

DVB-S2X Wideband Modulator

L-band Output



DVB S2X[®]



WORK Microwave's Wideband Modulator provides operators a platform for transferring Transport Streams in DVB-S2 multicast format as well IP/Ethernet data over DVB-S2/DVB-S2X satellite connections. Ethernet frames and IP packets are encapsulated directly within DVB-S2 baseband frames, resulting in low encapsulation overhead. For maximum bandwidth efficiency and ease of operation the device uses Generic Stream Encapsulation according to TS 102 606.

An aggregate data throughput of more than 1 Gbps can be achieved. Symbol rates up to 400 Msps are supported.

The unit is suitable for uplinks of High Throughput Satellites. It supports Broadcast, Broadband or hybrid Broadcast/Broadband systems.

OptiACM

An integrated OptiACM controller provides adaptive or variable FEC- and modulation setting for point-to-point or point-to-multipoint IP applications.

Predistortion

Broadcast Predistortion and Extended Predistortion - operating in the background during regular transmission - mitigates the negative effects in the filters and amplifiers of satellites by automatically compensating for linear and non linear distortions. Subsequently the satellite link can be operated with less back off/higher power and a higher signal-to-noise ratio increases beam coverage ensuring higher throughput and availability for the satellite operator.

High signal integrity

Low spurious emissions make the modem perfect for use in environments with demanding requirements, like high-power uplinks. Sophisticated temperature compensation guarantees output stability over a very wide temperature range.

Operating and control - easy integration into your system

The modem can be operated via push buttons on the front panel using intuitive display menus or via remote control (RS232, RS422/485 and TCP/IP over Ethernet). For the remote control addressable packet-based commands, a Web interface (HTTP browser). Detailed monitoring of system parameters is possible.

Key features

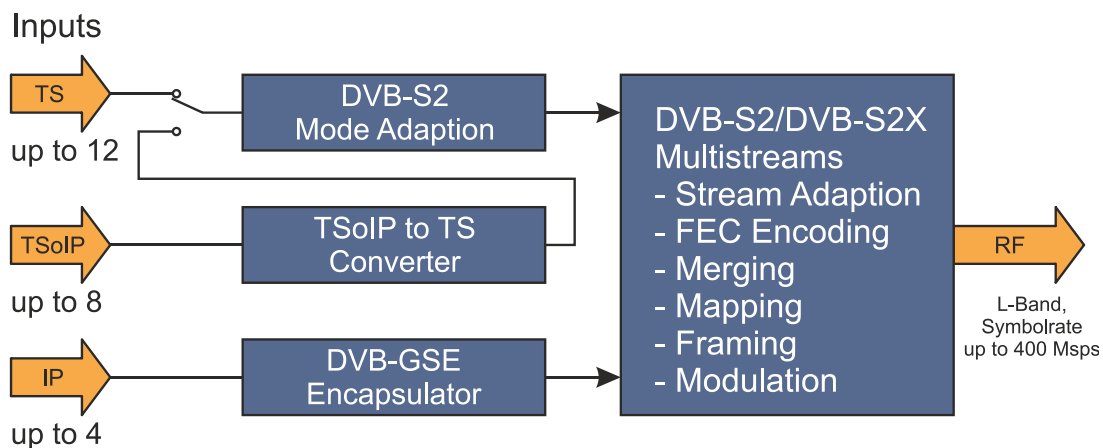
- Up to 12 ASI Input Interfaces for Multiple Transport Stream Inputs
- Up to 8 Transport Stream over IP Inputs
- Up to 4 Inputs for GSE encapsulators
- DVB-S2 - ETSI EN 302 307
DVB-S2X - ETSI EN 302 307-2
- DVB-S2/S2X modulations:
QPSK / 8PSK / 16APSK / 32APSK
64APSK / 128APSK / 256APSK coming soon
- Normal and short FEC frames, pilots on or off
- Broadcast Predistortion including automatic group delay and dynamic constellation predistortion for QPSK and 8PSK (preliminary option XB)
- Extended Predistortion including automatic group delay and static constellation predistortion up to 32APSK (preliminary option XE)
- Physical layer framing with scrambling codes 0 to 262141 according to DVB-S2
- Physical layer framing according DVB-S2 Annex M (time-slicing)
- Physical layer framing according DVB-S2X Annex E, Format 4: "Flexible Format with VL-SNR PLH Tracking"
- Symbol rates from 1 Msps to 400 Msps
- Roll-Off: 35 %, 25 %, 20 %, 15 %, 10 %, 5 %

- Adjustable digital gain slope equalizer
- Low spurious output
- OptiACM system for optimized bandwidth usage and extended weather insensitivity for IP transmission
- Gigabit Ethernet data interface
- IP and baseband traffic shaping
- Generic Stream Encapsulation (GSE) direct to DVB-S2 baseband frames
- Multiprotocol Encapsulation (MPE)
- Operates as Layer 2 Bridge, Layer 3 Bridge or Layer 3 Router
- Capacity calculator, optional capacity limitation per TS input
- Transmit mute input
- Tx Monitor Output on Frontpanel
- Remote control through RS232, RS422/485 (2-wire or 4-wire) interfaces, TCP/IP over Ethernet, Web browser interface

- 10 MHz Reference OCXO included
- Ext. 10 MHz reference input
- 10 MHz reference output
- Summary alarm output with dual change over switch contacts
- Operating temperature range 0 °C to 50 °C (32 °F to 122 °F)
- CE compliant
- **3 years warranty**

Open questions, demo units

If you need more information about WORK Microwave's satellite modulators or if you would like to have demo a unit, please contact us via e-mail: sales@work-microwave.com or call us. We are glad to assist you.



DVB-S2X Wideband Modulator

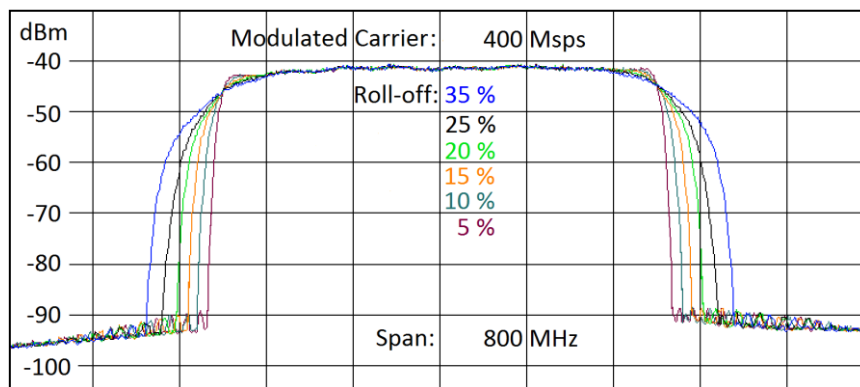
Modulator Type:	SDMW	
IF-Output Frequency:	L-band Output 950 ... 2150 MHz	
Frequency Resolution:	1 Hz	
Phase Noise:	10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz 10 MHz 100 MHz	-65 -75 -88 -90 -100 -120 -125 -130
	max. values in dBc/Hz	
IF-Output Characteristics:	Impedance: Return Loss: Output Power: Output Power muted: Connector:	50 Ω > 18 dB -30 dBm ... 0 dBm, 0.1 dB steps, ±0.5 dBm accuracy < -85 dBm SMA female
Monitoring Output (on front panel):	Output Power: Impedance: Return Loss: Connector:	-20 dB of L-band Output 50 Ω > 18 dB SMA female
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: Step size:	1 Msps ... 400 Msps 1 sps
Modulation / Encoding DVB-S2X:	ModCods non-linear: (normal FEC frame) ModCods non-linear: (short FEC frame) ModCods linear: (normal FEC frame) Physical Layer Framing: Physical Layer Signaling: Pilots Insertion: Physical Layer Scrambling:	QSPK 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 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 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, 25/36-L (contact factory for 64APSK, 128APSK, 256 APSK modulation types) According ETSI EN 302307 ETSI EN 302307 Annex M: Time-slicing ETSI EN 302307-2, Annex E, Format 4 yes on / off N = 0 ... 262141 (ETSI EN 302307) N = 0 ... 1048575 for reference and payload scrambler (ETSI EN 302307-2, Annex E)
Modulation / Coding DVB-S2:	Outer BCH Code: Inner LDPC Code: Physical Layer Framing: Physical Layer Signaling: Pilots Insertion: Physical Layer Scrambling:	FEC-Frames nldpc = 64800 (normal FEC Frame) nldpc = 16200 (short FEC Frame) 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 yes yes on / off N = 0 ... 262141 all according ETSI EN 302307
Packet Stuffing:	Dummy PLFRAME insertion when the data rate to transmit is higher than the data rate at the inputs.	
Signal Spectrum Mask:	α = 0.35, 0.25, 0.20 according ETSI EN 302307 α = 0.15, 0.10, 0.05 according ETSI EN 302307-2	
Broadcast Predistortion (Option XB) Extended Predistortion (Option XE):	Hardware and signal processing can be enabled through customer field selectable firmware options. An external windows PC is required to run the application program, which optimizes the predistortion parameters in the background of live transmissions (if activated), by reading information from a reference demodulator. For all communication between the reference demodulator, the application program and the modulator IP connectivity is used.	
Stream Adaption:	Stream Adaption: Baseband Scrambling:	yes yes (according ETSI EN 302307)
Transport Stream Inputs:	Up to 12 x ASI (BNC female 75 Ω) Supporting up to 12 Multiple Transport Stream Input (auto switching dual input) Alternatively for 8 out of 12 inputs Transport Stream over IP Inputs (Connector RJ-45, 100/1000 Mbps, auto sensing), IPv4, UDP and RTP support, FEC according SMPTE 2022 1/2, Jitter tolerance 1... 500 ms, Conversion TS over IP to TS.	
Multiple Transport Stream Input Operation:	Individual modulation and FEC (MODCOD) configuration per TS input. capacity calculator, capacity limitation per TS input can be activated.	
Transport Stream Frames Size:	188 or 204 bytes	
Data Rate:	3 kbps ... 213 Mbps (ASI interface) 10 kbps ... 213 Mbps (TS over IP interface)	
Transport Stream Mode Adaption DVB-S2:	Input Stream Synchroniser Null-Packet Deletion CRC-8 Encoder: Baseband Header Insertion:	yes (according ETSI EN 302307 Annex D.2) yes (according ETSI EN 302307 Annex D.3) yes yes

Specifications continued next page

GSE Encapsulator	Up to 4
Baseband Channels:	16 baseband channel with separate DVB-S2 baseband settings (MODCOD, FEC frame length, pilots, encapsulation type, multistream ID, timeout)
OptiACM:	CCM / VCM / ACM functionality for point-to-point and point-to-multipoint links 16 ACM channels with separate MODCOD range and Es/N0 sensitivity ACM channels arbitrary assignable to baseband channels
BB Traffic Shaper:	Baseband channel limits based on symbol rate for virtual share of the carrier Guaranteed and limited bandwidth individually configurable
Data Interface:	Ethernet (1xRJ-45, 10/100/1000 Mbps auto sensing)
IP Data Rate:	up to 400 Mbps or 80000 pps
Network Operation:	Layer 2: Bridge (Ethernet frame transmission) STP/RSTP Layer 3: Bridge/Router (IP packet transmission), IPv4, IPv6 256 IP/subnet routes per port 16 DVB-S2 baseband channels
Data Encapsulation:	Generic Stream Encapsulation (GSE) according ETSI TS 102606 Multiprotocol Encapsulation (MPE) according to ETSI EN 301192
IP Traffic Shaper:	64 independent rules Guaranteed and limited bandwidths Fixed or dynamically integrated into ACM (bind to MODCOD) Match criteria: source/destination IP subnet, source MAC, UDP/TCP port ranges, TOS/DS field, packet size (Active IP Traffic shaper reduces max. packet rate to typ. 50000 pps)

Monitoring and Control Interface:	Protocol: SNMP (tbc) Connection: UDP over Ethernet (10/100 Mbps auto sensing) IPv4, IPv6, connector RJ-45
	Protocol: HTTP (web browser interface) Connection: TCP/IP over Ethernet (10/100 Mbps, auto sensing) IPv4, IPv6, connector RJ-45
	Protocol: Multipoint Connection: RS232 or RS422/RS485 (configurable), connector DSUB09 female or TCP/IP over Ethernet (10/100 Mbps, auto sensing) IPv4, IPv6, connector RJ-45
Alarm Interface:	Alarm: two potential free contacts (DPDT), Mute Input: TTL logic input with internal pull up Connector DSUB09
Internal Fan	Fan included
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, 4 function keys
Mains Power Input:	100 ... 240 V AC nominal, 90 ... 264 V AC max, 50 ... 60 Hz
Mains Power Consumption:	Typ 78 W / 115 VA (2 x GSE Encapsulator, 2x TSolP ;Module)
Mains Power Input Connector:	IEC C14
Mains Fuse:	2 x 5 A time lag fuse
Dimension and Weight:	483 x 49 x 470 mm ³ (WxHxD), 2 RU (19") approx. 15 kg max

Specifications are subject to change



Order Information:

SDMW

Wideband Modulator with L-band Output 50 Ω (customized options on request)



Trade Mark of the DVB Digital Video Broadcasting Project