

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 kBaud to 75 MBaud
- Data rate up to 360 Mb/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**

iMOD-W SATELLITE MODULATOR

The iMOD-W is a family of next generation satellite modem platforms built on versatile FPGA - and software-based architecture. The iMOD-W 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, iMOD-W 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 **iMOD-W 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.



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
	Signal related spurs:	-115 dBc/Hz @ 1 MHz
< -67 dBc, unmodulated carrier, 950...1900 MHz		
< -55 dBc, unmodulated carrier, 1900...2150 MHz		
	< -45 dBc, unmodulated carrier harmonics, out of band	

Specifications continued next page

TX Signal Specifications (continued)			
Signal output 70/140 MHz: w/options IF50 or IF75	Frequency: 50..180 MHz Connector: BNC female Impedance: 50 Ohm or 75 Ohm Return Loss: > 16 dB Output power: -25..5 dBm 0.1 dB steps, ±0.5 dB accuracy Output power muted: < -85 dBm Phase Noise: -45 dBc/Hz @ 10 Hz -80 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: < -67 dBc, unmodulated carrier, 50..80 MHz or 100..180 MHz < -45 dBc, unmodulated carrier harmonics, out of band		
Clock stability:	Standard: ±2 x 10 ⁻⁷ after warm up, aging: ±2 x 10 ⁻⁸ per day, ±1 x 10 ⁻⁶ per year Extended: ±2 x 10 ⁻⁸ after warm up, aging: ±1 x 10 ⁻⁹ per day, ±1 x 10 ⁻⁷ per year w/options EXT or RI		
Symbol rate:	Range: 100 kBaud ... 75 Msps <i>depending on license TXS*</i> Step size: 1 sps		
DVB-S2X Modulation / Coding:	ModCods: (normal FEC frame) ModCods: (short FEC frame) ModCods linear: (normal FEC frame)	QPSK 8PSK 16APSK 32APSK 64APSK 128PSK 256PSK QPSK 8PSK 16APSK 32APSK 16APSK 32APSK 64APSK 256PSK all according to ETSI EN 302307-2	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 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 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
DVB-S2 Modulation / Coding:	ModCods: (normal and short FEC frame; 9/10 normal FEC frame only) Pilot insertion: Physical layer scrambling:	QPSK 8PSK 16APSK 32APSK on / off N = 0...262141 all according to ETSI EN 302307-2	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
DVB-S Modulation / Coding Optional	ModCods:	QPSK all according to ETSI EN 300421 only streaming functionality, no network operation	1/2, 2/3, 3/4, 5/6, 7/8
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 continued on next page

Data Processing and Device Specifications		
Device connectors:	Data network: M&C network: 10 MHz reference input: Alarm:	1x Ethernet RJ-45, 10/100/1000 Mb/s auto sensing 1x Ethernet RJ-45, 10/100/1000 Mb/s auto sensing BNC female, 50 Ohm <i>w/option RI</i> DSUB-9 female
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/NO 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/TC P 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 Mb/s or 80000 pps rx+tx processing, subject to prevailing modem limits maximum rates can vary in combination with complex internal processing (i.e. traffic shaping)
Stream inputs:	Interfaces: Baseband data: Transport stream:	2x RTP/UDP/IP over Ethernet according to IETF RFC 2250 Multicast and IGMPv3 support 2x ASI, BNC female 75 Ohm, 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 PCR correction, null packet deletion and insertion ASI inputs only
Front panel interface:	LCD-Display 2x40 characters, 4 cursor keys, 4 function keys VFD-Display 2x40 characters, 4 cursor keys, 4 function keys <i>w/option EXT</i>	
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...60° C <i>w/option EXT</i> -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 65 VA / 45 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	

Specifications are subject to change

Options

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 factory with specific requests.

IF50	additional IF output, 50 Ohm version
IF75	additional IF output, 75 Ohm version
RI	external 10 MHz reference input
EXT	extended operating temperature range of -30°C...60°C

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 MBaud 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 Mb/s select from: TXD10 (default), TXD30, TXD100, TX D160, 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
DC24	24VDC on L-band output
TAB	DVB table insertion for MPE encapsulation

Order Information

iMOD-W-XXX Satellite Modulator

Part Number	Included Options	Description
iMOD-W-001	TXD10+DC24+RI	ASI input, L-Band output, internal 10 MHz Ref., 24 VDC on L-Band output, DVB-S2/S2X QPSK/8PSK/16APSK, DVB-S not supported, 10 MHz Ref. input
iMOD-W-002	TXD10+DC24+RI+TSI	ASI & TS/IP inputs, L-Band output, internal 10 MHz Ref., 24 VDC on L-Band output, DVB-S2/S2X QPSK/8PSK/16APSK, DVB-S not supported, 10 MHz Ref. input
iMOD-W-003	TXD10+DC24+RI+DAE	ASI & IP inputs (MPE/GSE IPE), L-Band output, internal 10 MHz Ref., 24 VDC on L-Band output, DVB-S2/S2X QPSK/8PSK/16APSK, DVB-S not supported, 10 MHz Ref. input