AZ110
Broadcast Satellite Modulator
Azimuth Product Family

AZIMUTH SERIES

Description

The AZ110 is a state-of-the-art satellite modulator designed for broadcast contribution, DSNG and distribution applications over satellite in full compliance with the DVB standards. Depending on the applications and the activated features, the AZ110 can be used in conjunction with set-top boxes, professional IRDs or satellite demodulators such as the AZ910.

In its default configuration, the AZ110 is capable of transmitting one MPEG transport stream in DVB-S, DVB-DSNG or DVB-S2 mode. The AZ110 allows automatic or manual selection between two ASI inputs and has dual ASI monitoring outputs. Optionally, an optical ASI interface can be added.

Content distribution and contribution transmissions using DVB-S2 multistream are now available using the optional triple ASI input interface on the modulator.

To simplify the migration towards IP, the AZ110 is also available with DualFlow™ (combined ASI+Ethernet interface), providing broadcasters the following capabilities:

- The ability to transmit two transport streams simultaneously in DVB-S2 Multistream mode (via a second ASI input).
- The ability to interface (via a GbE input) with equipment or networks that carry transport streams over IP with the RTP or UDP protocols. The IP layer is removed by the modulator before transmission.
- The ability to transmit IP services (file transfers, VoIP, TCP services…) and transport stream(s) simultaneously. In this case the modulator performs the encapsulation of the IP data in XPE mode
- The ability to transmit IP services or transport stream(s) alternatively. In this case the modulator performs the encapsulation of the IP data in XPE or MPE mode.
- The ability to configure Quality of Service (QoS) of the IP traffic, while keeping absolute priority to the ASI streams

When several transport streams and/or IP services are transmitted simultaneously, the Variable Coding and Modulation (VCM) option allows each stream to be modulated with its own parameters.

To protect the satellite transmission, the BISS/BISSM or AES option can be activated. BISS scrambles a single program transport stream, BISSM a multiple program transport stream available on the ASI interface. AES allows to encrypt with a high security level the content of all DVB-S2 streams. When activated, the per stream mode allows to encrypt up to four S2 streams with individual keys.

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

This modulator provides exceptional performance and bandwidth efficiency. When activated, the unique linear and non- linear predistortion option Equalink™ provides an additional link margin improvement of up to 2,5dB, truly unleashing the full efficiency of higher modulation schemes such as 16 and 32 APSK.

Clean Channel Technology™ is available on the 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 and DVB-DSNG/S compliant
- QPSK, 8PSK, 16APSK and 32APSK
- Data rates up to 216 Mbit/s
- ASI or optical ASI transport stream interfaces
- L-band monitoring output
- Programmable amplitude slope equalizer
- Optional extended L-band (950 - 2150 MHz)
- Optional DualFlow™: combined ASI+GbE interface with integrated IP encapsulator and Configurable Quality of Service (QoS)
- Optional triple input ASI TS interface for multistream distribution
- Optional Baseband frame input support
- Optional switchable BUC power supply on L-band output
- Optional Multistream and/or VCM operation
- Optional integrated RF upconverter
- Optional 10 MHz reference input/output
- Optional BISS/BISSM scrambling or AES encryption
- Optional Linear and non-linear predistortion (Equalink™)
- Featured-based pricing and software upgradability
- Optional Clean Channel Technology™

Main advantages

- Lower operational costs thanks to highest bandwidth efficiency
- Guaranteed interoperability with DVB receivers
- High versatility and flexibility
- Future-proof design combining video and IP technologies
- High compactness

Applications

- Contribution
- Primary Distribution to headends and DTT towers (multistream MFN/SFN)
- Direct-to-home
- DSNG combined with IP services
- Data broadcast
- Distance learning, Business TV
- MVDDS
- Production testing

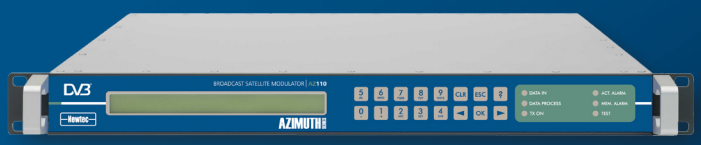
Related products

AZ410 Broadcast Satellite Modem
AZ910 DSNG and Contribution Demodulator

AZ7x0 Frequency converters
AZ21x 1+1 Modulator Redundancy Switch
AZ20x Universal Switching System

Related Documents

White paper Equalink®
Care Pack Brochure



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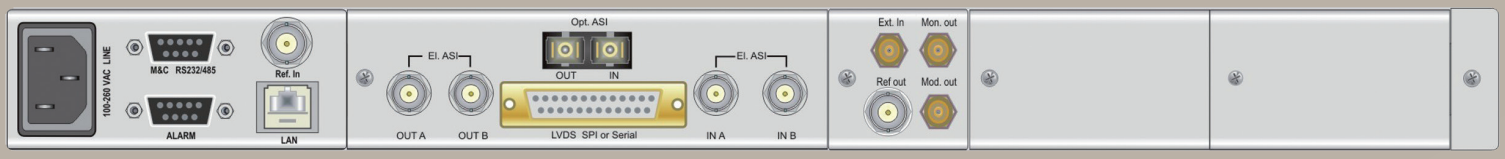
Rev. 9/11.2012

Specifications – AZ110(R9)



Input interface

ASI/SPI interface (default):

- 2 selectable ASI input on BNC (F) - 75 ohms (coax)
- 2 selectable ASI output (loop through) on BNC (F) - 75ohms (coax)
- SPI on 25 pin sub-D connector
- Optical ASI on ST (optional)
- 188 or 204 byte mode
- Encryption (optional)
  - BISS (single program): mode 0,1, E : up to 54 Mbit/s
  - BISSM (multiple program): mode 0,1,E : up to 100 Mbit/s
  - AES 64 bit encryption (optional)
- Rate adapter

ASI Multistream interface (optional triple ASI):

- 3 ASI input on BNC (F) - 75 ohms (coax)
- 1 selectable ASI output (loop through) on BNC (F) - 75 ohms (coax)
- 188 byte mode
- VCM Mode
- Rate adapter
- DVB-S2 multistream

DualFlow: Combined ASI+Ethernet (optional)

- 2 x ASI on BNC (F) - 75 ohms (coax)
- 2x ASI output (loop through) on BNC (F) - 75 ohms (coax)
- 188 byte mode
- Auto switching 10/100/1000 Base-T Ethernet interface:
  - transport stream on IP interface (UDP/RTP)
  - Ethernet/IP QoS:
    - 4 Queue priorities
    - 8 traffic classification rules
    - Configurable queue size
  - Layer 2 bridge mode – Ethernet frames over satellite (data piping)
  - Layer 3 bridge or router mode: IP packets over satellite using Multi Protocol (MPE) or Extended Performance (XPE) Encapsulation
  - Maximum 16 routes/destinations addresses
  - Processing of up to 40 000 IP packets per second – maximum 50 Mbit/s
- DVB-S2 Multistream support
- VCM support (optional)
- Base-Band frame (BBF) input support (optional)
- AES 64 bit encryption (optional)

Modulation

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

Baud rate range

- DVB-S2 0,05 – 45 Mbaud
- DVB-S/DSNG 0,05 – 45 Mbaud

Frame length

- DVB-S/DSNG 188 bytes
- DVB-S2 Short Frames 16200 bits
- 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
  N(F), 50 ohms (with option: AA-12 and AA-13)
- Return loss > 14 dB
- Level -35/+5 dBm (+/- 2 dB)
- Frequency 950 - 1750 MHz (50 Hz steps)
- spurious: better than -65 dBc/4 kHz @ +5dBm 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
- Return loss 50 ohms : > 14 dB
  75 ohms : > 20 dB
  (intermateable with 50 ohms)
- 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
  -34/+1 dBm (+/- 3 dB) output level
- spurious: better than -65 dBc/4 kHz @ -10 dBm level and > 256 kbaud

RF band (optional)

- Connector SMA (F), 50 ohms
- Return loss > 12 dB
- Frequencies 12.75-13.25 GHz
  13.75-14.5 GHz
- Level -35/-7 dBm (+/- 3dB)
- Frequencies 5,85 - 7,050 GHz
  17.30-18.10 GHz
  17.60-18.40 GHz
- Level -25/+3 dBm (+/- 3dB)

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 ±5x10-8 over 0°C to 65°C

10 MHz reference input / output interface (optional)

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

Internal Reference frequency

- High Stability (optional)
  Stability ±5x10-8 over 0°C to 70°C
  Ageing: ± 15 ppb/day
  ± 300 ppb/year
- Very High Stability (optional)
  Stability ±2x10-9 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

AZ 110 Broadcast Satellite Modulator		Order n°
Default Configuration		
DVB Modulator, SNMP Modulation & Baud rate: DVB-S 5Mbaud Input interface: ASI interface + Rate adaptor Output interface: L-band (950-1750 MHz)		AZ110
Configuration options Category	Max. 1 option per category	
Input Interface	ASI (Dual input, Single Stream)	Default
	ASI + Optical ASI (Single Stream)	AG-02
	DualFlow: Ethernet + ASI (CCM)	AG-03
	DualFlow: Ethernet + ASI (CCM +VCM)*	AG-04
	ASI (Triple Input, Multistream)	AG-05
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 BUC	AA-13
	Extended L-band (950-2150 MHz)	AA-18
	IF+ L-band	AA-06
	L + C-band (5,85-7,05 GHz)	AA-14
	L+ Ku-band (12,75-13,25 GHz)	AA-08
	L+ Ku-band (13,75-14,50 GHz)	AA-09
	L + DBS-band (17,30-18,10 GHz)	AA-10
	L + DBS-band (17,60-18,40 GHz)	AA-11
Modulation & Baud rate	DVB-S Q/8PSK, 16QAM 5Mbaud	Default
	DVB-S Q/8PSK, 16QAM 15Mbaud*	AB-02
	DVB-S Q/8PSK, 16QAM 36Mbaud*	AB-03
	DVB-S Q/8PSK, 16QAM 45Mbaud*	AB-04
	DVB-S/S2 QPSK 5Mbaud*	AB-25
	DVB-S/S2 QPSK 15Mbaud*	AB-26
	DVB-S/S2 QPSK 36Mbaud*	AB-27
	DVB-S/S2 QPSK 45Mbaud*	AB-28
	DVB-S/S2 Q/8PSK 5Mbaud*	AB-05
	DVB-S/S2 Q/8PSK 15Mbaud*	AB-06
	DVB-S/S2 Q/8PSK 36Mbaud*	AB-07
	DVB-S/S2 Q/8PSK 45Mbaud*	AB-08
	DVB-S/S2 Q/8PSK, 16QAM, 16APSK 5Mbaud*	AB-09
	DVB-S/S2 Q/8PSK, 16QAM, 16APSK 15Mbaud*	AB-10
	DVB-S/S2 Q/8PSK, 16QAM, 16APSK 36Mbaud*	AB-11
	DVB-S/S2 Q/8PSK, 16QAM, 16APSK 45Mbaud*	AB-12
	DVB-S/S2 Q/8PSK, 16QAM, 16/32APSK 5Mbaud*	AB-13
	DVB-S/S2 Q/8PSK, 16QAM, 16/32APSK 15Mbaud*	AB-14
	DVB-S/S2 Q/8PSK, 16QAM, 16/32APSK 36Mbaud*	AB-15
	DVB-S/S2 Q/8PSK, 16QAM, 16/32APSK 45Mbaud*	AB-16
Additional options Category	Max. 1 option per category	
10MHz reference In/Out	High stability	GR-01
	Very high stability	GR-02
Clean Channel Technology™	Clean Channel Technology for 5 Mbaud*	AI-01
	Clean Channel Technology for 15 Mbaud*	AI-02
	Clean Channel Technology for 36 Mbaud*	AI-03
	Clean Channel Technology for 45 Mbaud*	AI-04
Predistortion	Equalink *	AC-01
Encryption	BISS (**)	AD-01
	BISSM (**)	AD-02
Security	AES 64 bit encryption *	AS-01
Input frame	Base-Band frame (only with Ethernet interface)	AV-01
Services Category		
Assistance	Care Pack Basic	GA-06
	Care Pack Extended	GA-07

(*) upgradeable via license key
Other configurations and options such as RF-band amplifiers or 68 Mbaud rate are available on request. Contact your sales representative for details (sales@newtec.eu).
(**) Only with the default or AG-02 Input Interface options

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