Kaleido-X16
Hardware Description & Installation Manual

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Part Number: M869-9902-101 **11 August 2009**

Title	Kaleido-X16 Hardware Description & Installation Manual
Part Number	M869-9902-101
Revision	11 August 2009, 4:43 pm

Safety Compliance

This equipment complies with:

- CAN/CSA C22.2 No. 60950-1-07 Safety of Information Technology Equipment, Including Electrical Business Equipment
- UL60950-1 (2nd Edition) Safety of Information Technology Equipment, Including Electrical Business Equipment
- IEC60950 (2nd Edition) / Safety of Information Technology Equipment, Including Electrical Business Equipment

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, class A requirements for Digital Devices.

This equipment complies with the requirements of:

- EN 55022 Class A, Radiated Emissions.
- EN 55022 Class A, Conducted Emissions
- EN 61000-4-2, -3, & -11 Electromagnetic Immunity
- EN 61000-3-2 & -3-3, Disturbance in Supply Systems

Warranty Policies

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

Table of Contents

1 Kaleido-X16 Installation

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

Introduction

The Kaleido-X16 system is a cost-effective multi-image processor. The Kaleido-X16 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 router	The Kaleido-X16 can behave as a router, with 16 input channels as sources and the two *RT OUT* 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 on the Kaleido-X16

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

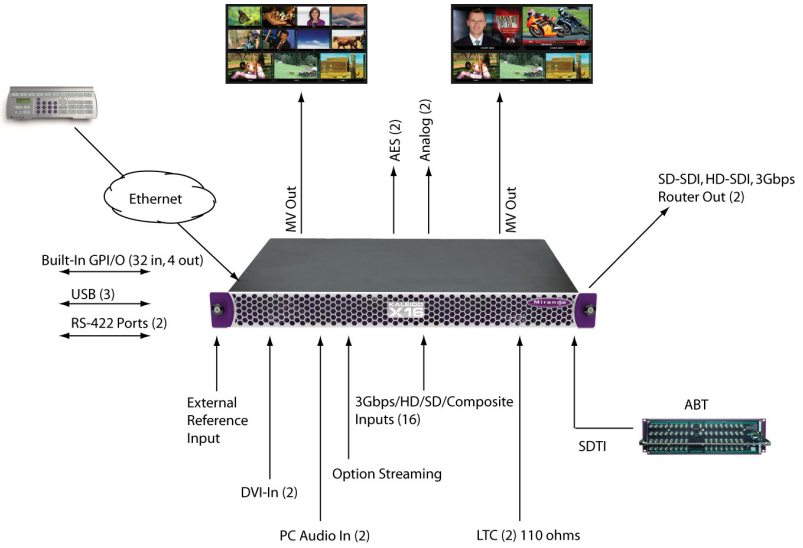
supported in the most recent release. The following table lists those ports on the Kaleido-X16 that are not currently supported in the most recent release of the Kaleido-X software:

Port or port functionality	Limitation
HD-SDI Router output	Does not switch in the vertical interval
Audio monitoring embedded in the MV-Out	Unavailable in current release
Option output	Unavailable in current release
PC In analog audio input	Unavailable in current release

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 an individual Kaleido-X16-Dual system with its inputs and outputs. Examples of the various external devices that connect to the Kaleido-X16 are also shown.



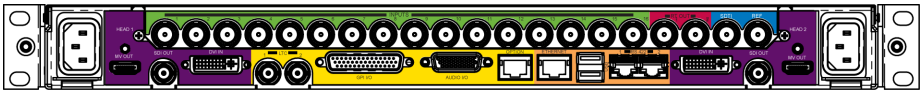
The Kaleido-X16 system is available in two model types: the Kaleido-X16-D and the Kaleido-X16-S. Throughout this manual, Kaleido-X16 refers to both models unless it is used to distinguish the *single head* model from the *dual head* model.

Kaleido-X16-D

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

Connection type	Number of connections on Head 1	Number of connections on Head 2
MV-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.

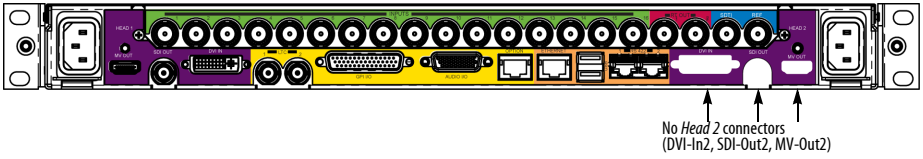
See also: *For more information about the Audio I/O TBA pinout differences between the two Kaleido-X16 models, see "Audio I/O TBA" on page 15.*

Kaleido-X16-S

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

Connection type	Number of connections on Head 1
MV-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 also:** *For more information about the Audio I/O TBA pinout differences between the two Kaleido-X16 models, see "Audio I/O" on page 15.*

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 pre-installed cards and power supplies
- 2 AC power cords
- A DVD of system software and documentation
- Mouse

Notes

- The Kaleido-RCP2 unit is optional and is not included in the standard Kaleido-X16 package.
- The standard Kaleido-X16 comes with one PSU. A redundant, second PSU is optional.

Rack-Mount Installation

The Kaleido-X16 frame may be installed in a standard 19-inch rack, using the proper screws and washers (not included). The Kaleido-RCP2 may also be installed in a rack using the optional KRCP-RK2 mounting kit.

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

Frame and Electrical Installation

The Kaleido-X16 frame 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

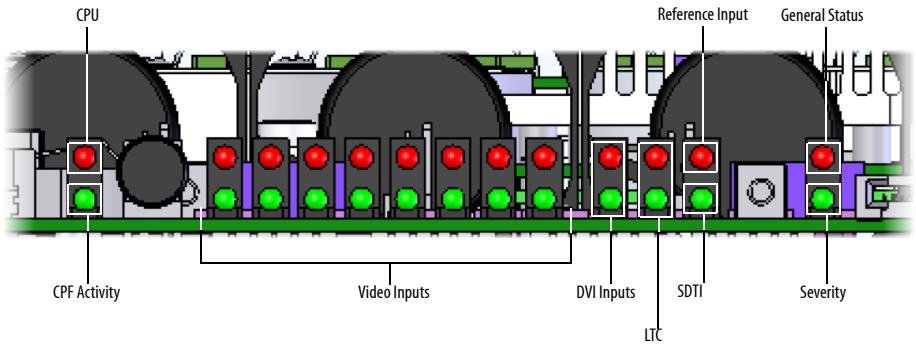
The Kaleido-X16 frame is 1 RU high. Input and output connectors are mounted on a connector panel on the rear of the frame. The redundant power supply is installed in the front of the frame.

The front door can be opened to give access to the PSUs, CompactFlash, USB connector, and basic LEDs.

The Kaleido-X16 frame incorporates the following key sections:

- A rack-mountable mechanical framework (for mounting into a 19-in EIA rack)
- A removable door to cover and protect the front of the frame
- 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 door)

The LEDs on the front of the frame (behind the door) indicate the following conditions depending on their color and whether they are blinking:

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	N/A
CPF Activity	N/A	Activity	N/A	N/A	N/A	N/A	No Activity
Video Inputs	Inputs are locked	N/A	• Inputs unlocked, or • no input	ERROR ON SIGNAL	N/A	N/A	N/A
DVI Inputs	Inputs are locked	N/A	• Inputs are unlocked, or • no input	ERROR ON SIGNAL	N/A	N/A	N/A
LTC	LTC valid	N/A	LTC invalid	N/A	N/A	N/A	No signal
Ex. Ref. Input	Input is locked	N/A	• Input is unlocked, or • no input	ERROR ON SIGNAL	N/A	N/A	N/A
SDTI	Inputs are locked	N/A	• Inputs are unlocked, or • no input, or • no SDTI signal	ERROR ON SIGNAL	N/A	N/A	N/A
General Status	System OK	Intrusive self-diagnostic finished	Config Failed/ Safe Mode	FW Upgrading	Boot up Diagnostic (Verbose switch on)	Firmware error	N/A
Severity	Boot OK	Booting	Boot error Need live-update	Fatal error CALL TECH SUPPORT	N/A	N/A	No power

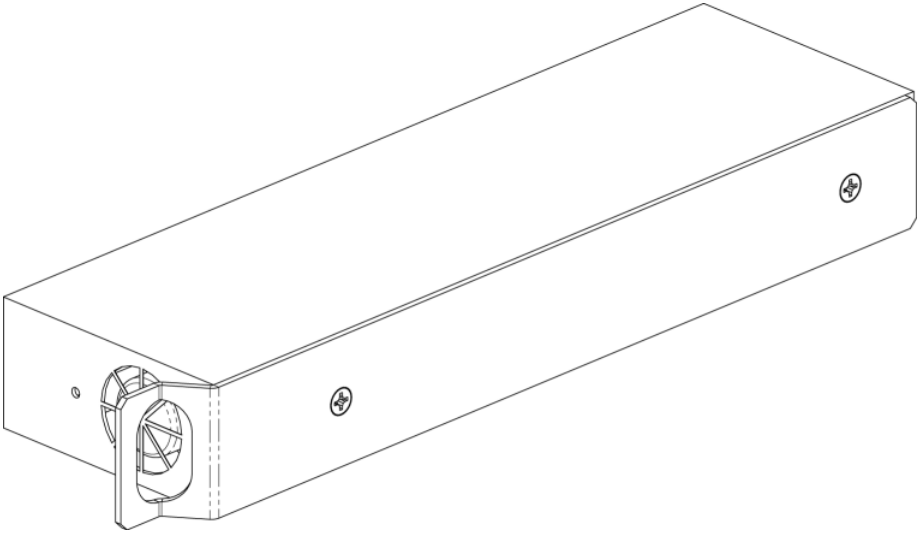
Monitoring the Temperature of the Kaleido-X16 Frame

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

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

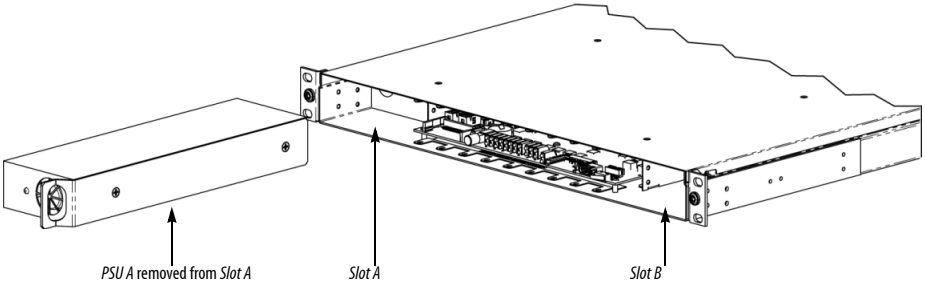
The Kaleido-X16 frame is powered by dual redundant, current-sharing power supply units (PSUs). The PSUs are installed and removed from the front of the frame and are hot-swappable, so that a defective supply may be replaced without removing the Kaleido-X16 frame from service. When facing the front of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

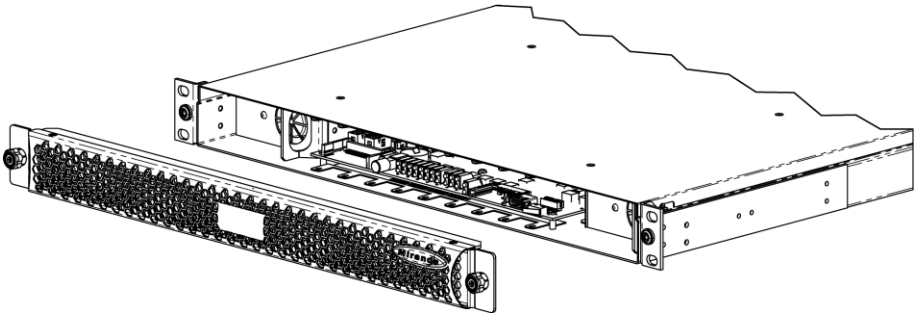
There are two power supplies: an operational PSU and a redundant PSU. The system operates with a single PSU. If you choose to have only one PSU installed in your Kaleido-X16 frame, you must do the following:

- *Clear the* **PSU B Installed** *check box for this Kaleido-X16 frame in XAdmin (see the "Configuring the PSU B Installed Option in XAdmin" section in the "Setting Up the Kaleido-X16" chapter of the Kaleido-X16 Quick Start Guide).*
- *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 9).*

Access the power supplies by removing the front door 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, do the following:

1. Open the front door 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, do the following:

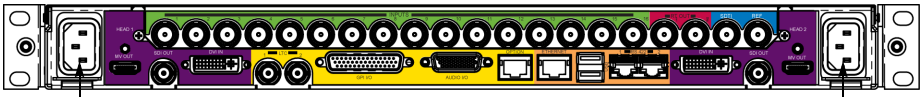
1. Position the power supply (PSU) in front of an empty power supply slot in front of the frame, with the connector end towards the frame and the PSU handle on the right side.
2. Slide the PSU into the empty slot, moving it gently until it contacts the sockets at the rear of the slot.
3. Push firmly 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.

Operation

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:

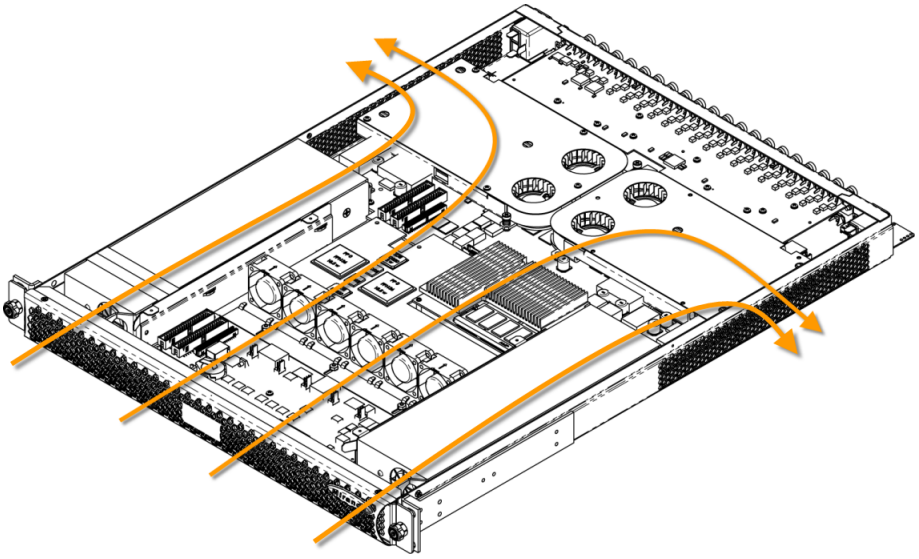
- The left power socket is for PSU B.
- The right power socket is for PSU A.



IMPORTANT: *A Kaleido-X16 frame 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.*

Ventilation

The Kaleido-X16 frame 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

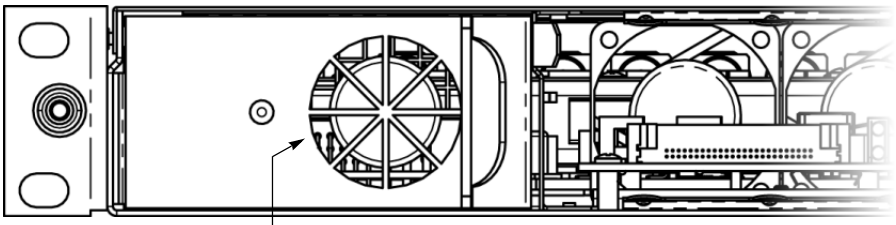
Frame Cooling Fans

Air intake for the frame 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 door. The heat sinks help to exhaust air out through grates on either side (see diagram, above).

IMPORTANT: *The Kaleido-X16 frame 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):



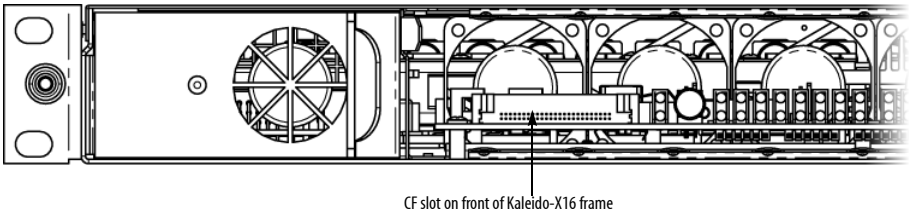
Air Filter

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

See also: *For more information about cleaning the air filter, see "Cleaning the Air Filter" on page 24.*

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 booting a Kaleido-X16, see the "Setting up the Kaleido-X" 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 4 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	see "Video and Graphic Output over the MV-Out Connection" on page 14	Digital output (no analog signal) compatible with a DVI-D signal.
REF	BNC	Reference signal to genlock the Kaleido KX to the local plant. Supported Reference formats: • 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 input #1-2
GPI 1-44	DSUB44 (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.

Connector label	Connector type	Function
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 note, below)	Connect to an RS-422 (SMPTE 207M, EBU-3245) or RS-485 device or network

Inputs

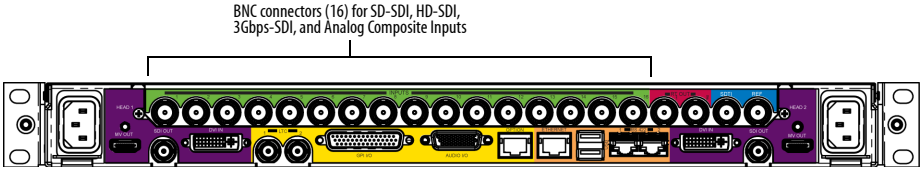
Graphic signals

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.

> **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.

See also: *For more information about DVI input specifications, see "DVI Graphic Inputs" on page 63.*

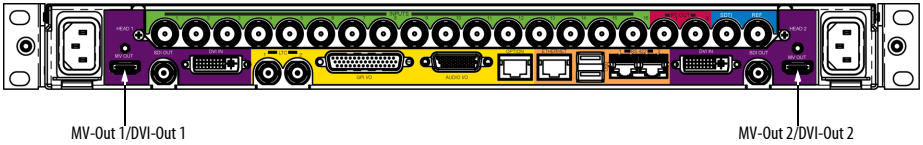
Video Signals



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 also: *For more information about Video signal input specifications, see "Video Signal Inputs" on page 61.*

Video and Graphic Output over the MV-Out Connection



You can use a Multi-Viewer Output connection as a DVI-Out by doing one of the following:

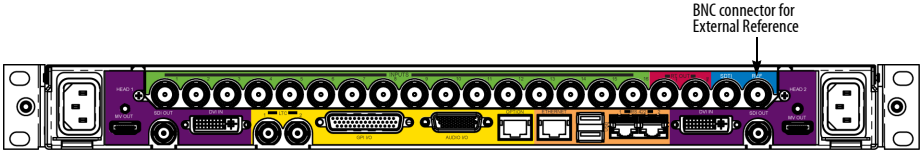
- Use a cable with both ends compatible with the MV-Out connector, and connect one end to an adapter that converts to DVI.
- Use a cable with one end compatible with the MV-Out connector and the other end compatible with DVI.

There is one Multi-Viewer (MV) Output for each Output Head. The MV-Out connection is a high definition connection for the multi-viewer output and can support resolutions up to 1920x1200 at 60Hz. The connection is based on TMDS technology as used to interconnect industrial and consumer displays. Single-link DVI-D cables (and cables electrically compatible to this) are supported. Since there are two user-assignable Outputs already available on the system, the Outputs can be paired with the AES and Analog Output.

See also: *For more information about Mosaic Video and Graphic Outputs over the MV-Out connection, see "MV Outputs" on page 63.*

External Reference

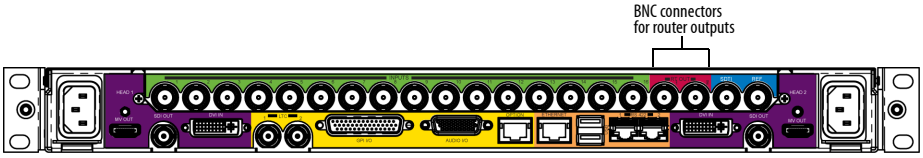
The external reference (or REF) input signal allows the Kaleido-X16 to genlock to the local plant.



See also: *For more information about external reference input specifications, see "Reference Input" on page 72.*

Router

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 Router Output ports on the rear connector panel:

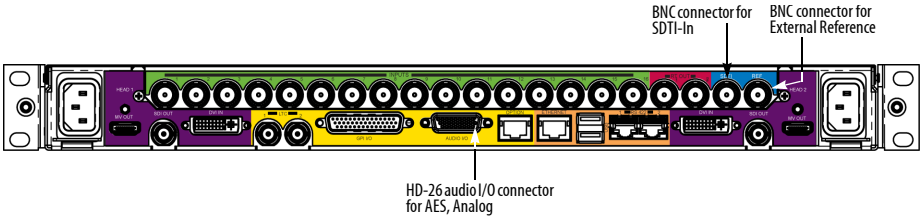


See also: *For more information about:*

- *Router Output specifications, see "Router Outputs" on page 65.*
- *Routers and the Kaleido-X16, see the "Routers" chapter of the Kaleido-X User's Manual.*

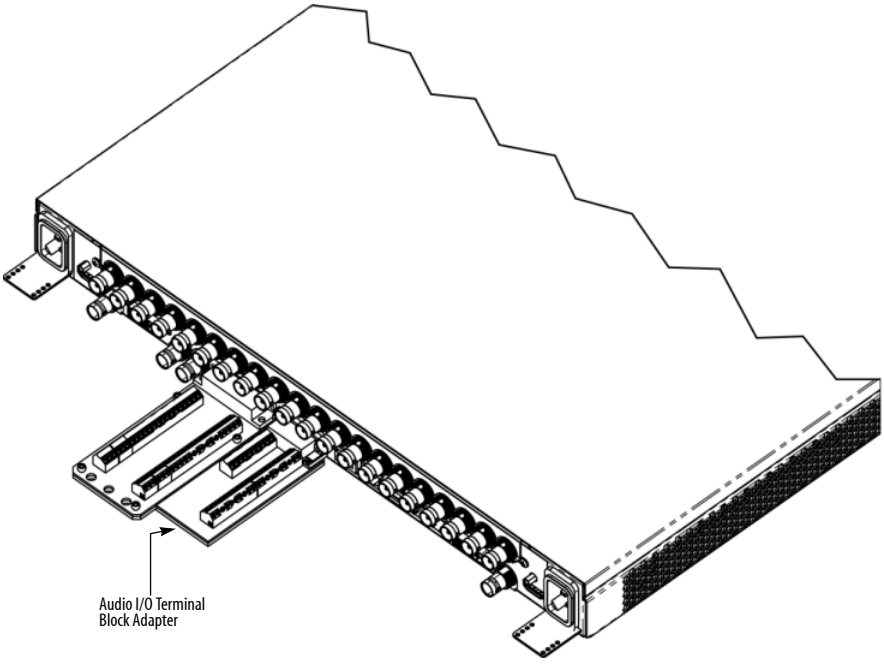
Audio I/O

The Kaleido-X16 supports audio monitoring of 26 input/output connections 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-In 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 item NSH26M).



Kaleido-X16 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 Kaleido-X16-Dual model or 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 (-)

Bottom row		Center row		Top row	
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

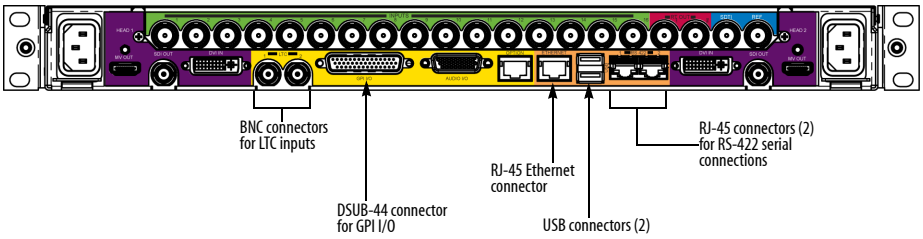
The Audio I/O TBA pinout on the Kaleido-X16-S is as follows:

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-In audio specifications, see "SDTI Audio Input" on page 67.*
- *analog audio specifications, see "Analog Audio Monitoring" on page 67.*
- *AES output specifications, see "AES Outputs" on page 68.*
- *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)

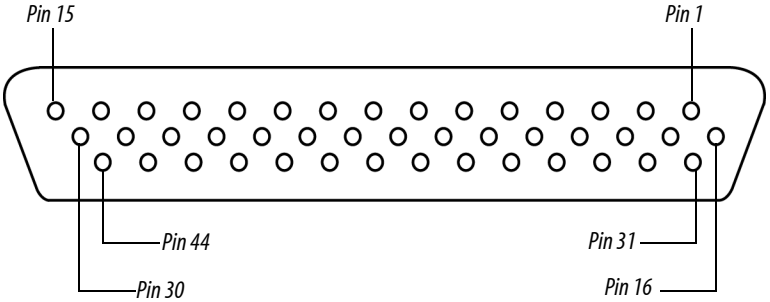
The Kaleido-X16 supports two linear time code (LTC) inputs over BNC connectors. The format is SMPTE 12M unbalanced.

See also: *For more information about LTC specifications, see "Time Code Inputs (LTC)" on page 68.*

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 DSUB-44 (female on the connector panel; male on the cable):

The pin numbering scheme for the GPI I/O connector is represented in the following diagram:



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

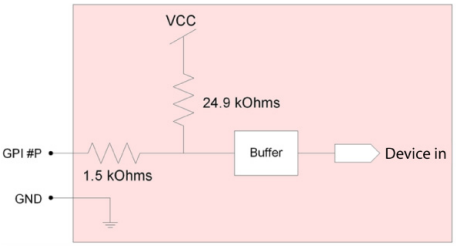
- 4 Ground (GND) pins
- 32 GPI Input pins
- 4 GPI Output Emitter pins (designated in the table, below, as "N")
- 4 GPI Output Collector pins (designated in the table, below, as "P")

The exact pinout for the GPI connector is as follows:

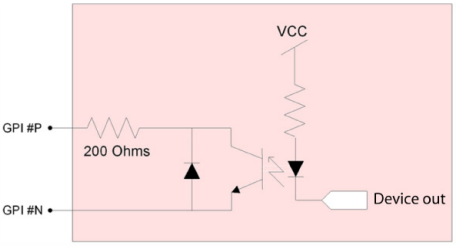
Bottom row		Middle row		Top row	
Pin #	**Description**	**Pin #**	**Description**	**Pin #**	**Description**
31	GND	16	GPI Output P<1>	1	GPI Output N<1>
32	GPI Output P<2>	17	GPI Output N<2>	2	GPI Output P<3>
33	GPI Output N<3>	18	GPI Output P<4>	3	GPI Output N<4>
34	GPI Input <31>	19	GPI Input <32>	4	GPI Input <29>
35	GND	20	GPI Input <30>	5	GPI Input <27>
36	GPI Input <26>	21	GPI Input <28>	6	GPI Input <24>
37	GPI Input <23>	22	GPI Input <25>	7	GPI Input <21>
38	GPI Input <20>	23	GPI Input <22>	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>
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:



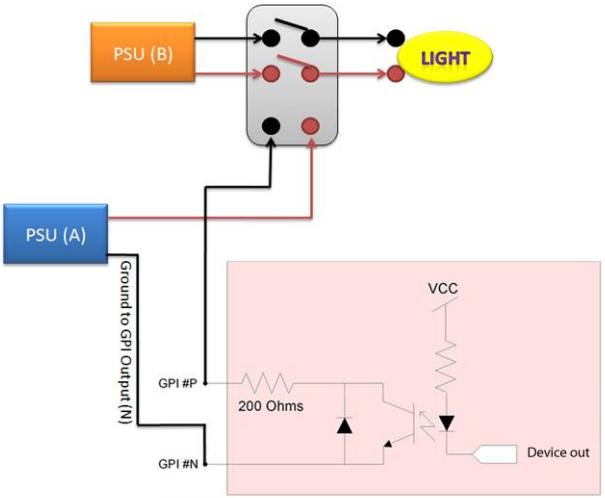
GPI configured as INPUT



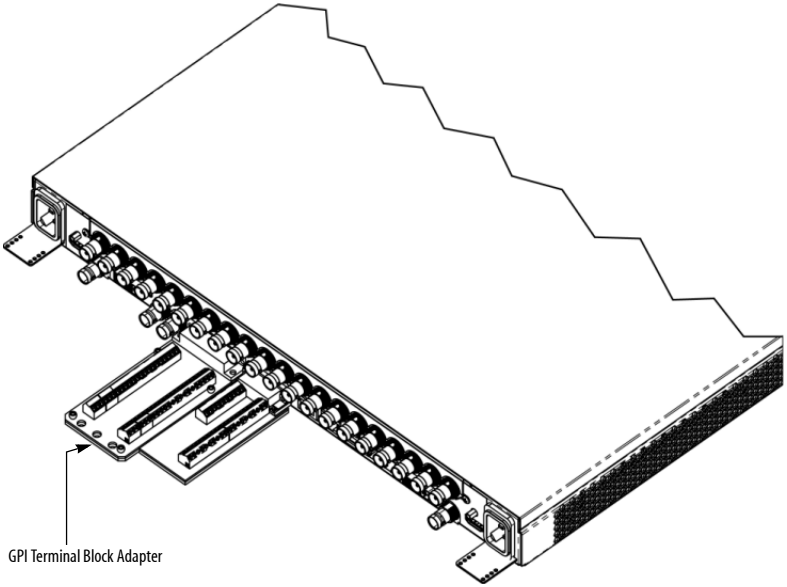
GPI configured as OUTPUT

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.

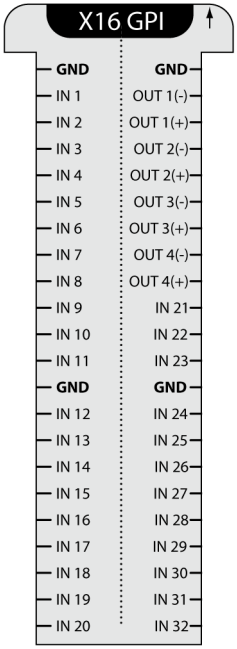
CAUTION: In the example, below, make sure your P and N connections are in the proper polarity otherwise your GPI output will always be in the ON state.



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-IN connections:



Kaleido-X16 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" on page 68.*
- *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.*

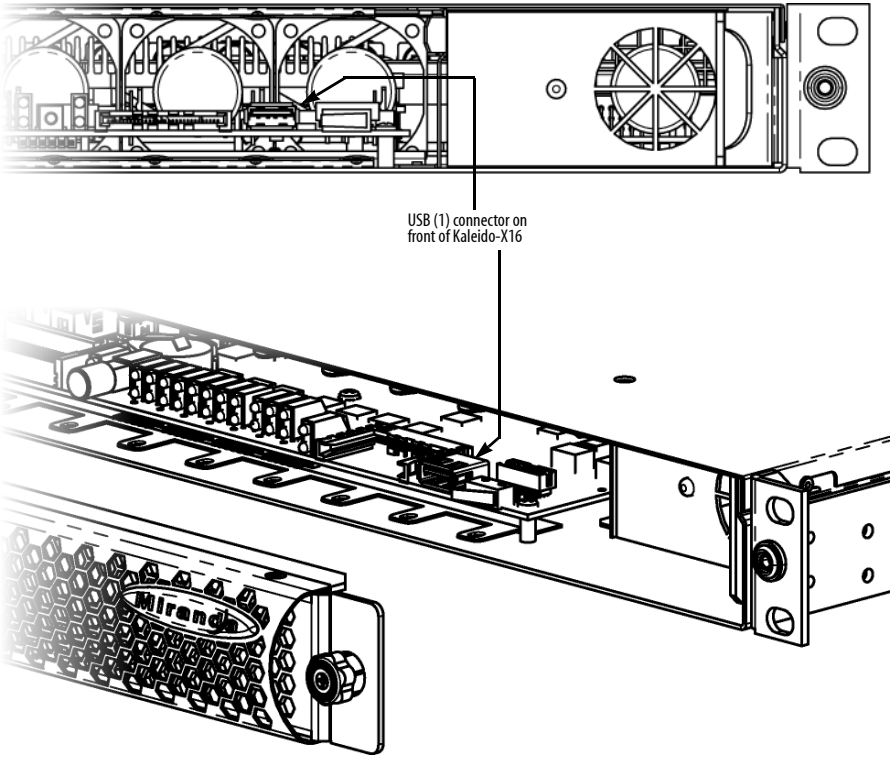
Ethernet

The Kaleido-X16 supports one Ethernet connection through an RJ-45 connector.

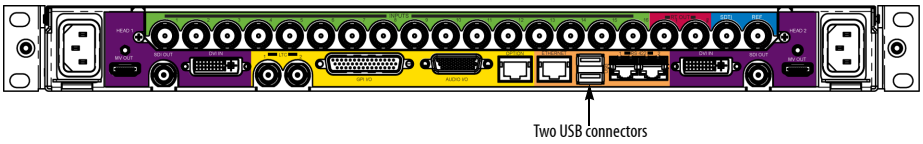
See also: *For more information about Ethernet specifications, see "Ethernet" on page 69.*

USB

The Kaleido-X16 supports three USB 1.0 connections. Connect a mouse, keyboard, or USB flash memory for a software upgrade or data backup. Two connectors are on the rear connector panel (see diagram at the beginning of the section called "Control" on page 18), and one is on the front of the frame behind the front cover:



One USB connection on the front of the frame



Two USB connections on the rear connector pane

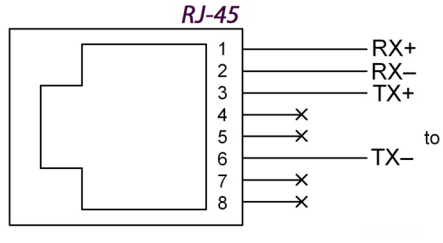
See also: *For more information about USB specifications, see "USB" on page 69.*

RS-422

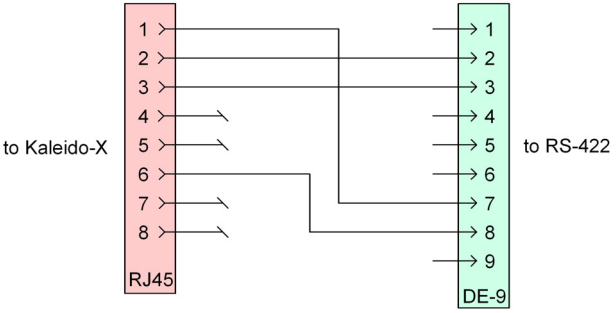
The Kaleido-X16 supports two RS-422 serial inputs over RJ-45 connectors. These inputs allow the Kaleido-X16 to connect to external serial devices such as a router, production switcher, or router controller.

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-9S connector, so if you are using this interface, you will require a DE-9S-to-RJ-45 adapter cable. Miranda supplies such a cable, correctly wired for this application (Miranda part no. 1737-3000-102).

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



Pinout of each RS-422 port's RJ-45 connector on the Kaleido-X16



Wiring diagram for an RJ-45-to-DE-9 adapter cable to connect the Kaleido-X16 to an RS-422 network

Note: The two RS-422 ports on the Kaleido-X16 side have no ground pin. Using the 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 69.*
- *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 door of the Kaleido-X16 frame. The filter may be cleaned without removing it from the door.

To clean the air filter, do the following:

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.*

2 Peripheral Equipment

This chapter describes peripheral equipment you can connect to the Kaleido-X16 frame.

Summary

Kaleido-RCP2

Introduction

The Kaleido-RCP2 is a multi-function remote control panel designed for use with Miranda's Kaleido-X16 systems. Ethernet connectivity allows multiple RCP2 users to access multiple Kaleido-X16 systems, allowing convenient access to the real-time operating features of the Kaleido-X16.

Description

The Kaleido-RCP2 is a compact, freestanding controller. All operating controls are located on the top of the unit. It requires only a single Ethernet cable for both connectivity and power. It also provides two USB ports allowing a USB mouse and one standard keyboard or numeric keypad to be connected.

Note: Multi-function keyboards or numeric keypads that have a built-in USB hub do not work when connected to the RCP2. No other device than a mouse, a numeric keypad without USB hub, a keyboard without USB hub or special function keys can be connected to the RCP2.

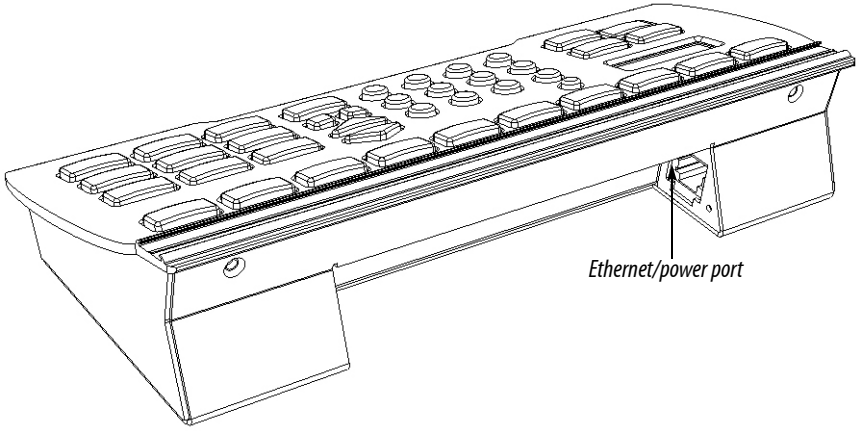
When logged on to a Kaleido-X16 via the RCP2's Ethernet connection, you can control various operating features of the Kaleido-X16.

Connections

The RCP2 is equipped with three connectors, located on the inside rear supports of the case.

Ethernet / Power Port

The power for the Kaleido-RCP2 arrives on an RJ-45 connector, and shares this connector with an Ethernet interface. The RCP2 conforms to the IEEE 802.3af standard for powered devices.



Two kinds of power sources are supported:

- midspan power source injector into an existing Ethernet network, and
- power sourcing Ethernet switch.

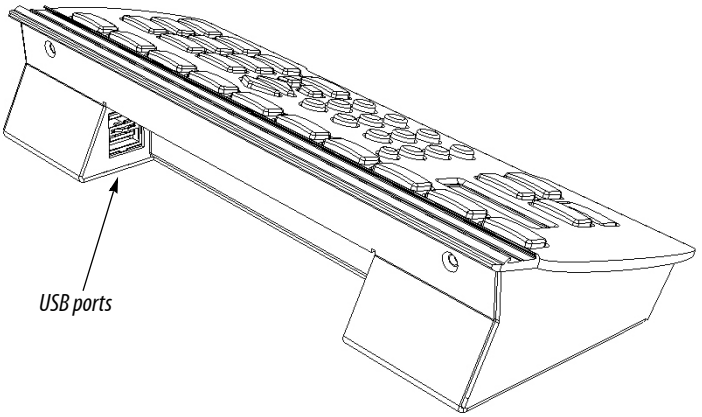
Full redundancy is obtained with both supplies present at the same time.

Ethernet connectivity is 10/100 Mbps.

2 USB Ports

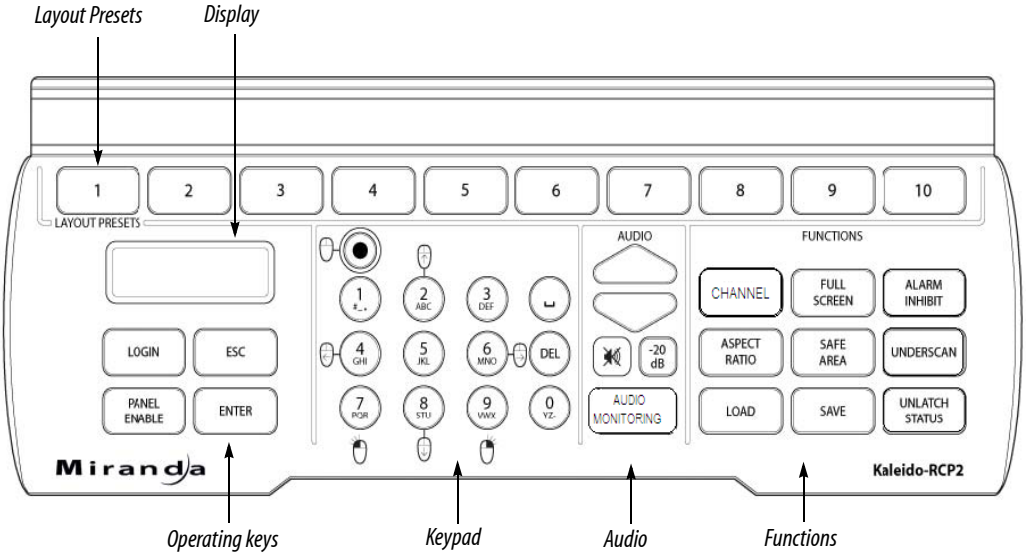
These ports are used to connect a mouse and keyboard, which may be used in operating the Kaleido-X16.

Note: Other USB devices, e.g. memory sticks, are not supported.



Control Surface Layout

The operating controls are laid out in functional groups:



Layout Presets

The ten numbered keys laid out across the top of the panel are used to recall saved layouts to the Kaleido-X16 display, and are also used to save layouts.

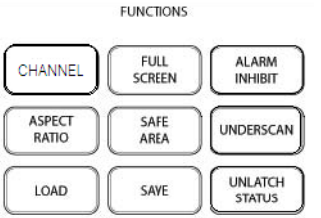
- Pressing and holding one of the preset buttons for 8 seconds will store the current layout to that button, allowing the user to easily return to it later.
- The layout associated with each button can be configured beforehand in XEdit.

You can insert a labeled strip into the built-in slot located above the keys to identify the saved layouts.

Functions

These function keys activate operating modes or functions on the Kaleido-X16.

CHANNEL	FULL SCREEN	ALARM INHIBIT
ASPECT RATIO	SAFE AREA	UNDERSCAN
LOAD	SAVE	UNLATCH STATUS



Note: The exact functionality of these buttons is determined by the configuration of the Kaleido-X16.

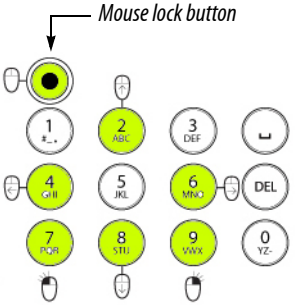
Audio

UP ARROW	Increase the audio monitoring volume
DOWN ARROW	Decrease the audio monitoring volume
MUTE	Mute the audio monitoring (push on/push off)
-20dB	Attenuate the audio monitoring gain by 20dB (push on/push off)
AUDIO MONITORING	Audio source selection

Keypad

The keypad buttons have double functions. Use the MOUSE LOCK button (top left) to switch between the two modes:

Numeric	All buttons at low brightness, alpha-numeric function as printed on each button is enabled.
Mouse	Numeric function disabled, and some keys are assigned mouse-equivalent functions. The MOUSE LOCK button and the mouse-function keys are bright.



Numeric key #	Mouse-equivalent function
2	Pointer up
8	Pointer down
4	Pointer left
6	Pointer right
7	Click
9	Right-click

Display and Operating Keys

The operating keys let you connect to a Kaleido-X16 system, navigate menus, and control the behavior of your Kaleido-RCP2's functions.

DISPLAY	The LCD display shows messages and text entries
LOGIN	Log on to a Kaleido-X16 through the Ethernet interface
ESC	Menu navigation
ENTER	Menu navigation
PANEL ENABLE	Enable/disable all other keys on this control panel, to prevent accidental operation

Note: To reset the control panel, simultaneously press ESC, ENTER, and DEL.

See also: *For more information about using the operating keys, see "Configuration" on page 32, and "Operation" on page 44*

Configuration

Before you can use your Kaleido-RCP2 to operate your Kaleido-X16 system, you must set up the Ethernet connection between the two devices.

> **Note:** The Kaleido-RCP2 is powered through its RJ-45 Ethernet connector (a PoE connection). However, the Kaleido-X16 frame does not feed power through its Ethernet connections. To power the Kaleido-RCP2, you must therefore source power from a separate device with a compatible PoE Ethernet connection.

Ethernet Configuration

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 can be found, the Kaleido-RCP2 will default to its static IP address.
- The time-out period before the RCP2 defaults to its static address is about 1 minute. To speed up the initialization, disable the DHCP option (see "Enabling or Disabling DHCP" on page 34).
- The default static IP address is 10.0.3.191, but this can be changed (see "Setting an IP Address, Subnet Mask and Gateway" on page 35).
- If you need to operate with a fixed IP address, you must use the **Configuration** menu to disable DHCP and set up the correct IP address, Network Mask and Gateway.
- To access Kaleido-X16 "rooms" located in other subnets, the RCP2 must be configured with the appropriate unicast IP addresses (see "Configuring Unicast IP Addresses" on page 37).

Room Selection

Before you can use your Kaleido-RCP2 to operate a Kaleido-X16, you must select the room in which to operate. Use the **Configuration** menu to access the list of available rooms and select the one you wish to control. See "Selecting a Position and Logging On" on page 44. for details.

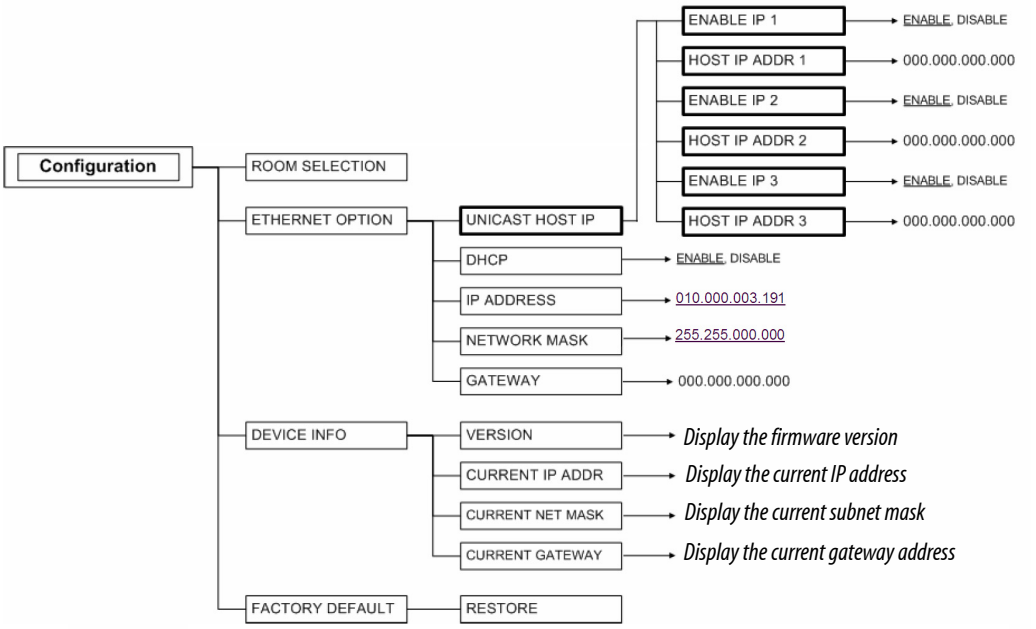
> **Note:** To log on to a room that is part of a Kaleido-X16 system configured in a different subnet, the RCP2 must be configured with the appropriate unicast IP addresses (see "Configuring Unicast IP Addresses" on page 37).

Navigating the Configuration Menu

Resources for setting up the Kaleido-RCP2 to operate the Kaleido-X16 are available through the Kaleido-RCP2's **Configuration** menu. The current menu selection is shown on the LCD display. Access the menu by pressing the ENTER key for at least 8 seconds, then use the keys to navigate, as indicated below:

2	Move UP
8	Move DOWN
ENTER	Access the submenu, or select the displayed value
ESC	Go back to the previous menu level, or cancel a value selection

Note: These keys are lit when menu access is enabled.



Kaleido-RCP2 Configuration menu summary

Selecting a Room

Use the **Configuration** menu to select the room you wish to access with your RCP2—the *ON AIR* room, for example. Once you select the room, you can log on as a specific user, corresponding to one of the login positions that are available for this room only. In the example described below, the three rooms that are available, are listed in this sequence: *RMA*, *RMB*, *RMC*. We will select room RMC.

Action	LCD indication	Other buttons
Press and hold the ENTER key for at least 8 seconds to enter the **Configuration** menu.	At the end of the 8 seconds: **Configuration** **ROOM SELECTION**	Digit keys **2** (UP) and **8** (DOWN), and the ENTER and ESC buttons, are lit; other digit keys are dimmed.
Press ENTER again to obtain the list of rooms from all Kaleido systems currently available on the network.	For some time until the list is received: **Acquiring room list...** Once the room list is received: **ROOM Select** **RMA**	
Press the **8** key twice, until the room you wish to select (i.e. RMC) appears on the display. (Press **2** to scroll in the opposite direction.)	**ROOM Select** **RMC**	
Once the display shows the desired room name, you can: • press ENTER to select this room; • press ESC to cancel the selection and return to the previous menu level in the menu.	**Configuration** **ROOM SELECTION**	Digit keys **2** (UP) and **8** (DOWN), and the ENTER and ESC buttons, are lit; other digit keys are dimmed.
Press ESC to exit the **Configuration** menu.	**RMC**	All buttons are dimmed.

Enabling or Disabling DHCP

The following table shows how to enable or disable the automatic allocation of an IP address from a server. This option is commonly called DHCP (the protocol that is used for address allocation). In our example, we suppose that the DHCP option is enabled, and must be disabled. This task is performed by using the **Configuration** menu.

Action	LCD indication	Other Buttons
Press and hold the ENTER key for at least 8 seconds to access the **Configuration** menu.	At the end of the 8 seconds: **Configuration** **ROOM SELECTION**	Digit keys **2** (UP) and **8** (DOWN), and the ENTER and ESC buttons, are lit; other digit keys are dimmed.
Press 8 once to go to the **ETHERNET OPTIONS** submenu.	**Configuration** **ETHERNET OPTION**	
Press ENTER to open the Ethernet parameter menu.	**ETHERNET OPTIONS** **DHCP**	
Press ENTER again to see the current DHCP status.	**DHCP** **ENABLE**	
Press 8 to go to the DISABLE option. (Press 2 to go back to the previous selection.)	**DHCP** **DISABLE**	
Press ENTER to select this option, or press ESC to cancel. In either case, you will return to the previous menu level.	**ETHERNET OPTIONS** **DHCP**	
Press ESC twice to exit the **Configuration** menu. **Note:** If you changed the DHCP parameter, the Kaleido-RCP2 unit will reboot.	**RMC**	All buttons are dimmed.

When you change the DHCP mode, the device must be restarted for the new option to take effect. This is done automatically but only after you exit the **Configuration** menu. You can make other changes using the **Configuration** menu, and only exit, once you are done with the changes.

Setting an IP Address, Subnet Mask and Gateway

The table below shows how to set a fixed IP address for a Kaleido-RCP2 unit. As an example, the IP address will be changed from 10.0.3.191 to 192.168.0.10. This task is performed by using the **Configuration** menu.

> **Note:** The method is the same for the **Subnet Mask** and **Gateway** menus.

Action	LCD indication	Other Buttons
Press and hold the ENTER key for at least 8 seconds to access the **Configuration** menu.	At the end of the 8 seconds: **Configuration** **ROOM SELECTION**	Digit keys **2** (UP) and **8** (DOWN), and the ENTER and ESC buttons, are lit; other digit keys are dimmed.
Press 8 once to go to the **ETHERNET OPTIONS** submenu.	**Configuration** **ETHERNET OPTIONS**	
Press ENTER to open the Ethernet parameter menu.	**ETHERNET OPTIONS** **DHCP**	
Press 8 to go to the next option in the menu. (Press 2 to return to the previous option.)	**ETHERNET OPTIONS** **IP ADDRESS**	
Press ENTER again to select this option and display the current IP address. You can move the cursor to the next digit position by pressing the space ␣ key. Use the DEL key to move the cursor back to the previous position.	**IP ADDRESS** **010.000.003.191** The cursor blinks, alternating between a black square and the digit.	All digit keys are lit as well as the ENTER, ESC, DEL and space ␣ key.
Use the digit keys to change the current value. Once you pressed a digit key, the cursor moves to the next position.	**IP ADDRESS** **192.168.000.010** The cursor blinks, alternating between a black square and the digit.	
When done, press ENTER to confirm the address, or ESC to cancel the change and go back to the previous menu level.	**ETHERNET OPTIONS** **IP ADDRESS**	All buttons are dimmed.
Press ESC twice to exit the **Configuration** menu. **Note:** If you changed any of the network parameters (IP address, subnet mask or gateway), the Kaleido-RCP2 unit will reboot.	**RMC** (the current room)	

When you change the DHCP mode, the device must be restarted for the new option to take effect. This is done automatically but only after you exit the **Configuration** menu. You can make other changes using the **Configuration** menu, and only exit, once you are done with the changes.

Configuring Unicast IP Addresses

The unicast IP feature enables a Kaleido-RCP2 to find up to three Kaleido-X16 systems on different subnets and connect to them (via network gateways), while maintaining connections to Kaleido-X16 systems in its own subnet.

Notes

- To navigate the 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-X16 systems on the same subnet as the RCP2.

To configure a unicast IP address on the RCP2, do the following:

1. Press and hold the ENTER key on the RCP2 for 8 seconds to display the configuration menu.
2. Select ETHERNET OPTIONS on the LCD display, then press ENTER.
3. Select **Unicast host IP**, then press ENTER.
4. Select **Enable IP 1**, then press ENTER.
   The Enable IP x parameter instructs the RCP2 to query the selected IP address for a list of rooms.
5. Select **Host IP ADDR**, then press ENTER.
6. Using the numeric keypad, type the IP address of a Kaleido-X16 on a remote subnet, then press ENTER.
7. Repeat step 4 to 6 to add unicast IP addresses for up to three remote Kaleido-X16 systems.

Restoring Default Parameters

The Kaleido-RCP2's **Configuration** menu provides an option to restore the device's default parameters. This option is called FACTORY DEFAULT.

Selecting this option will revert the following elements to their default values:

- The network parameters.
- The room selection.
- The login position.

Once you exit the **Configuration** menu, the device will restart.

Here are the default parameter values:

DHCP	Enable
Default IP address	10.0.3.191
Default subnet mask	255.255.0.0
Default gateway	0.0.0.0

In addition, the current room and login position are erased from the Kaleido-RCP2 memory.

Action	LCD indication	Other Buttons
Press and hold the ENTER key for at least 8 seconds to access the **Configuration** menu.	At the end of the 8 seconds: **Configuration** **ROOM SELECTION**	Digit keys **2** (UP) and **8** (DOWN), and the ENTER and ESC buttons, are lit; other digit keys are dimmed.
Press 8 three times to go to the FACTORY DEFAULT submenu.	**Configuration** **FACTORY DEFAULT**	
Press ENTER to open the FACTORY DEFAULT submenu.	**FACTORY DEFAULT** **RESTORE**	
Press ENTER to select the RESTORE option, or press ESC to return to the previous menu level without restoring the factory values.		
Press ENTER again to restore the factory defaults.	**Configuration** **FACTORY DEFAULT**	
Press ESC once to reboot the Kaleido-RCP2.	The LCD screen is blank after reboot.	All buttons are dimmed.

Updating the Kaleido-RCP2 Firmware

Firmware updates for the Kaleido-RCP2 are issued occasionally, usually with the release of a new version of the Kaleido-X16. The firmware update package, including the Kaleido-RCP2 Updater utility, is provided on the Kaleido-X16 DVD, or can be obtained by contacting Miranda Technical Support.

To determine if you need to update your RCP2, check its firmware version (refer to the diagram under "Navigating the Configuration Menu" on page 32), and compare it with the version of the firmware update file indicated in the Kaleido-X16 Release Notes under "Software and Firmware".

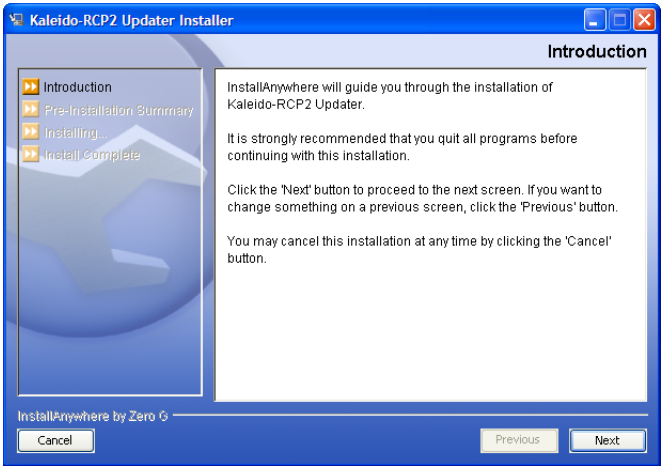
The Kaleido-RCP2 firmware can be updated over the Ethernet connection.

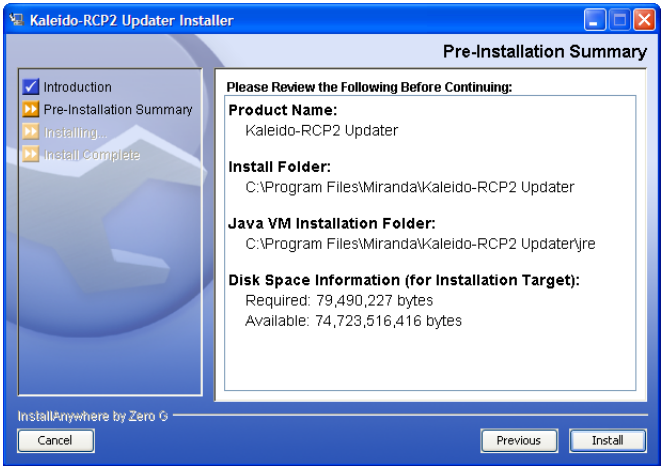
To update your Kaleido-RCP2 firmware, do the following:

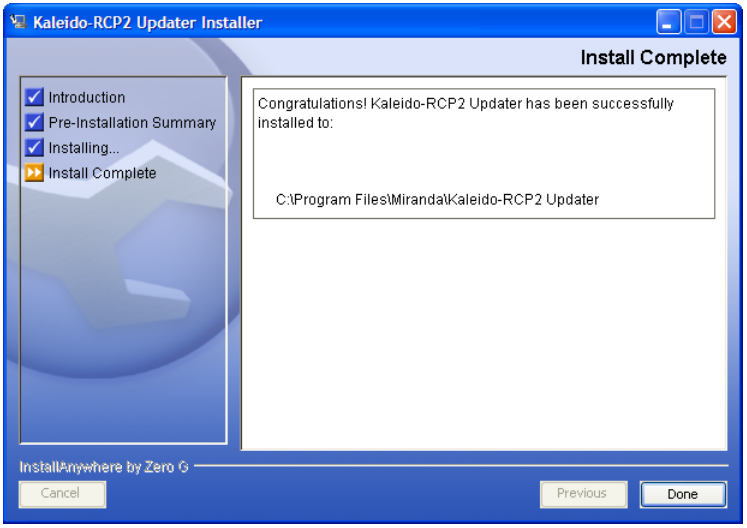
REQUIREMENTS: Make sure you fulfill the following conditions before beginning this procedure:

- There is a PC connected to the same subnetwork as your Kaleido-RCP2 unit.
- A copy of the Kaleido-RCP2 firmware update file on the PC.

1. Launch the Kaleido-RCP2 Updater Installer, and follow the on-screen instructions as shown below:



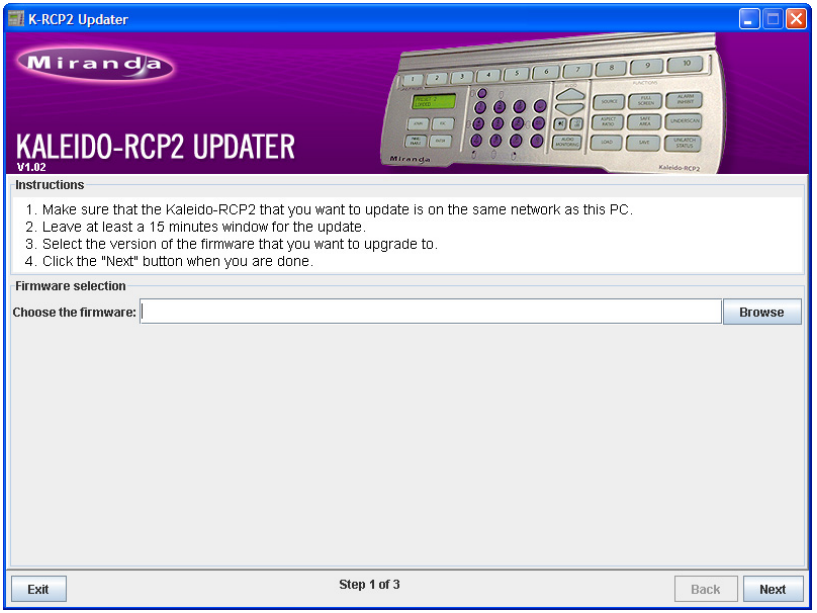




2. Once the updater has been installed, launch it.

   The **Kaleido-RCP2 Updater** window includes step-by-step instructions. The initial window is shown here.

> **Note:** The upgrade may take as long as 15 minutes to complete.

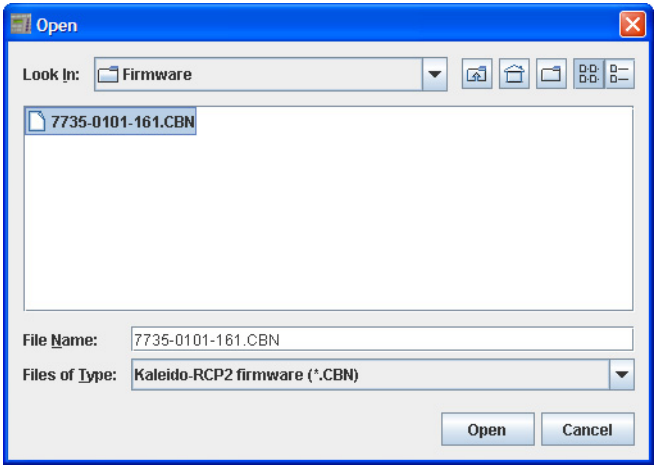


Firmware Selection (Step 1 of 3)

To prepare the firmware update, do the following:

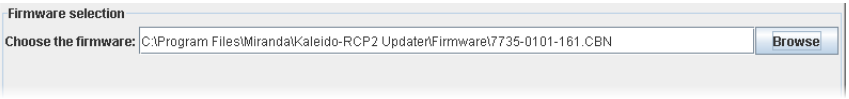
REQUIREMENT:	Make sure the Kaleido-RCP2 you wish to update is on the same network as your PC.

1. Type the name of the firmware data file you wish to use to upgrade your RCP2 unit in the **Choose the firmware** box. Alternatively, click **Browse** to locate the appropriate file.



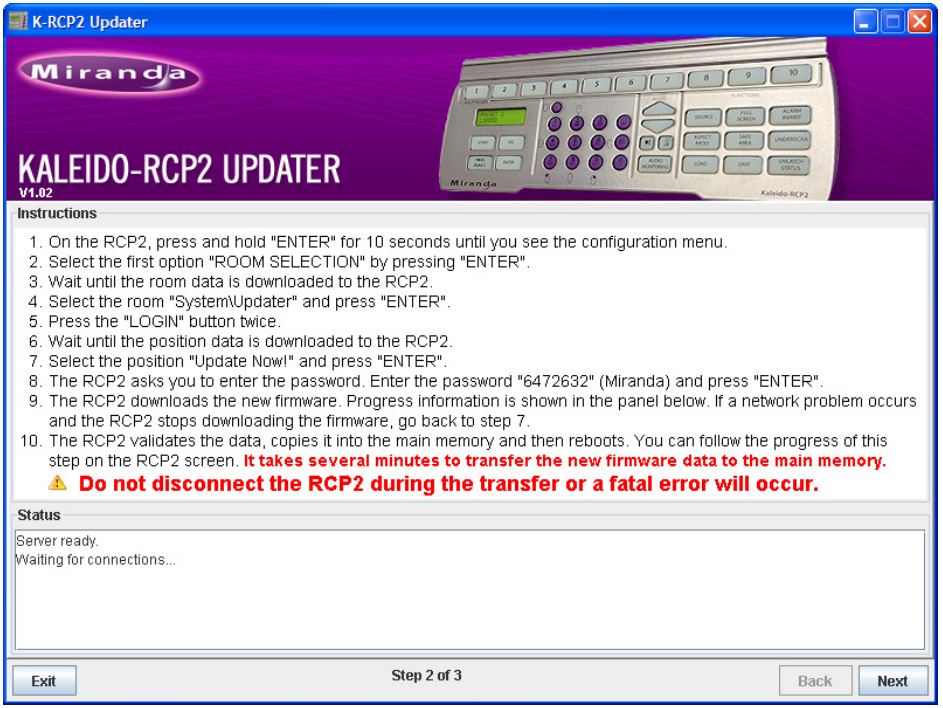
Note: Please contact Miranda Technical Support in order to obtain a copy of the latest firmware data file.

Once you have specified the firmware data file, the Firmware selection zone will look like this:



2. Click **Next** when you are done.

The next window includes step-by-step instructions for uploading the data file to the Kaleido-RCP2:



Firmware Update (Step 2 of 3)

To proceed with the firmware update, do the following:

1. On the RCP2, press and hold the ENTER key for 10 seconds or so, until you see the **Configuration** menu.
2. Press ENTER to select the first option: ROOM SELECTION, and then wait until the room list is downloaded to the RCP2.
3. Once the room list is available, press 8 repeatedly until **System\Updater** appears on the LCD display (press 2 to move back if necessary), and then press ENTER.
4. Press the LOGIN button twice, and then wait until the position data is downloaded to the RCP2.
5. Once the position data is available, select the position *Update Now!*, then press ENTER.
   The RCP2 prompts you for a password.
6. Type '6472632' (i.e. 'Miranda'), then press ENTER.
   The RCP2 downloads the new firmware from your PC. Progress information is shown in the **Status** section of the **Kaleido-RCP2 Updater** window on your PC.

Note: If a network problem occurs and the RCP2 stops downloading the firmware, go back to step 5.

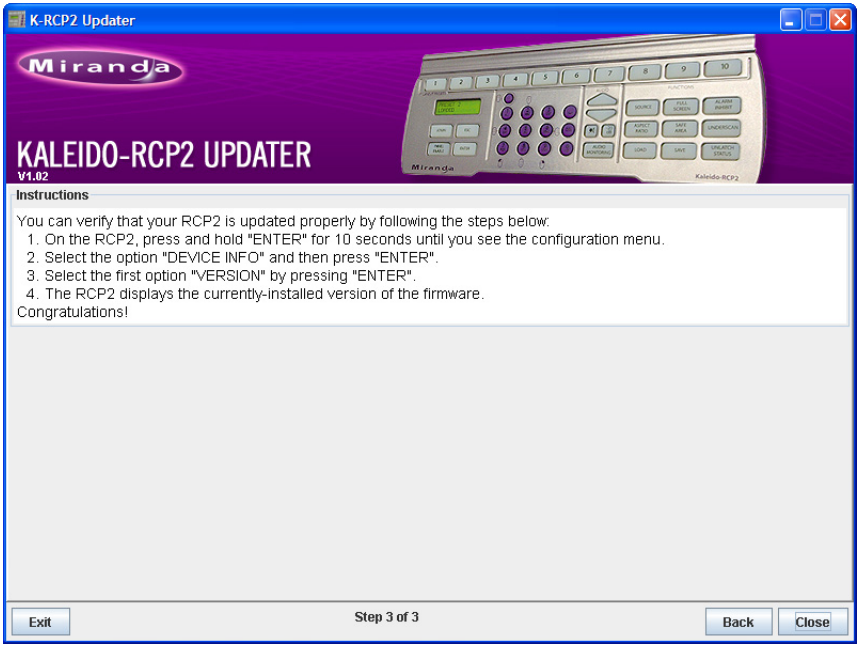
The RCP2 validates the data, copies it into the main memory and then reboots. You can follow the progress of this step on the RCP2 screen.

Note: It takes several minutes to transfer the new firmware data to the main memory.

IMPORTANT: *Do not disconnect the Kaleido-RCP2 while it is updating its firmware, as this may result in a fatal error. In this event, it will be necessary to return the unit to Miranda to be reprogrammed.*

7. Once the Kaleido-RCP2 has rebooted following the successful firmware upgrade, click **Next** in the **Kaleido-RCP2 Updater** window, on the PC.

   The final screen includes instructions for verifying that the new firmware is installed and functional:



Verification (step 3 of 3)

To verify that your RCP2 is updated properly, do the following:

1. On the RCP2, press and hold ENTER for 10 seconds or so, until you see the **Configuration** menu.
2. Select the option DEVICE INFO, and then press ENTER.
3. Select the first option, VERSION, by pressing ENTER again.
   The RCP2 displays the currently-installed version of the firmware.
   If this number matches the version number in the updater file that you selected in the in the first step (see "Firmware Selection (Step 1 of 3)" on page 41), then the update has been successful.
4. In the **Kaleido-RCP2 Updater** window on your PC, click **Close** to exit the updater.

Operation

Many of the operational functions of the Kaleido-RCP2 are determined by the configuration of the Kaleido-X16 operating environment, and are explained in the *Kaleido-X16 User's Manual*.

Selecting a Position and Logging On

To use your Kaleido-RCP2, you must validate your access to the Kaleido-X16 system. Press the LOGIN key, and select the appropriate position that corresponds to the type of user you are. You may require a password to log on. A room is supposed to be already set through the configuration menu of the device.

Here is a graphical summary of the login menu as it appears on the RCP2's LCD display:

To display the Login menu on the LCD, press the LOGIN key. Then, you can access any submenu, or select values, by pressing ENTER. Press ESC to cancel a selection, or to return to the previous menu level. Press **8** *to navigate from one menu option to the next. Press* **2** *to go back to the previous option.*

The available login positions depend on the room you selected from the Configuration menu. Scroll up and down the list, by pressing the **8** *and* **2** *buttons.*

The password can include up to 8 digits, that you can type by pressing the digit buttons on the keypad. If you make an error, press DEL and type the password again. When you are done press ENTER to validate the password.

The following table shows how to change the login position. As an example, the position will be changed from *TD01* to *TC01*. To accomplish this task, you must have first selected a room (see "Selecting a Room" on page 33).

Action	LCD indication	Other buttons
Press LOGIN.	Until the unit receives the list of login positions from the Kaleido system: **Acquiring login list...**	Lit (depending on the Kaleido system's configuration)
	Once the list of login positions is available: **LOGIN Position** **[first list item]**	Digit keys **2** and **8** are lit to indicate that they can be used to scroll the list
	If the list of login position is not available, the following message displays for 3 seconds: **No login list available**	Lit (depending on the Kaleido system's configuration)
	If the Kaleido system is not active, the following message displays for 3 seconds: **Target system is offline**	Dimmed (depending on the Kaleido system's configuration)
Press **8** repeatedly to scroll the list until you reach the position you wish to log on to, and then press ENTER to select the new position.	**Enter password:**	Digit buttons are lit as well as the ENTER and ESC buttons
Type the password using the digit keys (up to 8 digits), and then press ENTER.	**Enter password:** **** (one asterisk appears for each digit you type)	
	If the password is valid, the following message displays for 2 seconds: **Access granted** and then: **RMC** **TC01**	Dimmed (depending on the Kaleido system's configuration)
	If the password is wrong, the following message displays for 2 seconds: **Access is denied** and then: **RMC** **TD01**	Lit (depending on the Kaleido system's configuration)

Enabling/Disabling the Kaleido-RCP2 User Interface

The PANEL ENABLE button cycles the Kaleido-RCP2 between ENABLE and DISABLE modes.

In the DISABLE mode:

- The PANEL ENABLE LED is flashing.
- All other keys on the Kaleido-RCP2 are disabled (LEDs off).
- The LCD display is off.
- Any peripherals (e.g. mouse, keyboard) connected to the Kaleido-RCP2's USB ports are also disabled.

The purpose of the panel enable function is to lock the user interface of the remote, thus avoiding any accidental access to the Kaleido system.

Resetting the Kaleido-RCP2

You can reset the Kaleido-RCP2 in either of three way:.

Press ENTER + ESC + DEL. simultaneously	High level software reset that restarts the device and does nothing else.
Software and hardware watch-dogs.	Automatic reset the device on software or hardware failure of the internal controller
Disconnect and reconnect the Kaleido-RCP2's Ethernet cable.	Power up the remote and do nothing else.

Audio Bridge Terminal

Introduction

The optional Audio Bridge Terminal (ABT) is an external audio multiplexer/serializer for the Kaleido-X16. The Kaleido-X16 supports audio channel inputs from either a 64- or 128-ABT panel through a single SDTI input. The 64-ABT supports 64 channels and the 128-ABT supports 128 channels. The SDTI is a BNC connection located on the rear connector panel of the frame.

There is not enough space on the Kaleido-X16 rear panel to also include discrete audio connectors. An ABT provides connector space for multiple audio signal inputs, and multiplexes all the audio signals into a combined serial feed on a coaxial cable that connects to the rear connector panel.

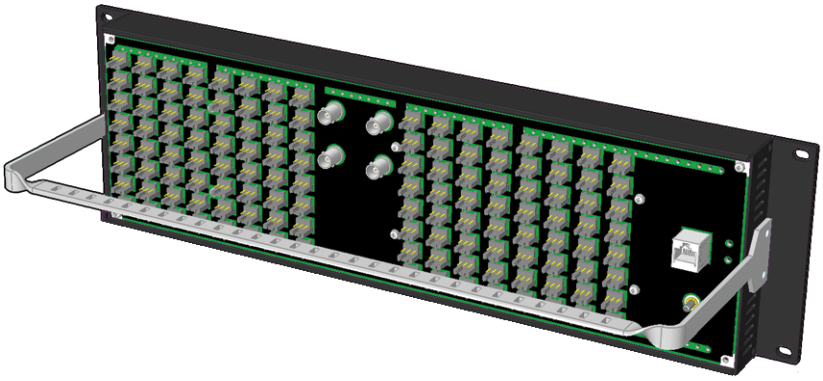
Features include:

- 128 channels of audio processing
- Analog or digital audio inputs
- Dual redundant SDTI outputs on standard video coaxial cable
- Internal tone generator
- 0 dBFS adjustments on analog inputs

- Locks to video, AES or Word clock reference (48 kHz only)
- Compatible with non-PCM signals
- Complies with IEEE 802.3af standard for Powered Over Ethernet devices
- Occupies 3 rack units, 4 cm width (plus connectors)
- Can fit in the back of racks
- Can be located up to 800 feet (250m) away from the Kaleido-X16 frame

Description

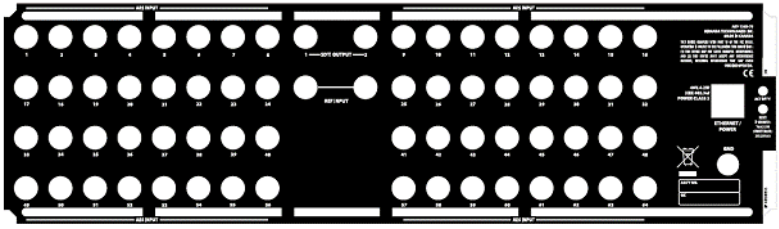
The ABT is designed to mount in a standard 19 in rack, and is 3 RU high. All connections are from the rear.



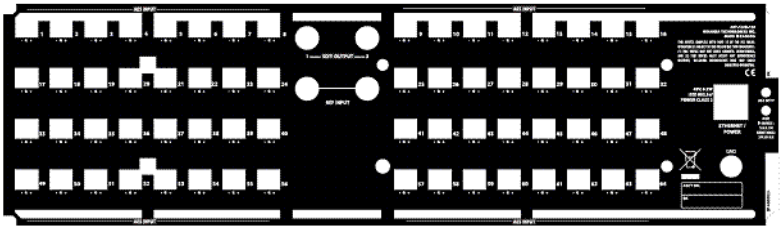
Audio Bridge Terminal - rear view

There are 6 different models of the ABT, based on signal/connector type and capacity:

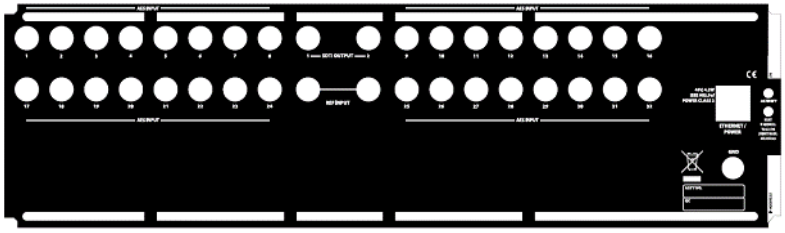
Model designation	Characteristics
ABT-128D-110	128 digital (64 AES) inputs on WECO connectors (balanced, 110 Ω impedance)
ABT-64D-110	64 digital (32 AES) inputs on WECO connectors (balanced, 110 Ω impedance)
ABT-128D-75	128 digital (64 AES) inputs on BNC connectors (unbalanced, 75 Ω impedance)
ABT-64D-75	64 digital (32 AES) inputs on BNC connectors (unbalanced, 75 Ω impedance)
ABT-128A	128 analog inputs on WECO connectors (balanced, 20 kΩ impedance)
ABT-64A	64 analog inputs on WECO connectors (balanced, 20 kΩ impedance)



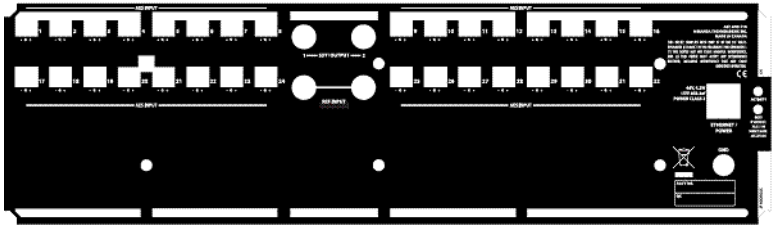
ABT-128D-75 rear panel layout



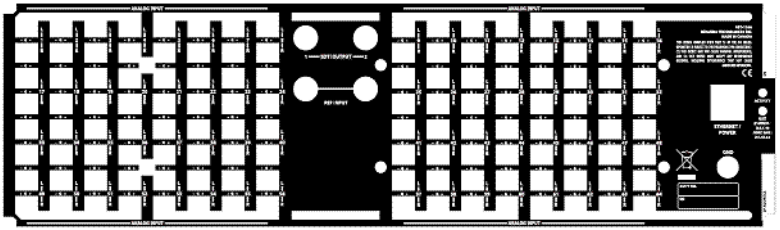
ABT-128D-110 rear panel layout



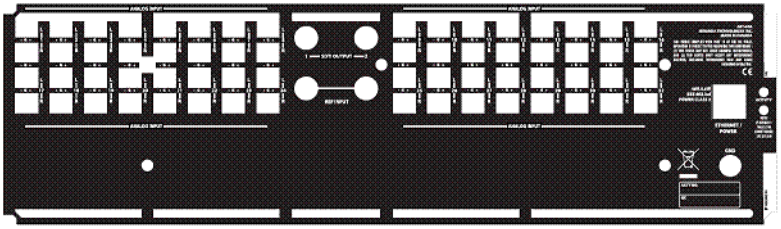
ABT-64D-75 rear panel layout



ABT-64D-110 rear panel layout



ABT-128A rear panel layout



ABT-64A rear panel layout

Connections

Audio Inputs

The number and configuration of the audio inputs depends on the specific model of ABT you are using.

Reference Input (Looped Through)

An external reference signal is required to synchronize the SDTI outputs. An analog video reference signal, word clock or AES-75 signal can be connected to one of the REFERENCE SIGNAL connectors. If the loop-through is not used, a 75 ohm termination on the other REFERENCE SIGNAL connector must be used to properly terminate the line.

For an Audio Bridge Terminal with an AES breakout panel, AES INPUT 1 can also be used for synchronization. This input signal must be error-free PCM audio sampled at 48 kHz. In the case where both REFERENCE SIGNAL and AES INPUT 1 have valid references, the signal connected to REFERENCE SIGNAL has priority.

Multiplexed Audio Outputs

The multiplexed audio outputs are formatted to be compatible with the STDI audio input connections on the KXI-16 series of cards.

The Serial Digital Transport Interface (SDTI) uses the Serial Digital Interface (SDI) developed to transport digital video signals as a carrier for other data types. It requires that the transmitter and receiver have the same codec.

Ethernet/Power

The power for the ABT arrives on an RJ-45 connector, and shares this connector with an Ethernet interface. The ABT conforms to the IEEE 802.3af standard for powered devices

Two kinds of power sources are supported:

- midspan power source injector into an existing Ethernet network
- power sourcing Ethernet switch.

Full redundancy is obtained with both supplies present at the same time.

Indicators

The ACTIVITY indicator is located on the right-hand side of the rear panel. This LED reports the status of the Ethernet connection as follows:

Color	Board Status
Off	No link detected
Green	Normal (good link)
Orange	Activity
Red	Hardware fault
Flashing Red	Upgrading firmware

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

Color	Board Status
Green	Normal
Flashing Green	Normal, rebooting

Color	Board Status
Orange	Warning
Flashing Orange	Warning, rebooting
Red	Hardware fault
Flashing Red	Upgrading firmware

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.

Controls

The RESET button is located on the right-hand side of the ABT rear panel.

Push the RESET button to reset the ABT's IP address to a default value:

- IP address:10.0.3.190
- Subnet mask:255.255.0.0

This simplifies the process of connecting to the ABT via its Ethernet connection.

See also: *For more information about connecting to the ABT with a Web browser, see "Web Interface" on page 52.*

Operation

Synchronization

An external reference signal is required to synchronize the SDTI outputs. An analog video reference signal, word clock or AES-75 signal can be connected to one of the REFERENCE SIGNAL connectors. If the loop-through is not used, a 75 ohm termination on the other REFERENCE SIGNAL connector must be used to properly terminate the line.

For an Audio Bridge Terminal with an AES breakout panel, AES INPUT 1 can also be used for synchronization. This input signal must be error-free PCM audio sampled at 48 kHz. In the case where both REFERENCE SIGNAL and AES INPUT 1 have valid references, the signal connected to REFERENCE SIGNAL has priority.

SDTI Link

The two SDTI outputs are identical, each including signals from all inputs. Each SDTI output can be connected to a Kaleido-X16 input module or to a specific SDTI de-multiplexer. Depending on the number

of input connections available, this link transports up to 128 channels of audio. The SDTI streams transport the current IP address of the Audio Bridge Terminal to the receiver. The connection via TCP/IP will give access to the different parameters and status.

Audio Inputs

Analog Audio Inputs

The analog channels pass through analog to digital converters with 24 bit resolution and a 48 kHz sample rate. To compensate the level of the analog signal, the 0 dBFS value may be set from +24 dBu to -7 dBu for each channel through the Web page interface.

Digital Audio Inputs

The ABT operates on at 48 kHz-sampled audio signals, and inputs at different sampling rates may not be processed satisfactorily. The validity, user and channel status bits are transmitted alongside the PCM samples. The input error status detected by the digital input receiver can be monitored by the Web page interface. The non-PCM data will pass unchanged.

Web Interface

To access the Web interface, the ABT must be connected to a local area network (LAN). If the unit's IP address is known, you can access the built-in Web server by entering the address in a Web browser connected to the same network.

If the IP address is not known, it is possible to reset the unit's network configuration. You must set up a simple LAN comprised of:

- one PC running the Web browser
- the ABT to be configured
- a hub or switch for interconnection.

To connect the ABT to the LAN, do the following:

1. Connect the PC to the hub or switch.
2. Set the PC network configuration with the following parameters:

Parameter	Value
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 ABT and make sure it is connected to the hub or switch.

   Note: If the hub or 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 hub or switch and the Audio Bridge Terminal.

4. Press the RESET button for at least 1 second.

   Note: The RESET button is beside the ETHERNET/POWER RJ-45 connector.

   The ABT will reboot with the following static network configuration:

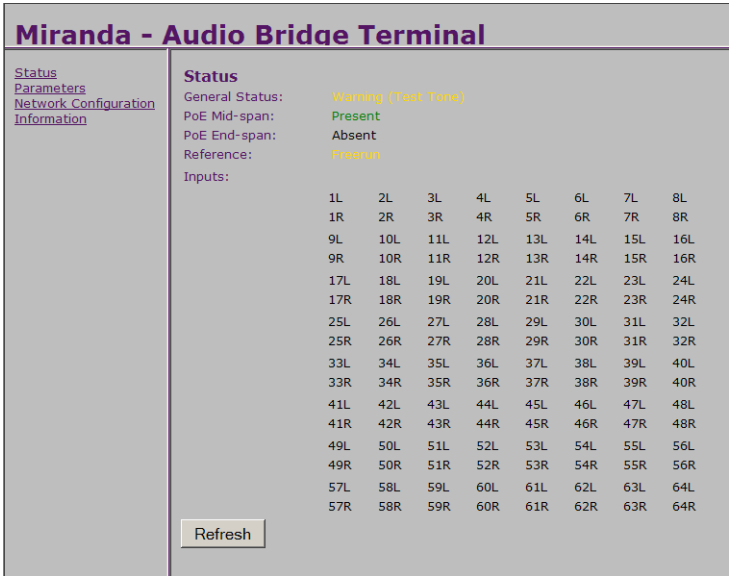
Parameter	Value
DHCP	OFF
Static IP address	10.0.3.190
Subnet mask	255.255.0.0
Default gateway	10.0.0.1

5. Using the browser, connect to the unit using the following address: 10.0.3.190.

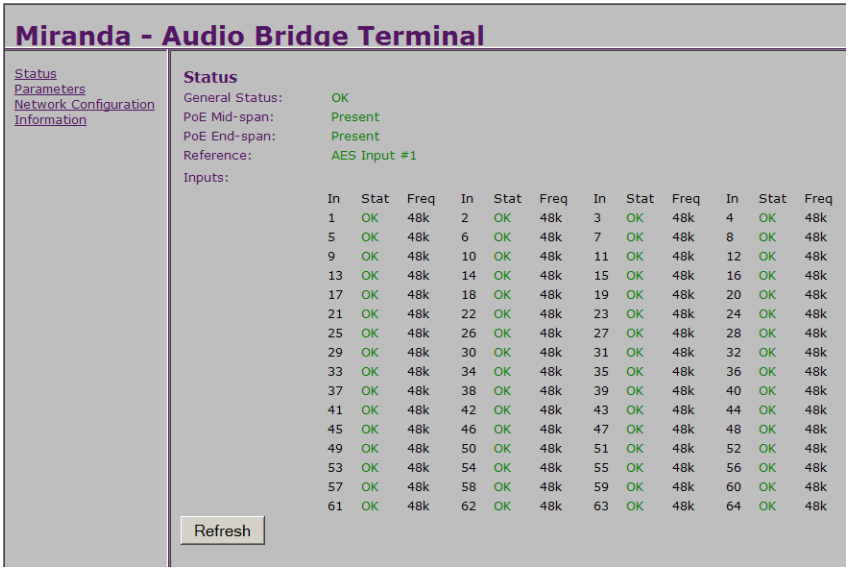
   The Web server serves the Web pages that allow monitoring and configuration of the parameters. You can access these pages by clicking on the links on the left side of the current page.

   The individual pages are described in the following sections.

Status Web Page



ABT-128A Status Web page



ABT-128D Status Web page

The Status Web page reports the status of several aspects of the ABT unit.

General Status: the overall status of the unit, as also reported by the front panel LED:

Text	Text color	LED color
OK	Green	Green
Warning	Orange	Orange
Hardware Error	Red	Red
Upgrading	Bold Red	Flashing Red

PoE Mid-span: reports whether PoE mid-span equipment is Present (green text) or absent (normal text)

PoE End-span: reports whether PoE end-span equipment is Present (green text) or absent (normal text)

Reference: reports the status of the reference used for input signal synchronization:

Text	Text color	Interpretation		
Freerun	Orange	No reference present		
(format name)	Normal	Video		Audio
		NTSC	HD 1080/30p	AES75
		PAL	HD 1080/29.97p	Word clock
		HD 1080/60i	HD 1080/25p	AES input 1
		HD 1080/60i	HD 1080/24p	
		HD 1080/59.94i	HD 1080/23.98p	
		HD 1080/50i	HD 720/60p	
		HD1080/24PsF	HD 720/59.94p	
		HD1080/23.98PsF	HD 720/50p	
		Note: All HD reference signals are analog with tri-level sync		

Inputs: reports the status of each of the audio inputs to the ABT.

The page content for Input Status varies depending on the model of ABT being monitored. The number of inputs varies with the model. In addition, analog and digital inputs are reported differently.

> **Note:** Analog inputs show channel number only.

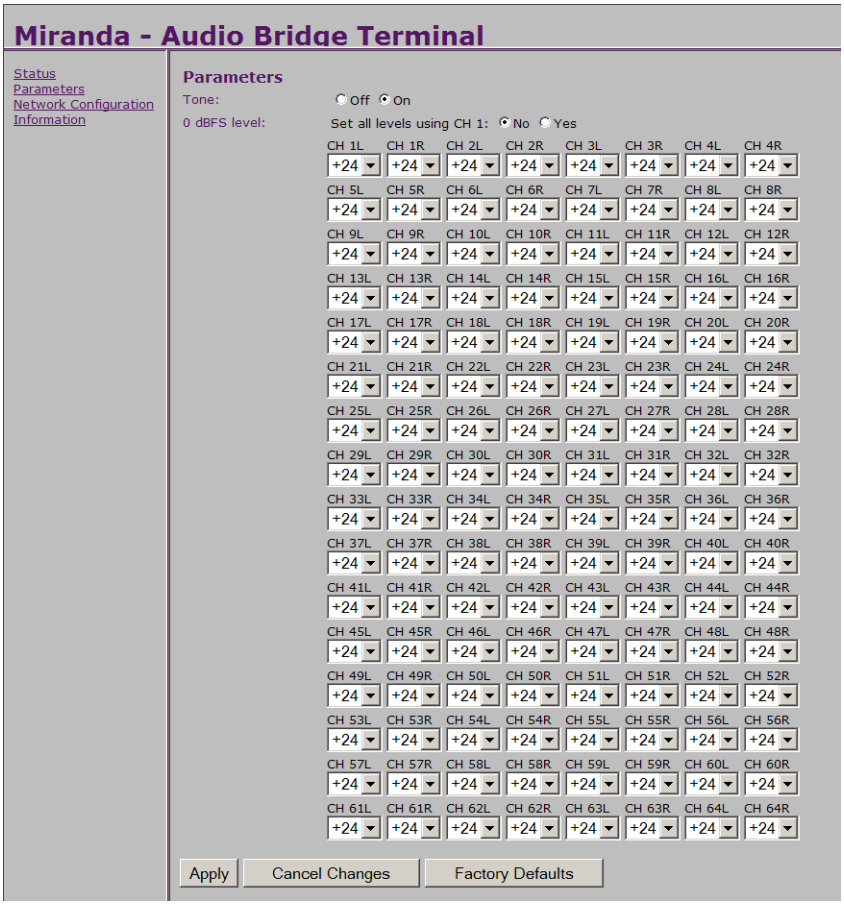
Analog Input Status	Text Color
OK[1]	Normal
Overload	Red

1. Silence is reported as OK in this context.

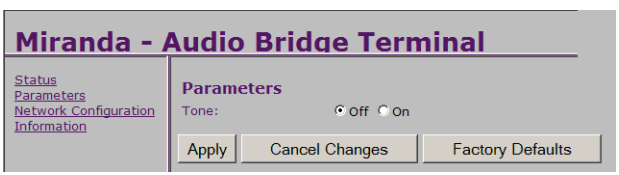
Digital Input Status	Text Color
OK	Green
Validity, CRCC errors	Yellow
Parity, Biphase errors	Orange
No lock	Red

Digital Input Channel	Text Color
OK	Normal
Overload	Red

Parameters Web Page



ABT-128A Parameters Web page



ABT-128D Parameters Web page

The **Parameters** Web page allows the configuration of different parameters:

- The **Tone** parameter activates or deactivates the EBU test tone applied simultaneously to all channels. The odd channel will be a 1 kHz sine wave at -18 dBFS with a period of silence lasting 250 ms every 3 seconds. The even channel will be a continuous 1 kHz sine wave at -18 dBFS.

- The **0 dBFS level** parameters are available for an ABT with analog inputs. They allow the adjustment of the 0 dBFS level for each input. The number of inputs depends on the model. In the case where all inputs must be set to the same level, click **Yes** beside **Set all levels using CH 1**.

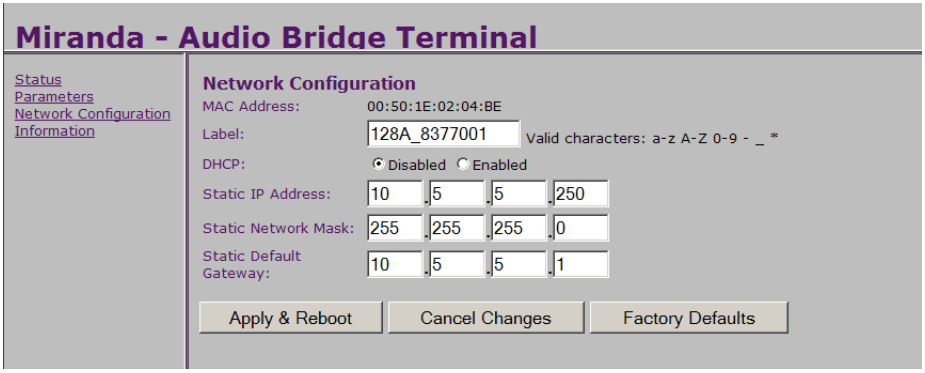
The changes take effect when you click **Apply**.

> **Note:** If changes to parameters are made before clicking **Apply** and the user wishes to reestablish the values displayed when the page was loaded, this can be done by clicking **Cancel Changes**.

Finally, factory default values for all parameters on this page can be displayed by clicking **Factory Defaults**.

The Audio level adjustments are not applicable to ABT models with digital inputs and do not appear on the Web page.

Network Configuration Web Page



Network Configuration Web page

The **Network Configuration** page allows you to configure network parameters.

The **MAC address** is the unique hardware address attributed to each Audio Bridge Terminal unit. Each unit has a different address, this being the only way to distinguish the units from each other when connected to a network.

The **Label** parameter gives the unit a label. The label is found in the title of the Web page. It can contain up to 16 characters. Valid characters are from the English alphabet (lowercase a through z, uppercase A through Z), numbers 0 through 9, the hyphen (-), the underscore (_) and the asterisk (*). If an invalid character is used, an error message will appear. The same label can be used by many units.

The **DHCP** parameter activates or deactivates dynamic network addressing. When activated, it allows a server to dynamically attribute an IP address and configuration information to the Audio Bridge Terminal.

Normally the DHCP server provides at least the following basic information: IP address, subnet mask and default gateway. When **Enabled** is chosen, the static network parameters become unavailable.

IMPORTANT: *When DHCP is enabled, the Audio Bridge Terminal will try to obtain an IP address dynamically after booting/rebooting. If successful, the new IP address, subnet mask and default gateway can only be known by the equipment receiving the SDTI signal because the network configuration addresses are embedded in the Source Address field of the Header Data of the stream (refer to SMPTE 305.2M-2000). If unsuccessful, the static network configuration will be used but DHCP will remain enabled. If the unit is rebooted and a DHCP server responds, it will then use the dynamic network configuration provided by the server.*

The **Static IP Address** parameter is the IP address used when DHCP is disabled or unsuccessful.

The **Static Network Mask** parameter is the network mask used when DHCP is disabled or unsuccessful.

The **Static Default Gateway** parameter is the default gateway used when DHCP is disabled or unsuccessful.

At any time, it is possible to return to a known static network configuration by pressing the reset button for at least 1 second. It can found in a small hole named RESET just beside the ETHERNET/POWER RJ-45 connector. The ABT will reboot with the following default static network configuration:

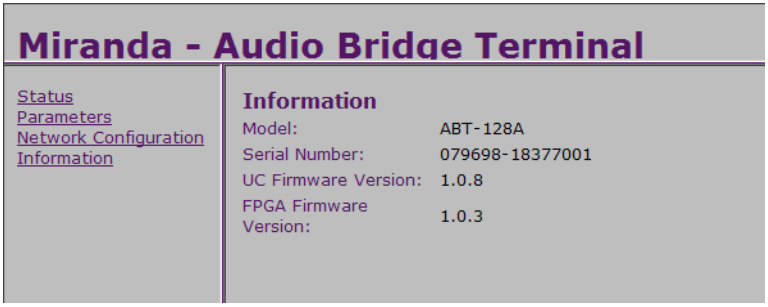
Parameter	Value
DHCP	Disabled
IP address	10.0.3.190
Subnet mask	255.255.0.0
Default gateway	10.0.0.1

Note: The changes are applied when you click **Apply & Reboot**. A new Web page appears reminding the new IP address if DHCP is disabled.

If changes to parameters are made before clicking **Apply & Reboot** and the user wishes to re-establish the values displayed when the page was loaded, this can be done by clicking **Cancel Changes**.

Finally, factory default values for all parameters on this page can be displayed by clicking **Factory Defaults**. The default Label is comprised of the ABT type (number of channels and the letter A for analog inputs or D for AES inputs) followed by the last part of its serial number. The default network configuration is the same as the one obtained by pressing the RESET button near the ETHERNET/POWER RJ-45 connector. Click **Cancel Changes** to return to the values displayed when the page was loaded. Click **Apply & Reboot** to apply the displayed values. The unit then reboots.

Information Web Page



Information Web page

The **Information** Web page gives model and version information.

- The model is made up of "ABT-" followed by the number of channels and the letter A for analog inputs or D for AES inputs.
- The serial number is the serial number of this ABT unit.
- The firmware version is the current firmware version. The device connected to this ABT will check the version before updating the firmware.

Firmware Updates

Firmware updates for the ABT are issued occasionally, often with the release of a new version of the Kaleido-X16. The firmware update package, including the MIU utility, is provided on the Kaleido-X16 DVD, or can be obtained by contacting Miranda Technical Support.

To determine if you need to update your ABT, check its firmware version (see "Information Web Page" on page 60), and compare it with the version of the firmware update file (see the "Software and Firmware" section in the Kaleido-X16 Release Notes).

The firmware of the ABT can be updated over its Ethernet connection.

1. Launch the Miranda Interface Updater utility.
2. Click the **Upgrade ABT** tab
3. Type the ABT's IP address, then click **Connect**.
4. Click **Open** and browse to the firmware update file.
5. Click **UPGRADE**.

Front panel LEDs will flash red during the file transfer and the update. When the process is completed successfully, the unit will reboot and resume operation using the new firmware. Settings are not modified.

3 Specifications

This chapter lists equipment specifications for the Kaleido-X16 and its peripheral devices.

Summary

Kaleido-X16 Inputs

Video Signal Inputs

The Kaleido-X16 frame supports 16 signal inputs. The supported input types include Composite, SD/SDI, or HD-SDI (auto-detected). The processing delay is two fields if the video inputs are genlocked. Signal inputs require BNC connectors.

Composite Inputs	
SIGNAL	NTSC (SMPTE 170M), PAL, 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 8281)
RETURN LOSS	>15 dB up to 270 MHz

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
CABLE LENGTH	100 m (328 ft) (Belden 1694)
RETURN LOSS	>15 dB up to 1.5 GHz

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
CABLE LENGTH	100 m (328 ft) (Belden 1694)
RETURN LOSS	>15 dB up to 1.5 GHz + 10 dB up to 2.97 GHz

DVI Graphic Inputs

The Kaleido-X16 frame 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)

Kaleido-X16 Outputs

MV Outputs

The Kaleido-X16 frame supports two MV outputs for interfaces electrically compatible with single link DVI-D:

SIGNAL	DVI-D
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
SUPPORTED CABLE TYPES	Single-link DVI-D cables (and cables electrically compatible to this)

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

Note: Users can customize their own timing rates through the XEdit software for resolutions ranging from 800 × 600 up to 1920 × 1200 pixels.

Resolution	Format name	Refresh rate (Hz)
800 × 600	SVGA	50.00
800 × 600	SVGA	59.94
1024 × 768	XGA	50.00
1024 × 768	XGA	59.94
1280 × 720 × 50	Margay	50.00
1280 × 720 × 60	Margay	59.94
1280 × 768	WXGA	50.00
1280 × 768	WXGA	59.94
1280 × 1024	SXGA	50.00
1280 × 1024	SXGA	59.94
1280 × 1024	BARCO	59.94
1360 × 768	NEC	50.00
1360 × 768	NEC	59.94

Resolution	Format name	Refresh rate (Hz)
1480 × 1200 × 50	Christie	50.00
1480 × 1200 × 60	Christie	59.94
1600 × 1200	UXGA	50.00
1600 × 1200	UXGA	59.94
1920 × 1080 × 50	Baycat	50.00
1920 × 1080 × 60	Baycat	59.94
1920 × 1200	UXGA	50.00

Router Outputs

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

SD-SDI Outputs	
SIGNAL	4:2:2 SMPTE 259M-C (270 Mbps), SMPTE 272M-1994
FORMATS	525 and 625
CABLE LENGTH	225 m (738 ft) (Belden 8281)
RETURN LOSS	>15 dB up to 270 MHz
ADDITIVE JITTER	< 0.2 UI @ 100 kHz
CONNECTOR TYPE	BNC

HD-SDI 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
CABLE LENGTH	100 m (328 ft) (Belden 1694)
RETURN LOSS	>15 dB up to 1.5 GHz
ADDITIVE JITTER	< 0.2 UI @ 100 kHz
CONNECTOR	BNC

3Gbps Outputs	
SIGNAL	4:2:2 SMPTE 424M-2006 (2.97 Gbps / 2.97/ 1.001 Gbps)
FORMATS	1920 × 1080p 60 Hz
	1920 × 1080p 59.94 Hz
	1920 × 1080p 50 Hz
CABLE LENGTH	100 m (328 ft) (Belden 1694)
RETURN LOSS	>15 dB up to 1.5 GHz + 10 dB up to 2.97 GHz
ADDITIVE JITTER	< 0.3 UI
CONNECTORS	BNC

Kaleido-X16 Audio I/O

SDTI Audio Input

The Kaleido-X16 frame supports one SDTI audio input.

SIGNAL	SMPTE-305 (up to 128 channels/64 AES)
CABLE LENGTH	250 m (820 ft) (Belden 8281)
CONNECTOR	BNC

Analog Audio Monitoring

The Kaleido-X16 frame supports two analog audio inputs through one HD-26 connector:

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

The Kaleido-X16 frame supports two AES outputs:

SIGNAL	SMPTE 276M
FORMAT	AES 3
IMPEDANCE	110 Ω
CONNECTOR	HD-26
VOLUME CONTROL	(Available in a future release)

Kaleido-X16 Control

Time Code Inputs (LTC)

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

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

GPI

The Kaleido-X16 frame supports a bidirectional GPI interface (72 GPI, software-configured). There are three DB-50 female connectors.

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

Kaleido-X16 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 (18.04 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)
WEIGHT (2 PSUs)	10.44 kg (23 lbs)
WEIGHT (1 PSU)	9.48 kg (21 lbs)

Kaleido-RCP2

ETHERNET PORT	
SIGNAL	100/10 BASE-T, (IEEE 802.3AF)
CONNECTOR	RJ-45 with LED and 48 V power

USB PORTS	
SIGNAL	USB 1.0

CONNECTOR	2 USB host connectors (mouse and keyboard only)
DIMENSIONS	78 mm × 203 mm × 32 mm (3.5 in × 8 in × 1 in)
VOLTAGE	48 V
POWER	5 W Max for RCP2 itself + 5W Max for USB Devices

Audio Bridge Terminal (ABT)

Analog Audio Inputs

SIGNAL	20 k Ω balanced, 10 k Ω unbalanced
MAXIMUM LEVEL	+24 dBu
CONNECTORS	WECO

Digital Audio Inputs

AES3	
LEVEL	0.2 to 7 V
TERMINATION	110 Ω balanced
QUANTIZATION	Up to 24 bits
CONNECTORS	WECO

AES-3ID	
LEVEL	0.2 to 2 V
RETURN LOSS	15 dB
QUANTIZATION	Up to 24 bits
TERMINATION	75 Ω unbalanced
CONNECTORS	BNC

Processing Performance

NUMBER OF CHANNELS	ABT-128D: 128 (64 AES)
	ABT-128A: 128
	ABT-64D: 64 (32 AES)
	ABT-64A: 64
QUANTIZATION	24 bits
SAMPLING	48 kHz
SNR	100 dB A Weighted
THD+n (ABT 128-A)	< -86.5 dB (20 to 997 Hz) < -82 dB (7 kHz)
THD+n (ABT 128-D)	-138 dB (20 Hz to 24 kHz)
0 DBFS	+24 dBu, adjustable to -7 dBu with 1 dB steps
FREQUENCY RESPONSE	20 Hz to 24 kHz ±0.2 dB
CMRR	38 dB @ 60 Hz, 38 dB @ 20 kHz
TEST TONE GENERATOR	-18 dBFs, 24 bit, 1 KHz sine wave interrupted on left channel on every pair (250 ms / 3 s) EBU R49

Reference Input

SIGNAL (1)	SMPTE 170M / ITU 624-4 composite sync
	SMPTE 274M / SMPTE 296M tri-level sync
	AES3id DARS

WORD CLOCK	
CONNECTOR	BNC

SDTI Outputs

SIGNAL (2)	SMPTE 305.2M
CONNECTORS	BNC

AES3 Output

OUTPUT LEVEL	2.7 p-p

AES3ID Output

OUTPUT LEVEL	2.7 p-p

Miscellaneous

COMMUNICATION PORT	10BASE-T (IEEE 802.3i), 100BASE-T (IEEE 803.2u)
POWER	4 to 10 W depending on model, Power over Ethernet
	(IEEE 802.3af)
CONNECTOR	RJ-45

Physical Dimensions

HEIGHT	3 RU
DEPTH	145 mm (5.71 in)

Contact Us!

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