The versatile HUB6000 is the next generation satellite hub designed for data applications over satellite in full compliance with the updated DVB-S2 and DVB-S2X standards and still supports the Newtec S2Extensions. The HUB6000 merges cutting edge modulation with the unique combination of traffic shaping and satellite segment bandwidth management. The multi-carrier demodulator unit inside the hub integrates three demodulators in one unit which greatly reduces the Total Cost of Ownership (TCO).

**Efficiency at the Core**

The HUB6000 satellite hub embeds the award-winning FlexACM® function. FlexACM® combines a set of advanced technologies which work together to ensure the satellite link is operating at full efficiency. These advanced technologies include Adaptive Coding and Modulation (ACM), Cross-Layer Optimization, Noise & Distortion Estimator (NoDE) and Thin Margin Manager (ThiMM). All of them individually reduce the satellite link margin and contribute to optimize the IP link.

New modulation and Forward Error Correction (FEC) codes up to 256APSK 3/4 in the DVB-S2X standard in combination with innovative technologies such as wideband (up to 72Mbaud), Clean Channel Technology™, and Automated Equalink® 2.0 are embedded into the hub and bring the satellite link to full efficiency. By increasing the amount of data that can be transferred per transponder the HUB6000 effectively increases business opportunities for Service Providers.

The performance can be increased even more by adding Newtec’s network optimization technologies such as TCP acceleration and compression.

**Optimal Availability**

Newtec’s auto-adaptive technology FlexACM® embedded in the HUB6000 deals with fading conditions (rain, dust, interference) and inclined orbit satellites with varying throughput patterns.

Thanks to FlexACM® these fading conditions 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 in accordance with Service Level Agreement (SLA) requirements.

Thanks to the Automatic Uplink Power Control feature it is possible to also combat uplink fading leading to even higher SLAs.

The HUB6000 satellite hub embeds the award-winning FlexACM® function. FlexACM® combines a set of advanced technologies which work together to ensure the satellite link is operating at full efficiency.

**Flexible Business Models**

The HUB6000 Satellite Hub provides a scalable and flexible platform which allows the customers to grow depending on their application and investment plan.

The Newtec hub brings the unique bandwidth manager feature where both the IP and satellite segment can be shaped. Individual customers are added or removed from the same network. Different services (Internet Access, VoIP, etc.) can be combined in the same satellite carrier with separate Service Level Agreement requirements and rate options. Both Committed Information Rates (CIR) and Peak Rates (PIR) are offered in an adaptive environment at various speeds.

The HUB6000 can be configured to match the size and the satellite network configuration (one-way or two-way) independent of speed rate, modulation and amount of return links. Through Gigabit Ethernet interface the Newtec hub integrates seamlessly with terrestrial IP networks and equipment. Moreover the hub can be coupled with any industry standard EMS/NMS system.

www.newtec.eu
**Key Features**

- Data rates up to 425Mbit/s for handling new applications and lower TCO
- Baudrates up to 72baud to handle all common transponder sizes
- DVB-S2 and optional DVB-S2X (QPSK up to 256APSK) for standard compliant optimal use of bandwidth
- Newtec S2 Extensions (up to 64APSK) for optimal closed network operation
- Clean Channel Technology™ for additional bandwidth efficiency gains by allowing optimal carrier spacing
- Optional Automated Equalink® 2.0 for optimal use of semi-saturated transponders
- Help fight RFI by using the optional DVB RF Carrier ID (DVB-CID)
- All modcods and baudrates default enabled for flexible and optimal operation of the network

**Architecture**

Depending on the application and the activated features, the HUB6000 Satellite Hub can be used in conjunction with professional modems such as the Newtec MDM6000 or EL470.

**Applications**

- IP Trunking networks
- IP Access networks
- IP Backhauling networks
- Government networks
- Content Contribution and Distribution over IP
- Corporate networks

**Related Products**

- **MDM6000**: Satellite Modem
- **NOP184x**: PEP Servers
- **NOP183x**: PEP Gateways
- **FRC07X0**: Frequency Converters Portfolio
- **HUB650x**: Newtec Dialog Hub

**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.
Input/Output Interfaces

SYSTEM ARCHITECTURE
- One-way or two-way point-to-multipoint operation
- IPv4 static routing or Ethernet bridging (IPv6, MPLS, VLAN compatible)
- Redundancy option as addition for Forward (1+1) and Return links (N+1)
- Built with proven Newtec FlexACM technology
- Remotes can be purchased separately
- Extendible with more remotes and/or higher speeds as the need arises
- 3x demodulators in one MCD6000 Multicarrier demodulator unit

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
  8PSK: from 3/4 to 9/10
  16APSK: from 3/2 to 9/10
  32APSK: from 3/4 to 9/10
- Newtec S2 Extensions
  Outer/Inner FEC: BCH/LDPC
  54 MODCODs:
  QPSK: from 45/180 to 144/180
  8PSK: from 80/180 to 150/180
  16APSK: from 80/180 to 162/180
  32APSK: from 100/180 to 162/180
  64APSK: 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
  8PSK: from 3/4 to 9/10
  16APSK: from 26/45 to 9/10
  32APSK: 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):
- 8APSK-L: 5/9, 26/45
- 16APSK-L: from 1/2 to 2/3
- 32APSK-L: 2/3
- 64APSK-L: 32/45
- 256APSK-L: 29/45 to 11/15
- 41 MODCODs (short frames):
- QPSK: from 11/45 to 8/9
- 8PSK: 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 embedded in MDM6000 modem (optional)
- Automatic Uplink Power Control

BAUD RATE RANGE
- Modulator: 256 kbaud - 72MBaud
- Class 1 Demodulator: 1 - 60Mbaud (depending MODCOD)
- Class 2 Demodulator: 256kbaud - 72Mbaud

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%
- Optimum carrier spacing
- Advanced filter technology

AUTOMATED EQUALINK™ 2.0
- Linear pre-distortion
- Non-linear pre-distortion for all modcods

CARRIER INTERFERENCE REDUCTION
- DVB RF Carrier ID
- Spread Spectrum Modulator (BPSK)
- Supports User Data
- Compliant to DVB Standard

Interfaces

INPUT/OUTPUT
- User Traffic on Gigabit Ethernet in/out
- M&C connectivity via separate Ethernet links
- Supports User Data (CID according ETSI TS 103 129 v1.1.1)
- DVB RF Carrier ID
- Wideband up to 72 Mbaud
- Automatic Uplink Power Control
- Basic network monitoring functionality

CONFIGURATION/MONITORING
- WEB GUIs to monitor all Newtec devices
- Command line interfaces
- SNMP

Functionalities
- VCM Multistream support
- FlexACM Optional
- Supports GSE encapsulation
- Flexible traffic classification on VLAN/MPLS/IP/UDP
- Traffic shaping using Cross-Layer-Optimization to take variable bandwidth into account
- Allows for overbooking and extensive SLA definition
- Optional IP Network Optimization Technology (Acceleration, Compression, Encryption) up to 200 Mbps
- Clean Channel Technology™
- Wband up to 72 Mbaud
- Automatic Uplink Power Control
- Basic network monitoring functionality

Implementation Services
- Project management
- Network implementation design
- Hub configuration
- Factory Integration and Test
- Logistics documentation
- On-site services (3 days) for installation and training
- Remote installation support for remote sites
- Satellite System handover
- Start-up care & customer support hand-over

Physical
- Collection of 1U rack-mountable devices (standard 19inch rack optional)
- Total number of units depending on configuration
- Minimum 5U for non-redundant one way system
- Cisco Gigabit Ethernet switch included
- Power: 100/240AC, 50/60Hz
- Operational Temperature: 10°C-40°C
- CE label on all devices

Newtec HUB6000 Technology

FlexACM™: is the unique and market proven end-to-end solution combining a range of technologies to maximise the efficiency of IP applications over adaptive satellite links at optimal efficiency.

S2-Extensions: are Newtec’s proposal for the new DVB-S2X standard, including higher order modcods (64APSK), additional FEC factors and smaller roll-off factors (5%, 10%, 15%) improving overall efficiency.

DVB-S2X: The new DVB standard which enhances the DVB-S2 standard with new features such as 256APSK, lower rolloffs and more granularity in modcod selection for better ACM rate adaption and overall higher efficiency.

Equalink™: gives significant improvements by pre-distorting the modulated signal resulting in 10% bandwidth gains and higher Quality of Service.

Clean Channel Technology*: improves satellite efficiency by up to 15% compared to the current DVB-S2 standard by implementing smaller roll-offs (5%, 10%, 15%) and advanced filter technology, thereby allowing optimum carrier spacing.

Cross-Layer-Optimization*: the satellite modulation equipment is in continuous interaction with Acceleration, Compression, Bandwidth Management and IP Shaping technology. As soon as a satellite link condition changes the link will be auto-optimised following Quality-of-Service and Priority Settings without the loss of data or link.

Thin Margin Manager (ThiMM): offers an accurate prediction of the upcoming variation (depth and direction) of the link condition. As a result, the excess link margin can be kept to the absolute minimum and further increase the efficiency of the link.

Noise & Distortion Estimator (NoDE): provides the estimation of the amount of linear and non-linear distortion on the received signal in order to provide the real satellite link margin and helps FlexACM to work at maximum accuracy.
**Newtec HUB6000 Satellite Hub (R2.0)**

### Default Configuration
DVB-S2/S2 Extensions Satellite Hub including
- Ethernet switches, dynamic shaper, multi-site modulation controller
- Outbound modulation up to 64APSK & 72 Mbaud
- Clean Channel Technology
- CCM, VCM, Advanced Quality-of-Service (QoS)
- AUPC
- 10 Mbps
- Single thread

### HUB6000 Configuration Options
**Category**

<table>
<thead>
<tr>
<th>Option</th>
<th>10-425 Mbps</th>
<th>yes/no</th>
<th>yes/no</th>
<th>yes/no</th>
<th>yes/no</th>
<th>yes/no</th>
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<tr>
<td>Outbound rate license (select from drop-down)</td>
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<td>Select 1 option</td>
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<td>ACM License</td>
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### Configuration Options Inbound
**Select required option**

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<th>Option</th>
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<tr>
<td>Return channel Class 2 Demodulator (select # return channels)</td>
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<td>S2 Extensions Inbound License</td>
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<td>ACM Inbound License</td>
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### Redundancy
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<th>Option</th>
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<td>Dual Power Supplies on Critical devices</td>
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<td>Outbound Redundancy</td>
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<tr>
<td>Inbound Redundancy</td>
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### Rack Option
**Select 1 option**

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<th>Option</th>
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<tbody>
<tr>
<td>19 inch Rack for Hub</td>
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