

A-Series AT-61-RF6 Satellite Modulator with direct RF output



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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-60 product line supports the full range of DVB-S2X/S2/S standards. 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-61 Satellite Modulator** provides DVB uplinks for streams over IP and ASI interfaces, with TV signals being the main application. A dedicated feature set serves the specific requirements of distribution and DTH networks. Real-time monitoring and control together with common alarm and reference connectors allows seamless integration into professional teleport infrastructures.

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 from 100 ksps to 75 Msps
- Data rate up to 360 Mbit/s 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 C-band:	Frequency: 5.85...6.65 GHz 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: < -70 dBm Phase noise: -45 dBc/Hz @ 10 Hz -70 dBc/Hz @ 100 Hz -80 dBc/Hz @ 1 kHz -85 dBc/Hz @ 10 kHz -95 dBc/Hz @ 100 kHz -105 dBc/Hz @ 1 MHz Signal related spurs: < -67 dBc, unmodulated carrier, $\Delta f > 2$ MHz < -60 dBc, unmodulated carrier, $\Delta f < 2$ MHz L-band monitor output: -30 dBm @ 2000 MHz, SMA female
Clock stability:	Standard: $\pm 2 \times 10^{-7}$ after warm up, aging: $\pm 2 \times 10^{-8}$ per day, $\pm 1 \times 10^{-6}$ per year Extended: $\pm 2 \times 10^{-8}$ after warm up, aging: $\pm 1 \times 10^{-9}$ per day, $\pm 1 \times 10^{-7}$ per year <i>w/ options EXT or RI</i>
Symbol rate:	Range: 100 ksps ... 75 Msps <i>depending on license TXS*</i> 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 128PSK 3/4, 7/9 256PSK 32/45, 3/4 ModCods: (short FEC frame) QPSK 11/45, 4/15, 14/45, 7/15, 8/15, 32/45 8PSK 2/15, 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) 16APSK 1/2-L, 8/15-L, 5/9-L, 3/5-L, 2/3-L 32APSK 2/3-L 64APSK 32/45-L 256PSK 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
DVB-S Modulation / Coding:	ModCods: QPSK 1/2, 2/3, 3/4, 5/6, 7/8 8PSK 2/3, 5/6, 8/9 16QAM 3/4, 7/8 all according to ETSI EN 300421 only streaming functionality, no network operation
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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Data Processing and Device Specifications

Device connectors:	Data network: M&C network: 10 MHz reference input: Alarm: Transport stream input:	2x Ethernet RJ-45, 10/100/1000Base-T auto sensing 1x Ethernet RJ-45, 10/100/1000Base-T auto sensing BNC female, 50 Ohm <i>w/ option RI</i> DSUB-9 female 2x BNC female, 75 Ohm
Network operation: <i>w/ licenses DAE and DAD</i>	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. 360 Mbps or 80000 pps rx+tx processing, subject to prevailing modem limits maximum rates can vary in combination with complex internal processing
Stream inputs:	Interfaces: Baseband data: Transport stream:	RTP/UDP/IP over Ethernet according to IETF RFC 2250 2 streams per data interface Multicast and IGMPv3 support 2x ASI, for transport stream only 2 streams for direct input of baseband frames individually assignable to baseband channels configurable UDP/IP-based flow control <i>w/ license BBI</i> 1 stream selectable from the inputs, manually or automatic automatic redundancy based on timeouts or SMPTE 2022-7 seamless reconstruction jitter compensation up to 500ms PCR correction, null packet deletion and insertion <i>w/ license TSI</i> for IP input
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 HTTP web browser interface TCP/IP over Ethernet/RJ-45
Temperature range:	Operating: Storage: Relative humidity:	0°C...50°C -30°C...80°C < 95% non condensing
Mains power:	Input: Consumption: Connector: Fuse:	100...240 V AC nominal, 90...264 V AC max, 50...60 Hz 80 VA / 60 W typical IEC C14 2x 3.15 A time-lag fuse
Dimension and weight:	483 x 44 x 505 mm ³ (WxHxD), 1 RU 19" up to approx. 10 kg depending on device type	

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Order information:

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

TXSxx symbol rate based transmission license for xx Msps
select from: **TXS15, TXS30, TXS45, TXS60, TXSmax**
TXSmax supports full throughput according to specification or device limits

TXDxx data rate based transmission license for xx Mbps
select from: **TXD10** (default), **TXD30, TXD100, TXD160, TXDmax**
TXDmax supports full throughput according to specification or device limits

License based functions:

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

BBI direct baseband frame input streaming over IP
TSI transport stream over IP input
DAE MPE and GSE data encapsulation and network operation
DAD MPE and GSE data decapsulation and network operation
TAB DVB table insertion for MPE encapsulation