



Kaleido-X16

Hardware Description & Installation Manual

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Safety Compliance



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

- CSA-C22.2 No. 60950-1-07
- UL 60950-1 (2nd Edition)
- EN 60950-1:2006 ITE
- IEC 60950-1:2005 (2nd Edition)

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

CAUTION: These servicing instructions are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel. Servicing should be done in a static-free environment.

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 complies with the requirements of the directive 2004/108/CE:

- 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 61000-4-5 Surge transient immunity
- EN 61000-4-6 Conducted disturbances immunity
- EN 61000-4-11 Voltage dips, short interruptions and voltage variations immunity

Warranty Policies

Warranty information is available in the Support section of the Miranda Web site (www.miranda.com).

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Kaleido-X16 Installation

The Kaleido-X16 is a 1RU, multi-image display processor with high image quality and a rich feature set. This chapter contains physical descriptions, installation instructions and connection information for the Kaleido-X16 frame.

Summary

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Introduction

The Kaleido-X16 system is a cost-effective multi-image processor. It can accommodate smaller systems or scale up to production systems, where smaller building blocks with fewer input counts per display are desirable. Each chassis can display up to 16 auto-sensing HD, SD, or Analog inputs that can be displayed across two high resolution outputs at multiple sizes.



Features

Small form factor	1RU
Expandable	Expandable multi-room architecture, based on a chassis with 16 inputs, and 2 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
Kaleido-X16 as a router	The Kaleido-X16 can behave as a router, with 16 input channels as sources and the two <i>RT OUT</i> outputs as destinations
Superior display	Highest quality multi-image output without compression, with superior on-screen graphics, for the most critical live monitoring applications
128 audio channels	Unprecedented audio performance with the ability to monitor up to 128 channels of audio, including embedded, discrete analog, discrete AES from ABT
DVI inputs	DVI inputs (one per output head) mappable in the background of each output without the need for scaling
Two-room layouts	Intuitive layout editor software allows rapid creation of two-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

Port Availability

The Kaleido-X16 offers a wide variety of ports for incoming and outgoing signals. However, with a view towards future expansion, there are ports whose connections exist but that are currently not fully

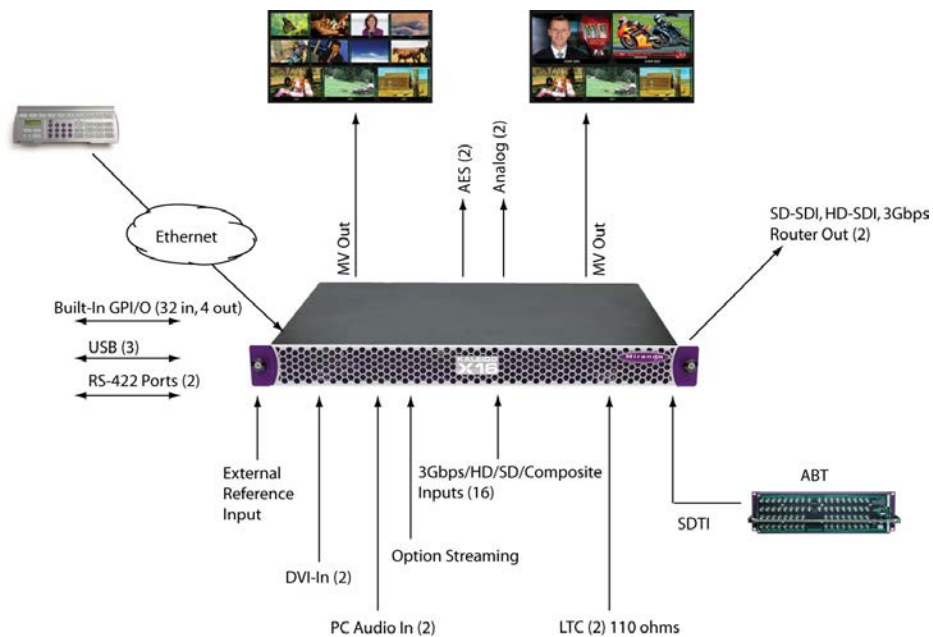
supported. The following ports on the Kaleido-X16 are not supported in the current release of the Kaleido-X Software:

- OPTION streaming output connector
- PC In analog audio input ports at the AUDIO I/O connector

Overview of the Kaleido-X16 System

The following diagram shows a basic Kaleido-X16 system configuration, with a single Kaleido-X16 feeding 2 monitor wall displays. The Kaleido-RCP2 would be located on the production desk, while the Client PC could be anywhere with Internet access to the network.

The diagram below shows a Kaleido-X16 system with its inputs and outputs. Examples of the various external devices that connect to the Kaleido-X16 are also shown.



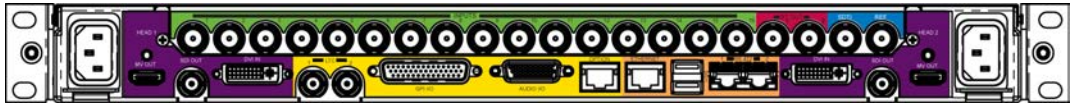
The Kaleido-X16 system is available in two model types: a single-head model (Kaleido-X16-S) and a dual-head model (Kaleido-X16-D). Throughout this manual, *Kaleido-X16* refers to both models unless it is necessary to distinguish the single-head model from the dual-head model.

Kaleido-X16-D

There are two heads (Head 1 and Head 2) on the dual-head Kaleido-X16 (Kaleido-X16-D). The Input and Output connections are as follows.

Connector	Number of connectors on Head 1	Number of connectors on Head 2
MV OUT	1	1
SDI OUT	1	1
DVI IN	1	1

The rear connector panel for this model is displayed, below:



In addition to the difference in the number of output heads, the Audio I/O TBA pinout is different between the two models (see "Audio I/O TBA" on page 16 for details).

Kaleido-X16-S

There is one head (Head 1) on the single-head Kaleido-X16 (Kaleido-X16-S). The Input and Output connections are as follows.

Connector	Number of connectors on Head 1
MV OUT	1
SDI OUT	1
DVI IN	1

The rear connector panel for this model is displayed, below:



In addition to the difference in the number of heads, the Audio I/O TBA pinout is different between the two models (see "Audio I/O TBA" on page 16 for details).

Mechanical Installation

Unpacking

Make sure the following items have been shipped with your Kaleido-X16. If any of these are missing, contact your distributor or Miranda Technologies Inc.

- Kaleido-X16 unit with one or two power supplies pre-installed (second power supply optional)
- Two support brackets
- One AC power cord per power supply
- DVD including manuals, software and release notes
- One mouse
- Four serial port adapters (one with straight wiring and one with crossover wiring for each of the two RS-422 ports on your multi-viewer):

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

Notes

- The Kaleido-RCP2 unit is optional and is not included in the standard Kaleido-X16 package. Refer to the Kaleido-RCP2 Guide to Installation and Operation (available on the DVD that shipped with your system) for more information.
 - The standard Kaleido-X16 comes with one PSU. A redundant, second PSU is optional.
-

Mounting the Kaleido-X16 in a Rack

To mount the Kaleido-X16 in a standard 19-inch rack:

1. Install both support brackets at the back of the rack by using suitable screws and washers (not included), so that the bottom of the Kaleido-X16 frame will be supported by the brackets.
2. Insert the Kaleido-X16 frame at the designated location within the rack, and secure the front of the frame to the rack by using suitable screws and washers (not included).

IMPORTANT: Mobile Installation

If you are deploying your Kaleido-X16 in a mobile unit, it is your responsibility to make sure the back of the multi-viewer is securely attached to the rack. For instance you may install a blank panel at the back of the rack, so that it meets the top of the frame, to prevent the frame from bouncing away from the support brackets.

Ventilation

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

Note: The optional Kaleido-RCP2 may also be installed in a rack, by using the KRCP-RK2 mounting kit.

Frame and Electrical Installation

The Kaleido-X16 multi-viewer is a self-contained unit consisting of a frame, redundant power supplies, and various input and output cards. The monitor wall displays and external control devices complete the system.

Frame

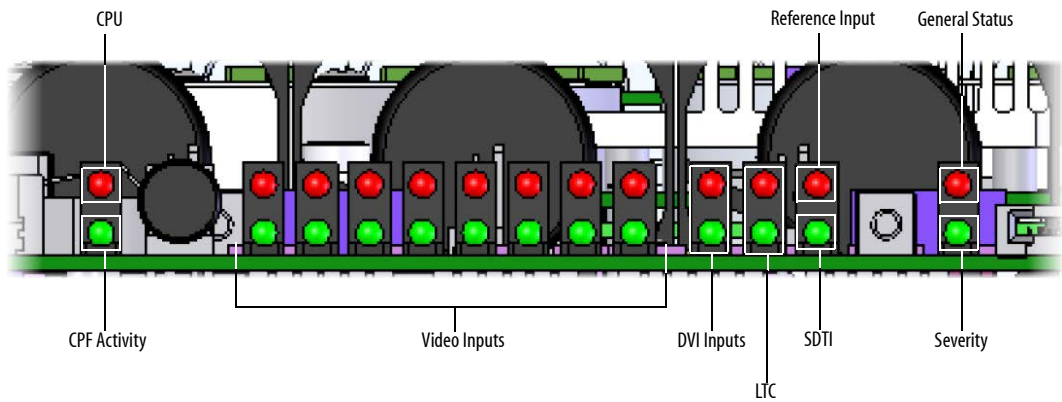
The Kaleido-X16 frame is 1 RU high. Input and output connectors are mounted on a connector panel on the rear of the frame. The redundant power supply is installed in the front of the frame. The front cover can be removed to give access to the PSUs, CompactFlash card, USB connector, and basic LEDs.

The Kaleido-X16 frame incorporates the following key elements:

- A rack-mountable mechanical framework (for mounting into a 19-inch EIA rack)
- A removable door to cover and protect the front of the frame
- An optional redundant power supply
- Ventilation



Front view of the Kaleido-X16 frame (PSUs installed; front cover removed)



LEDs on the front of the frame (behind the cover)

The LEDs on the front of the frame (behind the cover) indicate the following conditions depending on their color and whether they are blinking or not:

LED	LED Status						
	Green	Blinking green	Red	Blinking red	Yellow	Blinking yellow	Off
CPU	Normal operation	Application booting	Error	Live Update	OS Booting	N/A	Front cover is closed
CPF Activity	N/A	Activity	N/A	N/A	N/A	N/A	No Activity
Video Inputs	Inputs are locked	N/A	Inputs are unlocked, or no input	ERROR ON SIGNAL	N/A	N/A	Front cover is closed
DVI Inputs	Inputs are locked	N/A	Inputs are unlocked, or no input	ERROR ON SIGNAL	N/A	N/A	Front cover is closed
LTC	LTC valid	N/A	No signal	N/A	N/A	N/A	Front cover is closed
Ref. Input	Input is locked	N/A	Input is unlocked, or no input	ERROR ON SIGNAL	N/A	N/A	Front cover is closed
SDTI	Inputs are locked	N/A	Inputs are unlocked, or no input, or no SDTI signal	ERROR ON SIGNAL	N/A	N/A	Front cover is closed

LED	LED Status						
	Green	Blinking green	Red	Blinking red	Yellow	Blinking yellow	Off
Gen. Status	System OK	Intrusive self-diagnostic finished	Configuration Failed, Safe Mode	Firmware Upgrading	Boot up Diagnostic (Verbose switch on)	Firmware error	Front cover is closed
Severity	Boot OK	Booting	Boot error, Need live-update	Fatal error, CALL TECH SUPPORT	N/A	N/A	No power

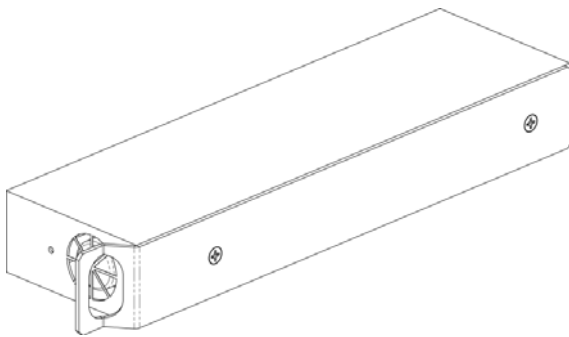
Monitoring the Temperature of the Kaleido-X16

For optimal performance, it is strongly recommended that you operate the Kaleido-X16 multi-viewer in an environment with an ambient temperature between 0 °C and 40 °C.

IMPORTANT: When measuring the ambient room temperature, take your readings from directly in front of the Kaleido-X16 frame.

There are two factors that could influence airflow inside the frame: altitude and airflow obstruction on the sides of the unit.

Power Supplies



Power supply for the Kaleido-X16 frame

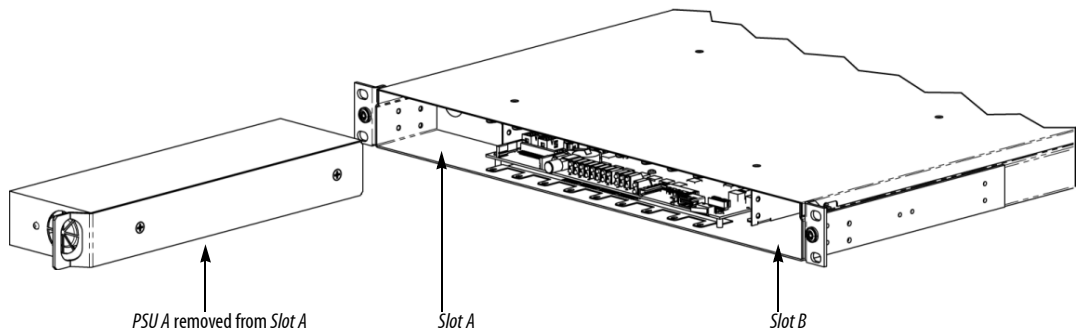
The Kaleido-X16 frame is powered by dual redundant, current-sharing power supply units (PSUs). The PSUs are installed and removed from the front of the frame and are hot-swappable, so that a defective supply may be replaced without removing the Kaleido-X16 frame from service. When facing the front of the frame, the PSU on the left side is referred to as *PSU A* and the PSU on the right side is *PSU B*.

IMPORTANT: If your frame has only one PSU, it must be installed in Slot A (left side of frame)

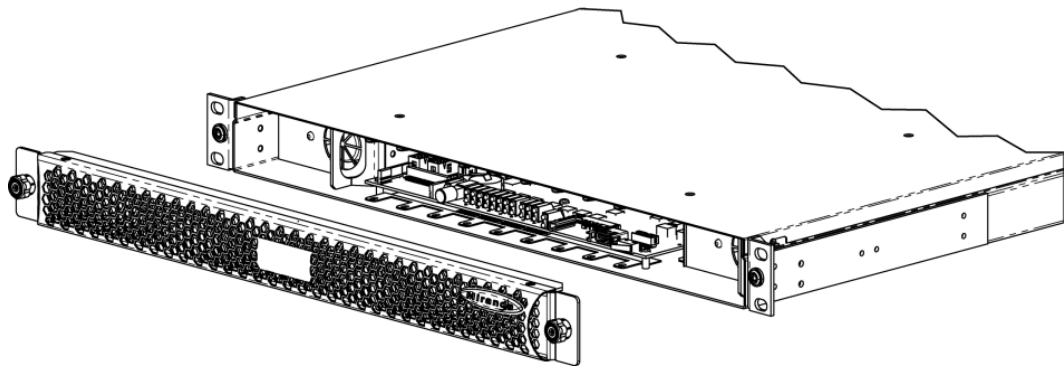
There are two power supplies: an operational PSU and a redundant PSU. The system operates with a single PSU. If you choose to have only one PSU installed in your Kaleido-X16 frame, you should do the following:

- Clear the **PSU B Installed** check box for this Kaleido-X16 frame in XAdmin (see the “Configuring Power Supply Redundancy on the Kaleido-X16” section in the “Getting Started” chapter of the Kaleido-X User’s Manual).
- Install the single PSU (PSU A) in Slot A (the left side of the frame when facing the front of the frame) (see “Installing a Power Supply” on page 10).

Access the power supplies by removing the front cover of the frame. Viewed from the front of the frame, the PSUs are located on the left-hand and right-hand sides of the frame:



PSU slot locations



Two PSUs installed in a frame; front cover removed

Removing a Power Supply

To remove a power supply:

1. Open the front cover of the frame and locate the power supply (PSU) you would like to remove (either the left or the right side).
2. Pull on the handle on the right side of the PSU and pull the PSU out of the frame.

Installing a Power Supply

To install a power supply:

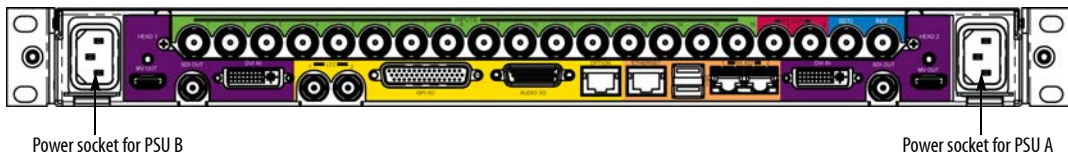
1. Position the power supply (PSU) in front of an empty power supply slot in front of the frame, with the connector end towards the frame and the PSU handle on the right side.
2. Slide the PSU into the empty slot, moving it gently until it contacts the sockets at the rear of the slot.
3. Push firmly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

Powering up the Kaleido-X16

Separate AC power sockets serve the two power supplies. On the rear of the frame, connect both power sockets of the Kaleido-X16 to an appropriate power source using the supplied power cords.

As seen from the rear of the frame:

- The left power socket is for PSU B.
- The right power socket is for PSU A.

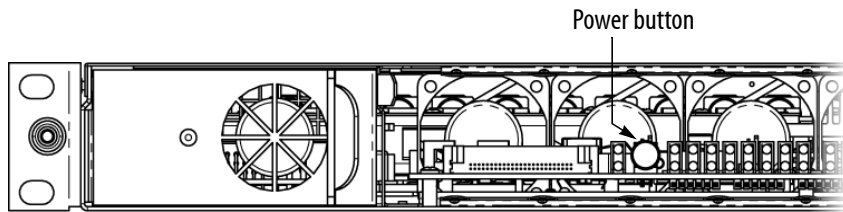


IMPORTANT:

- A Kaleido-X16 multi-viewer can draw 4.0 amps of current. Ensure that the circuit to which the frame is connected can handle that load, and that of any other connected devices.
- If you only have one PSU, make sure you plug your power cable into the power connector on the right side of the rear connector panel (as you face the rear of the frame). This should be on the same side of the frame as the one PSU you have installed. If you do not do this, your system cannot draw power.
- If you have two PSUs, make sure you plug in both power cables into both power connectors of the rear connector panel. If you do not do this your system cannot have PSU redundancy.

To power up the Kaleido-X16:

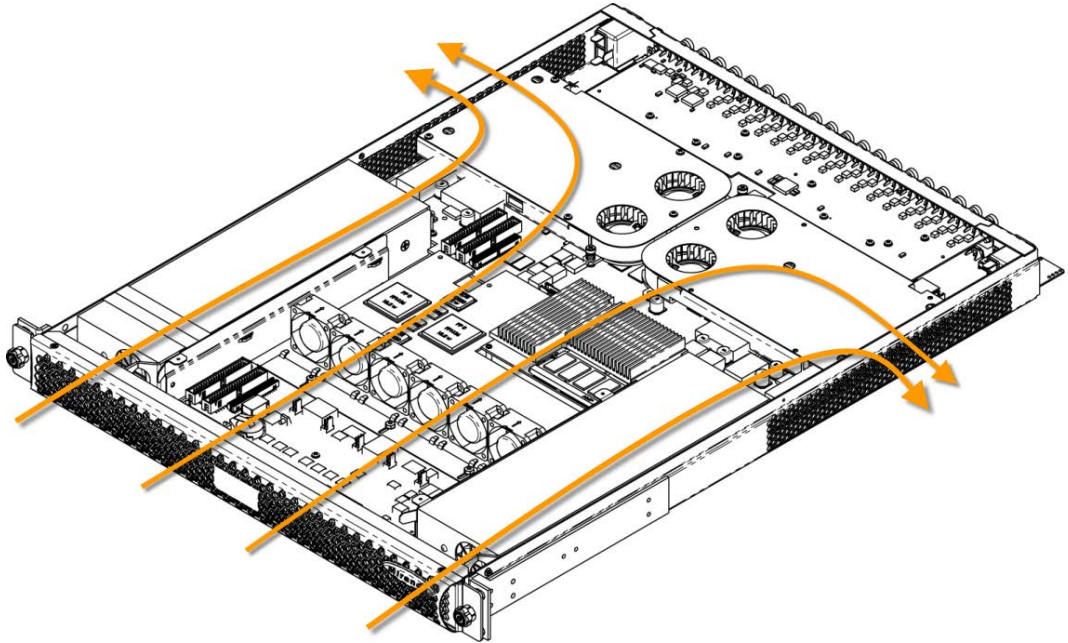
1. Plug the power cord(s) from the Kaleido-X16 into a grounded power outlet.
2. Push the power button at the front of the frame (behind the front cover).



The startup sequence takes a couple of minutes, during which time some video may appear on the displays. The startup is completed when the CPU LED is solid green.

Ventilation

The Kaleido-X16 multi-viewer is cooled by ventilation intakes located on the front of the frame. Fans are located in key positions within the frame:



Air flow through the Kaleido-X16 frame

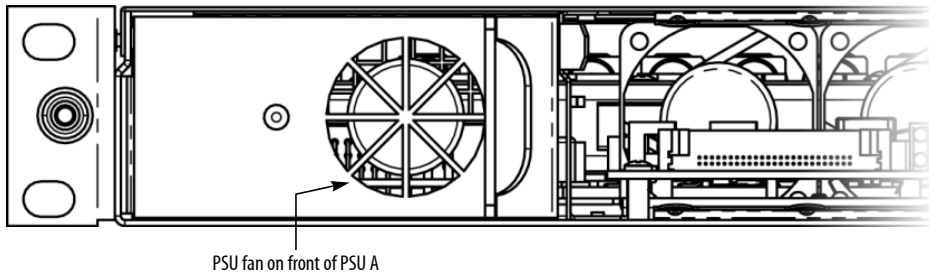
Frame Cooling Fans

Air intake for the multi-viewer is handled by six fans located near the front of the frame and two heat sinks near the rear of the frame. The fans draw air into the frame through a grille and filter in the front cover. The heat sinks help to exhaust air out through grates on either side (see diagram, above).

IMPORTANT: The Kaleido-X16 multi-viewer requires a constant flow of cooling air during operation. DO NOT OPERATE THE UNIT IF THESE FANS ARE NOT WORKING. If a fan is not working contact your next level of support.

Power Supply Cooling Fan

Each PSU has one fan located on its front. Each PSU draws air through the frame's front grille, through the PSU, then out to the closest rear fan to be exhausted out the side of the frame (see diagrams, above and below):



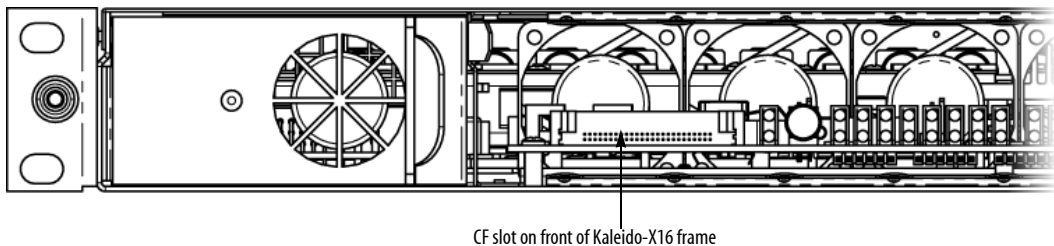
Air Filter

Cooling air drawn into the Kaleido-X16 frame by the ventilating fans passes through a filter located behind a grille in the front cover of the frame.

See also: For more information about cleaning the air filter, see “Cleaning the Air Filter” on page 25.

CompactFlash

In order to boot the CPU, you must ensure the appropriate CompactFlash (CF) card is properly inserted in the CF slot (accessible from the front of the Kaleido-X16 frame). The CF card contains the operating system required for a system boot.



See also: For more information about starting the Kaleido-X16, see the “Setting up the Kaleido-X16” chapter in the Kaleido-X16 Quick Start Guide.

Signalling

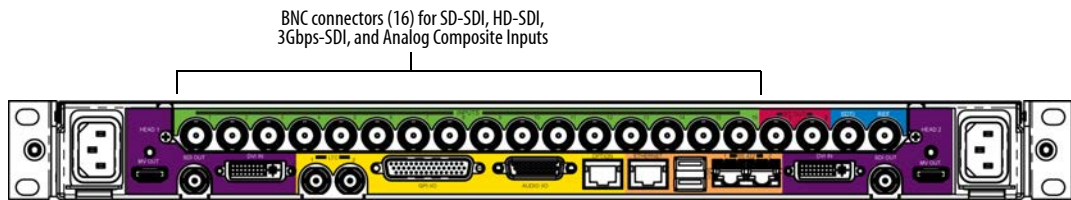
IMPORTANT: The Kaleido-X16-D model supports two Heads while the Kaleido-X16-S supports one Head. For details about the difference in connector support on the two models, see “Kaleido-X16-D” on page 3 and “Kaleido-X16-S” on page 4.

Connector label	Connector type	Function
DVI IN1-2	DVI	DVI input signal that can be used as a background in the monitor wall display in place of the internally-generated background.
INPUTS 1-16	BNC	HD/SD-SDI or composite video inputs 1 to 16.
MV OUT 1-2	HDMI	HDMI output including embedded audio for each head.
SDI OUT 1-2	BNC	Serial digital HD output signal for monitoring purposes.
REF	BNC	Reference signal to genlock the multi-viewer to the local plant. Supported Reference formats: <ul style="list-style-type: none"> •SMPTE 170M •SMPTE 318M •ITU 624-4 •BUT 470-6 •PAL and NTSC composite sync •SMPTE 274M •SMPTE 296M •SMPTE 240M
LTC 1-2	BNC	Time code inputs.
GPI 1-44	DB-44 (female)	GPI input/output (unidirectional) connections.
RT OUT 1-2	BNC	Supports 3Gbps-SDI, HD-SDI, and SD-SDI router output signals.
AUDIO I/O	HD-26 (female)	Supports two AES3 audio outputs or two analog audio inputs for monitoring.
SDTI	BNC	Multiplexed audio from an external audio box (Audio Bridge Terminal).
ETHERNET	RJ-45	100 Base-T Ethernet connection.
USB	USB	Connect a mouse, keyboard, or USB flash memory for software upgrade or data backup. Note: There are three USB ports, one on the front of the frame (behind the front cover) and two on the rear connector panel.
RS-422	RJ-45 (see "RS-422" on page 23)	Connect to an RS-422 (SMPTE 207M, EBU-3245) or RS-485 device or network.

Inputs

Video Signals

The 16 BNC *Input* connectors located on the Kaleido-X16 frame's rear connector panel support HD/SD/3 Gbps SDI or composite video inputs 1 to 16 (see "Video Signal Inputs" on page 27 for specification details).



Graphic Signals

The Kaleido-X16-D supports two digital DVI inputs, one for each of two heads (the Kaleido-X16-S supports a single DVI input). The DVI IN connectors on the rear panel are female, dual-link DVI-I universal connectors. The supported signal and cabling for this connection is single-link DVI-D (see "DVI Graphic Inputs" on page 30 for specification details).

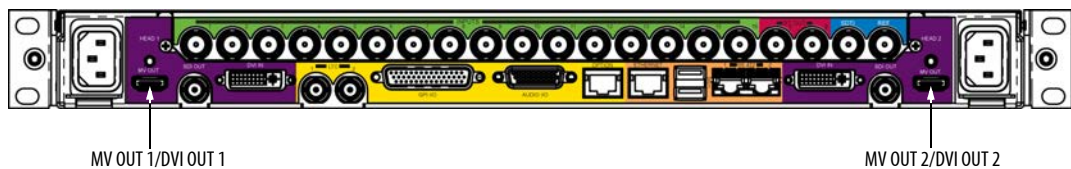
Note: The two DVI inputs cannot be crossed nor combined. That is, DVI IN 1 must output on Head 1, and DVI IN 2 must output on Head 2.



Mosaic Outputs

HDMI Outputs

There is one HDMI output for each output head (MV OUT 1, MV OUT 2). See "HDMI Outputs" on page 30 for specification details. The HDMI connection is a high definition connection for the multi-viewer output, which carries audio and video, and can support resolutions up to 1920 × 1200.



Note: To use an HDMI output connection as a DVI output:

- Use an HDMI cable with an HDMI-to-DVI adapter at one end.
- Use an HDMI-to-DVI cable.

HD-SDI Monitoring Outputs

IMPORTANT: Audio monitoring at the HD-SDI outputs is supported on recent hardware only. Support for audio monitoring at the HD-SDI outputs requires **version 5.30** (or later) of the Kaleido-X Software, and recent hardware. In the XAdmin Status and Options page, under SYSTEM, the value indicated for the **Card revision** attribute must be **0x4** or more.

There are two HD-SDI monitoring outputs: one for each head (see “HD-SDI Monitoring Outputs” on page 32 for specification details).



External Reference

The external reference (REF) input signal allows the Kaleido-X16 to genlock to the local plant.



Router Outputs

The Kaleido-X16 can be configured as a router. In this configuration, up to two Kaleido-X16 channels are considered as sources, and the destinations are the two RT OUT ports on the rear connector panel:

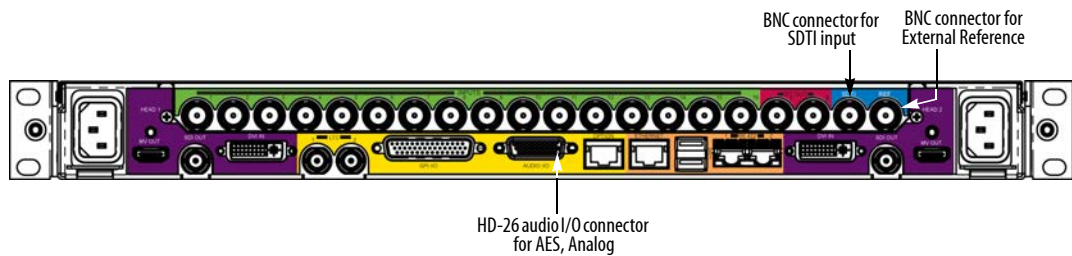


See also: For more information about:

- Router Output specifications, see "Router Outputs" on page 33.
- Routers and the Kaleido-X16, see the "Routers" chapter of the Kaleido-X User's Manual.

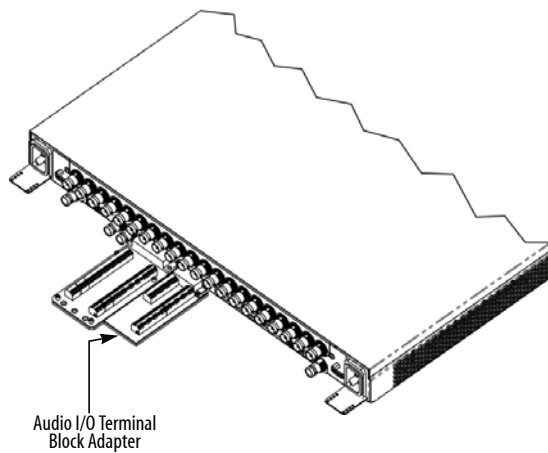
Audio I/O

The Kaleido-X16 supports audio monitoring through its HD-26 connector. The supported formats are the AES3 digital audio standard and analog audio monitoring. In addition, the Kaleido-X16 supports audio monitoring through the SDTI input port from an audio bridge terminal (ABT).



Audio I/O TBA

To facilitate cabling of the audio inputs and outputs through the HD-26 connector, a terminal block adapter (TBA) is available separately (Miranda part number NSH26M).



Audio I/O Terminal Block Adapter installed in rear connector panel

The pinout of the Audio I/O terminal block adapter (TBA) comes in two varieties, depending on whether you have a single-head or dual-head Kaleido-X16 model.

Audio I/O TBA Pinout on the Kaleido-X16-D

The Audio I/O TBA pinout on the Kaleido-X16-D is as follows:

Bottom row		Center row		Top row	
19	GND	10	AES Out 1 (+)	1	AES Out 1 (-)
20	GND	11	AES Out 2 (+)	2	AES Out 2 (-)
21	GND	12	GND	3	GND
22	GND	13	Analog Left Out 1 (+)	4	Analog Left Out 1 (-)
23	GND	14	Analog Right Out 1 (+)	5	Analog Right Out 1 (-)
24	GND	15	Analog Left Out 2 (+)	6	Analog Left Out 2 (-)
25	GND	16	Analog Right Out 2 (+)	7	Analog Right Out 2 (-)
26	GND	17	PC In 1 Left	8	PC In 1 Right
		18	PC In 2 Left	9	PC In 2 Right

Audio I/O TBA Pinout on the Kaleido-X16-S

The Audio I/O TBA pinout on the Kaleido-X16-S is as follows:

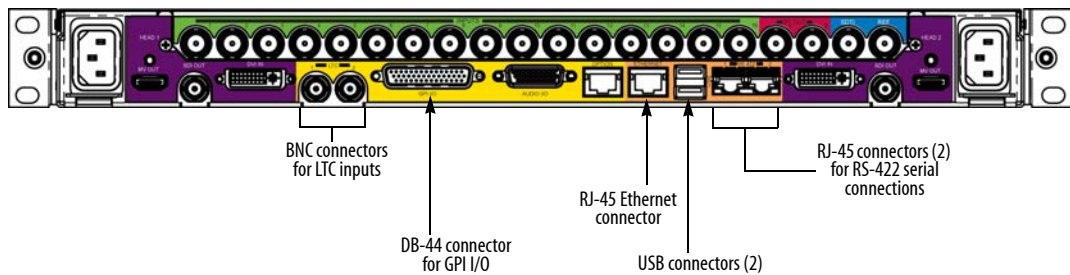
Bottom row		Center row		Top row	
19	GND	10	AES 1 (+)	1	AES 1 (-)
20	GND	11	NC	2	NC
21	GND	12	GND	3	GND
22	GND	13	Analog Left Out 1 (+)	4	Analog Left Out 1 (-)
23	GND	14	Analog Right Out 1 (+)	5	Analog Right Out 1 (-)
24	GND	15	NC	6	NC
25	GND	16	NC	7	NC
26	GND	17	PC In 1 Left	8	PC In 1 Right
		18	NC	9	NC

See also: For more information about:

- *SDTI audio specifications, see “SDTI Audio Input” on page 34.*
- *analog audio specifications, see “Analog Audio Input” and “Analog Audio Output” on page 35.*
- *AES output specifications, see “AES Outputs” on page 35.*
- *triggering audio monitoring, see “Triggering Audio Monitoring” in the “Operation of the Monitor Wall” chapter of the Kaleido-X User’s Manual.*
- *calibrating audio monitoring delay, see “Calibrating the Audio Monitoring Delay” in the “Calibrating the Kaleido-X” chapter of the Kaleido-X User’s Manual.*
- *calibrating audio monitoring color, see “Calibrating the Audio Monitoring Color” in the “Calibrating the Kaleido-X” chapter of the Kaleido-X User’s Manual.*

Control

The connectors located in the middle of the rear connector panel (the yellow and orange color-coded area) are *Control* connectors.

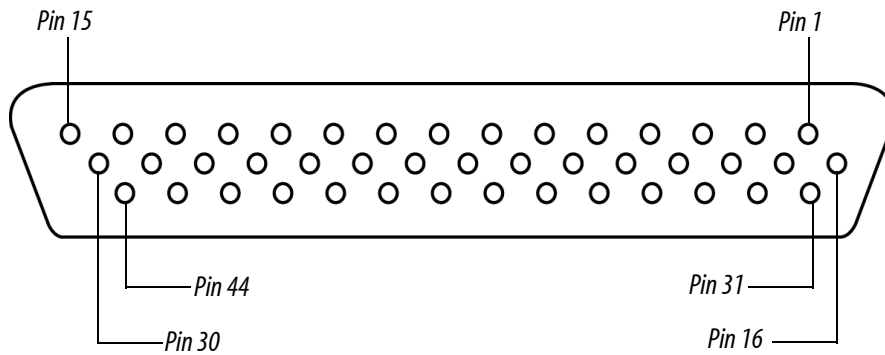


Linear Time Code (LTC)

The Kaleido-X16 supports two linear time code (LTC) inputs over BNC connectors. The format is SMPTE 12M unbalanced (see “Time Code Inputs (LTC)” on page 36 for specification details).

GPI I/O

The Kaleido-X16 supports status monitoring, genlock and GPI interfacing. The rear connector panel houses all input and output connectors associated with GPI I/O. The Kaleido-X16 supports 32 GPI inputs and 4 GPI outputs. The GPI connector type is a DB-44 (female on the connector panel; male on the cable):



There are 44 GPI connector pins (40 not including GND) whose functions are as follows:

- 4 Ground (GND) pins
- 32 GPI Input pins
- 4 GPI Output Emitter pins (designated in the table, below, as “N”)
- 4 GPI Output Collector pins (designated in the table, below, as “P”)

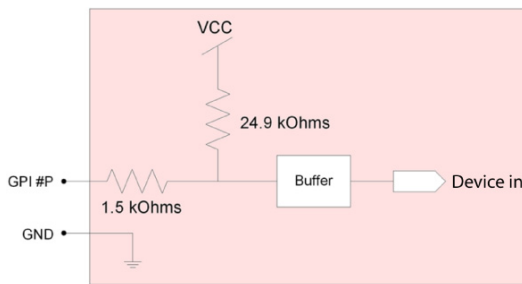
The exact pinout for the GPI connector is as follows:

Bottom row		Middle row		Top row	
Pin #	Description	Pin #	Description	Pin #	Description
31	GND	16	GPI Output N 1	1	GPI Output P 1
32	GPI Output N 2	17	GPI Output P 2	2	GPI Output N 3
33	GPI Output P 3	18	GPI Output N 4	3	GPI Output P 4
34	GPI Input 21	19	GPI Input 22	4	GPI Input 23
35	GND	20	GPI Input 24	5	GPI Input 25
36	GPI Input 26	21	GPI Input 27	6	GPI Input 28
37	GPI Input 29	22	GPI Input 30	7	GPI Input 31
38	GPI Input 20	23	GPI Input 32	8	GPI Input 18
39	GPI Input 16	24	GPI Input 19	9	GPI Input 15
40	GPI Input 14	25	GPI Input 17	10	GPI Input 12
41	GND	26	GPI Input 13	11	GPI Input 10
42	GPI Input 9	27	GPI Input 11	12	GPI Input 7
43	GPI Input 6	28	GPI Input 8	13	GPI Input 4

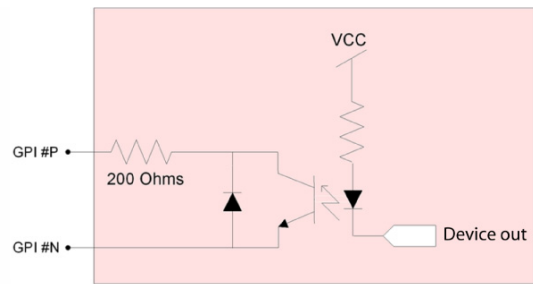
Bottom row		Middle row		Top row	
Pin #	Description	Pin #	Description	Pin #	Description
44	GPI Input 3	29	GPI Input 5	14	GPI Input 1
		30	GPI Input 2	15	GND

GPI Circuits

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



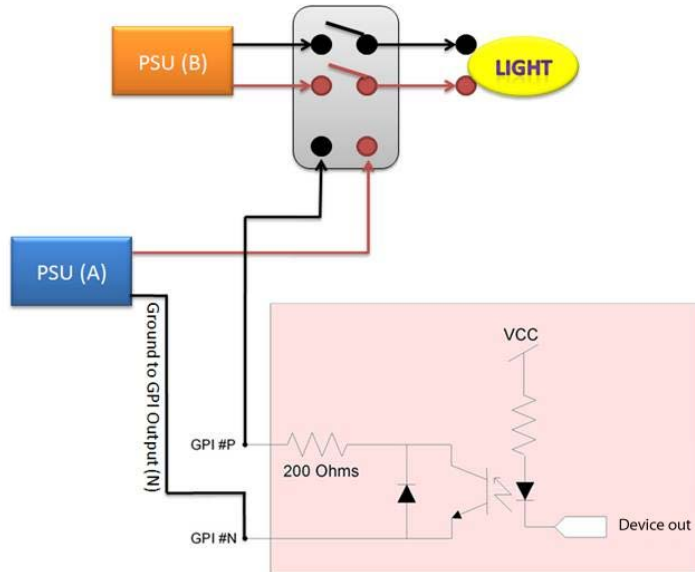
GPI configured as INPUT



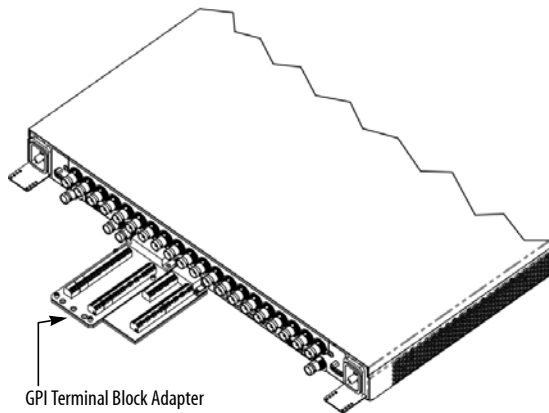
GPI configured as OUTPUT

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

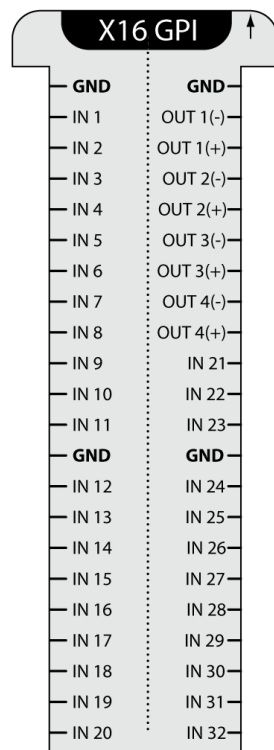
CAUTION: In the example, below, make sure your P and N connections are in the proper polarity otherwise your GPI output will always be in the ON state.



To facilitate cabling of the GPI inputs and outputs, a terminal block adapter is available separately (Miranda part number KXA-TBA-44). The GPI Terminal Block Adapter accommodates up to 44 terminal block connections using positive and negative terminal connections. Each column on the terminal block has 6 positive and 6 negative terminal connections that correspond to each pin position. Negative pins (labelled with an N) on the Terminal Block Adapter are not used as connections. Positive pins (labelled with a P) and Ground pins (labelled with a GND) correspond to GPI input connections:



GPI Terminal Block Adapter installed in rear connector panel



Kaleido-X16 GPI Terminal Block Adapter pinout

See also: For more information about:

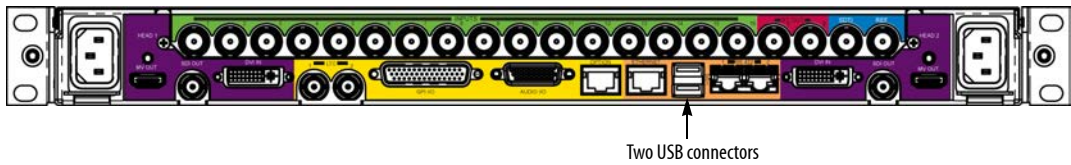
- *GPI specifications, see “GPI INPUT (up to 32)” and “GPI OUTPUT (up to 4)” on page 36.*
- *triggering GPI output events, see “Triggering GPI Output Events” in the “Operation of the Monitor Wall” chapter of the Kaleido-X User’s Manual.*
- *calibrating GPI lines, see “Calibrating GPI Lines” in the “Calibrating the Kaleido-X” chapter of the Kaleido-X User’s Manual.*

Ethernet

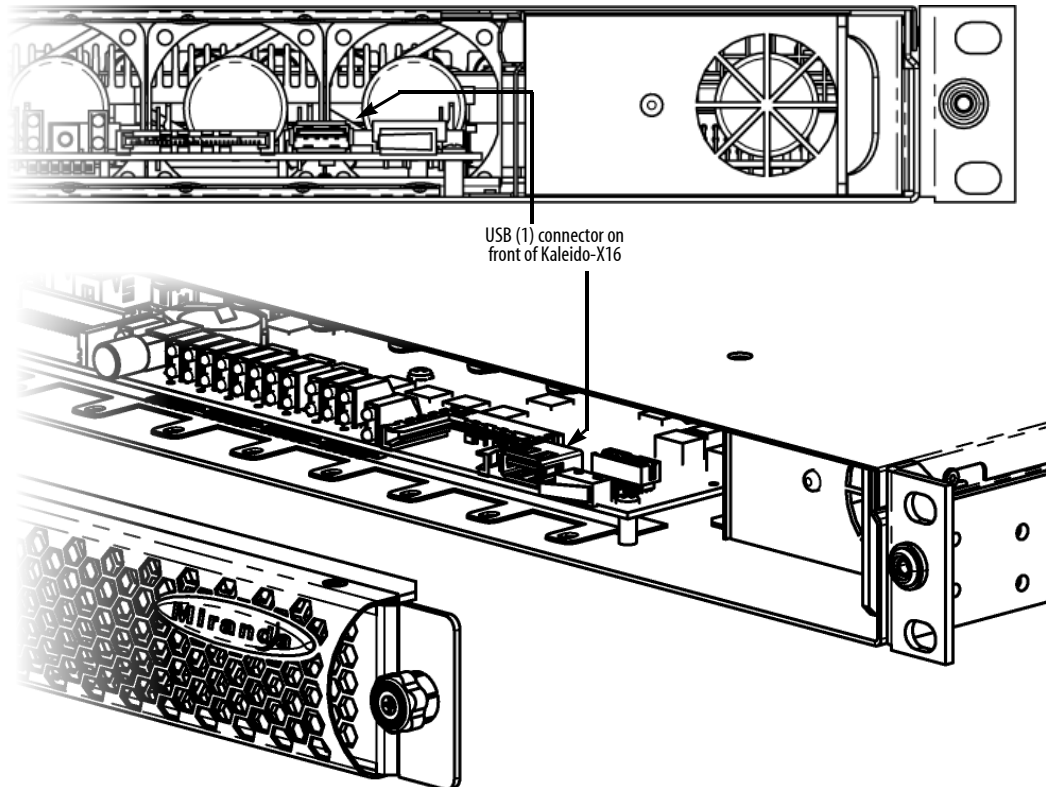
The Kaleido-X16 supports one Ethernet connection through an RJ-45 connector (see “Ethernet” on page 37 for specification details).

USB

The Kaleido-X16 has three USB 1.0 connectors (see “USB” on page 37 for specification details). Connect a mouse, keyboard, or USB flash memory for a software upgrade or data backup. Two connectors are on the rear connector panel, and one is on the front of the frame behind the front cover.



Two USB connectors on the rear panel



One USB connector on the front of the frame

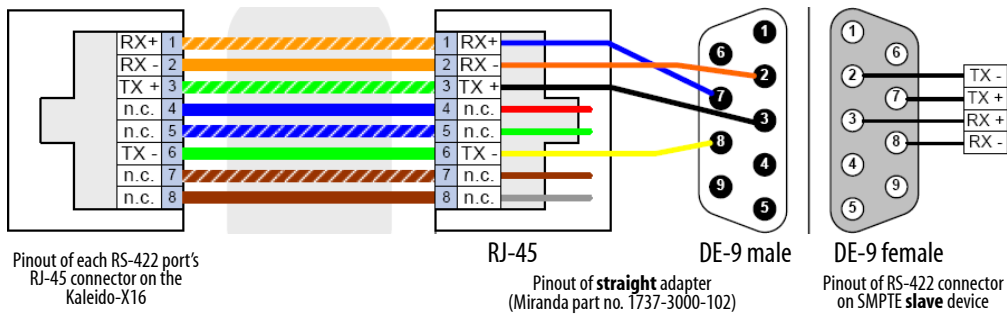
RS-422

The Kaleido-X16 supports two RS-422 serial inputs over RJ-45 connectors. These inputs allow the Kaleido-X16 to connect to external serial devices such as a router, production switcher, or router controller.

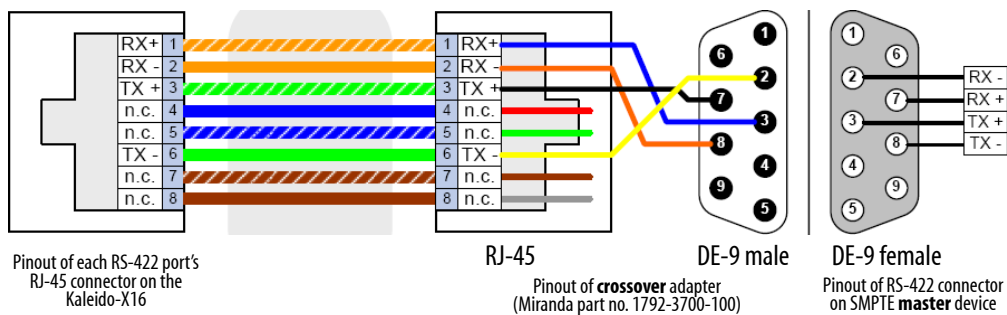
Note: The Kaleido-X16's two RS-422 ports each have an RJ-45 connector in order to preserve space on a busy panel. The RS-422 interface specifies a DE-9 connector, so if you are using this interface, you will require a DE-9-to-RJ-45 adapter. Miranda supplies two adapter models, correctly wired for this application: a straight adapter (part no. 1737-3000-102), and a crossover adapter (part no. 1792-3700-100).

The pinout for the RS-422 signals on the Kaleido-X16's RJ-45 connectors, and the wiring diagrams for the appropriate adapters, are shown here:

1 Kaleido-X16 Installation
RS-422



Standard wiring between Kaleido-X16 and devices wired to SMPTE "slave" specification (e.g. most routers, Ross Synergy switchers, Neveion ETH-CON)



Standard wiring between Kaleido-X16 and devices wired to SMPTE "master" specification (e.g. Philips Jupiter router control system, Miranda Presmaster PCS)

Note: The two RS-422 ports on the Kaleido-X16 side have no ground pin. Using the appropriate DE-9S-to-RJ-45 adapter, an external device should be able to communicate with a Kaleido-X16 despite the lack of a ground.

See also: For more information about:

- RS-422 specifications, see "RS-422" on page 37.
- RS-422 serial connections, see "Serial Connections" in the "Routers" chapter of the Kaleido-X User's Manual.

Maintenance

Cleaning the Air Filter

Occasionally, the air filter has to be cleaned in order to maintain proper ventilation. The air filter is located in the front cover of the Kaleido-X16 frame. The filter may be cleaned without removing it from the cover.

To clean the air filter:

1. Carefully remove the cover from the frame.

IMPORTANT: Risk of damage to CompactFlash card

Be careful not to damage the CompactFlash card as you remove the front cover of the frame. Lift the cover directly away from the frame (i.e.: not up or down).

2. Place the cover flat on a work surface with the inside facing up.
3. Using a vacuum cleaner with a brush nozzle to prevent scratching, vacuum the dust from the inner side of the cover.
4. Turn the cover over and vacuum the outer side of it.
5. Reinstall the cover onto the frame.

Replacing a Defective Power Supply

In the event of a power supply failure, the unit will switch to the redundant power supply for its power source. If a PSU's LED is not green, you must replace the unit.

See also: *For more information about removing and reinstalling a power supply, see "Power Supplies" on page 8.*

1 Kaleido-X16 Installation
Replacing a Defective Power Supply

Specifications

2

This chapter lists equipment specifications for the Kaleido-X16 multi-viewer.

Inputs

Video Signal Inputs

The Kaleido-X16 frame supports 16 signal inputs. The supported input types include Composite, SD/SDI, HD-SDI, and 3Gbps (auto-detected). The processing delay is two fields if the video inputs are genlocked, and two or three fields if the video inputs are not genlocked. Signal inputs require BNC connectors.

Composite Inputs

SIGNAL	NTSC (SMPTE 170M), NTSC-J, PAL-BGDHI, PAL-N, PAL-M, SECAM
RETURN LOSS	> 30 dB up to 5.75 MHz
QUANTIZATION	8 bits

SD-SDI Inputs

SIGNAL	4:2:2 SMPTE 259M-C (270 Mbps)
FORMATS	525 and 625
AUDIO	SMPTE 274M-1994
CABLE LENGTH	225 m (738 ft) (Belden 1694A)
RETURN LOSS	>15 dB up to 270 MHz
JITTER	< 0.2 UI

HD-SDI Inputs

SIGNAL	4:2:2 SMPTE 292M-C (1.5 Gbps)
FORMATS	720p 29.97 Hz 720p 25 Hz 720p 24 Hz 720p 59.94 Hz 720p 50 Hz 1080i 59.94 Hz / 29.97PsF 1080p 29.97 Hz 1080i 50 Hz / 25PsF 1080p 25 Hz 1080p 23.98 Hz / 24 Hz 1080p 23.98PsF / 24PsF 1080i 50 Hz
AUDIO	SMPTE 299M
RETURN LOSS	>15 dB up to 1.485 GHz
JITTER	< 0.2 UI
CABLE LENGTH	100 m (328 ft) (Belden 1694A)

3Gbps Inputs

SIGNAL	4:2:2 SMPTE 424M-2006 (2.97/1.001 Gbps)
FORMATS	1920 × 1080p 60 Hz 1920 × 1080p 59.94 Hz 1920 × 1080p 50 Hz
AUDIO	SMPTE 299M
RETURN LOSS	> 15 dB up to 1.485 GHz > 10dB up to 2.97GHz
JITTER	< 0.2 UI
CABLE LENGTH	100 m (328 ft) (Belden 1694A)

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

Signal	SMPTE 292M-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)

DVI Graphic Inputs

The Kaleido-X16 supports two DVI inputs, one for each of two output heads.

SIGNAL	DVI-D (single link)
RESOLUTION	From 800×600 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
CONNECTOR	DVI-I (dual link)

Outputs

Mosaic Outputs

The Kaleido-X16 frame supports two HDMI outputs.

HDMI Outputs

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	15.24 m (50 ft) with Gefen CAB-HDMI-50MM
CONNECTOR	HDMI
SUPPORTED CABLE TYPES	HDMI to HDMI, or HDMI to DVI-D cables

The following table lists some (but not all) output formats supported on the HDMI connection.

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

Note: Users can customize their own timing rates through the XEdit software for resolutions ranging from 1024 × 768 up to 1920 × 1200 pixels.

The Kaleido-X16 frame supports two 3G/HD-SDI monitoring outputs (with embedded audio).

HD-SDI Monitoring Outputs

SIGNAL	4:2:2 SMPTE 292M-C (1.5 Gbps)
FORMATS	720p 59.94 Hz 1080p 23.98 Hz 1080p 23.98SF 1080p 24 Hz 1080p 24SF 1080p 25SF 1080p 29.97Hz 1080i 50Hz 1080i 59.94Hz
AUDIO	SMPTE 299M (limited to one pair, embedded on group 1, pair 1)
CABLE LENGTH	100 m (328 ft) (Belden 1694A)
JITTER	< 0.2 UI
CONNECTORS	BNC

3G-SDI Monitoring Outputs

SIGNAL	4:2:2 SMPTE 424M-2006 (2.97 Gbps / 2.907/1.001 Gbps)
FORMATS (LEVEL A ONLY)	1920 × 1080p 60 Hz 1920 × 1080p 59.94 Hz 1920 × 1080p 50 Hz
AUDIO	SMPTE 299M (limited to one pair, embedded on group 1, pair 1)
CABLE LENGTH	100 m (328 ft) (Belden 1694A)
RETURN LOSS	> 15 dB up to 1.5 GHz + 10 dB up to 2.97 GHz
QUANTIZATION	8 bits

3G-SDI Monitoring Outputs

JITTER	< 0.33 UI
CONNECTORS	BNC

Router Outputs

The Kaleido-X16 frame supports two 3G/HD/SD-SDI router outputs.

SD-SDI Router Outputs

SIGNAL	4:2:2 SMPTE 259M-C (270 Mbps), SMPTE 272M-1994
FORMATS	525 and 625
CABLE LENGTH	225 m (738 ft) (Belden 1694A)
RETURN LOSS	>15 dB up to 270 MHz
ADDITIVE JITTER	< 0.2 UI p-p (wideband)
CONNECTOR TYPE	BNC

HD-SDI Router Outputs

SIGNAL	4:2:2 SMPTE 292M-C (1.5 Gbps)
FORMATS	480p 59.94 Hz 720p 59.94 Hz 1080p 23.98 Hz 1080p 23.98PsF 1080p 24 Hz 1080p 24PsF 1080p 25PsF 1080p 29.97 Hz 1080i 50 Hz 1080i 59.94 Hz

HD-SDI Router Outputs

CABLE LENGTH	100 m (328 ft) (Belden 1694A)
RETURN LOSS	>15 dB up to 1.5 GHz
ADDITIVE JITTER	< 0.2 UI p-p (wideband)
CONNECTOR	BNC

3G-SDI Router Outputs

SIGNAL	4:2:2 SMPTE 424M-2006 (2.97 Gbps / 2.97/1.001 Gbps)
FORMATS	1080p 60 Hz 1080p 59.94 Hz 1080p 50 Hz
CABLE LENGTH	100 m (328 ft) (Belden 1694A)
RETURN LOSS	>15 dB up to 1.5 GHz + 10 dB up to 2.97 GHz
JITTER	< 0.3 UI p-p (wideband)
CONNECTORS	BNC

Audio I/O

The Kaleido-X16 frame supports one SDTI audio input.

SDTI Audio Input

SIGNAL	SMPTE-305 (up to 128 channels/64 AES)
CABLE LENGTH	250 m (820 ft) (Belden 1694A)
CONNECTOR	BNC

The Kaleido-X16 supports audio monitoring through its HD-26 connector. The supported formats are the AES3 digital audio, and analog audio.

Analog Audio Input

IMPEDANCE	16,000 Ω
QUANTIZATION	20 bits
SAMPLING RATE	48 kHz (free-run)
MAX LEVEL	2 V p-p
CONNECTOR	HD-26

Analog Audio Output

SIGNAL	Balanced analog audio
LEVEL	MAX + 24 dBU
QUANTIZATION	20-24 bits
IMPEDANCE	< 600 Ω
THD+N	80 dB
SNR	92 dB
CONNECTOR	HD-26

AES Outputs

SIGNAL	Balanced digital audio
FORMAT	AES3
LEVEL	4 V p-p
IMPEDANCE	110 Ω
CONNECTOR	HD-26

Control

The Kaleido-X16 frame supports two LTC unbalanced inputs for clock synchronization.

Time Code Inputs (LTC)

SIGNAL	SMPTE 309M-1999, SMPTE 12M-1995(EBU-3259-E)
ELECTRICAL LEVEL	0.3 to 5 V p-p
IMPEDANCE	High Impedance (>10k Ω)
CONNECTOR	BNC

The Kaleido-X16 supports 32 GPI inputs and 4 GPI outputs, on a DB-44 female connector.

GPI INPUT (up to 32)

DESCRIPTION	Contact closure
SIGNAL	5 to 12 VDC
FORMATS	Fixed (Not bidirectional)
PROTECTION	Up to 24 V
CONNECTOR	DB-44

GPI OUTPUT (up to 4)

DESCRIPTION	Contact closure
SIGNAL	Open collector 5 to 12 VDC
MAXIMUM VOLTAGE	12 V
MAXIMUM CURRENT AT 12V	70 mA
FORMATS	Fixed (Not bidirectional)
PULSE MINIMUM DURATION	100 ms
CONNECTOR	DB-44

Ethernet

SIGNAL	10/100 BASE-T (IEEE 802.3)
CONNECTOR	RJ-45

RS-422

SIGNAL	RS-422 (SMPTE 207M, EBU-3245)
CONNECTOR	RJ-45

USB

SIGNAL	USB Version 1.0
CONNECTOR	USB

Frame

POWER SUPPLY	Hot-swappable redundant power supply
INPUT VOLTAGE	100-240 V
FREQUENCY	47.63 Hz
POWER	300 W @ 75% of PSU
MAX CURRENT	4 A
MAX POWER	300 W
DIMENSIONS	H: 45 mm (1.75 in) (1 RU) W: 451 mm (18 in) + mounting flange for standard 19-inch rack D (with cover and connectors): 641 mm (25.25 in) D (without cover and connectors): 591 mm (23.25 in)
FULL SPEC. TEMPERATURE RANGE	0-40 °C (ambient)

2 Specifications
Frame

WEIGHT (2 PSUs)	10.5 kg (23 lbs)
WEIGHT (1 PSU)	9.5 kg (21 lbs)



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