

EL178

High Speed IP Satellite Modulator

Elevation Product Family

ELEVATION

Description

The EL178 is a state-of-the-art satellite modulator optimized for high speed IP applications over satellite in compliance with the DVB-S2 standard. As a real IP product, this modulator performs IP processing functions such as packet filtering, routing and encapsulation. In order to achieve speeds up to 160 Mbit/s, only the fastest and most bandwidth-efficient encapsulation and modulation parameters are supported.

For point-to-point backbone links, the EL178 can be used in conjunction with the high speed IP satellite demodulator EL978. In star networks, such as the configuration used in IP trunking and government, the EL178 can be used in conjunction with the high speed modem EL478 in each of the remote sites.

The EL178 offers a dual auto-switching Gigabit Ethernet interface and integrates seamlessly with terrestrial IP networks and equipment. The incoming IP packets can be filtered using e.g. VLAN or MAC addresses, transmitted transparently (bridging) or routed to several destination addresses using Newtec's Extended Performance (XPE) Encapsulation.

The EL178 supports the DVB-S2 Multistream mode, allowing the IP traffic to be divided in several streams, each stream being transmitted with its own identifier. When the Variable Coding and Modulation (VCM) mode is activated, each stream can be transmitted with its own set of modulation parameters, further optimizing the transmission efficiency when different streams are intended to different receiving sites.

For maximum bandwidth efficiency, the EL178 can also be used in Adaptive Coding and Modulation (ACM) mode, modifying the modulation parameters dynamically in function of the link conditions. The modulator incorporates the renowned FlexACM[®] technology which fully optimizes the satellite link at optimal availability.

To protect the satellite transmission, the AES encryption option can be activated. AES allows to scramble the content of DVB-S2 streams with a high security level. The AES technology ensures the continuity of service without transmission outages or data losses when encryption keys are changed.

At the output of the modulator, the signal is available on an L-band interface. Extended L-band, IF-band as well as BUC power supply and reference frequency are available as configuration options, providing a compact and cost effective solution.

When activated, the unique linear and non-linear predistortion option Equalink[™] provides an additional link margin improvement of up to 2dB, truly unleashing the full efficiency of higher modulation schemes such as 16 and 32 APSK.

Clean Channel Technology[™] is available on the EL178 High Speed IP modulator as an option. Clean Channel Technology[™] further improves satellite efficiency by up to 15% compared to the current DVB-S2 standard. Newtec's customers will be able to immediately benefit from Clean Channel Technology, as it is available as a software field upgrade for existing Newtec equipment.

Key features

- DVB-S2 compliant
- QPSK, 8PSK, 16APSK and 32APSK
- Data rates up to 160 Mbit/s
- XPE encapsulation
- L-band monitoring output
- Programmable amplitude slope equalizer
- Optional extended L-band
- Optional 10 MHz reference input/output
- Optional switchable BUC power supply on L-band output
- Optional Linear and non-linear predistortion (Equalink[™])
- DVB-S2 Multistream,
- Optional VCM and ACM operation (FlexACM)
- Optional AES encryption
- Optional Clean Channel Technology[™]

Main advantages

- Enables high speed IP links over satellite
- Lower operational costs thanks to highest bandwidth efficiency
- Easy integration with terrestrial IP networks and routers
- High versatility and flexibility
- Secure and encrypted satellite transmissions
- Fit for operations over Inclined Orbit Satellites

Applications

- Backbone / Leased line in the sky
- IP trunking for ISP's
- IP Backhauling & WiMax
- Disaster recovery
- Government and Defence networks

Related products

EL170 IP satellite modulator
EL470 IP satellite modem
EL478 High speed IP satellite modem
EL940 IP satellite receiver
EL970 IP satellite demodulator
EL978 High speed IP satellite demodulator
EL501 Elevation IP Hub
EL8xx Protocol Enhancement Proxy IP appliances

AZ7x0 Frequency converters
AZ210 1+1 Modulator Redundancy Switch
AZ2xx Universal Switching System

Related Documents

White paper Equalink[™]
White paper optimization of satellite capacity
Care Pack Brochure
Reference cases
Application notes



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Specifications – EL178 (R9)



Input interface

- Auto switching 10/100/1000 Base-T Ethernet interface
- Maximum rate: 160 Mbit/s or 78,000 packets per second
- Layer 2 bridge mode: Ethernet frames over satellite
- Layer 3 bridge or router mode: IP packets over satellite
- Encapsulation: Extended Performance Encapsulation (XPE) -Newtec's highly efficient encapsulation protocol for the encapsulation of Ethernet/IP frames in DVB-S2 Base-Band frames
- Filtering and routing capabilities:
 - Up to 32 VLAN filters
 - Up to 255 MAC filters
 - Up to 255 IP routes/air-MAC addresses
 - Up to 16 DVB-S2 Streams
- Proxy ARP support
- DVB-S2 Multistream
- AES 64 bit encryption

Modulation

Supported modulation schemes and FEC

- DVB-S2:
 - Outer/Inner FEC: BCH/ LDPC
 - MODCODS:
 - QPSK: 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
- VCM support (optional)
- Embedded point-to-point FlexACM controller (optional)

Baud rate range

- DVB-S2
 - QPSK/8PSK/16APSK/32APSK 0,05 – 45 Mbaud

Frame length

- DVB-S2 Normal Frames 64800 bits

Roll-off factor

- 20 % - 25 % - 35 %

Clean Channel Technology™

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

Output interfaces

L-band output (default):

- Connector SMA (F), 50 ohms
- Return loss > 14 dB
- Level -35/+5 dBm (+/- 2dB)
- Frequency 950 - 1750 MHz (50 Hz steps)
- spurious: better than -65 dBc/4 kHz @ +5 dBm level and > 256 kbaud

Extended L-band output (optional)

- Connector SMA (F), 50 ohms
- Return loss > 14 dB
- Level -35/+5 dBm (+/- 2dB)
- Frequency 950 - 2150 MHz (50 Hz steps)
- spurious: better than -65 dBc/4 kHz @ +5 dBm level and > 256 kbaud

IF-band (optional):

- Connector BNC (F) - 75 ohms (intermateable with 50 ohms)
- Return loss
 - 50 ohms : > 14 dB
 - 75 ohms : > 20 dB
- Level -30/+5 dBm (± 3 dB)
- Frequency 50 - 180 MHz (50 Hz steps)
- spurious: better than -65 dBc/4 kHz @ -10 dBm level and > 256 kbaud

L-band+IF (optional)

- L-band: -30/+0 dBm (+/- 3dB) output level
- IF: fixed 70 or 140 MHz frequency
- spurious: -34/+1 dBm (+/- 3 dB) output level better than -65 dBc/4 kHz @ -10 dBm level and > 256 kbaud

L-band monitoring output (default):

- Connector SMA (F), 50 ohms
- Return loss > 7 dB
- Level -45 dBm
- Frequency default: identical to L-band output, with options AA-02 / AA-06: 1080 MHz

BUC power and reference frequency (optional)

- max. current 3 A
- voltage 24V, 48V
- frequency 10MHz
- stability $\pm 5 \times 10^{-8}$ over 0°C to 65°C

With this option installed, the L-band output connectors become N(F), 50 ohms

10 MHz reference input / output (optional)

- Connector BNC (F) – 50 ohms
- Input level -3dBm up to 7dBm
- Output level +7dBm

Internal Reference frequency

High Stability (optional)

- Stability $\pm 5 \times 10^{-8}$ over 0°C to 70°C
- Ageing: ± 15 ppb/day
- ± 300 ppb/year

Very High Stability (optional)

- Stability $\pm 2 \times 10^{-9}$ over 0°C to 65°C
- Ageing: ± 0.5 ppb/day
- ± 500 ppb/10 year

Generic

Monitor and control interfaces

- Web based GUI
- Diagnostics report, alarm log
- RMCP over TCP-IP/UDP and RS232/RS485
- SNMP v2c

Alarm interface

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

Physical

- 1RU, width: 19", depth 51 cm, 6 kg
- Power supply: 90-130 & 180-260 Vac, 105 VA, 47-63 Hz
- Temperature
 - Operational: 0°C to 40°C
 - Storage: -40 to +70°C
- Humidity: 5% to 85% non-condensing
- CE label

Ordering information

EL178 HIGH SPEED IP SATELLITE MODULATOR		Order n°
Default Configuration		
DVB-S2 IP modulator with GbE interface, QPSK, 8PSK, 16APSK 45Mbaud, 32APSK 33 Mbaud, XPE, CCM, Multistream, SNMP		EL178
Output interface: L-band 950-1750 MHz		
Configuration options		
Category		Max. 1 option per category
Output interface	L-band (950-1750 MHz)	Default
	IF (50-180 MHz)	AA-02
	L-band + 10MHz for BUC	AA-03
	L-band + 10MHz + 24Vdc for BUC	AA-12
	L-band + 10MHz + 48Vdc for BU	AA-13
	Extended L-band (950 - 2150 MHz)	AA-18
IF+ L-band	AA-06	
Additional options		
Category		Max. 1 option per category
10MHz reference In/Out	High stability : 1ppm	GR-01
	Very high stability : 0,01 ppm	GR-02
Encryption	AES 64 bit encryption	AG-01
Clean Channel Technology™	Clean Channel Technology for 45 Mbaud*	AI-04
Predistortion	Equalink *	AC-01
VCM/ACM	VCM*	AN-01
	VCM + Point-to-Point ACM controller	AR-02
Services		
Category		
Assistance	Care Pack Basic	GA-06
	Care Pack Extended	GA-07

(*): upgradeable via license key

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

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