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KALEIDO-X (7RU)

UNMATCHED PICTURE QUALITY AND LAYOUT FLEXIBILITY

Installation & Service Manual

M808-9902-118

2018-03-05

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Title	Kaleido-X (7RU) Installation & Service Manual
Part Number	M808-9902-118
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Important Safety Information

This section provides important safety guidelines for operators and service personnel. Specific warnings and cautions appear throughout the manual where they apply. Please read and follow this important information, especially those instructions related to the risk of electric shock or injury to persons.

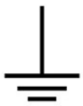
Symbols and Their Meanings

Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

Indicates that the user, operator or service technician should refer to the product manuals for important operating, maintenance, or service instructions.

This is a prompt to note the fuse rating when replacing fuses. The fuse referenced in the text must be replaced with one having the ratings indicated.

Identifies a protective grounding terminal which must be connected to earth ground prior to making any other equipment connections.



Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.

Indicates that static sensitive components are present, which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Indicates that the equipment has more than one power supply cord, and that all power supply cords must be disconnected before servicing to avoid electric shock.

The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Canadian Standard Association (CSA) regulations and recommendations for USA/Canada.

The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Underwriters Laboratory (UL) regulations and recommendations for USA/Canada.

The presence of this symbol in or on Grass Valley equipment means that it has been tested and certified as complying with applicable Intertek Testing Services regulations and recommendations for USA/Canada.

The presence of this symbol in or on Grass Valley product means that it complies with all applicable European Union (CE) directives.

The presence of this symbol in or on Grass Valley product means that it complies with safety of laser product applicable standards.

Warnings

A warning indicates a possible hazard to personnel, which may cause injury or death. Observe the following general warnings when using or working on this equipment:

- Appropriately listed/certified mains supply power cords must be used for the connection of the equipment to the mains voltage at either 120 V AC or 240 V AC.
- This product relies on the building's installation for short-circuit (over-current) protection. Ensure that a fuse or circuit breaker for 120 V AC or 240 V AC is used on the phase conductors.
- Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only.
- Do not operate the equipment in wet or damp conditions.
- This equipment is grounded through the grounding conductor of the power cords. To avoid electrical shock, plug the power cords into a properly wired receptacle before connecting the equipment inputs or outputs.
- Route power cords and other cables so they are not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.
- Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp cloth.
- Dangerous voltages may exist at several points in this equipment. To avoid injury, do not touch exposed connections and components while power is on.
- High leakage current may be present. Earth connection of product is essential before connecting power.
- Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.
- To avoid fire hazard, use only the fuse type and rating specified in the service instructions for this product, or on the equipment.
- To avoid explosion, do not operate this equipment in an explosive atmosphere.
- Use proper lift points. Do not use door latches to lift or move equipment.
- Avoid mechanical hazards. Allow all rotating devices to come to a stop before servicing.
- Have qualified service personnel perform safety checks after any service.

Cautions

A caution indicates a possible hazard to equipment that could result in equipment damage. Observe the following cautions when operating or working on this equipment:

- This equipment is meant to be installed in a restricted access location.

- When installing this equipment, do not attach the power cord to building surfaces.
- Products that have no on/off switch, and use an external power supply must be installed in proximity to a main power outlet that is easily accessible.
- Use the correct voltage setting. If this product lacks auto-ranging power supplies, before applying power ensure that each power supply is set to match the power source.
- Provide proper ventilation. To prevent product overheating, provide equipment ventilation in accordance with the installation instructions.
- Do not operate with suspected equipment failure. If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.
- 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. Servicing should be done in a static-free environment.
- This unit may have more than one power supply cord. Disconnect all power supply cords before servicing to avoid electric shock.
- Follow static precautions at all times when handling this equipment.

Electrostatic Discharge (ESD) Protection

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

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

Battery Handling

This product includes a backup battery. 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 Grass Valley equipment, please review the *Disposal and Recycling Information* appendix.

Mesures de sécurité et avis importants

La présente section fournit des consignes de sécurité importantes pour les opérateurs et le personnel de service. Des avertissements ou mises en garde spécifiques figurent dans le manuel, dans les sections où ils s'appliquent. Prenez le temps de bien lire les consignes et assurez-vous de les respecter, en particulier celles qui sont destinées à prévenir les décharges électriques ou les blessures.

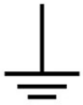
Signification des symboles utilisés

Signale la présence d'une tension élevée et dangereuse dans le boîtier de l'équipement ; cette tension peut être suffisante pour constituer un risque de décharge électrique.

Avertit l'utilisateur, l'opérateur ou le technicien de maintenance que des instructions importantes relatives à l'utilisation et à l'entretien se trouvent dans la documentation accompagnant l'équipement.

Invite l'utilisateur, l'opérateur ou le technicien de maintenance à prendre note du calibre du fusible lors du remplacement de ce dernier. Le fusible auquel il est fait référence dans le texte doit être remplacé par un fusible du même calibre.

Identifie une borne de mise à la terre de protection. Il faut relier cette borne à la terre avant d'effectuer toute autre connexion à l'équipement.



Identifie une borne de mise à la terre externe qui peut être connectée en tant que borne de mise à la terre supplémentaire.

Signale la présence de composants sensibles à l'électricité statique et qui sont susceptibles d'être endommagés par une décharge électrostatique. Utilisez des procédures, des équipements et des surfaces antistatiques durant les interventions d'entretien.

Le symbole ci-contre signifie que l'appareil comporte plus d'un cordon d'alimentation et qu'il faut débrancher tous les cordons d'alimentation avant toute opération d'entretien, afin de prévenir les chocs électriques.

La marque C-CSA-US certifie que l'appareil visé a été testé par l'Association canadienne de normalisation (CSA) et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.

La marque C-UL-US certifie que l'appareil visé a été testé par Underwriters Laboratory (UL) et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.

La marque ETL Listed d'Intertek pour le marché Nord-Américain certifie que l'appareil visé a été testé par Intertek et reconnu conforme aux exigences applicables en matière de sécurité électrique en vigueur au Canada et aux États-Unis.

Le marquage CE indique que l'appareil visé est conforme aux exigences essentielles des directives applicables de l'Union européenne en matière de sécurité électrique, de compatibilité électromagnétique et de conformité environnementale.

Le symbole ci-contre sur un appareil Grass Valley ou à l'intérieur de l'appareil indique qu'il est conforme aux normes applicables en matière de sécurité laser.

Avertissements

Les avertissements signalent des conditions ou des pratiques susceptibles d'occasionner des blessures graves, voire fatales. Veuillez vous familiariser avec les avertissements d'ordre général ci-dessous :

- Un cordon d'alimentation dûment homologué doit être utilisé pour connecter l'appareil à une tension de secteur de 120 V CA ou 240 V CA.
- La protection de ce produit contre les courts-circuits (surintensités) dépend de l'installation électrique du bâtiment. Assurez-vous qu'un fusible ou un disjoncteur pour 120 V CA ou 240 V CA est utilisé sur les conducteurs de phase.
- Dans le présent manuel, toutes les instructions qui nécessitent d'ouvrir le couvercle de l'équipement sont destinées exclusivement au personnel technique qualifié.
- N'utilisez pas cet appareil dans un environnement humide.
- Cet équipement est mis à la terre par le conducteur de mise à la terre des cordons d'alimentation. Pour éviter les chocs électriques, branchez les cordons d'alimentation sur une prise correctement câblée avant de brancher les entrées et sorties de l'équipement.
- Acheminez les cordons d'alimentation et autres câbles de façon à ce qu'ils ne risquent pas d'être endommagés. Supportez correctement les enroulements de câbles afin de ne pas endommager les connecteurs.
- Coupez l'alimentation avant de nettoyer l'équipement. Ne pas utiliser de nettoyants liquides ou en aérosol. Utilisez uniquement un chiffon humide.
- Des tensions dangereuses peuvent exister en plusieurs points dans cet équipement. Pour éviter toute blessure, ne touchez pas aux connexions ou aux composants exposés lorsque l'appareil est sous tension.
- Avant de procéder à toute opération d'entretien ou de dépannage, enlevez tous vos bijoux (notamment vos bagues, votre montre et autres objets métalliques).
- Pour éviter tout risque d'incendie, utilisez uniquement les fusibles du type et du calibre indiqués sur l'équipement ou dans la documentation qui l'accompagne.
- Ne pas utiliser cet appareil dans une atmosphère explosive.
- Présence possible de courants de fuite. Un raccordement à la masse est indispensable avant la mise sous tension.

- Après tout travail d'entretien ou de réparation, faites effectuer des contrôles de sécurité par le personnel technique qualifié.

Mises en garde

Les mises en garde signalent des conditions ou des pratiques susceptibles d'endommager l'équipement. Veuillez vous familiariser avec les mises en garde ci-dessous :

- L'appareil est conçu pour être installé dans un endroit à accès restreint.
- Au moment d'installer l'équipement, ne fixez pas les cordons d'alimentation aux surfaces intérieures de l'édifice.
- Les produits qui n'ont pas d'interrupteur marche-arrêt et qui disposent d'une source d'alimentation externe doivent être installés à proximité d'une prise de courant facile d'accès.
- Si l'équipement n'est pas pourvu d'un modules d'alimentation auto-adaptables, vérifiez la configuration de chacun des modules d'alimentation avant de les mettre sous tension.
- Assurez une ventilation adéquate. Pour éviter toute surchauffe du produit, assurez une ventilation de l'équipement conformément aux instructions d'installation.
- N'utilisez pas l'équipement si vous suspectez un dysfonctionnement du produit. Faites-le inspecter par un technicien qualifié.
- Pour réduire le risque de choc électrique, n'effectuez pas de réparations autres que celles qui sont décrites dans le présent manuel, sauf si vous êtes qualifié pour le faire. Confiez les réparations à un technicien qualifié. La maintenance doit se réaliser dans un milieu libre d'électricité statique.
- L'appareil peut comporter plus d'un cordon d'alimentation. Afin de prévenir les chocs électriques, débrancher tous les cordons d'alimentation avant toute opération d'entretien.
- Veillez à toujours prendre les mesures de protection antistatique appropriées quand vous manipulez l'équipement.

Protection contre les décharges électrostatiques (DES)

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

- Assurez-vous que le châssis est relié électriquement à la terre par le cordon d'alimentation ou tout autre moyen disponible.
- Portez un bracelet antistatique et assurez-vous qu'il est bien en contact avec la peau. Connectez la pince de masse à une *surface non peinte* du châssis pour détourner à la terre toute tension électrostatique indésirable. En l'absence de bracelet antistatique, déchargez l'électricité statique de votre corps en touchant une surface métallique *non peinte* du châssis.

- Pour plus de sécurité, vérifiez périodiquement la valeur de résistance du bracelet antistatique. Elle doit se situer entre 1 et 10 mégohms.
- Si vous devez mettre une carte de côté, assurez-vous de la ranger dans un sac protecteur antistatique.
- Les cartes qui sont reliées à un châssis ou boîtier métallique mis à la terre ne nécessitent pas de protection antistatique spéciale.

Remplacement et élimination des piles

L'appareil renferme une pile. Pour réduire le risque d'explosion, vérifiez la polarité et ne remplacez la pile que par une pile du même type, recommandée par le fabricant. Mettez les piles usagées au rebut conformément aux directives du fabricant. Avant de vous défaire de l'équipement, assurez-vous d'avoir lu l'appendice *Disposal and Recycling Information*.

Recycling

Visit www.grassvalley.com for recycling information.

Certification and Compliance

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 (2nd Edition)
- EN 60950-1:2006
- IEC 60950-1:2005

The power cords supplied with this equipment meet the appropriate national standards for the country of destination.

Electromagnetic Compatibility

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

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

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

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

Table of Contents

1 Overview

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

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.

Related Documentation

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

Document Number	Title
M770-2800	Kaleido Software User's Manual
M770-2103	Kaleido Software Release Notes
M770-9904	Kaleido Software Product Comparison Charts
GVB-1-0230C-EN-DS	Kaleido Software Datasheet
M770-9905	Kaleido Multiviewers Documentation Resource Guide
M808-9902	Kaleido-X (7RU) Installation & Service Manual
M860-9900	KXO-HDM Installation Instructions
M906-9900	GPI-1501 Guide to Installation and Operation
M735-9902	Kaleido-RCP2 Installation and Operation Guide
M876-9900	RCP-200 Guide to Installation and Operation
M770-0900	Kaleido Remote Control Protocol (Gateway) User's Guide
M796-9902	Audio Bridge Terminal Guide to Installation and Operation
M807-9700	KXI-DVI-Bridge User's Manual
M407-9900	iControl Router User Guide
Published online	iControl Online Help iControl Solo Online Help

Software and Firmware Updates

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

Introduction

The **Kaleido-X (4RU)** can display 32 3Gbps, HD, SD or analog inputs any number of times, in any size, across four displays of any resolution and orientation.

The **Kaleido-X (7RU)** can display 96 3Gbps, HD, SD or analog inputs any number of times, in any size, across eight displays of any resolution and orientation. With its router option, the Kaleido-X (7RU) offers switching unprocessed inputs to 48 HD/SD outputs for feeding monitors, test equipment and master control or production switchers. By using an optional mid-plane expansion module, two Kaleido-X (7RU) frames can be configured into a fully interconnected 14 RU system to display up to 192 video inputs over up to 12 displays, and capable of switching unprocessed inputs to 96 HD/SD router outputs.

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.

A Kaleido-X multiviewer system in its default configuration includes a number of layout presets. Each preset shows the video signals from a specific input module (card). Each output card drives displays in either VGA or DVI-D at a default resolution of 1280 × 1024 @ 60Hz. Consult the *Kaleido Software User's Manual* (see Related Documentation, on page 15) for instructions on how to create rooms and layouts according to your specific requirements.

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.

Current Limitations

The Kaleido-X multiviewer supports a subset of the features offered by other Kaleido Multiviewer series models as shown in the *Kaleido Multiviewer Product Comparison Guide* (see Related Documentation, on page 15).

Kaleido Software Minimum Version Compatibility

When installing a KXO-Dual card into a multiviewer, the Kaleido Software version currently loaded into a KXO-Dual card must meet the minimum Kaleido Software version number. The minimum Kaleido Software version number varies according to the card's assembly number. To find the card's assembly number, see Finding the KXO-Dual card's assembly number, on page 185.

Card's assembly number	0792-0100-401 to 462 0792-0100-550 to 562	0792-0100-563	0792-0100-463 0792-0100-564 to 571 0792-2800-604 to 611	0792-2800-612 to 656	0792-2800-701 to 703 0792-2800-AA or higher	0792-4400-100 and 101 0792-4400-AA or higher
Card Ejector Tab Label	KXO-Dual-F KXO-DUAL	KXO-DUAL	KXO-DUAL	KXO-DUAL3 KXO-DUAL3-F KXO-DUAL-3F	KXO-DUAL3	KXO-DUAL3-B
Factory installed: • RAM • Compact Flash	 • 1 GB • 2 GB	 • 2 GB • 2 GB	 • 2 GB • 4 GB	 • 2 GB • 4 GB	 • 2 GB • 4 GB	 • 2 GB • 4 GB
KXS versions 3.xx to 5.21	Compatible	Compatible	Compatible	Incompatible	Incompatible	Incompatible
KXS version 5.22 to 7.xx	Compatible with RAM upgrade[1]	Compatible	Compatible	Compatible	Incompatible	Incompatible
KXS versions 8.00 and above	Compatible with RAM & CF upgrade[2]	Compatible with CF upgrade[3]	Compatible	Compatible	Compatible	Compatible

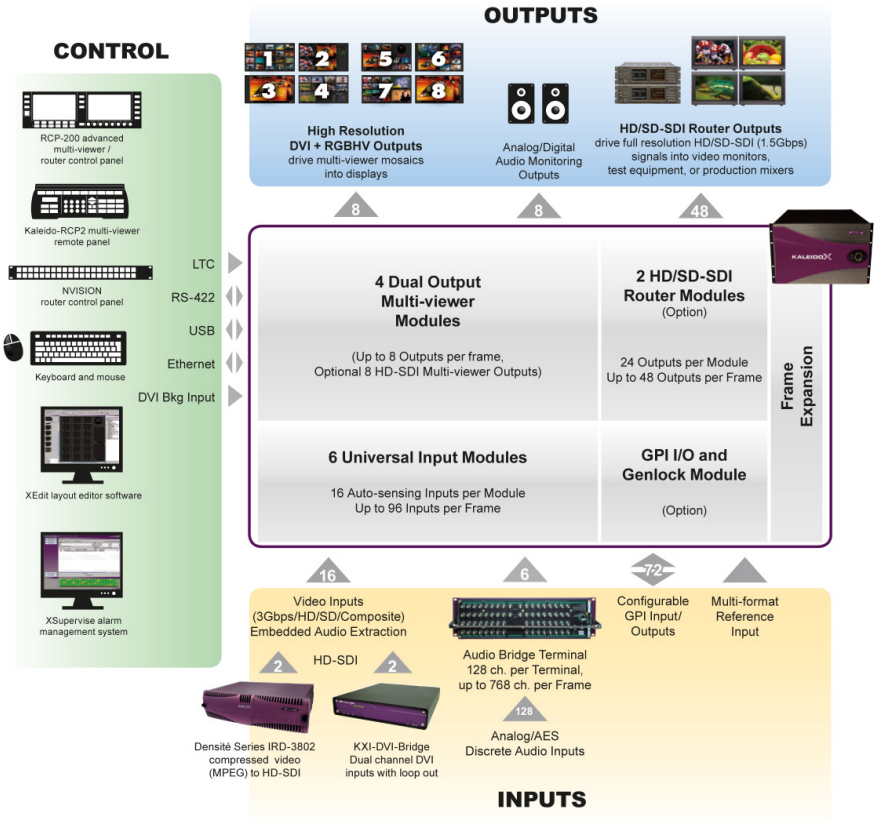
1. When the card has been upgraded to have 2 GB of RAM. To upgrade the card's memory, see Output Card Memory Module Upgrade Procedure, on page 185.
2. When the card has been upgraded to have 2 GB of RAM and a 4 GB Compact Flash (CF) card. To upgrade the card's memory, see Output Card Memory Module Upgrade Procedure, on page 185. To upgrade the CF card, contact Grass Valley Technical Support, on page 216.
3. When the card has been upgraded to have a 4 GB Compact Flash (CF) card. To upgrade the CF card, contact Grass Valley Technical Support, on page 216.

When downgrading this multiviewer, certain other requirements and limitations may be in effect; see Pre-upgrade Checklist, on page 168 for more information.

To upgrade a multiviewer's software, see Upgrading the Multiviewer, on page 168. To find a card's Kaleido Software version number, see Verifying the System IP Address, System Name, and Application Version, on page 160. To downgrade a multiviewer's software, see Downgrading the Multiviewer System, on page 179.

Whenever possible, upgrade the multiviewer to use the latest Kaleido Software version to take advantage of the latest bug fixes and stability enhancements. See the Kaleido Software Release Notes for more information about a Kaleido Software release.

Overview of the Kaleido-X System

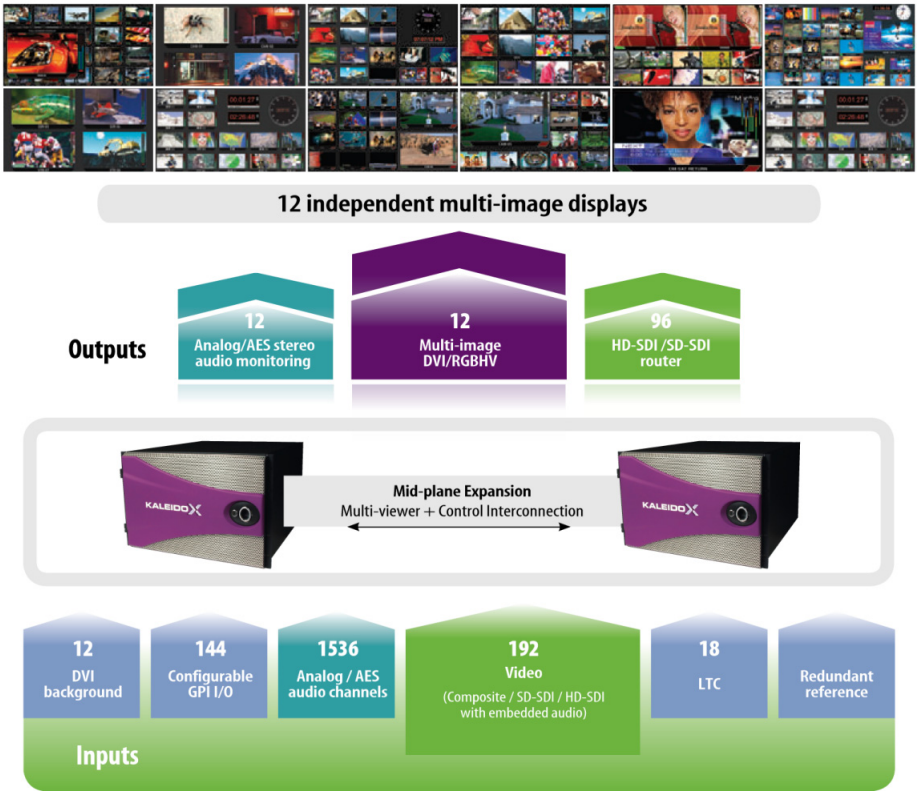


Kaleido-X (7RU) System Overview

Kaleido-X (14RU) Expansion System Overview

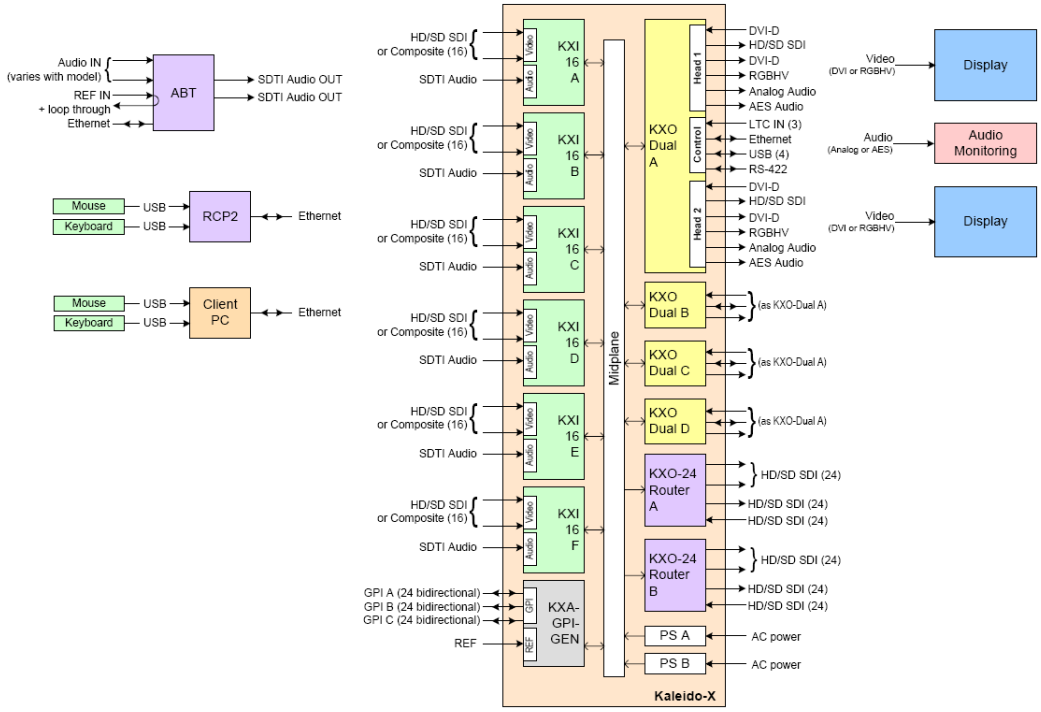
It is possible to expand the input connectivity of one Kaleido-X (7RU) frame to include that of a second. The two frames, each with its own expansion (KXO-EXP) card, are connected by a high-bandwidth cable, such that all the output modules on each frame (up to 6 in total) have access to all inputs on each frame (up to 192 in total) without any blocking or bandwidth limitations.

Using Grass Valley's XEdit software, the two frames can be configured as a single system, allowing *rooms* to have a mixture of input modules from either frame. The expansion card interconnect allows seamless sharing of video, audio monitoring output, time code inputs, reference input, metadata information (CC, XDS, alarms, etc.), and audio level data. For more information, see Kaleido-X (14RU) Expansion, on page 41.



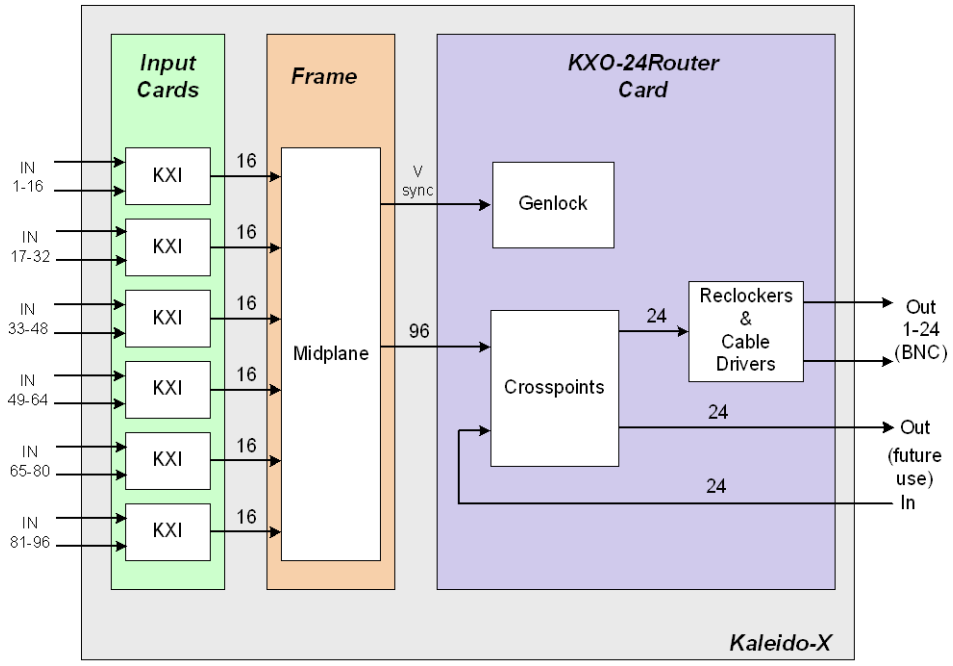
Functional Block Diagrams

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

The KXO-24Router card is connected to the other cards in the Kaleido-X frame through the frame's internal midplane.



Simplified Signal Flow Diagram - KX0-24Router

2 Installation

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

Getting Organized / Unpacking

Required Tools

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

Required Materials

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

- Kaleido-X unit, with pre-installed cards and power supplies
- 2 AC power cords per power supply
- Kaleido Multiviewers Documentation Resource Guide.
- Keyboard
- Mouse
- Serial port adapters; one with straight cabling and one with crossover cabling for each output card in your multiviewer (see also RS-422 Connection Diagram, on page 214):

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

- The Kaleido Multiviewers Documentation Resource Guide, which provides instructions on how to access the documentation you need to install and use your new multiviewer. See Related Documentation, on page 15.

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

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

- Up to 12 displays
- A dedicated 100Base-T Ethernet switch with enough ports for the Kaleido-X, client PCs, Kaleido-RCP2, and Audio Bridge Terminals
- Client PC (see System Requirements for a Client PC, on page 101)
- Cables (to connect your multiviewer to video sources, to displays, and to the network):

Cable type	Purpose
CAT-5	For Ethernet connectivity
Display cables	Either extension modules—for example, Grass Valley's DXF-200 (part number DXF-200-A)—or DVI cables
Video cables	Standard coaxial cables with BNC connectors

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

Optional Ancillary Equipment

The following optional equipment may be supplied with your order.

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

KX0-24Router Card Overview

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.

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 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

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.

Physical Interface

Kaleido-X Frame Interfaces

Overview

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.

Front Frame Interfaces

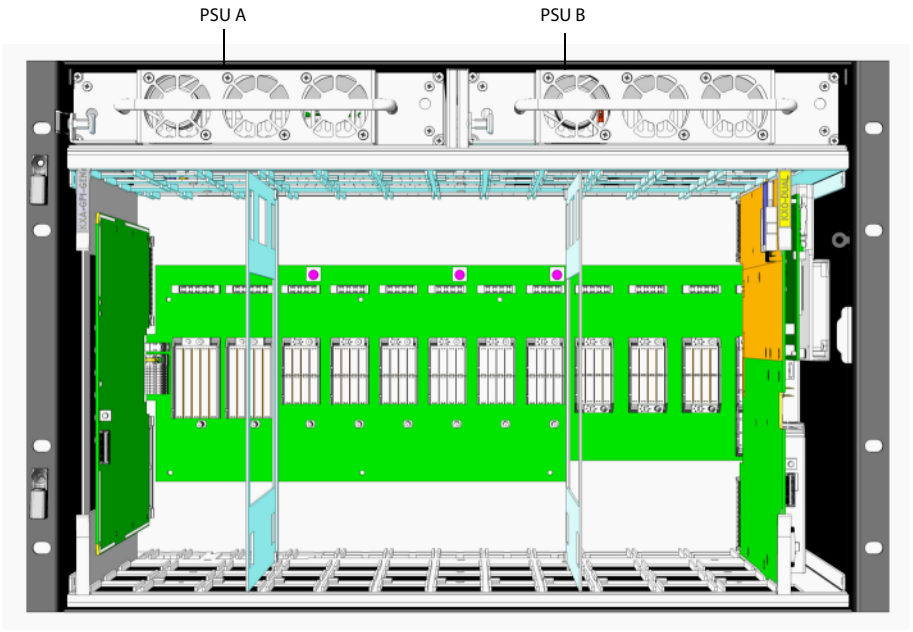
The hinged front door can be opened to give access to the cards. A removable retaining bar across the front of the frame inside the door holds the cards securely in place.

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

- A rack-mountable frame that has slots for cards and modules
- 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

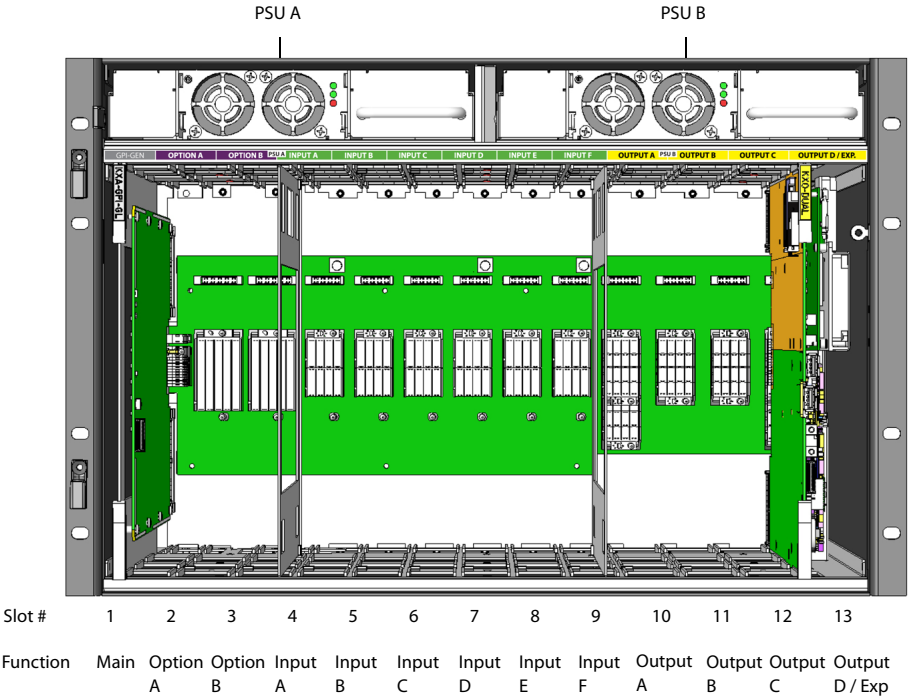
- Ventilation

IMPORTANT
Output D / EXP. and Output C are considered the master slots for the Kaleido-X system'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 install **Output B** or **Output A**.



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 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

Slot Color Coding by Card Type

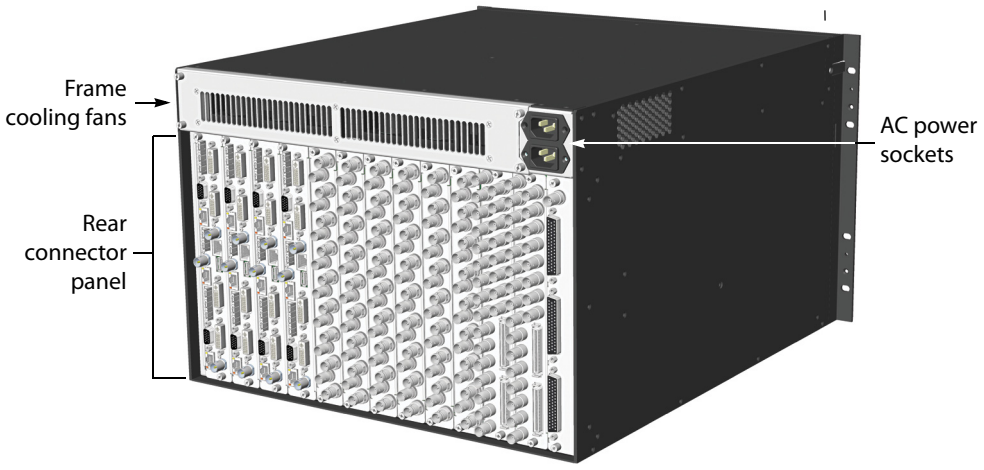
The front slots and rear panel connection points are color-coded according to the type of card that can be located in the slot. The extractor handles on the cards are color-coded to match. The cards are physically keyed so they cannot be installed in the wrong slot type.

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:

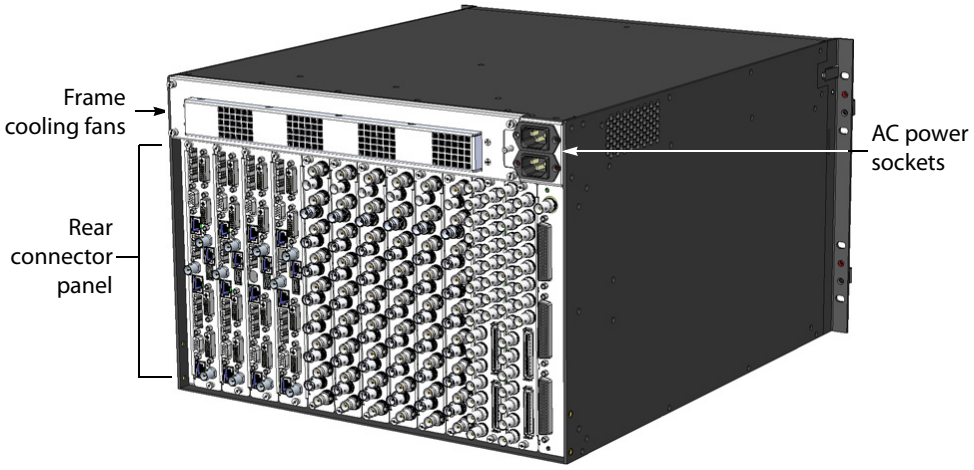
Slot	Function	Color code		Card type
1	Main	Grey		KXA-GPI-GEN
2 - 3	Option	Purple		KXO-24 HD/SD-SDI Router KXO-24 SD-SDI Router
4 - 9	Input	Green		KXI-16HSV3, KXI-16HSV KXI-16HS3, KXI-16HS KXI-16SV
10 - 12	Output	Yellow		KXO-Dual3, KXO-Dual
13	Output/Expansion	Yellow		KXO-Dual3, KXO-Dual, or KXO-EXP

Rear Frame Interfaces

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

Card Interfaces

The following sections describe each card's user interface such as the meaning of LED indicators and the use of push buttons. All other adjustment, alignment and configuration of these cards is made through external controllers (for example, a PC running XEdit software), and are documented in their respective manuals.

The card's ejector is color-coded and the card is to be used only in the corresponding frame slots with the same color. See Slot Color Coding by Card Type, on page 27. To make connections to these cards, see Signal Connections to the Multiviewer, on page 82.

KXO-Dual Output Card Overview

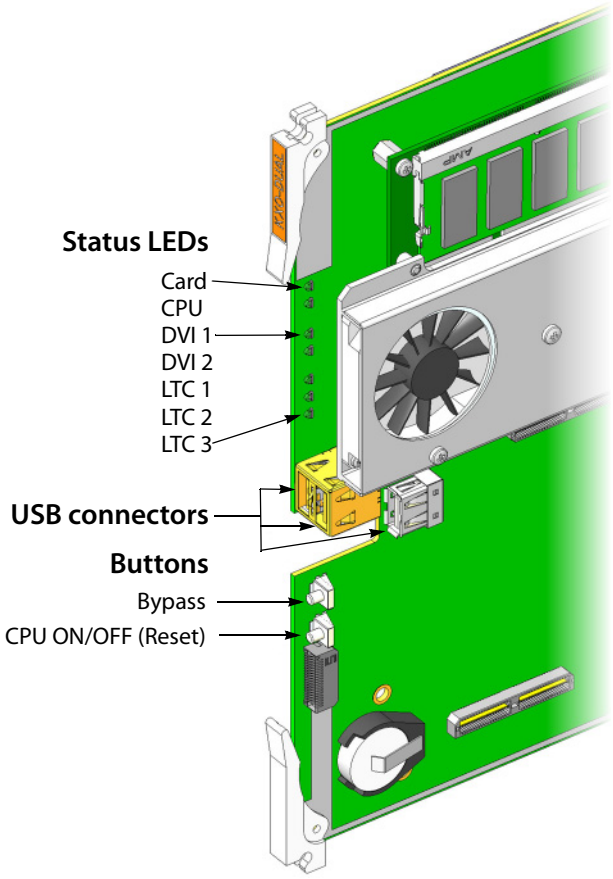
The KXO-Dual and KXO-Dual3 cards are output cards that can be installed in a Kaleido-X multiviewer. They are dual-head output cards as they support two independent outputs. These outputs, called *Head 1* and *Head 2*, are each provided with a complete set of connectors.

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 of the PCB. Each output card is complemented by a rear panel (KXO-Dual-R) that holds all input and output connectors associated with the card.

For more information on the corresponding rear panel, see KXO-Dual Output Rear Panel Connections, on page 82.

KXO-Dual Ouput Card Front-Edge Description

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



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 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 Kaleido Software upgrade or data backup
(unlabeled)	ICAT	(for factory use only)

Status LEDs

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

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

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

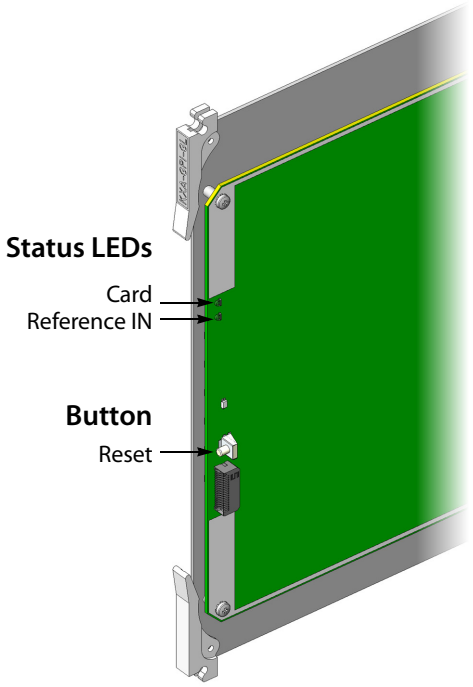
GPI/Genlock Card Overview

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

For more information on the corresponding rear panel, see GPI/Genlock Rear Panel Connections, on page 83.

GPI/Genlock Front Card Front-Edge Description

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



LED 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 Red Flashing Red	OK Configuration failed System upgrade in progress
Reference input status	Green Off Red Orange	OK No input Signal not recognized 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

ICAT 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 function.

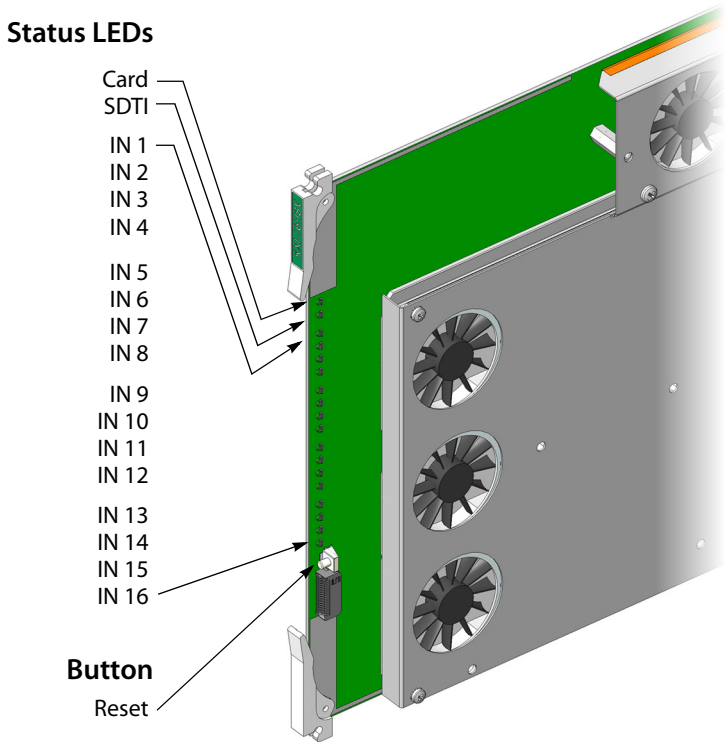
KXI-16 Input Card Overview

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).

For more information on the corresponding rear panel, see KXI-16 Input Rear Panel Connections, on page 86.

KXI-16 Input Card Front-Edge Layout

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



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

Controls

One button is located on the front card edge:

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

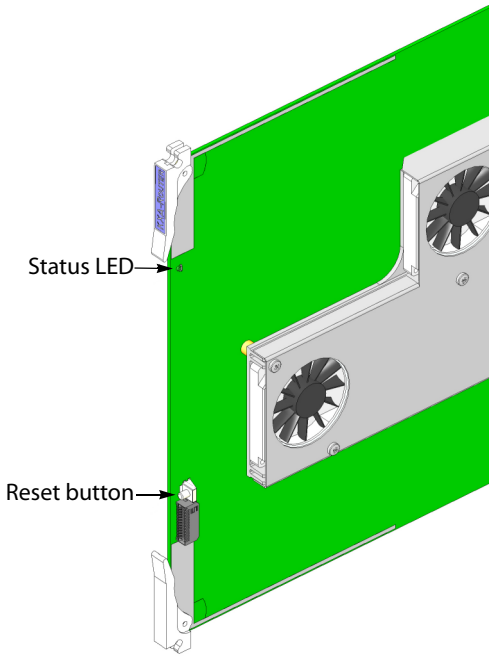
ICAT Connector

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 function.

KXO-24Router Card

The following diagram shows the various indicators, connectors and buttons that appear at the front end of the KXO-24Router cards:

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
	Flashing 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.

Mechanical Installation

Rack-Mount Installation

A Kaleido-X multiviewer can be installed in a standard 19-inch rack, using the appropriate 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.

Locate the multiviewer where it will receive proper ventilation. Make sure the front and side panel air vents are not blocked and the air filter is clean. See Ventilation, on page 37.

Card Installation in the Kaleido-X Frame

Each type of card is color-coded according to slot in the frame in which it can be used. See Slot Color Coding by Card Type, on page 27. To install a card and its corresponding rear panel, see Card Installation and Replacement, on page 161.

KXO-Dual Ouput Card Installation

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.

In XAdmin, you can identify which output card is the current Kaleido Software master, by looking for the card with the word “master” next to its identifier (this is shown in step 2 on page 132).

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). 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 41 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 reseat this card from Frame A Output C).

Notes

- The rear panel must be installed at the rear of the frame before the card is installed.
- Be careful to install the rear panel in the matching location at the rear of the frame.
- 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.

To install a dual channel HD-SDI monitoring mezzanine on a KXO-Dual or KXO-Dual3 module, refer to *KXO-HDM Installation Instructions*. See Related Documentation, on page 15.

Every output card is connected to the other cards in the Kaleido-X frame through the frame's internal midplane. See External connections to the card are made through connectors that are found in the following locations:

- on the rear panel (see KXO-Dual Output Rear Panel Connections, on page 82)
- on the front card edge (see KXO-Dual Ouput Card Front-Edge Description, on page 29)

GPI/Genlock Card Installation

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 161, for instructions on installing the card and the rear panel.

Notes

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

External connections to the card are made through the card's corresponding rear panel. See GPI/Genlock Rear Panel Connections, on page 83.

KXI-16 Input Card Installation

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

Every input 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 the card's corresponding KXI-16-R rear panel. See KXI-16 Input Rear Panel Connections, on page 86. See Card Installation and Replacement on page 161, for instructions on installing the card and the rear panel.

Notes

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

KXO-24Router Card Installation

The KXO-24Router card 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. See Card Installation and Replacement on page 161, for instructions on installing the card and the rear panel.

Notes

- In the case of 1080i signals, switching occurs at line 4, instead of line 7 (standard for HD signals).
- The rear panel must be installed at the rear of the frame before the card is installed.
- Be careful to install the KXO-24Router-R rear panel in the matching location at the rear of the frame.
- Kaleido-X cards are hot-swappable; it is not necessary to turn off the multiviewer when installing or exchanging cards.

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 card are made through the card's corresponding rear panel. See KXO-24Router-R Rear Panel Connections, on page 86.

Ventilation

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

Frame Cooling Fans

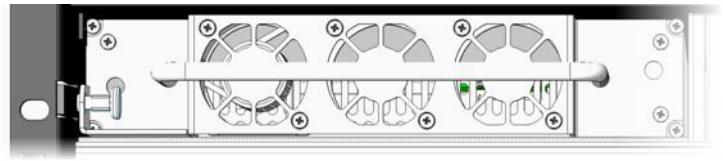
Primary ventilation for the cards installed in the frame is handled by six fans located at the top rear of the frame, behind the power supplies.

> 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 Frame Ventilation Fans, on page 165.

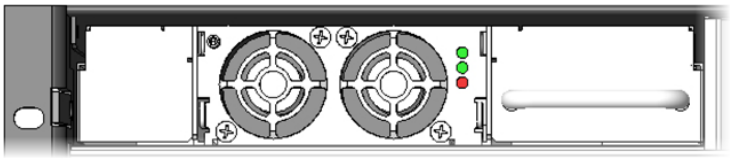
These fans draw air into the frame through a grille and filter in the front door, and exhaust it through the grate on the rear of the fan assembly.

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 166.

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 ºC (68 ºF).

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 ºC (167 ºF)
Output cards	83 ºC (181 ºF)

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 shed 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, Grass Valley 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 (contact Grass Valley Technical Support for the recommended practice).

3 Kaleido-X (14RU) Expansion

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

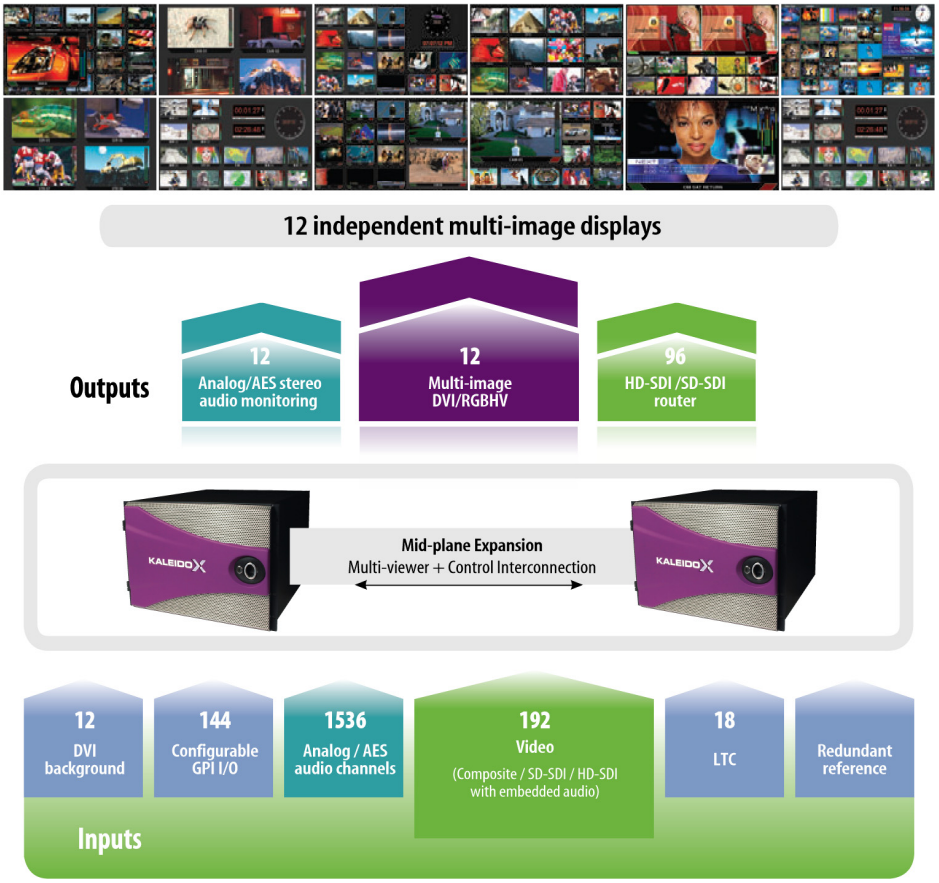
Introduction

As of version 3.00 of the Kaleido 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 Grass Valley'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

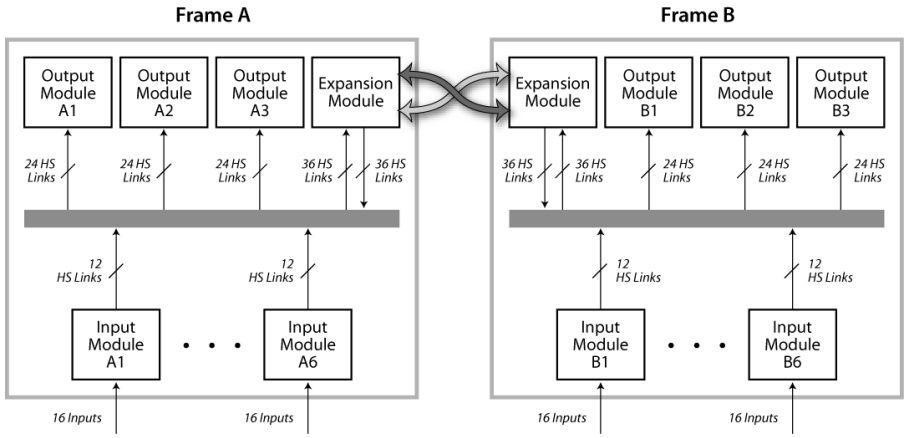
Two Kaleido-X frames in expansion mode can display up to 192 video inputs over up to 12 displays. This configuration provides easy system expansion without losing any of Kaleido-X's extreme signal flexibility, due to the full interconnectivity of video, audio and metadata, as well as time code and control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



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

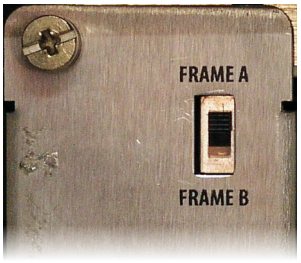
- Larger systems can be configured, with any source directed anywhere.
- Sources can be shared between frames.

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

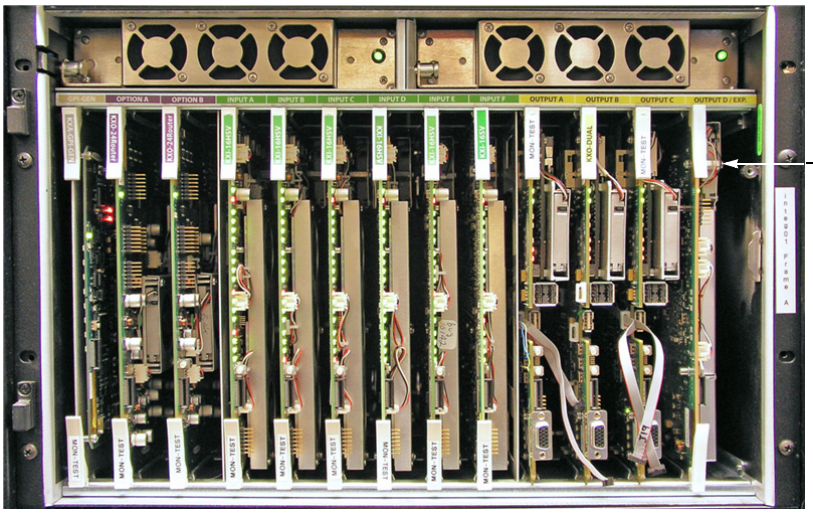
Kaleido-X (14RU) expansion frame	Refers to two Kaleido-X (7RU) frames operating in *Expansion Mode* (see below).
Master frame	When two Kaleido-X frames are interconnected, one is designated as **Frame A** and the other as **Frame B**. The setting is determined by a physical switch on the rear panel of the expansion card in each frame. **Frame A** is nominally considered to be the *master*. 
Expansion mode	When two Kaleido-X (7RU) frames work as one, they are said to be in *expansion mode*. To be in this mode, expansion cards and expansion cables must be properly connected, the **Enable expansion** 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. In expansion mode: • Two Kaleido-X (7RU) systems (**Frame A** + **Frame B**) operate as one frame. • KXI inputs from **Frame A** can be displayed on **Frame B**, without any restriction, and vice versa. • You can create and load layouts that overlap **Frame A** and **Frame B**.
Database	Kaleido-X operational data created in XEdit (for example, logical sources, layouts, rooms, users, system definition, actions) is stored in a database.
Router expansion	Expansion frames *cannot* 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 **Frame A** cannot be routed to the **Frame B** router cards, and vice versa. See Configuring Router Card Expansion, on page 69, 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 44)
- **KXO-EXP-R**—the rear panel (see KXO-EXP-R, on page 46)

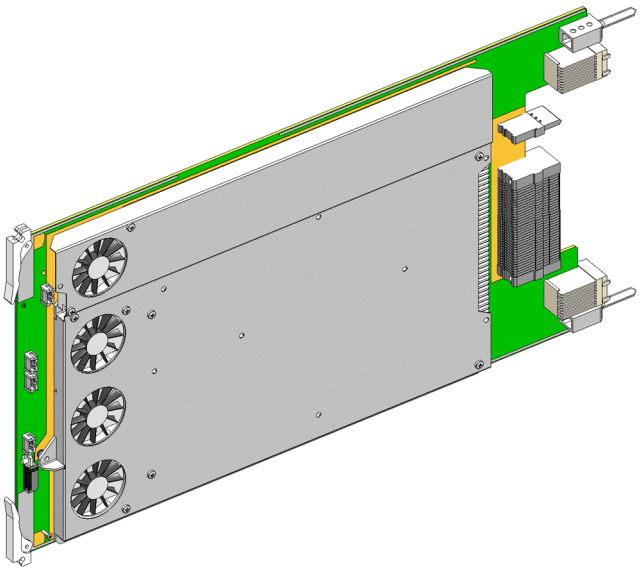
When inserted in their corresponding slots, the panels meet at the frame's internal midplane, which enables the KXO-EXP card to communicate with the other cards in the Kaleido-X frame. External connections to the KXO-EXP card are made through connectors that are found on the card's rear panel and on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



Kaleido-X frame with expansion card—front view

KXO-EXP-F

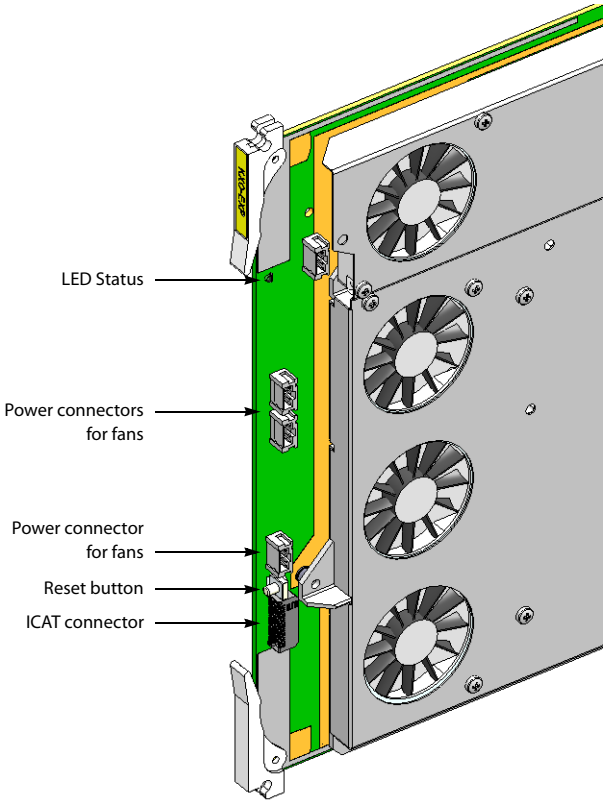
The KXO-EXP-F card is a multi-function card that performs a significant portion of the signal processing required to create the monitor wall output.



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 Red	OK Failed

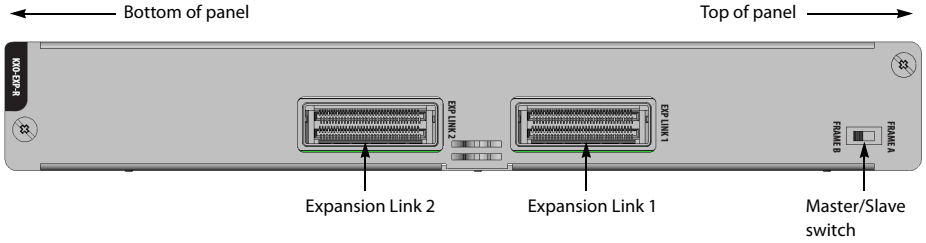
Front Card-Edge Controls

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

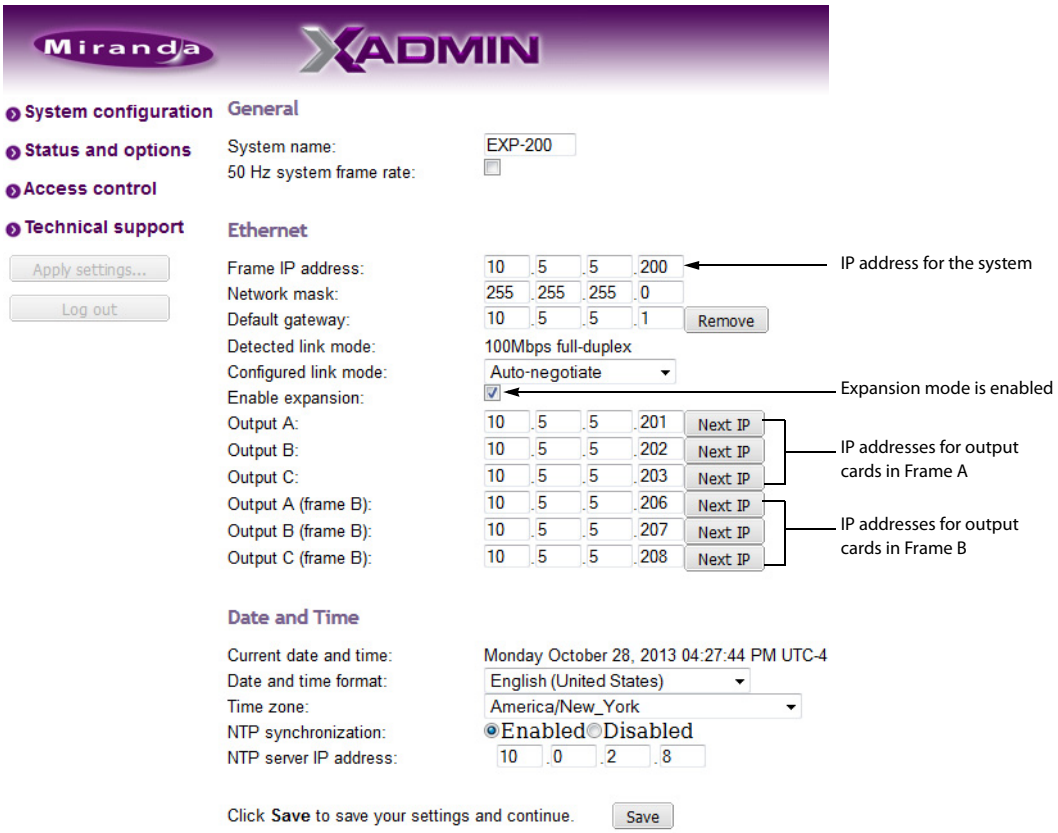
Signal Synchronization

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

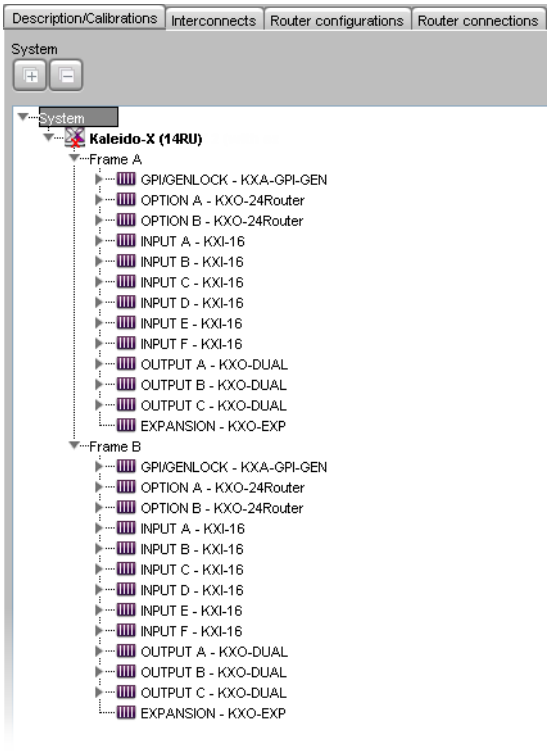
In addition to its other administrative functions, XAdmin is used to enable the expansion mode, and define the IP address scheme. Before two Kaleido-X systems are joined, each frame and its output cards have their own IP addresses. In expansion mode, a single IP address is assigned for the whole expansion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



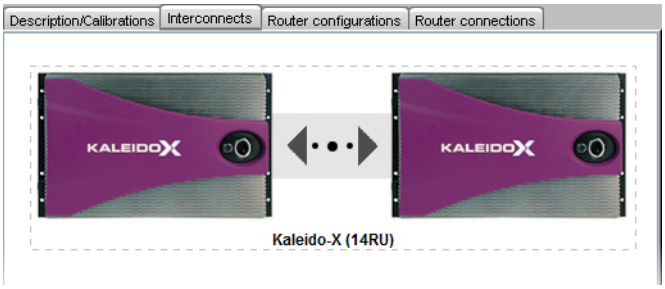
Expansion system configuration example

XEdit

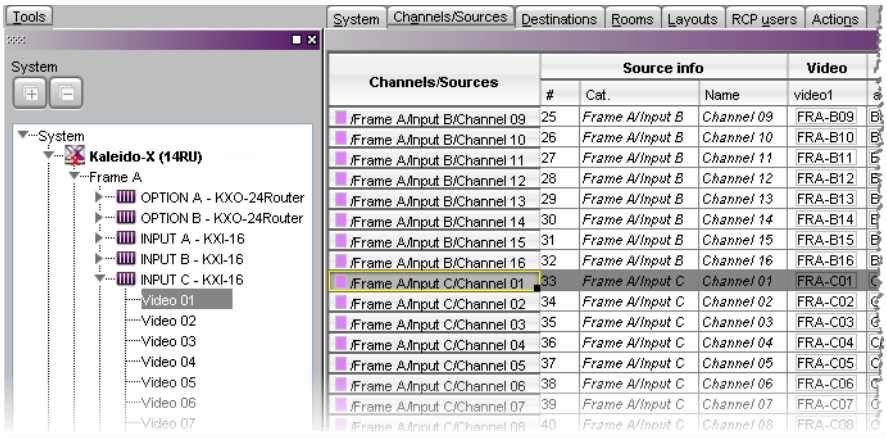
Two frames in an expanded system are presented in the XEdit hierarchical System list as shown below.



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



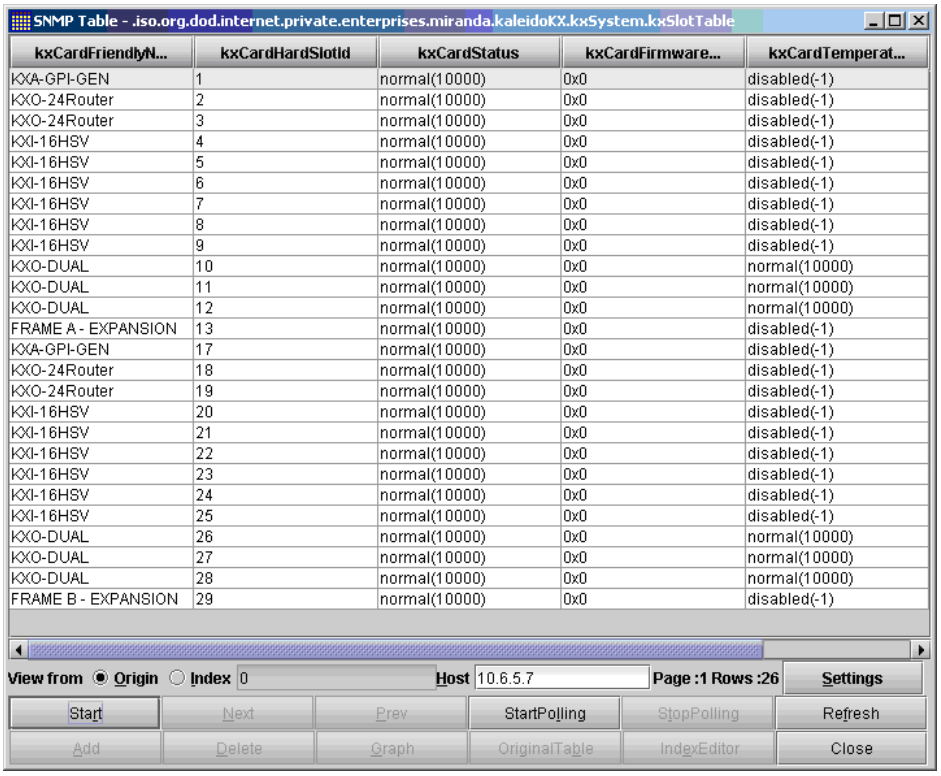
When two frames are joined, the default names for all available inputs are formed by concatenating the frame name, the input card, and the video number. For example, the logical source “/Frame A/Input C/Channel 01” corresponds to the first video input on KXI card C on Kaleido-X **Frame A**.



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.



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 56).
- **MIXED**: one new Kaleido-X frame plus one previously commissioned frame (see Expanding Mixed Kaleido-X Frames, on page 69).

> 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 52)
- configuring your expansion system representation in XEdit (see Part C — XEdit Settings, on page 54)

Part A — Physical Setup

1. Set up and configure the two standalone, independent Kaleido-X frames as described in the Kaleido Software User's Manual. See Related Documentation, on page 15.
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 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.

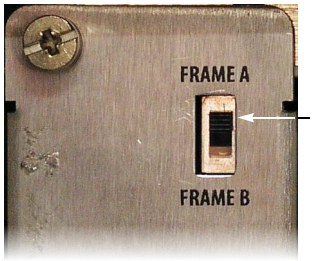
3. **Power down both frames**.
4. Check the pins on the expansion card connectors to make sure they are straight (inserting a card with bent pins can damage the card).

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 161 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.

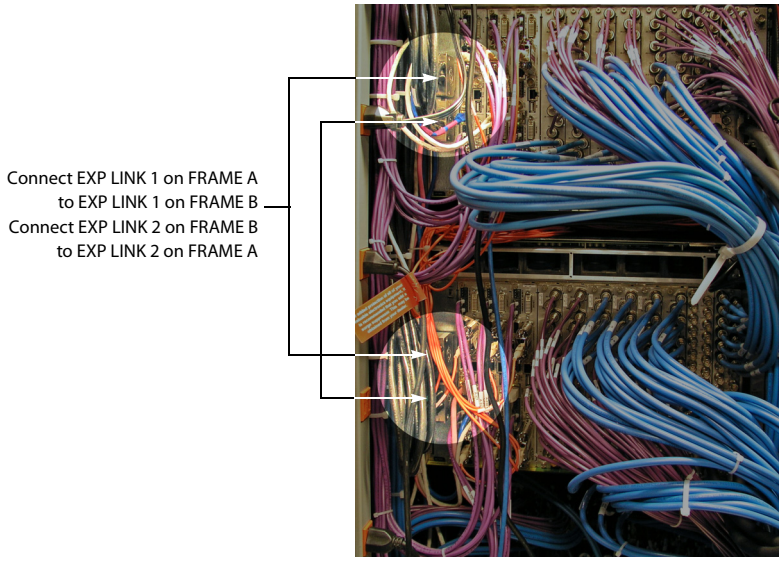


7 Gently but firmly, slide the other expansion card into the slot labelled **OUTPUT D / EXP** of the Kaleido-X that will be designated **Frame B**.

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 flashing 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[1] as described in Part B — XAdmin Settings below.

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

Part B — XAdmin Settings

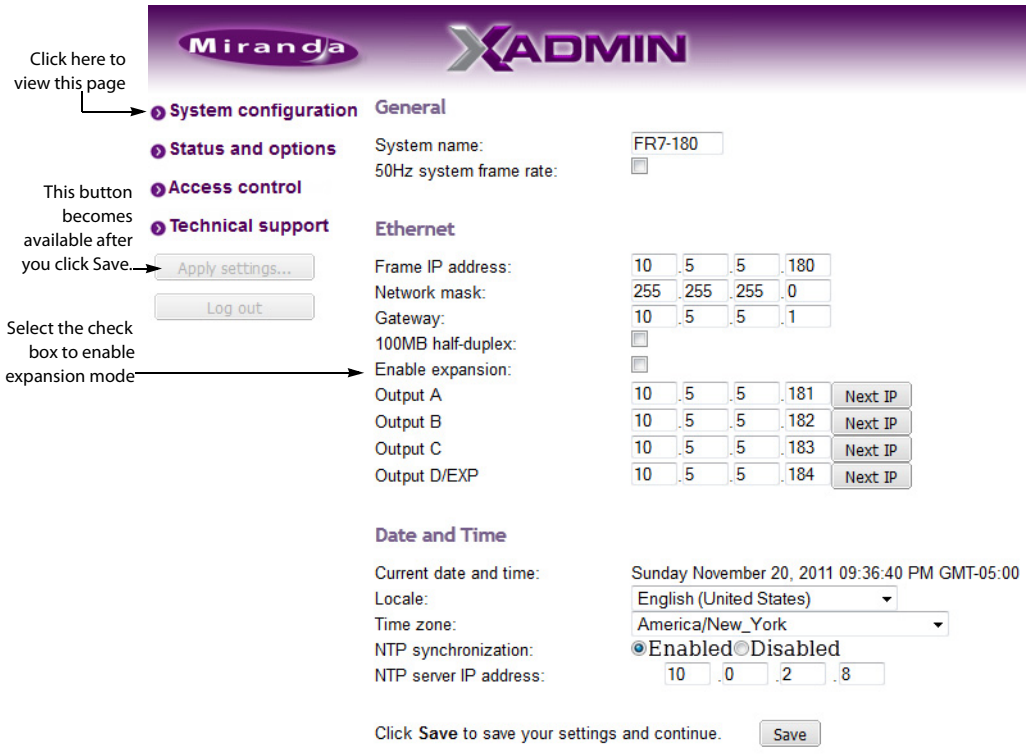
At this point, **Frame A** should be up and running, with all input, output, network and serial cables in position, and **Frame B** should not be rebooted.

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** (see *Opening XAdmin, on page 114*).

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.

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

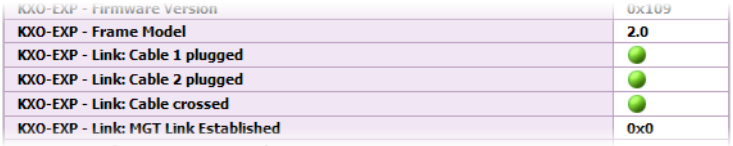
- You may see messages on the monitor wall warning you that KX0 heads are not assigned. This is normal.
- If one or more cards in a Kaleido-X frame is being upgraded (i.e. if a Live Update is in progress), then it is not possible to apply any changes made in XAdmin. If you click **Apply settings** in 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 75).

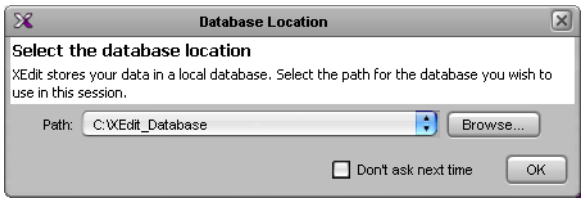
9 Check the frame and card statuses to make sure there are no problems or error conditions. In particular, the **Cable crossed** and **Cable plugged** alarms on the KXO-EXP cards should be normal (green).



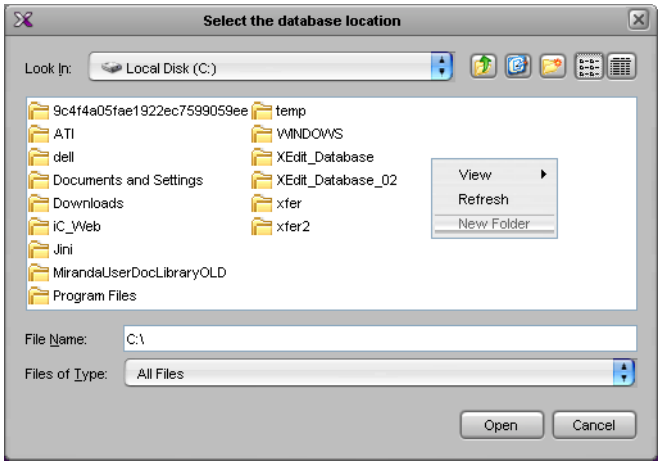
Part C — XEdit Settings

1 Open XEdit.

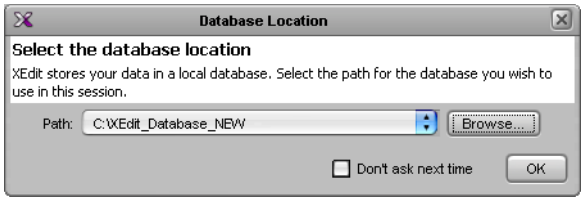
2 When the **Database Location** window appears, click **Browse**.



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**.



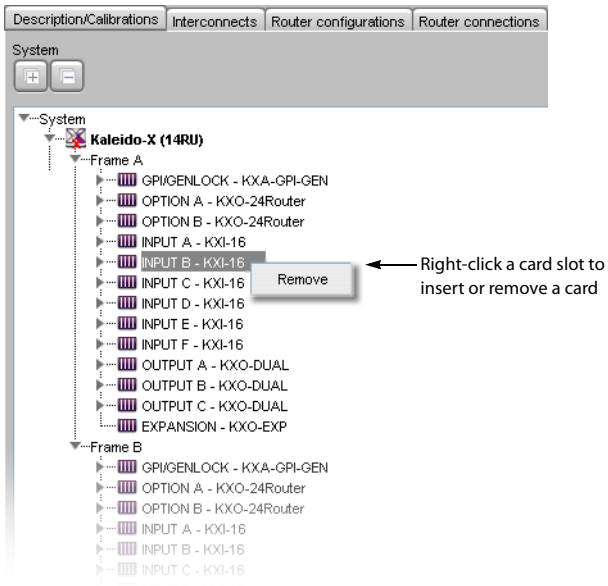
XEdit continues to start up, and loads a new, empty database. In the following steps, you will convert this empty database into what will become the database for the entire expansion frame.

5 Download the factory-default database. See Software and Firmware Updates, on page 16

6 On the **Configure** menu, point to **Database**, and then click **Restore backup** to load the the downloaded database (`Kaleido-X (14RU).zip`).

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:

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



8 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 Software User's Manual; see Related Documentation, on page 15).

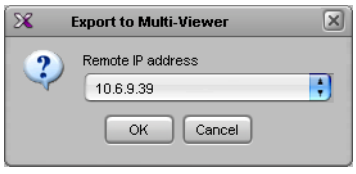
> TIP
>
> Once you have created new Rooms manually, you can use the Copy layout feature (see page 63) to copy existing layouts from another Kaleido-X.

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

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

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.

12 Click **OK**.

Expanding Existing Kaleido-X Frames

There are two procedures that must 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 65).

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.

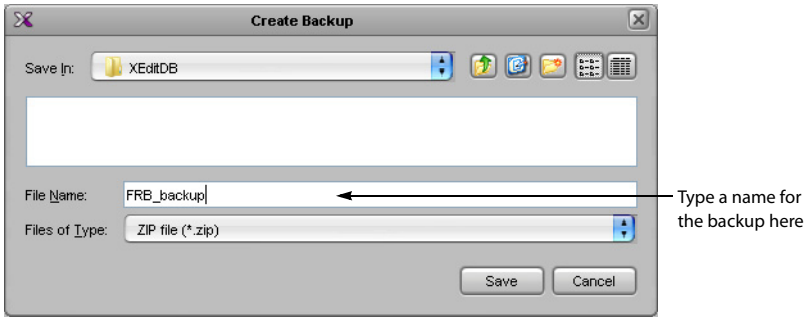
XEdit provides a tool for merging two databases into one, prior to the joining of the two frames. This tool combines the configuration settings from both frames, modifying them when necessary to avoid conflicts. For example, if a logical source name is the same on **Frame A** and **Frame B**, it will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

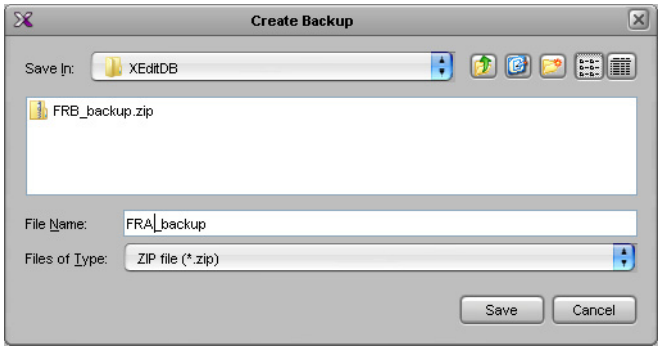
1. Open XEdit.
2. Import the database from **Frame B** (refer to *Importing a Database,* in the Kaleido Software User's Manual; see Related Documentation, on page 15).
3. Create a backup of the **Frame B** database (refer to *Creating a Backup,* in the Kaleido Software User's Manual; see Related Documentation, on page 15).



   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.



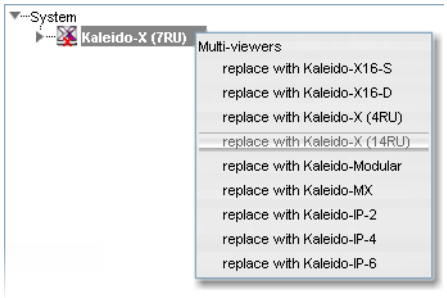
At this point, you have backed up the two single-frame databases—these are important, as they can be used (a) as a reference when re-creating settings not carried over during the merge, and (b) to split an expansion system back into two independent frames.

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.

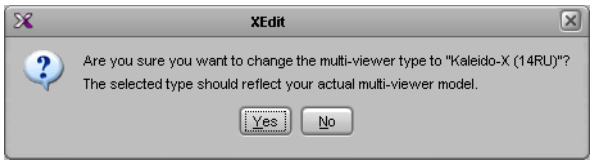
6 In XEdit, click the **Description/Calibrations** tab.

7 Right-click the current multiviewer in the System list, and then click **replace with Kaleido-X (14RU)**.



> 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.

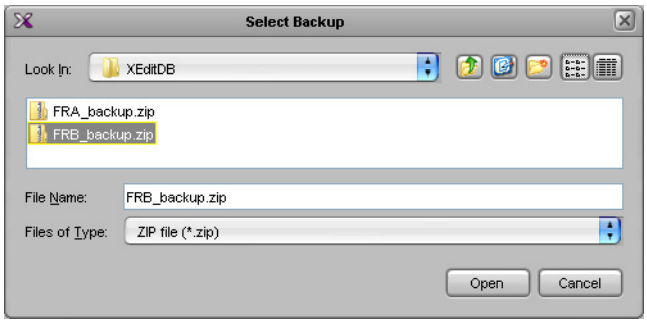
9 Add or remove cards to/from the System list so that it reflects the physical configuration of the expansion system.

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.

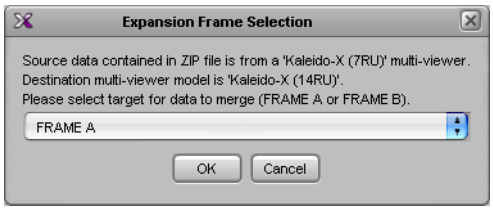


12 Click **Open**.

A confirmation message appears.

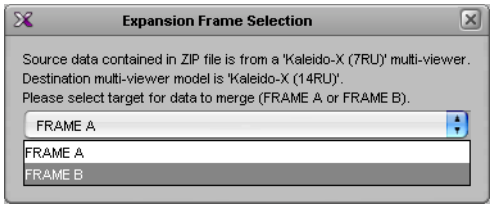
13 Click **Yes**.

The Merge tool determines the frame type (for example, 7RU) associated with the incoming database, and prompts you to choose a corresponding expansion frame.

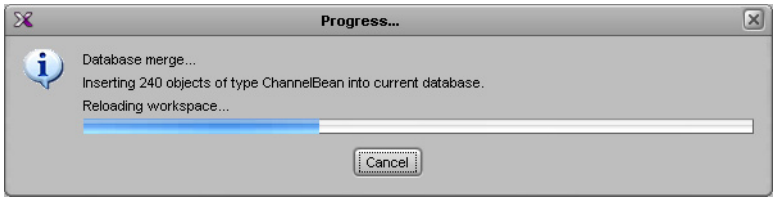


Choosing **Frame B** will cause incoming data (from the ZIP file) to be identified as belonging to **Frame B**. If you choose FRAME A, then the URIs (for logical sources, etc.) will not be modified to reference to **Frame B**.

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 (for example, 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:

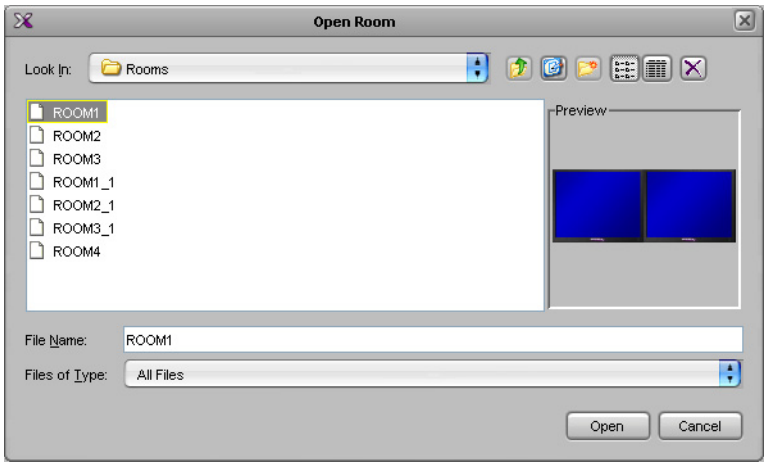
Database Element	Frame A	Frame B	Comments
System configuration	NO	NO	Must be recreated manually, prior to database merge
Peripheral device settings	YES	NO	
External router settings	NO	NO	
Rooms	YES	YES	Duplicate head assignments must be resolved
Layouts	YES	YES	
Full screen layouts	YES	YES	
Full screen 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:

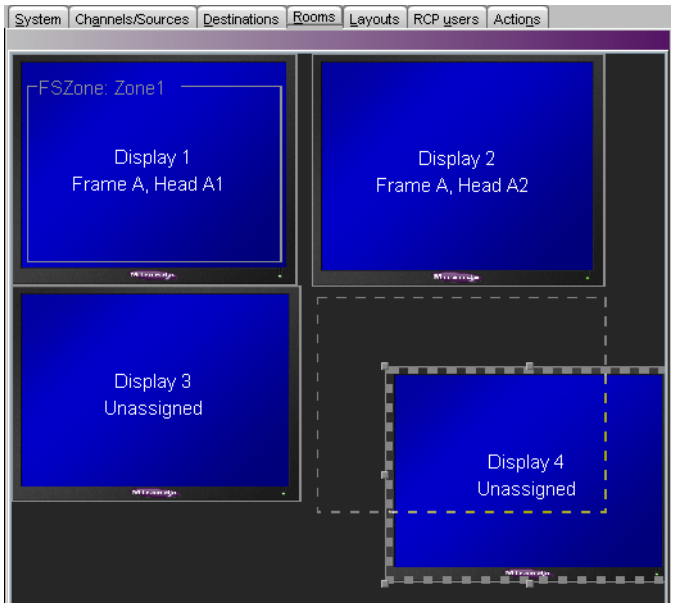
- creating new rooms or modifying existing ones to reflect the new expansion configuration
- resolving duplicate head assignments
- copying old layouts into new expansion ones

To modify a room

1 Open the room you wish to modify.

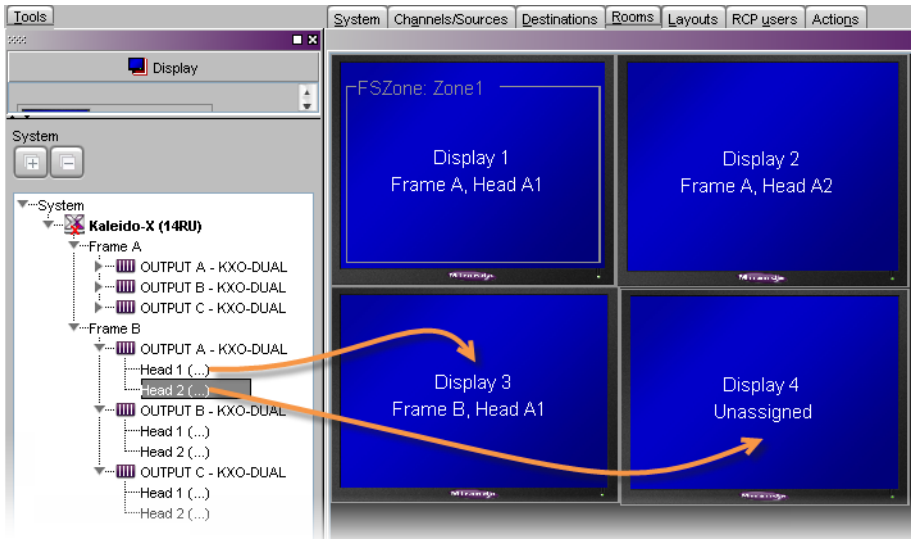


2 As needed, drag one or more new displays into the room.



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.



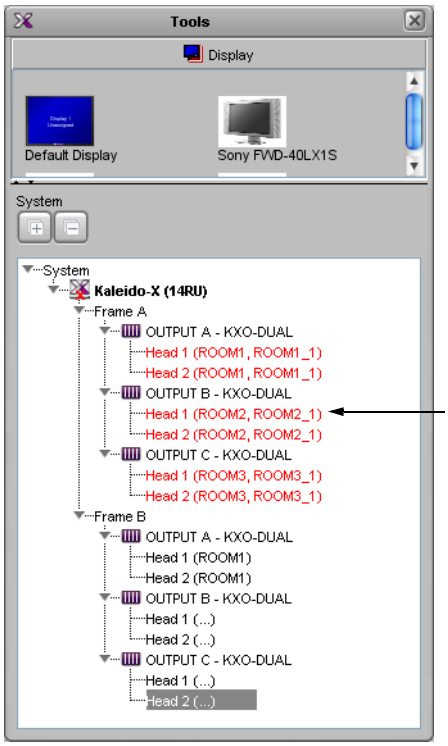
Note: You cannot have two rooms in the expansion configuration that use the same output head. Conflicts will appear in red text in the System list. XEdit will allow you to save such a database, but not to export it to a Kaleido-X. You must first modify or remove pre-expansion rooms that conflict with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

4 Click **Save**.

For more information about managing rooms, see *Managing Rooms,* in the Kaleido Software User's Manual. See Related Documentation, on page 15.

To resolve duplicate head assignments

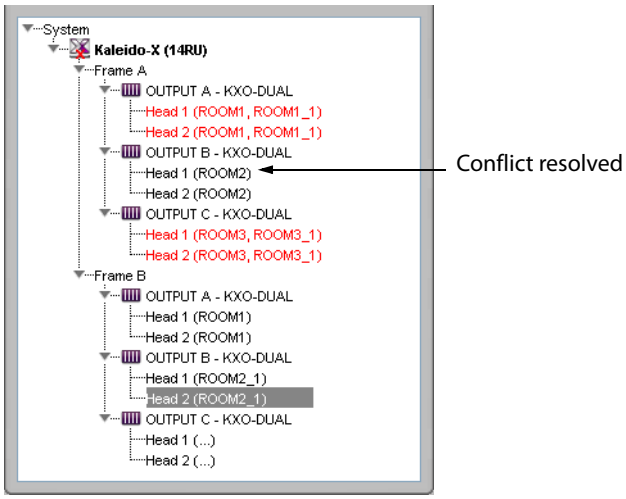
1 Expand the System list in the **Tools** pane. Duplicate head assignments are shown in red text, with the conflicting rooms in parentheses.



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.

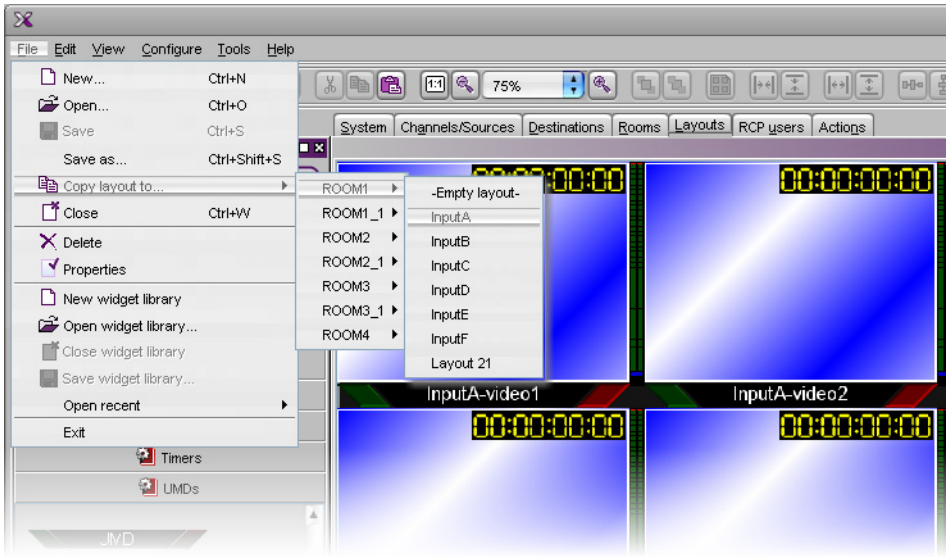


4 Repeat step 2 and step 3 until all duplicated head assignments have been resolved.

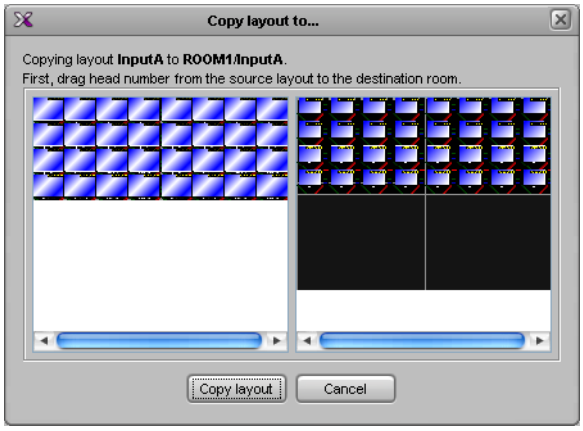
To copy old layouts into new expansion ones

1 Open an existing layout.

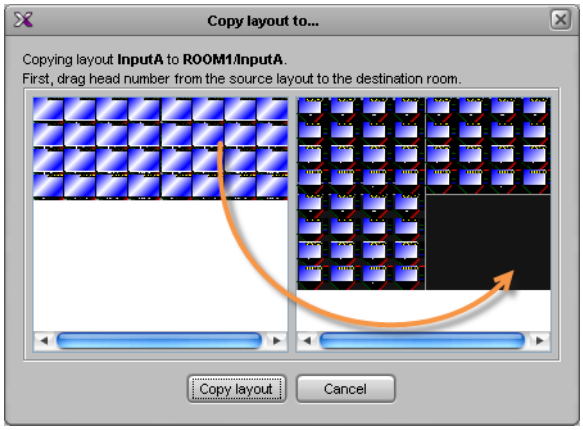
2 On the **File** menu, click **Copy layout to**, specifying a target room and layout.



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 Software User's Manual. See Related Documentation, on page 15.

> 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 the PC has sufficient resources to do so.

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 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**.

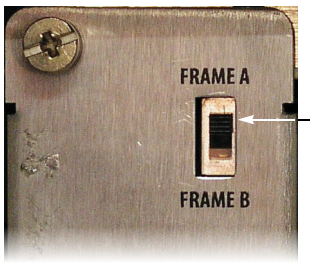
3 Check the pins on the expansion card connectors to make sure they are straight (inserting a card with bent pins can damage the card).

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 161 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.

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

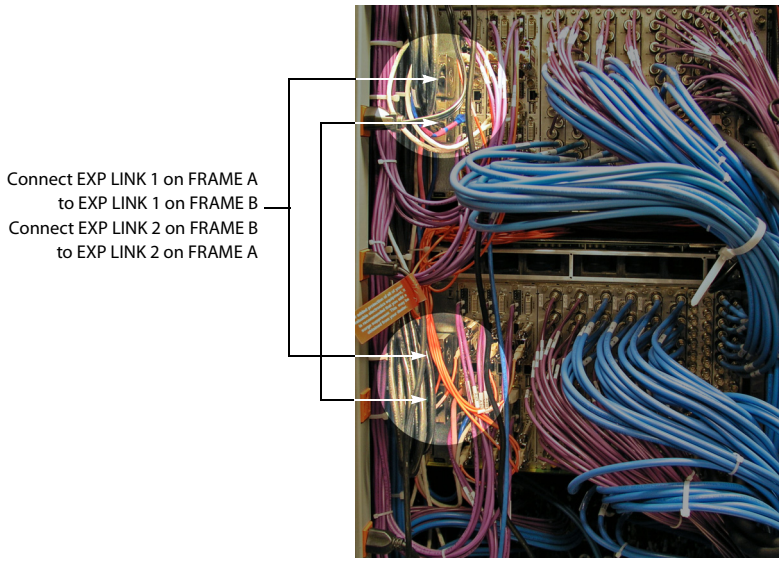


6 Gently but firmly, slide the other expansion card into the slot labelled **OUTPUT D / EXP** of the Kaleido-X that will be designated **Frame B**.

7 Set the **Frame ID** switch on the rear panel to the **Frame B** position.

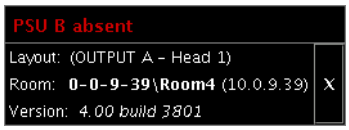
8 Connect the two expansion cards using the expansion cables:

- 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 flashing 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[1] as described in Part B — XAdmin Settings below.

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

Part B — XAdmin Settings

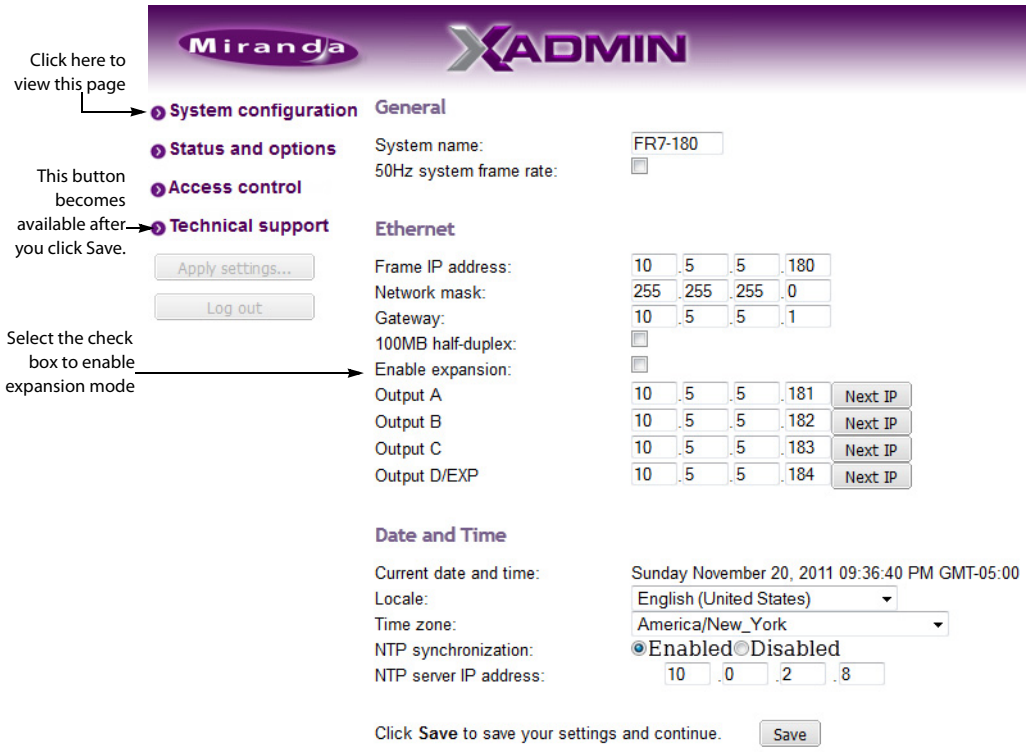
At this point, **Frame A** should be up and running, with all input, output, network and serial cables in position, and **Frame B** should not be rebooted. Prior to expansion, each frame and all KXO cards normally have unique IP addresses. You will now use XAdmin to:

- 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** (see *Opening XAdmin, on page 114*).

2 On the Status and Options page, select **Enable expansion**.

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



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

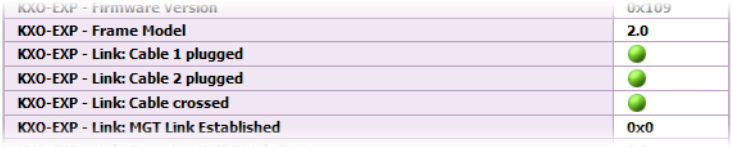
- You may see messages on the monitor wall warning you that KX0 heads are not assigned. This is normal.
- If one or more cards in a Kaleido Multiviewer frame is being upgraded (i.e. if a Live Update is in progress), then it is not possible to apply any changes made in XAdmin. If you click **Apply settings** 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 75).

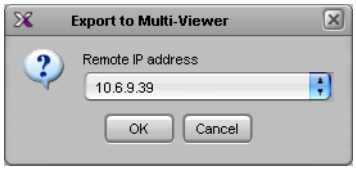
8 Check the frame and card statuses to make sure there are no problems or error conditions. In particular, the **Cable crossed** and **Cable plugged** alarms on the KXO-EXP cards should be normal (green).



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 56).

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 56. It is preferable, in such cases, to designate the new frame as **Frame B**.

Configuring Router Card Expansion

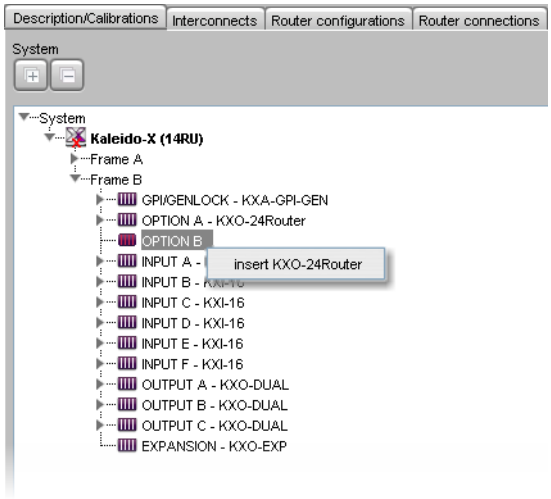
Once two Kaleido-X (7RU) systems are in a Kaleido-X (14RU) expansion configuration, thereby giving you access to any source from either frame in your layouts, their respective router cards are not automatically shared between the system's Frame A and Frame B. To be able to choose a source from one frame 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

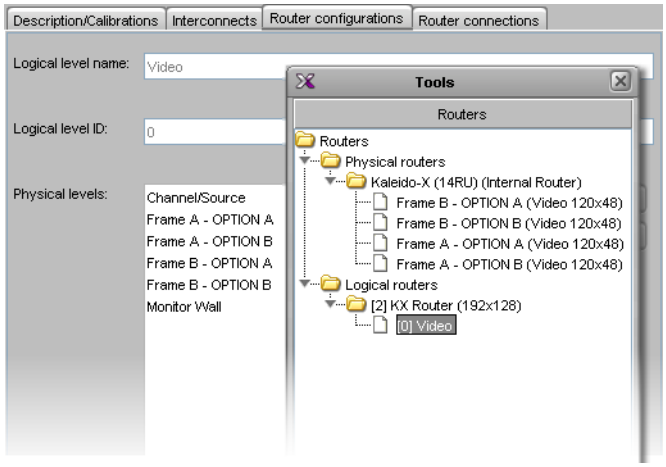
1 Open XEdit and load the database associated with the Kaleido-X expansion system you wish to configure.

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 Software User's Manual; see Related Documentation, on page 15).



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

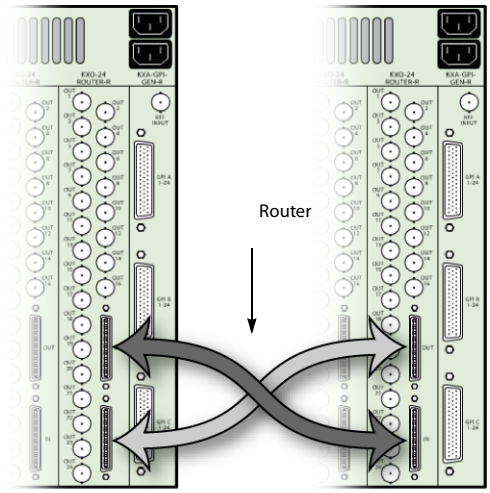
XEdit automatically created one physical router for every router card. In a factory-default configuration, the KX Router logical router also includes all corresponding physical levels in its first logical level.



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 Software User's Manual, for details; see Related Documentation, on page 15).

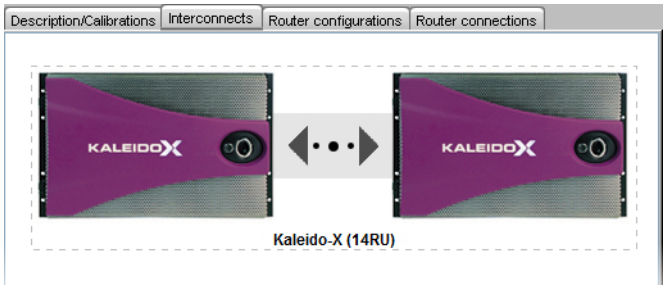
Once you have all router cards from both Kaleido Multiviewer frames covered within the KX Router configuration, some sources still cannot be routed to some destinations,

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).

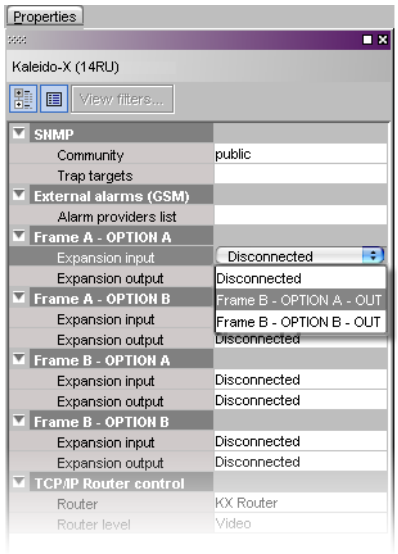


The cabling connections must then be described in XEdit.

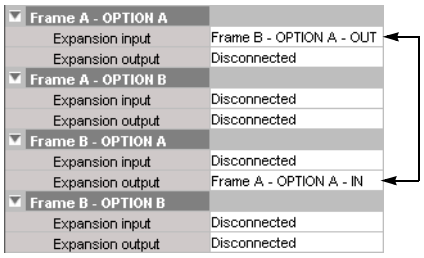
5 Click the **Interconnects** tab, and then click the expansion frame icon.



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 (for example, FRAME A – OPTION A to FRAME B – OPTION A).



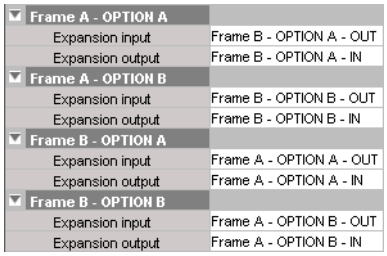
7 For **FRAME A – OPTION A**, click in the white column beside **Expansion input**, and choose the output option that matches your actual cabling connections from the list. A progress window may briefly appear. Note that the corresponding (inverse) settings appear beside the card you connected to.



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 Multiviewer 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 Software User's Manual; see Related Documentation, on page 15). 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, see Recovering an Expansion Frame, on page 78.

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 (see *Opening XAdmin, on page 114*).
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[1] (**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**. (for example, `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**.
(for example, `FrameB_DatabaseBackup.zip`)

9 Export the database to **Frame B**.

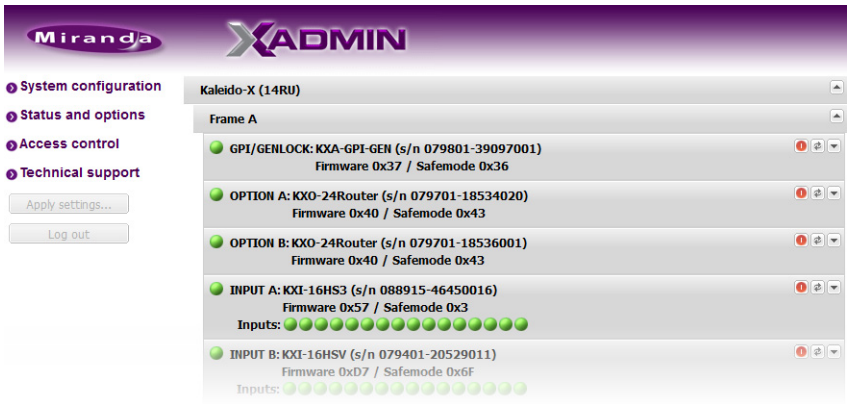
Viewing the Status of an Expansion Frame

To view the status of a Kaleido-X expansion frame

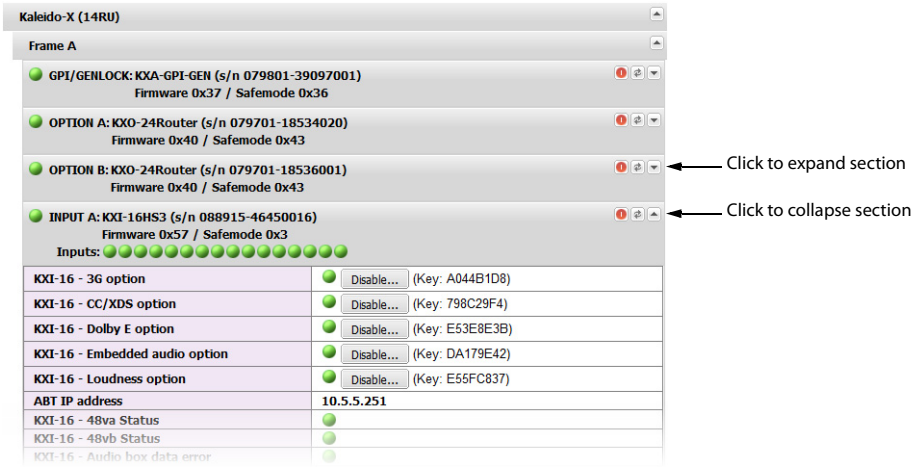
1 Open XAdmin (see *Opening XAdmin, on page 114*).

2 Click **Status and options**.

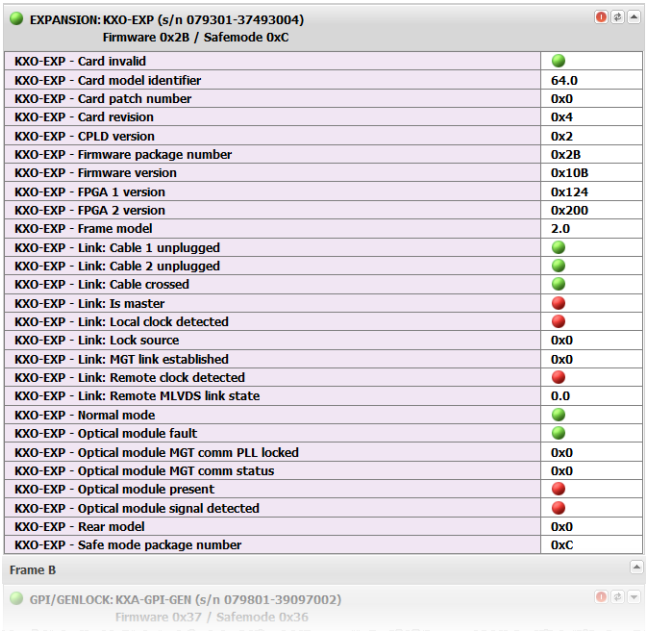
XAdmin collects status information from both frames, and then displays it in a scrolling list, starting with **Frame A**.



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 (for example, 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 in Splitting an Expansion Frame, on page 73, 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 see Recovering From a Failed Downgrade, on page 77.

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 (see Expanding New Kaleido-X Frames, on page 50)

or

- modify/replace the databases so that they correspond to the standalone operation of the frames (refer to the procedures described in If you have existing backup copies of the standalone frames, on page 74).

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 in If you have existing backup copies of the standalone frames, on page 74).

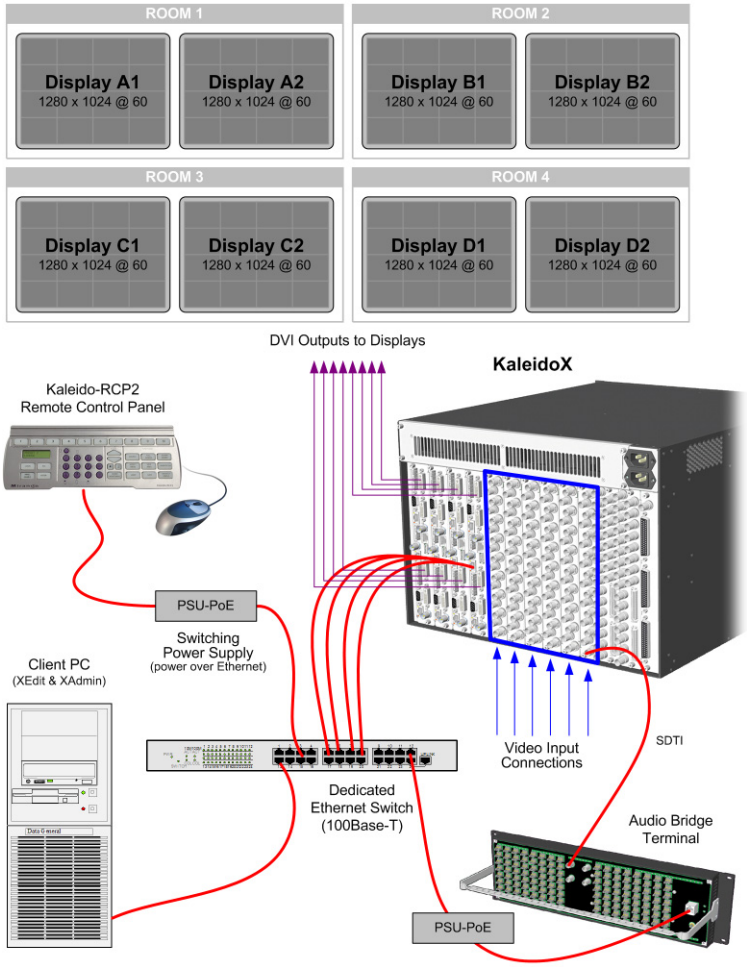
> If the initial condition that caused **Frame A** to fail is resolved, and you wish to return the expansion frame to its original state:
> - Power down both **Frame A** and **Frame B**.
> - Insert the KXO-EXP cards and reconnect the expansion cables.
> - Power up **Frame A** then **Frame B**.

4 Multiviewer Cabling

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

Cabling Diagram

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.



Kaleido-X (7RU) cabling diagram

Signal Connections to the Multiviewer

KXO-Dual Output Rear Panel Connections

HD-SDI Monitoring Output Option

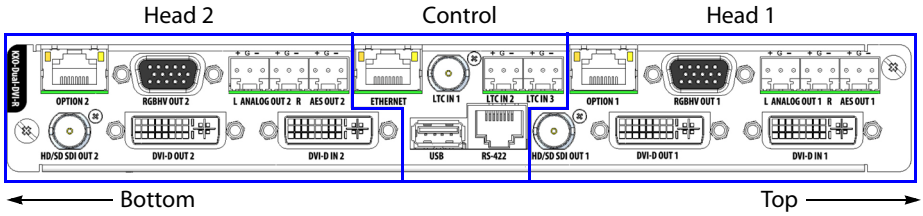
The output cards provide support for HD-SDI monitoring output in 720p, 1080i or 1080p (available with the optional KXO-HDM mezzanine).

- **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 Software User's Manual. See Related Documentation, on page 15, 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*, for details. See Related Documentation, on page 15

Rear Panel Connections

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



When the rear panel is horizontal and you can read the connector labels normally, the connectors located at the right-hand side are the *Head 1* connectors and the connectors located at the left-hand side are the *Head 2* connectors

The following table lists the function of each output head connector.

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
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

Connector label		Connector type	Function
Head 1	Head 2		
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	For future use

Control

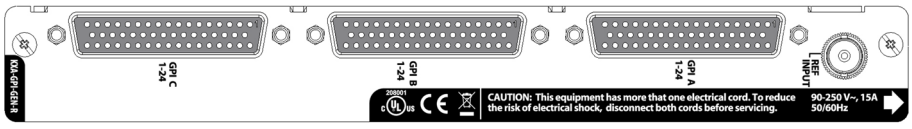
The connectors located in the middle of the rear panel are *control* connectors. The following table lists the purpose of each control connector.

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 Kaleido 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. Grass Valley supplies two adapter models, correctly wired for this application: a straight adapter (part no. 1737-3000-102), and a crossover adapter (part no. 1792-3700-100). See RS-422 Connection Diagram, on page 214 for the RS-422 pinout specification.

GPI/Genlock 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.



Bottom of panel ← → Top of panel

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: • 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

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:

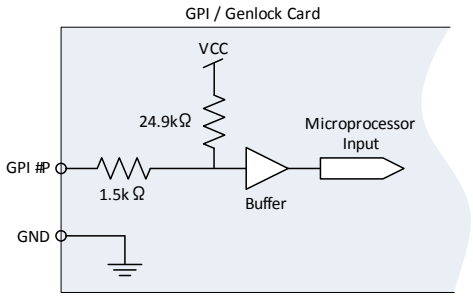
Pinout for GPI A, GPI B and GPI C connectors

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	22N	11	7N	21	20P	31	5P	41	15N
2	22P	12	7P	22	17N	32	2N	42	15P
3	19N	13	4N	23	17P	33	2P	43	12N
4	19P	14	4P	24	14N	34	GND	44	12P
5	16N	15	1N	25	14P	35	24N	45	9N
6	16P	16	1P	26	11N	36	24P	46	9P
7	13N	17	GND	27	11P	37	21N	47	6N
8	13P	18	23N	28	8N	38	21P	48	6P
9	10N	19	23P	29	8P	39	18N	49	3N
10	10P	20	20N	30	5N	40	18P	50	3P

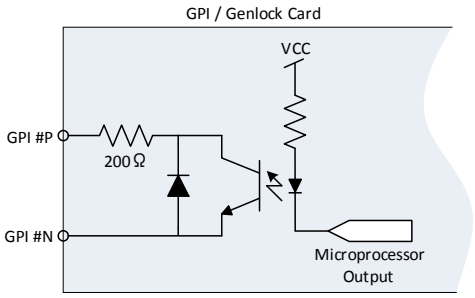
Signal polarity: *N* = Negative; *P* = Positive

GPI Circuits

The individual GPI contacts can be configured as either inputs or outputs. See KXA-GPI-GEN, on page 209 for input / output electrical requirements and specifications. For interfacing purposes, the card's internal input and output equivalent circuits are as shown in the following diagrams:



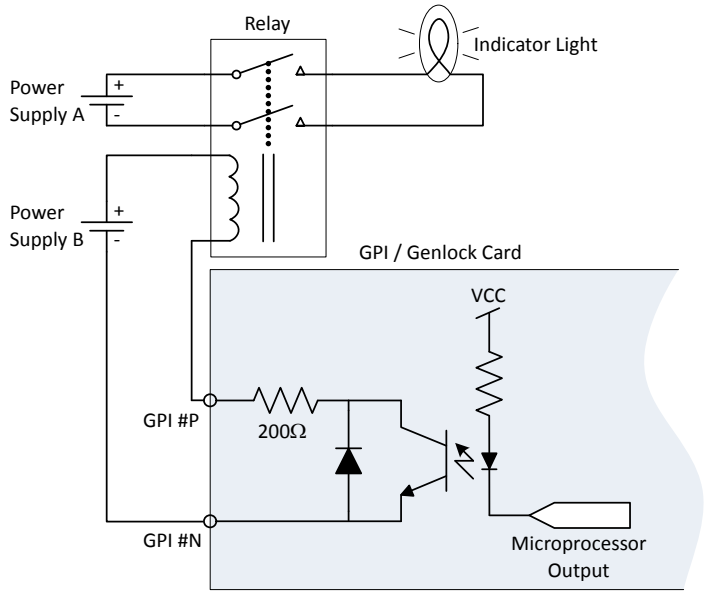
GPI configured as INPUT



GPI configured as OUTPUT

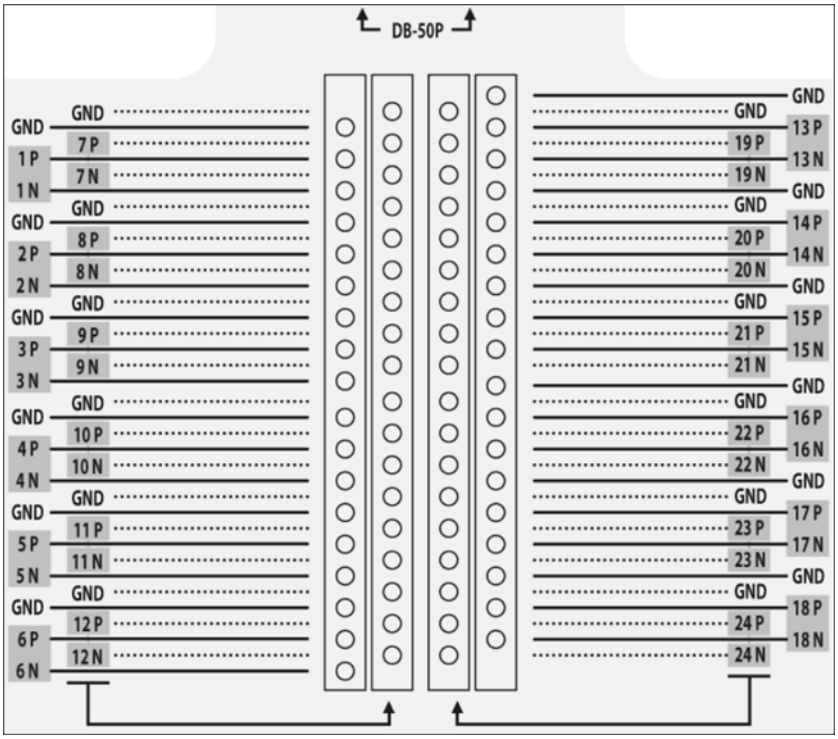
In the following example, the goal is to trigger a relay and light up a light.

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



To facilitate cabling of the GPI inputs and outputs, a terminal block adapter is available separately (order code 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.

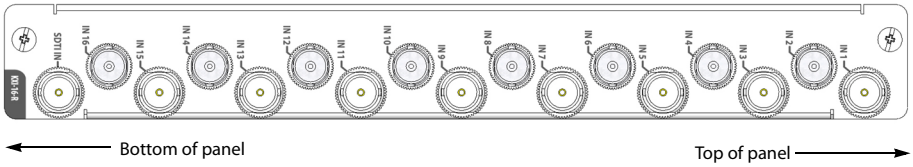
- For GPI outputs, terminals identified as N and P are used only.
- For GPI inputs, terminals identified as GND and P are used only.



P = Positive, N = Negative, GND = Ground

KXI-16 Input Rear Panel Connections

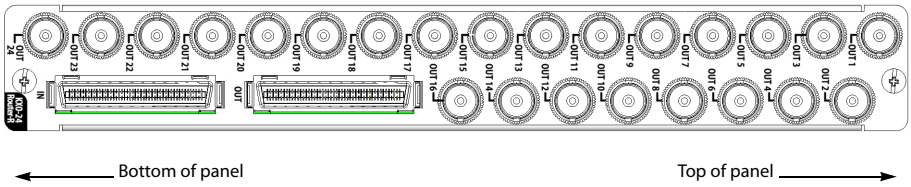
The connectors located on the KXI-16-R rear panel are shown in the diagram and described in the table below.



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 (for example, with an Audio Bridge Terminal (ABT), this connect to the ABT's SDTI OUTPUT connector. See Configuring an Audio Bridge Terminal, on page 145).

KXO-24Router-R Rear Panel Connections

External connections to the KXO-24Router card are made through connectors mounted on the KXO-24Router-R rear panel. 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

Commissioning the Multiviewer

To interconnect the multiviewer with its related equipment

1 Connect the multiviewer's outputs to your displays. See Cabling Diagram, on page 81.

The Kaleido-X has been configured to automatically detect the resolution of any connected display. If the multiviewer is not able to automatically detect the display's resolution, then the fall-back resolution of 1280 × 1024 @ 60 Hz is used.

- **Monitor wall displays:** Connect the multiviewer's DVI-D OUT outputs to the displays.
- **Broadcast monitors:** If your installation involves broadcast monitors, connect them to the appropriate SDI outputs. It is also possible to connect SDI outputs to a router. Refer to *Configuring the HD-SDI Monitoring Output Format,* in the Kaleido Software User's Manual; see Related Documentation, on page 15, for instructions on setting the scan format.

If you wish to use a different resolution, see Changing the Mosaic Output Resolution, on page 90, for detailed instructions.

2 Connect one or more video sources to the multiviewer's inputs (see Cabling Diagram, on page 81).

3 Make the network and other connections as shown in the cabling diagram (see Cabling Diagram, on page 81). Connect a client PC, the Kaleido-RCP2, one or more Audio Bridge Terminals, and every output module to a dedicated 100Base-T Ethernet switch (powered up). You can also connect a mouse and a keyboard to your Kaleido-RCP2.

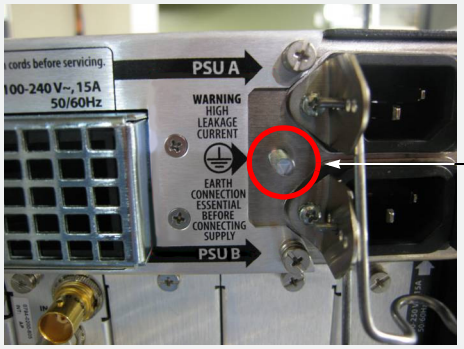
Notes

- The Kaleido-RCP2, and Audio Bridge Terminal (ABT) are optional devices, and may not have been shipped with your Kaleido-X (7RU) system. For information on these and other Kaleido-X options, contact your Grass Valley sales representative.
- You may need to upgrade your Audio Bridge Terminal and Kaleido-RCP2 devices (if available) to the latest firmware. See Software and Firmware Updates, on page 16. Refer to the *Kaleido-RCP2 Guide to Installation and Operation*, and to the *Audio Bridge Terminal Guide to Installation and Operation* for instructions on how to determine the firmware level, and how to perform the upgrade for these devices. See Related Documentation, on page 15.
- All equipment in the audio path (for example, ABT, multiviewer, audio source) must use the same reference source.

Powering Up the Multiviewer

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.

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.

To power up the Kaleido-X:

1 Once the multiviewer is installed in its designated rack position, and before powering up the unit, verify that each card is securely seated in its slot.

2 Plug both power cords from the Kaleido-X into a grounded power outlet.

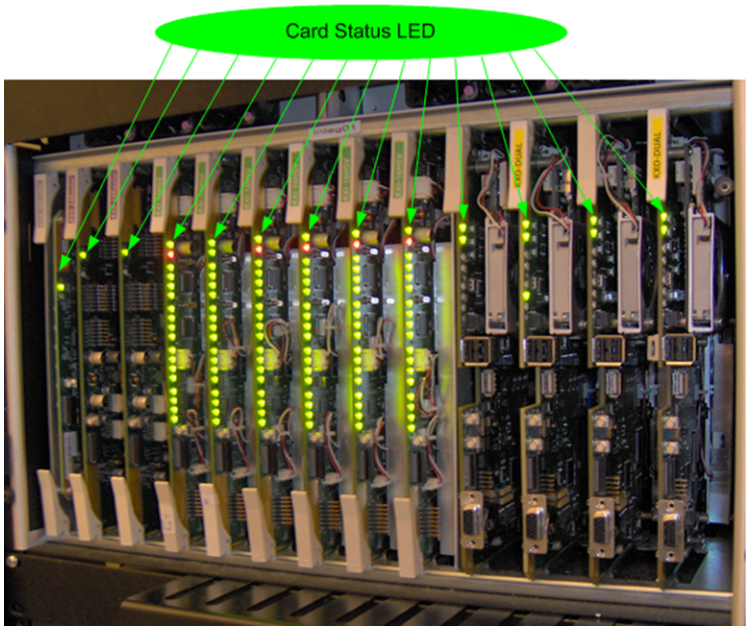
Note: The Kaleido-X (7RU) does not have power switches, and will start up as soon as it is plugged in.

The startup sequence takes approximately four minutes, during which time some video may appear on the displays. The startup is completed when the CPU LEDs of the output cards (second LED from the top) are solid green.

Verifying that the Cards are Ready

To verify that the cards (modules) are ready:

- Check the status LEDs on each card installed in the Kaleido-X frame. Make sure that none are indicating an error condition (see table below).



Photograph of a Kaleido-X (7RU) frame showing LED indicators on modules.

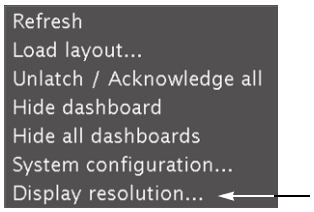
CPU LED Color	Card Status	Action Required
Solid green	Ready	None
Red	Fault	Verify that the card is securely seated in the proper slot in the frame. If status remains unchanged, remove the card, reseat it and then reboot.
Flashing green	Rebooting	Wait for card to reboot before starting operations.

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

Changing the Mosaic Output Resolution

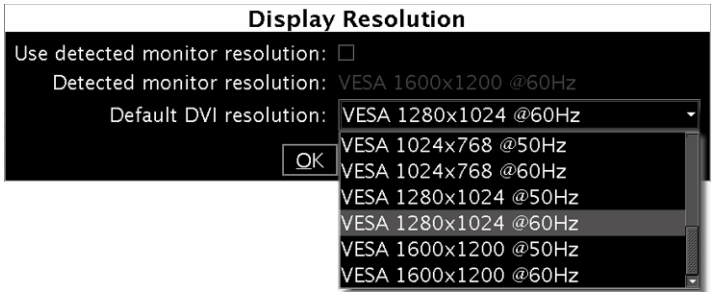
To set a display's output resolution from the monitor wall:

1. Connect a mouse to an output card's USB connector. See Troubleshooting with the card's front edge USB connector, on page 180.
2. Right-click anywhere on the monitor wall, point to **Monitor wall** (if you clicked a monitor), and then click **Display resolution**:



The **Display Resolution** window appears:

- If you would like the system to automatically select a resolution based on information from the connected display, select **Use detected monitor resolution**.
- If you would like to manually set the resolution, select the desired resolution from the **Default DVI resolution** list:



3 Click **OK**.

The output resolution is adjusted accordingly.

Enabling EDID Auto-Detection from the Monitor Wall

Notes

- The monitor EDID auto-detection feature is enabled by default in order to facilitate the initial setup of a Kaleido Software system. Setting an output head to a specific resolution, from the monitor wall disables the EDID auto-detection for this head.

To enable EDID auto-detect for a display

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

2 Select the **Use detected monitor resolution** check box.

3 Click **OK**.

5 IP Network Setup

This chapter explains how to implement IP network connectivity with the multiviewer.

Networking Essentials

The following network prerequisites must be met:

- Any multiviewer you wish to configure or access by using XEdit or XAdmin must be connected to an Ethernet switch.
- A client workstation must be connected to the LAN or Ethernet switch to access the multiviewer by using XAdmin or XEdit.
- The Ethernet switch must support 100 Mbps full-duplex connections. In the case of a Kaleido-IP multiviewer, the Ethernet switch associated with the *data* network should support 1000 Mbps full-duplex.
- The port on the Ethernet switch to which the multiviewer is connected should be configured to auto-negotiate. By default, multiviewers have their Ethernet ports set to auto-negotiate. If a switch does not support auto-negotiation, the recommended settings are 100 Mbps, full-duplex.

Assigning an IP Address to Each Device in your System

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

- Assigning an IP address, and specifying the appropriate network mask, gateway address, and a system name for each multiviewer. See Setting the Multiviewer's IP addresses, on page 93.
- Configuring the RCP-200, if available. See Configuring the RCP-200, on page 138.
- Configuring the Kaleido-RCP2, if available. See Configuring the Kaleido-RCP2, on page 142.
- Configuring the Audio Bridge Terminal (ABT), if available. See Configuring an Audio Bridge Terminal, on page 145.

Setting the Multiviewer's IP addresses

For the Kaleido-X unit to join a TCP/IP network, it must be configured with an IP address, a network mask, a gateway, and a system name. In addition, a client PC must be configured to communicate with the Kaleido-X (see Configuring a Client PC to Configure an ABT's Network Settings, on page 146).

The Kaleido-X is shipped with the following default settings:

	Kaleido-X (7 RU)	Kaleido-X (14 RU)	14RU (expansion)
Frame IP address	10.0.3.70	10.0.3.70	10.0.3.70
Network mask	255.255.0.0	255.255.0.0	255.255.0.0
Gateway	10.0.0.1	10.0.0.1	10.0.0.1
Output A	10.0.3.66	10.0.3.66	10.0.3.66
Output B	10.0.3.67	10.0.3.67	10.0.3.67
Output C	10.0.3.68	10.0.3.68	10.0.3.68
Output D/EXP	10.0.3.69	—	—
Output A (frame B)	—	10.0.3.61	10.0.3.61
Output B (frame B)	—	10.0.3.62	10.0.3.62
Output C (frame B)	—	10.0.3.63	10.0.3.63

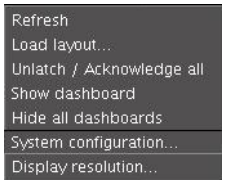
Note: If the IP address of the Kaleido-X has been changed (i.e. it no longer corresponds to the as-shipped configuration), it is still possible to determine the IP address. To determine the IP address of your Kaleido-X, see Verifying the System IP Address, System Name, and Application Version, on page 160.

Changing the IP Address of a Kaleido-X from the Monitor Wall

The IP address, system name, and other parameters can be set via a control panel on the monitor wall.

To change the IP address of the Kaleido-X from the monitor wall:

1. Connect a mouse to the USB connector of an output card.
2. Connect a USB keyboard to the USB connector of an output card.
3. Right-click anywhere on the monitor wall, point to **Monitor wall** (if you clicked a monitor), and then click **System configuration**.



   The **System Configuration** window appears.
4. Click the **Ethernet** tab.
5. Type the required Frame IP address, network mask, and gateway address in the appropriate boxes.
6. Type the required addresses for all outputs.
7. Click **OK**.
8. When prompted to restart the system to apply your changes, click **Yes**.

   The new configuration will become effective once the system restart has completed.

Network Considerations

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

TCP/UDP Port Usage

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

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

From client to multiviewer

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

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

From multiviewer to client

Port	Used for	Transport	Notes
1024–5000[1] 49152-65535[2]	Java RMI	TCP	Remote Method Invocation (client/server communication). Dynamic Allocation of ports. Required for communication between client and Application Server.

1. For Windows XP and earlier
2. For Windows 7 and later

From multiviewer to multiviewer

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

Port	Used for	Transport	Notes
22	SSH	TCP	Secure Shell Login is required to login to a multiviewer for maintenance.
4160	Java Jini	TCP	Responsible for discovery and communications between devices/services on a network.
8080	HTTP	TCP	
8082		TCP	Internal communication
8083		TCP	Internal communication
8084		TCP	Internal communication
8085		TCP	Internal communication
8086		TCP	Internal communication
8087		TCP	Used for debugging purposes
8090		TCP	Web service
32769		TCP	filenet-rpc
5120		UDP	On multicast 230.8.8.9 for RCP2
7572		UDP	On multicast 230.8.8.8 for “keep-alive” (heartbeat)
7571		UDP	For “keep-alive” (heartbeat)
5100	Densité	TCP	Internal communication within a Kaleido-MX, Kaleido-MX 4K, or Kaleido-Modular-X multiviewer system; communication with modules housed in a Densité frame.

From iControl to multiviewer

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

Between multiviewer and remote control panel

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

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

From multiviewer to peripheral devices

Port	Used for	Transport	Notes
25	SMTP	TCP	Simple Mail Transfer Protocol, for e-mail alerts.
8851	Alpermann+Velte	TCP	Used to obtain information from Plura (Alpermann+Velte) Studio Production Timer (SPT) systems.
5100	GPI-1501	TCP	Used to obtain information from GPI-1501 General Purpose Interface I/O modules.[1]
8910[2]	TSL (network)	TCP	Used to obtain information from TSL devices that use the TSL UMD version 5.0 protocol.

1. See also: From multiviewer to multiviewer, on page 96.
2. Configurable.

From peripheral devices to multiviewer

The following ports must be open on peripheral devices (for example, router controllers):

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

Router drivers also use default ports:

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

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

Between multiviewer and SNMP managers

Port	Used for	Transport	Notes
161	SNMP	UDP	Used for SNMP (Simple Network Management Protocol) communications between external SNMP managers and a multiviewer (for example, sending get, get-next, and set messages to a multiviewer's SNMP agent, and receiving the response).
1161		UDP	Used for SNMP (Simple Network Management Protocol) communications between external SNMP managers and a *Kaleido-IP* multiviewer (for example, sending get, get-next, and set messages to a multiviewer's SNMP agent, and receiving the response).

Between multiviewer and NTP server

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

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

Network Considerations for a Multiviewer Cluster

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

- If you change the system name or IP address of a cluster member while another cluster member is offline or otherwise unavailable, the cluster's integrity will be broken. If you attempt to make such a change, XEdit will alert you of the situation, prompting you to cancel the operation and try again later, when all cluster members are available. However, in the advent that such a change was made by mistake, or that it as been forced for some reason, you will have to repair the broken cluster (see "Repairing a Cluster System" in the Kaleido Software User's Manual). See Related Documentation, on page 15.
- To maintain the integrity of a cluster configuration, such changes must be made by using the system configuration features available in XAdmin.

6 System Configuration

This chapter shows you the various maintenance operations and corrective actions that maybe required to be performed during system commissioning and over the multiviewer's lifetime.

System Requirements for a Client PC

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

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

Multiviewer Model Representation in XEdit and XAdmin

The name used to represent a multiviewer model is shown in the table below.

In XEdit or XAdmin Select	To represent
Kaleido-X (7RU)	A Kaleido-X (7RU) frame
Kaleido-X (14RU)	A Kaleido-X (14RU) frame

Installing Kaleido Software Client Applications

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

- XEdit is a client application used to create layouts for the monitor wall, and to configure your multiviewer system, from your PC. When this PC has network connectivity to the multiviewer, you can use XEdit to modify layouts and settings directly on the multiviewer, or you can work locally on the computer and then export your changes to the multiviewer.
- If you have only one multiviewer (or if you have more than one but you intend to always have the same version of the Kaleido Software on all of them), download the XEdit installer file from the multiviewer's home page. Whenever you install a new version of the Kaleido Software on the multiviewer, the next time you open XEdit, your copy of the application will be automatically updated from the multiviewer. See Installing XEdit from your Multiviewer's Home Page on page 102.

- The Router Control Software Single Bus and Matrix View applications (also part of the iRouter Router Control Software packaged with iControl Application Servers) can be used to control your multiviewer's logical sources and monitor wall destinations, via the *KX Router* logical router, or to control other logical routers configured within your multiviewer system. See Installing Router Control on page 107.
- Signal Path Viewer opens as a standalone panel, updated in real time, showing assignment information between router sources and multiviewer inputs. Signal Path Viewer is not used with Kaleido-IP. See Installing Signal Path Viewer on page 110.

Installing XEdit from your Multiviewer's Home Page

To install XEdit from your multiviewer's home page

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

The multiviewer's home page appears.

2 Click the **XEdit** button.

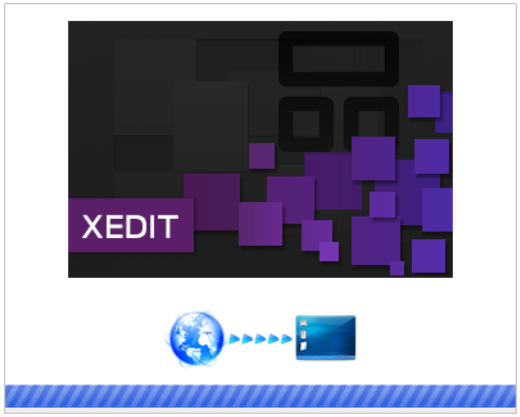
The browser prompts you to save an executable file to your hard drive (`Kaleido-windows32-online.exe`[1]). This file is an online installer, which will download XEdit and other companion elements from your multiviewer, and install them. Some browsers may allow you to run the file directly. Depending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

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

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

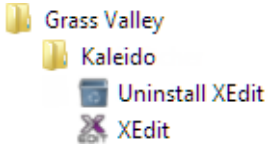
A window appears, showing the download and installation progress.

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

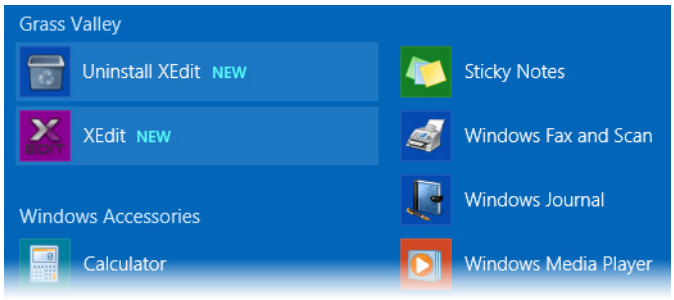


At the end of the installation process:

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



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

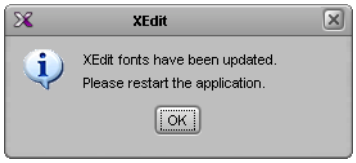


Once the installation has completed, the XEdit startup screen appears.

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

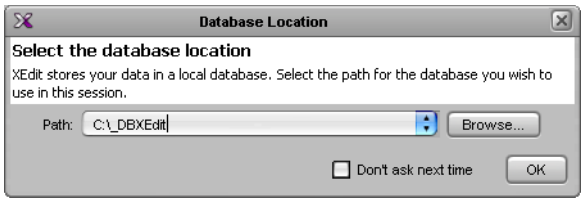
- Click **Allow access** to unblock the application.

If XEdit cannot find all of the fonts it needs already on your PC or laptop, it downloads them from the multiviewer automatically, in which case a message will appear to confirm the font update, and instruct you to restart the application.

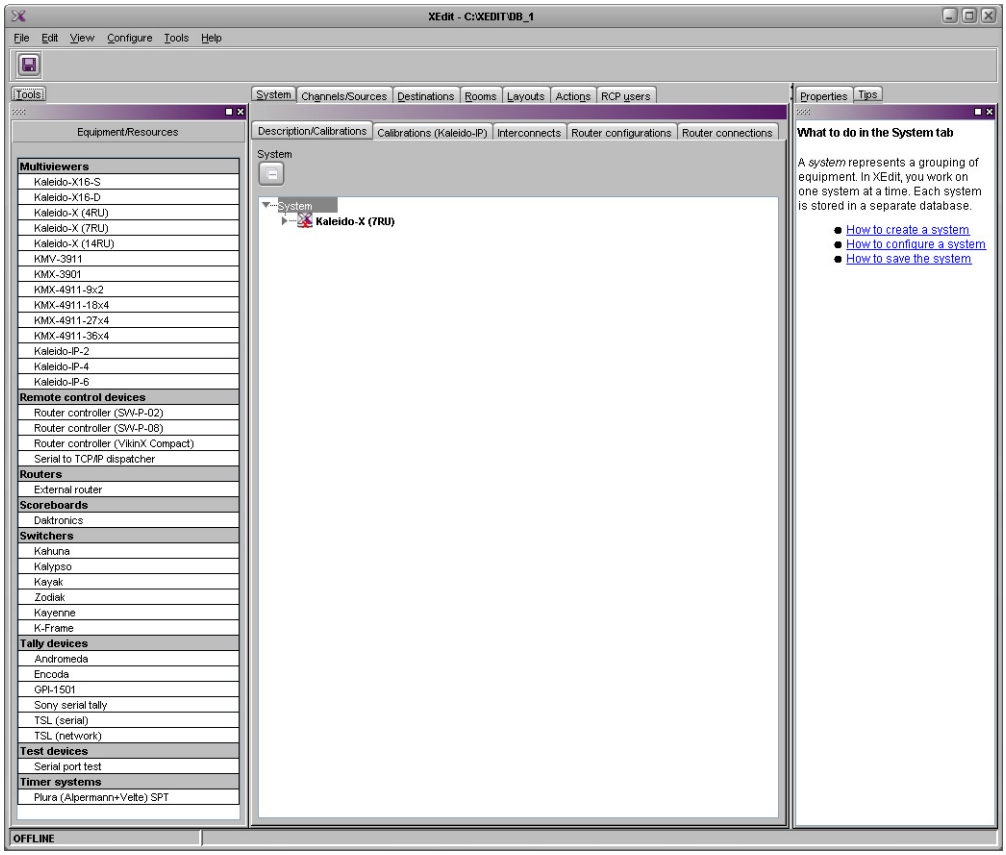


- Click **OK** to continue, and then open XEdit again, by using the shortcut on your desktop, in your Apps view (Windows 8.1) or Start screen (Windows 8), or from the Start menu (Windows 7, Windows 10).

4 When prompted to specify a database, choose one from the **Path** list, or click **Browse** to navigate to the database you wish to use as your local workspace, and then click **OK**.



Once the database has completed loading, XEdit's main application window appears.



> Note: Once it has been installed from the multiviewer, XEdit remains on your PC or laptop, and can be launched from the XEDIT shortcut that was added to your desktop, Apps view, or Start screen (see page 103), or from the Start menu. Whenever you install a new version of the Kaleido Software on the multiviewer, the next time you open XEdit, your installed copy of the application will be automatically updated from the multiviewer.

For more information about calibrating your system, configuring rooms, creating layouts, and operating the monitor wall, refer to the *Kaleido Software User's Manual*. See Related Documentation, on page 15.

Uninstalling XEdit

With recent versions of XEdit, an uninstall program is available from the Windows Start menu. See Uninstalling XEdit (Dynamic Version 7.20 or Later), on page 106.

If you have been using XEdit versions *earlier* than 7.20 you may want to uninstall them, by clearing the Java cache, on your PC or laptop. See Uninstalling XEdit (Version 7.11 or Earlier) on page 106.

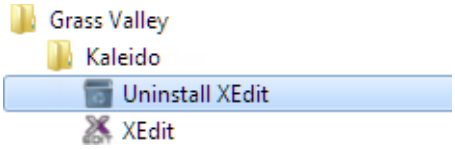
Uninstalling XEdit (Dynamic Version 7.20 or Later)

To uninstall XEdit (dynamic version 7.20 or later)

1 Close all XEdit windows you may have open.

2 Locate the **Uninstall XEdit** shortcut.

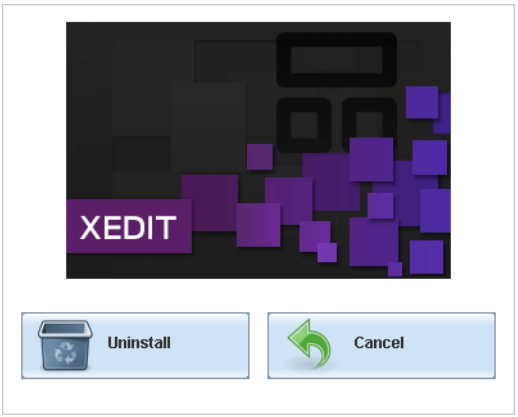
- If you have Windows 7, or Windows 10: Open the Start menu, click **All Programs**, scroll to the **Grass Valley** (or **Miranda Technologies**[1]) folder, and then expand the **Kaleido** folder.



- If you have Windows 8.1, or Windows 8: Switch to the App view or your Start screen.

3 Click **Uninstall XEdit**.

An uninstall screen appears.



4 Click **Uninstall**.

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

Uninstalling XEdit (Version 7.11 or Earlier)

To uninstall XEdit (version 7.11 or earlier)

1 Close all Java applications you may have open.

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

Java Control Panel opens.

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

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

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

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

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

Installing Router Control

To install Router Control from your multiviewer's home page

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

The multiviewer's home page appears.

2 Click the **Router Control** button.

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

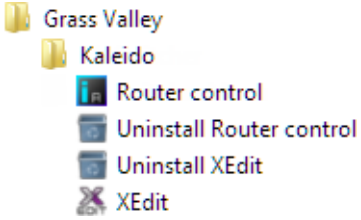
3 Unless your browser let you run the file (and you chose to do so), navigate to the location were you saved the installer file and open it.

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

A window appears, showing the download and installation progress.

At the end of the installation process:

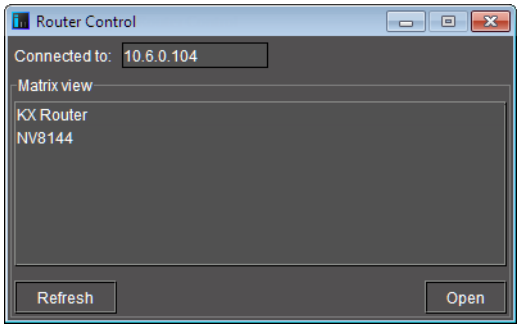
- If you have Windows 7, or Windows 10, shortcuts ( ) are added to your desktop and to the Start menu (under **All Programs**).



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

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

Once the installation has completed, the Router Control main application window appears. The application automatically connects to your multiviewer. The main window lists all logical routers configured within your multiviewer system, in addition to the *KX Router* logical router.

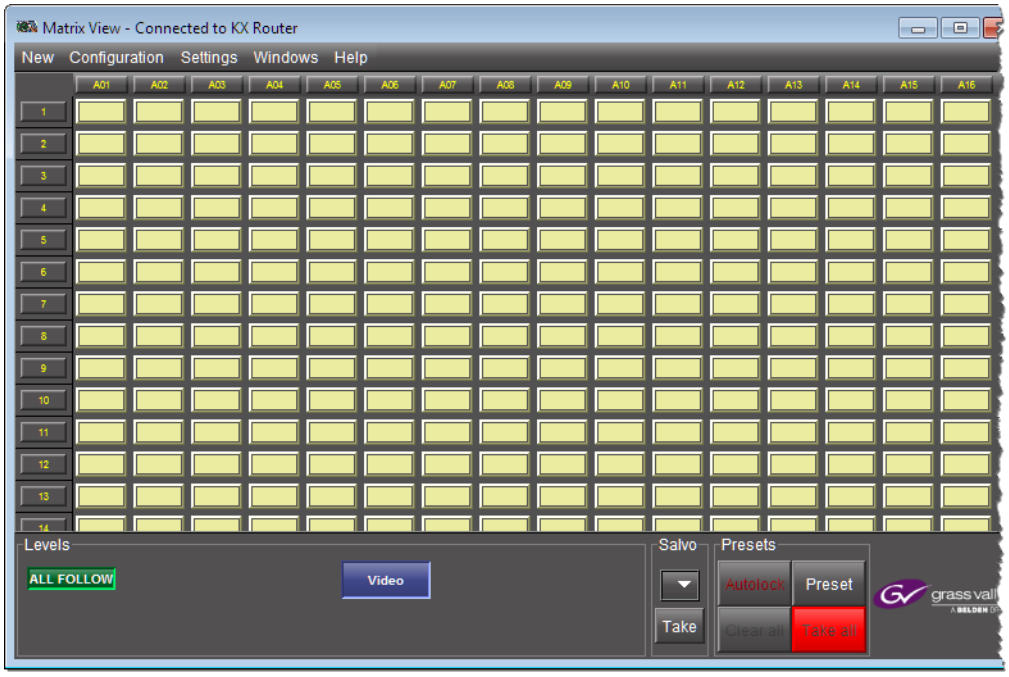


4 In **Router Control**, click the router you want to control, and then click **Open**.

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

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

The Matrix View application window opens.



On the **Help** menu, click **Help** to access the online documentation, or refer to the *iControl Router User Guide.* See Related Documentation, on page 15.

Notes

- Once it has been installed from the multiviewer, Router Control remains on your PC or laptop, and can be launched from the shortcut that was added to your desktop, Apps view, Start screen (see page 107), or from the Start menu. Whenever you install a new version of the Kaleido Software on the multiviewer, the next time you open Router Control, your installed copy of the application will be automatically updated from the multiviewer.
- Router Control can also connect to other Kaleido multiviewers or iControl Application Servers, and control their routers.
- Routers configured within a Kaleido multiviewer system are compatible with the Router Control modules packaged with iControl Application Servers version 6.10 and later.
- When Router Control is connected to an Application Server, a router manager configuration application is available from the main application window. When Router Control is connected to a Kaleido multiviewer, this router manager configuration application is not available (router configuration is performed with XEdit, in this case).

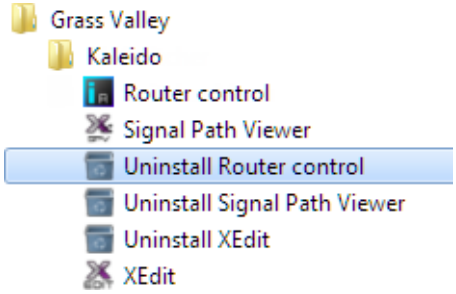
Uninstalling Router Control

To uninstall Router Control

1 Close all Router Control windows you may have open.

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

- If you have Windows 7, or Windows 10: Open the Start menu, click All Programs, scroll to the Grass Valley folder, and then expand the Kaleido folder.



- If you have Windows 8.1, or Windows 8: Switch to the App view or your Start screen.

3 Click **Uninstall Router Control**.

An uninstall screen appears.

4 Click **Uninstall**.

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

Installing Signal Path Viewer

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

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

The multiviewer's home page appears.

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

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

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

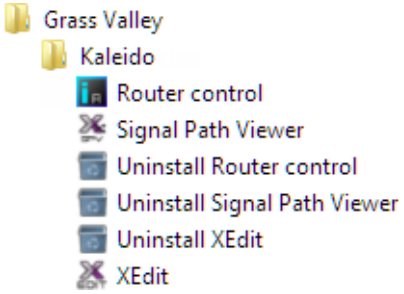
More security warnings or prompts may appear, which you may safely dismiss or accept.

A window appears, showing the download and installation progress.

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

At the end of the installation process:

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

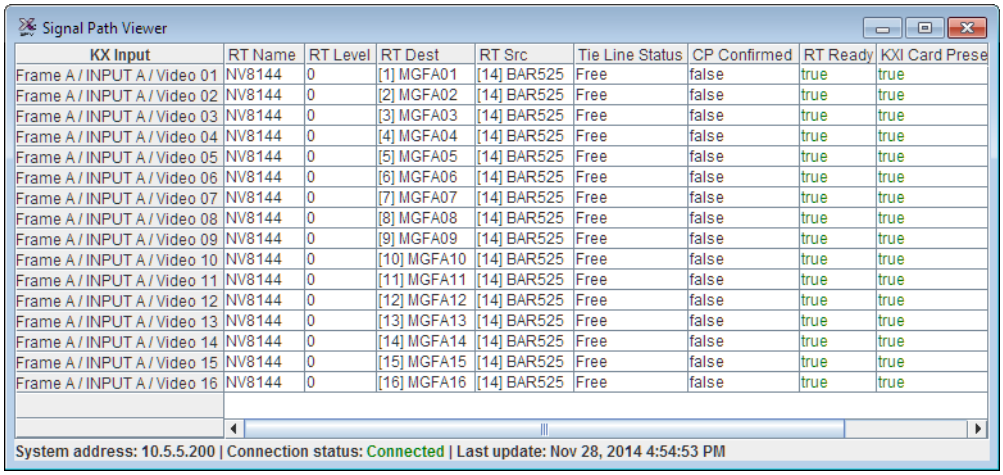


- If you have Windows 8.1, or Windows 8, Signal Path Viewer will appear on your desktop, in the Apps view with all the other installed applications on your PC (Windows 8.1), or in your Start screen (Windows 8).

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

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

The application automatically connects to your multiviewer.



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

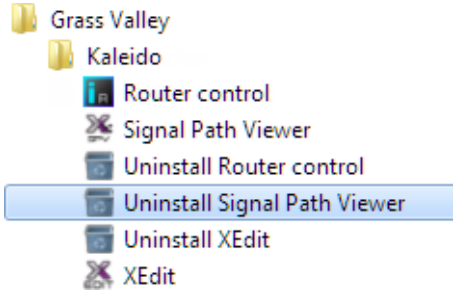
Notes

- Once it has been installed from the multiviewer, Signal Path Viewer remains on your PC or laptop, and can be launched from the shortcut that was added to your desktop, Apps view, Start screen (see page 111), or from the Start menu. Whenever you install a new version of the Kaleido Software on the multiviewer, the next time you open Signal Path Viewer, your installed copy of the application will be automatically updated from the multiviewer.
- Should you need Signal Path Viewer to connect to a different multiviewer, then you must install it again, from the other multiviewer's home page.
- If you remove or re-install output cards, Signal Path Viewer may stop displaying real-time updates, in which case close the application and then open it again (see Opening Signal Path Viewer on page 131).

Uninstalling Signal Path Viewer

To uninstall Signal Path Viewer

1. Close all Signal Path Viewer windows you may have open.
2. Locate the **Uninstall Signal Path Viewer** shortcut.
   - If you have Windows 7, or Windows 10: Open the Start menu, click All Programs, scroll to the Grass Valley folder, and then expand the Kaleido folder.



   - If you have Windows 8.1, or Windows 8: Switch to the App view or your Start screen.
3. Click **Uninstall Signal Path Viewer**.

   An uninstall screen appears.

4 Click **Uninstall**.

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

Opening XAdmin

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

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

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

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

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

Under this circumstance, proceed as follows.

- There is no compatibility problem if only the patch revision number is different between the Kaleido Software version on the multiviewer and the XEdit version on your PC. Click **Yes** to the Software Version Check screen.
- There is a compatibility problem if the major version, minor version, or both are different between the Kaleido Software version on the multiviewer and the XEdit version on your PC. The solution is to downgrade / upgrade the XEdit version used on your PC to the Kaleido Software version used by the multiviewer. Proceed as follows:
  - Click **No** to the Software Version Check screen.
  - Unistall XEdit from your PC (see Uninstalling XEdit, on page 105).
  - Install XEdit from the multiviewer (see Installing XEdit from your Multiviewer's Home Page, on page 102).

If you regularly connect to different multiviewer systems that use different Kaleido Software versions, and as a result you receive the Software Version Check error message, the best solution to avoid this is to upgrade all of your multiviewer systems to the same Kaleido Software version.

Ways to Access XAdmin

Access the XAdmin Web client as follows:

- from a **Web browser** (see Opening XAdmin from a Browser on page 115),
- from **XEdit** (see Opening XAdmin from XEdit on page 116),

The first time you access XAdmin for a multiviewer (and every time the multiviewer's IP address has changed), you may see a security warning or a certificate error message. The procedures below include instructions on how to address these messages (see Registering your Multiviewer's Security Credentials with your Browser on page 116). Internet Explorer users may also need to enable compatibility view (see Enabling the Compatibility View in Internet Explorer on page 125).

Opening XAdmin from a Browser

To open XAdmin from a browser

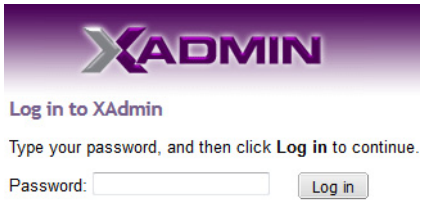
1 Open a Web browser window and enter the multiviewer's IP address in the address bar.

The Kaleido Multiviewer's home page appears.

2 Click the XAdmin button.

3 If you see a security warning, or a certificate error message, then see Registering your Multiviewer's Security Credentials with your Browser, on page 116.

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



5 **Internet Explorer users:** If a blank page appears, then see Enabling the Compatibility View in Internet Explorer, on page 125.

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

Opening XAdmin from XEdit

To open XAdmin from XEdit

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

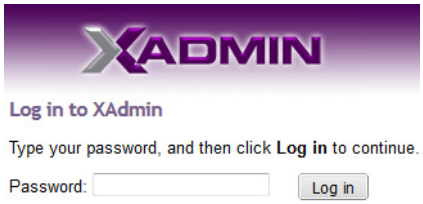
XEdit prompts you for the IP address of the multiviewer you want to access.

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

Your default Web browser opens.

3 If you see a security warning, or a certificate error message, then see Registering your Multiviewer's Security Credentials with your Browser, on page 116.

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



5 **Internet Explorer users:** If a blank page appears, then see Enabling the Compatibility View in Internet Explorer, on page 125.

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

Registering your Multiviewer's Security Credentials with your Browser

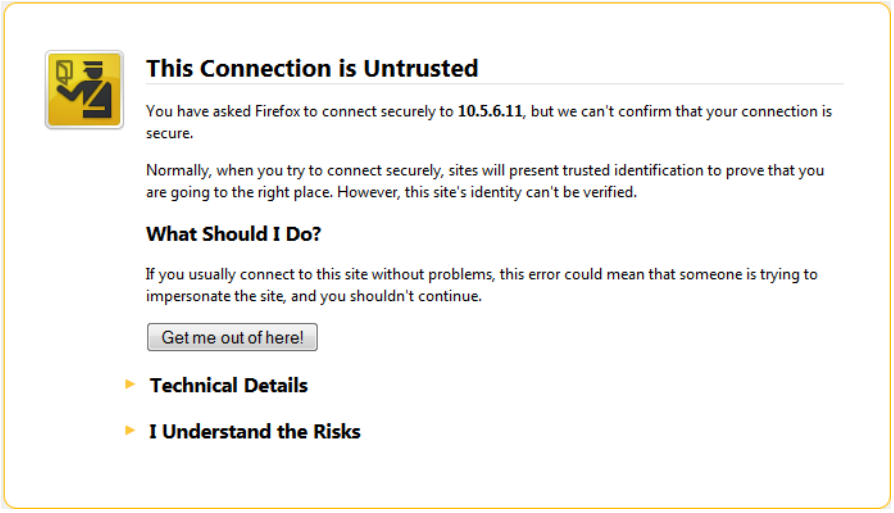
When you open your multiviewer's home page, or try to access XAdmin, your browser may report a certificate error (Internet Explorer), warn you about the site's security certificate (Chrome), or report an untrusted connection (Firefox). Follow the appropriate procedure below to register your multiviewer's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

- Suppressing untrusted connection warning in Firefox, on page 116
- Suppressing certificate error in Internet Explorer or Chrome, on page 118

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

Suppressing untrusted connection warning in Firefox

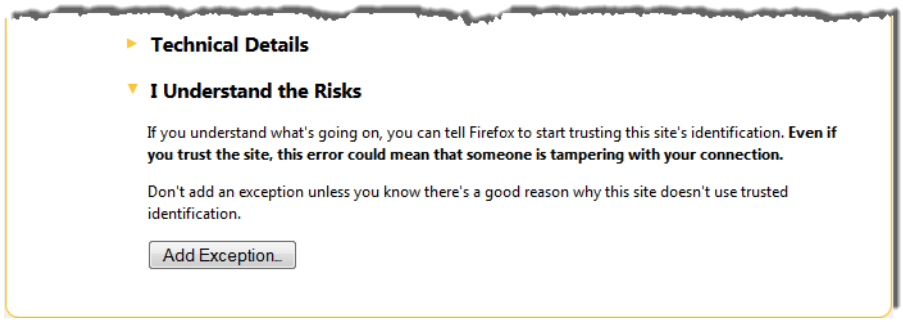
The first time you try to access XAdmin in Firefox, the browser may display the following page instead, prompting you to confirm the multiviewer's security credentials.



To register your multiviewer's security credentials with Firefox

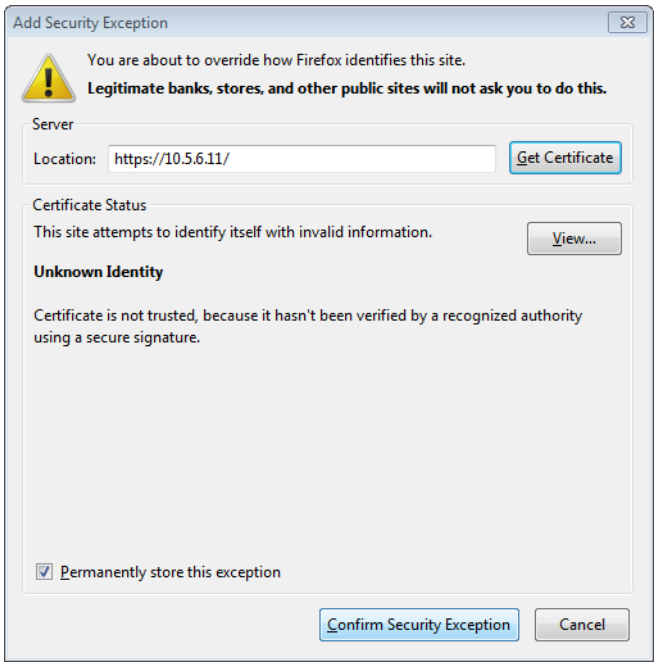
1 Click **I understand the Risks**, at the bottom of the page.

The message expands.



2 Click **Add Exception**.

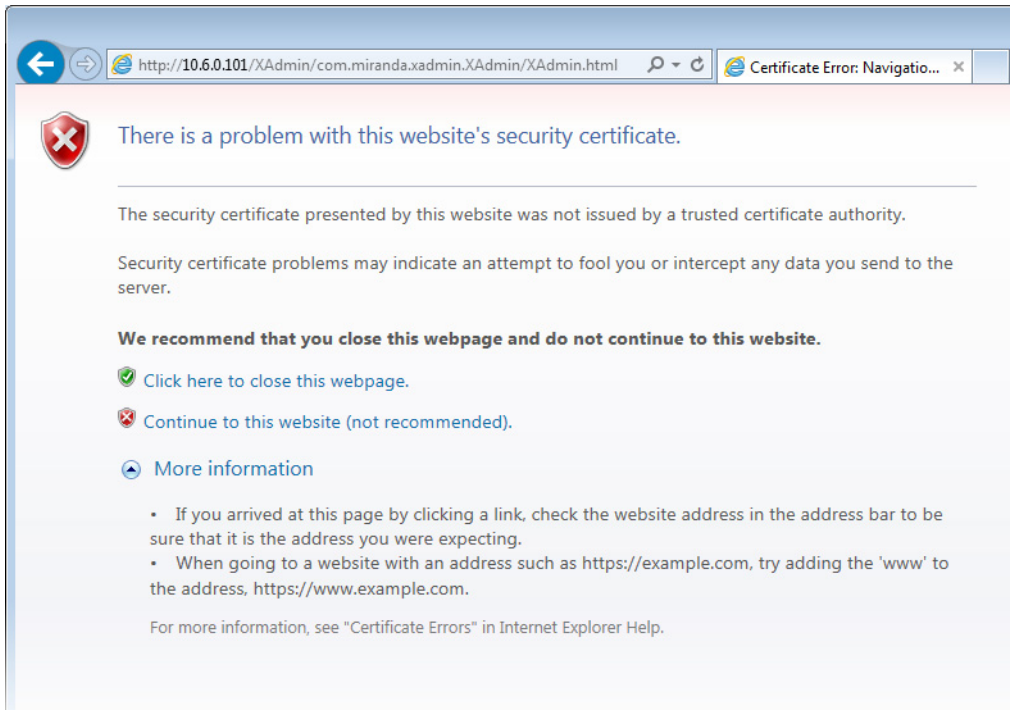
3 In **Add Security Exception**, click **Confirm Security Exception**.



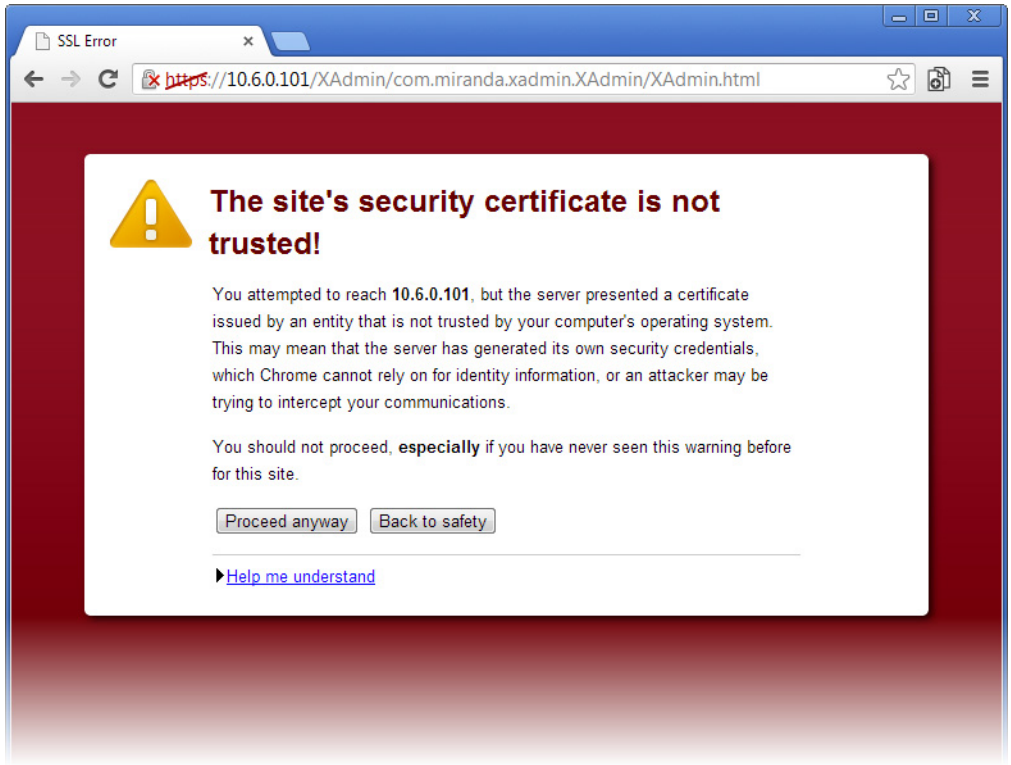
Your multiviewer's home page appears. You will now be able to access your multiviewer's client applications without seeing the warning. This will remain effective until the multiviewer's IP address is changed, in which case you will need follow the procedure again.

Suppressing certificate error in Internet Explorer or Chrome

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



Internet Explorer's security warning



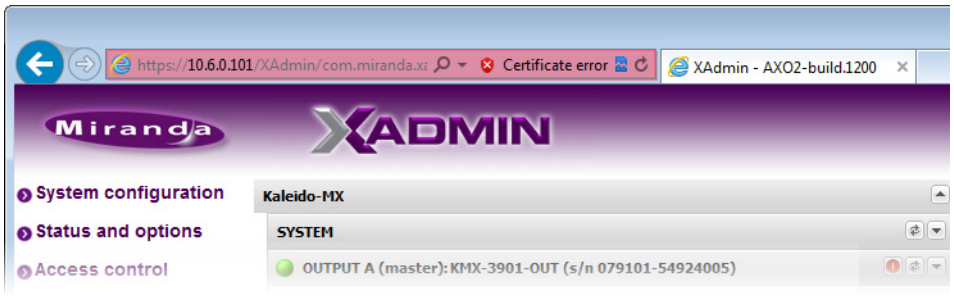
Chrome's security warning

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

To register your multiviewer's security credentials with Internet Explorer

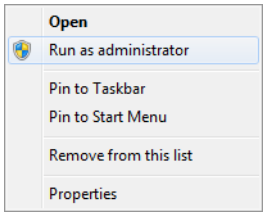
1 Click **Continue to this website (not recommended)**.

The address bar now indicates the certificate error.



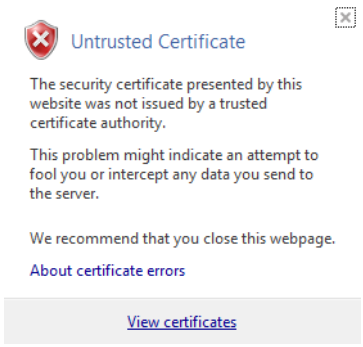
Special notes for Internet Explorer users

- If you see a blank page instead of XAdmin's Status and Options page, then see Enabling the Compatibility View in Internet Explorer, on page 125.
- You must have administrator status to accept the certificate error. If your user account does not have administrator status, then close your browser and, before you open it again, right-click the Internet Explorer icon, and then click **Run as administrator**:

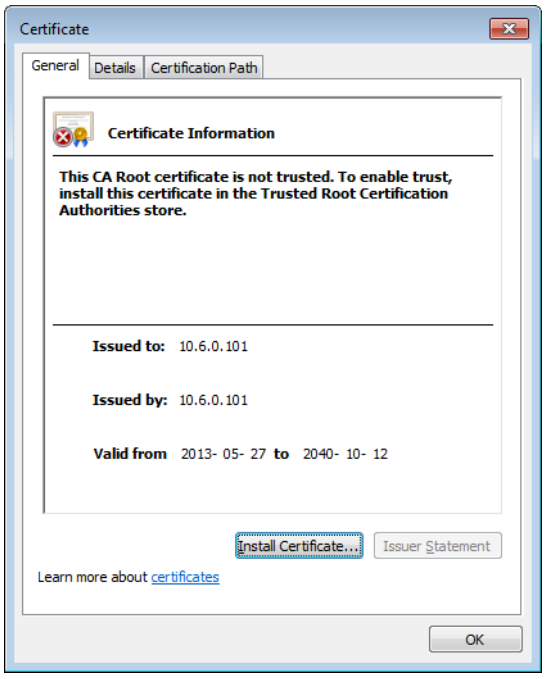


2 Click **Certificate error**.

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

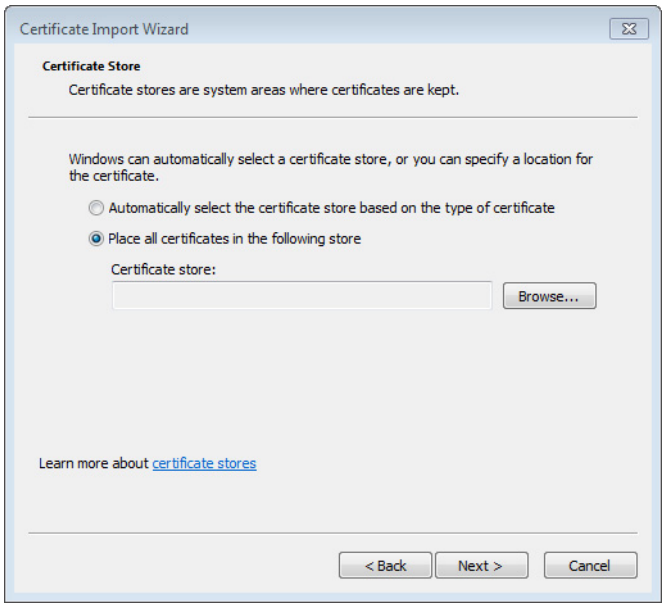


4 In **Certificate**, click **Install Certificate**.

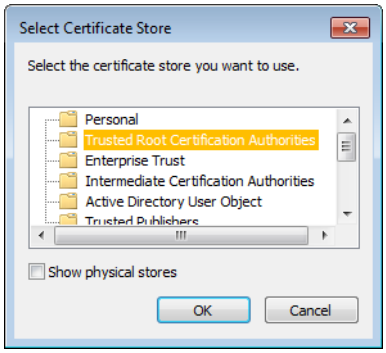


5 In **Certificate Import Wizard**, click **Next**.

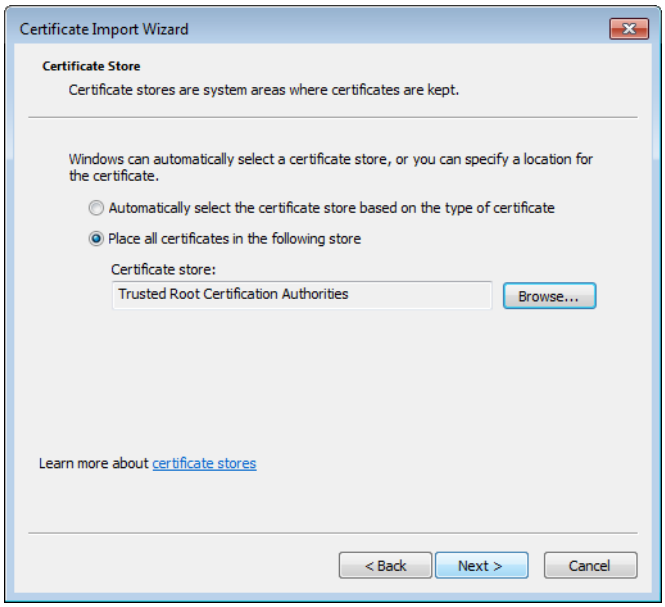
6 In **Certificate Import Wizard**, click **Place all certificates in the following store**, and then click **Browse**.



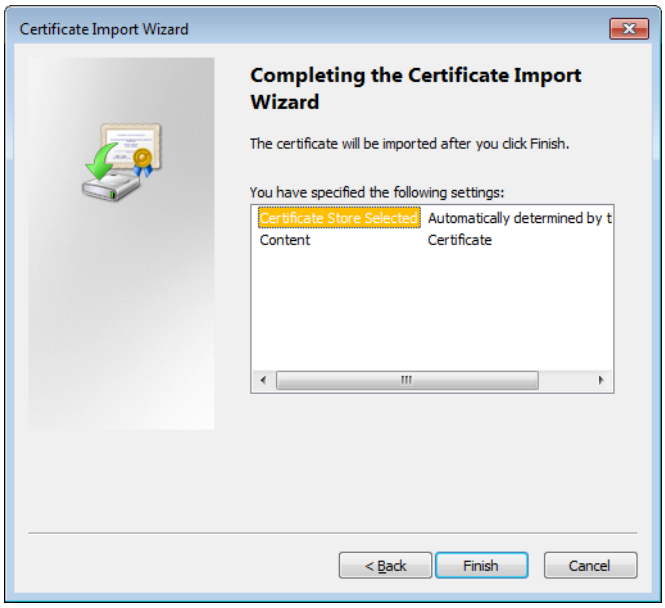
7 In **Select Certificate Store**, select **Trusted Root Certification Authorities**, and then click **OK**.



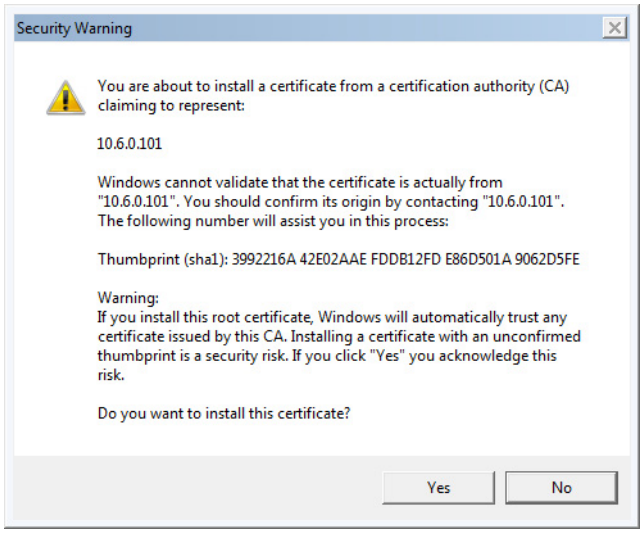
8 Back in **Certificate Import Wizard**, click **Next**.



9 Click **Finish**.

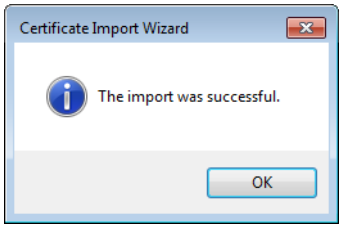


A security warning appears.



10 Click **Yes**.

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



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

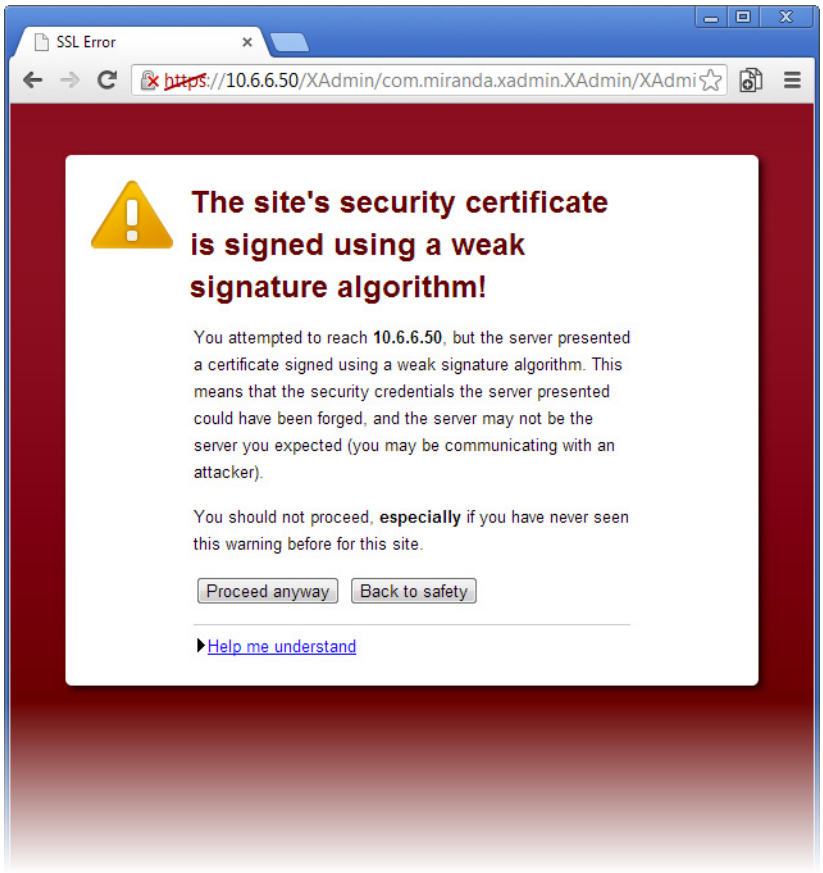
13 Close all Internet Explorer (and Chrome, if any) windows, and then open your browser again.

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

Special note for Chrome Web browser users

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

Special note for Chrome Web browser users *(continued)*

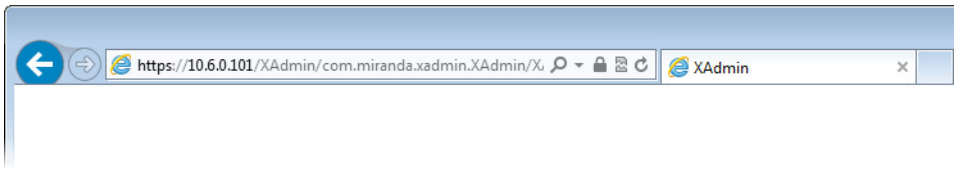


Enabling the Compatibility View in Internet Explorer

When you try to access XAdmin, from your multiviewer's home page, *in Internet Explorer 8, 9, or 10,* you may see a blank page instead of XAdmin's Status and Options page.[1]

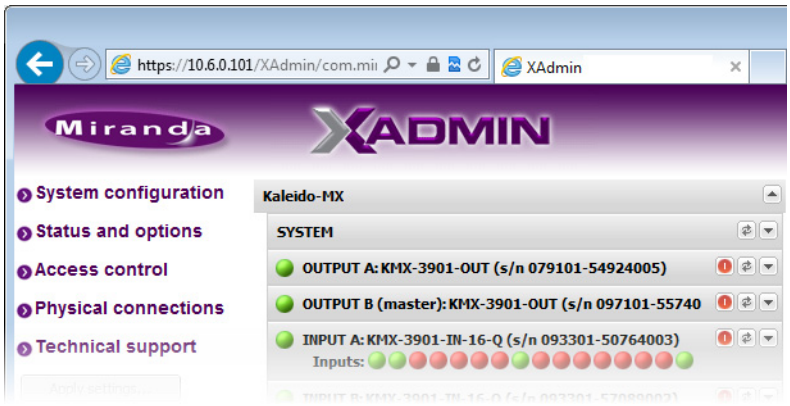
To enable the compatibility view for your multiviewer's XAdmin Web client

- Click the Compatibility View button at the end of your browser's address bar.



XAdmin's Status and Options page appears

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



The Compatibility View mode will remain enabled for this multiviewer as long as its IP address does not change.

XAdmin Access Control

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

Enabling XAdmin Access Control

To enable access control in XAdmin

1 Open XAdmin. See Opening XAdmin on page 114.

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

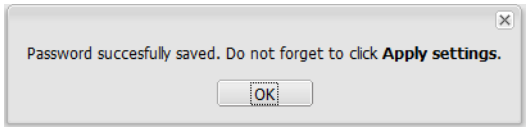
The Access Control page appears.

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

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

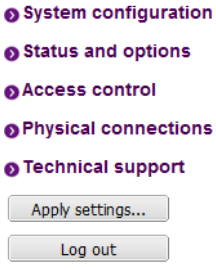
4 Click **Save**.

A confirmation message appears.



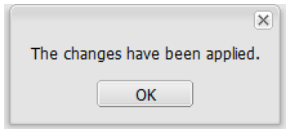
5 Click **OK** to close the message window.

The **Apply settings** button becomes available.



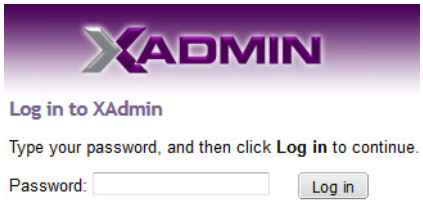
6 Click **Apply settings**.

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



7 Click **OK**.

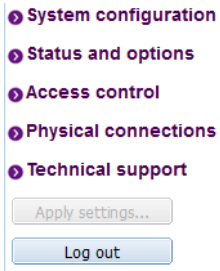
The Log in to XAdmin page appears. Other XAdmin sessions open against the same multiviewer are also redirected to the login page.



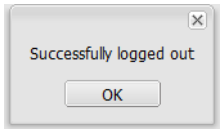
8 Type the password, and then click **Log in**.

The XAdmin Status and Options page appears.

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



A confirmation message appears.



10 Click **OK**.

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

Changing the XAdmin Password

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

1 Open XAdmin. See Opening XAdmin on page 114.

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

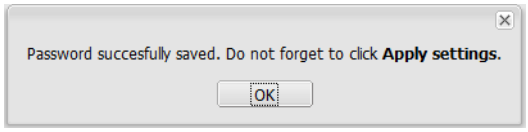
The Access Control page appears.

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

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

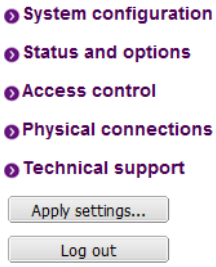
4 Click **Save**.

A confirmation message appears.



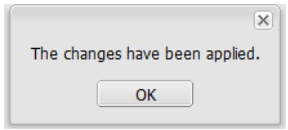
5 Click **OK** to close the message window.

The **Apply settings** button becomes available.



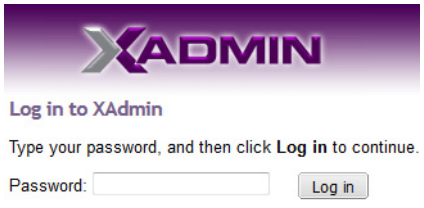
6 Click **Apply settings**.

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



7 Click **OK**.

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



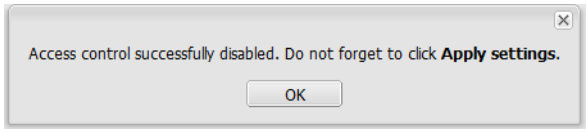
Disabling XAdmin Access Control

To disable access control in XAdmin

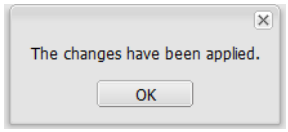
1 Open XAdmin. See Opening XAdmin on page 114.

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

3 Click **Disable access control**.
A confirmation message appears.



4 Click **OK** to close the message window, and then click **Apply settings**.
A progress indicator appears momentarily, followed by a confirmation message.

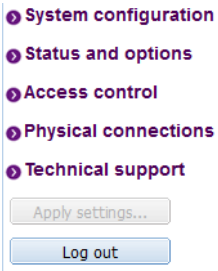


5 Click **OK**.
Unrestricted access to XAdmin is restored, for this multiviewer.

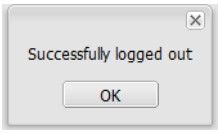
Closing a Password-Protected XAdmin Session

To close your XAdmin session

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



A confirmation message appears.



2 Click **OK**.

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

Opening Signal Path Viewer

To open Signal Path Viewer

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

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

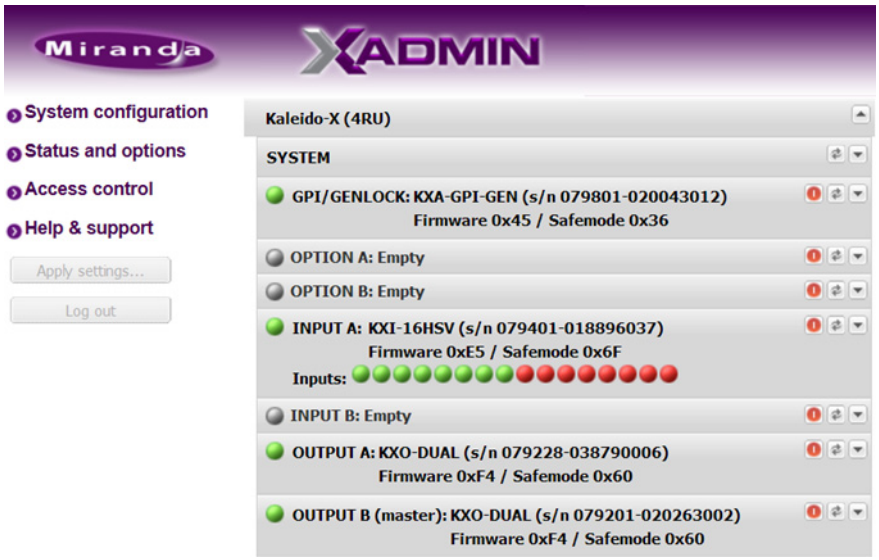
> Note: Should you need Signal Path Viewer to connect to a different multiviewer, then you must install it again, from the other multiviewer's home page. See Installing Signal Path Viewer on page 110.

Viewing a Multiviewer's Status Information

To view the status information for a multiviewer

1 Open XAdmin. See Opening XAdmin on page 114.

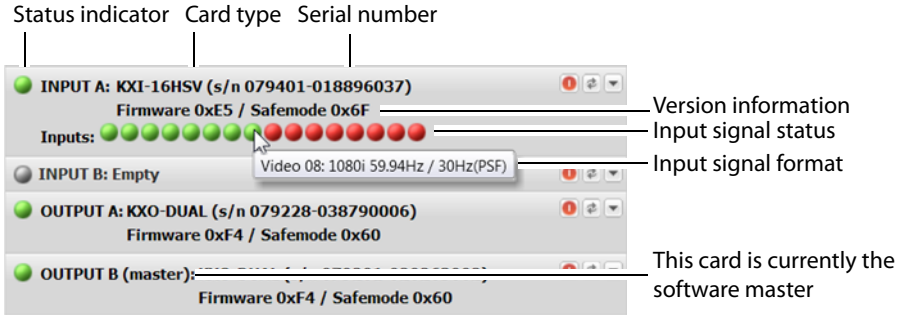
XAdmin's Status and Options page appears, showing the multiviewer model, and a list of all modules and their statuses.



Status and Options page for a Kaleido-X 4RU

- In the case of a **Kaleido-X (7RU)** or **Kaleido-X (14RU),** cards are presented in the order they appear, from left to right when looking at the front of the chassis.
- In the case of a **Kaleido-X (4RU),** cards are presented in the order they appear, starting from the top left corner down, and again from the top right corner, when looking at the front of the chassis.
- Some heading rows may show a card type, serial number, firmware and safe mode versions, a module status indicator, and input signal status indicators.
- You can identify which output card currently assumes the *software master* role (and is thus assigned the multiviewer's IP address) by looking for the word "master" next to the card's identifier, for example: "OUTPUT A (master)". This is shown in the figure below.
- The module status indicator shows whether the card (or module) is running normally (green) or in safe mode (red).
- The signal status indicators reveals the presence of a valid input signal at the corresponding connector.

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

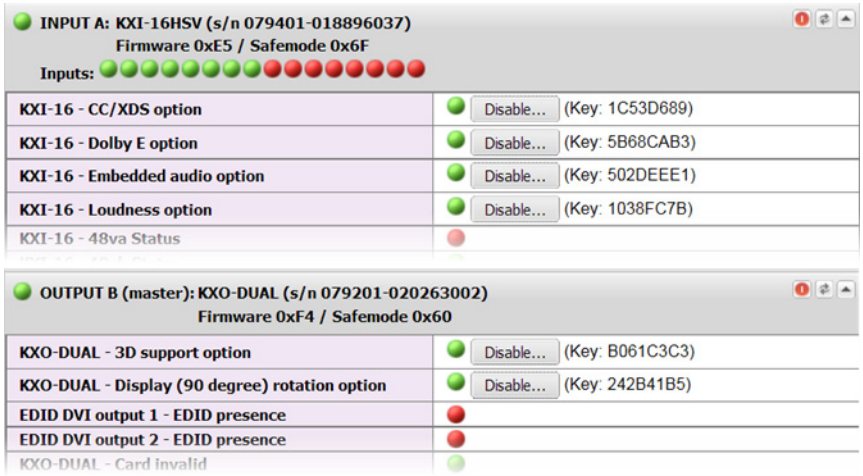


Note: The Kaleido Software does not distinguish neither between 1080PsF25 and 1080i50, nor between 1080PsF29.97 and 1080i59.94. Both 1080PsF25 and 1080i50 are reported as 1080i50, and both 1080PsF29.97 and 1080i59.94 are reported as 1080i59.94, on the monitor wall and in XAdmin's Status and Options page.

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

- At any time you can click the Refresh button to make sure the data displayed for the selected module is up to date.
- Click the "Reset card" button to reset the card or reset the multiviewer remotely from your Web browser.

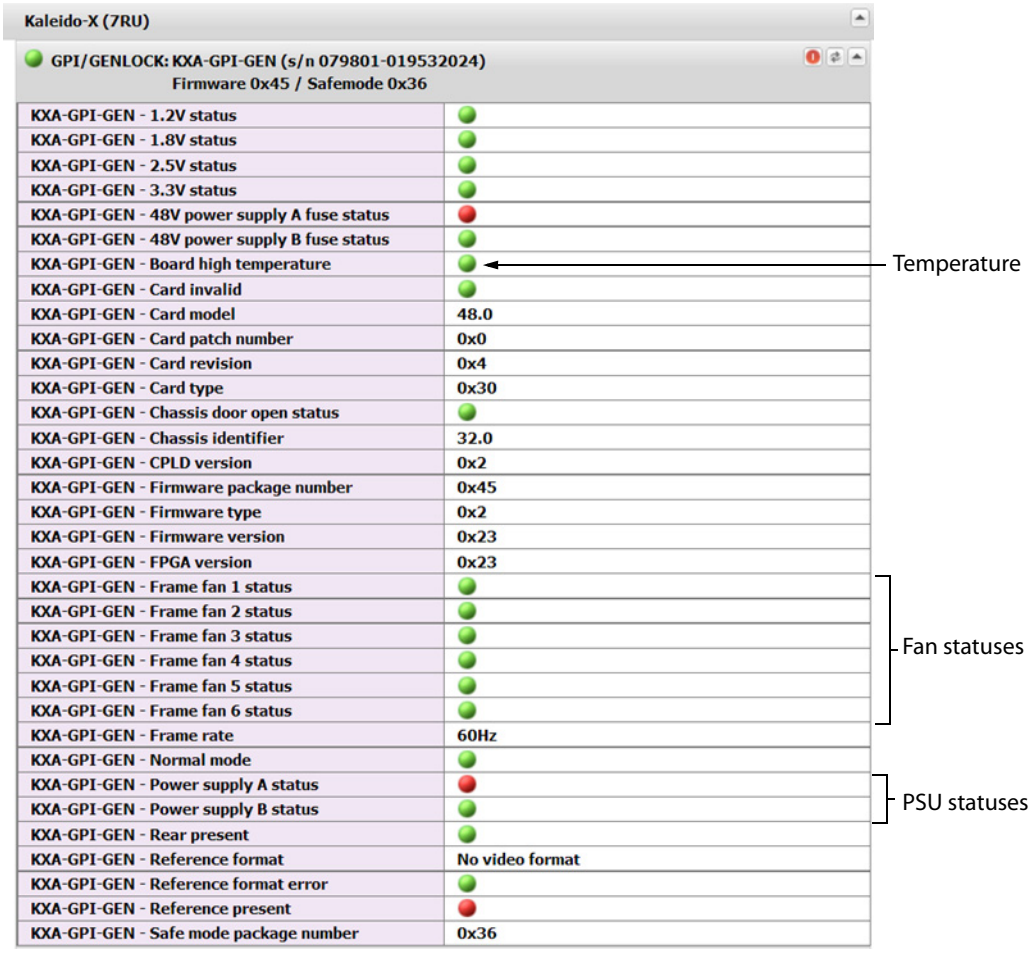
4 Review the enabled options for each module, and make sure that no error is reported.



Status and option information for a Kaleido-X multiviewer's input and output cards (partial view)

For more information about Kaleido Software options, see Available Hardware and Software Options, on page 149.

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



System status and option information

Notes

- The KXA-GPI-GEN card, with support for GPI, is standard on the Kaleido-X (7RU), and optional for the Kaleido-X (4RU).
- In the case of a Kaleido-X (4RU), PSU statuses are not available, and the fan statuses are listed with the master output card's information.

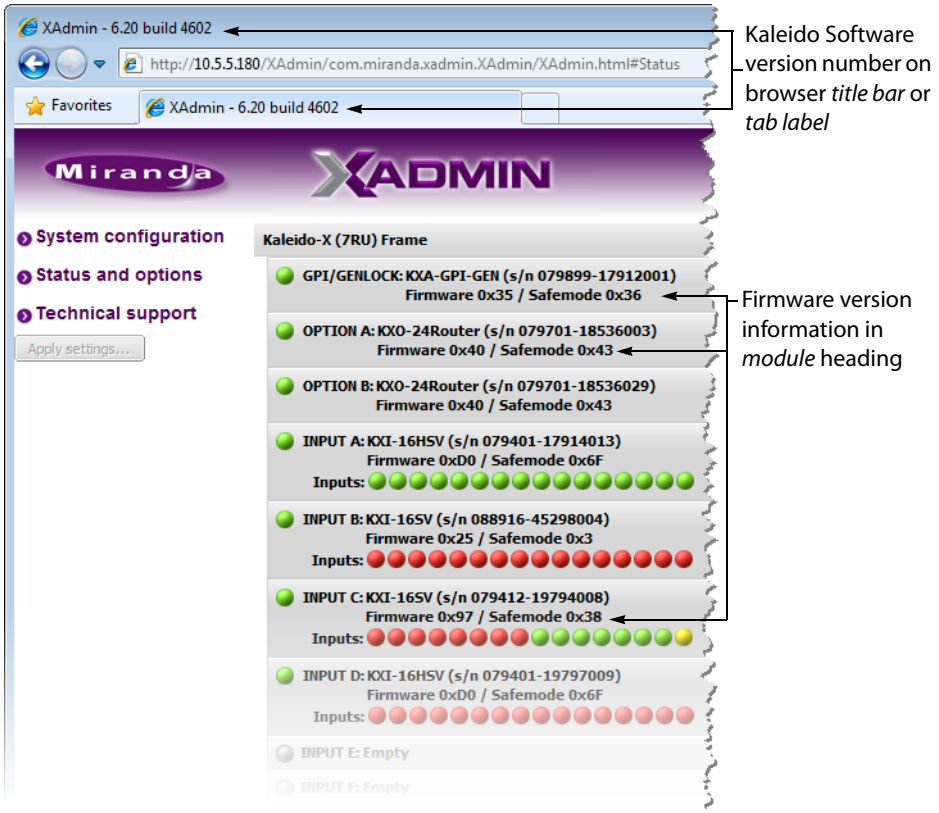
Viewing Version Information

To view your multiviewer's system and Kaleido Software version information

1 Open XAdmin. See Opening XAdmin on page 114.

The XAdmin Status and Options page appears.

- The Kaleido Software version appears on the Web browser's title bar or tab label.
- The firmware and safe mode package numbers appear both in the relevant heading row, and within the detailed status information.



Status and Option page for a Kaleido-X (7RU) multiviewer

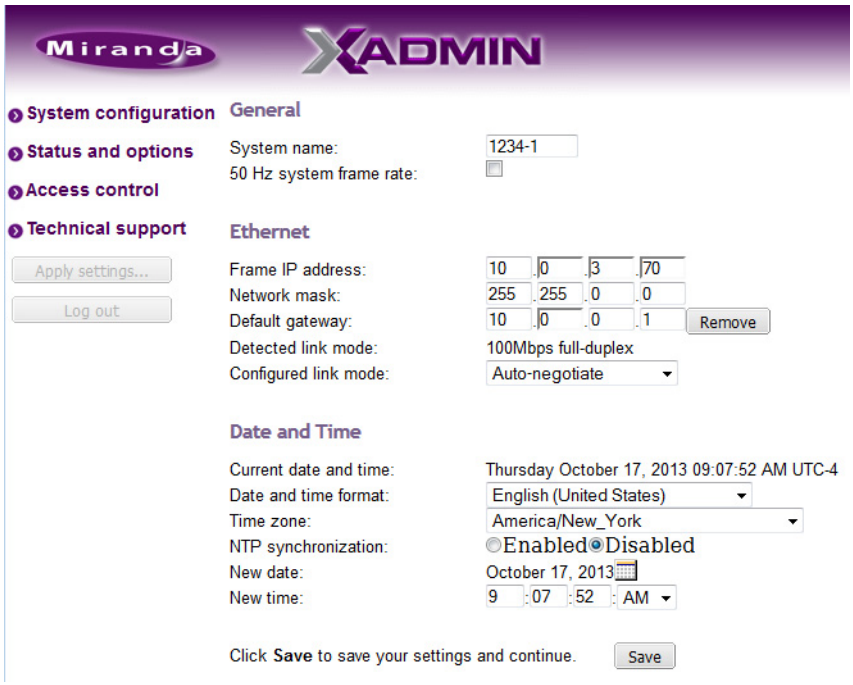
Configuring a Multiviewer's IP, Date, and Time Settings with XAdmin

To change your system's IP address and other parameters

1 Open XAdmin. See Opening XAdmin on page 114.

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

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



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

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

Notes

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

4 If your system requires a 50 Hz frame rate, to match the input signal data sampling rate, in the absence of a reference signal, then select the corresponding check box.

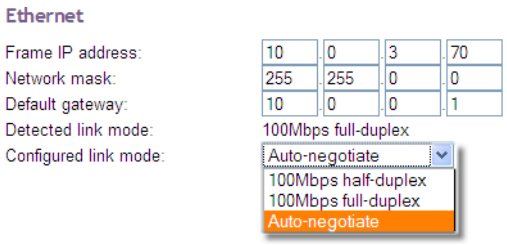
5 Adjust the date and time settings, as required.

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

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

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

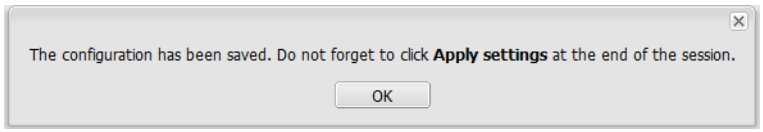
7 Should your network configuration require specific speed and duplex mode settings, select the appropriate value from the **Configured link mode** list.



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

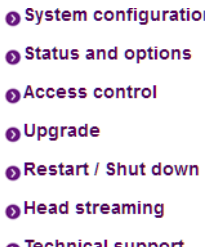
8 Click **Save**.

The new settings are saved locally.



9 Click **OK**.

The **Apply settings** button becomes available.



10 Click **Apply settings**.

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

11 Click **OK**.

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

If you have changed the multiviewer's IP address, you will need to edit the XAdmin URL in your Web browser's address bar in order to log on to the multiviewer again.

Configuring the RCP-200

The RCP-200 is shipped with an IP address of 10.0.3.200. On installation, you should consult your system administrator and replace this address with an appropriate address for your local network configuration (see Configuring the RCP-200's IP settings on page 138). Once your RCP-200 has an active connection to the network, you must then register the multiviewers you want to operate from the RCP-200 (see Specifying multiviewers for the RCP-200 on page 138), and their respective *KX Router* logical routers (see Specifying lookup servers for the RCP-200 on page 138). Once this is completed, you will be able to control the monitor wall from the RCP-200 (see Logging on to the RCP-200 on page 139).

Configuring the RCP-200's IP settings

To assign an IP address to the RCP-200

1. Press the CONFIG button, located between the two screens on the front of the RCP-200.
2. Touch the COMM category at the top of the right-hand screen.
3. Touch the ETHERNET tab on the right-hand screen.
4. In the SELECT area, rotate the leftmost control knob to select IP ADDRESS.
5. Use the four control knobs in the CHANGE area to set the new address.

   The current address is displayed in the CURRENT box for reference, and the new address you are setting appears in the MODIFIED box, as well as at the controls.
6. Press the SAVE control knob to store the new address.
7. Repeat from step 4 to configure the NETWORK MASK and GATEWAY settings.
8. Press the RESTART control knob to apply the changes.

   The panel will go dark for about 15 seconds before the startup screens appear.

Specifying multiviewers for the RCP-200

To specify a multiviewer for the RCP-200

1. Press the CONFIG button, located between the two screens on the front of the RCP-200.
2. Touch the COMM category on the right-hand screen.
3. Touch the KALEIDO DISCOVERY tab on the right-hand screen.
4. Use the four control knobs in the ADD TO LIST area to dial in the IP address of the multiviewer you want to operate.

   The address appears in the TO ADD box.
5. Press the ADD control knob.

   The multiviewer's IP address appears in the LOOKUP LIST area.
6. Press the CONFIG button, located between the two screens on the front of the RCP-200 to end the configuration process and return to normal operation.

Specifying lookup servers for the RCP-200

The RCP-200 needs to connect to a lookup server in order to control devices, including a multiviewer's *KX router* logical router.

To specify a lookup server for the RCP-200

1 Press the CONFIG button, located between the two screens on the front of the RCP-200.
2 Touch the COMM category on the right-hand screen.
3 Touch the DISCOVERY tab on the right-hand screen.
4 Use the four control knobs in the ADD TO LIST area to dial in the IP address of the multiviewer you want to operate.

   The address appears in the TO ADD box.
5 Press the ADD control knob.

   The multiviewer's IP address appears in the LOOKUP LIST area.
6 Press the CONFIG button, located between the two screens on the front of the RCP-200 to end the configuration process and return to normal operation.

Logging on to the RCP-200

Note: In a default system configuration, a multiviewer's video outputs are assigned to specific rooms:

- On a Kaleido-X (7RU), the two DVI/VGA outputs from each of the dual-head output cards A, B, C and D are assigned to ROOM1, ROOM2, ROOM3 and ROOM4 respectively.
- On a Kaleido-X (4RU), the two DVI/VGA outputs from each of the dual-head output cards A and B are assigned to ROOM1 and ROOM2 respectively.
- On a Kaleido-X (14RU) expansion system, the two DVI/VGA outputs from each of the dual-head output cards A, B and C of each of Frame A and Frame B are assigned to ROOM1, ROOM2, ROOM3, ROOM4, ROOM5 and ROOM6 respectively.

To log on to a Kaleido Multiviewer room from the RCP-200

1 On an RCP-200 with an active connection to the network, press the LIST button.

   All devices, and Kaleido Multiviewer rooms, detected by the RCP-200 appear on the left screen. Kaleido Multiviewer rooms are listed in the form [multiviewer name]\[room name].

   If a room belongs to a cluster system, its name appears once for each of the member multiviewers (for example, if two multiviewers, KX1 and KX2, are configured as a cluster, and ROOM1 includes displays fed by both multiviewers, then both KX1\ROOM1 and KX2\ROOM1 will be listed. To determine the one you should select, review the following:

   - Has the RCP user configuration you want to use been replicated on every member of the cluster? RCP Users are not automatically propagated to all multiviewers. Before a user can log on to a room associated with a cluster system, the corresponding RCP user configuration must be manually replicated on all member multiviewers across the cluster. See *Managing RCP Users* in the Kaleido Software User Guide.
   - Do you need to control an external router whose configuration is available only from one or some specific members of the cluster?

- Does your system configuration include actions that were configured only on one or some specific members of the cluster?
- Do you need to control a timer from the monitor wall in a cascade room?

If any of the above elements is available only from one or some specific members, then make sure you select the room name prefixed with the appropriate multiviewer name. In the case of a cascade room, unless you remember which multiviewer you were connected to when you added the timer you need to control, you will have to proceed by trial and error.

2 Touch the room you want to access (press the DOWN or UP soft keys to scroll the list as needed).

The list of users assigned to this room appears on the right-hand screen.

3 Touch the user name under which you want to log on, enter your password, and then touch LOG IN.

Note: By default, the user "Admin" has no password.

The following message appears on the right-hand screen: PLEASE SELECT A ROUTER FROM THE LEFT-HAND SCREEN, prefixed with the name of the multiviewer that appeared before the room name you selected in step 2.

4 In the list on the left-hand screen, touch the *KX Router* logical router associated with the same multiviewer (you can see the multiviewer name, its IP address, and the size of that particular KX Router).

5 Touch the Video level, in the area to the right of the router list, if it is not selected already, and then push SELECT.

The room's monitor wall control panel appears on the right-hand screen, with the ASSIGN CHANNEL category selected. If a mouse is connected to the RCP-200, then after touching WALL MOUSE you should be able to see and move the mouse pointer on the monitor wall.

- If the room you selected belongs to a *cascade* system, touch a monitor showing a source you can identify as coming from a different multiviewer than the one indicated with the room name you selected in step 2.
- If the room you selected belongs to a *cluster* system, rotate the HEAD knob (or touch the DISPLAY SELECT category) to display a head view from a different member of the cluster, and then touch a monitor.

  The ROUTER SELECT category becomes selected instead of ASSIGN CHANNEL, and the right-hand screen shows the message prompting you to select a router from the left-hand screen, prefixed with the name of the multiviewer, which means that you still need to complete the correlation between some monitor wall destinations and the representation of the KX Router logical router for this multiviewer. See Correlating Monitor Wall Destinations and KX Router Logical Routers for the RCP-200 on page 141. Repeat this for one head, with one layout, for every multiviewer that is part of the cluster of cascade. If you need to connect to a different instance of the same room then you will have to establish the correlation again, to be able to operate the monitor wall from the different context.

Notes

- The RCP-200 will remember your user credentials until you log out explicitly (by touching LOG OUT at the upper-right corner of the control panel).
- The pointer may flicker when two RCP users access displays fed by the same multiviewer output.
- Two users accessing the same display will be limited to sharing a single pointer.

For more information on the RCP-200, refer to the *RCP-200 Guide to Installation and Operation*. See Related Documentation, on page 15.

Correlating Monitor Wall Destinations and KX Router Logical Routers for the RCP-200

To operate the monitor wall from the RCP-200's category/index router view, your system must have been configured to be controlled as a router. In a layout, the RCP-200 can only control monitors that have been assigned a monitor wall destination. The first time you log on to a room from the RCP-200, you will be prompted to select a router from the left-hand screen. By selecting the appropriate KX Router logical router, you will establish the correlation between your multiviewer's monitor wall destinations and the RCP-200's representation of the multiviewer's *KX Router* logical router. In the case of a cluster or cascade system, you will also be prompted to select a router, the first time to try to assign a source to a monitor located in a part of the layout that belongs to a different member of the cluster or cascade. You only need to do this once, for every multiviewer that is part of a cluster (or cascade).

To correlate a monitor wall destination in a layout and the corresponding KX Router logical router

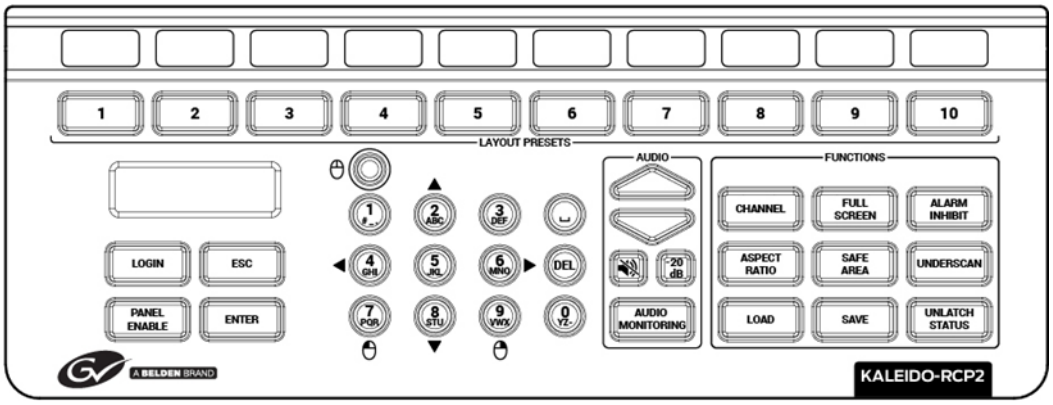
1. In the list on the left-hand screen, touch the *KX Router* logical router associated with the multiviewer whose name was indicated in the message prompting to select a router (you can see the multiviewer name, its IP address, and the size of that particular KX Router).
2. Touch the Video level, in the area to the right of the router list, if it is not selected already, and then push SELECT.

   The RCP-200 will remember the association with the KX Router logical router's destinations for the current multiviewer's monitor wall destinations.

Configuring the Kaleido-RCP2

> Note: The Kaleido-RCP2 unit is optional and is not included in the standard Kaleido-X package.

The Kaleido-RCP2 is a multi-function remote control panel designed for use with Kaleido multiviewers. Ethernet connectivity allows multiple RCP users to access multiple Kaleido Multiviewer systems, allowing convenient access to the real-time operating features. When logged on to a Kaleido multiviewer via its Ethernet connection, the RCP user can control various operating features.



Before you can use the Kaleido-RCP2 to operate your Kaleido Multiviewer, you must set up the Ethernet connection between the two devices. By default, the Kaleido-RCP2 is shipped with DHCP enabled, so it will automatically be assigned an IP address by a DHCP server. If no DHCP server is present on the network, the Kaleido-RCP2 will default to the static IP address 10.0.3.191.

> Notes
>
> - The Kaleido-RCP2 is powered through the RJ45 Ethernet connector. There is no power ON/OFF button, so the device is ON whenever a powered Ethernet cable is connected.
> - If you purchased more than one Kaleido-RCP2 units, keep in mind that they all ship with the same default static IP address. Make sure to assign them different static IP addresses before connecting them to the network if DHCP is not used. See the Kaleido-RCP2 User Guide for more information.
> - The time-out period before the Kaleido-RCP2 defaults to its static address is 1 minute. To speed up the initialization, disable the DHCP option.

Assigning a static IP address to the Kaleido-RCP2

To assign a static IP address to the Kaleido-RCP2

1. Press and hold the ENTER button until the ESC button lights up, to display the configuration menu.
2. Press the **8** key (to move down the list) until ETHERNET OPTIONS appears on the LCD display.

3 Press the ENTER key to display the ETHERNET OPTIONS menu.
4 Select the IP ADDRESS menu using the **2** key (to move up in the list) or the **8** key (to move down the list), and then press ENTER.
5 Using the numeric keypad, type the chosen IP address, and then press ENTER.
6 Select the NETWORK MASK menu using the **2** key (to move up in the list) or the **8** key (to move down the list), and then press ENTER.
7 Using the numeric keypad, type the chosen network mask, and then press ENTER.

You have assigned a static IP address to the Kaleido-RCP2.

Selecting a room for the Kaleido-RCP2

To select a room for the Kaleido-RCP2

1 Press and hold the ENTER button until the ESC button lights up, to display the configuration menu.
2 In the ROOM SELECTION display, press ENTER again to get the room list from the Kaleido Multiviewer systems that are currently available on the network.
3 In the room list, select the room you want to access by pressing the **2** key (to move up in the list) or the **8** key (to move down the list).

> Note: By default, a multiviewer's video outputs are assigned to specific rooms: the outputs are assigned to ROOM1.

4 When the appropriate room name is highlighted, press ENTER to accept the new selection.
5 When prompted, log on to the selected room. See Logging on to the Kaleido-RCP2 on page 144.

Connecting the Kaleido-RCP2 to Other Kaleido Multiviewer Systems

The unicast IP feature enables a Kaleido-RCP2 to find up to three Kaleido Multiviewer systems on different subnets and connect to them (via network gateways), while maintaining connections to Kaleido Multiviewer systems in its own subnet.

> Notes
> - To navigate the Kaleido-RCP2 menu, press the **2** key to move up, or the **8** key to move down.
> - There is no need to configure unicast IP addresses for Kaleido Multiviewer systems on the same subnet as the Kaleido-RCP2.

To configure a unicast IP address on the Kaleido-RCP2

1 Press and hold the ENTER button until the ESC button lights up, to display the configuration menu.
2 Select ETHERNET OPTIONS on the LCD display, and then press ENTER.
3 Select **Unicast host IP**, and then press ENTER.
4 Select **Enable IP 1**, and then press ENTER.

The Enable IP x parameter instructs the Kaleido-RCP2 to query the selected IP address for a list of rooms.

5 Select **Host IP ADDR**, and then press ENTER.

6 Using the numeric keypad, type the IP address of a Kaleido Multiviewer on a remote subnet, and then press ENTER.

7 Repeat step 4 to step 6 to add unicast IP addresses for up to three remote Kaleido Multiviewer systems.

Logging on to the Kaleido-RCP2

As a network device, the Kaleido-RCP2 provides access to any room configuration on any Kaleido Multiviewer system on the network. As a security measure, access is controlled by a login procedure.

To log on to a Kaleido Multiviewer system from the Kaleido-RCP2

1 Press the LOGIN key.

The following message will appear on the LCD display:

LOGIN Position
Admin

2 Press ENTER to select "Admin".

A message prompting you to enter a password will appear on the LCD display.

3 Press ENTER again (by default, there is no password).

The message "Access granted" will appear on the LCD display if the login is successful. If a mouse is connected to the Kaleido-RCP2, then you should be able to see and move the mouse pointer on the monitor wall.

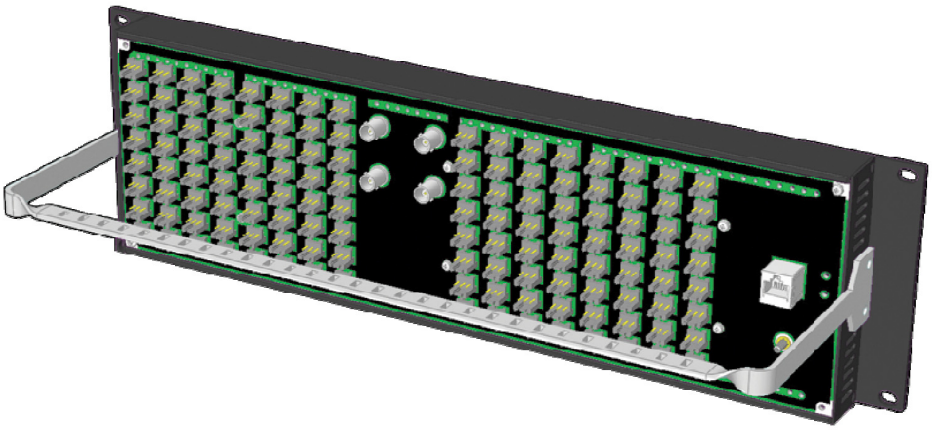
> Note: If at any time the message "Target system is offline" or "No login list available" appears on the LCD display, press the ESC, ENTER and DEL keys simultaneously and go back to step 1.

For more information, refer to the *Kaleido-RCP2 Guide to Installation and Operation*. See Related Documentation, on page 15.

Configuring an Audio Bridge Terminal

The optional Audio Bridge Terminal (ABT) is an external audio multiplexer/serializer for Kaleido multiviewers. The Kaleido-X supports audio channel inputs from the ABT-64 or ABT-128 series of Audio Bridge Terminal panels through up to two SDTI inputs. The ABT-64 supports 64 channels and the ABT-128 supports 128 channels.

The Audio Bridge Terminal (ABT) is an external audio multiplexer/serializer for Kaleido multiviewers. The ABT provides connector space for audio signal inputs, and multiplexes all the audio signals into combined serial feeds on coaxial cables that connect to the multiviewer's input modules.



Note: The ABT is powered through the RJ-45 Ethernet connector. There is no power ON/OFF button, so the device is ON whenever a powered Ethernet cable (PoE) is connected.

To configure the IP address and other network settings of the ABT

1 Connect a PC to a switch.

2 Referring to Configuring a Client PC to Configure an ABT's Network Settings, on page 146, configure the PC with the following network settings:

Property	Setting
DHCP	Off
Static IP address	10.0.0.1
Subnet mask	255.255.0.0
Default gateway	10.0.0.1

3 Apply power to the Audio Bridge Terminal and make sure it is connected to the same switch as the PC.

- If the switch is Power over Ethernet (PoE) enabled, simply connect it to the unit using an Ethernet cable.
- If not, PoE mid-span (*inserter*) equipment must be placed between the switch and the Audio Bridge Terminal.

4 Press the RESET button (located on the right-hand side of the ABT rear panel beside the ETHERNET/POWER RJ-45 connector) for at least 1 second.

The Audio Bridge Terminal will reboot with the following static network configuration:

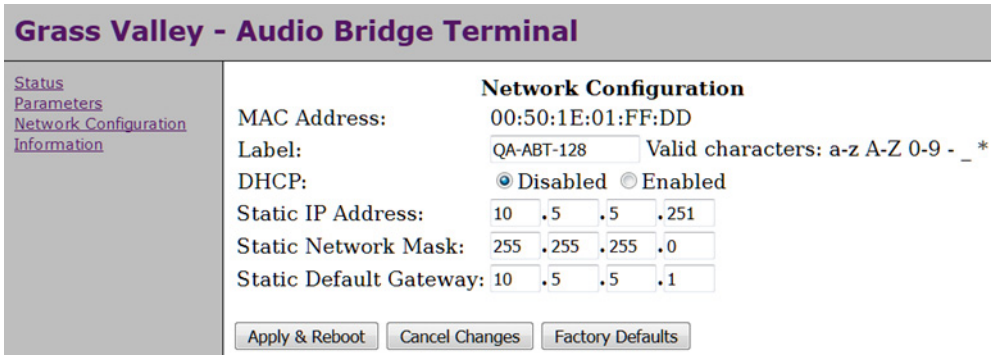
Property	Setting
DHCP	OFF
Static IP address	10.0.3.190
Subnet mask	255.255.0.0
Default gateway	10.0.0.1

5 Using a Web browser on the PC, connect to the ABT using the following address: 10.0.3.190.

The home page of the ABT's built-in Web server is displayed.

6 Click **Network Configuration** (in the navigation pane).

The **Network Configuration** page is displayed.



7 Change the ABT's network settings, as necessary, and then click **Apply & Reboot**.

> Note: Keep in mind that all ABTs ship with the same default static IP address. If you are adding more than one ABT to your network and do not use DHCP, make sure to assign each ABT a different static IP address before connecting them to the network.

For more information, refer to the *Audio Bridge Terminal Guide to Installation and Operation*. See Related Documentation, on page 15.

Configuring a Client PC to Configure an ABT's Network Settings

The client PC that you will use to communicate with the Kaleido-X (via XAdmin and XEdit) and the Kaleido-X itself must have IP addresses within the same subnet. The following procedure applies to a typical Windows 10, Windows 8, or Windows 7 system.

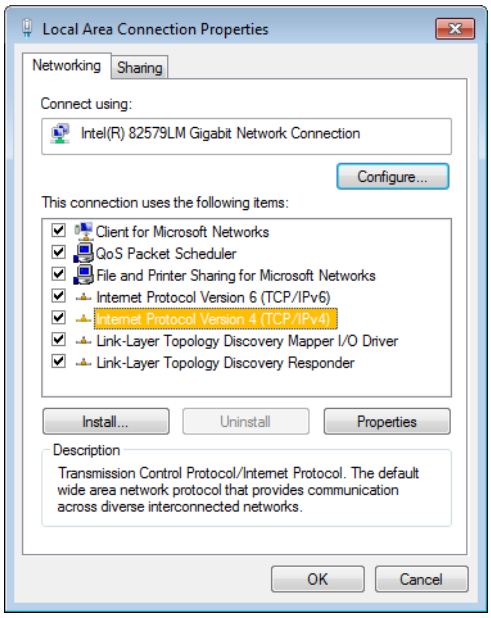
To change the IP address of the client PC

1 Press the Windows key on your keyboard, type "control panel" and then press Enter.

2 In the search box, type "adapter", and then, under **Network and Sharing Center**, click **View network connections**.

3 In **Network Connections**, right-click the network adapter you wish to configure (e.g., *Local Area Connection,* or *Ethernet*), and then click **Properties**. If the system prompts you for an administrator password or confirmation, type the password or provide confirmation.

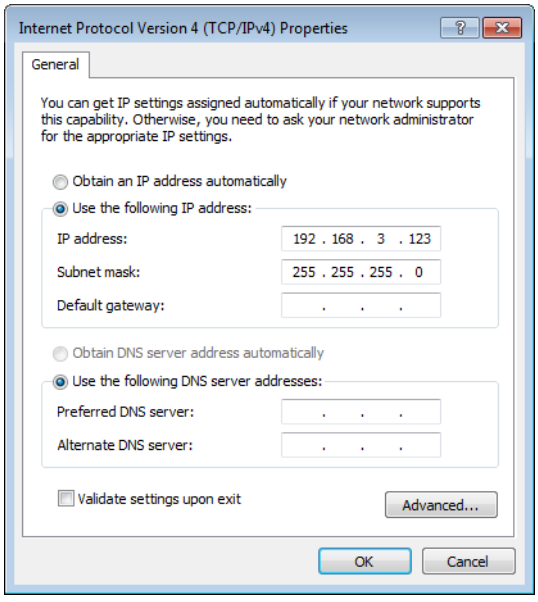
The Properties window for the selected network adapter opens.



4 On the **Networking** tab, under **This connection uses the following items**, click **Internet Protocol Version 4 (TCP/IPv4)**, and then click **Properties**.

The **Internet Protocol Version 4 (TCP/IPv4) Properties** window opens.

5 On the **General** tab, click **Use the following IP address**.



6 Type an IP address in the same range as the current ABT's IP address.

For example, if the ABT's IP address is 10.0.3.190, then the IP address of your client PC could be 10.0.3.1. If you are unsure, contact your network administrator.

7 Type a subnet mask in the same range as that of the ABT such as 255.255.0.0.

8 Click **OK**.

9 In **Local Area Connection Properties**, click **Close**.

Available Hardware and Software Options

You can purchase various Kaleido Software and hardware options to expand your multiviewer's capabilities that are not part of the basic offer. Kaleido Software options are enabled by entering a software key that has been sent to you once you have purchased the option. The following tables list options that can be enabled via the XAdmin Status and Options page (see Enabling Options on page 150).

Kaleido-X (7RU and 14RU) input options

Option	Part No.	Feature	Notes
3G	KXS-3Gbps	3Gbps format license	One 3G option key is needed per input card.
CC/XDS	KXS-CSX	CC/subtitling and XDS data license	One CC/XDS option key is needed per input card. Extraction of CC 608, CC 708, XDS and Subtitling WST metadata is activated as a single option.
Dolby E	KXS-Dolby	Dolby metadata extraction license	One Dolby E option key is needed per input card.
Embedded Audio	KXS-HD-EMB	HD/SD-SDI embedded audio license	One HD/SD-SDI embedded audio option key is needed per input card.
	KXS-SD-EMB	SD-SDI embedded audio license	One SD-SDI embedded audio option key is needed per input card.
Loudness	KXS-Loudness	Loudness level measurement license	One Loudness option key is needed per input card.

Kaleido-X (7RU and 14RU) output options

Option	Part No.	Feature	Notes
Display 90-Degree Rotation	KXS-ROTATOR	Display rotation license	One Display 90-Degree Rotation option key is needed per output card.
3D[1]	KXS-3DLA	Stereoscopic display license (line alternate mode) for Kaleido-X	One 3D option key is needed per output card.

1. After enabling the 3D support option in XAdmin, refresh the current layout or load another one, for the change to be reflected on the monitor wall.

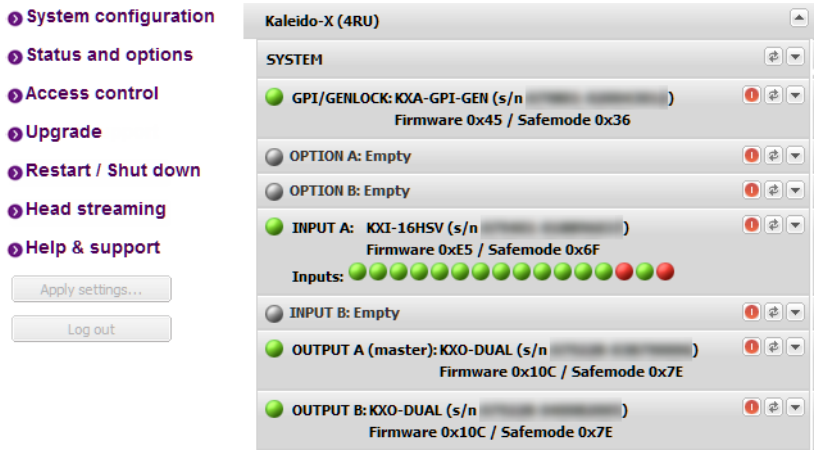
Enabling Options

To enable options on a multiviewer

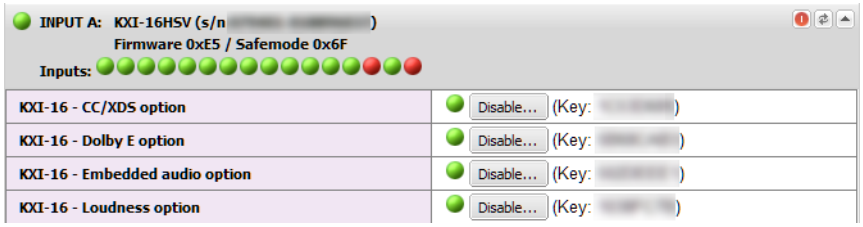
1 Obtain a license key from Grass Valley.

2 Open XAdmin.

The XAdmin Status and Options page appears.



3 Click the arrow button at the end of the heading row that corresponds to the module for which you want to enable an option.

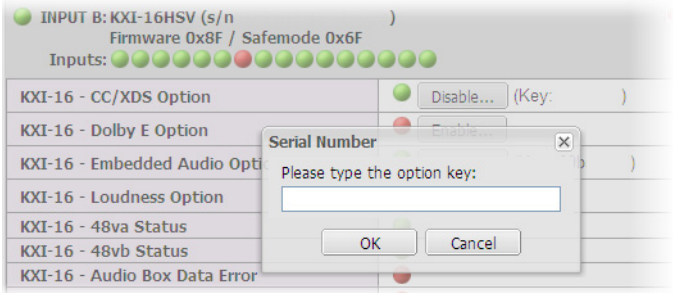


4 Locate the entry for the option you want to enable.

For example, to activate the Extraction of CC, Subtitling and XDS metadata option (CC/XDS Option) for an input card, you would need to locate the appropriate card in XAdmin's Status and Options page, expand it, and then locate the **KXI-16-CC/XDS option** line.

5 Click the **Enable** button.

A window appears prompting you for the license key.



6 Enter the license key for the specific option in the box, and then click **OK**.

Once the option is enabled, the license key is displayed, and a **Disable** button replaces the **Enable** button.

7 Maintenance & Troubleshooting

This chapter shows how to configure the multiviewer.

System Verification

Verifying the Kaleido-X Multiviewer Status

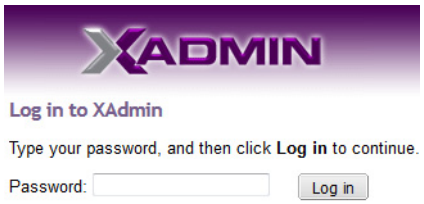
To verify the status of your Kaleido-X multiviewer:

1 Open a Web browser window and enter the multiviewer's IP address in the address bar. The Kaleido Multiviewer home page appears.

2 Click the XAdmin button.

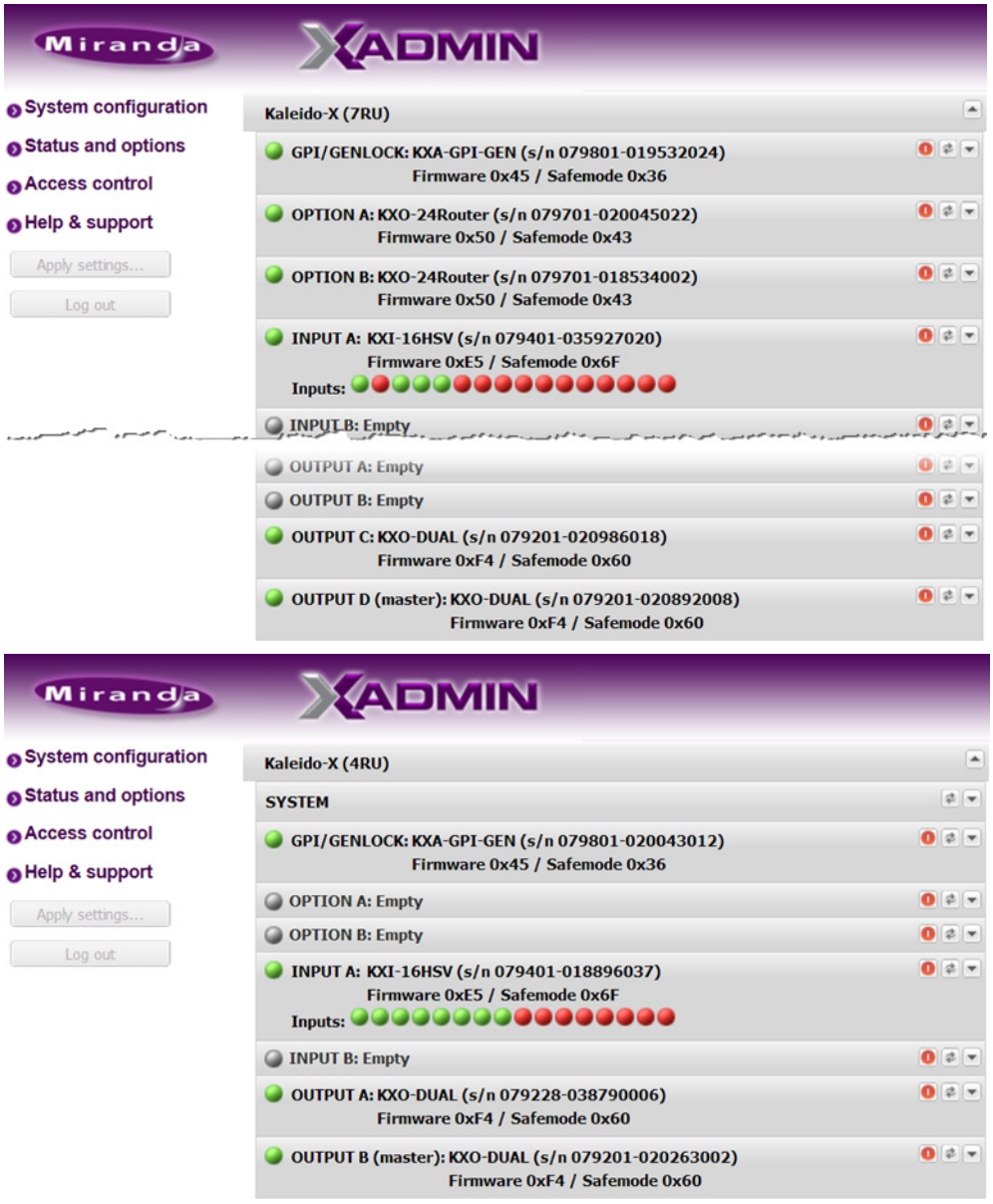
3 If you see a security warning, or a certificate error message, then see *Registering your Multiviewer's Security Credentials with your Browser*, on page 116.

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



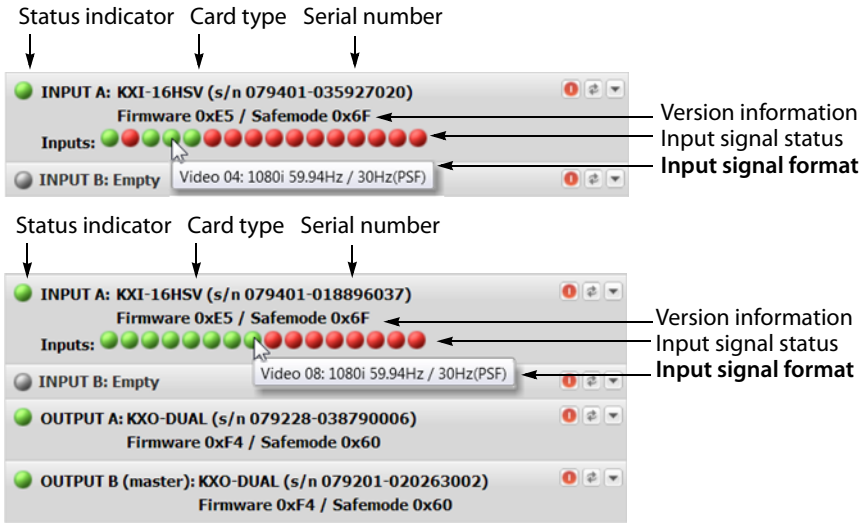
5 **Internet Explorer users:** If a blank page appears, then see *Enabling the Compatibility View in Internet Explorer*, on page 125.

The XAdmin Status and Options page appears, displaying a list of all cards and their statuses.

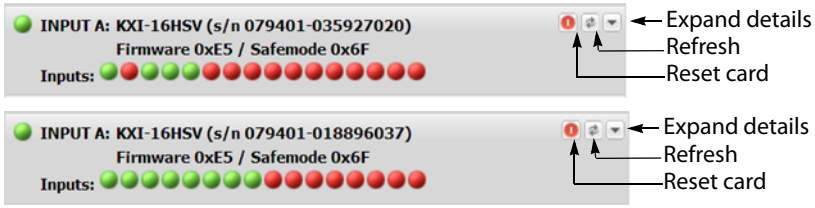


Cards are presented in the order they appear, from left to right when looking at the front of the chassis. The card heading shows the card type, serial number, firmware and safemode versions, and a summary view of the input signals for each input card.

6 Move the pointer to an input signal status icon to view the associated signal format.

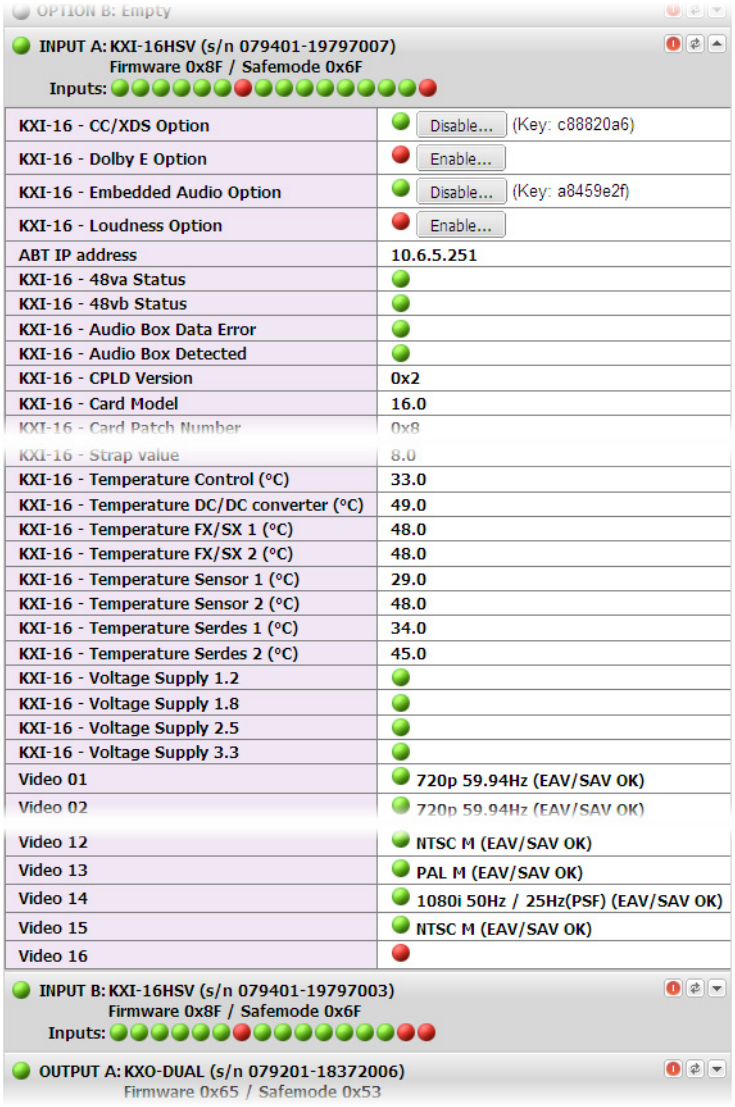


7 Click the arrow button at the end of each card's heading row to view detailed information for this card.



Note: At any time you can click the **Refresh** button to make sure the data displayed for the selected card is up to date. Click the **Reset card** button at the end of a card's heading row to reset the card remotely, directly from your Web browser.

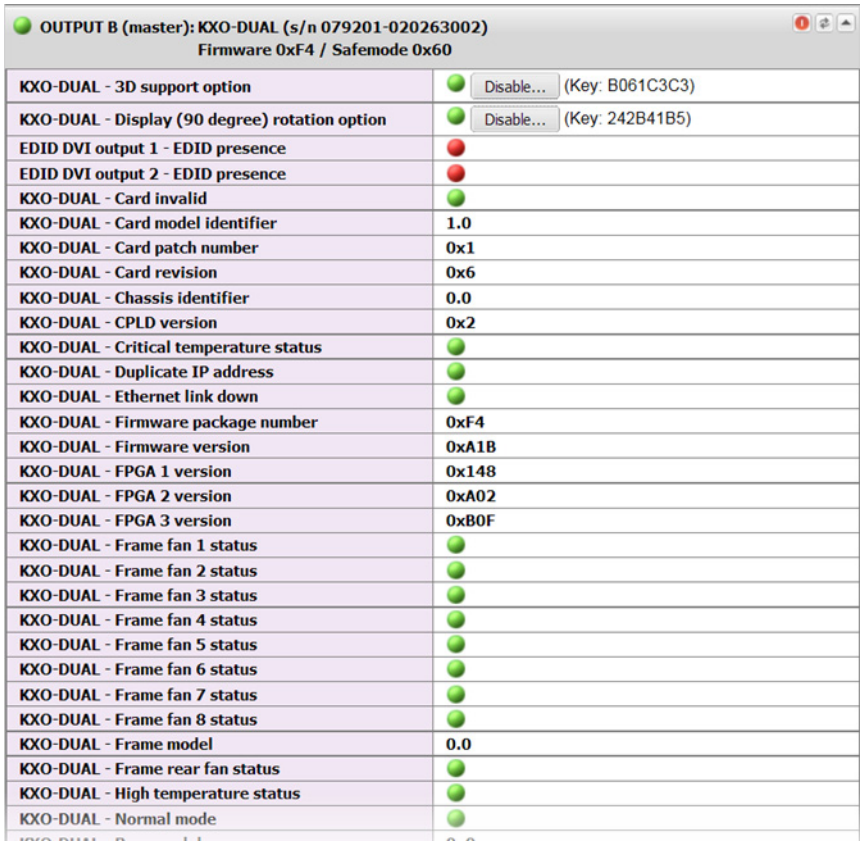
8 Review the enabled card options, and make sure that no card status error is reported.



OPTION B: Empty	
INPUT A: KXI-16HSV (s/n 079401-19797007) Firmware 0x8F / Safemode 0x6F Inputs:	
KXI-16 - CC/XDS Option	Disable... (Key: c88820a6)
KXI-16 - Dolby E Option	Enable...
KXI-16 - Embedded Audio Option	Disable... (Key: a8459e2f)
KXI-16 - Loudness Option	Enable...
ABT IP address	10.6.5.251
KXI-16 - 48va Status	
KXI-16 - 48vb Status	
KXI-16 - Audio Box Data Error	
KXI-16 - Audio Box Detected	
KXI-16 - CPLD Version	0x2
KXI-16 - Card Model	16.0
KXI-16 - Card Patch Number	0x8
KXI-16 - Strap value	8.0
KXI-16 - Temperature Control (°C)	33.0
KXI-16 - Temperature DC/DC converter (°C)	49.0
KXI-16 - Temperature FX/SX 1 (°C)	48.0
KXI-16 - Temperature FX/SX 2 (°C)	48.0
KXI-16 - Temperature Sensor 1 (°C)	29.0
KXI-16 - Temperature Sensor 2 (°C)	48.0
KXI-16 - Temperature Serdes 1 (°C)	34.0
KXI-16 - Temperature Serdes 2 (°C)	45.0
KXI-16 - Voltage Supply 1.2	
KXI-16 - Voltage Supply 1.8	
KXI-16 - Voltage Supply 2.5	
KXI-16 - Voltage Supply 3.3	
Video 01	720p 59.94Hz (EAV/SAV OK)
Video 02	720p 59.94Hz (EAV/SAV OK)
Video 12	NTSC M (EAV/SAV OK)
Video 13	PAL M (EAV/SAV OK)
Video 14	1080i 50Hz / 25Hz(PSF) (EAV/SAV OK)
Video 15	NTSC M (EAV/SAV OK)
Video 16	
INPUT B: KXI-16HSV (s/n 079401-19797003) Firmware 0x8F / Safemode 0x6F Inputs:	
OUTPUT A: KXO-DUAL (s/n 079201-18372006) Firmware 0x65 / Safemode 0x53	

Note: See *Available Hardware and Software Options*, on page 149, for more information on the available options.

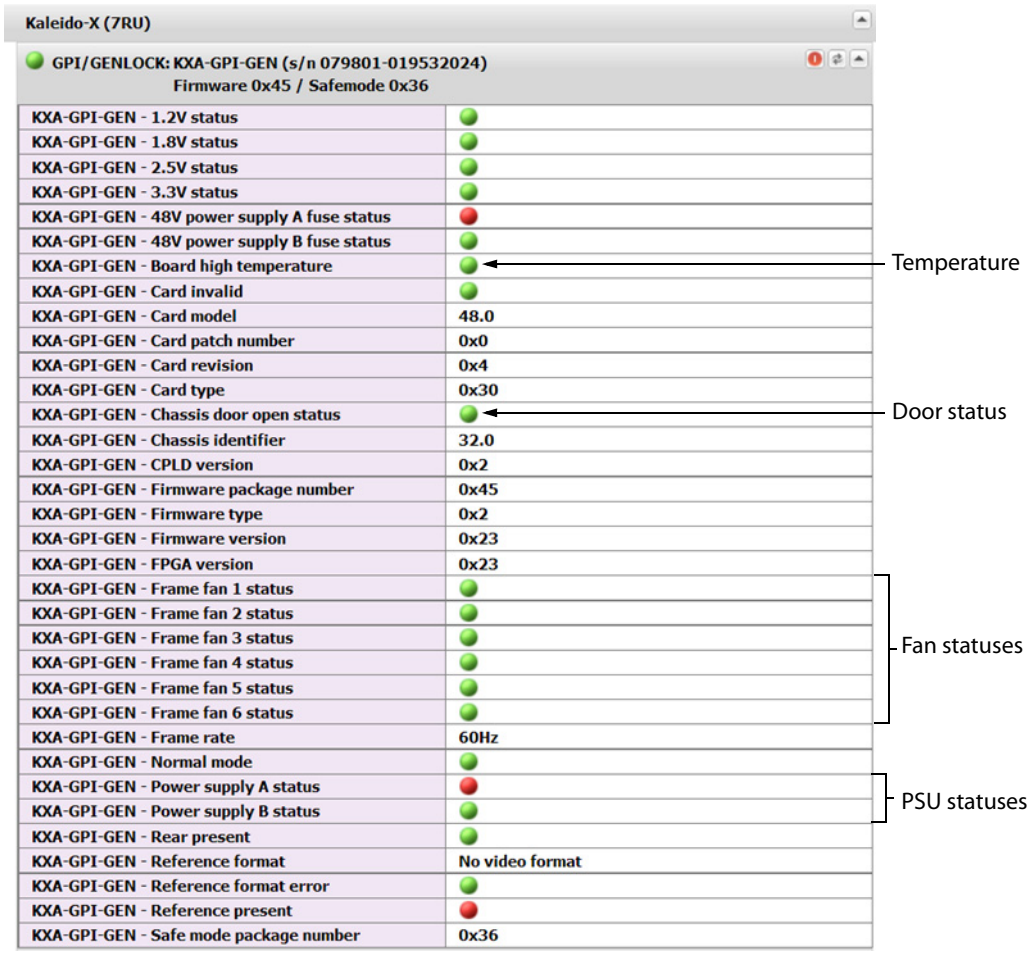
In the case of a Kaleido-X (4RU), fan status information for the frame is listed with the *master* output card's information.[1]



OUTPUT B (master): KXO-DUAL (s/n 079201-020263002) Firmware 0xF4 / Safemode 0x60	
KXO-DUAL - 3D support option	Disable... (Key: B061C3C3)
KXO-DUAL - Display (90 degree) rotation option	Disable... (Key: 242B41B5)
EDID DVI output 1 - EDID presence	
EDID DVI output 2 - EDID presence	
KXO-DUAL - Card invalid	
KXO-DUAL - Card model identifier	1.0
KXO-DUAL - Card patch number	0x1
KXO-DUAL - Card revision	0x6
KXO-DUAL - Chassis identifier	0.0
KXO-DUAL - CPLD version	0x2
KXO-DUAL - Critical temperature status	
KXO-DUAL - Duplicate IP address	
KXO-DUAL - Ethernet link down	
KXO-DUAL - Firmware package number	0xF4
KXO-DUAL - Firmware version	0xA1B
KXO-DUAL - FPGA 1 version	0x148
KXO-DUAL - FPGA 2 version	0xA02
KXO-DUAL - FPGA 3 version	0xB0F
KXO-DUAL - Frame fan 1 status	
KXO-DUAL - Frame fan 2 status	
KXO-DUAL - Frame fan 3 status	
KXO-DUAL - Frame fan 4 status	
KXO-DUAL - Frame fan 5 status	
KXO-DUAL - Frame fan 6 status	
KXO-DUAL - Frame fan 7 status	
KXO-DUAL - Frame fan 8 status	
KXO-DUAL - Frame model	0.0
KXO-DUAL - Frame rear fan status	
KXO-DUAL - High temperature status	
KXO-DUAL - Normal mode	

1. PSU status information is not available in XAdmin for this multiviewer model.

9 Expand the GPI/genlock module (KXA-GPI-GEN) and check the main system statuses of the Kaleido-X frame, to make Make sure that there are no errors or alerts related to system temperature, fan operation, or card fault conditions.



The other statuses should all be normal, although if you left the door open when checking the card LEDs, you may see a warning next to **Chassis door open status**.

Verifying the Kaleido-RCP2

To verify that the Kaleido-RCP2 is functioning normally

- Log on to the Kaleido-RCP2 (see Logging on to the Kaleido-RCP2, on page 144), and then test various operations using the Kaleido-RCP2 keyboard and the mouse (for example load a predefined layout).

Loading a Layout

If your system was configured prior to shipment, a layout already appears on all displays. Otherwise, a gray screen will appear with the following message in the middle: *No layout has been assigned to this room. Please load a layout.*

To load a layout on the monitor wall

- If you have configured a Kaleido-RCP2 (see Configuring the Kaleido-RCP2, on page 142), press any of the LAYOUT PRESETS buttons to load a predefined layout on the monitor wall.

  Note: To access other layouts, press the LOAD button. To assign a layout to a preset button, press and hold the button for more than six seconds while the desired layout is showing on the monitor wall.

- Alternatively, connect a mouse directly to one of the USB ports on your Kaleido-X output cards.
  a Right-click anywhere on the monitor wall, point to **Monitor Wall** (if you clicked a monitor), and then click **Load layout** on the shortcut menu.
  A layout browser appears on the displays associated with the current room. By default, each room is associated with one output card. Each default layout is pre-configured to show 16 video streams for each input card.
  b Select the layout you wish to load from the list of available layouts for this room, and then click **OK**.
  The selected layout appears on the room displays.

Customizing Layouts, Logical Sources, and other Kaleido-IP Elements

Refer to the *Kaleido Software User Manual* to learn how to customize the Kaleido-IP to suit your specific needs. See Related Documentation, on page 15.

Verifying the Audio Bridge Terminal

To verify that the ABT is functioning normally:

- Inspect the ACTIVITY and front panel LEDs on the unit to make sure there are no error conditions:

  The ACTIVITY indicator is located on the right-hand side of the rear panel. This LED reports the status of the Ethernet connection as indicated in the table below.

  Two LEDs are visible on the front panel, one for each power supply. When lit, they both indicate the same status.

  When the ABT is powered up, all three LEDs will be orange until the boot sequence is terminated. This is a visual indicator that the LEDs are functioning properly.

ACTIVITY Indicator on Rear Panel	
Color	Status
Off	No link detected
Green	Normal (good link)

Power-Supply LEDs on Front Panel	
Color	Status
Green	Normal
Flashing green	Normal, rebooting

ACTIVITY Indicator on Rear Panel	
Color	Status
Orange	Activity
Red	Hardware fault
Flashing red	Upgrading firmware

Power-Supply LEDs on Front Panel	
Color	Status
Orange	Warning
Flashing orange	Warning, rebooting
Red	Hardware fault
Flashing red	Upgrading firmware

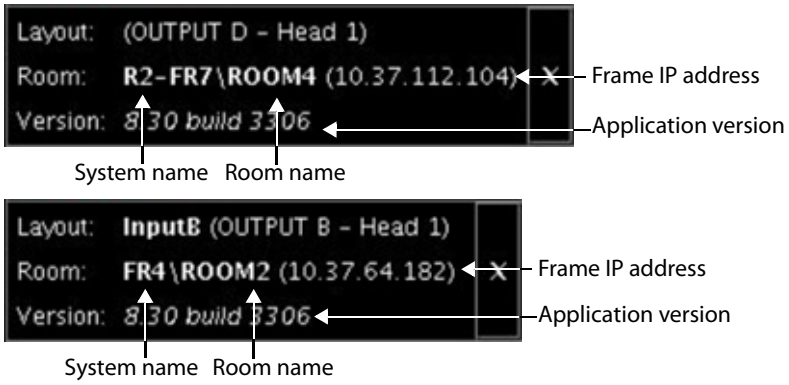
For more information, refer to the *Audio Bridge Terminal Guide to Installation and Operation*. See Related Documentation, on page 15.

Verifying the System IP Address, System Name, and Application Version

To find the system IP address, system name and application version:

1. Connect a mouse to the front USB connector of an output card.
2. Right-click anywhere on the monitor wall.
3. On the menu, point to **Monitor wall** (if you clicked a monitor), and then click **Show dashboard**.

   A small window appears, in the bottom right corner of the display, revealing the frame IP address and the system version. Take note of these values — they will be used later in the configuration process.



Maintenance

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.

   Note: The cards are mechanically configured so that it is impossible to install a card in the wrong slot.

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.

Replacing Power Supply Modules

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.

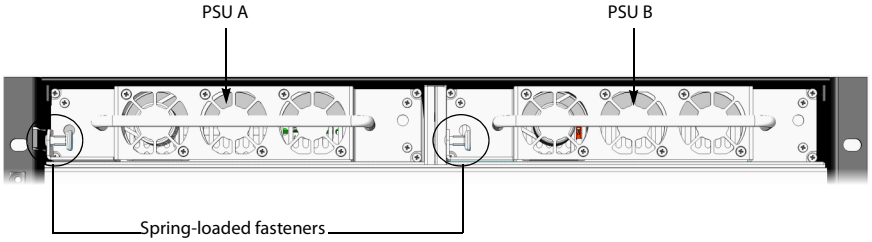
The Kaleido-X is powered by dual redundant power supplies. These are installed at the top of the frame above the cards. The supplies are installed and removed from the front of the frame and are hot-swappable, so that a defective supply may be replaced without removing the Kaleido-X from service.

IMPORTANT

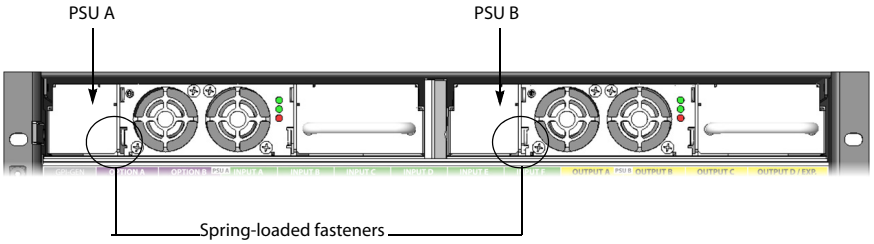
There are two different models of 7RU frames, and two models of power supply units. They are not interchangeable.

- 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.

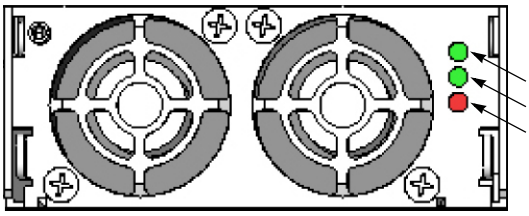


KXA-PSU-7 power supplies on a KXA-FR7 frame



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

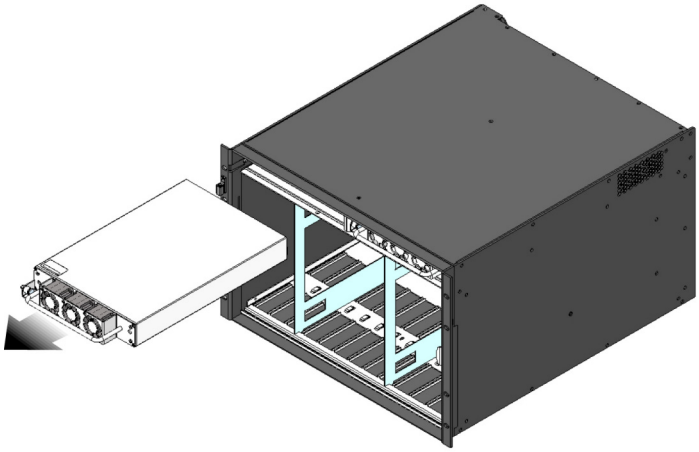
The KXA-PSU-7-B power supply model has three LED indicators:



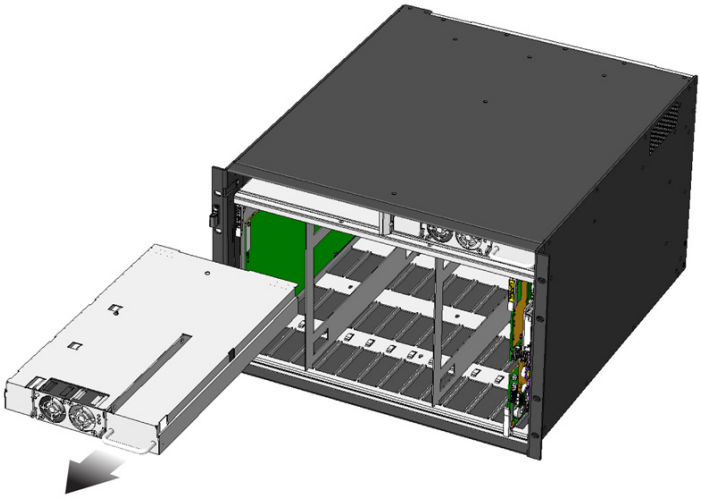
Removing a Power Supply

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.

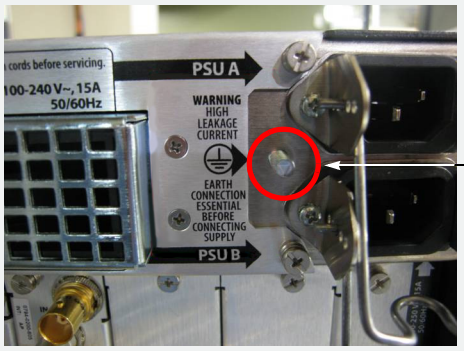
3 Push firmly but gently on the power supply handle until the power supply's connectors have mated with the frame's sockets, and the power supply will go in no further.

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.



Connect a ground cable between this stud and the rack

Replacing Frame Ventilation Fans

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.

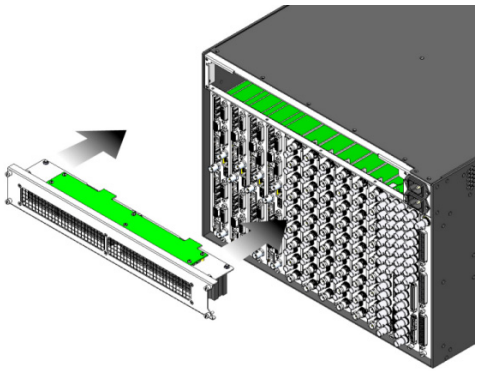
> IMPORTANT
> **The Kaleido-X requires a constant flow of cooling air during operation. DO NOT OPERATE THE UNIT IF THE FAN ASSEMBLY IS DISABLED OR REMOVED.**
> IN THE EVENT OF A FAN FAILURE: contact your nearest support center to get a replacement unit. The system can run with failed fans, but the temperature should be closely monitored using XAdmin and the defective units replaced ASAP.

To remove the fan assembly

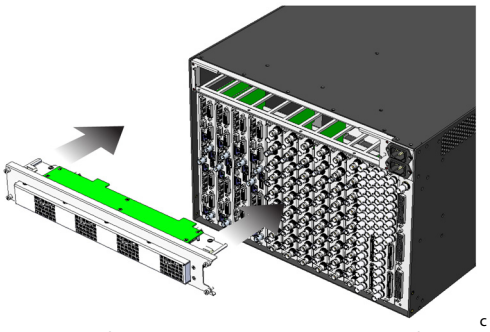
1. Power off the entire frame by unplugging the AC cords.
2. Release the four captive mounting screws at the top and bottom of the fan assembly.
3. Pull the assembly straight out of the frame.

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.

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.

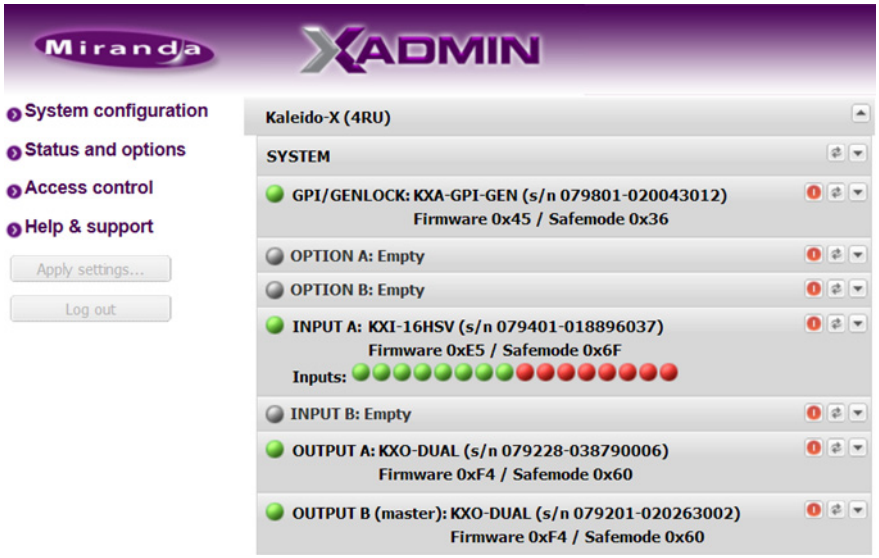
Generating a System Snapshot

A system snapshot creates a compressed file that contains information that can be used by Technical Support for troubleshooting purposes.

To generate a system snapshot

1 Open XAdmin. See Opening XAdmin on page 114.

The XAdmin Status and Options page appears.



2 Click the **Help & support** link in the navigation pane.

The Technical Support page appears.

3 Click **system snapshot**.

The system snapshot generation may take a few moments, after which your browser prompts you to save the resulting compressed folder to your hard drive.

4 Browse to the location where you want to save the ZIP file, and then click **Save**.

Upgrading the Multiviewer

Whenever possible, upgrade the multiviewer to use the latest Kaleido Software version number to take advantage of the latest bug fixes and stability enhancements. See the Kaleido Software Release Notes for more information about a Kaleido Software release.

Pre-upgrade Checklist

IMPORTANT

Back up your system database

Before upgrading the multiviewer system, make sure you have a backup of the current system database so that you can return to the previous Kaleido Software version if necessary. Refer to *Creating a Backup* in the Kaleido Software User's Manual, for details. See Related Documentation, on page 15.

Newer Kaleido Software versions may require upgrades to the KXO-Dual card's CompactFlash storage cards or a RAM upgrade

Find the assembly number for each KXO-Dual card in the multiviewer and using the Kaleido Software compatibility table, determine if you need to upgrade your hardware. See Kaleido Software Minimum Version Compatibility, on page 18.

Earlier Kaleido Software versions may not be compatible with some KXO-Dual3 output cards

KXO-Dual3 output cards have new hardware components that are not compatible with some earlier Kaleido Software versions.

This also may apply to older cards should they be refurbished or repaired to a newer revision level which may require that the multiviewer be upgraded.

Find the assembly number for each KXO-Dual card in the multiviewer and using the Kaleido Software compatibility table, determine if the Kaleido Software version is compatible with your hardware. See Kaleido Software Minimum Version Compatibility, on page 18.

[Ref. #KX-4751] **The "Internal router" logical router is not supported anymore**

When the multiviewer's internal router is controlled from an external router control device or application, and was configured *before* version 5.20 of the Kaleido Software, after upgrading your system to version 5.20 or higher, you may need to:

- add the internal router's physical levels to the first level (i.e. [0] Video) of the KX Router logical router, if you were previously using the now deprecated *Internal router* logical router, and,
- if your external router control device or application uses the SAM (Snell/Pro-Bel) SW-P-08 protocol, then adjust its configuration so that it refers to KX Router's logical router matrix ID.

Refer to *Configuring a Multiviewer's Internal Router,* in the Kaleido Software User's Manual, for more information.

IMPORTANT *(continued)*

Cluster and cascade systems

All multiviewers that are part of a cluster or cascade system must have the same Kaleido Software version.

For cluster systems, Kaleido Software versions 8.70 and 6.50 introduce a hard compatibility break with previous Kaleido Software versions.

Cluster backups you create with version 8.70 and 6.50 (or higher), cannot be restored by using an earlier version of XEdit. Grass Valley recommends you make a backup of the individual databases for every cluster member, *before upgrading* from a pre-8.70 or pre-6.50 version, to version 8.70 or 6.50 (or higher) respectively.

Virtual alarms used in iControl Web pages

The internal representation of virtual alarms has changed as of version 6.30 of the Kaleido Software. If you are upgrading the multiviewer from a version prior to 6.30, then, once the upgrade is complal alarms created in iControl are not affected.

Alarm debouncing may need to be recalibrated

Before upgrading from version 6.50 (or earlier) to version 6.60 (or higher) of the Kaleido Software, make sure to review your system's alarm debouncing calibrations, some of which you may have to modify if you want to maintain the same behavior.

iControl Alarm latching

As of version 6.60 of the Kaleido Software, multiviewer GSMs have their *acknowledgement snooze duration* set to 0 ms, by default. If you have set a non-default value for the acknowledgement snooze duration in the past, you may want to verify whether it is appropriate for your current purposes:

1. In the GSM alarm browser, click the **Admin** tab, and then click **Configuration** on the second-level tab bar.
2. Review the value indicated for **Acknowledgement snooze duration**.
3. Set it to 0 ms if needed, and then click **Save**.

Upgrade Oveview

Upgrade packages are made available by download from a Grass Valley FTP server. The format of the file should be `770-30G01-xxx.zip`. The upgrade package contains:

- the Kaleido Software Upgrade Manager application required to upgrade the multiviewer.
- one or more Kaleido Software operating system (`.os`, `.zip`, or `.run`) files.
- documentation, including the Release Notes.

If you do not have the upgrade package, contact Technical Support (see Grass Valley Technical Support, on page 216).

If you have a **cascade system,** refer to the *Cascade Upgrade* section, in the Cascade Step-by-Step Configuration guide for your system (see Related Documentation, on page 15).

You will need a USB key (not supplied) and a mouse to perform an upgrade of the Kaleido Software system. The USB key should be USB 2.0 compliant, have a capacity of at least 1 GB, and must be formatted using the FAT32 file system. See Upgrading the Multiviewer Using a USB Key on page 171.

Upgrading the Multiviewer Using a USB Key

See Kaleido Software Minimum Version Compatibility, on page 18 for the Kaleido Software compatibility with your current hardware and to identify if any required hardware upgrade may be necessary to be done before you upgrade your multiviewer.

IMPORTANT

Before upgrading the multiviewer system, review the following.

Kaleido-X may require new CompactFlash storage cards
As of version 8 of the Kaleido Software, every KXO-Dual3 output card in a Kaleido-X multiviewer must have a 4 GB CompactFlash storage card on board. Output cards with a 2 GB CF card cannot be upgraded to version 8 (or later). Contact Grass Valley to order the 4 GB CF cards you need (see Grass Valley Technical Support, on page 216).

Upgrading from a version prior to 6.60
Version 6.60 of the Kaleido Software introduced a change in the **alarm debouncing calibrations,** which could result in alarms being raised earlier and more frequently, after upgrading. The following properties have been removed from the list of configurable parameters: **Occurrences** and **Detection window**. After the upgrade, the system behavior will be based on *1* occurrence of an alarm event. A detection window is no longer used.
If, prior to the upgrade, the **Occurrences** parameter was set to a value other than *1,* then you will need to revise the **Set duration** value after the upgrade to take this change into account. For example:

- **Before the upgrade** — If you had the following settings: Occurrences = 3, Duration = 5 seconds, before the upgrade, then an alarm would be raised after 15 seconds.
- **After the upgrade** — The former settings will be replaced with the following: Set duration = 5 seconds, and the alarm will be raised after 5 seconds.

In this example, after the upgrade, you should set the **Set duration** parameter to 15 seconds to maintain the same behavior.
It is recommended to review and note down the alarm debouncing calibrations prior to the update, and to re-calibrate the alarm debouncing as needed after the upgrade.

Upgrading a Kaleido Software multiviewer with KXO-HDM modules from 5.22 (or earlier)
In the case of a Kaleido Software multiviewer that contains output cards equipped with the optional KXO-HDM module, upgrading to version 5.30 or later, from an earlier version of the Kaleido Software requires precautions.
Before upgrading, you must stop all activity on the monitor wall, through either of the following methods:

- Remove all input cards.
- Load special layouts that do not contain any video monitor to all heads in every room associated with the multiviewer, and make sure not to make any layout change until the upgrade has completed.

IMPORTANT *(continued)*

Internal router control

In the case of a multiviewer system whose internal router is controlled from an external router control device or application, and was configured *before* version 5.20 of the Kaleido Software, after upgrading your system to version 5.20 or later, you may need to:

- add the internal router's physical levels to the first level (i.e. [0] Video) of the *KX Router* logical router, if you were previously using the now deprecated *Internal router* logical router, and,
- if your external router control device or application uses the SAM (Snell/Pro-Bel) SW-P-08 protocol, then adjust its configuration so that it refers to KX Router's logical router matrix ID.

Refer to *Configuring a Multiviewer's Internal Router,* in the Kaleido Software User's Manual, for more information. See Related Documentation, on page 15.

Kaleido-X systems may require a RAM upgrade

Kaleido Software version 5.00 and later can be installed on all Kaleido-X multiviewers that have recent KXO-Dual3 output cards. To ensure optimal performance of the software, it is required to have all KXO-Dual output cards configured with a 2 GB RAM module. See Output Card Memory Module Upgrade Procedure, on page 185 to identify if an output card has 1 GB of RAM and for the required card upgrade procedure.

Expansion systems

Kaleido-X (7RU) multiviewers and all cards that are to become part of an expansion system (including spares) must be upgraded to version 3.00 or later, *before* performing the expansion. Once two Kaleido-X frames have been upgraded to version 3.00 or later, and joined in expansion mode, cards with older versions of the Kaleido Software will not work.

Brightness and contrast

After upgrading a Kaleido-X (4RU, 7RU, or 14RU) multiviewer system from a version prior to 2.00, you may have to recalibrate the brightness and contrast. Refer to the Kaleido Software User's Manual for instructions. See Related Documentation, on page 15.

Overview To upgrade your multiviewer

1 Copy the upgrade package files to a USB key (see Preparing a USB Key, on page 172).

2 Upgrade your multiviewer's Kaleido Software and firmware from the USB key (see Upgrading the Kaleido Software and Firmware, on page 174).

3 Verify the version number to confirm that the upgrade was successful (see Verifying the Version Number, on page 177).

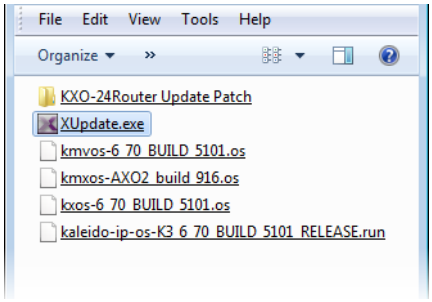
Preparing a USB Key

To copy all files required for the upgrade to a USB key

1 Download the update files onto your PC's hard drive. See Software and Firmware Updates, on page 16.

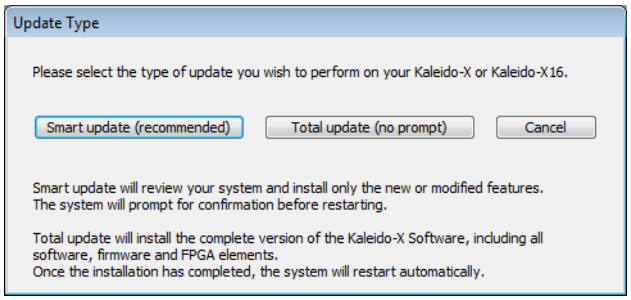
2 Insert a USB key into one of your PC's USB ports.

3 Locate and open the Kaleido Software Upgrade Manager application (XUpdate).



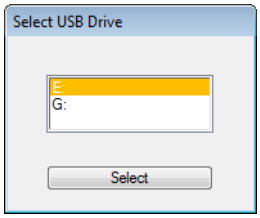
4 On the startup screen, click the appropriate update option for your multiviewer model: **Kaleido-X**

5 When prompted to select a type of update, click **Smart update (recommended)**.



Note: If you click **Total update (no prompt)**, then the update process, once initiated, cannot be halted. This option should only be used to recover from a failed upgrade.

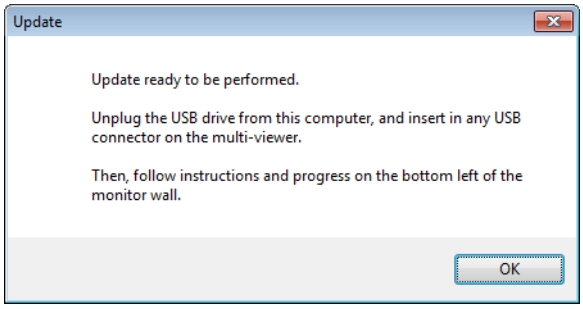
6 If the **Select USB Drive** window appears, click the letter corresponding to the USB key you inserted in step 2, and then click **Select**.



7 When prompted to select an update file, locate and open the following Kaleido Software operating system file, with the following format: `kxos-9.00_build_xxxx-4GB.img`

The `.os` file will be copied to the USB key. This may take a few minutes.

When the copying process has finished, a message appears.



8 Click **OK**.

9 Click **EXIT** on the startup screen.

10 Click the **Safely Remove Hardware** icon in your desktop's notification area, and then click the USB key on the menu. When a message informs you that it is safe to remove the key, do so.

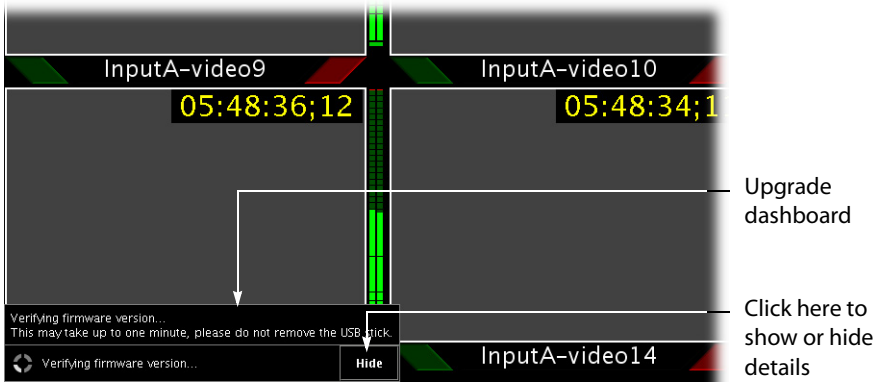
Upgrading the Kaleido Software and Firmware

At this point, you are ready to upgrade the Kaleido system software and firmware. The multiviewer should be powered up, with an active monitor wall display. You will need access to the monitor wall to observe the progress of the upgrade, and you will use a mouse to trigger a system restart from the monitor wall, once the upgrade has completed:

- If you have a Kaleido-RCP2, make sure that it is connected, and that you can use the mouse to move the pointer on the monitor wall. If the mouse is unresponsive, try rebooting the Kaleido-RCP2 by pressing ENTER+ESC+DEL on the Kaleido-RCP2's keypad.
- If your system does not include a Kaleido-RCP2, connect the mouse directly to a USB port on the multiviewer, and then make sure you can move the pointer on the monitor wall. See Troubleshooting with the card's front edge USB connector, on page 180 for more information about using the USB port on the multiviewer.

To upgrade the Kaleido system software and firmware

1 Insert the USB key into any USB port on the multiviewer. After a while, a message appears at the bottom left corner of the monitor wall, reporting that the Upgrade Manager is verifying software, firmware, and safe mode versions.



Note: You can click the **Details** button to view more information. The button label alternates between **Details** and **Hide**.

The firmware verification process may take a minute or so.

Note: If nothing happens, very that you have loaded onto the USB key the correct Kaleido Software operating system file, with the following format: `kxos-9.00_build_xxxx-4GB.img`

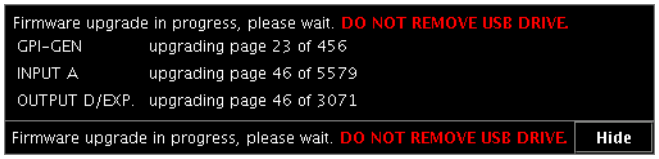
2 Once the verification process is complete, you will be advised what upgrade action, if any, needs to be performed.

IMPORTANT
To cancel the upgrade process, you must click to ABORT within 30 seconds.
During the 30-second countdown period, you may expect that removing the USB key will cancel the upgrade. However, if you do so, the system will still report that it is updating the software, but the upgrade will fail after a minute or so.
Insert the USB key again to properly update your system.

3 The upgrade process begins automatically, starting with the Kaleido Software upgrade.

> IMPORTANT
> All cards are updated in parallel, during which time their status LEDs will be flashing red. Do not interrupt this process. Do not insert or remove cards while an upgrade is in progress.

4 Once the Kaleido Software upgrade is complete, the firmware upgrade begins.



> **Note:** Should the upgrade dashboard report that some cards' software upgrade could not be completed, then proceed with Troubleshooting an Incomplete Upgrade, on page 177.
>
> 
>

When the entire upgrade process has successfully completed, a red button appears at the bottom of the dashboard on all displays that are connected to the system.

5 Click any of the **Upgrade complete** buttons to restart the system.

> **Note:** When the firmware upgrade (or downgrade) process involves several cards (for example, a fully populated expansion system), the dashboard may still be displaying firmware upgrade progress messages while the **Upgrade complete** button has already appeared. You can safely click the button to restart the system at this point.

The multiviewer now restarts.

IMPORTANT

If you are upgrading a Kaleido-X multiviewer from version 5.00 (or earlier) to version 5.10 (or later), and your system includes output cards with KXO-HDM mezzanines, the mezzanines' firmware will now be upgraded.
Upgrading the mezzanines may take up to 20 minutes, during which time their status LED will be orange. Once a mezzanine has completed its firmware upgrade, the output card will restart again.
When you next upgrade your system the card and mezzanine upgrades will take place at the same time, and no additional card restart will be required.

Troubleshooting an Incomplete Upgrade

Should the upgrade dashboard report that some cards' software upgrade failed, then follow the troubleshooting steps below to bring the update to completion.

To bring a partially failed upgrade to completion

- If your system includes *only one output card,* and it failed to be upgraded, remove the USB key, and then repeat the upgrade procedure (see Upgrading the Multiviewer Using a USB Key, on page 171).
- If the upgrade was successful on at least one output card, then:
  a Power down every *output* card by tilting its swivel handle, to lever the connectors apart, and then use the handle to pull the card part way out of its slot.
  b Power down the *input* cards, in the same fashion.
  c Reseat a successfully updated *output* card.
  This card becomes your system's *master* card.
  d Once the master card's startup process has completed, reseat all other cards.

  At this point, the system will recognize that the software version on some cards does not match the master card's version, and a *live update* process will start, to automatically bring all cards to the same version. At the end of the process, all updated cards will automatically restart.

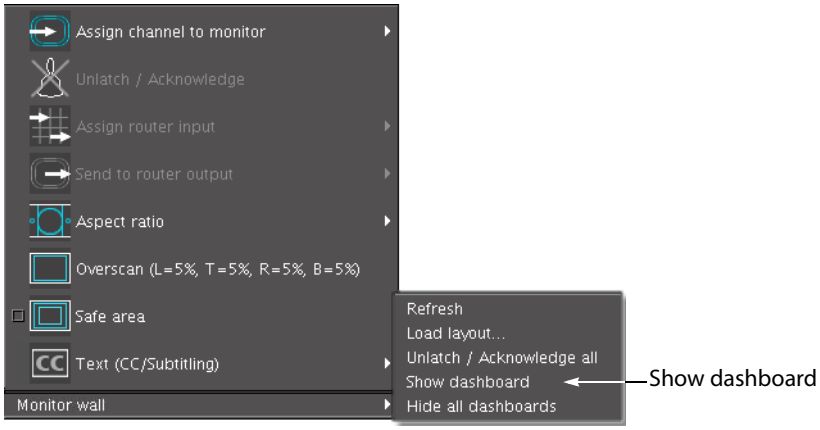
Verifying the Version Number

You can verify the new version number by displaying the dashboard on the monitor wall.

Displaying the Dashboard

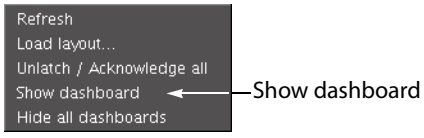
To display the dashboard

1 Right-click anywhere on the monitor wall. On the menu, point to **Monitor wall**, and then click **Show dashboard** to display the dashboard associated with the current head.



Monitor wall menu (within composite monitor menu)

Note: If you right-click the monitor wall background directly, then the monitor wall menu appears immediately. Click **Show dashboard**.



After a brief delay, the dashboard appears at the bottom-right corner of the monitor, and the command **Hide dashboard** replaces **Show dashboard** on the menu.

Dashboard on the monitor wall

Displaying the System's Version Number for a Kaleido-Modular Multiviewer

To display the system's version number on the Densité control panel

1 Press the Select button on the front edge of the Kaleido-Modular card.

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

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

The version of the Kaleido Software that is running on the card (for example, "9.0.0-build.21") appears on the display.

3 Press the Select button on the front edge of the Kaleido-Modular card to exit the control menu.

Downgrading the Multiviewer System

IMPORTANT
Before downgrading your Kaleido Software system, review the following.

- **Alarm debouncing may need to be recalibrated:** before downgrading from version 6.60 (or later) to version 6.50 (or earlier) of the Kaleido Software, make sure to review your system's alarm debouncing calibrations, some of which you may have to modify if you wish to maintain the same behavior. See Upgrading from a version prior to 6.60, on page 171 for details.
- **Kaleido-X (7RU, 4RU, and 14RU):**
  - Multiviewers with output cards that shipped with version 8 (or later), initially or after repairs, cannot be downgraded to a version earlier than 8.
  - Multiviewers with output cards that shipped with version 5.22 (or later), initially or after repairs, cannot be downgraded to a version earlier than 5.22.
  - If you are downgrading a multiviewer from version 5.10 (or later) to version 5.00 (or earlier), and your system includes output cards with **KXO-HDM** mezzanines, you will need to reseat these cards, once the older version of the Kaleido Software is installed and your multiviewer has restarted.
  - **Expansion systems:** before downgrading a Kaleido-X (14RU) expansion system to version 2.20 of the Kaleido Software, you must first split the system into two standalone frames. See Splitting an Expansion Frame, on page 73 and Recovering From a Failed Downgrade, on page 77.
  - Grass Valley does not recommend downgrading a Kaleido Software system to a version earlier than 2.10.

To downgrade your multiviewer to an earlier version of Kaleido Software

- Follow the upgrade instructions in the Release Notes that were published for the Kaleido Software version you want to downgrade to.

Troubleshooting

Troubleshooting with the card's front edge USB connector

A USB mouse can be directly connected to the multiviewer card for troubleshooting purposes (as opposed to connecting the mouse to a Kaleido-RCP2, for instance) with the following conditions.

- The pointer can only travel between the displays supported by that card.
- When more than one display is connected to the card, the required mouse movement to go between displays does not always follow the wall layout set in XEdit. For example, you will have to move the mouse pointer horizontally or vertically in order to go from one display to the next.

Dashboard Messages

The following tables explain messages that may appear in the *Status dashboard* (lower right corner) and in the *Upgrade dashboard* (lower left corner), on the Monitor wall.

Status dashboard messages

Message	Description
PSU A 48 V	PSU A is absent, overheating, has a DC circuitry fault condition, or no current is drawn from it.
PSU B 48 V	PSU B is absent, overheating, has a DC circuitry fault condition, or no current is drawn from it.
PSU A 48 V Fuse	PSU A fuse is blown.
PSU B 48 V Fuse	PSU B fuse is blown.
Duplicate IP Address Detected	Another equipment on the network shares the same IP address as an output card.
Ethernet Link Down	The output card to which this display monitor is connected has lost its network connection.
Rear Fan 1	Fan 1 is running too slow or not at all (replace whole module if in error).
Rear Fan 2	Fan 2 is running too slow or not at all (replace whole module if in error).
Rear Fan 3	Fan 3 is running too slow or not at all (replace whole module if in error).
Rear Fan 4	Fan 4 is running too slow or not at all (replace whole module if in error).
Rear Fan 5	Fan 5 is running too slow or not at all (replace whole module if in error).
Rear Fan 6	Fan 6 is running too slow or not at all (replace whole module if in error).
Board temperature high	This warning means that a card is warmer than normal and that you should verify cooling and ventilation (for example, check for anything obstructing the ventilation openings).
Board temperature critical	This alarm means that a card is overheating, which might result in decreased system performance (for example, green dots, flickering, card not starting). You should halt operations until the overheating problem is resolved.

Status dashboard messages *(continued)*

Message	Description
Card temperature critical	Card is overheating, which might result in decreased system performance (for example, green dots, flickering, card not starting). You should halt operations until the overheating problem is resolved.
Card temperature high	Temperature warning; this indicates that the card is warmer than normal and that you should verify cooling and ventilation (for example, check for anything obstructing the ventilation openings).

Upgrade dashboard messages

Message	Description
Error during firmware upgrade. Firmware upgrade cannot proceed until legacy KXO (<3.00) are removed from frame B.	This message will appear on an expansion frame with expansion enabled and with cards in Frame B running software or firmware older than version 3.00. To upgrade these cards, transfer them to Frame A.
Error during firmware upgrade. Card presence from frame B could not be verified.	This message will appear as a side effect of the presence of cards in Frame B running a version older than version 3.00. The upgrade will not be permitted on any card in the frame until these cards are removed from Frame B. To upgrade these cards, transfer them to Frame A.
Error during firmware upgrade. Duplicate IP has been detected. We cannot continue checking the Firmware version.	This message will appear if duplicate IP addresses are detected between different KXO cards in the frame. As long as this is the case, no upgrade is possible. You must resolve the duplicate IP address issue before resuming the upgrade.
Error during firmware upgrade. The current firmware version could not be verified.	This message will appear if software cannot retrieve firmware version from the cards. This may indicate an issue with the hardware.
Error during safemode upgrade. The current safemode version could not be verified.	This message will appear if software cannot retrieve safemode version from the cards. This may indicate an issue with the hardware.
Error during safemode upgrade. Card presence from frame B could not be verified.	This message will appear as a side effect of the presence of cards in Frame B running a version older than version 3.00. The upgrade will not be permitted on any card in the frame until these cards are removed from Frame B. To upgrade these cards, transfer them to Frame A.
Cannot upgrade card in this slot (if any). Please remove card from [slot number].	This message will appear on an expansion frame if Frame B contains cards running software or firmware older than version 3.00. The upgrade will not be permitted on any card in the frame until these cards are removed from Frame B. To upgrade these cards, transfer them to Frame A.

Upgrade dashboard messages *(continued)*

Message	Description
Cannot upgrade card in this slot. Move card to frame A or swap with card in frame A. Upgrade will proceed after current upgrade.	This message will appear on an expansion frame if Frame B contains cards running software or firmware older than version 3.00. The upgrade will not be permitted on any card in the frame until these cards are removed from Frame B. To upgrade these cards, transfer them to Frame A.
Cannot continue the upgrade until card in this slot is moved to frame A.	This message will appear on an expansion frame with expansion enabled and with cards in Frame B running software or firmware older than version 3.00. To upgrade these cards, transfer them to Frame A.

Troubleshooting Common Issues

Troubleshooting consists of using fault-isolation techniques to narrow down the probable cause to a specific multiviewer component. Schedule these maintenance operations during off hours when the system is not in use if possible as troubleshooting can cause outage. Use the following troubleshooting table to diagnose common issues and take corrective actions to restore operation.

Symptom	Probable cause	Test	Corrective action
Source signal input is unavailable.	Signal feed is unavailable.	Apply a signal from signal generator test set or another source to the multiviewer's input.	Verify what the input status LEDs show. See Verifying that the Cards are Ready, on page 90.
	Poor connection	The input status LED is amber.	Trace the cable's path and ensure connections at both ends are good.
Closed captioning/XDS / Dolby E / SCTE / Loudness does not work for certain tiles / video feeds.	Insufficient licenses have been installed.	View license status in XAdmin for each card. See Enabling Options, on page 150. Valid licenses have a green dot.	Purchase and install a license for each card as required. Contact Technical Support for more information and see Available Hardware and Software Options, on page 149. See Grass Valley Technical Support, on page 216.
Kaleido Software upgrade / downgrade has failed	A Kaleido Software installation requirement was not observed	Review the Kaleido Software Release Notes for information about compatibility, requirements, limitations, known issues, and bug fixes for a given software version. Confirm that the multiviewer's memory has sufficient capacity for the upgrade.	Install a software version that is compatible with your hardware or upgrade your hardware as required. See Upgrading the Multiviewer Using a USB Key on page 171 for the multiviewer's software requirements. See See Related Documentation on page 15.
System behaves erratically and unpredictably	The card's database has become corrupted.	-	Using XEdit, restore a database backup
Occasional frame repeats. At failure, a brief impact on whole display is noticed. ½ second to re-lock.	Loss of Genlock signal.	System will switch over to its internal frame rate. See the reference source shown in XAdmin.	Make sure that the external reference is connected to the multiviewer. See GPI/Genlock Rear Panel Connections, on page 83.

Symptom	Probable cause	Test	Corrective action
After restarting the whole system or after inserting an output card, the displays connected to the rear module of this output cards shows a black screen for over 7 minutes.	The Ethernet cable connected to the rear module of the card is not connected to a network	If the cable is connected to the card rear module, check that an amber LED is blinking next to the Ethernet cable connector. If not, the cable is not properly connected to a network	In order to work properly, an output card must be connected to a network switch. All Kaleido-X output cards must be network connected to start properly. When using an isolated Ethernet hub or switch from a LAN or WAN, make sure that it is powered on.
A display shows grey windows in the layout(s)	The bypass switch (the upper one in front of the card) is activated	-	Pressing the bypass switch may solve the problem (when videos come back immediately)

Should you need further assistance, see Grass Valley Technical Support, on page 216.

Swapping around a Card in a Multiviewer

Schedule this maintenance operation during off hours when the system is not in use if possible as this procedure can cause multiviewer outage.

In an attempt to restore multiviewer operation and to perform fault isolation procedures, you can swap the position of cards around in the multiviewer's frame to see if the problem follows the card or to see if normal multiviewer operation can be restored.

To swap the position of a card around in the multiviewer, you must first identify two identical cards installed in the multiviewer's frame. For example, the model number marked on each card's ejector tabs are the same. If two identical cards are found, eject both cards from the multiviewer's frame and exchange their positions within the frame before firmly reinserting the cards into the frame. To RMA a defective card, see Grass Valley Technical Support, on page 216.

Known Issues

- If a firmware update begins upon insertion of an input card, inserting a second input card, or making a change to another card via XEdit, will cause the update to fail. The input card on which the update failed will enter safe mode.

Swapping around a Power Supply in a Multiviewer

Schedule this maintenance operation during off hours when the system is not in use if possible as this procedure can cause multiviewer outage.

In an attempt to restore multiviewer operation and to perform fault isolation procedures, you can swap the position of a power supply around in the multiviewer frame to see if normal multiviewer operation can be restored.

If the frame has an empty power supply slot (for example, for a redundant power supply unit (PSU)), you can remove the PSU from the frame and insert it into the other power supply slot. See Replacing Power Supply Modules, on page 162. Ensure to connect a power cable at the rear of the frame's chassis for the PSU's new position in the frame. To RMA a defective PSU, see Grass Valley Technical Support, on page 216.

Output Card Memory Module Upgrade Procedure

An output card that has 1 GB RAM used with Kaleido Software version 5.00 or higher is not supported. To correct this issue, you must upgrade the RAM on the output card to 2 GB. The following procedures show you how to identify an output card that has 1 GB of RAM, and how to upgrade the memory module on the card.

Identifying Output Cards that were Factory Shipped with 1 GB RAM

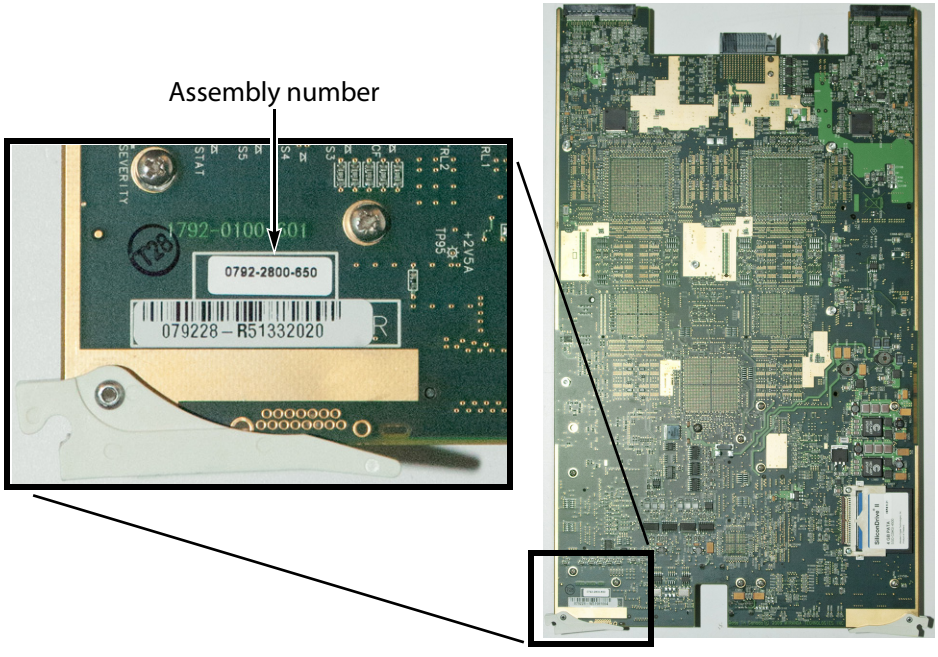
To know the amount of memory a card had factory-installed when it was shipped can be found by using the card's assembly number. See Finding the KXO-Dual card's assembly number, on page 185.

Once you have found the card's assembly number, use the table in Kaleido Software Minimum Version Compatibility, on page 18 to find the amount of factory-installed memory. If the a Kaleido-X output card was factory shipped with 2 GB RAM, then no further action is needed.

If the card was factory shipped with 1 GB RAM according to the table in Kaleido Software Minimum Version Compatibility, on page 18, the card may have been already upgraded to 2 GB RAM in the field. Due to this, you will need to verify the amount of RAM installed on the card by inspecting a snapshot of your system. See Verifying the Amount of RAM Installed on Kaleido-X Output Cards, on page 186.

Finding the KXO-Dual card's assembly number

To find the card's assembly number, look at the underside of the board near the bottom ejector (see picture below). The assembly number is printed on a small white label.

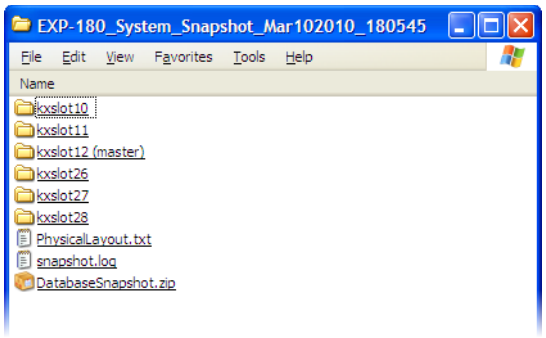


Verifying the Amount of RAM Installed on Kaleido-X Output Cards

To verify whether a KXO-Dual output card has 1 GB or 2 GB of RAM

1 Open XAdmin's Technical Support page, to download a system snapshot (see "Generating a System Snapshot" in the Kaleido Software User's Manual; see Related Documentation, on page 15), and then extract the content of the ZIP file to a folder on your local hard drive.

2 Open the folder where you extracted the system snapshot, and notice that it contains a number of subfolders whose name starts with "kxslot". There is one such folder for each output card. For example, the system snapshot folder for an expansion system with six output cards would look like this:



3 Referring to the tables below, identify which *kxslot* folder corresponds to the output card whose RAM capacity you wish to verify:

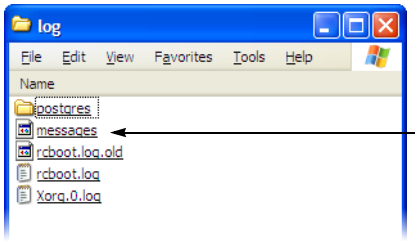
Kaleido-X (7RU)

Card	Folder
Output A	kxSlot10
Output B	kxSlot11
Output C	kxSlot12
Output D	kxSlot13

Kaleido-X (14RU)

Frame A		Frame B	
Card	Folder	Card	Folder
Output A	kxSlot10	Output A	kxSlot26
Output B	kxSlot11	Output B	kxSlot27
Output C	kxSlot12	Output C	kxSlot28

4 Open the folder you just identified, and navigate to `/var/log/messages`:



5 Open this file (`messages`) in a text editor. Alternatively you can also drag the file onto a browser window.

6 Search for a line where information similar to the following appears:

```
Mar 10 09:39:42 localhost kernel: Memory: 2044012k/2064192k available
(1354k kernel code, 19084k reserved, 468k data, 108k init, 1146688k
highmem)
```

-OR-

```
Mar  5 15:07:59 localhost kernel: Memory: 1004248k/1015616k available
(1354k kernel code, 10876k reserved, 468k data, 108k init, 98112k
highmem)
```

7 There may be more than one occurrence. Notice the date and time indicated at the beginning of the line, and keep searching until you have found the *most recent* entry in the file.

- If you see the string `Memory: 2044012k`, as the most recent entry, then this card already has **2 GB** of RAM, and does not need to be upgraded.
- If you see the string `Memory: 1004248k`, as the most recent entry, then this card only has **1 GB** of RAM, and you must order a memory upgrade kit. Note down the card's serial number; you will need to remember which card(s) need the memory upgrade, when you receive the new RAM modules.

8 Repeat the procedure for every output card whose RAM capacity you need to verify.

9 Once you have identified how many (if any) of your KXO-Dual cards only have a 1 GB RAM module, contact your Grass Valley sales representative to *order one memory upgrade option for every KXO-Dual card that must be upgraded.* See Grass Valley Technical Support, on page 216.

10 When you receive the new RAM modules, install them on the cards you identified (see Replacing / Upgrading the Memory Module on KXO-Dual Output Cards, below).

Replacing / Upgrading the Memory Module on KXO-Dual Output Cards

When the output card is equipped with 1 GB or RAM, then a memory upgrade is recommended. The memory upgrade kit includes a 2 GB memory module and a self-adhesive wire clamp (part no. 2400-0040-0).

To replace the memory modules on output cards within your Kaleido-X system, you must proceed according to a specific sequence:

- **In the case of a standalone Kaleido-X frame,** start with the KXO-Dual card in slot D, and then continue with the cards in slots C, B, and A (in this order).

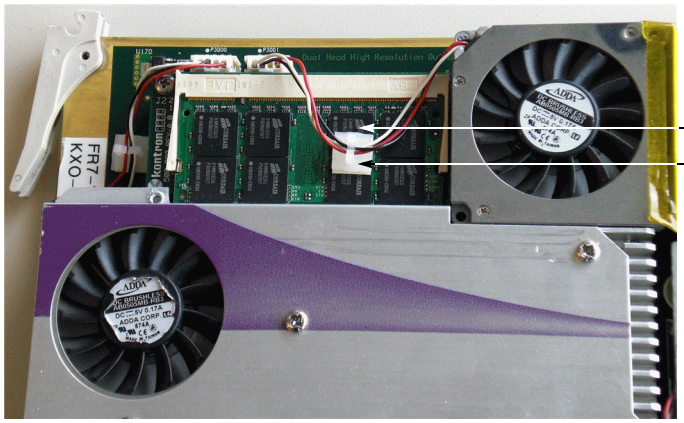
- **In the case of a Kaleido-X Expansion system,** start with the KXO-Dual card in Frame A slot C, then continue with the cards in slots B, and A. Next move on to Frame B slot C, and continue with the cards in slots B, and A (in this order).

> **WARNING**
> Before starting, make sure you are properly grounded, and all static electricity build-up has dissipated.

To remove the memory module on a KXO-Dual card

1 Remove the KXO-Dual card from the Kaleido-X system.

2 Locate the memory module near the front edge of the card in the corner that is enclosed by two fans:



3 If there is a plastic clamp holding fan wires glued on top of the memory module, carefully release the wires from the clamp.

4 Release the two retaining clips holding the memory module in place.

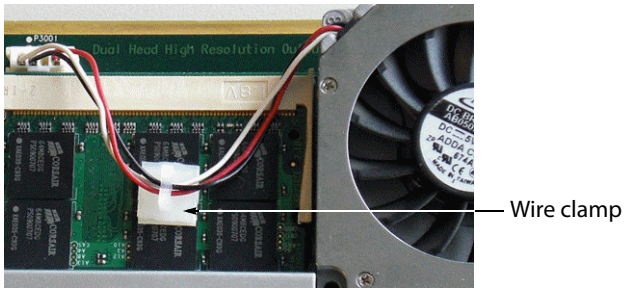
5 Pull the memory module away from the card at a 45 degree angle.

To install the replacement memory module on the KXO-Dual card

1 Insert the replacement memory module at a 45 degree angle.

2 Carefully press the memory module down so that the retaining clips lock into place.

3 Attach the self-adhesive wire clamp (part no. 2400-0040-0) to the top of the memory module, and carefully secure the fan wires as shown below:



4 Re-seat the KXO-Dual card into the frame. The card will now restart.

5 Once the card restart has completed, repeat the above procedures (remove module, install replacement, attach clamp, and secure fan wires) with the next card, until you have replaced the memory module on all KXO-Dual output cards in your system.

Disposal and Recycling Information

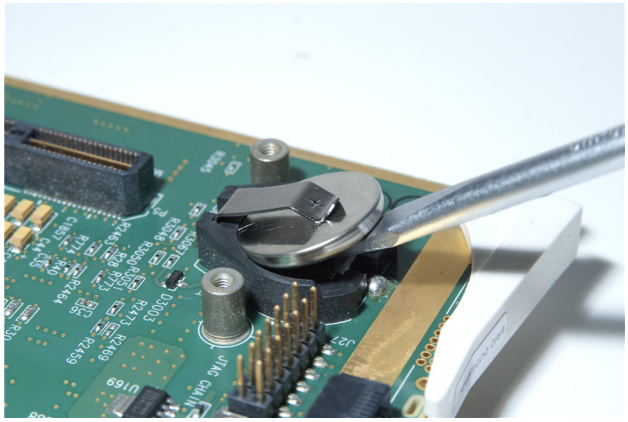
Your Grass Valley equipment comes with at least one lithium button battery (Li-MnO_2) located on the main printed circuit board. The batteries are used for backup and should not need to be replaced during the lifetime of the equipment.

Before disposing of your Grass Valley 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.
>
> 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 Grass Valley.

8 Kaleido-IP/Kaleido-X Cascade Step-by-Step Configuration

This chapter explains how to connect two multiviewers — a Kaleido-IP and a Kaleido-X in cascade mode, and how to configure and operate them as a single system. Both multiviewers must use the same Kaleido Software version of 6.40 or higher.

Introduction

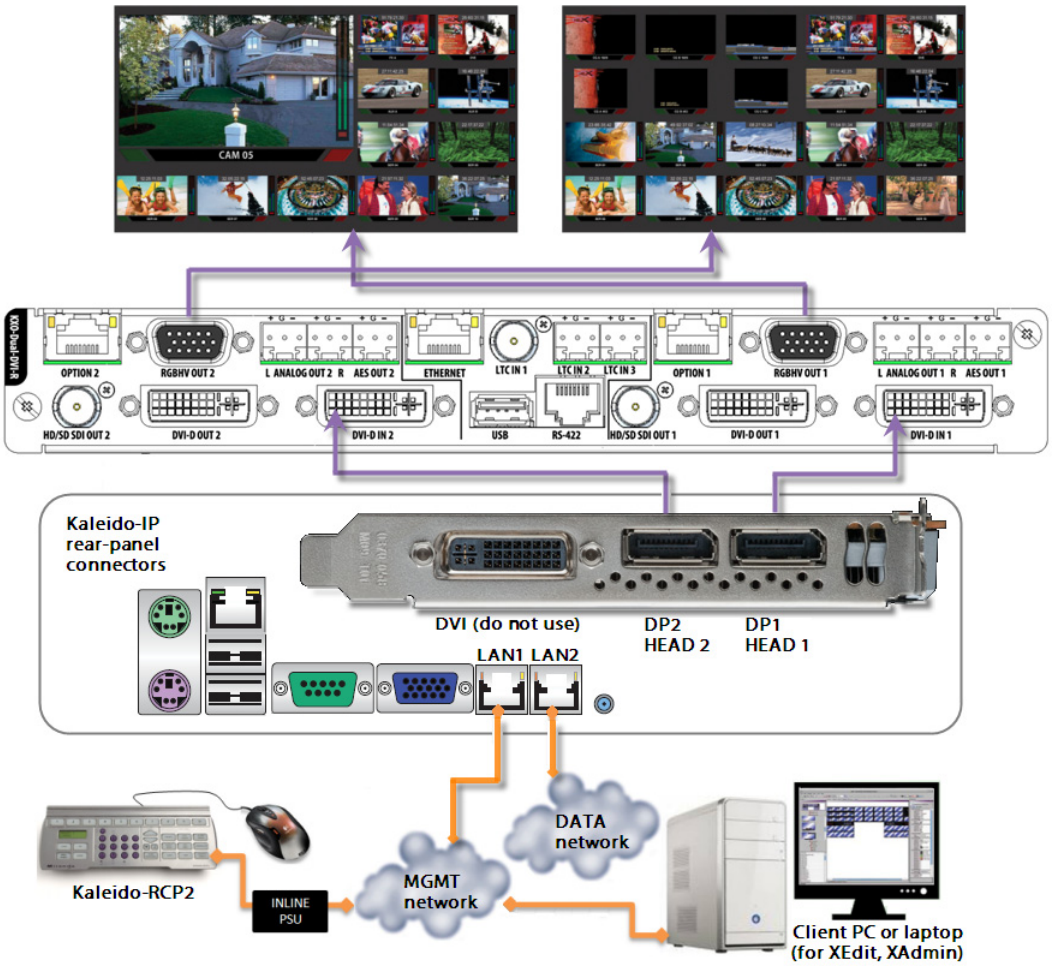
Depending on your purposes, you may wish to monitor both baseband and IP sources at once, on the same monitor wall display. This can be achieved by configuring a *hybrid* cascade system, involving one Kaleido-IP multiviewer and one Kaleido-X multiviewer.

With a Kaleido-IP/Kaleido-X Cascade system, the Kaleido-IP provides some parts of the monitor wall image, sends it to the Kaleido-X, which adds some more elements to the output and then sends the resulting output to the monitor wall. Unlike the cluster, whose purpose is to increase the number of output heads in a room, the hybrid cascade not only increases the maximum number of inputs that can be displayed to a single head but also allows you to display both IP sources and baseband sources to the same head.

To configure your Kaleido-IP and Kaleido-X multiviewers as a cascade system, you need to physically connect one Kaleido-IP output to a DVI input on the Kaleido-X multiviewer. Then connect a display to the appropriate output on the Kaleido-X. Once you have defined your cascade system and room in XEdit, you will be able to operate the cascade as a single multiviewer.

Physical Installation

To interconnect the Kaleido-IP and the Kaleido-X multiviewers in a cascade room with a single output head, you will need a good-quality DisplayPort-to-DVI cable, as short as possible. For a cascade room with two output heads, then you will need two such cables.



To interconnect a Kaleido-IP and a Kaleido-X into a cascade

1 Connect one of the Kaleido-IP's DisplayPort outputs to a DVI input on the Kaleido-X output card that will be connected to the monitor wall.

2 In the case of a cascade room with two output heads, connect the second DisplayPort output on the Kaleido-IP to the second DVI input on the Kaleido-X.

> Note: Although nothing prevents you from connecting any DisplayPort output to any DVI input, the recommended practice is to choose the most logical signal path, by connecting DP1 to DVI-D IN 1, and DP2 to the same output card's DVI-D IN 2. Configuring your cascade system in XEdit will then be straightforward.

3 Connect the appropriate outputs on the Kaleido-X to one or two monitor wall displays, depending on your specific purposes.

Cascade Configuration in XEdit

Adding Multiviewers to a Cascade

The Kaleido Software's support for cascade systems is based on the cluster feature. Therefore, like a cluster, a cascade system must meet the following requirements:

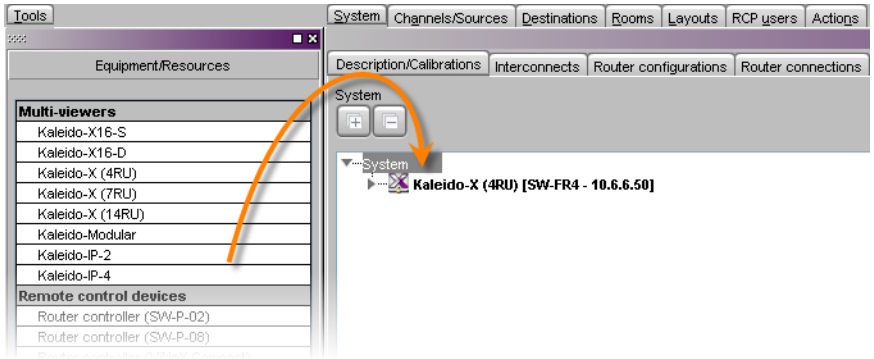
- The multiviewers you wish to add to a Kaleido-IP/Kaleido-X cascade must use Kaleido Software version 6.40 or higher, and both cascade members must use the same version of this Kaleido Software.
- Each multiviewer you wish to add to a cascade must have a unique name.
- Do not change the system name of a multiviewer or its IP address, once it has been added to a cascade, if the other multiviewer is offline or otherwise unavailable. This would cause all head assignments to become unknown. If you must rename a multiviewer, or change its IP address, while the other member of the cascade is unavailable, remove it from the cascade configuration first, and then add it again after you made the required change. You will then need to reconfigure the head assignments for any room that includes display screens associated with the renamed multiviewer (see Repairing a Cascade Configuration on page 196).
- A multiviewer can only be part of one cascade or cluster system at any time. XEdit will not let you add a multiviewer that is already included in a different cascade or cluster system.

To add multiviewers to a cascade

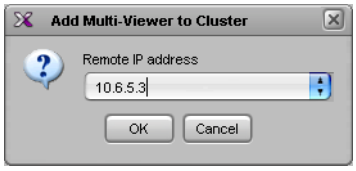
1 Open XEdit, and then click **Connect** on the **Configure** menu, to access the Kaleido-X (i.e. the multiviewer that will output directly to the monitor wall).

You can now create a cluster by adding the Kaleido-IP to your system configuration.

2 In the equipment library, select any multiviewer type, and then drag it onto the root of the System hierarchical list.



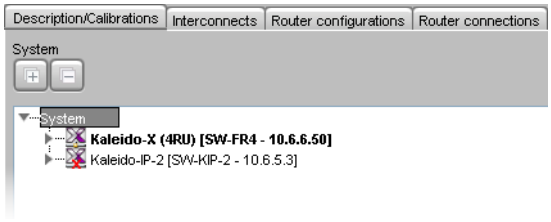
The **Add Multiviewer to Cluster** window appears.



3 If your PC and the multiviewer you wish to add are on the same subnet, then you can select the multiviewer's IP address from the list. Otherwise type the appropriate IP address in the box.

4 Click **OK**.

The multiviewer is added to the System list.

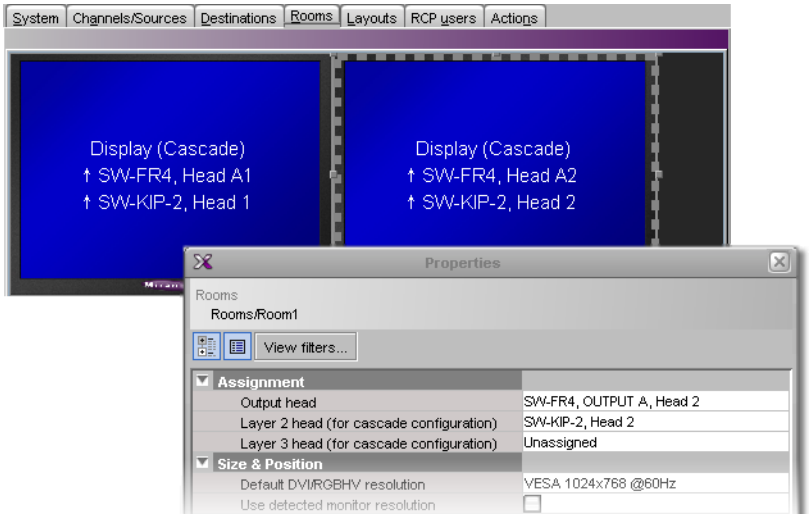


Notes

- The system type is automatically adjusted based on the actual target system.
- Each member of a cluster has its own database where both common information about the cluster and information local to the individual cluster member are stored. Room and layout definitions are automatically replicated to all cluster members, whereas the configuration for devices connected to a specific system is only stored in this system's database.

Configuring Cascade Rooms

In a Kaleido-IP/Kaleido-X cascade room, each cascaded display is assigned heads from both multiviewers, configured as layers, by setting the display's **Output head** and **Layer 2 head** property to match the actual head order in your physical configuration.



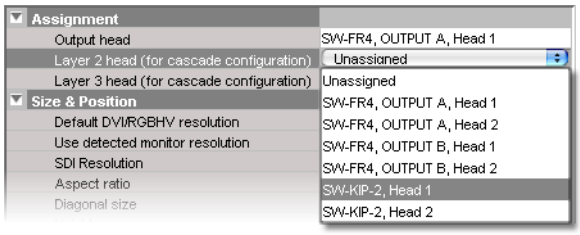
To configure a cascade room

1 In XEdit, while connected to the Kaleido-X, open the room you wish to configure.

Note: If the room does not exist yet, create it by adding the appropriate number of displays, and then assign heads from the current multiviewer to the displays in the usual fashion.

2 Click a first head. In the **Properties** pane, its name appears in the **Output head** box.

3 Select the appropriate Kaleido-IP head from the **Layer 2 head (for cascade configuration)** list.



Since the Kaleido-IP/Kaleido-X cascade does not support a third layer, leave **Layer 3 head (for cascade configuration)** unassigned.

4 In the case of a dual-head cascade room, repeat the procedure to configure the head layer assignments for the other Kaleido-X head.

5 On the **File** menu, click **Save**.

The updated room configuration is automatically propagated to the Kaleido-IP.

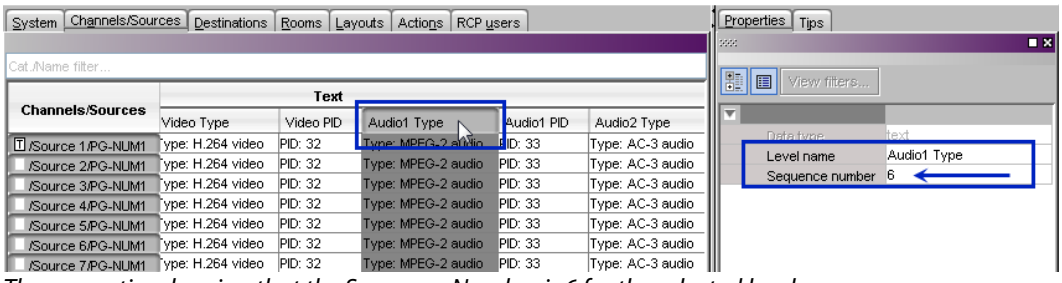
Configuring Layouts for a Cascade Room

Creating cascade layouts is no different than creating any regular layout. The only limitation is that all layout creation and configuration must be performed in online mode, while connected to one of the cascade members.

- When you configure layouts for a cascade room, all logical sources from all the multiviewers associated with this cascade room are available.
- When you save a Kaleido-IP/Kaleido-X cascade layout, any changes are automatically propagated to the other multiviewer in the cascade.

Setting the Same Channels/Sources Content Between Multiviewers

When configuring the Alarm and Text Levels in XEdit under the *Channels/Sources* tab, you must ensure that both the level names and level order are identical on all cascaded multiviewers. The level order is determined by the *Sequence number*. When you click a level name, the *Sequence number* for that column is shown under the *Properties* tab in the right pane. The *Sequence number* for a given level must match across all cascaded multiviewers. Otherwise text levels and alarms behavior will be incoherent depending on which multiviewer is providing the alarm data and which multiviewer is presenting the alarm data. Internally, the multiviewers process the source column based on the column's *Sequence number* only.



The properties showing that the Sequence Number is 6 for the selected level name

Repairing a Cascade Configuration

While connected in XEdit to a multiviewer that is part of a cascade, if you change the system name or IP address of this multiviewer while another cascade member is offline or otherwise unavailable, the underlying cluster's integrity will be broken. If you attempt to make such a change, XEdit will alert you of the situation, prompting you to cancel the operation and try again later, when all cascade members are available. However, in the advent that such a change was made by mistake, or that is had to be forced for some reason, you will have to repair the broken cascade.

> Note: In the procedure below, *System A* refers to the system whose name or IP address was changed while another multiviewer, referred to as *System B,* was unavailable.

To repair the cascade configuration

1. In XEdit, connect to *System B,* the multiviewer that was unavailable when the change was made, once it is available again.
2. In the **Description/Calibrations** tab, remove *System A* from the cluster, and then add it back to the cluster.

   If only the IP address was changed then no further action is required. Otherwise, if the system name was changed, then proceed as follows.
3. Connect to *System A*.
4. Change something in every room (for example, move a display and then bring it back to its initial position) to enable the **Save** button, and then save the room.

   This will replicate the proper room configuration to the other member of the cascade. (At the same time, the layouts will also be updated on all multiviewers in the cascade.)

Cascade Upgrade

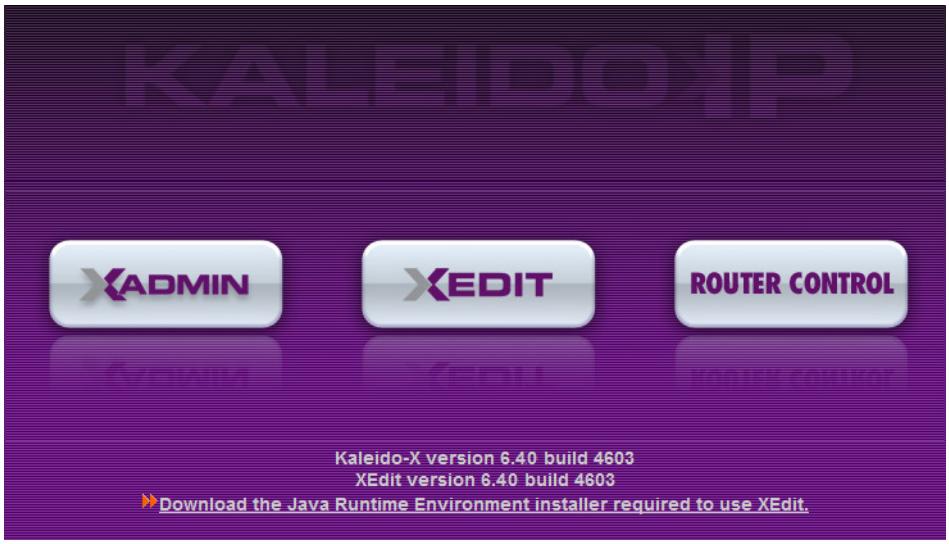
Update the multiviewers that are part of a Kaleido-IP/Kaleido-X cascade in sequence, starting with the multiviewer farthest from the monitor wall (i.e. the Kaleido-IP), and finishing with the one connected to the monitor wall displays (i.e. the Kaleido-X). When you restart one multiviewer at the end of its update process, you can start updating the other without waiting for the restart to be completed.

To upgrade a Kaleido-IP/Kaleido-X cascade system

1 Load an empty layout on the monitor wall, or make sure that the bottom area of the current layout is empty.

2 From a workstation on the same subnet, open a Web browser window and type the Kaleido-IP's *management* IP address in the address bar.

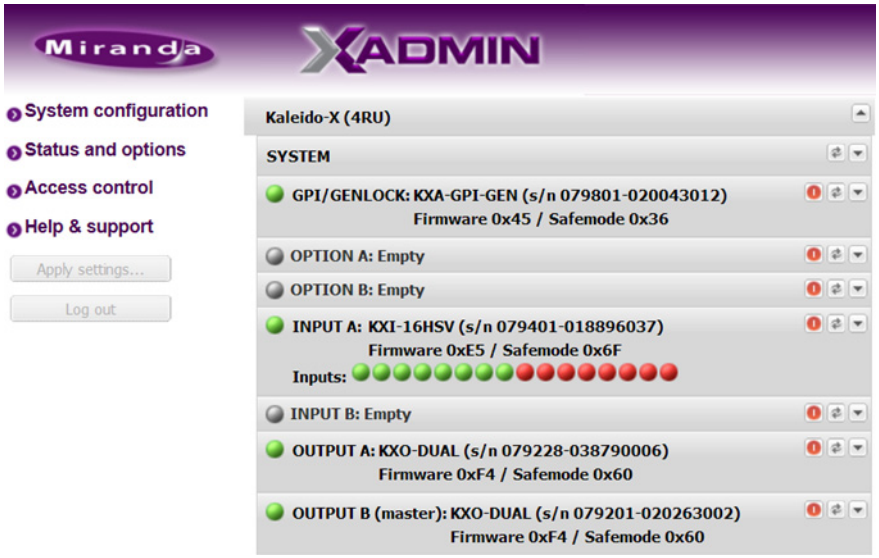
The Kaleido-IP home page appears.



Firefox users:
If you see a security warning instead of the home page, then see Registering your Multiviewer's Security Credentials with your Browser on page 116.

3 Click the XAdmin button.

The XAdmin Status and Options page appears.

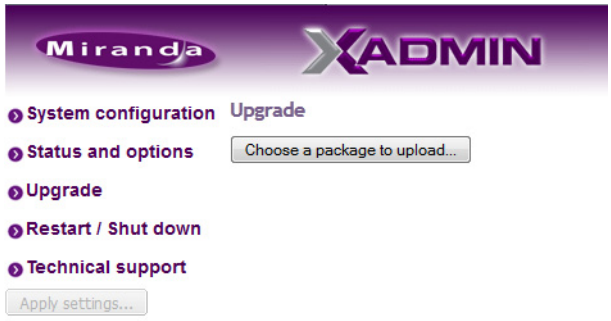


Internet Explorer users:

- If the page remains blank, then see Enabling the Compatibility View in Internet Explorer on page 125.
- If you see a certificate error message instead of the Status and Options page, then see Registering your Multiviewer's Security Credentials with your Browser on page 116.

4 Click **Upgrade**, in the navigation area on the left of the page.

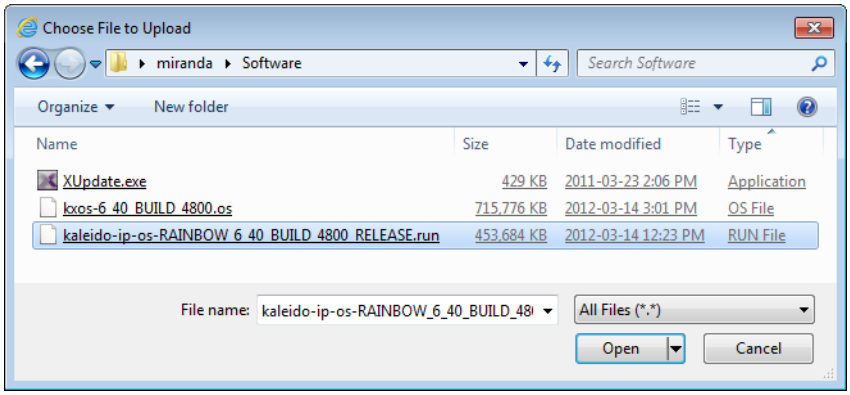
The Upgrade page appears.



5 Click **Choose a package to upload**.

A file chooser window appears.

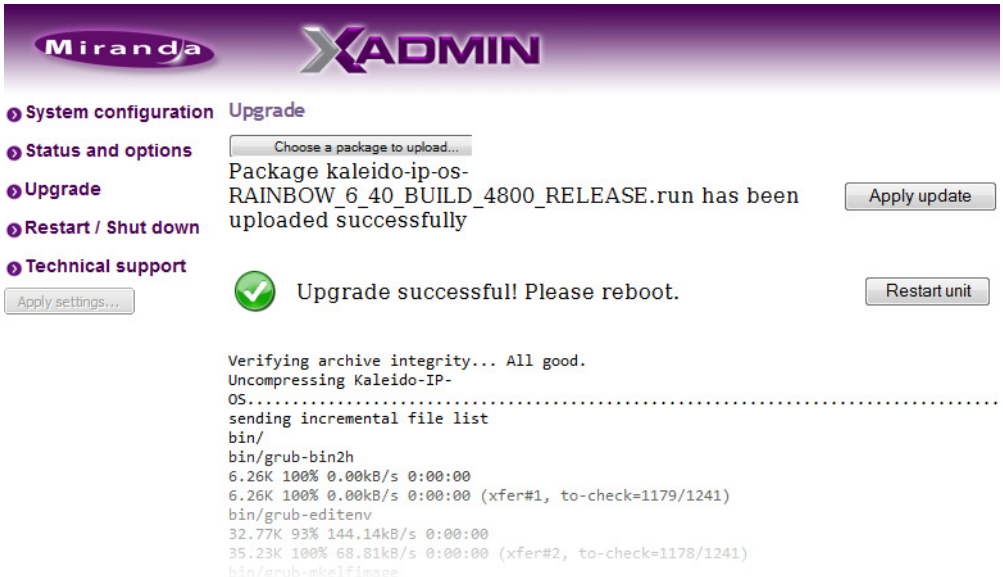
6 Navigate to the RUN package you wish to install, select it, and then click **Open**.



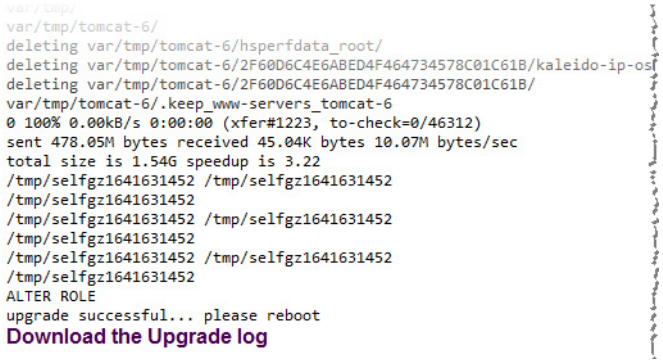
The selected file is uploaded to the Kaleido-IP. This may take a few seconds.

7 Once the upload has completed, click **Apply update**.

While the upgrade is taking place you can monitor its progress if you wish, or wait until the system prompts you to restart the Kaleido-IP unit.

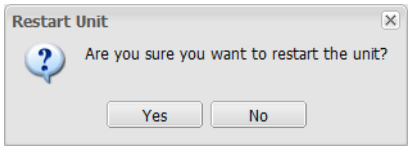


8 Once the upgrade has completed, if you wish to keep a copy of the log messages, scroll down to the bottom of the page, right-click **Download the Upgrade log**, and save the log to your hard drive as a text file.*f*



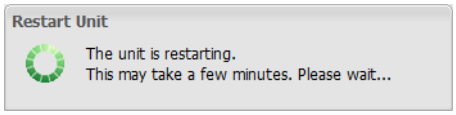
9 Click **Restart unit**.

The system prompts you to confirm.

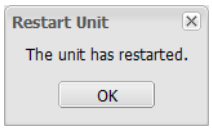


10 Click **Yes** to proceed.

Your multiviewer will shut down, and then start again. This may take a while.



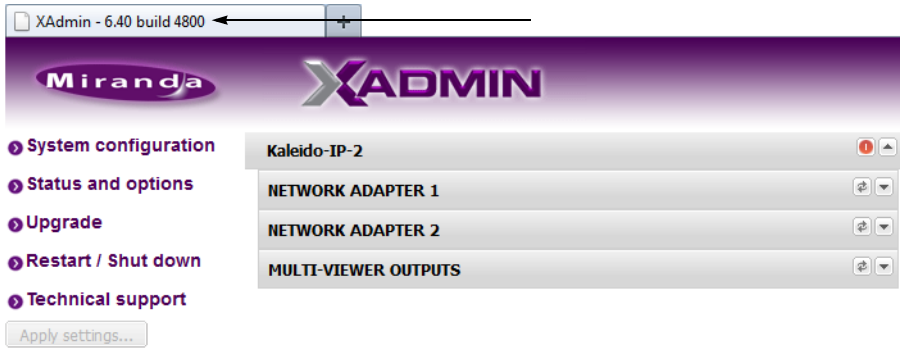
Once the multiviewer has restarted, the system notifies you.



11 Click **OK**.

The XAdmin Status and Options page appears.

12 Verify that the expected version number appears in the page title (check the tab label, or the browser's title bar).



At this point the Kaleido-IP upgrade is complete, and you can now proceed with upgrading the Kaleido-X.

13 Copy the Kaleido-X upgrade package files to a USB key (see Preparing a USB Key on page 172).

14 Insert the USB key into any of the USB ports on the Kaleido-X.

After a while, a message appears at the bottom left corner of the monitor wall, reporting that the Upgrade Manager is verifying Kaleido Software, firmware, and safe mode versions. Once the verification process is complete, you will be advised what upgrade action, if any, needs to be performed. Then, after 30 seconds, the upgrade process begins automatically, starting with the Kaleido Software upgrade.

IMPORTANT
In a Kaleido Multiviewer, all cards are updated in parallel, during which time their status LEDs will be flashing red. Do not interrupt this process. Do not insert or remove cards while an upgrade is in progress.

When the entire upgrade process has successfully completed, a red button appears at the bottom of the upgrade dashboard, prompting you to restart the multiviewer.

15 Click the **Upgrade complete** button to restart the system.

The multiviewer now restarts. This may take up to 30 seconds.

16 Remove the USB key from the USB port.

You have now completed the upgrade, for both multiviewers in this cascade.

Limitations

In the current version of the Kaleido Software, cascade systems are subject to the following limitations:

- **Full screen layouts** are not supported.
- **Changing a display resolution from the monitor wall menu** is not supported and will break the underlying cluster's integrity. You must use XEdit to configure the display resolution (refer to "Changing Room Display Resolutions" in the Kaleido Software User's Manual; see Related Documentation on page 15). In the event that such a change was made by mistake, you will have to repair the broken cascade as follows:
  1 Connect to the multiviewer associated with the display whose resolution was changed by mistake, and open the corresponding room.
    - If you wish to *restore the previous resolution,* then set this display to its previous resolution.
    - If you wish to *apply the new resolution,* then change something in the room to enable the **Save** button (for example, move a display and then bring it back to its initial position).
  2 On the **File** menu, click **Save**.
- **Some changes are not automatically propagated** to all members of a cascade. If you wish to have the same configuration for every multiviewer in a cascade, then the following elements must be manually replicated: system calibrations, audio monitoring

output assignment for each RCP user, sources/channels and router configurations, pointer size configuration.

> Note: After changing the pointer size for a room, on all multiviewers in a cascade, you must restart every multiviewer, for the change to become effective across the cascade system.

- When configuring text or alarm levels, they must match exactly on both multiviewers. See Setting the Same Channels/Sources Content Between Multiviewers on page 195.
- If two multiviewers in a cascade are connected to the same router, then the router name should be the same in both configurations. Conversely, two different routers in the same cascade must not have the same name.
- Serial ports are not shared between cascade members. A serial device connected to one multiviewer in a cascade is not known to the other cascade members.
- Audio monitoring is not supported.
- **RCP operation:** In the case of a cascade system, monitor wall functions performed via the associated buttons on a Kaleido-RCP2 or RCP-200 (ASPECT RATIO, UNDERSCAN, FULL SCREEN, etc.) only work in parts of the layout associated with the multiviewer that is directly connected to the displays.
  Workaround: Use the monitor wall menu.
- Router outputs are not cascaded.
- Working against the same cascade system in concurrent XEdit sessions is not supported.
- EDID auto-detection is not supported. When configuring a cascade room, make sure the Use detected monitor resolution check box is not selected for any of its displays. Refer to “Enabling EDID Auto-Detection from the Monitor Wall“, or “Enabling EDID Auto-Detection in XEdit“, in the Kaleido Software User’s Manual, for details. See Related Documentation on page 15.

9 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 Ω

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)

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 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[1]

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)

1. A *Dual Channel DVI to HD Bridge* must be connected between the multiviewer and the PC or laptop that provides the graphics to the multiviewer. The highest supported resolution is 1600 × 1200 in 4:3, and 1680 × 1050 in 16:9. To order this optional device (Part No. KXI-DVI-BRIDGE), contact your Grass Valley sales representative.

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

These cards support 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

These cards support 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

These cards support 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 kΩ
Connector	WECO (www.weco.ca) Plug-in Screw Connector System for Printed Circuit Boards Type 930-HFL (-DS), 930 / 931-HSL

KXO-24 Router Card

IN Inputs (Future Use)

Connector	Lanelink 12X (custom cable)

Kaleido-X Outputs

KXO-Dual and KXO-Dual3

These cards support two progressive scan RGBHV outputs:

RGBHV Outputs

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

These cards support two progressive scan DVI outputs:

DVI Outputs

Signal	DVI-D
Resolution	From 1024 × 768 to 1920 × 1200 NI (all progressive scan)
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

These cards support 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
Audio	SMPTE ST 299 (limited to one pair, embedded on group 1, pair 1)
Cable length	100 m (328 ft) (Belden 1694A)
Alignment jitter (100 KHz)	< 0.2 UI
Timing jitter (10Hz)	<1UI
Connectors	BNC

3G-SDI Ouputs

Signal	SMPTE ST 424 (2.97, 2.97/1.001 Gbps)
Formats	1080p50 1080p59.94
Audio	SMPTE ST 299 (limited to one pair, embedded on group 1, pair 1)
Alignment jitter (100 kHz)	< 0.3 UI
Timing jitter (10 Hz)	< 2 UI
Cable length	100 m (328 ft) (Belden 1694A) 45 m (148 ft) (Belden 1855A)

These cards support two Analog audio outputs:

Analog Audio Outputs

Signal	Balanced analog stereo
Impedance	< 600 Ω
Level	+24 dBu maximum
Connector	WECO

These cards support supports two AES outputs:

AES Outputs

Signal	AES3
Impedance	110 Ω
Connector	WECO

Option Outputs (Future Use)

Connector	RJ-45

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
Cable length	250 m (820 ft) (Belden 1694A)
Alignment jitter (100 KHz)	< 0.2 UI
Timing jitter (10Hz)	<1UI
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)
Alignment jitter (100 KHz)	< 0.2 UI
Timing jitter (10Hz)	<1 UI
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
Input mode	
Pull-up voltage	2.3 Volts
Source current	2 mA when input shorted
Low-level activation	0.8 Volts max
Over voltage	25 Volts max
Output mode	
Contact closure current	50 mA max
Reverse voltage	-15 Volts max
Reverse current	-50 mA max
V out low	0.6 Volts at 1.5mA

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)
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)

Multiviewer Integration with other Systems and Equipment

A number of configurable services are available to establish communications between the multiviewer and a wide variety of devices.

Optional Drivers for Controlling Routing Devices from the Multiviewer

Optional drivers are available to extend your Kaleido system with the ability to control routing devices that comply with the protocols listed in the following table. Contact your sales representative for details.

Company	Protocol	Text database download	Routers/Controllers
Datatek	D-2815 Control Module Protocol	No	
ETL	ETL Matrix	Yes	ETL Matrix
Evertz	Quartz Type 1	Yes	EQX
Grass Valley (Miranda)	Densité	Yes	HRS-1801
		No	HCO-1821, HCO-1822
Grass Valley (Miranda/NVISION)	NVEP NV9000 – Deprecated (NP0017)[1]	Yes	NV9000 system controllers
	NVEP NV9000 – Port Takes (NP0017)[2]	Yes	
	NVEP NV9000 – Device Takes (NP0017)[3]	Yes	
	NVEP Router (NP0016)	No	Compact router series
Grass Valley	GVG-NP Emulation	No	Jupiter CM-4000 and CM-4400 system controllers
	GVG 7000 Native Protocol[4]	Yes	Concerto-series routers, Encore-series control panels
Grass Valley (Thomson/Philips)[5]	Jupiter ASCII communications protocol	No	Jupiter VM-3000 system controller, Venus-series and Trinix-series routers
	ES-Switch protocol (serial)[6]	Yes	Jupiter VM-3000 system controller
Imagine Communications (Harris/Leitch)	Harris XY Passthrough Protocol	No	Platinum, Xplus, Integrator, Via-32, Panacea, Xpress
Lantronix	(Lightwave) Matrix-Hub Protocol	No	Matrix-Hub 1000
Nevion (Network Electronics)	Network Compact (serial)	No	VikinX Compact
	Network Modular (Ethernet)	No	VikinX Modular

Company	Protocol	Text database download	Routers/Controllers
PESA	USP (Unsolicited Status Protocol)	No	Cheetah, Tiger, Jaguar, Cougar, Ocelot, Bobcat, TDM3000, PERC2000 system controller
	CPU Link Protocol No.1 (serial)	No	
Quintech	XRM/SRM/MRF/MRM Series Protocol (serial)	No	SRM 2150 Matrix Switching Systems
SAM (Snell/Pro-Bel)	General Switcher Protocol (SW-P-02)	No	
	General Remote Protocol (SW-P-08)	Yes	Halo, Aurora and Sirius Controller (serial control)
Sony	Sony HKSPC (GVGNP Emulator)	No	Sony routers (requires HKSPC card); GVG routers (Ethernet)
Utah Scientific	PL-160/PL-320	No	AVS-1B
	RCP-1	No	SC-1, SC-2, SC-3 series
	RCP-3	Yes	SC-4 series (Ethernet only)

1. Deprecated. To be used with legacy configurations only.
2. To be used in most cases. Supports native locks, and aliases from router (provided system controller has NV9000 router control system version 6.0.6 or later)
3. To be used in very specific scenarios involving physical router interconnects with tie lines, or with hybrid router configurations. Contact Technical Support for more information (see Grass Valley Technical Support, on page 216).
4. For Thomson / Grass Valley Series 7000 devices, our current implementation of the Series 7000 Native Protocol supports serial devices, in addition to some Encore system controller models, which are also supported over Ethernet. For other Series 7000 devices you wish to control via Ethernet, use Sony HKSPC (GVGNP Emulator).
5. Our current implementations of the protocols listed above for Grass Valley (Thomson/Philips) routers and controllers support neither the CM-4400 nor the CM-4000 system controllers.
6. In the case of the Kaleido-X, and Kaleido-X16 multiviewers, the ES-Switch protocol is only supported with a baud rate of 19200.

Optional Drivers for Controlling Tally Interface Devices from the Multiviewer

Optional drivers are available to extend your Kaleido-X system with the ability to control tally interface devices such as the ones listed in the tables below. Contact your sales representative for more information.

Production Switchers

Company	Device/System
Grass Valley (Thomson)	Kayenne K-Frame, Karrera K-Frame, Zodiak, XtenDD HD/SD series

UMD controllers

Company	Device/System
Image Video	TSI-1000 Tally System Interface (requires option from Image Video)
TSL	UMD Controller (TCP/IP or UDP/IP) *IP Limitation:* only one screen index can be received per unicast port.

Automation systems

Company	Device/System
Sundance Digital	Fastbreak NXT Automation (requires option from Sundance Digital)

Optional Drivers for Timers

Timer systems

Company	Device/System
Plura (Alpermann+Velte)	Studio Production Timer (SPT)

Built-in Communications Protocols

The multiviewer itself can be controlled by external devices (e.g. Kaleido-RCP2, router control panels) or applications (e.g. router control software application, Remote Control Gateway) via built-in communications protocols. Such devices or applications can be used to command monitor wall operations (e.g. source assignment) or routing operations.

A router control device or application can control a Kaleido-X (7RU) or Kaleido-X16 multiviewer's internal router module, or any multiviewer's logical sources and monitor wall destinations, via the *KX Router* logical router. It can also control other logical routers configured within your multiviewer system. In the case of the *KX Router* logical router, the device or application must support the *NVEP Router (NP0016)* protocol.

The supported communications protocols are listed in the following table, with an indication of the supported connection types (TCP/IP or serial), and the dedicated port number on the multiviewer, in the case of a TCP/IP protocol.

Company	Protocol	TCP/IP (port)	Serial
Grass Valley (Miranda)	Kaleido Remote Control Protocol	Yes (13000)	Yes
Grass Valley (Miranda/NVISION)	NVEP Router (NP0016)	Yes (5194)	No
Nevion (Network Electronics)	Network Compact	N/A	Yes
	Network Modular	Yes (4381)	No

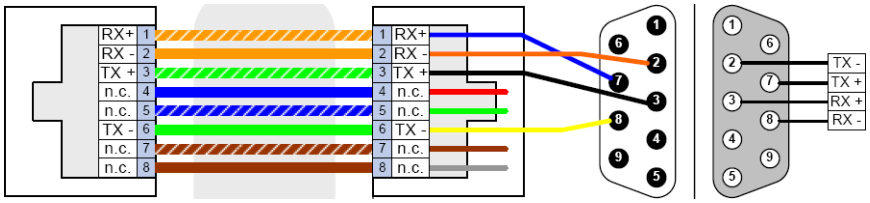
Company	Protocol	TCP/IP (port)	Serial
SAM (Snell/Pro-Bel)	SW-P-08	Yes (14000)	Yes
	SW-P-02	Yes (2000)	Yes

RS-422 Connection Diagram

Each output card supports one RS-422 port over an RJ-45 connector. This port allows the Kaleido-X to connect to external serial devices such as a router, production switcher, or router controller.

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

The pinout for the RS-422 signals on the RJ-45 connectors, and the wiring diagrams for the appropriate adapters, are shown here:



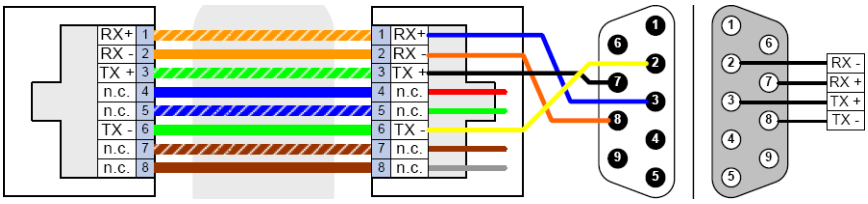
Pinout of an RS-422 port's RJ45 connector on the multiviewer

RJ45
Pinout of **straight** adapter (Grass Valley part no. 1737-3000-102)

DE-9 male

DE-9 female
Pinout of RS-422 connector on SMPTE **slave** device

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



Pinout of an RS-422 port's RJ45 connector on the multiviewer

RJ45
Pinout of **crossover** adapter (Grass Valley part no. 1792-3700-100)

DE-9 male

DE-9 female
Pinout of RS-422 connector on SMPTE **master** device

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

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

Grass Valley Technical Support

For technical assistance, contact our international support center, at 1-800-547-8949 (US and Canada) or +1-530-478-4148.

To obtain a local phone number for the support center nearest you, consult the Contact Us section of Grass Valley's website (www.grassvalley.com).

An online form for e-mail contact is also available from the website.

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