KALEIDOX

Audio Bridge Terminal
Guide to Installation and Operation

Miranda KALEIDOX

Part Number: M796-9902-101

19 April 2011

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Title	Audio Bridge Terminal Guide to Installation and Operation
Part Number	M796-9902-101
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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 EMC 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 fluctuations and flicker
- EN 61000-4-2 Electrostatic discharge immunity
- EN 61000-4-3 Radiated electromagnetic field immunity—radio-frequencies
- EN 61000-4-4 Electrical fast transient immunity
- EN 61000-4-5 Surge transient immunity
- EN 61000-4-6 Conducted disturbances immunity
- EN 61000-4-11 Voltage dips, short interruptions and voltage variations immunity
- EN 60255-22-4 Electrical fast transient/burst immunity

Warranty Policies

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

KALEIDO X

Audio Bridge Terminal

The Audio Bridge Terminal (ABT) is an external audio multiplexer/serializer for the Kaleido-X and Kaleido-X16 multi-viewer models. It offers highly space-efficient monitoring of up to 768 discrete audio channels.

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Introduction

The Kaleido-X and Kaleido-X16 multi-viewers support embedded audio in SDI signals, but there are cases when embedded audio is not available (e.g. analog inputs, or not embedded) or extra audio inputs are required. The ABT provides connector space for the audio signal inputs, and multiplexes all the audio signals into combined serial feeds on coaxial cables that connect to the multi-viewer.

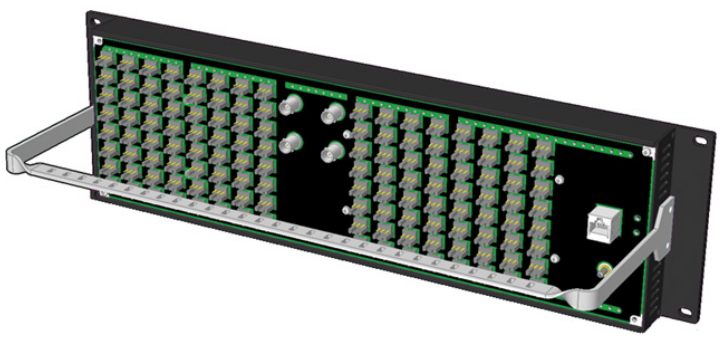
Features include:

- Up to 128 channels of audio processing (depending on model)

- 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 (1.57 in) width (plus connectors)
- Can fit in the back of racks
- Can be located up to 250 m (800 ft) away from the multi-viewer

Description

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

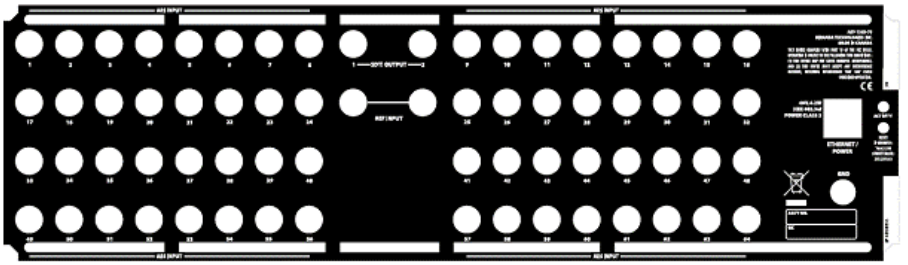


Audio Bridge Terminal - rear view

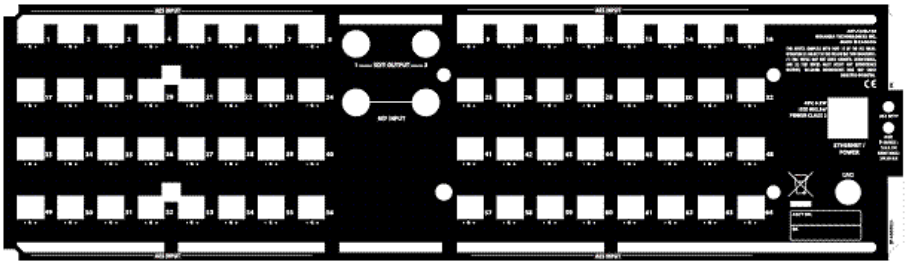
There are 6 different models of the ABT, based on signal/connector type and capacity:

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)

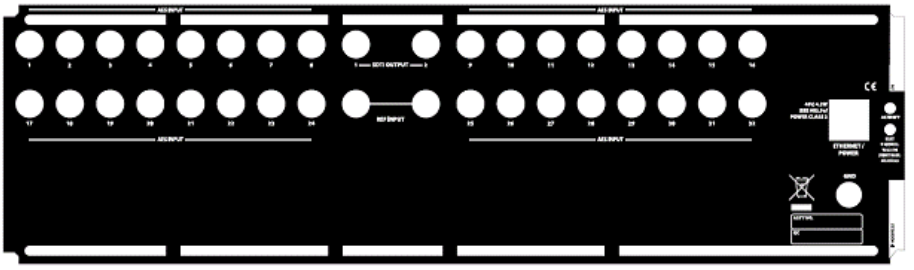
Model designation	Characteristics
ABT-64D-75	64 digital (32 AES) inputs on BNC connectors (unbalanced, 75 Ω impedance)
ABT-128A	128 analog inputs on WECO connectors (balanced, 20 kΩ impedance)
ABT-64A	64 analog inputs on WECO connectors (balanced, 20 kΩ impedance)



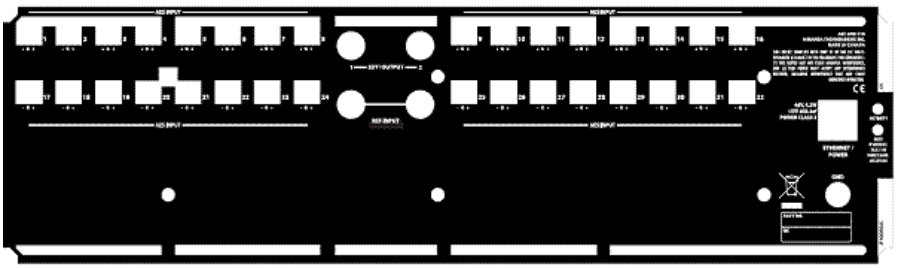
ABT-128D-75 rear panel layout



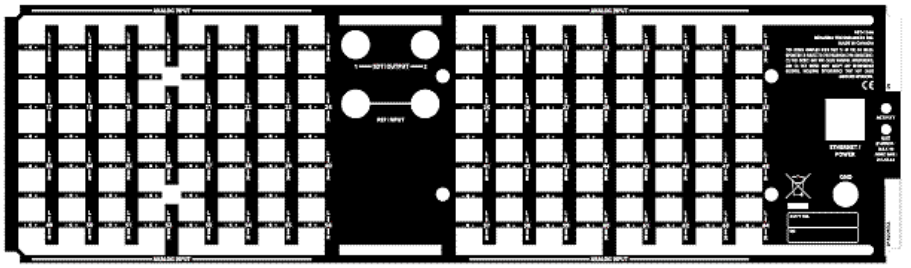
ABT-128D-110 rear panel layout



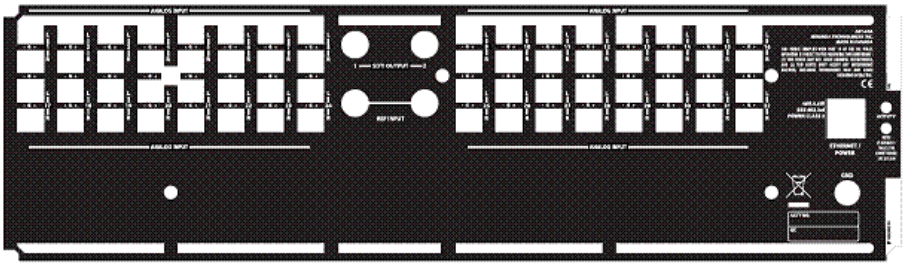
ABT-64D-75 rear panel layout



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 Ω 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

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
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. The process is described in more detail in “Web Interface” on page 7.

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 Ω 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 multi-viewer SDTI input 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 a Web browser
- the ABT to be configured
- a switch for interconnection.

To connect the ABT to the LAN:

1. Connect the PC to the 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 switch.

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

4. Press the RESET button 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:

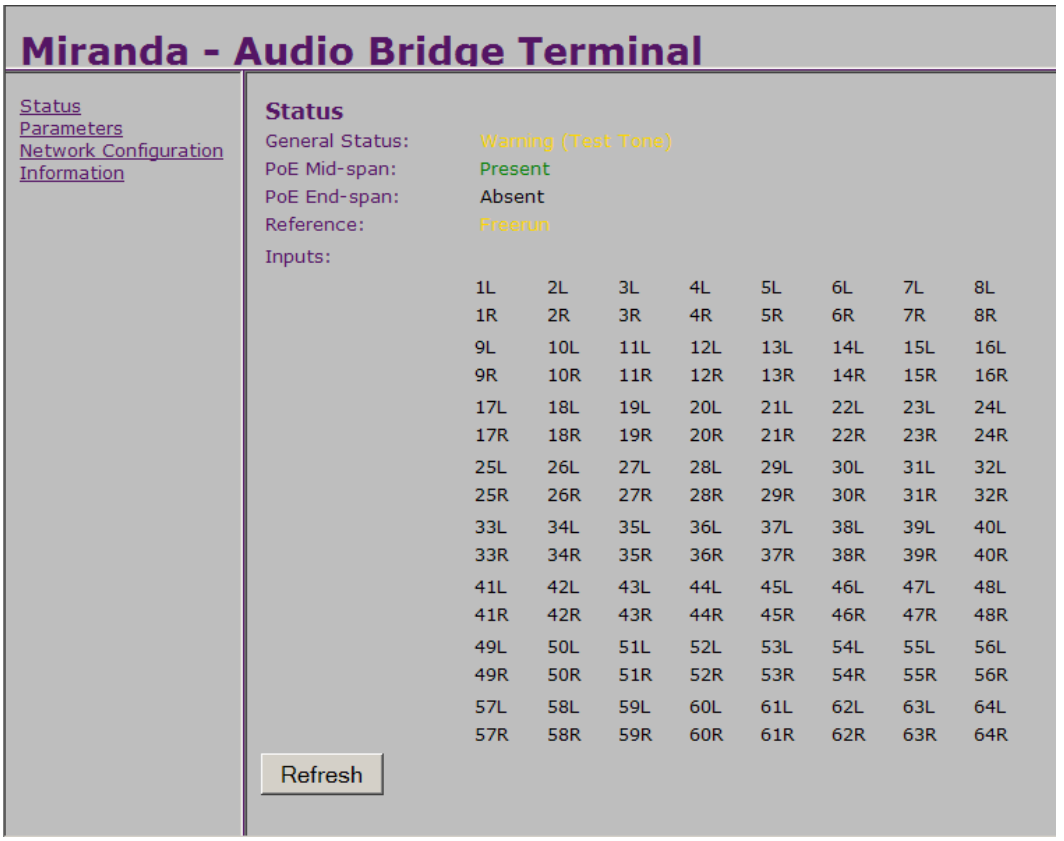
Parameter	Value
DHCP	OFF
Static IP address	10.0.3.190
Subnet mask	255.255.0.0
Default gateway	10.0.0.1

5. Type the IP address "10.0.3.190" in the browser's address bar to connect to the ABT unit.

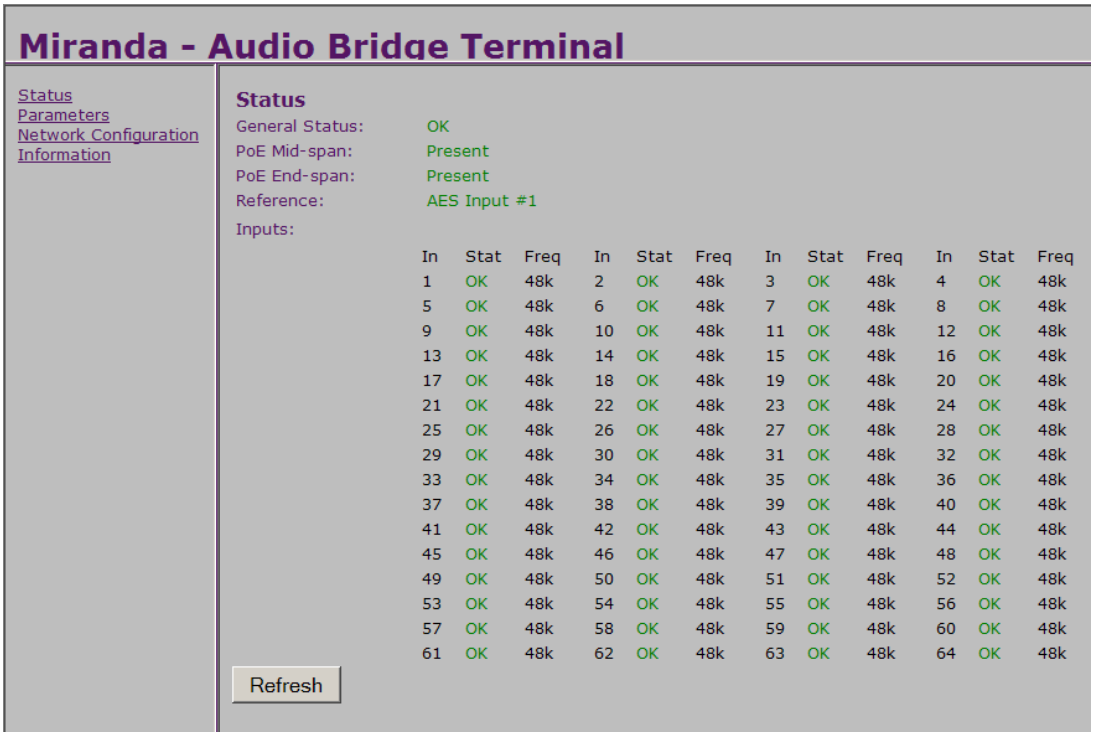
   The Web server serves the Web pages that allow monitoring and configuration of the parameters. You can access these pages by clicking on the links on the left side of the current page.

   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	Identifies the reference that is present.

The supported reference signal formats are the following:

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

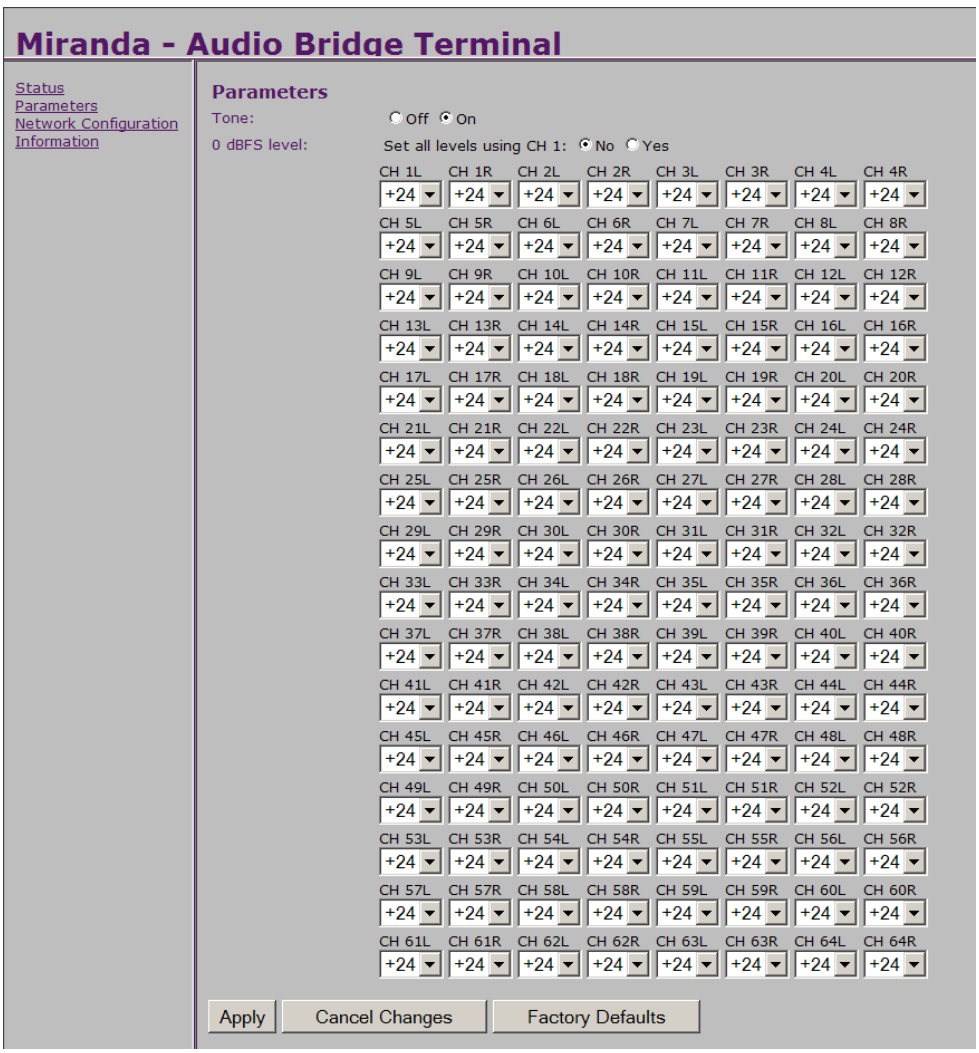
1. Silence is reported as OK in this context.

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

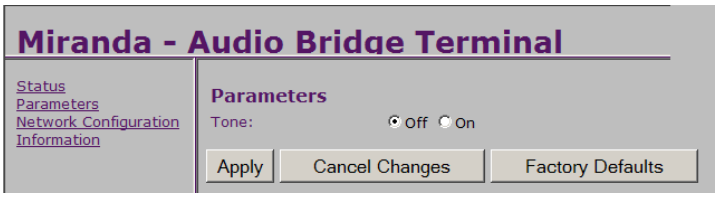
Digital Input Channel	Text Color
OK	Normal
Overload	Red

Here are sample pages showing the treatment of analog (ABT-128A) and digital (ABT-128D) inputs:

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**.

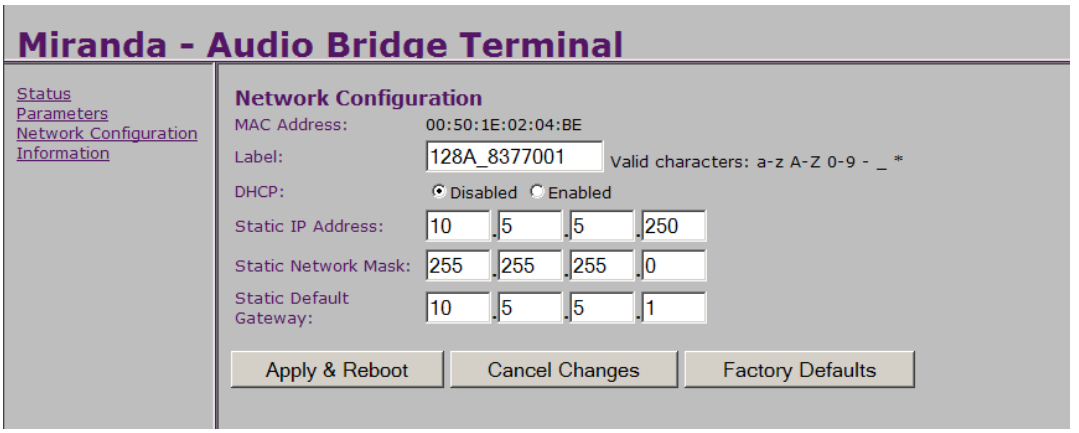
The changes take effect when you click **Apply**.

> **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.

Note: 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-X Software. The firmware update package, including the MIU utility, is provided on the Kaleido-X 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 15), and compare it with the version of the firmware update file (see the "Software and Firmware" section in the Kaleido-X Release Notes).

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

Updating the Audio Bridge Terminal's Firmware

Notes

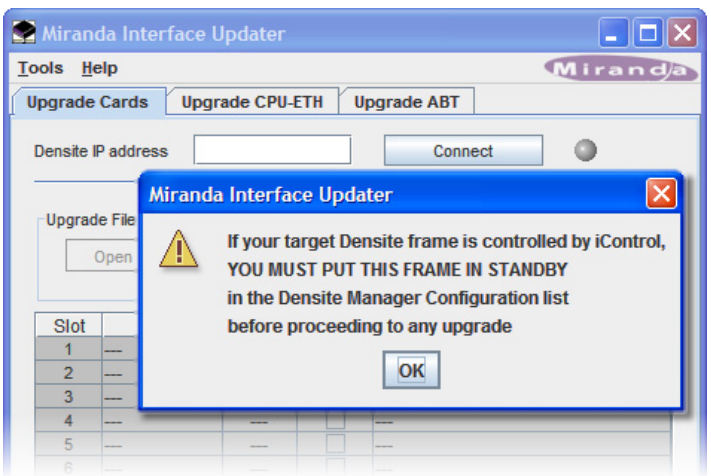
- Before starting the upgrade procedure, make sure there is no other device or application connected to the ABT unit. Close any Web browser or any instance of the XEdit application connected to the ABT.
- You need to have the Java Runtime Environment version 1.4.2 or later installed on your client PC or laptop.

The Miranda Interface Updater is stored on the Kaleido-X distribution DVD in a folder named `ABT Upgrade`. The folder contains two JAR files (`log4j-1.2.8.jar` and `iap.jar`), and a ZIP archive (`7796-0101-108.zip`) with the latest firmware for your ABT.

To update the ABT's firmware, do the following:

1. Open `iap.jar` to launch the Miranda Interface Updater (MIU) utility.

   A warning message appears.

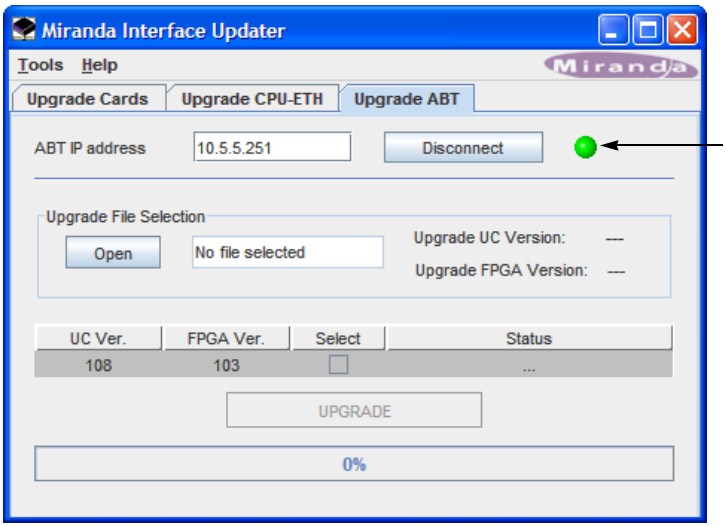


2. Click OK to dismiss the warning message.

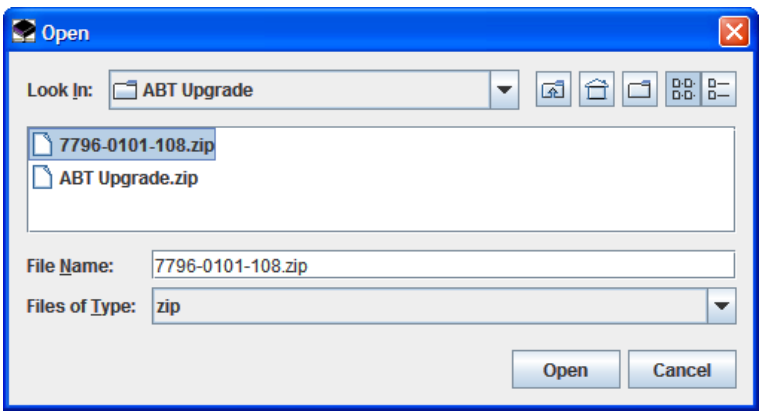
Note: MIU is also used to upgrade firmware on Densité cards. The initial warning message that appears is only relevant in the context of updating Densité cards. You can safely ignore it.

3. In **Miranda Interface Updater**, click the **Upgrade ABT** tab.
4. Type the IP address of the ABT unit you wish to upgrade in the **ABT IP address** box, and then click **Connect**.

   The connection indicator turns green, and the **Open** button becomes available:

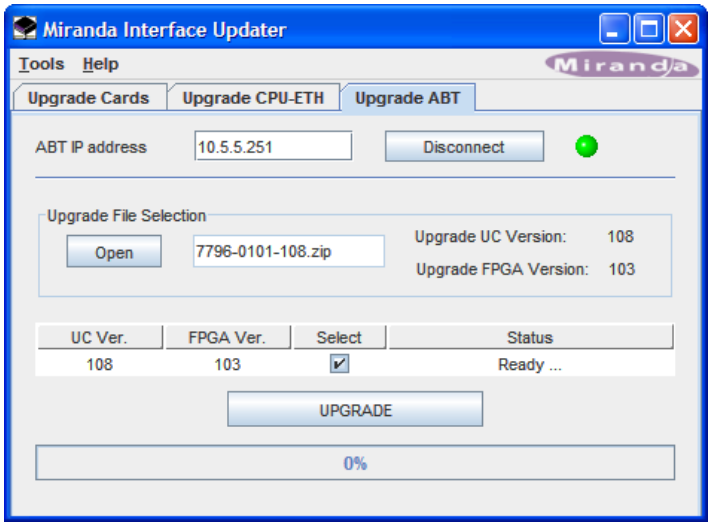


5. Click **Open**.
6. Navigate to the `ABT Upgrade` folder on the DVD, click the ZIP archive that contains the ABT firmware update, and then click **Open**:



If the ZIP file is valid, the UC and FPGA versions of the firmware appear, and the **Select** check box becomes available.

7. Select the **Select** check box:



The **UPGRADE** button becomes available.

> **IMPORTANT:** **Do not interrupt the upgrade process. This could corrupt the firmware and render the ABT inoperative.**

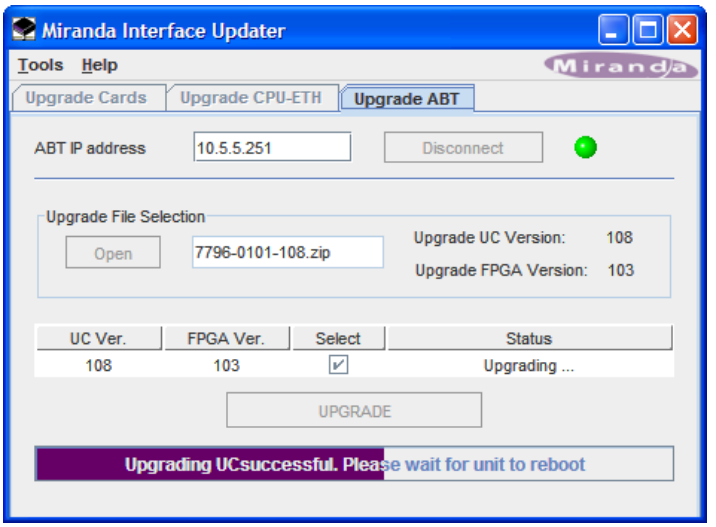
8. Click **UPGRADE**.

   A confirmation message appears.

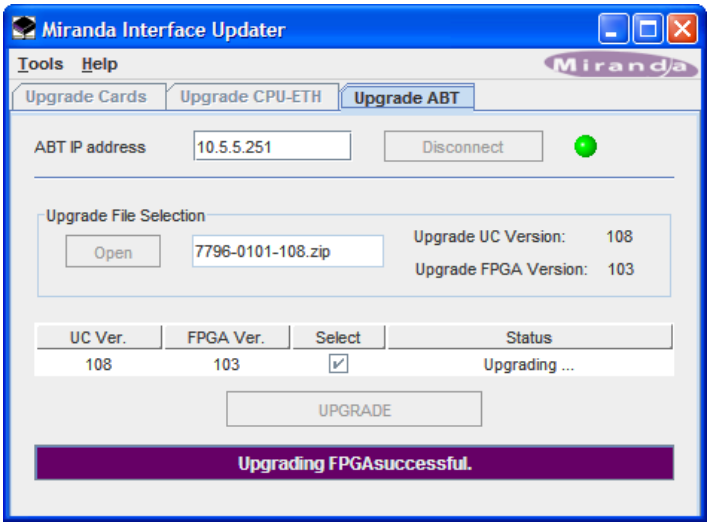
9. Click **Yes** to proceed with the upgrade.

> **Note:** On the ABT's front panel, LEDs will flash red during the file transfer and upgrade.

The UC (Central Unit) is upgraded first. Once the UC upgrade has completed, the ABT restarts automatically. This may take 20 seconds, during which a message is shown in the progress area of the window:

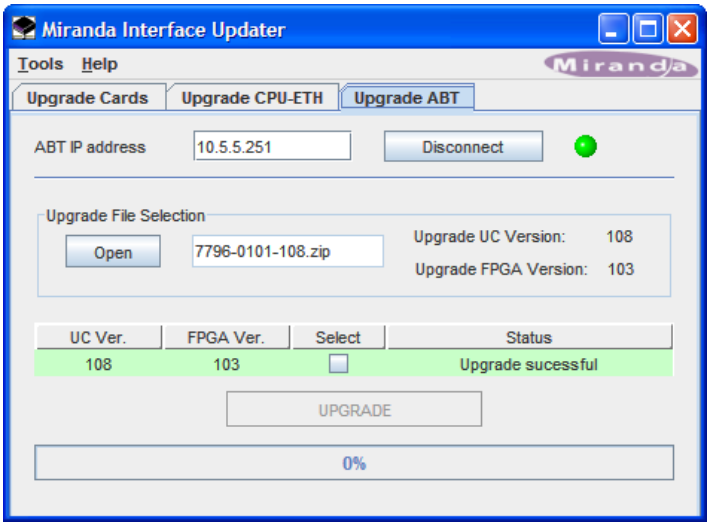


The FPGA is upgraded next. Once the FPGA upgrade has completed, the ABT restarts again, during which a message is shown in the progress area:



Once the ABT has restarted, the message "Upgrade successful" appears under **Status**, and operation resumes using the new firmware. Settings are not modified.

10. Click **Disconnect**.



Note: If the upgrade failed, click **Disconnect**, restart the ABT unit, and then follow the upgrade procedure again.

Specifications

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-128A: < -86.5 dB (20 to 997 Hz), < -82 dB (7 kHz)
	ABT-128D: -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 (5.75 in)

Contact Us!

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