

SAT-4d DVB Audio Satellite Receiver

Highlights

- ▶ Professional DVB-S/S2 audio receiver
- ▶ Multi-format 4-channel audio decoder
- ▶ Designed for audio over satellite distribution links



SAT-4d– DVB Audio Satellite Receiver (1/3)

DVB transport stream input

DVB-S/S2 (single and multiple channels per carrier) Double satellite tuner supporting QPSK, 8PSK, 16APSK and 32APSK

- ▶ Low symbol rate tuner 64 kSym/s*
- ▶ ASI input and output
- ▶ Gigabit IP
- ▶ BISS-1,E descrambling (SAT / ASI input)*

Audio decoding

High-quality multi-format audio decoding for up to 4 stereo channels

- ▶ MPEG-1/2 Layer 2, 3
- ▶ G.711, G.722, Linear PCM
- ▶ Opus, Ogg Vorbis
- ▶ AAC-LC, HE-AAC v1 & v2, AAC-LD, AAC-ELD, AAC-ELDv2, xHE-AAC
- ▶ Enhanced aptX (E-aptX)
- ▶ Dolby Digital Pro*

Audio output

Combined XLR connectors for digital or analog output

- ▶ Up to 4 balanced digital AES/EBU
- ▶ Up to 2 balanced analogue
- ▶ Analog/digital output can be configured per XLR pair

Redundancy

- ▶ Icecast, Shoutcast, HLS input*
- ▶ Enhanced integrated memory as additional back-up solution*

Data output

- ▶ 4x DTE (Ancillary data & auxiliary (PID) data)
- ▶ 8x DTE, per UDP up to 16*

* This function is optional. Please find the complete list of options at the end of the document.



SAT-4d– DVB Audio Satellite Receiver (2/3)

Transport stream output

- ▶ ASI input and output
- ▶ Gigabit IP (TS forwarding)

IP input

Rock solid network connection even in stress conditions according to standards RFC 3550, RFC 3551, RFC 3640, RFC 2250

- ▶ Professional audio IP reception using UDP, RTP
- ▶ PRO MPEG FEC, Dual streaming input
- ▶ SRT (Secure Reliable Transport) & RIST (Reliable Internet Stream Transport) *
- ▶ TS RTP, UDP and SRT streaming input*
- ▶ Livewire / Ravenna (SAP, AES67, PTPv2) *

Backup / advanced redundancy management

- ▶ Flexible automatic switch over concept with free definition of alternative input sources as redundancy solution in case of failures
- ▶ Playing files from internal storage or using alternative streams (Icecast, Shoutcast, HLS) *
- ▶ Dual IP ports for data + 1 IP port for control interface
- ▶ Redundant power supply 90 - 260 VAC or 48 VDC*

Special

- ▶ Energy efficient 24/7 broadcast quality
- ▶ RDS decoding (built in RDS / UECP decoder)
- ▶ Embedded auxiliary data (RBDS / RDS or PAD) and GPIO forwarding
- ▶ Synchronized FM transmission within FM SFN networks*

Monitoring and control

- ▶ Remote control with various possibilities: HTTP/S, FTP, NMS, SNMP
- ▶ Revised configuration via web user interface for easier setup
- ▶ SNMP v2c & V3, relays, inputs
- ▶ REST-API
- ▶ Ember+
- ▶ Remote control via satellite (on request)

* This function is optional. Please find the complete list of options at the end of the document.



SAT-4d – DVB Audio Satellite Receiver (3/3)

Advanced control functionalities

- ▶ HTTP / HTTPS: via web interface
- ▶ Adjustable silence detection
- ▶ IP buffer and jitter check
- ▶ PLL control
- ▶ SNMP, alarm, source switch & logging for control via centralized NMS (Network Management System)

Perfect audio & latency management

- ▶ GPS based 2wcom latency control solution usage in SFN FM networks*
- ▶ ACIP compliant high audio quality and PTPv2 network synchronization*

* This function is optional. Please find the complete list of options at the end of the document.



Technical details (1/4)

Input/output

SAT

	Dual Tuner (default)	Advanced Single Tuner (optional)
Connector RF1	F connector female (input)	F connector female (input)
Connector RF2	F connector female (2 nd input)	F connector female (loop-through)
	950 – 2.150 MHz, step 1 kHz All LNB oscillator frequencies possible	950 – 2.150 MHz, step 1 kHz All LNB oscillator frequencies possible
Input level, impedance	-75 – -20 dBm, 75 Ω	-75 – -20 dBm, 75 Ω
LNB Control	13 V vertical, 18 V horizontal, off 0 kHz low band, 22kHz high band	13 V vertical, 18 V horizontal, off 0 kHz low band, 22kHz high band
Noise figure	Typical 6dB, max. 12 dB	Typical 6dB, max. 12 dB
DVB-S Demodulation/Decoding	QPSK CCM VITERBI and Reed-Solomon decoder 1/2, 2/3, 3/4, 5/6, 6/7, 7/8	QPSK CCM VITERBI and Reed-Solomon decoder 1/2, 2/3, 3/4, 5/6, 6/7, 7/8
DVB-S2 Demodulation/Decoding	QPSK, 8PSK, 16APSK and 32APSK CCM, VCM and ACM LDPC and BCH decoder 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10	QPSK, 8PSK, 16APSK and 32APSK CCM, VCM and ACM LDPC and BCH decoder 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Symbol rates	1 – 45 MSym/s	QPSK, 8PSK, 16APSK: 0.64 – 45 MSym/s 32APSK: 0.64 – 38 MSym/s
Data processing	single and multiple MPEG TS	single and multiple MPEG TS single and multiple GSE
PL scrambling	ID 0 – 262144	ID 0 – 262144
IF Filter bandwidth	Automatic selection	Automatic selection
MPEG decoding	according to ETSI TR 101 154	according to ETSI TR 101 154

ASI

Connector	1x BNC 75 Ω output 1x BNC 75 Ω configurable to be either ASI input or 1PPS SYNC input (option)
Data	MPEG2 TS- 270 Mbps



Technical details (2/4)

Ethernet

Connector	3x RJ45 (Control, 2x Data)
Type	Auto switching 10/100/1000 BASE-T, Unicast, Multicast
Data	Audio, serial data and GPIO transmission, controlling and setup functions MPEG TS or MPE output

Redundancy Input

Data	Icecast, Shoutcast (optional)
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Audio decoder

Standards	Linear PCM, G.711, G.722 Opus, Ogg Vorbis MPEG 1/2 Layer 2, 3 MPEG-2/MPEG-4 AAC-LC, MPEG-4 HE-AAC v1 & v2, MPEG-4/MPEG-D xHE-AAC MPEG-4 AAC-LD/ELD/ELdv2 Enhanced aptX (E-aptX) Dolby Digital (AC-3), Dolby Digital Plus (E-AC-3), Dolby E on request. (optional)
Sample rates	16, 22.05, 24, 32, 44.1, 48 kHz (on request: up to 192 kHz)
Sample rate converter	8:1 (with bypass modes)

Interfaces

Audio

Digital out	4x AES/EBU, 110 Ω balanced, integrated XLR male shared with analog out (configurable)
Analog out	2x L/R, < 20 Ω balanced, integrated XLR male shared with digital out (configurable)
Headphone (out)	L/R, < 10 Ω , 6,3 mm
Analog reference level	+9 dBu
Adjustable gain	20 – +6 dB
Harmonic distortion	< 0.05 % / < -66 dB (40 Hz – 10 kHz)
Frequency response	Depends on sample rate – e.g. 48 kHz: 0,1 dB; 20 Hz – 22,5 kHz
Digital reference level	9 dBFS
Adjustable gain	20 – +6 dB
Dynamic range	16 Bit: > 89 dB; 24 Bit, > 130 dB



Technical details (3/4)

Serial

Connector	4x RS-232C (rear) Optional: 8x RS232c via Sub D-15
Data	Private data, MPEG ancillary data, UECP/RDS (acc.to TR 101 154)

USB

Connector	USB 2.0
Data	interface for service, configuration and firmware updates

Contact-closure

Connector	26 pole sub-D male
Inputs	8 inputs
Outputs	7+1 floating relays, 7 relays SPST (from A), 1 relay SPDT (from C) Optional: 16 relays, DC: max. 30 V, 1 A, 10 W

Internal storage (optional)

Data	internal audio files
Size	7 GB (optional 1000 GB)
Type	eMMC (optional SSD)

Time synchronization

PTP v2	Network synchronization according to IEEE 1588-2008
SYNC / AUX1	BNC – 75 Ω – 1PPS

Control and monitor

GUI and interfaces

User interface	Integrated Web GUI, LCD display
Protocols	2wcom NMS, HTTPS, SNMP, UDP, RTCP, SRT Secure Reliable Transport, SFTP IGMP, ICMP, NTP, DHCP, SNMP, SSH, PTPv2, TCP (Iccast, HLS)

Front panel

Display: LCD	Graphical, 264x64 pixel
Jog wheel	Impulse, enter button
LED	4 Duo LEDs: Power, input, output, warning



Technical details (4/4)

General data

Power consumption	< 20 W
Case dimensions	19", 1 RU, depth: 310 mm, width: 424 mm, front panel: 484 mm
Weight	< 5 kg
Material	Steel plate (aluminum-zinc coated)
Operating temp. range	0 – +45°C
Storage temp. range	-40 – +70°C
Languages	English

Power supply

Standard AC	1 internal IEC power connector voltage range 90 – 260 VAC (nominal 100 – 240 VAC) frequency range 47 – 63 Hz (nominal 50 – 60 Hz)
Standard DC (optional)	1 internal (Neutrik powerCON) voltage range -40 – -60 VDC (nominal -48 VDC)
Dual internal (optional)	Two internal redundant power supplies (AC or DC) automatic switchover and prioritization AC: 90 – 260 VAC (nominal 100 – 240 VAC), 47 – 63 Hz (nominal 50 – 60 Hz) DC: -40 – -60 VDC (nominal -48 VDC)
Dual hot-plug (optional)	Two hot-swappable redundant power supplies (AC or DC) automatic switchover and prioritization AC: 90 – 260 VAC (nominal 100 – 240 VAC), 47 – 63 Hz (nominal 50 – 60 Hz) DC: -40 – -60 VDC (nominal -48 VDC)



Options (1/2)

SAT-4d base unit variations

Each base unit includes one channel. You can choose between the following base unit variations:

Article no.	Name
VER63601	Base unit SAT-4d with 1x internal AC power supply
VER63602	Base unit SAT-4d with 2x internal AC power supplies
VER63603	Base unit SAT-4d with slot for 2x hot-plug power supply <ul style="list-style-type: none">▶ 2x hot-plug power supplies AC / DC not included.▶ Please order 2 hot-plug power supplies AC (VER45851) or DC (VER45852).
VER63604	Base unit SAT-4d with 1x AC / 1x DC (DC leading) internal power supplies
VER63605	Base unit SAT-4d with 1x DC internal power supply

SAT-4d hardware options

Please note that hardware options are installed at the factory in Flensburg, Germany, and can only be retrofitted independently in individual cases.

Article no.	Name	Description
VER63613	Advanced single satellite tuner (*)	DVB-S/S2 low symbol rate single tuner module with additional loop-through output <ul style="list-style-type: none">▶ QPSK, 8PSK, 16APSK, 32APSK▶ Supported symbol rates: 64 kSym/s – 45 MSym/s▶ GSE Support (* Replaces default tuner)
VER63009	Breakout cable RS232 8-times	Cable for in- and output of 8x ancillary data (e.g. UECP RDS data) via RS232 cable

SAT-4d software options

Please note that software options can be retrofitted remotely.

Article no.	Name	Description
VER63610	Activation of additional audio channel	Activation of additional audio channel of the base unit incl. all ordered audio codecs.
VER63012	Livewire+	According to the standard of audio over IP interoperability Livewire+ (Including AES67, LWRP, LWCP, Livewire Advertisement). Price per activated channel.
VER63001	Ravenna, AES67, PTP	According to the standard Ravenna of audio over IP interoperability (including AES67, SAP, RTSP, PTP). Price per activated channel.
VER63614	Audio-Backup IP-Input - Icecast	IP-Audio streaming input as an additional backup solution <ul style="list-style-type: none">▶ Icecast, Shoutcast Price per unit.



Options (2/2)

Article no.	Name	Description
VER63615	Audio-Backup File playout	File playout from internal memory as an additional back-up solution Price per unit.
VER63013	Live listening	Audio monitoring via web interface or any web stream client. Price per activated channel.
VER63003	SFN (single frequency network)	Perfect timing and network synchronization for SFN applications. Price per unit. On request.
VER63016	SRT/RIST decoder	SRT functionality for decoder according to SRT standard of the SRT Alliance (including UDP). RIST functionality for decoder according to IETF standard "RIST Simple Profile" and RFC 4585. Price per activated channel.
VER63617	BISS Descrambling	Descrambling of BISS-1 and BISS-E according to EBU-Tech 3292 rev. 2 Price per unit.
VER63024	MPE	MPE (Multiprotocol Encapsulation) decoding. Price per unit.
VER63025	TS forwarding over IP	TS Forwarding enables the forwarding of a complete TS or together with the MPE Option (VER63024) MPE-forwarding. The SAT tuner is used as source. Price per unit.
VER63019	Dolby Digital Pro Decoder	Supports Dolby Digital (AC-3), Dolby Digital Plus (E-AC-3) Support of Dolby E on request. Price per activated channel.