCODs (short frames):
      - QPSK: from 11/45 to 8/9
      - BPSK: from 7/15 to 8/9
      - 16APSK: from 7/15 to 8/9
      - 32APSK: from 2/3 to 8/9
      - FlexACM controller (optional)
      - FlexACM client (optional)
      - Automatic Uplink Power Control

BAUD RATE RANGE

- SCPC use: 0.256 MBaud - 133 MBaud
- BW use: 0.256 MBaud - 72 MBaud

FRAME LENGTH

- Short frames of 16200 bits for DVB-S2 and DVB-S2X
- Normal frames of 64800 bits for DVB-S2, DVB-S2X and Newtec's S2 Extensions

CLEAN CHANNEL TECHNOLOGY

- Roll-off: 5%-10%-15%-20%-25%-35%

EQUALINK 3

- Linear pre-distortion
- Non-linear pre-distortion for all MODCODs

CARRIER INTERFERENCE REDUCTION

- DVB RF Carrier ID
  - (CID according ETSI TS 103 129 v1.1.1)
- Spread Spectrum Modulator (BPSK)
- Supports User Data
- Compliant to DVB Standard

BANDWIDTH CANCELLATION (BWC)

- Max symbolrate: 72 MBaud
- Delay range 0 to 500 ms
- Cancellation range: -10 to +10 dB local to remote carrier
- Cancellation ratio: > 30 dB
- Es/No degradation at 0 dB
  - QPSK: 0.1 dB
  - 8PSK: 0.2 dB
  - 16APSK: 0.4 dB
  - 32APSK: 0.6 dB
  - 64APSK: 1.0 dB
  - 128APSK: 1.2 dB
  - 256APSK: 1.5 dB
- Monitoring: delay, frequency offset, local/remote power, local/total power, phase noise
- Fractional license for redundant modem

Modulation Interfaces

L-BAND

- Connector: N(F), 50 Ohm (optional SMA adapter)
- Frequency: 950 - 2150 MHz (10 Hz steps)
- Level: > -10 dBm (+/- 2 dB)
- Return loss: > 14 dB
- Switchable 10 MHz Reference
- Spurious performance
- Better than -65 dBc/4kHz @ +5 dBm output level and > 256 kBaudo
- Non-signal related: < -80 dBc @ +5 dBm output

IF-BAND

- Connector: BNC (F) - 75 Ohm
- Return loss: > 15 dB
- Level: See L-band input level spec above +10dBm
- Frequency: 50 - 180 MHz
- Adjacent signal < (Co+7) dBm/Hz with Co = signal level density

LNB POWER AND CONTROL

- Max. current 350 mA (on selected IF input)
- DISEqC control

Internal 10 MHz Reference Frequency

STANDARD STABILITY

- Stability: +/- 2000 ppb over 0 to 70°C
- Ageing: +/- 1000 ppb/year

VERY HIGH STABILITY (OPTIONAL)

- Stability: +/- 2 ppb over 0 to 65°C
- Ageing: +/- 500 ppb/10 year

Generic

- M&C connectivity via separate Ethernet links
- Web server GUI (HTTP) via web browser
- Diagnostics report, alarm log (HTTP)
- SNMP v2c
- Modified OpenAMIP protocol to control stabilized antenna from modem

ALARM INTERFACE

- Electrical dual contact closure alarm contacts
- Connector 9 pin sub-D (F)
- Logical interface and general device alarm

Physical

- Height 2RU, width: 19", depth 51 cm, 5.8 kg
- Power supply: 90-130 & 180-260 Vac, 125 VA, 47-63 Hz or 36-76 VDC, 160 W
- Temperature: Operational: 0°C to +50°C/+32°F to +122°F
  - Storage: -40°C to +70°C/-40°F to +158°F
- Humidity: 5% to 85% non-condensing
- CE label and UL

SATELLITE MODEM (R3.3)

MDM6000 HIGH SPEED
<table>
<thead>
<tr>
<th>Configuration Options Category</th>
<th>Ordering n°*</th>
</tr>
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<tbody>
<tr>
<td><strong>Hardware Platform</strong></td>
<td>MDM6000 HS</td>
</tr>
<tr>
<td>Chassis Version 03 (Modem)</td>
<td>CH-03</td>
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<tr>
<td>NOP1760 Chassis Version 01</td>
<td>CH-03</td>
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<tr>
<td><strong>Operating Software</strong></td>
<td>MS-30</td>
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<tr>
<td>MDM6000 Major Software version R3*</td>
<td>MS-30</td>
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<tr>
<td><strong>Efficiency Optimization Package</strong></td>
<td>OP-04</td>
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<tr>
<td>DVB-S2, DVB-S2X and S2 Ext, CCT and AUPEC</td>
<td>OP-04</td>
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<tr>
<td>For a modem or demodulator, select 1 option</td>
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<tr>
<td><strong>Demodulator Hardware</strong></td>
<td>DH-03</td>
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<tr>
<td>Class 3 (wide band up to 133 Mbaud)</td>
<td>DH-03</td>
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<tr>
<td><strong>Modulator Output Interface</strong></td>
<td>OU-06</td>
</tr>
<tr>
<td>IF+ L-band with switchable 10 MHz out*</td>
<td>OU-06</td>
</tr>
<tr>
<td>IF+L-band + 10 MHz output + 2 x 48 V BUC**</td>
<td>OU-06</td>
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<tr>
<td>For a modem or modulator, select 1 option</td>
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<tr>
<td><strong>Internal Reference Clock</strong></td>
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<tr>
<td>Standard 10 MHz</td>
<td>IR-02</td>
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<tr>
<td>Very High Stability 10 MHz</td>
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<tr>
<td><strong>Reference Clock Output</strong></td>
<td>RO-01</td>
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<tr>
<td>10 MHz Reference Output (BNC)</td>
<td>RO-01</td>
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<td>Select max 1 option</td>
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<tr>
<td><strong>Mains Power Supply Unit</strong></td>
<td>PS-11</td>
</tr>
<tr>
<td>PSU Single AC 110/240 V</td>
<td>PS-11</td>
</tr>
<tr>
<td>PSU Dual Redundant AC 110/240 V</td>
<td>PS-11</td>
</tr>
<tr>
<td>PSU Single DC 48 V**</td>
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<tr>
<td>PSU Dual DC 48 V**</td>
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<td>For a modem or modulator, select 1 option</td>
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<td><strong>Outbound Rates</strong></td>
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<tr>
<td>Outbound Rate*</td>
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</tr>
<tr>
<td>Inbound rate</td>
<td>OU-06</td>
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<tr>
<td>Inbound Rate*</td>
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<tr>
<td><strong>Additional Options Category</strong></td>
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<tr>
<td>Outbound ACM</td>
<td>AE-01</td>
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<tr>
<td>TX FlexACM point-to-point *</td>
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<tr>
<td>Inbound ACM</td>
<td>AE-01</td>
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<td>RX FlexACM Client*</td>
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<td>Bandwidth cancellation</td>
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<td>Full license or fractional license*</td>
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<td>Pre-Distortion</td>
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<tr>
<td>Equalink 3*</td>
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<tr>
<td>Modulator Output Connector</td>
<td>OU-10</td>
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<td>L-Band output N to SMA output adapter</td>
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<tr>
<td>For a modem or modulator, select 1 option</td>
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<td><strong>Services Category</strong></td>
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<td>Support</td>
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<td>Care Pack 3 Basic</td>
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<tr>
<td>Care Pack 3 Enhanced</td>
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</table>

(*) Selectable via license key
(**) Option PS-10 and PS-11 are mutually exclusive with option OU-06
Contact your sales representative for details (sales@newtec.eu).

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The details contained in this document, including product and feature specifications, are subject to change without notice and shall not bind Newtec in any way.

**Newtec MDM6000 High Speed Satellite Modem Release 3.3**

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