

# Kaleido-X (7RU)

Unmatched picture quality and layout flexibility

## Hardware Description & Installation Manual

M808-9902-113

28 March 2014



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A **BELDEN** BRAND

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## Safety Compliance



This equipment complies with the requirements of the following standards for safety of information technology equipment:

- CSA-C22.2 No. 60950-1-07
- UL 60950-1 (2<sup>nd</sup> Edition)
- EN 60950-1:2006
- IEC 60950-1:2005

### WARNING

**An appropriately listed/certified mains supply power cord must be used for the connection of the equipment to the mains voltage at either 120V~ or 240V~**

### CAUTION

**This equipment is meant to be installed in a restricted access location**  
**These servicing instructions are for use by qualified service personnel only**

To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel. Disconnect both power supply units before servicing. Servicing should be done in a static-free environment.

#### **Battery handling**

There is a danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Before disposing of your Miranda equipment, please review [Disposal and Recycling Information](#), on page 83.

## 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.

**CE** This equipment has been tested and found to comply with the requirements of the EMC directive 2004/108/EC:

- EN 55022 Class A Radiated and conducted emissions
- EN 61000-3-2 Limits for harmonic current emissions
- EN 61000-3-3 Limitation of voltage changes, 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/burst 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

# toc

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# 1

## Kaleido-X (7RU) Installation

The Kaleido-X is a multi-room, multi-image display processor and router in a single, expandable chassis. This document contains physical descriptions, installation instructions and connection information for the Kaleido-X (7RU) frame and the cards that are installed in it.

### Summary

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### Introduction

The Kaleido-X (7RU) system's unique mix of capabilities represents the most integrated monitoring and routing solution. As a multi-image processor, it offers the highest level of signal flexibility. Each chassis can display 96 HD, SD or Analog inputs any number of times, in any size, across 8 displays of any resolution and orientation. As a router, it offers switching of 96 unprocessed inputs to 48 HD/SD outputs for feeding monitors, test equipment and master control or production switchers.



### Features

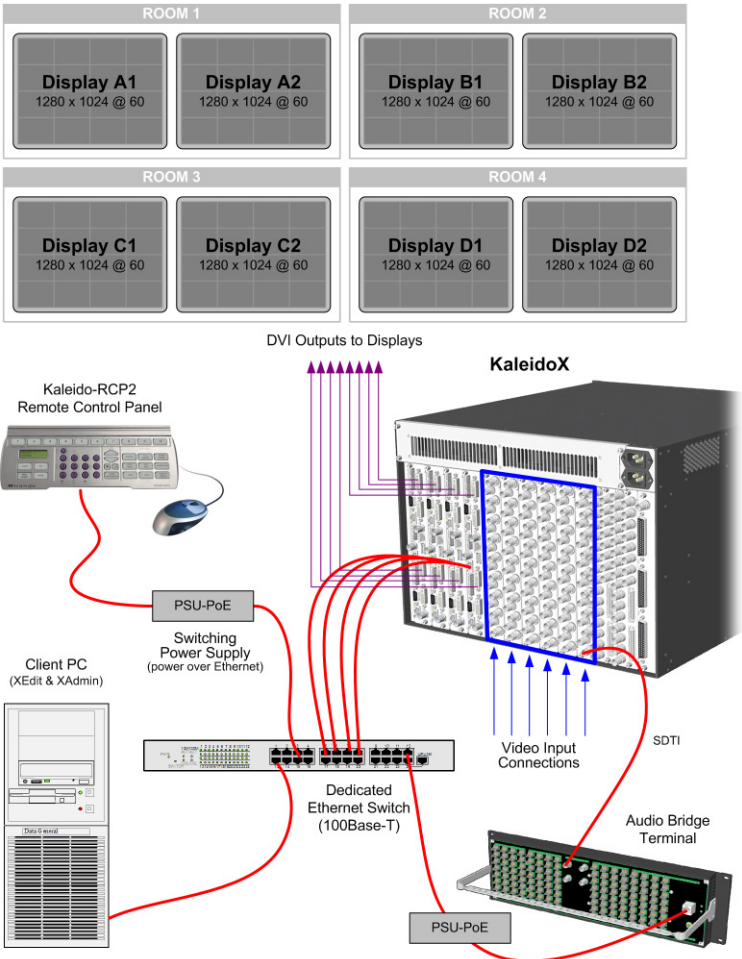
Expandable	Expandable multi-room architecture, based on a chassis with 96 inputs, and 8 independent multi-image display outputs.
Unmatched flexibility	Any source can be repeated to any position, to any display, at any size, at any resolution, without blocking or grouping restrictions.

Built-in router	Built-in router with access to any unprocessed HD/SD-SDI input for feeding monitors, test equipment and master control or production switchers.
Superior display	Highest quality multi-image output without compression, with superior on-screen graphics, for the most critical live monitoring applications.
2304audio channels	Unprecedented audio performance with the ability to monitor up to 2304 channels of audio, including embedded, discrete AES, or discrete analog.
Multi-room layouts	Intuitive layout editor software allows rapid creation of multi-room layouts, which can be recalled quickly from networked remote control panels.
Highly robust	Highly robust design, with multiple points of redundancy, and no single point of failure for reliable 24/7 operation.

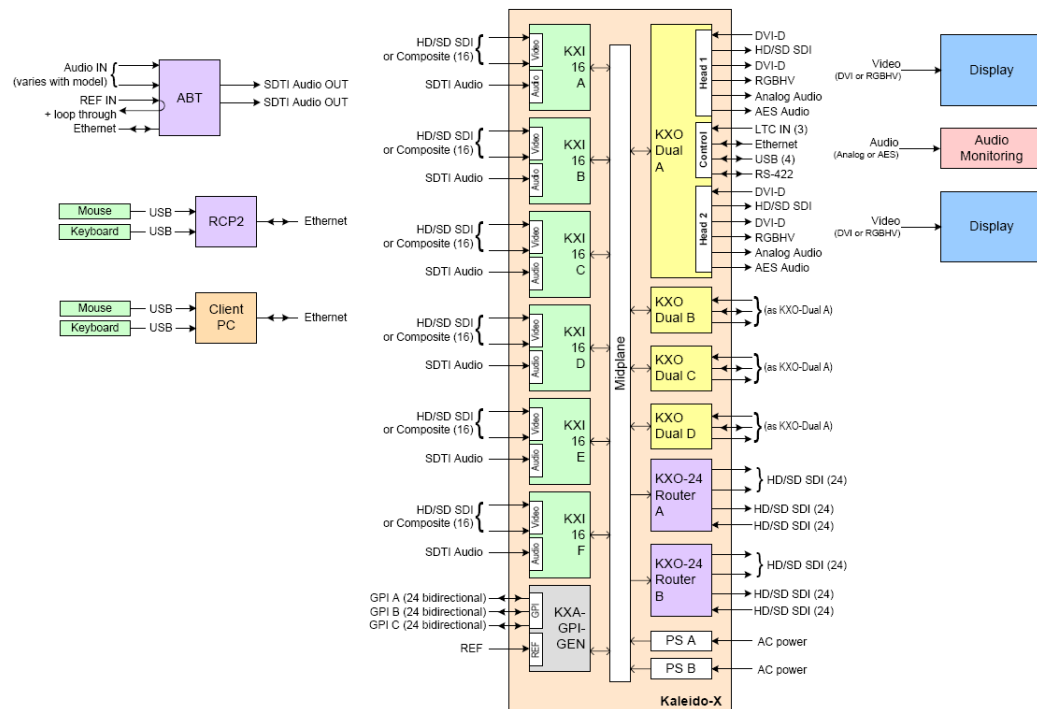
## Overview of the Kaleido-X System

The following diagram shows a basic Kaleido-X (7RU) system configuration, with a single Kaleido-X (7RU) feeding 8 monitor wall displays. The Kaleido-RCP2 (if available) would be located on the production desk, while the Client PC could be anywhere with internet access to the network.





The diagram below shows the Kaleido-X multiviewer system and its inputs and outputs. Examples of the various external devices that connect to the multiviewer are also shown.



Kaleido-X (7RU) system block diagram

## Mechanical Installation

### Unpacking

Make sure the following items have been shipped with your Kaleido-X. If any of these are missing, contact your distributor or Miranda.

- Kaleido unit, with pre-installed cards and power supplies
- 2 AC power cords
- A DVD of system software and documentation
- The Kaleido-X (7RU) Quick Start Guide
- DVD including the Release Notes for the current version of the Kaleido-X software, the Kaleido-X User's Manual, database samples, Quick Start guides and hardware reference manuals for all multiviewer models

**Note:** In line with our commitment to environmental preservation, only the Quick Start Guide for your multiviewer model, and some ancillary documents (e.g. welcome letters, warranty cards) are distributed in printed form. All manuals and the Release Notes are available on the DVD that shipped with your multiviewer. See the *Documentation* section of the Release Notes for a complete list. You can obtain the latest version of the manuals, the Release Notes, as well as software and useful data, from the *Software and documentation* section of Miranda's support portal.

- Keyboard

- Mouse
- Serial port adapters (one with straight cabling and one with crossover cabling for each output card in your multiviewer):

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

## Rack-Mount Installation

Kaleido may be installed in a standard 19-inch rack, using the proper screws and washers (not included). The Kaleido-RCP2 Remote Control Panel (optional) may also be installed in a rack using the optional KRCP-RK2 mounting kit.

For proper ventilation, make sure the front and side panel air vents are not blocked and the air filter is clean.

## Frame and Electrical Installation

Kaleido-X (7RU) is a self-contained unit consisting of a frame, redundant power supplies, and various input and output cards. The monitor wall displays and external control devices complete the system.

### Frame

The Kaleido-X (7RU) frame is 7 RU high. It incorporates an internal midplane for interconnecting the cards. Cards are installed from the front of the frame. Each card is associated with input and/or output connectors which are mounted on a connector panel. These connector panels are installed from the rear of the frame, in the same horizontal position as their associated card. The redundant power supplies are installed at the top of the frame.

The hinged front door can be opened to give access to the cards. A removable retaining bar across the front of the frame inside the door holds the cards securely in place.

The Kaleido-X (7RU) frame incorporates the following key elements:

- A rack-mountable mechanical framework
- A side-opening, removable door to cover and protect the front of the frame and the installed cards
- A midplane board that enables inter-card communication
- Slots for installing signal processing cards that plug into the midplane
- Mounting points for rear connector panels
- Redundant power supplies
- Ventilation

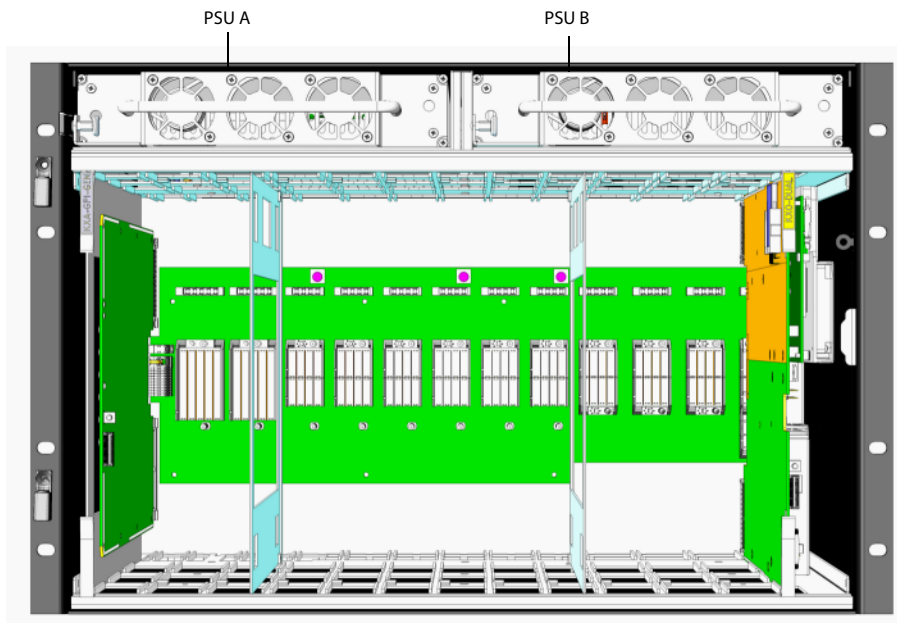
The front slots and rear panel connection points are color-coded according to the type of card that can be located in the slot. The extractor handles on the cards are color-coded to

match. The cards are physically configured so they cannot be installed in the wrong type of slot.

**IMPORTANT**

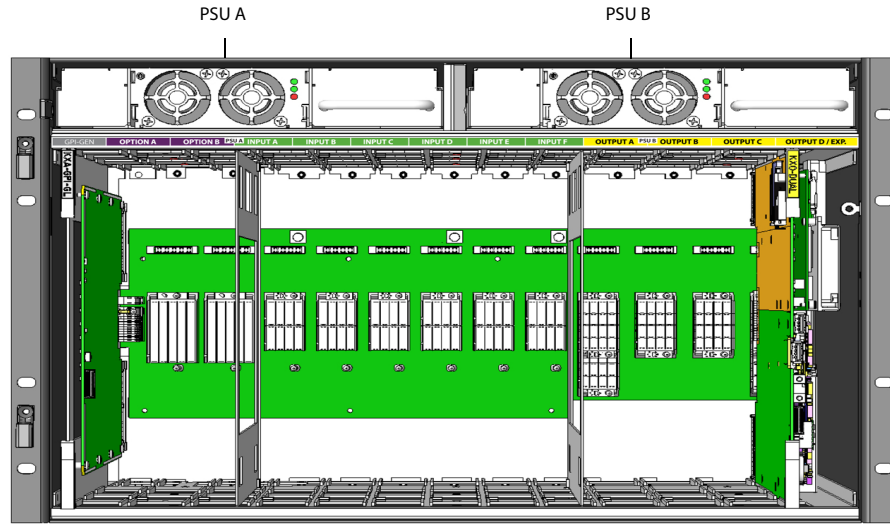
**Output D / EXP. and Output C are considered the master slots for Kaleido-X's internal redundancy process. An output card MUST be present in either Output D / EXP. or Output C, or the system will not start.**

**Install your output cards starting with Output D / EXP. or Output C, and then Output B or Output A.**



Slot #	1	2	3	4	5	6	7	8	9	10	11	12	13
Function	Main A	Option B	Option A	Input A	Input B	Input C	Input D	Input E	Input F	Output A	Output B	Output C	Output D/Exp






*KXA-FR7 frame model*



Slot #	1	2	3	4	5	6	7	8	9	10	11	12	13
Function	Main	Option A	Option B	Input A	Input B	Input C	Input D	Input E	Input F	Output A	Output B	Output C	Output D/Exp

*KXA-FR7-B frame model*

The illustrations above show the location of the available slots in the frame. From left to right as seen from the front of the frame, the available slots are as follows:

Slot	Function	Color code	Card type
1	Main	Grey 	KXA-GPI-GEN
2 - 3	Option	Purple 	KX0-24 HD/SD-SDI Router KX0-24 SD-SDI Router
4 - 9	Input	Green 	KXI-16HSV3, KXI-16HSV KXI-16HS3, KXI-16HS KXI-16SV
10 - 12	Output	Yellow 	KX0-Dual3, KXO-Dual
13	Output/Expansion	Yellow 	KX0-Dual3, KXO-Dual, or KXO-EXP

The rear of the frame holds the rear connector panels for the cards, the AC power connectors, and a fan for power-supply cooling.



*KXA-FR7 frame model*



*KXA-FR7-B frame model*

### **Monitoring the Temperature of the Kaleido-X**

For optimal performance, it is strongly recommended that you operate the Kaleido-X in an environment with an ambient temperature lower than 20 °C (68 °F).

**IMPORTANT**

**When measuring the ambient room temperature, take your readings from directly in front of the Kaleido-X frame.**

There are two factors that could influence airflow inside the frame:

- altitude
- airflow obstruction at the rear of the unit

To monitor airflow efficiency, the Kaleido-X offers on-board probing that monitors the temperature in strategic areas. Use the table, below, to determine whether measured values exceed recommended values.

Monitored values via XAdmin	Temperature should not exceed
Input cards	75 °C (167 °F)
Output cards	83 °C (181 °F)

Keep in mind that these values are measured *at the chip level* and should be interpreted as *relative indicators* of the cards' internal temperature and of the system's overall ability to evacuate excess heat, in the context of your specific system configuration.

The vast majority of installations meet these requirements. In the case of multiviewers installed in an environment where cards are prone to exceed the recommended temperature, Miranda recommends replacing the standard frame cooling fan assembly with a special fan tray that will help improve the airflow within the equipment rack or cabinet.

The Adapted Fan Tray (part number KXA-FAN-TRAY-1) is compatible with both Kaleido-X (7RU) frame models (part numbers KXA-FR7, and KXA-FR7-B). It ensures a vertical airflow (as opposed to the standard frame cooling fan assembly whose ventilation exhaust is directed horizontally), and can be mounted in four different configurations:

- Fan assembly on the left, facing up, attached to top side of tray (default configuration)
- Fan assembly on the left, facing down, attached to underside of tray
- Fan assembly on the right, facing down, attached to underside of tray
- Fan assembly on the right, facing up, attached to top side of tray

If measured values exceed recommended values, make the necessary corrections to your installation (please contact Miranda Technical Support for the recommended practice).

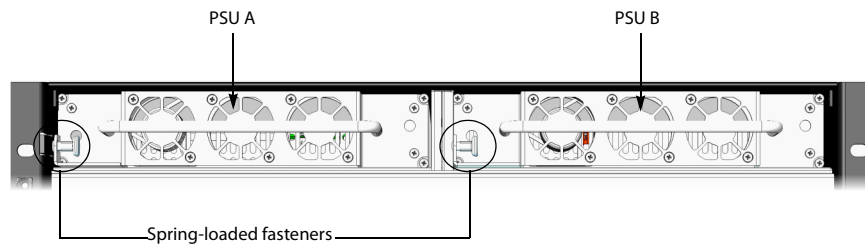
## Power Supplies

The Kaleido is powered by dual redundant power supplies. These are installed at the top of the frame above the cards. The supplies are installed and removed from the front of the frame and are hot-swappable, so that a defective supply may be replaced without removing the Kaleido from service.

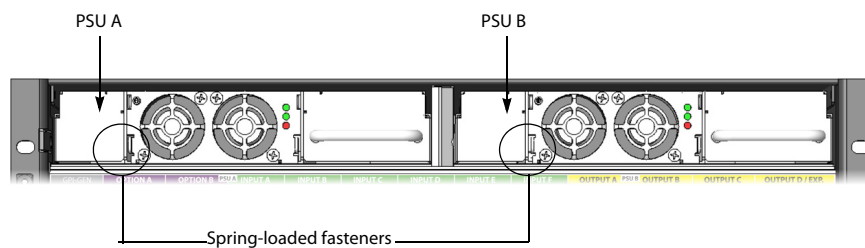
**IMPORTANT**  
**There are two different models of 7RU frames, and two models of power supply units. They are not interchangeable.**

- If you have a frame model KXA-FR7-B then you need the KXA-PSU-7-B power supply and you must ensure the supply is grounded before connecting your system.
- If you have a frame model KXA-FR7 then you need the KXA-PSU-7 power supply.

Access the power supplies by opening the front door of the frame. The two power supplies are located at the top, above the card slots. Viewed from the front of the frame, PSU A is located on the left-hand side, and PSU B is located on the right-hand side.

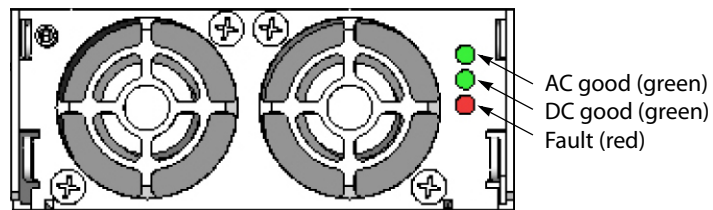


*KXA-PSU-7 power supplies on a KXA-FR7 frame*



*KXA-PSU-7-B power supplies on a KXA-FR7-B frame*

The KXA-PSU-7-B power supply model has three LED indicators:

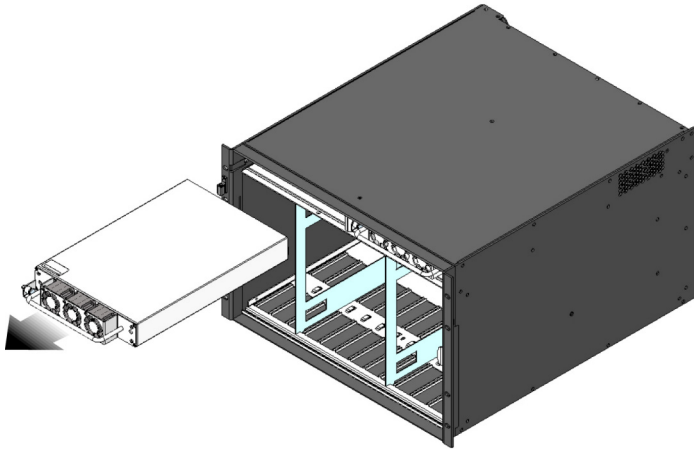


## Removing a Power Supply

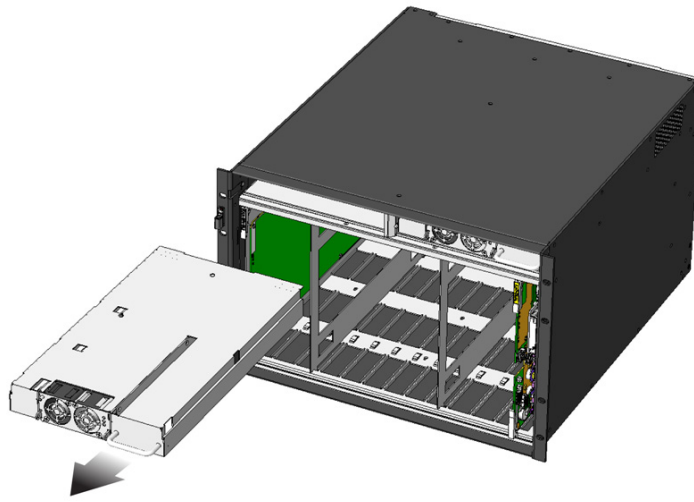
### To remove a power supply

- 1 Open the front door of the frame and locate the two power supplies at the lower right side.
- 2 Undo the threaded fastener at the upper right side of the supply to be removed.
- 3 Pull on the bracket holding the fastener; it rotates down and becomes a handle for pulling the power supply out of its slot.





*KXA-PSU-7 removal*



*KXA-PSU-7-B removal*

## Installing a Power Supply

### To install a power supply

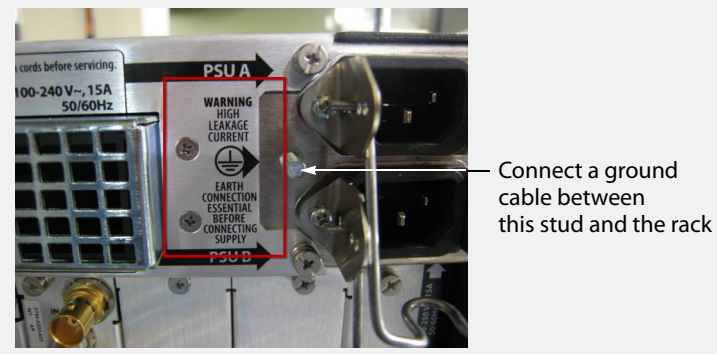
- 1 Position the supply in front of an empty power supply slot in the top front of the frame, with the connector end towards the frame.
- 2 Slide the power supply into the empty slot, moving it gently until it contacts the sockets at the rear of the slot.
- 3 Push firmly but gently on the power supply handle until the power supply's connectors have mated with the frame's sockets, and the power supply will go in no further.

- 4 As the supply reaches its final position, the spring-loaded fastener at the left-hand side of the supply will engage the frame, securing the power supply in place. You may need to pull the fastener out before the supply can be pushed into its final position.

#### IMPORTANT

**There are two different models of 7RU frames, and two models of power supplies.**

If you have a frame model KXA-FR7-B (with the corresponding KXA-PSU-7-B power supply), you must ensure that a ground cable (not included) is connected between the frame and the rack before powering up the unit.



### Operation

Separate AC connectors are provided for the two power supplies, and are located at the top right of the rear of the frame. Connect both power supplies to an appropriate power source using the supplied power cords.

- The top power socket is for PSU A.
- The bottom power socket is for PSU B.

#### CAUTION

**There is no ON/OFF switch for the Kaleido-X (7RU).**

The multiviewer will start as soon as the power is applied.

#### IMPORTANT

**A fully populated Kaleido-X frame will draw nearly 15 amps of current.**

Ensure that the circuit to which the frame is connected can handle that load, and that of any other connected devices.

### Ventilation

The Kaleido-X frame is cooled by ventilation fans. Fans are located in key positions within the frame.

## Frame Cooling Fans

Primary ventilation for the cards installed in the frame is handled by six fans located at the top rear of the frame, behind the power supplies.

### IMPORTANT

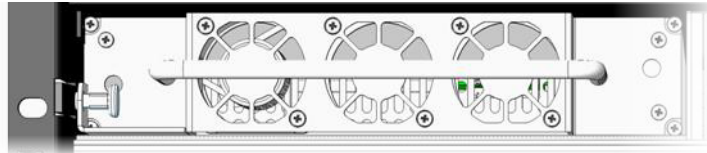
**The Kaleido-X requires a constant flow of cooling air during operation. DO NOT OPERATE THE UNIT IF THE FRAME COOLING FANS ARE NOT WORKING.**

To replace a defective fan, see [Replacing a Defective Cooling Fan](#), on page 33.

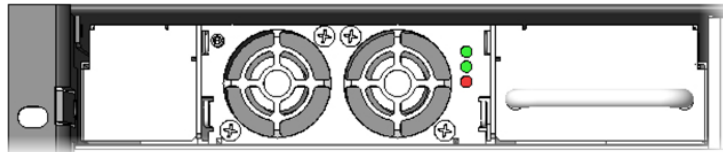
These fans draw air into the frame through a grille and filter in the front door, and exhaust it through the grate on the rear of the fan assembly.

## Power Supply Cooling Fans

Each power supply has two (KXA-PSU-7) or three (KXA-PSU-7-B) fans located on the front of the supply (behind the extraction handle, in the case of the KXA-PSU-7 power supply).



*KXA-PSU-7 power supply*



*KXA-PSU-7-B power supply*

## Card Cooling Fans

Some of the cards in the Kaleido-X system are equipped with on-board fans to ensure proper cooling of key components. These fans focus the air flow provided by the frame cooling fans.

Card	On-board fans
Output (KXO) card	4
Router card	2
Input (KXI-16) card	4
GPI/genlock card	0

## Air Filter

Cooling air drawn into the Kaleido-X frame by the ventilating fans passes through a filter located behind a grille in the front door of the frame. To clean the air filter, see [Cleaning the Air Filter](#), on page 32.

## Card Installation and Replacement

This section describes the installation of rear connector panels and cards in the Kaleido-X frame.

### Installing a Rear Connector Panel

#### To install a rear connector panel

- 1 Remove the blank rear panel or the rear panel from the previously-installed card, using a screwdriver to loosen the two captive screws.
- 2 Position the new rear panel in the vacant location so its connectors are aligned with the corresponding plugs, and push it gently into place so the connectors mate.
- 3 Secure the panel in place, using a screwdriver to tighten the two captive screws.

### Removing a Card

#### To remove a card

- 1 Open the front door of the frame and locate the card to be removed.
- 2 Remove the card retaining bar by unscrewing the captive screw on the right side, and pulling it out of the slot at the left side.
- 3 Pull the ends of the two extractor handles out and away from the center of the card, levering it out of its connector.
- 4 Grasp the extractor handles, and pull the card gently straight out of the slot.

### Installing a Card

#### To install a card

- 1 Open the front door of the frame and locate an empty slot appropriate for the card type.

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**Note:** The cards are mechanically configured so that it is not possible to install a card in the wrong slot.

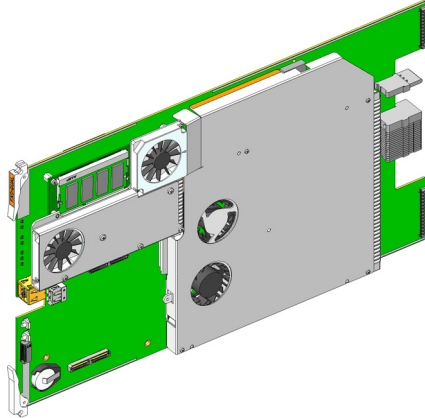
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- 2 Remove the card retaining bar by unscrewing the captive screw on the right side, and pulling it out of the slot at the left side.
- 3 Orient the card so that the labelled and color-coded extractor handle is at the top and the connectors are toward the frame.
- 4 Slide the card all the way into the slot until it touches the connectors.
- 5 Push gently on the extractor handles until the connectors mate and the card is completely into the slot.
- 6 Install the card retaining bar by slipping it into the slot on the left side of the frame and fastening the captive screw on the right side.

## Kaleido-X Cards

### KXO-Dual Output Cards

The KXO-Dual and KXO-Dual3 cards are output cards that can be installed in a Kaleido-X multiviewer. They are dual-head output cards, meaning that they support two independent outputs. These outputs, called *Head 1* and *Head 2*, are each provided with a complete set of connectors.



The KXO-Dual and KXO-Dual3 are multi-function cards that perform a significant portion of the signal processing required to create the monitor wall output. They incorporate a mezzanine card mounted on the component side. Each output card is complemented by a rear panel (KXO-Dual-R) that holds all input and output connectors associated with the card.

Output cards can be installed in any of the four available OUTPUT slots inside a Kaleido-X frame. These slots are color-coded YELLOW on the front and rear panel of the frame.

A Kaleido-X frame must contain at least one output card. In systems with more cards, one card is considered the *master* card, and the others are *slaves*, from a processing point of view.

One card must always be present in either the *Output C* slot or the *Output D / EXP.* slot to ensure proper operation of the system.

- If the only card in the frame is in *Output C*, then it can only be an output card (KXO-Dual3 or KXO-Dual).
- If the only card in the frame is in *Output D / EXP.*, then it can be an output card (KXO-Dual3 or KXO-Dual) or an expansion card (KXO-EXP).
- If both slots *Output C* and *Output D / EXP.* are occupied, the card in *Output D / EXP.* becomes the *hardware master*.
- If the card in *Output D / EXP.* is removed, the card in *Output C* will assume the hardware master role automatically.

In addition, there is always one output card designated as the *software master* (i.e. the card that has the frame's IP address). In XAdmin, you can identify which output card is the current software master, by looking for the card with the word "master" next to its identifier (refer to the *Administration and Servicing* chapter, in the Kaleido-X User's Manual, for more

information). At startup, the software master role is assumed by the first output card found in the multiviewer, based on the following rules:

- For a simple Kaleido-X (7RU) system: first output card found, starting from Output D / EXP, then Output C, Output B, and finally Output A.
- For an expansion system: first output card found, starting from Frame A, Output C, B, and A, and then Frame B, Output C, B, and A, in this sequence.
- If at any time, the master card is removed, a new master is designated, based on the same rules.
- If a slave card is removed, the master remains unchanged.
- If an output card is added to a system that did not have any so far, the new output card becomes the master.
- If an output card is added to a system that already has at least one output card, the new card is a slave.

In the case of an expansion system's initial configuration, there must be an output card in Output C of Frame A (see [Kaleido-X \(14RU\) Expansion](#), on page 35 for details). This card will start as the *software master* for the whole expansion system, but any other output card in the system may later become the master (for example, when you remove or reseal this card from Frame A Output C).

---

#### Notes

- Be careful to install the rear panel in the matching location at the rear of the frame.
  - The card and its rear panel can be installed in any order.
  - These cards are hot-swappable; it is not necessary to turn off the Kaleido-X when installing or replacing cards.
  - If a software master card loses network connectivity while remaining seated in its slot, then none of the other cards will take over and the multiviewer will be unavailable on the network until the connectivity issue is resolved.
- 

Every output card is connected to the other cards in the Kaleido-X frame through the frame's internal midplane.

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

- on the rear panel (see [Rear Panel Connections](#) below)
- on the front card edge (see [Front Card-Edge Layout](#), on page 19)

### HD-SDI Monitoring Output Option

The output cards provide support for HD-SDI monitoring output in 720p, 1080i or 1080p (available with the optional KXO-HDM mezzanine).

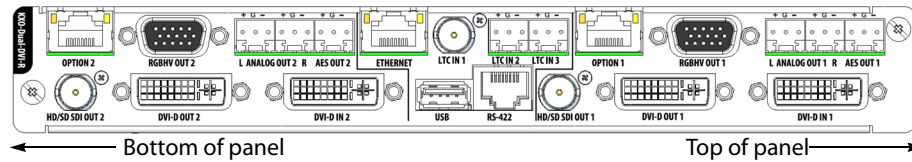
- **KXO-Dual:** If the KXO-HDM mezzanine is installed on a KXO-Dual card, the only HD-SDI output formats supported are 720p and 1080i.

- **KXO-Dual3:** For a KXO-Dual3 card, the scan format is set with the associated displays' configuration, in XEdit. Refer to the Rooms chapter, in the Kaleido-X User's Manual, for details.

Note: To install a KXO-HDM mezzanine on an existing KXO-Dual or KXO-Dual3 card, refer to the *KXO-HDM Installation Instructions* (Miranda Part No. M860-9900-104) for details. This document is available from Miranda's support portal, and on the DVD that shipped with your system.

## Rear Panel Connections

The rear panel layout is divided into three areas: Head 1, Head 2, and Control.



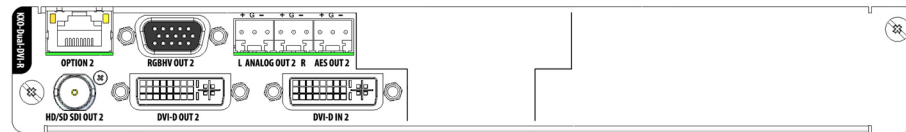
### Head 1

The connectors located at the top of the rear panel (right-hand side when the card is horizontal and you can read the connector labels normally) are the *Head 1* connectors.



### Head 2

The connectors located at the bottom of the rear panel (left-hand side when the card is horizontal and you can read the connector labels normally) are the *Head 2* connectors.



### Control

The connectors located in the middle of the rear panel are *control* connectors.

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

Connector label		Connector type	Function
Head 1	Head 2		
HD/SD SDI OUT 1	HD/SD SDI OUT 2	BNC	Serial digital HD output signal for monitoring purposes
DVI IN 1	DVI IN 2	DVI	DVI input signal that can be used as a background in the monitor wall display in place of the internally-generated background

Connector label		Connector type	Function
Head 1	Head 2		
DVI-D OUT 1	DVI-D OUT 2	DVI	DVI digital output (no analog signal on this connector)
RGBHV OUT 1	RGBHV OUT 2	DE-15S	High-resolution analog component output to feed the monitor wall display
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
AES OUT 1	AES OUT 2	WECO	Digital audio output (AES) to feed the audio monitoring system
OPTION 1	OPTION 2	RJ-45	<i>(for future use)</i>

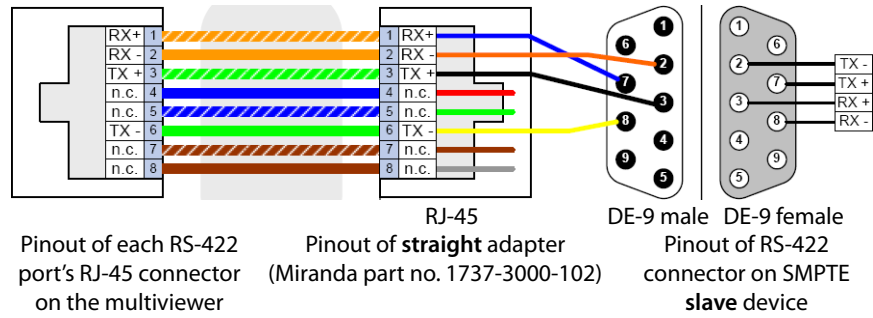
The following table lists the purpose of each connector associated with card control.

Connector label	Connector type	Function
LTC IN 1	BNC	Time code input #1
LTC IN 2	WECO	Time code input #2
LTC IN 3	WECO	Time code input #3
ETHERNET	RJ-45	100 Base-T Ethernet connection
USB	USB A	Connect a mouse, keyboard, or USB key for software upgrade or data backup There are three other USB ports accessible on the front of the card that serve the same functions.
RS-422	RJ-45 (see note below)	Connect to an RS-422 (SMPTE ST 207, EBU-3245) or RS-485 device or network

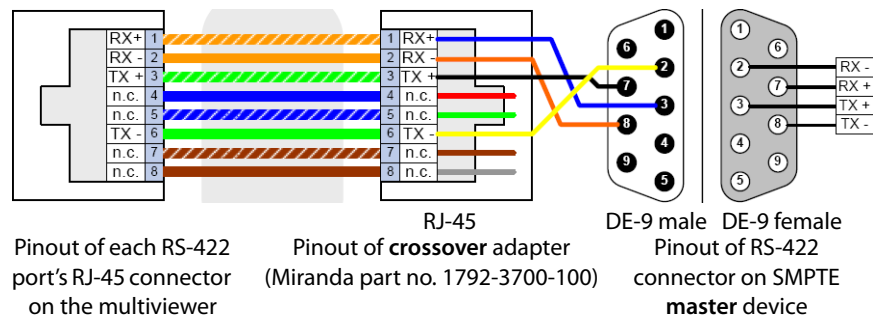
Note: The Kaleido-X's RS-422 ports have an RJ-45 connector in order to preserve space on a busy panel. The RS-422 interface specifies a DE-9 connector, so if you are using this interface, you will require a DE-9-to-RJ-45 adapter. Miranda supplies two adapter models, correctly wired for this application: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

The pinout for the RS-422 signal on the RJ-45 connector on the output cards' rear panel, and the wiring diagram for an appropriate adapters, are shown here:





Standard wiring between multiviewer and devices wired to SMPTE "slave" specification (e.g. most routers, Ross Synergy switchers, Neveon ETH-CON)



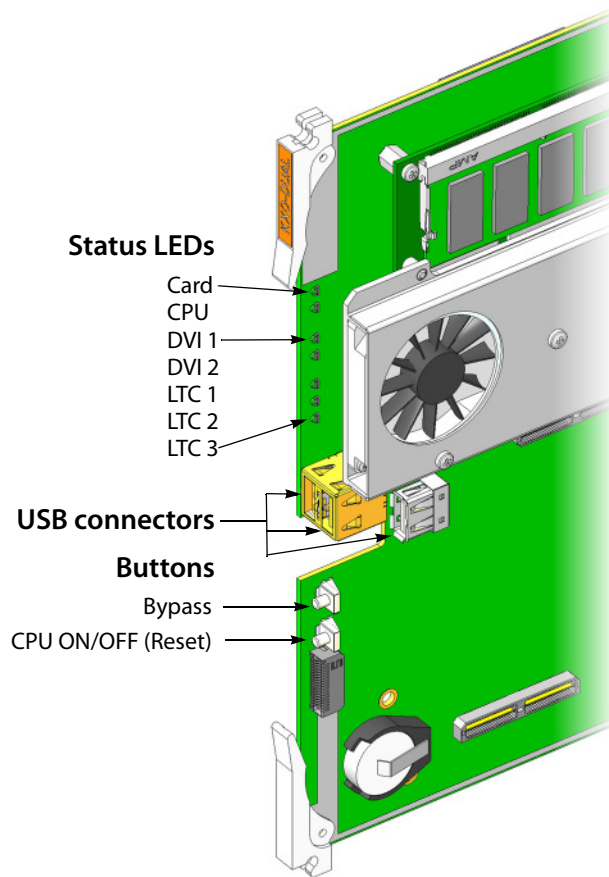
Standard wiring between multiviewer and devices wired to SMPTE "master" specification (e.g. Philips Jupiter router control system, Miranda Presmaster PCS)

**Note:** The RS-422 port on the multiviewer side has no ground pin. Using the appropriate DE-9S-to-RJ-45 adapter, an external device should be able to communicate with the multiviewer despite the lack of a ground.

For more information on the RS-422 port's specifications, see [KXO-Dual](#), and [KXO-Dual3](#), on page 81. For more information about RS-422 serial connections, see the "Serial Connections" section, in the *Routers* chapter of the Kaleido-X User's Manual.

### Front Card-Edge Layout

The following diagram shows the various indicators, connectors and buttons that appear on the output cards' front edge:



### Front Card-Edge Connectors

The front card-edge connectors are not accessible in normal use, as they are covered by the front door of the frame. They are provided for maintenance purposes, or for special circumstances. One exception is the recessed USB connector, which can be used to hold a USB key that can be left in place during operation with the door closed.

Connector label	Connector type	Function
USB 1, USB 2 and USB 4	USB A	Connect a mouse, keyboard, or USB key for software upgrade or data backup
(unlabeled)	ICAT	(for factory use only)

### Front Card-Edge Indicators

The following LED status indicators are visible on the output cards' front edge:

LED label	LED color	Interpretation
Card status	Green	OK
	Orange	Warning
	Red	Configuration failed
	Flashing red	Firmware upgrade in progress
CPU status	Off	Card is powered off
	Orange	OS is booting up
	Flashing Green	Kaleido-X Software is starting
	Green	Kaleido-X Software is up and running
	Flashing Red	Software upgrade in progress
DVI 1	Off	No input
	Green	DVI input detected on Head 1
	Orange	Test
DVI 2	Off	No input
	Green	DVI input detected on Head 2
	Orange	Test
LTC 1	Green	Valid LTC signal at LTC 1 input
	Red	No LTC signal or invalid signal at LTC 1 input
LTC 2	Green	Valid LTC signal at LTC 2 input
	Red	No LTC signal or invalid signal at LTC 2 input
LTC 3	Green	Valid LTC signal at LTC 3 input
	Red	No LTC signal or invalid signal at LTC 3 input

### KXO-HDM Indicator

One LED indicator is located on the optional KXO-HDM mezzanine:

LED color	Interpretation
Green	System OK
Red	Configuration failed / Safe mode
Flashing red	Programming
Yellow	Programming mode

### Front Card-Edge Controls

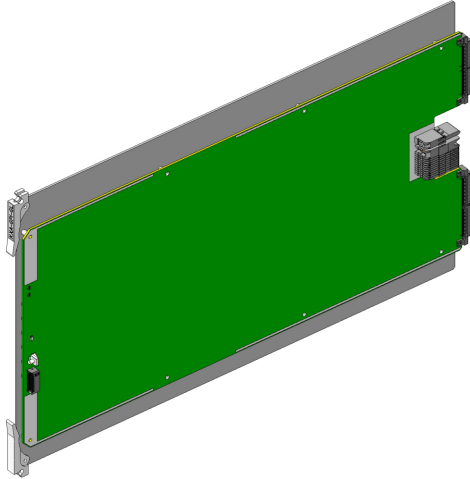
Two buttons are located on the output cards' front edge:

Button label	Function
Bypass	Toggle the display of video on the DVI-D outputs
CPU ON/OFF	Reset the card

All other adjustment, alignment and configuration of this card are accomplished using external controllers (e.g. the XEdit software), and are documented in their respective manuals.

## GPI/Genlock Card

The KXA-GPI-GEN card provides status monitoring, genlock and GPI I/O interfacing for the Kaleido-X.



The GPI/Genlock card fits in the Kaleido-X frame. It is complemented by a rear panel connector KXA-GPI-GEN-R that houses all input and output connectors associated with the card.

The GPI/Genlock card must be installed in the MAIN slot in the Kaleido-X frame. This slot is color-coded GREY on the front and rear panel of the frame.

The GPI/Genlock card is connected to the other cards in the Kaleido-X frame through the frame's internal midplane. See [Card Installation and Replacement](#) on page 14, for instructions on installing the card and the rear panel.

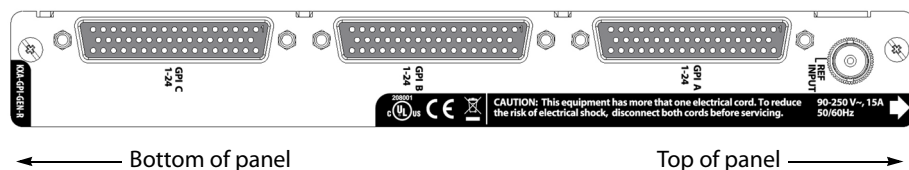
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### Notes

- Be careful to install the KXA-GPI-GEN-R rear panel in the matching location at the rear of the frame.
  - The GPI/Genlock card and its rear panel can be installed in any order.
  - Kaleido-X cards are hot-swappable; it is not necessary to turn off the multiviewer when installing or exchanging cards.
- 

## Rear Panel Connections

External connections to the GPI/Genlock card are made through connectors mounted on the KXA-GPI-GEN-R rear panel. These connectors carry both input and output signals.



### Rear Panel Connectors

Connector label	Connector type	Function
GPI A 1-24	DB-50 (female)	GPI A input/output (bidirectional) connections
GPI B 1-24	DB-50 (female)	GPI B input/output (bidirectional) connections
GPI C 1-24	DB-50 (female)	GPI C input/output (bidirectional) connections
REF INPUT	BNC	Reference signal to genlock the multiviewer to the local plant. Supported Reference formats: <ul style="list-style-type: none"> <li>• SMPTE ST 170, SMPTE ST 318</li> <li>• ITU 624-4, BUT 470-6</li> <li>• PAL and NTSC composite sync</li> <li>• SMPTE ST 274, SMPTE ST 296, SMPTE ST 240</li> </ul>

### GPI I/O Connections

The three GPI connectors each support 24 bidirectional GPI contacts. Each individual GPI can be configured via software as an Input or Output GPI. They are identified in the software as:

- GPI A, line 1 to 24
- GPI B, line 1 to 24
- GPI C, line 1 to 24

The pinouts of all three connectors are identical, and are shown in the following table:

#### Pinout for GPI A, GPI B and GPI C connectors

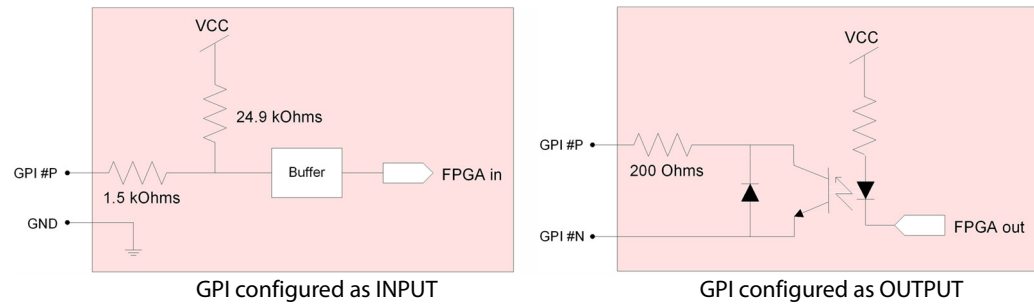
Pin	Signal	Pin	Signal	Pin	Signal
1	22N	18	23N	35	24N
2	22P	19	23P	36	24P
3	19N	20	20N	37	21N
4	19P	21	20P	38	21P
5	16N	22	17N	39	18N
6	16P	23	17P	40	18P
7	13N	24	14N	41	15N
8	13P	25	14P	42	15P
9	10N	26	11N	43	12N
10	10P	27	11P	44	12P
11	7N	28	8N	45	9N
12	7P	29	8P	46	9P
13	4N	30	5N	47	6N
14	4P	31	5P	48	6P
15	1N	32	2N	49	3N

**Pinout for GPI A, GPI B and GPI C connectors (continued)**

Pin	Signal	Pin	Signal	Pin	Signal
16	1P	33	2P	50	3P
17	GND	34	GND		

**GPI Circuits**

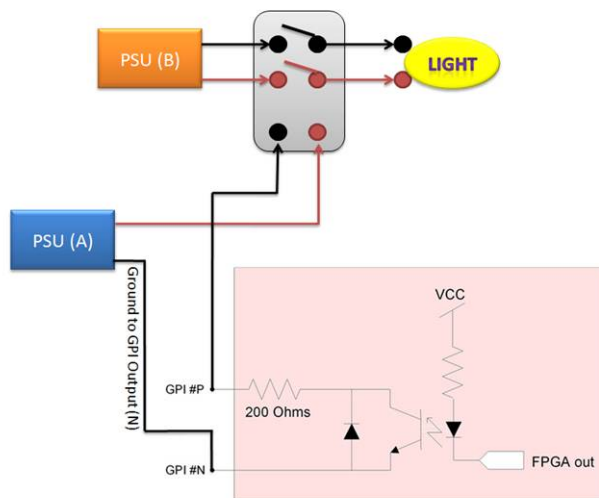
The individual GPI contacts are reconfigurable as either inputs or outputs. For interfacing purposes, the input and output circuit configurations are as shown in the following diagrams:



You should ensure your GPI physical connections are well established. In the following example, the goal is to trigger a relay and light up a light.

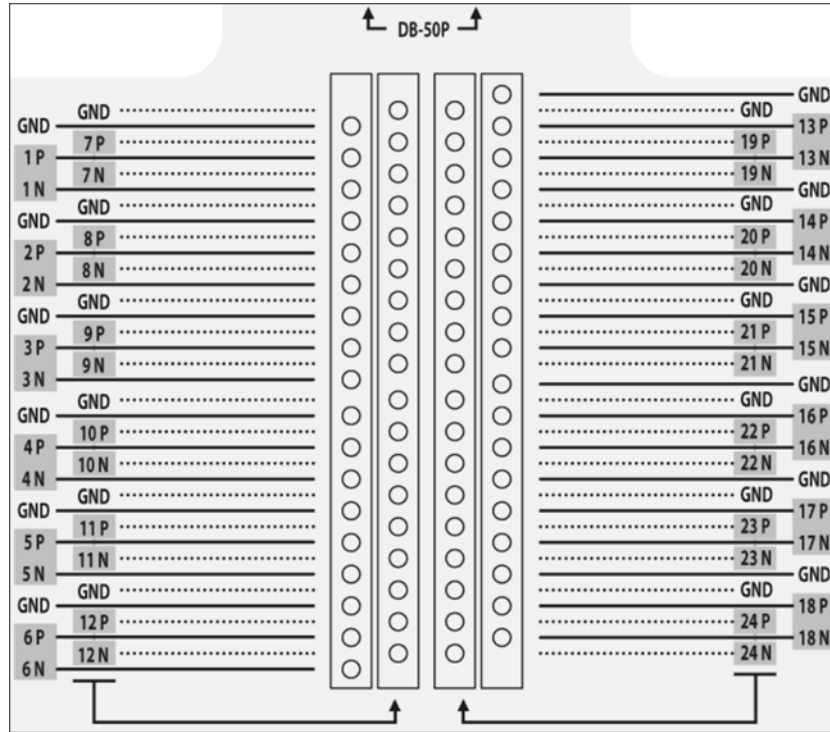
**CAUTION**

In the example below, make sure your P and N connections are in the proper polarity otherwise your GPI output will always be in the ON state.



To facilitate cabling of the GPI inputs and outputs, a terminal block adapter is available separately (Miranda item KXA-TBA-G). The GPI Terminal Block Adapter accommodates up to 24 terminal block connections using positive and negative terminal connections. Each column on the terminal block has 6 positive and 6 negative terminal connections that correspond to each pin position. Negative pins (labelled with an N) on the Terminal Block

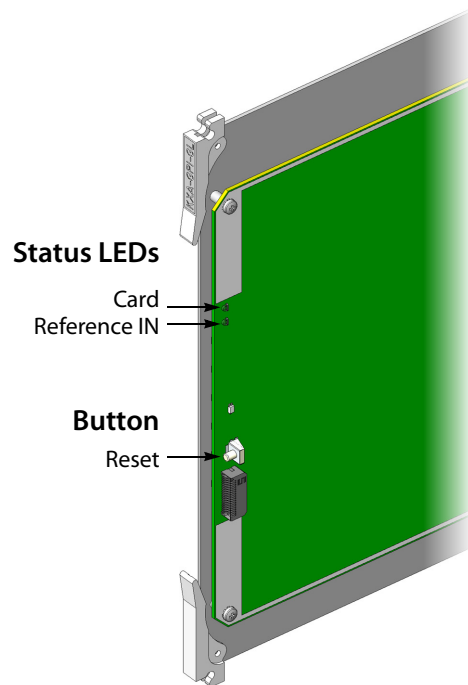
Adapter are not used as connections. Positive pins (labelled with a P) and Ground pins (labelled with a GND) correspond to GPI-IN connections.



P = Positive, N = Negative

### Front Card-Edge Layout

The following diagram shows the indicators and button that appear at the front end of the GPI/Genlock card:



### Indicators

The following LED status indicators are visible on the front edge of the GPI/Genlock card:

LED label	LED color	Interpretation
Card status	Green	OK
	Red	Configuration failed
	Blinking Red	System upgrade in progress
Reference input status	Green	OK
	Off	No input
	Red	Signal not recognized
	Orange	Frame rate not supported

### Controls

One button is located on the front card edge of the GPI/Genlock card:

Button label	Function
Reset	Reset the FPGA and restart the card—for maintenance use

All other adjustment, alignment and configuration of this card are accomplished using external controllers (e.g. the XEdit software), and are documented in their respective manuals.



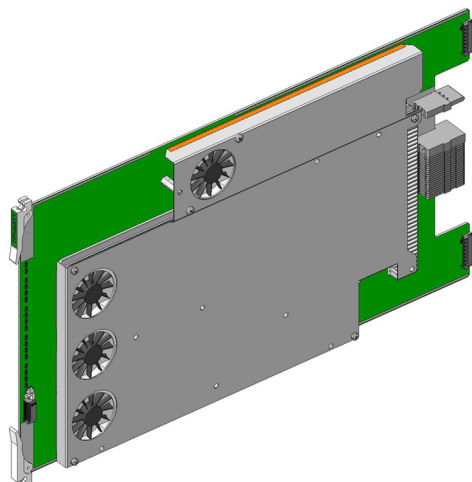
### Front Card-Edge Connector

An ICAT connector is located on the front card edge at the bottom, below the RESET button. This connector is reserved for factory use, and has no user functionality.

## KXI-16 Input Cards

The KXI-16HSV3 card is one of a series of input cards that can be installed in the Kaleido-X system. This card is a universal input card that accepts 3Gbps, HD-SDI, SD-SDI and composite inputs. Other cards in this series are the KXI-16HSV (3Gbps not supported), the KXI-16HS and KXI-16HS3 (composite inputs not supported), and the KXI-16SV (HD-SDI not supported).

Every KXI-16 card is complemented by a rear panel connector (KXI-16-R with 16 BNC connectors) that holds all input and output connectors associated with the card.



Input cards can be installed in any of the six available *Input* slots in the front of the Kaleido-X frame. These slots are color-coded GREEN on the front and rear panel of the frame.

Every input card is connected to the other cards in the Kaleido-X frame through the frame's internal midplane. External connections to a KXI-16 card are made through connectors mounted on the associated KXI-16-R rear panel. See [Card Installation and Replacement](#) on page 14, for instructions on installing the card and the rear panel.

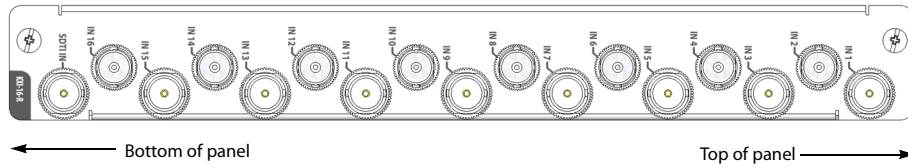
---

#### Notes

- Be careful to install the KXI-16-R rear panel in the matching location at the rear of the frame.
  - The KXI-16 card and its rear panel can be installed in any order.
  - Kaleido-X cards are hot-swappable; it is not necessary to turn off the Kaleido-X when installing or exchanging cards.
- 

### Rear Panel Connections

The connectors located on the KXI-16-R rear panel are shown in the diagram and described in the table below.

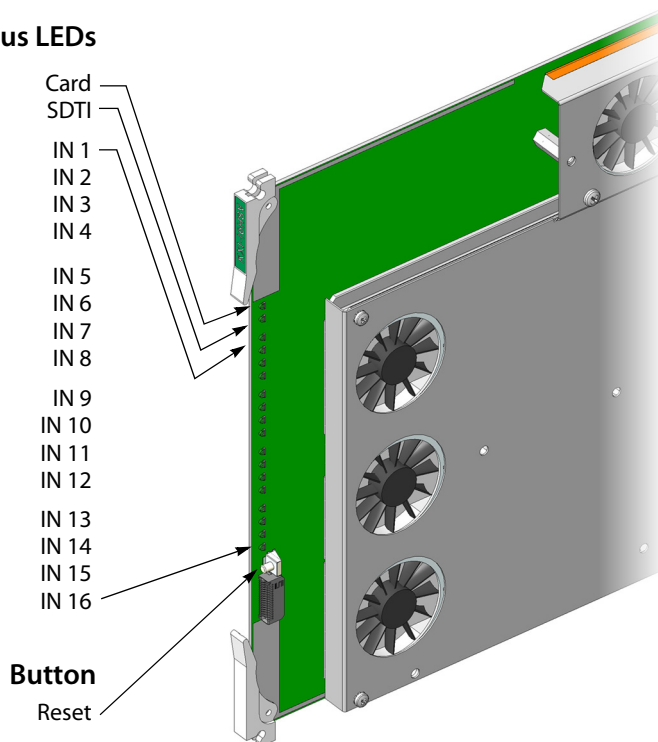


Connector label	Connector type	Function
IN 1 to IN 16	BNC	HD/SD SDI or composite video inputs 1 to 16
SDTI IN	BNC	Multiplexed audio from an external audio box (Audio Bridge Terminal)

### Front Card-Edge Layout

The following diagram shows the various indicators, connectors and buttons that appear at the front end of the KXI-16 input cards:

#### Status LEDs



### Front Card-Edge Indicators

The following LED status indicators are visible on the front edge of the input cards (listed from top to bottom):

LED label	LED color	Interpretation
Card Status	Green	Card OK
	Red	Error
	Orange	Programming in progress
	Blinking Red	Upgrade in progress
SDTI Status	Green	Valid signal present
	Red	No signal or invalid signal
IN 1 Status to IN 16 Status	Green	Valid signal present
	Red	No signal or invalid signal

### Front Card-Edge Controls

One button is located on the front card edge:

Button label	Function
Reset	Reset the FPGA and restart the card (for maintenance use)

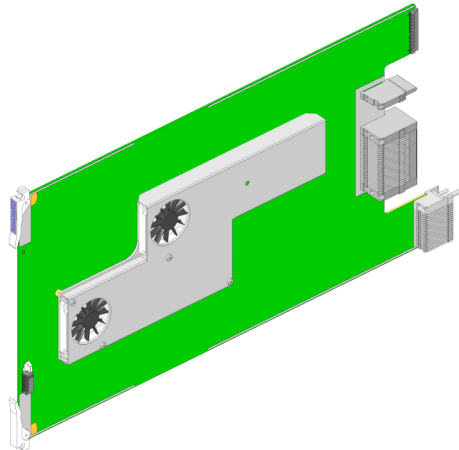
### Front Card-Edge Connector

An ICAT connector is located on the front card edge at the bottom below the RESET button.

This connector is reserved for factory use, and has no user functionality.

## KXO-24Router Card

The KXO-24Router card provides 24 external monitoring outputs that can be assigned to any of the 96 HD/SD SDI inputs of the Kaleido-X. Two cards can be installed in a Kaleido-X to provide up to 48 outputs. These unprocessed outputs can be used to feed high-quality CRT monitors, test equipment such as waveform monitors, as well as master control or production switchers.



The router card is available in two models:

Card name	Function
KXO-24 HD/SD-SDI Router	Supports both HD-SDI signals and SD-SDI signals
KXO-24 SD-SDI Router	Supports SD-SDI signals only

Signals of same format are switched in the vertical interval to avoid glitches. The sync reference used for switching the output signals on the router card is derived from the GPI/genlock card. If no reference is present on the GPI/genlock card, the sync reference is derived from the signal connected to Input 1 of the KXI-16 card installed in slot 4, i.e. the leftmost KXI-16 card as seen from the front of the frame.

The KXO-24Router card fits in the Kaleido-X Frame. It is complemented by a rear panel connector KXO-24Router-R that houses all input and output connectors associated with the card. The KXO-24Router card can be installed in one of the two available *Option* slots in the front of the Kaleido-X frame. These slots are color-coded PURPLE on the front and rear panel of the frame.

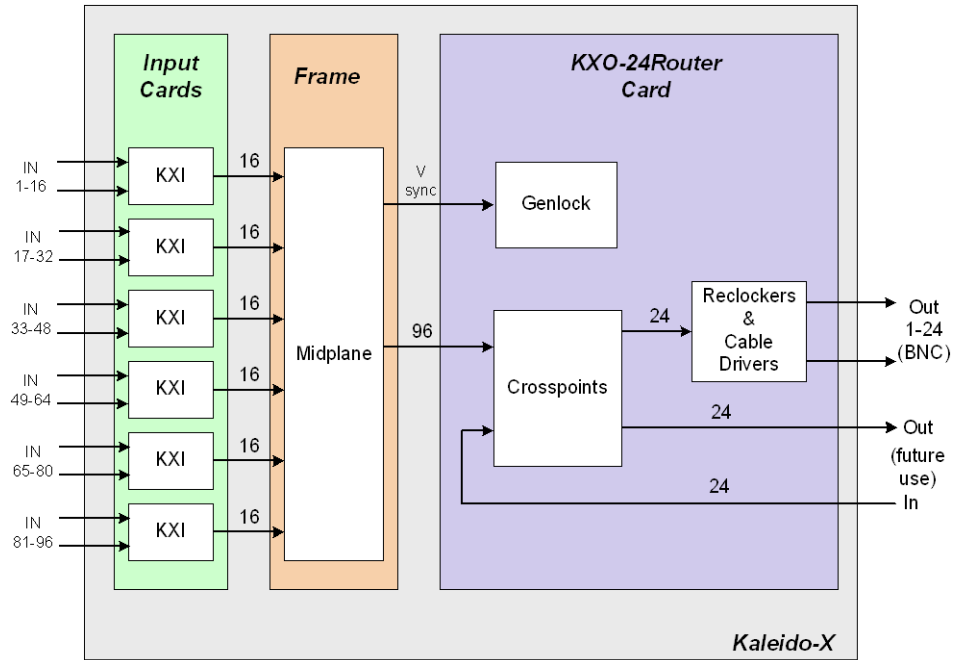
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#### Notes

- KXO-24Router cards do not support 3Gbps signals. In the case of a Kaleido-X (7RU) with the 3G input option enabled, if you try routing a 3 Gbps source to a KXO-24Router destination, the internal router will not let the video signal through, resulting in a black output.
  - In the case of 1080i signals, switching occurs at line 4, instead of line 7 (standard for HD signals).
  - Be careful to install the KXO-24Router-R rear panel in the matching location at the rear of the frame.
  - The KXO-24Router card and its rear panel can be installed in any order.
  - Kaleido-X cards are hot-swappable; it is not necessary to turn off the Kaleido-X when installing or exchanging cards.
- 

To install this card and rear panel, see [Card Installation and Replacement](#), on page 14.

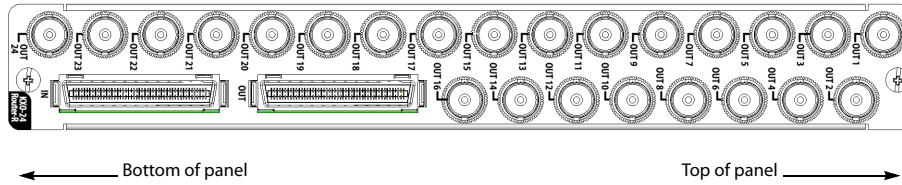
The KXO-24Router card is connected to the other cards in the Kaleido-X frame through the frame's internal midplane. External connections to the KXO-24Router card are made through connectors mounted on the KXO-24Router-R rear panel.



Simplified Signal Flow Diagram - KX0-24Router

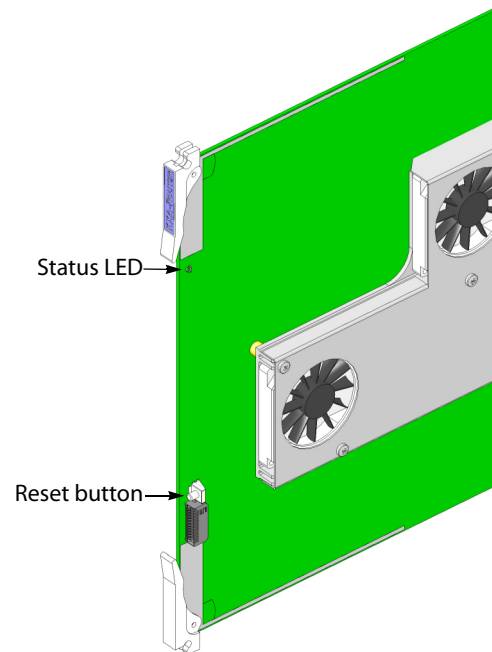
### Rear Panel Connections

The connectors located on the KXO-24Router-R rear panel are shown in the diagram and described in the table below.



Connector label	Connector type	Function
OUT 1 to OUT 24	BNC	Reclocked video outputs 1 to 24
IN	Lanelink 12X	24 SDI signals from a router in another Kaleido-X frame
OUT	Lanelink 12X	24 SDI signals to a router in another Kaleido-X frame

## Front Card-Edge Layout



A single LED status indicator is visible on the front edge of the card:

LED label	LED color	Interpretation
Card Status	Green	OK
	Red	Configuration failed
	Blinking Red	System upgrade in progress

The Reset button is located on the front card edge of the KXO-24Router card. Its function is to reset the FPGA and restart the card. This function is for maintenance use only.

An ICAT connector is located on the front card edge at the bottom below the RESET button. This connector is reserved for factory use, and has no user functionality.

## Maintenance

### Cleaning the Air Filter

Occasionally, the air filter has to be cleaned in order to maintain proper ventilation. The air filter is located in the front door of the Kaleido-X (7RU) frame. The filter may be cleaned without removing it from the door.

#### To clean the air filter

- 1 Remove the door from the frame by opening it, and lifting it straight up.
- 2 Place the door flat on a work surface with the inside of the door facing up.
- 3 Using a vacuum cleaner with a brush nozzle to prevent scratching, vacuum the dust from the inner side of the door.

- 4 Turn the door over and vacuum the outer side of the door.
- 5 Reinstall the door on the frame by positioning the hinge pins on the door over the hinge assembly on the frame, and lowering the door into place.

## Replacing a Defective Power Supply

In the event of a power supply failure, the unit will switch to the redundant power supply for its power source. An alarm will appear on the Kaleido-X output screen, until it is manually reset through the Kaleido software. It is not necessary to turn off the unit before replacing the defective power supply.

The faulty power supply will show a red FLT lamp on its front panel.

See [Power Supplies](#) on page 9 for complete instructions on removing and reinstalling a power supply.

## Replacing a Defective Cooling Fan

The primary cooling fans for the Kaleido-X frame are located at the top rear of the frame, behind the power supplies. Six fans are mounted in a removable assembly.

### IMPORTANT

**The Kaleido-X requires a constant flow of cooling air during operation. DO NOT OPERATE THE UNIT IF THE FAN ASSEMBLY IS DISABLED OR REMOVED.**

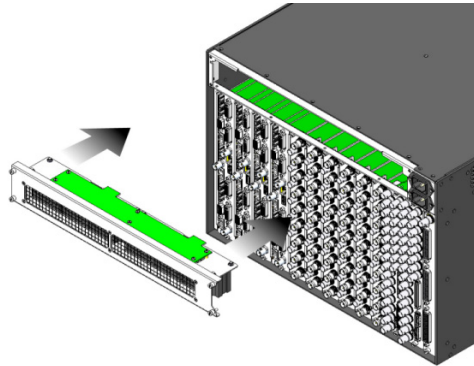
IN THE EVENT OF A FAN FAILURE: Please contact your nearest support center to get a replacement unit. The system can run with failed fans, but the temperature should be closely monitored using XAdmin and the defective units replaced ASAP.

### To remove the fan assembly

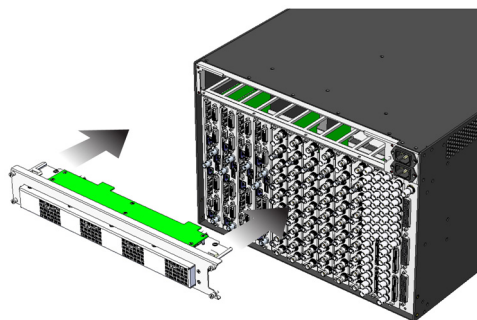
- 1 Power off the entire frame by unplugging the AC cords.
- 2 Release the four captive mounting screws at the top and bottom of the fan assembly.
- 3 Pull the assembly straight out of the frame.

### Once the defective fan has been replaced, reinstall the fan assembly

- 1 Position the assembly in the opening.
- 2 Slide the assembly into the opening so the four captive screws line up with their receptacles and the connectors mate with their plugs.



*Installing fan assembly into KXA-FR7 frame model*



*Installing fan assembly into KXA-FR7-B frame model*

- 3 Tighten the four captive screws.
- 4 Power up the frame by plugging in the AC cords.
- 5 Verify that all six fans are running properly.



# Kaleido-X (14RU) Expansion



This chapter describes how to connect two Kaleido-X (7RU) frames using expansion cards.

## Summary

<i>Introduction</i> .....	35
<i>Description</i> .....	37
<i>Installation</i> .....	44
<i>Troubleshooting</i> .....	70

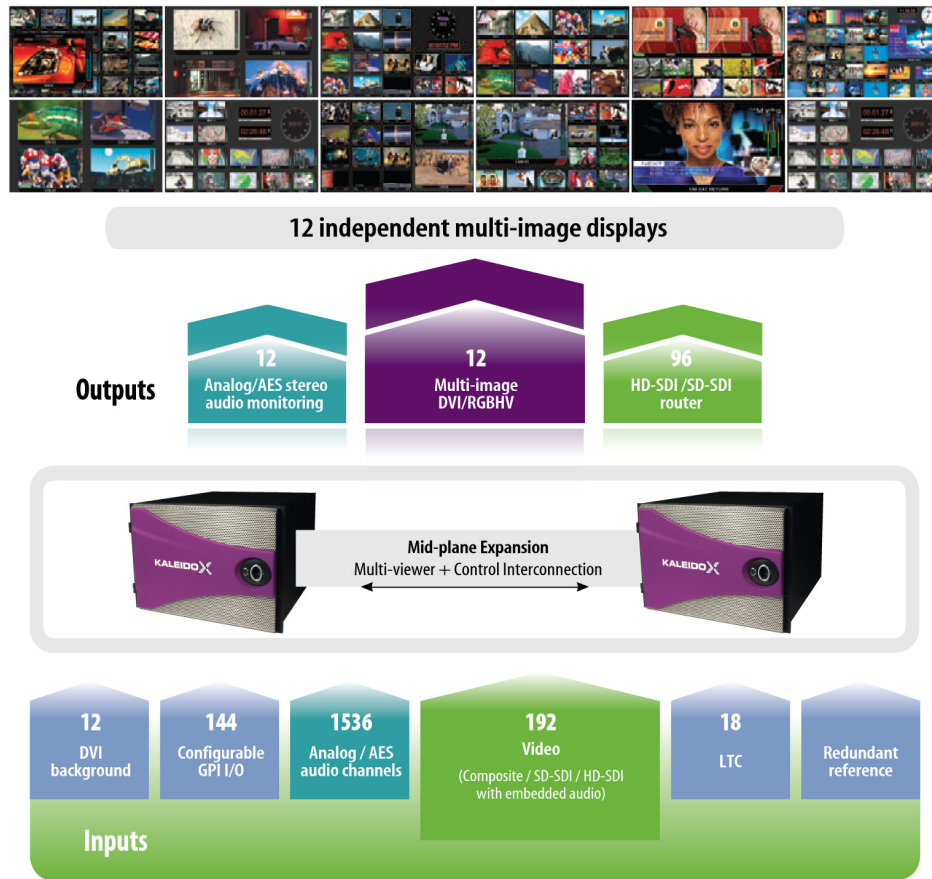
## Introduction

As of version 3.00 of the Kaleido-X Software, it is possible to expand the input connectivity of one Kaleido-X (7RU) frame to include that of a second. The two frames, each with its own expansion (KXO-EXP) card, are connected by a high-bandwidth cable, such that all the KXO output modules on each frame (up to 6 in total) have access to all KXI module inputs on each frame (up to 192 in total) without any blocking or bandwidth limitations. Using Miranda's XEdit software, the two frames can be configured as a single system, allowing Kaleido-X rooms to have layouts that contain inputs from either frame.

The expansion card allows seamless sharing of:

- video
- audio (embedded or discreet)
- time code and reference inputs
- video alarms (black detect, freeze, etc.)
- audio alarms (silence, overload, etc.)
- metadata information (CC, XDS, audio, etc.)
- audio level meter data

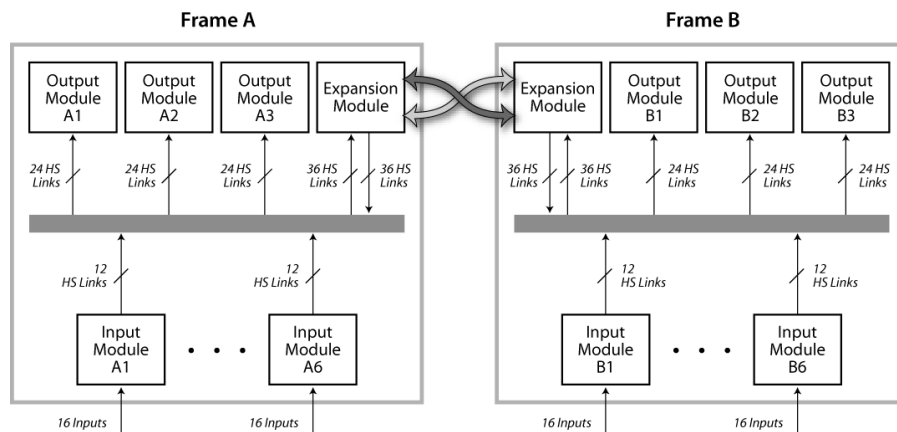
Two Kaleido-X frames in expansion mode can display up to 192 video inputs over up to 12 displays. This configuration provides easy system expansion without losing any of Kaleido-X's extreme signal flexibility, due to the full interconnectivity of video, audio and metadata, as well as time code and control signals.



Two Kaleido-X frames connected by KXO-EXP expansion cards offer the following advantages:

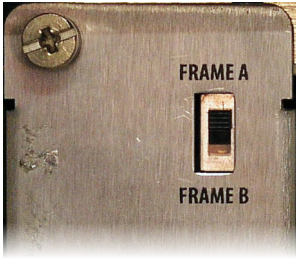
- Larger systems can be configured, with any source directed anywhere.
- Sources can be shared between frames.

The diagram below illustrates the types of inputs and outputs that can be shared between two Kaleido-X frames via their expansion cards.



The table below summarizes the expansion-related key concepts.

### Definitions

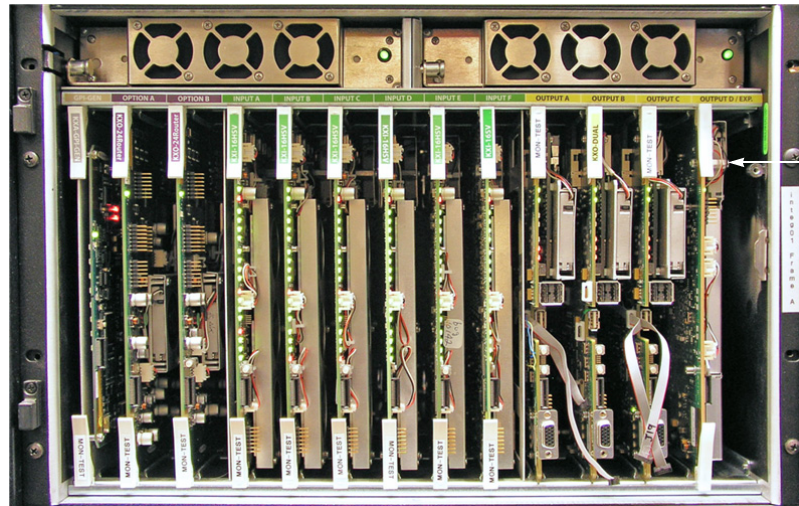
Kaleido-X (14RU) expansion frame	Refers to two Kaleido-X (7RU) frames operating in <i>Expansion Mode</i> (see below).
Master frame	When two Kaleido-X frames are interconnected, one is designated as <b>Frame A</b> and the other as <b>Frame B</b> . The setting is determined by a physical switch on the rear panel of the expansion card in each frame. <b>Frame A</b> is nominally considered to be the <i>master</i> .
	
Expansion mode	<p>When two Kaleido-X (7RU) frames work as one, they are said to be in <i>expansion mode</i>. To be in this mode, expansion cards and expansion cables must be properly connected, the <b>Enable expansion</b> option must be activated in XAdmin, and there must be a valid expansion database running on the expanded frame. Only one system name and frame IP address is accessible.</p> <p>In expansion mode:</p> <ul style="list-style-type: none"> <li>• Two Kaleido-X (7RU) systems (<b>Frame A + Frame B</b>) operate as one frame.</li> <li>• KXI inputs from <b>Frame A</b> can be displayed on <b>Frame B</b>, without any restriction, and vice versa.</li> <li>• You can create and load layouts that overlap <b>Frame A</b> and <b>Frame B</b>.</li> </ul>
Database	Kaleido-X operational data created in XEdit (e.g. logical sources, layouts, rooms, users, system definition, actions) is stored in a database.
Router expansion	Expansion frames <i>cannot</i> share internal router cards unless they are connected by router expansion cables (option available separately) whose interconnection has been properly described in the system representation. If the Kaleido-X (14RU) expansion system contains router cards that are not connected together using router expansion cables then the inputs from <b>Frame A</b> cannot be routed to the <b>Frame B</b> router cards, and vice versa. See <a href="#">Configuring Router Card Expansion</a> , on page 63, for more information.
Expansion mode with degradation	This mode is entered if the Kaleido-X is set to operate in expansion mode, but either the expansion cards are missing OR the expansion cables are unplugged. In this mode, both frames are controlled together (only one system name and frame IP address) but without video, audio or metadata exchange between frames.

## Description

Like other Kaleido-X cards, each expansion card consists of two panels:

- **KXO-EXP-F**—the front panel (see [KXO-EXP-F](#), on page 38)
- **KXO-EXP-R**—the rear panel (see [KXO-EXP-R](#), on page 40)

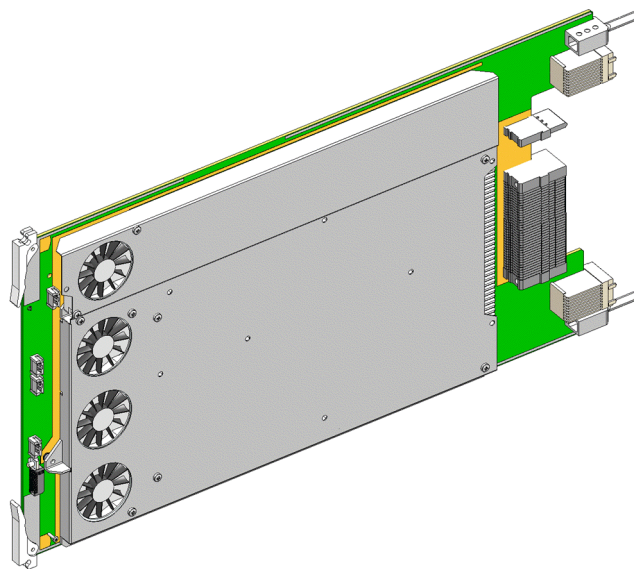
When inserted in their corresponding slots, the panels meet at the frame's internal midplane, which enables the KXO-EXP card to communicate with the other cards in the Kaleido-X frame. External connections to the KXO-EXP card are made through connectors that are found on the card's rear panel and on the front card edge.



*Kaleido-X frame with expansion card—front view*

## KXO-EXP-F

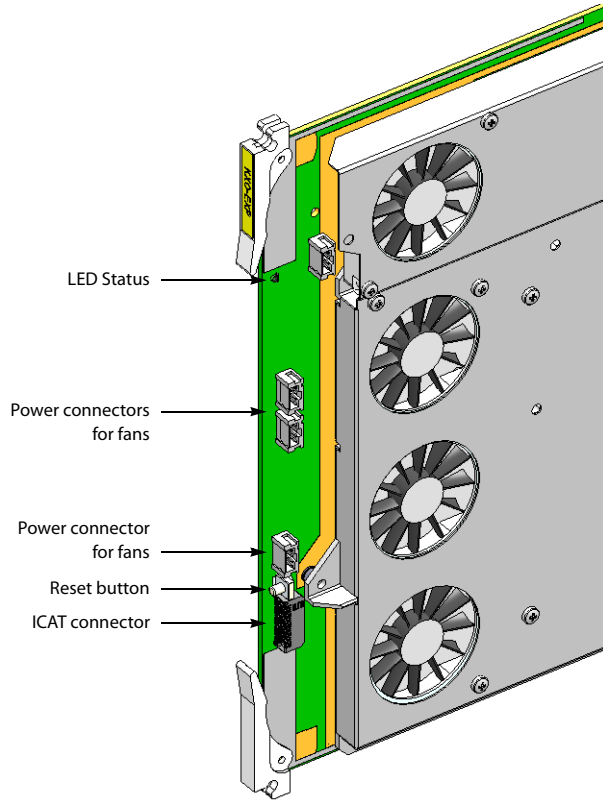
The KXO-EXP-F card is a multi-function card that performs a significant portion of the signal processing required to create the monitor wall output.



The KXO-EXP card must be installed in the slot labelled OUTPUT D / EXP (color-coded yellow) in the Kaleido-X frame.

## Front Card-Edge Connectors

The front card-edge connectors are not accessible in normal use, as they are covered by the front door of the frame. They are provided for maintenance purposes, or for special circumstances.



Item	Type	Function
Power	—	Power connections for fans
—	ICAT	For factory use only

LED status indicators are visible on the front edge of the card.

LED label	LED color	Interpretation
Card status	Green	OK
	Red	Failed

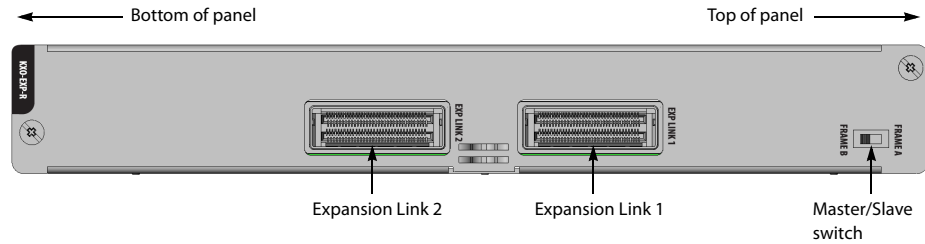
## Front Card-Edge Controls

One button is located on the front card edge of the KXO-Dual card:

Button label	Function
RESET	Press to reboot card without removing it from frame

## KXO-EXP-R

The front panel (KXO-EXP-F) is complemented by a rear panel that provides all input and output connectors associated with the card.



The table below describes the connectors and switch on the rear panel:

Connector	Connector type	Function
EXP LINK 1	Molex 74546-1602	Connects to EXP LINK 1 on second frame using expansion cable (maximum length = 2 meters)
EXP LINK 2	Molex 74546-1602	Connects to EXP LINK 2 on second frame using expansion cable (maximum length = 2 meters)
Frame A/B switch	—	Used to designate master/slave hierarchy: FRAME A = master, FRAME B = slave

## Signal Synchronization

A reference signal can be connected to either **Frame A** or **Frame B** to synchronize (genlock) the two-frame system. For redundancy, connect both.

## Software

### XAdmin

In addition to its other administrative functions, XAdmin is used to enable the expansion mode, and define the IP address scheme. Before two Kaleido-X systems are joined, each frame and its output cards have their own IP addresses. In expansion mode, a single IP address is assigned for the whole expansion system, and individual IP addresses for the output cards of both frames are assigned from the same page, in XAdmin.

**Miranda XADMIN**

**System configuration** General  
**Status and options** System name: EXP-200  
 50 Hz system frame rate:

**Access control**  
**Technical support**

**Ethernet**

Frame IP address: 10 . 5 . 5 . 200 ← IP address for the system  
 Network mask: 255 . 255 . 255 . 0  
 Default gateway: 10 . 5 . 5 . 1   
 Detected link mode: 100Mbps full-duplex  
 Configured link mode: Auto-negotiate  
 Enable expansion:  ← Expansion mode is enabled

Output A: 10 . 5 . 5 . 201   
 Output B: 10 . 5 . 5 . 202   
 Output C: 10 . 5 . 5 . 203   
 Output A (frame B): 10 . 5 . 5 . 206   
 Output B (frame B): 10 . 5 . 5 . 207   
 Output C (frame B): 10 . 5 . 5 . 208

IP addresses for output cards in Frame A  
 IP addresses for output cards in Frame B

**Date and Time**

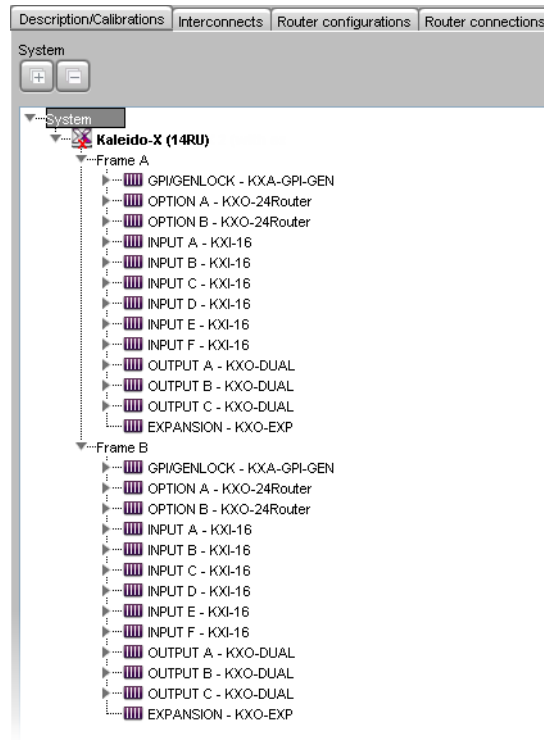
Current date and time: Monday October 28, 2013 04:27:44 PM UTC-4  
 Date and time format: English (United States)  
 Time zone: America/New\_York  
 NTP synchronization:  Enabled  Disabled  
 NTP server IP address: 10 . 0 . 2 . 8

Click **Save** to save your settings and continue.

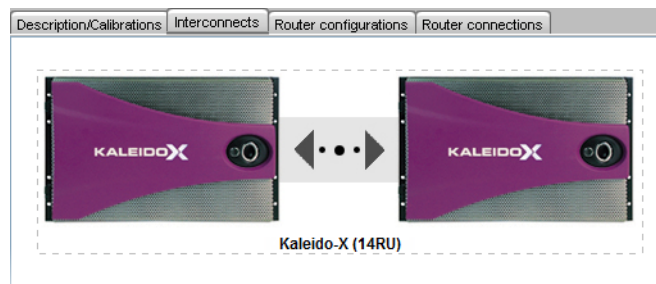
*Expansion system configuration example*

## XEdit

Two frames in an expanded system are presented in the XEdit hierarchical System list as shown below.

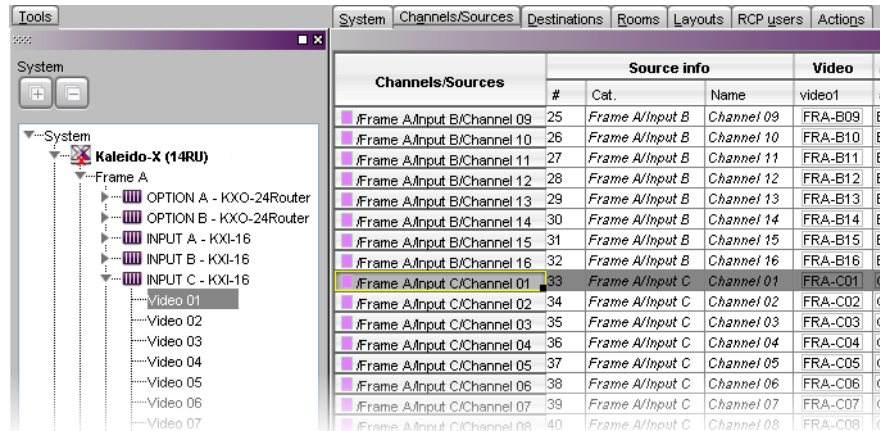


In the **Interconnects** tab, an expansion frame is depicted by an icon labelled **Kaleido-X (14RU)**.



When two frames are joined, the default names for all available inputs are formed by concatenating the frame name, the input card, and the video number. For example, the logical source `"/Frame A/Input C/Channel 01"` corresponds to the first video input on KXI card C on Kaleido-X **Frame A**.





## SNMP

Two frames in expansion mode are represented in the Kaleido-X MIB as one frame containing all cards from both systems. Overall status entries (kxFrameStatus, kxFanStatus, kxPowerSupplyStatus) represent the overall status of both frames.

An expansion system malfunction is reported as a trap, with reference to the kxSlotTrap table. Status details for specific card alarms can be obtained from XAdmin's Status and Options page.

The screenshot shows an SNMP Table window titled 'SNMP Table - iso.org.dod.internet.private.enterprises.miranda.kaleidoKX.kxSystem.kxSlotTable'. The table lists 29 rows of card information. The columns are: kxCardFriendlyN..., kxCardHardSlotId, kxCardStatus, kxCardFirmware..., and kxCardTemperat... (partially visible). The status for most cards is 'normal(10000)', while others are 'disabled(-1)'. The table is viewed from 'Origin' and shows 26 rows on page 1.

kxCardFriendlyN...	kxCardHardSlotId	kxCardStatus	kxCardFirmware...	kxCardTemperat...
KXA-GPI-GEN	1	normal(10000)	0x0	disabled(-1)
KXO-24Router	2	normal(10000)	0x0	disabled(-1)
KXO-24Router	3	normal(10000)	0x0	disabled(-1)
KXI-16HSV	4	normal(10000)	0x0	disabled(-1)
KXI-16HSV	5	normal(10000)	0x0	disabled(-1)
KXI-16HSV	6	normal(10000)	0x0	disabled(-1)
KXI-16HSV	7	normal(10000)	0x0	disabled(-1)
KXI-16HSV	8	normal(10000)	0x0	disabled(-1)
KXI-16HSV	9	normal(10000)	0x0	disabled(-1)
KXO-DUAL	10	normal(10000)	0x0	normal(10000)
KXO-DUAL	11	normal(10000)	0x0	normal(10000)
KXO-DUAL	12	normal(10000)	0x0	normal(10000)
FRAME A - EXPANSION	13	normal(10000)	0x0	disabled(-1)
KXA-GPI-GEN	17	normal(10000)	0x0	disabled(-1)
KXO-24Router	18	normal(10000)	0x0	disabled(-1)
KXO-24Router	19	normal(10000)	0x0	disabled(-1)
KXI-16HSV	20	normal(10000)	0x0	disabled(-1)
KXI-16HSV	21	normal(10000)	0x0	disabled(-1)
KXI-16HSV	22	normal(10000)	0x0	disabled(-1)
KXI-16HSV	23	normal(10000)	0x0	disabled(-1)
KXI-16HSV	24	normal(10000)	0x0	disabled(-1)
KXI-16HSV	25	normal(10000)	0x0	disabled(-1)
KXO-DUAL	26	normal(10000)	0x0	normal(10000)
KXO-DUAL	27	normal(10000)	0x0	normal(10000)
KXO-DUAL	28	normal(10000)	0x0	normal(10000)
FRAME B - EXPANSION	29	normal(10000)	0x0	disabled(-1)

## Installation

When two Kaleido-X frames are to be connected in an expansion configuration, it is important to consider whether the frames are new, or have already been commissioned. There are three possible combinations:

- **NEW:** two new Kaleido-X frames (see [Expanding NEW Kaleido-X Frames](#), below).
- **EXISTING:** two previously commissioned Kaleido-X frames (see [Expanding EXISTING Kaleido-X Frames](#), on page 50).
- **MIXED:** one new Kaleido-X frame plus one previously commissioned frame (see [Expanding MIXED Kaleido-X Frames](#), on page 63).

### IMPORTANT

You must follow the installation procedure that matches your situation. Failure to do so may impair the proper functioning of your multiviewer system.

## Expanding NEW Kaleido-X Frames

Joining two NEW Kaleido-X frames in an expansion configuration involves the following:

- installing and interconnecting the expansion cards, and designating Frame A and Frame B (see [Part A — Physical Setup](#) below)
- configuring IP addresses for your expansion system (see [Part B — XAdmin Settings](#), on page 46)
- configuring your expansion system representation in XEdit (see [Part C — XEdit Settings](#), on page 48)

### Part A — Physical Setup

- 1 Set up and configure the two standalone, independent Kaleido-X frames as described in the Kaleido-X User's Manual.
- 2 Open an XAdmin window for each frame. Click **Status and options**, and check the frame and card status to make sure there are no problems or error conditions (the **Normal mode** alarm should be **green** in all cases).

### IMPORTANT

**All cards must be at Kaleido-X software version 3.00 (or later) before two frames are joined in expansion mode.**

To upgrade existing frames, follow the upgrade procedure described in the Kaleido-X Version 4.10 (or later) Release Notes. Any spare cards you may have can be upgraded via the Live Update feature by hot swapping them in a standalone Kaleido-X at version 3.00 (or later). Check the card edge LEDs to make sure the cards are operating normally.

- 3 **Power down both frames.**
- 4 Check the pins on the expansion card connectors to make sure they are straight (inserting a card with bent pins can damage the card).

- 5 Gently but firmly, slide one expansion card into the slot labelled **OUTPUT D / EXP** of the Kaleido-X that will be designated **Frame A**.

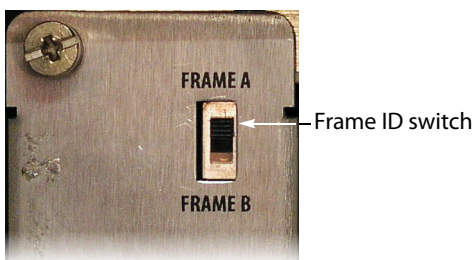
**Note:** Be careful to install the KXO-EXP-R rear panel in the matching location at the rear of the frame. The KXO-EXP-F card and its rear panel can be installed in any order. See [Card Installation and Replacement](#) on page 14 for more information.

**IMPORTANT**

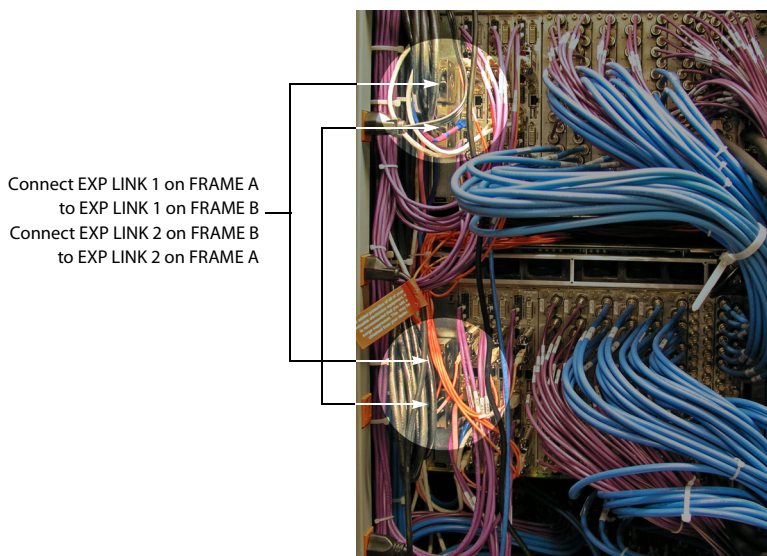
**Make sure that there is a KXO card in Slot C of Frame A.**

This card will act as the master for the expansion frame. Another output card may become the master.

- 6 Set the **Frame ID** switch on the rear panel to the **Frame A** position.



- 7 Gently but firmly, slide the other expansion card into the slot labelled **OUTPUT D / EXP** of the Kaleido-X that will be designated **Frame B**.
- 8 Set the **Frame ID** switch on the rear panel to the **FRAME B** position.
- 9 Connect the two expansion cards using the expansion cables:
  - EXP LINK 1 on **Frame A** to EXP LINK 1 on **Frame B**
  - EXP LINK 2 on **Frame A** to EXP LINK 2 on **Frame B**



- 10 Power up both frames.

Alarms may appear in the dashboard (see below), and, in some cases, you may see blinking LEDs on the KXO cards in **Frame B**. This is normal.



- 11 Wait 5 minutes (this allows some important internal processing to take place), and then continue with the procedure<sup>1</sup> as described in [Part B — XAdmin Settings](#) below.

**Frame B** will not boot completely at this stage. This is normal.

## Part B — XAdmin Settings

At this point, **Frame A** should be up and running, with all input, output, network and serial cables in position, and **Frame B** should not be rebooted.

Prior to expansion, each frame and all KXO cards normally have unique IP addresses. You will use XAdmin to:

- specify one IP address for the expanded system;
- verify that there are no conflicts among the IP addresses of the KXO cards;
- make sure that all IP addresses are on the same subnet.

- 1 Open XAdmin for **Frame A** (refer to *Opening XAdmin*, in the Kaleido-X User's Manual).
- 2 On the System Configuration page, select **Enable expansion**.

1. Even if, as in some cases, Frame B does not completely reboot.

The Output D/EXP IP address is replaced with new lines for the IP addresses of Frame B's Output A, B, and C cards.

The screenshot shows the XAdmin web interface for a Miranda system. The 'Ethernet' section is active, displaying configuration for the main system and expansion outputs. The main system IP is 10.5.5.180. Expansion outputs are listed as Output A, B, and C, each with a 'Next IP' button. A red box highlights the configuration for Frame B's outputs: Output A (frame B) with IP 0.0.0.0, Output B (frame B) with IP 0.0.0.0, and Output C (frame B) with IP 0.0.0.0. The 'Date and Time' section shows the current date and time as Sunday November 20, 2011 09:38:59 PM GMT-05:00, with locale set to English (United States) and time zone to America/New\_York. NTP synchronization is enabled with server IP 10.0.2.8.

- 3 If necessary, change the **System name** and **Frame IP address** (which will apply to both frames once they are in joined in expansion mode).
- 4 Enter the IP addresses currently used by **Frame B's** Output A, B, and C cards.
- 5 Click **Save**, and then click **Apply settings** in the sidebar.  
**Frame A** and **Frame B** should reboot automatically. If **Frame B** does not reboot automatically, perform a hard reboot on **Frame B** only.

#### Notes

- You may see messages on the monitor wall warning you that KX0 heads are not assigned. This is normal.
- If one or more cards in a Kaleido-X frame is being upgraded (i.e. if a Live Update is in progress), then it is not possible to apply any changes made in XAdmin. If you click **Apply settings** in the XAdmin sidebar, an error message will appear. This restriction also occurs during the first 10 to 20 seconds after a card is inserted into or removed from the frame. Wait until the upgrade has finished, and then click **Apply settings** again.

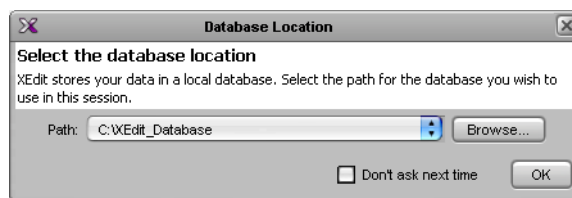
- 6 Open XAdmin, using what is now the expansion system IP address.
- 7 Click **Status and options**.
- 8 Verify that status information appears for all of the cards on both frames in the expansion system (see [Viewing the Status of an Expansion Frame](#), on page 69).

- 9 Check the frame and card statuses to make sure there are no problems or error conditions. In particular, the **Cable crossed** and **Cable plugged** alarms on the KXO-EXP cards should be normal (green).

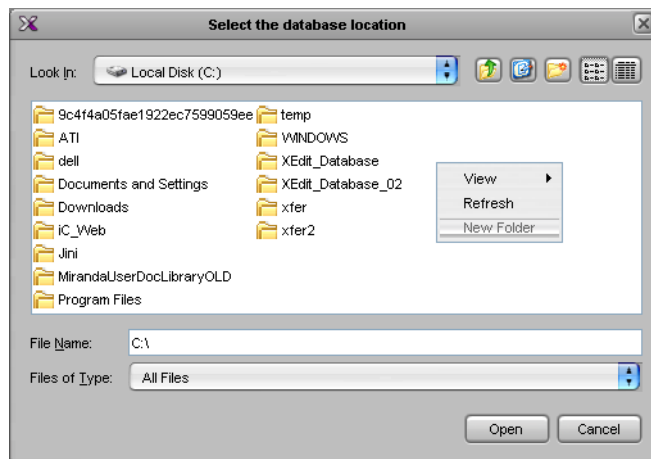
KXO-EXP - Firmware Version	0x109
KXO-EXP - Frame Model	2.0
KXO-EXP - Link: Cable 1 plugged	●
KXO-EXP - Link: Cable 2 plugged	●
KXO-EXP - Link: Cable crossed	●
KXO-EXP - Link: MGT Link Established	0x0

## Part C — XEdit Settings

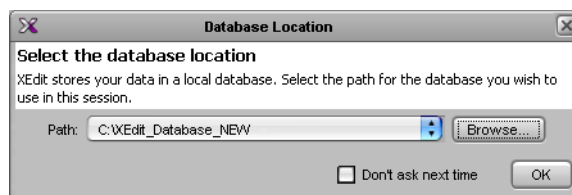
- 1 Open XEdit.
- 2 When the **Database Location** window appears, click **Browse**.



- 3 Right-click in the browse window, and create a new folder (if **New Folder** is not available, change the **Look In** location, and then try again).



- 4 Click **OK**.

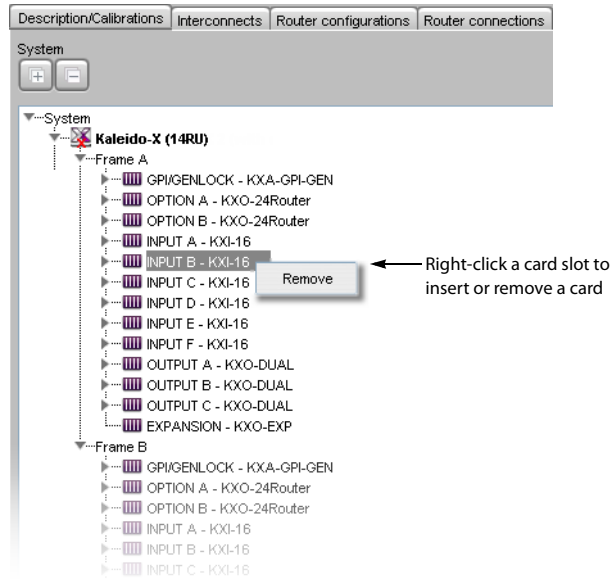


XEdit continues to start up, and loads a new, empty database. In the following steps, you will convert this empty database into what will become the database for the entire expansion frame.

- 5 On the **Configure** menu, point to **Database**, and then click **Restore backup** to load the factory-default database (Kaleido-X (14RU).zip) from the DVD shipped with the system.

With the factory defaults loaded, you can start using your Kaleido-X expansion system and its default rooms and layouts (you may see some warnings on the monitor wall about layout/room assignments). Normally, however, you will at this point wish to customize the room, layout and other settings:

- 6 Add cards to, or remove them from, the System list so that it reflects the physical configuration of the expansion system:



- 7 Configure other settings (logical sources, destinations, rooms, layouts, etc.) as you would for any new Kaleido-X system (refer to *Creating and Configuring Logical Sources*, *Managing Rooms*, and *Managing Layouts*, in the Kaleido-X User's Manual).

---

**TIP**

Once you have created new Rooms manually, you can use the Copy layout feature (see [page 57](#)) to copy existing layouts from another Kaleido-X.

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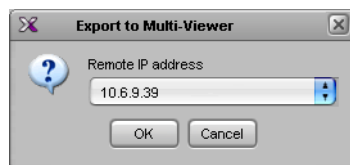
- 8 On the **File** menu, click **Save** to save the changes to the system.

---

**Note:** You should make a backup of the new database.

---

- 9 On the **Configure** menu, point to **Database**, and then click **Export**.
- 10 Type the IP address of the expansion frame, and then click **OK**.



A confirmation message appears.

- 11 Click **OK**.

## Expanding EXISTING Kaleido-X Frames

There are two procedures that must be completed to join two previously commissioned (standalone) Kaleido-X frames in expansion mode:

- Merge the databases of the two standalone frames (see [Part 1 of 2 — Merging Databases](#) below).
- Physically join and configure the frames (see [Part 2 of 2 — Joining & Configuring Frames](#), on page 59).

### Part 1 of 2 — Merging Databases

If you are planning to join two existing Kaleido-X frames, it is likely that you will want to keep their configurations (logical sources, levels, destinations, rooms, layouts, etc.) intact. But when two separate frames become one expansion frame, they share a single database.

XEdit provides a tool for merging two databases into one, prior to the joining of the two frames. This tool combines the configuration settings from both frames, modifying them when necessary to avoid conflicts. For example, if a logical source name is the same on **Frame A** and **Frame B**, it will be renamed.

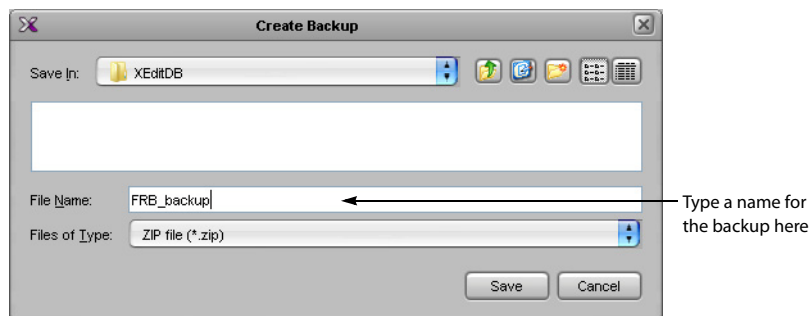
When a database for **Frame B** is merged into a database for **Frame A**, most of the information from **Frame A** is preserved, but only some of the information from **Frame B**. For this reason, *the standalone frame that has the most elaborate settings (rooms, layouts, logical sources, etc.) should be designated Frame A.*

#### IMPORTANT

You must merge databases before joining two existing frames in expansion mode.

### To merge two Kaleido-X databases

- 1 Open XEdit.
- 2 Import the database from **Frame B** (refer to *Importing a Database*, in the Kaleido-X User's Manual).
- 3 Create a backup of the **Frame B** database (refer to *Creating a Backup*, in the Kaleido-X User's Manual).



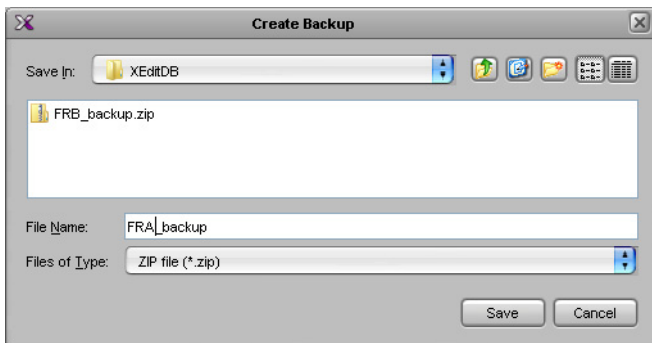
This is what will become the **Frame B** portion of the expansion database.

- 4 Import the database from **Frame A**.

It is important that you designate the most complete database (the one with the most elaborate rooms, layouts, logical sources, etc.) as the **Frame A** database, since not all data from the **Frame B** database is carried over during a merge.



5 Create a backup of the **Frame A** database.



At this point, you have backed up the two single-frame databases—these are important, as they can be used (a) as a reference when re-creating settings not carried over during the merge, and (b) to split an expansion system back into two independent frames.

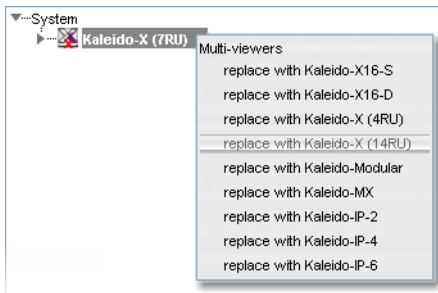
In the following steps, you will convert the currently loaded database (**Frame A**) into what will become the database for the entire expansion frame.

---

**Note:** XEdit must be in OFFLINE mode. It is not possible to merge databases while online.

---

- 6 In XEdit, click the **Description/Calibrations** tab.
- 7 Right-click the current multiviewer in the System list, and then click **replace with Kaleido-X (14RU)**.

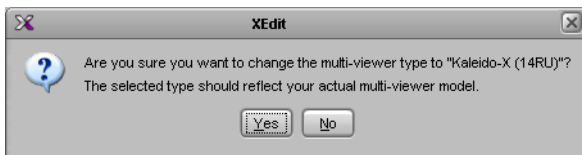


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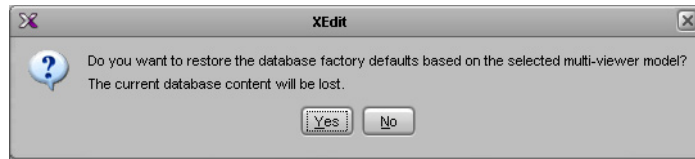
**Note:** This step is necessary, before merging databases, to specify that the new database applies to an expansion configuration. In so doing, however, you will lose certain settings, such as peripheral device configurations. When the database merge is complete, you will have to re-enter these settings manually.

---

8 When prompted to confirm the frame change, click **Yes**.



The next message prompts you about populating the database with a factory-default configuration for the selected multiviewer model.



**IMPORTANT**  
**When prompted to restore factory default settings, click No.**

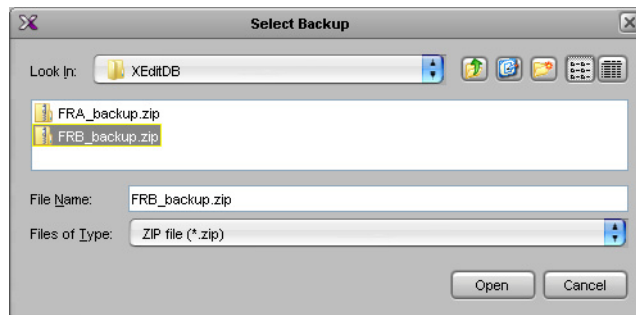
**Kaleido-X (7RU)** is replaced by a **Kaleido-X (14RU)** in the System list.

**Note:** When the system is replaced, some settings are lost: input/output cards, external routers, and third party devices. You will have to restore these settings manually, as indicated in the steps below.

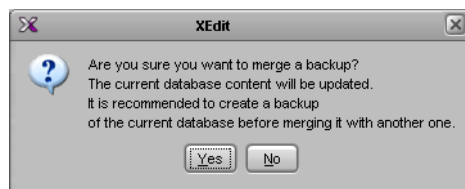
- 9 Add or remove cards to/from the System list so that it reflects the physical configuration of the expansion system.
- 10 On the **Configure** menu, point to **Database**, and then click **Merge backup**. The **Select Backup** window appears.

**Note:** The **Merge backup** command is only available in XEdit's OFFLINE mode.

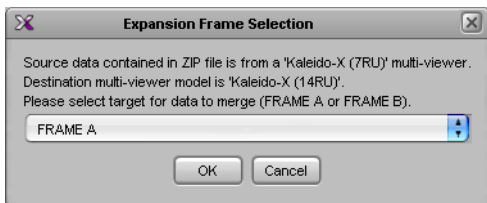
- 11 Select the ZIP file corresponding to the database backup for **Frame B** that was created in [step 3](#).



- 12 Click **Open**.  
A confirmation message appears.

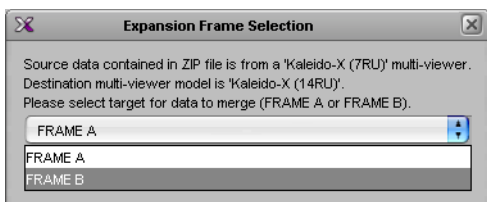


- 13 Click **Yes**.  
The Merge tool determines the frame type (e.g., 7RU) associated with the incoming database, and prompts you to choose a corresponding expansion frame.

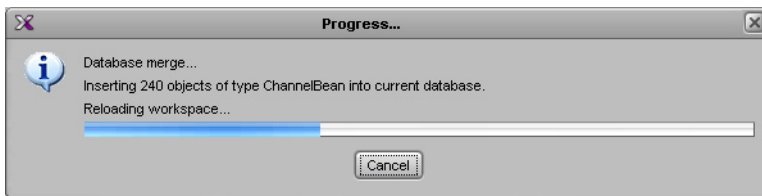


Choosing **Frame B** will cause incoming data (from the ZIP file) to be identified as belonging to **Frame B**. If you choose FRAME A, then the URIs (for logical sources, etc.) will not be modified to reference to **Frame B**.

- 14 Select **Frame B**, and then click **OK** to begin merging the incoming database (**Frame B**) into the currently loaded one (**Frame A**).



- 15 A window shows the progress of the database merge.



The *Merge* tool:

- renames user data upon detection of duplicate path + friendly names
- modifies URIs, if necessary, to indicate whether they belong to **Frame A** or **Frame B**
- removes unresolvable assignments (e.g. references to Output D are purged from the database)

---

Note: We recommend creating a backup of the new expansion database at this point.

---

### Modifying Data in a Merged Database

After having merged two databases, you will end up with data that you may wish to modify, either to correct missing or duplicated settings, or to take full advantage of expansion mode. For example, the merged database will contain rooms/layouts that are either on **Frame A** or on **Frame B**, but that won't overlap both frames. You can extend these layouts such that a room can mix output from both frames.

To this end, XEdit allows you:

- to assign the output from any KXO head, in either frame, to a monitor wall display.
- to save a room without output assignment. In the context of an expansion frame, this allows you to create a new room that overlaps both frames, while allowing previous rooms (limited to one frame) to exist in the database.

- to copy/paste monitors between layouts/displays.
- to reassign a layout to a different room.
- to save two or more rooms that are using the same heads.

The table below describes the state of the database following a merge:

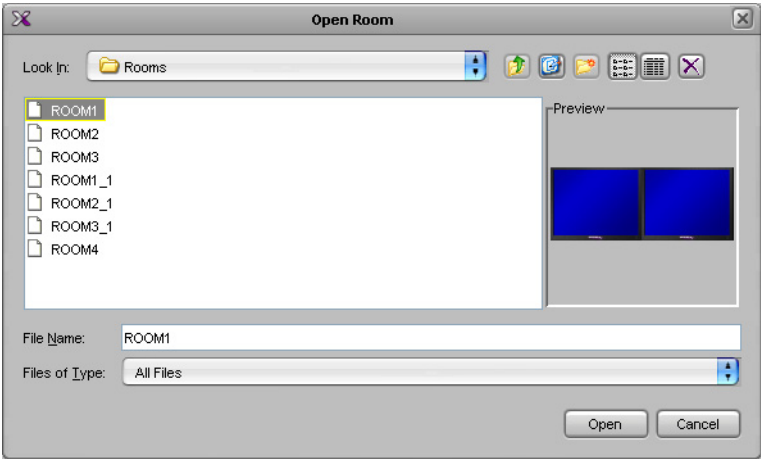
Database Element	Frame A	Frame B	Comments
System configuration	NO	NO	Must be recreated manually, prior to database merge
Peripheral device settings	YES	NO	
External router settings	NO	NO	
Rooms	YES	YES	Duplicate head assignments must be resolved
Layouts	YES	YES	
Full screen layouts	YES	YES	
Full screen zones	YES	YES	
Logical sources	YES	YES	Some logical sources may be duplicated. Signals from the two frames are identified with prefix F1 (Frame 1=master) and F2 (frame 2=slave) in order to track the assignments in XEdit and on the monitor wall. Example: F1MA I2 = Frame 1, Module A, Input 2
Levels	YES	YES	
Monitors	YES	YES	
Images	YES	YES	
Actions	YES	YES	Actions associated with monitors in a layout are preserved
Background actions	YES	NO	Introduced with Kaleido-X version 3.00
RCP users	YES	NO	
Resolutions	YES	NO	
Calibrations	YES	NO	
Timers	YES	NO	
Audio scales	YES	NO	

At this point, you can begin to restore the missing settings and bring the database up to date by:

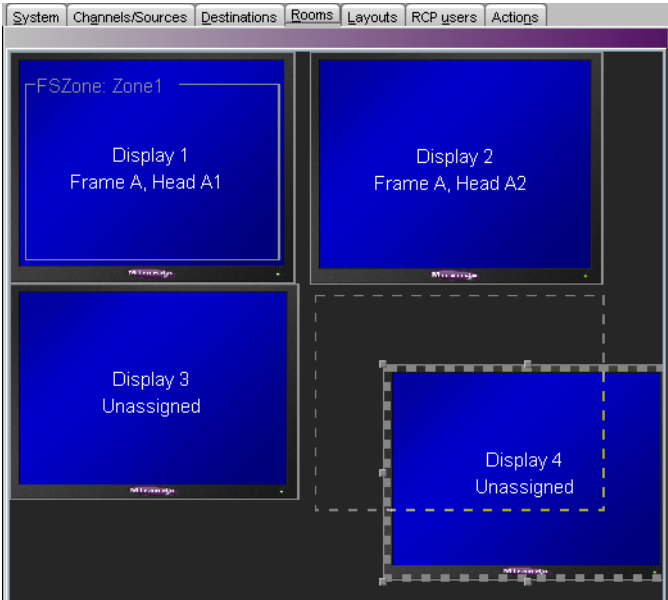
- creating new rooms or modifying existing ones to reflect the new expansion configuration
- resolving duplicate head assignments
- copying old layouts into new expansion ones

#### To modify a room

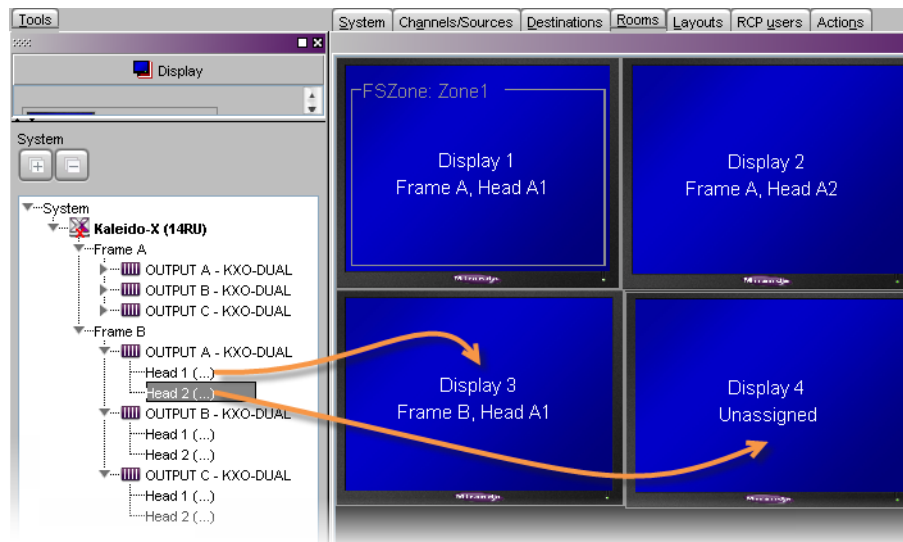
- 1 Open the room you wish to modify.



2 As needed, drag one or more new displays into the room.



3 Assign output heads from the expansion frame to the displays.  
You may have to temporarily move or resize full screen zones to be able to drag and drop head assignments onto displays.



---

**Note:** You cannot have two rooms in the expansion configuration that use the same output head. Conflicts will appear in red text in the System list. XEdit will allow you to save such a database, but not to export it to a Kaleido-X. You must first modify or remove pre-expansion rooms that conflict with this condition.

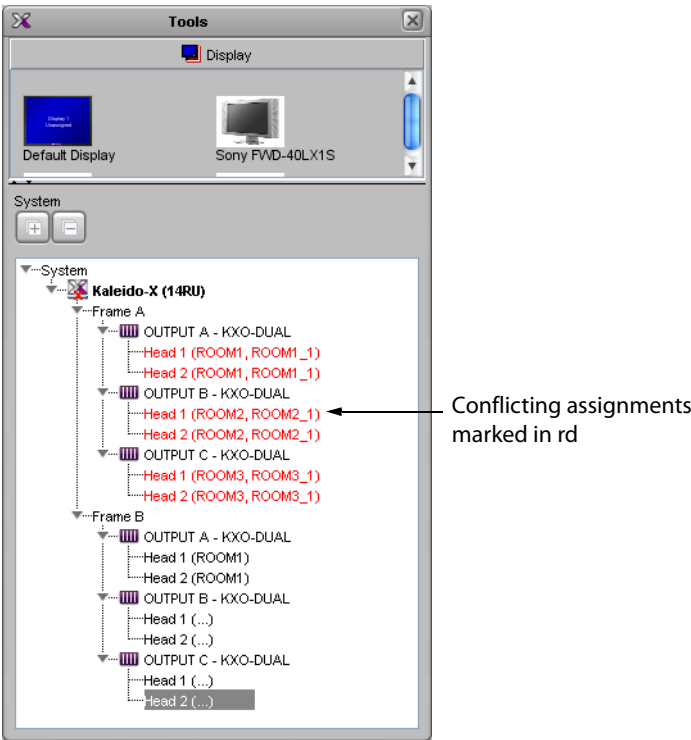
---

4 Click **Save**.

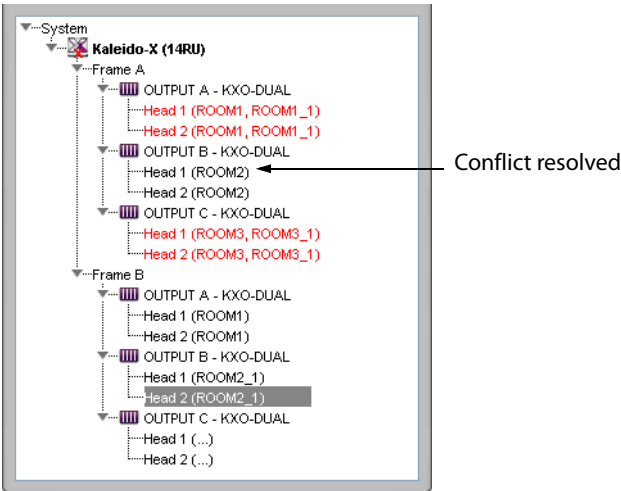
For more information about managing rooms, see *Managing Rooms*, in the Kaleido-X User's Manual.

**To resolve duplicate head assignments**

- 1 Expand the System list in the **Tools** pane. Duplicate head assignments are shown in red text, with the conflicting rooms in parentheses.



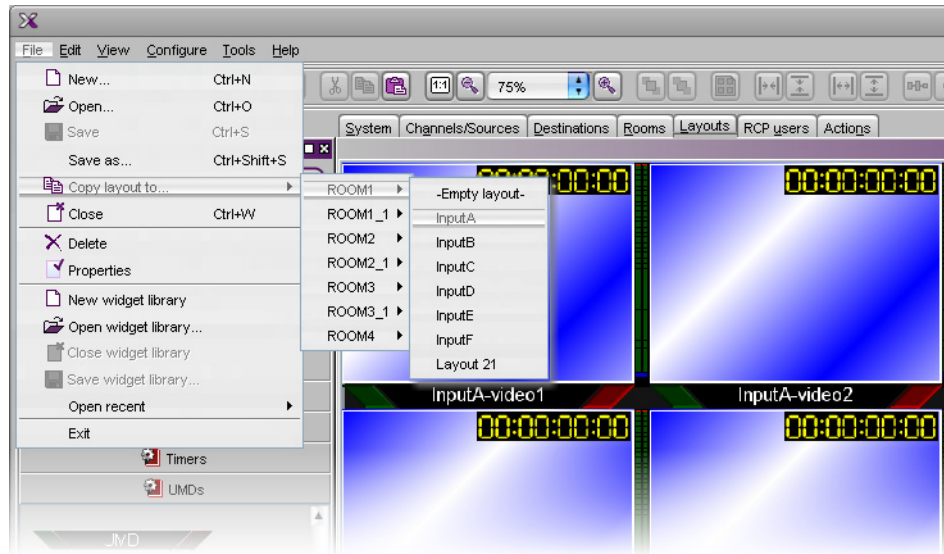
- 2 Open a room and locate the display with a duplicate head assignment.
  - 3 Expand the filtered System list in the **Tools** pane, and then drag the appropriate output head onto the display whose assignment you wish to rectify.
- The new head assignment information appears. In the System list, the red text turns black.



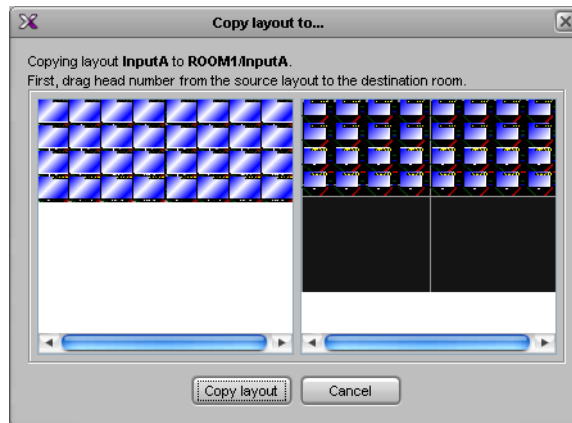
- 4 Repeat [step 2](#) and [step 3](#) until all duplicated head assignments have been resolved.

**To copy old layouts into new expansion ones**

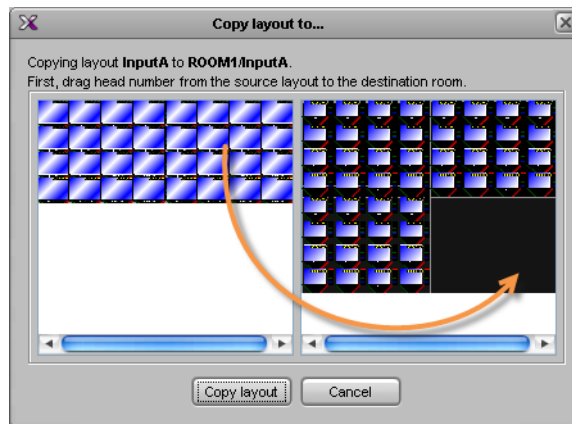
- 1 Open an existing layout.
- 2 On the **File** menu, click **Copy layout to**, specifying a target room and layout.



The **Copy layout to** window opens, displaying the currently open layout on the left, and the target layout on the right.



- 3 Click and drag layout elements (grouped by display/head) from the left panel to the right panel.





#### 4 Click **Copy layout**.

---

**Note:** Elements are positioned with the same relative offset. To avoid distortion in the layout, displays in the original and new rooms must have the same characteristics (i.e., resolution, size).

---

The last step in bringing the database up to date is to:

- reconfigure any third party devices, including external routers, that were originally configured on **Frame A** (if necessary) and **Frame B**
- add the RCP users, resolutions and audio scales etc. that were configured on **Frame B**

The procedures to be followed are the same as for any non-expansion system, and are described in the Kaleido-X User's Manual.

---

#### TIP

One way to help with the reconfiguration process is to open a separate XEdit window, import an old database, and use that window to view the settings, which you can then re-enter in the new (expansion) database. Two XEdit windows can be opened on the same PC, provided there is sufficient memory (1 GB RAM, 1.0 GHz CPU minimum, 2 GB RAM, 2.0 GHz CPU recommended).

---

At this point, you should have a newly merged database loaded in XEdit in OFFLINE mode. You can now proceed with the joining of the two Kaleido-X frames in expansion mode, as described below.

---

#### IMPORTANT

**You should back up the merged and updated database.**

---

The **Merge database** tool can also be used, for example, to copy layouts from a single Kaleido-X (7RU) (or 4RU) to another.

## Part 2 of 2 — Joining & Configuring Frames

### To physically join and configure two EXISTING Kaleido-X frames in expansion mode

---

#### IMPORTANT

**All cards must be at Kaleido-X software version 3.00 (or later) before two frames are joined in expansion mode.**

To upgrade existing frames, follow the upgrade procedure described in the Kaleido-X Version 4.10 (or later) Release Notes. Any spare cards you may have can be upgraded (via the Live Update feature) by hot swapping them in a standalone Kaleido-X at version 3.00 (or later). Check the card edge LEDs to make sure the cards are operating normally.

---

### Part A — Physical Setup

- 1 Open an XAdmin window for each frame. Click **Status and options**, and check the frame and card status to make sure there are no serious problems or critical error

conditions (the **Normal mode** alarm should be **green** in all cases). Take note of the **Ethernet** settings for each frame.

- 2 **Power down both frames.**
- 3 Check the pins on the expansion card connectors to make sure they are straight (inserting a card with bent pins can damage the card).
- 4 Gently but firmly, slide one expansion card into the slot labelled **OUTPUT D / EXP** of the Kaleido-X that will be designated **Frame A**.

---

Note: Be careful to install the KXO-EXP-R rear panel in the matching location at the rear of the frame. The KXO-EXP-F card and its rear panel can be installed in any order. See [Card Installation and Replacement](#) on page 14 for more information.

---

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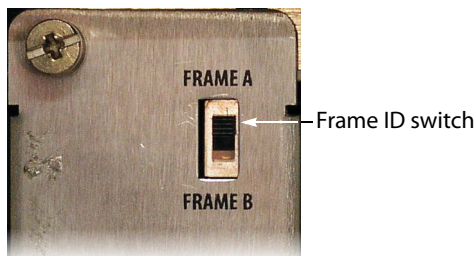
**IMPORTANT**

**Make sure that there is a KXO card in Slot C of Frame A.**

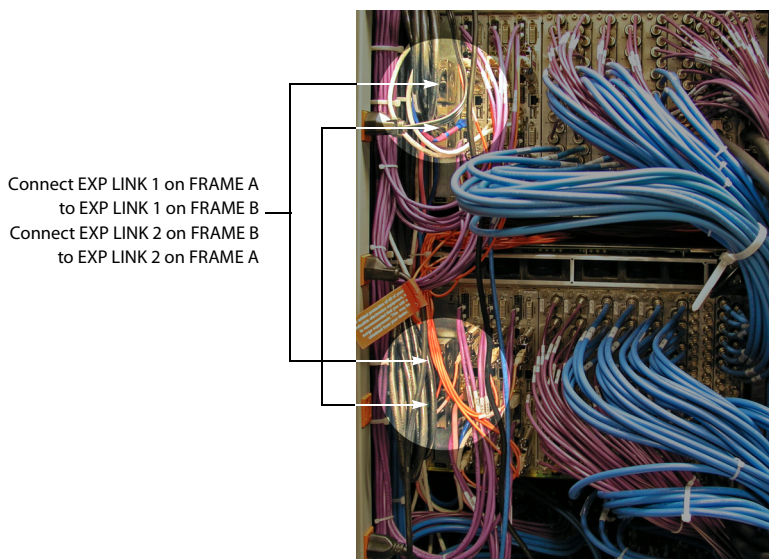
This card will act as the master for the expansion frame. Another output card may become the master.

---

- 5 Set the **Frame ID** switch on the rear panel to the **Frame A** position.



- 6 Gently but firmly, slide the other expansion card into the slot labelled **OUTPUT D / EXP** of the Kaleido-X that will be designated **Frame B**.
- 7 Set the **Frame ID** switch on the rear panel to the **Frame B** position.
- 8 Connect the two expansion cards using the expansion cables:
  - EXP LINK 1 on **Frame A** to EXP LINK 1 on **Frame B**
  - EXP LINK 2 on **Frame A** to EXP LINK 2 on **Frame B**



9 Power up both frames.

Alarms may appear in the dashboard (see below), and, in some cases, you may see blinking LEDs on the KXO cards in **Frame B**. This is normal.



Once the frames have rebooted, wait 5 minutes (this allows some important internal processing to take place) and then continue with the procedure<sup>1</sup> as described in [Part B — XAdmin Settings](#) below.

**Frame B** will not boot completely at this stage. This is normal.

### Part B — XAdmin Settings

At this point, **Frame A** should be up and running, with all input, output, network and serial cables in position, and **Frame B** should not be rebooted. Prior to expansion, each frame and all KXO cards normally have unique IP addresses. You will now use XAdmin to:

- specify one IP address for the expanded system
- verify that there are no conflicts among the IP addresses of the KXO cards
- make sure that all IP addresses are on the same subnet

- 1 Open XAdmin for **Frame A** (refer to *Opening XAdmin*, in the Kaleido-X User's Manual).
- 2 On the Status and Options page, select **Enable expansion**.

---

1. Even if, as in some cases, Frame B does not completely reboot.

The screenshot shows the Miranda XADMIN web interface. The top navigation bar includes 'System configuration', 'Status and options', 'Access control', and 'Technical support'. The 'System configuration' section is active, showing 'General' and 'Ethernet' settings. The 'General' section includes 'System name' (FR7-180) and '50Hz system frame rate' (checkbox). The 'Ethernet' section includes 'Frame IP address' (10.5.5.180), 'Network mask' (255.255.255.0), 'Gateway' (10.5.5.1), '100MB half-duplex' (checkbox), and 'Enable expansion' (checkbox). Below 'Enable expansion' are four output options: 'Output A' (10.5.5.181), 'Output B' (10.5.5.182), 'Output C' (10.5.5.183), and 'Output D/EXP' (10.5.5.184), each with a 'Next IP' button. The 'Date and Time' section includes 'Current date and time' (Sunday November 20, 2011 09:36:40 PM GMT-05:00), 'Locale' (English (United States)), 'Time zone' (America/New\_York), 'NTP synchronization' (Enabled), and 'NTP server IP address' (10.0.2.8). A 'Save' button is at the bottom right. Annotations on the left side point to various elements: 'Click here to view this page' points to the 'System configuration' link; 'This button becomes available after you click Save.' points to the 'Apply settings...' button; 'Select the check box to enable expansion mode' points to the 'Enable expansion' checkbox.

3 Enter the IP addresses currently used by **Frame B**.

4 Click **Save**, and then click **Apply settings**.

**Frame A** and **Frame B** should reboot automatically. If **Frame B** does not reboot automatically, perform a hard reboot on **Frame B** only.

#### Notes

- You may see messages on the monitor wall warning you that KX0 heads are not assigned. This is normal.
- If one or more cards in a Kaleido-X frame is being upgraded (i.e. if a Live Update is in progress), then it is not possible to apply any changes made in XAdmin. If you click **Apply settings** in the XAdmin sidebar, an error message will appear. This restriction also occurs during the first 10 to 20 seconds after a card is inserted into or removed from the frame. Wait until the upgrade has finished, and then click **Apply settings** again.

5 Open XAdmin, using what is now the expansion system IP address.

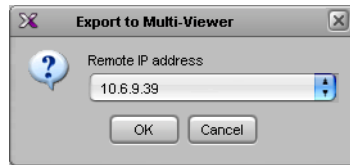
6 Click **Status and options**.

7 Verify that status information appears for all of the cards on both frames in the expansion system (see [Viewing the Status of an Expansion Frame](#), on page 69).

8 Check the frame and card statuses to make sure there are no problems or error conditions. In particular, the **Cable crossed** and **Cable plugged** alarms on the KXO-EXP cards should be normal (green).

KXO-EXP - Firmware Version	0x109
KXO-EXP - Frame Model	2.0
KXO-EXP - Link: Cable 1 plugged	●
KXO-EXP - Link: Cable 2 plugged	●
KXO-EXP - Link: Cable crossed	●
KXO-EXP - Link: MGT Link Established	0x0

- 9 Open XEdit and load the database that was merged and updated for the expansion system (see [Part 1 of 2 — Merging Databases](#), on page 50).
- 10 On the **Configure** menu, point to **Database**, and then click **Export**.
- 11 Type the IP address of the expansion frame, and then click **OK**.



A confirmation message appears.

---

**Note:** IP addresses are stored in a configuration file on all GPI, KXI and KXO cards. When a card boots, it searches the cards in its own frame for its IP address. The cards are searched in this order: GPI, then KXI-A to KXI-F. If no valid configuration file is found, the KXO configuration is used.

---

- 12 Click **OK**.

## Expanding MIXED Kaleido-X Frames

If you are planning to join an existing Kaleido-X frame with a new one, follow the instructions for [Expanding EXISTING Kaleido-X Frames](#), on page 50. It is preferable, in such cases, to designate the new frame as **Frame B**.

## Configuring Router Card Expansion

Once two Kaleido-X (7RU) systems are in a Kaleido-X (14RU) expansion configuration, thereby giving you access to any source from either frame in your layouts, their respective router cards are not automatically shared between the system's Frame A and Frame B. To be able to choose a source from one frame and send it to a router output on the other frame, you must have connected the router cards of one frame to those of the other using special cables plugged into the expansion ports on the router cards themselves. Then, in XEdit, you must specify how the cards are connected.

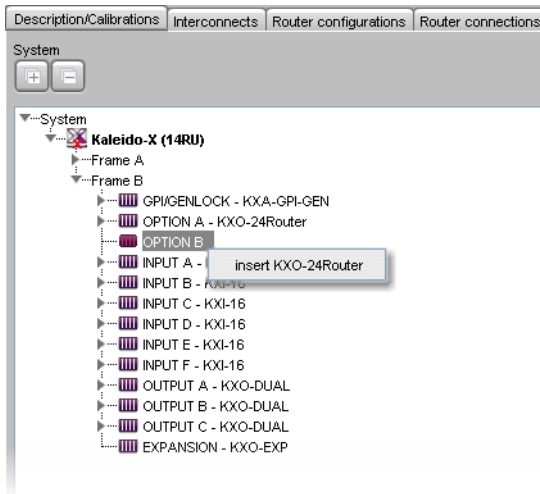
---

### Notes

- This procedure describes the case where two cards in one frame are connected to two more in the second frame, but it is also possible to connect only one card per frame.
  - Currently, router card expansion can only be applied to Kaleido-X (14RU) expansion systems.
-

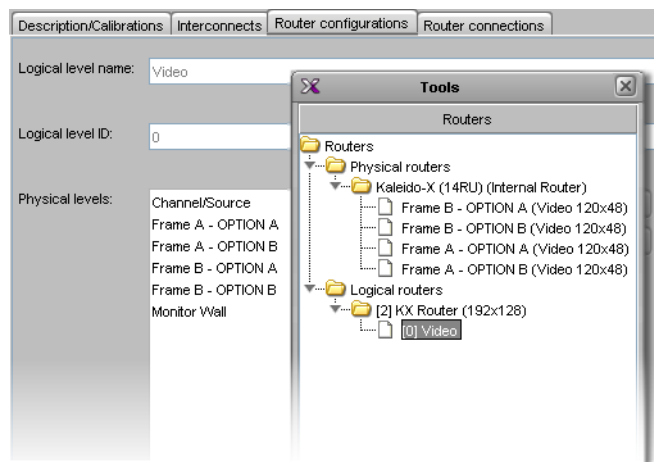
### To configure internal router card expansion

- 1 Open XEdit and load the database associated with the Kaleido-X expansion system you wish to configure.
- 2 In the System list, review the state of the OPTION slots in each frame, to verify that it matches the configuration of your actual system, and add or remove router cards as needed (refer to *Managing Cards in a Kaleido-X*, or *Kaleido-MX System Representation*, in the Kaleido-X User's Manual).



- 3 Click the **Router configurations** tab, navigate to the *KX Router* logical router, and then click its first level.

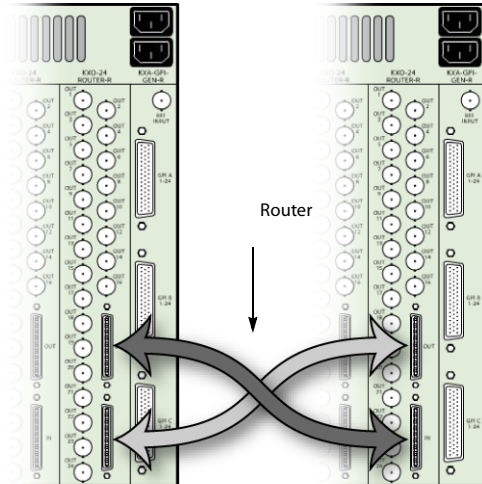
XEdit automatically created one physical router for every router card. In a factory-default configuration, the KX Router logical router also includes all corresponding physical levels in its first logical level.



- 4 If your router cards are not all listed in the Physical level (for example, this would be the case if you just added router cards to your system), then you must add the missing physical levels to your KX Router configuration (refer to *Configuring the Internal Router in a Kaleido-X (7RU)*, in the Kaleido-X User's Manual, for details).

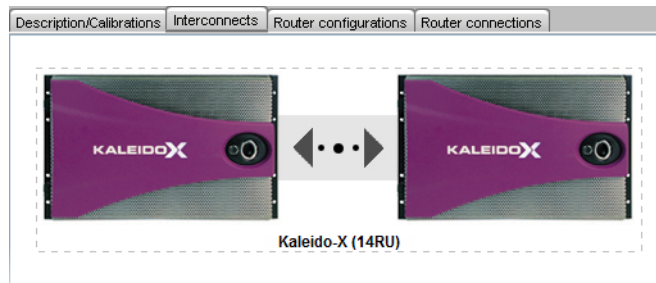
Once you have all router cards from both Kaleido-X frames covered within the KX Router configuration, some sources still cannot be routed to some destinations, creating holes in the router matrix. This is because the sources of one frame do not

have access to the internal router of the other frame. The signals do not pass via the frame expansion cable. To be able to route any source to any internal router destination in the KX Router logical router, the router cards must be connected by their own router expansion cables (IN to OUT between cards in the same slot in each frame).

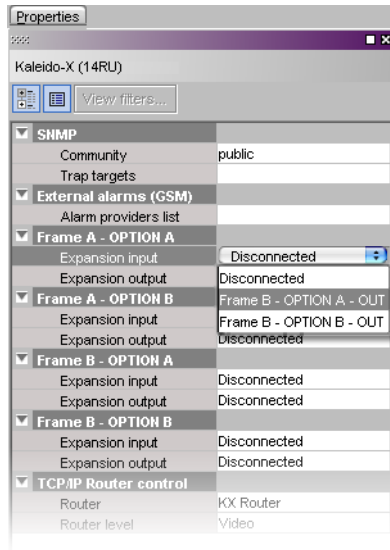


The cabling connections must then be described in XEdit.

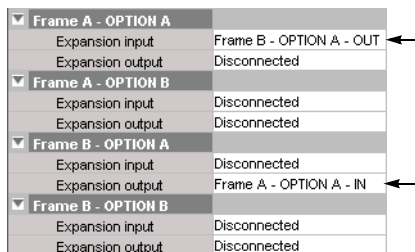
- 5 Click the **Interconnects** tab, and then click the expansion frame icon.



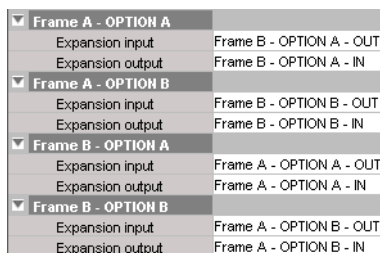
- 6 In the **Properties** tab, notice that there are four entries (two per frame) for the router cards (OPTION A and B) with rows labeled **Expansion input** and **Expansion output**. Normally, you connect the router cards in matching slots (e.g., FRAME A – OPTION A to FRAME B – OPTION A).



- 7 For **FRAME A – OPTION A**, click in the white column beside **Expansion input**, and choose the output option that matches your actual cabling connections from the list. A progress window may briefly appear. Note that the corresponding (inverse) settings appear beside the card you connected to.



- 8 Click in the white column beside **Expansion output**, and choose the input option that matches your actual cabling connections from the list.
- 9 Repeat for **FRAME A – OPTION B**.
- 10 **OPTION A and B for FRAME B** are completed automatically.



All sources can now be routed to any internal router destination via the router expansion cables.

**Note:** It is not yet possible to use the router expansion cables to connect router cards between two standalone Kaleido-X frames.



## Splitting an Expansion Frame

It is possible to split a Kaleido-X (14RU) expansion system so that the two frames can be used independently. Before splitting an expansion system, we recommend that you create a backup of the expansion database using XEdit (refer to *Creating a Backup*, in the Kaleido-X User's Manual). Once the expansion frame is split, the respective databases on the two standalone frames will have to be modified or replaced.

### IMPORTANT

The following procedure applies to the splitting of an expansion frame that is working normally. If the expansion system to be split is in an error condition or otherwise not working normally, please see [Recovering an Expansion Frame](#), on page 71.

### To split an expansion system

- 1 Make sure both **Frame A** and **Frame B** are powered up and operating normally.
- 2 Open XAdmin using the IP address of the expansion system (refer to *Opening XAdmin*, in the Kaleido-X User's Manual).
- 3 On the System Configuration page, clear the **Enable expansion** check box.
- 4 Click **Save**, and then click **Apply settings** in the sidebar.

**Frame A** automatically reboots in about two minutes<sup>1</sup> (**Frame B** does not reboot).

---

**Note:** If one or more cards in a Kaleido-X frame is being upgraded (i.e. if a Live Update is in progress), then it is not possible to apply any changes made in XAdmin. If you click **Apply settings** in the XAdmin sidebar, an error message will appear. This restriction also occurs during the first 10 to 20 seconds after a card is inserted into or removed from the frame. Wait until the upgrade has finished, and then click **Apply settings** again.

---

- 5 When **Frame A** has finished rebooting, open XAdmin (using the IP address of the expansion system).
- 6 On the System Configuration page, take note of all the IP addresses (including the one for Output/Expansion Slot D, which should follow in sequence from those for Slots A, B and C).
- 7 Power down **Frame A** and **Frame B**.
- 8 Remove the expansion cables and cards.
- 9 Power up **Frame B** (this should take about two minutes).
- 10 Open XAdmin (using the IP address of the expansion system).
- 11 On the System Configuration page, clear the **Enable expansion** check box.
- 12 Click **Save**, and then click **Apply settings** in the sidebar.  
**Frame B** automatically reboots in about two minutes.

---

1. The time it takes a Kaleido-X frame to reboot can vary, depending on the number of cards in the frame and the complexity of the layouts.

- 13 In XAdmin, on the System Configuration page, change the **Frame IP Address**, the **System name**, and the IP addresses of **Output A, B, C and D** so that they are unique to **Frame B**.

---

**IMPORTANT**

Make sure these are different from those you noted in [step 6](#) for Frame A.

---

- 14 Click **Save**, and then click **Apply settings** in the sidebar.  
**Frame B** automatically reboots in about two minutes.
- 15 Once **Frame B** has finished rebooting, open XAdmin from the new IP address you assigned in [step 13](#).
- 16 Verify that **Frame B** is working correctly, and that there are no serious errors reported on the Status and Options page.

---

**Note:** Video on the monitor wall that had previously come from **Frame A** will be missing—this is normal.

---

- 17 Power up **Frame A**.
- 18 Open XAdmin for **Frame A** (which should still have the old expansion system IP address).
- 19 Verify that **Frame A** is working correctly, and that there are no serious errors reported on the Status and Options page in XAdmin.  
At this point, the two frames are operating independently. The databases, however, need to be modified or replaced so that they correspond to the standalone operation of the frames.

**If you have existing backup copies of the standalone frames**

- 1 Open XEdit.
- 2 Import the backup database for **Frame A**.
- 3 Export the database to **Frame A**.
- 4 Repeat [step 2](#) and [step 3](#) for **Frame B**.

**If you do not have existing backup copies of the standalone frames**

- 1 Open XEdit.
- 2 Import the database from **Frame A** (this should still be the expansion database as it existed before the split).
- 3 Modify the database for use on what will become standalone **Frame A**.
  - Delete the database elements that apply uniquely to **Frame B**.
  - Recreate logical source assignments
  - Replace the Kaleido-X (14RU) expansion system in the hierarchical System list with a Kaleido-X (7RU) standalone system that reflects the physical configuration of **Frame A**.
- 4 Create a backup of the modified database. The filename should correspond to **Frame A**. (e.g. FrameA\_DatabaseBackup.zip)
- 5 Export the database to **Frame A**.

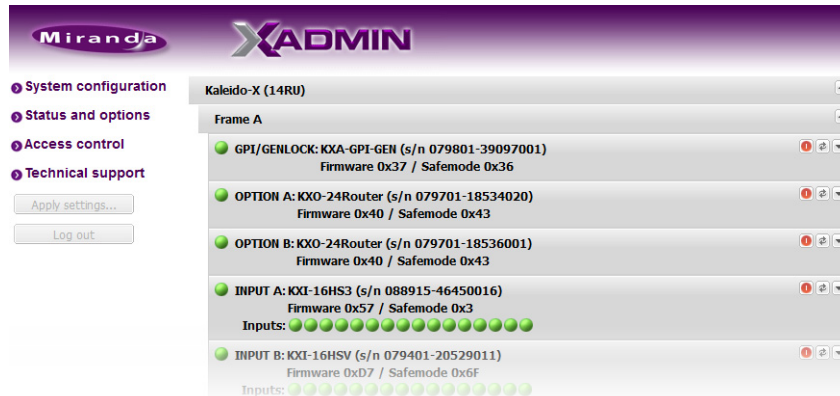
- 6 Import the database from **Frame B** (this should still be the expansion database as it existed before the split).
- 7 Modify the database for use on what will become standalone **Frame B**.
  - Delete the database elements that apply uniquely to **Frame A**.
  - Recreate logical source assignments
  - Replace the Kaleido-X (14RU) expansion system in the System list with a Kaleido-X (7RU) standalone system that reflects the physical configuration of **Frame B**.
- 8 Create a backup of the modified database. The file name should correspond to **Frame B**.  
(e.g. FrameB\_DatabaseBackup.zip)
- 9 Export the database to **Frame B**.

## Viewing the Status of an Expansion Frame

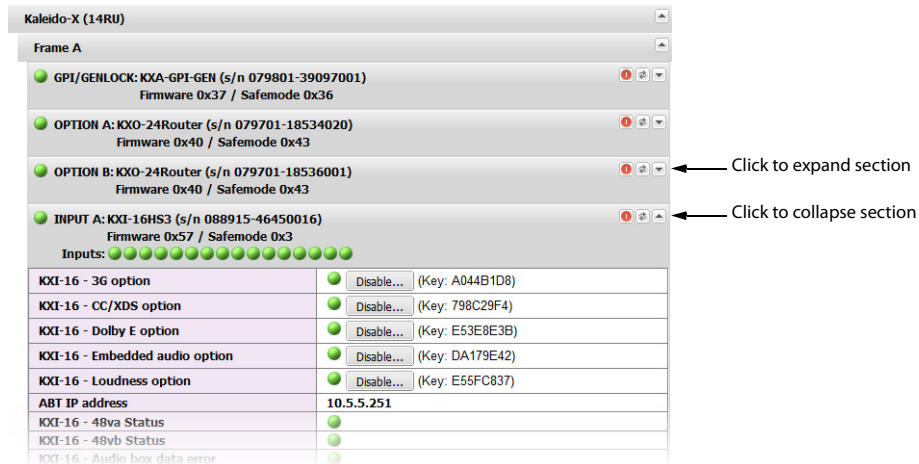
To view the status of a Kaleido-X expansion frame

- 1 Open XAdmin (refer to *Opening XAdmin*, in the Kaleido-X User's Manual).
- 2 Click **Status and options**.

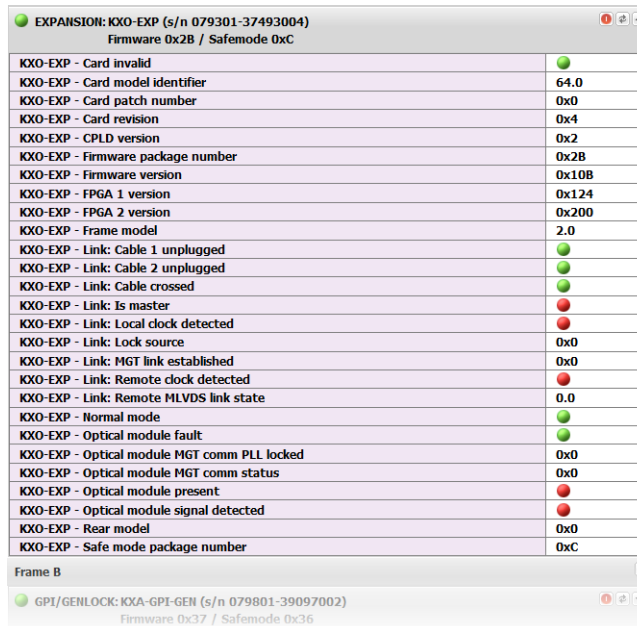
XAdmin collects status information from both frames, and then displays it in a scrolling list, starting with **Frame A**.



- 3 Click the arrow button (▾) at the end of each card's heading row to view detailed information for this card.



Included in this list is detailed information and alarm statuses for the expansion cards. The serial number for each of these cards is also displayed.



## Troubleshooting

### Losing Inter-Frame Connectivity

If the expansion card connectivity between **Frame A** and **Frame B** is lost (for example, if a cable is unplugged), the two frames will continue to operate, but with some limitations:

- Video feeds coming from **Frame A** and displayed on **Frame B** are lost, and vice versa.
- Metadata coming from **Frame A** and used on **Frame B** (either displayed on the Monitor Wall or reported as an alarm trigger) is lost, and vice versa.
- Kaleido-RCP2 control is unaffected. For example, changing layouts spanning over both frames will still work.

- XML Gateway operations are unaffected, except for operations involving video, audio or metadata exchange between frames.
- If router expansion is enabled, then the Router manager can be used to change crosspoints on **Frame B**.

## Losing Expansion Cards

Failure of an expansion card only impacts the exchange of sources and data between frames. It does not impact the display of sources and data that are within the same frame. If one or both expansion cards are lost (e.g. a card is removed from one of the frames), the result is identical to that of losing inter-frame connectivity, as described above.

Expansion cards are hot swappable. A complete reboot of the card takes approximately 10 seconds.

## Recovering From a Failed Downgrade

If you downgrade a Kaleido-X expansion system to version 2.20 without first splitting the frames as described on [page 67](#), neither frame will reboot properly or be accessible via XAdmin (the frames will have an invalid frame type and duplicate IP addresses).

### To recover from a failed downgrade

- 1 Power down both frames, and remove expansion cards and cables.
- 2 Power up **Frame A**.
- 3 Open XEdit, and then export a version 2.20 Kaleido-X (7RU) database to **Frame A**.
- 4 Reboot **Frame A**, and then power it down.
- 5 Power up **Frame B** with only one KXO card installed
- 6 Open XEdit, and then export a version 2.20 Kaleido-X (7RU) database to **Frame B**.
- 7 Reboot **Frame B**.
- 8 Open XAdmin from **Frame B**, and change its IP address and System name.
- 9 Reboot **Frame B**, and then reinsert any KXO cards you had removed in [step 5](#).
- 10 The firmware on these cards will be automatically downgraded to version 2.20.
- 11 Power up **Frame A**. Its KXO cards will have already been downgraded to version 2.20 by the original attempt (i.e. before splitting the frames).

## Recovering an Expansion Frame

There are some situations where a Kaleido-X (14RU) expansion system may stop working normally, or become partially unresponsive. It is possible to recover from such situations by first splitting the two frames, and then rejoining them in an expansion configuration.

### IMPORTANT

**The following procedure applies to the splitting of an expansion frame that is in an error condition or otherwise not working normally.**

If the expansion system to be split is working normally, then refer to [Recovering From a Failed Downgrade](#), on page 71.

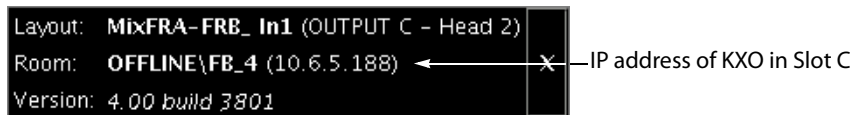
**To split an expansion system (version 4.03 or earlier)**

- 1 Power down **Frame A** and **Frame B**.
- 2 Slide the expansion cards on both frames partially out of their slots.
- 3 On **Frame B**, slide the front panels of the KXO cards partially out of slots A and B (if applicable), leaving the KXO card in slot C inserted.
- 4 Power up **Frame B**. The following error message appears on the monitor wall:  
Cannot communicate with master. Possible cause: disconnected ethernet cable or invalid IP configuration. Retrying for ### seconds.

**Frame B** will boot up in OFFLINE mode (this should take about five minutes).

- 5 Open XAdmin (using the IP address of the KXO card in slot C).

You can find the IP address of the KXO card in the dashboard on the monitor wall.



---

**TIP**

If the XAdmin home page does not appear right away, wait a few seconds and try again.

---

- 6 On the System Configuration page, clear the **Enable expansion** check box.

---

**Note:** If the **Enable expansion** check box is already cleared, select it, click **Save**, and then clear the check box again.

---

- 7 Click **Save**, and then click **Apply settings** in the sidebar.

**Frame B** automatically reboots in ONLINE mode (this should take about two minutes).

---

**Note:** If one or more cards in a Kaleido-X frame is being upgraded (i.e. if a Live Update is in progress), then it is not possible to apply any changes made in XAdmin. If you click **Apply settings** in the XAdmin sidebar, an error message will appear. This restriction also occurs during the first 10 to 20 seconds after a card is inserted into or removed from the frame. Wait until the upgrade has finished, and then click **Apply settings** again.

---

- 8 Open XAdmin (using the expansion frame IP address).
- 9 On the System Configuration page, change the **Frame IP Address**, the **System name**, and the IP addresses of **Output A, B** and **C** so that they are unique to **Frame B** (i.e. different from those of **Frame A**).
- 10 Click **Save**, and then click **Apply settings** in the sidebar.  
**Frame B** automatically reboots (this should take about two minutes).
- 11 When **Frame B** has finished rebooting, open XAdmin using the new Frame IP Address you assigned in [step 9](#).
- 12 Verify that **Frame B** is working correctly, and that there are no errors reported on the Status and Options page.
- 13 Reinsert the KXO cards in slots A and B (if applicable).

- 14 Power up **Frame A** (this should take about two minutes).
- 15 When **Frame A** has finished rebooting, open XAdmin (using the IP address of the expansion system, which is now, effectively, the IP address of **Frame A**).
- 16 On the System Configuration page, clear the **Enable expansion** check box.
- 17 Click **Save**, and then click **Apply settings** in the sidebar.  
**Frame A** automatically reboots (this should take about two to three minutes).
- 18 Open XAdmin (again, using the IP address of the expansion system).
- 19 Verify that **Frame A** is working correctly, and that there are no errors reported on the Status and Options page.  
At this point, the two frames are operating independently, but each with its own copy of the expansion system database. You can now:
  - rejoin the two frames in an expansion configuration (refer to [Expanding NEW Kaleido-X Frames](#), on page 44)

or

  - modify/replace the databases so that they correspond to the standalone operation of the frames (refer to the procedures described on [page 68](#)).

**To split an expansion system when only Frame B is running (version 4.10 or later)**

- 1 Make sure that **Frame A** is powered down.
- 2 On **Frame B**, slide the front panels of the KXO cards partially out of slots A and B (if present), leaving the master KXO card in slot C inserted.
- 3 Open XAdmin using the IP address of the expansion system.
- 4 On the System Configuration page, clear the **Enable expansion** check box.  
The IP addresses associated with the KXO cards in **Frame B** disappear.

---

**Note:** If the **Enable expansion** check box is already unchecked, select it, click **Save**, and then clear the check box again.

---

- 5 Click **Save**, and then click **Apply settings** in the sidebar.

---

**Note:** If one or more cards in a Kaleido-X frame is being upgraded (i.e. if a Live Update is in progress), then it is not possible to apply any changes made in XAdmin. If you click **Apply settings** in the XAdmin sidebar, an error message will appear. This restriction also occurs during the first 10 to 20 seconds after a card is inserted into or removed from the frame. Wait until the upgrade has finished, and then click **Apply settings** again.

---

- 6 The master KXO card in **Frame B** automatically begins to reboot. Wait about 30 seconds, and then power down **Frame B**.
- 7 Remove the expansion cables and cards from both frames.
- 8 Power up **Frame B** (this should take about two or three minutes).
- 9 Open XAdmin using the IP address of the expansion system.
- 10 On the System Configuration page, change the **Frame IP Address**, the **System name**, and the IP addresses of **Output A, B and C** so that they are unique to **Frame B** (i.e. different from those of **Frame A**).

- 11 Click **Save**, and then click **Apply settings** in the sidebar.  
**Frame B** automatically reboots (this should take about two minutes).
- 12 When **Frame B** has finished rebooting, re-insert the front panels of the KXO cards in slots A and B (if present).
- 13 Open XAdmin using the new **Frame IP Address** you assigned in [step 10](#).
- 14 Verify that **Frame B** is working correctly, and that there are no errors reported on the Status and Options page.

At this point, **Frame B** is operating independently, but using its own copy of the expansion system database. You can now:

- join another frame to **Frame B** in an expansion configuration

*or*

- modify/replace the **Frame B** database so that it corresponds to the standalone operation of the frame (refer to the procedures described on [page 68](#)).

---

If the initial condition that caused **Frame A** to fail is resolved, and you wish to return the expansion frame to its original state:

- Power down both **Frame A** and **Frame B**.
  - Insert the KXO-EXP cards and reconnect the expansion cables.
  - Power up **Frame A** then **Frame B**.
-



# 3 Specifications

This chapter lists equipment specifications for the Kaleido-X (7RU) multiviewers and their cards.

## Kaleido-X Inputs

### KXI-16HSV, KXI-16HS, KXI-16SV, KXI-16HSV3, and KXI-16HS3

These cards support 16 signal inputs. The input types include 3G-SDI, Composite, SD-SDI, or HD-SDI (auto-detected), depending on the card type. The processing delay is two fields if the video inputs are genlocked, and two or three fields if the video inputs are not genlocked. Signal inputs require BNC connectors.

#### Composite Inputs (KXI-16HSV3, KXI-16HSV, KXI-16SV)

Signal	NTSC (SMPTE ST 170), NTSC-J, PAL-BGDHI, PAL-N, PAL-M, SECAM
Return loss	> 25 dB up to 5.75 MHz
Quantization	8 bits
Impedance	75 $\Omega$

#### SD-SDI Inputs (KXI-16HSV3, KXI-16HSV, KXI-16HS3, KXI-16HS, KXI-16SV)

Signal	4:2:2 SMPTE ST 259-C (270 Mbps)
Formats	525 and 625
Audio	SMPTE ST 274:1994
Return loss	> 15 dB up to 270 MHz
Jitter	< 0.2 UI
Cable length	250 m (820 ft) (Belden 1694A)

## Specifications

KXI-16HSV, KXI-16HS, KXI-16SV, KXI-16HSV3, and KXI-16HS3

### HD-SDI Inputs (KXI-16HSV3, KXI-16HSV, KXI-16HS3, KXI-16HS)

Signal	4:2:2 SMPTE ST 292-C (1.5 Gbps)
Formats	720p24, 720p25, 720p29.97, 720p50, 720p59.94 1080i50, 1080i59.94 1080PsF23.98, 1080PsF24, 1080PsF25, 1080PsF29.97 1080p23.98, 1080p24, 1080p25, 1080p29.97  Note: The Kaleido-X software does not distinguish between 1080PsF25 and 1080i50, and neither 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.
Audio	SMPTE ST 299
Return loss	> 12 dB up to 1.485 GHz
Jitter	< 0.2 UI
Cable length	100 m (328 ft) (Belden 1694A)

### 3G-SDI Inputs (KXI-16HSV3, KXI-16HS3)

Signal	4:2:2 SMPTE ST 424:2006 (2.97, 2.97/1.001 Gbps)
Formats	SMPTE ST 425:2008 level A and level B (single stream) 1080p50 1080p59.94
Audio	SMPTE ST 299
Return loss	> 15 dB up to 1.5 GHz > 10 dB up to 2.97 GHz
Jitter	< 0.2 UI
Cable length	100 m (328 ft) (Belden 1694A)

### Graphic converted to HD-SDI from KXI-DVI-Bridge

Signal	SMPTE ST 292-C (1.485, 1.485/1.001 Gbps)
Formats	1024 × 768 @ 60 (XGA) 1280 × 1024 @ 60 (SXGA) 1366 × 768 or 1368 × 768 @ 60 (WXGA) 1680 × 1050 @ 60 (WSXGA+) 1600 × 1200 @ 60 (UXGA)
Cable length	100 m (328 ft) (Belden 1694A)

These cards support one SDTI audio input.

#### **SDTI Audio Inputs**

Signal	SMPTE ST 305:2005 (up to 128 channels/64 AES)
Cable length	250 m (820 ft) (Belden 1694A)
Connector	BNC

### **KXA-GPI-GEN Card**

This card supports a reference input for system genlock.

#### **Reference Inputs**

Supported formats	SMPTE ST 170 SMPTE ST 318 ITU 624-4 BUT 470-6 PAL and NTSC composite sync SMPTE ST 274 SMPTE ST 296 SMPTE ST 240
Connector	BNC

### **KXO-Dual / KXO-Dual3 Cards**

This card supports two DVI-D inputs for background graphics:

#### **DVI-D Inputs**

Signal	DVI-D
Resolution	From 1024 × 768 to 1920 × 1200 NI
H frequency	37 kHz to 96 kHz
Refresh rate	50/59.94 Hz
Cable length	3.6 m (12 ft) with Altinex CB4012DV
Connectors	DVI-I

This card supports one LTC unbalanced input for clock synchronization:

#### **LTC Unbalanced Input**

Signal	SMPTE ST 309:1999, SMPTE ST 12:1995 (EBU-3259-E)
Level	500 mVp-p to 10 Vp-p
Impedance	>10 kΩ
Connector	BNC

This card supports two LTC balanced inputs for clock synchronization:

**LTC Balanced Inputs**

Signal	SMPTE ST 309:1999, SMPTE ST 12:1995 (EBU-3259-E)
Level	500 mVp-p to 10 Vp-p
Impedance	>10 k $\Omega$
Connector	WECO ( <a href="http://www.weco.ca">www.weco.ca</a> ) Plug-in Screw Connector System for Printed Circuit Boards Type 930-HFL (-DS), 930 / 931-HSL

**KXO-24Router Card**

**IN Inputs (Future Use)**

Connector	Lanelink 12X (custom cable)
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**Kaleido-X Outputs**

**KXO-Dual, and KXO-Dual3**

These cards support two Progressive RGBHV outputs:

**Progressive RGBHV Outputs**

Signal	Analog RGBHV
Resolution	From 1024 $\times$ 768 to 1920 $\times$ 1200 NI
H frequency	31 kHz to 96 kHz
Refresh rate	50/59.94 Hz
Level	0.7 Vp-p
Connector	DE-15S (female)

This card supports two DVI outputs:

**DVI Outputs**

Signal	DVI-D
Resolution	From 1024 $\times$ 768 to 1920 $\times$ 1200 NI
H frequency	37 kHz to 96 kHz
Refresh rate	50/59.94 Hz
Cable length	3.6 m (12 ft) with Altinex CB4012DV
Connector	DVI-I

This card supports two HD-SDI outputs:

#### HD-SDI Outputs

Signal	4:2:2 SMPTE ST 292-C (1.5 Gbps), SMPTE ST 424
Supported resolutions	720p59.94 1080i50 1080i59.94 1080p59.94
Audio	SMPTE ST 299 (limited to one pair, embedded on group 1, pair 1)
Cable length	100 m (328 ft) (Belden 1694A)
Jitter	< 0.2 UI p-p (wideband)
Connectors	BNC

This card supports two Analog audio outputs:

#### Analog Audio Outputs

Signal	Balanced analog stereo
Impedance	< 600 $\Omega$
Level	+24 dBu maximum
Connector	WECO

This card supports two AES outputs:

#### AES Outputs

Signal	AES3
Impedance	110 $\Omega$
Connector	WECO

#### Option Outputs (Future Use)

Connector	RJ-45
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## KXO-24Router Card

### Outputs

This card supports 24 outputs. Outputs on this card are reclocked input signals from KXI cards:

#### SD-SDI Outputs

Signal	4:2:2 SMPTE ST 259-C (270 Mbps)
Formats	525 and 625

### SD-SDI Outputs *(continued)*

Cable length	250 m (820 ft) (Belden 1694A)
Jitter	< 0.2 UI p-p (wideband)
Connectors	BNC

### HD-SDI Outputs

Signal	4:2:2 SMPTE ST 292-C (1.5 Gbps)
Supported resolutions	720p59.94 1080p23.98 1080p24 1080i50 1080i59.94 1080PsF23.98 1080PsF24 1080PsF25 1080p29.97
Cable length	100 m (328 ft) (Belden 1694A)
Jitter	< 0.2 UI p-p (wideband)
Connectors	BNC

## Kaleido-X Control

### KXA-GPI-GEN

This card supports a bidirectional GPI interface (72 GPI, software-configured). There are three DB-50 female connectors: GPI A, GPI B, and GPI C.

#### GPI bidirectional (up to 72)

Description	Contact closure to GND
Signal	Open collector 5 to 12 VDC
<i>Input mode</i>	
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
<i>Output mode</i>	
Contact closure current	50 mA max
Reverse voltage	-15 Volts max

**GPI bidirectional (up to 72) (continued)**

Reverse current	-50 mA max
V out low	0.6 Volts at 1.5mA

**KXO-Dual, and KXO-Dual3**

**ETHERNET**

Signal	10/100 BASE-T (IEEE 802.3)
Connector	RJ-45

**RS-422/485**

Signal	RS-422 (SMPTE ST 207, EBU-3245), RS-485
Connector	RJ-45

**USB (4 connectors)**

Signal	USB Version 1.0
Connector	USB

**Kaleido-X (7RU) Frame**

Power supply	Hot-swappable redundant power supply
Input voltage	100-240 V
Frequency	50/60 Hz
Power	1200 W
Max current	15A
Max Power out	1300 W @ 100 Vac
Dimensions	H: 309 mm (12.17 in) (7 RU) W: 448 mm (17.64 in) + mounting flange for standard 19 in rack D: 527 mm (20.75 in)
Full spec. temperature range	0-25°C (32°F-77°F) (ambient)
Storage humidity	90% RH non-condensing
Functional humidity	65% RH non-condensing
Weight (bare frame including fan)	16 kg (35 lbs)

Specifications  
Kaleido-X (7RU) Frame

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Weight (typical configuration: 2 power supplies, 1 fan, 3 cards)	27.12 kg (59.7 lbs)
Component weight	
2 power supplies	6 kg (13.2 lbs)
KXO-Dual (including rear)	2.25 kg (5 lbs)
KXI (including rear)	2.1 kg (4.6 lbs)
KXI-GPI-GEN (including rear)	0.77 kg (1.7 lbs)
KXO-EXP (including rear)	2.7 kg (6 lbs)
KXO-24Router (including rear)	1.5 kg (3.2 lbs)



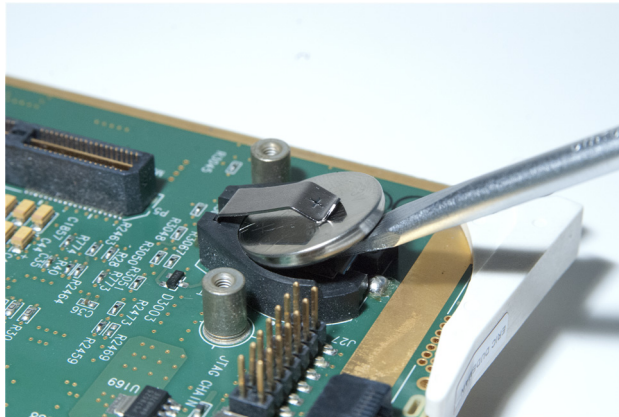
# Disposal and Recycling Information



Your Miranda equipment comes with at least one lithium button battery (Li-MnO<sub>2</sub>) located on the main printed circuit board. The batteries are used for backup and should not need to be replaced during the lifetime of the equipment.

**Before disposing of your Miranda equipment, please remove the battery as follows:**

- 1 Make sure the AC adapter is unplugged from the power outlet.
- 2 Remove the protective cover from your equipment.
- 3 Gently remove the battery from its casing using a blunt instrument for leverage such as a screwdriver if necessary.



- 4 Dispose of the battery and equipment according to your local environmental laws and guidelines.

## WARNING

Be careful not to short-circuit the batteries by adhering to the appropriate safe handling practices. Do not dispose of batteries in a fire as they may explode. Batteries may explode if damaged or overheated. Do not dispose of batteries as household waste. Do not dismantle, open or shred batteries. Keep batteries out of the reach of children.

The electrolyte of the batteries contains 1,2-dimethoxyethane (DME) (CAS 110-71-4, EINECS 203-794-9) above 0.1% by weight. DME is listed as a Substance of Very High Concern (SVHC) by the regulation (EC) No 1907/2006 of the European Parliament and of the Council. It is classified as a reprotoxic of category 2 in the European Union. Accordingly, exposure to DME may impair fertility and may cause harm to the unborn child. DME is also classified as harmful by inhalation.

**WARNING** *(continued)*

Risk of exposure occurs only if the battery is mechanically or electrically abused. The most likely risk is acute exposure when a cell vents. In the event of a battery leak, do not allow battery liquid to come in contact with skin or eyes. Seek medical help immediately in case of ingestion, inhalation, skin or eye contact, or suspected exposure to the contents of an opened battery.

For more information about recycling, please contact Miranda Technologies.



## Miranda Technical Support

For technical assistance, please contact the Miranda Technical Support center nearest you:

### Americas

Office hours: 9:00 a.m. – 9:00 p.m. (EST)  
Telephone: 1-800-224-7882  
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