MGW Pico+ TOUGH

Military Grade HEVC & H.264 Rugged Encoder

MGW Pico+ TOUGH is a miniature, power-efficient MIL-STD certified HEVC and H.264 rugged video encoder. It encodes and streams real-time video with frame-accurate KLV metadata. MGW Pico+ TOUGH is fanless and its pocket-size enclosure is designed for use on unmanned and manned vehicles, in fly-away kits or hand-carried in extreme conditions. MGW Pico+ TOUGH is available as a portable rugged encoder or as a single board with UHD encoding support for integrators.

Designed to meet the most stringent environmental requirements, the MGW Pico+ TOUGH packs all the necessary capabilities for any Surveillance, Intelligence and Reconnaissance (ISR) sensor or Situational Awareness (SA) video in an ultra-small enclosure.

The unit supports simultaneous encoding and streaming of analog and SDI sources in low bandwidth HEVC or H.264, asynchronous and synchronous KLV/STANAG metadata ingest from various sources, real-time image video scaling and efficient stream transport protections, and it outputs JITC compliant video streams.

Weighing under 400g, with 8.8W power consumption for 4K or dual channel streaming, and only 18 seconds from power-on to live IP stream, MGW Pico+ TOUGH is the ideal video encoder for any aerospace project, ground forces and manned/unmanned platforms needing low latency, low bandwidth HEVC with high-quality video streaming.

Applications

- Real-time IP streaming of 4K/HD/SD content for Situational Awareness (SA)
- Intelligence, Surveillance and Reconnaissance (ISR) video from ground and airborne vehicles over RF or satellite link
- Broadcast quality video contribution in harsh environments

Features & Benefits

- Low latency HD/SD streaming from SDI and Composite simultaneously
- Dual SDI inputs capture, with 4K/UHD support for the OEM board
- Low bandwidth HEVC/H.264 encoder suited for ISR missions
- Hardware based resolution and frame rate scaling
- Overlay for video input identification and timestamping
- Stream and record simultaneously to ensure content is stored while streaming over unreliable networks
- KLV/STANAG metadata ingest from SDI, IP or Serial with custom filtering
- Best SWAP: 0.82lb, 8.8W (typical) in a miniature form factor
- Available as rugged appliance or OEM board for integrators
- Not controlled under ITAR

Technical Specifications

Video Inputs

MGW Pico+ TOUGH

- 1 x 3G/HD/SD-SDI (SMPTE 259M-C, SMPTE 292M, SMPTE 274M, SMPTE 296M, SMPTE 424M, SMPTE 425M Level A only)
- 1 x Analog Composite/RS-170

MGW Pico+ TOUGH OEM (board)

- 1 x 12G/3G/HD/SD-SDI (SMPTE 259M-C, SMPTE 292M, SMPTE 274M, SMPTE 296M, SMPTE 424M, SMPTE 425M Level A only, SMPTE 2082-1)
- 1 x 3G/HD/SD-SDI (SMPTE 259M-C, SMPTE 292M, SMPTE 274M, SMPTE 296M, SMPTE 424M, SMPTE 425M) or 1 x Analog Composite/RS-170 (mixed input)

Input Resolutions/Frame Rates

- 4096x2160p @ 60, 59.94, 50, 30, 29.97, 25, 24, 23.98 Hz (4K DCI) - OEM board only
- 3840x2160p @ 60, 59.94, 50, 30, 29.97, 25, 24, 23.98 Hz (UHD) - OEM board only
- 1920x1080p @ 60, 59.94, 50, 30, 29.97, 25, 24 Hz
- 1920x1080i @ 60, 59.94, 50 Hz
- 1280x720p @ 60, 59.94, 50, 30, 29.97, 25 Hz
- 720x480i @ 59.94 Hz
- 720x576i @ 50 Hz

Audio Inputs

- SDI Embedded audio (Stereo and Mono)
- Analog unbalanced audio (Stereo and Mono)

Video Output

- Simultaneous H.264 and HEVC encoding of 2 x independent channels
- Up to 1x 4K60p output stream (OEM board only)
- Overlay for video input identification and timestamping (text and time)

HEVC (H.265) MPEG-H HEVC (ISO/IEC 23008-2)

- Main/Main 10 and Main 4:2:2 - up to 4:2:2 10-bits
- Level up to Level 6.1, Main and High Tier
- Selectable GOP structure and size: I, IP, IBP, IBBP, I(BP, I(4)BP
- Bit rate: 36Kbps to 80Mbps
  - Regulation modes: Constant (CBR), Variable (VBR)
- Frame rate: 1-60 fps. Configurable frame rate from 60 down to 1fps.
- Output resolutions: Configurable from CIF up to 3840x2160p60
- Encoding latency less than 30ms (p60)

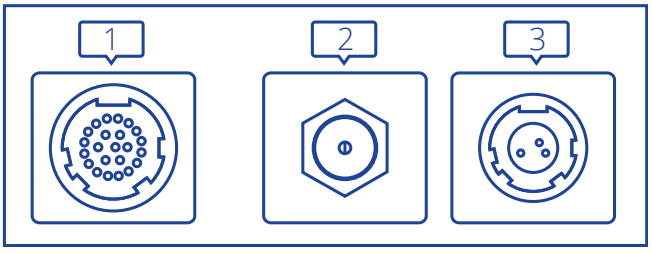
H.264 (MPEG-4 AVC Part 10) - ISO\IEC 14496-10 MPEG-4 AVC – Rec.

- ITU-T H.264
- Modes: Baseline Profile L3, Main Profile L3 and L4, High Profile L4 and L4.2
- Selectable GOP structure and size: I, IP, IBP, IBBP, I(3)BP, I(4)BP
- Bit rate: 64Kbps to 80Mbps
  - Regulation modes: Constant (CBR), Variable (VBR)
- Frame rate: 1-60 fps. Configurable frame rate from 60 down to 1fps.
- Output resolutions: Configurable from CIF up to 3840x2160p60
- Encoding latency less than 30ms (p60)

Audio Output

- Codec: MPEG-4 AAC-LC (ISO/IEC 14496-3)
- Stereo and Mono modes
- Bit Rate: 32Kbps - 256Kbps in Stereo, 16Kbps - 128Kbps in Mono
- Sampling Rate: 16 kHz - 48 kHz

Rear Panel Interfaces



1. **Ethernet, CVBS Analog Video In, RS232, Analog Audio, Reset**
2. **3G/HD/SD-SDI**
3. **Power 16-40VDC MIL-STD-704**

Network Protocols

- UDP TS: MPEG Transport Stream over UDP
- RTP TS: MPEG Transport Stream over RTP
- RTP ES (RTSP): Elementary stream over RTP
- Zixi Stream protection
  - Zixi P2P and Broadcaster modes
  - Zixi ABR streaming (Adaptive Bit rate)
  - Zixi Low Latency RTP TS with ProMPEG Forward Error Correction (SMPTE 2022)
- SRT (Caller, Listener and RendezVous)
- RIST
- SPRINT
- RTMP (H.264)
- Unicast and Multicast (IGMPv3) streaming
- HTTPS, SSH
- NTP, PTP v1 & v2 (IEEE 1588-2002, IEEE 1588-2008)

Encryption

- Real-time AES encryption for video, audio and metadata

Metadata

- Support for KLV over UDP and SDI (MISB STD 0605.7, VANC per SMPTE 336M)
- Custom KLV filtering of UAS Datalink Local Set to reduce the stream bit rate
- Absolute Time System and Timestamps (MISB STD 0603.4)
- Time Stamping and Transport of Compressed Motion Imagery and Metadata (MISB STD 0604.5)
- Security Metadata Universal and Local Sets for Digital Motion Imagery (MISB STD 0102.11)
- UAS Datalink Local Metadata Set (MISB STD 0601.11, STD 0902.6)
- STANAG 4609 output stream over UDP/IP
- JITC-MISB Compliant streaming of HD/SD ISR video

Management

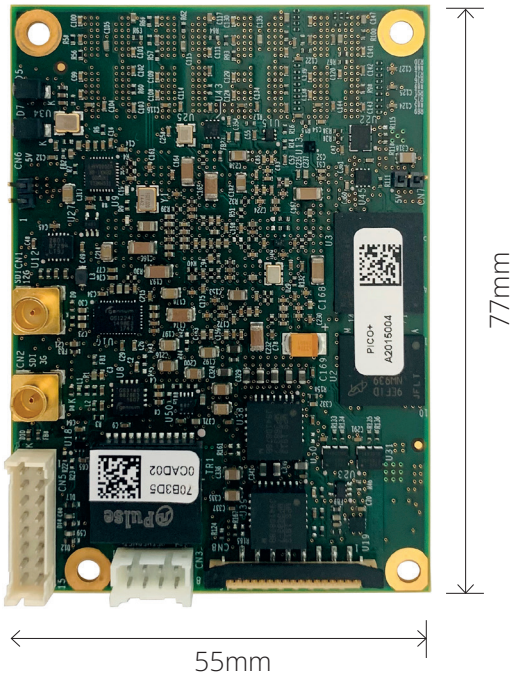
- Secure Web based remote management interface (HTTPS), password protected
- Custom SSL certificate loading capability
- Customizable Notice and Consent login banner
- Zixi/SRT streaming statistics for easier configuration and enhanced Quality of Service
- Autostart mode recovers saved configuration after power cycle
- Remote firmware and software upgrade capability via command line or web-GUI
- System and channel event logging
- Easy to use HTTPS Rest API for control and status monitoring from 3rd party control software
- Status LEDs for power, network activity, temperature and fan errors, streaming and video source indications
- System Discovery to retrieve MGW Pico+ IP address on a network
- SSH/Telnet interface for management (status and control)

Advanced Features

- Low latency HD/SD streaming from SDI and/or Composite sources with metadata
- UHD encoding in the PCB-only version from 12G-SDI input
- Hardware based resolution and frame rate scaling
- Highly flexible hardware-based resolution scaling (11 configurations) and frame rate sampling (1 to 60fps)
- Record content from any of the input sources to internal memory (max 2 streams simultaneously)
- Alternatively, record on a USB drive (PCB/OEM board only)
- Zixi, SRT, RIST and ProMPEG FEC error correction/packet recovery
- Time-synchronized playback: synchronize the playback of multiple independent streams when paired with MGW Ace Decoder
- On-the-fly bit rate change and Zixi ABR streaming for auto adaptive bit rate based on network conditions (HEVC/H.264)
- Latency monitoring when paired with MGW Ace Decoder
- Fast boot time, less than 20 seconds

PCB

With Secure-lock headers



Environmental/Regulation

- Operating Temperatures: -40° C to +70° C (-40° F to +158° F)
- Storage Temperatures: -55° C to 85° C (-67° F to 185 ° F), battery-free
- Relative Humidity: 5% to 95% (non-condensing)
- MTBF (As per MIL-HDBK-217F, 20°C, Operation time 100%):
  - Ground - 67 years
  - Airborne Inhabited cargo - 46.70 years
- Rugged design to meet DO-160G, MIL-STD-810G
- Complies with MIL-STD-461G
- Not controlled under ITAR
- TAA-compliant

OEM/Integration Ready PCB

- MGW Pico+ TOUGH was designed with industrial, aeronautics and commercial integrators in mind. The encoder is also available as a PCB-only unit with UHD encoding capabilities. It features 1x12G-SDI and 1x3G-SDI or Composite inputs for dual SDI channel encoding capabilities. A comprehensive SDK for command and control over IP is provided.

Physical

- 1.24" H x 3.70" W x 2.80" D (31.5mm H x 94mm W x 72.5mm D) Additional 20mm D for MIL connectors
- Weight: 0.82lb (370g)
- Enclosure: Military-grade rugged aluminum case, composite MIL connectors
- Status LEDs for power, network activity, streaming and video source indications
- Fanless, no moving parts design, 100% silent operation
- Mounting holes for seamless installation in vehicles/ on flat surface
- IP67

Power

- DC Input: 16-40VDC, 8.8W at 25° C (11W at 70° C)
- MIL-DTL-38999 series III Circular Connector
- MIL-STD-704

Ordering information

- 17967 -MGW Pico+ TOUGH (System)
- 18269 -MIL-DTL-38999 Cables Kit (Power supply, A/V, network and data cables MIL-DTL-38999 to Commercial plugs)
- 18095 - MGW Pico+ TOUGH PCB/OEM (PCB for integration into 3rd party systems)
- 18202 - MGW Pico+ TOUGH Developer Kit (PCB, I/O extension board with stand, Documentation)
- 18866 - Licence - AES encryption
- 19235 - MGW Diamond/Pico - License - Recording