

User Manual

ALP442e & ALP442e-MIC ALP882e & ALP882e-MIC

Professional multi-channel sound cards



May 2023

Author	Date	Status
SBT	12/05/23	Release version

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1 INTRODUCTION

This document describes the installation and use of the following Digigram multichannel PCI Express cards under Windows and Linux: ALP442e, ALP442e-MIC, ALP882e, and ALP882e-MIC.

These cards are part of the ALP-X professional sound cards range.

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Digigram and the Digigram logo, ALP442e, ALP442e-MIC, ALP882e and ALP882e-MIC are trademarks or brand names of Digigram Digital. All other marks are owned by their respective companies.

2 IMPORTANT NOTICE

Certifications

The product is currently being certified.

This product has been designed in accordance with the following standards:

- EMC Directive 2014/30/EU.
- FCC Rules Part 15, Subpart B.

To ensure compliance with the standards listed above, the following rules must be followed:

- The cable supplied must not be modified.
- The additional cables used must have their respective shielding connected at each end.

Caution



An electrostatic discharge (ESD) can damage the card components. Take the following precautions to avoid such damage when handling the card:



Connect the card and everything entering into contact with it to the earth potential by providing a conductive surface and discharge paths. Take these precautions as a minimum:

- Unplug all power and signal sources.
- Place the card on an earthed conductive work surface.
- Connect to the earth potential using an anti-static strap or by holding an earthed object.
- Earth all the tools entering into contact with the card.

Given the shortened length of the PCI EXPRESS™ connector and the resulting lack of mechanical stability, we strongly advise against transporting the cards installed in a computer, unless its chassis or case has a device for holding the card firmly in place to avoid material damage.

3 BOX CONTENTS

Thank you for purchasing a DIGIGRAM sound card in the ALP-X range.

The box contains:

- The ALP442e, or ALP442e-MIC, or ALP882e, or ALP882e-MIC sound card equipped with a low-profile bracket (79.2 mm),
- a standard height bracket (full height: 120 mm) that can be fitted instead of the low profile one.

The two breakout cables that bear the XLR and BNC connectors are available as an option. One cable supports the analog I/Os, the other one supports the digital I/Os and clocks.

Please contact your card supplier to acquire the Digigram-certified cables.

4 GENERAL CHARACTERISTICS

ALP442e, ALP442e-MIC, ALP882e and ALP882e-MIC are PCI EXPRESS™ x1 sound cards. They can be inserted into and therefore operate in PCIe® x1, x4, x8 or x16 slots.

4.1 Main hardware characteristics

- 4 (ALP442e/ALP442e-MIC) or 8 (ALP882e/ALP882e-MIC) balanced analog inputs with:
 - software-adjustable analog gain and a maximum input level of +24 dBu.
 - switchable 48V phantom power on each input (ALP442e-MIC and ALP882e-MIC)These inputs can be used in unbalanced mode ("-" signal to be connected to the ground).
- 8 electronically balanced analog outputs, with a maximum output level of +24 dBu. (Electronically balanced outputs can process either balanced or unbalanced lines without loss of level).
- 2 (ALP442e/ALP442e-MIC) or 4 (ALP882e/ALP882e-MIC) stereo digital AES3 inputs, 32 kHz to 192 kHz, each with a high quality hardware sample rate converter (SRC).
- 2 (ALP442e/ALP442e-MIC) or 4 (ALP882e/ALP882e-MIC) AES3 stereo digital AES3 outputs (up to 192 kHz)
- 1 AES11 synchronisation input (up to 192 kHz)
- 1 word clock input/output (up to 192 kHz)
- 8 GPI dry contacts and 8 GPO relays
- Inter-card synchronisation

4.2 Main software characteristics

- Low latency multi-card drivers
 - Wasapi/DirectSound and ASIO application programming interfaces under Windows
 - Alsa and libgpi for Linux
- ALP442e / ALP442e-MIC: 8 playback channels / 8 recording channels
ALP882e / ALP882e-MIC: 16 playback channels / 16 recording channels
- Simultaneous acquisition and playback in PCM (8, 16 and 24 bit)
- On-board mixing of physical audio inputs and software "playback" devices to physical audio

- outputs and software recording devices.
- "ALP-X Manager" application installed with the driver, to control the card settings:
 - clock source (internal, wordclock, AES11, AES3 input)
 - frequency of the fallback internal clock
 - input and output gains and VU-meters
 - 48V phantom power switches (for -MIC cards)
 - routing of inputs to outputs
- API for implementing the management of the card settings in a software application.

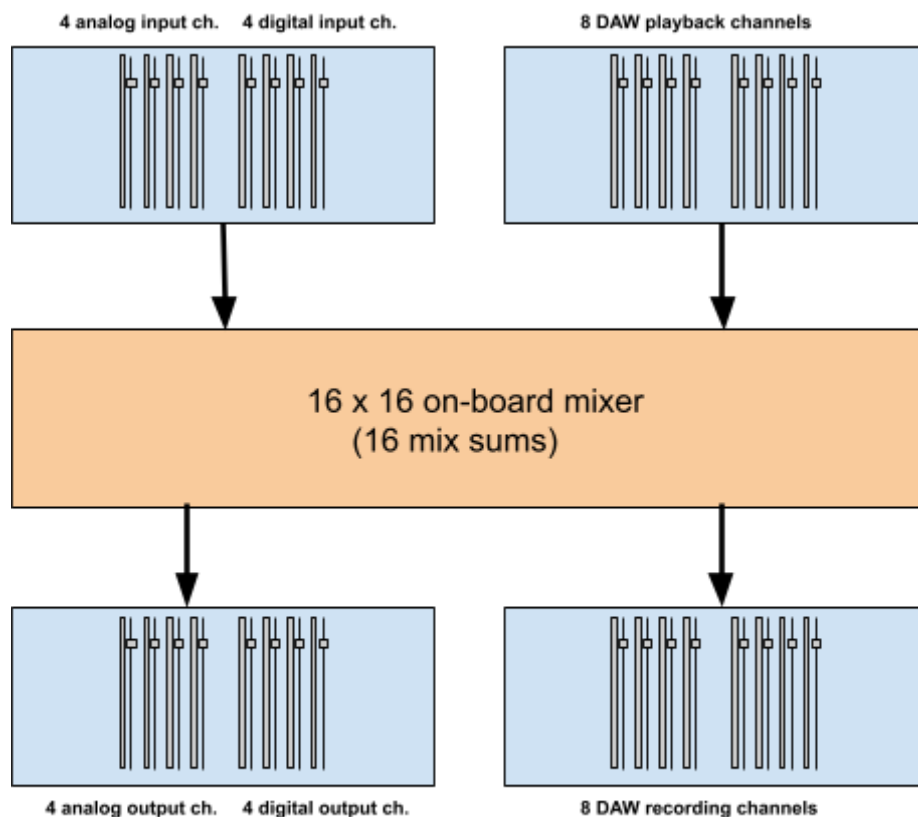
4.3 Routing audio streams in the card

The ALP cards incorporate an on-board mixer in an FPGA component.

On ALP442e and ALP442e-MIC, this is a mixer with 16 mono inputs (8 stereo) and 16 mono outputs (8 stereo). The mixer captures the physical input channels of the card (4 analog channels and 4 AES3 channels) and the 8 channels of the playback devices.

The mixer restores 16 audio channels, respectively to the 8 physical outputs of the card (4 analog channels and 4 AES3 channels) and the 8 recording device channels.

The mixer can therefore be configured to perform the mixing and the routing of the 16 input channels to the 16 output channels (16 mix sums).



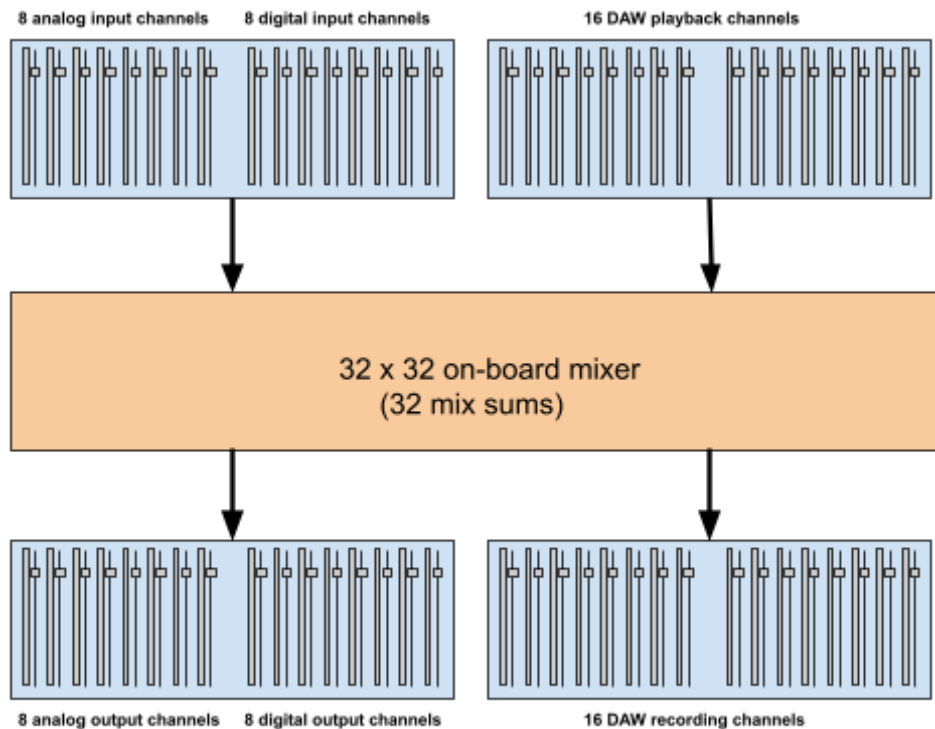
ALP442e & ALP442e-MIC

On ALP882e and ALP882e-MIC, this is a mixer with 32 mono inputs (16 stereo) and 32 mono outputs (16 stereo).

The mixer captures the physical input channels of the card (8 analog channels and 8 AES3 channels) and the 16 channels of the playback devices.

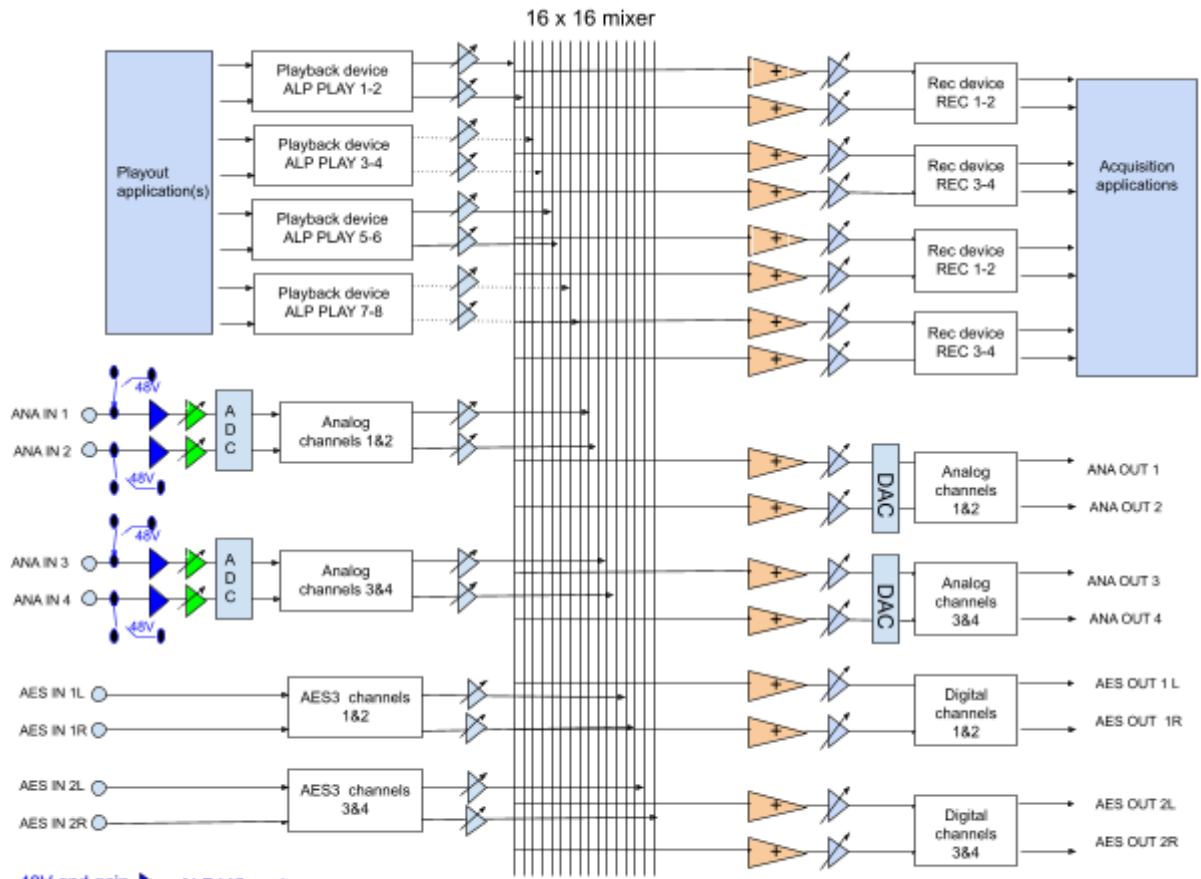
The mixer restores 32 audio channels, respectively to the 16 physical outputs of the card (8 analog channels and 8 AES3 channels) and the 16 recording device channels.

The mixer can therefore be configured to perform the mixing and the routing of all the 32 input channels to the 32 output channels (32 mix sums).

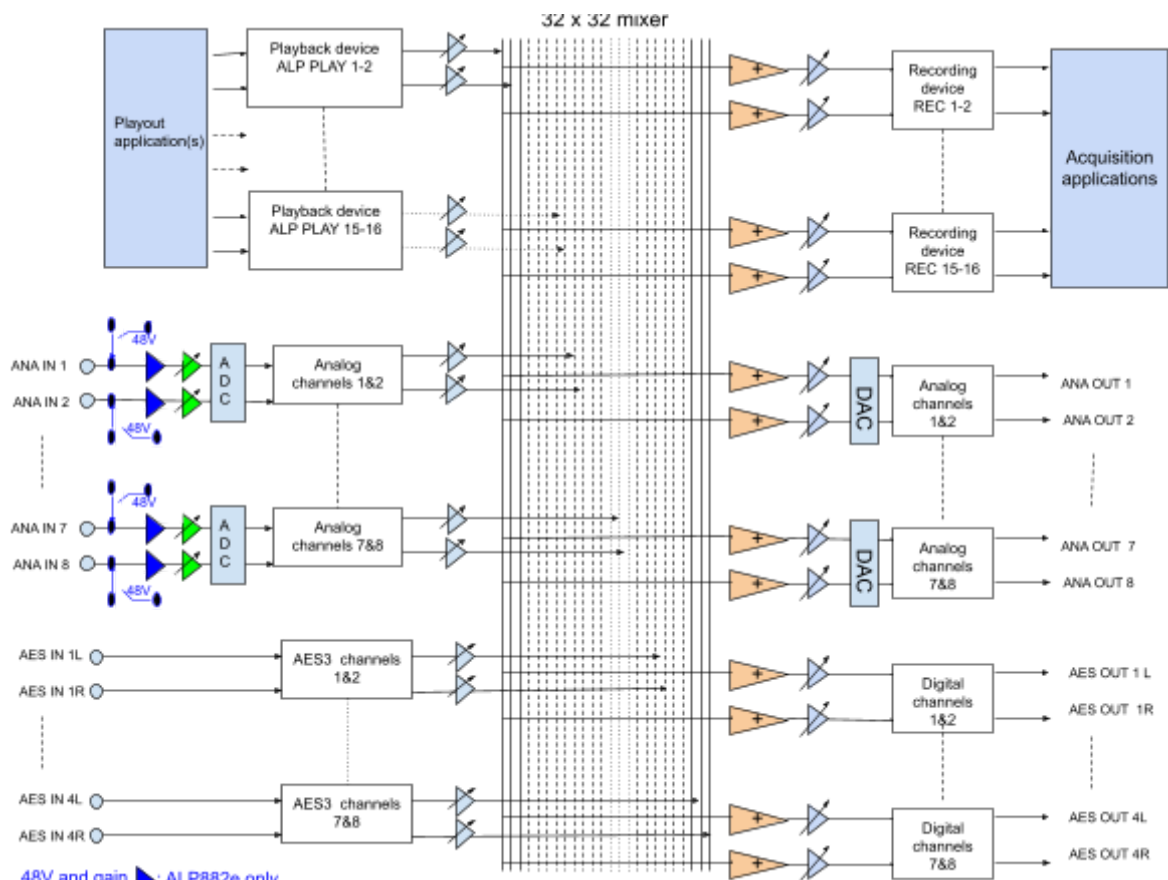


ALP882e & ALP882e-MIC

The following diagrams show a more detailed view of the workflows in the card, with the input and output gains.



ALP442e and ALP442e-MIC



ALP882e and ALP882e-MIC

5 REQUIRED CONFIGURATION

5.1 Required hardware configuration

There are no particular hardware restrictions in terms of PC on using the ALP card and its driver. The PC can have standard height or low profile PCIe card slots. The ALP card can in particular be used in 2U racks or reduced size PCs by using the smaller bracket instead of the standard height bracket that is fitted by default.

A PCI EXPRESS™ (PCIe®) x1, x4, x8 or x16 slot must be available to plug in the card.

The processor power and memory required depend mainly on the operating system and the applications used on the PC.

Note: The driver of the card reports to the OS that it does not manage the Sleep mode. As a consequence, the PC should not go to sleep mode.

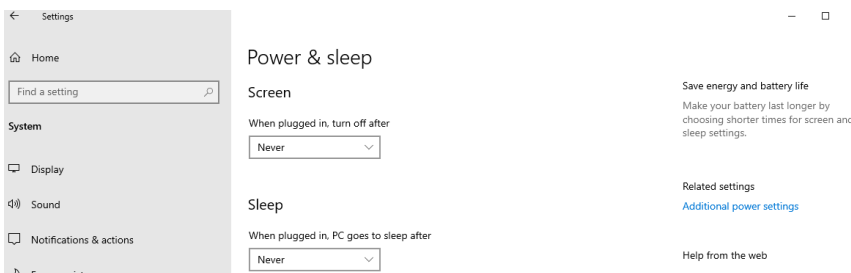
In case the PC goes to sleep mode under Windows, please proceed as follows to disable the sleep mode.



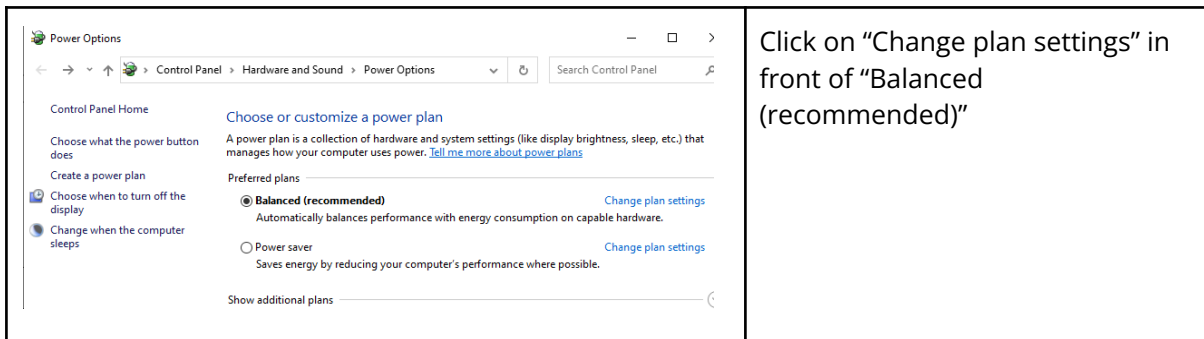
The windows sleep mode for the PCIe bus must be disabled.

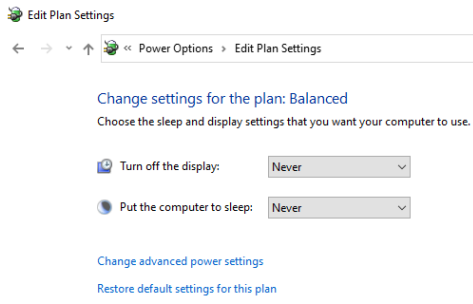
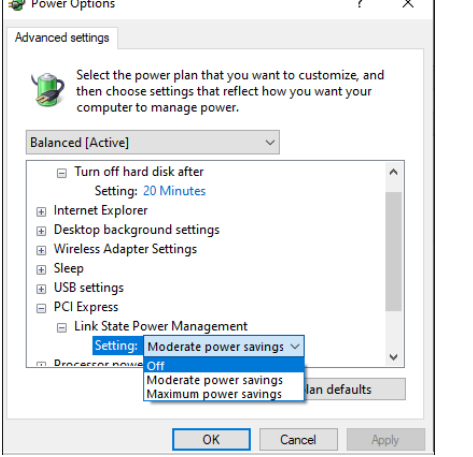
Go to Windows Settings, System, and select “Power & sleep”.

Select “Never” for the option “Put the computer to sleep”.



On the same window, click on “Additional power settings”.



	<p>Select "Change advanced power settings".</p>
	<p>Select "PCI Express", "Link State Power Management", and select "Off" for the setting. Click on Ok to validate</p>

5.2 Necessary software configuration under Windows

ALP cards operate under Windows from 64-bit versions of Windows 10 from version 20H2, and from Windows Server 2019.

To use your ALP-X card, you must install the driver included in the installation kit "ALP-X Kit". Download the latest version from the digigram website from the [ALP882e card support page](#) or from the support pages for ALP882e-MIC and ALP442e and ALP442e-MIC (the same driver supports all the ALP cards).

The "ALP-X Kit" installer is used to install the following components:

- a 64-bit WDM driver offering the WASAPI and DirectSound application interfaces,
- an ASIO driver (32 bits and 64 bits), with its "ALP-X ASIO Settings" configuration interface. Installing this component is optional,
- the "ALP-X Manager" application, which serves to adjust the ALP-X card settings and display the vu-meters. Installing this component is optional.

Note for Windows Server operating systems

Under Windows server, it is necessary to allow the applications to access the input audio devices of the sound cards.

Please proceed as follows:

- Go to the Windows Settings, and select **Privacy**.
- Select "**Microphone**"
- Activate the option "**Allow apps to access your microphone**"

5.3 Necessary software configuration under Linux

ALP cards operate under Linux from the 64-bit Kernel 4.1x onwards.

The Alsa driver for Linux is available for downloading. It is supplied as a DKMS package, which can therefore be used to compile the driver for the target Linux distribution used.

6 HARDWARE INSTALLATION

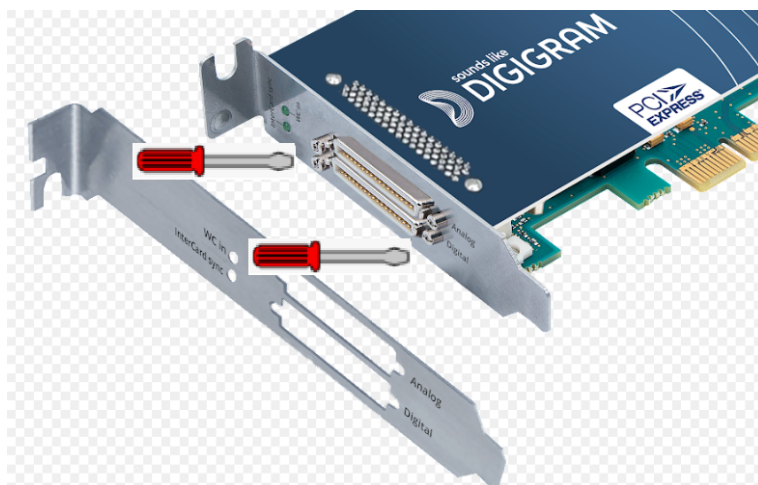
Given the shortened length of the PCI EXPRESS™ connector and the resulting lack of mechanical stability, we strongly advise against transporting the cards installed in a computer, unless it has a device for holding the card firmly in place to avoid material damage.

The card must be inserted in the computer before installing its driver.

6.1 Preparing the card

Before fixing the card in the computer, make sure you install on the card the bracket matching the PCIe slot into which it is going to be inserted.

To install the card in a standard height PCIe slot, remove the low profile bracket by loosening the two screws on the sides of the cable connector, position the standard height bracket and retighten the two screws.



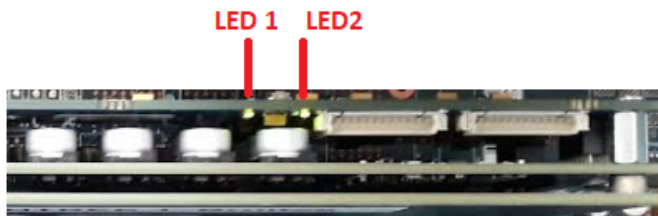
6.2 Installing the card

Insert the card in the available PCIe slot and press to position it firmly.

Tighten the screw fixing the bracket to the chassis or lock the card using the device provided for this purpose on your computer.

6.3 State of internal LED

The ALP card has two internal LEDs on the edge of its mother board, as shown below.. The state of these LEDs can be seen when the PC cover is open.



If the card and its on-board firmware are initialised correctly, LED 1 must be lit solid green, and LED 2 must flash every second (1 Hz).

If LED 2 flashes faster (twice per second - 2 Hz), this means that the firmware version that has been uploaded to the card is corrupted, and the card is running the backup factory firmware version. It is then necessary to re-install the appropriate firmware version.

7 SOFTWARE INSTALLATION UNDER WINDOWS

IMPORTANT

To install the software, you must have administrator rights on the computer.

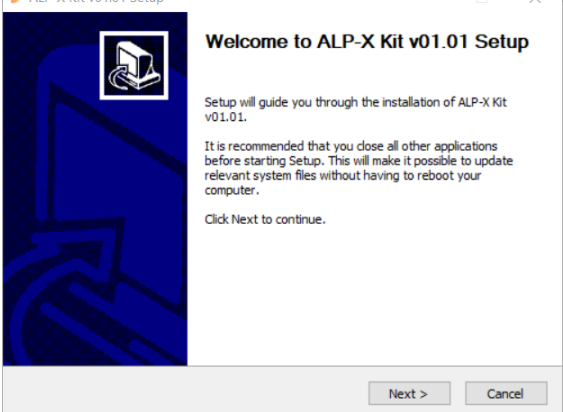
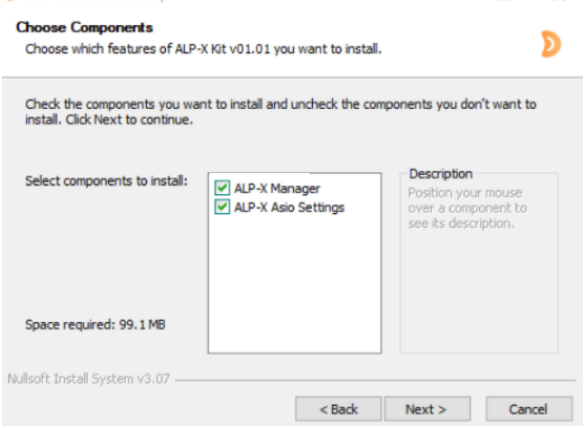
Please visit the Digigram website at www.digigram.com to obtain the most recent driver.

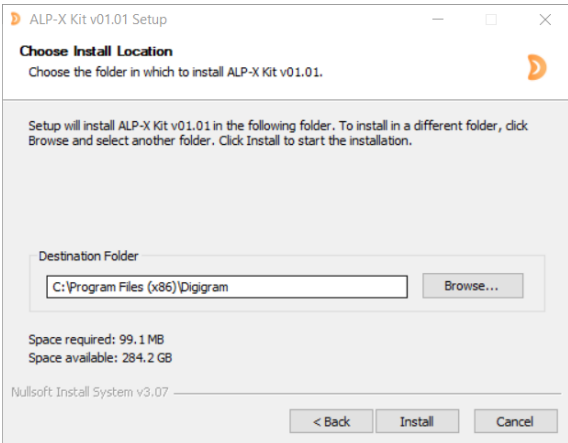
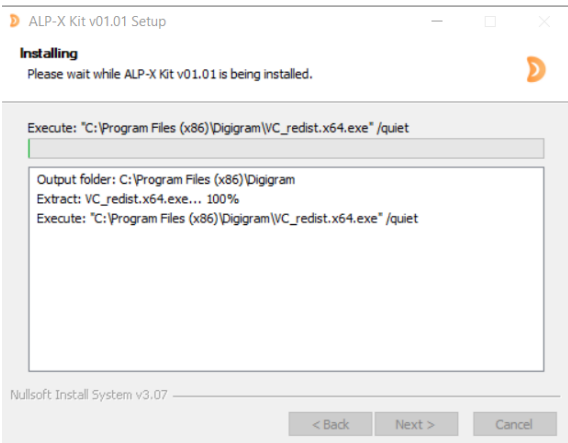
Should you use a specific application developed or installed by a Digigram partner, this may mean using a specific driver version. In this case, confirm with your application supplier which driver version to use.

Any driver downloaded from our website has to be unpacked before installing it. Double click on the downloaded file to start the auto-extraction utility. You can choose the default destination (temporary Windows folder) or select another one.

7.1 Very first installation

- Switch off the computer and insert the ALP card(s) in an available PCIe slot.
- Restart the computer.
- Click on Cancel if the "New device detected" wizard appears.
- Double click on the ALP driver installation file "ALP-X Kit vxx.exe"

	<p>Click on Next to continue with the installation.</p>
	<p>Click on "I agree" to continue with the installation.</p>
	<p>In this window, select the components to be installed in addition to the card driver.</p> <ul style="list-style-type: none"> • ALP-X Manager: application used to configure the settings of the ALP card(s) installed. Some software programs may have been designed with the ALP card settings controls built in. In this case, it may be recommended not to install the ALP-X Manager application. • ALP-X ASIO Settings: this application is used to configure the ASIO driver

	<p>settings. There is no need to install it if no application reliant on the ASIO interface is used.</p>
	<p>The driver is installed by default in the folder "C:\Program Files (x86)\Digigram\ALP-X".</p> <p>To change this folder, click on Browse and select a new destination.</p> <p>Click on Install to continue with the installation.</p>
	<p>The driver and selected components are being installed.</p>

7.2 Updating the driver version

If a driver version for the ALP card has already been installed, and you want to install another version, first uninstall the current driver version (see chapter [“Uninstalling the driver under Windows”](#)), and then install the new version by double clicking on the driver installation file "ALP-X Kit vxx.exe" (see the detailed procedure in the hereinabove chapter [“Very first installation”](#)).

7.3 Updating the firmware

The ALP card on-board firmware may have to be upgraded, and updates can be supplied by Digigram and prove necessary.

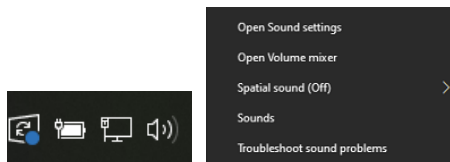
Updating the firmware can be done from the ALP-X Manager GUI (see chapter [Firmware update procedure](#)).

7.4 Verifying the card installation

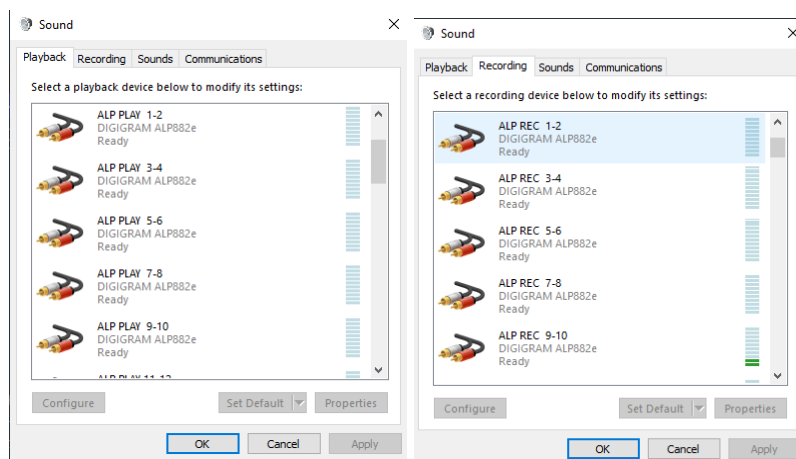
Once the driver and card have been installed as per the process described hereinabove, you can verify that the card is installed correctly and working properly.

7.4.1 Presence of playback and recording devices

The audio devices exposed by the card driver are visible on the Windows Sound panel. To open it, right click on the loudspeaker icon in the Windows taskbar and select "Sounds":



The audio devices exposed by the card driver are visible from the "Play" and "Record" tabs.



If the card devices are not listed in the Windows Sound control panel:

- Make sure that the card is inserted correctly in the PCI slot and screwed to the computer chassis.
- Try to uninstall the **ALP-X Kit** (from the Windows control panel, Applications) and re-install it.

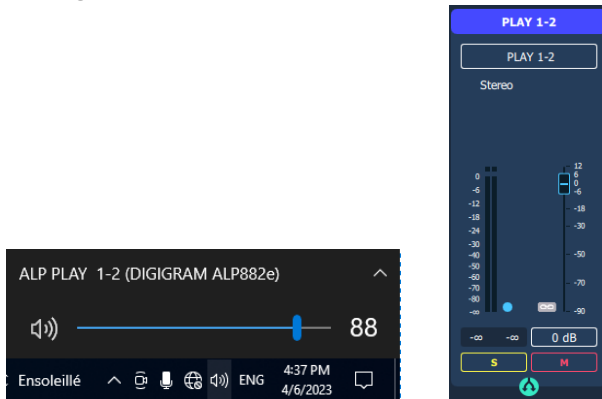
Playback to a device can be tested by right clicking on it and selecting "Test". The VU-meter must then show modulation and the sound must be heard on the card output(s) according to the routing and levels configured in the ALP-X Manager application.

If several cards of the same model are installed, their devices have the same name (ALP PLAY and ALP REC), but the name of the card associated to each device differs from an index (no index for the first card, and index starting from 2 for the following cards of the same model). In the example below, the first card in the PCIe slot enumeration order is an ALP882e, the second card is an ALP442e, and the third card is an ALP882e.

First card: ALP882e	Second card: ALP442e	Third card: ALP882e
ALP PLAY 1-2 Digigram ALP882e	ALP PLAY 1-2 Digigram ALP442e	ALP PLAY 1-2 2-Digigram ALP882e
ALP PLAY 3-4 Digigram ALP882e	ALP PLAY 3-4 Digigram ALP442e	ALP PLAY 3-4 2-Digigram ALP882e
...
ALP PLAY 15-16 Digigram ALP882e	ALP PLAY 7-8 Digigram ALP442e	ALP PLAY 15-16 2-DigigramALP882e

Note

The output WDM device level setting, accessible from the Windows Sound control panel, is coupled to the corresponding input level setting of the card's onboard mixer, and impacts left and right channels.

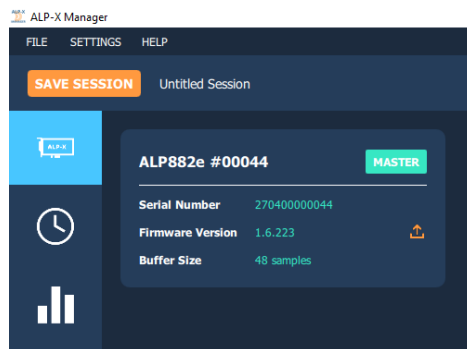


Note that after the first installation of the card, the default gain settings are as follows:

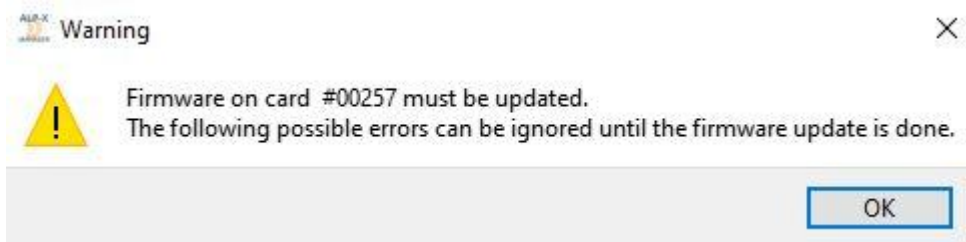
- Input analog gains are set to -24 dB (+24 dU -> 0 dBfs).
- Digital input and output gains are set to 0 dB

7.4.2 Card detected by the Digigram ALP-X Manager application

The ALP-X Manager application, installed with the driver, is used to control the ALP card settings via a graphic interface. This application can be launched from the shortcut created on the desktop or from the start menu, Digigram group. The card must appear as below if it and its driver are installed correctly. Note that a maximum of eight ALP cards can be displayed and handled in ALP-X Manager.



Note: When the ALP Manager application is started, if the driver detects that the firmware version on the ALP Card is too old, a message like the following one is displayed.



If several ALP cards are running in the PC with a too old firmware version, one message per card is displayed.

From the list of ALP cards displayed in the ALP Manager, a firmware to be updated is displayed in red colour as shown below.



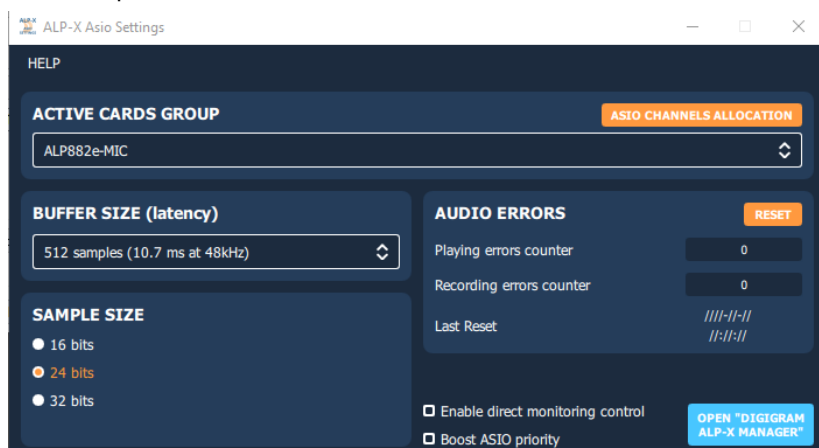
Please refer to the [firmware update procedure](#).

7.4.3 Card availability under ASIO

If the ASIO driver for the card has been installed (option to be selected during the installation procedure), then the card must be detected and displayed in the ASIO control panel.

This control panel can be started from the ASIO application to select the appropriate audio devices.

All cards present must be listed in the "ACTIVE CARDS GROUP" selection list.



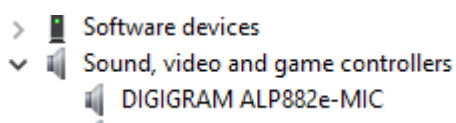
7.5 Adjusting the internal latency of the card

The following describes advanced settings that may impact the proper functioning of data exchanges between the card and the PC. It is recommended that you do not change these settings.

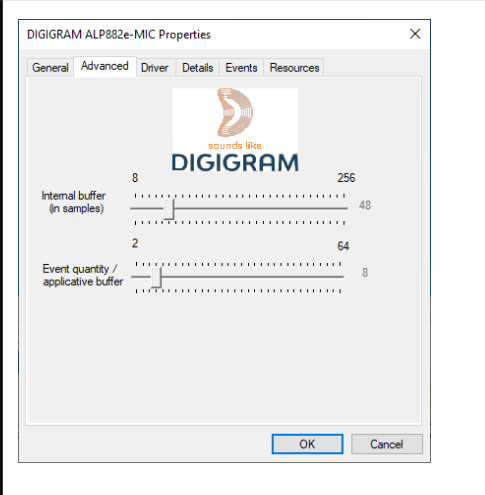
The internal latency of the card is determined by the duration of sample buffers the card exchanges with the PC for playback and recording audio streams. By default, this duration is 512 sampling clock periods (10.7ms at 48 kHz).

The lower the internal latency, the lower the global latency of the card. However, a very low latency may lead to "choppy" audio on slow PCs. In this case it is necessary to increase the internal latency.

The internal latency of the card can be changed by electing the properties of the card, from the Windows Device Manager:



Right click on the ALP card, and select Properties, Advanced. The following window is displayed:

	<p>Internal buffer: number of sampling clock periods of the buffers exchanged between the card and the driver.</p> <p>Event quantity: This parameter should not be modified without having technical advice from Digigram.</p>
---	--

Select the new latency value, and click on “Ok”.

The PC must be restarted.

7.6 Replacing a card

If an ALP card has to be replaced by another one, it is strongly recommended to proceed as follows:

- Turn off the PC.
- Remove the card to be replaced.
- Restart the PC.
- Go to the Windows Device Manager, and select “Sound, video and game controllers”. From the “View” menu, select “Show Hidden devices”. Select the ALP card that was hidden and select “Uninstall”.
- Turn off the PC.
- Insert the new card.
- Restart the PC.

7.7 Changing the order of installed cards



If several ALP cards are installed, and you want to move cards from a slot to another, it is strongly recommended to proceed as follows:

- Turn off the PC.
- Remove the cards to be moved.
- Restart the PC.
- Go to the Windows Device Manager, and select “Sound, video and game controllers”. From the “View” menu, select “Show Hidden devices”. Select the ALP cards that were hidden and select “Uninstall”.
- Turn off the PC.
- Insert the cards in the appropriate slots.
- Restart the PC.

8 UNINSTALLING THE DRIVER UNDER WINDOWS

Proceed as follows to uninstall an ALP driver version.

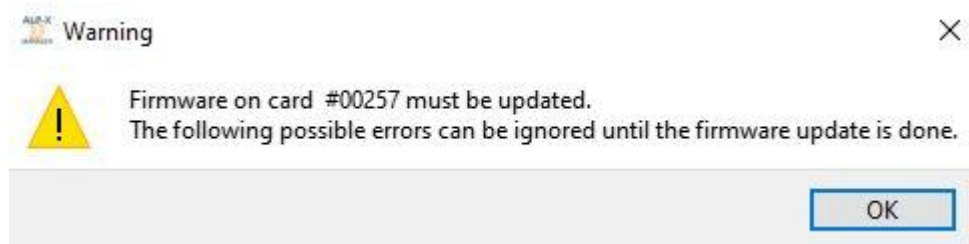
Please note that uninstalling a version must be done prior to the installation of another version.

	<p>From Windows Start menu, open the "Settings" panel</p>						
 <p>Apps Uninstall, defaults, optional features</p>	<p>Click on the "Apps" icon.</p>						
<p>Apps & features</p> <p>Optional features</p> <p>App execution aliases</p> <p>Search, sort, and filter by drive. If you would like to uninstall or move an app, select it from the list.</p> <input data-bbox="220 936 456 958" type="text" value="Search this list"/> <p>Sort by: Name ▾ Filter by: All drives ▾</p> <p>50 apps found</p> <table border="0"> <tr> <td data-bbox="220 1043 252 1077"></td> <td data-bbox="260 1043 539 1077">3D Viewer Microsoft Corporation</td> <td data-bbox="547 1043 596 1077">16.0 KB 8/4/2022</td> </tr> <tr> <td data-bbox="220 1093 252 1126"></td> <td data-bbox="260 1093 539 1126">ALP-X Kit</td> <td data-bbox="547 1093 596 1126">145 MB 9/20/2022</td> </tr> </table>		3D Viewer Microsoft Corporation	16.0 KB 8/4/2022		ALP-X Kit	145 MB 9/20/2022	<p>From the list of installed Apps & features, select ALP-X Kit.</p>
	3D Viewer Microsoft Corporation	16.0 KB 8/4/2022					
	ALP-X Kit	145 MB 9/20/2022					
<div data-bbox="217 1193 536 1256" style="border: 1px solid #ccc; padding: 5px; display: flex; gap: 10px;"> Modify Uninstall </div>	<p>Click on Uninstall.</p> <p>This will remove all the ALP-X ... components</p>						

9 CONFIGURING THE CARD UNDER WINDOWS VIA THE ALP-X MANAGER APPLICATION

This application can be launched from the shortcut created on the desktop or from the start menu, Digigram group.

When the ALP Manager application is started, if the driver detects that the firmware version on the ALP Card is too old, a message like the following one is displayed.




If several ALP cards are running in the PC with a too old firmware version, one message per card is displayed.

From the list of ALP cards displayed in the ALP Manager, a firmware to be updated is displayed in red colour as shown below.



Please refer to the [firmware update procedure](#).

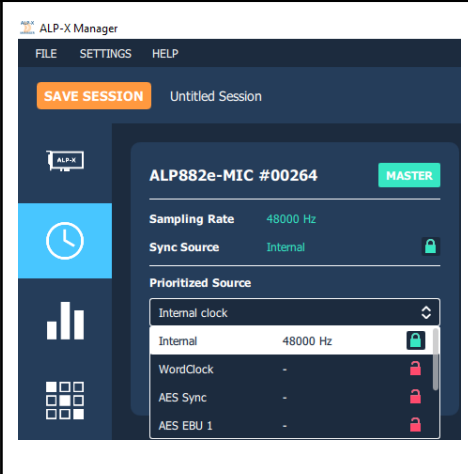
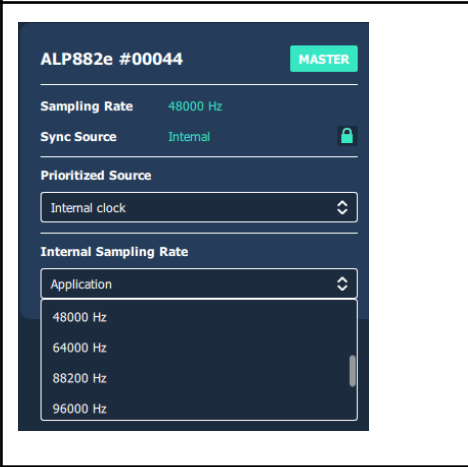
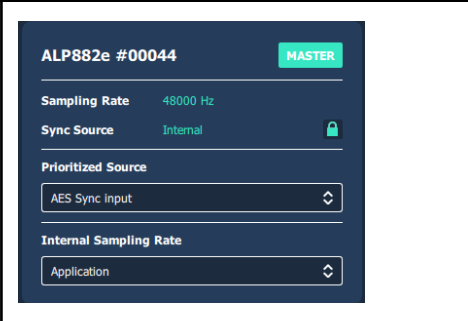
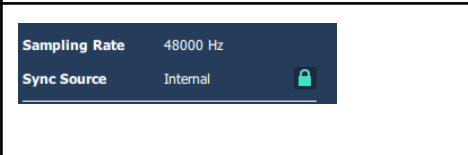
If another view is displayed, click on the  icon to display the list of ALP cards present and detected.

The following settings are displayed for each ALP card detected:

- its serial number,
- the on-board firmware version,
- the size of buffers exchanged between the driver and the card (see [Adjusting the internal latency of the card](#)).

9.1 Sampling clock management

Click on the clock icon to display the clock selection settings of each present ALP card.

	<p>The ALP card can be configured as an internal clock or external clock (AES11, AES3 input, Word Clock). To select the clock source, click on the "Prioritized source" selection list and select the desired source.</p> <p>A red padlock icon on the right of the clock name means the clock signal is absent. A green padlock icon on the right of the clock name means the clock signal is present.</p> <p>In addition, the detected sample rate of an external clock is displayed in the clock list.</p>
	<p>If the internal clock is selected ("Internal"), select the sampling Rate value from the "Internal Sampling Rate" selection list.</p> <p>Possible values are: (in kHz) 11.025, 16, 22.05, 24, 32, 44.1, 48, 64, 88.2, 96, 128, 176.4, 192, and Application.</p> <p>Selecting "Application" means that the sampling frequency is set by the application.</p> <p>Setting the card to one of the frequency values means that a software application that uses the card must be configured at the same frequency value.</p>
	<p>If an external clock is selected, the card is synchronised to it as long as it is present.</p> <p>If the external clock signal is lost, the ALP card falls back to its internal clock, which is automatically set at the same frequency as the external clock.</p>
	<p>The clock source used at a given moment is displayed in the "Sync Source" field, and its frequency value is given by the "Sampling Rate" field.</p>

9.2 Managing input and output levels

At the first installation of the card, the default gain settings are as follows:

- Input analog gains are set to -24 dB (+24 dU -> 0 dBfs).
- Digital input and output gains are set to 0 dB
- The routing matrix is configured this way:

ALP442e & ALP442e-Mic	ALP882e & ALP882e-Mic
Play 1-2 routed to analog outputs 1-2 Play 3-4 routed to analog outputs 3-4 Play 5-6 routed to left & right channels of AES3 output 1 Play 7-8 routed to left & right channels of AES3 output 2	Play 1-2 routed to analog outputs 1-2 Play 3-4 routed to analog outputs 3-4 Play 5-6 routed to analog outputs 5-6 Play 7-8 routed to analog outputs 7-8 Play 9-10 routed to left & right ch. of AES3 output 1 Play 11-12 routed to left & right ch. of AES3 output 2 Play 13-14 routed to left & right ch. of AES3 output 3 Play 15-16 routed to left & right ch. of AES3 output 4
Analog Inputs 1-2 routed to Rec channels 1-2 Analog Inputs 3-4 routed to Rec channels 3-4 Left & right channels of AES3 Input 1 routed to Rec ch. 5-6 Left & right channels of AES3 Input 2 routed to Rec ch. 7-8	Analog Inputs 1-2 routed to Rec channels 1-2 Analog Inputs 3-4 routed to Rec channels 3-4 Analog Inputs 5-6 routed to Rec channels 5-6 Analog Inputs 7-8 routed to Rec channels 7-8 Left & right channels of AES3 Input 1 routed to Rec ch. 9-10 Left & right channels of AES3 Input 2 routed to Rec ch. 11-12 Left & right channels of AES3 Input 3 routed to Rec ch. 13-14 Left & right channels of AES3 Input 4 routed to Rec ch. 15-16

The other routing points of the matrix are muted (no mix).

Click on the  icon to access the "I/O Monitor" view which is used to adjust audio levels.



The onboard mixer features two categories of audio inputs and audio outputs

- Physical inputs (analog and AES3)
- Software playback inputs. They correspond to the playback devices exposed by the driver to the applications.
- Physical outputs (analog and AES3)

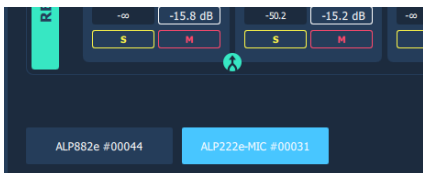
- Software recording outputs. They correspond to the recording devices exposed by the driver and captured by the applications

The table below gives the correspondence between the sound devices exposed in the operating system and the Play inputs and Rec outputs of the matrix.

		Software audio device	Windows Audio Devices	ASIO devices		Software audio device	Windows Audio Devices	ASIO devices
		Playback devices = Mixer inputs				Recording devices = Mixer output		
ALP442e / -MIC	ALP	PLAY 1-2 (stereo) PLAY 1 & PLAY 2 (mono)	ALP PLAY 1-2	ALP-1 / ALP-2		REC 1-2 (stereo) REC 1 & REC 2 (mono)	ALP REC 1-2	ALP-1 / ALP-2
		PLAY 3-4 (stereo) PLAY 3 & PLAY 4 (mono)	ALP PLAY 3-4	ALP-3 / ALP-4		REC 3-4 (stereo) REC 3 & REC 4 (mono)	ALP REC 3-4	ALP-3 / ALP-4
		PLAY 5-6 (stereo) PLAY 5 & PLAY 6 (mono)	ALP PLAY 5-6	ALP-5 / ALP-6		PLAY 5-6 (stereo) REC 5 & REC 6 (mono)	ALP REC 5-6	ALP-5 / ALP-6
		PLAY 7-8 (stereo) PLAY 7 & PLAY 8 (mono)	ALP PLAY 7-8	ALP-7 / ALP-8		REC 7-8 (stereo) REC 7 & REC 8 (mono)	ALP REC 7-8	ALP-7 / ALP-8
ALP882e / -MIC	ALP	PLAY 9-10 (stereo) PLAY 9 & PLAY 10 (mono)	ALP PLAY 9-10	ALP-9 / ALP-10		REC 9-10 (stereo) REC 9 & REC 10 (mono)	ALP REC 9-10	ALP-9 / ALP-10
		PLAY 11-12 (stereo) PLAY 11 & PLAY 12 (mono)	ALP PLAY 11-12	ALP-11 / ALP-12		REC 11-12 (stereo) REC 11 & REC 12 (mono)	ALP REC 11-12	ALP-11 / ALP-12
		PLAY 13-14 (stereo) PLAY 13 & PLAY 14 (mono)	ALP PLAY 13-14	ALP-13 / ALP-14		REC 13-14 (stereo) REC 13 & REC 14 (mono)	ALP REC 13-14	ALP-13 / ALP-14
		PLAY 15-16 (stereo) PLAY 15 & PLAY 16 (mono)	ALP PLAY 15-16	ALP-15 / ALP-16		REC 15-16 (stereo) REC 15 & REC 16 (mono)	ALP REC 15-16	ALP-15 / ALP-16


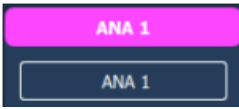


The physical inputs are displayed in the mixer GUI when the "INPUTS" button is activated.
 The software playback inputs are displayed when the "PLAYBACK" button is activated.
 The physical outputs are displayed when the "OUTPUTS" button is activated.
 The software recording inputs are displayed when the "RECORD" button is activated.

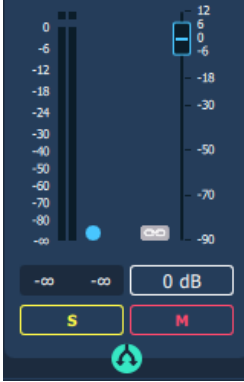
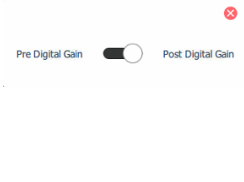



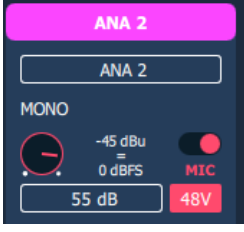
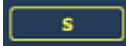
From the bottom bar of the I/O Monitor view, select the ALP card to display its Monitor page.

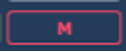

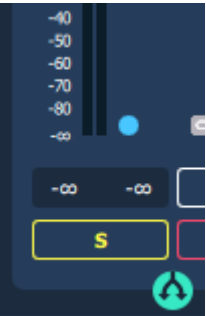


The following table lists the various possible settings from the mixer view.

	Click on this icon to display the concerned pair of channels as two mono channel strips.
--	--

	<p>Click on this icon to display the concerned pair of channels as one stereo channel strip.</p> <p>On a stereo channel strip, the controls (volumes, solo, mute) are applied to the left and right channels.</p>		
	<p>Channel strip name</p> <p>Click on the channel strip name  and enter a new name.</p> <p>Note: when a channel strip display is changed from mono to stereo, or stereo to mono, the channel stream name goes back to the default name.</p> <p>As a consequence, it is recommended to keep the display mode used (mono or stereo) when the channel strip names have been changed.</p>		
	<p>Analog input gain settings</p> <p>The first screen capture on the left relates to the ALP442e or ALP882e. The screen capture below relates to the ALP442e-MIC or ALP882e-MIC, where a Line/Mic level selection is available.</p> <p>The analog input gain can be adjusted thanks to the potentiometer at the top of the analog input channel strip. Note that if the inputs are displayed as a stereo input, the gain adjustment applies to the left and right channels.</p> <p>There are three ways of adjusting the input gain.</p> <ol style="list-style-type: none"> 1) Click on the round potentiometer without releasing and move the mouse left or right to decrease and increase the gain respectively, in steps of 0.5 dB. 2) Press the Ctrl key without releasing and then click on the potentiometer with the mouse. The gain can be adjusted in steps of 1 dB with the mouse wheel as long as the Ctrl key remains pressed. 3) Click on the gain value displayed below the potentiometer, write and enter the new value. <p>Double click on the potentiometer to reset the analog gain to 0 dB.</p> <p>For ALP442e / ALP882e and ALP442e-MIC / ALP882e-MIC in LINE input mode, analog input gain values range from -24 dB to +16 dB, in steps of 0.5 dB.</p> <p>Selecting the Mic mode from the Line/Mic selector sets the input to the Mic mode. This changes the gain range and gives access to the 48V phantom power switch.</p> <p>For ALP442e-MIC / ALP882e-MIC in Mic input mode, analog input gain values range from 0 dB to +56 dB, in steps of 0.5 dB.</p> <p>Here are a few examples of input level alignment:</p> <table border="1" data-bbox="464 1868 1380 2007"> <tr> <td data-bbox="464 1868 895 2007">ALP442e / ALP882e and ALP442e-MIC / ALP882e-MIC in LINE input mode</td> <td data-bbox="895 1868 1380 2007">ALP442e-MIC / ALP882e-MIC in Mic input mode</td> </tr> </table>	ALP442e / ALP882e and ALP442e-MIC / ALP882e-MIC in LINE input mode	ALP442e-MIC / ALP882e-MIC in Mic input mode
ALP442e / ALP882e and ALP442e-MIC / ALP882e-MIC in LINE input mode	ALP442e-MIC / ALP882e-MIC in Mic input mode		

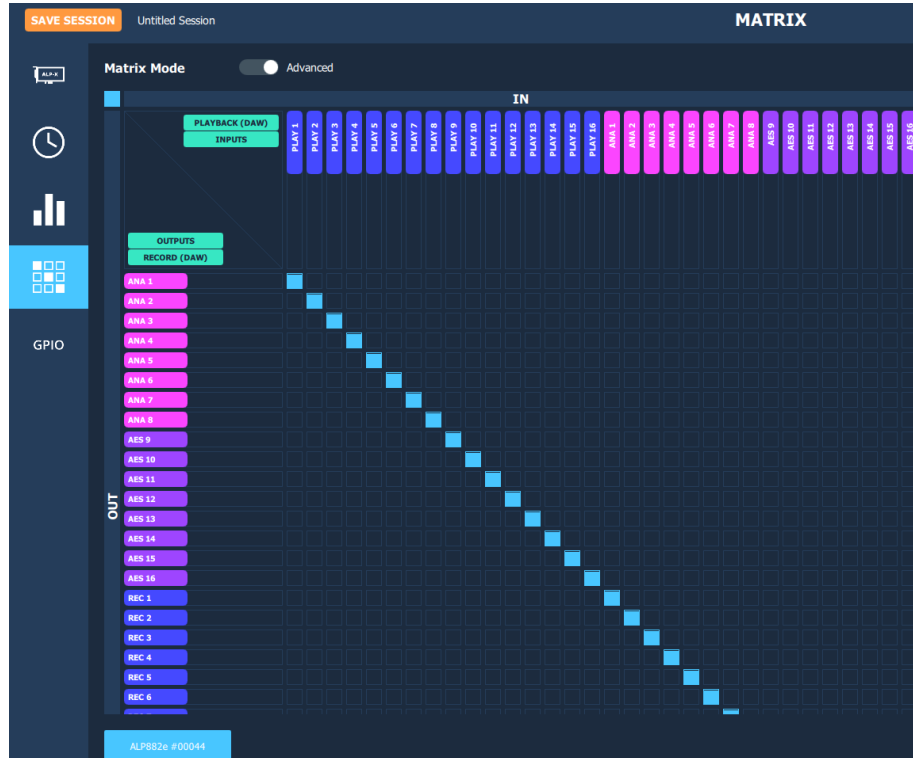
	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><i>Gain=+16dB: -16 dBu->0 dBfs.</i></p> <p><i>Gain=+ 10 dB: -10 dBu->0 dBfs</i></p> <p><i>Gain=+ 0 dB: 0 dBu->0 dBfs</i></p> <p><i>Gain=-10 dB: +10 dBu->0 dBfs</i></p> <p><i>Gain=-24 dB: +24 dBu->-0 dBfs</i></p> </td> <td style="width: 50%; vertical-align: top;"> <p><i>Gain= 56 dB: -56 dBu->0 dBfs</i></p> <p><i>Gain= 46 dB: -46 dBu-> 0dBfs</i></p> <p><i>Gain= 30 dB: -30 dBu-> 0dBfs</i></p> <p><i>Gain= 10 dB: -10 dBu->0 dBfs</i></p> <p><i>Gain= 0 dB: 0 dBu->0 dBfs</i></p> <p><i>Gain= -10 dB: +10 dBu->0 dBfs</i></p> </td> </tr> </table>	<p><i>Gain=+16dB: -16 dBu->0 dBfs.</i></p> <p><i>Gain=+ 10 dB: -10 dBu->0 dBfs</i></p> <p><i>Gain=+ 0 dB: 0 dBu->0 dBfs</i></p> <p><i>Gain=-10 dB: +10 dBu->0 dBfs</i></p> <p><i>Gain=-24 dB: +24 dBu->-0 dBfs</i></p>	<p><i>Gain= 56 dB: -56 dBu->0 dBfs</i></p> <p><i>Gain= 46 dB: -46 dBu-> 0dBfs</i></p> <p><i>Gain= 30 dB: -30 dBu-> 0dBfs</i></p> <p><i>Gain= 10 dB: -10 dBu->0 dBfs</i></p> <p><i>Gain= 0 dB: 0 dBu->0 dBfs</i></p> <p><i>Gain= -10 dB: +10 dBu->0 dBfs</i></p>
<p><i>Gain=+16dB: -16 dBu->0 dBfs.</i></p> <p><i>Gain=+ 10 dB: -10 dBu->0 dBfs</i></p> <p><i>Gain=+ 0 dB: 0 dBu->0 dBfs</i></p> <p><i>Gain=-10 dB: +10 dBu->0 dBfs</i></p> <p><i>Gain=-24 dB: +24 dBu->-0 dBfs</i></p>	<p><i>Gain= 56 dB: -56 dBu->0 dBfs</i></p> <p><i>Gain= 46 dB: -46 dBu-> 0dBfs</i></p> <p><i>Gain= 30 dB: -30 dBu-> 0dBfs</i></p> <p><i>Gain= 10 dB: -10 dBu->0 dBfs</i></p> <p><i>Gain= 0 dB: 0 dBu->0 dBfs</i></p> <p><i>Gain= -10 dB: +10 dBu->0 dBfs</i></p>		
	<p>Digital gain settings</p> <p>Digital gains are available for all the input and output audio streams, and can be adjusted via the faders.</p> <p>There are three ways of adjusting the digital gain.</p> <ol style="list-style-type: none"> 1) Click and hold the fader button down and move the mouse vertically to increase/decrease the gain in 0.1 dB steps. 2) Press the Ctrl key without releasing and then click on the fader button. The gain can be adjusted with the mouse wheel in 1 dB steps as long as the Ctrl key remains pressed. 3) Click on the gain value displayed below the fader, write and enter the new value. <p>Double click on the fader to reset the digital gain to 0 dB.</p> <p>Digital gain values range from -90.1 dB to +12 dB, in steps of 0.1 dB.</p>		
	<p>Each Vu-meter displays the input signal level in dBfs, before or after the digital gain is applied..</p> <p>Double click on the blue radio button on the bottom left of the vu-meter to display the Pre/Post digital gain selection. The radio button appearance depends on the selected mode</p> <p> : Pre-fader  : Post-fader</p>		
	<p>The Vu-meters display the levels in peak-meter.</p> <p>The clipping threshold of the vu-meters can be adjusted from the global menu "Settings/Audio meters" . When the signal level exceeds this threshold, the red LED above the Vu-meter lights up.</p>		
	<p>48V phantom power (ALP442e-MIC / ALP882e-MIC)</p> <p>Setting the phantom power on an analog input is possible when this input is set to Mic level mode.</p>		
	<p>Solo</p> <p>The solo button has an effect on the two channels of a stereo pair.</p> <p>A click on this button sets the two channels in solo mode, and it turns</p>		

	yellow.
	<p>Mute</p> <p>The mute button has an effect on the two channels of a stereo pair. A click on this button sets the two channels in mute mode, and it turns red.</p>
	<p>Pairing channel strips</p> <p>To set a common level for several input channel strips, validate the button on each channel strip. The gain setting on one channel strip is then applied to all the paired channel strips.</p>
	<p>Pre or post fader Vu-meters</p> <p>The blue LED button allows selecting if the Vu-meter displays the signal level before or after the digital gain set via the fader.</p> <p>To select pre or post fader Vu-meter, click on the blue LED button on the right of the Vu-meter bar(s), and select the mode.</p>

9.3 Managing the routing and mixing of input signals



Click on the icon to access the "Matrix" view which is used to mix/route input signals towards the outputs



From the bottom bar of the MATRIX view, select the ALP card to display its matrix.

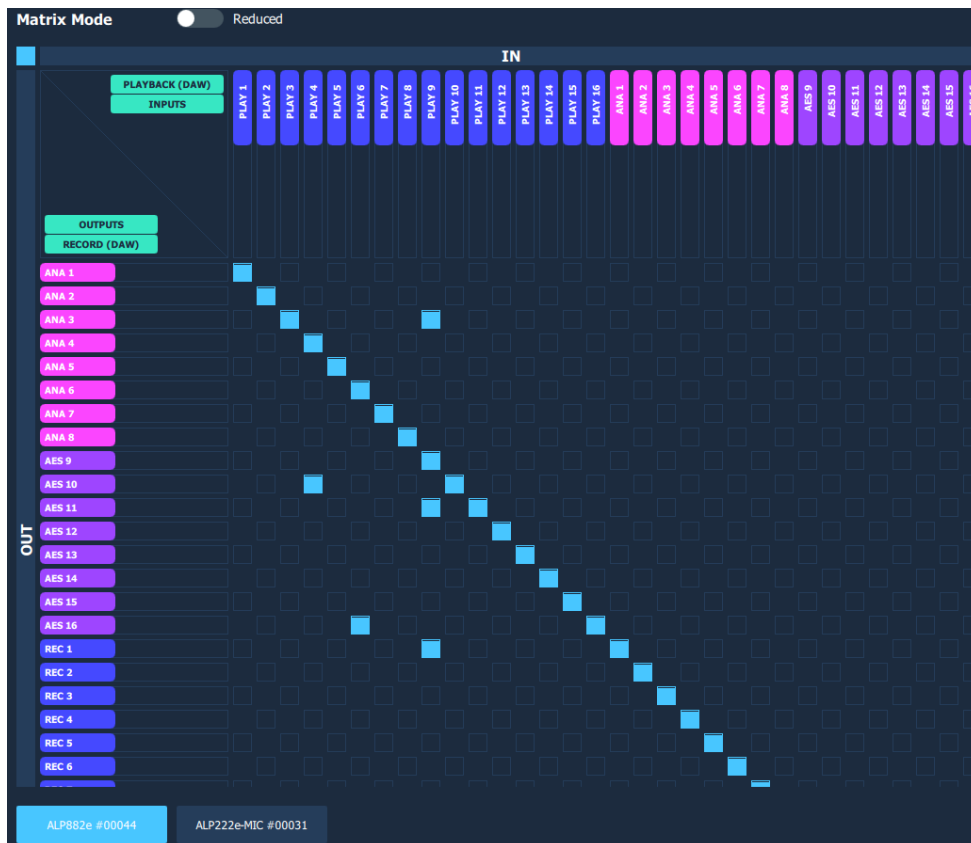
For each ALP card, the internal mixer can mix all or some of the input signals towards each output. Each output can therefore receive its own mix of inputs.

As in the "I/O Monitor" view, it is possible to select the inputs displayed in this matrix (physical inputs-INPUTS and/or software play inputs-PLAYBACK) and the outputs displayed (physical outputs-OUTPUTS and/or outputs-RECORD).

There are two possible matrix views:

- A complete view that shows all the mixing points. This view is displayed when the "MATRIX MODE" selector is positioned on "ADVANCED" (view displayed above).
- A reduced view which displays a sub-assembly of mixing points. This view is displayed when the "MATRIX MODE" selector is positioned on "REDUCED" (below).

It allows to route left input channels of the matrix to its left output channels, and the right input channels to its right output channels



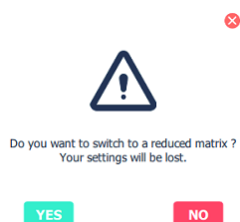
Each mixing point can be activated or deactivated by clicking on it (Mute / Unmute). All the hidden boxes are deactivated mixing points.

The digital gain applied to the channel can be adjusted for each mixing point. To do this, press the Ctrl key, place the mouse cursor over the mixing point without clicking and use the mouse wheel to increase or decrease the digital gain value; the gain value applied is then displayed during the adjustment.

To directly set the gain to 0dB, press the Ctrl key and double click on the mixing point.

Visually, a mixing point is a solid blue if the gain is at its maximum (+12 dB). It is circled in blue and empty if the gain is at its minimum value (-90 dB).

Caution:



Moving from "ADVANCED" view to "REDUCED" view deactivates certain mixing points. If gain settings have been configured on these points in the "ADVANCED" view, these settings are lost when moving to "REDUCED" mode. The message opposite warns the user. Select Yes to confirm the move to REDUCED mode.

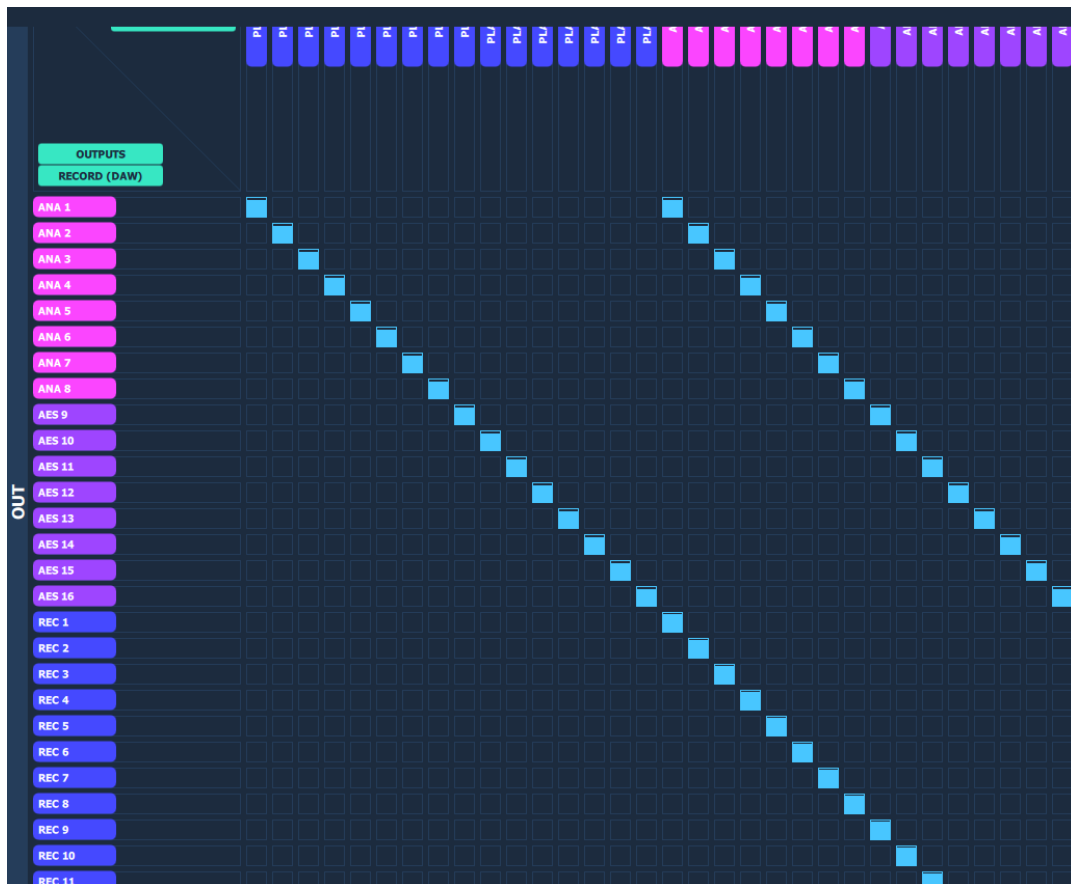
As an example, the matrix below allows the following:

- Routing the audio stream played by an application: playback channels 1&2 routed towards analog outputs 1&2, and playback channels 3&4 routed towards the AES3 output.
- Routing the physical input signals towards the corresponding outputs (ANA IN 1 towards ANAOUT1, ANAIN2 towards ANAOUT2, AES3 IN towards AES3 OUT).

As a result, playback signals and input signals are mixed to the outputs.

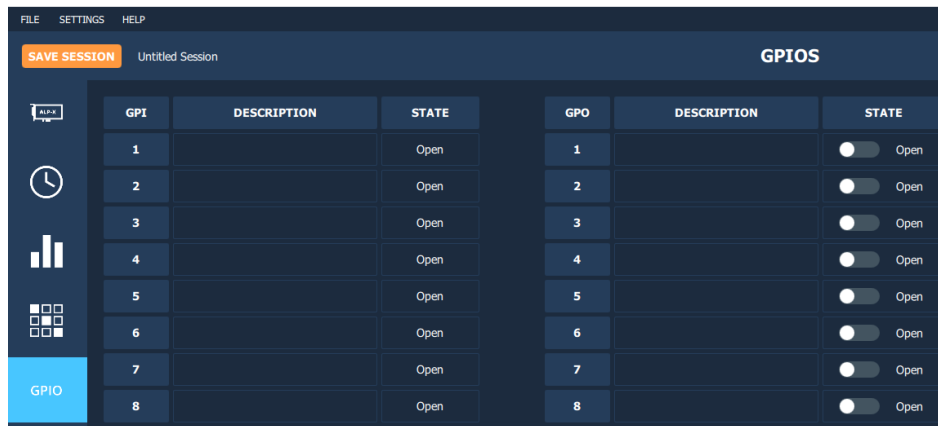
Note that a gain is applied to each input signal towards the output.

- Routing the content of physical inputs towards the associated recording outputs, so that an application can capture the input signals.



9.4 Display of GPIOs and control of GPOs

Click on the **GPIO** icon to access the view that displays the state of the card's GPIO, from which the GPO can be activated/deactivated.



From the bottom bar of the GPIOs view, select the ALP card to display the status of its GPIOs.

The status of the GPIs is displayed on the left, and the state of the GPO is displayed on the right.

To position the state of a GPO manually, click on the "STATE" switch matching this GPO to move it to the desired position: Open or Close.

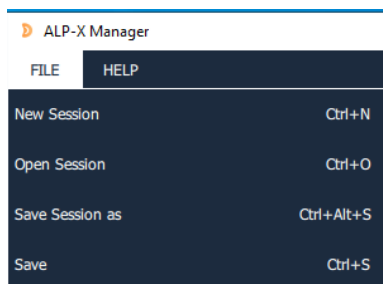
9.5 Creating, saving and loading sessions

The current configuration of all settings defined in ALP-X Manager can be saved. Go to the File menu and select "Save session as".

To load a settings configuration, go to the File menu and select "Open session".


To create a new configuration from blank settings, go to the File menu and select "New session".

To save the settings during an existing session, go to the File menu and select "Save".



9.6 Firmware update procedure

The ALP card on-board firmware may have to be upgraded, and updates can be supplied by Digigram and prove necessary.

To perform an update, click on the button  on the right of the "Firmware version" field, as shown on the screen capture below.



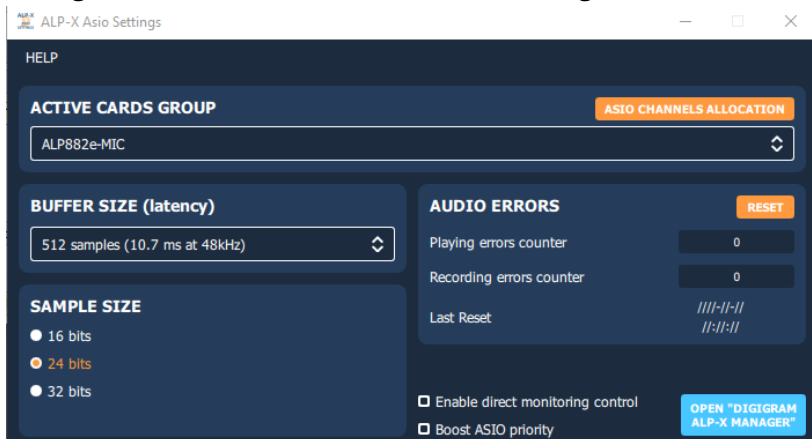
	<p>The ALP card is selected from the list of cards detected.</p> <p>Click on the "Browse" button and select the file matching the new firmware to be applied (file with extension ".bin").</p>
	<p>Click on the "Update" button to launch the update.</p>
	<p>The firmware upload is in progress</p>
	<p>Once the upload is completed, it is necessary to shut down the computer. Select "Shut down now" for an immediate automatic shutdown, or "Shut down later" if you want to shut down the computer later. In this latter case, don't forget to shut down and restart the computer before using the card.</p>
	<p>Select "Yes" to confirm the shut down, or "No, I will shut down later". In this latter case, don't forget to shut down and restart the computer before using the card.</p>

9.7 Keyboard shortcuts

Keyboard shortcut	Action
Session	
Ctrl + S	Save
Ctrl + Alt + S	Save As
Ctrl + N	New
Ctrl + O	Open
Potentiometer/Fader	
Ctrl + Wheel	1 dB increments on the potentiometer/fader
Ctrl + Shift + Wheel	0.1 dB increments on the fader 0.5 dB increments on the potentiometer
Double click	Reset the fader/potentiometer value to 0
Matrix	
Ctrl + Wheel	1 dB increments on the mixing point
Ctrl + Shift + Wheel	0.1 dB increments on the mixing point

10 ASIO CONTROL PANEL for Windows

The ASIO control panel can be started from the Asio application, from the menu allowing for the settings of the audio device and the ASIO configuration.



Active cards group/Asio channels allocation

This section is used to select the input channels and output channels that are managed by the ASIO driver and which can therefore be used by any application based on the ASIO interface.

For every card selected from the "ACTIVE CARDS GROUP" list, click on the "ASIO CHANNELS ALLOCATION" button and select the channels to be used under ASIO.



IMPORTANT: The current driver version does allow for the selection of multiple cards to be used from the same application.

A card that is not used under ASIO can be used from a WASAPI or DirectSound application.



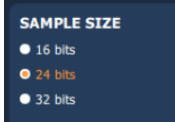
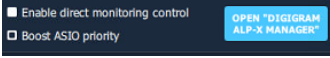
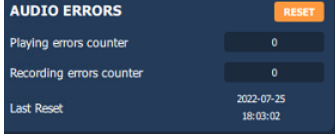
Buffer size (latency)

This section is used to select the size of audio buffers used by the ASIO driver. This size is given as a number of samples and a cross-reference in duration is indicated for a sampling frequency of 48 kHz. The higher the buffer size, the higher the latency.

A small buffer size can lead to breaks in audio throughput on a low-powered machine or on a machine with a high processor load.

The latency value to select **must be** at least 5ms (which is 256 samples at 48 kHz).

The default value is set to 512 samples (10,7ms).

 <p>SAMPLE SIZE</p> <ul style="list-style-type: none"> 16 bits 24 bits 32 bits 	<p>Sample size</p> <p>This setting defines the format of samples exchanged between the application and the card driver.</p>
 <p><input checked="" type="checkbox"/> Enable direct monitoring control</p> <p><input type="checkbox"/> Boost ASIO priority</p> <p>OPEN "DIGIGRAM ALP-X MANAGER"</p>	<p>Enable Direct Monitoring Control</p> <p>Tick this setting to authorise an ASIO application to drive the zero latency hardware monitoring of inputs towards outputs. If an application monitors software, this causes latency between the input signal and the output signal, linked to the ASIO buffer sizes.</p>
	<p>Boost ASIO priority</p> <p>This option allows the system to run the ASIO process with high priority, thereby increasing the reliability of this process. Caution, however, this can make other processes unstable.</p>
 <p>AUDIO ERRORS RESET</p> <p>Playing errors counter: 0</p> <p>Recording errors counter: 0</p> <p>Last Reset: 2022-07-25 18:03:02</p>	<p>Audio errors</p> <p>This section is used to visualise current errors for playback and recording via the ASIO driver. Errors frequently reflect too small an ASIO buffer size for the system's possibilities. Should they occur, then the buffer size needs to be increased until there are no more errors.</p> <p>Sync status errors reflect clock synchro errors (AES11 external clock, WordClock or inter-card synchro).</p> <p>Error counters can be reset to zero by clicking on the RESET button.</p> <p>Lastly, a time counter displays the time elapsed since the last counter reset.</p>

11 SOFTWARE INSTALLATION UNDER LINUX

11.1 Automatic installation

This method works on most major distributions, by using the DKMS system. After the initial installation, nothing more is needed to be done as DKMS will take care of re-building the driver every time the kernel is updated, or a new kernel is installed.

Requirements:

A package manager which supports DKMS. Most major distributions support this, please check your distribution's documentation if you are not sure.

DKMS

The kernel headers for the kernel version(s) you need

Git, if you don't use a Debian-based or RPM-based distribution

1. Download and install the driver
2. Install the dependencies
3. Download the driver package (Choose the latest .deb or .rpm package)
4. Install the driver package

11.2 Building and installing the driver manually

This method works for any Linux system, but it is necessary to apply it every time the kernel is updated, as it doesn't use any package manager to automatically rebuild the driver.

Requirements:

- The kernel headers for the kernel version(s) you need
- Git
- Make and a C compiler such as gcc

Please refer to your distribution's documentation to install these requirements.

1. Get the source code (contact support@digigram.com)
2. Compile the driver: Go into the src/ directory, and compile the driver by simply running make to create the file: snd-alpx.ko and snd-pcm-dmaengine.ko depending on your current kernel's configuration
3. Install and load the driver: The compilation has generated a kernel module: snd-alpx.ko.
4. Copy this/these module(s) to the kernel's module directory:
5. Run "sudo depmod -a"
6. Run sudo modprobe snd-alpx
7. Then run lsmod | grep snd to check installation of the driver
8. Run aplay -l or L to list the devices
9. Launch alsamixer

12 CONFIGURING THE ALP882e AND ALP882e-MIC CARDS UNDER LINUX VIA AMIXER

12.1 Diagram of the audio inputs towards audio outputs chain for

The mixer inputs and outputs are numbered 0 to 31. The mixer offers 32 mix buses, with 32 input channels per bus, and a digital gain associated to each channel in a mix.

- The DAW0 to DAW15 inputs are the 16 audio channels coming from the host machine (played by software on the host machine).
- The ANA0 to ANA7 inputs are the eight analog input channels (IN1 and IN8).
- The inputs AES0 to AES7 are the eight input channels of the four digital inputs AES/EBU IN1 to AES/EBU IN4.
- The DAW0 to DAW15 outputs are the 16 audio channels destined for the host machine (captured by software on the host machine).
- The ANA0 to ANA7 outputs are the eight analog output channels (OUT1 and OUT8).
- The AES0 to AES7 outputs are the eight channels of the four stereo digital outputs AES/EBU OUT1 to AES/EBU OUT4.

By default, the matrix gains are positioned so as to have:

DAW0 PLAY -> ANA0 OUT 1	ANA1 IN -> DAW0 Record
DAW1 PLAY -> ANA0 OUT 2	ANA2 IN -> DAW1 Record
DAW2 PLAY -> ANA0 OUT 3	ANA3 IN -> DAW2 Record
DAW3 PLAY -> ANA0 OUT 4	ANA4 IN -> DAW3 Record
DAW4 PLAY -> ANA0 OUT 5	ANA5 IN -> DAW4 Record
DAW5 PLAY -> ANA0 OUT 6	ANA6 IN -> DAW5 Record
DAW6 PLAY -> ANA0 OUT 7	ANA7 IN -> DAW6 Record
DAW7 PLAY -> ANA0 OUT 8	ANA8 IN -> DAW7 Record
DAW8 PLAY -> AES0 OUT (AES/EBU OUT1 Left)	AES0 (AES/EBU IN1 Left) -> DAW8 Record
DAW9 PLAY -> AES1 OUT (AES/EBU OUT1 Right)	AES1 (AES/EBU IN1 Right) -> DAW9 Record
DAW10 PLAY -> AES2 OUT (AES/EBU OUT2 Left)	AES2 (AES/EBU IN2 Left) -> DAW10 Record
DAW11 PLAY -> AES3 OUT (AES/EBU OUT2 Right)	AES3 (AES/EBU IN2 Right) -> DAW11 Record
DAW12 PLAY -> AES4 OUT (AES/EBU OUT3 Left)	AES4 (AES/EBU IN3 Left) -> DAW12 Record
DAW13 PLAY -> AES5 OUT (AES/EBU OUT3 Right)	AES5 (AES/EBU IN3 Right) -> DAW13 Record
DAW14 PLAY -> AES6 OUT (AES/EBU OUT4 Left)	AES6 (AES/EBU IN4 Left) -> DAW14 Record
DAW15 PLAY -> AES7 OUT (AES/EBU OUT4 Right)	AES7 (AES/EBU IN4 right) -> DAW15 Record

DAW0	1	65	97	129	161	193	225	257	289	321	353	385	417	449	481	513	545	577	609	641	673	705	737	769	801	833	865	897	929	961	993	1025	1057
DAW1	2	66	98	130	162	194	226	258	290	322	354	386	418	450	482	514	546	578	610	642	674	706	738	770	802	834	866	898	930	962	994	1026	1058
DAW2	3	67	99	131	163	195	227	259	291	323	355	387	419	451	483	515	547	579	611	643	675	707	739	771	803	835	867	899	931	963	995	1027	1059
DAW3	4	68	100	132	164	196	228	260	292	324	356	388	420	452	484	516	548	580	612	644	676	708	740	772	804	836	868	900	932	964	996	1028	1060
DAW4	5	69	101	133	165	197	229	261	293	325	357	389	421	453	485	517	549	581	613	645	677	709	741	773	805	837	869	901	933	965	997	1029	1061
DAW5	6	70	102	134	166	198	230	262	294	326	358	390	422	454	486	518	550	582	614	646	678	710	742	774	806	838	870	902	934	966	998	1030	1062
DAW6	7	71	103	135	167	199	231	263	295	327	359	391	423	455	487	519	551	583	615	647	679	711	743	775	807	839	871	903	935	967	999	1031	1063
DAW7	8	72	104	136	168	200	232	264	296	328	360	392	424	456	488	520	552	584	616	648	680	712	744	776	808	840	872	904	936	968	1000	1032	1064
DAW8	9	73	105	137	169	201	233	265	297	329	361	393	425	457	489	521	553	585	617	649	681	713	745	777	809	841	873	905	937	969	1001	1033	1065
DAW9	10	74	106	138	170	202	234	266	298	330	362	394	426	458	490	522	554	586	618	650	682	714	746	778	810	842	874	906	938	970	1002	1034	1066
DAW10	11	75	107	139	171	203	235	267	299	331	363	395	427	459	491	523	555	587	619	651	683	715	747	779	811	843	875	907	939	971	1003	1035	1067
DAW11	12	76	108	140	172	204	236	268	300	332	364	396	428	460	492	524	556	588	620	652	684	716	748	780	812	844	876	908	940	972	1004	1036	1068
DAW12	13	77	109	141	173	205	237	269	301	333	365	397	429	461	493	525	557	589	621	653	685	717	749	781	813	845	877	909	941	973	1005	1037	1069
DAW13	14	78	110	142	174	206	238	270	302	334	366	398	430	462	494	526	558	590	622	654	686	718	750	782	814	846	878	910	942	974	1006	1038	1070
DAW14	15	79	111	143	175	207	239	271	303	335	367	399	431	463	495	527	559	591	623	655	687	719	751	783	815	847	879	911	943	975	1007	1039	1071
DAW15	16	80	112	144	176	208	240	272	304	336	368	400	432	464	496	528	560	592	624	656	688	720	752	784	816	848	880	912	944	976	1008	1040	1072
ANA0	1102	81	113	145	177	209	241	273	305	337	369	401	433	465	497	529	561	593	625	657	689	721	753	785	817	849	881	913	945	977	1009	1041	1073
ANA1	1103	82	114	146	178	210	242	274	306	338	370	402	434	466	498	530	562	594	626	658	690	722	754	786	818	850	882	914	946	978	1010	1042	1074
ANA2	1104	83	115	147	179	211	243	275	307	339	371	403	435	467	499	531	563	595	627	659	691	723	755	787	819	851	883	915	947	979	1011	1043	1075
ANA3	1105	84	116	148	180	212	244	276	308	340	372	404	436	468	500	532	564	596	628	660	692	724	756	788	820	852	884	916	948	980	1012	1044	1076
ANA4	1106	85	117	149	181	213	245	277	309	341	373	405	437	469	501	533	565	597	629	661	693	725	757	789	821	853	885	917	949	981	1013	1045	1077
ANA5	1107	86	118	150	182	214	246	278	310	342	374	406	438	470	502	534	566	598	630	662	694	726	758	790	822	854	886	918	950	982	1014	1046	1078
ANA6	1108	87	119	151	183	215	247	279	311	343	375	407	439	471	503	535	567	599	631	663	695	727	759	791	823	855	887	919	951	983	1015	1047	1079
ANA7	1109	88	120	152	184	216	248	280	312	344	376	408	440	472	504	536	568	600	632	664	696	728	760	792	824	856	888	920	952	984	1016	1048	1080
AE90	33	89	121	153	185	217	249	281	313	345	377	409	441	473	505	537	569	601	633	665	697	729	761	793	825	857	889	921	953	985	1017	1049	1081
AE91	34	90	122	154	186	218	250	282	314	346	378	410	442	474	506	538	570	602	634	666	698	730	762	794	826	858	890	922	954	986	1018	1050	1082
AE92	35	91	123	155	187	219	251	283	315	347	379	411	443	475	507	539	571	603	635	667	699	731	763	795	827	859	891	923	955	987	1019	1051	1083
AE93	36	92	124	156	188	220	252	284	316	348	380	412	444	476	508	540	572	604	636	668	700	732	764	796	828	860	892	924	956	988	1020	1052	1084
AE94	37	93	125	157	189	221	253	285	317	349	381	413	445	477	509	541	573	605	637	669	701	733	765	797	829	861	893	925	957	989	1021	1053	1085
AE95	38	94	126	158	190	222	254	286	318	350	382	414	446	478	510	542	574	606	638	670	702	734	766	798	830	862	894	926	958	990	1022	1054	1086
AE96	39	95	127	159	191	223	255	287	319	351	383	415	447	479	511	543	575	607	639	671	703	735	767	799	831	863	895	927	959	991	1023	1055	1087
AE97	40	96	128	160	192	224	256	288	320	352	384	416	448	480	512	544	576	608	640	672	704	736	768	800	832	864	896	928	960	992	1024	1056	1088
		41	97	130	162	194	226	258	290	322	354	386	418	450	482	514	546	578	610	642	674	706	738	770	802	834	866	898	930	962	994	1026	1058
		42	98	131	163	195	227	259	291	323	355	387	419	451	483	515	547	579	611	643	675	707	739	771	803	835	867	899	931	963	995	1027	1059
		43	99	132	164	196	228	260	292	324	356	388	420	452	484	516	548	580	612	644	676	708	740	772	804	836	868	900	932	964	996	1028	1060
		44	100	133	165	197	229	261	293	325	357	389	421	453	485	517	549	581	613	645	677	709	741	773	805	837	869	901	933	965	997	1029	1061
		45	101	134	166	198	230	262	294	326	358	390	422	454	486	518	550	582	614	646	678	710	742	774	806	838	870	902	934	966	998	1030	1062
		46	102	135	167	199	231	263	295	327	359	391	423	455	487	519	551	583	615	647	679	711	743	775	807	839	871	903	935	967	999	1031	1063
		47	103	136	168	200	232	264	296	328	360	392	424	456	488	520	552	584	616	648	680	712	744	776	808	840	872	904	936	968	1000	1032	1064
		48	104	137	169	201	233	265	297	329																							

12.2 Description of the controls for ALP882e and ALP882e-MIC

12.2.1 Clock, SRCs, and phantom power for ALP882e-MIC)

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Detail
Card clock source	Clk Src	R	0	1089	0 1 2 3 4 5 6	Word Clk = Wordclock in AES Syn = AES11 Sync in AES Aud 1/2 = AES3 in 1 AES Aud 3/4 = AES3 in 2 AES Aud 5/6 = AES3 in 3 AES Aud 7/8 = AES3 in 4 Internal = Internal clock
Effective Clock value Effective clock value in kHz is: "Clk Eff base" x "Clk Eff Coef".	Clk Eff Base	R	0	1090	0 1 2 3 4 5 6 7	Invalid, Reserved, Reserved, Reserved, Reserved, 32kHz, 44.1kHz, 48kHz
	Clk Eff Coef	R	0	1091	0 1 2	x1, x2, x4
Enable / disable the SRC on the AES3 input 1	AES SRC 1/2 Disable	W	0	1097	1 0	Disabled Enabled
Enable / disable the SRC on the AES3 input 2	AES SRC 3/4 Disable	W	0	1098		
Enable / disable the SRC on the AES3 input 3	AES SRC 5/6 Disable	W	0	1099		
Enable / disable the SRC on the AES3 input 4	AES SRC 7/8 Disable	W	0	1100		
Authorisation to switch to a source with lower priority	Clk Src Up	W	0	1092	0 1	No switching Switching authorised
Authorisation to switch to a source with higher priority	Clk Src Down	W	0	1093		
Clock priority 0 (highest priority)	Clk P0	W	0	1094	0 1 2 3 4 5 6	Word Clk = Wordclock in AES Syn = AES11 Sync in AES Aud 1/2 = AES3 in 1 AES Aud 3/4 = AES3 in 2 AES Aud 5/6 = AES3 in 3 AES Aud 7/8 = AES3 in 4 Internal = Internal clock
Clock priority 1	Clk P1	W	0	1095		
Clock priority 2	Clk P2	W	0	1096		
Clock priority 3 (lowest priority)	Clk P3	W	0	1097		

Description	Alsa mixer control	Read / Write	Index	NumId	Value	Status
Phantom power on analog In 1	McPh1	R / W	0	1110	0	48V OFF
Phantom power on analog In 2	McPh2		0	1111		
Phantom power on analog In 3	McPh3		0	1112		
Phantom power on analog In 4	McPh4		0	1113		
Phantom power on analog In 5 (*)	McPh5		0	1114	1	48 V ON
Phantom power on analog In 6	McPh6		0	1115		
Phantom power on analog In 7	McPh7		0	1116		
Phantom power on analog In 8	McPh8		0	1117		

12.2.2 Gains on the physical inputs

Description of control	Alsa mixer control	Read / Write	Index	NumId	Values	Gain in dB	
						ALP442e ALP882e	ALP442e-MC ALP882e-MIC
Analog gain on analog input 1	Codec Analog Capture Volume	R / W	0	1102	0 1 2 50 82 162	Mute	Mute
Analog gain on analog input 2			1	1103		-24.5 dB	N.A
Analog gain on analog input 3			2	1104		-24 dB	N.A.
Analog gain on analog input 4			3	1105		...	N.A
Analog gain on analog input 5			4	1106		...	N.A
Analog gain on analog input 6			5	1107		0 dB	0dB
Analog gain on analog input 7			6	1108		+16 dB	+16 dB
Analog gain on analog input 8			7	1109		N.A	+56 dB
Digital gain on analog input 1	Ana Capture Volume	R / W	0	17	0 1 901 1021		
Digital gain on analog input 2			1	18			
Digital gain on analog input 3			2	19		-90.1dB	
Digital gain on analog input 4			3	20		-90 dB	
Digital gain on analog input 5			4	21		0 dB	
Digital gain on analog input 6			5	22		+12 dB	
Digital gain on analog input 7			6	23			
Digital gain on analog input 8			7	24			
Digital gain on left channel of AES3 input 1	AES Capture Volume	R / W	0	25	0 1 901 1021		
Digital gain on right channel of AES3 input 1			1	26			
Digital gain on left channel of AES3 input 2			2	27		-90.1dB	
Digital gain on right channel of AES3 input 2			3	28		-90 dB	
Digital gain on left channel of AES3 input 3			4	29		0 dB	
Digital gain on right channel of AES3 input 3			5	30		+12 dB	
Digital gain on left channel of AES3 input 4			6	31			
Digital gain on right channel of AES3 input 4			7	32			

12.2.3 Gains on the application DAW inputs (play from software applications)

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Gain in dB
Digital gain on Play DAW0 input	DAW Playback Volume	R / W	0	1	0 1 901 1021	-90.1 dB -90 dB 0 dB +12 dB
Digital gain on Play DAW1 input			1	2		
Digital gain on Play DAW2 input			2	3		
Digital gain on Play DAW3 input			3	4		
Digital gain on Play DAW4 input			4	5		
Digital gain on Play DAW5 input			5	6		
Digital gain on Play DAW6 input			6	7		
Digital gain on Play DAW7 input			7	8		
Digital gain on Play DAW8 input			8	9		
Digital gain on Play DAW9 input			9	10		
Digital gain on Play DAW10 input			10	11		
Digital gain on Play DAW11 input			11	12		
Digital gain on Play DAW12 input			12	13		
Digital gain on Play DAW13 input			13	14		
Digital gain on Play DAW14 input			14	15		
Digital gain on Play DAW15 input			15	16		

12.2.4 Gains on the physical outputs

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Gain in dB
Digital gain on analog output 1	Analog Playback Volume	R / W	0	33	0 1 901 1021	-90.1 dB -90 dB 0 dB +12 dB
Digital gain on analog output2			1	34		
Digital gain on analog output3			2	35		
Digital gain on analog output4			3	36		
Digital gain on analog output5			4	37		
Digital gain on analog output 6			5	38		
Digital gain on analog output 7			6	39		
Digital gain on analog output 8			7	40		
Digital gain on left channel of AES3 output 1	AES Playback Volume	R / W	0	41	0 1 901 1021	-90.1dB -90 dB 0 dB +12 dB
Digital gain on right channel of AES3 output 1			1	42		
Digital gain on left channel of AES3 output 2			2	43		
Digital gain on right channel of AES3 output 2			3	44		
Digital gain on left channel of AES3 output 3			4	45		
Digital gain on right channel of AES3 output 3			5	46		
Digital gain on left channel of AES3 output 4			6	47		
Digital gain on right channel of AES3 output 4			7	48		

12.2.5 Gains on the DAW outputs (recording from software applications)

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Gain in dB
Digital gain on DAW0 output	DAW Capture Volume	R / W	0	49	0 1 901 1021	-90.1dB -90 dB 0 dB +12 dB
Digital gain on DAW1 output			1	50		
Digital gain on DAW2 output			2	51		
Digital gain on DAW3 output			3	52		
Digital gain on DAW4 output			4	53		
Digital gain on DAW5 output			5	54		
Digital gain on DAW6 output			6	55		
Digital gain on DAW7 output			7	56		
Digital gain on DAW8 output			8	57		
Digital gain on DAW9 output			9	58		
Digital gain on DAW10 output			10	59		
Digital gain on DA11 output			11	60		
Digital gain on DAW12 output			12	61		
Digital gain on DAW13 output			13	62		
Digital gain on DAW14 output			14	63		
Digital gain on DAW15 output			15	64		

12.2.6 Gains in the matrix applied to a Play DAW input

In the following table, replace x by the input number, from 0 to 15.

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Gain in dB
Play DAW INx gain towards analog OUTt 1	Mxr x/0	R / W	0	65 + x	0 1 901 1021	-90.1dB -90 dB 0 dB +12 dB
Play DAW INx gain towards analog OUTt 2	Mxr x/1		0	97 + x		
Play DAW INx gain towards analog OUTt 3	Mxr x/2		0	129 + x		
Play DAW INx gain towards analog OUTt 4	Mxr x/3		0	161 + x		
Play DAW INx gain towards analog OUTt 5	Mxr x/4		0	193 + x		
Play DAW INx gain towards analog OUTt 6	Mxr x/5		0	225 + x		
Play DAW INx gain towards analog OUTt 7	Mxr x/6		0	257 + x		
Play DAW INx gain towards analog OUT 8	Mxr x/7		0	289 + x		
Play DAW INx gain towards AES OUT 1 ch 1	Mxr x/8		0	321 + x		
Play DAW IN x gain towards AES OUT ch 2	Mxr x/9		0	353 + x		

Play DAW IN x gain towards AES OUT ch 3	Mxr x/10	0	385 + x
Play DAW IN x gain towards AES OUT ch 4	Mxr x/11	0	417 + x
Play DAW IN x gain towards AES OUT ch 5	Mxr x/12	0	449 + x
Play DAW IN x gain towards AES OUT ch 6	Mxr x/13	0	481 + x
Play DAW IN x gain towards AES OUT ch 7	Mxr x/14	0	513 + x
Play DAW IN x gain towards AES OUT ch 8	Mxr x/15	0	545 + x
Play DAWx gain towards DAW0 record output	Mxr x/16	0	577 + x
Play DAWx gain towards DAW1 record output	Mxr x/17	0	609 + x
Play DAWx gain towards DAW2 record output	Mxr x/18	0	641 + x
Play DAWx gain towards DAW3 record output	Mxr x/19	0	673 + x
Play DAWx gain towards DAW4 record output	Mxr x/20	0	705 + x
Play DAWx gain towards DAW5 record output	Mxr x/21	0	737 + x
Play DAWx gain towards DAW6 record output	Mxr x/22	0	769 + x
Play DAWx gain towards DAW7 record output	Mxr x/23	0	801 + x
Play DAWx gain towards DAW8 record output	Mxr x/24	0	833 + x
Play DAWx gain towards DAW9 record output	Mxr x/25	0	865 + x
Play DAWx gain towards DAW10 record output	Mxr x/26	0	897 + x
Play DAWx gain towards DAW11 record output	Mxr x/27	0	929 + x
Play DAWx gain towards DAW12 record output	Mxr x/28	0	961 + x
Play DAWx gain towards DAW13 record output	Mxr x/29	0	993 + x
Play DAWx gain towards DAW14 record output	Mxr x/30	0	1025 + x
Play DAWx gain towards DAW15 record output	Mxr x/31	0	1057 + x

12.2.7 Gains in the matrix applied to the signal from an analog input

In the following table, replace x by the analog input number, from 0 to 7.

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Gain in dB
Gain on analog IN x towards analog output 1	Mxr (x+16)/0	R / W	0	81 + x	0 1 901 1021	-90.1dB -90 dB 0 dB +12 dB
Gain on analog IN x towards analog output 2	Mxr (x+16)/1		0	113 + x		
Gain on analog IN xx towards analog output 3	Mxr (x+16)/2		0	145 + x		
Gain on analog IN x towards analog output 4	Mxr (x+16)/3		0	177 + x		
Gain on analog IN x towards analog output 5	Mxr(x+16)/4		0	209 + x		
Gain on analog IN x towards analog output 6	Mxr (x+16)/5		0	241 + x		
Gain on analog IN x towards analog output 7	Mxr (x+16)/6		0	273 + x		
Gain on analog IN x towards analog output 8	Mxr (x+16)/7		0	305 + x		
Gain on analog IN x towards AES output channel 1	Mxr (x+16)/8		0	337 + x		
Gain on analog IN x towards AES output channel 2	Mxr (x+16)/9		0	369 + x		
Gain on analog IN x towards AES output channel 3	Mxr (x+16)/10		0	401 + x		
Gain on analog IN x towards AES output channel 4	Mxr (x+16)/11		0	433 + x		
Gain on analog IN x towards AES output channel 5	Mxr (x+16)/12		0	465 + x		
Gain on analog IN x towards AES output channel 6	Mxr (x+16)/13		0	497 + x		
Gain on analog IN x towards AES output channel 7	Mxr (x+16)/14		0	529 + x		
Gain on analog IN x towards AES output channel 8	Mxr (x+16)/15		0	561 + x		
Gain on analog IN x towards DAW0 record output	Mxr (x+16)/16		0	593 + x		
Gain on analog IN x towards DAW1 record output	Mxr (x+16)/17		0	625 + x		
Gain on analog IN x towards DAW2 record output	Mxr (x+16)/18		0	657 + x		
Gain on analog IN x towards DAW3 record output	Mxr (x+16)/19		0	689 + x		
Gain on analog IN x towards DAW4 record output	Mxr (x+16)/20		0	721 + x		
Gain on analog IN x towards DAW5 record output	Mxr (x+16)/21		0	753 + x		
Gain on analog IN x towards DAW6 record output	Mxr (x+16)/22		0	785 + x		
Gain on analog IN x towards DAW7 record output	Mxr (x+16)/23		0	817 + x		
Gain on analog IN x towards DAW8 record output	Mxr (x+16)/24		0	849 + x		
Gain on analog iIN x towards DAW9 record output	Mxr (x+16)/25		0	881 + x		
Gain on analog IN x towards DAW10 record output	Mxr (x+16)/26		0	913 + x		
Gain on analog IN x towards DAW11 record output	Mxr (x+16)/27		0	945 + x		
Gain on analog IN x towards DAW12 record output	Mxr (x+16)/28		0	977 + x		
Gain on analog IN x towards DAW13 record output	Mxr (x+16)/29	0	1009 + x			

Gain on analog IN x towards DAW14 record output	$Mxr (x+16)/30$		0	$1041 + x$		
Gain on analog IN x towards DAW15 record output	$Mxr (x+16)/31$		0	$1073 + x$		

12.2.8 Gains in the matrix applied to the signal from a digital input

In the following table, replace x by the analog input number, from 0 to 7.

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Gain in dB
Gain on AES channel x towards analog output 1	Mxr (x+24)/0	R / W	0	89 + x	0 1 901 1021	-90.1dB -90 dB 0 dB +12 dB
Gain on AES channel x towards analog output 2	Mxr (x+24)/1		0	121 + x		
Gain on AES channel x towards analog output 3	Mxr (x+24)/2		0	153 + x		
Gain on AES channel x towards analog output 4	Mxr (x+24)/3		0	185 + x		
Gain on AES channel x towards analog output 5	Mxr (x+24)/4		0	217 + x		
Gain on AES channel x towards analog output 6	Mxr (x+24)/5		0	249 + x		
Gain on AES channel x towards analog output 7	Mxr (x+24)/6		0	281 + x		
Gain on AES channel x towards analog output 8	Mxr (x+24)/7		0	313 + x		
Gain on AES channel x towards AES output ch. 1	Mxr (x+24)/8		0	345 + x		
Gain on AES channel x towards AES output ch. 2	Mxr (x+24)/9		0	377 + x		
Gain on AES channel x towards AES output ch. 3	Mxr (x+24)/10		0	409 + x		
Gain on AES channel x towards AES output ch. 4	Mxr (x+24)/11		0	441 + x		
Gain on AES channel x towards AES output ch. 5	Mxr (x+24)/12		0	473 + x		
Gain on AES channel x towards AES output ch. 6	Mxr (x+24)/13		0	505 + x		
Gain on AES channel x towards AES output ch. 7	Mxr (x+24)/14		0	537 + x		
Gain on AES channel x towards AES output ch. 8	Mxr (x+24)/15		0	569 + x		
Gain on AES channel x towards DAW0 record output	Mxr (x+24)/16		0	601 + x		
Gain on AES channel x towards DAW1 record output	Mxr (x+24)/17		0	633 + x		
Gain on AES channel x towards DAW2 record output	Mxr (x+24)/18		0	665 + x		
Gain on AES channel x towards DAW3 record output	Mxr (x+24)/19		0	697 + x		
Gain on AES channel x towards DAW4 record output	Mxr (x+24)/20		0	729 + x		
Gain on AES channel x towards DAW5 record output	Mxr (x+24)/21		0	761 + x		
Gain on AES channel x towards DAW6 record output	Mxr (x+24)/22		0	793 + x		
Gain on AES channel x towards DAW7 record output	Mxr (x+24)/23		0	825 + x		
Gain on AES channel x towards DAW8 record output	Mxr (x+24)/24		0	857 + x		
Gain on AES channel x towards DAW9 record output	Mxr (x+24)/25		0	889 + x		
Gain on AES channel x towards DAW10 record out	Mxr (x+24)/26		0	921 + x		
Gain on AES channel x towards DAW11 record out	Mxr (x+24)/27		0	953 + x		
Gain on AES channel x towards DAW12 record out	Mxr (x+24)/28		0	985 + x		
Gain on AES channel x towards DAW13 record out	Mxr (x+24)/29	0	1017 + x			

Gain on AES channel x towards DAW14 record out	$Mx_r (x+24)/30$		0	$1049 + x$		
Gain on AES channel x towards DAW15 record out	$Mx_r (x+24)/31$		0	$1081 + x$		

13 CONFIGURING THE ALP442e AND ALP442e-MIC CARDS UNDER LINUX VIA AMIXER

13.1 Diagram of the audio inputs towards audio outputs chain for ALP442e and ALP442e-MIC

The mixer inputs and outputs are numbered 0 to 15. The mixer offers 16 mix buses, with 16 input channels per bus, and a digital gain associated to each channel in a mix.

- The DAW0 to DAW7 inputs are the 8 audio channels coming from the host machine (played by software on the host machine).
- The ANA0 to ANA3 inputs are the four analog input channels (IN1 to IN4).
- The inputs AES0 to AES3 are the four input channels of the two digital inputs AES/EBU IN1 and IN2.
- The DAW0 to DAW7 outputs are the 8 audio channels destined for the host machine (captured by software on the host machine).
- The ANA0 to ANA3 outputs are the four analog output channels (OUT1 to OUT4)
- The AES0 to AES3 outputs are the four channels of the two stereo digital outputs AES/EBU OUT1 and OUT4.

By default, the matrix gains are positioned so as to have:

DAW0 PLAY -> ANA0 OUT 1 DAW1 PLAY -> ANA0 OUT 2 DAW2 PLAY -> ANA0 OUT 3 DAW3 PLAY -> ANA0 OUT 4 DAW4 PLAY -> AES0 OUT (AES/EBU OUT1 Left) DAW5 PLAY -> AES1 OUT (AES/EBU OUT1 Right) DAW6 PLAY -> AES2 OUT (AES/EBU OUT2 Left) DAW7 PLAY -> AES3 OUT (AES/EBU OUT2 Right)	ANA1 IN -> DAW0 Record ANA2 IN -> DAW1 Record ANA3 IN -> DAW2 Record ANA4 IN -> DAW3 Record AES0 (AES/EBU IN1 Left) -> DAW4 Record AES1 (AES/EBU IN1 Right) -> DAW5 Record AES2 (AES/EBU IN2 Left) -> DAW6 Record AES3 (AES/EBU IN2 Right) -> DAW7 Record
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13.2 Description of the controls for ALP442e and ALP442e-MIC

13.2.1 Clock, SRCs, and phantom power for ALP442e-MIC)

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Detail
Card clock source	Clk Eff Src	R	0	289	0 1 2 3 4 5	Internal = Internal clock SIC (Inter card synchro) Word Clk = Wordclock in AES Syn = AES11 Sync in AES Aud 1/2 = AES3 in 1 AES Aud 3/4 = AES3 in 2
Effective Clock value Effective clock value in kHz is: "Clk Eff base" x "Clk Eff Coef".	Clk Eff	R	0	290	0 1 2 3 4 5 6 7 8 9 10 11 12 13	8 kHz, 11.025kHz, 16kHz, 22.05kHz, 24kHz, 32kHz, 44.1kHz, 48kHz 64kHz 88.2kHz 96kHz 128kHz 176,4kHz 192kHz
Enable / disable the SRC on the AES3 input 1	AES SRC 1/2 Disable	W	0	298	1	Disabled
Enable / disable the SRC on the AES3 input 2	AES SRC 3/4 Disable	W	0	299	0	Enabled
Authorisation to switch to a source with lower priority	Clk Src Up	W	0	292	0	No switching Switching authorised
Authorisation to switch to a source with higher priority	Clk Src Down	W	0	293	1	
Clock priority 0 (highest priority)	Clk P0	W	0	294	0 1 2 3 4 5	Internal = Internal clock SIC (Inter card synchro) Word Clk = Wordclock in AES Syn = AES11 Sync in AES Aud 1/2 = AES3 in 1 AES Aud 3/4 = AES3 in 2
Clock priority 1	Clk P1	W	0	295		
Clock priority 2	Clk P2	W	0	296		
Clock priority 3 (lowest priority)	Clk P3	W	0	297		

Description	Alsa mixer control	Read / Write	Index	NumId	Value	Status	
Phantom power on analog In 1	McPh1	R / W	0	304	0	48V OFF	
Phantom power on analog In 2	McPh2		0	305			
Phantom power on analog In 3	McPh3		0	306	1		48 V ON
Phantom power on analog In 4	McPh4		0	307			

13.2.2 Gains on the physical inputs

Description of control	Alsa mixer control	Read /	Index	NumId	Values	Gain in dB ALP442e ALP442e-MC ALP882e ALP882e-MIC
Analog gain on analog input 1	Codec Analog Capture Volume	R / W	0	300	0	Mute Mute
Analog gain on analog input 2			1	301	1	-24.5 dB N.A
Analog gain on analog input 3			2	302	2	-24 dB N.A.
Analog gain on analog input 4			3	303
					50	0 dB 0dB
				
					82	+16 dB +16 dB
					...	N.A
					162	+56 dB
Digital gain on analog input 1	Ana Capture Volume	R / W	0	9	0 1 901 1021	-90.1dB -90 dB 0 dB +12 dB
Digital gain on analog input 2			1	10		
Digital gain on analog input 3			2	11		
Digital gain on analog input 4			3	12		
Digital gain on left channel of AES3 input 1	AES Capture Volume	R / W	0	13	0 1 901 1021	-90.1dB -90 dB 0 dB +12 dB
Digital gain on right channel of AES3 input 1			1	14		
Digital gain on left channel of AES3 input 2			2	16		
Digital gain on right channel of AES3 input 2			3	16		

13.2.3 Gains on the application DAW inputs (play from software applications)

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Gain in dB
Digital gain on Play DAW0 input	DAW Playback Volume	R / W	0	1	0	-90.1 dB
Digital gain on Play DAW1 input			1	2		
Digital gain on Play DAW2 input			2	3		
Digital gain on Play DAW3 input			3	4	1	
Digital gain on Play DAW4 input			4	5	901	
Digital gain on Play DAW5 input			5	6	1021	
Digital gain on Play DAW6 input			6	7		
Digital gain on Play DAW7 input			7	8		

13.2.4 Gains on the physical outputs

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Gain in dB
Digital gain on analog output 1	Analog Playback Volume	R / W	0	17	0	-90.1 dB
Digital gain on analog output2			1	18	1	-90 dB
Digital gain on analog output3			2	19	901	0 dB
Digital gain on analog output4			3	20	1021	+12 dB
Digital gain on left channel of AES3 output 1	AES Playback Volume	R / W	0	21	0	-90.1dB
Digital gain on right channel of AES3 output 1			1	22	1	-90 dB
Digital gain on left channel of AES3 output 2			2	23	901	0 dB
Digital gain on right channel of AES3 output 2			3	24	1021	+12 dB

13.2.5 Gains on the DAW outputs (recording from software applications)

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Gain in dB
Digital gain on DAW0 output	DAW Capture Volume	R / W	0	25	0	-90.1dB
Digital gain on DAW1 output			1	26		
Digital gain on DAW2 output			2	27		
Digital gain on DAW3 output			3	28	1	
Digital gain on DAW4 output			4	29	901	
Digital gain on DAW5 output			5	30		
Digital gain on DAW6 output			6	31	1021	
Digital gain on DAW7 output			7	32		

(*) ALP882e and ALP882e-Mic only.

13.2.6 Gains in the matrix applied to a Play DAW input

In the following table, replace x by the input number, from 0 to 7.

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Gain in dB	
Play DAW INx gain towards analog OUTt 1	Mxr x/0	R / W	0	33 + x	0	-90.1dB	
Play DAW INx gain towards analog OUTt 2	Mxr x/1		0	49 + x			
Play DAW INx gain towards analog OUTt 3	Mxr x/2		0	65 + x			
Play DAW INx gain towards analog OUTt 4	Mxr x/3		0	81+ x			
Play DAW INx gain towards AES OUT 1 ch 1	Mxr x/4		0	97+ x			
Play DAW IN x gain towards AES OUT ch 2	Mxr x/5		0	113+ x			
Play DAW IN x gain towards AES OUT ch 3	Mxr x/6		0	129+ x			
Play DAW IN x gain towards AES OUT ch 4	Mxr x/7		0	145+ x			
Play DAW INx gain towards DAW0 record output	Mxr x/8		0	161+ x			1
Play DAW INx gain towards DAW1 record output	Mxr x/9		0	177+ x			901
Play DAW INx gain towards DAW2 record output	Mxr x/10		0	193+ x			1021

Play DAW INx gain towards DAW3 record output	Mxr x/11		0	209+ x		
Play DAW INx gain towards DAW4 record output	Mxr x/12		0	225+ x		
Play DAW INx gain towards DAW5 record output	Mxr x/13		0	241+ x		
Play DAW INx gain towards DAW6 record output	Mxr x/14		0	257+ x		
Play DAW INx gain towards DAW7 record output	Mxr x/15		0	273+ x		

13.2.7 Gains in the matrix applied to the signal from an analog input

In the following table, replace x by the analog input number, from 0 to 3.

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Gain in dB		
Gain on analog IN x towards analog output 1	Mxr (x+8)/0	R / W	0	41 + x	0	-90.1dB		
Gain on analog IN x towards analog output 2	Mxr (x+8)/1		0	57+ x				
Gain on analog IN xx towards analog output 3	Mxr (x+8)/2		0	73+ x				
Gain on analog IN x towards analog output 4	Mxr (x+8)/3		0	89+ x				
Gain on analog IN x towards AES output channel 1	Mxr (x+8)/4		0	105+ x				
Gain on analog IN x towards AES output channel 2	Mxr (x+8)/5		0	121+ x				
Gain on analog IN x towards AES output channel 3	Mxr (x+8)/6		0	137+ x				
Gain on analog IN x towards AES output channel 4	Mxr (x+8)/7		0	153+ x				
Gain on analog IN x towards DAW0 record output	Mxr (x+8)/8		0	169+ x			1	-90 dB
Gain on analog IN x towards DAW1 record output	Mxr (x+8)/9		0	185+ x			901	0 dB
Gain on analog IN x towards DAW2 record output	Mxr (x+8)/10		0	201+ x			1021	+12 dB
Gain on analog IN x towards DAW3 record output	Mxr (x+8)/11		0	217+ x				
Gain on analog IN x towards DAW4 record output	Mxr (x+8)/12		0	233+ x				
Gain on analog IN x towards DAW5 record output	Mxr (x+8)/13		0	249+ x				
Gain on analog IN x towards DAW6 record output	Mxr (x+8)/14		0	265+ x				
Gain on analog IN x towards DAW7 record output	Mxr (x+8)/15		0	281+ x				

13.2.8 Gains in the matrix applied to the signal from a digital input

In the following table, replace x by the digital input number, from 0 to 3.

Description	Alsa mixer control	Read / Write	Index	NumId	Values	Gain in dB
Gain on AES channel x towards analog output 1	Mxr (x+12)/0	R / W	0	45+ x	0 1 901 1021	-90.1dB -90 dB 0 dB +12 dB
Gain on AES channel x towards analog output 2	Mxr (x+12)/1		0	61+ x		
Gain on AES channel x towards analog output 3	Mxr (x+12)/2		0	77+ x		
Gain on AES channel x towards analog output 4	Mxr (x+12)/3		0	93+ x		
Gain on AES channel x towards AES output ch. 1	Mxr (x+12)/4		0	109+ x		
Gain on AES channel x towards AES output ch. 2	Mxr (x+12)/5		0	125+ x		
Gain on AES channel x towards AES output ch. 3	Mxr (x+12)/6		0	141+ x		
Gain on AES channel x towards AES output ch. 4	Mxr (x+12)/7		0	157+ x		
Gain on AES channel x towards DAW0 record output	Mxr (x+12)/8		0	173+ x		
Gain on AES channel x towards DAW1 record output	Mxr (x+12)/9		0	189+ x		
Gain on AES channel x towards DAW2 record output	Mxr (x+12)/10		0	205+ x		
Gain on AES channel x towards DAW3 record output	Mxr (x+12)/11		0	221+ x		
Gain on AES channel x towards DAW4 record output	Mxr (x+12)/12		0	237+ x		
Gain on AES channel x towards DAW5 record output	Mxr (x+12)/13		0	253+ x		
Gain on AES channel x towards DAW6 record output	Mxr (x+12)/14		0	269+ x		
Gain on AES channel x towards DAW7 record output	Mxr (x+12)/15		0	285+ x		

13.3 RULES TO CALCULATE THE GAIN VALUES

The ALP442e and ALP882e cards are designed so that 0dBfs is reached for an analog input signal of 0dBu (0.780V), and an analog gain set to 0 dB.

- **Analog input gain**

If G is the analog input gain in dB

Value (numid[index]) = 50+2G, with: G(dB) ∈ [-24;16], and index ∈ [1;82]

Example: $G = -24\text{dB} \Rightarrow \text{numid}[\text{index}] = 2$

Value of numid(index) With index=1102 to 1109	Gain	Max input signal for 0dBfs
0	Mute	--
1	-24.5 dB	24.5 dB
2	-24 dB	24 dB
6	-22 dB	22
14	-18 dB	18
26	-12 dB	12
42	-4 dB	4
50	0 dB	0
56	+3 dB	-3
70	+10 dB	-10
82	+16 dB	-16

- Digital input gain**

If G is the digital gain value in dB

Value ($\text{numid}[\text{index}]$) = $901 + 10G$, with: $G(\text{dB}) \in [-90.1; 12]$

Example: $-24\text{dB} \Rightarrow \text{numid}(\text{index}) = 661$

Digital Gain	Value for numid(index)
-90.1	09
-12 dB	781
-6 dB	841
-3 dB	871
0 dB	901
+3 dB	931
+6 dB	961
+12 dB	1021

13.3.1 Example of gains for the calibration of input and output signal levels

Let's consider the first analog input and output.

Gains to be set for recording

Type of gain	Numid	ALP442e & ALP882e		ALP442e-MIC & ALP882e-MIC	
		Value for +12dBu = 0dBfs	Value for +24 dBu = 0dBfs	Value for -50 dBu = 0dBfs	Value for -30dBu = 0dBfs
Analog input gain	1102	26	2	150	110
Digital input gain	17	901	901	901	901
Mixer gain	593	901	901	901	901
Record digital gain	1	901	901	901	901

Gains to be set for playback

Type of gain	Numid	Value for 0 dBfs=+12 dBu	Value for 0dBfs=+24dBu
Play digital gain	49	901	901
Mixer gain	65	901	901
Digital gain on analog output	33	781	901

13.3.2 GPIOs

Reading the status of the GPIs and setting the status of the GPOs can be done through the Linux libgpio library.

14 SPECIFICATIONS

14.1 Configuration

Bus/Format	PCI EXPRESS™ x1 / Low profile (compatible x4, x8, x16)
Dimensions	168 mm × 69 mm x 20 mm
Consumption (+3.3 V/+12 V)	1 A/0.35 A
In operation: temperature/humidity (without condensation)	0°C/+50°C • 5%/90%
Storage: temperature/humidity (without condensation)	-5°C/+70°C • 0%/95%

14.2 Inputs

	ALP442e	ALP442e-Mic	ALP882e	ALP882e-Mic
Line analog inputs	4 balanced		8 balanced	
Maximum input level / impedance	+24 dBu / >10 kΩ	Line: +24 dBu / >10 kΩ Mic : +10 dBu / >10 kΩ (ALP882e-MIC only)	+24 dBu / >10 kΩ	Line: +24 dBu / >10 kΩ Mic : +10 dBu / >10 kΩ (ALP882e-MIC only)
Digital input (stereo)	2 AES3 stereo, 110 Ohms, with hardware SRC on each input		4 AES3 stereo, 110 Ohms, with hardware SRC on each input	
Line input gains	-24 dB to +16 dB, in 0.5 dB steps Max. sensitivity: 0 dBfs for -16 dBu			
Mic input gains	-	0 dB to +56 dB, in 0.5 dB steps Max. sensitivity: 0 dBfs for -56 dBu	-	0 dB to +56 dB, in 0.5 dB steps Max. sensitivity: 0 dBfs for -56 dBu
Programmable digital input gains	-90 dB to +12 dB, 0.1 dB increments			
Synchronisation inputs	1 AES11, 32 kHz to 192 Khz 1 Word Clock, (75 Ohms), 32 kHz to 192 Khz			
GPIs	8 dry contacts			

14.3 Outputs

	ALP442e & ALP442e-Mic	ALP882e & ALP882e-Mic
Line analog outputs	4 electronically balanced (can be used asymmetrically without loss of level)	8 electronically balanced (can be used asymmetrically without loss of level)
Maximum output level / impedance	+24 dBu / <100 kΩ	
Digital output	4 AES3 stereo, up to 192 kHz	
Programmable digital output gain	-90 dB to +12 dB, 0.1 dB increments	
Clock output	1 Word Clock, (75 Ohms), 32 kHz to 192 KHz	
Contacts	8 relay contacts, 0.5 A, 48 VDC	

14.4 Audio characteristics

Sampling frequency	Programmable from 8 to 192 kHz
CAN/CNA resolutions	24 bits/192 kHz
Audio formats supported	PCM: 16, 24, 32 bits, Float IEEE754

14.5 Analog performances

Measurements taken at $F_s=48$ kHz, with filter on band 22 Hz-22 kHz.

Frequency response	@48 kHz, 20 Hz - 20 kHz - Inputs: +/- 0.83 dB Outputs: +/- 0.57 dB @48 kHz, 10 Hz - 20 kHz - Inputs: +/- 2.72 dB Outputs: +/- 0.57 dB
Phase shift between tracks	@10 Hz: Inputs: < 0.81° / Outputs: < -0.24° @1 kHz: Inputs: < 0.01° / Outputs: < -0.02° @20 kHz: Inputs: < 0.14° / Outputs: < -0.13°
Signal to Noise Ratio	Inputs: >115 dBA (>112 dB unweighted) Outputs: >109 dBA (>106 dB unweighted)
THD + Noise	@1 kHz +24 dBu : Inputs: <-95dB / Outputs: <-94 dB +22 dBu : Inputs: <-98dB / Outputs: <-96 dB
Crosstalk	Inputs: -128 dB @1 kHz / -107 dB @15 kHz / -105 dB @20 kHz Outputs: -127 dB @1 kHz / -112 dB @15 kHz / -108.5 dB @20 kHz
Equivalent Input Noise (E.I.N) (ALP882e-MIC)	-124 dB (A/D-D/A, G=+56 dB)

14.6 Sample rate converters (SRC)

Maximum frequency	192 kHz
Frequency ratio	1:8 to 7.5:1

14.7 Connectors

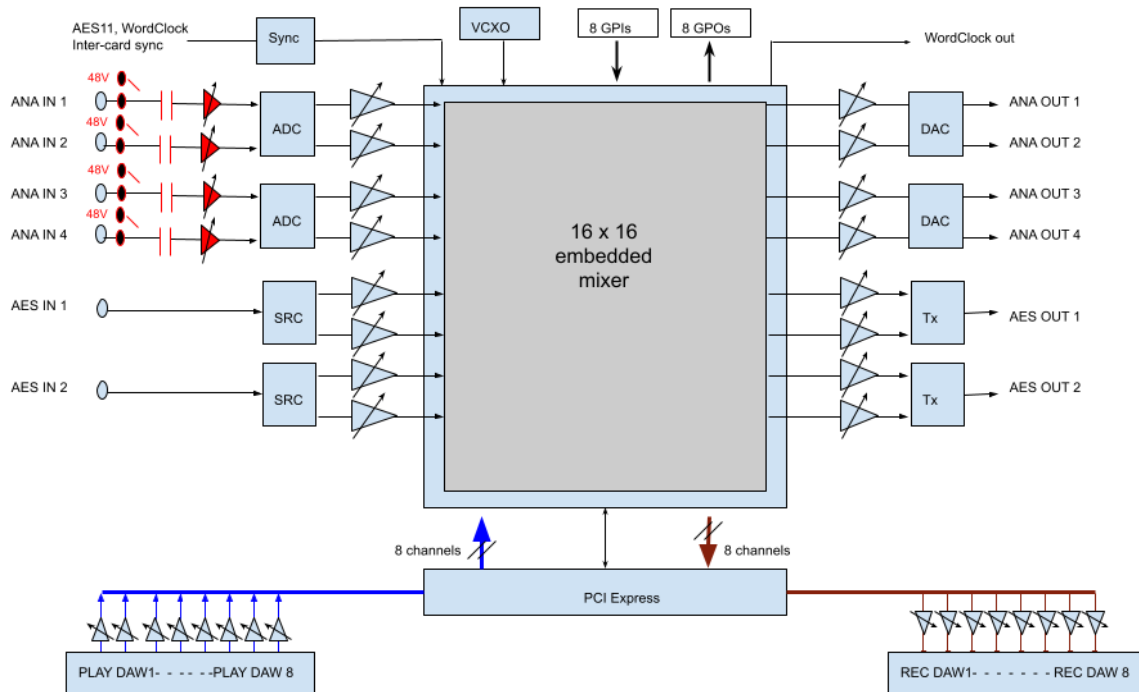
Internal connectors	Inter-card synchronisation
External connectors	2 x 68-pin VHDCI connectors One for analog I/Os One for Digital I/Os (AES3 I/Os + Clocks + GPIOs)

14.8 Development environment

Drivers	DirectSound/WASAPI, ASIO
Operating systems supported	Windows 10 from version 20H2, Enterprise version LTSC 1607 Linux (from Linux Kernel 4.9)
Main characteristics of on-board processing	PCM playback and acquisition, Float IEEE754, direct monitoring, real time mixing, levels adjustment, panning management

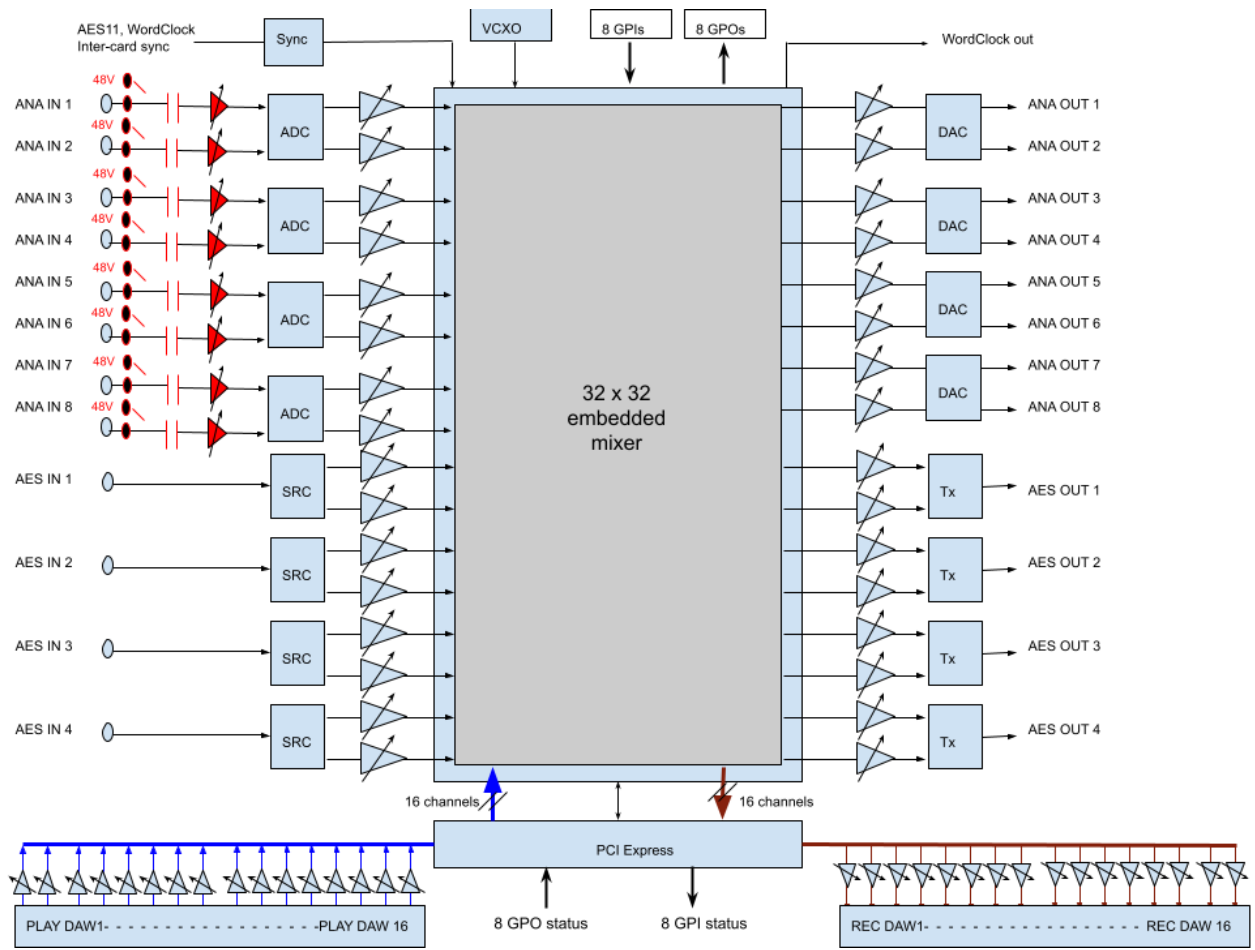
15 APPENDICES

15.1 ALP442e & ALP442e-MIC functional diagram



Note: 48V phantom power only for ALP442e-MIC

15.2 ALP882e & ALP882e-MIC functional diagram



Note: 48V phantom power only for ALP882e-MIC

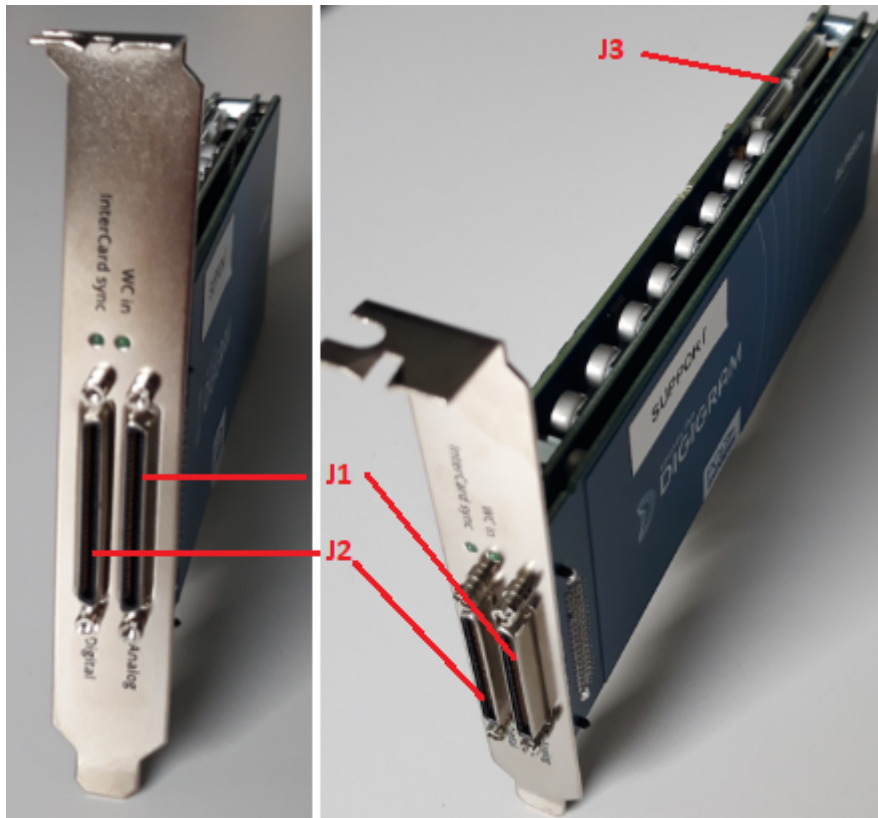
15.3 LED

The ALP card has four green LEDs: 2 LEDs on the PCB (only visible when the PC is open) and two LEDs on the bracket as illustrated in the diagram below.



LED	Description	Behaviour
LED 1	Signals when the card is initialised correctly	Constantly lit
LED 2	Signals if the card is running the last updated firmware or the backup factory firmware version.	<ul style="list-style-type: none"> Flashes every 2 seconds: The card runs the last uploaded firmware version (normal behaviour). Flashes every second: The card runs the backup factory firmware instead of the last uploaded version. This last firmware is corrupted in memory and has to be applied again.
WC In	Wordclock	<ul style="list-style-type: none"> Off when no Wordclock signal is detected. Flashes when a Wordclock signal is detected but the card is not synchronised on it Lit when the card is synchronised to the Wordclock input
InterCard sync	Intercard synchro / card locator	<ul style="list-style-type: none"> Off when the card is not synchronised to another one via the inter card ribbon cable Lit when the card is slaved to another one via the intercard synchro ribbon. Flashes when the button "card locator" is pressed from the ALP-X Manager application.

15.4 Connectors and switches



J1: Connector for analog I/Os

VHDCI 68 pins, female

J2: Connector for digital I/Os

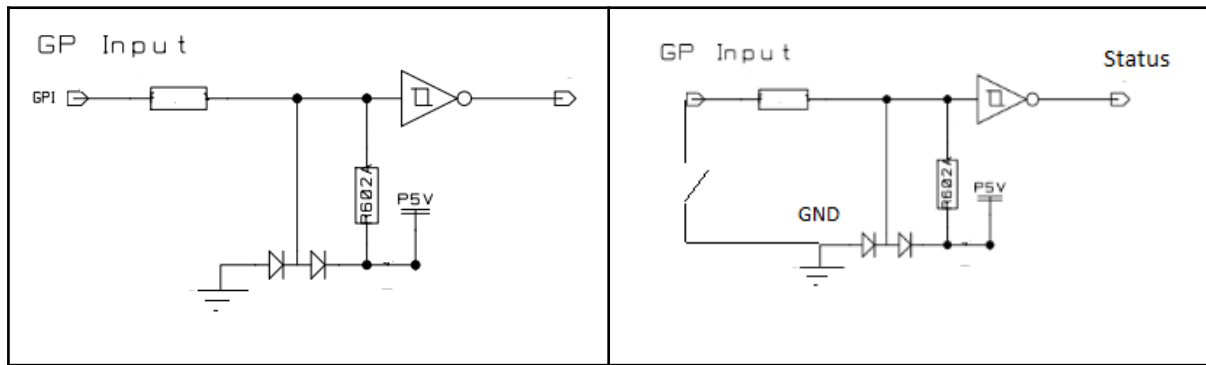
VHDCI 68 pins, female.

J3: Connector for inter-card synchronisation

15.5 How to use the GPIOs

15.5.1 GPIs

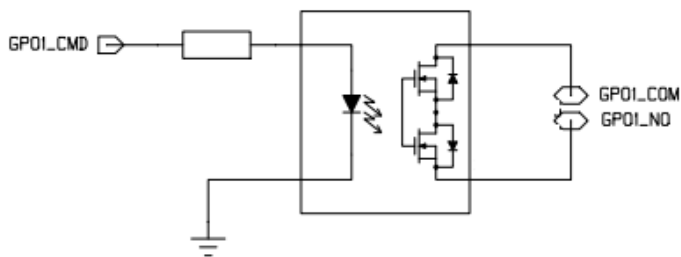
The eight GPIs are dry contacts, as shown on the diagram below. It is not necessary to connect a voltage to the GPIs.



When the GPI pin is not connected to the ground, the GPI status is OPEN.
 When the GPI X pin is connected to the ground, the GPI status is CLOSED.

15.5.2 GPOs

The eight GPOs are opti-relays, as shown on the diagram below.

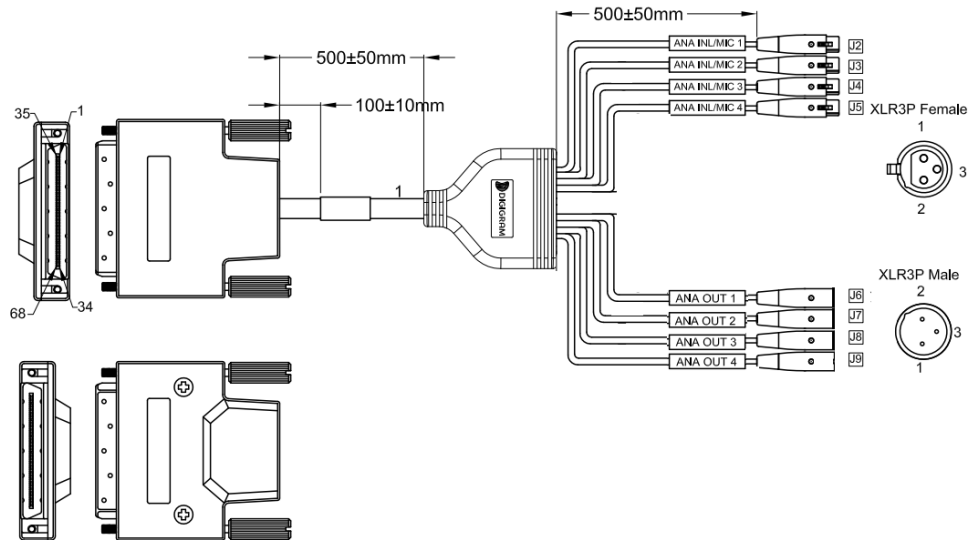


The contact between GPO_COM and GPO-NO is made when the CLOSED command is sent.
 GPOs support a maximal voltage of 48VDC and a maximum current of 500 mA.

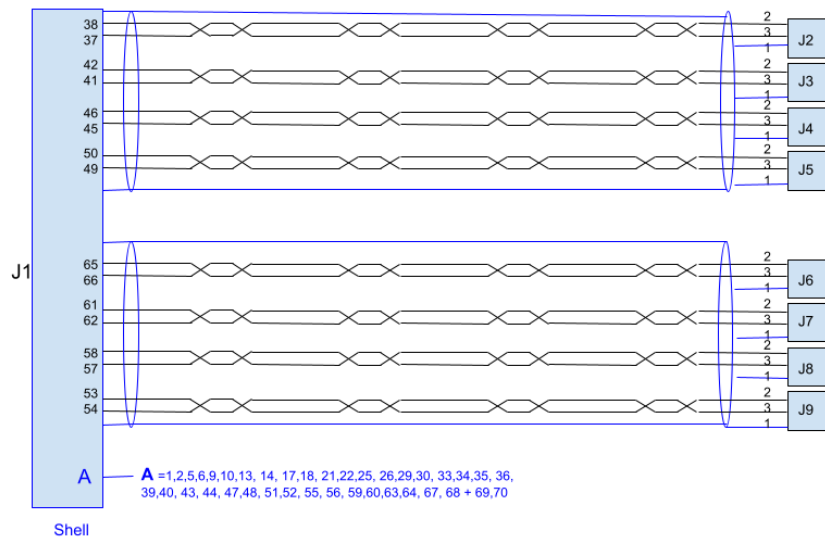
15.6 Cables for ALP442e and ALP442e-MIC

15.6.1 Cable for analog I/Os

15.6.1.1 Diagram



15.6.1.2 Pinout



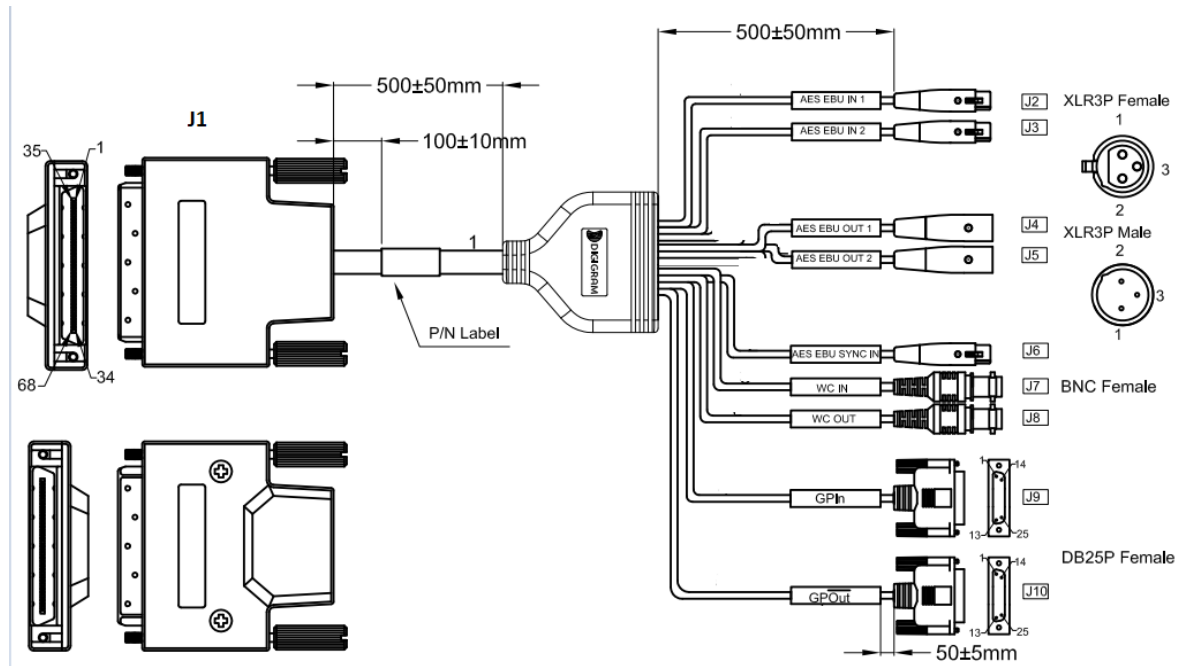
J1	Upper VHDCI 68 pins male
J2 to J9	Female XLR: analog inputs
J10 to J17	Male XLR: analog outputs

Pinout of connector J1 (VHDCI male)

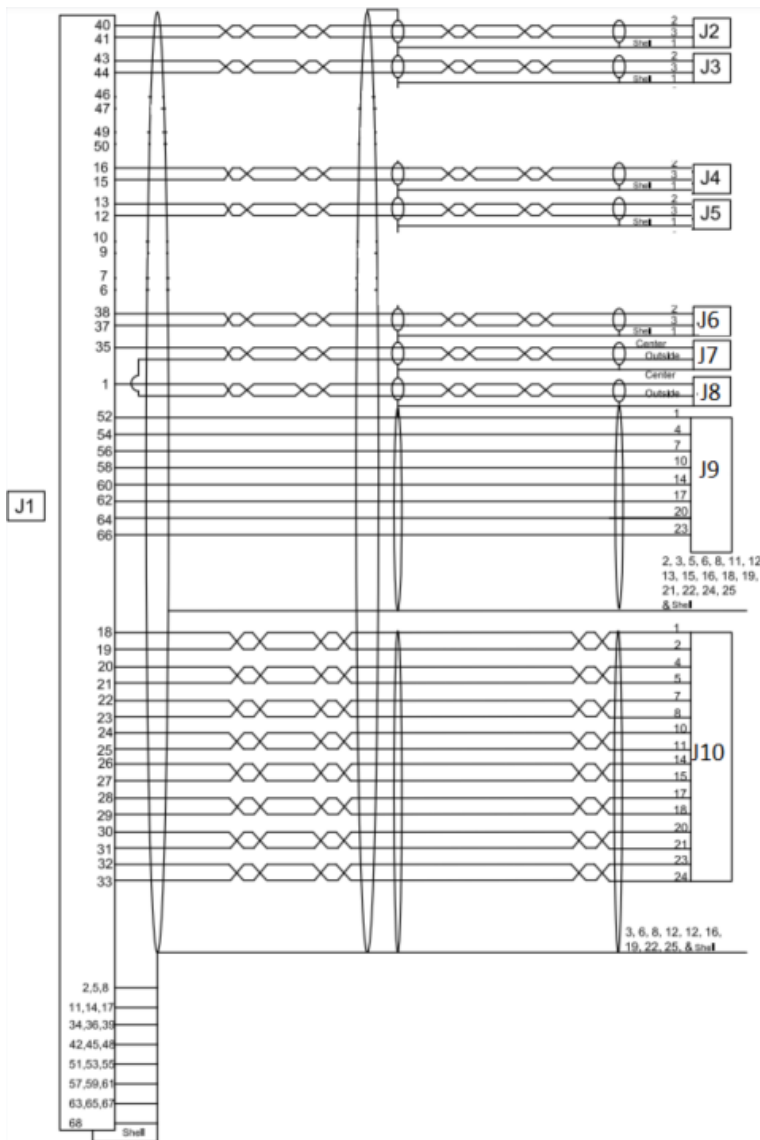
Pin#	Signal	Pin #	Signal	Pin #	Signal
1	GND	24		47	GND
2	GND	25	GND	48	GND
3		26	GND	49	ANA IN4 -
4		27		50	ANA IN4 +
5	GND	28		51	GND
6	GND	29	GND	52	GND
7		30	GND	53	ANA OUT4 +
8		31		54	ANA OUT4 -
9	GND	32		55	GND
10	GND	33	GND	56	GND
11		34	GND	57	ANA OUT3-
12		35	GND	58	ANA OUT3 +
13	GND	36	GND	59	GND
14	GND	37	ANA IN1 -	60	GND
15		38	ANA IN1 +	61	ANA OUT2 +
16		39	GND	62	ANA OUT2 -
17	GND	40	GND	63	GND
18	GND	41	ANA IN2 -	64	GND
19		42	ANA IN2 +	65	ANA OUT1 +
20		43	GND	66	ANA OUT1 -
21	GND	44	GND	67	GND
22	GND	45	ANA IN3 -	68	GND
23		46	ANA IN3 +	-	-

15.6.2 Cable for digital I/Os

15.6.2.1 Diagram



15.6.2.2 Pinout



J1 connector (lower VHDCI male)							
Pin#	Signal	Pin #	Signal	Pin #	Signal	Pin #	Signal
1	WLCK OUT	18	GPO1-COM	35	WLCK IN	52	GPI 1
2	GND	19	GPO1-NO	36	GND	53	GND
3	GND	20	GPO2-COM	37	AES11-SYNC IN-	54	GPI 2
4	-	21	GPO2-NO	38	AES11-SYNC IN+	55	GND
5	-	22	GPO3-COM	39	GND	56	GPI 3
6		23	GPO3-NO	40	AES3 IN 1+	57	GND
7		24	GPO4-COM	41	AES3 IN 1-	58	GPI 4
8	GND	25	GPO4-NO	42	GND	59	GND
9		26	GPO5-COM	43	AES3 IN 2+	60	GPI 5
10		27	GPO5-NO	44	AES3 IN 2-	61	GND
11	GND	28	GPO6-COM	45	GND	62	GPI 6

J1 connector (lower VHDCI male)							
Pin#	Signal	Pin #	Signal	Pin #	Signal	Pin #	Signal
1	WLCK OUT	18	GPO1-COM	35	WLCK IN	52	GPI 1
2	GND	19	GPO1-NO	36	GND	53	GND
12	AES3 OUT2 -	29	GPO6-NO	46		63	GND
13	AES3 OUT2 +	30	GPO7-COM	47		64	GPI 7
14	GND	31	GPO7-NO	48	GND	65	GND
15	AES3 OUT1 -	32	GPO8-COM	49		66	GPI 8
16	AES3 OUT1 +	33	GPO8-NO	50		67	GND
17	GND	34	GND	51	GND	68	GND

J9 (Sub-DB25 female) - GPIs				J10 (Sub-DB25 female) - GPOs			
Pin#	Signal	Pin#	Signal	Pin#	Signal	Pin#	Signal
1	GPI 1	14	GPI5	1	GPO1 COM	14	GPO5 COM
2	GND	15	GND	2	GPO1 NO	15	GPO5 NO
3	GND	17	GPI6	4	GPO2 COM	17	GPO6 COM
4	GPI 2	18	GND	5	GPO2 NO	18	GPO6 NO
5	GND	20	GPI7	7	GPO3 COM	20	GPO7 COM
6	GND	21	GND	8	GPO3 NO	21	GPO7 NO
7	GPI3	23	GPI8	7	GND	23	GPO8 COM
8	GND	24	GND	10	GPO4 COM	24	GPO8 NO
10	GPI4	25	GND	11	GPO4 NO	25	GND

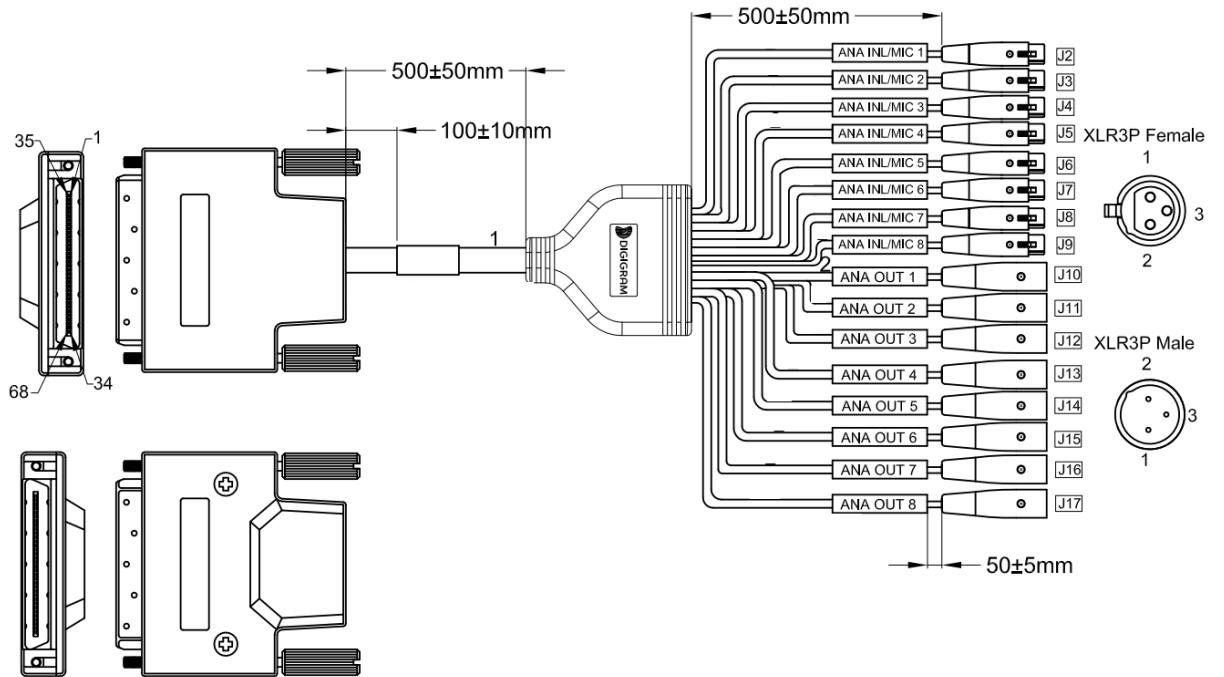
Pins that are not mentioned are connected to the ground.

J2 & J3 (Female XLR)	AES3 inputs 1 & 2	Pin 1: GND Pin 2= + Pin 3= -
J4 to J5 (Male XLR)	AES3 outputs 1 & 2	
J6 (Female XLR)	AES11 SYNC	
J7 (female BNC)	Wordclock IN	
J8 (female BNC)	Wordclock OUT	

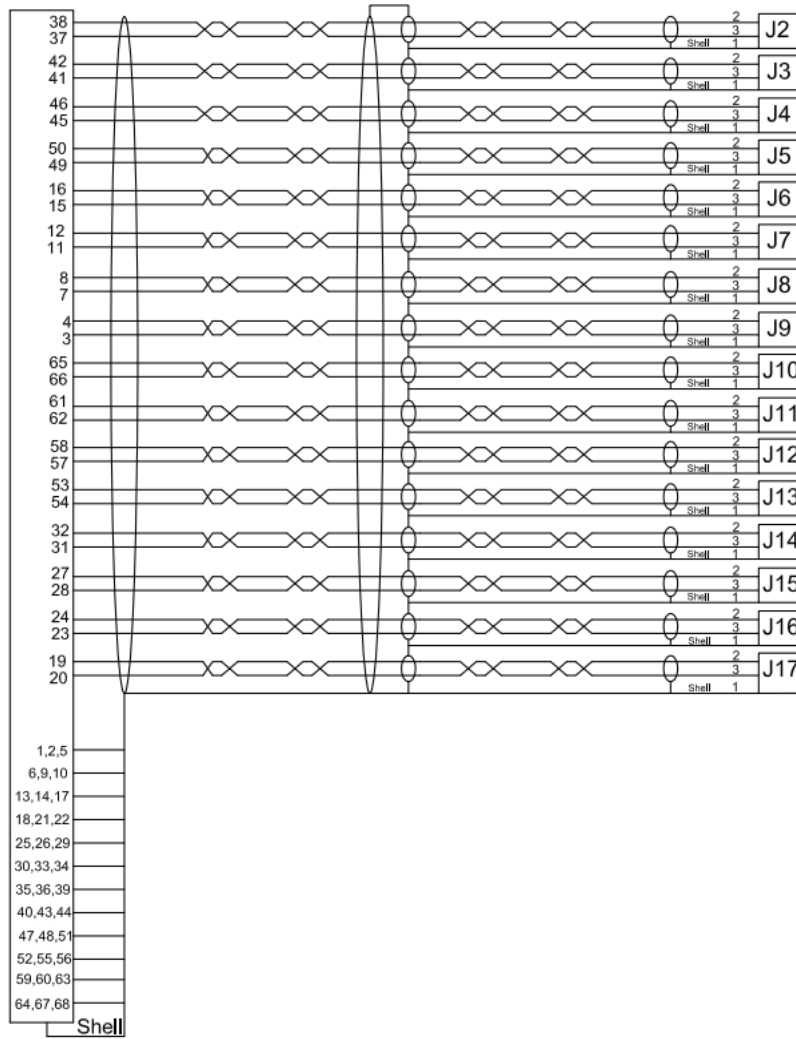
15.7 Cables for ALP882e and ALP882e-MIC

15.7.1 Cable for analog I/Os

15.7.1.1 Diagram



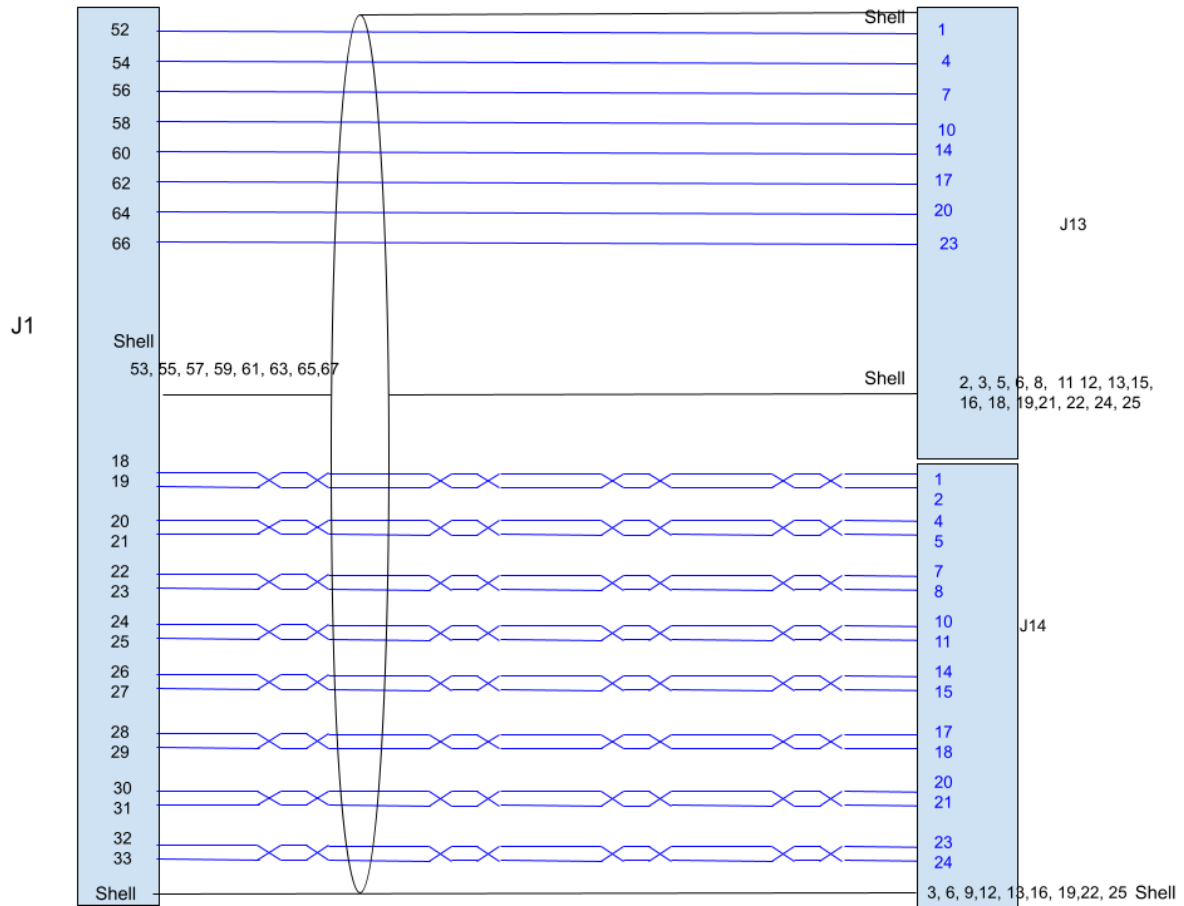
15.7.1.2 Pinout



J1	Upper VHDCI 68 pins male
J2 to J9	Female XLR: analog inputs
J10 to J17	Male XLR: analog outputs

Pinout of connector J1 (VHDCI male)

Pin#	Signal	Pin #	Signal	Pin #	Signal
1	GND	24	ANA OUT7 +	47	GND
2	GND	25	GND	48	GND
3	ANA IN8 -	26	GND	49	ANA IN4 -
4	ANA IN8 +	27	ANA OUT6 +	50	ANA IN4 +
5	GND	28	ANA OUT6 -	51	GND
6	GND	29	GND	52	GND
7	ANA IN7 -	30	GND	53	ANA OUT4 +
8	ANA IN7 +	31	ANA OUT5 -	54	ANA OUT4 -
9	GND	32	ANA OUT6 +	55	GND
10	GND	33	GND	56	GND
11	ANA IN6 -	34	GND	57	ANA OUT3-
12	ANA IN6 +	35	GND	58	ANA OUT3 +
13	GND	36	GND	59	GND
14	GND	37	ANA IN1 -	60	GND
15	ANA IN5 -	38	ANA IN1 +	61	ANA OUT2 +
16	ANA IN5 +	39	GND	62	ANA OUT2 -
17	GND	40	GND	63	GND
18	GND	41	ANA IN2 -	64	GND
19	ANA OUT8 +	42	ANA IN2 +	65	ANA OUT1 +
20	ANA OUT8 -	43	GND	66	ANA OUT1 -
21	GND	44	GND	67	GND
22	GND	45	ANA IN3 -	68	GND
23	ANA OUT7 -	46	ANA IN3 +	-	-



J1 connector (lower VHDCI male)							
Pin#	Signal	Pin #	Signal	Pin #	Signal	Pin #	Signal
1	WLCK OUT	18	GPO1-COM	35	WLCK IN	52	GPI 1
2	GND	19	GPO1-NO	36	GND	53	GND
3	GND	20	GPO2-COM	37	AES11-SYNC IN-	54	GPI 2
4	-	21	GPO2-NO	38	AES11-SYNC IN+	55	GND
5	-	22	GPO3-COM	39	GND	56	GPI 3
6	AES3 OUT4 -	23	GPO3-NO	40	AES3 IN 1+	57	GND
7	AES3 OUT4 +	24	GPO4-COM	41	AES3 IN 1-	58	GPI 4
8	GND	25	GPO4-NO	42	GND	59	GND
9	AES3 OUT3 -	26	GPO5-COM	43	AES3 IN 2+	60	GPI 5
10	AES3 OUT3 +	27	GPO5-NO	44	AES3 IN 2-	61	GND
11	GND	28	GPO6-COM	45	GND	62	GPI 6
12	AES3 OUT2 -	29	GPO6-NO	46	AES3 IN 3+	63	GND
13	AES3 OUT2 +	30	GPO7-COM	47	AES3 IN 3-	64	GPI 7
14	GND	31	GPO7-NO	48	GND	65	GND
15	AES3 OUT1 -	32	GPO8-COM	49	AES3 IN 4+	66	GPI 8
16	AES3 OUT1 +	33	GPO8-NO	50	AES3 IN 4-	67	GND
17	GND	34	GND	51	GND	68	GND

J13 (Sub-DB25 female) - GPIs				J14 (Sub-DB25 female) - GPOs			
Pin#	Signal	Pin#	Signal	Pin#	Signal	Pin#	Signal
1	GPI 1	14	GPI5	1	GPO1 COM	14	GPO5 COM
2	GND	15	GND	2	GPO1 NO	15	GPO5 NO
3	GND	17	GPI6	4	GPO2 COM	17	GPO6 COM
4	GPI 2	18	GND	5	GPO2 NO	18	GPO6 NO
5	GND	20	GPI7	7	GPO3 COM	20	GPO7 COM
6	GND	21	GND	8	GPO3 NO	21	GPO7 NO
7	GPI3	23	GPI8	7	GND	23	GPO8 COM
8	GND	24	GND	10	GPO4 COM	24	GPO8 NO
10	GPI4	25	GND	11	GPO4 NO	25	GND

Pins that are not mentioned are connected to the ground.

J2 to J5 (Female XLR)	AES3 inputs 1 to 4	Pin 1: GND / Pin 2: + / Pin 3: -
J6 to J9 (Male XLR)	AES3 outputs 1 to 4	
J10 (Female XLR)	AES11 SYNC	
J11 (female BNC)	Wordclock IN	
J12 (female BNC)	Wordclock OUT	

Please contact your distributor for all technical support issues



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