grass valley
A BELDEN BRAND

Datasheet

Kaleido-X16

Super-silent, 16 Input, Dual Output Multiviewers

A clear view for any of your monitoring requirements.

The Kaleido-X16 from Grass Valley, a Belden Brand, is a compact, ultra-quiet multiviewer that is ideal for small control rooms and trucks or large rooms with monitoring router design.

Offering the finest image quality, it can be used with 3G/HD/SD and analog video. Kaleido-X16 provides 16 inputs, two multiviewer outputs and two router outputs.

When paired with routers, Kaleido-X16 can also create large combined multiviewer and routing systems.

KEY FEATURES

Unmatched Image Quality
- Unmatched multiviewer picture quality, and superior on-screen graphics, for the most critical monitoring applications
- 2 HDMI and 2 HD-SDI multiviewer outputs
- DXF-200 optical DVI extension uses multimode fiber with SC connector to simplify long runs of up to 1 km (3,280 ft.)

Superior Layout Flexibility
- Any of the video inputs can be displayed, any number of times, at different resolutions and sizes up to full screen, on the multiviewer outputs, without blocking or bandwidth limitations

Multiformat Operation
- 3G/HD/SD/analog inputs
- Stereoscopic 3D support (dual link 1.5 Gb/s, SMPTE-292M)
- DVI and MPEG video accepted with optional interfaces

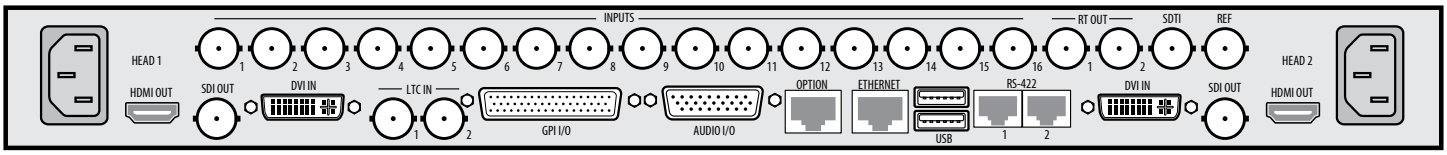
Scalable for the Largest Systems
- Expansion through combination with upstream router (NVISION or third-party)
- Can create the very largest combined multiviewer/router systems with up to 1,152 video inputs, 144 independent multiviewer outputs

Advanced Signal Probing
- Integral signal probing and on-screen alarms
- Display of XDS Metadata and Closed Captioning

Built-In Router
- Two 3G/HD/SD router outputs (16x2)
- Internal router control by NVISION panel and NV9000 Controller

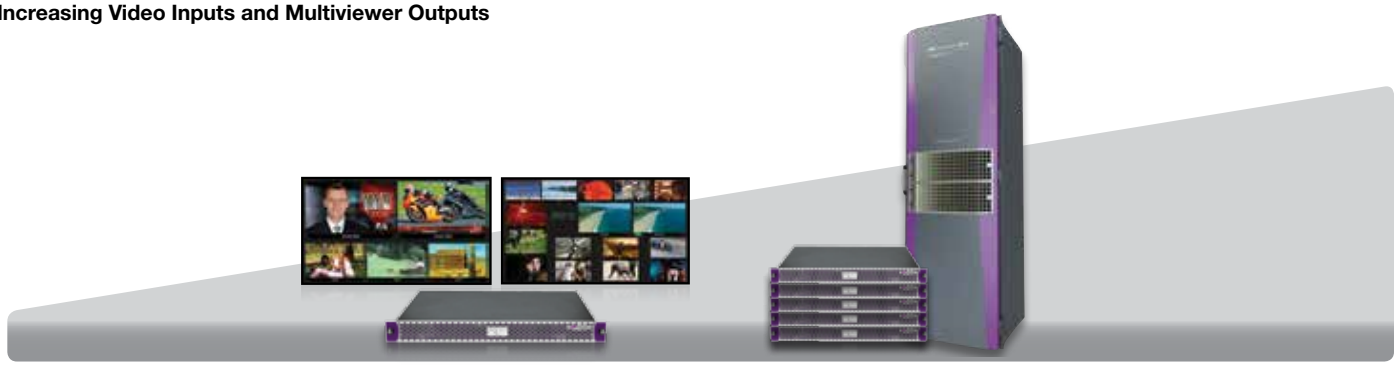
Legendary Ease of Use
- Easy layout preparation with XEdit
- Intuitive on-screen mouse control
- Choice of multiviewer remote control panels: simple Kaleido-RCP2 and advanced RCP-200 with router control

Ultra-Quiet, Robust Design
- Super silent for installation within studios and control rooms
- Highly robust 1RU design with optional redundant power supply



Kaleido-X16 rear panel

Increasing Video Inputs and Multiviewer Outputs



Kaleido-X16 (1RU)
- 16 video inputs
- 2 multiviewer outputs

Kaleido-X16 + NVISION router
- Up to 1152 video inputs
- Up to 144 multiviewer outputs

Kaleido-X16 is ideal for small control rooms but can be combined with routers to create the very largest combined routing and multiviewer system with up to 1152 video inputs and 144 multiviewer outputs.

OUTPUTS

High resolution HDMI outputs
with audio monitoring

High resolution 3Gbps/HD/SD outputs

3Gbps/HD/SD router outputs
drive full resolution 3Gbps/HD/SD signals into video monitors or test equipment

2 2 2

2 Multiviewer outputs

2 3Gbps/HD/SD router outputs (option)

16 auto-sensing inputs per frame

16 36

Video inputs (3Gbps/HD/SD/composite) embedded audio extraction

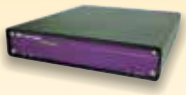
Audio bridge terminal up to 128 ch. per frame

32 GPI input/ 4 outputs

Multiformat reference input

HD-SDI

Densité series IRD-3802 compressed video (MPEG) to HD-SDI



KXI-DVI-Bridge dual channel DVI inputs with loop out

128

Analog/AES discrete audio inputs

INPUTS

CONTROL

RCP-200 advanced multiviewer / router control panel

Kaleido-RCP2 multiviewer remote panel

LTC
RS-422
USB
Ethernet
2 DVI bkg input

NVISION router control panel

Keyboard and mouse

XEDIT layout editor software

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.

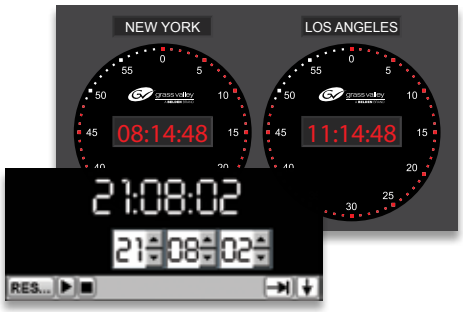
Automatic Aspect Ratio control and Safe Areas

Aspect ratio and safe area markers can be positioned over video windows to simplify multiformat 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 output module features three independent LTC inputs.

Unmatched Picture Quality and Display Elements

Picture-in-Picture and Display Customization

Picture-in-picture displays can be generated for easy comparisons between playout and return feed signals or for the playout server's backup confidence monitoring. Main/backup comparison is also available via split-screen monitor configuration with both main and backup videos in one channel.
Bitmap images can be displayed to customize the display background with channel logos and other graphics.

Signal Validity Monitoring

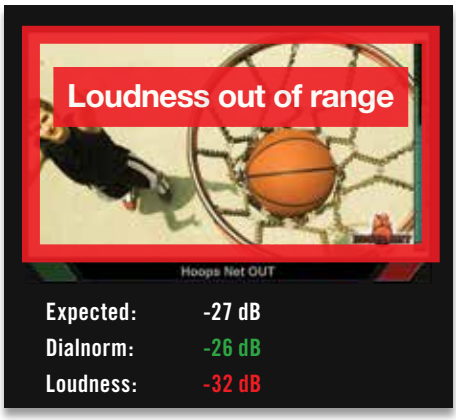
The following parameters can be detected and presented on-screen, or reported to SNMP-based signal and facility monitoring systems, including Grass Valley's iControl systems:

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
- DVB Subtitling display and monitoring over IP inputs

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.



Loudness/Dolby Monitoring

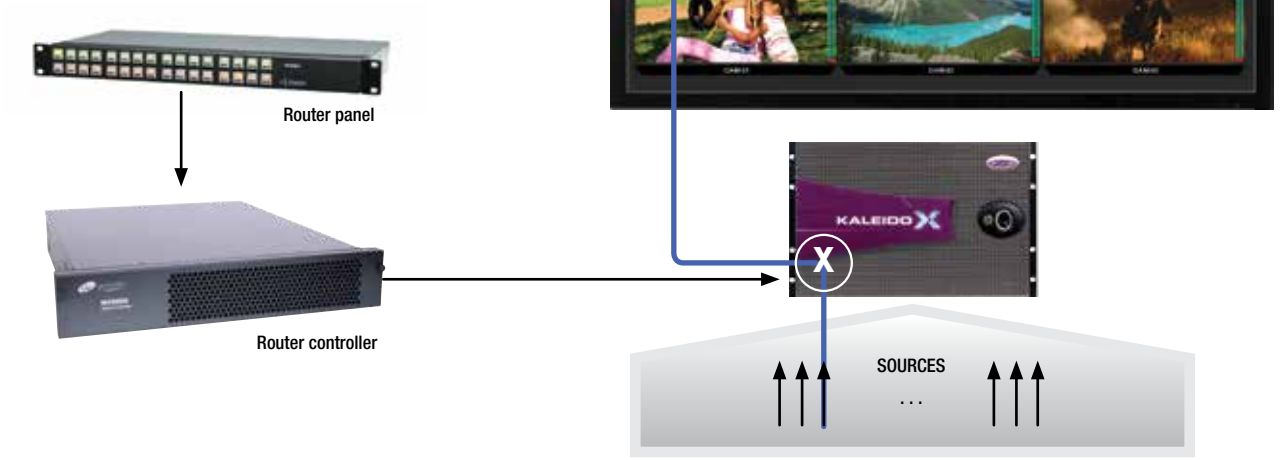
In addition to displaying the Dialnorm value encoded in the video signal, Kaleido processors can also measure the perceived loudness of the audio signal and compare it to the encoded value. The system can alert operators when signals exceed thresholds, by comparing the Dialnorm and measured loudness against a target values. The loudness is measured using LEQ-A or ITU-R-BS-1770.

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. DVB subtitles display and monitoring over IP with unique multilanguage DVB subtitling monitor widget for efficient use of screen real estate.

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, as well as third-party router control panels from Snell (Pro-bel) and Nevion.

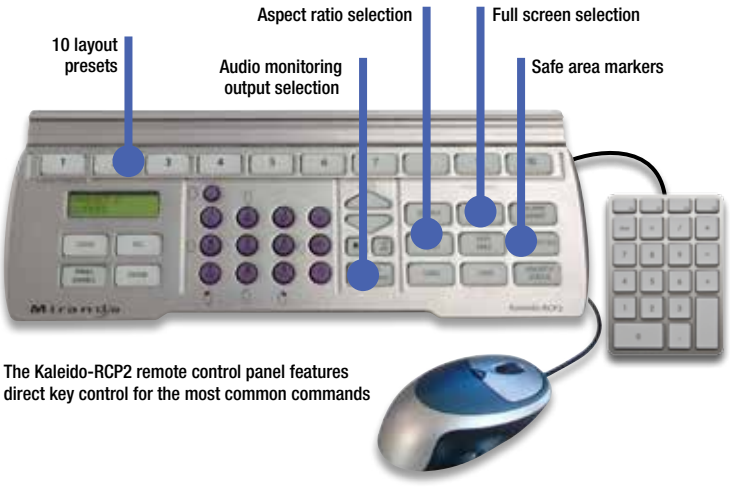


The highly graphical RCP-200 touchscreen remote panel offers more advanced control of combined multiviewer and routing systems. The panel provides multiviewer layout pre-set selection and quick router source assignment control via a category/index graphical interface. The RCP-200 is a multifunctional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



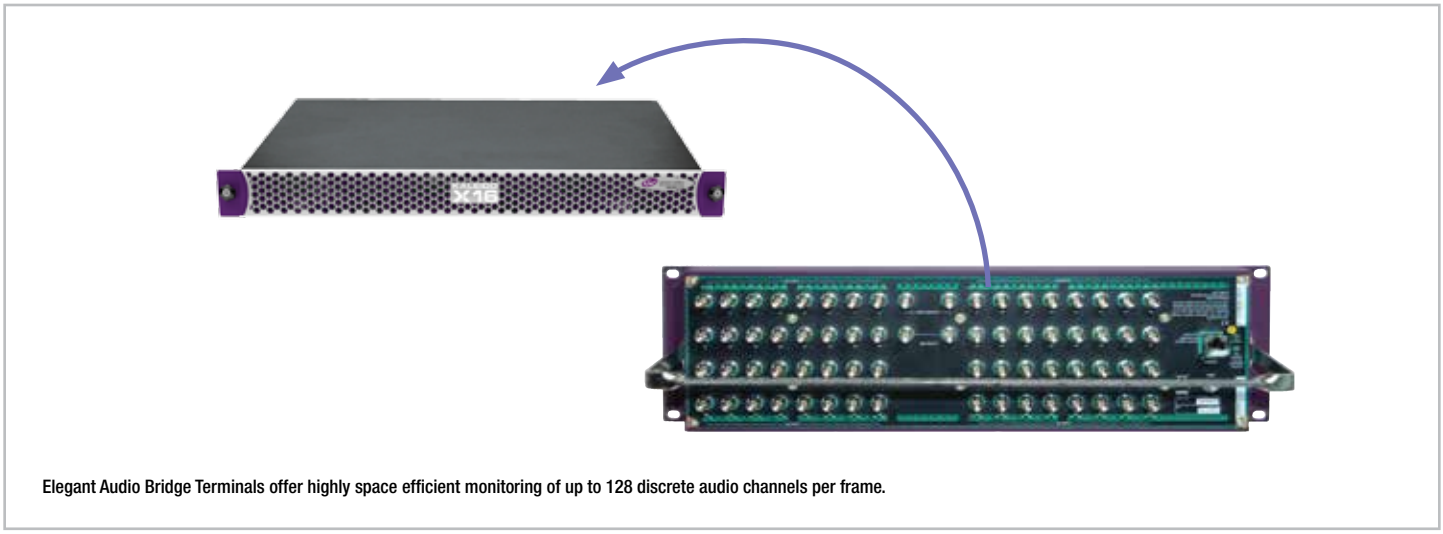
The Kaleido-RCP2 remote control panel features direct key control for the most common commands

384 Audio Channels Per Frame

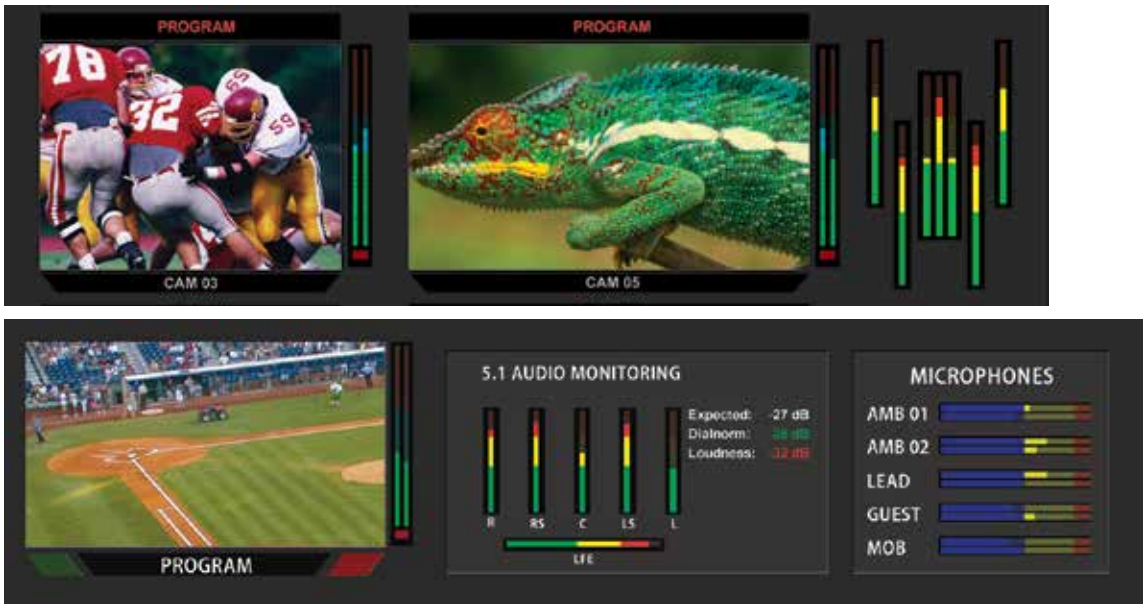
Kaleido-X16 offers exceptional audio performance, with the ability to monitor up to 384 channels of audio per frame (256 embedded audio channels plus 128 discrete audio channels), including embedded, discrete AES or discrete analog.

The amount of cabling needed for discrete (non embedded) audio is minimized by the Audio Bridge Terminals, which accept analog (balanced or unbalanced) and digital audio (75 Ω or 110 Ω). The Audio Bridge Terminals can fit in the back of racks, and can be located up to250m (800 feet) away from a Kaleido-X16 frame, with connection over standard video coax. With this configuration, it is no longer necessary to route individual audio signals to the multi-image processor/router.

Audio Bridge Terminals offer two coaxial outputs which provide redundancy and allow audio inputs to be shared among multiple frames. Power for the Audio Bridge Terminals originates from external supply or from the Ethernet switch using Power over Ethernet (PoE).



Elegant Audio Bridge Terminals offer highly space efficient monitoring of up to 128 discrete audio channels per frame.

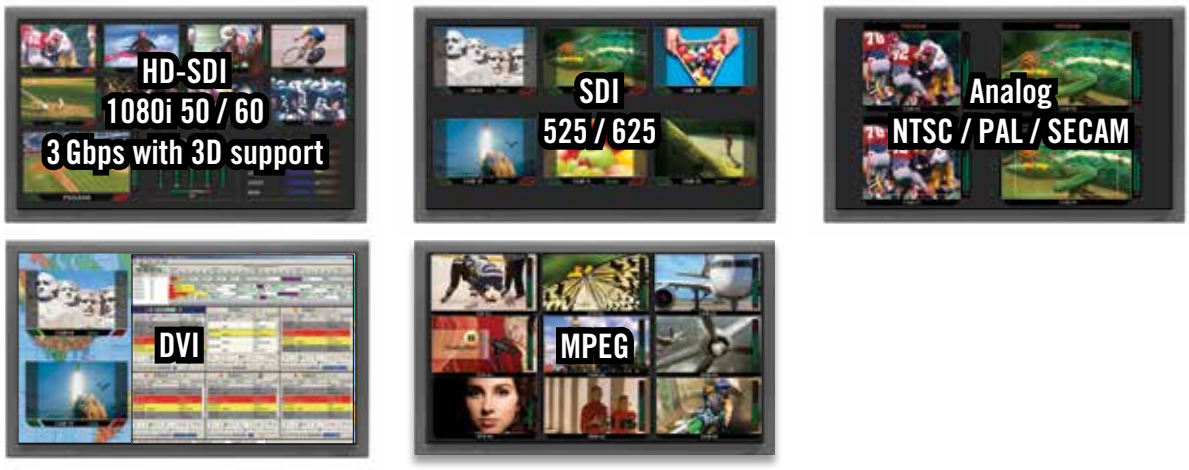


Dolby E Metatada can be extracted from an embedded audio signal to feed 5.1 audio level meters. Audio meter assignment is slaved from the Dolby E Program Configuration, and this allows precise monitoring of Dolby E audio without additional hardware.

Superior Display Flexibility with Kaleido-X16

Kaleido-X16 offers superior signal flexibility due to the system's high bandwidth performance. This allows an operator to focus on the ideal monitoring configuration, without worrying about the multiviewer's limitations.

Any Source



Auto-sensing inputs allow multiple source formats to be combined. DVI and MPEG are input via external options.

Any Resolution

Simultaneously display across monitors of different resolutions up to 1920 x 1200, and display across flat panels and projection cubes.

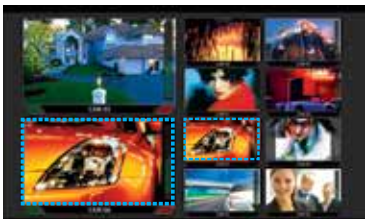
Any Size

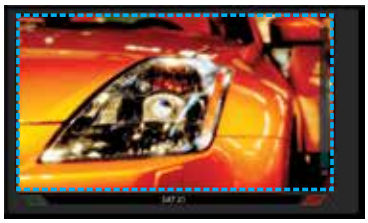
Signals can be displayed at any size up to full screen at full HD resolution.

Any Repetition

Sources can be repeated across multiple displays.

Any Position



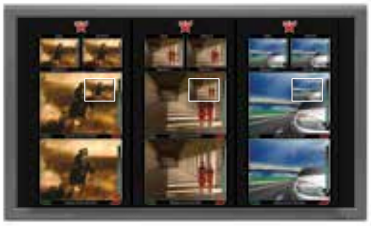


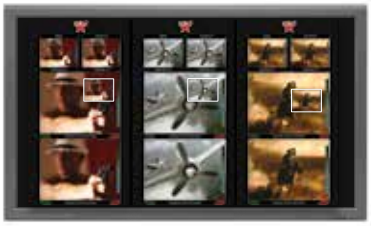
Signals can be positioned anywhere across displays.

Any Span

Signals can span across two displays.

Any PIP





Sources can be repeated (picture in picture) across displays.

Any Format

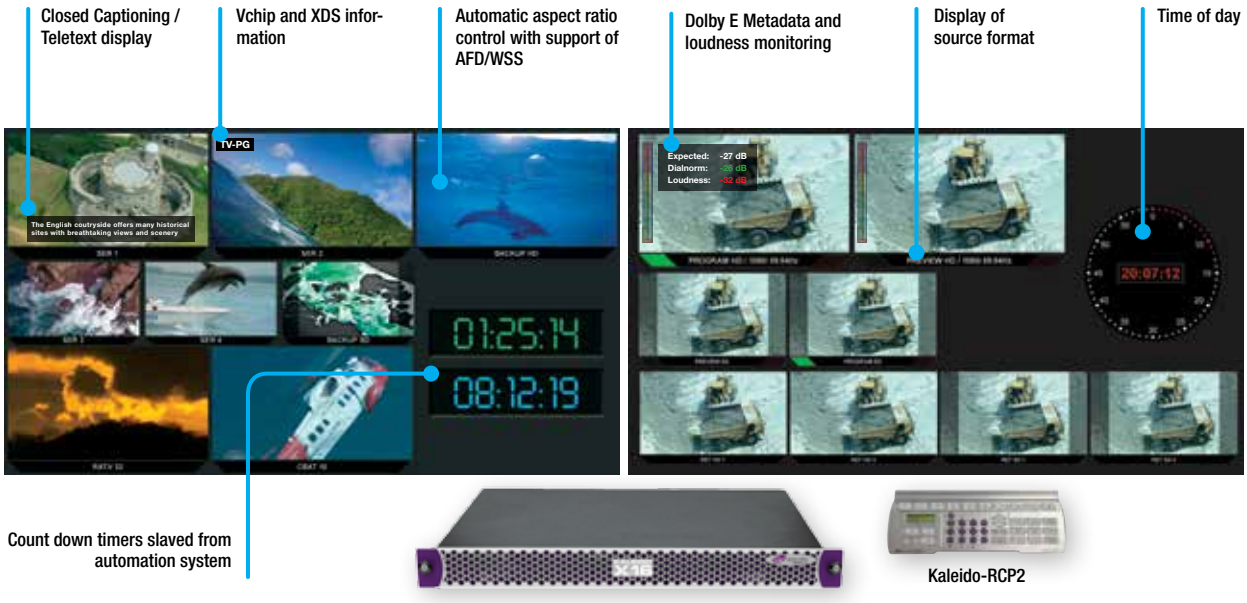
Signals of different aspect ratios can be displayed alongside each other, and the displays can be either landscape or portrait.

Using the Compact Kaleido-X16 in Smaller Control Rooms

The Kaleido-X16 processor is ideal for smaller monitoring facilities, such as call letter television station master control rooms, mobile trucks and production fly cases. Despite its compact size, the multiviewer provides all the advanced metadata extraction, probing, and alarming capabilities of the larger Kaleido-X multiviewer.

Community television, small studios and trucks

With native router control and a direct tally interface with production switchers, the Kaleido-X16 is perfect for small studios and trucks. The built-in 16 x 2 router can feed quality control instruments or redundant output paths.



Small call letter TV station master control room

The Kaleido-X16 provides all the signal validation tools required, with extraction of the important Metadata. The processor's two router outputs can be used to feed the master control switcher.

Production fly case

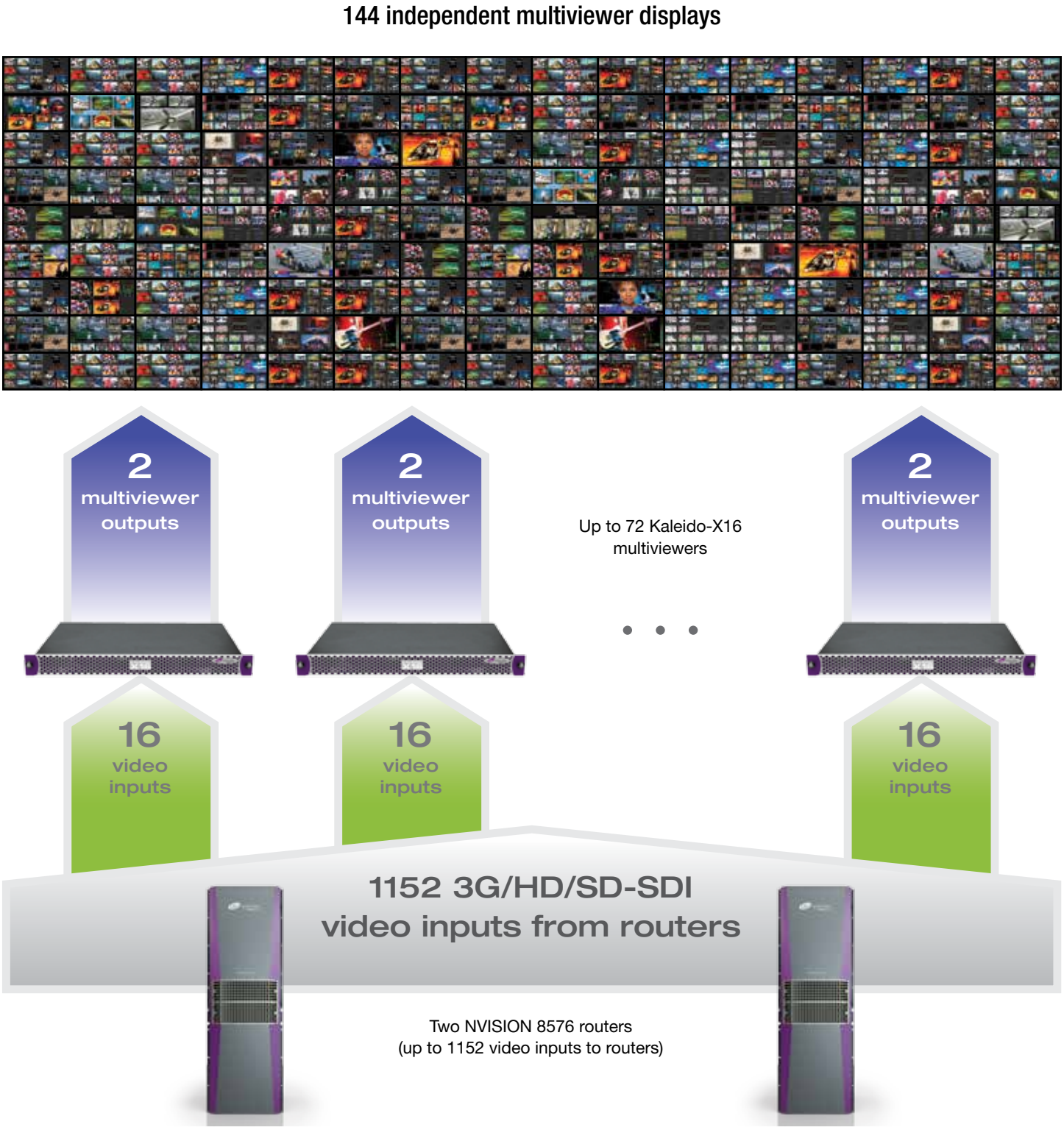
The Kaleido-X16's compact, standalone design, quiet ventilation and easy set-up makes it ideal for fly case applications.

Router Integration: Large Multiviewer, Small Failure Block

Kaleido-X16 offers seamless integration with the NVISION router family, and third-party routers, to allow expansion up to 1,152 video inputs and 144 multiviewer outputs.

Grass Valley's Cluster Feature enables multiple multiviewers to behave like a single system from an operator's perspective, with full layout flexibility.

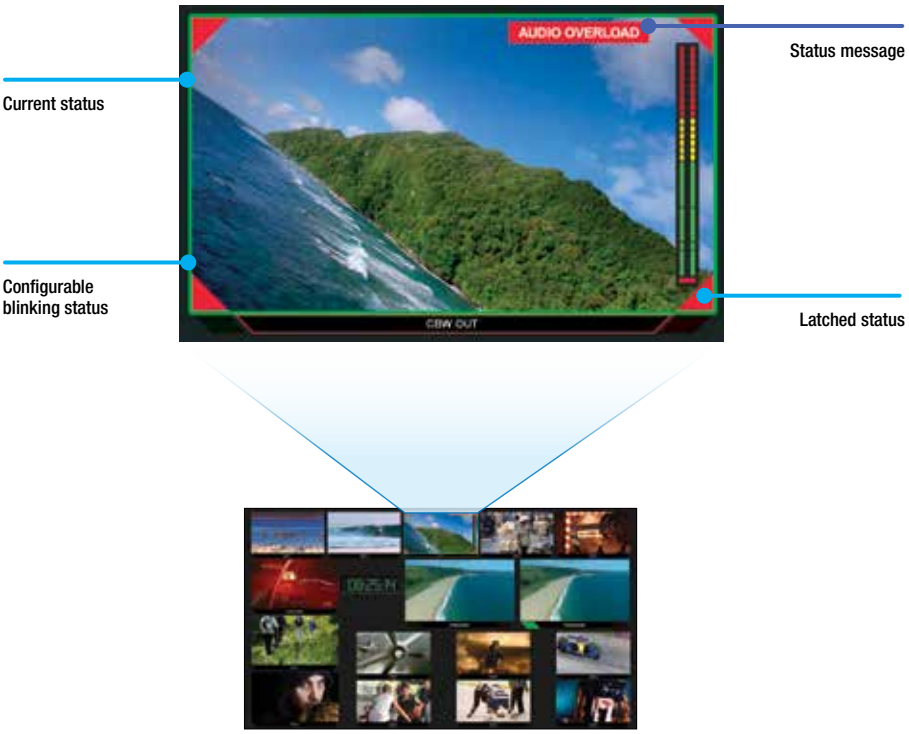
For example, two NVISION 8576 routers are integrated with 72 Kaleido-X16 processors. Each multiviewer provides two multiviewer displays, creating a total of 144 independent multiviewer outputs, and a small multiviewer failure block (just two displays out of 144). The entire system is fully integrated to offer seamless control of the source assignments via on-screen mouse operation or by a router control panel.



Sophisticated Alarm Displays

The Kaleido-X16 offers very sophisticated alarm display elements, which are activated when video/audio, Metadata or SNMP alarms are detected. Informative text and graphics alert operators at the monitor wall, with color coded on-screen alarm status indicators. These status indicators can be configured to latch the status, in case of sudden faults that cannot be intercepted by the operators. Acknowledgement mechanisms are available, with interaction by on-screen mouse.

The virtual alarm configuration tool allows grouping of alarm statuses to create a single 'virtual' alarm. It also offers alarm severity configuration and logical operations like AND, OR, and XOR between alarms.



Kaleido-X16 alarms can be shared with Grass Valley's iControl system for fully integrated facility monitoring

SPECIFICATIONS

Inputs (16) Composite
Signal: NTSC (SMPTE 170M), NTSC-J, PAL-BG-DHI, PAL-N, PAL-M, SECAM
Return loss: >30 dB up to 5.75 MHz
Quantization: 8 bits

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: 225m (738 ft.) Belden 1694A

HD-SDI
Signal: 4:2:2 SMPTE 292M-C (1.5 Gb/s)
Formats: 720p29.97 Hz, 720p25 Hz, 720p24 Hz, 720p59.94 Hz, 720p50 Hz, 1080i59.94 Hz / 29.97 Hz (PSF), 1080p29.97 Hz, 1080i50 Hz / 25 Hz (PSF), 1080p25 Hz, 1080p23.98 Hz / 24 Hz, 1080p23.98(PSF) / 24(PSF), 1080i50 Hz
Audio: SMPTE 299M
Return loss: >15 dB up to 1.485 GHz
Jitter: <0.2 UI
Cable length: 100m (328 ft.) Belden 1694A

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: >10 dB up to 2.97 GHz
Jitter (wideband): <0.3 UI
Cable length: 100m (328 ft.) Belden 1694

DVI Inputs
Device: KXI-DVI-Bridge
Signal: DVI-D
Resolutions: MODE A: 1024x768, 1366x768, 1280x1024, 1680x1050, 1600x1200 at 60 Hz
MODE B: 1280x720 and 1920x1080 at 50/60 Hz
Cable length: 100m (328 ft.) Belden 1694A

DVI Background Inputs (2)
Description: Each DVI background input is dedicated to one HDMI output
Signal (2): DVI-D
Resolutions: No scaling available, must match the DVI output resolution

Mosaic Outputs (Video and Graphic)

HDMI (2)
Signal: HDMI
Resolutions: Variable/autosensing from 800x600 to 1920x1200
H frequency: 37 kHz to 96 kHz
Refresh rate: 50/59.94 Hz
Processing delay: 1 frame total when signals and frame are genlocked
Scaling performance: High quality adaptive filtering process providing best performance scaling at every image size
Connector: HDMI

HD-SDI (2)
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
3G: <0.33 UI
Cable length: 100m (328 ft.) Belden 1694A

HD-SDI Router Outputs
Card: KXS-X16-RTR-16x2
Signals (2): 4:2:2 SMPTE 292M-C (3 Gb/s)
Formats: 525, 625, 720p59.94 Hz, 1080p23.98 Hz, 1080p23.98 SF, 1080p24 Hz, 1080p24 SF, 1080p25 SF, 1080p29.97, 1080i50 Hz, 1080i59.94 Hz, 1080p50 Hz, 1080p59.94 Hz
Switching: Vertical interval with reference input, selectable field
Reclocking: Configurable with or without by output port
Processing delay: Negligible
Jitter:
HD/SD: <0.2 UI p-p (wideband)
3G: <0.3 UI p-p (wideband)
Connectors: BNC

Reference Input
Supported formats: SMPTE 170M, SMPTE 318M, ITU 624-4, BUT 470-6, PAL and NTSC composite sync, SMPTE 274M, SMPTE 296M, SMPTE 240M

Analog Audio
Inputs: ABT-64A or ABT-128A
Signals (64 or 128 mono channels): 20kΩ balanced, 10kΩ unbalanced
Maximum level: +24 dBu
Connectors: WECO

AES 110Ω
Audio inputs: ABT-64D-110 and ABT-128D-110
Signals (32 or 64 AES): AES3
Termination: 110Ω balanced
Sampling: 48 kHz
Connectors: WECO

AES 75Ω
Audio inputs: ABT-64D-75 and ABT-128D-75
Signals (32 or 64 AES): AES3
Termination: 75Ω unbalanced
Connectors: BNC

Analog Audio Monitoring Outputs
Signals (2): Balanced analog stereo
Impedance: <600Ω
Level: +24 dBu maximum
Connector: Via HD-26 connector

AES Audio Monitoring Outputs
Signals (2): AES3
Impedance: <110Ω
Connector: Via HD-26 connector

LTC Inputs
Signal (2): SMPTE 12M-1995 (EBU-3259-E), SMPTE 309M
Level: 501 mVp-p to 10 Vp-p
Impedance: >10kΩ
Refresh rate: 50/59.94 Hz
Connectors: BNC

GPI Inputs
Signals (32): Contact closure
Opto-isolated, active low with internal pull-ups to 5 VDC and up to 12 VDC

GPI Outputs
Signals (4): Contact closure open collector 5 to 12 VDC

KALEIDO-X16 Frame
Power supply: Hot swappable redundant power supplies
Input voltage: 100-240V
Frequency: 50/60 Hz
Power: 300W
Dimensions:
H: 44 mm (1.75 in.) (1 RU) W: 448 mm (17.6 in.) D: 641 mm (25.5 in.)
Full spec. temperature range: 0 to 40° C (32 to 104° F) (ambient)
Weight: 10.44 kg (23 lbs.)

ORDERING

Frame Selection	
KALEIDO-X16-D	16 input dual head multi-image processor
KALEIDO-X16-S	16 input single head multi-image processor
Input Options	
KXS-X16-3G	3 Gb/s format license (1/frame)
KXS-X16-DOLBY	Dolby metadata extraction license (1/frame)
KXS-X16-LOUDNESS	Loudness level measurement license (1/frame)
KXS-X16-CSX	CC/subtitling and XDS data license (1/frame)
KXI-DVI-BRIDGE	Dual channel DVI to HD bridge
Audio Input Modules	
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
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
NSH26M	Terminal block adaptor for HD-26 connections (for audio I/O connections)
Output Options	
KXS-X16-HDM-D	HD-SDI monitoring output for Kaleido-X16-D
KXS-X16-HDM-S	HD-SDI monitoring output for Kaleido-X16-S
KXS-X16-ROTATOR-D	Rotation license for Kaleido-X16-D
KXS-X16-ROTATOR-S	Rotation license for Kaleido-X16-S
KXS-X16-RTR16X2	Dual router output option (1/frame)
KXS-X16-3DLA-D	Stereoscopic display license (line alternate mode) for Kaleido-X16-D
KXS-X16-3DLA-S	Stereoscopic display license (line alternate mode) for Kaleido-X16-S
DXF-200-B	Optical extension system w/HDMI+L - HDMI+L cable
DXF-200-PSU	DXF-200 power supply (1x sub-module)
KXC-HDMI-DVI	HDMI to DVI fem cable 0.3m (1 ft.)
KXC-HDMI-L-DVI	HDMI w/lock to DVI fem cable 0.3m (1 ft.)

Control Options	
KALEIDO-RCP2	Ethernet remote control panel and KM gateway
KRCP-RK2	Kaleido-RCP2 rack mount bracket
RCP-200	Advanced remote control panel for models and accessories
KXA-TBA-44	Terminal block adapter for HD-44 connections (for GPI connections)

Note: For router control with physical control panel, make a selection within the range of Grass Valley/ NVISION control panel series. One of the NV9000 or NV920 is required to interface the panel and the router.

Grass Valley & Third-Party Interface Options	
KXS-X16-CTRL/UMD-NVISION3	Control and UMD support for NVISION routers
KXS-X16-CTRL/UMD-DATATEK	Control and UMD support for Datatek routers
KXS-X16-CTRL/UMD-ENCORE	Control and UMD support for Encore controllers
KXS-X16-CTRL/UMD-EVERTZ	Control and UMD support for Evertz routers
KXS-X16-CTRL/UMD-GVG7000	Control and UMD support for GVG7000 routers
KXS-X16-CTRL/UMD-JUPITER	Control and UMD support for Jupiter routers
KXS-X16-CTRL/UMD-HARRIS	Control and UMD support for Leitch routers
KXS-X16-CTRL/UMD-NETWORK	Control and UMD support for Nevion routers
KXS-X16-CTRL/UMD-SNELL	Control and UMD support for Probel routers
KXS-X16-CTRL/UMD-PESA	Control and UMD support for PESA routers
KXS-X16-CTRL/UMD-UTAH	Control and UMD support for Utah routers
KXS-X16-TALLY-KAHUNA	Tally interface for Snell and Wilcox Kahuna switchers
KXS-X16-TALLY-KALYPSO	Tally interface for Grass Valley Kalypso switchers
KXS-X16-TALLY-KAYAK	Tally interface for Grass Valley Kayak switchers
KXS-X16-TALLY-SONY	Tally interface for Sony switchers (serial protocol)
KXS-X16-TALLY-SYNERGY	Tally interface for Ross Synergy and Vision switchers
KXS-X16-TALLY-ZODIAC	Tally interface for Grass Valley Zodiac switchers
Spares	
KXA-X16-PSU	Kaleido-X16 redundant power supply module
PSU-POE	Replacement power over Ethernet module

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