A-Series AX-80
Wideband All-IP Platform

DVB S2X **DVB GSE** **DVB CID**

The A-Series is a next generation FPGA-based family of satellite modem, modulator and demodulator platforms. The AX-80 product line is based on a powerful architecture that supports the new DVB-S2X standard for ultra-wideband transponders up to 500 Msps. DVB-S2X features include higher modulation schemes up to 256APSK, a finer granularity of ModCods and advanced filtering.

Beyond DVB-S2X, the AX-80 platform can be extended to customized waveforms and user-defined data processing. Through an all-IP structure, the platform supports both native network operation as well as data streaming over IP. Built-in encapsulators

and decapsulators provide support for the standard formats, such as GSE and MPE plus specialized streaming like transparent baseband data, raw IQ information, space data formats and more.

A-Series devices are based on a new processing architecture that offers signal based advancements, a flexible software platform and improved access from monitoring and control to the transmission parameters. This allows direct real-time monitoring and quick adaptation to specific customer requirements. Scalable hardware ensures that operators can serve all applications from very low up to extremely high throughput.

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
- Annex M Time-slicing
- Symbol rates up to 500 Msps
- Data rate up to 3 Gbit/s per direction integrated
- Roll-Off: 35 %, 25 %, 20 %, 15 %, 10 %, 5 %

- Low spurious output
- Operates as Layer 3 Bridge or Layer 3 Router
- Predistortion ready for automatic group delay and nonlinearity compensation
- OptiACM controller (open for other ACM systems)
- Real-time M&C capabilities
- IP and baseband traffic shaping
- Generic Stream Encapsulation (GSE)
- Multiprotocol Encapsulation (MPE)
- CE compliant
- **3 years warranty**

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Modulator Parameters:		AX-80 / AT-80	
Signal Outputs:		1x L-band output	
IF-Output Frequency:		Max. Range:	950 … 2150 MHz
		Step size:	1 Hz
Phase Noise:	**10 Hz**		-55
	100 Hz		-75
	1 kHz		-88
	10 kHz		-90
	100 kHz		-100
	1 MHz		-115
		max. values in dBc/Hz	
IF-Output Characteristics:		Impedance:	50 Ω
		Return Loss:	> 16 dB
		Output Power:	-30 dBm … 0 dBm,
			0.1 dB steps, ±0.5 dBm accuracy
		Output Power muted:	< -85 dBm
		Connector:	N female 50 Ω
		10 MHz reference output:	1.5 ±1.5 dBm (can be switched on/off)
Spurious Outputs:		Signal related:	< -55 dBc, nearby carrier
			< -50 dBc, unmodulated carrier, 950 … 2150 MHz
Frequency and Clock Stability:		±2 x 10^{-8} (-30 °C ... 60 °C, after warm up), aging: ±1 x 10^{-9} per day, ±1 x 10^{-7} per year	
Symbol Rate:		Max. Range:	5 Msps … 500 Msps
		Step size:	1 sps
DVB-S2X Modulation / Coding:		ModCods:	QSPK — 13/45, 9/20, 11/20
		(normal FEC frame)	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:	QPSK — 11/45, 4/15, 14/45, 7/15, 8/15, 32/45
		(short FEC frame)	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:	8PSK — 5/9-L, 26/45-L
		(normal FEC frame)	16APSK — 1/2-L, 8/15-L, 5/9-L, 3/5-L, 2/3-L
			32APSK — 25/36-L
			64APSK — 32/45-L
			256APSK — 29/45, 2/3, 31/45, 11/15
			all according to ETSI EN 302307-2
DVB-S2 Modulation / Coding:		ModCods:	QPSK — 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
		(normal and short FEC frame;	8PSK — 3/5, 2/3, 3/4, 5/6, 8/9, 9/10
		except 9/10 short FEC frame only)	16APSK — 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
			32APSK — 3/4, 4/5, 5/6, 8/9, 9/10
		Pilots Insertion:	on / off
		Physical Layer Scrambling:	N = 0 … 262141
			all according to ETSI EN 302307-1
Time-slicing:		Physical Layer Header according to ETSI EN 302307 Annex M (contact factory for options)	
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 ETSI EN 302307	

Specifications continued next page

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Demodulator Parameters:		AX-80 / AR-80	
Signal Inputs:	1x L-band input		
IF-Input Frequency:	Max. Range:	950 … 2150 MHz	
	Acquisition Range:	+/- 50% of selected symbol rate	
IF-Input Characteristics:	Impedance:	50 Ω	
	Return Loss:	> 13 dB	
	Input Power:	-55 dBm … -10 dBm	
		(total aggregate power)	
	IF-Connector:	N female	
Symbol Rate:	Max. Range:	5 Msps … 500 Msps	
	Acquisition Range:	+/- 1% of selected symbol rate	
DVB-S2X Demodulation / Decoding:	ModCods non-linear:	QSPK	13/45, 9/20, 11/20
	(normal FEC frame)	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 non-linear:	QPSK	11/45, 4/15, 14/45, 7/15, 8/15, 32/45
	(short FEC frame)	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:	8PSK	5/9-L, 26/45-L
	(normal FEC frame)	16APSK	1/2-L, 8/15-L, 5/9-L, 3/5-L, 2/3-L
		32APSK	25/36-L
		64APSK	32/45-L
		256APSK	29/45, 2/3, 31/45, 11/15
		all according to ETSI EN 302307-2	
DVB-S2 Demodulation / Decoding:	ModCods:	QPSK	1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
	(normal and short FEC frame;	8PSK	3/5, 2/3, 3/4, 5/6, 8/9, 9/10
	except 9/10 short FEC frame only)	16APSK	2/3, 3/4, 4/5, 5/6, 8/9, 9/10
		32APSK	3/4, 4/5, 5/6, 8/9, 9/10
	Demodulator auto detection:	Modulation- and FEC-type, pilots on/off are automatically detected	
	Physical Layer Scrambling:	N = 0 … 262141	
		all according to ETSI EN 302307-1	
Time-slicing:	Physical Layer Header according to ETSI EN 302307 Annex M (contact factory for options)		
Signal Spectrum Mask:	α = 0.35, 0.25, 0.20, 0.15, 0.10, 0.05 according ETSI EN 302307-2		

Common Parameters:		AX-80 / AT-80 / AR-80
Data Interfaces:	6x Ethernet 10/100/1000Base-T auto sensing, RJ45 connector	
	2x SFP+ adapter slot for optical GbE or optical/copper 10GbE, contact factory for available SFP+ modules	
Network Operation:	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	
Data Encapsulation:	Generic Stream Encapsulation (GSE) according to ETSI TS 102606	
	Multiprotocol Encapsulation (MPE) according to ETSI EN 301192	
IP Data Rate:	up to 3 Gbps per direction	
	up to 1 Mpps rx+tx processing	
	data rates/packet rates can vary in combination with complex internal processing (i.e. traffic shaping)	
Traffic Shaper/QoS on BB level:	configurable baseband channel limits based on symbol rate	
	guaranteed and limited bandwidth individually configurable	
Traffic Shaper/QoS on IP level:	(contact factory for options)	
OptiACM:	CCM / VCM / ACM functionality for point-to-point and point-to-multipoint links	
	64 ACM channels with separate MODCOD range and Es/N0 sensitivity	
Predistortion:	(contact factory for options)	
Monitoring and Control:	Protocol:	SNMP
	Connection:	UDP/IP over Ethernet or in-band via satellite link
	Protocol:	HTTP (web browser interface)
	Connection:	TCP/IP over Ethernet or in-band via satellite link
Temperature Range:	0°C ... 50°C operating	
	-30°C ... 80°C storage	
Relative Humidity:	< 95% non condensing	
User Interface:	LCD-Display 2 x 40 characters, 4 cursor keys, 2/4 function keys	
Mains Power Input:	100 … 240 V AC nominal, 90 … 264 V AC max, 50 … 60 Hz	
Mains Power Consumption:	tbd	
Mains Power Input Connector:	IEC C14	
Dimension and Weight:	483 x 98 x 505 mm³ (WxHxD), 2 RU (19") up to approx. 14 kg depending on device type	

Specifications are subject to change

A-Series AX-80
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Order Information:

AX-80	IP Modem
AT-80	IP Modulator
AR-80	IP Demodulator

Hardware options:

RT   support for external 10 MHz reference and time stamp synchronization for output data

Hardware options may only be available for certain device types and are not field-upgradable. Please contact factory with specific requests.

License based options:

License based options are field-upgradable by a license file.

TXSxxx   transmission symbol rate limit / applicable to AX-80 and AT-80 devices

TXS125	max 125 Msps Tx carrier
TXS250	max 250 Msps Tx carrier
TXS400	max 400 Msps Tx carrier
TXS500	max 500 Msps Tx carrier

Either a symbol rate or a data rate based license has to be selected. License model can be changed in field.

RXSxxx   reception symbol rate limit / applicable to AX-80 and AR-80 devices

RXS125	max 125 Msps Rx carrier
RXS250	max 250 Msps Rx carrier
RXS400	max 400 Msps Rx carrier
RXS500	max 500 Msps Rx carrier

Either a symbol rate or a data rate based license has to be selected. License model can be changed in field.

BBO	baseband frame output interface over IP
BBI	baseband frame input interface over IP
IQ	IQ raw data output over IP
CCSDS	decapsulation of CCSDS CADU frames from DVB-S2/S2X signals

ilable licenses are subject to change. Please contact factory for additional features and customized licenses for OEM products.

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