

TITAN T-Rug Enc

ULTIMATE FLEXIBLE UHD ENCODER AND DECODER FOR HARSH ENVIRONMENTS

Our flexible UHD encoder and decoder, hosted on the robust Ateme T-RUG server, is engineered to deliver unparalleled video quality in the most demanding conditions. This advanced solution offers versatile configurations to meet diverse content processing needs, ensuring exceptional results even in extreme environments.



Hosted on Ateme T-RUG Server

The flexible UHD encoder and decoder is powered by the Ateme T-RUG, a short-depth ruggedized server designed to thrive in harsh environments while maintaining peak performance. The T-RUG server provides:

- **Extended Temperature Range:** Ensures reliable operation in extreme conditions.
- **Shock and Vibration Resistance:** Built to withstand physical stresses common in mobile and outdoor setups.
- **Dust Filter:** Keeps internal components clean, ensuring longevity and consistent performance.
- **Front Panel with LCD and Keypad:** Simplifies video and application monitoring and control.
- **Low Noise and Fast Boot Time:** Ideal for environments where quick setup and quiet operation are crucial.
- **Energy Efficiency:** Equipped with a mono AMD processor, it delivers high performance at half the power consumption of dual Intel processors.



Key Features

- **4k UHD Encoding and Decoding:** Seamless high-definition content creation and delivery.
- **Dual UHD Decoders:** Maximizes decoding capabilities for handling multiple streams simultaneously.
- **Motion Estimation Frame-Rate Converter:** Offers SDI to SDI conversion, ensuring smooth and adaptable frame rate transitions.
- **Dense SMPTE-2110 or TS JPEG-XS Links:** High-efficiency links for professional video over IP transport.
- **Multi-Source Support:** Compatible with satellite, terrestrial, IP reception or emission, over-the-air, and scrambled sources.
- **Gateway and IP Turnaround:** Facilitates smooth video delivery and distribution.

Additional Benefits

- **Ease of Operation:** User-friendly front panel and BMC management for simplified control and monitoring.
- **Reduced Hardware Investment:** A single server with versatile I/O interfaces, reducing the need for multiple devices.
- **Compact Design:** Short depth and 1U height, optimized for space-saving in production trucks and outdoor cabinets.
- **Modular Software Integration:** Seamlessly integrates with Ateme's TITAN family software, offering flexibility and innovation-driven enhancements.

Applications

- **Production Trucks:** Reliable encoding and decoding in mobile broadcasting units.
- **Outdoor Cabinets:** Durable performance in remote and challenging locations.
- **On-Premises and Off-Premises Installations:** Versatile deployment options for diverse operational needs.
- **DSNG Applications:** Integration of L-Band Demodulation and Modulation offers a dense and efficient solution for Digital Satellite News Gathering (DSNG) applications.

The flexible UHD encoder and decoder on the Ateme T-RUG server is the ultimate solution for high-quality video processing in rugged environments, combining superior video performance with the reliability of a robust server platform.

I/O

Baseband inputs

- Up to 12G-SDI input
- SMPTE 2022-6 and SMPTE 2110 input
- JPEG-XS decompression from SMPTE 2110-22 and TR-07
- SDI & SMPTE 2022-6 failover & SMPTE 2022-7
- SMPTE 2110 Control with AMWA NMOS IS-04 and IS-05
- Follow input format up to HD in SDI, SMPTE 2022-6 & TR-07

Compressed outputs

- Up to 4 independant outputs
- MPEG2-TS over UDP/RTP (Unicast/Multicast)
- FEC ProMPEG CoP3r2
- Mirroring for SMPTE 2022-7
- ASI output
- DVB-S/S2/S2X modulation output
- Service filtering per output
- Zixi feeder - push and pull modes
- SRT feeder - caller, listener & rendez-vous modes
- RIST feeder (simple and main profile)

Modulation

- L-Band RF SMA 50 Ohms output (950-2150MHz)
- IF Band RF SMA 50 Ohms output (50-180 MHz)
- Symbol Rate: 0.05 to 80MBAud / Step 1Baud
- Main output: -35/+3 dBm $\pm$ 1 dB
- Main output step size: 0.1dB, stability: $\pm$ 0.1dB/10°C
- Frequency step size 1 Hz, Accuracy 0.4 Hz
- Spurious In-Band < -65dBc/4kHz
- Shoulder rejection < -50dB
- Monitoring output Main - 20dB
- Ref External Input / Output 10 MHz
- DVB-S (EN 300421) / DVB-S (DSNG EN 301210-1.1.1)
- DVB-S2 (EN 302307-1) / DVB-S2x (EN 302307-2)

Compressed inputs

- MPEG2-TS over UDP/RTP (Unicast/Multicast) input
- RF input (DVB-S/S2/S2X/T/T2/ATSC1.0/ISDB-T)
- ASI input
- Zixi receiver - push and pull modes
- SRT receiver - caller, listener and rendez-vous modes
- RIST receiver (simple and main profile)
- HLS Receiver, DASH Receiver**
- RTMP receiver
- Failover Any to Any & SMPTE 2022-7
- FEC ProMPEG CoP3r2
- IGMPv3 Source Filtering (SSM)

Demodulation

- Multi RF demodulator with selectable RF inputs
- L-Band input, C-band, Ku-band support
- Frequency Range: 950-2150 MHz (L-Band)
- C/N, BeR, C/N margin, Link margin monitoring
- Adjustable Search Range ***
- Support VCM, CCM*
- LNB Control
- DVB-S (EN 300421) / DVB-S (DSNG EN 301210-1.1.1)
- DVB-S2 (EN 302307-1) / DVB-S2x (EN 302307-2)
- DVB-T (EN 300744) / DVB-T2 Lite / DVB-T2 (TS 102 831)
- 8VSB demodulation, compliant with America ATSC1.0
- ISDB-T

Baseband outputs

- SD-SDI standard: SMPTE 259
- HD-SDI standard: SMPTE 292
- 3G-SDI standard: SMPTE 424
- 12G-SDI standard: SMPTE 2082
- SDR/HDR Signalling: SMPTE 425-5
- SDR/HDR Metadata in SMPTE-2108
- 2 independent outputs per channels
- SMPTE 2022-6 and SMPTE 2110 output
- Mirrored output for SMPTE 2022-7
- JPEG-XS compression on SMPTE 2110-22 and TR-07
- SMPTE 2110 Control with AMWA NMOS IS-04 and IS-05
- AES/EBU & Analog audio output***
- Analog CVBS composite output***ISDB-T

Video

Video Encoding

- HEVC (Main 4:2:0/4:2:2 10/12-bits) 120 Mbps max
- H.264 (Main/High 4:2:0/4:2:2 8/10-bit) 120 Mbps max
- MPEG-2 (4:2:0/4:2:2 8-bit) 80 Mbps max
- MPEG-4 AVC-I mode
- Resolution upscale & downscale
- Low latency mode (495ms HD, 555ms UHD)

Video Decoding

- Input up to 12-bit 4:2:2 HEVC UHDp59.94
- HEVC, H264, MPEG2, JPEG2000 (J2K) decode
- Low latency (sub 200ms)

Audio

Audio compression

- MPEG1-L2, MPEG-2/MPEG-4 AAC-LC, AAC-HEv1/HEv2 encode
- Dolby DD/DD+ Atmos /AC-4 encode, Dolby-E decode
- Dolby DD/DD+/AC-4, Dolby E, AES-302M pass-through

Audio decompression

- MPEG-1 Layer II, AAC-LC, AAC-HEv1/v2 decode
- Dolby E, AES302M pass through
- DD / DD+ / AC-4 decode & passthrough
- 5.1 to stereo downmix
- Audio/Video delay +/- 500ms
- Audio decode and Pass-through
- Up to 16 mono channels on SDI
- Audio Confidence monitoring on web UI

Ancillary Data

- AFD, WSS, VPS, VPI, VITC, ATC, CC, DVB Teletext, SMPTE2031, OP47, SCTE35 insertion via SCTE104 triggers

Content Protection

Scrambling

- BISS 0/1/E (Tech 3292-rev.2 and EBU R139)
- BISS-CA (Tech 3292-1)

Descrambling

- BISS1/2 mode 0/1/E (Tech 3292-rev.2 and EBU R139)
- BISS-CA (Tech 3292-1)
- HLS AES-128
- Support of major CAS vendors: Conax, Irdeto, NDS, Viaccess Protection
- DVB-CI CAM/IRD Pairing
- Fingerprinting: EMM/ECM controlled, OSD
- Watermarking: Nagra NexGuard, Verimatrix StreamControl, Viaccess-Orca WAO**, Irdeto TraceMark**StreamControl, Viaccess-Orca WAO**, Irdeto TraceMark**

* Contact your sales representative for the detailed list of features

** Contact factory for availability

*** Refer to the PCIe board used

System

- Secured Web UI for system/channels management
- Web UI monitoring and Mosaic
- HTTPS REST API (documented through Open API v3.0)
- JSON Configuration export/import
- SNMP (MIB v2c) to remote supervisor (alarms & traps)
- 64 Channel/Server Presets configurations memory
- Fw/Lic/Config/Assets Update - OTA DVB-SSU (ETSI 102-006)
- NTP and PTP support, DNS resolution
- VLAN and NIC bonding management
- Integrated Firewall per interface
- Remote Syslog, VPN support, IGMPv3 support
- User Management/scopes, OAuth2, LDAP & SAML support

Front Panel

- LCD screen + keypad for monitoring and configuration
- On/Off push button
- 6-keys keyboard for input & navigation
- Up to 4x 2.5" SATA slots, for M-CAM or HDD/SSD
- Dust filter, easy to clean & replace

Rear Panel

- 2x PCIe Gen3.0 x8 low profile slots
- 1x PCIe Gen3.0 x16 full height slot with additional power connector

IP interface

- 4x 1Gbps RJ45 + 1x RJ45 BMC for baseboard mgmt
- Up to 2x100Gbps***

ASI/SDI interface

- Up to 8 x SDI/ASI reversible pin per PCIe board***

RF interface

- Up to 4 x RF connectors / 8 demodulators per PCIe board ***
- Up to 1 x RF modulator L-band output***

Server

- Dual redundant, hot-plug PSUs 90-240VAC 650W
- Power consumption < 240W, 120W idle
- Board Management Controller (BMC)
- Dimensions: Depth: 540mm (21.2"); Width: 480mm (18.9")
- Height: 42.75 mm (1.68") - 1U minus 1.7mm, enabling piling with slides
- Weight 11.9 kg (raw with packing)
- Auto-adaptative airflow cooling, 4 very-high-performance, double fans
- Storage temperature: - 20°C to 80°C
- Operating temperature: 0°C to 45°C, extended to +55°C
- Vibrations: ETS 300019-2-2 (Transport); ETS 300019-2-5 (operating)

- Schocks: ETS 300019-2-2 (Transport, bumps + Free falls); IEC 60068-2-27 (operating)
- EMC: FCC part 15 class B, EN 55032, EN 61000-3-2, EN61000-3-3, EN55035
- Electrical Security: IEC 62368-1, UL 62368-1, CSA C22.2 NO. 62368, CE mark, NRTL
- Reliability: Designed for 24/7 operation. MTBF > 7 years @35°C
- RoHS, WEEE compliance to both EU directive 2011/95/EU and 2012/19/EU
- Customs HTSUS 8471.50.0000, ECCN 4D994, Made in China

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