## Newtec HUB6000
### Description

The versatile HUB6000 is the next generation satellite hub designed for IP applications over satellite in full compliance with DVB-S2 and the upcoming S2-Extensions candidates for improved performance. The HUB6000 merges cutting edge modulation with the unique combination of IP shaping and satellite segment bandwidth management. The multi-carrier demodulator unit inside the hub integrates three S2/S2 Extensions 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® module. 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 64APSK 9/10 (which can be seen as demonstrators for evolutions in extending the DVB-S2 standard) in combination with innovative technologies such as wideband (up to 72Mbaud), Clean Channel Technology™, and Automated Equalink® are embedded in 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 bandwidth cancellation and 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.

### 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 and Peak Rates are offered in an adaptive environment at various speeds.

The HUB6000 can be set-up 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.

*The Newtec HUB6000 Satellite Hub and the market renowned Newtec FlexACM® implementation double the IP throughput over satellite at optimal availability. Optimal efficiency can be kept in adaptive environments with respect for flexible business models.*

## Key features

- DVB-S2 compliant
- Candidate S2 Extensions and MODCODs
- QPSK/8PSK/16APSK/32APSK and 64APSK
- Baud rate range: 1 – 72 Mbaud
- Data rates up to 380 Mbps
- FlexACM® for adaptive environments
- GSE encapsulation, data piping encapsulation
- All outbound MODCODs and baud rates enabled by default
- RFI reduction using optional DVB RF Carrier ID (DVB-CID)

- Supports Committed (CIR) and Peak (PIR) Information rate policies (even in ACM)
- Adaptive traffic shaping and bandwidth management
- Shaping hierarchies can be changed on-the-fly
- Optional Clean Channel Technology™
- Optional automated linear Equalink® Pre-distortion
- Optional Network Optimization (acceleration & compression)
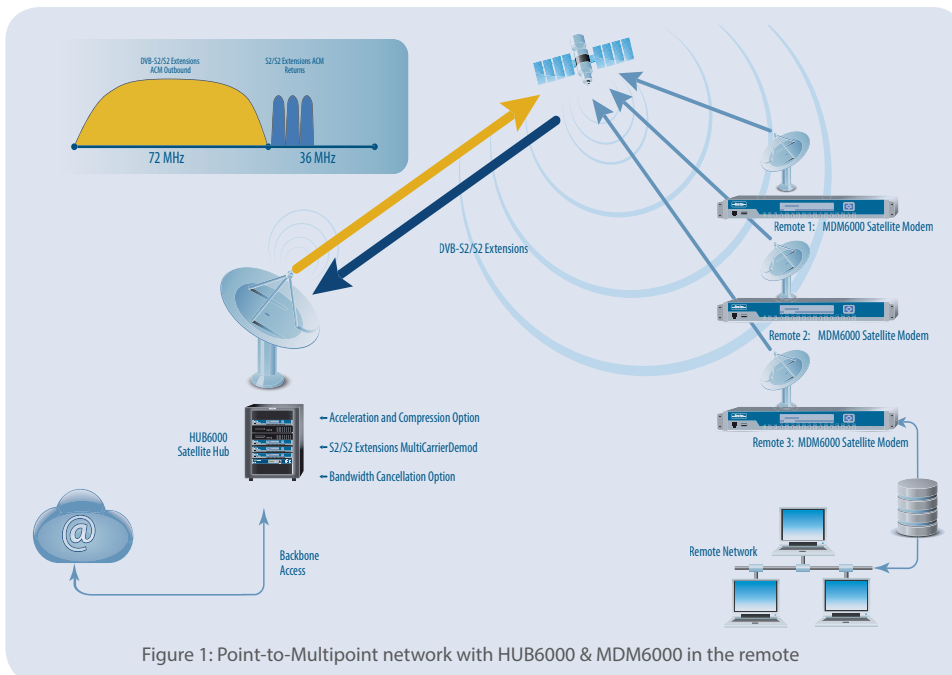- Optional Automatic Uplink Power Control

## Main advantages

- Lower operational costs thanks to the highest bandwidth efficiency
- Automated Equalink® pre-distortion provides up to 10% bandwidth gains and higher Quality of Service
- Optimal availability even in fading conditions or with services over inclined orbit satellites
- Based on DVB-S2 standards and upcoming S2 Extension candidates for better efficiency (up to 37%)
- Clean Channel Technology™ provides up to 15% bandwidth efficiency gains on top of the DVB-S2 standard
- Maximum efficiency in combination with bandwidth cancellation and network optimisation technologies
- Easy integration with terrestrial IP networks and routers
- Unique combination of IP Shaping and satellite bandwidth management

## 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.

## 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.

## Applications

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

## Newtec HUB6000 Network Diagram



Figure 1: Point-to-Multipoint network with HUB6000 & MDM6000 in the remote

## Related products

| | |
|---|---|
| MDM6000 | Satellite Modem |
| NOP1760 | Bandwidth Manager and Shaper |
| MCD6000 | Multicarrier Demodulator |
| BWC0900 | Bandwidth Canceller |
| NOP184x | PEP Servers |
| NOP183x | PEP Gateways |
| AZ212 | 1+1 Modular Redundancy Switch |
| AZ7x0 | Frequency Converters Portfolio |

## Input/Output interfaces

**System Architecture**
- One-way or two-way point-to-multipoint operation
- IPv4 modes
- Redundancy as option 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 outbound (inbound optional)
- Outer/Inner FEC: BCH/ LDPC
- MODCODS:  QPSK: 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10;
  8PSK: 3/5, 2/3, 3/4, 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

**S2 Extensions outbound (inbound optional)**
- Outer/Inner FEC: BCH/ LDPC
- MODCODs:

  QPSK: 45/180, 60/180, 72/180, 80/180, 90/180, 100/180, 108/180, 114/180, 120/180, 126/180, 135/180, 144/180, 150/180, 160/180, 162/180

  8PSK: 80/180, 90/180, 100/180, 108/180, 114/180, 120/180, 126/180, 135/180, 144/180, 150/180

  16APSK: 80/180, 90/180, 100/180, 108/180, 114/180, 120/180, 126/180, 135/180, 144/180, 150/180, 160/180, 162/180

  32APSK: 100/180, 108/180, 114/180, 120/180, 126/180, 135/180, 144/180, 150/180, 160/180, 162/180

  64APSK: 90/180, 100/180, 108/180, 114/180, 120/180, 126/180, 135/180, 144/180, 150/180, 160/180, 162/180

  Linear MODCODs:

  8PSK-L: 80/180, 90/180, 100/180, 108/180, 114/180, 120/180

  16APSK-L: 80/180, 190/180, 100/180, 108/180, 114/180, 120/180, 126/180, 135/180, 144/180, 150/180, 160/180, 162/180

  64APSK-L: 90/180, 100/180, 108/180, 114/180, 120/180, 126/180, 135/180, 144/180, 6150/180, 160/180, 162/180

**Baud rate range**
- DVB-S2                      1 – 68 Mbaud
- S2 Extensions          1 – 72 Mbaud

**Frame Length**
- DVB-S2 Short Frames          16200 bits
- DVB-S2 Normal Frames          64800 bits
- S2 Extensions Normal Frames  64800 bits

**Roll-off factor**
- DVB-S2                      20% - 25% - 35%
- S2 Extensions          5% -10% -15% -20% - 25% - 35%

**Clean Channel Technology™**
- Roll-off :          5% -10% -15% -20% - 25% - 35%
- Optimum carrier spacing
- Advanced filter technology

## Interfaces

**Input/Output**
- User Traffic on Gigabit Ethernet in/out
- M&C connectivity via separate Ethernet link
- All RF Interfaces on extended L-band (950-2150 MHz)

**Configuration/Monitoring**
- WEB GUIs to monitor all Newtec devices
- Command line interface
- SNMP to most devices

## Functionalities

- VCM Multistream support
- FlexACM Optional
- Supports GSE encapsulation
- VLAN and IP traffic shaping using Cross-Layer-Optimization to take variable bandwidth into account
- Allows for overbooking and extensive SLA definition
- Accounting data accessible for external processing
- Optional Network Optimization Technology (Acceleration, Compression, Prefetching, Encryption) up to 160 Mbps
- Optional bandwidth cancellation
- Optional Clean Channel Technology™
- Optional Wideband up to 72 Mbaud
- Automatic Uplink Power Control (optional)

## Implementation services

- Project management
- Network implementation design
- Hub configuration
- Factory Integration and Test
- Logistics documentation
- On-site installation and commissioning
- 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
- Ethernet switch included
- Power: 100/240AC, 50/60Hz
- Operational Temperature: 10°C-40°C
- CE label

## Newtec HUB6000 technology & options

**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 the candidate improvements in the upcoming DVB-S2 standard, including higher baudrates (up to 72 Mbaud), modcods (64APSK), wideband (up to 72 Mbaud), smaller roll-off factors (5%, 10%, 15%) improving overall efficiency

**Equalink®:** Provides significant improvements by pre-distorting the modulated signal resulting in 10% bandwidth gains and higher Quality of Service

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

Through **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.

**Bandwidth Cancellation:** by combining the forward and return transmissions in the same satellite bandwidth extra capacity can be made available

**Thin Margin Manager (ThiMM):** allows setting of a target BER of the link and provides 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

## Ordering Information

| Newtec HUB6000 Satellite Hub (R1.1) | Ordering n° |
|---|---|
| **Default Configuration** | |
| DVB-S2/S2 Extensions IP Satellite Hub including<br> - Ethernet switches, dynamic shaper, multi-site modulation controller<br> - Outbound modulation up to 64APSK & 72 Mbaud<br> - Clean Channel Technology<br> - CCM, VCM<br> - Advanced L3 Quality-of-Service (QoS)<br>Single thread | HUB6000 |
| **Configuration Options Outbound** | |
| | Select 1 option |
| Outbound rate license (select from drop-down)* | 10-380 Mbps |
| | Select 1 option |
| Outbound ACM License* | yes/no |
| | Select 1 option |
| Network Optimization (Acceleration, Compression, Prefetching, Encryption) up to 160 Mbps | yes/no |
| | Select 1 option |
| Automated Equalink Pre-distortion* | yes/no |
| **Configuration Options Inbound** | |
| | Select Required Option |
| Inbound ACM license | yes/no |
| | Select Required Option |
| Return channel Grade 2 Demodulator (select # return channels) | 0-n |
| **Redundancy** | |
| | Select 1 option |
| Outbound Redundancy | yes/no |
| | Select 1 option |
| Inbound Redundancy | yes/no |

(*) Other configurations and options such as RF output interfaces are available on request.
Contact your sales representative for details (sales@newtec.eu)