# SAT-4da

# DVB Audio Satellite Receiver

## Highlights

- Professional DVB-S/S2 audio receiver
- Multi-format 4-channel audio decoder
- Full analog stereo support with 8 XLR outputs

Your audio. Our solution.

2wcom


# SAT-4da – 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 8 balanced digital AES/EBU
- Up to 4 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-4da – 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-4da – 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 (2nd input) | F connector female (loop-through) |
| | 950 – 2.150 MHz, step 1 kHz<br>All LNB oscillator frequencies possible | 950 – 2.150 MHz, step 1 kHz<br>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<br>0 kHz low band, 22kHz high band | 13 V vertical, 18 V horizontal, off<br>0 kHz low band, 22kHz high band |
| **Noise figure** | Typical 6dB, max. 12 dB | Typical 6dB, max. 12 dB |
| **DVB-S Demodulation/ Decoding** | QPSK<br>CCM<br>VITERBI and Reed-Solomon decoder 1/2, 2/3, 3/4, 5/6, 6/7, 7/8 | QPSK<br>CCM<br>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<br>CCM, VCM and ACM<br>LDPC and BCH decoder<br>1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 | QPSK, 8PSK, 16APSK and 32APSK<br>CCM, VCM and ACM<br>LDPC and BCH decoder<br>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:<br>0.64 – 45 MSym/s<br>32APSK: 0.64 – 38 MSym/s |
| **Data processing** | single and multiple MPEG TS | single and multiple MPEG TS<br>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<br>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<br>MPEG TS or MPE output |

## Redundancy Input

| | |
|---|---|
| **Data** | Icecast, Shoutcast (optional) |

## Audio decoder

| | |
|---|---|
| **Standards** | Linear PCM, G.711, G.722<br>Opus, Ogg Vorbis<br>MPEG 1/2 Layer 2, 3<br>MPEG-2/MPEG-4 AAC-LC, MPEG-4 HE-AAC v1 & v2, MPEG-4/MPEG-D xHE-AAC<br>MPEG-4 AAC-LD/ELD/ELDv2<br>Enhanced aptX (E-aptX)<br>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** | 8x AES/EBU, 110 Ω balanced, integrated XLR male<br>output 1–4 are mirrored on output 5 – 8<br>shared with analog out (configurable) |
| **Analog out** | 4x L/R, < 20 Ω balanced, integrated XLR male<br>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)<br>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)<br>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 WebGUI, LCD display |
| **Protocols** | 2wcom NMS, HTTPS, SNMP, UDP, RTCP, SRT Secure Reliable Transport, SFTP IGMP, ICMP, NTP, DHCP, SNMP, SSH, PTPv2, TCP (Icecast, 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<br>voltage range 90 – 260 VAC (nominal 100 – 240 VAC)<br>frequency range 47 – 63 Hz (nominal 50 – 60 Hz) |
| **Standard DC (optional)** | 1 internal (Neutrik powerCON)<br>voltage range -40 – -60 VDC (nominal -48 VDC) |
| **Dual internal (optional)** | Two internal redundant power supplies (AC or DC)<br>automatic switchover and prioritization<br>AC: 90 – 260 VAC (nominal 100 – 240 VAC), 47 – 63 Hz (nominal 50 – 60 Hz)<br>DC: -40 – -60 VDC (nominal -48 VDC) |
| **Dual hot-plug (optional)** | Two hot-swappable redundant power supplies (AC or DC)<br>automatic switchover and prioritization<br>AC: 90 – 260 VAC (nominal 100 – 240 VAC), 47 – 63 Hz (nominal 50 – 60 Hz)<br>DC: -40 – -60 VDC (nominal -48 VDC) |

# Options (1/2)

## SAT-4da base unit variations

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

| Article no. | Name |
|---|---|
| **VER63701** | Base unit SAT-4da with 1x internal AC power supply |
| **VER63702** | Base unit SAT-4da with 2x internal AC power supplies |
| **VER63703** | Base unit SAT-4da with slot for 2x hot-plug power supply<br>▶ 2x hot-plug power supplies AC / DC not included.<br>▶ Please order 2 hot-plug power supplies AC (VER45851) or DC (VER45852). |

## SAT-4da 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<br>▶ QPSK, 8PSK, 16APSK, 32APSK<br>▶ Supported symbol rates: 64 kSym/s – 45 MSym/s<br>▶ GSE Support<br>(*) 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 |
| **VER45851** | Hot-plug AC power supply | Power supply with automatic switch over in case of failure.<br>▶ 90 – 260 VAC (nominal 100 – 240 VAC),<br>▶ 47 – 63 Hz (nominal 50 – 60 Hz) |
| **VER45852** | Hot-plug DC power supply | Power supply with automatic switch over in case of failure.<br>▶ 40 – -60 VDC (nominal -48 VDC) |

## SAT4da 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).<br>Price per activated channel. |

# Options (2/2)

| Article no. | Name | Description |
|---|---|---|
| **VER63001** | Ravenna, AES67, PTP | According to the standard Ravenna of audio over IP interoperability (including AES67, SAP, RTSP, PTP).<br>Price per activated channel. |
| **VER63614** | Audio-Backup IP-Input - Icecast | IP-Audio streaming input as an additional backup solution<br>Icecast, Shoutcast<br>Price per unit. |
| **VER63615** | Audio-Backup File playout | File playout from internal memory as an additional back-up solution<br>Price per unit. |
| **VER63013** | Live listening | Audio monitoring via web interface or any web stream client.<br>Price per activated channel. |
| **VER63003** | SFN (single frequency network) | Perfect timing and network synchronization for SFN applications.<br>Price per activated channel.<br>On request. |
| **VER63016** | SRT/RIST decoder | SRT functionality for decoder according to SRT standard of the SRT Alliance (including UDP).<br>RIST functionality for decoder according to IETF standard "RIST Simple Profile" and RFC 4585.<br>Price per activated channel. |
| **VER63617** | BISS Descrambling | Descrambling of BISS-1 and BISS-E according to EBU-Tech 3292 rev. 2<br>Price per unit. |
| **VER63024** | MPE | MPE (Multiprotocol Encapsulation) decoding.<br>Price per unit. |
| **VER63025** | TS forwarding over IP | TS Forwarding enables the forwarding of a complete TS or together with the MPE Option (VER63024)<br>MPE-forwarding. The SAT tuner is used as source..<br>Price per unit. |
| **VER63019** | Dolby Digital Pro Decoder | Supports Dolby Digital (AC-3), Dolby Digital Plus (E-AC-3)<br>Support of Dolby E on request.<br>Price per unit. |