

4K/Multi-HD Remote Production Encoder



Matrox® Monarch™ EDGE 4K/Multi-HD Remote Production Encoder

Affordably produce live, multi-camera events, while minimizing on-site expenses by keeping talent in-house with Monarch EDGE. A compact, robust, and low-power remote production encoder, Monarch EDGE synchronizes and securely delivers remote camera feeds to your master control room or cloud for production with remarkably low latency. Programs destined for web or over-the-top (OTT) delivery can select the 4:2:0 8-bit encoder version, while the 4:2:2 10-bit capable Monarch EDGE encoder version is ideal for demanding, broadcast-quality productions.

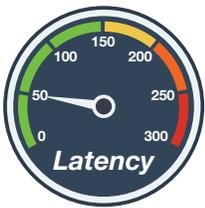


Big Productions, Small Footprint

Easily produce multi-angle live events by extending the production studio to any remote location with a network connection. Monarch EDGE can encode up to four camera feeds from HD or 3G-SDI sources. When an in-studio 4K production requires a remote feed, Monarch EDGE can accept either 4K signals over 12G-SDI, or a quad 3G-SDI to deliver a full-4K stream. For events that require more cameras, its compact footprint ensures that two units will fit into a single 1RU space.

Built for High Quality 10-bit H.264 Encoding

The optimized H.264 engine powering Monarch EDGE keeps data rates exceptionally low without sacrificing quality. I-frame-only streams reaching 120 Mbps can be delivered if quality is a high priority. Each input can be streamed at resolutions up to 1080p60 using the High 4:2:2 H.264 encoding profile. Furthermore, multiple processes can be performed on each input by powerful scaling and de-interlacing engines. This enables each input to be streamed at multiple resolutions and bitrates simultaneously, which is useful for remote monitoring.

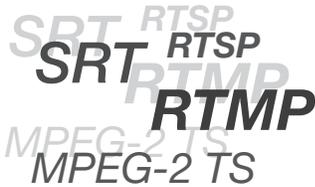


Exceptionally Low Encode Latency

In live productions, multiple signal sources must be synchronized. If a remote production encoder takes too long to transfer the signal from the field to the production system, delivering crisp cuts between local and remote feeds can prove difficult. High latency often means long delays between video capture and delivery, making live productions appear unsynchronized and unprofessional. With an exceptionally low 50ms of latency between video capture and stream output, Monarch EDGE achieves some of the lowest latencies on the market, ensuring remote production staff feel like they are at the event.

Keep it In-sync

All channels encoded by Monarch EDGE will be locked to a single clock, and the streams generated will have timestamps to allow a decoder to realign the streams at output. For the very best results, the cameras feeding the encoder should be genlocked together to ensure each frame is captured in phase. Monarch EDGE offers a genlock output jack with a signal that can be distributed to those cameras if an on-site sync generator is not available.



Flexible Streaming Formats

There are a variety of streaming protocols available to Monarch EDGE users. On closed networks, MPEG-2 TS or RTSP streams can be selected for delivery. For cloud-based destinations, or when the network is congested, SRT may be more appropriate. SRT is a new open-source format that provides the reliability of RTMP, while reducing latency, for use on open networks. SRT streams can also be encrypted if security is a concern.

Tally and Talkback¹

Monarch EDGE provides tally signals and talkback channels to facilitate bi-directional communication between on-site camera operators and in-studio personnel. These provisions on the device help reduce the amount of equipment required on site.



SDI and IP Connectivity

Monarch EDGE offers flexible, future-proof connectivity with 3G, 12G SDI, and ST 2110 over 25 GbE network connections. Inputs are auto-detectable and allow for a wide range of connectivity to devices such as cameras, switchers, vision mixers or routers. Additionally, audio can be selected from two channels of embedded audio per video input, or balanced analog audio connectors.

¹ These features must be supported at the decode end of the production chain with the help of custom integration by the user or vision mixer provider.



Convenient, Centralized Control

Monarch EDGE Control Hub is a powerful application that provides management and configuration remotely over all Monarch Edge units on the network. This powerful software provides authorized users with high-level views of all devices on the network, and enables full access and control from a single, easy-to-use interface.

Preview Inputs

Allowing up to four simultaneous input previews on a single desktop monitor, Monarch EDGE ensures that videos are ready to be webcasted. Monarch EDGE Control Hub allows users to effortlessly configure how they would like to preview audio sources of input. Users can choose to monitor one input at a time, or mute the DisplayPort audio output.



Robust and Practical Design

Monarch EDGE was built with reliability in mind. An LCD screen on the front of the appliance allows the user to quickly access its status and configuration settings. A locking power connector safeguards against connection loss during production. Redundant Ethernet (1 GbE) ports allow users to control the device from one port while sending video from a second port. Users can opt to send the same streams from each port while taking completely separate network paths. Finally, Monarch EDGE's compact design ensures it can be installed in a fly-pack or with a second Monarch EDGE unit in a 1RU-rack space.



Matrox Monarch EDGE connections



- | | | |
|---|------------------------|---------------------------|
| 1. USB 1 | 7. Analog Audio Output | 14. *SFP28 Ports |
| 2. USB 2 | 8. Analog Audio Input | 15. Display Port |
| 3. Power LED | 9. Genlock | 16. USB 3 |
| 4. Reset Button | 10. Balance Audio | 17. Gigabit Ethernet Port |
| 5. LCD Panel | 11. Tally Signals | 18. Power Connection |
| 6. Navigation and Configuration Buttons | 12. 3G SDI | 19. Power Switch |
| | 13. 12G SDI | |

**SFP module supplied by third party*

Technical Specifications

Connectivity

Input connections

- 1x 12G SDI input per ST 2082
- 3x 3G SDI inputs per ST 425 (Level A mapping only)
- UHD support using 4 SDI inputs per SMPTE ST 425-5
 - Square division
 - 2x sample interleave input¹
- 2x SFP 28 network ports (up to 25 Gbps)¹
- Capture up to four independent 3 Gbps video streams or one 12 Gbps (4Kp60) stream encapsulated per SMPTE ST 2110-10, -20, and -21. Seamless protection (redundancy) according to SMPTE ST 2022-7.

Resolutions

- 2160p at 50, 59.94, 60 fps
- 1080p at 25¹, 29.97¹, 30¹, 50, 59.94, 60 fps
- 1080i at 25, 29.97, 30¹ fps
- 720p at 50, 59.94, 60 fps

Configurable genlock

- Bi-level genlock output
- Bi-level or tri-level genlock input

Digital audio

- 8x channels of embedded audio support per SDI input. Two channels per input supported with first release.¹

Analog audio²

- 2x channels of balanced analog audio input via XLR connector
- 2x channels of balanced analog audio output via XLR connector¹
- 1 channel of unbalanced stereo audio output via 1/8" TRS connector
- All sampled at 48 kHz

Audio processing

- Embedded or analog audio channels can be compressed as a stereo pair or processed as PCM¹ (uncompressed audio)
- Multi-channel audio support as separate audio pairs¹

Control and management

Access

- Monarch EDGE Control Hub dedicated Windows® application
- RESTful HTTP API³

Physical

- On-device buttons and screen for basic set up and monitoring operations

Monitoring output

- 1x DisplayPort (HD output only)

¹. Enabled with future firmware update.

². Available via optional Audio cable.

³. Contact Matrox Representative for Availability.

Compression

Codecs

- Video: H.264/MPEG-4 part 10 (AVC)
- Audio: AAC-HE and AAC-LC

Bitrate per stream

- Video: Up to 120 Mbps
- Audio: From 32 to 256 Kbps

Chroma sub-sampling

- 4:2:2 (8-bit and 10-bit),
- 4:2:0 (8-bit and 10-bit) – MDG4/E10/I
- 4:2:0 (8-bit only) – MDG4/E8/I

Encoding controls

- Up to 5.2 level support
- GOP size and structure
- Variable and constant bit rate support
- Average max/min data rate controls
- Encoding frame rates offered independent of input frame rates

Profile

- Up to High 4:2:2 profile (Hi422P)

Latency

- Encode latency as low as 50ms (network transfers and decode operation not included in value)

Encode density/workflow examples

- One (1) 3840 x 2160p @60 fps (encoded as 4:2:0 or 4:2:2) plus one 1080p (4:2:0 8 bit) proxy stream OR

- Four (4) 1920 x 1080 @60 fps (encoded as 4:2:0 or 4:2:2) plus four 720p30 (4:2:0) proxy stream

There are a number of additional encoding profiles that can be generated per input.

VANC ancillary data processing (SDI and IP)¹

- Closed captioning (CC) embedded in VANC processing as CEA-608/708
- Vertical interval timecode (RP-188)
- HDR and colorimetry metadata

Tally light output¹

- 8x tally signals (sent to cameras)
- Tally ports available via a 15-pin D-SUB connector

Streaming protocols

- MPEG-2 TS over UDP
- RTP/RTSP
- Native RTP¹ (unicast or multicast)
- SRT
- RTMP

Network

- 2x RJ45, 100/1000BASE-T Ethernet
- 2x MSA-compatible SFP28 cage supporting 10 GbE and 25 GbE modules¹

Physical and power

Product dimensions

(length x width x height)

- 8.53x7.45x1.68 in (21.7x18.9x4.3 cm)
- Rack-mountable; two Monarch EDGE appliances can fit in 1 RU space

Product weight

- 3.65 lbs (1,660 g)

Operating conditions

- 32 to 104 deg. F (0 to 40 deg. C), 20 to 80% relative humidity (non-condensing)

Power

- Line voltage: 12 volts
- Total power consumption: 45 watts [avg.]
- Connector: DIN 4

Power supply

- Line voltage: 100-240 VAC
- Frequency: 50-60 Hz
- Input: external AC/DC adapter - IEC320-C14
- DIN4 locking power connector

Regulatory

- EMI: FCC Class A, CE Mark Class A, ACMA C-Tick Mark, VCCI
- Power-supply safety: UL/CUL(UL60950-1), TUV-GS(EN60950-1), T-LICENSE(BS EN60950-1), CCC(GB4943.1-2011), PSE(J60950), SAA(AS/NZS60950-1), KC-MARK(K60950), S-MARK(IEC60950-1)
- RoHS directive 2002/95/EC

Warranty

- Two-year limited warranty with free online or telephone support

Ordering information

MDG4/E10/I

- Monarch EDGE appliance with 4:2:0 8-bit and 4:2:2 10-bit encoding

MDG4/E8/I

- Monarch EDGE appliance with 4:2:0 8-bit encoding

MRCH/RACK/KIT

- Monarch Rack Mount Kit. Can fit up to two Monarch EDGE units in a 1RU space.

PWR/SUP/MDG

- Monarch EDGE power supply unit. Does not include IEC-C14 power cord. These cables must be sourced locally.

MDG/AUD/CBL

- Monarch EDGE break out audio cable. Provides two input channels and two output channels. DB15 to XLR I/O.

Contact Matrox

North America Corporate Headquarters

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E-mail: video.info@matrox.com

Matrox is a market leader in the 4K and HD digital video hardware and software fields, offering accelerated H.264 encoding, streaming, AV signal conversion, capture/playout servers, and CGs. Matrox's Emmy award-winning technology powers a range of multi-screen content creation and delivery platforms used by broadcasters, telcos, cable operators, post-production facilities, live event producers, videographers, and AV professionals worldwide. Founded in 1976, Matrox is a privately held company headquartered in Montreal, Canada.

For more information, visit www.matrox.com/video.

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