MGW Diamond

4K & Multi-Channel SD/HD HEVC Encoder

VITEC

MGW Diamond Encoder

MGW Diamond is a small, power-efficient quad channel HD or one channel 4K HEVC video encoder ideal for field-based applications. It features a powerful encoding engine with the ability to output up to eight streams simultaneously.

MGW Diamond is available either as a portable appliance featuring impressive size, weight and power (SWaP) characteristics or as an openGear card for easy integration within production studios, broadcast facilities or corporate server room. Both product versions provide best-in-class video quality over a rich and industry-standard audio/video connectivity.

MGW Diamond captures up to 4x 3G/HD/SD-SDI or Composite inputs and streams live up to 8 channels, addressing diverse applications within sports, enterprise, defense and surveillance markets. Featuring Ultra High Definition and High Definition range (HDR) support, MGW Diamond can capture and stream 4K60p HDR10 or HLG video from either its 4x3G-SDI or 12G-SDI inputs.

For data-sensitive applications, the MGW Diamond supports KLV / STANAG metadata ingest from various sources (SDI, IP or Serial), real-time image cropping and video scaling, Forward Error Correction (FEC) streaming and JITC compliant output streams. It packs all the needed capabilities for delivering any type of Intelligence, Surveillance, and Reconnaissance (ISR) or Situational Awareness (SA) video generated by ground vehicles, manned or unmanned airborne platforms and marine vessels.

Applications

- Multi-site and/or Multi-channel IP Video contribution
- IP Video dissemination from multiple video sources (analog/digital) for Situation Awareness (SA) within ground vehicles, ships or aircraft
- Streaming Situational Awareness and FMV content across LANs and WANs with KLV / STANAG metadata
- Streaming Intelligence, Surveillance and Reconnaissance (ISR) video feeds from ground and airborne vehicles over RF or satellite link
- Streaming video to desktop/laptop, TV and mobile devices over bandwidth-constrained pipes

Benefits

- Low latency streaming from 4x SDI/Composite sources simultaneously
- Support for Ultra High Definition (4K) and High Definition Range (HDR)
- Up to 8x output streams
- Next-generation HEVC (H.265) compression support to reduce network bandwidth utilization by up to 50% compared to H.264
- Stream protection for reliable video/audio and metadata transmission (Zixi, SRT, RIST and Pro-MPEG)
- KLV / STANAG metadata ingest from SDI, IP plus multiplexing – JITC Compliant
- Compact, low-power hardware design – optimized for field use (14W) or dense openGear encoding solution

Rear Panel Interfaces
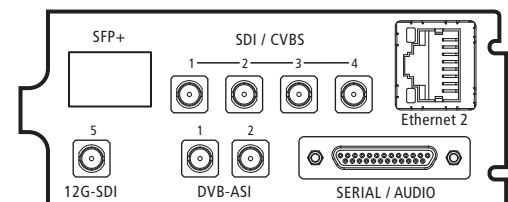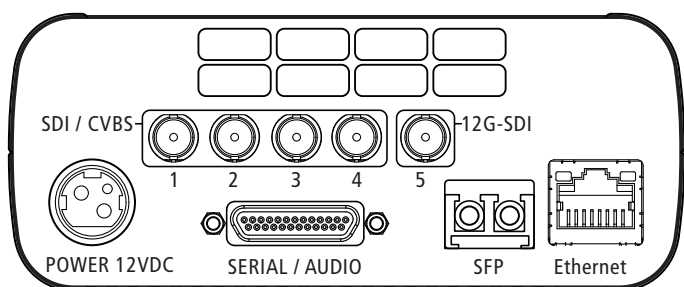
MGW Diamond OG rear module

Technical Specifications

Video Inputs
- SDI / Composite Inputs (HD-BNC)
- Supported standards:
  - o 12G-SDI (SMPTE 2082-1)
  - o 4x3G-SDI (SMPTE 425-5 Level A / Two-Sample Interleave)
  - o 3G/HD/SD-SDI (SMPTE 259M-C, SMPTE 292M, SMPTE 274M, SMPTE 296M, SMPTE 424M, 425M Level A only)
  - o Analog Composite / RS-170 (NTSC, PAL, PAL-M)
- Quad channel mode in 3G-SDI, HD-SDI, SD-SDI and Composite

Input Resolutions / Frame Rates
4096x2160p @ 60, 59.94, 50, 30, 29.97, 25, 24, 23.98 Hz (4K DCI)
3840x2160p @ 60, 59.94, 50, 30, 29.97, 25, 24, 23.98 Hz (UHD)
2048x1080p @ 60, 59.94, 50, 30, 29.97, 25, 24, 23.98 Hz
1920x1080p @ 60, 59.94, 50, 30, 29.97, 25, 24, 23.98 Hz
1920x1080i @ 60, 59.94, 50 Hz
1280x720p @ 60, 59.94, 50, 30, 29.97, 25 Hz
720x480/576i @ 60, 59.94, 50 Hz (NTSC, PAL, PAL-M)

Audio Inputs
- SDI Embedded audio (Stereo and Mono)
- 4x Analog unbalanced audio (Stereo and Mono)

Video Output
- Simultaneous HEVC and H.264 IP Video encoding of 4x independent channels (up to 1080p60 per channel)
- Up to 8 output streams with independent resolution (downscaling), frame rate and bitrate
- Up to 1x 4K60p output stream

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 5.2, Main and High Tier
- Selectable GOP structure and size: I, IP, IBP, IBBP, I(3)BP, I(4)BP
- Bit Rate: 36Kbps to 80Mbps
- Frame Rate: 1-60 fps. Configurable frame rate from 60 down to 1fps.
- Bit Rate Regulation Modes: Constant (CBR), Variable (VBR)
- Output Resolutions: Configurable from CIF up to 3840x2160p60
- Encoding latency less than 55ms

H.264 (MPEG-4 AVC Part 10) - ISO\IEC 14496-10 MPEG-4 AVC – Rec. ITU-T H.264
- Modes:
  - o Baseline Profile L3
  - o Main Profile L3 and L4
  - o High Profile L4 and L4.2
- Bit Rate: 64Kbps to 80Mbps
- Selectable GOP structure and size: I, IP, IBP, IBBP, I(3)BP, I(4)BP
- Frame Rate: 1-60 fps. Configurable framerate from 60 down to 1fps.
- Bit Rate Regulation Modes: Constant (CBR), Variable (VBR)
- Output Resolutions: Configurable from CIF up to 3840x2160p60
- Encoding latency less than 55ms

Audio Output
- Up to x32 audio encoding channels
- 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

Ancillary Data Support
- Timecode (SMPTE12M-2)
- Closed captions:
  - o CEA-708 / CEA-608
  - o Transport: ANSI/SCTE 128, ATSC A/72 [CC in HEVC user data]
- High Dynamic Range (HDR) :
  - o HDR10 (SMPTE ST 2084/ITU-R BT.2100)
  - o HLG (ITU-R BT.2100) from SDI (SMPTE ST 2108)

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
  - o Zixi P2P and Broadcaster modes
  - o Zixi ABR streaming (Adaptive Bitrate)
  - o Zixi Low Latency
- RTP TS with ProMPEG Forward Error Correction (SMPTE 2022)
- SRT (Caller, Listener and RendezVous)
- RTMP (H.264)
- Unicast and Multicast (IGMPv3) streaming
- HTTPS, NTP, SSH, SAP

Encryption
- Real-time AES encryption for video, audio and metadata.
- 128 and 256 bit encryption key support.
- Interoperability with AES compliant systems such as VITEC EZ TV and FITIS distribution platforms

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 LED's for power, network activity, Temperature and Fan Errors, streaming and video source indications
- Recovery or initialization of Ethernet settings over USB thumb drive
- System Discovery to retrieve MGW Diamond IP address on a network
- SSH/Telnet interface for management (status and control)

Network Interfaces
- 1x Gigabit Ethernet ports for streaming and/or management (10/100/1000 Base-T, Auto Detect, Half/Full Duplex)
- 1x SFP port for Gigabit Ethernet over RJ45 or Fiber
- DHCP / Static IP address, IPv4 and IPv6 support

Peripherals
- 4x RS-232 / Serial interface for KLV ingest
- 1x USB 2.0 port for easy configuration of system settings
- 1x Hardware system reset for factory reset or reboot

Metadata
- Support for KLV over UDP and SDI (MISB STD 0605.7, VANC per SMPTE 336M)
- 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

Environmental / Regulation
- Operating Temperatures: -20º C to +55º C (-4º F to +131º F)
- Relative Humidity: 5% to 95% (non-condensing)
- EMC Standards: FCC part 15 / ICES-003 Class A and CE
- Power: 12VDC, 14W (Typical), 17W (Max)
- MTBF: Ground - 14.29 years, Airborne Inhabited Cargo - 7.63 years (as per MIL-HDBK-217F, 20ºC, Operation time 100%)
- Not controlled under ITAR
- TAA Compliant

Physical
- MGW Diamond
  - o 1.57" H x 4.29" W x 4.21" D (40.1mm H x 109.6mm W x 107.6mm D)
  - o 1.01lb (0.46Kg)
  - o Enclosure: Industrial-grade, with mounting holes for seamless installation in vehicles / onto flat surfaces
  - o Optional rack-mount kit for standard 1RU 19" wide racks
- MGW Diamond OG
  - o Compatible with OGX and OG3 openGear frames
  - o Full Rear I/O Module (2 slots) for up to 10 cards within a 2RU openGear chassis

Advanced Features
- Multi-channel Low latency HD/SD streaming from SDI and/or Composite sources with metadata
- Hardware based resolution and frame rate scaling
- Highly flexible hardware based resolution scaling (11 configurations) and frame rate sampling (1 to 60fps)
- Zixi, SRT, RIST and ProMPEG FEC error correction / packet recovery
- Time-synchronized playback: synchronize the playback of multiple independent streams using with MGW Ace Decoder
- On-the-fly bitrate change and Zixi ABR streaming for auto adaptive bitrate based on network conditions (HEVC/H.264)
- Latency monitoring when paired with MGW Ace Decoder
- Fast boot time, less than 20 seconds

Ordering Information (P/N)
17338 → MGW Diamond - 4x HD or 1x4K channel - HEVC/H.264 Encoder (Breakout cable included)
17245 → MGW Diamond - 2x HD or 1x4K channel - HEVC/H.264 Encoder (Breakout cable included)
17851 → MGW Diamond - 1x4K channel - HEVC/H.264 Encoder (Breakout cable included)
17643 → MGW Diamond OG - 4x HD or 1x4K channel - HEVC/H.264 Encoder (Main and Rear I/O openGear modules)
17335 → MGW Diamond - KLV license
17239 → MGW Diamond Encoder Breakout cable (4x Unbalanced audio inputs, 4xSerial, 1x Talkback audio output)
16858 → Rack-mount kit for standard 1RU 19" wide racks (for 3x MGW Diamond)
16827 → Rack-mount front panel for 3x MGW Diamond
17498 → SFP to RJ45 Copper Ethernet module

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