ZN461
LDPC Satellite Modem
Zenith Product Family

Zenith

Description

The Newtec ZN461 is the state-of-the-art LDPC satellite modem designed for low to medium rate IP applications over satellite. The modem typically addresses a large set of IP point-to-point or multi-point-to-point applications (e.g. enterprises, government and defense, DSNG, oil and gas, etc.) as from 1.2 kbps. As a default the ZN461 modem connects directly to terrestrial IP network infrastructures via serial connections or alternatively through an optional Ethernet interface.

The LDPC modem comes with several hardware and software options which allow the operator to carefully select the modem configuration that perfectly fits the application. By flexibly changing the settings the satellite link efficiency can be optimized to the full.

The ZN461 modem supports Viterbi, Reed Solomon and Turbo coding options next to the advanced LDPC coding (Low Density Parity Code). In addition a large selection of code rates and block sizes are available. The LDPC implementation in the ZN461 provides the industry's highest spectral efficiency and configuration flexibility to squeeze the most out of the satellite's available bandwidth and spectral power, while keeping processing latency at the desired level.

At the output of the modem the signal is available on a 70MHz IF-band interface by default. L-band, 140 MHz IF-band as well as an internal BUC power supply and reference frequency are available as configuration options, providing a compact and cost effective solution.

To further optimize the end-to-end performance of the ZN461 LDPC modem, standard functionality as Automatic Uplink Power Control (AUPC) and remote modem control can be multiplexed into the satellite carrier. The optional on board acceleration enhances TCP traffic over the link to boost throughput.

Key features

- Extended LDPC with wide range of block sizes
- BPSK/QPSK/OQPS/8PSK/8QAM/16QAM
- Data rates as from 1.2 kbps in both directions
- Compatible FEC: Viterbi, TCM, Reed Solomon, TPC
- Serial and 10/100 Base-T Ethernet interfaces
- Automatic Uplink Power Control (AUPC)
- Fastest acquisition time: 71 ms at 64 kbps QPSK
- Lowest latency: <15 ms at 64 kbps ¾ QPSK
- 10 MHz reference input/output
- Standard 70 MHz IF-band (50-90 MHz)
- Optional 140 MHz IF-band (100-180 MHz)
- Optional L-band (Tx: 950-1750 MHz) (Rx: 950-1900 MHz)
- Optional internal BUC and LNB power (24v & 48v)
- Optional on-board acceleration

Main advantages

- Lowest OPEX thanks to highest bandwidth efficiency
- Wide configuration flexibility
- OPEX meets CAPEX, Efficiency meets value at low rates
- Remote in-band management
- Compatible with other modem manufacturers
- Supports symmetric and asymmetric operations
- Smooth migration path towards efficient satellite networks
- High compactness
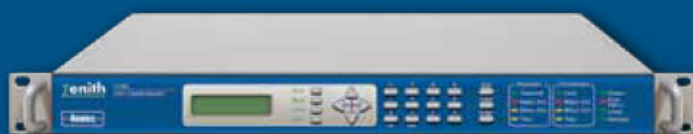- High versatility & flexibility

Applications

- IP Trunking
- Enterprise
- Oil & Gas
- Maritime
- Government & Defense
- Satellite News Gathering (SNG)
- IP based cellular backhaul
- Disaster Recovery
- Emergency Communications

Related products

AZ7x0 Frequency Converters

Related documents

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Newtec ZN461

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SHAPING THE FUTURE OF SATELLITE COMMUNICATIONS

Input/Output Interface

- Auto switching 10/100 Base-T Ethernet (option)
- Serial RS232, RS422, V.35, V.36, EIA-530(A)
- Data rate minimum: 1.2 kbps ½ BPSK
- Data rate maximum: 29.52 Mbps ¾ 8PSK
- Data rate selection: 1 bps increments
- Symbol rate range: 2.4 ksps to 14 Msps in 1 bps step sizes
- Layer 2 bridge mode
- Layer 2 VLAN support
- Layer 3 QoS Linux scripts
- Static IP routing for Unicast & Multicast

Modulation and Demodulation

Supported modulation schemes and FEC
- Modulation:
  BPSK, QPSK, OQPSK, 8PSK, 8QAM, 16QAM
- Turbo Product Code Modes:
  M5 Full, Short & Legacy, Comtech & Advanced
- Concatenated Reed Solomon:
  Selectable N&K, IESS 308/309/310 and CT Comp
- Reed Solomon Depth
  4, 8 and 16
- FEC and code rates

FEC	Code rates
Viterbi	1/2, ¾ , 5/6, 7/8 (k=7)
Trellis	2/3
TPC 4k	½, ¾, 7/8, 0.95, 21/44
TPC 16K	½, ¾, 7/8, 0.922, 0.453
LDPC (256 to 16k)	½, 2/3, ¾, 14/17, 7/8, 10/11, 16/17

- (De)Scrambler Types: IBS, V.35, IESS, TPC, RS, LDPC, EFD

Modulation interface

IF-band (70 MHz default) & (140 MHz option)
- Connector: BNC 75 or 50 Ohms selectable
- Return loss: 20 dB minimum
- Level: +5 to -35 dBm in 0.1 dB steps (max 3 dB at 50 Ohms)
- Frequency 70 MHz (default): 50 – 90 MHz
- Frequency 140 MHz (option): 100-180 MHz
- Frequency tuning: 1 Hz steps
- Spurious: better than -55 dBc/4 KHz, typical better than -65 dBc/4 KHz

L-band output (option)
- Connector: N-type 50 Ohms
- Return loss: 14 dB typical, 10 dB minimum
- Level: +5 to -35 dBm in 0.1 dB steps (max 3 dB at 50 Ohms)
- Frequency: 950-1750 MHz
- Frequency tuning: 1 Hz steps
- Spurious: better than -55 dBc/4 KHz, typical better than -65 dBc/4 KHz

BUC power (option)
- 24 VDC at 160W, 5A max w/PFC
- 48 VDC at 160W, 3.2A max w/PFC
- Reference: 10 MHz
- Stability/Aging: 1x 10-8 OCXO, 2x-7 / year aging

10 MHz reference input/output (together with L-band option)
- Connector: BNC (F) 1,5,9 or 10 MHz input
- Transmit BUC Reference : 10 MHz at nominal – 3 dBm internal/external
- Reference phase noise: -110 dBc @ 10 Hz, -130 dBc @ 100 Hz, -140 dBc @ 1 kHz, -150 dBc @ 10 kHz, -155 dBc @ 100 kHz

Demodulator Interface

Monitor and control interfaces
IF-band input
- Connector: BNC 75 or 50 Ohms selectable
- Return loss: 20 dB minimum
- Level: -20 to -70 dBm, scales to -101 dBm at lower rates
- Frequency 70 MHz (default): 50 – 90 MHz
- Frequency 140 MHz (option): 100-180 MHz
- Max Composite Input: - 5 dBm or +40 dBc, whichever is lower power

L-band input (70 MHz default) & (140 MHz option)
- Connector: F-type 75 Ohms
- Return loss: 10 dB minimum
- Level: -20 to -70 dBm, scales to -101 dBm at lower rates
- Frequency: 950-1750 MHz
- Frequency tuning: 1 Hz steps
- Max Composite Input: - 5 dBm or +40 dBc, whichever is lower power
- Input Phase Noise: Better than Intelsat by 6 dB typical, 4 dB min

LNB power and control
- Possible LNB Selections: Off, 13 or 18 VDC

Performance at BER 1E-8 (in dB)

Selected Code Rates		1/2	2/3	3/4	7/8	0.922
Viterbi	QPSK	6.20		7.19	8.22	
Viterbi+RS-CT	QPSK	2.95		4.08	5.33	
Trellis+RS-CT	8PSK		5.68			
Turbo(TPC)	QPSK	2.27		2.81	3.98	4.91
	8PSK			5.19	6.81	7.87
	8QAM	4.12		4.70	5.98	7.60
	16QAM	5.06		5.98	7.52	8.51
LDPC-2K	QPSK	2.04	2.77	3.52	4.96	
	8PSK		4.88	5.97	7.89	
	8QAM	3.80	4.68	5.51	6.98	
	16QAM	4.48	5.85	6.78	8.48	
LDPC-4K	QPSK	1.73	2.46	3.14	4.32	
	8PSK		4.53	5.56	7.21	
	8QAM	3.44	4.36	5.11	6.40	
	16QAM	4.16	5.46	6.37	7.84	
LDPC-16K	QPSK	1.38	2.09	2.72	3.90	
	8PSK		4.14	5.07	6.66	
	8QAM	3.04	3.91	4.63	5.87	
	16QAM	3.76	5.01	5.87	7.32	

Receive Lock Performance

- Example: FEC ½, EB/N0 = 6.0 dB, Acquisition Range of ± 30 kHz
  - 315 ms at 9.6 kbps QPSK
  - 175 ms at 9.6 kbps BPSK
  - 71 ms at 64 kbps QPSK

Generic

Multiplexer and Overhead Features:

- IBS Multiplexer: Built-in IBS Overhead Channel with standard and enhanced variable rate RS232 and RS485. Supports Automatic Uplink Power Control (AUPC), Remote Modem Control Interface and 2 Form-C Backward Alarms

Monitor and Control:

- Front Panel: LCD and Keyboard for easy control and status
- Terminal Mode: Full screen interactive display of all parameters
- Remote Packet Mode: Packet driven RS232/RS485 control and status
- Web Browser: Available through the optional Ethernet Interface
- Command Line Interface over telnet
- SNMPv1/v2c with standard and custom MIB

Diagnostics:

- Loopback Modes: IF, bi-directional terrestrial and satellite data loopbacks
- Built-in BER test
- BERT: Built-in bi-directional bit error rate test set
- Carrier: Pure carrier and sideband
- Form C Relays: Assignable faults to Form C rear alarm connector

Physical

- Very compact: 1RU, (19"W x 12"D x 1.75"H), 3.18 kg
- Power supply: 90 to 264 VAC, 50/60 Hz, < 30 watts, 220 Watts Max fully loaded including internal BUC and LNB power
- Temperature
  - Operational: 0°C to 50°C
  - Storage: -20 to +70°C
- Humidity: 95% non-condensing
- CE Certified for: EN55022 Class B (Emissions) EN50082-1 Part 1 (Immunity), EN60950(Safety)
- RoHS Compliant: Meets RoHS lead-free standards

Ordering information

ZN461 LDPC Satellite Modem			Order n°
Default Configuration			
Satellite Modem with Serial, IF 70MHz, RF interface Modem: IF-band (50-90 MHz), Modulation/Demodulation: BPSK, QPSK, OQPSK, Viterbi-RS			ZN461
Configuration options			
Category	Max. 1 option per category		
RF Options (hardware options)	IF 70 MHz (50-90MHz)		Default
	IF 140MHz (100-180MHz)		AA-02
	L-band + 10 MHz		AA-03
	L-band with 24V DC power built-in + 10 MHz		AA-04
	L-band with 48V DC power built-in + 10 MHz		AA-05
Modulation/ Demodulation	BPSK-QPSK-OQPSK		Default
	BPSK-QPSK-OQPSK-8PSK/8QAM (*)		AB-02
	BPSK-QPSK-OQPSK-8PSK-8QAM-16QAM (*)		AB-03
Additional options			
Category	Max. 1 option per category		
FEC Decoding Options LDPC	LDPC 2K		AC-01
	Full LDPC		AC-02
FEC Decoding Options TPC	TPC-4k		AC-03
	TPC-4k +16k		AC-04
Interfaces	Ethernet TCP/IP interface		AF-01
Redundancy	1+1 Redundancy Cable Kit		AD-01
Acceleration	TCP Acceleration		AD-02
Services			
Category	Max. 1 option per category		
Assistance	Care Pack Basic		GA-06
	Care Pack Extended		GA-07

- Contact your sales representative for details (sales@newtec.eu)
(*) Upgrade via licence key