

DENSITÉ series

ADC-1722

Dual Analog Audio to AES Converter

Guide to Installation and Operation

M696-9900-400

17 Apr 2013



A **BELDEN** BRAND

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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 found to comply with the requirements of the EMC directive 2004/108/CE:

- EN 55022 Class A radiated and conducted emissions
- EN 61000-3-2 Harmonic current emission limits
- EN 61000-3-3 Voltage fluctuations and flicker limitations
- 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 immunity
- EN 61000-4-6 Conducted immunity
- EN 61000-4-11 Voltage-dips, short-interruption and voltage variation immunity

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1 ADC-1722 Dual Analog Audio to AES Converter

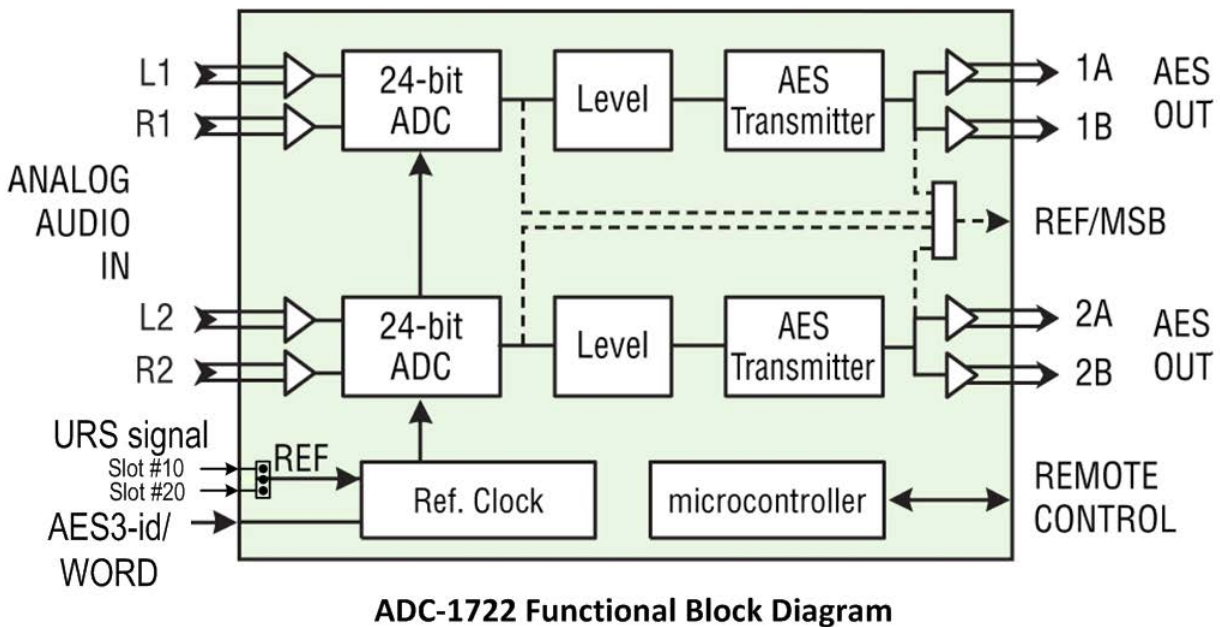
1.1 Introduction

The ADC-1722 is a high-quality, 24-bit, analog audio to digital converter which allows conversion of two stereo analog audio signals to AES type digital signals. Sampling rates can be set to 32, 48 or 96 kHz. AES outputs can be locked an external reference signal. An internal digital EBU tone generator facilitates alignment of audio levels. User-defined channel identification data may be encoded in the AES status bits. An input audio signal status is also available indicating the input signal presence or overload. The ADC-1722 is compatible with both AES3 and AES-3id digital audio standards and is housed in a Densité frame, 2 or 3 RU. A single or double-width rear panel is required.

1.2 Features

- (1 or 2) balanced analog audio inputs
- external reference loop input (Word Clock or AES3-id DARS)
- (2 or 2x2) AES digital audio outputs
- Balanced AES3 or unbalanced AES3-id outputs
- 24-bit A to D conversion
(16, 20 or 24 bits output word length)
- 32, 48 and 96 kHz sampling rates
(Optional VCXO for 44.1/88.2 kHz)
- -96 to +12 dB of level adjustment (in 0.5 dB steps)
- 0 dBFS selectable (0 to +28 dBu, 1 dB steps)
- Internal EBU tone generator
- No signal delay threshold adjustable
- Overload detection and reporting
- Settings and adjustments through frame control panel
- Status LED and remote reporting
- Provides output to Monitoring Switching Bridge option (MSB-1121)
 - Not supported for Assy# starting at 0696-1200-400
- Supports REF-1701 or REF-1801 reference card
 - jumper selectable for Assy #0696-1200-2xx
 - automatic for Assy# starting at 0696-1200-400

1.3 Functional Diagram



2 Installation

2.1 Unpacking

Make sure the following items have been shipped with your ADC-1722. If any of the following items are missing, contact your distributor or Miranda Technologies Inc.

- ADC-1722 Dual analog audio to AES converter
- ADC-1722-DRP-75 or ADC-1722-DRP-110 Dual Rear Panel, or ADC-1722-SRP-75 or ADC-1722-SRP-110 Single Rear Panel (see figure)

2.2 Installation in the Densité frame

The ADC-1722 and its associated rear connector panel must be mounted in a DENSITÉ frame. It is not necessary to switch off the frame's power when installing or removing the panel. See the DENSITÉ Frame manual for detailed instructions for installing cards and their associated rear panels.

When a double-width rear panel is used, the module must be installed in the right-most of the two slots associated with the rear panel in order to mate with the rear-panel connectors. If it is placed in the wrong slot, the front panel LED will flash red. Move the card to other slot for correct operation. No damage will result to the card should this occur.

If a card is placed in the wrong slot, its front panel LED will flash red. Move the card to other slot for correct operation. No damage will result to the card should this occur.

Attention:

For cards with an Assy# 0696-1200-2xx only – if a reference card is installed in the DENSITÉ frame, e.g. a REF-1701 in slot #20 or a REF-1801 in slot #10, you have to set the JP1 jumper accordingly. Please refer to the silkscreen on the card for the jumper position. This selection is automatic with an Assy# starting at 0696-1200-400.

Rear Panel Connections

Four different rear panels are available for the ADC-1722. Their layouts are shown in the figure, and the signal connections are detailed below.

- The double-width rear panels support dual stereo audio channels
- The single-width rear panels support a single stereo audio channel.

The rear panel connections are as follows:

ANALOG AUDIO IN (stereo pairs, left & right)
Connect two or four analog audio signals.

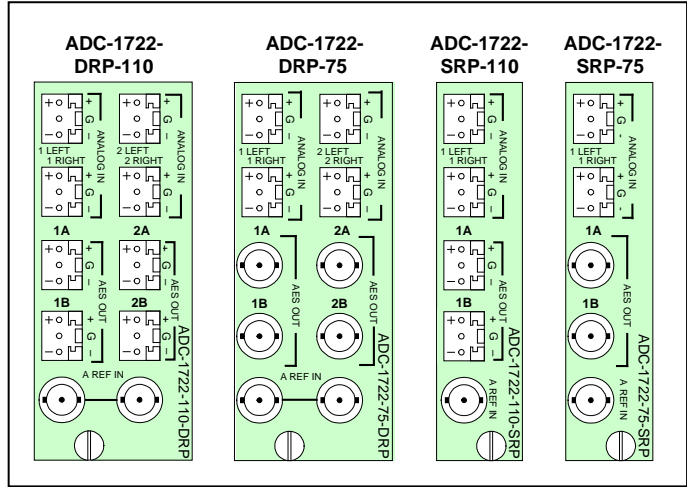
AES OUT – digital audio outputs

These connectors carry the output AES signal (one or two channels depending on the rear). Connector type depends on impedance:

- Weco for AES3 (balanced output) 110Ω
- BNC for AES-3id (unbalanced output) 75Ω

A REF IN – audio reference signal (with loop-through on the double rear only)

Connect an AES-3id or word clock signal to one of the connectors.



3 Operation

3.1 Control options

The ADC-1722 can be controlled in two different ways:

- The local control panel and its push-buttons can be used to move through a menu of parameters and adjust parameter values (see section 3.3).
- Miranda's iControl system can be used to access the card's operating parameters from a remote computer, using a convenient graphical user interface (GUI). (see section 3.4)

3.2 Card-Edge Status LED

The status monitor LED is located on the front card-edge of the ADC-1722, and is visible through the front access door of the DENSITÉ frame. This multi-color LED indicates the status of the ADC-1722 by color, and by flashing/steady illumination.

The chart shows how the various error conditions that can be flagged on the ADC-1722 affect the LED status.

- If a cell is gray, the error condition cannot cause the LED to assume that status
- If more than one LED status is possible for a particular error condition, the status is configurable. See Section 3.4.5 for details.
- The factory default status is shown by a ✱

The LED will always show the most severe detected error status that it is configured to display, and in the chart error severity increases from left to right, with green representing no error/disabled, and flashing red the most severe error.

Error Condition	LED Status			
	Green	Yellow	Red	Flashing Red
No errors	✱			
No signal		✱		
No external reference	✱			
No frame reference		✱		
Tone		✱		
Overload			✱	
Mute		✱		
Missing or incorrect rear panel				✱

If the LED is Flashing Yellow, it means that the card is selected for local control using the Densité frame's control panel. See Section 3.3 for details.

3.3 Local control using the Densité frame control panel

3.3.1 Overview

Push the SELECT button on the ADC-1722 card edge to assign the local control panel to operate the ADC-1722. Use the control panel buttons to navigate through the menu, as described below.

All of the cards installed in a Densité frame are connected to the frame's controller card, which handles all interaction between the cards and the outside world. There are no operating controls located on the cards themselves. The controller supports remote operation via its Ethernet ports, and local operation using its integrated control panel.

The local control panel is fastened to the front of the CPU-ETH2 controller card, and when installed can be accessed by opening the front door of the frame. The panel consists of a display unit capable of displaying two lines of text, each 16 characters in length, and five pushbuttons.

The panel is assigned to operate any card in the frame by pushing the SELECT button on the front edge of that card.

- Pushing the CONTROLLER button on the control panel selects the Controller card itself.
- The STATUS LED on the selected card flashes yellow.

The local control panel displays a menu that can be navigated using the four pushbuttons located beneath the display. The functionality of the pushbuttons is as follows:

[+] [-] Used for menu navigation and value modification

[SELECT] Gives access to the next menu level. When a parameter value is shown, pushing this button once enables modification of the value using the [+] and [-] buttons; a second push confirms the new value

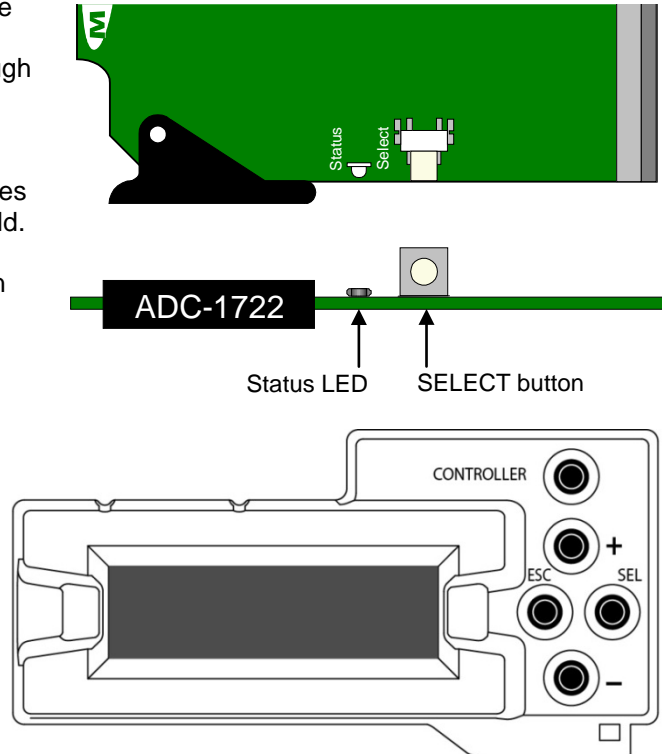
[ESC] Cancels the effect of parameter value changes that have not been confirmed; pushing [ESC] causes the parameter to revert to its former value.

Pushing [ESC] moves the user back up to the previous menu level. At the main menu, [ESC] does *not* exit the menu system. To exit, re-push the [SELECT] button for the card being controlled.

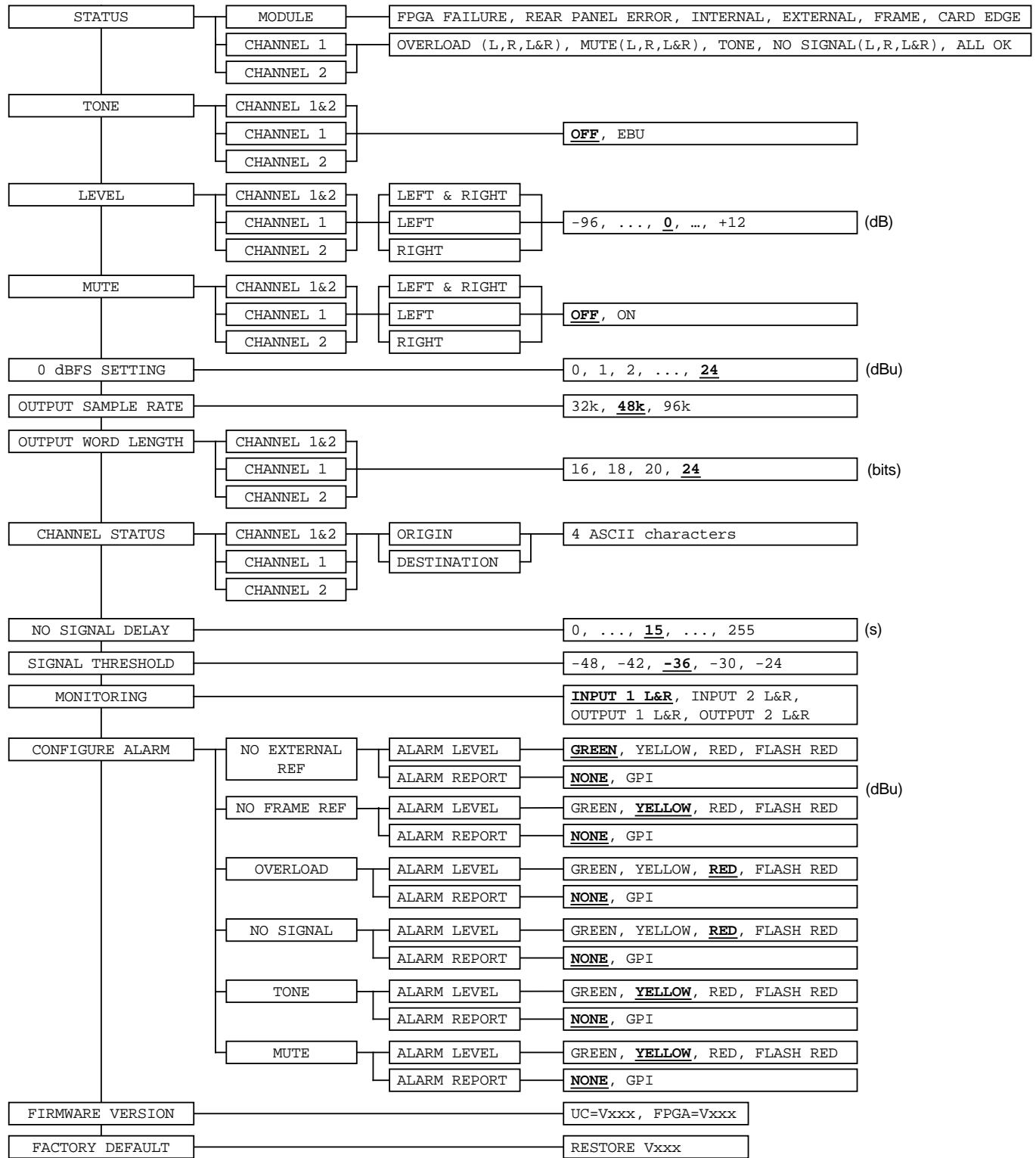
If no control is operated for 30 seconds, the controller reverts to its normal standby status, and the selected card's STATUS LED reverts to its normal operating mode.

3.3.2 Menu for local control

The ADC-1722 has operating parameters that may be adjusted locally at the controller card interface.



- Press the SELECT button on the ADC-1722 front card edge to assign the Densité frame's local control panel to the ADC-1722
- Use the keys on the local control panel to step through the displayed menu to configure and adjust the ADC-1722.



3.3.3 Explanation of Menu Parameters

by channel Parameters so marked can be set for either Channel 1, Channel 2 or both channels together.

{STATUS}

MODULE: displays the status of the different board alarms.

FPGA FAILURE Faulty programmable component.

REAR PANEL ERROR Indicates an absence of the rear panel or an incompatibility between the module and the rear panel. The *STATUS* led turns on flashing red.

INTERNAL No valid reference signal connected.

EXTERNAL The signal connected at the rear BNC is selected as reference for the card.

FRAME The internal frame signal is selected as reference for the card; for Assy# 0696-1200-2xx only the JP1 jumper has to be set accordingly with the reference generator card installed in the Densité frame.

CARD EDGE The signal coming from an adjacent module via the rear panel is selected as reference for the card (only when used with the AMX-1101 rear panel).

CHANNEL (1/2): displays the status of the corresponding analog input channel.

OVERLOAD (L/R) Indicates an internal signal level higher than -0.5 dBFS.

MUTE (L/R) Indicates a muted channel.

tone indicates the tone generator is active.

NO SIGNAL (L/R) Indicates an internal signal level lower than the selected threshold during a user-defined period.

ALL OK indicates an absence of alarms.

{TONE} by channel

Activates the tone generator. The internal tone generator provides a 1 kHz (-18 dBFS) sine wave. The EBU mode provides channel identification: left channel is cut off for 250 ms every three seconds.

{LEVEL} by channel

Adjust the input level. This adjustment is made within a range of -96 dB to +12 dB in 0.5 dB steps. The default value is 0 dB.

{MUTE} by channel

A mute command starts with a soft mute, followed by an AES silence. Automatic mute is performed on non-audio or non valid samples.

{0dBFS SETTING}

Enables the selection of the RMS value of the input sine wave voltage associated with the digital full scale 0 dBFS.

{OUTPUT SAMPLE RATE}

Selection of the output sample rate.

{OUTPUT WORD LENGTH} by channel

Selection of the quantization value.

{CHANNEL STATUS} by channel

ORIGIN "origin" signal message (4 ASCII characters).

DESTINATION “destination” signal message (4 ASCII characters).

{NO SIGNAL DELAY}

Signal absence is declared when the signal level is lower than the signal threshold during the selected period, adjustable from 0 to 255 s. The default value is 15 s.

{SIGNAL THRESHOLD}

The signal presence threshold can be adjusted from -72 to -48 dBFS in 6 dB steps. The default value is -60 dBFS.

{CONFIGURE ALARM} for each error type

Set the Level (*STATUS* Led color) and/or Report (GPI relay activation) that will occur when the ADC-1722 detects this error.

Note: Alarm relay activation can only occur if the parameter GPI REPORT is enabled in the menu of the Densité frame’s controller card

ALARM LEVEL Associates a *STATUS* led color (GREEN, YELLOW, RED or FLASH RED) with each error. This selection has no influence on the {STATUS} menu display.

ALARM REPORT Select *GPI* to activate an alarm relay when an error is detected (but see note above) The default value is NONE.

{FIRMWARE VERSION}

UC = Vxxx Microcontroller firmware version

FPGA = Vxxx Programmable logic element firmware version.

{FACTORY DEFAULT}

RESTORE Vxxx Loads the module with the factory default parameters (shown underlined in the menu above);
(Vxxx indicates the current version of the microcontroller)

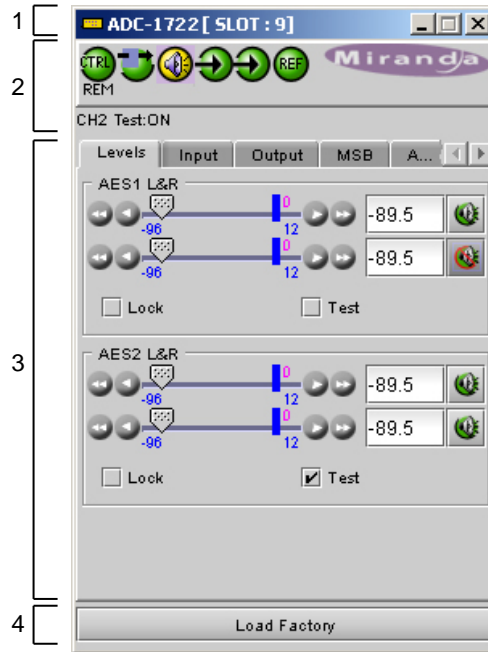
3.4 Remote control using iControl

The operation of the ADC-1722 may be controlled using Miranda's iControl system.

- This manual describes the control panels associated with the ADC-1722 and their use.
- Please consult the iControl User's Guide for information about setting up and operating iControl.

In iControl Navigator or iControl Websites, double-click on the ADC-1722 icon to open the control panel.

The control panel window is divided into four sections, as shown in the figure:



Section 1: The header section shows the name of the product (ADC-1722) and identifies the slot in which it is installed in its Densité frame (Slot 9 in the example).

On the left is the card status icon, reflecting the status of the card's on-board alarms. See section 3.4.5 for information about programming the card alarm system.

Section 2: This section shows status icons for six selected card parameters



Icon # 1 2 3 4 5 6










Move the mouse over an icon and a status message appears below the icon providing additional information. If there is an error, the error status message appears in the message area without mouse-over.






- If there are multiple errors, the error messages cycle so all can be seen
- The icon whose status or error message is shown is highlighted with a mauve background

The table below lists the various status icons that can appear, and how they are to be interpreted.

- In cases where there is more than one possible interpretation, read the error message in the iControl window to see which applies.

Table – iControl Status Icon interpretation

Icon #1 – Manual Card Configuration	
	Remote card control activated. The iControl interface can be used to operate the card
	Local card control active, The card is being controlled using the Densité frame control panel, as described in section 3.3. Any changes made using the iControl interface will have no effect on the card.
Icon #2 – Audio Test Ch 1	
	Ch 1 Test OFF
	Ch 1 Test ON – audio test tones enabled (see Sect.3.4.1)
Icon #3 – Audio Test Ch 2	
	Ch 2 Test OFF
	Ch 2 Test ON – audio test tones enabled (see Sect.3.4.1)
Icon #4 – Input 1 status	
	Signal detected and valid.
	Signal absent (Left and Right reported individually)
	No rear Reference mismatch

Icon #5 – Input 2 status	
 (green)	Signal detected and valid.
 (yellow)	Signal absent (Left and Right reported individually)
 (red)	No rear Reference mismatch
Icon #6 – Reference	
 (green)	Reference Used: <i>(names the reference, e.g. URS)</i>
 (gray)	Reference Used: None

Section 3: This section contains various control panels, accessed via the tabs at the top. Use the arrows at the top right of the section to slide across to additional tabs (there are seven tabs in total).

- The panels are described individually in sections 3.4.1 to 3.4.6 below.

Section 4: The Load Factory button restores the ADC-1722 to a standard factory-designated setup. The values for the factory setup are shown underlined in the card menu in section 3.3.2.

3.4.1 The Levels panel

This panel provides control of the four analog inputs of the ADC-1722. Each input has identical controls, as follows:

Level – 2 sliders, Left (on top) and Right (below)

Click and drag the slider until the desired value appears in the data box, or type the desired value into the data box. Use the arrow icons to move the slider if convenient.

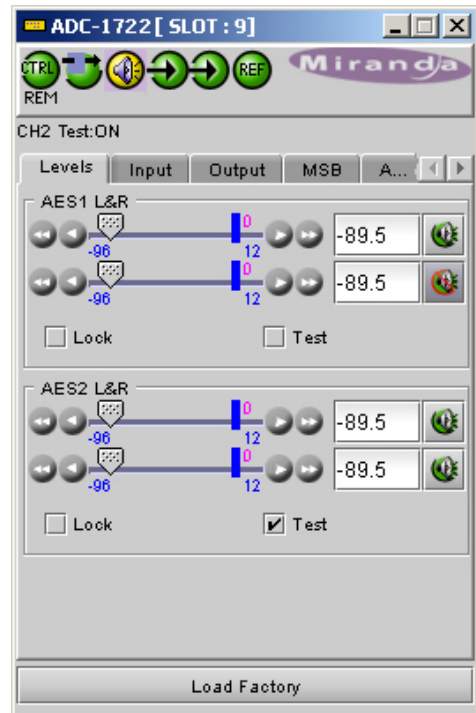
- Range: -96 to +12 dB

Mute – the button to the right of the data box is the MUTE button. Click it to mute the channel. The icon on the button shows the status:



Lock – Click in the box to select the Lock mode. The two sliders for this output are locked together, and any value set on one will automatically apply to the other.

Test – the input signals will be replaced by internally generated test tones.



3.4.2 The Input panel

0 dBFS – use the pulldown to select the analog input signal level (in dBu) that will be converted to 0 dBFS in the AES digital signal.

- Range: 0 to +24 dBu, 1 dB steps

Signal threshold – use the pulldown to set the level that will be considered as “signal absent” when triggering card alarms.

- Range: -48, -42, -36, -30, -24 dBu

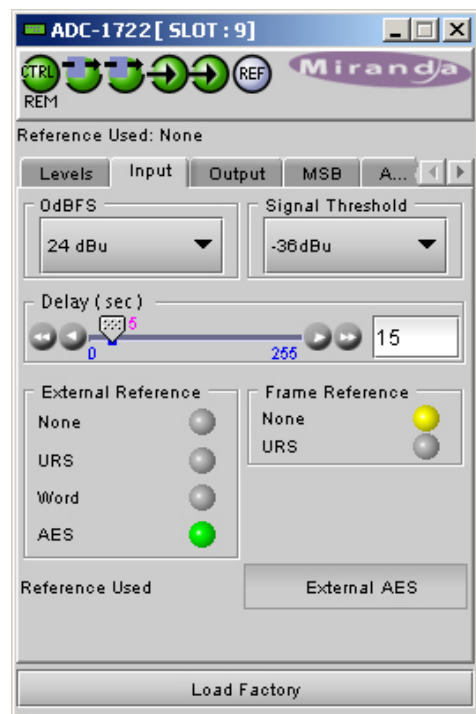
Delay – use the slider or type in the data box to set the period of time during which the signal must be continuously detected as “absent” before alarms are triggered.

- Range: 0 to 255 seconds

External Reference – the icons indicate the type of external reference that is available at the rear panel, if any (URS is only available with the AMX-1101-DRP rear).

Frame Reference – the icons indicate whether a URS reference is available in the Densité frame.

- Requires a REF-1701 card or a REF-1801 card
- NB must also set the correct position of jumper JP1 to select between the REF card type if the ADC card has Assy# 0696-1200-2xx.



Reference Used - the text box names the reference currently in use.

3.4.3 The **Output** panel

Output Sample Rate – use the pulldown to select the sample rate of the output digital audio

- Choices: 32, 48, 96 KHz

Word Length – use the pulldowns to select the digital audio word length for the two outputs independently:

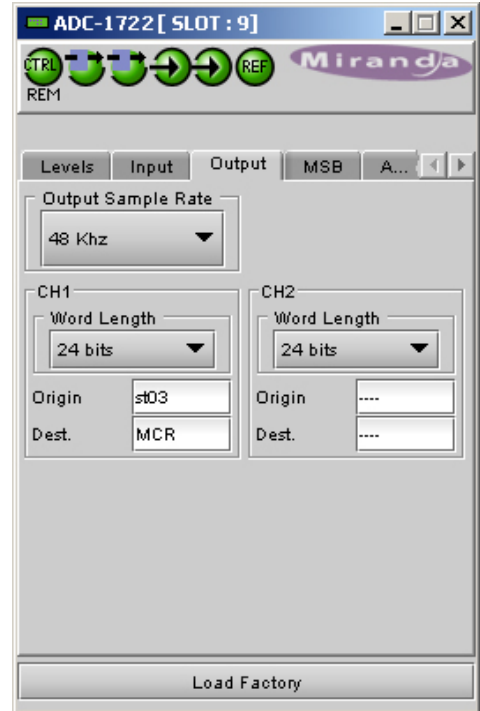
- Choices: 16, 18, 20, 24 bits

Origin – User-defined signal message (4 ASCII characters)

- Type the message in the box and [Enter] to insert it.
- The text will be red when typing, and black after entering
- To delete, click at the end of the message and backspace to delete it, then [Enter]

Dest. – User-defined signal message (4 ASCII characters)

- Type the message in the box and [Enter] to insert it.
- The text will be red when typing, and black after entering
- To delete, click at the end of the message and backspace to delete it, then [Enter]

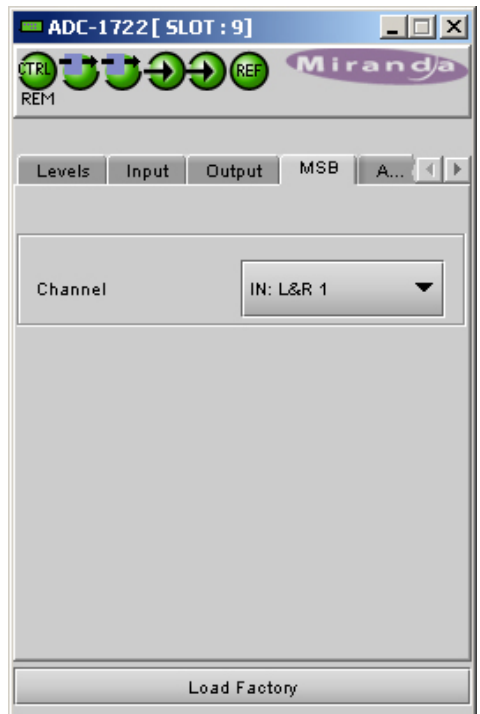


3.4.4 The **MSB** panel

- Valid only for card Assy# 0696-1200-2xx.
- Feature not supported for card Assy# starting at 0696-1200-400.

Channel – use the pulldown to select the audio information that will be sent to the Densité frame’s optional Monitoring Switching Bridge (MSB) card, if installed:

- Choices: IN: L&R 1
IN: L&R 2
OUT: AES1
OUT: AES2



3.4.5 The Alarms panel

This panel includes only the Alarm Config button. Click on the button to open the *Alarm Configuration for ADC-1722* window.

The window is organized in columns.

Status/Name

This contains an expandable tree listing all the alarms reported by this ADC-1722 card.

- Each alarm name includes an icon that shows its current status

The **Overall alarm** and **GSM contribution** columns contain pulldown lists that allow the level of contribution of each individual alarm to the alarm named in the column heading to be set.

- If there is no arrowhead in the box, there is no pulldown and the alarm is not user-configurable

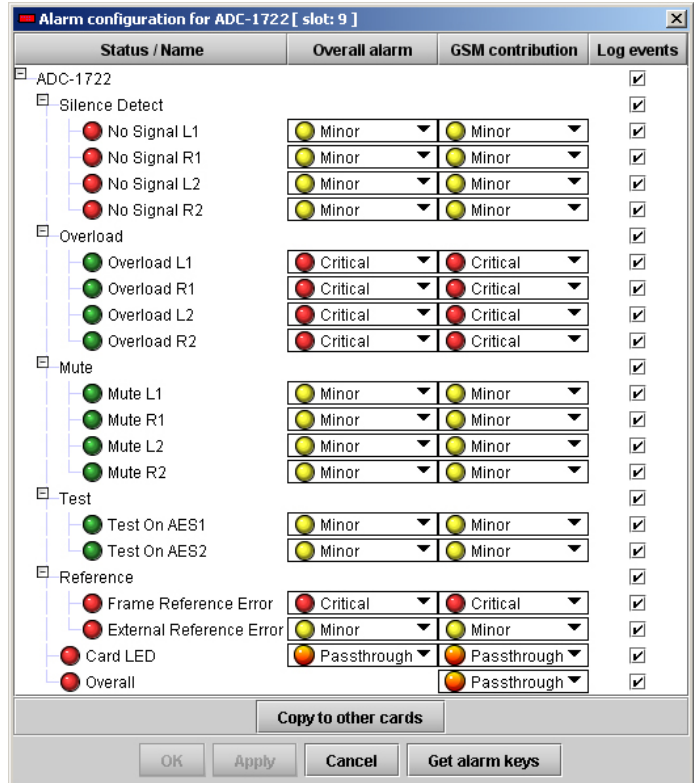
Overall Alarm

This column allows configuration of the contribution of each individual alarm to the Overall Alarm associated with this card. The Overall Alarm is shown in the upper left corner of the iControl panel, and also appears at the bottom of the Status/Name column.

GSM Contribution

This column allows configuration of the contribution of each individual alarm to the GSM Alarm Status associated with this card. GSM is a dynamic register of all iControl system alarms, and is also an alarm provider for external applications. The possible values for this contribution are related to the Overall alarm contribution:

- If the Overall alarm contribution is selected as Disabled, the GSM alarm contribution can be set to any available value
- If the Overall alarm contribution is selected as any level other than disabled, the GSM contribution is forced to follow the Overall Alarm.



Levels associated with these alarms:

The pulldown lists may contain some or all of the following options:

- Disabled The alarm makes no contribution (black icon)
- Minor The alarm is of minor importance (yellow icon)
- Major The alarm is of major importance (orange icon)
- Critical The alarm is of critical importance (red icon)
- Passthrough The alarm exists but has no effect (used for text and composite alarms)

Shortcut: if you click in one of the Set All boxes beside a section heading, you will open a pulldown that lets you assign a level to all alarms in that section of the column simultaneously.

Log Events

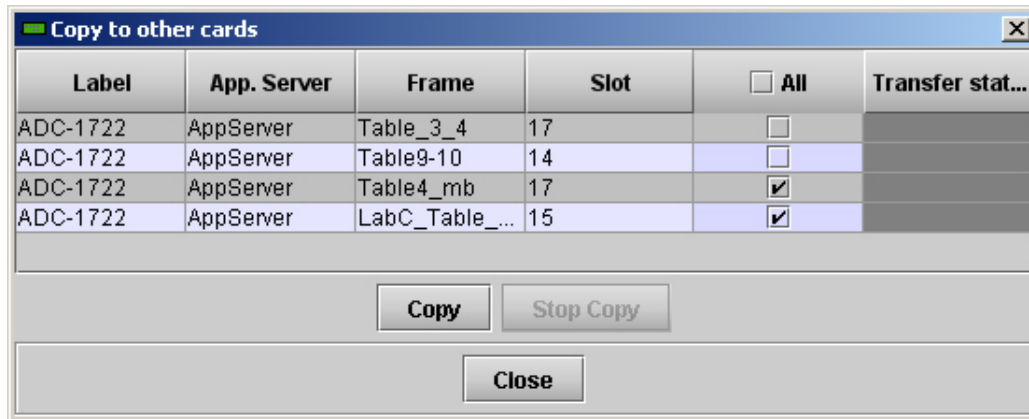
iControl maintains a log of alarm events associated with the card. The log is useful for troubleshooting and identifying event sequences. Click in the checkbox to enable logging of alarm events for each individual alarm.

At the bottom of the window are several other controls

Copy to other cards

Click this button to open a panel that allows the alarm configuration set for this card to be copied into other ADC-1722 cards.

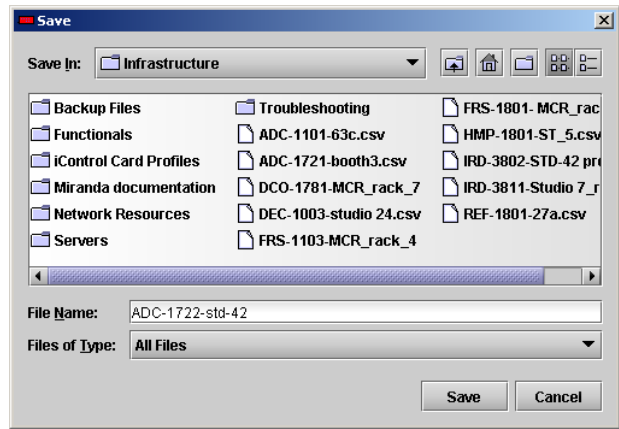
- The window shows other ADC-1722 cards available through iControl
- Select one or more destination cards from the list in the window by clicking in the checkboxes, or all of them by clicking in the *All* checkbox



Get alarm keys

Click this button to open a save dialog where you can save a file containing a list of all alarms on this card and their current values, along with an Alarm Key for each. The alarm keys are useful for system integration and troubleshooting.

- The file is saved in Excel.csv format



OK, Apply, Cancel

- **OK** accepts the settings and closes the window once the card confirms that there are no errors.
- **Apply** accepts the settings, but leaves the window open
- **Cancel** closes the window without applying any changes, and leaves the previous settings intact.

3.4.6 The Info panel

When the ADC-1722 is included in an iControl environment, certain information about the card should be available to the iControl system. The user can enter labels and comments that will make this card easy to identify in a complex setup. This information is entered into data boxes in this control panel.

Label: type the label that is shown for this ADC-1722 when it appears in iControl applications

Short Label type the short-form label that iControl uses in some cases (8 characters)

Source ID type a descriptive name for this ADC-1722

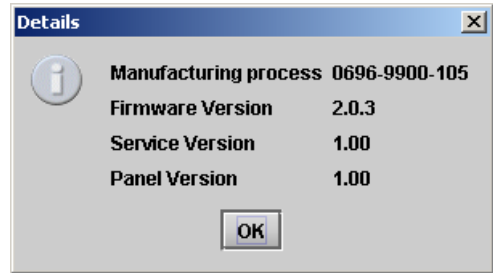
Comments: type any desired text

The remaining data boxes show manufacturing information about this card.

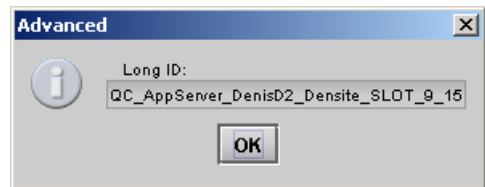


Three buttons in the panel give access to other information.

- **Details...:** Reports the Firmware version, service version, and panel version for this card



- **Advanced...:** Shows the Miranda LongID for this card. The Miranda LongID is the address of this ADC-1722 in the iControl network.



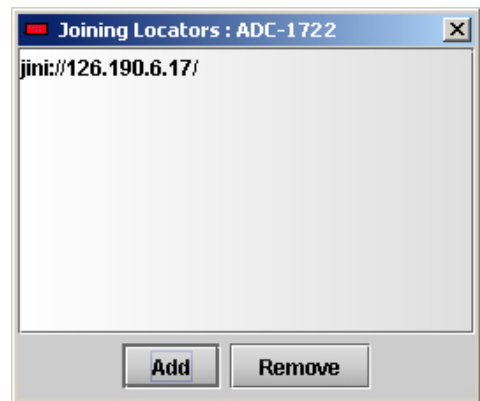
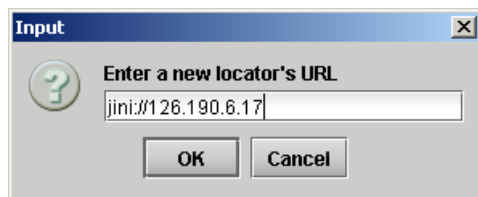
- **Remote System Administration** – opens the Joining Locators data box, which lists remote lookup services to which this ADC-1722 is registered.

Add: Force the iControl service for this ADC-1722 to register itself on a user-specified Jini lookup service, using the following syntax:

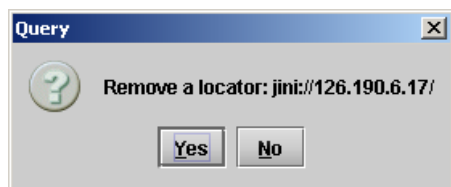
`jini://<ip_address>`

where `<ip_address>` is the ip address of the server running the lookup service

Enter the address in the Input data box, e.g.:



Remove: select one of the services listed in the window by clicking on it, and click *Remove* to delete it from the window.



4 Specifications

Analog Inputs (4)

Signal: balanced analog audio
 Input impedance: > 12 k Ω
 Max. Level: +24 dBu

External Reference Input (1)

Signal: AES3-id or Word Clock
 Frequency: 32, 48 or 96 kHz
 (Opt.44.1 kHz only)
 Input impedance: 75 Ω

Frame Reference Input (1)

Signal: URS from Miranda Technologies,
 Implies a REF-1701 or a REF-1801 card installed in the frame and
 proper position of the JP1 jumper for card Assy#0696-1200-2xx.

Outputs (4)

AES3

Level: 4 Vpp
 Impedance: 110 Ω balanced
 Jitter: 0.008 UI peak (50 Hz to 100 kHz)

AES-3id

Level: 1.0 Vpp
 Impedance: 75 Ω unbalanced
 Jitter: 0.008 UI peak (50 Hz to 100 kHz)

Processing Performance

Quantization: 24 bits
 Sampling: 32, 48 or 96 kHz
 SNR: >113 dB A weighted
 0 dBFS: 0 to +24 dBu (1 dB steps)
 Distortion: < -100 dB (0.001%)
 Crosstalk: < -100 dB (20 Hz to 20 kHz)
 Freq. response: \pm 0.1 dB (20 Hz to 20 kHz)
 Processing delay: 810 μ sec @ 48 kHz
 Tone generator: -18 dBFS 1 kHz sine wave interrupted on left channel
 (250 ms / 3 s) per EBU R49

Miscellaneous

Signal presence threshold: from -72 to -54 dBFS
 (6 dB steps)
 No signal delay: from 0 to 255 s (1 s steps)

Power

With ADC-1722-DRP-75..... 4.9 W (Assy#0696-120-2xx); 3.5 W (Assy#0696-1200-400)
 With ADC-1722-DRP-110..... 5.1 W (Assy#0696-120-2xx); 3.5 W (Assy#0696-1200-400)