

# EL978

## High Speed IP Satellite Demodulator

### Elevation Product Family

#### Description

The EL978 is a state-of-the-art satellite demodulator optimized for the reception of high speed IP applications over satellite in full compliance with the DVB-S2 standard. In order to achieve speeds up to 160 Mbit/s, only the fastest and most bandwidth-efficient encapsulation and modulation parameters are supported.

The EL978 can be used in high speed Point-to-Point backbone links or in star IP Trunking and Government configurations.

The EL978 offers a dual auto-switching Gigabit Ethernet interface and integrates seamlessly with terrestrial IP networks and equipment. The data received from the satellite must be encapsulated with Newtec's XPE (Extended Performance Encapsulation) protocol, a highly efficient system to transmit IP data in DVB-S2.

For maximum bandwidth efficiency, the optional FlexACM® client allows the EL978 to provide feedback on the link condition to an FlexACM controller located at the uplink site, so that the modulation parameters can be adapted automatically and dynamically.

The EL978 supports the DVB-S2 Multistream mode, allowing the IP traffic to be divided in several streams, each stream being received 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 types of receiving sites.

The EL978 has a dual L-band input. The active input is selected by the user and can provide DC power and frequency band selection signals compatible with most professional and commercial LNBS. Optionally, one L-band input can be replaced by an IF input.

The integrated Noise & Distortion Estimator tool provides an accurate reading of the satellite link margin even in presence of non-linear distortion and allows the user to find the optimum input back-off setting very easily for 16APSK or 32APSK operation, whether or not non-linear predistortion is applied.

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.

#### Key features

- DVB-S2 compliant
- QPSK, 8PSK, 16APSK and 32APSK
- Data rates up to 160 Mbit/s
- XPE encapsulation
- Multistream and VCM support
- Adaptive equaliser
- Optional ACM client (FlexACM®)
- Noise & Distortion Estimator (NoDE) tool
- Optional 10 MHz reference input/output

- Optional AES decryption
- Optional Clean Channel Technology™ inside

#### 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
- Government networks

#### Related products

EL170 IP satellite modulator  
 EL178 High speed IP satellite modulator  
 EL470 IP satellite modem  
 EL478 High speed IP satellite modem  
 EL940 IP satellite receiver  
 EL970 IP satellite demodulator

EL501 Elevation IP Hub  
 EL8xx Protocol Enhancement Proxy appliances  
 EL860 Shaper and Bandwidth Manager

AZ7x0 Frequency converters  
 AZ290 1+1 Demodulator Redundancy Switch  
 AZ2xx Universal Switching System

#### Related Documents

White paper optimization of satellite capacity  
 Care Pack Brochure  
 Reference cases  
 Application notes



SHAPING THE FUTURE OF SATELLITE COMMUNICATIONS

# Specifications – EL978<sup>(R9)</sup>



## Input interface

### Dual L-band input (default)

- Connector: 2 x F-type (F), 75 ohms
- Return loss: > 7 dB
- Level: -65/-25dBm
- Frequency: 950 - 2150 MHz
- Adjacent signal: < (Co+7) dBm/Hz where Co = signal level density

### IF-band input (optional, replaces one L-band input)

- Connector: BNC (F) - 75 ohms
- Return loss: > 15 dB
- Level: -55 to -15 dBm
- Frequency: 50 - 180 MHz
- Adjacent signal: < (Co+7) dBm/Hz where Co = signal level density

### LNB power and control (optional)

- max. current: 350 mA (on selected IFL input)
- voltage: 11,5 -14 V (Vertical polarization)  
16 -19 V (Horizontal polarization) & additional  
22 kHz +/- 4KHz (band selection according to universal LNB for Astra satellites & DiSEqC command transmission)
- 10 MHz reference

## Demodulation

### 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
- CCM, VCM and Multistream support
- FlexACM client (optional)

### Baud rate range

- QPSK/8PSK/16APSK: 0,256 – 45 Mbaud
- 32 APSK: 1 - 33 Mbaud

### Frame length

- DVB-S2 Normal Frames: 64 800 bit

### Roll-off factor

- 20 % - 25 % - 35 %

### Clean Channel Technology™

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

#### DVB-S2 performances at PER 1E-5

< 45 Mbaud		< 45 Mbaud	
Config	Normal Frames Es/No	Config	Normal Frames Es/No
QPSK-1/2	1.4	16APSK-2/3	9.6
QPSK-3/5	2.8	16APSK-3/4	10.5
QPSK-2/3	3.6	16APSK-4/5	11.5
QPSK-3/4	4.3	16APSK-5/6	12.1
QPSK-4/5	5.1	16APSK-8/9	13.3
QPSK-5/6	5.5	16APSK-9/10	13.6
QPSK-8/9	6.6	32APSK-3/4	13.6
QPSK-9/10	6.7	32APSK-4/5	14.5
8PSK-3/5	6.3	32APSK-5/6	14.9
8PSK-2/3	7.1	32APSK-8/9	16.1
8PSK-3/4	8.4	32APSK-9/10	16.5
8PSK-5/6	9.7		
8PSK-8/9	11.1		
8PSK-9/10	11.3		

## Output 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
- Data filtering: - 16 ISI/AirMAC filters
- AES 64 bit decryption

## Internal Reference frequency

### High Stability (optional)

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

### Very High Stability (optional)

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

## Generic

### 10 MHz reference input / output (optional)

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

### LNB reference frequency output (optional, only available with L-band)

- Frequency: 10 MHz
- stability: +/- 5x10-8 over 0°C to 65°C
- warm up time: 5 min (+/-100ppb)
- ageing: +/- 15 ppb/day  
+/- 300 ppb/year

### 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

EL978 HIGH SPEED IP SATELLITE DEMODULATOR		Order n°
<b>Default Configuration</b>		
DVB-S2 IP demodulator with GbE interface, QPSK, 8PSK, 16APSK 45Mbaud, 32APSK 33 Mbaud, XPE Multistream decapsulator, VCM, SNMP Input interface: L-band (950 - 2150 MHz)		EL978
<b>Configuration options</b>		
Category Max. 1 option per category		
Input Interface	L-band	Default
	L-band + 10MHz	AJ-02
	IF+ L-band	AJ-03
	IF + L-band + 10MHz	AJ-04
<b>Additional options</b>		
Category Max. 1 option per category		
10MHz reference In/Out	High stability : 1 ppm	GR-01
	Very high stability : 0,01 ppm	GR-02
Decryption	AES 64 bit decryption	AA-01
ACM	FlexACM client *	AR-04
<b>Services</b>		
Category		
Assistance	Care Pack Basic	GA-06
	Care Pack Extended	GA-07

(\*) upgradeable via license key

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

Request A Quote