

EL470

IP Satellite Modem

Elevation Product Family

ELEVATION

Description

The EL470 is a state-of-the-art satellite modem designed for the transmission and reception of IP streams over satellite at rates of up to 133 Mbit/s in full compliance with the DVB standards. The EL470 modem connects directly to terrestrial IP network infrastructures via a single auto-switching Gigabit Ethernet interface

The EL470 comes with several hardware and software options and can be used in Point-to-Point links as well as in Point-to-Multi Point networks. It is compatible with a wide range of encapsulation protocols: data piping, MPE, ULE and Newtec's XPE (Extended Performance Encapsulation). The EL470 is capable of receiving DVB-S2 Multistream and VCM signals and can optionally transmit in VCM mode. For maximum bandwidth efficiency an ease of operation, the EL470 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.

The EL470 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 (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 and DVB-DSNG/S compliant
- QPSK, 8PSK, 16APSK and 32APSK
- XPE, ULE, MPE, data piping encapsulation
- Data rates up to 133 Mbit/s in each direction
- Adaptive equaliser (demodulator input)
- L-band monitoring output
- Programmable amplitude slope equalizer (L-band output)
- Noise & Distortion Estimator (NoDE) tool
- DVB-S2 Multistream
- Optional extended L-band

- Optional VCM and ACM operation
- Optional embedded point-to-point ACM controller and ACM client (FlexACM)
- Optional 10 MHz reference input/output
- Optional Linear and non-linear predistortion (Equalink™)
- Featured-based pricing and software upgradability

Main advantages

- Lower operational costs thanks to highest bandwidth efficiency
- Highest bandwidth efficiency through the most efficient IP encapsulation protocols.
- Integrated hardware and software offering for end-to-end solution
- High compactness
- High versatility and flexibility

Applications

- Corporate networks
- Backhauling for cellular networks
- IP trunking backbone

Related products

EL170 IP satellite modulator
EL178 High speed IP satellite modulator
EL478 High speed IP satellite modem
EL940 IP satellite receiver
EL970 IP satellite demodulator
EL978 High speed IP satellite demodulator

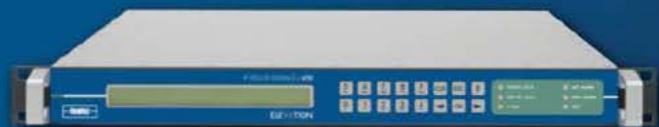
EL8xx Protocol Enhancement Proxy IP appliances

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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Specifications - EL470^(R7)



Input/output interface

- Auto switching 10/100/1000 Base-T Ethernet interface
- Maximum rate: 133 Mbit/s in each direction, or 200 Mbit/s Tx+Rx or 67,000 packets per second Tx + Rx
- Layer 2 bridge mode: Ethernet frames over satellite
- Layer 3 bridge or router mode: IP packets over satellite
- Supported encapsulation modes:
 - Data piping
 - Ultra Lightweight Encapsulation (ULE)
 - Multi Protocol Encapsulation (MPE):
 - 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 256 PIDs
 - Up to 16 DVB-S2 Streams
- Data filtering (downlink):
 - up to 32 streams in DVB-S2 Multistream
 - up to 32 configurable PID filters
 - one air MAC address filter per PID or stream
- Proxy ARP support
- Base Band Frame Input/Output (Optional)

Modulation and demodulation

Supported modulation schemes and FEC

- DVB-S/DSNG: Outer/Inner FEC: Reed Solomon / Viterbi
 - MODCODS:
 - QPSK: 1/2, 2/3, 3/4, 5/6, 7/8
 - 8PSK: 2/3, 5/6, 8/9
 - 16QAM: 3/4, 7/8
- DVB-S2: 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
- Embedded point-to-point FlexACM controller (optional)
- Support of DVB-S2 VCM mode (demod)
- FlexACM client (optional)

Baud rate range

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

Frame length

- DVB-S2 Short Frames 16200 bits
- DVB-S2 Normal Frames 64800 bits
- DVB-S/DSNG 188 bytes

Roll-off factor

- 20% - 25% - 35%

Modulator interface

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 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 interface

Dual L-band Input

- 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 (75 ohms - BNC(F))
- 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	Short Frames		Normal Frames	
	Es/No	Eb/No	Es/No	Eb/No
QPSK 1/3	-0,6	-0,7	-	-
QPSK 2/5	0,4	0,2	-	-
QPSK 1/2	1	1,4	-	-
QPSK 3/5	3,1	2,8	-	-
QPSK 2/3	3,8	3,6	-	-
QPSK 3/4	4,5	4,3	-	-
QPSK 4/5	5,1	5,1	-	-
QPSK 5/6	5,8	5,5	-	-
QPSK 8/9	6,7	6,6	-	-
QPSK 9/10	-	6,7	-	-
8PSK 3/5	6,5	6,3	-	-
8PSK 2/3	7,4	7,1	-	-
8PSK 3/4	8,6	8,4	-	-
8PSK 5/6	10,2	9,7	-	-
8PSK 8/9	11,4	11,1	-	-
8PSK 9/10	-	11,3	-	-
16APSK 2/3	9,9	9,6	-	-
16APSK 3/4	10,9	10,5	-	-
16APSK 4/5	11,6	11,5	-	-
16APSK 5/6	12,4	12,1	-	-
16APSK 8/9	13,6	13,3	-	-
16APSK 9/10	-	13,6	-	-
32APSK 3/4	-	13,6	-	-
32APSK 4/5	-	14,5	-	-
32APSK 5/6	-	14,9	-	-
32APSK 8/9	-	16,1	-	-
32APSK 9/10	-	16,5	-	-

DVB DSNG/S performances at BER 1E-7 after RS

Config	< 20 Mbaud		> 20 Mbaud	
	Eb/No	Eb/No	Eb/No	Eb/No
QPSK 1/2	3,9	3,9	4,4	4,5
QPSK 2/3	4,4	4,5	5,1	5,1
QPSK 3/4	4,9	5,1	5,4	5,8
QPSK 5/6	5,4	5,8	6,4	6,4
8PSK 2/3	6,3	6,5	8,3	8,8
8PSK 5/6	8,3	8,8	8,8	9,8
8PSK 8/9	8,8	9,8	8,4	8,6
16QAM - 3/4	8,4	8,6	10,1	11,1
16 QAM-7/8	10,1	11,1	-	-

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

- 1 RU, 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

EL470 IP SATELLITE MODEM		Order n°
Default Configuration		
DVB-S/DVB-DSNG/DVB-S2 IP modem with GbE interface, data piping, MPE, ULE and XPE encapsulator, Multistream CCM, L-band (950 - 2150 MHz) demod input, SNMP Output interface Modulator: L-band (950 - 1750 MHz) Modulation & Baud rate modulator: QPSK-8PSK 5Mbaud Modulation & Baud rate demodulator: QPSK-8PSK 33Mbaud		EL470
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 Interface	L-band + 10MHz + 24Vdc for BUC	AA-04
	dual L-band	Default
Modulation & Baud rate	IF + L-band (only with IF Mod Output)	AJ-03
	QPSK-8PSK 5Mbaud	Default
	QPSK-8PSK 15Mbaud *	AB-06
	QPSK-8PSK 33Mbaud *	AB-07
	QPSK-8PSK 45Mbaud *	AB-08
	QPSK- 8PSK-16QAM-16APSK 5Mbaud *	AB-09
Demodulation & Baud rate	QPSK- 8PSK-16QAM-16APSK 15Mbaud *	AB-10
	QPSK- 8PSK-16QAM-16APSK 33Mbaud *	AB-11
	Q/8PSK-16QAM-16APSK-32APSK 5Mbaud*	AB-13
	Q/8PSK-16QAM-16APSK-32APSK 15Mbaud*	AB-14
	Q/8PSK-16QAM-16APSK-32 APSP 33Mbaud *	AB-15
	QPSK-8PSK 33Mbaud	Default
Additional options	QPSK-8PSK 45Mbaud *	AL-08
	QPSK- 8PSK-16QAM-16APSK 33Mbaud *	AL-11
	Q/8PSK-16QAM-16APSK 45Mbaud 32APSK 33Mbaud *	AL-16
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
VCM/ACM (Tx)	Base Band Frame input/output*	AR-01
	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)