KALEIDO-MODULAR-X

HIGH PICTURE COUNT, ULTRA-FLEXIBLE AND SCALABLE MULTIVIEWER

Installation & Service Manual

www.grassvalley.com

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Terms and Conditions

Electrostatic Discharge (ESD) Protection

⚠️ Electrostatic discharge occurs when electronic components are improperly handled and can result in intermittent failure or complete damage adversely affecting an electrical circuit. When you remove and replace any card from a frame always follow ESD-prevention procedures:

- Ensure that the frame is electrically connected to earth ground through the power cord or any other means if available.
- Wear an ESD wrist strap ensuring that it makes good skin contact. Connect the grounding clip to an *unpainted surface* of the chassis frame to safely ground unwanted ESD voltages. If no wrist strap is available, ground yourself by touching the *unpainted* metal part of the chassis.
- For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms.
- When temporarily storing a card make sure it is placed in an ESD bag.
- Cards in an earth grounded metal frame or casing do not require any special ESD protection.

Protection contre les décharges électrostatiques (DES)

⚠️ Une décharge électrostatique peut se produire lorsque des composants électroniques ne sont pas manipulés de manière adéquate, ce qui peut entraîner des défaillances intermittentes ou endommager irrémédiablement un circuit électrique. Au moment de remplacer une carte dans un châssis, prenez toujours les mesures de protection antistatique appropriées :

- Assurez-vous que le châssis est relié électriquement à la terre par le cordon d'alimentation ou tout autre moyen disponible.
- Portez un bracelet antistatique et assurez-vous qu'il est bien en contact avec la peau. Connectez la pince de masse à une *surface non peinte* du châssis pour détourner à la terre toute tension électrostatique indésirable. En l'absence de bracelet antistatique, déchargez l'électricité statique de votre corps en touchant une surface métallique *non peinte* du châssis.
- Pour plus de sécurité, vérifiez périodiquement la valeur de résistance du bracelet antistatique. Elle doit se situer entre 1 et 10 mégohms.
- Si vous devez mettre une carte de côté, assurez-vous de la ranger dans un sac protecteur antistatique.
- Les cartes qui sont reliées à un châssis ou boîtier métallique mis à la terre ne nécessitent pas de protection antistatique spéciale.

Recycling

Visit www.grassvalley.com for recycling information.

Certification and Compliance

Electromagnetic Compatibility

This equipment has been tested for verification of compliance with FCC Part 15, Subpart B requirements for class A digital devices.

> Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This equipment has been tested and found to comply with the requirements of the EMC directive 2014/30/EU:

- EN 55022 Class A Radiated and conducted emissions
- EN 61000-3-2 Limits for harmonic current emissions
- EN 61000-3-3 Limitation of voltage fluctuations and flicker
- EN 61000-4-2 Electrostatic discharge immunity
- EN 61000-4-3 Radiated, radio-frequency, electromagnetic field immunity
- EN 61000-4-4 Electrical fast transient immunity
- EN 61000-4-5 Surge transient immunity
- EN 61000-4-6 Conducted disturbances immunity
- EN 61000-4-11 Voltage dips, short interruptions and voltage variations immunity

Environmental Compliance

部件名称 Part name	有毒有害物质或元素 (Toxic or hazardous substances and elements)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6)	多溴联苯 (PBB)	多溴二苯 (PBDE)
电缆及电缆组件 Cables and cable assemblies	X	O	O	O	O	O
电路模块 Circuit modules	X	O	O	O	O	O
金属零件 Metal parts	X	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 GB/T 26572-2011 规定的限量要求以下。

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572-2011.

X：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572-2011 规定的限量要求。

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials for this part is above the limit requirement in GB/T 26572-2011.

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Technical explanations: This statement is based on the information provided by our suppliers of components and collected through our Grass Valley's environmental management system. Grass Valley believes this environmental information to be correct but cannot guarantee its completeness or accuracy as it is based on data received from sources outside our company. All specifications are subject to change without notice.

Table of Contents

1 Overview

Welcome to the Kaleido family of multiviewers! This Installation & Service Manual is designed to help you get your Kaleido-Modular-X multiviewer up and running. The following chapters will guide you through the installation of a Kaleido-Modular-X system in its default configuration. This chapter provides an overview of the Kaleido-Modular-X unit.

Related Documentation

The Kaleido-Modular-X multiviewer is installed in a Densité frame. As such, the Densité frame must be networked and powered, and configured for use.

Use the following related documentation to configure the multiviewer and to better understand the features available with this multiviewer. You can obtain the latest product documentation from the Documentation Library section of Grass Valley's website (www.grassvalley.com/docs/multiviewers).

Document Number	Title
M770-2800	Kaleido Software User's Manual
M770-2103	Kaleido Software Release Notes
M770-9904	Kaleido Multiviewer Product Comparison Charts
GVB-1-0134D-EN-DS	Kaleido-Modular-X Datasheet
GVB-1-0490B-EN-DS	KMX-3901-IN-IP Datasheet
M770-9905	Kaleido Multiviewers Documentation Resource Guide
M933-9802	Kaleido-Modular-X Hardware Description & Installation Manual
M659-9900	CPU-ETH2 Guide to Installation and Operation
M844-9900	Densité 3 Frame Installation and Operation Guide
M969-9900	Densité 3+ FR1 User Manual
M3007-9900	Densité 3+ FR4 Frame User Manual
M3036-9900	IPG-3901 Guide to Installation and Operation
M906-9900	GPI-1501 Guide to Installation and Operation
M845-9900	REF-1801 Guide to Installation and Operation
M735-9902	Kaleido-RCP2 Guide to Installation and Operation
M876-9900	RCP-200 Guide to Installation and Operation
M770-0900	Kaleido Remote Control Protocol (Gateway) User's Guide
M796-9902	Audio Bridge Terminal Guide to Installation and Operation
M807-9700	KXI-DVI-Bridge User's Manual

Document Number	Title
M407-9900	iControl Router User Guide
Published online	iControl Online Help iControl Solo Online Help
UG0034	NV8500 Series User's Guide

Software and Firmware Updates

You can obtain the latest software, drivers, and sample databases from the *Downloads* section of the Grass Valley's website (www.grassvalley.com/dl/multiviewers).

About the Multiviewer

The **Kaleido-Modular-X** is a flexible and scalable 4K- and IP-ready multiviewer for TV production optimized for the space, power and weight considerations found in studios and outside broadcast trucks. FlexBridge coax cable bridging between the input and output modules allows for the installation of the input stage next to the router or sources, and the output stage next to displays, for simpler, cost-effective cabling with none of the risk associated with HDMI extenders. The Kaleido-Modular-X supports up to 64 video inputs, and up to four multiviewer outputs.

A Kaleido-Modular-X multiviewer system in its default configuration includes a number of layout presets. Each preset shows the video signals from a specific input module (card). Refer to the *Kaleido Software User's Manual* (see Related Documentation, on page 11) for instructions on how to create rooms and layouts according to your specific requirements.

This section provides information about system requirements and the items shipped with your Kaleido-Modular-X cards.

Introduction

The Kaleido-Modular-X supports up to 64 video inputs, and up to four multiviewer outputs.

Features

Kaleido-Modular-X features

Space-efficient modular design	Modular design offers wide range of input/output configurations, with optional separation of input and output stages for streamlined, cost-saving cabling and optimization of space usage. Standard Densité frame housings enable *mix-and-match* capability of multiviewers with signal processing modules, URS frame reference, and GPI I/O via GPI-1501 cards.
Unique FlexBridge technology	Flexible coax cable bridging between input modules, and to the output modules. Expand your multiviewer beyond the number of slots within a single frame by bridging additional input or output modules housed in a different frame. Install the input stage next to the router and the output stage next to the displays to eliminate the HDMI extenders. More robust than cascading, with bypass relay protection to remain on air even when removing a module.
Unmatched image quality	Unmatched multiviewer picture quality, and superior on-screen graphics. Simultaneous HDMI and SDI outputs at full 1080p 50/60Hz resolution on up to four multiviewer displays. Input signal processing up to 3 Gb/s signal formats. Natively capable of handling 4K UHD quad-link sources seamlessly recombining them into a pixel perfect image.
Robust and serviceable design	Hot swappable cards with unique auto-recovery feature, which provides fast automated recovery after a *cold* spare is inserted. 4 RU, 3 RU and 1 RU Densité frame housings, with redundant power supplies, and quiet cooling.
Multi-room, multi-user oriented	A single Kaleido-Modular-X 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* to create a seamless monitoring system across a facility. Choice of control options such as the standalone Kaleido-RCP2 or RCP-200 panels, integrated with router control systems and panels, iControl, and third-party control systems.
Superior layout flexibility	Unlimited signal repetition at any sizes across all displays, without blocking, grouping restrictions or bandwidth restrictions.
Router and switcher integration	Fast and easy NVISION router to multiviewer installation with M3 integration cable, which also offers space and weight reductions. The Kaleido-Modular-X integrates with the 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. A combined multiviewer/router system may include up to 1152 video inputs, and 288 multiviewer outputs.

Available Options

- Second power supply for redundant power security
- GPI-1501 GPI I/O module
- REF-1801 reference card
- Rear connector panels compatible with the M3 3 Gbps router integration cable (two models available: one for the KMX-3901-IN-16-D, one for the KMX-3901-IN-16-Q input cards)
- Double rear connector panels for the KMX-3901-IN input cards (five models available), compatible with the Densité 3+ FR4, and Densité 3+ FR1 housing frames only
- Single rear connector panel for the KMX-3901-OUT output cards, compatible with the Densité 3+ FR4, and Densité 3+ FR1 housing frames only

Optional Ancillary Equipment

The following optional equipment may be supplied with your order.

- Kaleido RCP-2 or RCP-200 multi-function remote control panel
- Audio Bridge Terminal (ABT)

Overview of the Kaleido-Modular-X System

Kaleido-Modular-X modules are interconnected using standard coax cables. FlexBridge connections are used to connect an input card to an output card, or to another input card as shown in the 32×4 configuration below. Up to four input and two output modules can be combined for multiviewer sizes of up to 64×4.

- KMX-3901-IN SDI input modules are available with two or four FlexBridge connectors for bridging to one or two KMX-3901-OUT output modules.
- KMX-3901-IN-IP input/output modules with two FlexBridge connectors for bridging to KMX-3901-OUT output heads are also available.
- Two FlexBridge connections per KMX-3901-OUT are required.
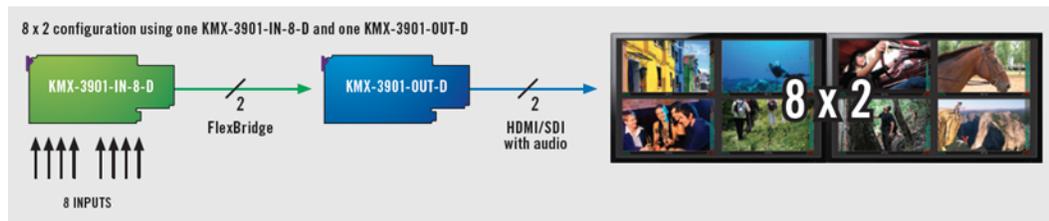
Kaleido-Modular-X configuration with 8 inputs and 2 outputs
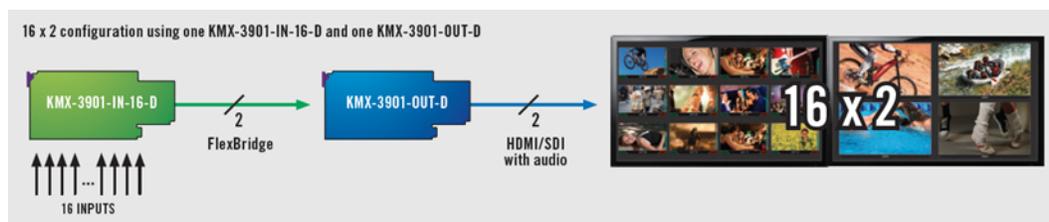
Kaleido-Modular-X configuration with 16 inputs and 2 outputs
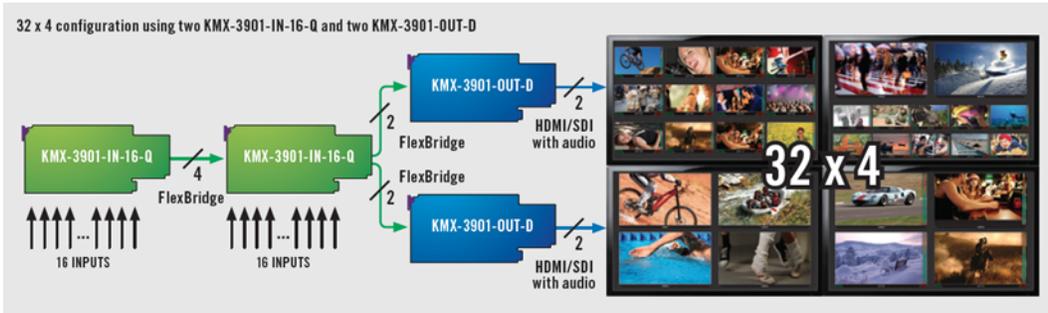
Kaleido-Modular-X configuration with 32 inputs and 4 outputs
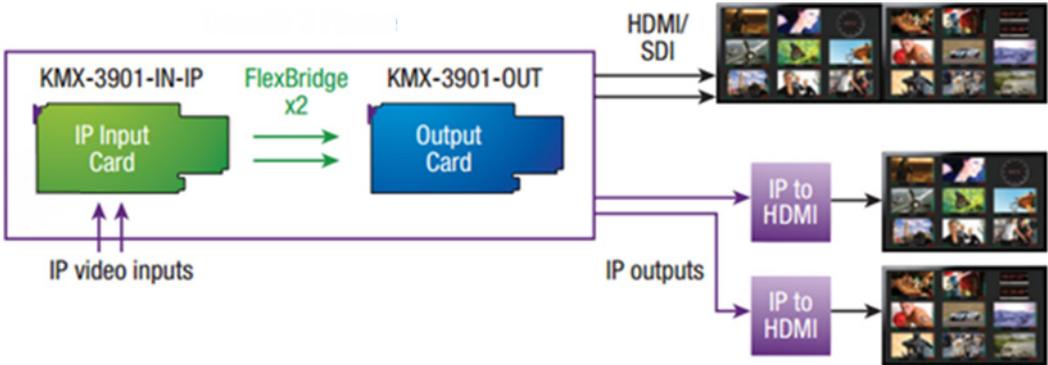
Kaleido-Modular-X configuration with IP inputs, 2 IP outputs, and 2 HDMI/SDI outputs
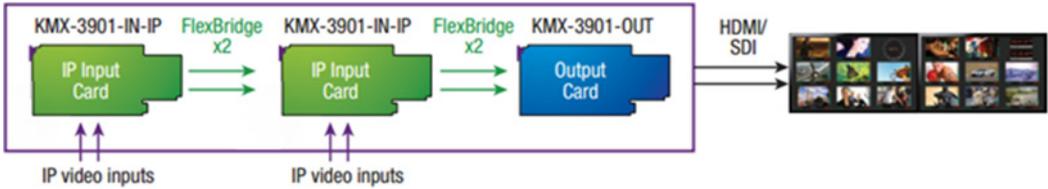
Kaleido-Modular-X configuration with 2 IP input/output modules and 2 HDMI/SDI outputs
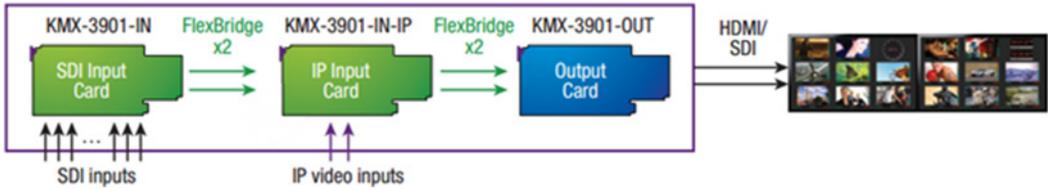
Kaleido-Modular-X configuration supporting both SDI, and IP inputs, with 2 HDMI/SDI outputs

Kaleido-Modular-X input and output modules can be housed in the same physical Densité frame, or in multiple frames, allowing expansion beyond the number of slots available within a single frame.
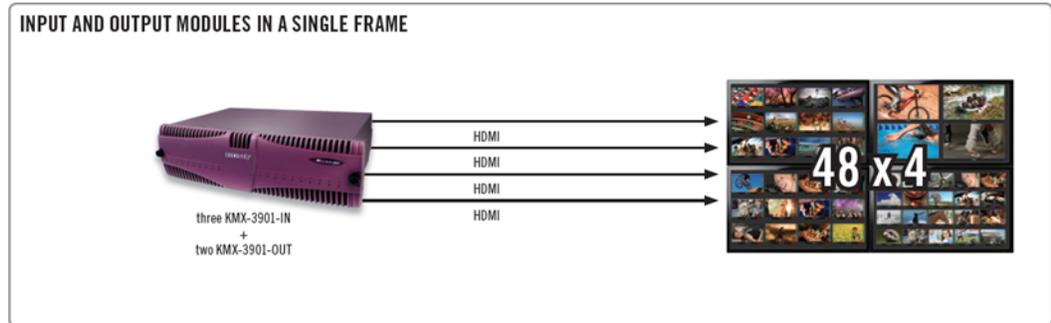
Kaleido-Modular-X single-frame configuration with 48 inputs and 4 outputs
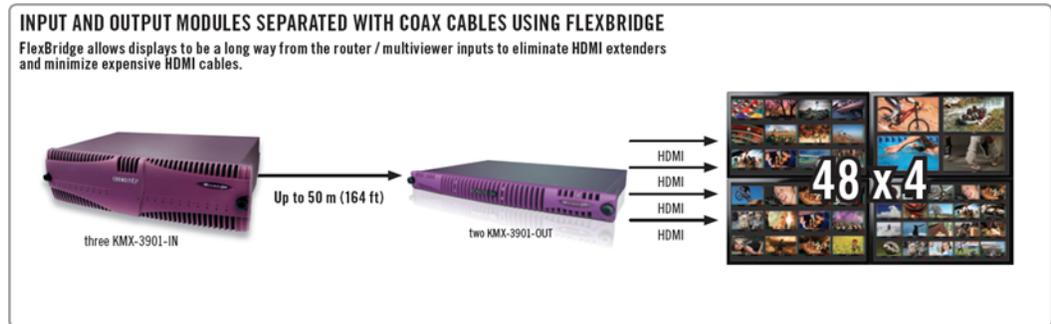
Kaleido-Modular-X distributed configuration with 48 inputs and 4outputs

Functional block diagrams
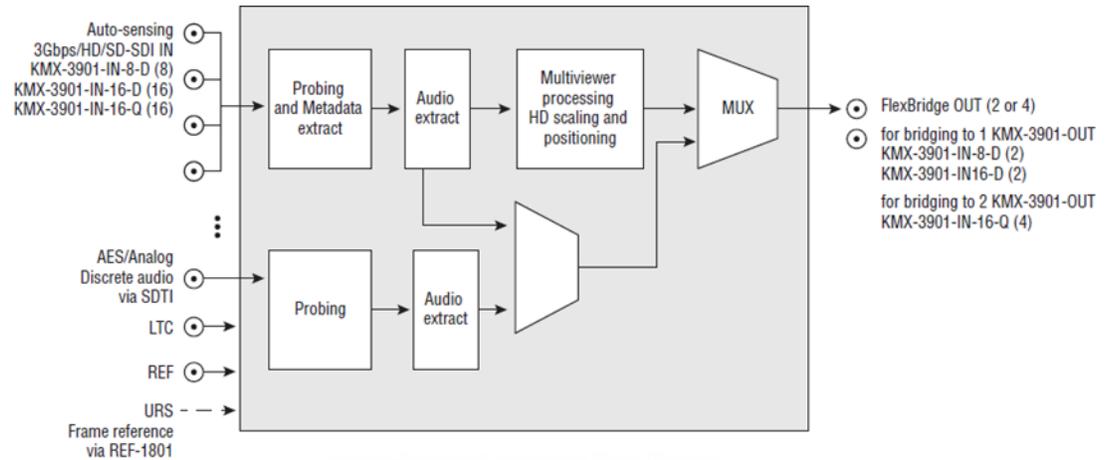
Kaleido-Modular-X functional block diagram: KMX-3901-IN input modules (KMX-3901-IN-8-D, KMX-3901-IN-16-D, and KMX-3901-IN-16-Q)
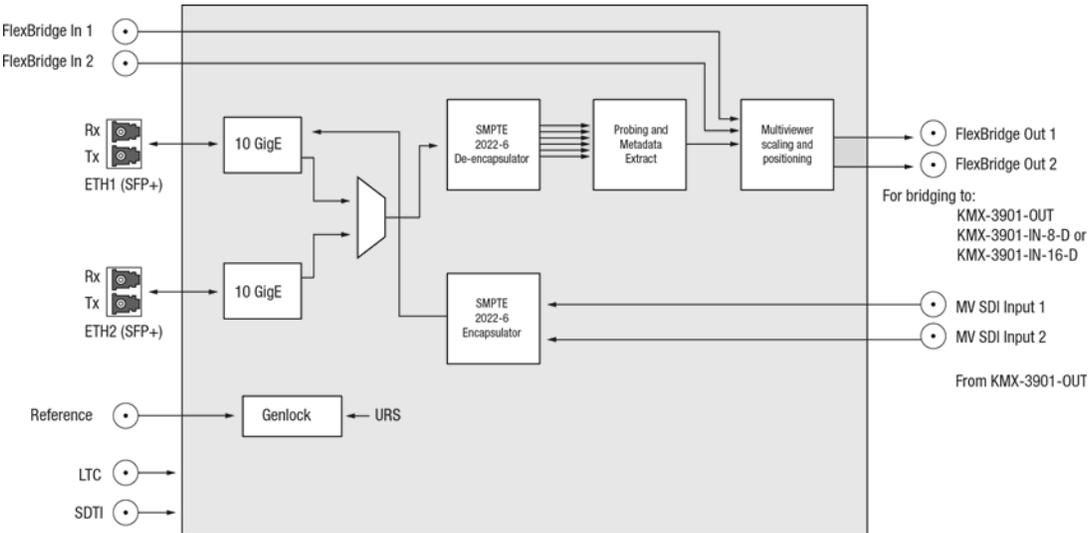
Kaleido-Modular-X functional block diagram: KMX-3901-IN-IP input/output modules
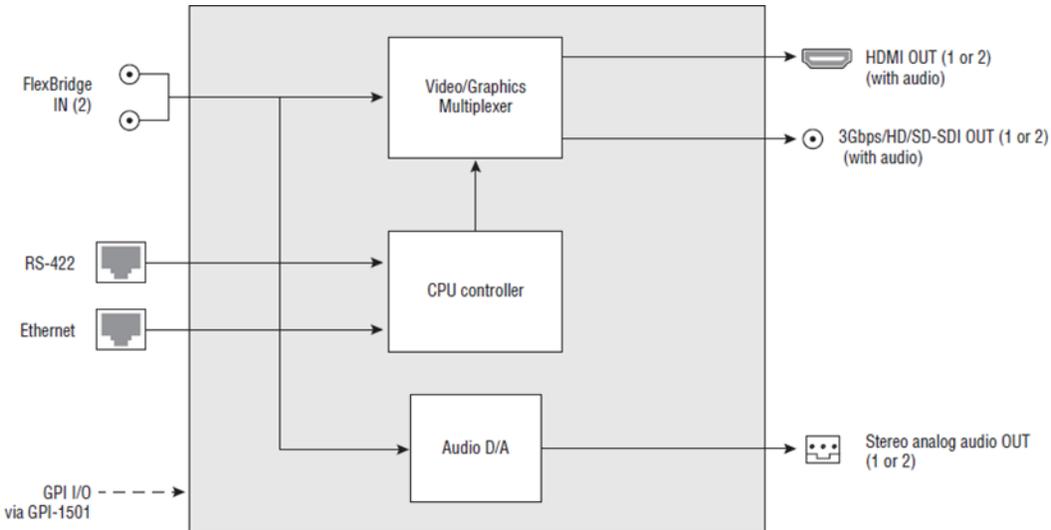
Kaleido-Modular-X functional block diagram: KMX-3901-OUT output modules (KMX-390-OUT-D, and KMX-3901-OUT-S)

2 Installation

This chapter provides information about system requirements, items shipped with your Kaleido-Modular-X multiviewer and it will guide you through the installation of a Kaleido-Modular-X multiviewer.

Getting Organized / Unpacking

This section provides information about system requirements, and items shipped with your Kaleido-Modular-X.

Required Tools

Use a field-supplied Phillips #2 screwdriver to remove and install rear panels.

Required Materials

The following tables shows the number of slots required for every available input and output card. In a Densité 3+ FR4 frame, there is a special slot for the CPU-ETH3 controller card. In a Densité 3, or Densité 3+ FR1 frame, there is a special slot for the CPU-ETH2 controller card. The Densité 3+ FR1 frame has another special slot for the GPI-1501. In a Densité 3 frame, allow one slot for the GPI-1501 (if available).

Your Kaleido-Modular-X system package includes the following:

- 1–4 KMX-3901-IN input cards with matching rear modules, as per order

SDI Input module parts	Description	Slots Required
KMX-3901-IN-8-D	8 input HD/SD-SDI and 3 Gbps input module with dual FlexBridge outputs. This card's revisions 300–310, and 400 are not fully compatible with the Densité 3+ FR4 frame (see Notes, on page 22).	-
KMX-3901-IN-8-D-3TRP	Triple rear connector panel with bypass relay.	3
KMX-3901-IN-8-D-3+DRP	Double rear connector panel with bypass relay. Compatible with Densité 3+ FR1, and Densité 3+ FR4 only.	2
KMX-3901-IN-16-D	16 input HD/SD-SDI and 3 Gbps input module with dual FlexBridge outputs. This card's revisions 200, 201, 300–307, and 400 are not fully compatible with the Densité 3+ FR4 frame (see Notes, on page 22).	-
KMX-3901-IN-16-D-3QRP	Quadruple rear connector panel with bypass relay.	4

SDI Input module parts	Description	Slots Required
KMX-3901-IN-16-D-3+DRP	Double rear connector panel with bypass relay. Compatible with Densité 3+ FR1, and Densité 3+ FR4 only.	2
KMX-3901-IN-16-Q	16 input HD/SD-SDI and 3 Gbps input module with quad FlexBridge outputs. Convertible to a 4K UHD prescaler. This card's revisions 300–307, and 400 are not fully compatible with the Densité 3+ FR4 frame (see Notes, on page 22).	-
KMX-3901-IN-16-Q-3PRP	Quintuple rear connector panel with bypass relay.	5
KMX-3901-IN-16-Q-3+DRP	Double rear connector panel with bypass relay. Compatible with Densité 3+ FR1, and Densité 3+ FR4 only.	2

- 1–4 KMX-3901-IN IP input/output cards with matching rear modules, as per order

IP module parts	Description	Slots Required
KMX-3901-IN-IP-D	10 GigE IP input module for SMPTE-2022-6 (3G/HD/SD) sources. This module comprises *two cards:* a KMX-3901-IN-8-D input card, and an IPG-3901 SDI/IP gateway card. The KMX-3901-IN-8-D card's revisions 200, 201, 300–307, and 400 are not fully compatible with the Densité 3+ FR4 frame (see Notes, on page 22). *KMX-IN-8-OPT-3GBPS license required for 3 Gb/s.*	-
KMX-3901-IN-IP-D-3+TRP	Triple rear connector panel. Compatible with Densité 3+ FR4 only.	3

- 1–4 KMX-3901-IN-M3 rear modules, M3 cables, and NVISION router-side rears, as per order

M3 module parts	Description	Slots Required
KMX-3901-IN-M3-D-3QRP	Quadruple rear connector panel with bypass relay for the M3 cable. Use with KMX-3901-IN-16-D.	4
KMX-3901-IN-M3-Q-3PRP	Quintuple rear connector panel with bypass relay for the M3 cable. Use with KMX-3901-IN-16-Q.	5
KMX-3901-IN-M3-D-3+DRP	Double rear connector panel with bypass relay for the M3 cable. Use with KMX-3901-IN-16-D. Compatible with Densité 3+ FR1, and Densité 3+ FR4 only.	2
KMX-3901-IN-M3-Q-3+DRP	Double rear connector panel with bypass relay for the M3 cable. Use with KMX-3901-IN-16-Q. Compatible with Densité 3+ FR1, and Densité 3+ FR4 only.	2

- 1 or 2 KMX-3901-OUT output cards, with rear modules, as per order

Output module parts	Description	Slots Required
KMX-3901-OUT-S	Single head output module, upgradable to dual head outputs.	-
KMX-3901-OUT-D	Dual head output module.	-
KMX-3901-OUT-D-3DRP	Double rear connector panel.	2
KMX-3901-OUT-D-3+SRP	Single rear connector panel. Compatible with Densité 3+ FR1, and Densité 3+ FR4 only.	1

- 1–16 12-inch FlexBridge cables (DIN-DIN coax cables), as per order

Number of FlexBridge cables for typical configurations (SDI inputs)

Model	FlexBridge	Model	FlexBridge	Model	FlexBridge
8 × 1	1	24 × 1	2	48 × 2	6
8 × 2	2	24 × 2	4	48 × 4	12
16 × 1	1	32 × 2	4	64 × 2	8
16 × 2	2	32 × 4	8	64 × 4	16
16 ×4	4				

Number of FlexBridge cables for IP-only configurations

Number of IP input/output cards	1	2	3	4
FlexBridge cables	2	4	6	8

- 2 WECO analog audio mating connectors for each output card
- 2 serial port adapters (1 with straight cabling and 1 with crossover cabling — see RS-422 connection diagram, on page 209) for every output card ordered with a double rear connector panel

Part number	Adapter cabling	RS-422 pinout at the DE-9P connector
1737-3000-102	Straight	Controller (SMPTE master) mode
1792-3700-100	Crossover	Tributary (SMPTE slave) mode

Note: The single rear connector panel KMX-3901-OUT-D-3+SRP does not have a serial port. To support a serial device, your Kaleido-Modular-X system must have at least one output card with a double rear connector panel (KMX-3901-OUT-D-3DRP).

- The Kaleido Multiviewers Documentation Resource Guide, which provides instructions on how to access the documentation you need to install and use your new multiviewer. See Related Documentation, on page 11.

> Note: In line with our commitment to environmental preservation, only the *Kaleido Multiviewers Documentation Resource Guide*, and some related documents (e.g., welcome letters, warranty cards) are distributed in printed form. You can obtain the latest version of the Kaleido Software User's Manual and Installation & Service Manual for this multiviewer model, as well as the Release Notes, from the *Documentation Library* section of the Grass Valley website. Software, drivers, and sample databases are available from the *Downloads* section of the website.

In addition to the above, you need the following (not supplied):

- At least one Densité 3, Densité 3+ FR4, or Densité 3+ FR1 housing frame

  > Notes
  >
  > - Early revisions of the KMX-3901-IN input cards (see SDI Input module parts, on page 19) are *not* fully compatible with the Densité 3+ FR4 frame. These cards are unable to properly extract the URS signal from the frame. Should you decide to rely on the card's external reference input (instead of the URS signal), to genlock your signals, the card will operate properly, however URS time code extraction will be unreliable. Grass Valley can modify these cards if needed (see , on page 210).
  > - Rear panels with part names that end with *-3+* are only compatible with Densité 3+ FR4 and Densité 3+ FR1frames.
  > - KMX-3901-IN IP input/output cards and their associated rear connector panel are compatible with Densité 3+ FR4 only.

- For a quad-head system with 64 SDI inputs, or if you want to have separate input and output stages, then you will also need a separate Densité 3, Densité 3+ FR4, or Densité 3+ FR1 frame to house your output cards

  > Note: Output cards with a *single* rear connector panel (KMX-3901-OUT-D-3+SRP) are compatible with Densité 3+ FR4, and Densité 3+ FR1 only.

- A Densité CPU-ETH2, or CPU-ETH3 frame controller card for each housing frame
- A GPI-1501 GPI I/O module *(optional)*
- A REF-1801 HD/SD frame reference module *(optional — not needed if the frame controller is a CPU-ETH3)*
- Up to 4 displays
- Management network—A dedicated 100Base-T Ethernet switch with enough ports for the KMX-3901-OUT output cards, the housing frames' CPU-ETH2, or CPU-ETH3 controller cards, client PCs, Kaleido-RCP2 units, and Audio Bridge Terminals
- Data network—Access to a separate network, for the KMX-3901-IN IP input/output modules' IPG-3901 card to connect to data streams (if your order includes KMX-3901-IN IP modules)
- Client PC (see System Requirements for a Client PC, on page 93)

• Cables (to connect your multiviewer to video sources, to displays, and to the network):

Cable type	Purpose
CAT-5	For Ethernet connectivity

Display cables	To connect the multiviewer's HDMI outputs to displays:
	• Standard HDMI cables
	• Extension modules—for example, Grass Valley's DXF-200 DVI/HDMI Optical Extension System:
	  • part number DXF-200-B, for output cards with a double rear connector panel (KMX-3901-OUT-D-3DRP)
	  • part number DXF-200-C, for output cards with a single rear connector panel (KMX-3901-OUT-D-3+SRP)
	
	To connect the multiviewer's SDI outputs to displays:
	• Standard coaxial cables with DIN 1.0/2.3 connectors
	• SDI to HDMI 2.0 (or SDI to DisplayPort) converter—for example, AJA's Hi5-4K Mini-Converter (firmware version 2.2 or later)

Video cables	Standard coaxial cables with DIN 1.0/2.3 connectors

Note: On all Kaleido multiviewers, the network adapters are set to auto-negotiate. By default, the connection speed and duplex mode will be set automatically based on the corresponding port settings on the switch.

Frame Physical Interface

Densité Frame Interfaces

Densité 3 and Densité 3+ FR1 frame interface

When the frame door is closed, the status LED on each of the cards in the frame is visible via a light pipe in the door. No other controls or indicators are present.

Card status LEDs (slots 1–10)   Controller card status LED   Card status LEDs (slots 11–20)

Front of Densité 3 frame

Controller card status   Card status (slots 1–2)   Card status (slots 3–4)   GPI-1501 card status
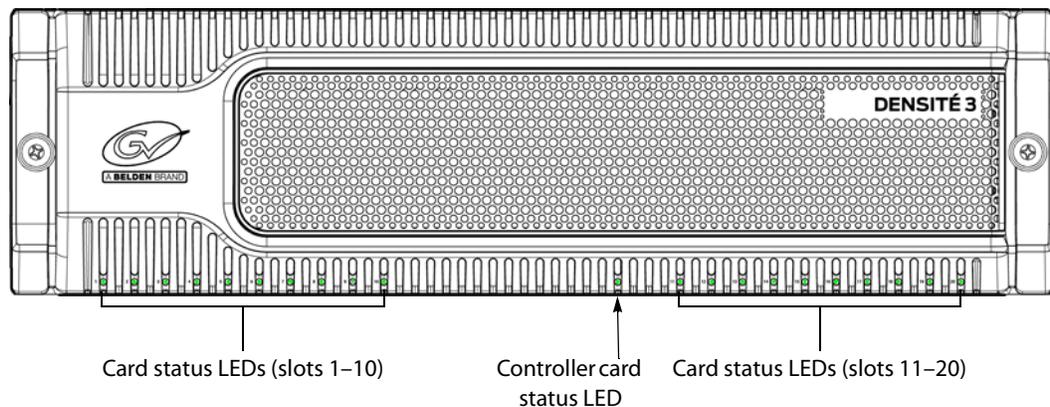
Front of Densité 3+ FR1 frame
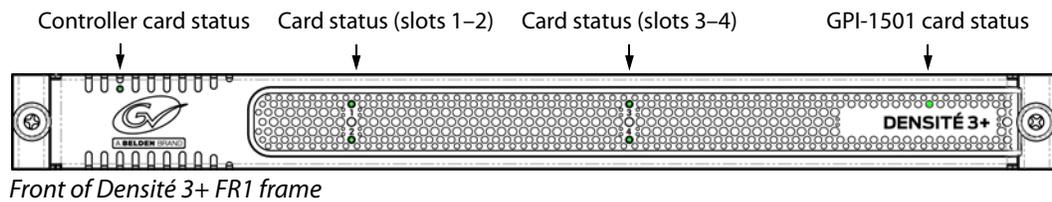
Densité 3+ FR4 frame interface

When the frame door is closed, the controller card touch screen is exposed through an opening in the top center of the door. All other front elements are concealed by the door.

Densité 3+ CPU-ETH3 local control panel
with controller and card status indicators

Front of Densité 3+ FR4 frame
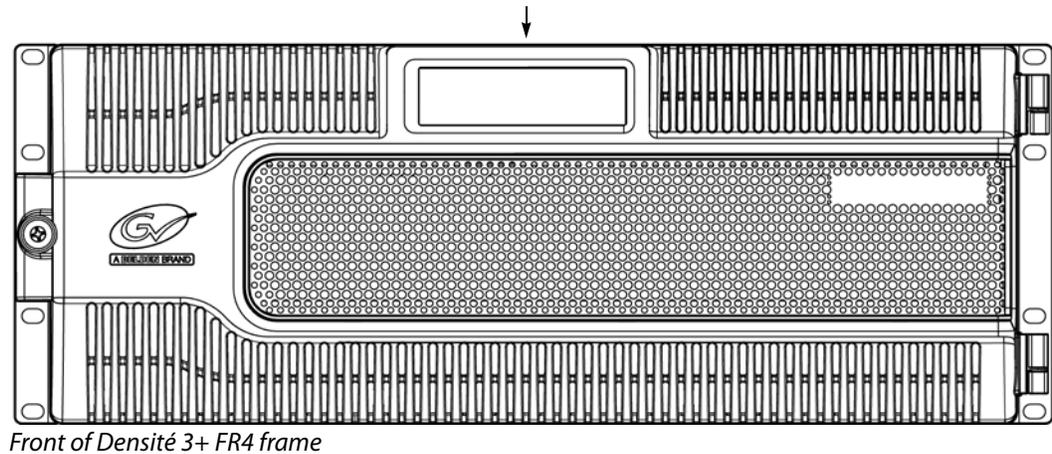
Installation of KMX-3901 Cards in the Densité Frame

The KMX-3901-IN input cards and the KMX-3901-OUT output cards can be installed in a Densité 3, Densité 3+ FR1, or Densité 3+ FR4 frame, depending on the rear connector panels you ordered. The KMX-3901-IN IP input/output cards and their associated rear connector panels must be installed in a Densité 3+ FR4 frame. It is not necessary to switch off the frame's power when installing or removing a card.

To set up the Kaleido-Modular-X hardware

1 Install your Densité 3, Densité 3+ FR4, or Densité 3+ FR1 housing frames in their designated rack position, if they are not installed already (refer to the appropriate manuals for your frames: the *Densité 3+ FR4 User Manual, the Densité 3+ FR1 User Manual,* or the *Densité 3 Housing Frame Guide to Installation and Operation; see* Related Documentation, on page 11).

2 Identify the appropriate slots for your new cards. See Required Materials, on page 19.

   To open the front door, see Opening and Closing the Front Door, on page 163.

   The following tables show examples of slot distributions for typical Kaleido-Modular-X configurations, for SDI source monitoring purposes. In these examples, the input cards have the 3–5-slot rear connector panels compatible with the Densité 3 frame, and the

output cards have a *double* rear connector panel. A Densité 3+ FR1 frame can house up to 4 output cards with *single* rear panels.

64 × 4 in Two Separate Housing Frames Example

Card	Model	Rear panel covers...	Insert card at...
Output A	KMX-3901-OUT-D	Slots 1–2 (for example, in Densité 3+ FR1)	Slot 1
Output B	KMX-3901-OUT-D	Slots 3–4 (for example, in Densité 3+ FR1)	Slot 3
Input A	KMX-3901-IN-16-Q	Slots 1–5	Slot 3
Input B	KMX-3901-IN-16-Q	Slots 6–10	Slot 8
Input C	KMX-3901-IN-16-Q	Slots 11–15	Slot 13
Input D	KMX-3901-IN-16-Q	Slots 16–20	Slot 18

64 × 2 Example

Card	Model	Rear panel covers...	Insert card at...
Output A	KMX-3901-OUT-D	Slots 1–2	Slot 1
Input A	KMX-3901-IN-16-D	Slots 3–6	Slot 5
Input B	KMX-3901-IN-16-D	Slots 7–10	Slot 9
Input C	KMX-3901-IN-16-D	Slots 11–14	Slot 13
Input D	KMX-3901-IN-16-D	Slots 15–18	Slot 17

48 × 4 Example

Card	Model	Rear panel covers...	Insert card at...
Output B	KMX-3901-OUT-D	Slots 2–3	Slot 2
Output A	KMX-3901-OUT-D	Slots 4–5	Slot 4
Input A	KMX-3901-IN-16-Q	Slots 6–10	Slot 8
Input B	KMX-3901-IN-16-Q	Slots 11–15	Slot 13
Input C	KMX-3901-IN-16-Q	Slots 16–20	Slot 18

48 × 2 Example

Card	Model	Rear panel covers...	Insert card at...
Output A	KMX-3901-OUT-D	Slots 1–2	Slot 1
Input A	KMX-3901-IN-16-D	Slots 3–6	Slot 5
Input B	KMX-3901-IN-16-D	Slots 7–10	Slot 9
Input C	KMX-3901-IN-16-D	Slots 11–14	Slot 13

32 × 4 Example

Card	Model	Rear panel covers...	Insert card at...
Output B	KMX-3901-OUT-D	Slots 2–3	Slot 2
Output A	KMX-3901-OUT-D	Slots 4–5	Slot 4
Input A	KMX-3901-IN-16-Q	Slots 6–10	Slot 8
Input B	KMX-3901-IN-16-Q	Slots 11–15	Slot 13

32 × 2 Example

Card	Model	Rear panel covers...	Insert card at...
Output A	KMX-3901-OUT-D	Slots 1–2	Slot 1
Input A	KMX-3901-IN-16-D	Slots 3–6	Slot 5
Input B	KMX-3901-IN-16-D	Slots 7–10	Slot 9

24 × 2 Example

Card	Model	Rear panel covers...	Insert card at...
Output A	KMX-3901-OUT-D	Slots 2–3	Slot 2
Input A	KMX-3901-IN-16-D	Slots 4–7	Slot 6
Input B	KMX-3901-IN-8-D	Slots 8–10	Slot 9

16 × 4 Example

Card	Model	Rear panel covers...	Insert card at...
Output B	KMX-3901-OUT-D	Slots 2–3	Slot 2
Output A	KMX-3901-OUT-D	Slots 4–5	Slot 4
Input A	KMX-3901-IN-16-Q	Slots 6–10	Slot 8

16 × 2, 16 × 1 Example

Card	Model	Rear panel covers...	Insert card at...
Output A	KMX-3901-OUT-D	Slots 1–2	Slot 1
Input A	KMX-3901-IN-16-D	Slots 3–6	Slot 5

8 × 2, 8 × 1 Example

Card	Model	Rear panel covers...	Insert card at...
Output A	KMX-3901-OUT-D	Slots 2–3	Slot 2
Input A	KMX-3901-IN-8-D	Slots 4–6	Slot 5

The KMX-3901-IN IP input/output module (KMX-3901-IN-IP-D), for IP source monitoring, comprises two cards: a KMX-3901-IN-8-D input card, and an IPG-3901

SDI/IP gateway card, with a common rear panel covering 3 slots, compatible with Densité 3+ FR4 only.

6 × 2, 6 × 1 (IP)

Card	Model	Rear panel covers...	Insert card at...
Output A	KMX-3901-OUT-D	Slots 2–3	Slot 2
Input A	KMX-3901-IN-IP-D	Slots 4–6	Slot 5 (IPG-3901), and slot 6 (KMX-3901-IN-8-D)

3 Remove the blank rear panels that cover the slots where you want to install your cards, by releasing their captive screws.

4 Position the new rear panels, and secure them in place with the captive screws at the bottom (or on the right, in the case of a Densité 3+ FR1 frame).

5 Slide each of your new input and output cards into the appropriate slot (refer to the tables matching your intended configuration, above, if needed), and push gently on the handle to seat the connectors. Seating an input card requires more pressure.

> **IMPORTANT**
>
> - If you need to replace or momentarily remove a rear panel, make sure to first remove the corresponding card itself from its slot (see *Replacing Cards*, on page 165).
>
> - Removing more than one input card at a time from a Kaleido-Modular-X system in operation is not supported.

6 Verify that each card is securely seated in its slot, and leave the frame door open so that you can monitor all the card's LEDs.

> Note: For more information on the card's LEDs, see Card Interfaces and Troubleshooting, on page 63.

7 Make the physical connections between your input and output cards, by using the FlexBridge cables that shipped with your system. See Bridging the Input and Output Cards in a Kaleido-Modular-X, on page 33.

8 Power up the frame, if it was not in operation already.

Once the networking parameters are correctly configured on your KMX-3901-OUT output cards, it will not be necessary to switch off the housing frame's power when installing or removing cards.

The Kaleido-Modular-X system starts up. The startup sequence takes approximately four minutes, during which time every card's status LED is flashing orange. See Card Interfaces and Troubleshooting on page 63 for more information. Once the startup has completed, the status LEDs on the *output cards* should be red (steady) because the cards are not connected to the network yet. See Input card Status LED on page 64 and Output card Status LED, on page 68.

9 If your system includes KMX-3901-IN-16-Q input cards to be used as 4K UHD prescalers, connect their FlexBridge outputs **A1** and **B1** to the 3G/HD SDI inputs you want to use for your 4K monitoring purposes, at the rear of a KMX-3901 input card, and then see Converting a KMX-3901-IN-16-Q Input Card to a 4K UHD Prescaler, on page 58, to

enable these cards' prescaler mode.
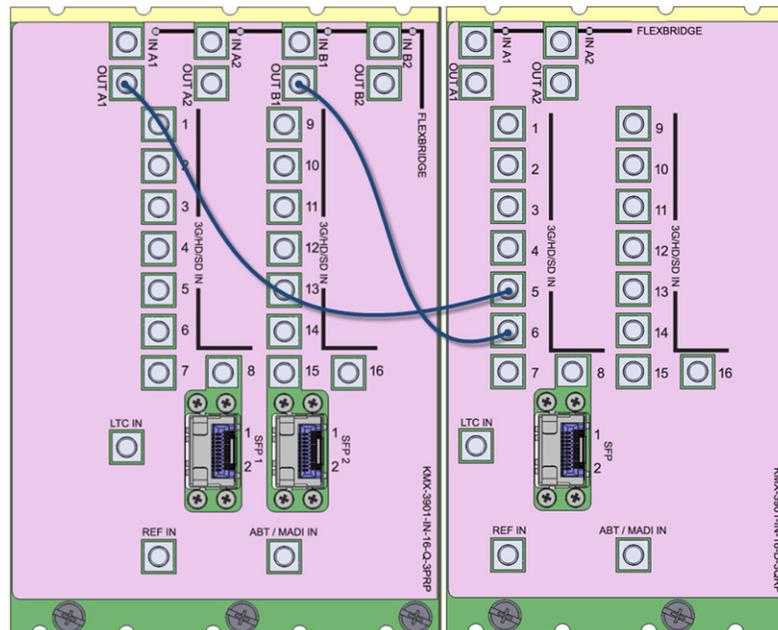
Example: 4K UHD prescaler's FlexBridge outputs A1 and B1, connected to 3G/HD SDI inputs 5 and 6, at the rear of a KMX-3901-IN-16-D input card

10 Connect the Kaleido-RCP2 and the Audio Bridge Terminal (if available) to the management network (see Cabling Diagram, on page 44). You can also connect a mouse and a keyboard to your Kaleido-RCP2.

> **Notes**
>
> - You may need to upgrade your Audio Bridge Terminal and Kaleido-RCP2 devices (if available) to the latest firmware. See Software and Firmware Updates, on page 12. Refer to the *Kaleido-RCP2 Guide to Installation and Operation*, and to the *Audio Bridge Terminal Guide to Installation and Operation* (*see* Related Documentation, on page 11) for instructions on how to determine the firmware level, and how to perform the upgrade for these devices.
>
> - The Kaleido-Modular-X supports one ABT device. With a 3RU model, you can achieve redundancy by connecting the ABT to more than one input card, in which case the Kaleido-Modular-X system uses the signal from the input card that is the farthest from the output cards (for example, Input D, if you have 4 input cards, Input C if you have 3 input cards, Input B if you have 2 input cards).

KMX-3901-OUT output cards automatically detect the resolution of any connected display. If the required information is not available, then a fall-back resolution of 1920 × 1080 @ 60 Hz (HDTV) is used.

11 Connect your KMX-3901-OUT output cards to displays that support this resolution.

- **Monitor wall displays:** Connect the output cards' MV OUT outputs to the displays.
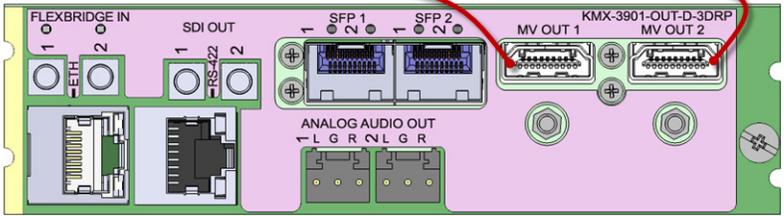
HDMI outputs on double rear module, connected to displays
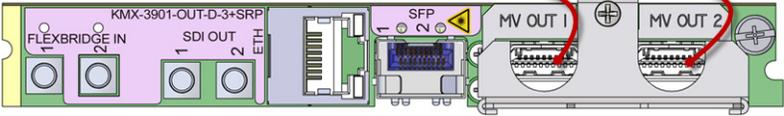
HDMI outputs on single rear module, connected to displays

• **Quad-link 4K UHD output:**

   • **Four 1080p displays**—In the case of a quad-head system meant to output a 4K UHD signal to four 1080p displays, connect the output cards' SDI monitoring outputs to the displays, referring to the table below for proper mapping.

   • **One 4K UHD display**—If your system is meant to output to a single 4K UHD display, connect the output cards' SDI monitoring outputs to the display, using an SDI-to-HDMI converter, if needed. Refer to the table below for proper mapping.

The SDI outputs are mapped as follows. This configuration does not support rotated displays. Refer to *Creating a 4K UHD Room,* and to *4K UHD Spanning,* in the Kaleido Software User's Manual, for instructions on how to create 4K UHD rooms and layouts. See Related Documentation, on page 11.

OUTPUT A, SDI OUT 1	Top left quadrant	OUTPUT B, SDI OUT 1	Top right quadrant
OUTPUT A, SDI OUT 2	Bottom left quadrant	OUTPUT B, SDI OUT 2	Bottom right quadrant

· **Broadcast monitors:** If your installation involves broadcast monitors, connect them to the appropriate SDI outputs. It is also possible to connect SDI outputs to a router. Refer to *Configuring the HD-SDI Monitoring Output Format,* in the Kaleido Software User's Manual, for instructions on setting the scan format. *See* Related Documentation, on page 11.

If you want to use a different resolution, see Changing the Mosaic Output Resolution, on page 77, for detailed instructions.

> IMPORTANT
> Within a Kaleido-Modular-X system, all output heads must be configured with the same refresh rate. If your system is referenced, then the heads' refresh rate must also match the reference signal's refresh rate.

12 Connect one or more video sources to the KMX-3901-IN input cards (see Cabling Diagram, on page 44).

13 If you have configured 4K UHD prescaler cards (at step 9, above), connect one or two quad link 3G-SDI signal sources to each prescaler card, as follows:

Description	Connector
Link 1A – Top left quadrant of 4K UHD signal A	3G/HD/SD IN 1
Link 2A – Top right quadrant of 4K UHD signal A	3G/HD/SD IN 2
Link 3A – Bottom left quadrant of 4K UHD signal A	3G/HD/SD IN 9
Link 4A – Bottom right quadrant of 4K UHD signal A	3G/HD/SD IN 10
Link 1B – Top left quadrant of 4K UHD signal B	3G/HD/SD IN 5
Link 2B – Top right quadrant of 4K UHD signal B	3G/HD/SD IN 6
Link 3B – Bottom left quadrant of 4K UHD signal B	3G/HD/SD IN 13
Link 4B – Bottom right quadrant of 4K UHD signal B	3G/HD/SD IN 14

> IMPORTANT
> The 4K UHD prescaler card and its 4K UHD source signals must be referenced together.

14 If your system configuration involves M3 cables, connect them between the appropriate output modules on the router side, and the KMX-3901-IN-M3 rear modules on the multiviewer side.

KMX-3901-IN-M3-D-3QRP
rear module

KMX-3901-IN-M3-Q-3PRP rear module

> Note: When the M3 output card is installed in the *lower output bays of an NV8576 router frame,* its backplane is *upside down* and the ordering of its ports differs from when the backplane is installed in the upper bays (right side up) of an NV8576 frame. See *NV8500 M3 Backplane Connections, on page 55* to determine the correct mapping between router outputs and multiviewer inputs, when using the M3 cable.

15 Connect a reference source (if available) to one or more reference inputs.

> Note: Unless your system includes a 4K UHD prescaler card (see step 9, and step 13 above), a reference is optional. If minimal processing delay is required for your monitoring purposes, then you must reference your system. However, if you must monitor 50 Hz input signals on 60 Hz displays (or vice-versa), then do not reference your system.
> To properly reference a Kaleido-Modular-X system, either:
> • Connect all reference inputs on all the KMX-3901-IN input cards, or
> • Use a REF-1801 card externally connected to the house reference, in every Densité frame that contains KMX-3901-IN input cards. The REF-1801 will distribute the reference to all cards in the frame internally through the URS on the frame midplane.

You can now proceed with the networking setup (see System Configuration, on page 93).

Ventilation

In a **Densité 3** frame, ventilation for the frame is provided by a fan mounted in the center of the rear panel. In a **Densité 3+ FR1** frame, ventilation is provided by two fans, one located at each end of the rear panel. In a **Densité 3+ FR4** frame, ventilation is provided by two fan assemblies, each containing three fans, located on each side in the top section of the rear

panel. The fans draw air through the frame and exhaust it to the rear. Ventilation slots in the front panel allow air to flow into the frame, and an air filter is mounted in the frame door.

> IMPORTANT
> To ensure proper cooling, the front panel of the Densité frame must be closed at all times when cards are installed and operating.

The frame-mounted fans are supplemented by thermostatically-controlled fans mounted in each power supply. They are not field-serviceable.

Ensure that the front panel ventilation slots are not obstructed. Check the air filter regularly to ensure that it is not plugged up with debris. The filter may be cleaned by rinsing it in warm water. Dry thoroughly before replacing it in the frame. See Replacing the Frame's Air Filter on page 182, for details.

Densité 3+ FR1 fan speed control

On the Densité 3+ FR1 frame's rear panel, a slider switch beside the controller-side fan allows the speed of the two rear-panel fans to be specified by the user. Two settings are provided:

- FULL – The fans operate at top speed at all times.
- VAR – The fan speed is managed by the controller card, which is monitoring the temperature inside the frame. This is the factory-default setting, and it is appropriate for most situations.
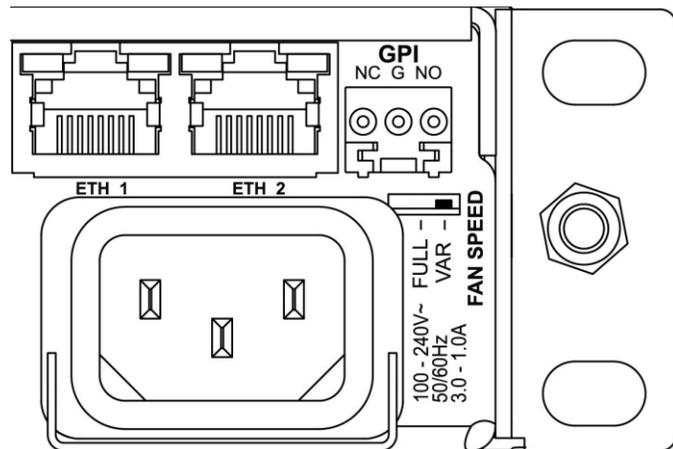
Use a small tool (for example, a pen tip or a small screwdriver) to change the switch setting.

3

Multiviewer Cabling

This chapter shows how to interconnect the multiviewer with its associated equipment.

Bridging the Input and Output Cards in a Kaleido-Modular-X

The Kaleido-Modular-X requires FlexBridge connections between the input and output cards. Use the DIN-DIN coax cables that shipped with your system to make these physical connections. The number of cables required depends on the number of input and output cards (see Required Materials, on page 19).

Depending on your monitoring purposes you may have ordered SDI input cards, or IP input/output cards, or both. The following sections describe FlexBridge wiring for typical configurations:

- FlexBridge wiring for SDI systems, on page 33
- FlexBridge wiring for IP systems, on page 39
- FlexBridge wiring for SDI/IP hybrid systems, on page 42

FlexBridge wiring for SDI systems

FlexBridge wiring for a 8 × 1 or 16 × 1 SDI system

To connect the input and output cards in a Kaleido-Modular-X 8 × 1 or 16 × 1

- Bridge **Input A** to **Output A**, by connecting:
    - INPUT A FLEXBRIDGE OUT A1 to OUTPUT A FLEXBRIDGE IN 1

Rear panels for a KMX-3901-IN-8-D (left), and KMX-3901-OUT-D (double panel shown on right). The Flexbridge connectors are the same on the KMX-3901-IN-8-D and KMX-3901-IN-16-D card's rear panels, and on the output card's single and double rear panels.

INPUT A   OUTPUT A
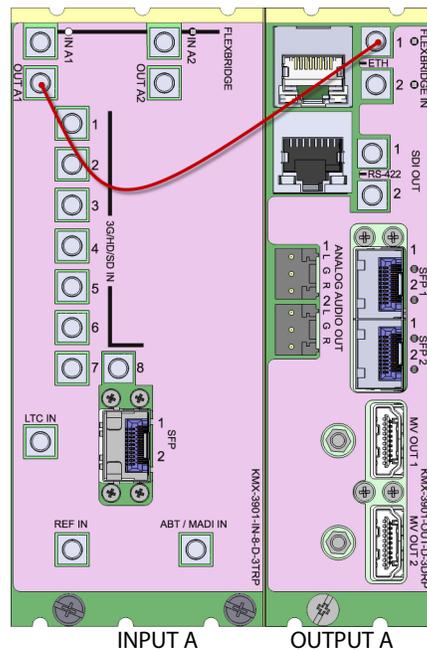
FlexBridge wiring for a 8 × 2 or 16 × 2 SDI system

To connect the input and output cards in a Kaleido-Modular-X 8 × 2 or 16 × 2

- Bridge **Input A** to **Output A**, by connecting:
    - INPUT A FLEXBRIDGE OUT A1 to OUTPUT A FLEXBRIDGE IN 1
    - INPUT A FLEXBRIDGE OUT A2 to OUTPUT A FLEXBRIDGE IN 2

Rear panels for a KMX-3901-IN-8-D (left), and KMX-3901-OUT-D (double panel shown on right). The Flexbridge connectors are the same on the KMX-3901-IN-8-D and KMX-3901-IN-16-D card's rear panels, and on the output card's single and double rear panels.

INPUT A   OUTPUT A

FlexBridge wiring for a 32 × 2 SDI system

To connect the input and output cards in a Kaleido-Modular-X 32 × 2

1 Complete the bridging for a 16 × 2 configuration (see FlexBridge wiring for a 8 × 2 or 16 × 2 SDI system, above).

2 Bridge **Input B** to **Input A**, by connecting:

- INPUT B FLEXBRIDGE OUT A1 to INPUT A FLEXBRIDGE IN A1
- INPUT B FLEXBRIDGE OUT A2 to INPUT A FLEXBRIDGE IN A2

INPUT B   INPUT A   OUTPUT A
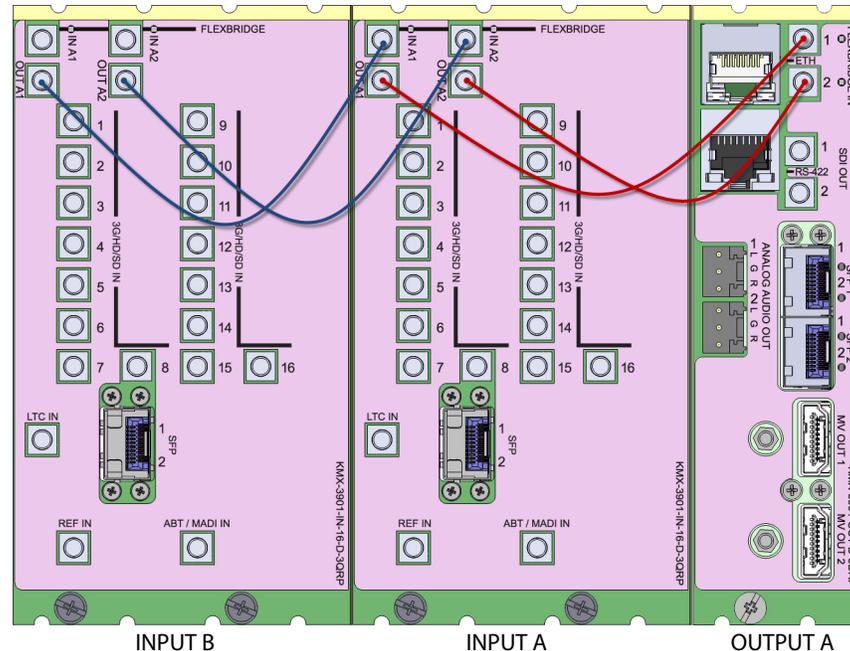
FlexBridge wiring for a 48 × 2 SDI system

To connect the input and output cards in a Kaleido-Modular-X 48 × 2

1 Complete the bridging for a 32 × 2 configuration (see FlexBridge wiring for a 32 × 2 SDI system, above).

2 Bridge **Input C** to **Input B**, by connecting:

- INPUT C FLEXBRIDGE OUT A1 to INPUT B FLEXBRIDGE IN A1
- INPUT C FLEXBRIDGE OUT A2 to INPUT B FLEXBRIDGE IN A2

FlexBridge wiring for a 64 × 2 SDI system

To connect the input and output cards in a Kaleido-Modular-X 64 × 2

1 Complete the bridging for a 48 × 2 configuration (see FlexBridge wiring for a 48 × 2 SDI system, above).

2 Bridge **Input D** to **Input C**, by connecting:

- INPUT D FLEXBRIDGE OUT A1 to INPUT C FLEXBRIDGE IN A1
- INPUT D FLEXBRIDGE OUT A2 to INPUT C FLEXBRIDGE IN A2

FlexBridge wiring for a 16 × 4 SDI system

To connect the input and output cards in a Kaleido-Modular-X 16 × 4

1 Bridge **Input A** to **Output A**, by connecting:

- INPUT A FLEXBRIDGE OUT A1 to OUTPUT A FLEXBRIDGE IN 1
- INPUT A FLEXBRIDGE OUT A2 to OUTPUT A FLEXBRIDGE IN 2

INPUT A   OUTPUT A

2 Bridge **Input A** to **Output B**, by connecting:

- INPUT A FLEXBRIDGE OUT B1 to OUTPUT B FLEXBRIDGE IN 1
- INPUT A FLEXBRIDGE OUT B2 to OUTPUT B FLEXBRIDGE IN 2

FlexBridge wiring for a 32 × 4 SDI system

To connect the input and output cards in a Kaleido-Modular-X 32 × 4

1 Complete the bridging for a 16 × 4 configuration (see FlexBridge wiring for a 16 × 4 SDI system, above).

2 Bridge **Input B** to **Input A**, by connecting:
   • INPUT B FLEXBRIDGE OUT A1 to INPUT A FLEXBRIDGE IN A1
   • INPUT B FLEXBRIDGE OUT A2 to INPUT A FLEXBRIDGE IN A2
   • INPUT B FLEXBRIDGE OUT B1 to INPUT A FLEXBRIDGE IN B1
   • INPUT B FLEXBRIDGE OUT B2 to INPUT A FLEXBRIDGE IN B2

| INPUT B | INPUT A | OUTPUT A | OUTPUT B |

FlexBridge wiring for a 48 × 4 SDI system

To connect the input and output cards in a Kaleido-Modular-X 48 × 4

1 Complete the bridging for a 32 × 4 configuration (see FlexBridge wiring for a 32 × 4 SDI system, above).

2 Bridge **Input C** to **Input B**, by connecting:

- INPUT C FLEXBRIDGE OUT A1 to INPUT B FLEXBRIDGE IN A1
- INPUT C FLEXBRIDGE OUT A2 to INPUT B FLEXBRIDGE IN A2
- INPUT C FLEXBRIDGE OUT B1 to INPUT B FLEXBRIDGE IN B1
- INPUT C FLEXBRIDGE OUT B2 to INPUT B FLEXBRIDGE IN B2

FlexBridge wiring for a 64 × 4 SDI system

To connect the input and output cards in a Kaleido-Modular-X 64 × 4

1 Complete the bridging for a 48 × 4 configuration (see FlexBridge wiring for a 32 × 4 SDI system, above).

2 Bridge **Input D** to **Input C**, by connecting:

- INPUT D FLEXBRIDGE OUT A1 to INPUT C FLEXBRIDGE IN A1
- INPUT D FLEXBRIDGE OUT A2 to INPUT C FLEXBRIDGE IN A2
- INPUT D FLEXBRIDGE OUT B1 to INPUT C FLEXBRIDGE IN B1
- INPUT D FLEXBRIDGE OUT B2 to INPUT C FLEXBRIDGE IN B2

FlexBridge wiring for IP systems

FlexBridge wiring for a 6 × 1 IP system

To connect the input and output cards in a Kaleido-Modular-X 6 × 1 IP system

- Bridge **Input A** to **Output A**, by connecting:
  - INPUT A FLEXBRIDGE OUT 1 to OUTPUT A FLEXBRIDGE IN 1
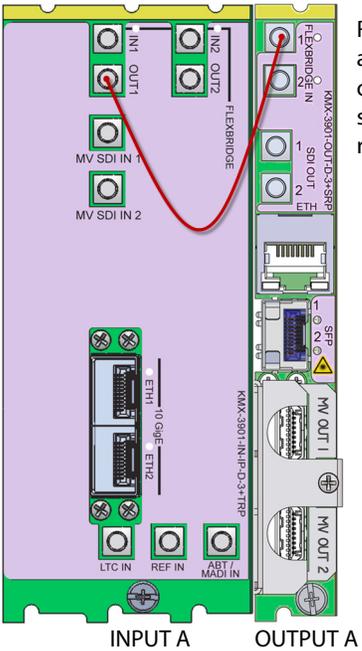
Rear panels for a KMX-3901-IN-IP-D (left), and KMX-3901-OUT-D (single panel shown on right). The Flexbridge connectors are the same on the output card's single and double rear panels.

- If you plan to stream the system's mosaic output to your data network, bridge **Output A** to **Input A** by also connecting OUTPUT A **SDI OUT 1** to INPUT A **MV SDI IN 1**
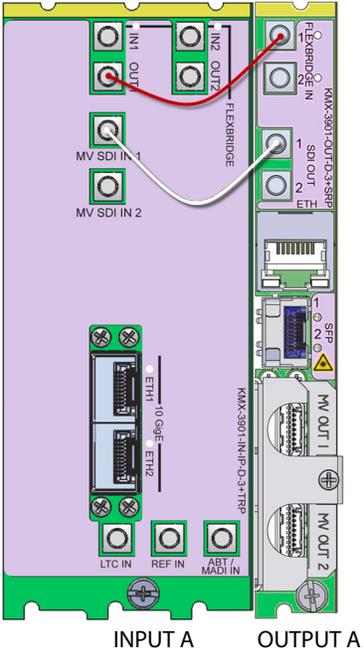
FlexBridge wiring for a 6 × 2 IP system

To connect the input and output cards in a Kaleido-Modular-X 6 × 2 IP system

- Bridge **Input A** to **Output A**, by connecting:
    - INPUT A FLEXBRIDGE OUT 1 to OUTPUT A FLEXBRIDGE IN 1
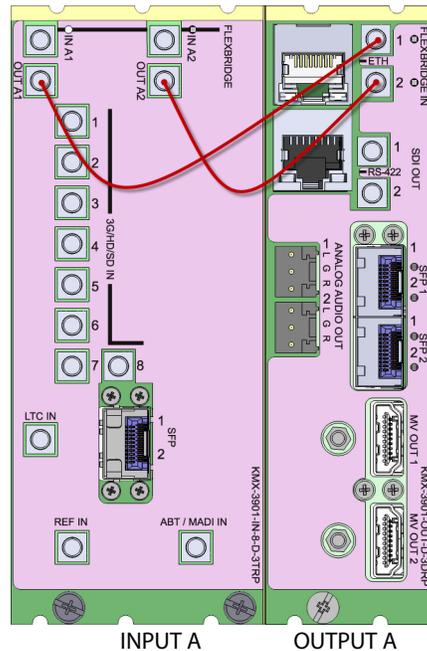   - INPUT A FLEXBRIDGE OUT 2 to OUTPUT A FLEXBRIDGE IN 2


Rear panels for a KMX-3901-IN-IP-D (left), and KMX-3901-OUT-D (single panel shown on right). The Flexbridge connectors are the same on the KMX-3901-IN-8-D and KMX-3901-IN-16-D card's rear panels, and on the output card's single and double rear panels.

INPUT A   OUTPUT A

- If you plan to stream the system's mosaic output to your data network, bridge **Output A** to **Input A** by also connecting:
    - OUTPUT A **SDI OUT 1** to INPUT A **MV SDI IN 1**
    - OUTPUT A **SDI OUT 2** to INPUT A **MV SDI IN 2**
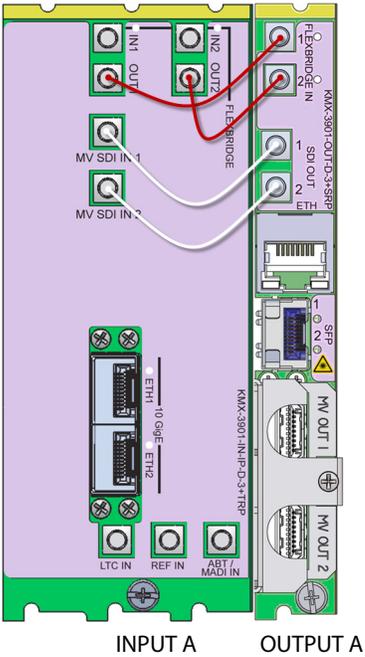
INPUT A   OUTPUT A

FlexBridge wiring for a 12 × 2 IP system

To connect the input and output cards in a Kaleido-Modular-X 12 × 2 IP system

1 Complete the bridging for a 6 × 2 configuration (see FlexBridge wiring for a 6 × 2 IP system, above).

2 Bridge **Input B** to **Input A**, by connecting:

   • INPUT B FLEXBRIDGE OUT 1 to INPUT A FLEXBRIDGE IN 1

   • INPUT B FLEXBRIDGE OUT 2 to INPUT A FLEXBRIDGE IN 2

INPUT B   INPUT A   OUTPUT A
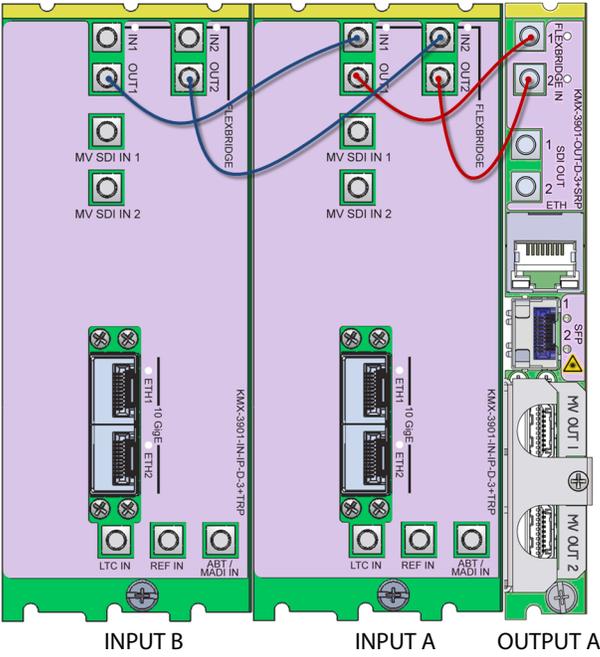
FlexBridge wiring for a 18 × 2 IP system

To connect the input and output cards in a Kaleido-Modular-X 18 × 2 IP system

1 Complete the bridging for a 12 × 2 configuration (see FlexBridge wiring for a 12 × 2 IP system, above).

2 Bridge **Input C** to **Input B**, by connecting:

   • INPUT C FLEXBRIDGE OUT 1 to INPUT B FLEXBRIDGE IN 1

   • INPUT C FLEXBRIDGE OUT 2 to INPUT B FLEXBRIDGE IN 2

FlexBridge wiring for a 24 × 2 IP system

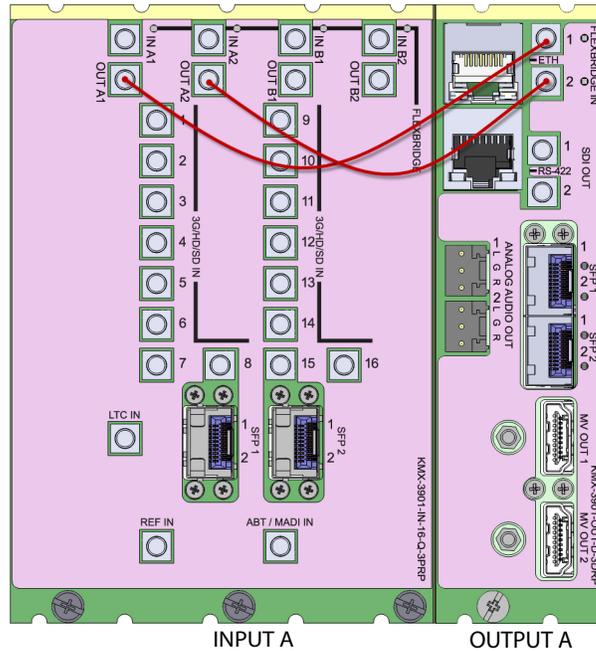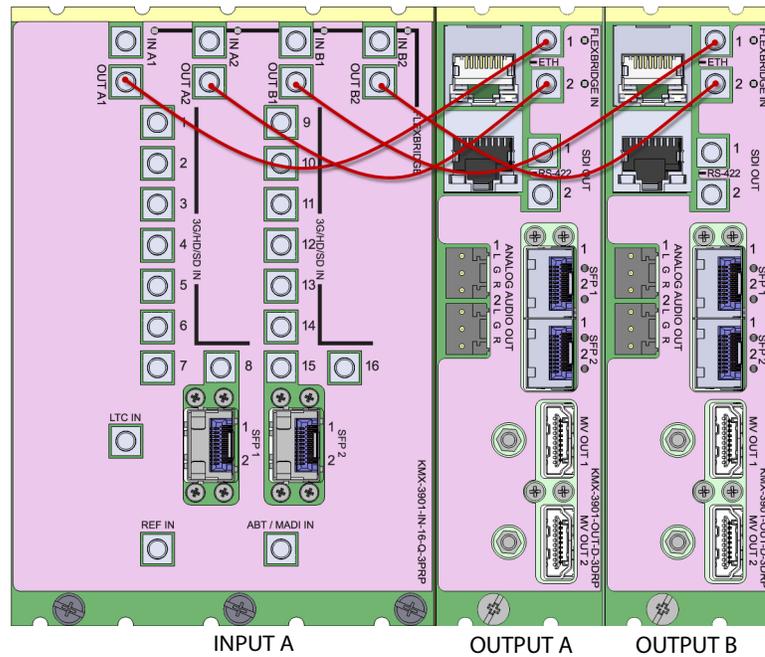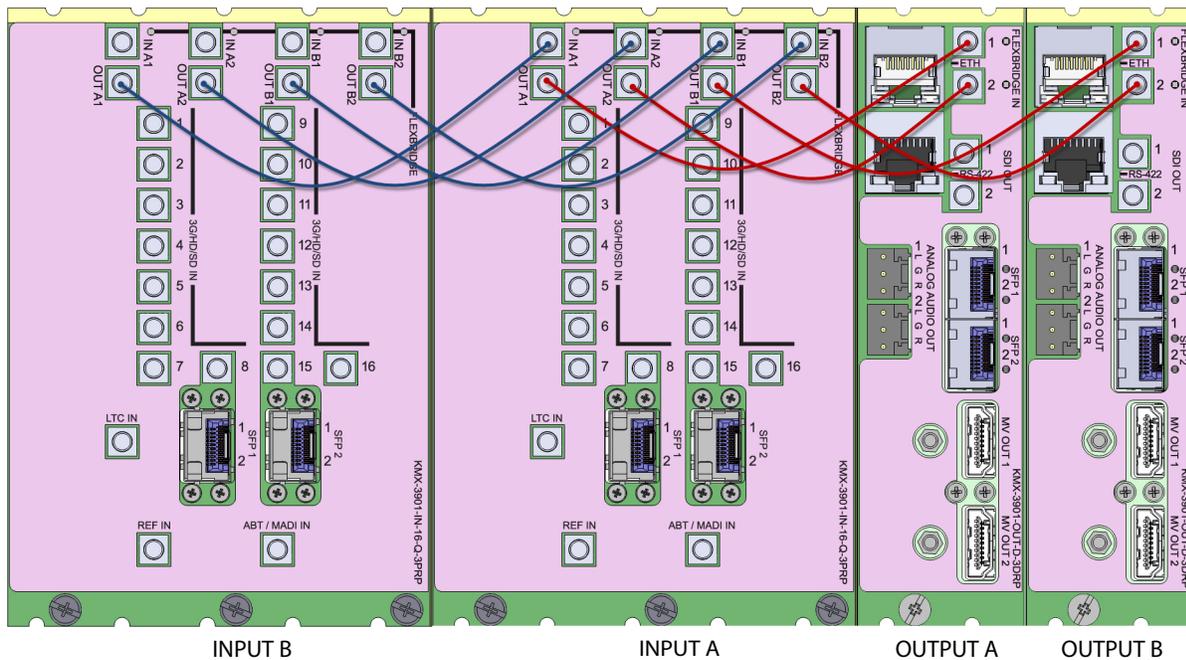**To connect the input and output cards in a Kaleido-Modular-X 24 × 2 IP system**

1 Complete the bridging for a 18 × 2 configuration (see FlexBridge wiring for a 18 × 2 IP system, above).

2 Bridge **Input D** to **Input C**, by connecting:

   • INPUT D FLEXBRIDGE OUT 1 to INPUT C FLEXBRIDGE IN 1

   • INPUT D FLEXBRIDGE OUT 2 to INPUT C FLEXBRIDGE IN 2

FlexBridge wiring for SDI/IP hybrid systems

You can mix and match up to four SDI and IP cards, in any order. The following procedure describes a system with one KMX-3901-IN IP input/output card, between a KMX-3901-IN-16-D input card, and a KMX-3901-OUT output card. To configure a system with a different card distribution, refer to the FlexBridge wiring procedures for SDI systems, or for IP systems, as needed (see FlexBridge wiring for SDI systems, on page 33, and FlexBridge wiring for IP systems, on page 39).

To connect the input and output cards in a Kaleido-Modular-X SDI/IP hybrid system

1 Complete the bridging for a 6 × 2 configuration (see FlexBridge wiring for a 6 × 2 IP system, above).

2 Bridge **Input B** to **Input A**, by connecting:

   • INPUT B FLEXBRIDGE OUT A1 to INPUT A FLEXBRIDGE IN 1

   • INPUT B FLEXBRIDGE OUT A2 to INPUT A FLEXBRIDGE IN 2
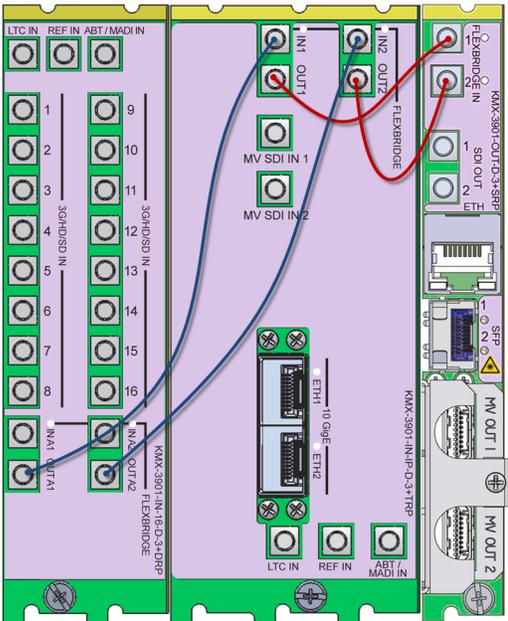
Rear panels for a KMX-3901-IN-16-D (double panel shown on the left), KMX-3901-IN-IP-D (center), and KMX-3901-OUT-D (single panel shown on the right). The Flexbridge connectors are the same on the KMX-3901-IN-8-D and KMX-3901-IN-16-D card's rear panels, and on the output card's single and double rear panels.

Cabling Diagram
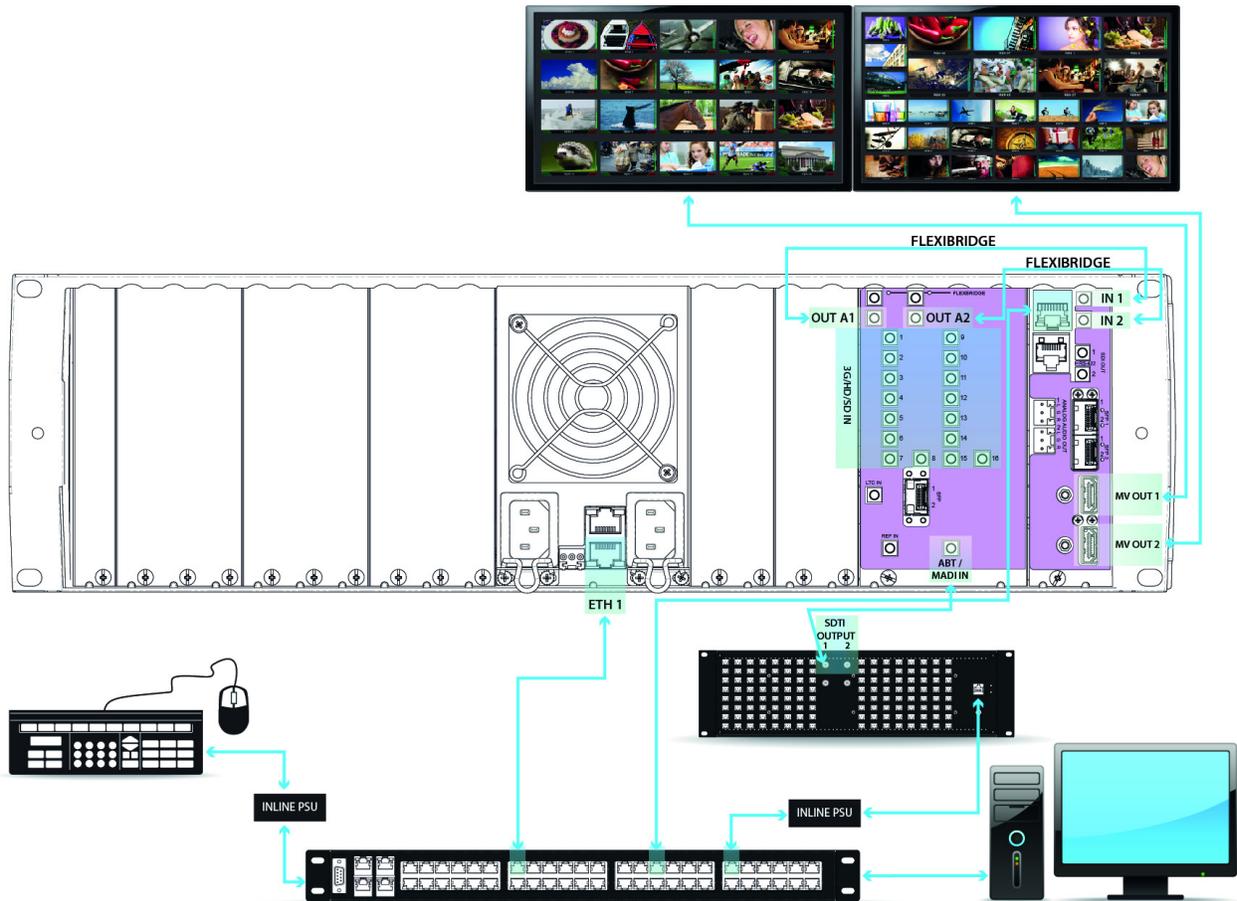
Typical Cabling diagram, showing rear view of a Kaleido-Modular-X 16 × 2 system

> Note: **Do not** connect the KMX-3901-OUT *output cards* to the network until the cards' networking parameters are properly set.

Signal Connections to the Multiviewer

Output Cards

The KMX-3901-OUT cards are output modules that can be installed in a Densité 3, Densité 3+ FR1, Densité 3+ FR4 or Densité 3 mini frame, to be part of a Kaleido-Modular-X multiviewer system. Within a Kaleido-Modular-X system an output card can be designated as either *Output A,* or *Output B.* They are dual-head output cards, meaning that they support two independent outputs called *Head 1* and *Head 2.* Each output card is complemented by a rear panel (KMX-3901-OUT-D-3DRP, or KMX-3901-OUT-D-3+SRP) that holds all input and output connectors associated with the card.
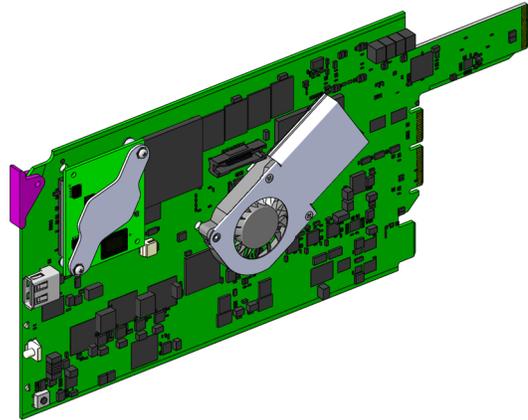
> Note: Output cards with a single rear connector panel (KMX-3901-OUT-D-3+SRP) are compatible with Densité 3+ FR1, and Densité 3+ FR4 only.

In Kaleido-Modular-X systems with two cards, one card is considered the *master* card, and the others is the *slave* card. If the master card is removed, the other output card will take on the master role automatically.

An output card is connected to the other cards in the Kaleido-Modular-X system to which it belongs through the housing frame's internal midplane (for cards housed in the same frame), in addition to Ethernet, and FlexBridge connections.

External connections to an output card are made through connectors that are found in two locations:

- on the rear panel (see KMX-3901-OUT-D-3DRP rear panel connections, below, and KMX-3901-OUT-D-3+SRP rear panel connections, on page 47)
- on the front card edge (see USB connector, on page 70)

KMX-3901-OUT-D-3DRP rear panel connections

The KMX-3901-OUT-D-3DRP rear-panel covers 2 slots, and its layout includes 2 HDMI outputs, 2 HD-SDI monitoring outputs, 2 analog audio outputs, 1 Ethernet connector, 1 RS-422 connector, 2 FlexBridge inputs, and 2 SFP cages. In the case of the HDMI outputs, HD-SDI monitoring outputs, and analog audio outputs, in each pair, the output associated with the second head is **NOT** enabled if your output card is the single-head model (KMX-3901-OUT-S). A Kaleido Software option is available to enable the second head. See Available Hardware and Software Options, on page 154.

KMX-3901-OUT-D-3DRP rear panel

The following table lists the function of each connector associated with the output heads.

Connector label		Connector type	Function
Head 1	Head 2		
FLEXBRIDGE IN 1	FLEXBRIDGE IN 2	DIN 1.0/2.3	Connection carrying a 3G SDI signal, which contains the mosaic from the input cards (without graphical elements, such as no audio meters, no UMDs, etc.).
MV OUT 1	MV OUT 2	HDMI	High definition connection for the multiviewer output, which carries audio and video, and can support resolutions up to 1920 × 1200 (all progressive scan).
SDI OUT 1	SDI OUT 2	DIN 1.0/2.3	Serial digital HD output signal for monitoring purposes
ANALOG OUT 1 L	ANALOG OUT 2 L	WECO	Analog audio output (left channel) to feed the audio monitoring system
ANALOG OUT 1 R	ANALOG OUT 2 R	WECO	Analog audio output (right channel) to feed the audio monitoring system
SFP 1	SFP 2	—	Optional inputs. *Not yet supported.*

The following table lists the purpose of each connector associated with card control.

Connector label	Connector type	Function
ETH	RJ45	100 Base-T Ethernet connection
RS-422	RJ45[a]	Connect to an RS-422 (SMPTE ST 207, EBU-3245) or RS-485 device or network

a. The KMX-3901-OUT's RS-422 ports have an RJ-45 connector in order to preserve space on a busy panel. The RS-422 interface specifies a DE-9 connector, so if you are using this interface, you will require a DE-9-to-RJ-45 adapter. Grass Valley supplies two adapter models, correctly wired for this application: a straight adapter (part no. 1737-3000-102), and a crossover adapter (part no. 1792-3700-100).

Installation & Service Manual

KMX-3901-OUT-D-3+SRP rear panel connections

The KMX-3901-OUT-D-3+SRP rear panel covers 1 slot, and its layout includes 2 HDMI outputs, 2 HD-SDI monitoring outputs, 1 Ethernet connector, 2 FlexBridge inputs, and 1 SFP cages. In the case of the HDMI outputs, and HD-SDI monitoring outputs, in each pair, the output associated with the second head is **NOT** enabled if your output card is the single-head model (KMX-3901-OUT-S). A Kaleido Software option is available to enable the second head. See Available Hardware and Software Options, on page 154.
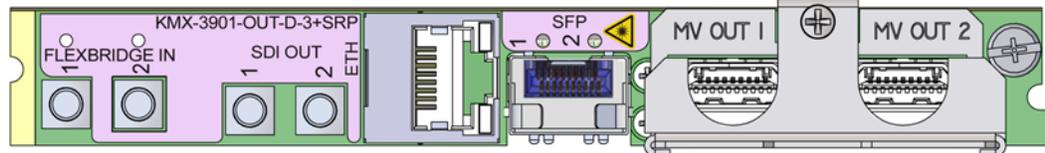
KMX-3901-OUT-D-3+SRP rear panel

Notes

- The single rear connector panel KMX-3901-OUT-D-3+SRP does not have a serial port. To support a serial device, your Kaleido-Modular-X system must have at least one output card with a double rear connector panel (KMX-3901-OUT-D-3DRP).

- The single rear connector panel does not support analog audio outputs. Audio monitoring is available at the SDI and HDMI outputs only.

The following table lists the function of each connector associated with the output heads.

Connector label		Connector type	Function
Head 1	Head 2		
FLEXBRIDGE IN 1	FLEXBRIDGE IN 2	DIN 1.0/2.3	Connection carrying a 3G SDI signal, which contains the mosaic from the input cards (without graphical elements, such as no audio meters, no UMDs, etc.).
MV OUT 1	MV OUT 2	HDMI	High definition connection for the multiviewer output, which carries audio and video, and can support resolutions up to 1920 × 1200.
SDI OUT 1	SDI OUT 2	DIN 1.0/2.3	Serial digital HD output signal for monitoring purposes
SFP 1	SFP 2	—	Optional inputs. *Not yet supported.*

The following table lists the purpose of the connector associated with card control.

Connector label	Connector type	Function
ETH	RJ45	100 Base-T Ethernet connection

Input Cards

KMX-3901-IN cards

The KMX-3901-IN cards are input modules that can be installed in a Densité 3, Densité 3+ FR1, or Densité 3+ FR4 frame, to be part of a Kaleido-Modular-X multiviewer system. SDI input cards are available with eight or 16 inputs. Two different 16-input card models are available to drive one or two output cards for two or four possible multiviewer outputs.

A KMX-3901-IN-IP input/output card is available with two (1+1 redundant) 10 GigE ports supporting up to 6 SMPTE ST 2022-6 IP video inputs (3G/HD/SD). This input card can drive one output card, for two multiviewer output. In addition, one or both multiviewer outputs can be looped back into this card's SDI inputs and made available over IP, as a SMPTE-2022-6 stream.

Notes

- Early revisions of the KMX-3901-IN input cards (see SDI Input module parts, on page 19) are *not* fully compatible with the Densité 3+ FR4 frame. These cards are unable to properly extract the URS signal from the frame. Should you decide to rely on the card's external reference input (instead of the URS signal), to genlock your signals, the card will operate properly, however URS time code extraction will be unreliable. Grass Valley can modify these cards if needed (see , on page 210).

- Input cards with a double rear connector panel (KMX-3901-IN-8-D-3+DRP, KMX-3901-IN-16-D-3+DRP, KMX-3901-IN-16-Q-3+DRP, KMX-3901-IN-M3-D-3+DRP, KMX-3901-IN-M3-Q-3+DRP) are compatible with Densité 3+ FR1, and Densité 3+ FR4 only.

- KMX-3901-IN-IP input/output cards are compatible with Densité 3+ FR4 only.

Within a Kaleido-Modular-X system, input cards are designated as *Input A, Input B, Input C,* and *Input D,* where Input A is the card closest to the output stage. Every KMX-3901-IN card is complemented by a rear panel that holds all input and output connectors associated with the card.

An input card is connected to the other cards in the Kaleido-Modular-X system to which it belongs through the housing frame's internal midplane (for cards housed in the same frame), and through FlexBridge connections.
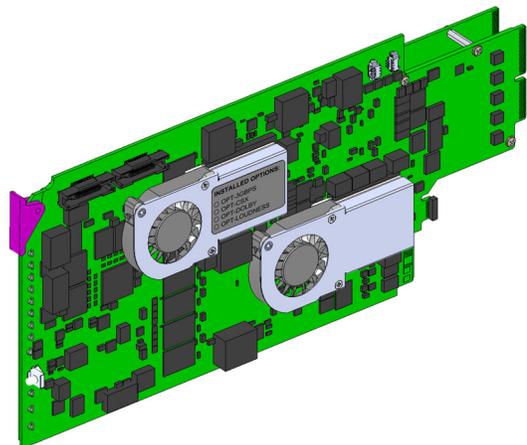
Rear panel with IP input connectors

The KMX-3901-IN-IP rear panels include two (1+1 redundant) 10 GigE ports, 1 ABT/MADI audio input, 1 LTC input, 1 reference input, 2 FlexBridge inputs, 2 FlexBridge outputs, and 2 SDI input connectors for the SDI mosaic outputs from head 1 and head 2 of the KMX-3901-OUT-D output card.
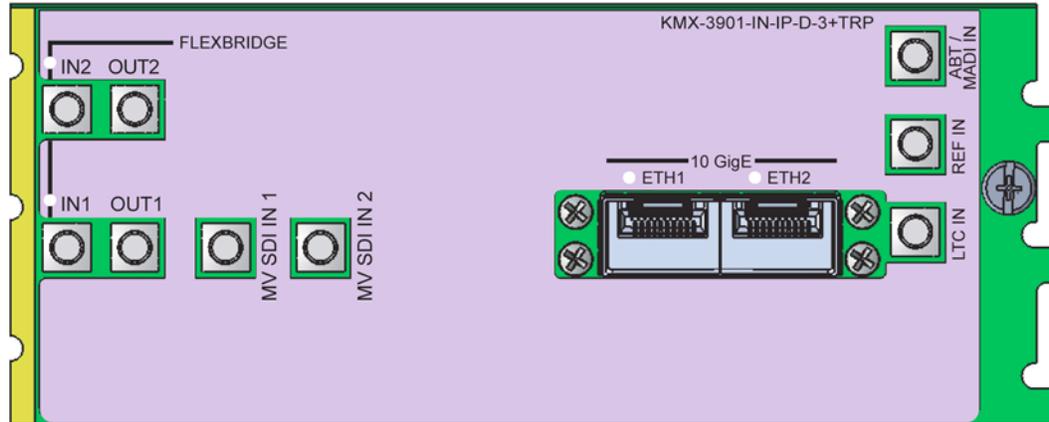
KMX-3901-IN-IP-D-3+TRP rear panel

Connector label	Connector type	Function
ETH1, ETH2	SFP+	SD-SDI, HD-SDI, or 3G-SDI video inputs.
ABT/MADI IN	DIN 1.0/2.3	Multiplexed audio from an external device (for example, MADI multiplexer, or Audio Bridge Terminal).
LTC IN	DIN 1.0/2.3	Time code input.
REF IN	DIN 1.0/2.3	Reference signal to genlock the multiviewer to the local plant.
FLEXBRIDGE IN1, FLEXBRIDGE IN2	DIN 1.0/2.3	Connections carrying the 3G SDI signals, which contains the mosaic (without graphical elements, such as no audio meters, no UMDs, etc.) from an upstream input card, for two heads of the system.
FLEXBRIDGE OUT1, FLEXBRIDGE OUT2	DIN 1.0/2.3	Connections carrying the 3G SDI signals, which contains the mosaic (without graphical elements, such as no audio meters, no UMDs, etc.) resulting from any upstream input cards and the current input card, for two heads of the system.
MV SDI IN1, MV SDI IN2	DIN 1.0/2.3	3G-SDI inputs for the SDI mosaic outputs from head 1, and head 2 of the KMX-3901-OUT-D output card to be made available as a SMPTE 2022-6 signal at the ETH1 and ETH2 connectors.

Rear panels with 8, or 16 SDI input connectors

The KMX-3901-IN rear panels include 8 or 16 input connectors, 1 ABT/MADI audio input, 1 LTC input, 1 reference input, 2 or 4 FlexBridge inputs, 2 or 4 FlexBridge outputs, and 1 or 2 SFP cages (except for the *double* rear connector panels, which do not have any SFP cages).
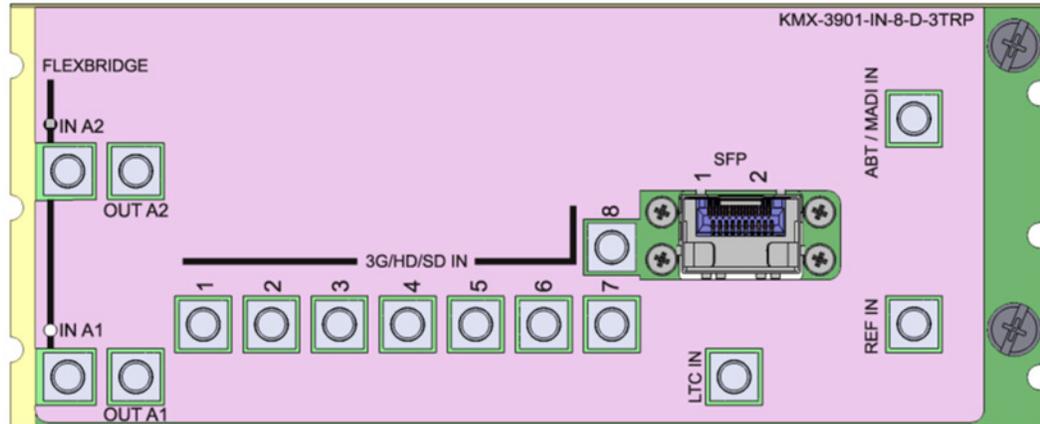
KMX-3901-IN-8-D-3TRP rear panel
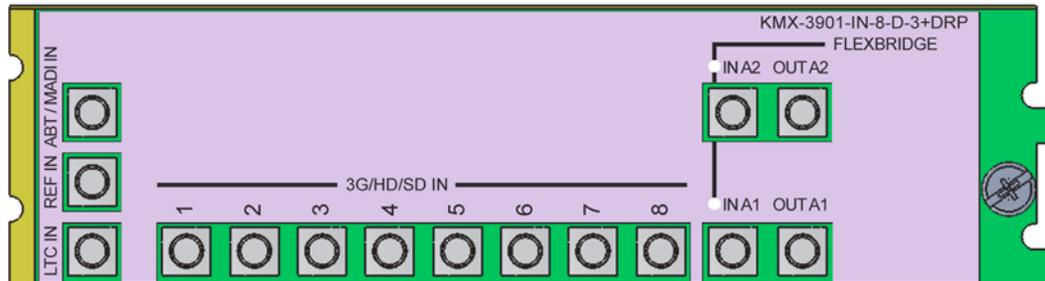
KMX-3901-IN-8-D-3+DRP rear panel
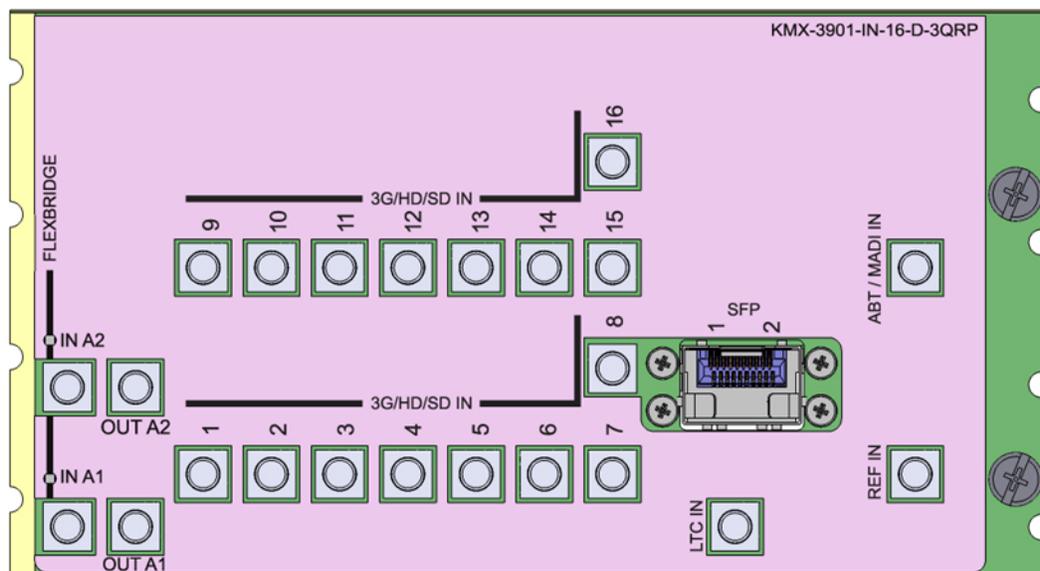
KMX-3901-IN-16-D-3QRP rear panel
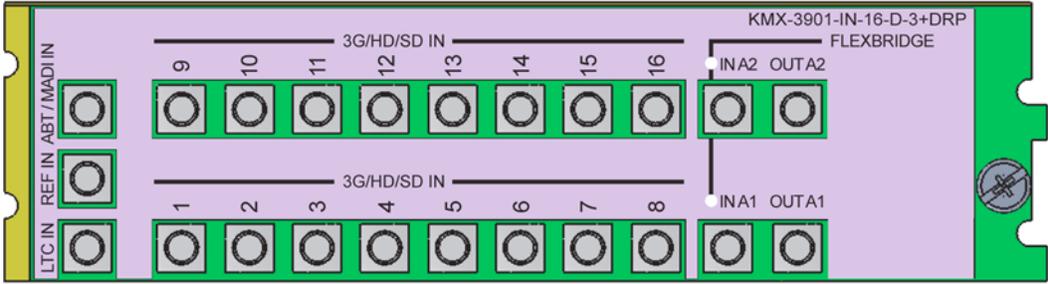
KMX-3901-IN-16-D-3+DRP rear panel

KMX-3901-IN-16-Q-3PRP rear panel
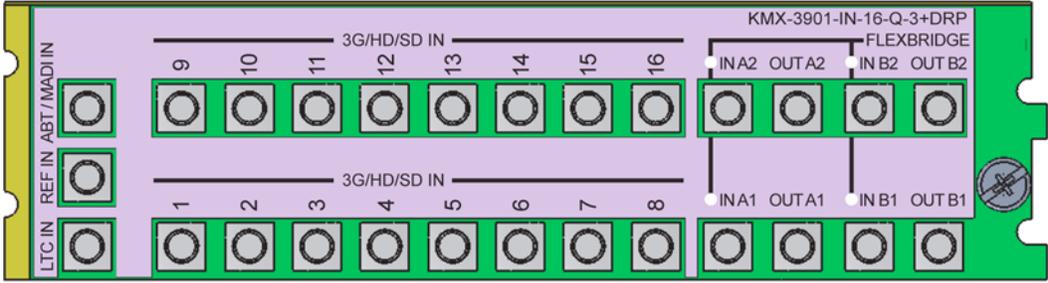
KMX-3901-IN-16-Q-3+DRP rear panel

Connector label	Connector type	Function
3G/HD/SD IN 1 to 3G/HD/SD IN 16	DIN 1.0/2.3	SD-SDI, HD-SDI, or 3G-SDI video inputs 1 to 16
ABT/MADI IN	DIN 1.0/2.3	Multiplexed audio from an external device (for example, MADI multiplexer, or Audio Bridge Terminal)
LTC IN	DIN 1.0/2.3	Time code input
REF IN	DIN 1.0/2.3	Reference signal to genlock the multiviewer to the local plant.
FLEXBRIDGE IN A1, FLEXBRIDGE IN A2	DIN 1.0/2.3	Connections carrying the 3G SDI signals, which contains the mosaic (without graphical elements, such as no audio meters, no UMDs, etc.) from an upstream input card, for two heads of the system.
FLEXBRIDGE OUT A1, FLEXBRIDGE OUT A2	DIN 1.0/2.3	Connections carrying the 3G SDI signals, which contains the mosaic (without graphical elements, such as no audio meters, no UMDs, etc.) resulting from any upstream input cards and the current input card, for two heads of the system.
FLEXBRIDGE IN B1, FLEXBRIDGE IN B2	DIN 1.0/2.3	Connections carrying the 3G SDI signals, which contains the mosaic (without graphical elements, such as no audio meters, no UMDs, etc.) from an upstream input card, for two heads of the system.
FLEXBRIDGE OUT B1, FLEXBRIDGE OUT B2	DIN 1.0/2.3	Connections carrying the 3G SDI signals, which contains the mosaic (without graphical elements, such as no audio meters, no UMDs, etc.) resulting from any upstream input cards and the current input card, for two heads of the system.
SFP 1, SFP 2	—	Optional ports. *Not yet supported.*

Rear panels with M3 connector

The KMX-3901-IN-M3 rear panels include 1 M3 input connector, 1 ABT/MADI audio input, 1 LTC input, 1 reference input, 2 or 4 FlexBridge inputs, 2 or 4 FlexBridge outputs, and 1 or 2 SFP cages.
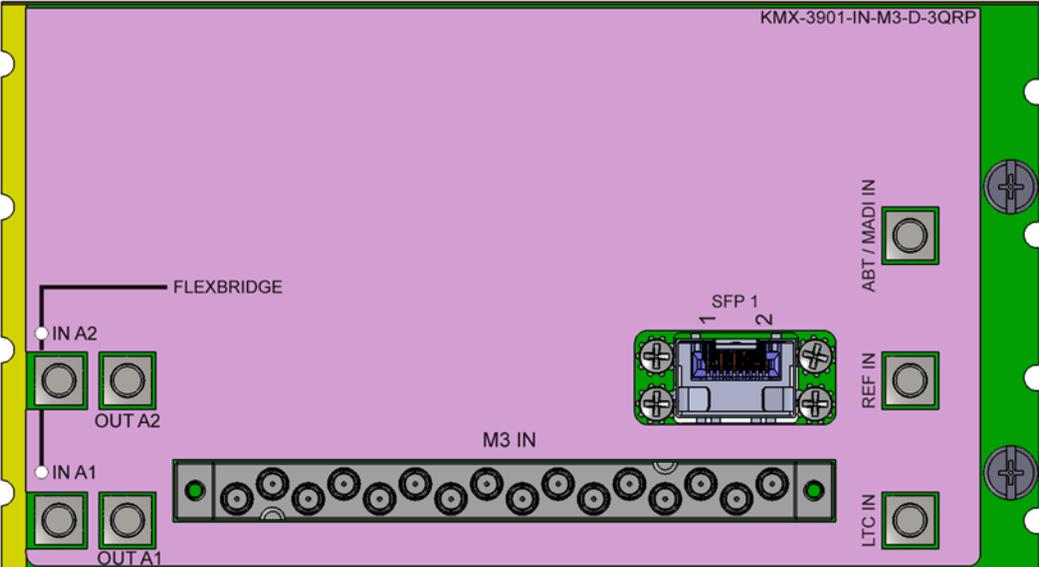
KMX-3901-IN-M3-D-3QRP rear panel
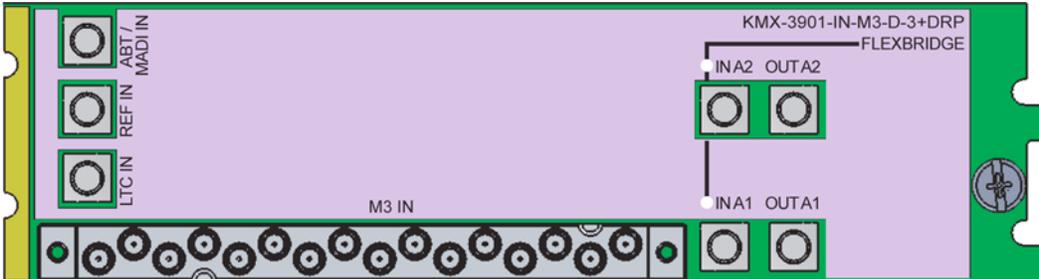
KMX-3901-IN-M3-D-3+DRP rear panel
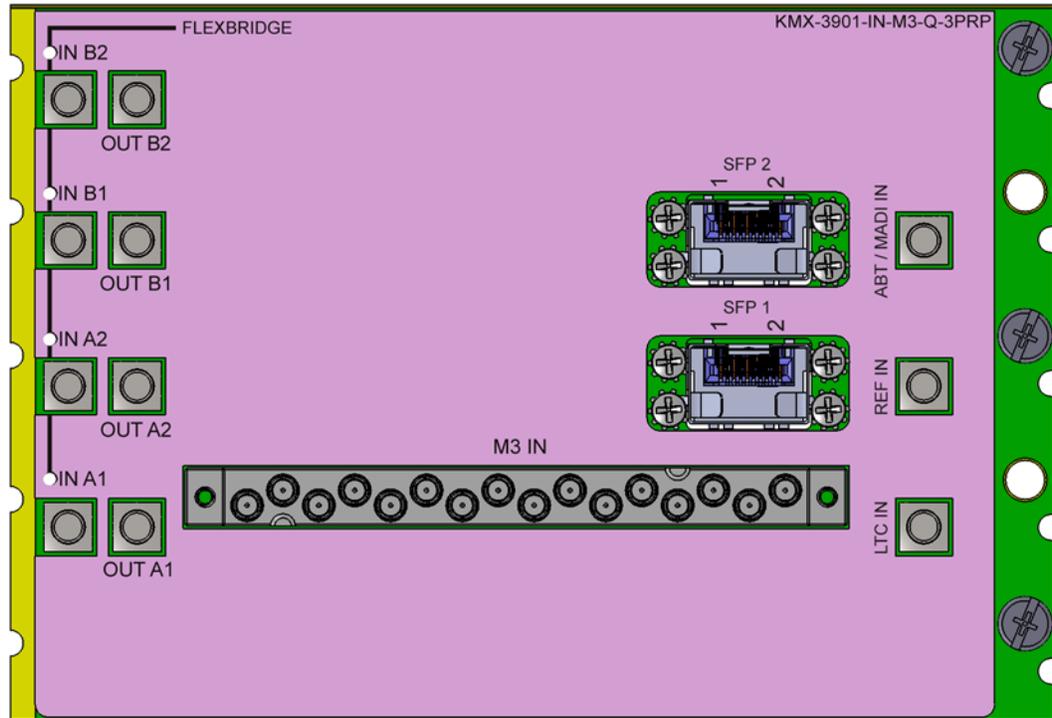
KMX-3901-IN-M3-Q-3PRP rear panel
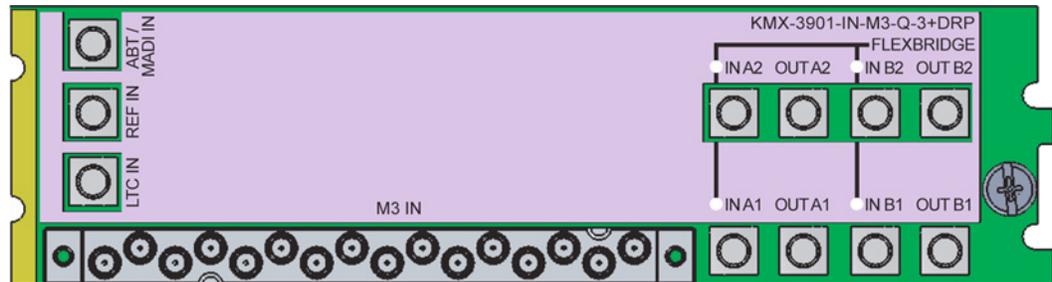
KMX-3901-IN-M3-Q-3+DRP rear panel

Connector label	Connector type	Function
M3 IN	M3	SD-SDI, HD-SDI, or 3G-SDI video inputs 1 to 16 from NVISION router output module. See NV8500 M3 Backplane Connections below to determine the correct mapping between router outputs and multiviewer inputs, when using the M3 cable.
ABT/MADI IN	DIN 1.0/2.3	Multiplexed audio from an external device (for example, MADI multiplexer, or Audio Bridge Terminal).
LTC IN	DIN 1.0/2.3	Time code input.
REF IN	DIN 1.0/2.3	Reference signal to genlock the multiviewer to the local plant.

Connector label	Connector type	Function
FLEXBRIDGE IN A1, FLEXBRIDGE IN A2	DIN 1.0/2.3	Connections carrying the 3G SDI signals, which contains the mosaic (without graphical elements, such as no audio meters, no UMDs, etc.) from an upstream input card, for two heads of the system.
FLEXBRIDGE OUT A1, FLEXBRIDGE OUT A2	DIN 1.0/2.3	Connections carrying the 3G SDI signals, which contains the mosaic (without graphical elements, such as no audio meters, no UMDs, etc.) resulting from any upstream input cards and the current input card, for two heads of the system.
FLEXBRIDGE IN B1, FLEXBRIDGE IN B2	DIN 1.0/2.3	Connections carrying the 3G SDI signals, which contains the mosaic (without graphical elements, such as no audio meters, no UMDs, etc.) from an upstream input card, for two heads of the system.
FLEXBRIDGE OUT B1, FLEXBRIDGE OUT B2	DIN 1.0/2.3	Connections carrying the 3G SDI signals, which contains the mosaic (without graphical elements, such as no audio meters, no UMDs, etc.) resulting from any upstream input cards and the current input card, for two heads of the system.
SFP 1, SFP 2	—	Optional ports. *Not yet supported.*

NV8500 M3 Backplane Connections

If the M3 output card is installed in the *upper output bays of an NV8576 router frame,* or in an NV8140, NV8144, or an NV8280, then the mapping between the router outputs and the multiviewer inputs will be as follows. Notice that router outputs 9, and 18 are skipped.

Router output	Multiviewer input	Router output	Multiviewer input
1	1	10	9
2	2	11	10
3	3	12	11
4	4	13	12
5	5	14	13
6	6	15	14
7	7	16	15
8	8	17	16

If the M3 output card is installed in the *lower output bays of an NV8576 router frame,* its backplane is *upside down* and the ordering of its ports differs from when the backplane is installed in the upper bays (right side up) of an NV8576 frame. Notice that router outputs 1, and 10 are skipped.

Router output	Multiviewer input	Router output	Multiviewer input
2	16	11	8
3	15	12	7

Router output	Multiviewer input	Router output	Multiviewer input
4	14	13	6
5	13	14	5
6	12	15	4
7	11	16	3
8	10	17	2
9	9	18	1

Refer to the *NV8500 Series User's Guide* (see Related Documentation, on page 11) for more information on the M3 output card and backplane module.

4K UHD Prescaler

On the KMX-3901-IN-16Q configured as a 4K UHD prescaler, the input connectors 3G/HD/SD IN 3, 4, 7, 8, 11, 12, 15, and 16 are not used. The connectors listed in the table below support quad link 3G-SDI signal sources.

Connector	Description
3G/HD/SD IN 1	Link 1A – Top left quadrant of 4K UHD signal A
3G/HD/SD IN 2	Link 2A – Top right quadrant of 4K UHD signal A
3G/HD/SD IN 9	Link 3A – Bottom left quadrant of 4K UHD signal A
3G/HD/SD IN 10	Link 4A – Bottom right quadrant of 4K UHD signal A
FLEXBRIDGE OUT A1	1080p prescaled output of signal A
3G/HD/SD IN 5	Link 1B – Top left quadrant of 4K UHD signal B
3G/HD/SD IN 6	Link 2B – Top right quadrant of 4K UHD signal B
3G/HD/SD IN 13	Link 3B – Bottom left quadrant of 4K UHD signal B
3G/HD/SD IN 14	Link 4B – Bottom right quadrant of 4K UHD signal B
FLEXBRIDGE OUT B1	1080p prescaled output of signal B

Make sure that the 4K UHD prescaler card and its 4K UHD source signals are all referenced together. The refresh rate of the prescaler card outputs follow the refresh rate of the input reference signal. The eight audio channels embedded into the output signal come from video input 1 for head 1 and from video input 5 for head 2.

Prescaled signal B output
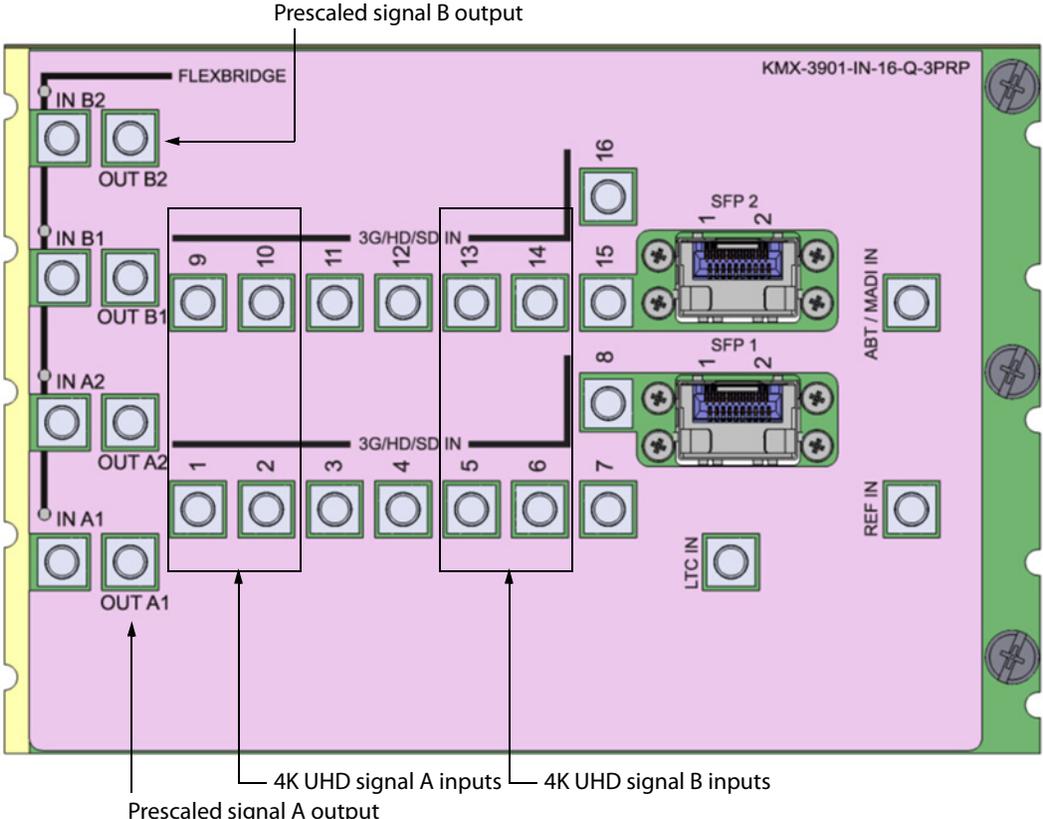
Connectors used on KMX-3901-IN-16-Q-3PRP rear panel for 4K UHD prescaler

4K UHD signal A inputs — 4K UHD signal B inputs

Prescaled signal A output

4K UHD signal A inputs — 4K UHD signal B inputs — Prescaled signal B output

Prescaled signal A output
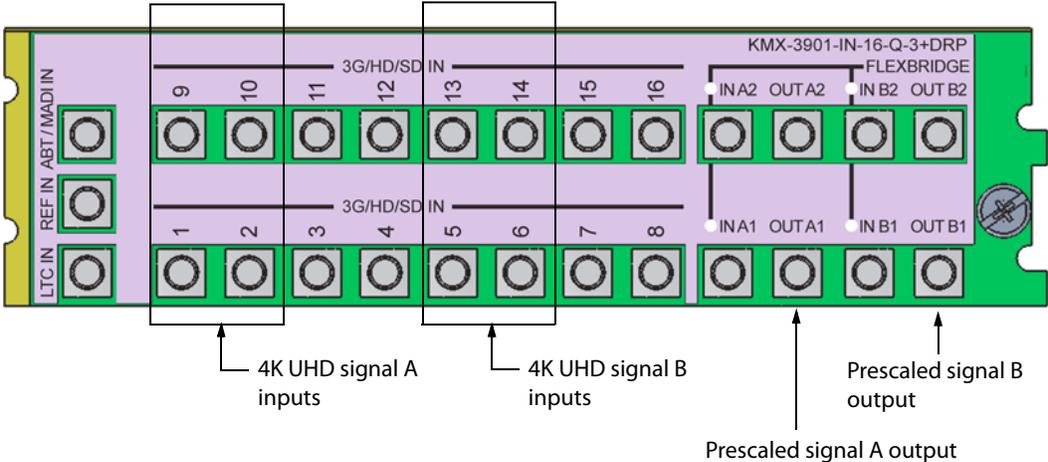
Connectors used on KMX-3901-IN-16-Q-3+DRP rear panel for 4K UHD prescaler

4K UHD Prescaler Configuration and Upgrade

Converting a KMX-3901-IN-16-Q Input Card to a 4K UHD Prescaler

To configure a KMX-3901-IN-16-Q input card as a 4K UHD prescaler

1 Press the Select button on the front edge of the *KMX-3901-IN-16-Q input card* you want to configure. See KMX-3901-IN Input Card Interface on page 64 for more information.

   The Status LED on the selected card flashes orange, and the associated control menu appears on the LCD display of the Densité frame's local control panel. See Using the Densité Frame Control Panel on page 71.

2 On the local control panel, press the [–] button.

   CONFIG appears on the LCD display.

3 Press the SEL button.

   4K UHD PRESCALER appears on the LCD display.

4 Press the SEL button.

5 Press the [+] or [–] buttons, if needed, until ENABLE appears on the LCD display.

6 Press the SEL button.

   ENABLE appears on the top line of the LCD display, and then, after 10 seconds, a message appears on the second line to let you know that the card will restart in 20 seconds.

7 After the card has restarted, notice that the SDI LEDs 3, 4, 7, 8, 11, 12, 15, and 16 are not lit.

   This indicates that the card is now configured as a 4K UHD prescaler.

Converting a 4K UHD Prescaler to a KMX-3901-IN-16-Q Input Card

To configure a 4K UHD prescaler as a KMX-3901-IN-16-Q input card

1 Press the Select button on the front edge of the prescaler card you want to configure.

   The Status LED on the selected card flashes orange, and the associated control menu appears on the LCD display of the Densité frame's local control panel.

2 On the local control panel, press the [–] button.

   CONFIG appears on the LCD display.

3 Press the SEL button.

   4K UHD PRESCALER appears on the LCD display.

4 Press the SEL button.

5 Press the [+] or [–] buttons, if needed, until DISABLE appears on the LCD display.

6 Press the SEL button.

   DISABLE appears on the top line of the LCD display, and then, after a few seconds, a message appears on the second line to let you know that the card will restart in 20 seconds.

7 After the card has restarted, notice that all SDI LEDs are lit.

   This indicates that the card has reverted to its original mode.

Upgrading 4K UHD Prescaler Cards

If your Kaleido-Modular-X system includes 4K UHD prescaler cards, these must be upgraded individually, *after* you have upgraded your system by the usual method.

To upgrade your system's 4K UHD prescaler cards

1 Upgrade your Kaleido-Modular-X system by the usual method (refer to the Kaleido Software Release Notes for detailed instructions). See Related Documentation, on page 11.

2 After all input and output cards have restarted, momentarily remove one of your system's KMX-3901-IN-16-Q input cards, and set it aside.

3 Repeat the following for every prescaler card in your system:

   a Momentarily revert the prescaler card to an input card (see Converting a 4K UHD Prescaler to a KMX-3901-IN-16-Q Input Card, on page 58).

   b After the card you are upgrading has restarted, remove it from its slot, and then insert it in the slot you emptied at step 2 above.
   The system detects that the newly inserted card has a different Kaleido Software version, and upgrades it automatically. This takes a few minutes, after which the card restarts.

   c Once the card has restarted, remove it from the slot, and insert it back into its original position.

   d Convert the card back to a 4K UHD prescaler (see Converting a KMX-3901-IN-16-Q Input Card to a 4K UHD Prescaler, on page 58).

4 Insert the input card you had set aside at step 2 back into its original position.

GPI-1501 General Purpose Interface I/O Module

A GPI-1501 card supports 20 GPI inputs, and 8 configurable GPI input/output terminals. The associated rear panel holds a DB-44 connector, through which all signal inputs and outputs are routed.

The pinout of this connector is as follows:

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GPIO-1 +	12	GPI-I 7	23	RS422-TX +	34	GPIO-5 –
2	GPIO-3 –	13	GPI-I 4	24	GPI-I 19	35	GND
3	GPIO-4 +	14	GPI-I 1	25	GPI-I 17	36	GPIO-7 +
4	GPIO-6 –	15	GND	26	GPI-I 13	37	RS422-RX –
5	GPIO-7 –	16	GPIO-1 –	27	GPI-I 11	38	GPI-I 20 / LTC
6	GPIO-8 +	17	GPIO-2 +	28	GPI-I 8	39	GPI-I 16
7	RS422-TX –	18	GPIO-4 –	29	GPI-I 5	40	GPI-I 14
8	GPI-I 18	19	GPIO-5 +	30	GPI-I 2	41	GND
9	GPI-I 15	20	GPIO-6 +	31	GND	42	GPI-I 9
10	GPI-I 12	21	GPIO-8 –	32	GPIO-2 –	43	GPI-I 6
11	GPI-I 10	22	RS422-RX +	33	GPIO-3 +	44	GPI-I 3
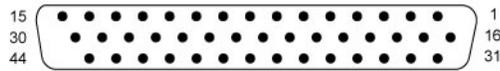
DB-44 connector

For ease of connection, you may use the GPI-1501-TBA terminal block adapter with integral 44-pin connector. Refer to the GPI-1501 Guide to Installation and Operation (see Related Documentation, on page 11), for more information. Refer to the Kaleido Software User's Manual for detailed instructions on configuring a GPI-1501 within your multiviewer system. See Related Documentation, on page 11.

Commissioning the Multiviewer

To make the multiviewer operational

1   With the Kaleido-Modular-X frame installed in its designated rack position, and before powering up the unit, verify that each card is securely seated in its slot, and leave the frame door open so that you can monitor all the card's LEDs.

> Note: For more information on the card's LEDs, see Card Interfaces and Troubleshooting, on page 63.

2   Power up the frame.

The multiviewer starts up. The startup sequence takes approximately four minutes, during which time every card's status LED is blinking orange. See Card Interfaces and Troubleshooting, on page 63.

Once the startup has completed, the status LEDs on the *output cards* should be red (steady) because the cards are not connected to the network yet. See Card Interfaces and Troubleshooting, on page 63.

3   Connect the Kaleido-RCP2 and the Audio Bridge Terminal (if available) to a dedicated 100Base-T Ethernet switch (see Cabling Diagram, on page 44). You can also connect a mouse and a keyboard to your Kaleido-RCP2.

> Notes
>
> • You may need to upgrade your Audio Bridge Terminal and Kaleido-RCP2 devices (if available) to the latest firmware. See Software and Firmware Updates, on page 12. Refer to the *Kaleido-RCP2 Guide to Installation and Operation*, and to the *Audio Bridge Terminal Guide to Installation and Operation* (see Related Documentation, on page 11) for instructions on how to determine the firmware level, and how to perform the upgrade for these devices.
>
> • The Kaleido-Modular-X (1RU) supports only one ABT device.

4   Connect the multiviewer's outputs to your displays. See Cabling Diagram, on page 44. To change the display resolution, see Changing the Mosaic Output Resolution, on page 77.

5   Connect one or more video sources to the multiviewer's inputs (see Cabling Diagram, on page 44).

6 Connect a reference source (if available) to one or more reference inputs.

> Note: A reference is optional but, if minimal processing delay is required for your monitoring purposes, then you must reference your system. However, if you must monitor 50 Hz input signals on 60 Hz displays (or vice-versa), then do not reference your system.

7 Connect the controller card's ETH 1 port to your Ethernet switch (see Cabling Diagram, on page 44).

> Note: The Kaleido-Modular-X does not support the controller card's second Ethernet port (ETHERNET 2).

8 Connect the output cards' ETH ports to your Ethernet switch.

> IMPORTANT
> Make sure to connect your Densité controller and output cards to the same subnet, and that your Ethernet switch remains isolated from the rest of your network (consult your network administrator if necessary) until all required networking setup is complete.

You can now proceed with the networking setup (see Networking Essentials, on page 80).

Frame Operation and IP Network Setup

4

Introduction

This chapter shows the multiviewer interfaces, explains the local operations that can be performed, and it explains how to implement IP network connectivity with the multiviewer.

A Kaleido-Modular-X multiviewer system can be controlled in the following ways:

- In the housing frame, you can monitor card operating status of your Kaleido-Modular-X input and output cards by looking at the card-edge LEDs (see Card Interfaces and Troubleshooting, on page 63), and use the CPU-ETH2, or CPU-ETH3 local control panel and its buttons to navigate menus and adjust parameter values (see Using the Densité Frame Control Panel, on page 71).

- The loading and management of layouts is handled by XEdit, accessed through a dedicated Ethernet port (refer to the Kaleido Software User's Manual; see Related Documentation, on page 11).

- Grass Valley's iControl system can be used to access the card's operating parameters from a remote computer, using a convenient graphical user interface (see Remote Control Using iControl, on page 127).

- A GPI interface allows remote layout selection.

- The output resolution of the card can be controlled automatically through the EDID interface with the display.

- The RCP-200 advanced remote control panel, and the Kaleido-RCP2 control panel allow you to perform operations on the monitor wall, either by themselves or in association with an external keyboard and a mouse. Refer to the RCP-200, Kaleido-RCP2, and Kaleido Multiviewer documentation (see Related Documentation, on page 11).

Card Interfaces and Troubleshooting

The front card edges of the Kaleido-Modular-X input and output modules incorporate several operational elements. See KMX-3901-IN Input Card Interface on page 64, KMX-3901-IN-IP Input/Output Card Interface, on page 67, 4K UHD Prescaler Card Interface, on page 67, and KMX-3901-OUT Output Card Interface, on page 68, for more information.

KMX-3901-IN Input Card Interface

SDI LEDs 1–8
SDI LEDs 9–16
Status LED
Select button
Power LED
ABT LED
REF LED
Boot status 1
Boot status 2
(not used)
Input card, left side
Input card, right side

Summary view of the interface on the left side, and on the right side of a KMX-3901-IN input card
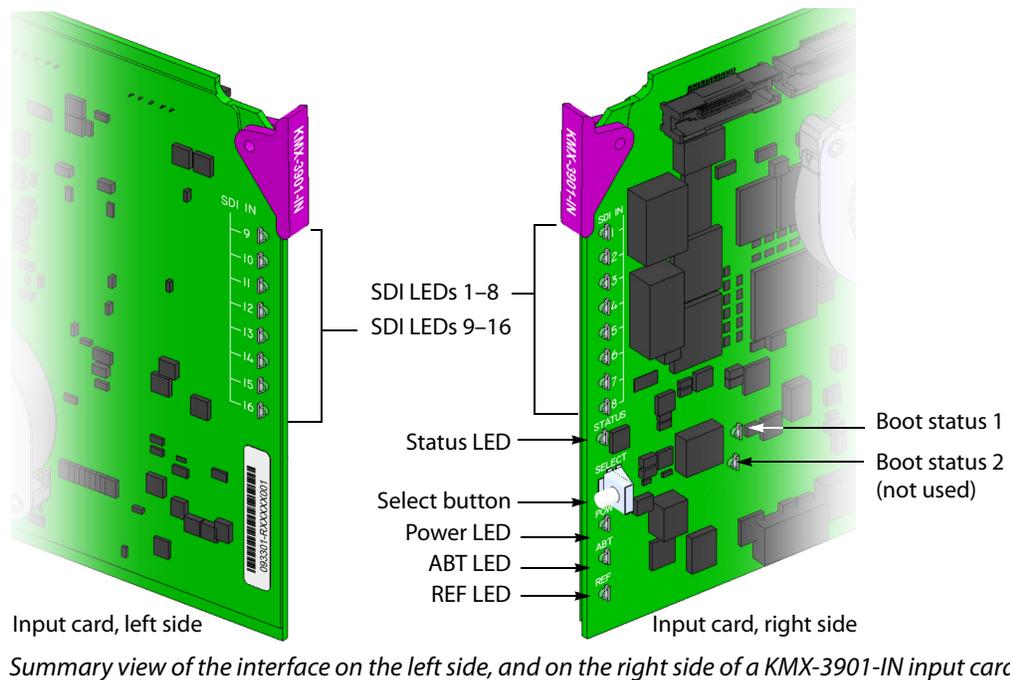
Input card Status LED

The Status LED is located on the front edge of a KMX-3901-IN card, immediately above the Select button, and is visible through the front access door of the Densité frame. This multi-color LED indicates the status of the card, by color, and by flashing/steady illumination:

Status LED color	Meaning
Green	Normal (communication established with an output card)
Flashing orange	Booting (or the card is selected for local control)
Red	Default color before firmware initialization is complete / update in progress (may last up to 10 minutes)
Flashing red	Fan failure / no rear

The Status LED always shows the most severe detected error status. In the table above, error severity increases from top to bottom, with green representing no error/disabled, and flashing red the most severe error conditions.

If the Status LED is flashing orange, it means that the card is selected for local control using the Densité frame's control panel (or that the card is booting up). See Using the Densité Frame Control Panel, on page 71 for details.

If the Status LED is steady red (not flashing), use the Densité frame control panel to review card status information (see Local Control Panel Menu Structure, on page 73). If the card status menu reports that an update is in progress, then you know that you should not interrupt this process (by reseating the card, for example).

Input card power LED

Monitors the status of the 1.8V and 3.3V power supplies on board the KMX-3901-IN input card.

Power LED Color	Meaning
Green	OK
OFF	Failure of the 1.8V or 3.3V on-board PSUs

SDI LEDs

This group of LEDs monitors the status of the 8 or 16 inputs (depending on card model) to the KMX-3901-IN input cards. The frame door must be open for the LEDs to be visible.

SDI LED Color	Meaning
Green	SD-SDI, HD-SDI or 3G input signal detected
Red	No input signal detected

ABT LED

This LED monitors the status of the ABT/MADI input on the KMX-3901-IN input cards.

ABT LED Color	Meaning
Green	ABT/MADI signal detected
Red	No signal detected

REF LED

This LED monitors the status of the REF input on the KMX-3901-IN input cards.

REF LED Color	Meaning
Green	Black-burst or tri-level-sync signal detected
Red	No signal detected

Boot status LED 1

Monitors the status of the firmware.

Boot Status LED Color	Meaning
Green	Normal (firmware has completed initialization and communication was established with at least one output card)
Flashing orange	Error or no communication with an output card
Flashing green/red	Transitory state during firmware initialization
Red	Initial state

Boot status LED 2

This LED is always red, and currently not relevant.

Input card FlexBridge input LEDs

KMX-3901-IN input cards have 2 or 4 LEDs (depending on card model) monitoring the status of the FlexBridge inputs located on their rear connector panel.

Flexbridge input LEDS on quintuple rear panel
(layout is similar on the other rear panels)
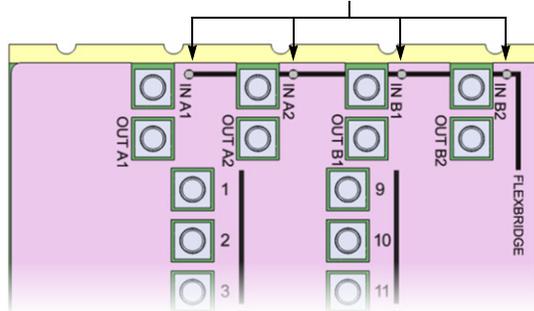
Input LED Color	Meaning
Green	HD-SDI or 3G-SDI signal detected
Red	No SDI signal detected

KMX-3901-IN-IP Input/Output Card Interface

The KMX-3901-IN-IP comprises two front modules: KMX-3901-IN-8-D, on the left, and IPG-3901, on the right. Each module has its own Select button and Status LED.

- See KMX-3901-IN Input Card Interface on page 64 for more information on the KMX-3901-IN-8-D interface.
- Refer to the IPG-3901 Guide to Installation and Operation (see Related Documentation, on page 11), for more information on the IPG-3901 user interface.

SDI LEDs 1–8

Status LED

Select button
Power LED
ABT LED
REF LED

Status LED

Select button
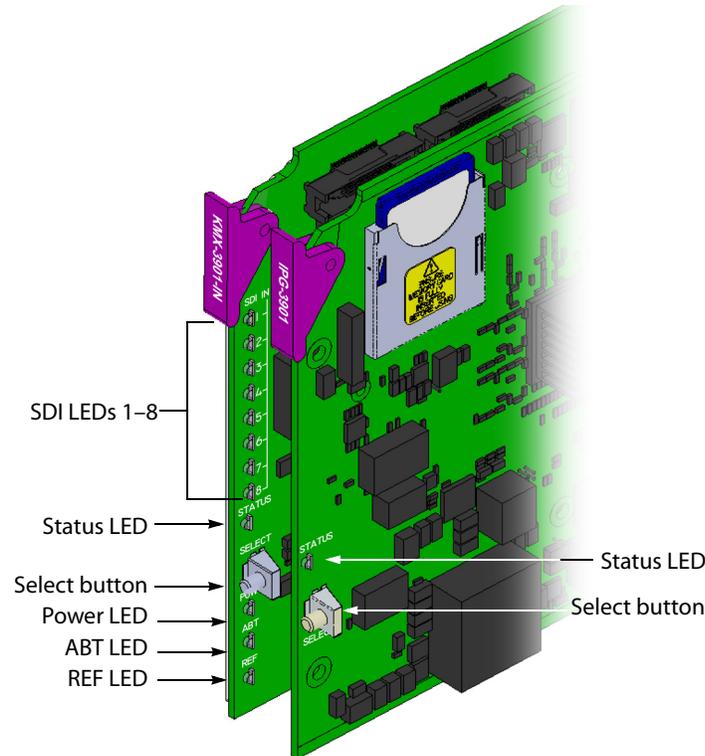
Summary view of the interface on the right side of a KMX-3901-IN-IP input/output module

4K UHD Prescaler Card Interface

When a KMX-3901-IN-16-Q card operates as a 4K UHD prescaler, its SDI LEDs 3, 4, 7, 8, 11, 12, 15, and 16 are always off. SDI LEDs 1, 2, 5, 6, 9, 10, 13, and 14 monitor the status of the two quad link inputs to the prescaler card, and behave as indicated below. The frame door must be open for the LEDs to be visible.

LED Color	Meaning
Green	1080p 60/50 input signal detected
Orange	1080p 60/50 input signal detected, with EAV/SAV errors
Red	No input signal detected, or detected signal is not 1080p 60/50

See KMX-3901-IN Input Card Interface, on page 64, for more information about the other LEDs on the card.

KMX-3901-OUT Output Card Interface

Output card, right
side (or bottom, if
in a 1RU frame)

Other side:
ETH com LED
(future use)
CPU 0 LED *(not used)*
CPU 1 LED

SD card access LED
Heartbeat LED

USB connector

Status LED

Select button

Power LED
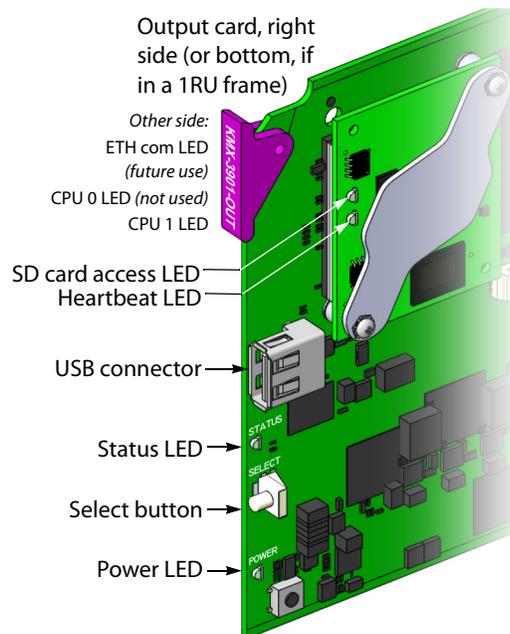
Summary view of the interface on a KMX-3901-OUT output card front edge

Output card Status LED

The Status LED is located on the front edge of a KMX-3901-OUT card, immediately above
the Select button, and is visible through the front access door of the Densité frame. This
multi-color LED indicates the status of the card, by color, and by flashing/steady
illumination:

Status LED Color	Meaning
Green	Normal
Flashing orange	Booting (or the card is selected for local control)
Red	Firmware initialization in progress / no Ethernet / SD card error / CPU kernel error / update in progress (may last up to 10 minutes)
Flashing red	Fan failure / no rear / duplicate IP address

The Status LED always shows the most severe detected error status. In the table above,
error severity increases from top to bottom, with green representing no error/disabled, and
flashing red the most severe error conditions.

If the Status LED is flashing orange, it means that the card is selected for local control using
the Densité frame's control panel (or that the card is booting up). See Using the Densité
Frame Control Panel, on page 71 for details.

If the Status LED is steady red (not flashing), use the Densité frame control panel to review
card status information (see Local Control Panel Menu Structure, on page 73). If the card
status menu reports that an update is in progress, then you know that you should not
interrupt this process (by reseating the card, for example).

Output card power LED

Monitors the status of the power supplies on board the KMX-3901-OUT card.

Power LED Color	Meaning
Green	OK
OFF	Failure of an on-board PSU, or there was a glitch on the 3.3V PSU (in which case reseating the card may resolve the problem). In the first case, reseating the card will not resolve the problem.

Output card heartbeat LED

Monitors the status of the system firmware.

Heartbeat LED Color	Meaning
Flashing red	System OK (*heartbeat* signal)

Memory card access LED

Monitors read/write operations to the SD memory card.

Memory Card Access LED Color	Meaning
OFF	No read/write operations in progress
Flashing green	Read of write operation in progress

ETH communication LED

This LED is always OFF, and currently not relevant.

CPU 0 LED (not used)

This LED is always orange, and currently not relevant.

CPU 1 LED

Monitors the status of the firmware during the startup process.

CPU 1 LED Color	Meaning
Green	Normal (the Kaleido Software, XEdit, XAdmin are available)
Flashing orange	Firmware initialization completed (waiting for the Kaleido Software to start)
Orange	Transitory state during firmware initialization
Red	Initial state

USB connector

The KMX-3901-OUT output cards have one USB connector, into which you may connect a mouse, keyboard, or USB flash memory for a Kaleido Software upgrade or data backup.

Output card FlexBridge input LEDs

KMX-3901-OUT output cards have 2 LEDs monitoring the status of their FlexBridge inputs 1 and 2 located on their rear connector panel.

Flexbridge input LEDs 1 and 2, on double rear panel

Flexbridge input LEDs 1 and 2, on single rear panel
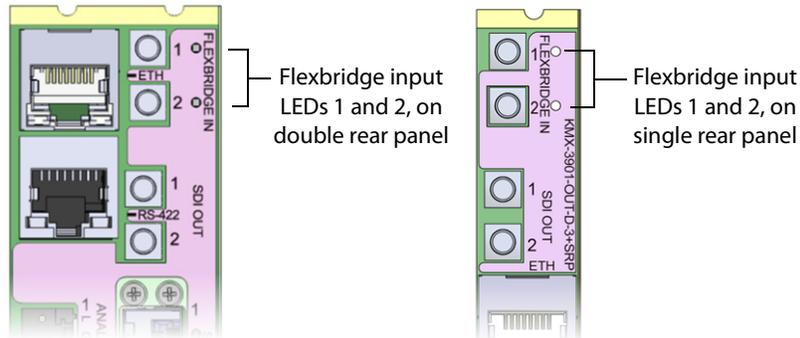
Input LED Color	Meaning
Green	HD-SDI or 3G-SDI signal detected
Red	No SDI signal detected

SFP LEDs

KMX-3901-OUT output cards have 2 or 4 SFP LEDs (depending on rear model) located on their rear connector panel. These LEDs are always OFF, and currently are not relevant.

4 SFP LEDs on double rear panel *(future use)*

SFP LEDs 1 and 2, on single rear panel *(future use)*
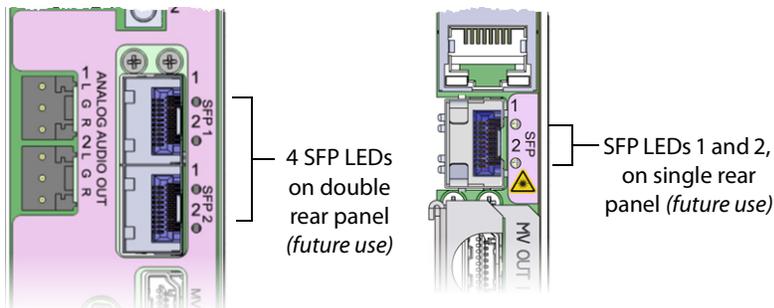
Using the Densité Frame Control Panel

All of the cards installed in a Densité frame are connected to the frame's controller card, which handles all interaction between the cards and the outside world. There are no operating controls located on the cards themselves. The controller supports remote operation via its Ethernet ports, and local operation using its integrated control panel.

CPU-ETH2 Local Control Panel

In the case of a Densité 3 or Densité 3+ FR1 frame, the local control panel is fastened to the CPU-ETH2 controller card, and consists of a display unit capable of displaying two lines of text, each 16 characters in length, and five buttons.
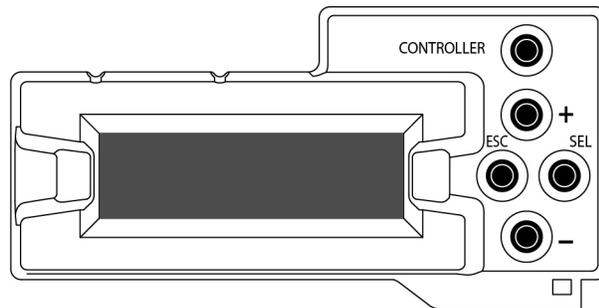
CPU-ETH2 local control panel

The panel is assigned to operate any card in the frame by pressing the Select button *on the front edge of that card.* The Status LED on the selected card will then be flashing orange.

Press the CONTROLLER button on the control panel to select the controller card itself.

CPU-ETH3 Local Control Panel

In the case of a Densité 3+ FR4 frame, the local control interface is fastened to the front of the CPU-ETH3 controller card, and when installed is located in the top center of the frame. The control interface is a touch screen that allows you to view the status of Densité 3+ FR1 frame components including that of each card currently installed in the 24 slots. A number of buttons (PS1, PS2, FANs, CTRL, and REF) allow you to access the menus for the Densité 3+ FR4 frame components including its reference module. The outline color of the buttons behave like status indicators. For example, in the image below, the card in slot 13 is in alarm.
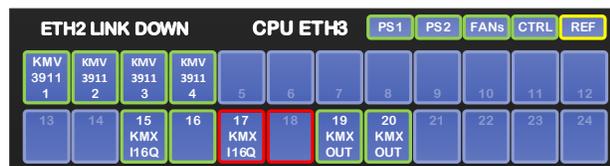
CPU-ETH3 local control panel - Top Menu

Once a card has been selected, four virtual navigation buttons (SEL, ESC, [+], and [-]) allow you to navigate through menus to view and configure the card's parameters.

The panel is assigned to operate any card in the frame by pressing the icon representing the appropriate card on the Densité 3+ FR1 frame's local control panel touch display. Alternatively, pressing the status button on the front edge of a card will also bring up the menu. The Status LED on the selected card becomes flashing orange.

Touch the CTRL button on the control panel to select the Densité 3+ FR1 frame's controller card itself.

Navigating the Local Control Panel Menu

The Kaleido-Modular-X has operating parameters which may be adjusted locally at the controller card interface. Press the Select button *on the front edge of a Kaleido-Modular-X input or output card* to assign the local control panel to operate the card.

> Note: The KMX-3901-IN IP input modules comprise two cards: a KMX-3901-IN-8-D input card, and an IPG-3901 SDI/IP gateway card, configured separately through their respective menu.

The local control panel displays a menu that can be navigated using the four buttons located next to the display. The functionality of the buttons is as follows:

[+] and [-]   Used for menu navigation and value modification.

SEL   Gives access to the next menu level. When a parameter value is shown, pressing or touching this button once enables modification of the value using the [+] and [-] buttons; pressing or touching a second time confirms the new value.

ESC   Cancels the effect of parameter value changes that have not been confirmed; pressing or touching ESC causes the parameter to revert to its former value.

               Pressing or touching ESC moves the user back up to the previous menu level. At the main menu, ESC does not exit the menu system. To exit, press the Select button on the front edge of the card being controlled.

If no controls are operated for 30 seconds, the controller reverts to its normal standby status, and the selected card's Status LED reverts to its normal operating mode. If a parameter was changed on the card but not submitted (SEL was not pressed or touched) and the 30 second timeout occurs, the parameters will be confirmed as if the SEL button had been pressed or touched.

Local Control Panel Menu Structure

Where applicable, default values are underlined.

KMX-3901-OUT output card local menu

STATUS	{CARD STATUS}**	
{CARD VERSION}**		
RESOLUTION	HEAD1	{List of resolutions;* = current}**
	HEAD2	{List of resolutions;* = current}**
{LINK STATE}**		
FANS	{CPU FAN STATUS}**	
	{FPGA FAN STATUS}**	
NETWORK SETTINGS	FRAME IP ADDRESS EDIT	###.###.###.###
	NETMASK EDIT	###.###.###.###
	DEFAULT GW EDIT	###.###.###.###
	LINK MODE EDIT	<u>Auto-negotiate</u>
		100Mbps half-duplex
		100Mbps full-duplex
	OUTPUT A IP EDIT	###.###.###.###
	OUTPUT B IP EDIT	###.###.###.###
	{POSITION}**	
	{MAC ADDRESS}**	

* All KMX-3901-OUT output cards within a housing frame must have their output heads configured with the same refresh rate. If your frame is referenced, then the heads' refresh rate must also match the reference signal's refresh rate.
** Parameters shown here in braces { } will display the actual value of the item and not the text shown above.

KMX-3901-IN input card local menu

STATUS	CARD STATUS	{CARD STATUS}**	
	INPUT STATUS	1 {FORMAT}**	
		2 {FORMAT}**	
		3 {FORMAT}**	
		⋮	
		16 {FORMAT}**	
CONFIG	4K UHD PRESCALER	ENABLE	
		<u>DISABLE</u>	
	SFP CONFIG***	SFP OUT 1	<u>ON</u>
			OFF
		SFP OUT 2	<u>ON</u>
			OFF
		SFP OUT 3	<u>ON</u>

KMX-3901-IN input card local menu *(continued)*

			OFF
		SFP OUT 4	ON
			OFF
FACTORY DEFAULT	RESTORE		
{CARD VERSION}**			

** Parameters shown here in braces { } will display the actual value of the item and not the text shown above.
*** The SFP ports are not yet supported.

Kaleido-Modular-X 4K UHD prescaler local menu

STATUS	CARD STATUS	{CARD STATUS}**	OFF
	INPUT STATUS	1 {FORMAT}**	
		2 {FORMAT}**	
		3 {FORMAT}**	
		⋮	
		16 {FORMAT}**	
	REF STATUS	{EXTERNAL | URS | FREE RUN | FLEXBRIDGE}**	
CONFIG	4K UHD PRESCALER	ENABLE	
		DISABLE	
	SFP CONFIG***	SFP OUT 1	ON
			OFF
		SFP OUT 2	ON
			OFF
		SFP OUT 3	ON
			OFF
		SFP OUT 4	ON
			OFF
FACTORY DEFAULT	RESTORE		
{CARD VERSION}**			

** Parameters shown here in braces { } will display the actual value of the item and not the text shown above.
*** The SFP ports are not yet supported.

IPG-3901 SDI/IP gateway local menu - typical, this varies according to the IPG version

STATUS	GENERAL	REAR TYPE	KMX-3901-IN-IP-D-3PRP
		SERIAL NUMBER	{XXXXXX-XXXXXXXX}**
	REFERENCE	{MISSING | REF NTSC | REF PAL | REF URS 29 | REF URS 25 | NO REF | REF-MISMATCH | UNSUPPORTED | NOT LOCKED}**	
	ETH1	LINK STATUS	{LINK UP | LINK DOWN}**
		MAC ADDRESS	{00:00:00:00:00:00}**
	ETH2	LINK STATUS	{LINK UP | LINK DOWN}**
		MAC ADDRESS	{00:00:00:00:00:00}**
	GATEWAY	SDI IN 1	{ACTIVE | INACTIVE | DISABLED}** {video format at MV OUT 1}**
		SDI IN 2	{ACTIVE | INACTIVE | DISABLED}** {video format at MV OUT 2}**
		SDI IN/OUT 1	{ACTIVE | INACTIVE | DISABLED}** {video format at MV IN 1}**
		SDI IN/OUT 2	{ACTIVE | INACTIVE | DISABLED}** {video format at MV IN 2}**
		SDI IN/OUT 3	{ACTIVE | INACTIVE | DISABLED}** {video format at MV IN 3}**
		⋮	
		SDI IN/OUT 7	{ACTIVE | INACTIVE | DISABLED}** {video format at MV IN 7}**
		SDI OUT 1	{ACTIVE | INACTIVE | DISABLED}** {video format at MV IN 8}**

IPG-3901 SDI/IP gateway local menu - typical, this varies according to the IPG version

		SDI OUT 2	*Not relevant in the context of the KMX-3901-IN-IP I/O module*
	HEALTH	{HARDWARE STATUS}** {FAN STATUS}** {TEMPERATURE STATUS}**	
CARD PRESET	LOAD	DEFAULT	
		USER 2	
		USER 3	
		USER 4	
		USER 5	
	SAVE	DEFAULT	
		USER 2	
		USER 3	
		USER 4	
		USER 5	
NETWORK CONFIG	ETH1	IP ADDRESS	###.###.###.###
		MASK	###.###.###.###
		GATEWAY	###.###.###.###
	ETH2	IP ADDRESS	###.###.###.###
		MASK	###.###.###.###
		GATEWAY	###.###.###.###
SYSTEM	SCAN RATE	50 / 25Hz	
		<u>59.94</u> / 29.97Hz	
TEST PATTERN	FORMAT	<u>1080i</u>	
		720p	
		SD	
	FORCE ALL	ON	
		<u>OFF</u>	
	SDI IN 1	ON	*Enables a test pattern in the selected video format at MV SDI OUT 1*
		<u>OFF</u>	
	SDI IN 2	ON	*Enables a test pattern in the selected video format at MV SDI OUT 2*
		<u>OFF</u>	

IPG-3901 SDI/IP gateway local menu - typical, this varies according to the IPG version

	SDI IN/OUT 1	ON	*Enables a test pattern in the selected video format at MV SDI IN 1*
		OFF	
	SDI IN/OUT 2	ON	*Enables a test pattern in the selected video format at MV SDI IN 2*
		OFF	
	SDI IN/OUT 3	ON	*Enables a test pattern in the selected video format at MV SDI IN 3*
		OFF	
	⋮		
	SDI IN/OUT 7	ON	*Enables a test pattern in the selected video format at MV SDI IN 7*
		OFF	
	SDI OUT 1	ON	*Enables a test pattern in the selected video format at MV SDI IN 8*
		OFF	
	SDI OUT 2		*Not relevant in the context of the KMX-3901-IN-IP I/O module*
VERSION	{CARD VERSION}** {FPGA BUILD}**		
FACTORY DEFAULT	WITHOUT NETWORK	CANCEL | APPLY	
	INCLUDE NETWORK	CANCEL | APPLY	

** Parameters shown here in braces { } will display the actual value of the item and not the text shown above.

Changing the Mosaic Output Resolution

> IMPORTANT
> Within a Kaleido-Modular-X system, all output heads must be configured with the same refresh rate. If your system is referenced, then the heads' refresh rate must also match the reference signal's refresh rate. If you must monitor 50 Hz input signals on 60 Hz displays (or vice-versa), then do not reference your system.

To change the display resolution from the frame controller's local control panel

1 Press the Select button on the front edge of the *output card* whose heads you want to configure. See KMX-3901-OUT Output Card Interface on page 68 for more information.

The Status LED on the selected card flashes orange, and the associated control menu appears on the LCD display of the Densité frame's local control panel. See Using the

Densité Frame Control Panel on page 71.

2 On the local control panel, press the [–] button twice, until RESOLUTION appears on the LCD display.

3 Press the SEL button.

    HEAD 1 appears on the LCD display.

4 Press the SEL button again.

5 The current resolution for the monitor wall display that is connected to the multiviewer's output head 1 (connected to the MV OUT 1 connector) appears on the LCD display.

6 Press the [+] and [–] buttons, to navigate to a suitable output resolution for your monitor wall display.

7 Press SEL to apply the value shown on the LCD display.

    The selected resolution is applied to the multiviewer's output head 1.

8 Press ESC to return to the previous level in the local control menu.

    HEAD 1 appears again on the LCD display.

9 If you want to change the resolution on the second output head (if available), then press the [–] button.

    HEAD 2 appears on the LCD display and you can repeat step 4 to step 8 above to verify or configure the resolution of the display that is connected to the multiviewer's output head 2 (connected to the MV OUT 2 connector).

10 When you are satisfied with the selected output resolution settings, press the Select button *on the front edge of the output card* to exit the control menu.

Notes

• If you do not press any button on the local control panel, the frame controller will revert to its normal standby mode, and the selected card's status LED will revert to its normal operating mode, after 30 seconds.

• If you changed a parameter from the card's control menu, but have not applied your change (you did not press the SEL button on the local control panel), once the 30-second timeout has occurred, the parameters will be confirmed as if you had pressed the SEL button.

Enabling EDID Auto-Detection from the Monitor Wall

Notes

• The monitor EDID auto-detection feature is enabled by default in order to facilitate the initial setup of a Kaleido Multiviewer system. Setting an output head to a specific resolution, from a multiviewer service panel in iControl (if available), or from a Densité controller's local control panel disables the EDID auto-detection for this head.

To enable EDID auto-detect for a display

1 Right-click the monitor wall background, and then click **Display Resolution** on the menu.

Refresh
Load layout...
Unlatch / Acknowledge all
Hide dashboard
Hide all dashboards
System configuration...
Display resolution...
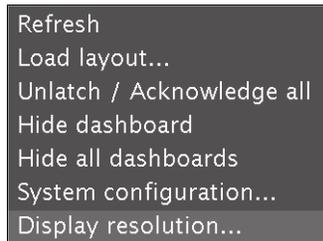
2   Select the **Use detected monitor resolution** check box.

Display Resolution
Use detected monitor resolution: ☑
Detected monitor resolution: 1920x1200@60Hz – Based on EDID
Default DVI resolution: VESA 1280x1024 @60Hz
OK   Cancel
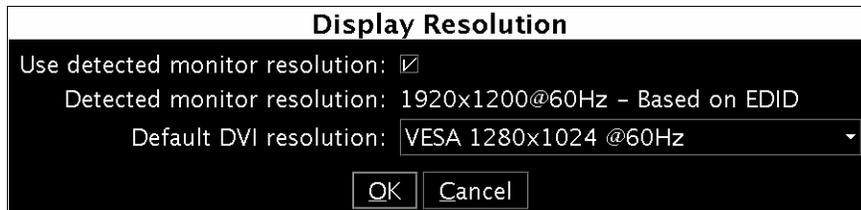
3   Click **OK**.

Enabling the Frame Controller's Automatic Restore Feature

Enabling the CPU-ETH2 Automatic Restore Feature

To enable the frame controller's automatic restore feature

1   On the Densité frame's local control panel, press the CONTROLLER button. See Using the Densité Frame Control Panel on page 71.

2   Press the [–] button repeatedly until RESTORE POINTS appears on the display, and then press the SEL button.

3   Press the [–] button repeatedly until DEFAULT ACTION appears on the display, and then press the SEL button.

   • If the control panel's display shows UPDATE SETTINGS, then the automatic restore feature is already enabled.

   • If the control panel's display shows KEEP SETTINGS, navigate to UPDATE SETTINGS by pressing the [–] button, and then press the SEL button to apply your change.

4   Press the CONTROLLER button to exit the controller's menu.

Disabling the CPU-ETH2 Automatic Restore Feature

To disable the CPU-ETH2 automatic restore feature

1   On the Densité frame's local control panel, press the CONTROLLER button. See Using the Densité Frame Control Panel on page 71.

2   Press the [–] button repeatedly until RESTORE POINTS appears on the display, and then press the SEL button.

3   Press the [–] button repeatedly until DEFAULT ACTION appears on the display, and then press the SEL button.

- If the control panel's display shows KEEP SETTINGS, then the automatic restore feature is already disabled.
- If the control panel's display shows UPDATE SETTINGS, navigate to KEEP SETTINGS by pressing the [+] button, and then press the SEL button to apply your change.

4 Press the CONTROLLER button to exit the controller's menu.

Saving a Restore Point to the CPU-ETH2 for a Single Card

To save a restore point to the controller's non-volatile memory

1 On the Densité frame's local control panel, press the CONTROLLER button.

2 Press the [–] button repeatedly until RESTORE POINTS appears on the display, and then press the SEL button.

3 Press the [–] button repeatedly until SAVE A CARD appears on the display, and then press the SEL button.

4 Press the [–] button repeatedly until CARD # N—where N matches the slot number for the Kaleido-Modular card whose configuration you wish to save—appears on the display, and then press the SEL button.

5 Press the CONTROLLER button to exit the controller's menu.

Saving Restore Points to the CPU-ETH2 for All Card

To save restore points to the controller's non-volatile memory, for all cards

1 On the Densité frame's local control panel, press the CONTROLLER button.

2 Press the [–] button repeatedly until RESTORE POINTS appears on the display, and then press the SEL button.

3 Press the [–] button repeatedly until SAVE ALL CARDS appears on the display, and then press the SEL button.

4 Press the CONTROLLER button to exit the controller's menu.

Networking Essentials

The following network prerequisites must be met:

- Any multiviewer you wish to configure or access by using XEdit or XAdmin must be connected to an Ethernet switch.
- A client workstation must be connected to the LAN or Ethernet switch to access the multiviewer by using XAdmin or XEdit.
- The Ethernet switch must support 100 Mbps full-duplex connections.
- The port on the Ethernet switch to which the multiviewer is connected should be configured to auto-negotiate. By default, multiviewers have their Ethernet ports set to auto-negotiate. If a switch does not support auto-negotiation, the recommended settings are 100 Mbps, full-duplex.

Assigning an IP Address to Each Device in your System

Multiviewers and most peripheral devices that are part of a Kaleido-Modular-X system communicate through a TCP/IP network. Configuring your system's network parameters includes the following:

- Assigning an IP address, and specifying the appropriate network mask, gateway address, and a system name for each multiviewer. See Setting the Multiviewer's IP addresses, on page 81.
- Configuring the RCP-200, if available. See Configuring the RCP-200, on page 144.
- Configuring the Kaleido-RCP2, if available. See Configuring the Kaleido-RCP2, on page 148.
- Configuring the Audio Bridge Terminal (ABT), if available. See Configuring an Audio Bridge Terminal, on page 150.

Setting the Multiviewer's IP addresses

For the Kaleido-Modular-X multiviewer to join a TCP/IP network, it must be configured with a system name, appropriate IP addresses, network mask, and gateway settings. You may also need to configure networking parameters for the CPU-ETH2, or CPU-ETH3 frame controllers (if your housing frames were not already in operation), any new Kaleido-RCP2 and Audio Bridge Terminal units you ordered, and a PC to communicate with the multiviewer and its peripheral devices.

A quad-head Kaleido-Modular-X multiviewer system requires three IP addresses (one for each output card, one for the system), while a dual- or single-head system requires only one (the output card's IP address doubles as the system IP address), unless your system includes KMX-3901-IN IP input/output modules, in which case you need to allow one or two IP addresses for every KMX-3901-IN IP module.[1] KMX-3901-OUT output cards are shipped with the following default settings:

KMX-3901-OUT default IP settings

System	IP address	192.168.3.31
	Network mask	255.255.255.0
	Gateway	0.0.0.0
Output A	IP address	192.168.3.31
Output B	IP address	0.0.0.0

Note: The default gateway address is either 0.0.0.0, or the default system IP address. Either setting results in the same system behavior.

Densité 3 and Densité 3+ FR1 housing frames are shipped with their CPU-ETH2 controller configured with the following default settings:

1.Refer to the IPG-3901 Guide to Installation and Operation, for more information. See Related Documentation, on page 11.

CPU-ETH2 controller default IP settings

IP address 1	192.168.3.1
Network mask	255.255.255.0
Gateway	0.0.0.0
IP address 2	0.0.0.0
Network mask	0.0.0.0
Gateway	0.0.0.0

Densité 3+ FR4 housing frames are shipped with their CPU-ETH3 controller configured with the following default settings:

CPU-ETH3 controller default IP settings

IP address	192.168.3.1
Network mask	255.255.0.0
Gateway	0.0.0.0

Once the networking parameters are correctly configured on your KMX-3901-OUT output cards, it will not be necessary to switch off the housing frame's power when installing or removing cards.

To set the system name and IP addresses for your Kaleido-Modular-X multiviewer

1 If any frame housing your Kaleido-Modular-X input and output cards was not already in operation, configure the frame controller's networking parameters. See Setting a Densité Frame Controller's IP Address on page 83.

2 For every frame housing Kaleido-Modular-X input or output cards, verify that the frame controller's automatic restore feature is enabled (see Enabling the Frame Controller's Automatic Restore Feature, on page 79).

> Note: For the card hot swap feature to function properly, the frame controller's automatic restore feature must be activated on all frames housing Kaleido-Modular-X cards (that is for both input and output cards).

3 Configure your output cards' networking parameters:

   • If you are setting up a **quad-head** Kaleido-Modular-X, replace the system IP address, network mask, default gateway, and both output cards' IP addresses as appropriate. See Configuring the Network Settings for a Quad-Head System on page 86.

   The *system* IP address will be your system's virtual IP address. This is the address you will use to access your system from XEdit and XAdmin, for example.

   • If you are setting up a **single-head** or a **dual-head** Kaleido-Modular-X, then replace the IP address for Output A with an appropriate IP address, and change the network mask and default gateway as appropriate. See Configuring the Network Settings for a Single- or Dual-Head System on page 84.

   The output card's IP address will automatically become your system's virtual IP address.

4 Configure your KMX-3901-IN IP input/output modules, if any. See Configuring a KMX-3901-IN IP Input/Output Module on page 138.

5 Configure the Kaleido-RCP2, and Audio Bridge Terminal units you have connected to your system, if any. See Configuring the Kaleido-RCP2 on page 148, and Configuring an Audio Bridge Terminal, on page 150.

6 Complete your Kaleido-Modular-X system configuration by changing the system name, if desired. See Setting the System Name on page 142.

> Note: If there are more than one multiviewer in the same network environment, it is important to assign each a unique system name, so that you can tell them apart (for example, when using a remote control panel such as the Kaleido-RCP2 or RCP-200).

You are now ready to open XAdmin and XEdit from your PC and verify your system communication status (see Multiviewer Model Representation in XEdit and XAdmin, on page 93, and System Verification, on page 157).

Setting a Densité Frame Controller's IP Address

To set the frame controller's IP address

1 On the housing frame's local control panel, press the CONTROLLER button. See Using the Densité Frame Control Panel on page 71.

2 Press the [−] button repeatedly until ETH1 OPTIONS appears on the display, and then press the SEL button.

3 Press the [−] button repeatedly until IP ADDRESS appears on the display.

4 Press the SEL button.

The current value appears on the display.

- Press the [+] and [−] buttons, to change the digit at the current input position.
- Press SEL to move one position to the right.
- Press ESC to move one position to the left.

5 When the display shows the desired value, press SEL repeatedly until you reach the last position (if needed), and then press SEL once more to save your changes and return to the previous menu level.

> Note: Pressing ESC when the input focus is in the first position returns to the previous menu level. Pressing SEL when the input focus is in the last position saves the changes and returns to the previous menu level.

IP ADDRESS appears on the control panel's display.

6 Press the [−] button.

NETWORK MASK appears on the control panel's display.

7 Repeat step 4 and step 5 to configure the netmask.

8 Once you have set the network mask, press the [−] button again.

GATEWAY appears on the control panel's display.

9 Repeat step 4 and step 5 to configure the gateway.

10 Once you have set the gateway, press the CONTROLLER button to exit the controller's menu.

The frame controller restarts.

11 Connect the controller card's ETHERNET 1 port to your management network (see Cabling Diagram, on page 44).

> Notes
> - The Kaleido-Modular-X does not support the controller card's second Ethernet port (ETHERNET 2).
> - To avoid IP-address conflicts, you should wait until you have configured the appropriate network settings for your KMX-3901 output cards before connecting the output cards' ETH ports to the management network.

> IMPORTANT
> **Make sure the controller's internal clock is set to the correct date and time.**
> The clock settings will persist for 10 days after a power loss. Should you later need to change the time on a CPU-ETH2 controller, then you will have to restart any multiviewer system housed in the same frame. Refer to the Densité CPU-ETH2 Enhanced Ethernet Controller Card Guide to Installation and Operation, for more information. See Related Documentation, on page 11.

Configuring the Network Settings for a Single- or Dual-Head System

To configure the network settings for a Kaleido-Modular-X with one output card

1 Press the Select button on the front edge of the *output* card. See Using the Densité Frame Control Panel on page 71. See KMX-3901-OUT Output Card Interface on page 68 for more information.

The Status LED on the selected card flashes orange, and the associated control menu appears on the display of the Densité frame's local control panel.

2 On the local control panel, press the [–] button repeatedly until NETWORK SETTINGS appears on the display, and then press the SEL button. See Using the Densité Frame Control Panel on page 71.

FRAME IP ADDRESS EDIT appears on the display.

3 Press the [–] button to skip this option (the system will automatically receive the IP address you configure for Output A, once the card will have restarted).

NETMASK EDIT appears on the display.

4 Press the SEL button.

The current value appears on the display.

- Press the [+] and [–] buttons, to change the digit at the current input position.
- Press SEL to move one position to the right.
- Press ESC to move one position to the left.

5 When the display shows the desired value, press SEL repeatedly until you reach the last position (if needed), and then press SEL once more to save your changes and return to the previous menu level.

> Note: Pressing ESC when the input focus is in the first position returns to the previous menu level. Pressing SEL when the input focus is in the last position saves the changes and returns to the previous menu level.

NETMASK EDIT appears on the display.

6 Once you have set the network mask, press the [–] button.

DEFAULT GW EDIT appears on the display.

7 Repeat step 4 and step 5 to configure the gateway.

8 Once you have configured the gateway and navigated back to the previous menu level, press the [–] button again.

LINK MODE EDIT appears on the display.

9 Press the SEL button.

10 The current link mode appears on the display.

> Note: On all Kaleido multiviewers, the network adapters are set to auto-negotiate. By default, the connection speed and duplex mode will be set automatically based on the corresponding port settings on the switch.

11 If your network's mode of operation requires you to change the link mode, press the [+] and [–] buttons to navigate to the suitable option (100 Mbps half-duplex, or 100Mbps full-duplex), and then press SEL to apply the value shown on the display.

The selected link mode is applied.

12 Press ESC to return to the previous level in the local control menu.

LINK MODE EDIT appears again on the display.

13 Press the [–] button.

OUTPUT A IP EDIT appears on the display.

14 Repeat step 4 and step 5 to configure the IP address for Output A.

15 Once you have set the IP address for Output A, press the Select button *on the front edge of the output card* to exit the control menu.

> Notes
>
> • If you do not press any button on the Densité frame local control panel, the frame controller will revert to its normal standby mode, and the selected card's Status LED will revert to its normal operating mode, after 30 seconds.
>
> • If you changed a parameter from the card's control menu, but have not applied your change (you did not press the SEL button on the local control panel), once the 30-second timeout has occurred, the parameters will be confirmed as if you had pressed the SEL button.

After a moment, the card restarts. The startup sequence takes approximately four minutes, during which time the Status LED is first red and then flashing orange. Once

the startup has completed, the Status LED should be red (steady) because the card is not connected to the network yet.

16 Connect the output card's ETH port to your management network (see Cabling Diagram, on page 44).

17 Check the card's Status LED again, and make sure that it does not indicate an error condition. See Output card Status LED on page 68.

Should the Status LED indicate an error condition, look at the other LEDs to find out what the other LEDs might be indicating. See Card Interfaces and Troubleshooting on page 63.

18 Verify that the new IP address is effective, by referring to Verifying an Output Card's IP Address and Application Version, on page 161.

Configuring the Network Settings for a Quad-Head System

To configure the network settings for a Kaleido-Modular-X with two output cards

1 Press the Select button on the front edge of one of your system's *output* cards. See Using the Densité Frame Control Panel on page 71. See KMX-3901-OUT Output Card Interface on page 68 for more information.

The Status LED on the selected card flashes orange, and the associated control menu appears on the display of the Densité frame's local control panel.

2 On the local control panel, press the [–] button repeatedly until NETWORK SETTINGS appears on the display, and then press the SEL button. See Using the Densité Frame Control Panel on page 71.

FRAME IP ADDRESS EDIT appears on the display.

3 Press the SEL button again.

The current value appears on the display.

- Press the [+] and [–] buttons, to change the digit at the current input position.
- Press SEL to move one position to the right.
- Press ESC to move one position to the left.

4 When the display shows the desired value, press SEL repeatedly until you reach the last position (if needed), and then press SEL once more to save your changes and return to the previous menu level.

Note: Pressing ESC when the input focus is in the first position returns to the previous menu level. Pressing SEL when the input focus is in the last position saves the changes and returns to the previous menu level.

FRAME IP ADDRESS EDIT appears on the control panel's display.

5 Press the [–] button.

NETMASK EDIT appears on the control panel's display.

6 Repeat step 3 and step 4 to configure the netmask.

7 Once you have set the network mask and navigated back to the previous menu level, press the [–] button again.

DEFAULT GW EDIT appears on the control panel's display.

8 Repeat step 3 and step 4 to configure the gateway.

9 Once you have configured the gateway and navigated back to the previous menu level, press the [–] button again.

LINK MODE EDIT appears on the control panel's display.

10 Press the SEL button.

11 The current link mode ("Auto-negotiate") appears on the LCD display.

> Note: On all Kaleido multiviewers, the network adapters are set to auto-negotiate. By default, the connection speed and duplex mode will be set automatically based on the corresponding port settings on the switch.

12 If your network's mode of operation requires you to change the link mode, press the [+] and [–] buttons to navigate to the suitable option (100 Mbps half-duplex, or 100Mbps full-duplex), and then press SEL to apply the value shown on the display.

The selected link mode is applied.

13 Press ESC to return to the previous level in the local control menu.

LINK MODE EDIT appears again on the LCD display.

14 Press the [–] button.

OUTPUT A IP EDIT appears on the control panel's display.

15 Repeat step 3 and step 4 to configure the IP address for Output A.

16 Once you have set the IP address for Output A, and navigated back to the previous menu level, press the [–] button again.

OUTPUT B IP EDIT appears on the control panel's display.

17 Repeat step 3 and step 4 to configure the IP address for Output B.

18 Once you have set the IP address for Output B, press the Select button *on the front edge of the output card* to exit the control menu.

> Notes
>
> • If you do not press any button on the Densité frame local control panel, the frame controller will revert to its normal standby mode, and the selected card's Status LED will revert to its normal operating mode, after 30 seconds.
>
> • If you changed a parameter from the card's control menu, but have not applied your change (you did not press the SEL button on the local control panel), once the 30-second timeout has occurred, the parameters will be confirmed as if you had pressed the SEL button.

After a moment, the card restarts. The startup sequence takes approximately four minutes, during which time the Status LED is first red and then flashing orange. Once the startup has completed, the Status LED should be red (steady) because the card is not connected to the network yet.

19 Press the Select button on the front edge of *the other output card,* and repeat from step 2, to configure the second output card with the same network settings.

20 Connect both output cards' ETH ports to your management network (see Cabling Diagram, on page 44).

21 The system momentarily reports a duplicate IP address on the monitor wall, after which Output B restarts. Once the startup has completed, check both cards' Status LEDs again, and make sure that they do not indicate an error condition. See Output card Status LED on page 68

Should the Status LED indicate an error condition, look at the other LEDs to find out what the other LEDs might be indicating. See Card Interfaces and Troubleshooting on page 63.

22 Verify that both cards' and the system's new IP addresses are effective, by referring to Verifying the Multiviewer's IP Addresses and Application Version, on page 161.

23

Network Considerations

This multiviewer generates a low to moderate amount of client-to-server data traffic, and therefore has a minimal bandwidth impact on a network.

TCP/UDP Port Usage

The various Kaleido-Modular-X communication protocols require access to specific ports. In networks where a firewall is present between device A and device B, the ports used to communicate **from** device A **to** device B must be open on the incoming (external) side of the firewall.

> Note: All necessary ports are open by default on the multiviewer. There is no mechanism provided for changing the default settings.

From client to multiviewer

The following ports must be open on the Client (i.e., the workstation running XEdit):

Port	Used for	Transport	Notes
443	HTTPS	TCP	Used by XAdmin for secure access
7	HTTP	TCP	Used by XEdit for ping probing
80		TCP	Used by XEdit and XAdmin
5122		TCP	Used by XEdit for *keepalive* (heartbeat)
5432		TCP	Used by XEdit for export operations
7600		TCP	Used for troubleshooting the REST API (remote control)
13000		TCP	Online connection
13100		TCP	Used for calibration data from XEdit
5120	RCP2	TCP	Used to listen for Kaleido Software discovery packets
10000		TCP	For RCP2 protocol
10001		TCP	For RCP2 protocol
5120		UDP	On multicast 230.8.8.9 for RCP2 protocol
5121		UDP	For RCP2 protocol

From multiviewer to client

Port	Used for	Transport	Notes
1024–5000[a] 49152-65535[b]	Java RMI	TCP	Remote Method Invocation (client/server communication). Dynamic Allocation of ports. Required for communication between client and Application Server.

a. For Windows XP and earlier
b. For Windows 7 and later

From multiviewer to multiviewer

The following ports, used for inter-frame communications, are open by default on all Kaleido Multiviewer systems:

Port	Used for	Transport	Notes
22	SSH	TCP	Secure Shell Login is required to login to a multiviewer for maintenance.
4160	Java Jini	TCP	Responsible for discovery and communications between devices/services on a network.
8080	HTTP	TCP	
8082		TCP	Internal communication
8083		TCP	Internal communication
8084		TCP	Internal communication
8085		TCP	Internal communication
8086		TCP	Internal communication
8087		TCP	Used for debugging purposes
8090		TCP	Web service
32769		TCP	filenet-rpc
5120		UDP	On multicast 230.8.8.9 for RCP2
7572		UDP	On multicast 230.8.8.8 for "keep-alive" (heartbeat)
7571		UDP	For "keep-alive" (heartbeat)
5100	Densité	TCP	Internal communication within a Kaleido-Modular-X multiviewer system; communication with modules housed in a Densité frame.

From iControl to multiviewer

Port	Used for	Transport	Notes
4160	Java Jini	TCP	Responsible for discovery and communications between devices/services on a network.
32768–65535	Java RMI	TCP	Remote Method Invocation (client/server communication). Dynamic Allocation of ports. Required for communication between client and Application Server. This range can be restricted to match specific security requirements. A minimum of 4000 ports should be allocated.

Between multiviewer and remote control panel

The following ports, used for communications to/from RCP-200 and Kaleido-RCP2 control panels, are open by default on all Kaleido Multiviewer systems:

Port	Used for	Transport	Notes
5120	RCP2	TCP	Used to listen for Kaleido Software discovery packets
10000		TCP	For RCP2 protocol
10001		TCP	For RCP2 protocol
5120		UDP	On multicast 230.8.8.9 for RCP2 protocol
5121		UDP	For RCP2 protocol
80	HTTP	TCP	Used by the RCP-200 to obtain information from the multiviewer's system database
13000		TCP	Used by the RCP-200 to control the multiviewer via the gateway

From multiviewer to peripheral devices

Port	Used for	Transport	Notes
25	SMTP	TCP	Simple Mail Transfer Protocol, for e-mail alerts.
8851	Alpermann+Velte	TCP	Used to obtain information from Plura (Alpermann+Velte) Studio Production Timer (SPT) systems.
5100	GPI-1501	TCP	Used to obtain information from GPI-1501 General Purpose Interface I/O modules.[a]
8910[b]	TSL (network)	TCP	Used to obtain information from TSL devices that use the TSL UMD version 5.0 protocol.

a. See also: From multiviewer to multiviewer, on page 89.
b. Configurable.

From peripheral devices to multiviewer

The following ports must be open on peripheral devices (e.g., router controllers):

Port	Transport	Notes
2000	TCP	Used to control the multiviewer's internal router via the SAM (Snell/Pro-Bel) SW-P-02 protocol
4381	TCP	Used to control the multiviewer's internal router via the Nevion (Network) protocol
5194	TCP	Used to control the multiviewer's internal router via the NVEP Router (NP0016) protocol
14000	TCP	Used to control the multiviewer's internal router via the SAM (Snell/Pro-Bel) SW-P-08 protocol

Router drivers also use default ports:

Driver	Port	Transport	Notes
ETL	4000	TCP	
GVG 7000 Native	12345	TCP	
NVEP NV9000 (NP0017)	9193	TCP	
VikinX Modular	4381	TCP	
Quintech	9100	TCP	
Sony HKSPC	12345	TCP	GVGNP Emulator
Utah RCP-3	5001	TCP	SC-4 Ethernet
SAM (Snell/Pro-Bel) SW-P-02	2000	TCP	
SAM (Snell/Pro-Bel) SW-P-08	14000	TCP	

> Note: This is configurable in XEdit—you can choose any UDP or TCP/IP port to use for communications between the multiviewer and an external router.

Between multiviewer and SNMP managers

Port	Used for	Transport	Notes
161	SNMP	UDP	Used for SNMP (Simple Network Management Protocol) communications between external SNMP managers and a multiviewer (e.g., sending get, get-next, and set messages to a multiviewer's SNMP agent, and receiving the response).

Between multiviewer and NTP server

The following ports, used for communications to/from Network Time Protocol servers, are open by default on all Kaleido Multiviewer systems:

Port	Used for	Transport	Notes
123	NTP	TCP	Used for Network Time Protocol synchronization. Port needs to be open in both directions.

Network Considerations for a Multiviewer Cluster

> IMPORTANT
> **Before changing the system name or IP address of a multiviewer associated with a cluster, review the following.**

- If you change the system name or IP address of a cluster member while another cluster member is offline or otherwise unavailable, the cluster's integrity will be broken. If you attempt to make such a change, XEdit will alert you to the situation, prompting you to cancel the operation and try again later, when all cluster members are available. However, in the advent that such a change was made by mistake, or that it as been forced for some reason, you will have to repair the broken cluster (see "Repairing a Cluster System" in the Kaleido Software User's Manual).

- To maintain the integrity of a cluster configuration, such changes must be made by using the system configuration features available in XAdmin.

System Configuration

This chapter shows how to configure the multiviewer.

System Requirements for a Client PC

A client PC or laptop meeting the following requirements is required to access the XAdmin Web client, and the other Kaleido Software client applications.

Operating system	Microsoft Windows 10, Windows 8.1, Windows 8, or Windows 7.
Processor	The minimum required by the operating system or better.
Memory	The minimum required by the operating system plus 2 GB or more.
Disk space	The minimum required by the operating system plus 2 GB or more.

Multiviewer Model Representation in XEdit and XAdmin

The name used in Kaleido-X by XAdmin and XEdit to represent this multiviewer model is KMX-3901.

XEdit Installation

Installing Kaleido Software Client Applications

In addition to the XAdmin Web client, which does not require installation, the Kaleido Software includes the following client applications:

- XEdit is a client application used to create layouts for the monitor wall, and to configure your multiviewer system, from your PC. When this PC has network connectivity to the multiviewer, you can use XEdit to modify layouts and settings directly on the multiviewer, or you can work locally on the computer and then export your changes to the multiviewer.
  - If you have only one multiviewer (or if you have more than one but you intend to always have the same version of the Kaleido Software on all of them), download the XEdit installer file from the multiviewer's home page. Whenever you install a new version of the Kaleido Software on the multiviewer, the next time you open XEdit, your copy of the application will be automatically updated from the multiviewer. See Installing XEdit from your Multiviewer's Home Page on page 94.
- The Router Control Software Single Bus and Matrix View applications (also part of the iRouter Router Control Software packaged with iControl Application Servers) can be used to control your multiviewer's logical sources and monitor wall destinations, via the *KX Router* logical router, or to control other logical routers configured within your

multiviewer system. See Installing Router Control on page 99.

• Signal Path Viewer opens as a standalone panel, updated in real time, showing assignment information between router sources and multiviewer inputs. See Installing Signal Path Viewer on page 102.

Installing XEdit from your Multiviewer's Home Page

To install XEdit from your multiviewer's home page

1 With your PC, open a Web browser window and type the multiviewer's IP address in the address bar.

The multiviewer's home page appears.
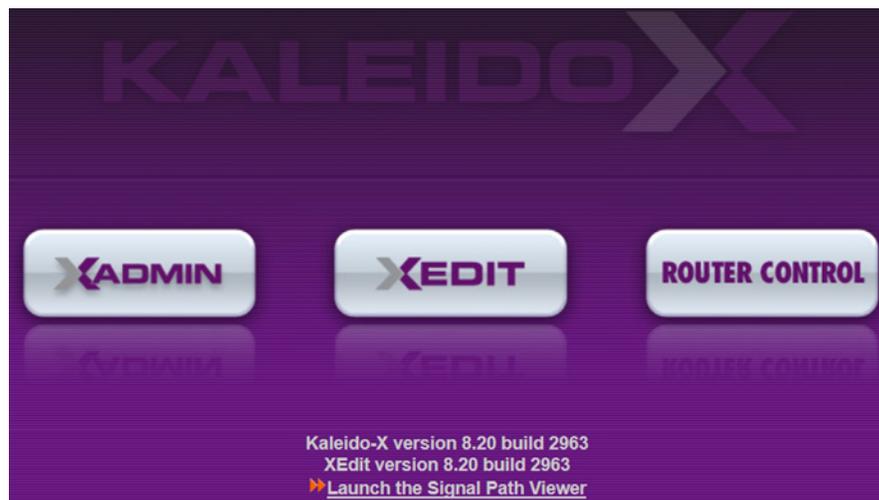
2 Click the **XEdit** button.

The browser prompts you to save an executable file to your hard drive (`Kaleido-windows32-online.exe`[1]). This file is an online installer, which will download XEdit and other companion elements from your multiviewer, and install them. Some browsers may allow you to run the file directly. Depending on your browser's security features, warnings may appear, which you may safely dismiss.

3 Unless your browser let you run the file (and you chose to do so), navigate to the location were you saved the installer file and open it.

More security warnings or prompts may appear, which you may safely dismiss or accept.

1.Installers for Linux or Mac OS X are not yet available.

A window appears, showing the download and installation progress.

At the end of the installation process:

• If you have Windows 7, or Windows 10, shortcuts ( ) are added to your desktop and to the Start menu (under **All Programs**).
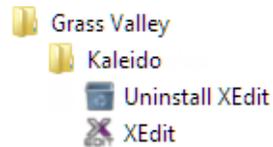
• If you have Windows 8.1, or Windows 8, XEdit will appear on your desktop, in the Apps view with all the other applications on your PC (Windows 8.1), or in your Start screen (Windows 8).
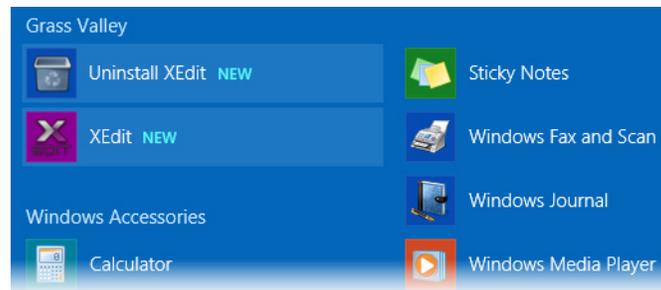
Once the installation has completed, the XEdit startup screen appears.
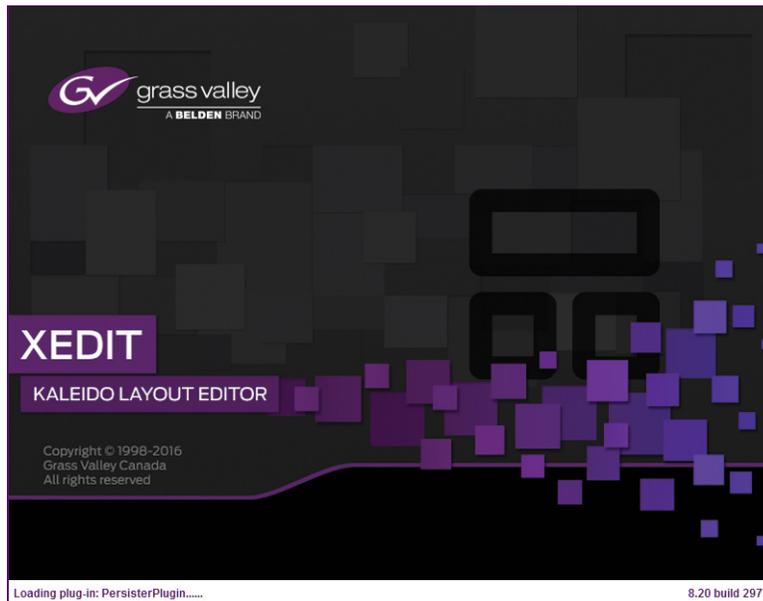
Depending on your Windows Firewall settings, a security alert may appear.

- Click **Allow access** to unblock the application.

If XEdit cannot find all of the fonts it needs already on your PC or laptop, it downloads them from the multiviewer automatically, in which case a message will appear to confirm the font update, and instruct you to restart the application.
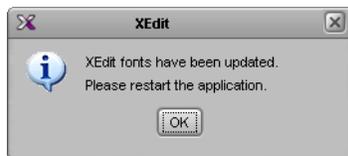
- Click **OK** to continue, and then open XEdit again, by using the shortcut on your desktop, in your Apps view (Windows 8.1) or Start screen (Windows 8), or from the Start menu (Windows 7, Windows 10).

4 When prompted to specify a database, choose one from the **Path** list, or click **Browse** to navigate to the database you wish to use as your local workspace, and then click **OK**.
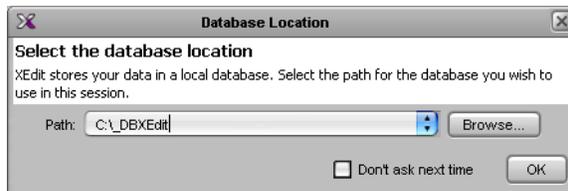
Once the database has completed loading, XEdit's main application window appears.
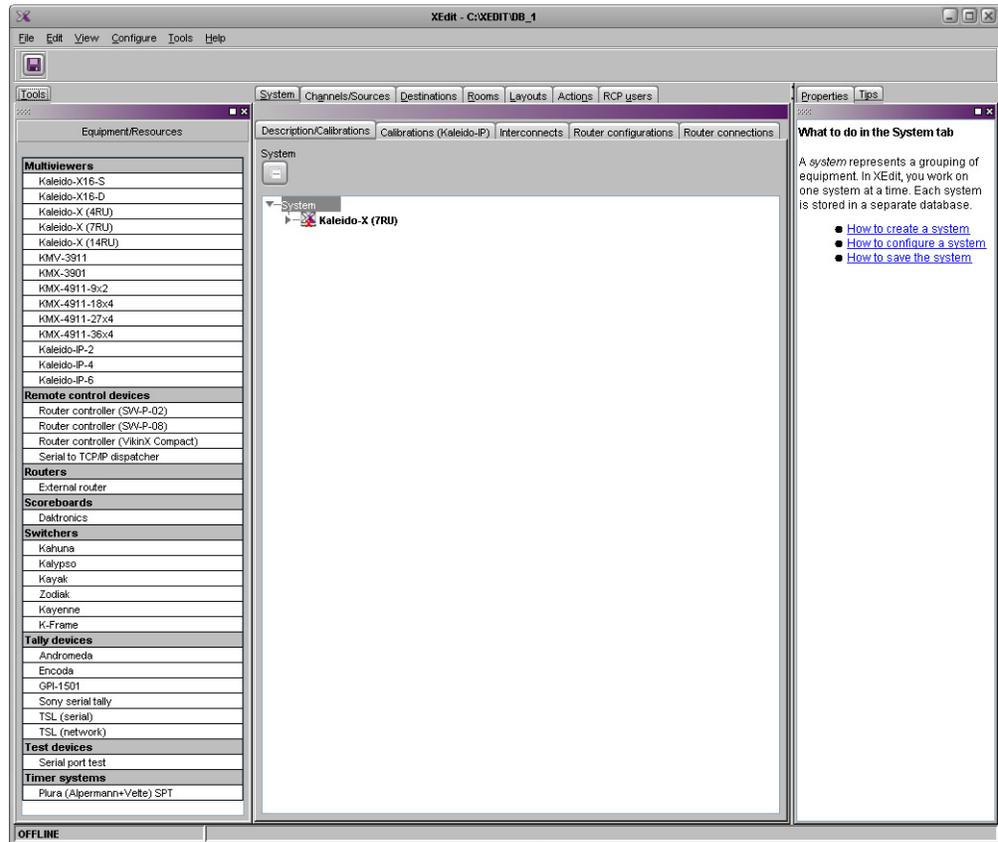
Note: Once it has been installed from the multiviewer, XEdit remains on your PC or laptop, and can be launched from the ![icon] shortcut that was added to your desktop, Apps view, or Start screen (see page 95), or from the Start menu. Whenever you install a new version of the Kaleido Software on the multiviewer, the next time you open XEdit, your installed copy of the application will be automatically updated from the multiviewer.

For more information about calibrating your system, configuring rooms, creating layouts, and operating the monitor wall, refer to the *Kaleido Software User's Manual*. See Related Documentation, on page 11.

Uninstalling XEdit

With recent versions of XEdit, an uninstall program is available from the Windows Start menu. If you installed XEdit from your multiviewer's home page, see Uninstalling XEdit (Dynamic Version 7.20 or Later), on page 98.

If you have been using XEdit versions *earlier* than 7.20 you may want to uninstall them, by clearing the Java cache, on your PC or laptop. See Uninstalling XEdit (Version 7.11 or Earlier) on page 98.

Uninstalling XEdit (Dynamic Version 7.20 or Later)

To uninstall XEdit (dynamic version 7.20 or later)

1 Close all XEdit windows you may have open.

2 Locate the **Uninstall XEdit** shortcut.

- If you have Windows 7, or Windows 10: Open the Start menu, click **All Programs**, scroll to the **Grass Valley** (or **Miranda Technologies**[2]) folder, and then expand the **Kaleido** folder.
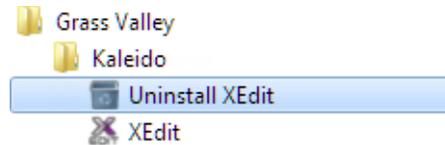
- If you have Windows 8.1, or Windows 8: Switch to the App view or your Start screen.

3 Click **Uninstall XEdit**.

An uninstall screen appears.
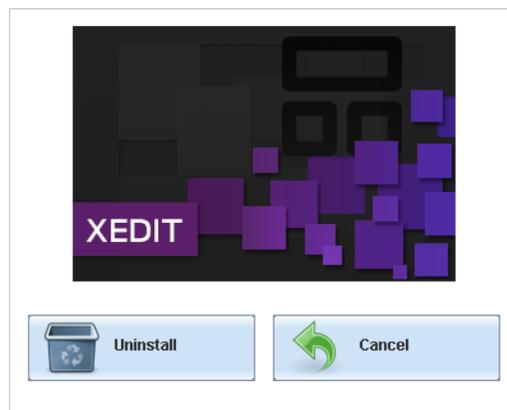
4 Click **Uninstall**.

This removes XEdit, including all shortcuts, launchers, and other elements that were installed with it, from your system.

Uninstalling XEdit (Version 7.11 or Earlier)

To uninstall XEdit (version 7.11 or earlier)

1 Close all Java applications you may have open.

2 On the Start menu, click **Control Panels**, and then click **Java (32-bit)**.

Java Control Panel opens.

3 In the **General** tab, click **Settings**.

4 In **Temporary Files Settings**, click **Delete Files**.

5 In **Delete Files and Applications** select all the check boxes, and then click **OK**.

6 Close **Temporary Files Settings**, and then **Java Control Panel**, by clicking their **OK** button.

---

2. Launcher icons for versions 7.20–7.52 would have been installed in the Miranda Technologies folder.

Installing Router Control

To install Router Control from your multiviewer's home page

1 From a workstation on the same subnet as the multiviewer, open a Web browser window and type the multiviewer's IP address in the address bar.

The multiviewer's home page appears.

2 Click the **Router Control** button.

The browser prompts you to save an executable file to your hard drive (`Kaleido__RouterControl-windows32-online.exe`[3]). This file is an online installer, which will download Router Control and other companion elements from your multiviewer, and install them. Some browsers may allow you to run the file directly. Depending on your browser's security features, warnings may appear, which you may safely dismiss.

3 Unless your browser let you run the file (and you chose to do so), navigate to the location were you saved the installer file and open it.

More security warnings or prompts may appear, which you may safely dismiss or accept.

A window appears, showing the download and installation progress.
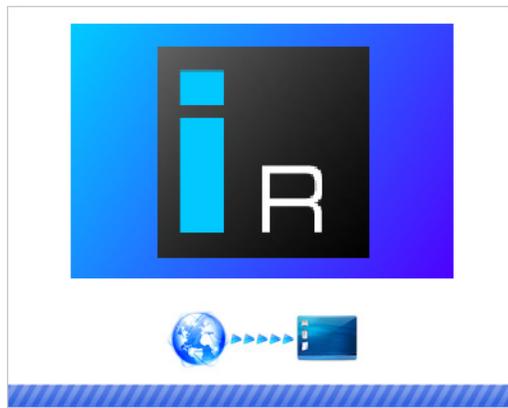
At the end of the installation process:

- If you have Windows 7, or Windows 10, shortcuts () are added to your desktop and to the Start menu (under **All Programs**).
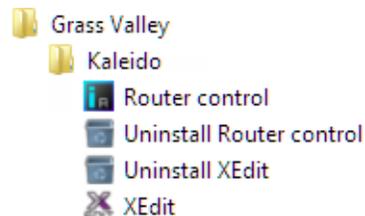
- If you have Windows 8.1, or Windows 8, Router Control will appear on your desktop, in the Apps view with all other installed applications on your PC (Windows 8.1), or in your Start screen (Windows 8).

---

3. Installers for Linux or Mac OS X are not available.

Once the installation has completed, the Router Control main application window appears. The application automatically connects to your multiviewer. The main window lists all logical routers configured within your multiviewer system, in addition to the *KX Router* logical router.
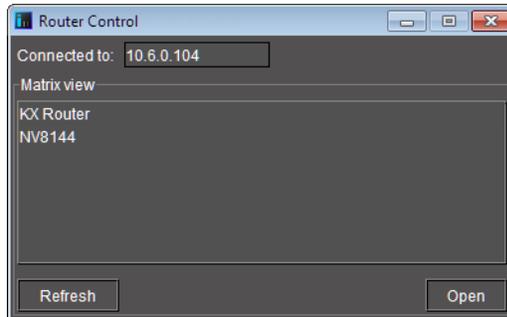
4 In **Router Control**, click the router you want to control, and then click **Open**.

Depending on your Windows Firewall settings, a security alert may appear.

- Click **Allow access** to unblock the application.

The Matrix View application window opens.
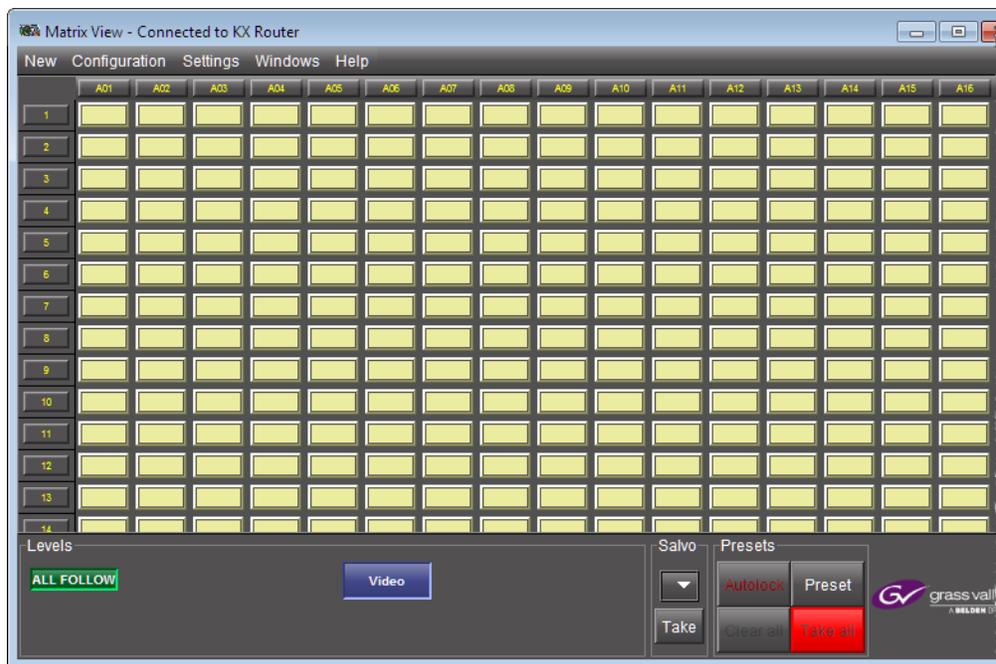
On the **Help** menu, click **Help** to access the online documentation, or refer to the *iControl Router User Guide*; see Related Documentation, on page 11.

Notes

- Once it has been installed from the multiviewer, Router Control remains on your PC or laptop, and can be launched from the ▣ shortcut that was added to your desktop, Apps view, Start screen (see), or from the Start menu. Whenever you install a new version of the Kaleido Software on the multiviewer, the next time you open Router Control, your installed copy of the application will be automatically updated from the multiviewer.

- Router Control can also connect to other Kaleido multiviewers or iControl Application Servers, and control their routers.

- Routers configured within a Kaleido multiviewer system are compatible with the Router Control modules packaged with iControl Application Servers version 6.10 and later.

- When Router Control is connected to an Application Server, a router manager configuration application is available from the main application window. When Router Control is connected to a Kaleido multiviewer, this router manager configuration application is not available (router configuration is performed with XEdit, in this case).
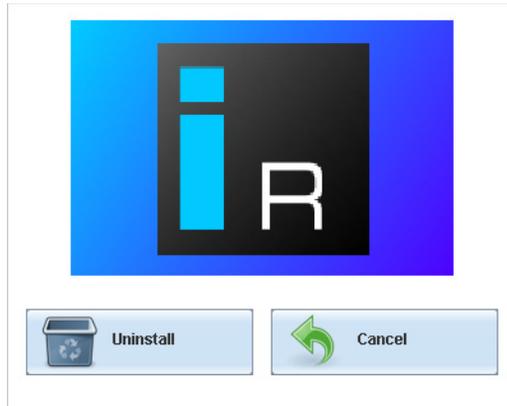
Uninstalling Router Control

To uninstall Router Control

1 Close all Router Control windows you may have open.

2 Locate the **Uninstall Router Control** shortcut.

   - If you have Windows 7, or Windows 10: Open the Start menu, click All Programs, scroll to the Grass Valley folder, and then expand the Kaleido folder.
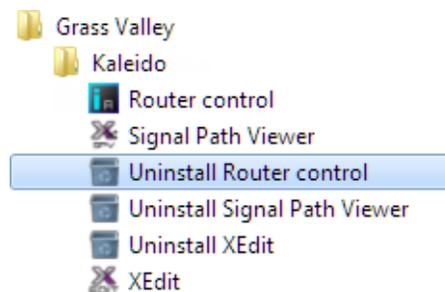
   - If you have Windows 8.1, or Windows 8: Switch to the App view or your Start screen.

3 Click **Uninstall Router Control**.

An uninstall screen appears.

4 Click **Uninstall**.

This removes Router Control, including all shortcuts, and other elements that were installed with it, from your system.

Installing Signal Path Viewer

To install Signal Path Viewer from your multiviewer's home page

1 From a workstation on the same subnet as the multiviewer, open a Web browser window and type the multiviewer's IP address in the address bar.

The multiviewer's home page appears.

2 Click **Launch the Signal Path Viewer**.

The browser prompts you to save an executable file to your hard drive (`Kaleido__SignalPathViewer-windows32-online.exe`[4]). This file is an online installer, which will download Signal Path Viewer from your multiviewer, and install it. Some browsers may allow you to run the file directly. Depending on your browser's security features, warnings may appear, which you may safely dismiss.

3 Unless your browser let you run the file (and you chose to do so), navigate to the location were you saved the installer file and open it.

More security warnings or prompts may appear, which you may safely dismiss or accept.
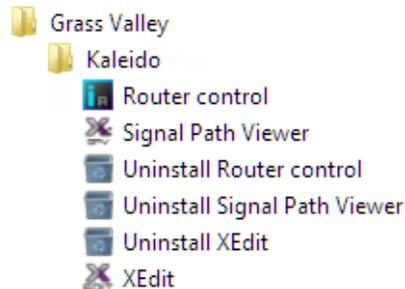
---

4. Installers for Linux or Mac OS X are not available.

A window appears, showing the download and installation progress.

At the end of the installation process:

- If you have Windows 7, or Windows 10, shortcuts ( ) are added to your desktop and to the Start menu (under **All Programs**).

- If you have Windows 8.1, or Windows 8, Signal Path Viewer will appear on your desktop, in the Apps view with all the other installed applications on your PC (Windows 8.1), or in your Start screen (Windows 8).

Once the installation has completed, the Signal Path Viewer panel appears. Depending on your Windows Firewall settings, a security alert may also appear.

- Click **Allow access** to unblock the application.

The application automatically connects to your multiviewer.

KX Input	RT Name	RT Level	RT Dest	RT Src	Tie Line Status	CP Confirmed	RT Ready	KXI Card Prese
Frame A / INPUT A / Video 01	NV8144	0	[1] MGFA01	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 02	NV8144	0	[2] MGFA02	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 03	NV8144	0	[3] MGFA03	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 04	NV8144	0	[4] MGFA04	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 05	NV8144	0	[5] MGFA05	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 06	NV8144	0	[6] MGFA06	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 07	NV8144	0	[7] MGFA07	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 08	NV8144	0	[8] MGFA08	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 09	NV8144	0	[9] MGFA09	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 10	NV8144	0	[10] MGFA10	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 11	NV8144	0	[11] MGFA11	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 12	NV8144	0	[12] MGFA12	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 13	NV8144	0	[13] MGFA13	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 14	NV8144	0	[14] MGFA14	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 15	NV8144	0	[15] MGFA15	[14] BAR525	Free	false	true	true
Frame A / INPUT A / Video 16	NV8144	0	[16] MGFA16	[14] BAR525	Free	false	true	true

System address: 10.5.5.200 | Connection status: Connected | Last update: Nov 28, 2014 4:54:53 PM

> **Notes**
>
> - Once it has been installed from the multiviewer, Signal Path Viewer remains on your PC or laptop, and can be launched from the ![shortcut icon] shortcut that was added to your desktop, Apps view, Start screen (see page 103), or from the Start menu. Whenever you install a new version of the Kaleido Software on the multiviewer, the next time you open Signal Path Viewer, your installed copy of the application will be automatically updated from the multiviewer.
>
> - Should you need Signal Path Viewer to connect to a different multiviewer, then you must install it again, from the other multiviewer's home page.

Uninstalling Signal Path Viewer

To uninstall Signal Path Viewer

1 Close all Signal Path Viewer windows you may have open.

2 Locate the **Uninstall Signal Path Viewer** shortcut.

   - If you have Windows 7, or Windows 10: Open the Start menu, click All Programs, scroll to the Grass Valley folder, and then expand the Kaleido folder.
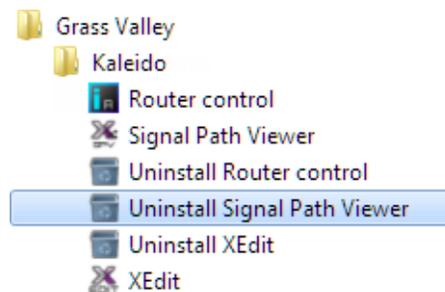
   - If you have Windows 8.1, or Windows 8: Switch to the App view or your Start screen.

3 Click **Uninstall Signal Path Viewer**.

   An uninstall screen appears.

4 Click **Uninstall**.

This removes Signal Path Viewer, including all shortcuts, and other elements that were installed with it, from your system.

Opening XAdmin

Connecting to a Multiviewer with a Different XEdit Version from your PC's Version

When connecting to a multiviewer with your PC and your PC already has XEdit installed, the XEdit version installed on your PC and the Kaleido Software version on the multiviewer must be same as explained below.

The composition of a Kaleido Software / XEdit version numbering is explained in the following table.

Kaleido Software / XEdit Version Reference	Description
Version *M.mp*	**M** is the major revision number **m** is the minor revision number **p** is the patch revision number

When you connect to a multiviewer, the multiviewer's Kaleido Software major and minor version must match the XEdit major and minor version installed on your PC. When there is a version number mismatch between the multiviewer's Kaleido Software version and your PC's XEdit version, you will receive the following error when you try to connect to the multiviewer with your PC.
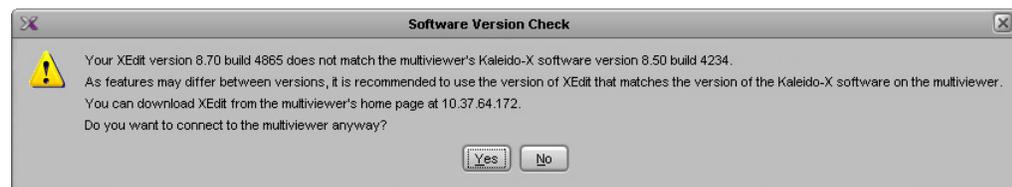
Under this circumstance, proceed as follows.

- There is no compatibility problem if only the patch revision number is different between the Kaleido Software version on the multiviewer and the XEdit version on your PC. Click **Yes** to the Software Version Check screen.
- There is a compatibility problem if the major version, minor version, or both are different between the Kaleido Software version on the multiviewer and the XEdit version on your PC. The solution is to downgrade / upgrade the XEdit version used on your PC to the Kaleido Software version used by the multiviewer. Proceed as follows:
    - Click **No** to the Software Version Check screen.
    - Uninstall XEdit from your PC (see Uninstalling XEdit, on page 97).
    - Install XEdit from the multiviewer (see Installing XEdit from your Multiviewer's Home Page, on page 94).

If you regularly connect to different multiviewer systems that use different Kaleido Software versions, and as a result you receive the Software Version Check error message,

the best solution to avoid this is to upgrade all of your multiviewer systems to the same Kaleido Software version.

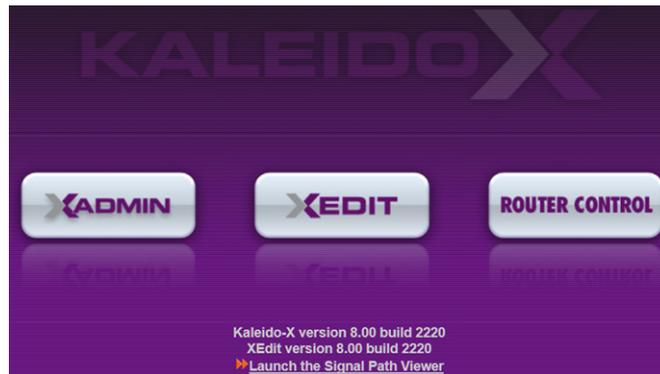## Ways to Access XAdmin

Access the XAdmin Web client as follows:

- from a **Web browser** (see Opening XAdmin from a Browser on page 106),
- from **XEdit** (see Opening XAdmin from XEdit on page 107),

The first time you access XAdmin for a multiviewer (and every time the multiviewer's IP address has changed), you may see a security warning or a certificate error message. The procedures below include instructions on how to address these messages (see Registering your Multiviewer's Security Credentials with your Browser on page 107). Internet Explorer users may also need to enable compatibility view (see Enabling the Compatibility View in Internet Explorer on page 117).

Opening XAdmin from a Browser

To open XAdmin from a browser

1 Open a Web browser window and enter the multiviewer's IP address in the address bar.

   The Kaleido Multiviewer's home page appears.

2 Click the XAdmin button.

3 If you see a security warning, or a certificate error message, then see Registering your Multiviewer's Security Credentials with your Browser, on page 107.

4 If the "Log in to XAdmin" page appears, type the password, and then click **Log in**.

5 **Internet Explorer users:** If a blank page appears, then see Enabling the Compatibility View in Internet Explorer, on page 117.

   The XAdmin Status and Options page appears. You can access all XAdmin features, by clicking the links, in the navigation area on the left of the page.

Opening XAdmin from XEdit

To open XAdmin from XEdit

1 On the **Configure** menu, click **Use XAdmin**.

   XEdit prompts you for the IP address of the multiviewer you want to access.

2 Type the IP address, and then click **OK**.

   Your default Web browser opens.

3 If you see a security warning, or a certificate error message, then see Registering your Multiviewer's Security Credentials with your Browser, on page 107.

4 If the "Log in to XAdmin" page appears, type the password, and then click **Log in**.

5 **Internet Explorer users:** If a blank page appears, then see Enabling the Compatibility View in Internet Explorer, on page 117.

   The XAdmin Status and Options page appears. You can access all XAdmin features, by clicking the links, in the navigation area on the left side of the page.

Registering your Multiviewer's Security Credentials with your Browser

When you open your multiviewer's home page, or try to access XAdmin, your browser may report a certificate error (Internet Explorer), warn you about the site's security certificate (Chrome), or report an untrusted connection (Firefox). Follow the appropriate procedure below to register your multiviewer's security credentials with your browser:

- Suppressing untrusted connection warning in Firefox, on page 108
- Suppressing certificate error in Internet Explorer or Chrome, on page 110

You will be then able to access your multiviewer's client applications without seeing the error message again, as long as the multiviewer's IP address does not change.

Suppressing untrusted connection warning in Firefox

The first time you try to access XAdmin in Firefox, the browser may display the following page instead, prompting you to confirm the multiviewer's security credentials.
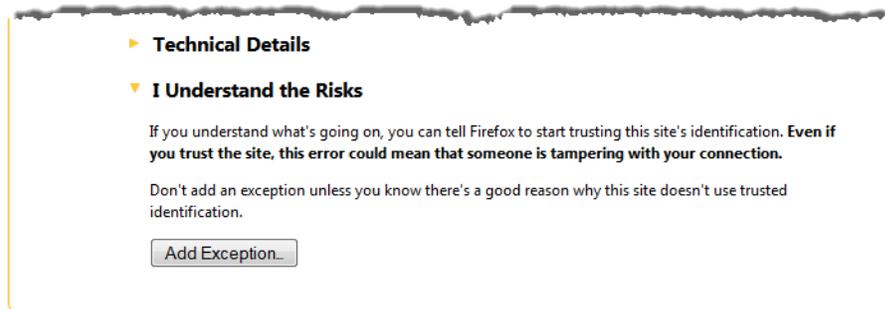

To register your multiviewer's security credentials with Firefox

1 Click **I understand the Risks**, at the bottom of the page.

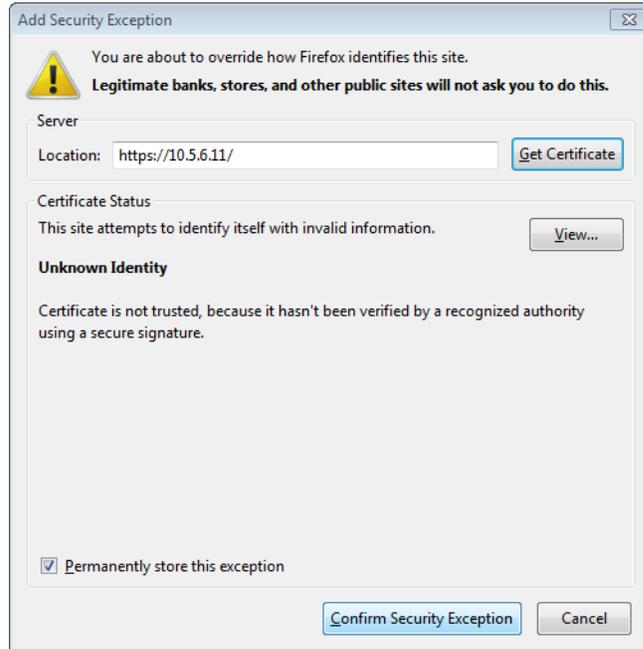   The message expands.


2 Click **Add Exception**.

3 In **Add Security Exception**, click **Confirm Security Exception**.

Your multiviewer's home page appears. You will now be able to access your multiviewer's client applications without seeing the warning. This will remain effective until the multiviewer's IP address is changed, in which case you will need follow the procedure again.

Suppressing certificate error in Internet Explorer or Chrome

The first time you try to access XAdmin in Internet Explorer or Chrome, the browser may prompt you to confirm the multiviewer's security credentials.
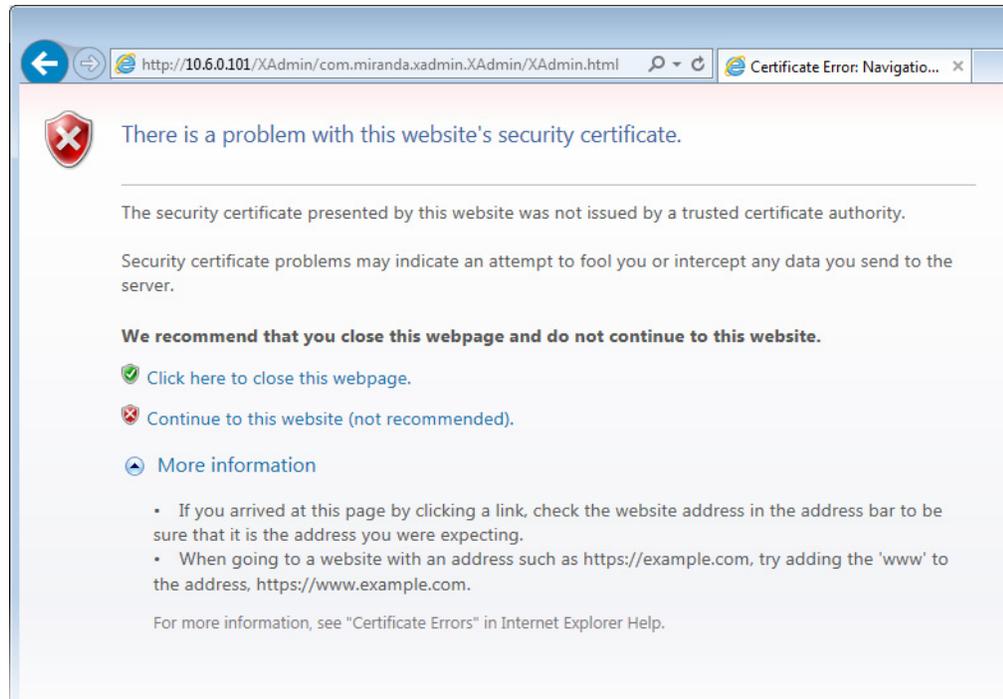
Internet Explorer's security warning
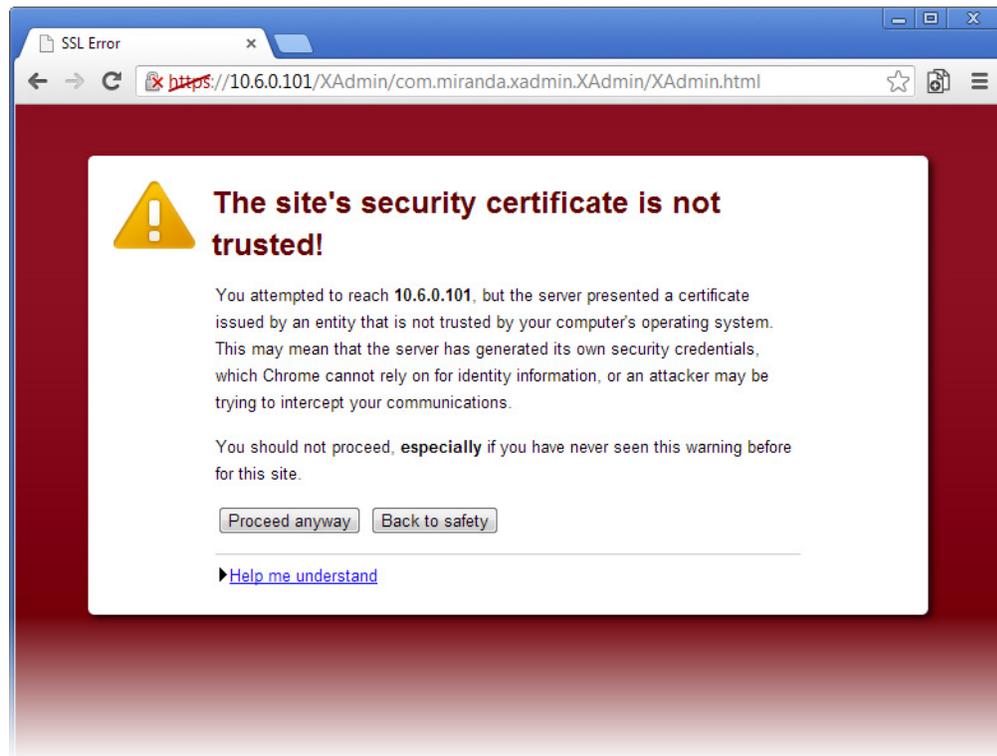
Chrome's security warning

Clicking **Continue to this website (not recommended)** (Internet Explorer), or **Proceed anyway** (Chrome) will let you access XAdmin but the browser's address bar will keep indicating that the multiviewer's identity is not verified. To suppress this warning, you need to perform the following, in Internet Explorer, *even if your preferred browser is Chrome*.

To register your multiviewer's security credentials with Internet Explorer

1 Click **Continue to this website (not recommended)**.

The address bar now indicates the certificate error.

Special notes for Internet Explorer users

• If you see a blank page instead of XAdmin's Status and Options page, then see Enabling the Compatibility View in Internet Explorer, on page 117.
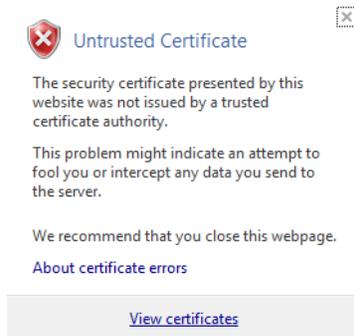
Special notes for Internet Explorer users *(continued)*

• You must have administrator status to accept the certificate error. If your user account does not have administrator status, then close your browser and, before you open it again, right-click the Internet Explorer icon, and then click **Run as administrator**:
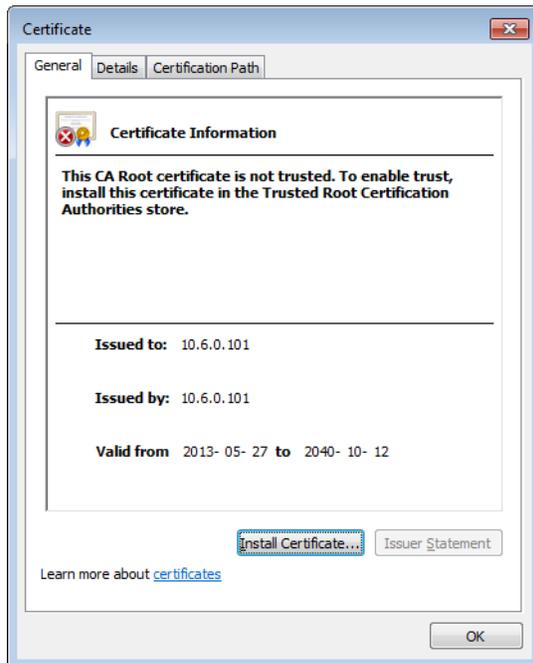
	Open
🛡	Run as administrator
	Pin to Taskbar
	Pin to Start Menu
	Remove from this list
	Properties
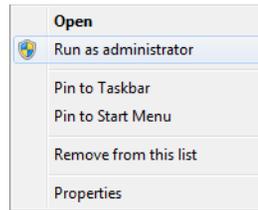
2 Click **Certificate error**.

3 In **Untrusted Certificate**, click **View certificates**.

Untrusted Certificate

The security certificate presented by this website was not issued by a trusted certificate authority.

This problem might indicate an attempt to fool you or intercept any data you send to the server.

We recommend that you close this webpage.

About certificate errors

View certificates

4 In **Certificate**, click **Install Certificate**.

Certificate

General | Details | Certification Path

Certificate Information

This CA Root certificate is not trusted. To enable trust, install this certificate in the Trusted Root Certification Authorities store.

Issued to: 10.6.0.101

Issued by: 10.6.0.101

Valid from 2013- 05- 27 to 2040- 10- 12

Install Certificate...   Issuer Statement

Learn more about certificates

OK

5 In **Certificate Import Wizard**, click **Next**.

6 In **Certificate Import Wizard**, click **Place all certificates in the following store**, and then click **Browse**.
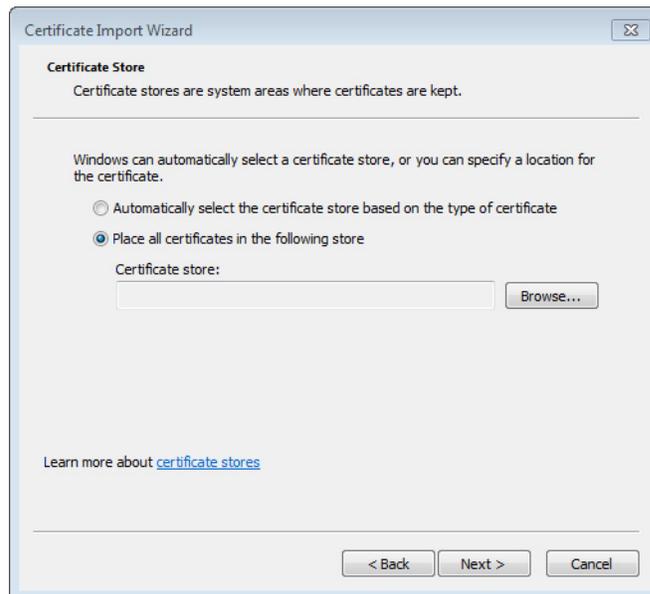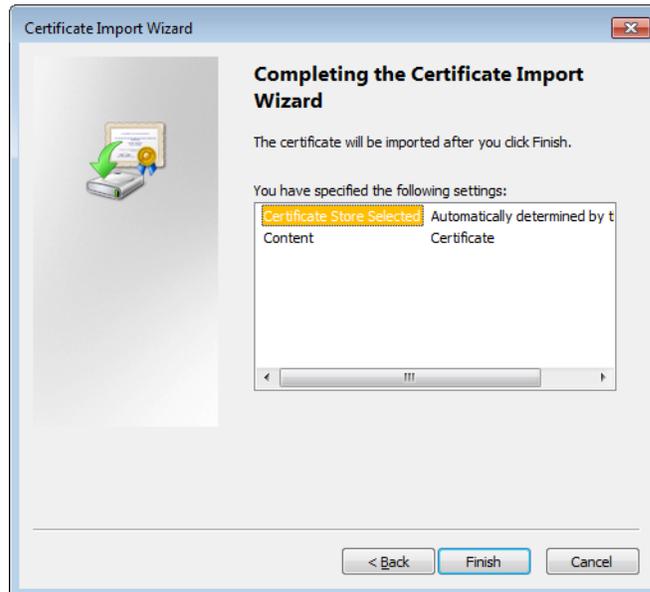
7 In **Select Certificate Store**, select **Trusted Root Certification Authorities**, and then click **OK**.
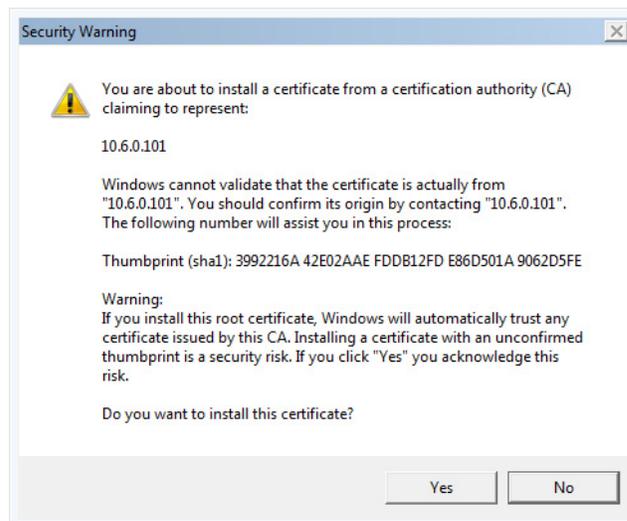

8 Back in **Certificate Import Wizard**, click **Next**.
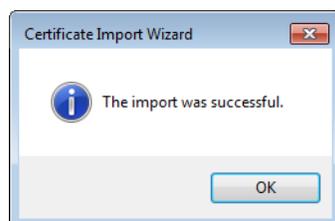
9 Click **Finish**.

A security warning appears.

10 Click **Yes**.

11 **Certificate Import Wizard** reports that the import was successful.


12 Click **OK** to continue, and then click **OK** to close the **Certificate** window.

13 Close all Internet Explorer (and Chrome, if any) windows, and then open your browser again.

You should now be able to access XAdmin, from your multiviewer home page without ever seeing the security warning again, unless the multiviewer's IP address is changed, in which case you will want to repeat this procedure.

Special note for Chrome users

This multiviewer currently uses an older version of Java to generate their certificate. For this reason, *every time you open Chrome and try to access XAdmin,* you may see a warning about the site's security certificate. Click **Proceed anyway.**
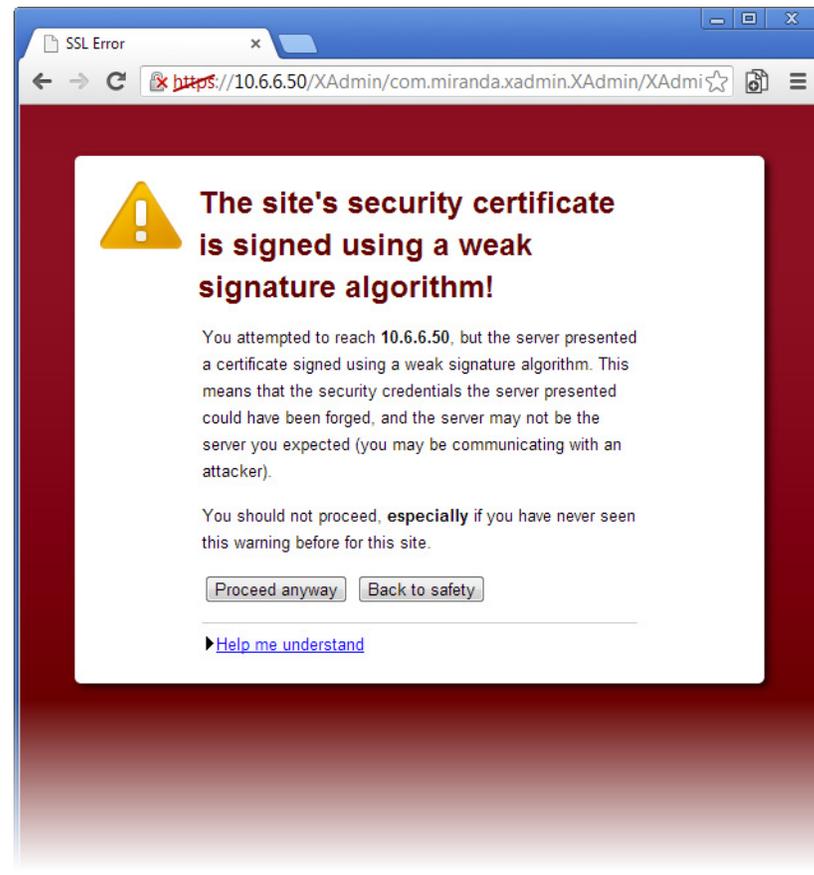
## Enabling the Compatibility View in Internet Explorer

When you try to access XAdmin, from your multiviewer's home page, *in Internet Explorer 8, 9, or 10,* you may see a blank page instead of XAdmin's Status and Options page.[5]

To enable the compatibility view for your multiviewer's XAdmin Web client

• Click the Compatibility View ⬚ button at the end of your browser's address bar.
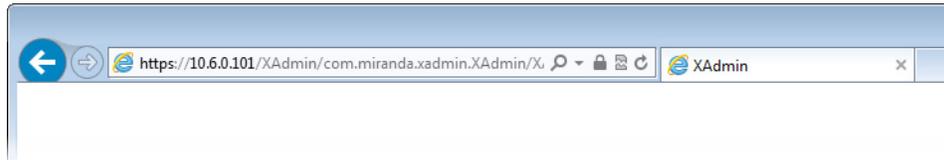
XAdmin's Status and Options page appears
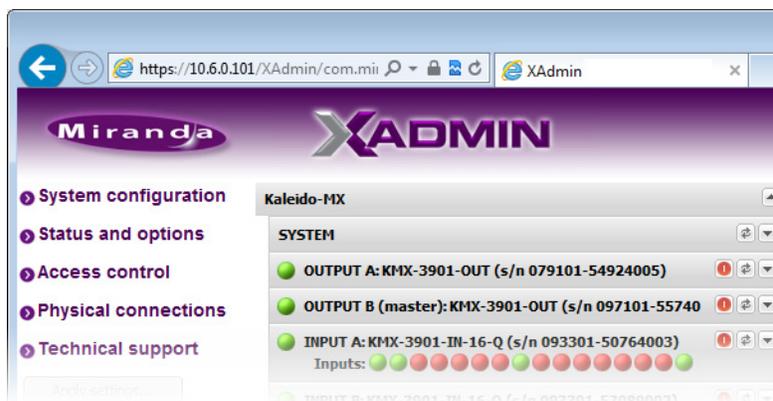
The Compatibility View mode will remain enabled for this multiviewer as long as its IP address does not change.

XAdmin Access Control

XAdmin supports a simple authentication mechanism to prevent unauthorized users from modifying a multiviewer's system configuration.

Enabling XAdmin Access Control

To enable access control in XAdmin

1 Open XAdmin. See Opening XAdmin on page 105.
2 Click **Access control**, in the navigation area on the left side of the page.

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5. Should this happen with Internet Explorer 11, refer to *Fix site display problems with Compatibility View,* at
http://windows.microsoft.com/en-us/internet-explorer/use-compatibility-view#ie=ie-11

The Access Control page appears.

3 Type the password you want to enforce in both the **New password** and the **Confirm** boxes.

The password must contain between 6 and 20 alphanumeric characters or symbols.

4 Click **Save**.

A confirmation message appears.
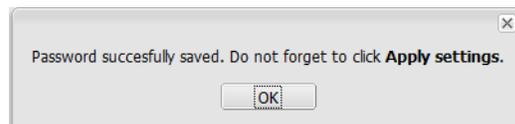
5 Click **OK** to close the message window.

The **Apply settings** button becomes available.

6 Click **Apply settings**.

XAdmin must upload the password to the multiviewer, for password enforcement to take effect. A progress indicator appears momentarily, followed by a confirmation message.
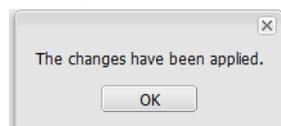
7 Click **OK**.

The Log in to XAdmin page appears. Other XAdmin sessions open against the same multiviewer are also redirected to the login page.

8 Type the password, and then click **Log in**.

The XAdmin Status and Options page appears.

9 Click **Log out**, when you are ready to close you session.

A confirmation message appears.

10 Click **OK**.

The login page appears. Only authorized users have access to XAdmin.

Changing the XAdmin Password

To change the password used to prevent access to your multiviewer from XAdmin

1 Open XAdmin. See

2 Click **Access control**, in the navigation area on the left side of the page.

The Access Control page appears.

3 Type the new password you want to enforce in both the **New password** and the **Confirm** boxes.

The password must contain between 6 and 20 alphanumeric characters or symbols.

4 Click **Save**.

A confirmation message appears.

5 Click **OK** to close the message window.

The **Apply settings** button becomes available.

6 Click **Apply settings**.

XAdmin must upload the password to the multiviewer, for the password change to take effect. A progress indicator appears momentarily, followed by a confirmation message.
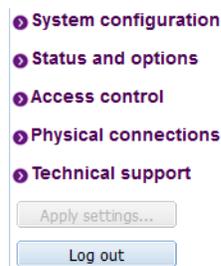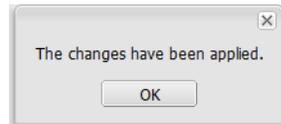

7 Click **OK**.

The Log in to XAdmin page appears. Other XAdmin sessions open against the same multiviewer are also redirected to the login page.
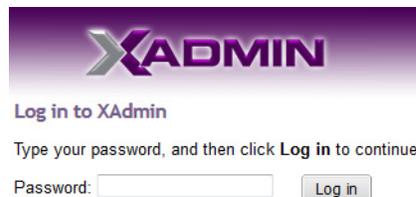
Disabling XAdmin Access Control

To disable access control in XAdmin

1 Open XAdmin. See

2 Click **Access control**, in the navigation area on the left side of the page.

The Access Control page appears.

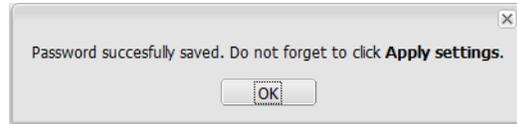3 Click **Disable access control**.

A confirmation message appears.
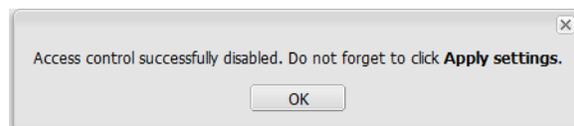
4 Click **OK** to close the message window, and then click **Apply settings**.

A progress indicator appears momentarily, followed by a confirmation message.
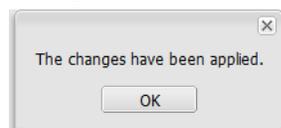
5 Click **OK**.

Unrestricted access to XAdmin is restored, for this multiviewer.

Closing a Password-Protected XAdmin Session

To close your XAdmin session

1 Click **Log out**, in the navigation area on the left side of the current page, when you are ready to close you session.
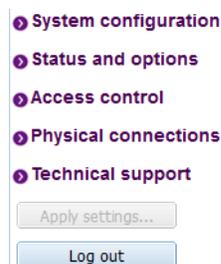
A confirmation message appears.

2 Click **OK**.

The login page appears. Only authorized users have access to XAdmin for this multiviewer.

Opening Signal Path Viewer

To open Signal Path Viewer

- Double-click the Signal Path Viewer shortcut 🔧 on your desktop.

    The application automatically connects to your multiviewer, and the Signal Path Viewer panel appears.

    > Note: Should you need Signal Path Viewer to connect to a different multiviewer, then you must install it again, from the other multiviewer's home page. See Installing Signal Path Viewer on page 102.

Viewing a Multiviewer's Status Information

To view the status information for a multiviewer

1. Open XAdmin. See Opening XAdmin on page 105.

    XAdmin's Status and Options page appears, showing the multiviewer model, and a list of all modules and their statuses.
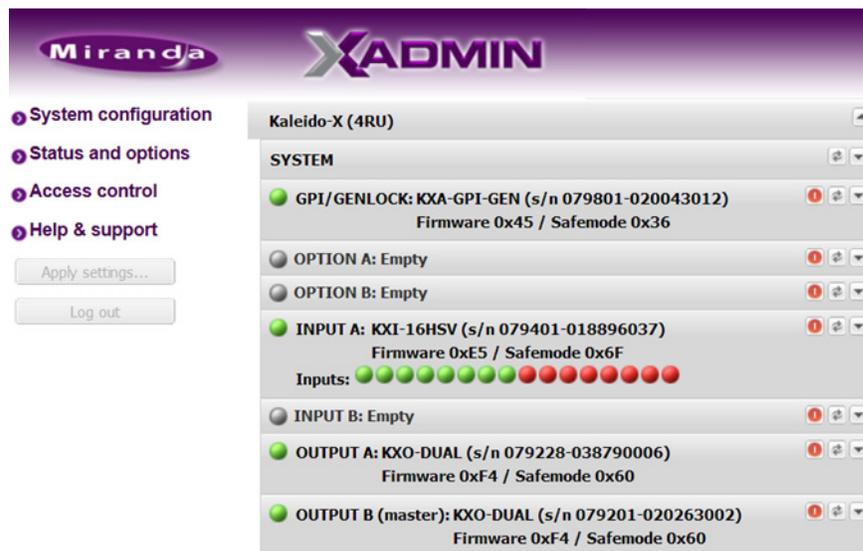
Status and Options page for a Kaleido-X (4RU)

- Some heading rows may show a card type, serial number, firmware and safe mode versions, a module status indicator, and input signal status indicators.

- You can identify which output card currently assumes the *software master* role (and is thus assigned the multiviewer's IP address) by looking for the word "master" next to the card's identifier, for example: "OUTPUT A (master)".

- The module status indicator shows whether the card (or module) is running normally (green) or in safe mode (red).

- The signal status indicators reveals the presence of a valid input signal at the corresponding connector.

2 Move the pointer to an input signal status indicator to view the associated signal format.

Status indicator   Card type   Serial number
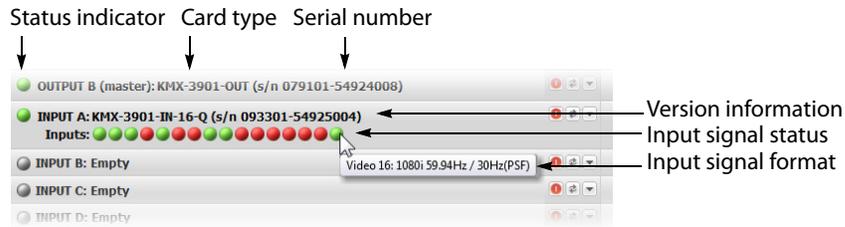
Note: The Kaleido Software does not distinguish neither between 1080PsF25 and 1080i50, nor between 1080PsF29.97 and 1080i59.94. Both 1080PsF25 and 1080i50 are reported as 1080i50, and both 1080PsF29.97 and 1080i59.94 are reported as 1080i59.94, on the monitor wall and in XAdmin's Status and Options page.

3 Click the arrow button ▼ at the end of a module's heading row to view more detailed information about this card or multiviewer.

- At any time you can click the Refresh button 🔄 to make sure the data displayed for the selected module is up to date.

- Click the "Reset card" button 🔴 to reset the card or reset the multiviewer remotely from your Web browser.

4 Review the enabled options for each module, and make sure that no error is reported.
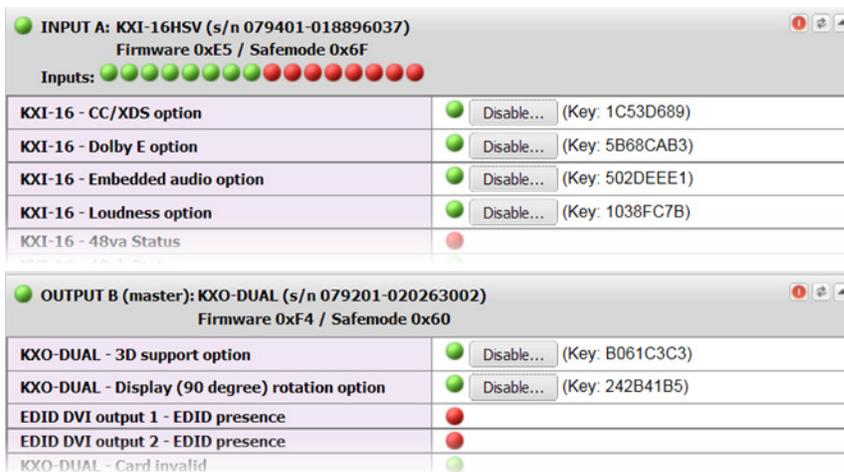
Status and option information for a Kaleido Multiviewer's input and output cards (partial view)

For more information about Kaleido Software options, see Available Hardware and Software Options, on page 154.

5 If your system supports a GPI interface, check the main system statuses of the multiviewer, to make sure that there are no errors or alerts related to system temperature, power supply status, fan operation, or other card fault conditions.

Kaleido-X (7RU)	
GPI/GENLOCK: KXA-GPI-GEN (s/n 079801-019532024) Firmware 0x45 / Safemode 0x36	
KXA-GPI-GEN - 1.2V status	🟢
KXA-GPI-GEN - 1.8V status	🟢
KXA-GPI-GEN - 2.5V status	🟢
KXA-GPI-GEN - 3.3V status	🟢
KXA-GPI-GEN - 48V power supply A fuse status	🔴
KXA-GPI-GEN - 48V power supply B fuse status	🟢
KXA-GPI-GEN - Board high temperature	🟢 ← Temperature
KXA-GPI-GEN - Card invalid	🟢
KXA-GPI-GEN - Card model	48.0
KXA-GPI-GEN - Card patch number	0x0
KXA-GPI-GEN - Card revision	0x4
KXA-GPI-GEN - Card type	0x30
KXA-GPI-GEN - Chassis door open status	🟢
KXA-GPI-GEN - Chassis identifier	32.0
KXA-GPI-GEN - CPLD version	0x2
KXA-GPI-GEN - Firmware package number	0x45
KXA-GPI-GEN - Firmware type	0x2
KXA-GPI-GEN - Firmware version	0x23
KXA-GPI-GEN - FPGA version	0x23
KXA-GPI-GEN - Frame fan 1 status	🟢
KXA-GPI-GEN - Frame fan 2 status	🟢
KXA-GPI-GEN - Frame fan 3 status	🟢 Fan statuses
KXA-GPI-GEN - Frame fan 4 status	🟢
KXA-GPI-GEN - Frame fan 5 status	🟢
KXA-GPI-GEN - Frame fan 6 status	🟢
KXA-GPI-GEN - Frame rate	60Hz
KXA-GPI-GEN - Normal mode	🟢
KXA-GPI-GEN - Power supply A status	🔴 PSU statuses
KXA-GPI-GEN - Power supply B status	🟢
KXA-GPI-GEN - Rear present	🟢
KXA-GPI-GEN - Reference format	No video format
KXA-GPI-GEN - Reference format error	🟢
KXA-GPI-GEN - Reference present	🔴
KXA-GPI-GEN - Safe mode package number	0x36

System status and option information

Configuring a Multiviewer's IP Settings with XAdmin

To change your system's IP address and other parameters

1 Open XAdmin. See Opening XAdmin on page 105.

2 Click **System configuration**, in the navigation area on the left side of the page.

The System Configuration page appears, showing the current system name, IP settings, as well as the date and time settings.

3 Optionally, type a descriptive name for your system to make it readily identifiable.

If there are more than one multiviewer in the same network environment, it is important to assign each a unique system name, so that you can tell them apart (for example, when using a remote control panel such as the Kaleido-RCP2 or RCP-200).

Notes

Only lower-ASCII characters are allowed in the system name. Braces and tilde are not allowed.

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4 Adjust the date and time settings, as required.

Clocks in your layouts will then display date and time in the applicable format.

5 Enter the appropriate IP information: frame or card IP addresses, network mask, and default gateway.

By default, all network adapters are set to auto-negotiate. The connection speed and duplex mode will be set automatically based on the corresponding port settings on the associated switch. The current speed and link mode are displayed next to **Detected link mode**, for every network adapter.

6 Should your network configuration require specific speed and duplex mode settings, select the appropriate value from the **Configured link mode** list.

Ethernet

Frame IP address:	10	.0	.3	.70
Network mask:	255	.255	.0	.0
Default gateway:	10	.0	.0	.1

Detected link mode: 100Mbps full-duplex
Configured link mode: Auto-negotiate

100Mbps half-duplex
100Mbps full-duplex
Auto-negotiate

Note: As required by the IEEE-802.3 standard, section 28D.5, 1000 Mbps full-duplex communication is only supported via auto-negotiation.

7 Click **Save**.

The new settings are saved locally.

The configuration has been saved. Do not forget to click **Apply settings** at the end of the session.

OK

8 Click **OK**.

The **Apply settings** button becomes available.

- System configuration
- Status and options
- Access control
- Upgrade
- Restart / Shut down
- Head streaming
- Technical support

Apply settings...

Log out
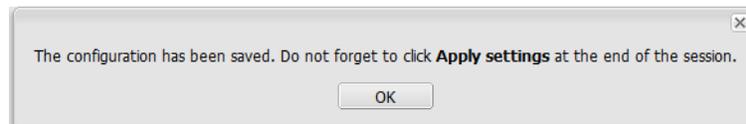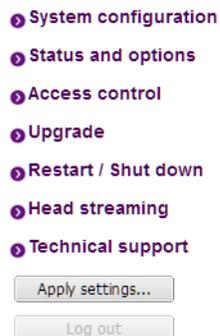
9 Click **Apply settings**.

The Kaleido Multiviewer must be restarted for changes to the network configuration to take effect. A message appears prompting you to reboot the system immediately.

10 Click **OK**.

Note: Settings cannot be applied to a multiviewer system while an upgrade is in progress. If the multiviewer does not reboot after 10 seconds or so, try clicking **Apply settings** again after a minute or two, until the multiviewer reboots.

You will need to edit the XAdmin URL in your Web browser's address bar, in order to log on to the multiviewer again.

Remote Control Using iControl

The KMX-3901-IN input cards and KMX-3901-OUT output cards may be controlled by using Grass Valley's iControl version 4.43 or later. The KMX-3901-IN-IP input/output cards require iControl version 7.10 or later. This section describes the three control panels associated with the Kaleido-Modular-X's input and output cards and their use. Refer to the iControl User's Guide for information about setting up and operating iControl. See Related Documentation, on page 11.

In iControl Navigator, iControl Web, or iControl Solo, double-click the icon for a Kaleido-Modular-X input or output card (KMX-3901-OUT, KMX-3901-IN-8-D, KMX-3901-IN-16-D, or KMX-3901-IN-16-Q) to open the associated control panel.

Kaleido-Modular-X Service Control Panels in iControl

The card label (*KMX-IN-16-D,* and *KMX-OUT* in the examples below) and the slot number where the card is installed in the Densité frame are indicated in the window's title bar.

The service control panel for **KMX-3901-IN input cards** only offers information.
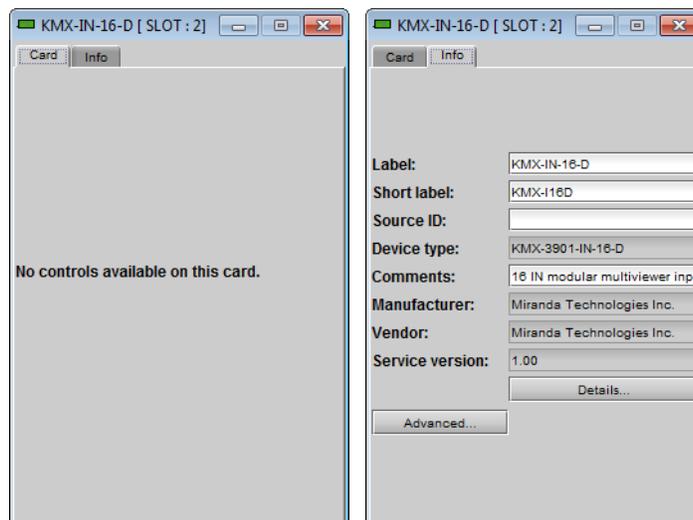
Service control panel for a KMX-3901-IN input card

See Info Panel on page 135 for more information.

In the control panel window for a KMX-3901-OUT output card, or for an IPG-3901 gateway card (part of the KMX-3901-IN-IP input/output modules), there are three main areas: the status icon area, the navigation area, and the operating control area.
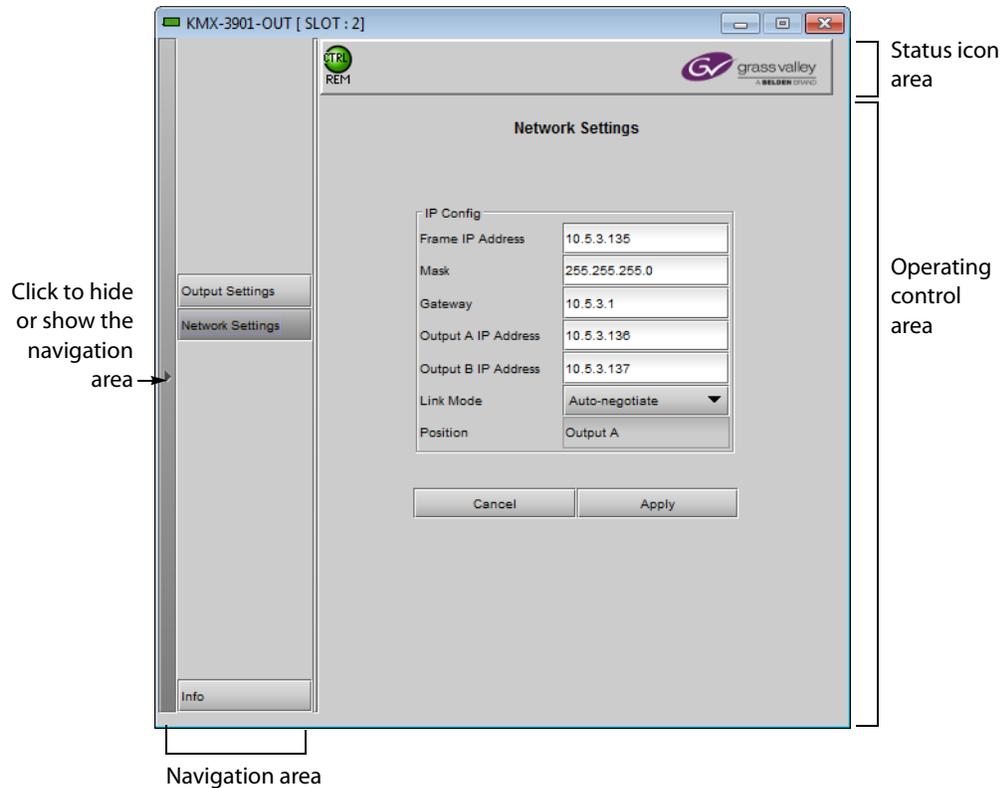
Service control panel for a KMX-3901-OUT output card

The KMX-3901-OUT panel's status icon area contains only one icon: the control status icon.

- A green control status icon 🟢 indicates that the card is available for remote control from the service control panel in iControl.
- A yellow icon 🟡 indicates that someone is controlling the card from the control panel on the housing frame (see Using the Densité Frame Control Panel, on page 71).

The status icon area of the IPG-3901 panel contains several icons, in addition to the control status icon described above. Refer to the IPG-3901 Guide to Installation and Operation, for more information on the other status icons. See Related Documentation, on page 11

Service control panel for an IPG-3901 gateway card—partial view showing status icon area

The navigation area contains buttons that control the contents of the main area.

- Click a button to access the associated features.
- Click the left side border (identified by a small arrow icon) to hide or reveal this area.

The operating control area contains the main operating controls for managing the Kaleido-Modular-X multiviewer's feature set. The contents change depending on the button you clicked in the navigation area. The relevant panels are described individually in the following sections:

- KMX-3901-OUT Output Settings Panel, on page 129
- KMX-3901-OUT Network Settings Panel, on page 131
- IPG-3901 Network Config Panel, on page 132
- IPG-3901 Gateway Config Panel, on page 133
- Info Panel, on page 135

KMX-3901-OUT Output Settings Panel

Set the resolution of the multiviewer output heads to an appropriate value based on the displays in use. If a display uses EDID (Extended Display Identification Data) to communicate its characteristics to the Kaleido-Modular-X multiviewer via the HDMI connector, the matching can be done automatically, in which case the detected resolution appears in the **Detected resolution** box. Select the check box to use the detected resolution. If the detected resolution is not used (either because the check box is not selected or because the display does not make the information available) the value selected in the **Output resolution** list will be used.
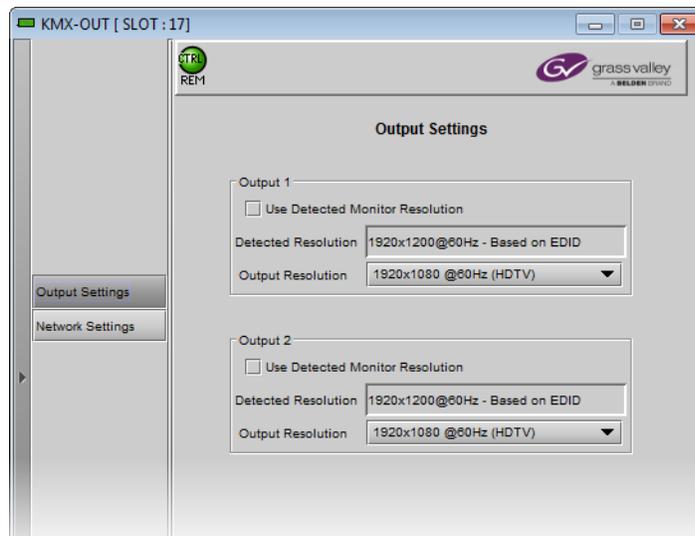
The following table lists some (but not all) output formats supported at the HDMI connections. You can customize your own timing rates for resolutions ranging from 1024 × 768 pixels up to 1920 × 1200 pixels (all progressive scan), by using XEdit.

KMX-3901-OUT HDMI output resolutions

Resolution	Format name	Refresh rates (Hz)
1024 × 768	XGA	50.00, 59.94
1280 × 720	Margay	50.00, 59.94
1280 × 768	WXGA	50.00, 59.94
1280 × 1024	SXGA	50.00, 59.94
1280 × 1024	BARCO	59.94
1360 × 768	NEC	50.00, 59.94
1480 × 1200	Christie	50.00, 59.94
1600 × 1200	UXGA	50.00, 59.94
1920 × 1080	Baycat	50.00, 59.94
1920 × 1200	WUXGA	50.00, 59.94

Note: All KMX-3901-OUT output cards within a housing frame must have their output heads configured with the same refresh rate. If your frame is referenced, then the heads' refresh rate must also match the reference signal's refresh rate.

KMX-3901-OUT Network Settings Panel

KMX-3901-OUT output cards are shipped with default network settings, which you must replace with values suitable for your network environment. You may need to consult your network administrator to get the correct values. Enter the appropriate IP address, mask and gateway information to configure a KMX-3901-OUT output card within your Ethernet network.
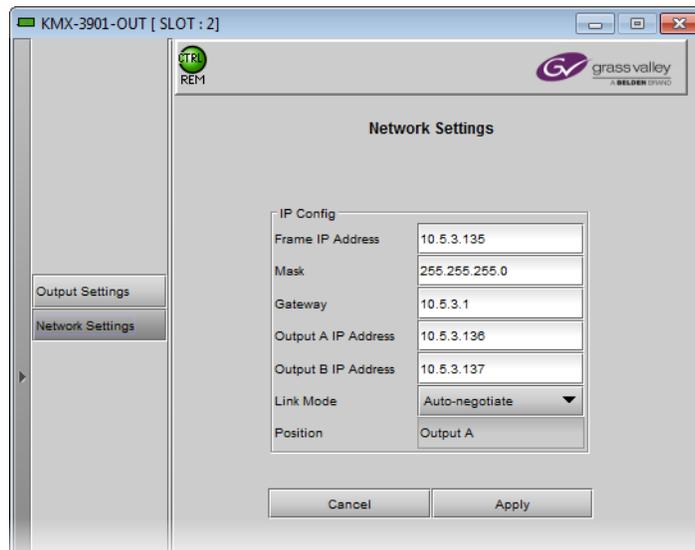
Click **Apply** to set these values into the card, or **Cancel** to leave the original values unchanged.

Notes

- These settings apply to the rear-panel Ethernet port of the KMX-3901-OUT output cards; *not* to the Ethernet ports at the back of the Densité controller card.

- On all Grass Valley multiviewers, the network adapters are set to auto-negotiate. By default, the connection speed and duplex mode will be set automatically based on the corresponding port settings on the switch.

- The position of the output card is not configurable; the information is presented here for information only.

- Quad-head Kaleido-Modular-X systems, which include two output cards, require three IP addresses: one for each output card, and a virtual IP address for the system. A dual- or single-head system requires only one IP address (the output card's IP address automatically doubles as the system IP address). See Setting the Multiviewer's IP addresses, on page 81.

IPG-3901 Network Config Panel

In the context of a Kaleido-Modular-X system with KMX-3901-IN-IP input/output cards, if you want to stream the system's mosaic output to your TCP/IP network, then you must configure network settings for the IPG-3901 module. These settings are available on the IPG-3901 module's **Network Config** panel, under the **Settings** tab. You may need to consult your network administrator to get the correct values.

Type the appropriate IP address, mask and gateway information to configure the IPG-3901 module within your Ethernet network. Click **Apply** to set these values into the card, or **Cancel** to leave the original values unchanged.

> Note: These settings apply to the rear-panel Ethernet port of the KMX-3901-IN-IP input/output cards; *not* to the Ethernet ports at the back of the CPU-ETH3 frame controller card.

IPG-3901 Gateway Config Panel

In the context of a Kaleido-Modular-X system with KMX-3901-IN-IP input/output cards, you must configure a stream addresses, and select a signal format for each input or output gateway you choose to enable on the IPG-3901 modules. These settings are available on the IPG-3901 module's **Gateway Config** panel, under the **Gateways** tab. You may need to consult your network administrator.

Determine how many input and output gateways you need, and then clear the check box, in the **En.** column, for every gateway you do *not* want to use. For example, if you do not want to stream the mosaic output at all, clear the check boxes for both MV OUT 1 and MV OUT 2, or, if two input gateways can handle the number of streams you want to monitor, then clear the check boxes for the remaining input gateways.

> Note: The current version of the KMX-3901-IN-IP card supports a maximum of 6 HD input streams.

Select an enabled MV IN or MV OUT gateway, by clicking anywhere in the corresponding row. In the editing area at the bottom of the panel, enter the appropriate stream address and port number, and select the appropriate signal format. Click **Apply** to set these values

into the card, or **Cancel** to leave the original values unchanged. Proceed in the same fashion for all enabled gateways.

IPG-3901 Reference Panel

In the context of a Kaleido-Modular-X system with KMX-3901-IN-IP input/output cards, the IPG-3901 module must be bounded to the frame controller's URS signal. Make sure the selected scan rate is appropriate for your facilities, that URS is enabled (**On**), and that the module is configured to automatically lock to the available reference source (**Auto**).
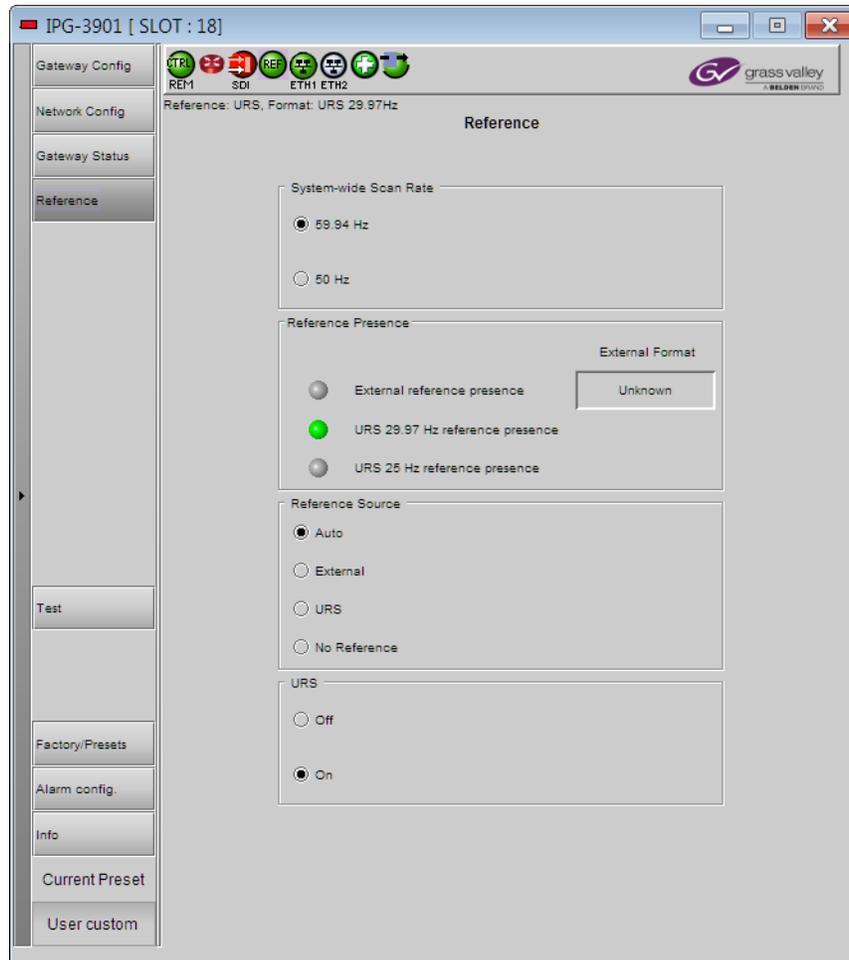
Info Panel

When a Kaleido-Modular-X input or output card is included in an iControl environment, certain information about the card may be made available to the iControl system. In the

boxes with a white background, you can type labels and comments that will make this card easier to identify in a complex setup.

Label   Type a label to identify this Kaleido-Modular-X card when it appears in
             iControl applications. This label appears in the service panel's title bar, in
             iControl Solo, and in the iControl Navigator views

Short label Type the shorter label that iControl uses in some cases (8 characters).

Source ID   Type a descriptive name for this Kaleido-Modular-X card.

Comments   Type any desired text.

The remaining boxes show manufacturing information about this card, including the card
type (for example, KMX-3901-OUT, KMX-3901-IN-16-D), and, in the case of the IPG-3901
(part of a KMX-3901-IN-IP input/output card), the rear type (KMX-3901-IN-IP-D-3+TRP).

> Note: The services currently available with iControl do not yet recognize the
> 4K UHD prescaler mode. When the input card control panel reports a KMX-
> 3901-IN-16-Q card type, there are no indications as to whether the prescaler
> mode is enabled or not.

Three buttons give access to additional information and controls:

Details   Reports the firmware version, service version, and panel version for this card.
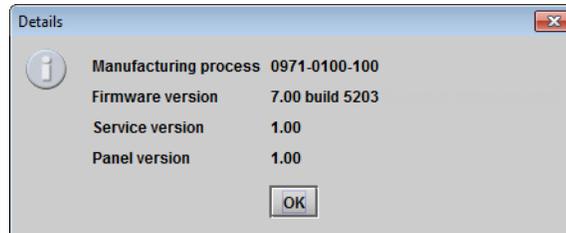
Output card Details window

Advanced   Shows the Long ID for this Kaleido-Modular-X card. The Long ID is the address of this card in the iControl network.
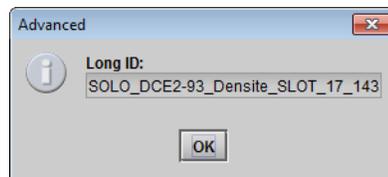
Remote system administration Opens the **Joining Locators** window, which lists remote lookup services to which this Kaleido-Modular-X card is registered.
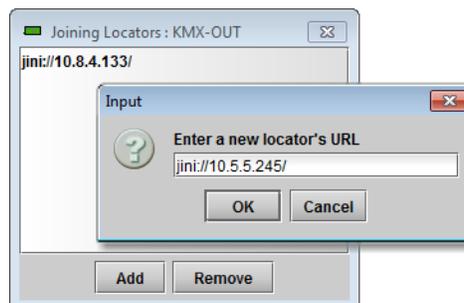
- Click **Add** to force the iControl service for this Kaleido-Modular-X card to register itself on a lookup service, by using the following syntax in the **Input** window:

  jini://<ip_address>

  where <ip_address> is the IP address of the server running the lookup service.
- Select one of the services listed in the window by clicking on it, and then click **Remove** to remove it from the list.

Configuring a KMX-3901-IN IP Input/Output Module

Configuring a KMX-3901-IN IP input/output module involves the following:

- the KMX-3901-IN IP profile file for the IPG-3901 gateway card (see Software and Firmware Updates, on page 12)
- a host address for the IPG-3901 gateway card

- stream addresses, port numbers, and a signal format, for each input or output gateway you choose to enable on the IPG-3901
- the scan rate and reference source for the IPG-3901

To configure a KMX-3901-IN IP module

1 Physically connect the KMX-3901-IN IP module to the data network.

2 Download the KMX-3901-IN IP profile file, and save it to your hard drive.

3 Configure your client PC or laptop with an IP address in the same range as the frame controller if needed (see Configuring a PC to Configure an ABT's Network Settings, on page 152).

4 Open **iControl Solo** (or **iControl Navigator,** if you have an iControl application server), and locate the service panel for the IPG-3901 card you want to configure, based on the slot number, and the housing frame's name (refer to the iControl Solo User Guide, or to the iControl User Guide, for more information; see Related Documentation, on page 11).

5 Open the IPG-3901 service panel.

6 Click the **Factory/Presets** button, in the service panel's navigation area.
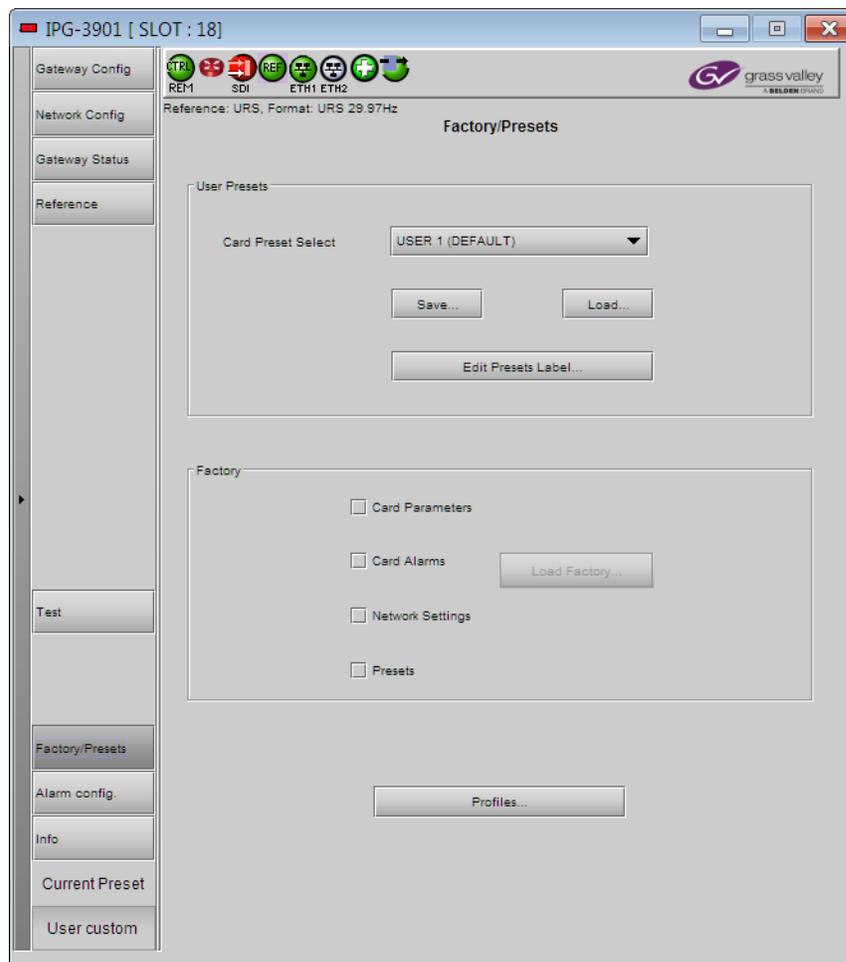
7 In the **Factory/Presets** tab, click **Profiles.**

Profile Copy for Card opens.
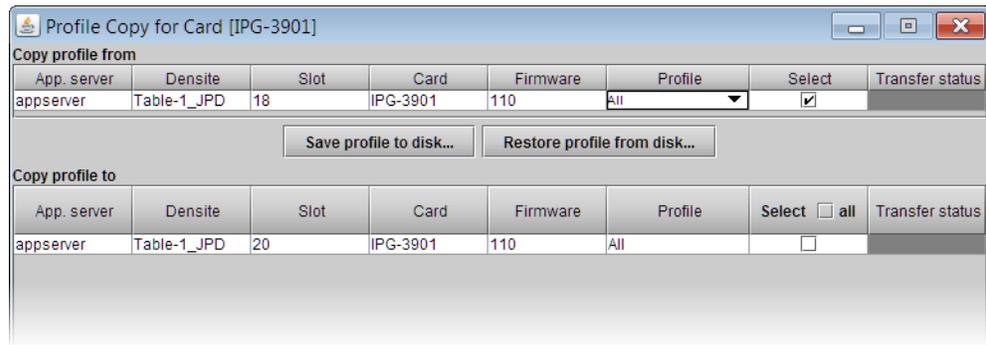
8 Click **Restore profile from disk**.

The **Open** window appears.

9 Navigate to the location where you saved the KMX-3901-IN IP profile file, select the file, and then click **Open**.

A message appears prompting you to confirm your intention.

10 Click **OK** to dismiss the message.

In **Profile Copy for Card**, the transfer status indicator reports the profile restore progress.

11 Once the indicator shows *Succeeded,* click **Exit**.

The KMX-3901-IN IP profile has now been applied to the IPG-3901 card's default preset USER 1. This profile sets appropriate directions and friendly names for the available gateways to act as multiviewer inputs and outputs.

12 Click the **Network Config** button, in the service panel's navigation area.

13 In the **Settings** tab, type the appropriate IP address, mask and gateway information to configure the IPG-3901 module within your *data* network, and then click **Apply**.

14 Click the **Gateway Config** button, in the service panel's navigation area.

15 Click the **Gateways** tab.

16 Determine how many input and output gateways you need, and then clear the check box, in the **En.** column, for every gateway you do *not* want to use.

For example, if you do not want to stream the mosaic output at all, clear the check boxes for both MV OUT 1 and MV OUT 2, or, if two input gateways can handle the

number of streams you want to monitor, then clear the check boxes for the remaining input gateways.
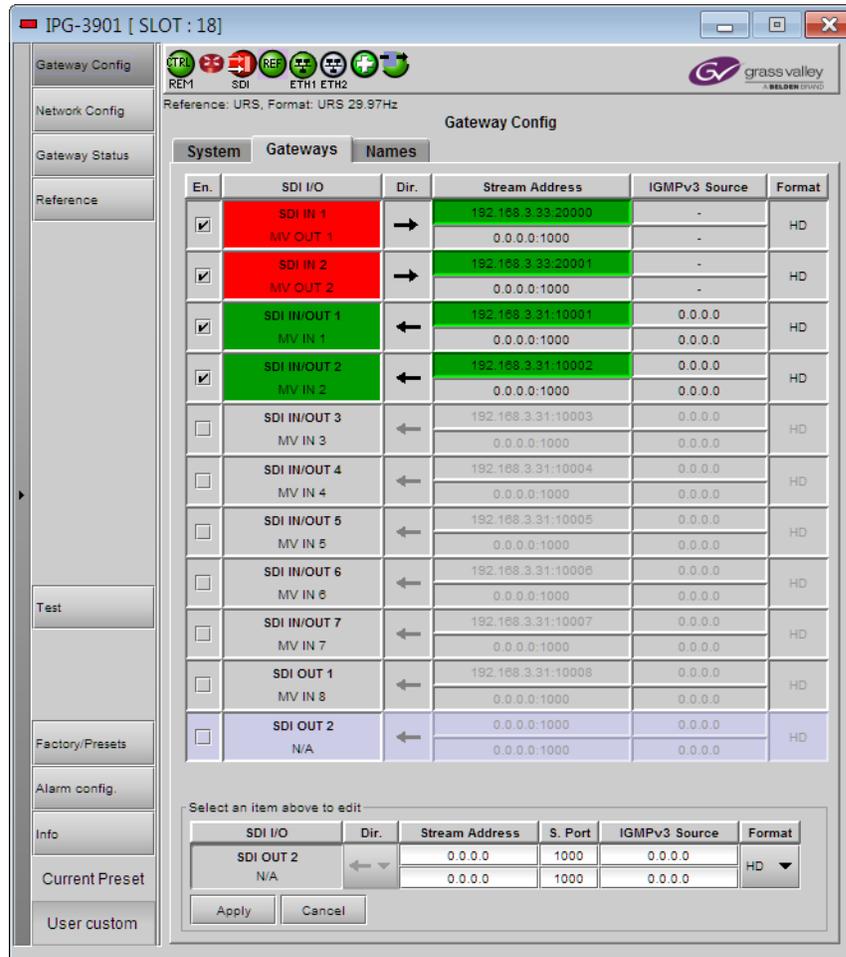
> Note: The current version of the KMX-3901-IN-IP card supports a maximum of 6 HD input streams.

17 For each enabled MV IN or MV OUT gateways:

   a Select the gateway, by clicking anywhere in the corresponding row.

   b In the editing area at the bottom of the panel, type the appropriate primary stream address and port number.

   c Type the appropriate secondary stream address and port number, if using redundancy[6].

   d Select the appropriate signal format.

18 Click **Apply**.

19 Click the **Reference** button, in the service panel's navigation area.

---

6. Refer to the IPG-3901 Guide to Installation and Operation, for more information. See Related Documentation, on page 11.

20 In the **Reference** tab, select the scan rate (59.94 Hz, or 50 Hz) that matches the reference signal you want to use.

21 Under **URS**, select **On**.

22 Under **Reference Source**, select the appropriate mode:

- If *all* the sources you want to monitor are synchronized to the reference signal, select **Auto**.

- If any of the sources you want to monitor is *not* synchronized to the reference signal, select **No Reference**.

23 Close the IPG-3901 service panel, and iControl Solo (or iControl Navigator), as appropriate.

Setting the System Name

Once you have configured the output cards from the local control panel, use XAdmin to complete your system's network setup.

To set your Kaleido-Modular-X system name

1 Configure your client PC or laptop with an IP address in the same range as the multiviewer's current IP addresses if needed (see Configuring a PC to Configure an ABT's Network Settings, on page 152).

2 Open a Web browser window and enter the multiviewer's *system* IP address in the address bar (see Finding the System IP Address, on page 161, if needed).

3 The Kaleido Multiviewer's home page appears.

4 Click the XAdmin button.

5 If you see a security warning, or a certificate error message, then see Registering your Multiviewer's Security Credentials with your Browser, on page 107.

6 If the "Log in to XAdmin" page appears, type the password, and then click **Log in**.
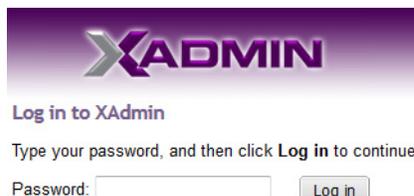
7 **Internet Explorer users:** If a blank page appears, then see Enabling the Compatibility View in Internet Explorer, on page 117.

The XAdmin Status and Options page appears.
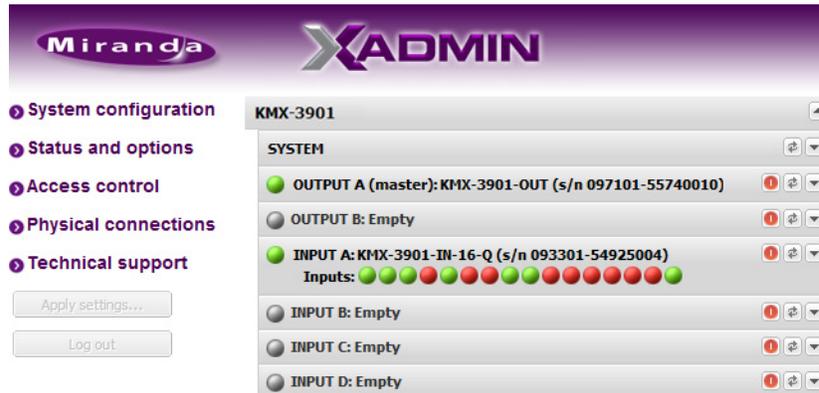
8 Click **System configuration**, in the navigation area on the left of the page.

The System Configuration page appears, showing the current system name, IP addresses, network mask, default gateway, connection-speed and duplex-mode settings, information about your housing frame, the input cards and the output card you are currently connected to, as well as date and time settings.
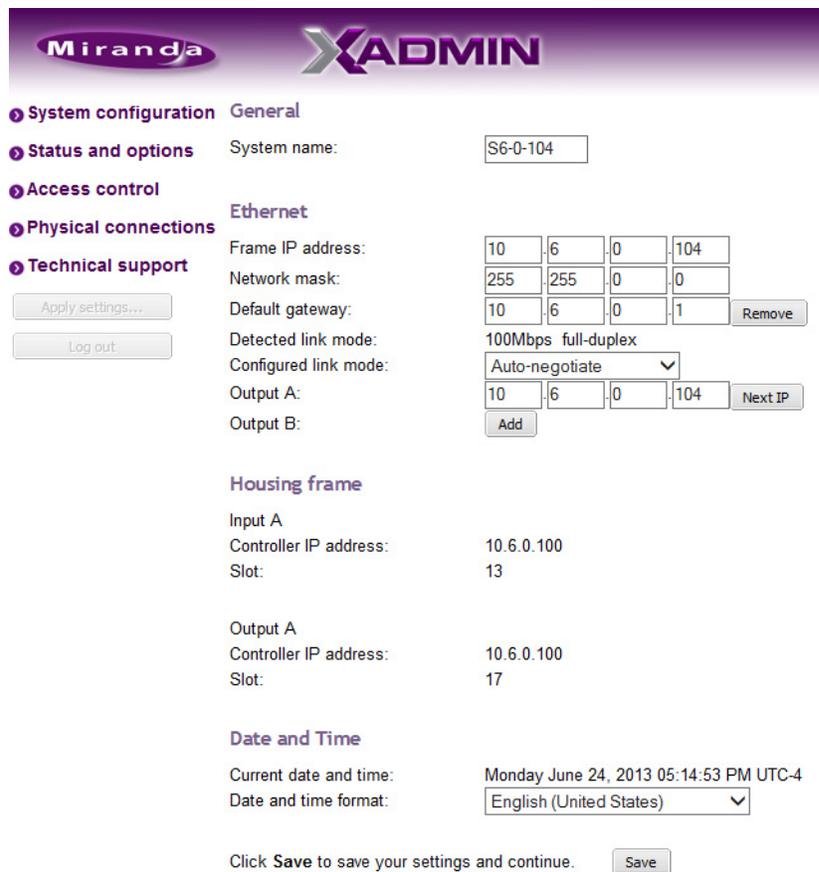
9 Under **General**, type the name you want to use for your system.

If there are more than one multiviewer in the same network environment, it is important to assign each a unique system name, so that you can tell them apart (for example, when using a remote control panel such as the Kaleido-RCP2 or RCP-200).

Only lower-ASCII characters are allowed in the system name. Braces and tilde are not allowed.

> Note: Under **Ethernet**, you may review the IP addresses, network mask, gateway settings, and the detected connection speeds and duplex modes. Should you want to make any further changes to the network settings, you may find it more convenient to use XAdmin's System configuration page, from now on.

10 Click **Save**.

The new settings are saved locally, and XAdmin reminds you to click **Apply Setting** before closing your session.

The configuration has been saved. Do not forget to click **Apply settings** at the end of the session.

OK
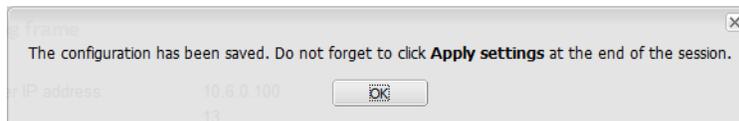
11 Click **OK**.

The **Apply settings** button becomes available.

> System configuration
> Status and options
> Access control
> Physical connections
> Technical support

Apply settings...

Log out
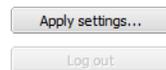
12 Click **Apply settings**.

The multiviewer must restart for changes to the network configuration to take effect. A message appears prompting you to restart the system immediately.

13 Click **OK**.

> Note: Settings cannot be applied to a multiviewer system while an upgrade is in progress. If the multiviewer does not restart after 10 seconds or so, try clicking **Apply settings** again after a minute or two.

Configuring the RCP-200

The RCP-200 is shipped with an IP address of 10.0.3.200. On installation, you should consult your system administrator and replace this address with an appropriate address for your local network configuration (see Configuring the RCP-200's IP settings on page 145). Once your RCP-200 has an active connection to the network, you must then register the multiviewers you want to operate from the RCP-200 (see Specifying multiviewers for the RCP-200 on page 145), and their respective *KX Router* logical routers (see Specifying lookup servers for the RCP-200 on page 145). Once this is completed, you will be able to control the monitor wall from the RCP-200 (see Logging on to the RCP-200 on page 146).

Configuring the RCP-200's IP settings

To assign an IP address to the RCP-200

1 Press the CONFIG button, located between the two screens on the front of the RCP-200.

2 Touch the COMM category at the top of the right-hand screen.

3 Touch the ETHERNET tab on the right-hand screen.

4 In the SELECT area, rotate the leftmost control knob to select IP ADDRESS.

5 Use the four control knobs in the CHANGE area to set the new address.

   The current address is displayed in the CURRENT box for reference, and the new address you are setting appears in the MODIFIED box, as well as at the controls.

6 Press the SAVE control knob to store the new address.

7 Repeat from step 4 to configure the NETWORK MASK and GATEWAY settings.

8 Press the RESTART control knob to apply the changes.

   The panel will go dark for about 15 seconds before the startup screens appear.

Specifying multiviewers for the RCP-200

To specify a multiviewer for the RCP-200

1 Press the CONFIG button, located between the two screens on the front of the RCP-200.

2 Touch the COMM category on the right-hand screen.

3 Touch the KALEIDO DISCOVERY tab on the right-hand screen.

4 Use the four control knobs in the ADD TO LIST area to dial in the IP address of the multiviewer you want to operate.

   The address appears in the TO ADD box.

5 Press the ADD control knob.

   The multiviewer's IP address appears in the LOOKUP LIST area.

6 Press the CONFIG button, located between the two screens on the front of the RCP-200 to end the configuration process and return to normal operation.

Specifying lookup servers for the RCP-200

The RCP-200 needs to connect to a lookup server in order to control devices, including a multiviewer's *KX router* logical router.

To specify a lookup server for the RCP-200

1 Press the CONFIG button, located between the two screens on the front of the RCP-200.

2 Touch the COMM category on the right-hand screen.

3 Touch the DISCOVERY tab on the right-hand screen.

4 Use the four control knobs in the ADD TO LIST area to dial in the IP address of the multiviewer you want to operate.

   The address appears in the TO ADD box.

5 Press the ADD control knob.

   The multiviewer's IP address appears in the LOOKUP LIST area.

6 Press the CONFIG button, located between the two screens on the front of the RCP-200 to end the configuration process and return to normal operation.

Logging on to the RCP-200

> Note: In a default system configuration, a multiviewer's video outputs are assigned to ROOM1.

To log on to a Kaleido Multiviewer's room from the RCP-200

1 On an RCP-200 with an active connection to the network, press the LIST button.

All devices, and Kaleido Multiviewer rooms, detected by the RCP-200 appear on the left screen. Kaleido Multiviewer rooms are listed in the form [multiviewer name]\[room name].

If a room belongs to a cluster system, its name appears once for each of the member multiviewers (e.g., if two multiviewers, KX1 and KX2, are configured as a cluster, and ROOM1 includes displays fed by both multiviewers, then both KX1\ROOM1 and KX2\ROOM1 will be listed. To determine the one you should select, review the following:

- Has the RCP user configuration you want to use been replicated on every member of the cluster? RCP Users are not automatically propagated to all multiviewers. Before a user can log on to a room associated with a cluster system, the corresponding RCP user configuration must be manually replicated on all member multiviewers across the cluster. See *Managing RCP Users* in the Kaleido Software User Guide. See Related Documentation, on page 11.
- Do you need to control an external router whose configuration is available only from one or some specific members of the cluster?
- Does your system configuration include actions that were configured only on one or some specific members of the cluster?

If any of the above elements is available only from one or some specific members, then make sure you select the room name prefixed with the appropriate multiviewer name.

2 Touch the room you want to access (press the DOWN or UP soft keys to scroll the list as needed).

The list of users assigned to this room appears on the right-hand screen.

3 Touch the user name under which you want to log on, enter your password, and then touch LOG IN.

> Note: By default, the user "Admin" has no password.

The following message appears on the right-hand screen: PLEASE SELECT A ROUTER FROM THE LEFT-HAND SCREEN, prefixed with the name of the multiviewer that appeared before the room name you selected in step 2.

4 In the list on the left-hand screen, touch the *KX Router* logical router associated with the same multiviewer (you can see the multiviewer name, its IP address, and the size of that particular KX Router).

5 Touch the Video level, in the area to the right of the router list, if it is not selected already, and then push SELECT.

The room's monitor wall control panel appears on the right-hand screen, with the ASSIGN CHANNEL category selected. If a mouse is connected to the RCP-200, then after touching WALL MOUSE you should be able to see and move the mouse pointer on the monitor wall.

- If the room you selected belongs to a *cluster* system, rotate the HEAD knob (or touch the DISPLAY SELECT category) to display a head view from a different member of the cluster, and then touch a monitor.

The ROUTER SELECT category becomes selected instead of ASSIGN CHANNEL, and the right-hand screen shows the message prompting you to select a router from the left-hand screen, prefixed with the name of the multiviewer, which means that you still need to complete the correlation between some monitor wall destinations and the representation of the KX Router logical router for this multiviewer. See Correlating Monitor Wall Destinations and KX Router Logical Routers for the RCP-200 on page 147. Repeat this for one head, with one layout, for every multiviewer that is part of the cluster. If you need to connect to a different instance of the same room then you will have to establish the correlation again, to be able to operate the monitor wall from the different context.

Notes
- The RCP-200 will remember your user credentials until you log out explicitly (by touching LOG OUT at the upper-right corner of the control panel).
- The pointer may flicker when two RCP users access displays fed by the same multiviewer output.
- Two users accessing the same display will be limited to sharing a single pointer.

For more information on the RCP-200, refer to the *RCP-200 Guide to Installation and Operation*; *see* Related Documentation, on page 11.

Correlating Monitor Wall Destinations and KX Router Logical Routers for the RCP-200

To operate the monitor wall from the RCP-200's category/index router view, your system must have been configured to be controlled as a router. In a layout, the RCP-200 can only control monitors that have been assigned a monitor wall destination. The first time you log on to a room from the RCP-200, you will be prompted to select a router from the left-hand screen. By selecting the appropriate KX Router logical router, you will establish the correlation between your multiviewer's monitor wall destinations and the RCP-200's representation of the multiviewer's *KX Router* logical router. In the case of a cluster system, you will also be prompted to select a router, the first time to try to assign a source to a monitor located in a part of the layout that belongs to a different member of the cluster. You only need to do this once, for every multiviewer that is part of a cluster.

To correlate a monitor wall destination in a layout and the corresponding KX Router logical router

1 In the list on the left-hand screen, touch the *KX Router* logical router associated with the multiviewer whose name was indicated in the message prompting to select a router

(you can see the multiviewer name, its IP address, and the size of that particular KX Router).

2 Touch the Video level, in the area to the right of the router list, if it is not selected already, and then push SELECT.

The RCP-200 will remember the association with the KX Router logical router's destinations for the current multiviewer's monitor wall destinations.

Configuring the Kaleido-RCP2

Note: The Kaleido-RCP2 unit is optional and is not included in the standard Kaleido-Modular-X package.

The Kaleido-RCP2 is a multi-function remote control panel designed for use with Kaleido multiviewers. Ethernet connectivity allows multiple RCP users to access multiple Kaleido Multiviewer systems, allowing convenient access to the real-time operating features. When logged on to a Kaleido multiviewer via its Ethernet connection, the RCP user can control various operating features.
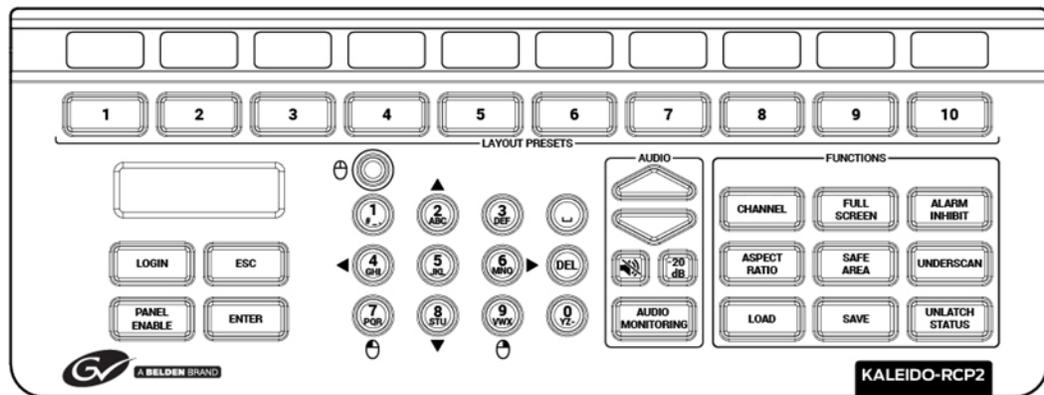
Before you can use the Kaleido-RCP2 to operate your Kaleido Multiviewer, you must set up the Ethernet connection between the two devices. By default, the Kaleido-RCP2 is shipped with DHCP enabled, so it will automatically be assigned an IP address by a DHCP server. If no DHCP server is present on the network, the Kaleido-RCP2 will default to the static IP address 10.0.3.191.

Notes
- The Kaleido-RCP2 is powered through the RJ45 Ethernet connector. There is no power ON/OFF button, so the device is ON whenever a powered Ethernet cable is connected.
- If you purchased more than one Kaleido-RCP2 units, keep in mind that they all ship with the same default static IP address. Make sure to assign them different static IP addresses before connecting them to the network if DHCP is not used. See the Kaleido-RCP2 User Guide for more information. See Related Documentation, on page 11.
- The time-out period before the Kaleido-RCP2 defaults to its static address is 1 minute. To speed up the initialization, disable the DHCP option.

Assigning a static IP address to the Kaleido-RCP2

To assign a static IP address to the Kaleido-RCP2

1 Press and hold the ENTER button until the ESC button lights up, to display the configuration menu.

2 Press the **8** key (to move down the list) until ETHERNET OPTIONS appears on the LCD display.

3 Press the ENTER key to display the ETHERNET OPTIONS menu.

4 Select the IP ADDRESS menu using the **2** key (to move up in the list) or the **8** key (to move down the list), and then press ENTER.

5 Using the numeric keypad, type the chosen IP address, and then press ENTER.

6 Select the NETWORK MASK menu using the **2** key (to move up in the list) or the **8** key (to move down the list), and then press ENTER.

7 Using the numeric keypad, type the chosen network mask, and then press ENTER.

You have assigned a static IP address to the Kaleido-RCP2.

Selecting a room for the Kaleido-RCP2

To select a room for the Kaleido-RCP2

1 Press and hold the ENTER button until the ESC button lights up, to display the configuration menu.

2 In the ROOM SELECTION display, press ENTER again to get the room list from the Kaleido Multiviewer systems that are currently available on the network.

3 In the room list, select the room you want to access by pressing the **2** key (to move up in the list) or the **8** key (to move down the list).

> Note: By default, a multiviewer's video outputs are assigned to specific rooms: the outputs are assigned to ROOM1.

4 When the appropriate room name is highlighted, press ENTER to accept the new selection.

5 When prompted, log on to the selected room. See

Connecting the Kaleido-RCP2 to other Kaleido Multiviewer Systems

The unicast IP feature enables a Kaleido-RCP2 to find up to three Kaleido Multiviewer systems on different subnets and connect to them (via network gateways), while maintaining connections to Kaleido Multiviewer systems in its own subnet.

> Notes
> • To navigate the Kaleido-RCP2 menu, press the **2** key to move up, or the **8** key to move down.
> • There is no need to configure unicast IP addresses for Kaleido Multiviewer systems on the same subnet as the Kaleido-RCP2.

To configure a unicast IP address on the Kaleido-RCP2

1 Press and hold the ENTER button until the ESC button lights up, to display the configuration menu.

2 Select ETHERNET OPTIONS on the LCD display, and then press ENTER.

3 Select **Unicast host IP**, and then press ENTER.

4 Select **Enable IP 1**, and then press ENTER.

The Enable IP x parameter instructs the Kaleido-RCP2 to query the selected IP address for a list of rooms.

5 Select **Host IP ADDR**, and then press ENTER.

6 Using the numeric keypad, type the IP address of a Kaleido Multiviewer on a remote subnet, and then press ENTER.

7 Repeat step 4 to step 6 to add unicast IP addresses for up to three remote Kaleido Multiviewer systems.

Logging on to the Kaleido-RCP2

As a network device, the Kaleido-RCP2 provides access to any room configuration on any Kaleido Multiviewer system on the network. As a security measure, access is controlled by a login procedure.

To log on to a Kaleido Multiviewer system from the Kaleido-RCP2

1 Press the LOGIN key.

The following message will appear on the LCD display:

LOGIN Position
Admin

2 Press ENTER to select "Admin".

A message prompting you to enter a password will appear on the LCD display.

3 Press ENTER again (by default, there is no password).

The message "Access granted" will appear on the LCD display if the login is successful. If a mouse is connected to the Kaleido-RCP2, then you should be able to see and move the mouse pointer on the monitor wall.

Note: If at any time the message "Target system is offline" or "No login list available" appears on the LCD display, press the ESC, ENTER and DEL keys simultaneously and go back to step 1.

For more information, refer to the *Kaleido-RCP2 Guide to Installation and Operation*; see Related Documentation, on page 11.

Configuring an Audio Bridge Terminal

The optional Audio Bridge Terminal (ABT) is an external audio multiplexer/serializer for the Kaleido-Modular-X. The Kaleido-Modular-X supports audio channel inputs from the ABT-64 or ABT-128 series of Audio Bridge Terminal panels through the KMX-3901-IN input cards ABT/MADI inputs. The ABT-64 supports 64 channels and the ABT-128 supports 128 channels.

The Audio Bridge Terminal (ABT) is an external audio multiplexer/serializer for Kaleido multiviewers. The ABT provides connector space for audio signal inputs, and multiplexes all the audio signals into combined serial feeds on coaxial cables that connect to the KMX-3901-IN input cards.
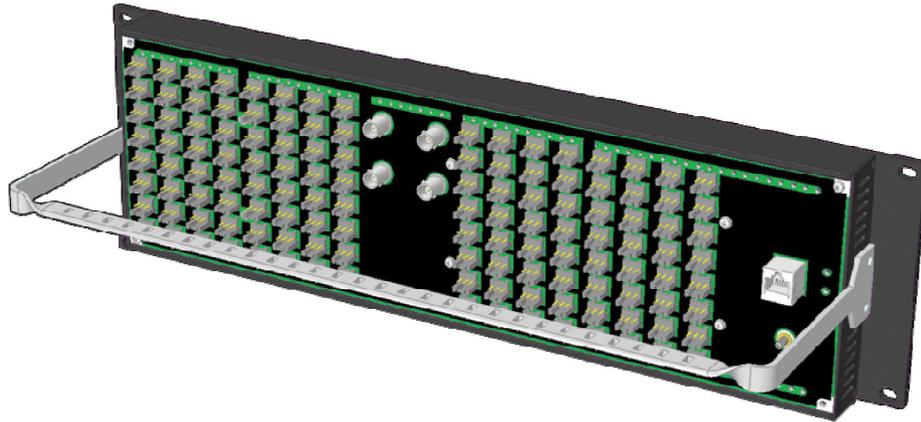
Note: The ABT is powered through the RJ45 Ethernet connector. There is no power ON/OFF button, so the device is ON whenever a powered Ethernet cable (PoE) is connected.

To configure the IP address and other network settings of the ABT

1 Connect a PC to a switch.

2 Referring to Configuring a PC to Configure an ABT's Network Settings, on page 152, configure the PC with the following network settings:

Property	Setting
DHCP	Off
Static IP address	10.0.0.1
Subnet mask	255.255.0.0
Default gateway	10.0.0.1

3 Apply power to the Audio Bridge Terminal and make sure it is connected to the same switch as the PC.

   • If the switch is Power over Ethernet (PoE) enabled, simply connect it to the unit using an Ethernet cable.

   • If not, PoE mid-span (*inserter*) equipment must be placed between the switch and the Audio Bridge Terminal.

4 Press the RESET button (located on the right-hand side of the ABT rear panel beside the ETHERNET/POWER RJ-45 connector) for at least 1 second.

The Audio Bridge Terminal will reboot with the following static network configuration:

Property	Setting
DHCP	OFF
Static IP address	10.0.3.190
Subnet mask	255.255.0.0
Default gateway	10.0.0.1

5 Using a Web browser on the PC, connect to the ABT using the following address: 10.0.3.190.

The home page of the ABT's built-in Web server is displayed.

6 Click **Network Configuration** (in the navigation pane).

The **Network Configuration** page is displayed.

7 Change the ABT's network settings, as necessary, and then click **Apply & Reboot**.

> Notes
>
> • The Kaleido-Modular-X supports one ABT device. You can achieve redundancy by connecting the ABT to more than one input card, in which case the Kaleido-Modular-X uses the signal from the input card that is the farthest from the output cards (for example, Input D, if you have 4 input cards, Input C if you have 3 input cards, Input B if you have 2 input cards).
>
> • Keep in mind that all ABTs ship with the same default static IP address. If you are adding more than one ABT to your network and do not use DHCP, make sure to assign each ABT a different static IP address before connecting them to the network.

For more information about the ABT, refer to the *Audio Bridge Terminal Guide to Installation and Operation*; see Related Documentation, on page 11.

Configuring a PC to Configure an ABT's Network Settings

The PC that you will use to communicate with the ABT must have an IP addresses within the same subnet. The following procedure applies to a typical Windows 10, Windows 8, or Windows 7 system.

To change the IP address of the client PC

1 Press the Windows key on your keyboard, type "control panel" and then press Enter.

2   In the search box, type "adapter", and then, under **Network and Sharing Center**, click **View network connections**.

3   In **Network Connections**, right-click the network adapter you wish to configure (e.g., *Local Area Connection,* or *Ethernet*), and then click **Properties**. If the system prompts you for an administrator password or confirmation, type the password or provide confirmation.

The Properties window for the selected network adapter opens.
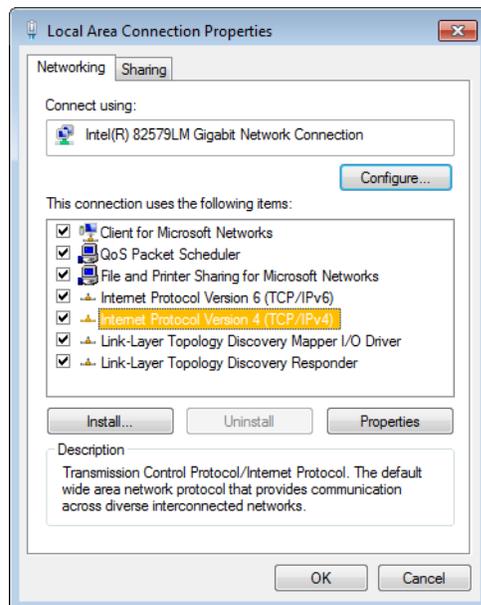
4   On the **Networking** tab, under **This connection uses the following items**, click **Internet Protocol Version 4 (TCP/IPv4)**, and then click **Properties**.

The **Internet Protocol Version 4 (TCP/IPv4) Properties** window opens.

5   On the **General** tab, click **Use the following IP address**.
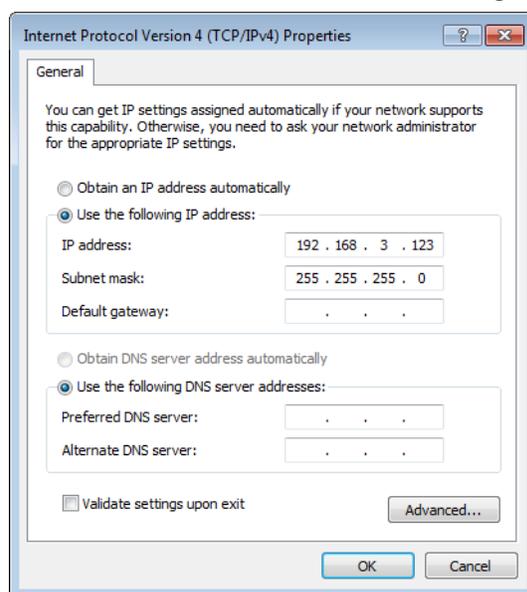
6 Type an IP address in the same range as the current ABT's IP address.

For example, if the ABT's IP address is 10.0.3.190, then the IP address of your client PC could be 10.0.3.1. If you are unsure, contact your network administrator.

7 Type a subnet mask in the same range as that of the ABT such as 255.255.0.0.

8 Click **OK**.

9 In **Local Area Connection Properties**, click **Close**.

Available Hardware and Software Options

You can purchase various software and hardware options to expand your multiviewer's capabilities that are not part of the basic offer. Software options are enabled by entering a software key that has been sent to you once you have purchased the option. The following tables list options that can be enabled and disabled via the XAdmin Status and Options page (see Enabling Options on page 155).

Kaleido-Modular-X input options

Option	Part No.	Feature
3G	KMX-IN-8-OPT-3GBPS	3 Gbps signal format license (8 inputs) for KMX-3901-IN-8-D, and for KMX-3901-IN-IP
	KMX-IN-16-OPT-3GBPS	3 Gbps / 4K UHD[a] signal format license (16 inputs) for KMX-3901-IN-16-D and KMX-3901-IN-16-Q
CC/XDS	KMX-IN-8-OPT-CSX	CC/subtitling and XDS data license (8 inputs) for KMX-3901-IN-8-D
	KMX-IN-16-OPT-CSX	CC/subtitling and XDS data license (16 inputs) for KMX-3901-IN-16-D and KMX-3901-IN-16-Q The extraction of CC 608, CC 708, XDS and Subtitling WST metadata are all activated as a single option.
Dolby E	KMX-IN-8-OPT-DOLBY	Dolby metadata extraction license (8 inputs) for KMX-3901-IN-8-D
	KMX-IN-16-OPT-DOLBY	Dolby metadata extraction license (16 inputs) for KMX-3901-IN-16-D and KMX-3901-IN-16-Q

a. 4K UHD support requires a minimum of 2 licenses: 1 for the prescaler card, and 1 for every KMX-3901-IN input card connected to the prescaler card.

Kaleido-Modular-X output options

Option	Part No.	Feature
Second Head Activation	KMX-OUT-OPT-OP2	Second head output enable license for KMX-3901-OUT-S
Display 90-Degree Rotation	KMX-OUT-OPT-ROT-S	Single head rotation license for KMX-3901-OUT-S
	KMX-OUT-OPT-ROT-D	Dual head rotation license for KMX-3901-OUT-D

Enabling Options

To enable options on a multiviewer

1 Obtain a license key from Grass Valley.

2 Open XAdmin. See .

The XAdmin Status and Options page appears.
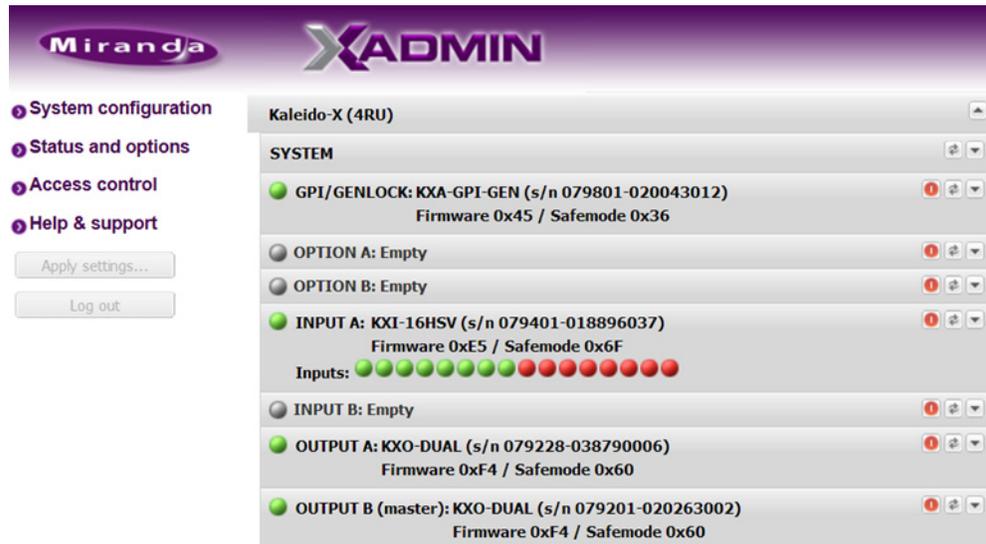
3 Click the arrow button at the end of the heading row that corresponds to the module for which you want to enable an option.
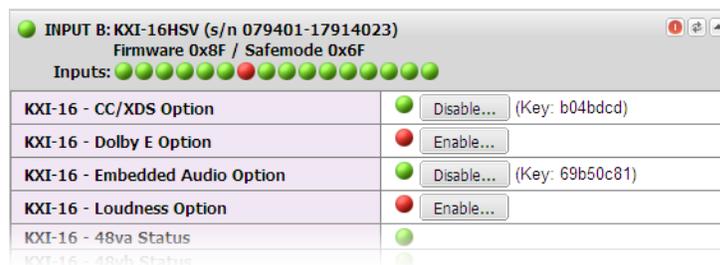
4 Locate the entry for the option you want to enable.

For example, to activate the Extraction of CC, Subtitling and XDS metadata option (CC/XDS Option) for a Kaleido Multiviewer input card, you would need to locate the appropriate card in XAdmin's Status and Options page, expand it, and then locate the **KXI-16-CC/XDS option** line.

5 Click the **Enable** button.

A window appears prompting you for the option key.
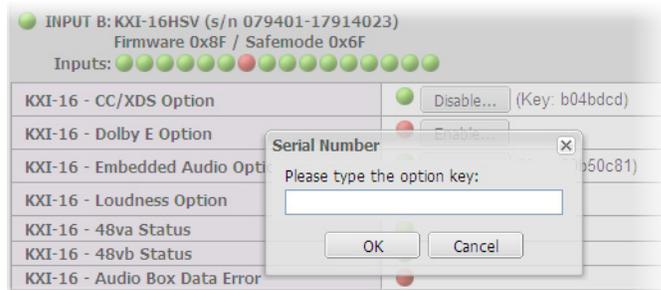
6 Enter the key for the specific option in the box, and then click **OK**.

Once the option is enabled, the key is displayed, and a **Disable** button replaces the **Enable** button.

Maintenance & Troubleshooting

This chapter shows you the various maintenance operations and corrective actions that maybe required to be performed during system commissioning and over the multiviewer's lifetime.

System Verification

Verifying the Kaleido-Modular-X Multiviewer Status

You can check internal system statuses via the Web-based XAdmin application.

To verify the status of your Kaleido-Modular-X multiviewer

1 Open a Web browser window and type your multiviewer's *system* IP address (the IP address you configured for Output A, in the case of a single- or dual-head system (see step 14 on page 85), or the virtual IP address you configured at step 4 on page 86, in the case of a quad-head system) in the address bar.

   The Kaleido Multiviewer's home page appears.

2 Click the XAdmin button.

3 If you see a security warning, or a certificate error message, then see *Registering your Multiviewer's Security Credentials with your Browser*, on page 107.

4 If the "Log in to XAdmin" page appears, type the password, and then click **Log in**.
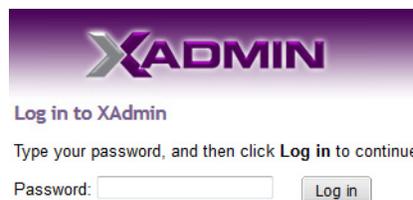
5 **Internet Explorer users:** If a blank page appears, then see *Enabling the Compatibility View in Internet Explorer*, on page 117.

The XAdmin Status and Options page appears, displaying a list of all modules and their statuses.
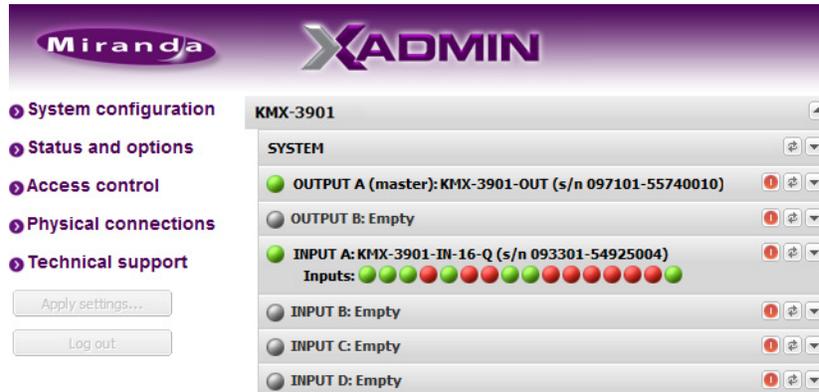
6 Click **Physical connections**, in the navigation area on the left of the page.

The Physical Connections page appears, showing the current connection status for your system, with a visual representation of the physical connections between the detected input cards and the output cards associated with the frame IP address.

7 Review the information on this page, to make sure your input and output cards are all properly interconnected. Information in red indicates the location where a problem was detected.

8 Click **Status and options**, in the navigation area on the left of the page, to go back to the Status and Options page.

The module headings show the card type and serial number for the input and output cards, and a summary view of the input signals for each input card.

9 Move the pointer to an input signal status icon to view the associated signal format.

Card type   Serial number

Input signal status

Input signal format
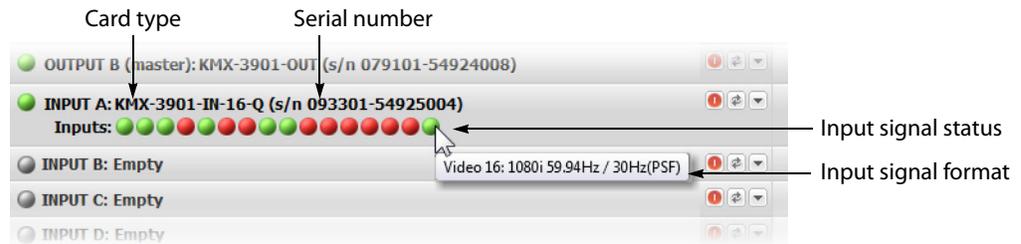
10 Click the arrow button (▾) at the end of a module's heading row to view detailed information.

Reset card
Expand details
Refresh
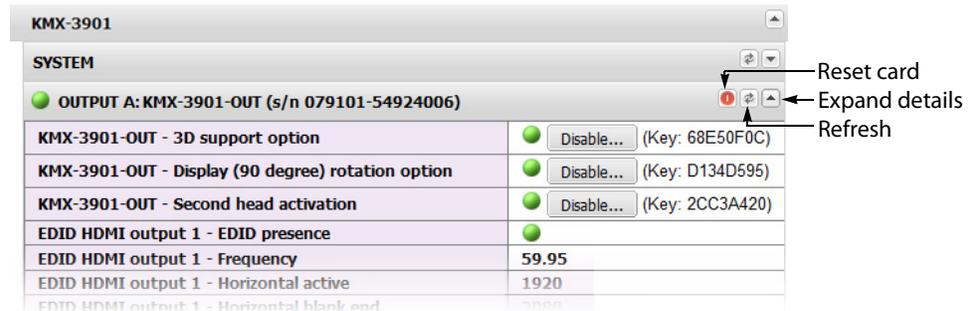
11 Review the enabled input and output options, and the main system statuses of the Kaleido-Modular-X frame, to make sure that there are no status errors, and no alerts related to system temperature, fan operation, FlexBridge connectivity, or card fault conditions.

Notes

• At any time you can click the **Refresh** button to make sure the data displayed for the selected card is up to date. Click the **Reset card** button at the end of a card's heading row to reset the card remotely, directly from your Web browser.

• Refer to *Available Hardware and Software Options*, on page 154, for more information on the available options.

Verifying the Kaleido-RCP2

To verify that the Kaleido-RCP2 is functioning normally

• Log on to the Kaleido-RCP2 (see Configuring the Kaleido-RCP2, on page 148), and then test various operations using the Kaleido-RCP2 keyboard and the mouse (e.g. load a predefined layout).

Loading a Layout

To load a layout on the monitor wall

1 Connect a mouse to the Kaleido-RCP2 (if available) and log on to the appropriate room, if you have not already done so (see Configuring the Kaleido-RCP2, on page 148).

Alternatively, connect the mouse directly to the USB port at the front of one of your system's output card.

2 Right-click anywhere on the monitor wall, point to **Monitor wall** (if you clicked a monitor), and then click **Load layout** on the menu.

> Refresh
> Load layout...   ⟵
> Unlatch / Acknowledge all
> Hide dashboard
> Hide all dashboards
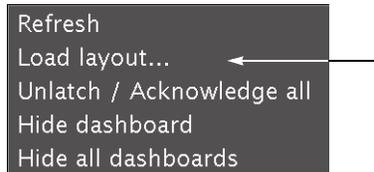
Monitor wall shortcut menu

A layout browser appears on the displays associated with the current room.

3 Select the layout you want to load from the list of available layouts for this room, and then click **OK**.

The selected layout appears on the room displays.

Customizing Layouts, Logical Sources, and other Kaleido Elements

Refer to the *Kaleido Software User Manual* to learn how to customize the Kaleido to suit your specific needs. See Related Documentation, on page 11.

Verifying the Audio Bridge Terminal

To verify that the ABT is functioning normally

• Inspect the ACTIVITY and front panel LEDs on the unit to make sure there are no error conditions:

The ACTIVITY indicator is located on the right-hand side of the rear panel. This LED reports the status of the Ethernet connection as indicated in the table below.

Two LEDs are visible on the front panel, one for each power supply. When lit, they both indicate the same status.

When the ABT is powered up, all three LEDs will be orange until the boot sequence is terminated. This is a visual indicator that the LEDs are functioning properly.

ACTIVITY Indicator on Rear Panel		Power-Supply LEDs on Front Panel	
Color	Status	Color	Status
Off	No link detected	Green	Normal
Green	Normal (good link)	Flashing green	Normal, rebooting
Orange	Activity	Orange	Warning
Red	Hardware fault	Flashing orange	Warning, rebooting
Flashing red	Upgrading firmware	Red	Hardware fault
		Flashing red	Upgrading firmware

For more information, refer to the *Audio Bridge Terminal Guide to Installation and Operation*; see Related Documentation, on page 11.

Verifying the Multiviewer's IP Addresses and Application Version

Finding the System IP Address

To find your multiviewer's system IP address

1 Press the Select button on the front edge of a *KMX-3901-OUT output* card.

   The Status LED on the selected card flashes orange, and the associated control menu appears on the display of the Densité frame's local control panel.

2 On the local control panel, press the [–] button repeatedly until NETWORK SETTINGS appears on the display, and then press the SEL button. See Using the Densité Frame Control Panel on page 71.

   FRAME IP ADDRESS EDIT appears on the control panel's display.

3 Press the SEL button again.

   The current system IP address appears on the display. This is your system's virtual IP address; this is the address you will use to access your system from XEdit and XAdmin.

4 Press the Select button *on the front edge of the output card* to exit the control menu.

Verifying an Output Card's IP Address and Application Version

To verify the IP address and application version on an output card

1 Press the Select button on the front edge of the KMX-3901-OUT output card.

   The Status LED on the selected card flashes orange, and the associated control menu appears on the display of the Densité frame's local control panel. See Using the Densité Frame Control Panel on page 71.

2 Note the position indication *A* or *B* in the card information shown on the first line of the LCD display: either KMX-OUTA, or KMX-OUTB, followed with the slot number (for example, KMX-OUTA Slot 4).

3 On the local control panel, press the [–] button.

   The version of the Kaleido Software that is running on the card (e.g. "7.10-build.5201") appears on the display.

4 On the local control panel, press the [–] button repeatedly until NETWORK SETTINGS appears on the display, and then press the SEL button.

   FRAME IP ADDRESS EDIT appears on the control panel's display.

5 If the card was identified as KMX-OUTA on the display, then press the [–] button repeatedly until OUTPUT A IP EDIT appears. If the card is identified as KMX-OUTB, then press the [–] button until OUTPUT B IP EDIT appears.

6 Press the SEL button.

   The current IP address for this card appears on the display.

   Note: If you have a single- or dual-head Kaleido-Modular-X multiviewer, then this IP address doubles as the system IP address.

7 Press the Select button *on the front edge of the output card* to exit the control menu.

Verifying an Input Card's Application Version

To verify the application version on an input card

1 Press the Select button on the front edge of the KMX-3901-IN input card. See Using the Densité Frame Control Panel on page 71. See KMX-3901-IN Input Card Interface on page 64 for more information.

   The Status LED on the selected card flashes orange, and the associated control menu appears on the display of the Densité frame's local control panel.

2 On the local control panel, press the [–] button.

   The version of the Kaleido Software that is running on the card (e.g. "7.10-build.5201") appears on the display.

3 Press the Select button *on the front edge of the input card* to exit the control menu.

Maintenance

Required Tools

Use a field-supplied Phillips #2 screwdriver to remove and install rear panels.

Field Replaceable Units

The following components are field replaceable units. The repair procedure is to swap in a new (known good) component to restore system operation.

- KMX-3901-IN Multiviewer Cards and rear panels. See Required Materials, on page 19.
- KMX-3901-OUTMultiviewer Cards and rear panels. See Required Materials, on page 19.
- Miscellaneous hardware. Available Options, on page 14.

There are no user-serviceable parts within these components except that cooling fans can be replaced on some cards and in some frame components. See Cooling Fan Replacement, on page 173.

Opening and Closing the Front Door

Densité 3 Housing Frame

The front door of a Densité 3 housing frame is fastened in place by two captive thumbscrews, one at each end of the door. The door is attached to the frame by guides that slide out of the frame as the door is pulled, and allow the door to be lowered below the frame so that cards and power supplies can be removed and installed.
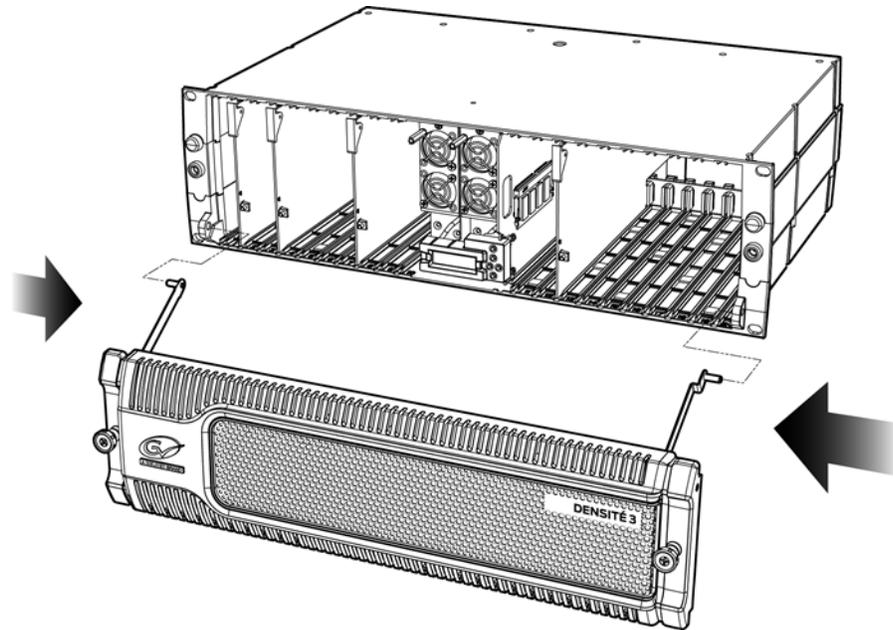
Densité 3 frame with open door

Opening the front door of a Densité 3 frame

• Turn both thumbscrews counterclockwise until they release, and then pull the door away from the front of the frame.

Removing the front door of a Densité 3 frame

• Slip the ends of the guides off the posts on the door assembly.

> Note: You must tilt the door on an angle so the guides can move freely.
> There are no electrical connections to the door.

Closing the front door of a Densité 3 frame

• Slide it into position against the front of the frame, and then turn the captive thumbscrews clockwise until the door is securely fastened into place.

Densité 3+ FR1 Housing Frame

The front door of a Densité 3+ FR1 housing frame is fastened in place by two captive thumbscrews, one at each end of the door. The door is attached to the frame by guides that

slide out of the frame as the door is pulled, and allow the door to be lowered below the frame so that cards and power supplies can be removed and installed.
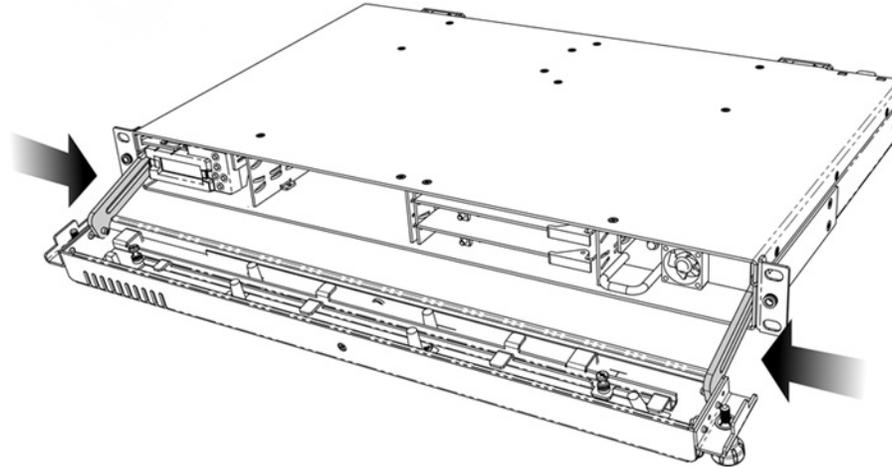
Densité 3+ FR1 frame with open door

Opening the front door of a Densité 3+ FR1 frame

• Turn both thumbscrews counterclockwise until they release, and then pull the door away from the front of the frame.

Removing the front door of a Densité 3+ FR1 frame

• Slip the ends of the guides off the posts on the door assembly.

> Note: You must tilt the door on an angle so the guides can move freely. There are no electrical connections to the door.

Closing the front door of a Densité 3+ FR1 frame

• Slide it into position against the front of the frame, and then turn the captive thumbscrews clockwise until the door is securely fastened into place.

Densité 3+ FR4 Housing Frame

The front door of the Densité 3+ FR4 frame is hinged on the right-hand side, and latched by a captive thumbscrew on the left-hand side. There are no electrical connections to the door.
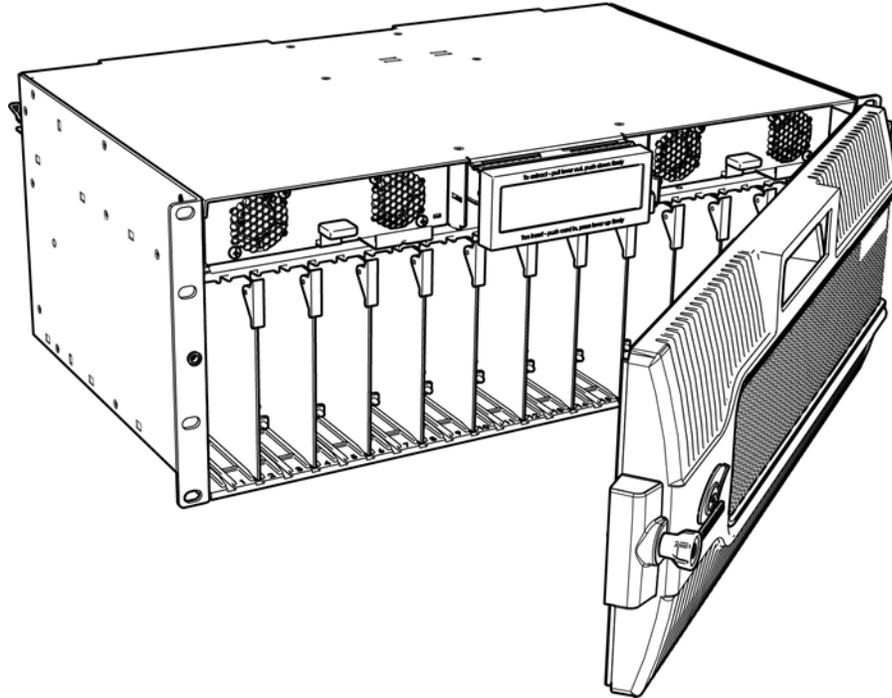
Densité 3+ FR4 frame with open door

Opening the front door of a Densité 3+ FR4 frame

• Turn the thumbscrew counterclockwise until it releases, and then pull the door open.

Removing the front door of a Densité 3+ FR4 frame

• Slide it vertically off the hinge pins on the right-hand side.

Closing the front door of a Densité 3+ FR4 frame

• Slide the door down onto the hinge pins on the right-hand side, push it into the closed position, and then turn the thumbscrew on the left-hand side clockwise to latch the door in the closed position.

Replacing Cards

All cards and rear panels can be installed with the frame power on. Each card has a connector which plugs into the frame's backplane for distribution of power and connection to the controller card, and one or two connectors (depending on the card type) that plug into the associated rear panel for inputs and outputs.

> IMPORTANT
> The rear panel must be installed before the card is inserted into the frame.

Replacing rear connector panels

To replace a rear connector panel in a Densité 3 or Densité 3+ FR4 frame

1 If a card is already installed in a slot covered by the rear panel you want to change, remove it (see Removing a card, on page 168).

2 Remove the existing panel (either blank or belonging to an existing card) by releasing the captive screws at the bottom.

There may be several captive screws, depending on the card type.

3 Position the new panel and secure it in place with the captive screws at the bottom.
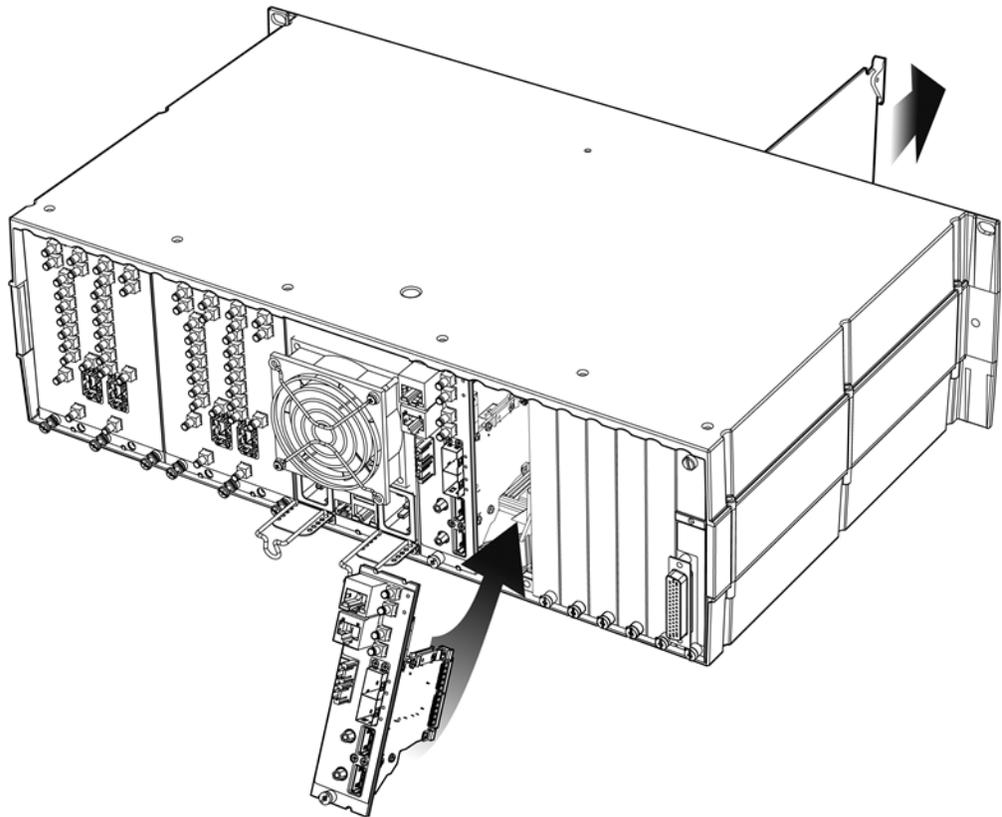
Rear panel installation (Densité 3 frame)
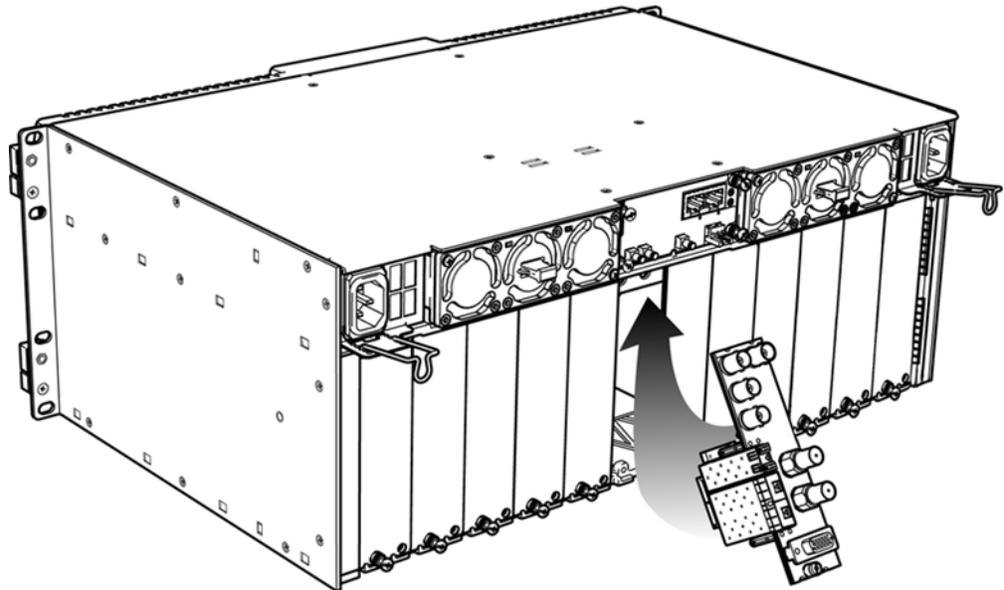
Rear panel installation (Densité 3+ FR4 frame)

To replace a rear connector panel in a Densité 3+ FR1 frame

1 If a card is already installed in a slot covered by the rear panel you want to change, remove it (see Removing a card, on page 168).

2 Remove the existing panel by releasing the captive screw.

3 Position the new panel and secure it in place with the captive screw.
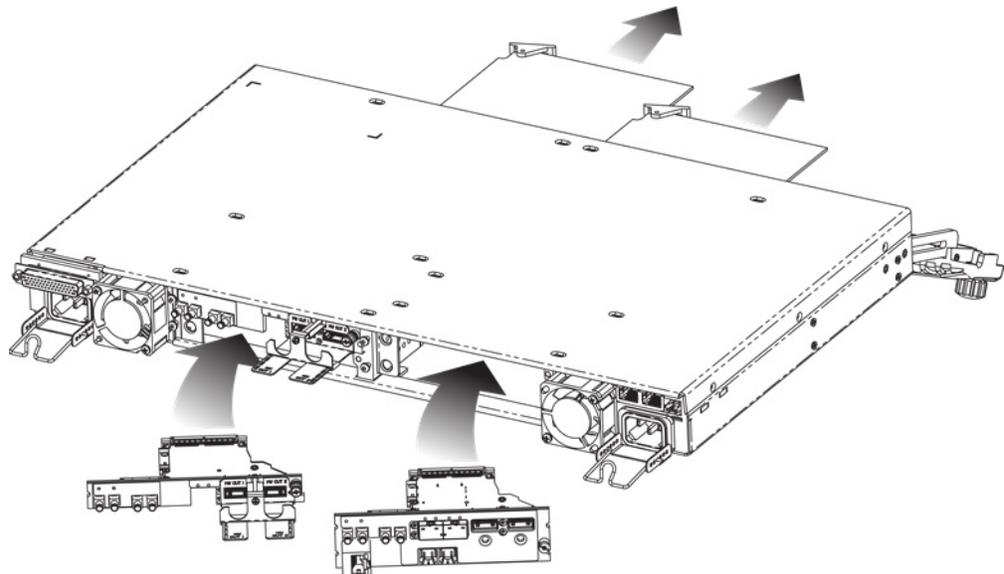
Removing a card

> Note: Removing more than one input card from a Kaleido-Modular-X system in operation is not supported.

To remove a card

1 Open the front door of the frame (see Opening the front door of a Densité 3+ FR1 frame, on page 164).

2 Tilt the swivel handle, on the front of the card you want to remove, to lever the connectors apart, and then use the handle to pull the card straight out of the slot.

3 Close the front door of the frame (see Closing the front door of a Densité 3+ FR1 frame, on page 164).

Installing a card

> Note: The rear panel must be installed before the card. See Replacing rear connector panels on page 166.

To install a card in a Densité 3 or Densité 3+ FR4 frame

1 Open the front door of the frame (see Opening the front door of a Densité 3+ FR4 frame, on page 165).

2 To install a card into an empty slot, slide the card into the slot, and push gently on the handle to seat the connectors.

   Seating input cards requires more pressure. Their rear panels cover up to 5 slots, depending on the model, to accommodate a large number of connectors.

   • In a Densité 3+ FR4 frame, input cards can be installed with a double-width rear panel, in which case they should be inserted into the left-hand slot (for example, if the rear panel covers slots 2 and 3, you must insert the card itself at slot 2).

   • A KMX-3901-IN-8-D input card with a triple rear panel occupies 3 slots and should be inserted in the center slot (e.g. if the rear panel covers slots 4–6, insert the card itself at slot 5).

   • A KMX-3901-IN-16-D input card with a quadruple rear panel occupies 4 slots and should be inserted *one* slot to the left of the rightmost slot (e.g. if the rear panel covers slots 7–10, insert the card itself at slot 9).

   • A KMX-3901-IN-16-Q input card with a quintuple rear panel occupies 5 slots and should be inserted *two* slots to the left of the rightmost slot (e.g. if the rear panel covers slots 11–15, insert the card itself at slot 13).

   • In a Densité 3 frame, output cards must be installed with a double-width rear panel, and they should be inserted into the left-hand slot (for example, if the rear panel covers slots 2 and 3, you must insert the card itself at slot 2).

   Inserting the card into the wrong slot will not damage the card, and will be flagged by the on-card status LED flashing to indicate that there is no connection to the rear panel.

3 Close the front door of the frame (see Closing the front door of a Densité 3+ FR4 frame, on page 165).

To install a card in a Densité 3+ FR1 frame

1 Open the front door of the frame (see Opening the front door of a Densité 3+ FR1 frame, on page 164).

2 To install a card into an empty slot, slide the card into the slot with the swivel handle to the right, and push gently on the handle to seat the connectors. If the card requires a double-width rear panel to accommodate a large number of connectors, it should be inserted into the lower slot. Inserting the card into the wrong slot will not damage the card, and will be flagged by the on-card status LED flashing to indicate that there is no connection to the rear panel.

3 Close the front door of the frame (see Closing the front door of a Densité 3+ FR1 frame, on page 164).

Replacing the Frame Controller Card

To replace a CPU-ETH2 frame controller

1 Open the front door of the frame (see Opening the front door of a Densité 3 frame, on page 163 or Opening the front door of a Densité 3+ FR1 frame, on page 164).

In a **Densité 3** frame, the frame controller card is located to the right of the power supply slots at the center of the frame.

· Hook your finger through the opening at the top of the card.

In a **Densité 3+ FR1** frame, the frame controller card is located on the upper left-hand side of the frame, above the left-hand power supply.

· Grasp the metal handle on the upper left-hand side of the card; the handle will slide out so that it can be gripped properly.

2 Pull gently until the card is released from the rear connector, and then slide the card out of the frame.

Note: Do not pull on the control panel to remove the card.

----

3 Slide the new card into the controller slot, and push gently on the card edge to engage the rear connectors.

4 Be sure to close the front door before operating your Kaleido-Modular-X system, to ensure proper ventilation (see Closing the front door of a Densité 3 frame, on page 163 or Closing the front door of a Densité 3+ FR1 frame, on page 164).

To replace a CPU-ETH3 frame controller

1 Open the front door of the frame (see Opening the front door of a Densité 3+ FR4 frame, on page 165).

In a **Densité 3+ FR4** frame, the frame controller card is located at the top center of the frame.

2   Grasp the lever on the lower right-hand side of the controller beside the display, and pull it straight out until it is fully extended.
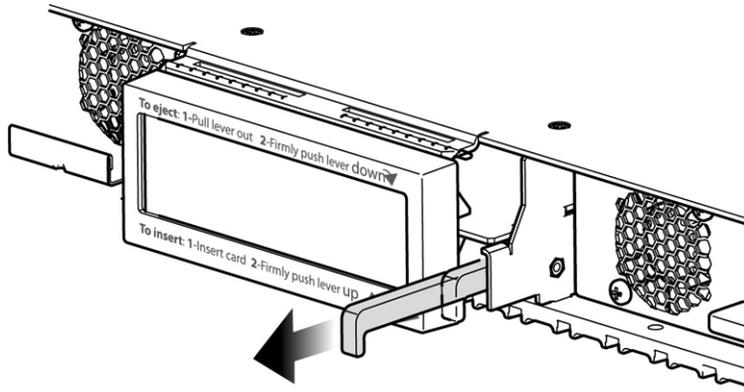
3   Push the lever firmly down to release the controller so that it can slide freely.
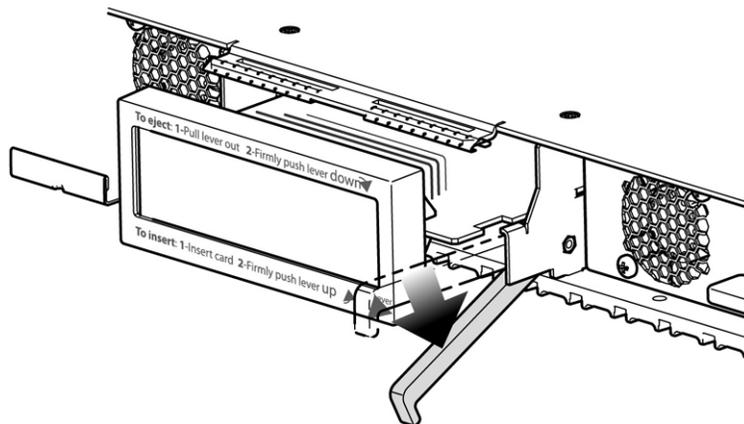
4   Pull gently on the display panel and slide the controller out of the frame.

5   With the lever extended, slide the new controller gently into the controller slot as far as you can until it stops.

    Do not apply any force, as it may damage the controller/display interface.

6   Firmly push the lever up to seat the card in its connectors.
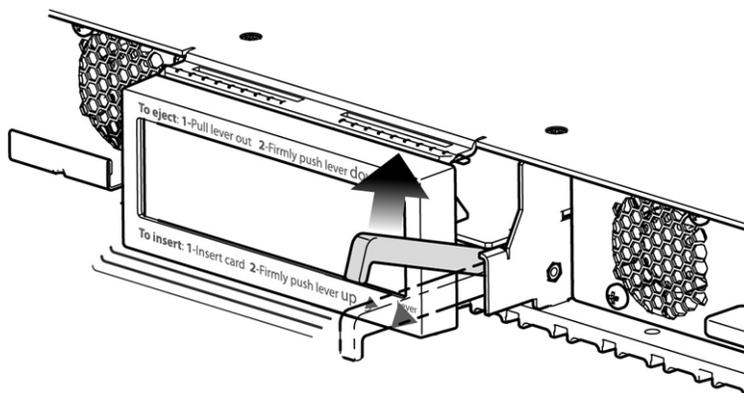
7 Be sure to close the front door before operating your Kaleido-Modular-X system, to ensure proper ventilation (see Closing the front door of a Densité 3+ FR4 frame, on page 165).

Replacing a GPI-1501 Card

In a **Densité 3+ FR1** frame, the GPI-1501 card is located in a special slot, on the upper right-hand side of the frame, above the (optional) right-hand power supply.

To replace a GPI-1501 card

1 Open the front door of the frame (see Opening the front door of a Densité 3+ FR1 frame, on page 164).

2 Tilt the swivel handle, on the front of the card, to lever the connectors apart, and then use the handle to pull the card straight out of the slot.

3 Slide the new GPI-1501 card into the slot — with the swivel handle to the right, if in a 1RU frame —, and push gently on the handle to seat the connectors.

4 Close the front door of the frame (see Closing the front door of a Densité 3+ FR1 frame, on page 164).

Replacing Power Supply Modules

The Densité frames support dual redundant hot-swappable power supplies. The basic configuration includes a single supply, with an empty slot for the optional redundant power supply. Installing a second power supply module and applying power to it automatically engages the redundant supply mode. Each power supply has its own power socket on the rear panel, and should be connected to the AC supply using the power cord that shipped with your hardware, or other approved cord.

Notes

• A single power supply can be installed in either of the two slots. In a 1RU frame, you may prefer to install the power supply module in the right-hand slot to avoid having to remove the controller card should you need to replace the power supply.

• Power integrity is enhanced if the two power supplies are plugged into different circuits.

To install or change a power supply module in a Densité 3 frame

1 Open the front door of the frame (see Opening and Closing the Front Door, on page 163).

2 Remove the controller card, to provide access to the power supply slots (see Replacing the Frame Controller Card, on page 169).

3 Release the retaining spring by turning the captive screw mounted on the lower front panel of the power supply counterclockwise.

4 Remove the power supply module by pulling on the handle on its front panel and sliding it out of the frame.

5 Slide the new power supply module into the slot, and push it gently into position to seat the connectors.

6   Secure the supply in position by turning the captive screw mounted on the lower front of the power supply clockwise.

This engages a retaining spring which holds the supply securely in place.

7   Replace the controller card.

8   Close the front door of the frame (see Opening and Closing the Front Door, on page 163).

To install or change a power supply module in a Densité 3+ FR1 frame

1   Open the front door of the frame (see Opening the front door of a Densité 3+ FR1 frame, on page 164).

2   If you are removing the left-hand side power supply, you must first remove the controller card. See Replacing the Frame Controller Card below.

3   Remove the power supply module by pulling on the handle on its front panel and sliding it out of the frame.

4   Slide the new power supply module into the slot, and push it gently into position to seat the connectors.

There is no guiding slot — the supply base sits on the floor of the frame.

5   If you removed the controller card in step 2, reinstall it (see Replacing the Frame Controller Card).

6   Close the front door of the frame (see Closing the front door of a Densité 3+ FR1 frame, on page 164).

The door secures the power supplies in place.

To install or change a power supply module in a Densité 3+ FR4 frame

1   Open the front door of the frame (see Opening the front door of a Densité 3+ FR4 frame, on page 165).

2   Lift up the latching tab in the front center of the supply.
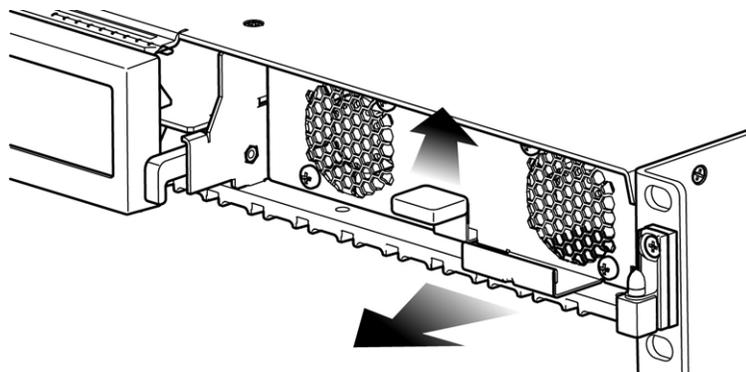
3   Slide the power supply out of the frame by pulling on the bracket on the bottom right of the supply.

4   Slide the new power supply module into the slot, and push it gently into position to seat the connectors.

There is no guiding slot: the supply base sits on the floor of the frame. The latch clicks into position once the supply is properly seated.

5   Close the front door of the frame (see Closing the front door of a Densité 3+ FR4 frame, on page 165).

Cooling Fan Replacement

A cooling fan has moving parts that, over time, can wear out. In the final stages of fan wear out, the fan may make a distinctive sound and it rotates at a slower speed, thereby reducing airflow which undermines its ability to remove heat from electronic circuitry. Under this condition, fan replacement is required.

Also, dust contained in the ambient air can accumulate on the fan and on surfaces around the fan and heatsink, thereby reducing airflow, and preventing air from coming into direct contact with the heatsink surfaces which undermines its ability to remove heat from the electronic component. Under this condition, cleaning is necessary and fan replacement may be required.

Some diagnostic procedures may interrupt normal system operation. Changing a card's cooling fan will interrupt normal system operation. Down time can be minimized by swapping in a new or a known good card to restore system operation quickly. Schedule maintenance operations during off hours when the system is not in use.

Diagnostics

The KMX-3901 card's electronic circuitry generates heat that must be shed by forcing air to move across heat-generating components. Reduced air flow or high ambient temperature results in heat build-up within temperature-sensitive components on the card. This can cause unexpected behavior such as glitches or even a system freeze or shutdown. The multiviewer self-diagnoses high temperature conditions by raising critical temperature and fan alarms.

Critical temperature and fan alarms are reported through the following mechanisms:

- The alarm statuses in XAdmin are called *XXXX fan failed* where *XXXX* identifies the specific fan. For example, *DAP 0 fan failed*.
- A *Fan Failure* message is displayed in the dashboard.

The fan alarm indicates that the fan is not rotating fast enough due to wear and thus it may not provide enough cooling. A fan alarm must be addressed right away. A critical temperature alarm can be ignored if it is accompanied by a fan alarm as the root cause is the fan not rotating fast enough.

Otherwise, if the fan is running properly according to the fan alarm, then the *Critical Temperature Alarm Corrective Actions* steps should be taken.

Critical Temperature Alarm Corrective Actions

If the fan alarm is inactive and the critical temperature alarm is active, then undertake the following diagnostic steps in the following order:

1 Confirm that the room temperature is within multiviewer's operating temperature range specification. If necessary, take corrective actions by, for example, increasing the amount of air conditioning made available to the multiviewer's frame.

2 Confirm that air flow around the multiviewer's frame is not obstructed. If necessary, take corrective actions by, for example, removing obstructions or rerouting cables around and away from the multiviewer's frame.

3 When the previous corrective actions do not eliminate a critical temperature alarm, verify that the Kaleido-Modular-X's onboard fan is working correctly. See Fan Noise below.

Fan Noise

Over time, a fan's performance (operating speed) can degrade which may raise critical temperature and fan alarms. Under this circumstance, a fan may emit a rough-sounding lower pitched sound as compared to the sound that other healthier fans emit. To confirm that the card / module has an abnormally-sounding fan, during off hours when the system is not in use, eject the card or if possible, the module from the multiviewer's frame to verify that the distinctive sound stops and take corrective actions (see below).

Or there may be no sound at all if the fan's rotation is completely blocked. While the card / module is in the multiviewer's frame, make a visual inspection with a flashlight to confirm fan rotation. If the fan is not rotating, then corrective actions must be taken.

Fan Alarm and Fan Noise Corrective Actions

When a fan alarm is raised, it must be addressed right away. During off hours when the system is not in use, eject the card or if possible, the module from the multiviewer's frame and inspect the fan assembly: remove any accumulated dust and dirt from the card / module with compressed air and remove any obstruction to the fan's ability to freely rotate.

Reinsert the card / module into the multiviewer's frame and restore system operation to see if the fan alarm becomes inactive.

The multiviewer's circuitry monitors the fan motor's rotational speed to detect that the fan is rotating fast enough to provide sufficient cooling; it raises a fan alarm when the fan's rotational speed has gone below a factory-set threshold.

When the fan is not rotating fast enough (as detect by a fan alarm), is making abnormal noises, or is not rotating at all, the fan is worn out and it must be replaced with a new one.

Fan Replacement Kit

The replacement fan kit is available by contacting Customer Support. See , on page 210. The location of the card's part number and serial number is shown below.

Identifying the Fan to Replace for a Fan Fail Alarm

As some cards / modules have more than one fan, identify in XAdmin the specific fan to be changed on the card / module: check each card / module individually in XAdmin for a fan

fail alarm. When there is a fan fail alarm for a fan in some modules, the entire fan assembly must be replaced.
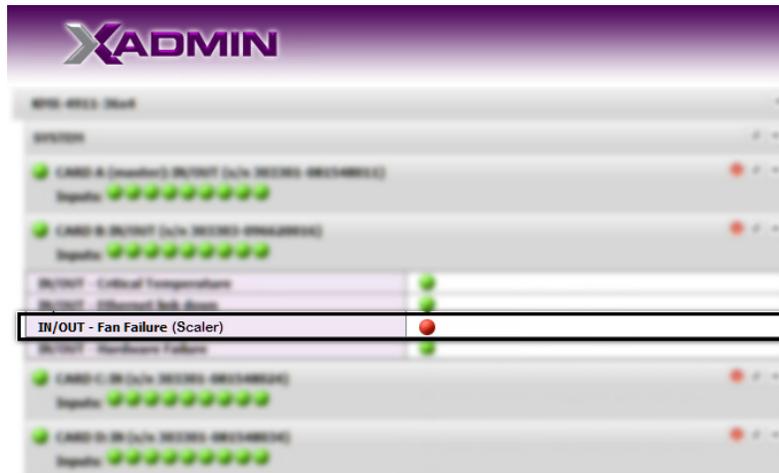
Fans are located on certain cards and within the multiviewer's frame. To replace a fan:

- on a card, see Replacing KMX-3911 Card Fans, on page 176.
- within the multiviewer's frame, see Replacing Frame Ventilation Fans, on page 180.

Replacing KMX-3911 Card Fans

> Note: Fans must be connected to their intended power connector shown in the tables below for XEdit to be able to correctly identify the specific fan that has failed.

The location of the fans on the KMX-3901-IN card are shown below. The number of fans on a card depends on the model.
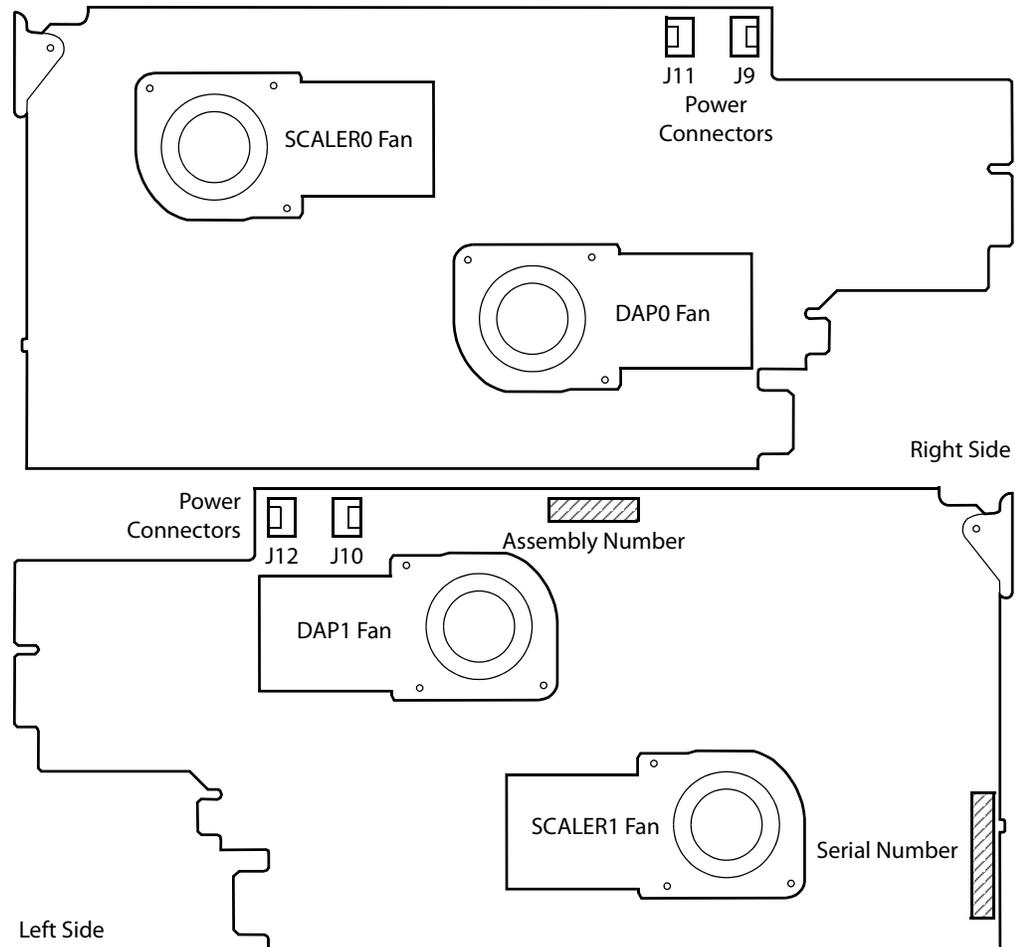
XEdit Fan Fail Alarm	Applies to model			Uses Power Connector
	KMX-3901-IN-8-D	KMX-3901-IN-16-D	KMX-3901-IN-16-Q	
SCALER0 Fan Failed	●	●	●	J11
DAP0 Fan Failed	●	●	●	J9
DAP1 Fan Failed		●	●	J12
SCALER1 Fan Failed			●	J10

The location of the fan on the KMX-3901-OUT card is shown below.
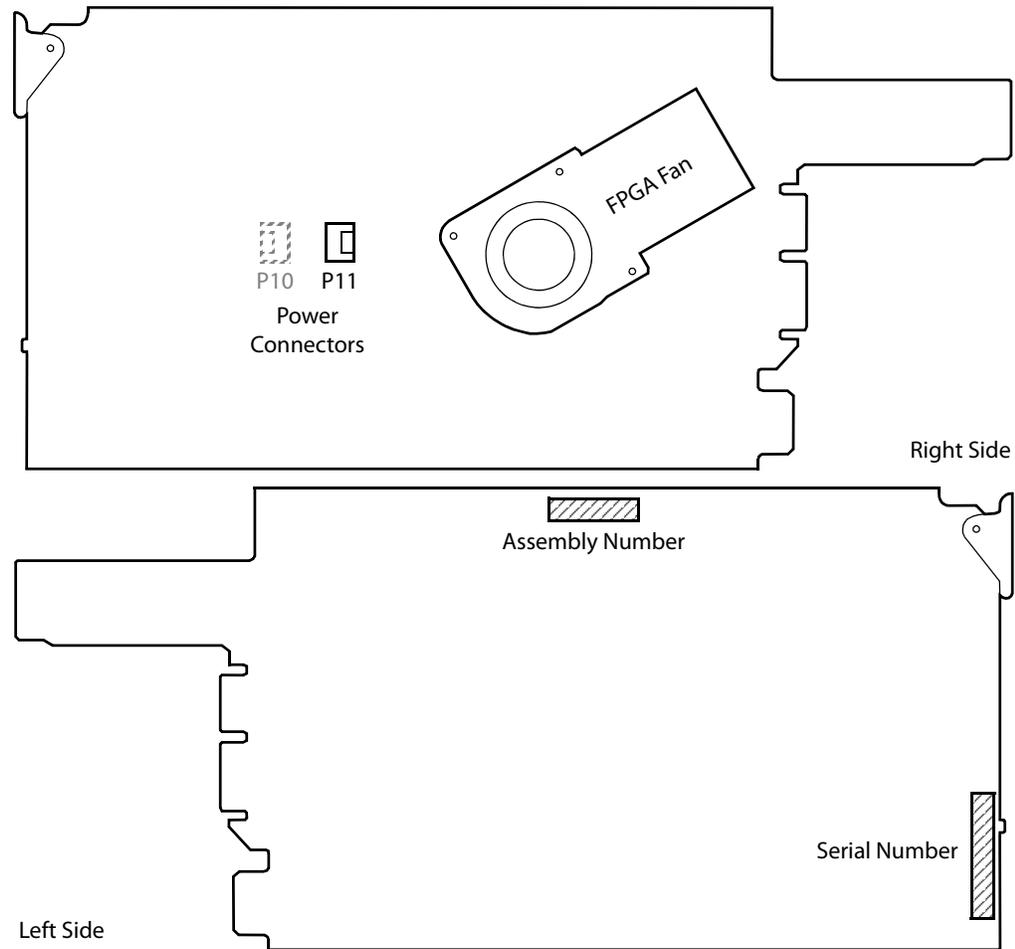
XEdit Fan Fail Alarm	Uses Power Connector
FPGA Fan Failure	P11

Fan Replacement Kit

The fan replacement kit is available by contacting Customer Support. See , on page 210. The location of the card's part number and serial number is shown in the illustrations above.

Required Tools

The following field-supplied material is required:

- Compressed air to remove dust from the card.
- Flashlight to perform a visual inspection to confirm fan rotation.
- Phillips screwdrivers:
  - #1 jeweler's screwdriver with a miniature shaft to remove the fan from the fan cover assembly and install the replacement fan back onto the fan cover assembly.
  - #2 screwdriver to remove and install the fan cover assembly.

- Curved tweezers to disconnect the fan's power connector from the KMX-3901 card.
- Anti-static bag or anti-static work surface to reduce the possibility of electrostatic discharge damage to the card.
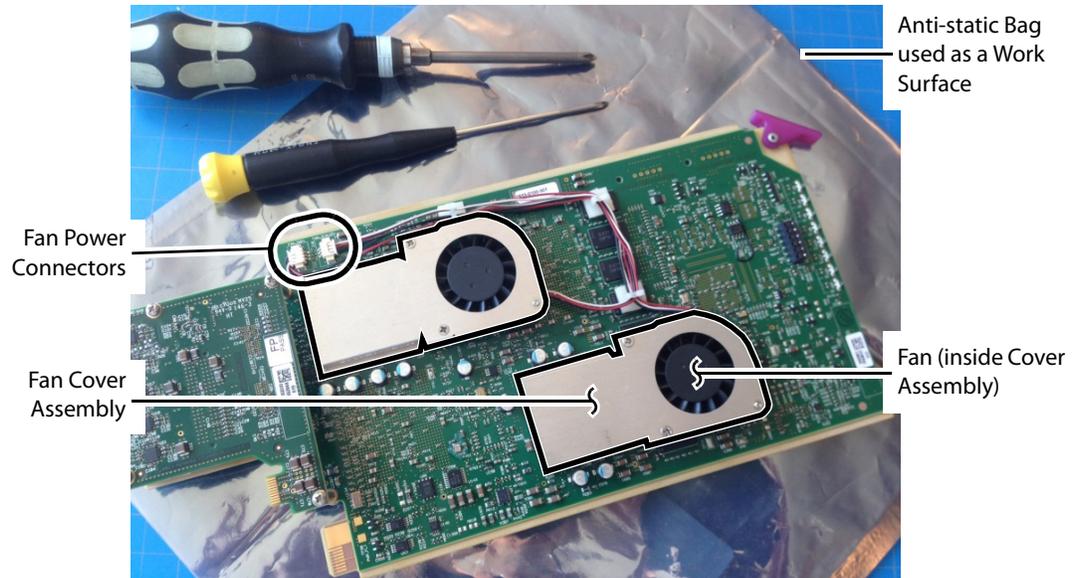
Typical card with onboard fan, screwdrivers, tweezers, and anti-static bag

To replace a fan

1 During off hours when the system is not in use, eject the card from the multiviewer's frame. See Replacing Cards, on page 165.

2 Place the card on an anti-static bag or anti-static work surface.

3 Using curved tweezers, disconnect the fan power connector plug, very carefully; gently wiggle the connector plug from the socket (jack). Do not pull on the wires. If the wires are routed through wire holders, remove the wires from the holders first, before disconnecting.
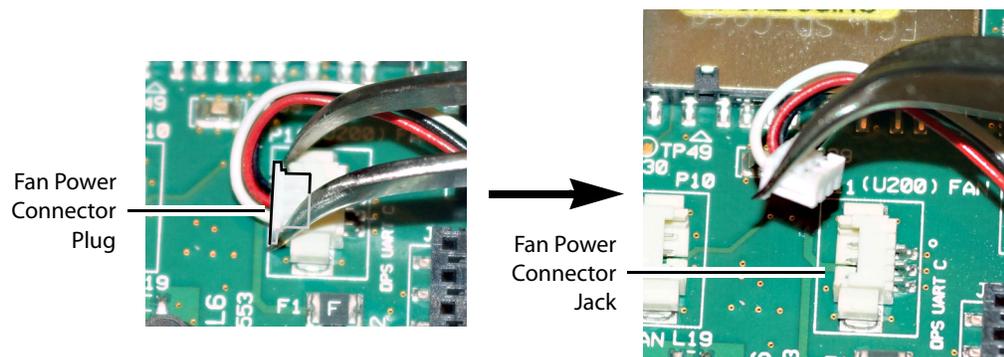
4 Free up the fan cover assembly by removing the 2 screws in the middle.

Once the 2 screws are removed, remove the fan cover assembly.
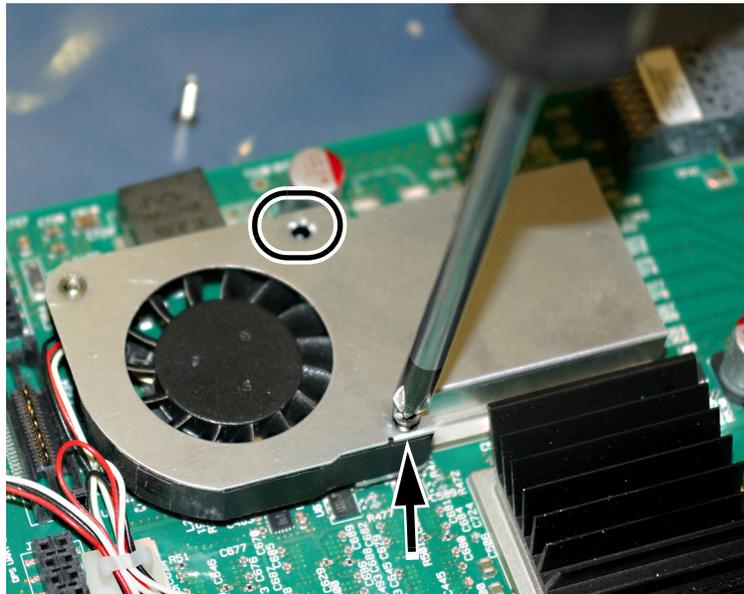
5 Flip the fan cover over, and remove the last screw holding the fan with the #1 Phillips screwdriver.
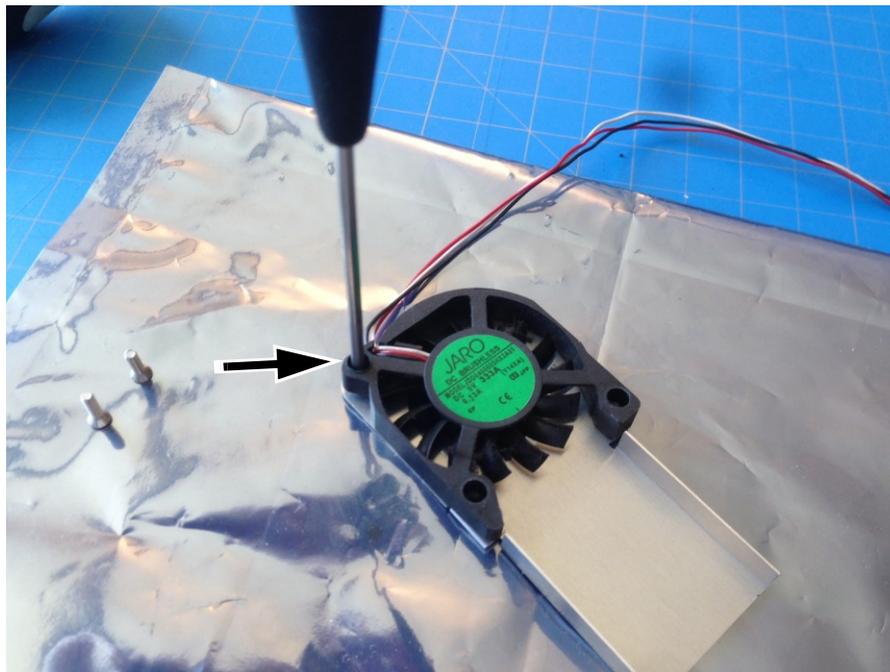
6 Remove any accumulated dust from the card with compressed air.

7 Replace the fan with the new one, and replace all screws, in the reverse order.

8 Route the fan's power wires through the wire holders, and make the connection to the card's fan power connector.

9 Restore system operation by inserting the card back into the multiviewer's frame. See Replacing Cards, on page 165.

Put the multiviewer into operation and confirm that the critical temperature and fan alarms remain inactive.

Replacing Frame Ventilation Fans

The main cooling fans on the rear of Densité frames may be replaced in case of failure. Replacement fans are Grass Valley part number 1844-3000-200 for a Densité 3 frame, #03007-2100-100 for a Densité 3+ FR4 frame, or #0969-2100 for a Densité 3+ FR1 frame. The fan replacement kit is available by contacting Customer Support. See , on page 210.

Replacing the frame ventilation fan in a Densité 3 frame

To replace the frame ventilation fan in a Densité 3 frame

1 Remove the two screws that secure the grill and fan unit to the frame.

Retain the screws and grill, as they will be used with the replacement fan.

2 Pull the unit away from the frame, and disconnect the power feed by grasping the connector and pulling straight out.

Grass Valley uses two different fan units for this product. While they are electrically equivalent, they have slightly different dimensions. The fan is installed with two screws located on opposite corners. The mounting plate has two sets of corner holes — one to fit each of the available fan models.

3 Start installing your new fan unit with one corner screw, and then try the diagonally opposite corner to see if it fits. If not, use the other pair of corners.

These two fan units also have different power connection configurations. There are two identical power connectors available on the frame for the fan's power cable. When you install the fan, you will be able to tell which one you should use: only one will be within reach.

4 Grasp the power connector attached to the fan assembly, and push it onto the appropriately-located power outlet inside the cutout on the rear panel.

5 Use the two screws you retained from the old fan, to install the new fan and grill.
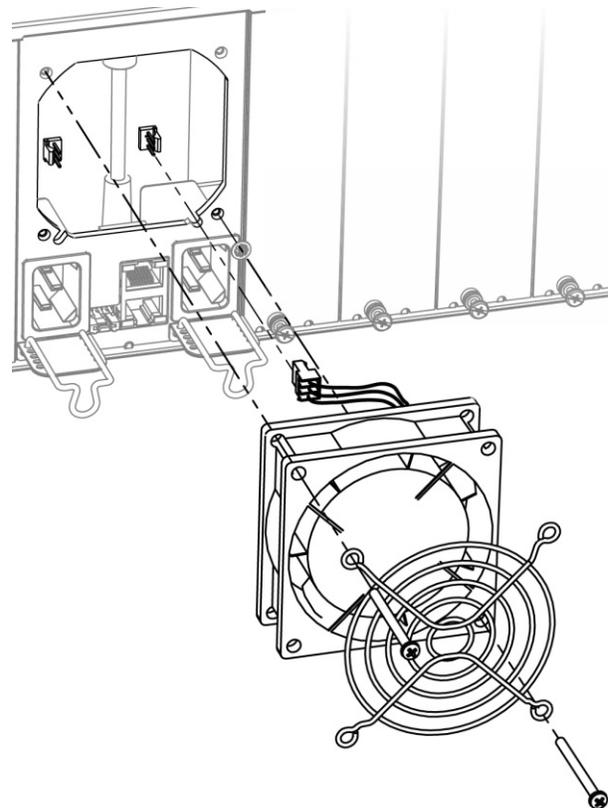
Replacing the frame ventilation fan in a Densité 3+ FR1 frame

To replace the frame ventilation fan in a Densité 3+ FR1 frame

1   Remove the two screws that secure the fan assembly to the frame, and pull the fan assembly straight out of the frame.

   Retain the screws, as they will be used with the replacement fan.

2   Slide the new fan assembly into the opening on the rear panel, pushing it straight in, and ensuring that the connector on the assembly mates with the socket in the frame.
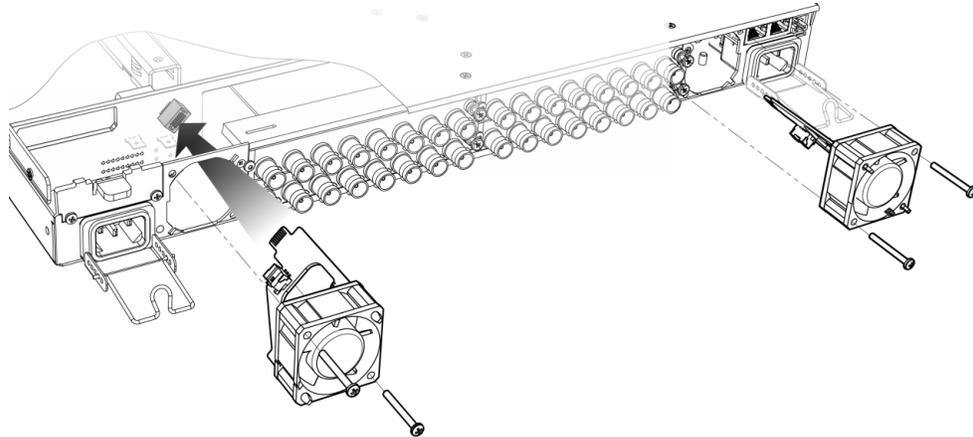
   The two ventilator fans are mounted at different angles, as shown in the above figure.

3   Align the circuit board on the fan assembly with the notches in the edge of the rear-panel opening (see arrows in figure at right) to ensure the correct alignment.

   The socket into which the circuit board connects is hidden from view by the fan assembly during installation and there is no guide to ensure that they are aligned. The easiest way to make sure that the connector and socket have mated properly is to install the fan with the frame power turned on. You will hear the fan start up when the connection is made.

4   Use the two screws you retained from the old fan, to secure the new fan assembly to the rear panel.
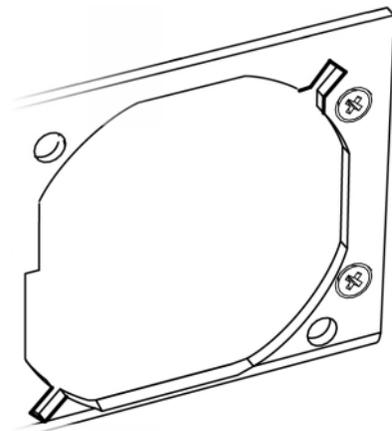
Replacing the frame ventilation fan in a Densité 3+ FR4 frame

To replace the frame ventilation fan in a Densité 3+ FR4 frame

1   Remove the two screws (top left and bottom right corners) that secure the fan assembly to the frame, and pull the fan assembly straight out of the frame.

   Retain the screws, as they will be used to install the replacement fan assembly.

2 Slide the new fan assembly into the opening on the rear panel, pushing it straight in, and ensuring that the connector on the assembly mates with the socket in the frame.
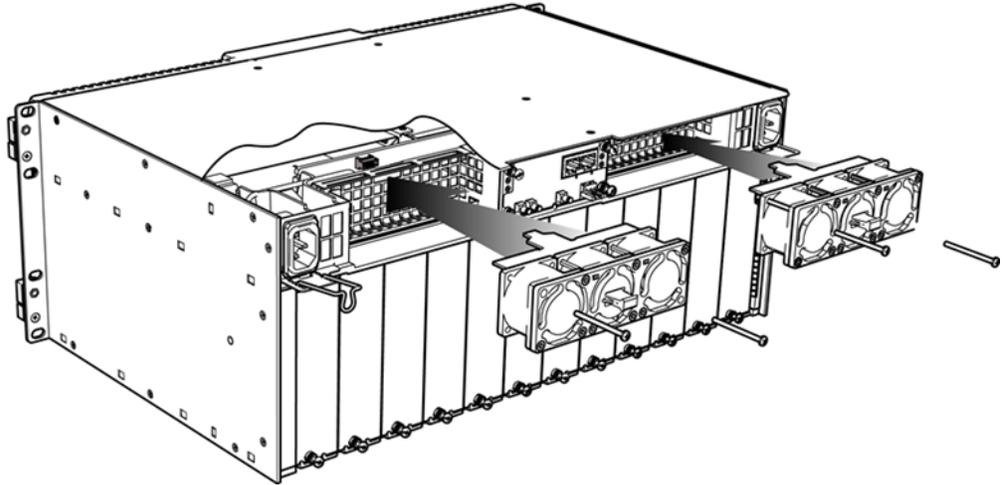
3 Use the two screws you retained from the old fan, to secure the new fan assembly to the rear panel.

Replacing the Frame's Air Filter

You may remove the air filter for cleaning or replacement.

To remove the air filter in a Densité 3 or Densité 3+ FR1 frame

1 Open the front panel of the frame (see Opening the front door of a Densité 3+ FR1 frame, on page 164).

2 Grasp the top of the filter installed on the rear of the door, and pull it gently out of its mounting slot.

To install a filter in a Densité 3 or Densité 3+ FR1 frame

1 Slide the filter into the slot at the bottom of the front panel door, and ensure that the filter is not bunched or folded.

2 Close the front panel of the frame (see Closing the front door of a Densité 3+ FR1 frame, on page 164).

To remove the air filter in a Densité 3+ FR4 frame

1 Open the front door of the frame (see Opening the front door of a Densité 3+ FR4 frame, on page 165).

2 Lift the door up to slide it off the hinge pins, and lay it face down on a work surface.

3 Undo the captive thumbscrew at one end of the filter retaining bar.

4 Slip the other end of the retaining bar out of its slot.

5 Pull the filter away from the faceplate, by slipping it off the retaining hooks at the four corners.

To install a filter in a Densité 3+ FR4 frame

1 Orient the filter so the cutout for the controller display window lines up with the window in the frame door.

2 Slip the holes in the four corners of the filter over the hooks on the door panel.

3 Insert the tip of the retaining bar into the slot on the hinge end of the door.

4 Tighten the thumbscrew on the other end of the retaining bar to hold it in place.

5 Install the door onto the frame by sliding it down onto the hinge pins.

6 Close the front panel of the frame (see Closing the front door of a Densité 3+ FR4 frame, on page 165).

Generating a System Snapshot

A system snapshot creates a compressed file that contains information that can be used by Technical Support for troubleshooting purposes.

To generate a system snapshot

1 Open XAdmin. See Opening XAdmin on page 105.

   The XAdmin Status and Options page appears.
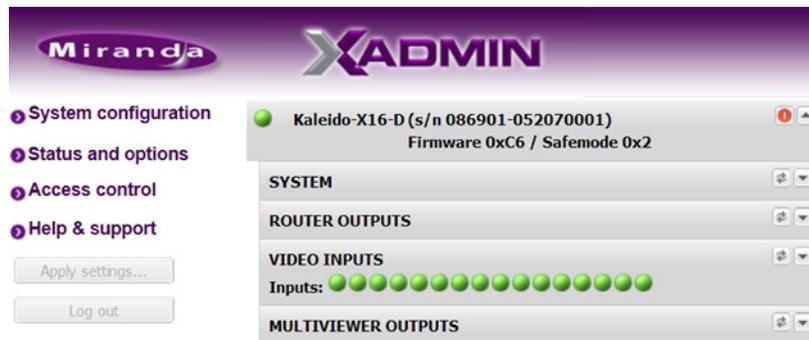
2 Click the **Help & support** link in the navigation pane.

   The Technical Support page appears.

Click here
... or here

3 Click **system snapshot**.

The system snapshot generation may take a few moments, after which your browser prompts you to save the resulting compressed folder to your hard drive.

4 Browse to the location where you want to save the ZIP file, and then click **Save**.

Upgrading the Multiviewer System

Whenever possible, upgrade the multiviewer to use the latest Kaleido Software version number to take advantage of the latest bug fixes and stability enhancements. See the Kaleido Software Release Notes for more information about a Kaleido Software release.

IMPORTANT

Back up your system database
Before upgrading the multiviewer system, make sure you have a backup of the current system database. Refer to *Creating a Backup* in the Kaleido Software User's Manual, for details. See Related Documentation, on page 11.

Cluster systems
All multiviewers that are part of a cluster system must use the same Kaleido Software version. For cluster systems, Kaleido Software versions 8.70 and 6.50 introduce a hard compatibility break with previous Kaleido Software versions.
Cluster backups you create with version 8.70 and 6.50 (or higher), cannot be restored by using an earlier version of XEdit. Grass Valley recommends you make a backup of the individual databases for every cluster member, *before upgrading* from a pre-8.70 or pre-6.50 version, to version 8.70 or 6.50 (or higher) respectively.

Virtual alarms used in iControl Web pages
The internal representation of virtual alarms has changed as of version 6.30 of the Kaleido Software. If you are upgrading the multiviewer from a version prior to 6.30, then, once the upgrade is completed, it will be necessary to reassign any virtual alarms that were created on the multiviewer before the change, and used in iControl Web pages. Virtual alarms created in iControl are not affected.

Upgrade packages are available for download. See Software and Firmware Updates, on page 12. The upgrade package contains:

- the Kaleido Software Upgrade Manager application required to upgrade the multiviewer.
- one or more Kaleido Software operating system (`.os`, `.zip`, or `.run`) files.
- documentation, including the Installation & Service Manual.

If you do not have the upgrade package, contact Grass Valley Technical Support (see Grass Valley Technical Support, on page 210).

You will need a USB key (not supplied) and a mouse to perform an upgrade of the Kaleido-Modular-X system. The USB key should be USB 2.0 compliant, have a capacity of at least 1 GB, and must be formatted using the FAT32 file system. See Upgrading the Multiviewer Using a USB Key on page 185.

Upgrading the Multiviewer Using a USB Key

IMPORTANT

Before upgrading the multiviewer system, review the following.

The *first time* you upgrade this multiviewer, *from version 7.80 R5 (or earlier) to version 7.82 (or later),* expect an additional delay, after the multiviewer has restarted at the end of the installation process. See Multiviewer input cards on page 190.

Upgrading the multiviewer from version 7.50 or earlier
Version 7.51 of the Kaleido Software introduced a change in the location of URS time code information in the system representation. *After the upgrade,* connect XEdit to your multiviewer, and review the sources table, to locate text, alarm, or time code levels with assignments marked in red.
If you found assignments marked in red
1 Click an affected level, and then expand the SYSTEM module in the filtered System list.
2 Locate the appropriate element, and then drag it onto the affected level.
3 Repeat until all assignments related with URS time code have been restored. Use the incremental copy tool, or the logical source template, as needed.

Upgrading the multiviewer may require a controller upgrade
To fully benefit from the auto recovery features introduced in Kaleido Software version 7.20, the multiviewer require a controller with at least version 2.2.0 of the CPU-ETH2 firmware, and a 4 GB CompactFlash storage card.

Upgrading from a version prior to 6.60
Version 6.60 of the Kaleido Software introduced a change in the **alarm debouncing calibrations,** which could result in alarms being raised earlier and more frequently, after upgrading. The following properties have been removed from the list of configurable parameters: **Occurrences** and **Detection window**. After the upgrade, the system behavior will be based on *1* occurrence of an alarm event. A detection window is no longer used.

If, prior to the upgrade, the **Occurrences** parameter was set to a value other than *1,* then you will need to revise the **Set duration** value after the upgrade to take this change into account. For example:
• **Before the upgrade** — If you had the following settings: Occurrences = 3, Duration = 5 seconds, before the upgrade, then an alarm would be raised after 15 seconds.
• **After the upgrade** — The former settings will be replaced with the following: Set duration = 5 seconds, and the alarm will be raised after 5 seconds.
In this example, after the upgrade, you should set the **Set duration** parameter to 15 seconds to maintain the same behavior.
It is recommended to review and note down the alarm debouncing calibrations prior to the update, and to re-calibrate the alarm debouncing as needed after the upgrade.

To upgrade your multiviewer

1 Copy the upgrade package files to a USB key (see Preparing a USB Key, on page 186).

2 Upgrade your multiviewer's Kaleido Software and firmware from the USB key (see Upgrading the Kaleido Software and Firmware, on page 188).

3 Verify the version number to confirm that the upgrade was successful (see Verifying the Version Number, on page 190).

Preparing a USB Key

To copy all files required for the upgrade to a USB key

1 Download the update files onto your PC's hard drive. See Software and Firmware Updates, on page 12.

2 Insert a USB key into one of your PC's USB ports.

3 Locate and open the Kaleido-Modular-X Upgrade Manager application (XUpdate).
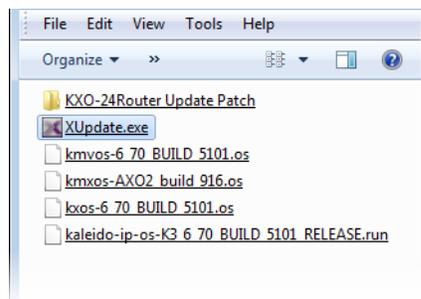
4 On the startup screen, click **KMX-3901 update**.

5 When prompted to select a type of update, click **Smart update (recommended)**.

> **Update Type**
>
> Please select the type of update you wish to perform on your Kaleido-X or Kaleido-X16.
>
> [Smart update (recommended)]   [Total update (no prompt)]   [Cancel]
>
> Smart update will review your system and install only the new or modified features.
> The system will prompt for confirmation before restarting.
>
> Total update will install the complete version of the Kaleido-X Software, including all
> software, firmware and FPGA elements.
> Once the installation has completed, the system will restart automatically.

> **Note:** If you click **Total update (no prompt)**, then the update process, once initiated, cannot be halted. This option should only be used to recover from a failed upgrade.

6 If the **Select USB Drive** window appears, click the letter corresponding to the USB key you inserted in step 2, and then click **Select**.

> **Select USB Drive**
>
> E:
> G:
>
> [Select]
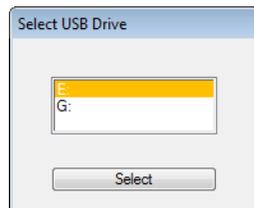
7 When prompted to select an update file, locate and open the following Kaleido Software operating system file: `kmxos-8.70_build_xxxx.os`

The `.os` file will be copied to the USB key. This may take a few minutes.

When the copying process has finished, a message appears.

> **Update**
>
> Update ready to be performed.
>
> Unplug the USB drive from this computer, and insert in any USB connector on the multi-viewer.
>
> Then, follow instructions and progress on the bottom left of the monitor wall.
>
> [OK]
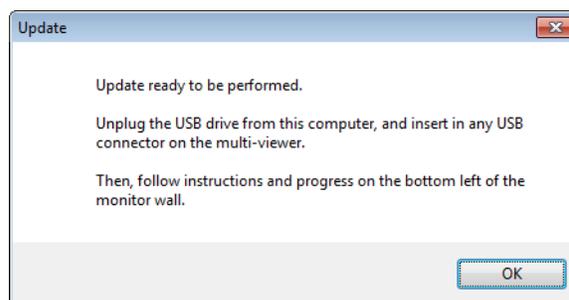
8 Click **OK**.

9 Click **EXIT** on the startup screen.

10 Click the **Safely Remove Hardware** icon 🔌 in your desktop's notification area, and then click the USB key on the menu. When a message informs you that it is safe to remove the key, do so.

Upgrading the Kaleido Software and Firmware

At this point, you are ready to upgrade the Kaleido system software and firmware. The multiviewer should be powered up, with an active monitor wall display. You will need access to the monitor wall to observe the progress of the upgrade, and you will use a mouse to trigger a system restart from the monitor wall, once the upgrade has completed:

- If you have a Kaleido-RCP2, make sure that it is connected, and that you can use the mouse to move the pointer on the monitor wall. If the mouse is unresponsive, try rebooting the Kaleido-RCP2 by pressing ENTER+ESC+DEL on the Kaleido-RCP2's keypad.
- If your system does not include a Kaleido-RCP2, connect the mouse directly to a USB port on the multiviewer, and then make sure you can move the pointer on the monitor wall. See Troubleshooting with the card's front edge USB connector, on page 193 for more information about using the USB port on the multiviewer.

To upgrade the Kaleido system software and firmware

1 Insert the USB key into any USB port on the multiviewer. After a while, a message appears at the bottom left corner of the monitor wall, reporting that the Upgrade Manager is verifying software, firmware, and safe mode versions.

Upgrade dashboard

Click here to show or hide details
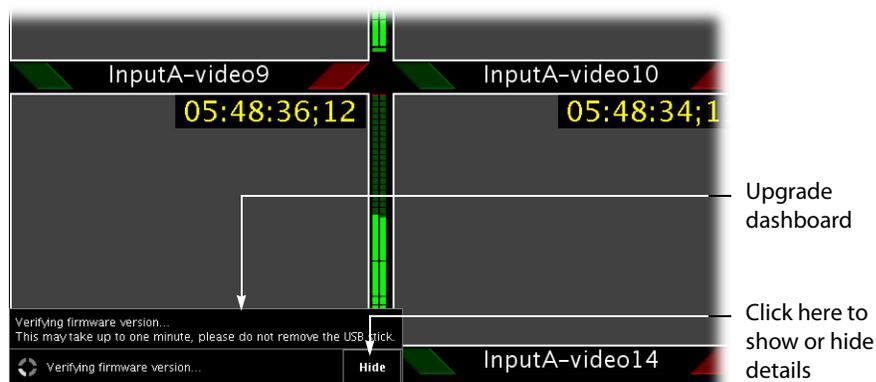
Note: You can click the **Details** button to view more information. The button label alternates between **Details** and **Hide**.

The firmware verification process may take a minute or so.
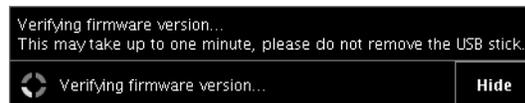
2 Once the verification process is complete, you will be advised what upgrade action, if any, needs to be performed.

```
Your system needs to be upgraded:
  GPI-GEN        will be upgraded to:   Firwmare to 0x19
  INPUT A        will be upgraded to:   Firwmare to 0x46
  OUTPUT D/EXP.  will be upgraded to:   Firwmare to 0x36 Software to 3.00 build 3607

Upgrade needed on the system                              [ Hide ]
                UPGRADE starting in 20 sec. Click to ABORT.
```

> **IMPORTANT**
> **To cancel the upgrade process, you must click to ABORT within 30 seconds.**

3 The upgrade process begins automatically, starting with the Kaleido Software upgrade.

```
Upgrading software to 3.00 build 3607
  OUTPUT D/EXP.  Upgrading software to 3.00 build 3607  ⟨ ⟩

Software upgrade in progress, please wait. DO NOT REMOVE USB DRIVE.  [ Hide ]
```

> **IMPORTANT**
> All cards are updated in parallel, during which time their status LEDs will be flashing red. Do not interrupt this process. Do not insert or remove cards while an upgrade is in progress.

4 Once the Kaleido Software upgrade is complete, the firmware upgrade begins.

```
Firmware upgrade in progress, please wait. DO NOT REMOVE USB DRIVE.
  GPI-GEN        upgrading page 23 of 456
  INPUT A        upgrading page 46 of 5579
  OUTPUT D/EXP.  upgrading page 46 of 3071

Firmware upgrade in progress, please wait. DO NOT REMOVE USB DRIVE.  [ Hide ]
```
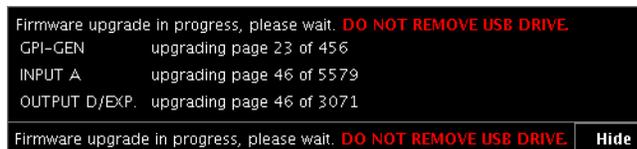
> **Note:** Should the upgrade dashboard report that some cards' software upgrade could not be completed, then proceed with
>
> ```
> A software upgrade could not be successfully completed, see below:
>   INPUT A      Software upgrade failed.
>   INPUT B      Upgrade completed successfully.
>   INPUT C      Upgrade completed successfully.
>   INPUT D      Upgrade completed successfully.
>   OUTPUT A     Upgrade completed successfully.
>   OUTPUT B     Upgrade completed successfully.
>
> Upgrade failed                                          [ Hide ]
> ```

When the entire upgrade process has successfully completed, a red button appears at the bottom of the dashboard on all displays that are connected to the system.

```
        Upgrade complete. Click here to restart the system.
```

5 Click any of the **Upgrade complete** buttons to restart the system.

Note: When the firmware upgrade (or downgrade) process involves several cards (e.g., a fully populated expansion system), the dashboard may still be displaying firmware upgrade progress messages while the **Upgrade complete** button has already appeared. You can safely click the button to restart the system at this point.

The multiviewer now restarts.

IMPORTANT

Multiviewer input cards

If this is the *first time* you upgrade this multiviewer *from version 7.80 R5 (or earlier) to version 7.82 (or later),* then an additional update process will now start on the *input* cards. This may take up to 20 minutes, after which the input cards will automatically restart. When you next upgrade your system the entire input card update will take place at the same time as the output card update, and no additional card restart will be required.

Troubleshooting an Incomplete Upgrade

Should the upgrade dashboard report that some cards' Kaleido Software upgrade failed, then follow the troubleshooting steps below to bring the update to completion.

To bring a partially failed upgrade to completion

- If your system includes *only one output card,* and it failed to be upgraded, remove the USB key, and then repeat the upgrade procedure (see Upgrading the Multiviewer Using a USB Key, on page 185).
- If the upgrade was successful on at least one output card, then:

  a Power down every *output* card by tilting its swivel handle, to lever the connectors apart, and then use the handle to pull the card part way out of its slot.

  b Power down the *input* cards, in the same fashion.

  c Reseat a successfully updated *output* card.
  This card becomes your system's *master* card.

  d Once the master card's startup process has completed, reseat all other cards.

At this point, the system will recognize that the Kaleido Software version on some cards does not match the master card's version, and a *live update* process will start, to automatically bring all cards to the same version. At the end of the process, all updated cards will automatically restart.

Verifying the Version Number

You can verify the new version number by displaying the dashboard on the monitor wall or, in the case of a Kaleido-Modular multiviewer, by using the control panel on the Densité housing frame (see Displaying the System's Version Number for a Kaleido-Modular Multiviewer, below).

Displaying the Dashboard

To display the dashboard

1 Right-click anywhere on the monitor wall. On the menu, point to **Monitor wall**, and then click **Show dashboard** to display the dashboard associated with the current head.
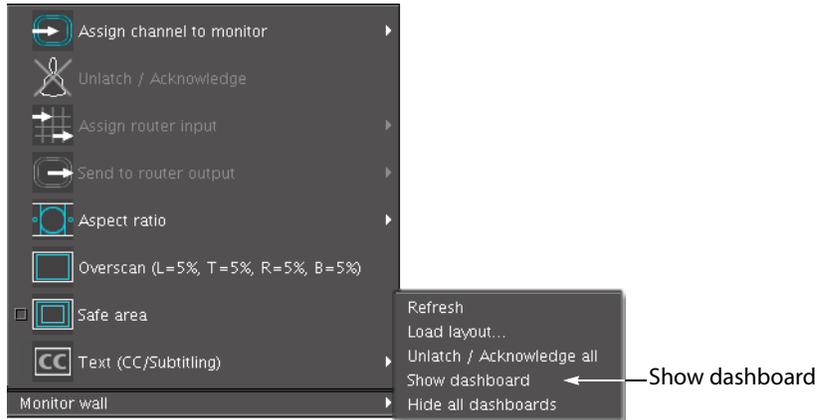
Monitor wall menu (within composite monitor menu)

Note: If you right-click the monitor wall background directly, then the monitor wall menu appears immediately. Click **Show dashboard**.
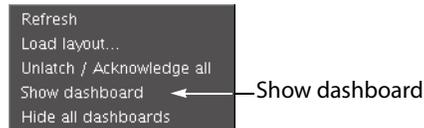
After a brief delay, the dashboard appears at the bottom-right corner of the monitor, and the command **Hide dashboard** replaces **Show dashboard** on the menu.

Dashboard on the monitor wall

Displaying the System's Version Number for a Kaleido-Modular Multiviewer

To display the system's version number on the Densité control panel

1 Press the Select button on the front edge of the Kaleido-Modular card. See See Card Interfaces and Troubleshooting on page 63

The Status LED on the selected card flashes orange, and the associated control menu appears on the display of the Densité frame's local control panel.

2 On the local control panel, press the [–] button.

The version of the Kaleido Software that is running on the card (e.g., "8.70-build.21") appears on the display.

3 Press the Select button on the front edge of the Kaleido-Modular card to exit the control menu.

Downgrading the Multiviewer System

> IMPORTANT
> Before downgrading your Kaleido Software system, review the following.

- **Alarm debouncing may need to be recalibrated:** before downgrading from version 6.60 (or later) to version 6.50 (or earlier) of the Kaleido Software, make sure to review your system's alarm debouncing calibrations, some of which you may have to modify if you wish to maintain the same behavior. See Upgrading from a version prior to 6.60, on page 185 for details.
- Kaleido-MX and Kaleido-Modular-X multiviewers that have two output cards, and are used to monitor URS time code information should not be downgraded to a version earlier than 7.51 (see Upgrading the multiviewer from version 7.50 or earlier, on page 185).
- Kaleido-Modular-X multiviewers with output cards that shipped with version 7.40 (or later), initially or after repairs, cannot be downgraded to a version earlier than 7.40.
- **CPU-ETH2 compatibility:** Kaleido-Modular-X multiviewers housed in a Densité frame with a controller card that has *version 2.2.0 (or later) of the CPU-ETH2 firmware* cannot be downgraded to a Kaleido Software version earlier than 7.20.
- Kaleido-Modular-X multiviewers can otherwise not be downgraded to a version earlier than 7.00.
- **Router control:** as of Kaleido Software version 4.00, router configuration changes made in Router Manager Configurator are not compatible with earlier versions of the Kaleido Software. Downgrading is supported but any change to the router configuration made in Kaleido Software version 4.00 or later will be lost during the downgrade. After downgrading, any router configuration will have reverted to what it was before the last upgrade.

To downgrade your multiviewer to an earlier version of Kaleido Software

- Follow the upgrade instructions in the Release Notes that were published for the Kaleido Software version you want to downgrade to.

Troubleshooting

Troubleshooting with the card's front edge USB connector

A USB mouse can be directly connected to the multiviewer card for troubleshooting purposes (as opposed to connecting the mouse to a Kaleido-RCP2, for instance) with the following conditions.

- The pointer can only travel between the displays supported by that card.
- When more than one display is connected to the card, the required mouse movement to go between displays does not always follow the wall layout set in XEdit. For example, you will have to move the mouse pointer horizontally or vertically in order to go from one display to the next.

Dashboard Messages

The following tables explain messages that may appear in the *Status dashboard* (lower right corner) and in the *Upgrade dashboard* (lower left corner), on the Monitor wall.

Status dashboard messages

Message	Description
Duplicate IP Address Detected	Another equipment on the network shares the same IP address as an output card.
Duplicate frame IP address	Another equipment on the network shares the same IP address as the multiviewer system (in a multiple output card setup).
Ethernet Link Down	The output card to which this display monitor is connected has lost its network connection.
Card temperature critical	Card is overheating, which might result in decreased system performance (e.g., green dots, flickering, card not starting). You should halt operations until the overheating problem is resolved.
Card temperature high	Temperature warning; this indicates that the card is warmer than normal and that you should verify cooling and ventilation (e.g., check for anything obstructing the ventilation openings).
Critical voltage upper limit reached	One of the voltages is above its critical threshold.
Critical voltage lower limit reached	One of the voltages is below its critical threshold.
Critical current upper limit reached	Current or power is above its critical threshold.
FPGA fan failed	FPGA fan failed
Firmware status	Tells whether firmware is running properly on the card.
HDMI 0 power failed	HDMI output for first head has a power failure.
HDMI 1 power failed	HDMI output for second head has a power failure.

Specifications

This chapter lists equipment specifications for the Kaleido-Modular-X input, output, and companion cards, and their rear panels.

KMX-3901-IN Input Cards

The KMX-3901-IN-8-D cards support 8 signal inputs. The KMX-3901-IN-16-D and KMX-3901-IN-16-Q support 16 signal inputs. The supported video input types include SD-SDI, HD-SDI, 3G-SDI, and 4K UHD[7] (auto-detected). The processing delay is two fields if the video inputs are genlocked, and two or three fields if the video inputs are not genlocked. In rotation mode the processing delay may increase by one field. Signal inputs require DIN 1.0/2.3 connectors.

Video Inputs

SD-SDI inputs

Signal	4:2:2 SMPTE ST 259-C (270 Mbps), SMPTE ST 272
Formats	525 and 625
Audio	SMPTE ST 274
Return loss	> 15 dB up to 270 MHz
Alignment jitter (100 kHz)	< 0.2 UI
Timing jitter (10 Hz)	< 1 UI
Cable length	250 m (820 ft) (Belden 1694A) 150 m (492 ft) (Belden 1855A)

HD-SDI inputs

Signal	SMPTE ST 292-1 (1.485, 1.485/1.001 Gbps)
Formats[a]	720p29.97, 720p30, 720p50, 720p59.94 1080i50, 1080i59.94 1080PsF23.98, 1080PsF24, 1080PsF25, 1080PsF29.97 1080p23.98, 1080p24, 1080p25, 1080p29.97, 1080p30
Audio	SMPTE ST 299
Return loss	> 15 dB up to 1.5 GHz
Alignment jitter (100 kHz)	< 0.2 UI

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7. From 4K UHD prescaler (see KMX-3901-IN 4K UHD Prescaler Cards, on page 200).

HD-SDI inputs *(continued)*

Timing jitter (10 Hz)	< 1 UI
Cable length	100 m (328 ft) (Belden 1694A) 45 m (148 ft) (Belden 1855A)

a. The Kaleido Software does not distinguish between 1080PsF25 and 1080i50, between 1080PsF29.97 and 1080i59.94, between 720p29.97 and 720p30, and between 1080p29.97 and 1080p30. On the monitor wall and in XAdmin's Status and Options page, 1080PsF25 is reported as 1080i50, 1080PsF29.97 is reported as 1080i59.94, 720p30 as 720p29.97, and 1080p30 as 1080p29.97.

3G-SDI inputs

Signal	SMPTE ST 424 (2.97, 2.97/1.001 Gbps)
Formats	1080p50 1080p59.94
Audio	SMPTE ST 299
Return loss	> 15 dB up to 1.5 GHz > 10 dB up to 3 GHz
Alignment jitter (100 kHz)	< 0.3 UI
Timing jitter (10 Hz)	< 2 UI
Cable length	100 m (328 ft) (Belden 1694A) 45 m (148 ft) (Belden 1855A)

Graphic converted to HD-SDI from KXI-DVI-Bridge[a]

Signal	SMPTE ST 292-1 (1.485, 1.485/1.001 Gbps)
Format	1080p60
Cable length	100 m (328 ft) (Belden 1694A) 45 m (148 ft) (Belden 1855A)

a. A *Dual Channel DVI to HD Bridge* must be connected between the multiviewer and the PC or laptop that provides the graphics to the multiviewer. To order this optional device (Part No. KXI-DVI-BRIDGE), contact your Grass Valley sales representative.

Discrete Audio Inputs

Every Kaleido-Modular-X input card supports one ABT/MADI audio input.

MADI audio inputs

Signal	AES10-2008
Sampling frequency	48 kHz nominal, 64 channels, synchronous with video reference signal
Return loss	≥ 15 dB 100 kHz to 125 MHz
Cable length	100 m (325 ft) (Belden 8281 or Belden 1694A)
Connector	Coaxial via DIN 1.0/2.3, 75 Ω

ABT audio inputs

Signal	SMPTE ST 259-C (270 Mbps), SMPTE ST 305
Format	SDTI
Return loss	> 15 dB up to 270 MHz
Alignment jitter (100 kHz)	< 0.2UI
Timing jitter (10 Hz)	< 1UI
Cable length	250 m (820 ft) (Belden 1694A) 150 m (492 ft) (Belden 1855A)
Connector	DIN 1.0/2.3

FlexBridge Inputs/Outputs

The KMX-3901-IN-8-D, and KMX-3901-IN-16-D support 2 FlexBridge inputs, and 2 FlexBridge outputs. The KMX-3901-IN-16-Q cards support 4 FlexBridge inputs, and 4 FlexBridge outputs.

FlexBridge inputs and outputs

Signal	SMPTE ST 424 (2.97, 2.97/1.001 Gbps)
Formats	*Proprietary*
Audio	SMPTE ST 299
Return loss	> 15 dB up to 1.5 GHz > 10 dB up to 3 GHz
Alignment jitter (100 kHz)	< 0.3 UI
Timing jitter (10 Hz)	< 2 UI
Cable length between two input cards	10 m (33 ft) (Belden 1694A) 6 m (20 ft) (Belden 1855A)
Cable length from input card to output card	50 m (164 ft) (Belden 1694A) 35 m (115 ft) (Belden 1855A)
Connector	DIN 1.0/2.3

Control

Reference Inputs

The KMX-3901-IN cards support one external reference input for system genlock.

Reference Input

Supported formats	SMPTE ST 170 / SMPTE ST 318 / ITU 624-4 black burst
	SMPTE ST 274 / SMPTE ST 296 tri-level sync
Connector	DIN 1.0/2.3

LTC Inputs

The KMX-3901-IN cards support one unbalanced LTC input for clock synchronization, or for monitoring a time code source from a timer, VTR, etc.

LTC Inputs

Signal	SMPTE ST 309-1999, SMPTE ST 12-1995 (EBU-3097-E)
Level	500 mVp-p to 10 Vp-p
Impedance	>12 kΩ
Refresh rate	50/59.94 Hz
Connector	DIN 1.0/2.3

Electrical

Power consumption

KMX-3901-IN-8-D	28 W max
KMX-3901-IN-16-D	46 W max
KMX-3901-IN-16-Q	55 W max

Physical

Full spec. temperature range	0–40°C (32–104°F) (ambient)
Max. storage humidity	90% RH non-condensing
Max. functional humidity	65% RH non-condensing
Weight	
KMX-3901-IN-8-D	207 g
KMX-3901-IN-8-D-3TRP	97 g
KMX-3901-IN-8-D-3+DRP	55 g
KMX-3901-IN-16-D	351 g
KMX-3901-IN-16-D-3QRP	141 g
KMX-3901-IN-16-D-3+DRP	67 g
KMX-3901-IN-M3-D-3QRP	124 g
KMX-3901-IN-M3-D-3+DRP	80 g
KMX-3901-IN-16-Q	381 g
KMX-3901-IN-16-Q-3PRP	161 g
KMX-3901-IN-16-Q-3+DRP	72 g
KMX-3901-IN-M3-Q-3PRP	163 g
KMX-3901-IN-M3-Q-3+DRP	85 g

KMX-3901-IN 4K UHD Prescaler Cards

When a KMX-3901-IN-16-Q card is configured as a 4K UHD prescaler, it supports two quad link 3G-SDI signal inputs, which are assumed to be the constituent parts of two UHD 4K 3840×2160 sources. The processing delay is two fields if the video inputs are genlocked, and two or three fields if the video inputs are not genlocked.

Video inputs

Signal	SMPTE ST 424 (2.97, 2.97/1.001 Gbps) Level A / Level B dual link
Formats[a]	SMPTE ST 425-5 12G over 4 3G links Square division quad split 　2160p59.94 　2160p50 　2160p30 　2160p29.97 　2160p25
Audio	SMPTE ST 299
Return loss	> 15 dB up to 1.5 GHz > 10 dB up to 3 GHz
Alignment jitter (100 kHz)	< 0.3 UI
Timing jitter (10 Hz)	< 2 UI
Cable length	100 m (328 ft) (Belden 1694A) 45 m (148 ft) (Belden 1855A)
Connector	DIN 1.0/2.3

a. The Kaleido Software does not distinguish between 2160p30 and 2160p29.97. On the monitor wall and in XAdmin's Status and Options page, 2160p30 is reported as 2160p29.97.

Video outputs

Signal	SMPTE ST 424 (2.97, 2.97/1.001 Gbps) Level A
Formats	1080p50 1080p59.94
Audio	SMPTE ST 299 First 8 channels from quadrant 1 (top left)
Alignment jitter (100 kHz)	< 0.3 UI
Timing jitter (10 Hz)	< 2 UI
Cable length	50 m (164 ft) (Belden 1694A) 35 m (115 ft) (Belden 1855A)
Connector	DIN 1.0/2.3

Electrical

Power consumption	55 W max

Physical

Full spec. temperature range	0–40°C (32–104°F) (ambient)
Max. storage humidity	90% RH non-condensing
Max. functional humidity	65% RH non-condensing
Weight	
KMX-3901-IN-16-Q	381 g
KMX-3901-IN-16-Q-3PRP	161 g
KMX-3901-IN-16-Q-3+DRP	72 g

KMX-3901-IN-IP Input/Output Cards

IP Communications

Ethernet port

Physical	2 SFP+ sockets for copper, short reach and long reach fiber
Standard	IEEE 802.3-2008 10 Gb Ethernet
IP standard	SMPTE-2022-6
Transport	Multicast or unicast

Video Inputs Over IP

SD-SDI inputs

Signal	4:2:2 SMPTE ST 259-C (270 Mbps), SMPTE ST 272
Formats	525 and 625
Audio	SMPTE ST 274
Return loss	> 15 dB up to 270 MHz
Alignment jitter (100 kHz)	< 0.2 UI
Timing jitter (10 Hz)	< 1 UI
Cable length	250 m (820 ft) (Belden 1694A) 150 m (492 ft) (Belden 1855A)

HD-SDI inputs

Signal	SMPTE ST 292-1 (1.485, 1.485/1.001 Gbps)
Formats	720p50, 720p59.94 1080i50, 1080i59.94
Audio	SMPTE ST 299
Return loss	> 15 dB up to 1.5 GHz
Alignment jitter (100 kHz)	< 0.2 UI
Timing jitter (10 Hz)	< 1 UI
Cable length	100 m (328 ft) (Belden 1694A) 45 m (148 ft) (Belden 1855A)

3G-SDI inputs

Signal	SMPTE ST 424 (2.97, 2.97/1.001 Gbps)
Formats	1080p50 1080p59.94
Audio	SMPTE ST 299
Return loss	> 15 dB up to 1.5 GHz > 10 dB up to 3 GHz
Alignment jitter (100 kHz)	< 0.3 UI
Timing jitter (10 Hz)	< 2 UI
Cable length	100 m (328 ft) (Belden 1694A) 45 m (148 ft) (Belden 1855A)

Video Inputs Over SDI

The KMX-3901-IN-IP input/output card supports 2 SDI input connectors intended for streaming the output card's mosaic output.

MV SDI Inputs

Physical	2 DIN 1.0/2.3 connectors
Standard	SMPTE-424M (2.970, 2.970/1.001 Gb/s)
Supported formats	1080p59.94, 1080p50

FlexBridge Inputs/Outputs

The KMX-3901-IN IP cards support 2 FlexBridge inputs, and 2 FlexBridge outputs.

FlexBridge inputs and outputs

Signal	SMPTE ST 424 (2.97, 2.97/1.001 Gbps)
Formats	*Proprietary*
Audio	SMPTE ST 299
Return loss	> 15 dB up to 1.5 GHz > 10 dB up to 3 GHz
Alignment jitter (100 kHz)	< 0.3 UI
Timing jitter (10 Hz)	< 2 UI
Cable length between two input cards	10 m (33 ft) (Belden 1694A) 6 m (20 ft) (Belden 1855A)
Cable length from input card to output card	50 m (164 ft) (Belden 1694A) 35 m (115 ft) (Belden 1855A)
Connector	DIN 1.0/2.3

Control

The KMX-3901-IN-IP cards support one external reference input for system genlock.

Reference Input

Supported formats	SMPTE ST 170 / SMPTE ST 318 / ITU 624-4 black burst
Connector	DIN 1.0/2.3

The KMX-3901-IN-IP cards support one unbalanced LTC input for clock synchronization, or for monitoring a time code source from a timer, VTR, etc.

LTC Inputs

Signal	SMPTE ST 309-1999, SMPTE ST 12-1995 (EBU-3097-E)
Level	500 mVp-p to 10 Vp-p
Impedance	>12 kΩ
Refresh rate	50/59.94 Hz
Connector	DIN 1.0/2.3

Electrical

Power consumption	60 W

Physical

Full spec. temperature range	0–40°C (32–104°F) (ambient)
Max. storage humidity	90% RH non-condensing
Max. functional humidity	65% RH non-condensing
Weight	
KMX-3901-IN-8-D	207 g
IPG-3901	207 g
KMX-3901-IN-IP-D-3+TRP	96 g

KMX-3901-OUT Output Cards

Mosaic Outputs

The KMX-3901-OUT cards support one, or two progressive scan HDMI outputs.

HDMI outputs

Signal	HDMI V1.3
Format	1024 × 768 up to 1920 × 1200, configurable (all progressive scan) Supported refresh rates: 50 Hz and 59.94 Hz
Audio	PCM 24 bits
Cable length	15 m (50 ft) with Gefen CAB-HDMI-50MM
Connector	HDMI type connector
Signal path	24 bits RGB

SDI Monitoring Outputs

The KMX-3901-OUT cards support one, or two 3G/HD-SDI outputs (with embedded audio).

HD-SDI monitoring outputs

Signal	SMPTE ST 292-1 (1.485, 1.485/1.001 Gbps)
Formats	720p50
	720p59.94
	1080i50
	1080i59.94
Audio	SMPTE ST 299-1 (limited to one pair, embedded on group 1, pair 1)
Return loss	> 15 dB up to 1.5 GHz
Alignment jitter (100 kHz)	< 0.2 UI
Timing jitter (10 Hz)	< 2.5 UI
Cable length	100 m (328 ft) (Belden 1694A)
	45 m (148 ft) (Belden 1855A)
Connectors	DIN 1.0/2.3
Quantization	8 bits

3G-SDI monitoring outputs

Signal	SMPTE ST 424 (2.97 Gbps / 2.97/1.001 Gbps)
Formats (Level A only)	1080p50
	1080p59.94
Audio	SMPTE ST 299-1 (limited to one pair, embedded on group 1, pair 1)
Return loss	> 15 dB up to 1.5 GHz
	> 10 dB up to 3 GHz
Alignment jitter (100 kHz)	< 0.3 UI
Timing jitter (10 Hz)	< 2 UI
Cable length	100 m (328 ft) (Belden 1694A)
	45 m (148 ft) (Belden 1855A)
Connectors	DIN 1.0/2.3
Quantization	8 bits

Analog Audio Outputs

KMX-3901-OUT cards with a double rear connector panel[8] support one, or two analog audio outputs.

Analog audio outputs

Signal	Unbalanced analog stereo
Impedance	10 kΩ
Level	2 V p-p
Connector	WECO

FlexBridge Inputs

The KMX-3901-OUT cards support one, or two FlexBridge inputs.

FlexBridge inputs

Signal	SMPTE ST 424 (2.97, 2.97/1.001 Gbps)
Formats	*Proprietary*
Audio	SMPTE ST 299
Return loss	> 15 dB up to 1.5 GHz > 10 dB up to 3 GHz
Alignment jitter (100 kHz)	< 0.3 UI
Timing jitter (10 Hz)	< 2 UI
Cable length from input card to output card	50 m (164 ft) (Belden 1694A) 35 m (115 ft) (Belden 1855A)
Connector	DIN 1.0/2.3

Communication

Ethernet

Signal	10/100 BASE-T
Standard	IEEE 802.3
Connector	RJ45

8. The single rear connector panel does not support analog audio outputs (see KMX-3901-OUT-D-3+SRP rear panel connections, on page 47). With the single panel, audio monitoring is available at the SDI and HDMI outputs only.

Serial port

Signal	RS-422 (SMPTE ST 207, EBU-3245), RS-485
Connector	RJ45[a]

a. Not available on the single rear connector panel

USB

Standard	USB version 2.0
Peripherals supported	Mouse, keyboard, memory stick
Connector	USB type A

Electrical

Power consumption

KMX-3901-OUT-S KMX-3901-OUT-D	25 W max

Physical

Full spec. temperature range	0–40°C (32–104°F) (ambient)
Max. storage humidity	90% RH non-condensing
Max. functional humidity	65% RH non-condensing
Weight	
KMX-3901-OUT-S	212 g
KMX-3901-OUT-D	218 g
KMX-3901-OUT-D-3DRP	87 g
KMX-3901-OUT-D-3+SRP	78 g

GPI-1501 GPI I/O module

This card supports 20 GPI inputs, and 8 configurable GPI inputs/outputs.

GPI input (up to 20)

Description	Contact closure to GND
Pull-up voltage	2.3 Volts
Source current	2 mA when input shorted
Low-level activation	0.8 Volts max
Over voltage	25 Volts max
Connector	DB-44

GPI bidirectional (up to 8)

Description	Contact closure to GND
Signal	Open collector 5 to 12 VDC
Connector	DB-44
Input mode	
Pull-up voltage	2.3 Volts
Source current	2 mA when input shorted
Low-level activation	0.8 Volts max
Over voltage	25 Volts max
Output mode	
Contact closure current	50 mA max
Reverse voltage	-15 Volts max
Reverse current	-50 mA max
V out low	0.6 Volts at 1.5mA

Electrical

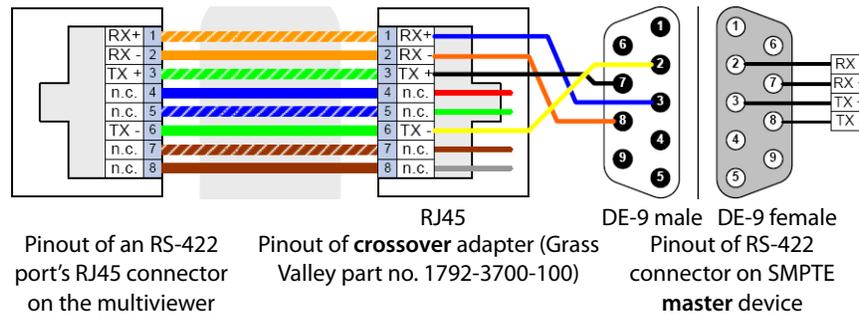|	
Power consumption	1 W max

Weight

GPI-1501 card	84 g
GPI-1501-SRP-3RU rear panel	30 g

RS-422 connection diagram

The pinout for the RS-422 signals on the RJ-45 connectors, and the wiring diagrams for the appropriate adapters, are shown here:

| Pinout of an RS-422 port's RJ45 connector on the multiviewer | Pinout of **straight** adapter (Grass Valley part no. 1737-3000-102) | Pinout of RS-422 connector on SMPTE **slave** device |
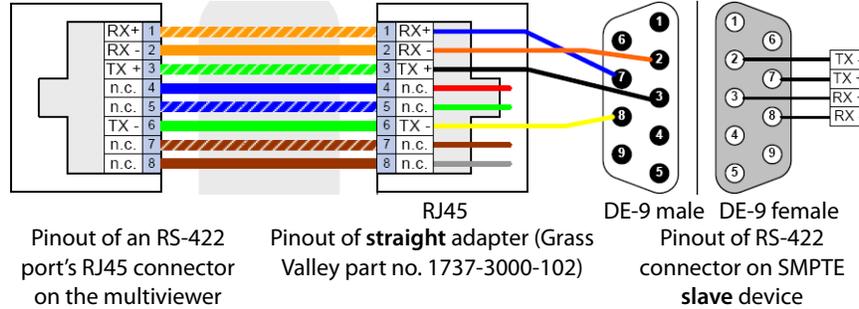
Standard wiring between multiviewer and devices wired to SMPTE "slave" specification (e.g. most routers, Ross Synergy switchers, Nevion ETH-CON)

| Pinout of an RS-422 port's RJ45 connector on the multiviewer | Pinout of **crossover** adapter (Grass Valley part no. 1792-3700-100) | Pinout of RS-422 connector on SMPTE **master** device |

Standard wiring between multiviewer and devices wired to SMPTE "master" specification (e.g. Philips Jupiter router control system, Grass Valley Presmaster PCS)

Note: The two RS-422 ports on the multiviewer side have no ground pin. Using the appropriate DE-9S-to-RJ-45 adapter, an external device should be able to communicate with a multiviewer despite the lack of a ground.

For more information about the serial ports' specifications, see Serial port, on page 207. For more information about the RS-422 serial connections, see the "Serial Connections" section in the *Routers* chapter of the Kaleido Software User's Manual.

Contact Us

Grass Valley Technical Support

For technical assistance, contact our international support center, at 1-800-547-8949 (US and Canada) or +1 530 478 4148.

To obtain a local phone number for the support center nearest you, consult the Contact Us section of Grass Valley's website (www.grassvalley.com).

An online form for e-mail contact is also available from the website.

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