

# Kaleido-MX

High Quality, Pre-Configured Multiviewer (up to 64x4)



A clear view for any of your monitoring requirements.

Pre-configured for simple and easy installation, Kaleido-MX from Grass Valley, a Belden Brand, is available in a wide choice of configurations for both high-end in-studio TV production and outside broadcast trucks, as well as high quality playout facilities.

Kaleido-MX offers reduced power consumption and a lightweight, compact design that's ultra-quiet and runs cool.

With advanced probing features, which rapidly and clearly alert operators to on-air problems, the Kaleido-MX is perfect for ensuring a high quality of broadcast for master control playout.

Innovative scaling technology within Kaleido-MX offers the best video image quality as well as full layout flexibility to assign "any source, anywhere" with no bandwidth limitations. Kaleido-MX provides hot swappable modules and power supplies for robust performance in the harshest environments.



Kaleido-MX 1RU

Kaleido-MX 3RU

# Kaleido-MX High Quality, Pre-Configured Multiviewer (up to 64x4)

## KEY FEATURES

### Unmatched image quality

- Unmatched multiviewer picture quality and superior on-screen graphics, for the most critical monitoring applications and high-end TV production requirements
- Simultaneous HDMI and SDI outputs at full 1080p50/60 Hz resolution on up to 4 multiviewer displays
- Input signal processing up to 3G signal formats

### Robust and serviceable design

- Unique Auto-Recovery feature provides fast automated recovery after a “cold” spare is inserted into the frame
- Hot swappable modules and power supplies
- 1 RU and 3 RU frame models with quiet cooling

### Multiroom, multiuser oriented

- A single Kaleido-MX multiviewer can be used to share sources across multiple rooms or operator positions, with fully independent displays, audio monitoring and control panels dedicated to each operator

### Seamless control across multiple multiviewers

- Kaleido multiviewers can be “mixed-and-matched” with others to create a seamless monitoring system across a facility
- Choice of multiple control options such as standalone RCP-2/RCP-200 panels, integrated with router control systems and panels, iControl and third-party control systems

### Superior layout flexibility

- Ultimate level of layout flexibility, with unlimited signal repetition and sizing across all displays, without blocking, grouping restrictions or bandwidth restrictions

### Router and Switcher Integration

- Kaleido-MX offers rich integration with NVISION router family, and third-party routers and production switchers for tally and label/alias source management.

- Multiple multiviewers can be controlled from a single control panel

### Scalable for the largest systems

- Virtually limitless multiviewer system expansion with upstream NVISION router
- Can create combined multiviewer/router system with 1,152 video inputs, 288 multiviewer outputs

### Advanced Probing and Alarming

- Closed captioning and teletext subtitling display and alarming to ensure compliance with regulation, includes XDS and AFD
- Software licensable Dolby E metadata extraction for metering and content alarming without the need of expensive hardware decoders
- Sophisticated on-screen alarm displays for clear operator alerts. Supports multicolor and blinking statuses based on severity, latching and status message

## SPECIFICATIONS

### Video Inputs (8, 16, 24, 32, 48 or 64)

Connector: DIN 1.0/2.3

### SD-SDI

**Signal:** 4:2:2 SMPTE 259M-C (270 Mb/s)

**Formats:** 525 and 625

**Audio:** SMPTE 274M-1994

**Return loss:** >15 dB up to 270 MHz

**Jitter:** <0.2 UI

**Cable length:**

– 250m (820 ft.) (Belden 1694A)

– 150m (492 ft.) (Belden 1855A)

### HD-SDI

**Signal:** 4:2:2 SMPTE 292M-C (1.5 Gb/s)

**Formats:** 720p24/25/29.97/50/59.94, 1080PsF23.98p/24p/25i/29.97i, 1080i50/59.94, 1080p23.98/24/25/29.97

**Audio:** SMPTE 299M

**Return loss:** >15 dB up to 1.5 GHz

**Jitter:** <0.2 UI

**Cable length:**

– 100m (328 ft.) (Belden 1694A)

– 45m (148 ft.) (Belden 1855A)

### 3G-SDI

**Signal:** SMPTE 424M-2006 (2.97, 2.97/1.001 Gb/s) Level A and B

**Formats:** 1920x1080p60, 1920x1080p59.94, 1920x1080p50

**Audio:** SMPTE 299M

**Return loss:**

– >15 dB up to 1.5 GHz

– >10 dB from 1.5 GHz to 3 GHz

**Jitter:** <0.3 UI

**Cable length:**

– 100m (328 ft.) (Belden 1694A)

– 45m (148 ft.) (Belden 1855A)

### LTC Inputs

**Signal:** SMPTE 12M-1995 (EBU-3259-E), SMPTE 309M

**Level:** 500 mVp-p to 10 Vp-p

**Impedance:** >10 kΩ

**Refresh rate:** 50/59.94 Hz

**Connector:** DIN 1.0/2.3

### Reference

**External:** SMPTE 170M, SMPTE 318M, ITU 624-4, BUT 470-6, PAL and NTSC composite sync, SMPTE 274M, SMPTE 296M, SMPTE 240M

**Connector:** DIN 1.0/2.3

### Mosaic Outputs (video and graphic)

#### HDMI (1, 2, or 4)

**Signal :** HDMI V1.3

**Format:** 1280x1024 up to 1920x1200p configurable

Refresh rate supported (50 Hz and 59.94 Hz)

**Cable length:** 4.57m (15 ft.)

**Connector:** HDMI

**Signal path:** 8 bits output

#### HD-SDI (1, 2 or 4)

**Signal:** 3G/HD-SDI SMPTE 424M and 292M compliant

Supports data rates of 1483.5, 1485, 2967, 2970 Mb/s

**Return loss:**

– >15 dB up to 1.5 GHz

– >10 dB from 1.5 GHz to 3 GHz

**Jitter (wideband):** HD: <0.2 UI

**3 Gb/s:** <0.3 UI

#### DVI Inputs (optional)

**Device:** KXI-DVI-Bridge

**Signal:** DVI

**Resolutions:** Mode A: 1024x768, 1366x768, 1280x1024, 1680x1050, 1600x1200 at 60 Hz  
Mode B: 1280x720 and 1920x1080 at 50/60 Hz

#### Communication Ethernet (1)

**Signal:** 10/100 BASE-T

**Connector:** RJ45

Serial Port (1)

**Signal:** RS-422 (SMPTE 207M, EBU-3245)

**Connector:** RJ45

#### Analog Audio Monitoring (1, 2 or 4)

**Signals (2):** Balanced analog stereo

**Impedance:** <600Ω

**Level:** +24 dBu maximum

**Connector:** WECO

### Video Processing Performance

**Signal path:** 8-bit YCbCr to 24-bit RGB

**Processing delay:** 1 frame in genlock mode, 1-2 frame in non-genlock mode

### Audio Processing Performance

**Quantization:** 20-24 bits

**Sampling:** 48 kHz

**THD+N:** 80 dB

**SNR:** 98 dB

### Kaleido-MX (1 RU) Frame

**Power supply:** Hot swappable redundant power supplies

**Input voltage:** 100-240V

**Frequency:** 50/60 Hz

**Power:** 150W max

**Dimensions:** 1 RU x 485 mm (19 in.) x 286 mm (11.25 in.)

**Full spec temperature range:** 0-40° C (32-104° F) (ambient)

**Weight:** 4.2 kg (9.2 lbs.) for 16x2

**Communication ports:** Ethernet 10/100 BASE-T

**Alarm:** GPI contact

### Kaleido-MX (3 RU) Frame

**Power supply:** Hot swappable redundant power supplies

**Input voltage:** 100-240V

**Frequency:** 50/60 Hz

**Power:** 350W max

**Dimensions:** 3 RU x 485 mm (19 in.) x 286 mm (11.25 in.)

**Full spec temperature range:** 0-40° C (32-104° F) (ambient)

**Weight:** 4.8 kg (10.6 lbs.) for 32x4

**Communication ports:** Ethernet 10/100 BASE-T

**Alarm:** GPI contact

### Discrete Audio Inputs (optional)

#### Analog Audio

**Device:** ABT-64A or ABT-128A

**Signals (64 or 128 mono channels):** 20 kΩ balanced, 10 kΩ unbalanced

**Maximum level:** +24 dBu

**Connectors:** WECO

#### AES 110Ω

**Device:** ABT-64D-110 and ABT-128D-110

**Signals (32 or 64 AES):** AES3

**Termination:** 110Ω balanced

**Sampling:** 48 kHz

**Connectors:** WECO

#### AES 75Ω

**Device:** ABT-64D-75 and ABT-128D-75

**Signals (32 or 64 AES):** AES3

**Termination:** 75Ω unbalanced

**Connectors:** BNC

#### GPI IN

**Connector:** DB-44

**Number of input:** 1 RU: 20 opto-isolated

**3RU:** 20 or 40 (optional) opto-isolated

**Pull-up voltage:** 2.3V

**Source current:** 2 mA when input shorted

**Low level activation:** 0.8V max

**Over voltage:** 25V max

**Pulse duration:** 8 ms min

#### GPI Bidirectional

**Connector:** DB-44

**Number of I/O:**

– 1 RU: 8

– 3 RU: 8 or 16 (optional)

#### Input Mode

**Pull-up voltage:** 2.3V

**Source current:** 2 mA when input shorted

**Low level activation:** 0.8V max

**Over voltage:** 25V max

**Pulse duration:** 8 ms min

#### Output Mode

**Contact closure current:** 50 mA max

**Reverse voltage:** -15V max

**Reverse current:** -50 mA max

**V OUT low:** 0.6V at 1.5 mA

## ORDERING

### **KALEIDO-MX-8X1**

8 input single head multiviewer in 1 RU

### **KALEIDO-MX-8X2**

8 input dual head multiviewer in 1 RU

### **KALEIDO-MX-16X1**

16 input single head multiviewer in 1 RU

### **KALEIDO-MX-16X2**

16 input dual head multiviewer in 1 RU

### **KALEIDO-MX-16X4**

16 input quad head multiviewer in 1 RU

### **KALEIDO-MX-24X1**

24 input single head multiviewer in 1 RU

### **KALEIDO-MX-24X2**

24 input dual head multiviewer in 1 RU

### **KALEIDO-MX-32X2**

32 input dual head multiviewer in 3 RU

### **KALEIDO-MX-32X4**

32 input quad head multiviewer in 3 RU

### **KALEIDO-MX-48X2**

48 input dual head multiviewer in 3 RU

### **KALEIDO-MX-48X4**

48 input quad head multiviewer in 3RU

### **KALEIDO-MX-64X2**

64 input dual head multiviewer in 3 RU

### **KALEIDO-MX-64X4**

64 input quad head multiviewer in 3 RU

### **OUTPUT OPTIONS**

#### **KMX-OUT-OPT-OP2**

Second head output enable license for KALEIDO-MX-8X1, KALEIDO-MX-16X1 and KALEIDO-MX-24x1

#### **KMX-OUT-ROTATOR-S**

Single head rotation license for KALEIDO-MX-8X1, KALEIDO-MX-16X1 and KALEIDO-MX-24x1

#### **KMX-OUT-ROTATOR-D**

Dual head rotation license (1 license required for dual head units and 2 licenses required for quad head units.)

### **INPUT OPTIONS**

Options for blocks of 8 or 16 inputs

#### **KMX-IN-8-OPT-3GBPS**

3 Gb/s signal format license (8 inputs)

#### **KMX-IN-16-OPT-3GBPS**

3 Gb/s signal format license (16 inputs)

#### **KMX-IN-8-OPT-CSX**

CC/Subtitling and XDS data license (8 inputs)

#### **KMX-IN-16-OPT-CSX**

CC/Subtitling and XDS data license (16 inputs)

#### **KMX-IN-8-OPT-DOLBY**

License for extraction of Dolby Metadata (8 inputs)

#### **KMX-IN-16-OPT-DOLBY**

License for extraction of Dolby Metadata (16 inputs)

### **AUDIO INPUT MODULES**

#### **ABT-64A**

64 channel analog audio bridge terminal

#### **ABT-64D-110**

64 channel 110Ω AES audio bridge terminal

#### **ABT-64D-75**

64 channel 75Ω AES audio bridge terminal

#### **ABT-128A**

128 channel analog audio bridge terminal

#### **ABT-128D-110**

128 channel 110Ω AES audio bridge terminal

#### **ABT-128D-75**

128 channel 75Ω AES audio bridge terminal

### **POWER SUPPLIES**

#### **DENSITÉ 3+FR1-PSU-AC**

Optional redundant power supply for KALEIDO-MX 1 RU models

#### **DENSITÉ 3-PSU-AC**

Optional redundant power supply for KALEIDO-MX 3 RU models

### **ACCESSORIES**

#### **KXI-DVI-BRIDGE**

Dual channel DVI to HD bridge for DVI inputs

#### **DXF-200-B**

HDMI Optical extension system for all Kaleido-MX models except the KALEIDO-MX-16X4

#### **DXF-200-C**

HDMI Optical extension system for the KALEIDO-MX-16X4

#### **DXF-200-PSU**

DXF-200 power supply (1x sub-module)

#### **KALEIDO-RCP2**

Ethernet remote control panel and KM Gateway

#### **PSU-POE**

Replacement power over Ethernet module

#### **KRCP-RK2**

Kaleido-RCP2 rack mount bracket

#### **GPI-1501-TBA**

GPI I/O terminal block adapter

#### **GPI-1501**

Additional GPI I/O module for KALEIDO-MX 3 RU models

#### **REF-1801**

Redundant reference for KALEIDO-MX 3 RU models

### **THIRD-PARTY INTERFACE OPTIONS**

#### **KMX-OPT-RT-NVISION**

Control and UMD support for NVISION routers

#### **KMX-OPT-RT-DATATEK**

Control and UMD support for Datatek routers

#### **KMX-OPT-RT-ENCORE**

Control and UMD support for Encore controllers

#### **KMX-OPT-RT-EVERTZ**

Control and UMD support for Evertz routers

#### **KMX-OPT-RT-GVG7000**

Control and UMD support for GV 7000 routers

#### **KMX-OPT-RT-JUPITER**

Control and UMD support for Jupiter routers

#### **KMX-OPT-RT-HARRIS**

Control and UMD support for Harris/Imagine Communications routers

#### **KMX-OPT-RT-NETWORK**

Control and UMD support for Network routers

#### **KMX-OPT-RT-NVISION**

Control and UMD support for NVISION routers

#### **KMX-OPT-RT-SNELL**

Control and UMD support for Snell routers

#### **KMX-OPT-RT-PESA**

Control and UMD support for PESA routers

#### **KMX-OPT-RT-UTAH**

Control and UMD support for Utah routers

#### **KMX-OPT-TLY-KAHUNA**

Tally Interface for Snell and Wilcox Kahuna switchers

#### **KMX-OPT-TLY-KALYPSO**

Tally Interface for Grass Valley Kalypso switchers

#### **KMX-OPT-TLY-KAYAK**

Tally Interface for Grass Valley Kayak switchers

#### **KMX-OPT-TLY-SONY**

Tally Interface for Sony switchers (serial protocol)

#### **KMX-OPT-TLY-SYNERGY**

Tally Interface for Ross Synergy switchers

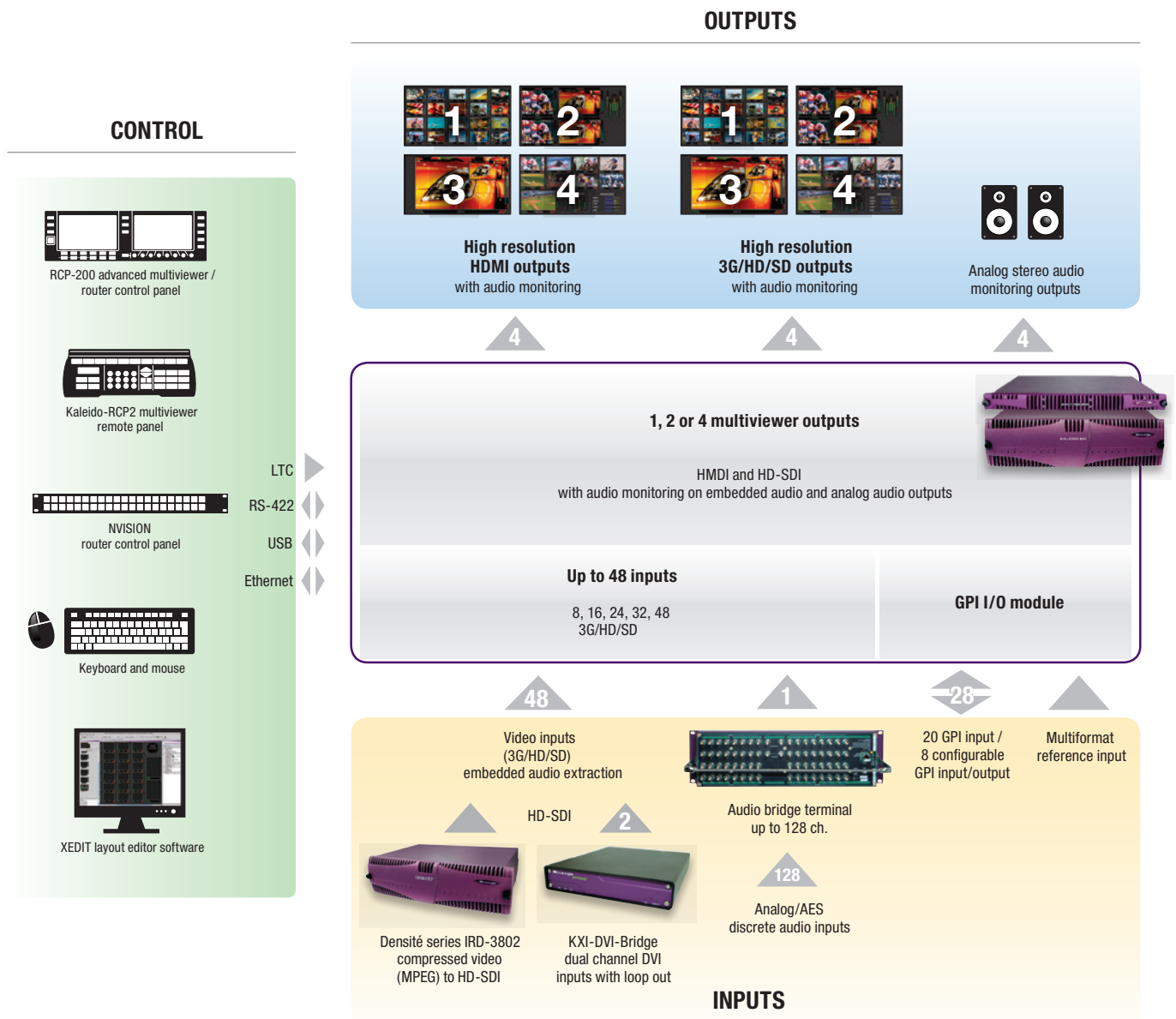
#### **KMX-OPT-TLY-ZODIAK**

Tally Interface for Grass Valley Zodiac switchers

#### **KMX-OPT-TLY-KAYENNE**

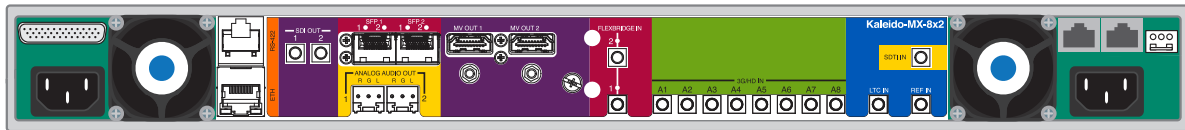
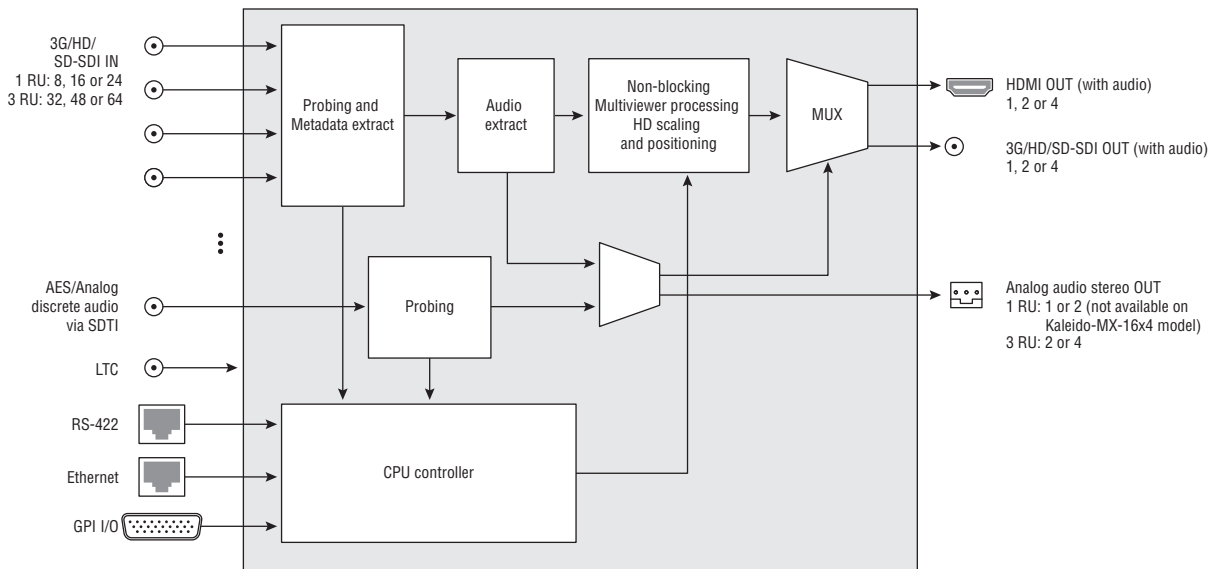
Tally interface for Grass Valley Kayenne and Karrera switchers

**Overview of Input/Outputs**

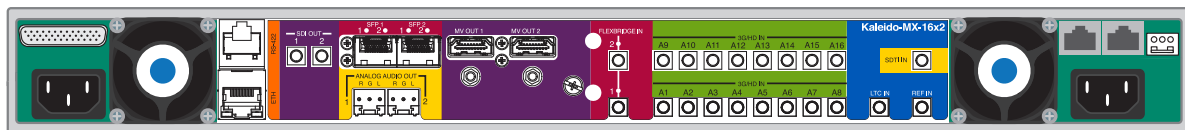




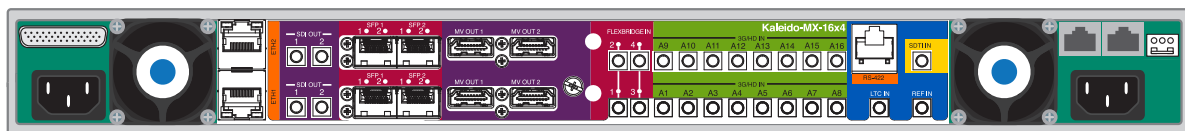
Functional Block Diagram, Rear Panel Views and Specifications



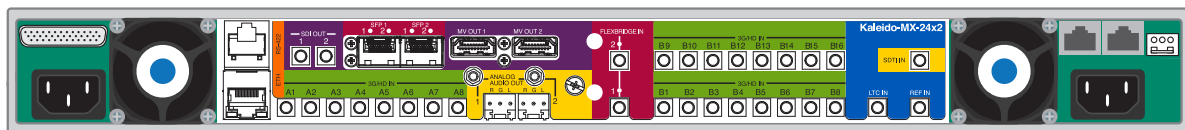
Kaleido-MX-8x2



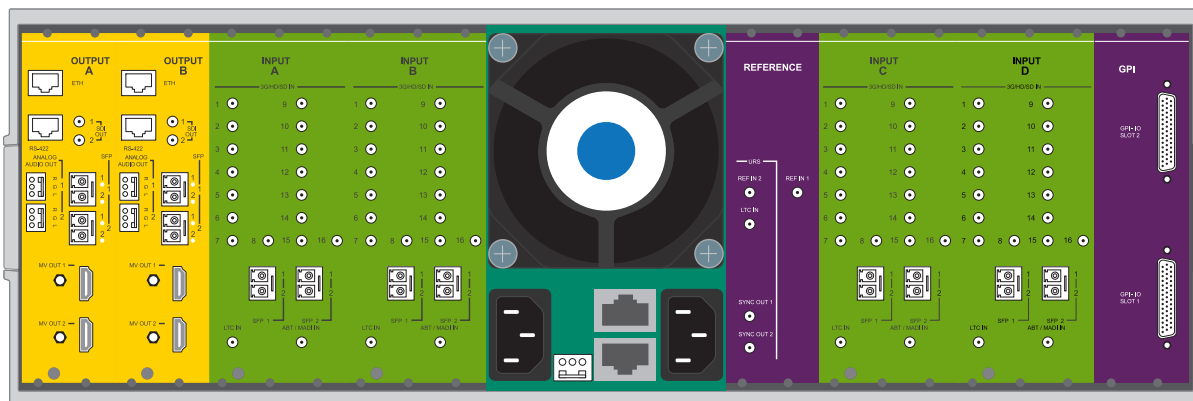
Kaleido-MX-16x2



Kaleido-MX-16x4



Kaleido-MX-24x2



Kaleido-MX-64x4

## Unmatched picture quality and display elements

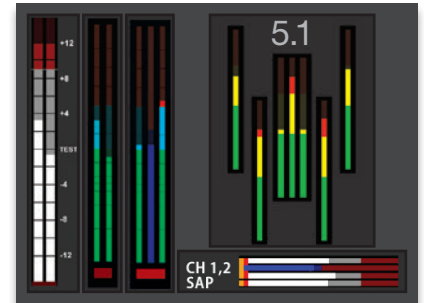
### Picture Quality

The Kaleido multiviewers system offers unmatched picture quality — irrespective of picture size — using Grass Valley’s polyphase scaling technology. Windows can be resized all the way from very small windows up to full screen display, without the loss of definition that is commonly associated with multiviewers. This high performance, combined with superior on-screen graphics, makes Kaleido ideal for the most critical monitoring applications.



### Audio Meters

Kaleido multiviewers can display four group, 16 channels, multichannel audio for multilingual and 5.1 applications. Audio level meters are extracted from analog, AES or embedded signals, and can be positioned inside the video window in transparency or outside. Ballistics and scales are configurable, and a phase correlation meter can be displayed with each pair. Dolby E audio can be extracted from an embedded audio signal for on-screen metering. An audio meter can readjust itself based on inserted Program Configuration metadata.



### Automatic Aspect Ratio Control and Safe Areas

Aspect ratio and safe area markers can be positioned over video windows to simplify multi-format monitoring. Free form safe area markers, based on a user’s bitmap, can be overlaid on top of each video window. This feature is useful to protect graphical content or branding that will be applied downstream after production.

The processor can automatically change a signal’s aspect ratio between 16:9 and 4:3, based on the Active Format Description (AFD), Wide Screen Signaling (WSS ) or source resolution. Image formatting rules are followed during conversion, including letter/pillar boxing and resizing/cropping.



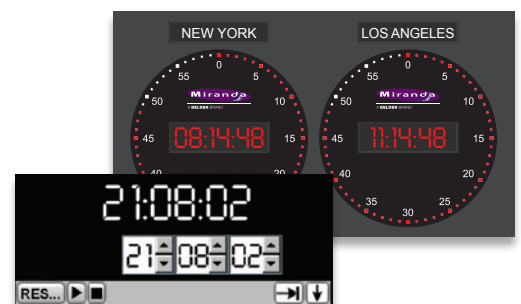
### Dynamically Updated UMDs

Text labels (UMDs) can be displayed inside or outside windows, and updated by a UMD controller. Dynamic text can be driven by NVISION and many third-party routers, and by some automation vendors. Kaleido multiviewers also offer a serial interface for leading production switchers, which provides tally updates as well as sources and destination labels. Text fonts are flexible and support UNICODE for multilingual texts



### Clocks and Timers

Multiple analog and digital clocks/timers (with date) can be displayed with programmable offsets and configurable colors. The clocks/timers can be driven by LTC, referenced internally, or to an NTP server. Each input module features one LTC input.



## Signal Validity Monitoring

The following parameters can be detected and presented on-screen, or reported to SNMP-based signal and facility monitoring systems, including Grass Valley's iControl systems:

### Video Probing

- Video black
- Video frozen
- Video level too high
- Loss of video
- EAV /SAV error

### Audio Probing

- Audio silence
- Audio overload
- Audio mono
- AudioOUT of phase

### Metadata Monitoring

- XDS data including V-Chip rating
- Closed captioning and teletext (608, 708 and WST 42 and 47) is presented in the format seen by television viewers in their homes

Probing points can be configured with different thresholds, and a specific probing zone within the video can be configured for the freeze and black detection.

## Display of Closed Captions, Subtitles, XDS and Dolby E Metadata

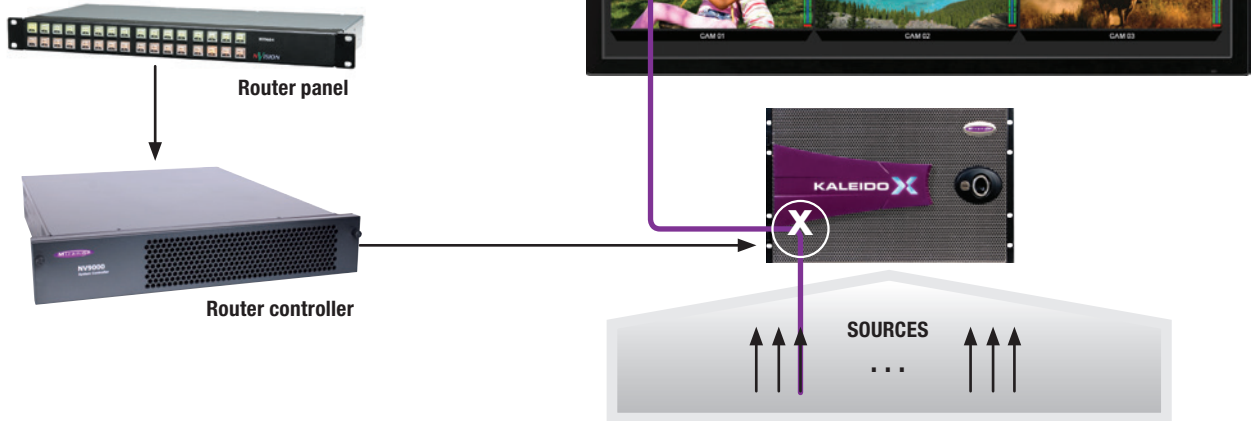
Closed captions and subtitles are presented in the format seen by television viewers in their homes. XDS data, including V-Chip information, can also be overlaid in each video window, along with the Dolby E metadata, AFD/WSS formats, and audio/video signal format.



**Remote Control of Integrated Routing and Multiviewer Systems**

Integrated multiviewer and routing systems can be controlled using a choice of remote control panels. One simple option is to use a traditional router control panel to assign any source, anywhere, any number of times on the monitor wall. This mimics what the router would do to a traditional monitor wall, by allowing the user to assign any source to any destination. This type of control is available with the NVISION control panels (shown below), as well as third-party router control panels from Snell (Pro-bel) and Neveion.

Source to virtual monitor wall assignment can be made via any NVISION control panel via the NVISION 920 or 9000 controller.



The highly graphical RCP-200 touchscreen remote panel offers more advanced control of combined multiviewer and routing systems. The panel provides multiviewer layout pre-set selection, and quick router source assignment control via a category/index graphical interface. The RCP-200 is a multifunctional panel, and can also be used for control of Densité Series interfaces.



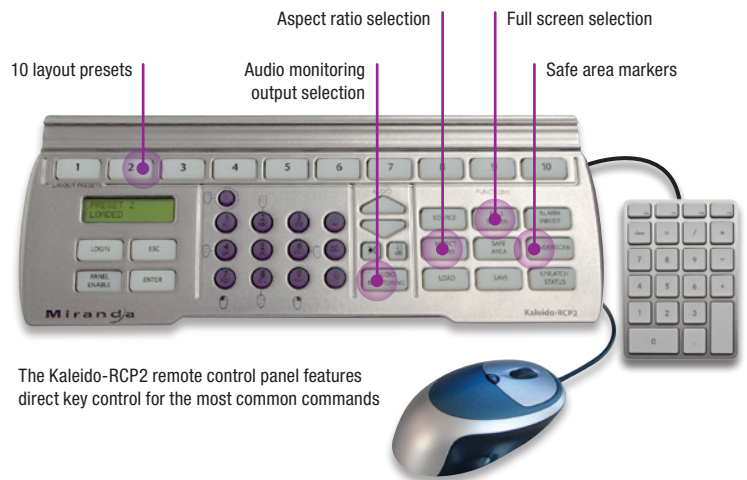
**Intuitive control across multiviewers**

Kaleido multiviewer systems can be easily controlled by one or more dedicated remote control panels, or by an on-screen mouse control.

Simple to use, on-screen mouse operated drop-down menus are contextual to speed operations, and offer numerous functions, such as changing aspect ratios, checking the safe area, assigning an input, and changing text in a UMD.

Users can also instantly change layout configurations, and dynamically zoom one source larger for quality control, or audio monitoring of an on-screen source.

The Kaleido-RCP2 remote panel exemplifies this simplicity, and provides easy multiroom, multioperator control over Ethernet, with local connections for a mouse and keyboard.



The Kaleido-RCP2 remote control panel features direct key control for the most common commands