A-Series AT-80
Satellite Modulator

WORK MICROWAVE

The A-Series is a family of next generation satellite modem platforms built on versatile FPGA- and software-based architecture. The AX-80 product line supports DVB-S2X/S2 standards with utmost possible throughput up to bandwidths of 500 Msps. Exceptional analog and digital engineering provides teleport-grade devices with future-proof expandability.

Beyond DVB waveforms, A-Series devices can be extended to customized signal and data processing. Through an all-IP structure, the platform supports both native network operation as well as data streaming

over IP. Built-in encapsulators provide support for a wide range of formats plus specialized streaming like transparent baseband data, raw IQ information, space data formats and more.

The **AT-80 Satellite Modulator** provides IP connectivity over DVB uplinks, in particular as integral part of VSAT hub stations. Operators can rely on the latest high-throughput technology for wideband links. Real-time monitoring and control open to extensions with custom protocols allows integration into any system.

Key Features

- DVB-S2X - ETSI EN 302 307-2
- DVB-S2 - ETSI EN 302 307-1
- DVB-S2X modulations:
  QPSK to 256APSK normal, short, linear
- DVB-S2 modulations:
  QPSK to 32APSK; normal, short
- Symbol rates up to 500 Msps
- Data rate up to 3 Gbit/s per direction integrated
- Roll-Off: 35%, 25%, 20%, 15%, 10%, 5%
- Exceptionally clean signal output and internal processing
- Predistortion for automatic group delay and nonlinearity compensation

- Operates as layer 3 bridge or layer 3 router including traffic shaping / QoS functionality
- ACM controller open to various ACM systems
- GSE and MPE encapsulation integrated
- Customizable processing infrastructure for easy integration into large communication systems
- Flexible software architecture for easy extension and future virtualization of functionality
- **3 years warranty**

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TX Signal Specifications

Signal output L-band:	Frequency:	950...2150 MHz	
	Connector:	N female	
	Impedance:	50 Ohm	
	Return Loss:	> 16 dB	
	Output power:	-30...0 dBm 0.1 dB steps, ±0.5 dB accuracy	
	Output power muted:	< -85 dBm	
	10 MHz reference:	1.5 dB +/- 1.5 dB, switchable	
	Phase Noise:	-45 dBc/Hz @ 10 Hz -75 dBc/Hz @ 100 Hz -88 dBc/Hz @ 1 kHz -90 dBc/Hz @ 10 kHz -100 dBc/Hz @ 100 kHz -115 dBc/Hz @ 1 MHz	
	Signal related spurs:	< -55 dBc, nearby carrier < -50 dBc, unmodulated carrier, 950...2150 MHz	
Clock stability:	Standard:	±2 x 10^-8 after warm up, aging: ±1 x 10^-9 per day, ±1 x 10^-7 per year	
Symbol rate:	Range:	5 Msps ... 500 Msps *depending on license TXS**	
	Step size:	1 sps	
DVB-S2X Modulation / Coding:	ModCods: (normal FEC frame)	QPSK 8PSK 16APSK 32APSK 64APSK 128PSK 256PSK	13/45, 9/20, 11/20 23/36, 25/36, 13/18 26/45, 3/5, 28/45, 23/36, 25/36, 13/18, 7/9, 77/90 32/45, 11/15, 7/9 11/15, 7/9, 4/5, 5/6 3/4, 7/9 32/45, 3/4
	ModCods: (short FEC frame)	QPSK 8PSK 16APSK 32APSK	11/45, 4/15, 14/45, 7/15, 8/15, 32/45 2/15, 8/15, 26/45, 32/45 7/15, 8/15, 26/45, 3/5, 32/45 2/3, 32/45
	ModCods linear: (normal FEC frame)	16APSK 32APSK 64APSK 256PSK	1/2-L, 8/15-L, 5/9-L, 3/5-L, 2/3-L 2/3-L 32/45-L 29/45-L, 2/3-L, 31/45-L, 11/15-L
	all according to ETSI EN 302307-2		
DVB-S2 Modulation / Coding:	ModCods: (normal and short FEC frame; 9/10 normal FEC frame only)	QPSK 8PSK 16APSK 32APSK	1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 3/5, 2/3, 3/4, 5/6, 8/9, 9/10 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 3/4, 4/5, 5/6, 8/9, 9/10
	Pilot insertion:	on / off	
	Physical layer scrambling:	N = 0...262141	
	all according to ETSI EN 302307-1		
Time-slicing:	Physical layer framing according to ETSI EN 302307 Annex M *w/ license TTS*		
Carrier ID:	DVB-CID according to ETSI TS 103129		
Signal spectrum mask:	α = 0.35, 0.25, 0.20, 0.15, 0.10, 0.05 according to ETSI EN 302307		
Predistortion:	*Contact factory for details.*		

Specifications are subject to change

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Data Processing and Device Specifications

Device connectors:	Data network:	6x Ethernet RJ-45, 10/100/1000Base-T auto sensing 2x SFP+ adapter slot for optical GbE or optical/copper 10GbE ***Contact factory for available SFP+ modules.***
	M&C network:	1x Ethernet RJ-45, 10/100/1000Base-T auto sensing
	10 MHz reference input:	BNC female, 50 Ohm ***w/ option RI***
	1 PPS input:	BNC female, 50 Ohm ***w/ option RI***
	Alarm:	DSUB-9 female ***w/ option RI***
Network operation:	IP network connectivity:	Layer 3 Bridge or Router for IPv4 packet transmission, IPv6 on request 256 IP/subnet routes towards satellite 64 baseband channels with independent DVB-S2X and encapsulation settings ACM MODCOD range and Es/N0 sensitivity independent per channel ***Contact factory for customized IP-to-baseband data handling.*** ***Contact factory for customized ACM messaging formats.***
	IP traffic shaping/QoS:	255 independent rules Guaranteed and limited bandwidths Fixed or dynamically integrated into ACM by binding to MODCOD Match criteria: source/destination IP subnet, source MAC, UDP/TCP port ranges, TOS/DS field, packet size
	Baseband traffic shaping/QoS:	configurable baseband channel limits based on symbol rate guaranteed and limited bandwidth individually configurable
	Data encapsulation:	Generic Stream Encapsulation (GSE) according to ETSI TS 102606 Multiprotocol Encapsulation (MPE) according to ETSI EN 301192 ***Contact factory for other encapsulation formats.***
	IP data rate limits:	6 Gbps or 1 Mpps rx+tx processing, subject to prevailing modem limits maximum rates can vary in combination with complex internal processing
Stream inputs:	Interfaces:	2x RTP/UDP/IP over Ethernet according to IETF RFC 2250 Multicast and IGMPv3 support
	Baseband data:	2 streams for direct input of baseband frames individually assignable to baseband channels configurable UDP/IP-based flow control ***w/ license BBI***
Frontpanel interface:	LCD-Display 2x40 characters, 4 cursor keys, 4 function keys	
Remote monitoring and control:	Protocol:	SNMP
	Connection:	UDP/IPover Ethernet/RJ-45 or in-band via satellite link
	Protocol:	HTTP web browser interface
	Connection:	TCP/IP over Ethernet/RJ-45 or in-band via satellite link
Temperature range:	Operating:	0°C...50°C
	Storage:	-30°C...80°C
	Relative humidity:	< 95% non condensing
Mains power:	Input:	100...240 V AC nominal, 90...264 V AC max, 50...60 Hz
	Consumption:	150 VA / 150 W typical
	Connector:	IEC C14
Dimension and weight:	483 x 98 x 505 mm³ (WxHxD), 1 RU 19" up to approx. 14 kg depending on device type	

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Order information:

    AT-80   Satellite Modulator

Hardware options:

Hardware options have to be defined with the order and are not field-upgradable. Not all device types may support all combinations. Contact factory with specific requests.

    RI   external 10 MHz reference input

License based throughput:

License based throughput performance is field-upgradable by uploading a license file to the device.

    TXSxxx   symbol rate based transmission license for xxx Msps
                       select from: **TXS125** (default), **TXS250, TXS400, TXS500**

License based functions:

License based functions are field-upgradable by uploading a license file to the device.

    TTS   DVB-S2X time-slicing support for transmission
    BBI   direct baseband frame input streaming over IP
    TAB   DVB table insertion for MPE encapsulation