

EL478

High Speed IP Satellite Modem

Elevation Product Family

Description

The EL478 is a state-of-the-art satellite modem optimized for high speed IP applications over satellite in compliance with the DVB-S2 standard. As a real IP product, this modem 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.

The EL478 offers an auto-switching Gigabit Ethernet interface to transmit and receive simultaneously IP packets (or Ethernet frames) over satellite. The modem integrates seamlessly with terrestrial IP networks and equipment. Incoming IP packets can be filtered using VLAN or MAC addresses, transmitted transparently (bridging) or routed to several destination addresses using Newtec's Extended Performance (XPE) encapsulation.

The EL478 is capable of receiving DVB-S2 Multistream, VCM or ACM signals and can optionally transmit in VCM mode. For maximum bandwidth efficiency an ease of operation, the EL478 has an embedded point-to-point FlexACM controller option that allows to automatically and dynamically adapt its uplink modulation parameters in function of the link condition. The FlexACM client option provides the modulator/modem on the other side of the satellite link with feedback on the conditions of the received signal. When two modems both equipped with the FlexACM controller and client options are connected to each other, they negotiate automatically and dynamically their configuration parameters in both directions.

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.

On the receive side, the EL478 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. An adaptive equalizer compensates linear distortion of the transmission channel and the integrated Noise & Distortion Estimator (NoDE) 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.

Key features

- DVB-S2 compliant
- QPSK, 8PSK, 16APSK and 32APSK
- XPE encapsulation
- Data rates up to 160 Mbit/s

- L-band monitoring output
- Programmable amplitude slope equalizer
- Noise & Distortion Estimator (NoDE) tool
- Multistream, VCM and ACM reception
- Optional Extended L-band
- Optional embedded point-to-point FlexACM controller and/or client (FlexACM)
- Optional 10 MHz reference input/output
- Optional Linear and non-linear predistortion (Equalink™)
- Featured-based pricing and software upgradability

Main advantages

- Enables high speed IP links over satellite
- Lower operational costs thanks to highest bandwidth efficiency
- Integrated hardware and software offering for end-to-end solution
- High compactness
- High versatility and flexibility

Applications

- Backbone / Leased line in the sky
- IP trunking for ISP's, WiMax
- Corporate networking

Related products

EL170 IP satellite modulator
 EL178 High speed IP satellite modulator
 EL470 IP satellite modem
 EL940 IP satellite receiver
 EL970 IP satellite demodulator
 EL978 High speed IP satellite demodulator

EL8xx Protocol Enhancement Proxy IP appliances
 EL860 ACM Controller, Shaper and Encapsulator (CSE)

AZ7x0 Frequency converters

AZ200 Universal Switching System

Related Documents

White paper Equalink™
 White paper optimization of satellite capacity
 Care Pack Brochure
 Reference cases



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Input/output interface

- Auto switching 10/100/1000 Base-T Ethernet interface
- Maximum rates: 160 Mbit/s in each direction, or 78,000 packets per second Tx + Rx
- 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 (uplink)
 - Up to 32 VLAN filters
 - Up to 255 MAC filters
 - Up to 255 IP routes/air-MAC addresses
 - Up to 16 DVB-S2 Streams
- Data filtering (downlink):
 - up to 32 streams
 - one air MAC address filter per stream
- Proxy ARP support
- Base Band Frame Input/Output (optional)

Modulation and demodulation

Supported modulation schemes and FEC

- DVB-S2: Outer/Inner FEC: BCH/ LDPC
- MDCODS:
 - 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
- Embedded point-to-point FlexACM controller (optional)
- Support of DVB-S2 VCM mode (demod)
- FlexACM client (optional)

Baud rate range

- DVB-S2
 - QPSK/8PSK/16APSK 0,256 – 45 Mbaud
 - 32APSK 1 – 33 Mbaud

Frame length

- DVB-S2 Normal Frames 64800 bits

Roll-off factor

- 20 % - 25 % - 35 %

Modulator 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 Ohm (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 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: 1080 MHz

BUc power and reference frequency (optional)

- max. current 1,5 A
- voltage 24V
- frequency 10MHz
- stability ±5x10-8 over 0°C to 65°C

10 MHz reference input / output (optional)

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

Demodulator interfaces

Dual L-band input (default)

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

LNB power and control

- 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)

DVB-S2 performances at PER 1E-5

Config	Normal Frames		Config	Normal Frames	
	< 45 Mbaud	Es/No		< 45 Mbaud	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				

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

EL478 HIGH SPEED IP SATELLITE MODEM		Order n°
Default Configuration		
DVB-S2 IP modem with GbE interface, QPSK, 8PSK, 16APSK 45Mbaud, 32APSK 33 Mbaud, XPE encapsulator, CCM, Multistream, L-Band (950-2150 MHz) demod input, SNMP Output interface Modulator: L-band (950 - 1750 MHz)		EL478
Configuration options		
Category	Max. 1 option per category	
Modulator Output Interface	L-band (950-1750 MHz)	Default
	IF (50-180 MHz)	AA-02
	Extended L-band (950-2150 MHz)	AA-18
	L-band + 10MHz for BUC	AA-03
Demodulator Input Interfaces	L-band + 10MHz + 24Vdc for BUC	AA-04
	dual L-band	Default
	IF+L-band (Only with IF Mod Output)	AJ-03
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
Predistortion	Equalink *	AC-01
ACM (Rx)	FlexACM client*	AR-04
	Base Band Frame input/output*	AR-01
VCM/ACM (Tx)	VCM + Point-to-Point FlexACM controller*	AR-03
Services		
Category		
Assistance	Care Pack Basic	GA-06
	Care Pack Extended	GA-07

(*) upgradeable via license key
Other configurations and options are available upon request.
Contact your sales representative for details (sales@newtec.eu)