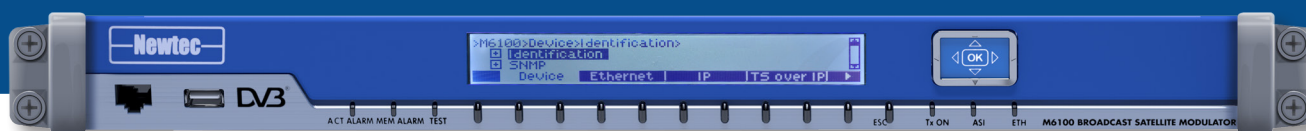


# Newtec

## M6100 BROADCAST SATELLITE MODULATOR (R2.1)



### Description

The Newtec M6100 Broadcast Satellite Modulator is the new generation DVB compliant modulator specifically designed for broadcast direct-to-home, primary distribution to headends and contribution of television and radio content. The modulator supports the updated DVB-S2 and DVB-S2X, next to the legacy DVB-S and DVB-DSNG standards, as well as Newtec S2 Extensions in order to achieve barrier-breaking efficiency. The M6100 can be used in conjunction with set-top boxes, professional IRD's or professional satellite demodulators such as the MDM6100.

#### DELIVERING THE HIGHEST UPTIME FOR VITAL LINKS



**VITAL**

Uptime and reliability are essential in the design of the modulator, taking a vital role in the satellite network. Input source redundancy and the shortest redundancy switch-over times of modulators, operating both in 1+1 and N+1 topologies, are setting the standard in our industry.

Advanced capabilities are built in such as a MPEG Transport Stream analyser, support of SMPTE 2022 FEC at the GbE inputs (for distributed IP headends), and native support of Carrier ID according to the new DVB standard as well as in the transport stream NIT Table. Special care was taken to cope with jittery transport stream over IP inputs. The 6 ASI ports are programmable as inputs or as monitoring outputs.

#### GET THE BEST PERFORMANCE AND LOWER YOUR COSTS



**PERFORM**

The Broadcast Satellite Modulator performs among the best, offering unmatched bandwidth efficiency optimization options, thereby lowering overall Total Cost of Ownership. The fully automated operation of Newtec's field-proven Equalink® 2.0 pre-distortion technology is now available for any satellite transmission application providing up to 10% bandwidth gains for single carrier per transponder constellations. Clean Channel Technology®, in combination with DVB-S2X or Newtec S2 Extensions, improve satellite efficiency by up to 15%, thereby enabling much smaller carrier spacing.

Maximum symbol rates up to 72 Mbaud and modulations up to 256APSK (DVB-S2X standard) combined with VCM (Variable Coding and Modulation) allow for maximum throughput of up to six transport streams in large contribution links.

At the output of the Broadcast Satellite Modulator, the signal is available in IF or extended L-band (950 MHz-2150 MHz), providing a compact and cost effective solution. A switchable 10 MHz reference signal and optional 24V or 48V DC for an outdoor BUC is multiplexed on the L-band interface.

The Broadcast Satellite Modulator can be easily monitored and controlled via a comprehensive front panel menu, advanced web GUI as well as via SNMP protocol. This enables easy integration into any industry-standard EMS/NMS system.

#### EVOLVE TOWARDS TOMORROW'S TECHNOLOGY



**EVOLVE**

Built upon flexible and latest generation programmable technology, the M6100 Broadcast Satellite Modulator is a future-proof building block that lets any satellite network evolve to the next level of capabilities. A scalable, pay-as-you-grow, licensing and software upgrade mechanism facilitates the launch of new services, or last minute network design changes, without rebuilding the entire network infrastructure. Migration from ASI to GbE and IF to L-band or upgrade to the new DVB-S2X standard or Newtec S2 Extensions is facilitated by simple in-field installation of license keys.

The brand new DVB-CID carrier identifier is already available as a software option on the M6100 and DSNG profiles as defined by WBU-ISOG can be easily selected. These profiles define the basic parameters for the most common use cases including the new DVB-S2X standard.

Newtec's Next Generation Broadcast Satellite Modulator is not just a modulator. It's a platform that takes a vital role in your networks, performs the best on the market and helps you evolve your business through ongoing market and technology innovations.

# SPECIFICATIONS

## Key Features

- Baud rate range: 50 kbaud – 72 Mbaud
- Data rates up to 425 Mbit/s (in multi-stream mode)
- Data rates up to 216 Mbit/s (in single stream mode)
- IF (70/140) and L-Band (950-2150) high power outputs
- Highest system reliability and service uptime through robust design and industry leading redundancy solutions
  - Exceptional jitter recovery on TS over IP inputs with SMPTE 2022 FEC
  - Redundant optional (mechanical or optical) ASI or GbE interfaces in single stream mode
  - Redundant optional ASI interfaces for up to 3 TS input streams
  - Redundancy with main TS over ASI and back-up TS over IP input
  - Built-in TS Analyser with PCR jitter measurements
  - RFI reduction using optional DVB RF Carrier ID (DVB-CID) and NIT table CID (default)
  - Automatic TS rate adaptation
  - L-band monitoring output
  - Market leading RF purity and performance
  - Programmable amplitude slope equalizer
  - PRBS generator for link performance tests
  - Optional high stability internal clock reference
  - Optional dual AC power supply
- Low Total Cost of Ownership as a result of very high bandwidth efficiency technology options, and ease of monitoring and control
  - DVB-S2X, DVB-S2, DVB-DSNG and DVB-S compliant
  - Newtec S2 Extensions
  - QPSK, 8PSK, 16APSK, 32APSK, 64APSK, 128APSK and 256APSK
  - Clean Channel Technology® provides up to 15% bandwidth efficiency gains on top of the DVB-S2 standard
  - Optional automated Equalink® 2.0 Pre-distortion provides up to 10% bandwidth gains, higher QoS and geographic coverage
  - Multistream CCM or VCM mode with ISSY
  - Secure front panel, SNMP, HTTP and CLI interfaces
  - Selection of DSNG profiles acc. WBU-ISOG including the new DVB-S2X standard
- Future-proof design combining video and IP multi-service capabilities, supports transport of today's and tomorrow's services
  - Multistream transmission of up to 6 Transport Streams on GbE (TSoverIP) or optional ASI interfaces (on R1.4 and later hardware only)
- Optional built-in support for opportunistic data insertion up to 40Mbps, interoperable with IRD's that support Multi Protocol Encapsulation (MPE)
- Supports SFN Networks using transparent TS pass-through
- Optional BISS Content protection
- External reference input
- Optional 10 MHz reference output
- Easy integration with industry leading management systems (EMS/NMS/OSS)
- Feature-based pricing and software upgrades
- Pay-as-you-grow flexible licensing scheme

## Applications

- Broadcast Direct-to-home (DTH)
- Broadcast Primary Distribution
- Broadcast Contribution
- Upgrade of Distribution networks towards Newtec S2 Extensions or DVB-S2X

### 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.

## Related Products

**MDM6100** Broadcast Satellite Modem (works together with M6100 to perform automated Equalink®)

**FRC07x0** Frequency converters portfolio

**USS0212** 1+1 Modulator Redundancy Switch

**USS0202** Universal Switching System

## Related Bandwidth Efficiency Technologies

Clean Channel Technology®

Fully Automated Equalink®

Newtec S2 Extensions and DVB-S2X



## Data interfaces

### ASI INTERFACE (OPTIONAL)

#### Single stream mode

- 2 selectable ASI inputs on BNC (F) - 75 ohms (coax) or optical SC connectors
- 2 x ASI output (loop through) on BNC (F) - 75 ohms (coax)
- 188 or 204 byte mode
- Rate adapter
- MPTS or SPTS according to ISO/IEC 13818

#### Multi stream mode (on R1.4 and later hardware only)

- 6 BNC(F) - 75 ohms (coax) connectors individually configurable as input or monitoring output or as 3 redundant TS inputs with auto switching
- 188 or 204 byte mode
- Rate adapter
- MPTS or SPTS according to ISO/IEC 13818

### ETH INTERFACE

- Auto switching 10/100/1000 Base-T Ethernet interface
- Transport stream over IP interface (UDP/RTP)
  - Forward Error Correction SMPTE 2022-1 and -2
  - 188 or 204 byte mode
  - Rate adapter
  - MPTS or SPTS according to ISO/IEC 13818
  - Single stream or Multi stream mode
  - Multi stream mode on R1.4 and later hardware only

## Content Encryption and Protection

### BISS ENCRYPTION

- Support for BISS-0, BISS-1 and BISS-E
- On one single TS (SPTS or MPTS)

## IP Encapsulation

- MPE Encapsulation of IP frames in 1 transport stream
- Max 40 Mbit/s

## Modulation

### SUPPORTED MODULATION SCHEMES AND FEC

- DVB-S  
Outer/Inner FEC: Reed Solomon / Viterbi  
MODCODs:  
QPSK: 1/2, 2/3, 3/4, 5/6, 7/8
- DVB-DSNG  
Outer/Inner FEC: Reed Solomon / Viterbi  
MODCODs:  
8PSK: 2/3, 5/6  
16QAM 3/4, 7/8
- DVB-S2 (acc. ETSI EN 302 307 v1.2.1)  
Outer/Inner FEC: BCH/LDPC  
52 MODCODs (short & normal frames):  
QPSK: from 1/4 to 9/10  
8PSK: from 3/5 to 9/10  
16APSK: from 2/3 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
- 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  
8PSK: from 3/5 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
- Support of DVB-S2 VCM mode

### BAUD RATE RANGE

- DVB-S2, DVB-S2X & Newtec  
S2 Extensions 50kbaud - 72 Mbaud
- DVB-S 50kbaud - 72 Mbaud

### FRAME LENGTH

- DVB-S 188 bytes
- DVB-S2, DVB-S2X & Newtec S2 Extensions  
Short Frames 16200 bits
- DVB-S2, DVB-S2X & Newtec S2 Extensions  
Normal Frames 64800 bits

### CLEAN CHANNEL TECHNOLOGY®

- Roll-off : 5% -10% -15% -20% - 25% - 35%
- Optimum carrier spacing
- Advanced filter technology

### AUTOMATED EQUALINK® 2.0

- Predistortion for all MODCODs

### CARRIER INTERFERENCE REDUCTION

- DVB RF Carrier ID (DVB-CID)
  - Spread Spectrum Modulator (BPSK)
  - Supports User Data
  - Compliant to ETSI 103 129 v1.1.1 (2013-05)
- Carrier ID NIT Table

## Modulation interfaces

### L-BAND (CONFIGURATION OPTION)

- Connector N(F), 50 Ohms (optional SMA adapter)
- Frequency 950 - 2150 MHz (10 Hz steps)
- Level -35/+7 dBm (+/- 2dB)
- Return loss > 14 dB
- Switchable 10MHz Reference
- Spurious performance  
Better than - 65 dBc/4kHz @ +5 dBm output level and > 256kbaud  
Non-signal related: < - 80 dBc @ +5 dBm output

### IF-BAND (CONFIGURATION OPTION)

- Connector BNC (F) - 75 ohms (intermateable with 50 ohms)
- Frequency 50 - 180 MHz (10 Hz steps)
- Level -35/+10 dBm (± 2 dB)
- Return loss 50 ohms : > 14 dB  
75 ohms : > 20 dB
- Spurious performance  
Better than - 65 dBc/4kHz @ +5 dBm output level and > 256kbaud  
Non-signal related: < - 80 dBc @ +5 dBm output

### L-BAND MONITORING

- Connector SMA (F), 50 ohms
- Frequency Same as L-Band output frequency or 1050 MHz in case of IF output option only
- Level -45 dBm
- Return loss > 10 dB

### 10 MHZ REFERENCE INPUT

- Connector BNC (F), 50 ohms
- Input level -3 dBm up to +7dBm
- Frequencies 1,2,5,10,20 MHz

### 10 MHZ REFERENCE OUTPUT (OPTIONAL)

- Connector BNC (F), 50 ohms
- Output level +3 dBm (+/- 2dB)

### BUC POWER (OPTIONAL)

- Max. current: 3.8A
- Voltage: 24V,48V (Software controlled)

## 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/10year

## Generic

### MONITOR AND CONTROL INTERFACES

- Web server GUI (HTTP) via web browser
- M&C connectivity via separate Ethernet links
- Diagnostics report, alarm log (HTTP)
- SNMP v2c

### ALARM INTERFACE

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

## Physical

- Height 1RU, width: 19", depth 51 cm, 5.8 kg
- Power supply:  
90-130 & 180-260 Vac, 125 VA, 47-63 Hz
- Temperature:  
Operational: 0°C to +50°C / +32°F to +122°F  
Storage: -40° to +70°C / -40°F to +158°F
- Humidity: 5% to 85% non-condensing
- CE label and UL

Newtec M6100 Broadcast Satellite Modulator		Ordering n°
<b>Configuration Options Category</b>		<b>M6100</b>
		Select 1 option
Hardware Platform	Chassis Type 01 (Modulator)	CH-01
		Select 1 option
Operating Software	M6100/MDM6100 Major Software R2*	MS-20
		Select 1 option
Mains Power Supply Unit	PSU Single AC 110/240V	PS-00
	PSU Dual Redundant AC 110/240V**	PS-01
		Select 1 option
Video Package	Video TS, Carrier-ID(NIT), TS Analyser*	VP-01
		Select 1 option
Video Interface	Gb TSolP, SMPTE-2022 FEC (req. VP-01)*	VI-01
	ASI (6 connectors) (req. VP-01)	AS-02
	ASI(2) + Optical ASI(2) (req. VP-01)	AO-01
	GbE TSolP + ASI(6) (req. VP-01)	VI-02
	GbE TSolP + Optical ASI(2) (req. VP-01)	VI-03
		Select 1 option
Modulator Output Interface	L-band with switchable 10MHz output*	OU-00
	IF (50-180 MHz)*	OU-01
	IF+ L-band with switchable 10 MHz out*	OU-02
	L-band + 10MHz output + 24/48V BUC**	OU-05
		Select 1 option
Modulation Standard and Coding (includes multistream support)	DVB-S Q/8PSK*	SC-01
	DVB-S/S2 QPSK*	SC-02
	DVB-S/S2 Q/8PSK*	SC-03
	DVB-S/S2 Q/8PSK 16QAM 16APSK*	SC-04
	DVB-S/S2 Q/8PSK 16QAM 16/32APSK*	SC-05
	DVB-S/S2/Ext Q/8PSK*	SC-06
	DVB-S/S2/Ext Q/8PSK 16QAM 16APSK*	SC-07
	DVB-S/S2/Ext Q/8PSK 16QAM 16/32APSK*	SC-08
	DVB-S/S2/Ext Q/8PSK 16QAM 16/32/64APSK*	SC-09
	DVB-S/S2/S2X Q/8PSK*	SC-10
	DVB-S/S2/S2X Q/8PSK 16QAM 16APSK*	SC-11
	DVB-S/S2/S2X Q/8PSK 16QAM 16/32APSK*	SC-12
	DVB-S/S2/S2X Q/8PSK 16QAM 16/32/64/128/256*	SC-13
		Select 1 option
Modulation Maximum Symbol Rates	Modulation Symbol Rate 5Mbaud*	SR-05
	Modulation Symbol Rate 15Mbaud*	SR-15
	Modulation Symbol Rate 36Mbaud*	SR-36
	Modulation Symbol Rate 54Mbaud*	SR-54
	Modulation Symbol Rate 72Mbaud*	SR-72
		Select 1 option
Internal Reference Clock	Standard 10MHz	IR-00
	Very High Stability 10MHz	IR-02
<b>Additional Options Category</b>		
		Max. 1 option per category
Reference Clock Output	10 MHz Reference Output (BNC)	RO-01
		Max. 1 option per category
Modulator Output Connector	L-Band output N to SMA output adapter	OU-10
		Max. 1 option per category
Clean Channel Technology®	Clean Channel Technology for 5Mbaud*	CC-05
	Clean Channel Technology for 15Mbaud*	CC-15
	Clean Channel Technology for 36Mbaud*	CC-36
	Clean Channel Technology for 54Mbaud*	CC-54
	Clean Channel Technology for 72Mbaud*	CC-72
		Max. 1 option per category
Pre-Distortion	Automated Equalink® *	AE-01
		Max. 1 option per category
DVB Carrier Identifier	DVB RF Carrier Identifier*	ID-01
		Max. 1 option per category
MPE Insertion	MPE Data insertion in TS (req. VP-01)*	VM-01
		Max. 1 option per category
Encryption	BISS (0-1-E) Single TS (Req. VP-01)*	CA-01
<b>Services Category</b>		
		Max. 1 option per category
Support	Care Pack 3 Basic	GA-08
	Care Pack 3 Enhanced	GA-09

(\*) Selectable via license key  
 (\*\*) Dual PSU option PS-01 cannot be combined with OU-05 nor OU-06  
 Contact your sales representative for details (sales@newtec.eu).

This brochure is provided for information purposes only. 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.

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Shaping the Future of Satellite Communications

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