Matrox® **Monarch™ EDGE S1**
Simultaneous Encode/Decode Appliance for Remote Production (REMI)

Affordably enhance remote production (REMI) workflows with Monarch EDGE S1. A simultaneous encode/decode appliance, Monarch EDGE S1 allows users to provide return feeds to multi-camera production crews in the field. Monarch EDGE S1 offers one 3G-SDI input, allowing low latency return feeds coming from studio to be encoded for secure transport over private or public internet connections. At remote sites, Monarch EDGE S1 can decode one HD feed and output via a genlockable 3G-SDI connection for distribution of the program feed. As both encode and decode operations can occur simultaneously, a single camera contributor in the field can use this device to both send a high-quality feed to studio and receive the program feed being produced by the studio.

matrox.com/video

matrox®

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.
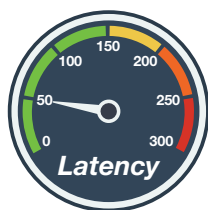
Exceptionally low latency

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.
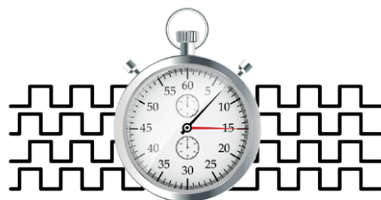
Keep it in-sync

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.

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 convenient 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.

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.

SDI Input   SDI Ouput

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 Ports
14. Display Port
15. USB 3
16. Gigabit Ethernet Port
17. Power Connection
18. Power Switch

*SFP module supplied by third party

Technical Specifications

Product

Part Number
• MDG2/ED10/I

Form Factor
• Standalone appliance
• Rack-mountable: 1U (horizontal)

Connectivity

Video Input/Output (simultaneous operation)
• 1x 3G SDI input and 1x 3G SDI output per ST425 (Level A mapping only)
• 2x SFP 28 network ports (up to 25 Gbps)[1]

Video Input/Output 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
• Bi-level or tri-level genlock 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

Audio Input
Digital:
• 16x channels of embedded SDI audio is supported per input, and 8x channels of audio support per encode using SRT or MPEG2 TS.
Analog:
• 2x channels of balanced analog audio input via XLR connector[2]
• Line Level

Audio Ouput
Digital:
• 8x channels of embedded audio support per SDI output.
Analog:
• 2x channels of balanced analog audio output via XLR connector
• 1 channel of unbalanced stereo audio output via 1/8" TRS connector[2]

Confidence Preview
• 1x DisplayPort 1.1
• Maximum resolution: 1920x1080

Multi-unit support
• Yes

Video and Audio Processing

Video Scaling
• High Quality multi-tap 10 bit Up/Down Scaler and De-Interlacer

Video Deinterlacing
• Yes

Audio Encoding Format
• AAC-LC

Audio Sampling Frequency
• 48 kHz when digitized from analog source

Audio Bitrates
• Range from 32 kbps to 256 kbps

Codec

Video Encoding Formats
• H.264/MPEG-4 Part 10 (AVC)

Encoding Profiles
• Up to High 4:2:2 profile (Hi422P)

Color Space and Chroma Sub-Sampling
• 4:2:0 (8-bit and 10-bit)
• 4:2:2 (8-bit and 10-bit)

Encoder Bitrates Range
• Video: Up to 120 Mbps

Encoding Rate Control
• Encoding frame rates offered independent of input frame rates
• GOP size and structure
• Variable and constant bit rate support

Encoding Level
• Up to 5.2

Encoding

Encoding Capability
• Monarch EDGE S1 is capable of sending many streams from a single input
• Each stream can be a different resolution, encoding profile, and bitrate

Encoding Latency
• Latency as low as 50 ms (network transfers and decode operation not included in value)

Decoding

Decoding Capability
• 1x 1920x1080 60p

Decoding Latency
• Latency as low as 50ms (network transfers and encode operation not included in value)

Network

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

IP Addressing
• IPv4
• IPv6[1]
• DHCP (default) and static IP

Streaming Protocols
• MPEG-2 TS over UDP (unicast or multicast)
• RTP/RTSP
• Native RTP[1] (unicast or multicast)
• SRT
• RTMP (encoder only)

Command and Control
• HTTPS over TCP
• UPnP (discovery)

Physical

Product dimensions
• 8.53 (L) x 7.45 (W) x 1.68 (H) inches 21.7 (L) x 18.9 (W) x 4.3 (H) cm

Unit Weight
• 3.65 lbs (1,660 g)

Power Supply Unit
• Line voltage: 100-240V ac.
• Frequency: 50-60 Hz
• Input: external AC/DC adapter - IEC320-C14
• DIN4 locking power connector
• Power-supply safety: cULus (Canada/US), CE (EU), NOM (Mexico), CCC (China), RCM (Au/Nz), EAC (Russia / Customs Union), PSE (Japan), KCC (Korea), BIS (India)

Additional Features
Tally/GPIO
• When paired with another MDG2/ED/10, up to 4x tally/GPIO signals can be sent in either direction simultaneously
• Tally/GPIO ports available via a 15 Position Pin D-Sub Standard Connector[3]

Hardware & Software

Hardware Included
• Monarch EDGE appliance
• Matrox Monarch EDGE power supply
• Includes IEC-C14 power cord (US, UK, AUS, EUR)

Accessories (sold separately)
• Monarch Rack Mount Kit* (MRCH/RACK/KIT)
• Monarch EDGE power supply cable** (PWR/SUP/MDG)
• Monarch EDGE break out audio cable*** (MDG/AUD/CBL)
*Can fit up to two Monarch EDGE units in a 1RU space
**Does not include IEC-C14 power cord. These cables must be sourced locally.
***Provides two input channels and two output channels. DB15 to XLR I/O.

Software
• Monarch EDGE Control Hub—dedicated Windows® application (free download)
• RESTful HTTP API[4]

Environmental

Operating Conditions
• Temperature: 0 to 40 degrees Celsius
• Humidity: 20% to 80% non-condensing

Storage Conditions
• Temperature: -40 to 70 degrees Celsius
• Altitude: 192 hPa (12,000 m) to 1,020 hPa (-50 m)
• Humidity: 5% to 95% non-condensing

Power Consumption
• Line voltage: 12 volts
• Total power consumption: 45 watts [avg.]

General

Supported Operating Systems (software)
• Windows 10 (64 bit)

EMC/EMI Device Class
• Class A

EMC/EMI Certifications
• CE (EU), FCC (US), ICES-3 (Canada), KC (Korea), RCM (Aus/NZ)

Environmental Certifications
• RoHS Directive 2011/65/EU amended by (EU) 2015/863

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

1. Enabled with future firmware update.
2. Available via optional audio cable.
3. 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.
4. Contact Matrox representative for availability.

matrox®