ALL-IN-ONE
HD ENCODER/DECODER

Matrox® **Monarch™ EDGE S1**

Simultaneous Encode/Decode Appliance for Remote Production, Contribution, and Supporting Distribution Workflows

Increase the quality and flexibility of your broadcast and media video transport workflows with Matrox Monarch EDGE Series, our versatile, professional 10-bit remote production and contribution encoder, and easily integrate with video distribution workflows. Transmit high-resolution, low-latency synchronized streams of HDR 4:2:2 10-bit video carrying ancillary data (SCTE and ANC) over SRT and other protocols. Enhance productivity with multi-unit sync, multi-stream sync, and onboard genlock. Integrate with advanced automation workflows and deliver audience-ready feeds to cloud distribution platforms and private video circuits. Enjoy peace of mind with reliable performance, professional technical support, and lifetime upgrades included with all Monarch EDGE encoders.

Ancillary data for automation and viewer experience

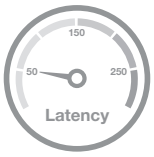
Monarch EDGE supports contribution and distribution workflows by sending and receiving ancillary data, including closed captioning and SCTE messaging. Easily integrate into automated workflows for playout and ad insertion and transmit closed captions to enhance audience engagement. Monarch EDGE improves operational efficiency and strengthens the overall viewer experience, all with the highest video quality, making it a trusted choice for broadcasters.

Enhanced productions, small footprint

Bringing remote guests and talent together from separate locations for live productions has never been easier. Monarch EDGE S1's ability to simultaneously encode and decode HD feeds provides remote participants with a single encoding channel while decoding a return channel. This Monarch EDGE S1 feature – coupled with the device's ability to provide some of the lowest latencies on the market while using public internet – allows participants to interact with the live show and panel in near real-time.

Built for high quality 10-bit H.264 encoding

The optimized H.264 engine powering Monarch EDGE S1 keeps data rates exceptionally low without sacrificing quality. If quality is of the highest importance, streams can be encoded at 50 Mbps or higher. The 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 the input via a powerful scaling and de-interlacing engine. This enables the input to be streamed at multiple resolutions and bitrates simultaneously, which is useful for remote monitoring.



Exceptionally low latency

Low signal transport latencies are necessary for facilitating seamless interaction between staff in the production studio and on-site personnel at the event venue. With glass-to-glass latencies as low as 100 ms between Monarch EDGE S1 devices, staff at the production venue can benefit from viewing return feeds of the live broadcast in near-real time. Furthermore, when a live production has remote guest requirements, these ultra-low latencies can facilitate near-real time interactions between speakers.

Flexible protocols

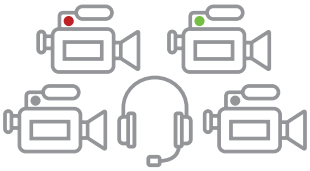
There are a variety of streaming protocols available to Monarch EDGE S1 users for use during remote productions (REMI). On closed networks, MPEG-2 TS or RTSP streams can be selected for delivery. For cloud-based destinations, or when the network is congested, SRT may be more appropriate. SRT is an open-source 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. Monarch EDGE S1 supports the processing of MPEG-2 TS, RTSP, and SRT protocols for encode and decode operations.

Keep it in-sync

When multiple Monarch EDGE encoders are at a remote location, they can share a single clock to ensure they are encoded in-sync. For the very best results, the cameras feeding the encoders should be genlocked together to ensure each frame is captured in phase. The Monarch EDGE S1 also has a genlock input so that an SDI output feed will be in-sync with the other SDI signals originating from the studio.

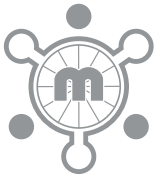
Simple, Easy-to-Use Tally[1] and Talkback

Monarch EDGE S1 offers the transfer of tally[1] signals and independent talkback channels to facilitate easy communication between on-site camera operators and in-studio personnel.



Centralized command, convenient control

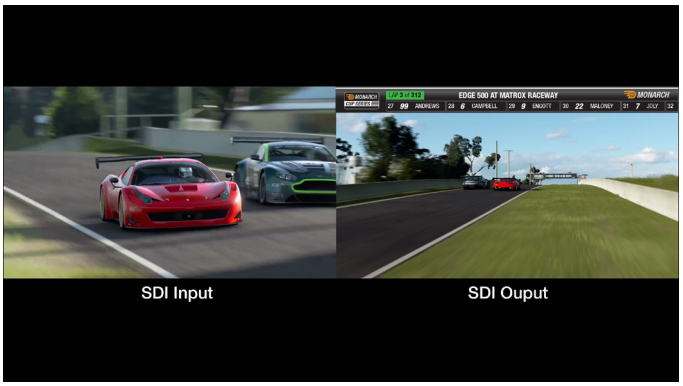
Access and manage your Monarch EDGE devices via a desktop application or web interface. Monarch EDGE Control Hub software enables you to discover, configure, and control all Monarch EDGE units on a local network through a Windows® desktop application. With Monarch EDGE Commander Center, you can access your Monarch EDGE devices locally or over the internet via a web browser, without additional software installation requirements. Benefit from web-based firmware updates and included technical support to ensure your devices are up-to-date and running smoothly.



1 This feature is offered via a 15 Position Pin D-Sub Standard Connector. With the help of a Pinout diagram, a cable can be assembled to interface to any tally output interface on the vision mixer.

Localized preview

Monarch EDGE S1 users can preview the input, output, or both simultaneously on a desktop monitor. Monarch EDGE Control Hub allows users to configure how they would like to preview an audio input source. From the DisplayPort and line out, users can choose to monitor or mute the audio input.



Robust and practical design

All Monarch EDGE devices are 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, the Monarch EDGE S1 device'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 Encoder Decoder Connections

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

1. SFP module supplied by third party

Technical Specifications

Connectivity

Input connections
[available simulataneously with output operation]
- 1x 3G SDI per SMPTE ST 425 (Level A and B mapping)

Output connections
- [available simulataneously with input operation]
- 1x 3G SDI per SMPTE ST 425 (Level A mapping only)

Resolutions
- 1080p at 23.98, 24, 25, 29.97, 30, 50, 59.94, 60 fps
- 1080i at 25, 29.97, 30 fps
- 720p at 50, 59.94, 60 fps

Genlock
- Selectable Bi-level genlock output, or
- Bi-level or tri-level genlock input

Digital audio
- 16x channels of embedded SDI audio
- 16x channels of audio support per encode using SRT or MPEG-2 TS

Analog audio[2]
- 2x channels of balanced analog audio input via XLR connector
- 2x channels of balanced analog audio output via XLR connector
- 1 channel of unbalanced stereo audio output via 1/8" TRS connector

Audio processing
- Embedded or analog audio channels can be compressed as a stereo pair or processed as PCM[1] (uncompressed audio)
- Multi-channel audio support as separate audio pairs

USB ports
- 2x USB 2.0 (front)
- 1x USB 3.0 (back)

Confidence preview
- 1x DisplayPort 1.1
- Maximum resolution: 1920x1080

Multi-unit synchronization support
- Yes

Control and management

Access
- Matrox Monarch EDGE Command Center (web UI)
- Monarch EDGE Control Hub dedicated Windows® application
- RESTful HTTP API[3]

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

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)

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

Decoding controls
- Scaling of HD/UHD resolutions
- Frame rate conversions

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

Latency
- Encode latency as low as 100ms glass-to-glass (network transfers not included in value)

Encode density/workflow examples
- 4:2:2/4:2:0 workflows
  - 4x 1920x1080p @60fps (different bitrates) plus 1x 720p30 proxy stream

VANC ancillary data transport as per ST-2038

- Closed captioning (CC) embedded as CEA-608/708
- SCTE-104 messages (Matrox encoder to decoder)
  - SCTE-104 to SCTE-35 translation[1]
- Vertical interval timecode (ST 12-2)[1]
- HDR and colorimetry metadata[1]

Tally[4]

- 4 x Tally (GPIO) inputs
- 4 x Tally (GPIO) outputs
- Tally ports available via a 15-pin D-SUB Connector

Streaming protocols

- MPEG-2 TS over UDP or RTP
- RTP/RTSP
- Native RTP (unicast or multicast)
- SRT (Caller, Listener, Rendez-Vous and Stream ID modes)
- RTMP (encoder only)

Network

- 2x RJ45, 100/1000BASE-T Ethernet
- 2x MSA-compatible SFP28 cage supporting 10 GbE and 25 GbE modules[1]

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 5

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

MDG2/ED10/I2
- Includes IEC-C14 power cord (US, UK, AUS, EUR)

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.

Accessories

NRG Redundant Power Supply
- NRG-5-1DB: Rack tray with one NRG RPSU pre-installed
- NRG-5-2DB: Rack tray with two NRG RPSU pre-installed

1. Enabled with future firmware update.
2. Available via optional audio cable.
3. Contact a Matrox Video representative for availability.
4. This feature is offered via a 15 Position Pin D-Sub Standard Connector. With the help of a Pinout diagram, a cable can be assembled to interface to any tally output interface on the vision mixer.

Contact Matrox Video

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