

A-Series AX-80 Satellite Modem



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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 Msp. 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 **AX-80 Satellite Modem** provides full IP connectivity over DVB links in the Gigabit-per-second-class. 10G Ethernet interfaces enable high-speed integration into terrestrial networks. Real-time monitoring and control together with powerful IP processing capabilities support the fastest link available over satellite.

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 Msp
- Data rate up to 3 Gbit/s per direction
- 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: $\pm 2 \times 10^{-8}$ after warm up, aging: $\pm 1 \times 10^{-9}$ per day, $\pm 1 \times 10^{-7}$ 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 13/45, 9/20, 11/20 8PSK 23/36, 25/36, 13/18 16APSK 26/45, 3/5, 28/45, 23/36, 25/36, 13/18, 7/9, 77/90 32APSK 32/45, 11/15, 7/9 64APSK 11/15, 7/9, 4/5, 5/6 128APSK 3/4, 7/9 256APSK 32/45, 3/4 ModCods: (short FEC frame) QPSK 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 8PSK 7/15, 8/15, 26/45, 32/45 16APSK 7/15, 8/15, 26/45, 3/5, 32/45 32APSK 2/3, 32/45 ModCods linear: (normal FEC frame) 8PSK 5/9-L, 26/45-L 16APSK 1/2-L, 8/15-L, 5/9-L, 3/5-L, 2/3-L 32APSK 2/3-L 64APSK 32/45-L 256APSK 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 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 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
Super-Frame Structure:	Super-Frame Structure Format 4 according to ETSI EN 302307-2 Annex E w/ license SFTX
Carrier ID:	DVB-CID according to ETSI TS 103129
Signal spectrum mask:	$\alpha = 0.35, 0.25, 0.20, 0.15, 0.10, 0.05$ according to ETSI EN 302307
Predistortion:	Contact factory for details.

Specifications are subject to change

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RX Signal Specifications

Signal input L-band:	Frequency: 950...2150 MHz Connector: 1x N female / SMA female adapter included Impedance: 50 Ohm Return Loss: > 13 dB Input power: -55...-10 dBm total aggregate power						
Symbol rate:	Range: 5 Msps ... 500 Msps <i>depending on license RXS*</i> Acquisition bandwidth: \pm selected symbol rate / 2 Tolerance: \pm 1% of selected symbol rate						
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Auto detection:	Modulation- and FEC-type pilots on / off CCM / VCM / ACM						
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 <i>w/ license RTS</i>						
Signal spectrum mask:	$\alpha = 0.35, 0.25, 0.20, 0.15, 0.10, 0.05$ according to ETSI EN 302307						

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Data Processing and Device Specifications

Device connectors:	Data network: M&C network: Reference input: 1 PPS input: Alarm:	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. 1x Ethernet RJ-45, 10/100/1000Base-T auto sensing BNC female, 50 Ohm <i>w/ option RI</i> BNC female, 50 Ohm <i>w/ option RI</i> DSUB-9 female <i>w/ option RI</i>
Reference Input: <i>w/ option RI</i>	Frequency: Level: Modes: Connector:	5 or 10 MHz sine wave 5 dBm +/- 5 dB @ 50 Ohm auto / extern / intern BNC female, 50 Ohm
Network operation:	IP network connectivity: IP traffic shaping/QoS: Baseband traffic shaping/QoS: Data encapsulation: IP data rate limits:	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. 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 configurable baseband channel limits based on symbol rate guaranteed and limited bandwidth individually configurable Generic Stream Encapsulation (GSE) according to ETSI TS 102606 Multiprotocol Encapsulation (MPE) according to ETSI EN 301192 Contact factory for other encapsulation formats. 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: Baseband data:	2x RTP/UDP/IP over Ethernet according to IETF RFC 2250 Multicast and IGMPv3 support 2 streams for direct input of baseband frames individually assignable to baseband channels configurable UDP/IP-based flow control <i>w/ license BBI</i>
Stream outputs:	Interfaces: Baseband data: Transport stream: IQ data: CCSDS CADU frames:	2x RTP/UDP/IP over Ethernet according to IETF RFC 2250 direct output of baseband data w/o filtering padding selectable <i>w/ license BBO</i> transport stream from DVB carriers 1 ISI selectable from DVB-S2 multistream carriers <i>w/ license TSO</i> raw IQ data after demodulation signed 8-bit I and Q values for each symbol decimator selectable to reduce bandwidth occupation <i>w/ license IQ</i> extraction of CCSDS CADU frames from DVB-S2 automatic detection of frame length <i>w/ license CCSDS131.3</i>
Frontpanel interface:	LCD-Display 2x40 characters, 4 cursor keys, 4 function keys	
Remote monitoring and control:	Protocol: Connection: Protocol: Connection:	SNMP UDP/IP over Ethernet/RJ-45 or in-band via satellite link HTTP web browser interface TCP/IP over Ethernet/RJ-45 or in-band via satellite link
Temperature range:	Operating: Storage: Relative humidity:	0°C...50°C -30°C...80°C < 95% non condensing
Mains power:	Input: Consumption: Connector:	100...240 V AC nominal, 90...264 V AC max, 50...60 Hz 150 VA / 150 W typical IEC C14
Dimension and weight:	483 x 89 x 505 mm ³ (WxHxD), 2 RU 19" up to approx. 14 kg depending on device type	

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Order information:

AX-80 Satellite Modem

Hardware options:

Hardware options have to be defined with the order and are not field-upgradable. Not all device types may support all combinations. Please contact WORK Microwave for custom hardware options.

RI external 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**

RXSxxx symbol rate based reception license for xxx Msps
select from: **RXS125** (default), **RXS250**, **RXS400**, **RXS500**

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
RTS DVB-S2X time-slicing support for reception
SFTX DVB-S2X super-frame structure support for transmission
BBI direct baseband frame input streaming over IP
BBO direct baseband frame output streaming over IP
TSO transport stream over IP output
TAB DVB table insertion for MPE encapsulation
IQ IQ constellation data output over IP
CCSDS131.3 decapsulation of CCSDS CADU frames from DVB-S2/S2X signals