DirectOut TECHNOLOGIES

ACE

User's Manual

Version 1.0

Table of contents

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About This Manual

How to Use This Manual

This manual guides you through the installation and operation of the device. Use the Table of Contents at the beginning of the manual or Index Directory at the end of the document to locate help on a particular topic. You can access more information and latest news by visiting on the DirectOut website at www.directout.eu.

Conventions

The following symbols are used to draw your attention to:

TIPS

indicate useful hints and shortcuts.

NOTES

are used for important points of clarification or cross references.

WARNINGS!

alert you when an action should always be observed.

Updates

DirectOut products are continually in development, and therefore the information in this manual may be superseded by new releases. To access the latest documentation, please visit the DirectOut website: www.directout.eu.

This guide refers to System Update 26.06.00.

CHAPTER 1: Overview

Introduction

Welcome to ACE – DirectOut's portable audio engine for professional applications.

ACE provides two operating concepts:

- ACE Modes offer simplified, wizard-guided workflows for typical tasks such as playback, tuning small PA systems and corporate automixing. They reduce visible complexity and get a system running in a few steps.

- PRODIGY Mode exposes the complete internal DSP and routing structure for expert users. It is intended for detailed system design, tuning and integration in more complex setups.

Feature Summary

Network Audio (I/O)	Option - configure to order, one of the following: - Dante (64 ch) - AVB / MILAN (64 ch)
MADI (I/O)	4 x SFP (empty cage without transceiver)
Analog (I/O)	4 x Analog I/O - Mic/Line In / Line Out
Digital AES3 (I/O)	4 x AES3 In / Out
Headphones (O)	4 x 6.3 mm jack & 1 x 3.5 mm jack
Word Clock (I/O):	2 x coaxial BNC (75 Ω termination switchable)
Supported Network Audio protocols (depending on module)	Dante / AES67 AVB / MILAN
Sample Rate Conversion	Optional: FastSRC™ on MADI I/Os and network audio
DSP Functions	Flex Channels with EQ, Dynamics, Delay Matrix Mixer, Summing Busses, DSP Routing
MADI Formats	56/57/64 channel, High Speed or Legacy Native or 48k/96k Frame, S/MUX
Sample Rates	44.1, 48, 88.2, 96, 176.4, 192 kHz +/-12.5%
Management Port	1 x RJ45 Socket (Gigabit-Ethernet)
Device Control	remote: via globcon local: via touch-display
GPIO	1 x DSUB-9 (2 x GPI, 2 x GPO, MOSFET switches)
USB Port	1 x USB-A (USB 2.0) 1 x USB-C, lockable (USB 3.1)
Power Supply	External, 2 x USB-C PD (20 V, max 60 W)

How it works

A variety of physical inputs and outputs are managed by an internal routing matrix.

ACE provides four analog inputs and outputs, four digital (AES3) ports, a network audio option and four MADI (AES10) ports plus four phones outputs.
Combined the maximum channel capacity totals in 332 inputs and 336 outputs.

Signal processing is managed internally by a DSP routing matrix which connects hardware I/Os with the DSP processing blocks - such as Flex Channels, Matrix Mixer, Summing Busses and Plug-Ins (EQ, Delay, Dynamics).

Two operating concepts are available:

- ACE Modes are application-oriented configurations (e.g. Playback, PA4, PA8)* exposing a simplified user interface. Each mode uses a dedicated wizard to guide the user through a few setup steps and then automatically configures routing, processing and control.

- PRODIGY Mode provides full expert access to the DSP resources (MatMix, Flex Channels, FIR/IIR, Dynamics, Delays, Automix)*. It requires globcon as a control frontend and enables advanced configuration and snapshot scoping that are hidden in ACE Modes.

* depending on the licenses installed - see „Operating Modes (ACE / PRODIGY)“ on page 42.

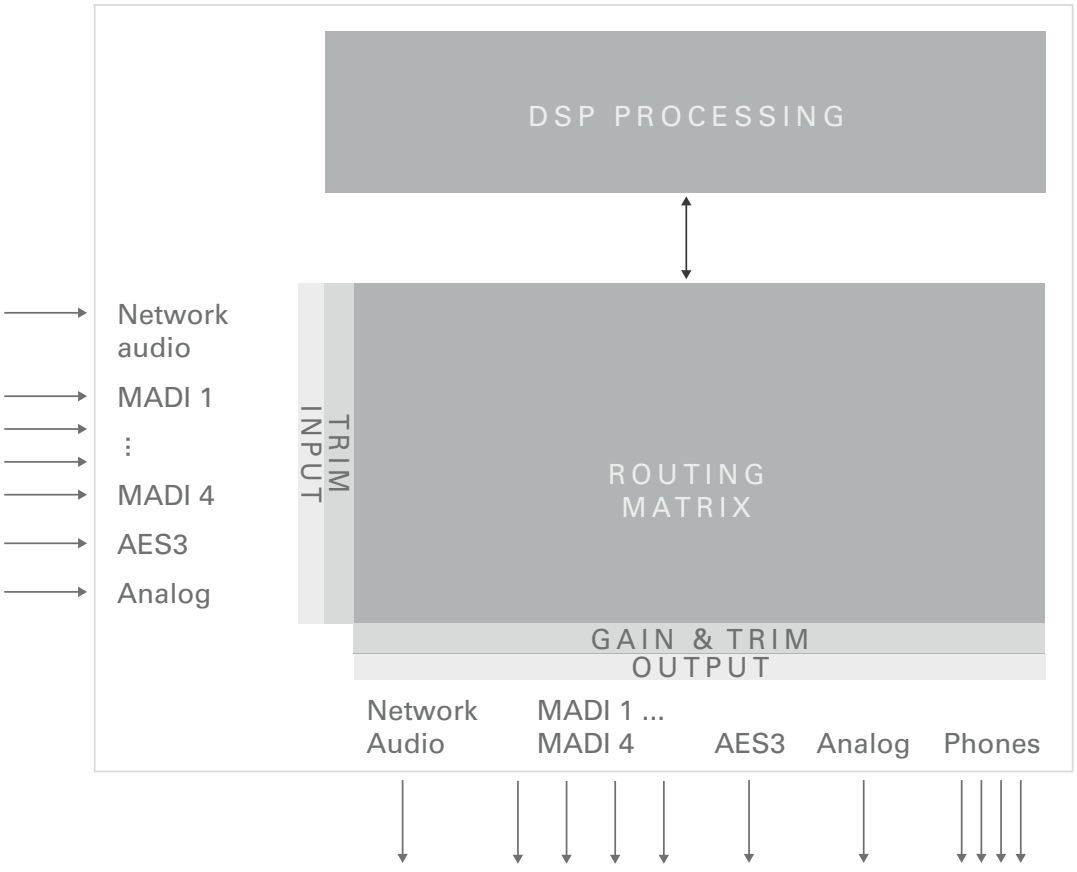
Applications

ACE is designed as a flexible, portable audio engine that can cover a wide range of professional scenarios.

Typical applications include:

- Playback Systems - Multichannel playback for live shows, theatre, touring productions and fixed installations where reliable, high-quality audio distribution is needed.
- PA4 Systems - Small to medium PA setups with up to four main outputs, such as front-of-house plus fills, small venues, clubs or mobile systems.
- PA8 Systems - Larger PA configurations with more zones or speaker arrays, for example line arrays, multi-zone venues, festivals or distributed sound systems.
- Automixer / Corporate Applications - Conference rooms, corporate events, panel discussions and presentations with multiple microphones, where automatic mixing and clear speech intelligibility are required.

Scheme


DSP PROCESSING
Network audio
MADI 1
MADI 4
AES3
Analog
TRIM INPUT
ROUTING MATRIX
GAIN & TRIM OUTPUT
Network Audio
MADI 1 ... MADI 4
AES3
Analog
Phones

Contents

The contents of your ACE package should include:

- 1 x ACE
- 1 x power supply with USB-C cable
- 2 x DSUB-25 to XLR breakout cable (DSUB25.AES59)
- 4 x rubber bumper

TIP

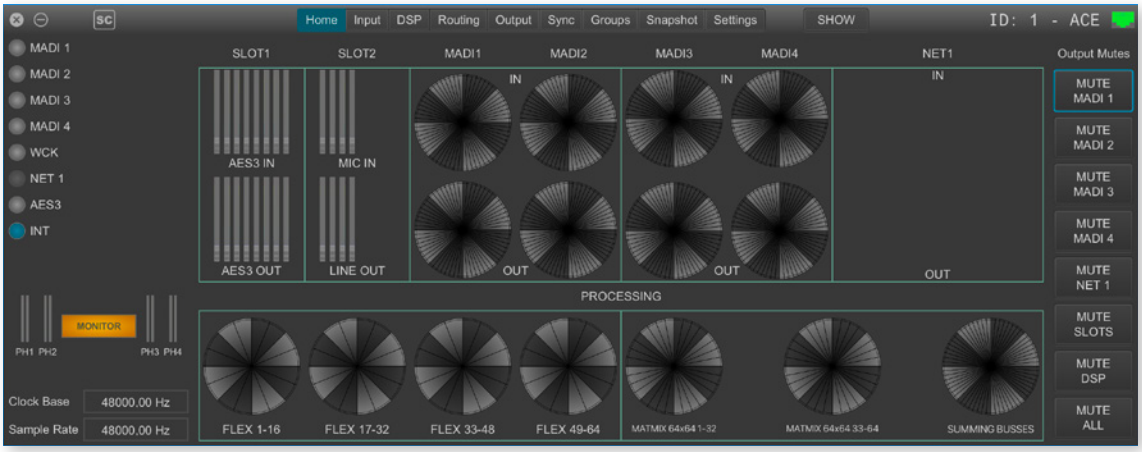
Keep any packaging in order to protect the device should it need to be dispatched for service.

NOTE

For transport, use appropriate packaging to protect the device from damage.

Remote Control

To access all functions of the device it is required to install the globcon remote control.



Home view of ACE in PRODIGY Mode

globcon is a free, global control software platform for the management of professional audio equipment. Almost all products of the DirectOut product portfolio are supported by globcon.

Link: www.globcon.pro

Accessories

SFP Transceiver - USB.MADI

- USB.MADI - SFP transceiver (No: DOUMIO001)
- Transceiver for bidirectional transmission of 64 audio channels via USB-C.
- RME drivers for Windows and macOS
- Class compliant firmware
- Compatible with SFP MADI ports of:
  - PRODIGY series
  - MAVEN.A
  - ACE
  - ANDIAMO (3rd GEN)
  - EXBOX.MD
  - EXBOX.RAV

Characteristics

- Buffer sizes/latencies from 32 up to 8192 samples selectable
- 64 channels @ 48 kHz, 32 channels @ 96 kHz, 16 channels @ 192 kHz
- USB-C socket
- Class Compliant operation at full channel count
- TotalMix for latency-free submixes and perfect ASIO Direct Monitoring
- TotalMix FX: 4096 channel mixer with 46 bit internal resolution
- Up to 64 individual submixes
- Internal Loopback function
- USB error analysis, displayed in the Settings dialog

SFP Transceiver - MADI

Two different optical and one coaxial SFP transceiver for MADI transmission are available from DirectOut GmbH:

- SFP MADI transceiver multi-mode (No: DOICT0136)
- SFP MADI transceiver single-mode (No: DOICT0137)
- SFP MADI transceiver BNC (No: DOSET0111)

Specification of the optical SFP transceiver:

SFP	Multi-mode	Single-mode
Connector	LC Duplex	LC Duplex
Distance	2000 m @MMF	20000 m @SMF
Datarate	155 Mbit/s	1.25 Gbit/s
Wavelength TX typical	1310 nm	1310 nm
Wavelength TX min	1260 nm	1260 nm
Wavelength TX max	1360 nm	1360 nm
Wavelength RX min	1260 nm	1260 nm
Wavelength RX max	1580 nm	1580 nm
TX Power min	- 20 dBm	- 14 dBm
TX Power max	- 13 dBm	- 8 dBm
RX sensitivity	- 31 dBm	- 32 dBm
RX max	- 3 dBm	- 3 dBm
Temperature (min)	0° Celsius	0° Celsius
Temperature (max)	70° Celsius	70° Celsius
Type of DDM/DOM	internal	internal
Extinction Ratio	8.20 dB	9 dB
Laser	FP	FP
Receiver Type	PIN	PIN

Specification of the coaxial SFP transceiver:

SFP	**BNC**
Connector	HD-BNC (75Ω)*
Temperature (min)	-40° Celsius
Temperature (max)	80° Celsius
Hot pluggable	yes
AES10-2008 compliant	yes
RX Equalizer	Equalizes Belden 1694A (or similar) cable up to 300m
TX Cable Driver	Integrated TX Cable Driver with output impedance of 75 Ω ±2 Ω

* adaptor cable to standard BNC included

CHAPTER 2: Legal issues & facts

Before Installing This Device

WARNING!

Please read and observe all of the following notes before installing this product:

- Check the hardware device for transport damage.
- Any devices showing signs of mechanical damage or damage from the spillage of liquids must not be connected to the mains supply, or disconnected from the mains immediately by pulling out the power lead.
- All devices must be grounded. The device is grounded through its IEC power connections.
- All devices must be connected to the mains using the three-cord power leads supplied with the system. Only supply electrical interfaces with the voltages and signals described in these instructions. Proper grounding is mandatory.
- Do not use the device at extreme temperatures. Proper operation can only be guaranteed between temperatures of 5° C and 45° C and a maximum relative humidity of 80 %, non-condensing.
- The cabinet of the device will heat up. Do not place the device close to heating sources (e.g. heaters). Observe the environmental conditions.
- The device must only be operated in weather-protected environments.
- This system is intended for in-building cabling only. Any inter-building connections, especially copper cabling between separate buildings, are explicitly excluded from the specification and are considered non-intended use. No liability is accepted for any damage or malfunction resulting from such installations.

Defective Parts/Modules

WARNING!

This device contains no user-serviceable parts. Therefore do not open the device. In the event of a hardware defect, please send the device to your DirectOut representative together with a detailed description of the fault.
We would like to remind you to please check carefully whether the failure is caused by erroneous configuration, operation or connection before sending parts for repair.

First Aid (in case of electric shock)

WARNING!

- Do not touch the person or his/her clothing before power is turned off, otherwise you risk sustaining an electric shock yourself.
- Separate the person as quickly as possible from the electric power source as follows:
  - Switch off the equipment.
  - Unplug or disconnect the mains cable.
- Move the person away from the power source by using dry insulating material (such as wood or plastic).
- If the person is unconscious:
  - Check their pulse and reanimate if their respiration is poor.
  - Lay the body down and turn it to one side. Call for a doctor immediately.
- Having sustained an electric shock, always consult a doctor.

Intended Operation

ACE is a professional audio processing and routing device for use in live sound, installation, studio, and broadcast environments. It is not a consumer product and must be installed and operated in technically controlled environments.

Functional Purpose

- ACE is designed for audio signal processing, conversion, and routing between analog, digital, and network audio signals*, as well as for interfacing with digital audio workstations.
- ACE provides application-specific workflows (e.g. PA tuning, playback, personal monitoring, commentary, automixing)
- ACE offers optional advanced functions via software licenses (e.g. extended DSP routing, SRC, automixer, control protocols)
- ACE operates in either one of the following modes:
  - ACE modes – simplified, application-oriented configurations using a dedicated user interface in globcon
  - PRODIGY mode – advanced configuration via globcon for experienced users

* Digital audio refers to AES3 and AES10 (MADI), while network audio refers to Dante and AVB / MILAN. Interfacing refers to USB audio.

Intended User

ACE is intended for use by trained personnel in professional audio applications:

- Audio technicians, system integrators and engineers
- Trained operators in professional audio environments
- Knowledgeable advanced users

Users must:

- Understand basic audio signal flow
- Follow the safety and installation instructions in this manual
- Observe applicable standards and local regulations

Conditions of Use

- Indoor or equivalent protected environments, within specified temperature (5° C and 45° C) and
  humidity limits (maximum relative humidity of 80 %,non-condensing).
- Operation at altitudes up to 3000 m above sea level.
- It must be ensured that the active cooling system can function correctly at all times.
- Approved environment: EMC Class B.
- Use only with approved accessories, cabling and control software from DirectOut.
- Use only with officially provided and licensed features.
- This equipment is not suitable for use in locations where children are likely to be present.
- Any use outside these applications, user groups or conditions is not in accordance with the intended use.

WARNING!

No compensation can be claimed for damages caused by operation of this unit other than for the intended use described above. Consecutive damages are also excluded explicitly. The general terms and conditions of business of DirectOut GmbH are applied.

Conditions of Warranty

This unit has been designed and examined carefully by the manufacturer and complies with actual norms and directives.
Warranty is granted by DirectOut GmbH over the period of 36 months for all components that are essential for proper and intended operation of the device. The date of purchase is applied for this period.
Consumable parts (e.g. battery) are excluded from warranty claims.

WARNING!

All claims of warranty will expire once the device has been opened or modified, or if instructions and warnings were ignored.
For warranty claims please contact the dealer where your device was acquired.

Conformity & Certificates - External Power Supply

Model: D65A-PD65W-C14

The external power supply model D65A-PD65W-C14 has been subjected to conformity assessment procedures and evaluated in accordance with applicable international standards governing electrical safety, electromagnetic compatibility (EMC), energy efficiency, and environmental compliance. Testing and certification have been performed by accredited laboratories and recognized certification bodies where required.

European Union (EU) and United Kingdom (UK)

- CE Marking – Declaration of conformity with applicable EU directives and regulations, including but not limited to the Low Voltage Directive (LVD) and EMC Directive
- TÜV/GS (Geprüfte Sicherheit) – Independent third-party certification confirming compliance with recognized safety standards
- RoHS Directive – Compliance with restrictions on hazardous substances
- REACH Regulation – Compliance with chemical substance requirements
- ErP Directive – Conformity with applicable energy-related product requirements
- IECEE CB Scheme – International certification supporting conformity assessment and market access
- UKCA- United Kingdom (UK) – National deviations covered via the CB scheme, where applicable

North America (United States and Canada)

- cETLus (Canada / United States) – Certification to applicable North American electrical safety standards (e.g., UL/CSA)
- FCC (United States) – Compliance with limits for electromagnetic emissions under applicable regulations
- DoE Level VI (United States) – Compliance with energy efficiency requirements for external power supplies

International / Cross-Regional Standards

- IECEE CB scheme – Facilitates mutual recognition of test results across participating countries

General Compliance Statement

The above certifications and approvals confirm that model D65A-PD65W-C14 complies with applicable statutory and regulatory requirements in the regions specified. Compliance is valid provided that the product is used strictly in accordance with its intended purpose, rated input/output specifications, and defined operating conditions.

To remain within the intended compliance conditions, users should observe the following:

- Use the power supply indoors only.
- Operate it only within the specified input range and environmental conditions.
- Do not open, modify, or repair the unit unless performed by authorized qualified personnel.
- Use the product only for compatible equipment that accepts the stated USB-C PD output profiles.
- Replace damaged units rather than continuing operation with cracked housing, damaged cable, or bent connectors.
- Dispose of the product through approved e-waste channels at end of life.

WARNING

Certification applies to the approved product configuration. Unauthorized modifications, relabeling, component substitution, or use outside the specified conditions can invalidate compliance and may create safety or EMC risks.

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Conformity & Certificates

CE

This device complies with the basic requests of applicable EU guidelines. The appropriate procedure for approval has been carried out.

RoHS

(Restriction of the use of certain Hazardous Substances)
This device was constructed fulfilling the directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2011/65/EU and 2015/863.

WEEE

(Directive on Waste Electrical and Electronic Equipment)
Due to the directive 2002/96/EC for waste disposal this device must be recycled.
For correct recycling please dispatch the device to:
DirectOut GmbH,
Hainichener Str. 66a
09648 Mittweida
Germany
Only stamped parcels will be accepted!
WEEE-Reg.-No. DE 64879540

LUCID

LUCID-Reg-No.: DE1314118018883

Contact

DirectOut GmbH
Hainichener Str. 66a, 09648 Mittweida, Germany
Phone: +49 (0)3727 5650-00
Mail: sales@directout.eu
www.directout.eu

CHAPTER 3: Installation

Installing the Device

1. Open the packaging and check that the contents have been delivered complete and undamaged.
2. Place the device on a non-slip horizontal surface.

WARNING!

Avoid damage from condensation by waiting for the device to adapt to the environmental temperature. Proper operation can only be guaranteed between temperatures of 5° C and 45° C and a maximum relative humidity of 80%, non-condensing.
Ensure that the unit has sufficient air circulation for cooling.
Do not cover the fan outlets and the slots at the sides of the device!
Do not block the fans by putting objects through the protective grid!

3. Connect the supplied audio signal cables to the DSUB25 ports.
   To connect MADI or USB audio plug the transceivers* to the SFP ports - see „SFP Transceiver- MADI“ on page 14 or
   see „SFP Transceiver- USB.MADI“ on page 13.
   To connect network audio use ethernet cabling (Cat 6 STP)*.
   To connect word clock, use appropriate cabling (BNC 75 Ω)*.

* not included in delivery

4. Connect a network cable to the socket ‘MGMT’ to control the device via network.

5. Connect the USB-C cable of the supplied external PSU to one USB-C port labelled ‘POWER’. Then connect the external PSU to a matching power supply.

WARNING!

The external PSU must be connected to the mains using the three-cord power lead supplied with the system. Only supply the voltages and signals indicated (84 V – 264 V). Proper grounding is mandatory.

6. Press and hold the encoder on the front for more than 3 seconds to switch on the device.

Check the display on the front panel for warnings.

NOTE

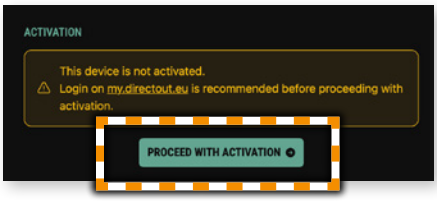
The device remembers its last on/off state. If it is switched on when power is interrupted, it will automatically turn on again once power is restored ('always on'). To switch the device off, press and hold the encoder for 3 seconds.

7. Associate device
Prerequisites:
- ACE is connected to the same network as your computer.
- The network is 'online' = fast track or 'offline' = copy & paste, down-/ upload.

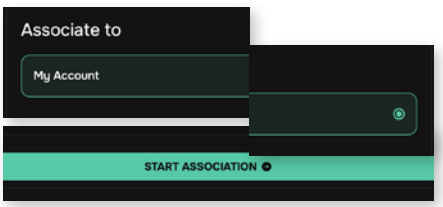
Procedure- Associate Device:
- Open URL <DEVICE-IP>*

* default IP: DHCP. The IP address is assigned by the DHCP server of your network and can be checked or altered on the display at the front panel.

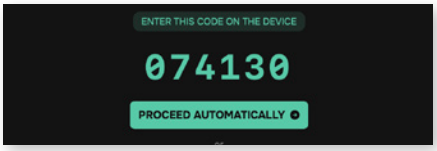
- Click ‚Proceed with activation'

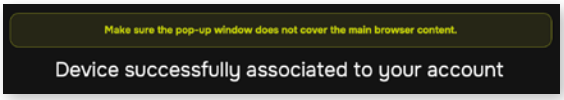


- new window ‚Associate Device'
- Click ‚My Account' and ‚Start association'



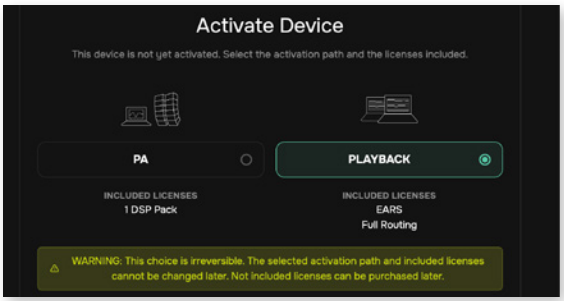
- 6 digit code will be displayed click ‘Proceed Automatically’



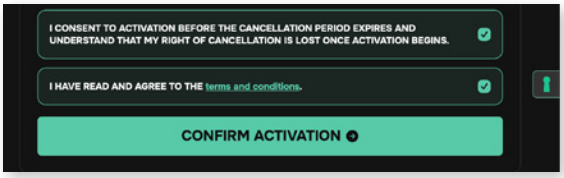


8. Activate Device

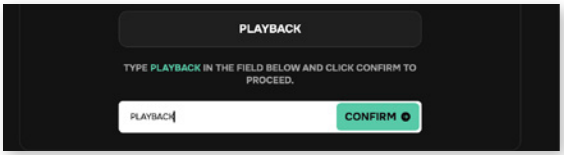
- Select activation (choice is not reversible!)



- Consent to disclaimer and terms & conditions
- Click ‘Confirm Activation’

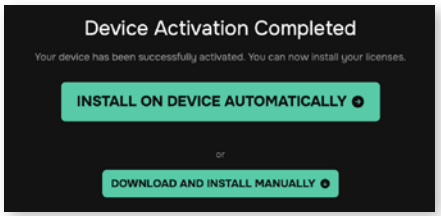


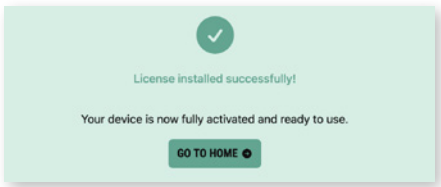
- Second confirmation: Enter the text as prompted and ‚Confirm‘



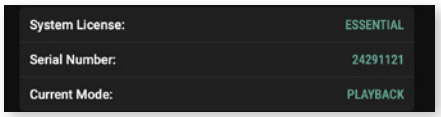
9. Installation software license

- Install on device automatically or Download and install manually





- ✓ device associated
- ✓ device activated
- ✓ license installed

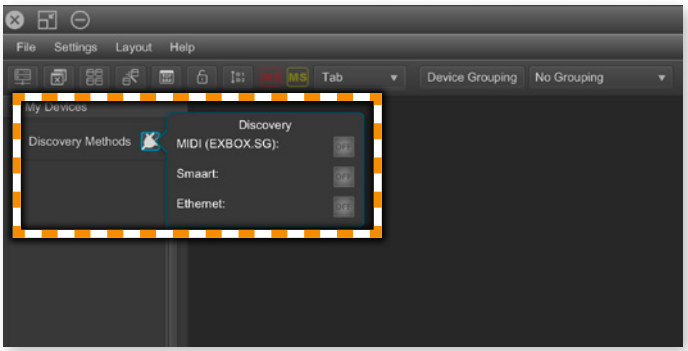


10. Install globcon on your computer

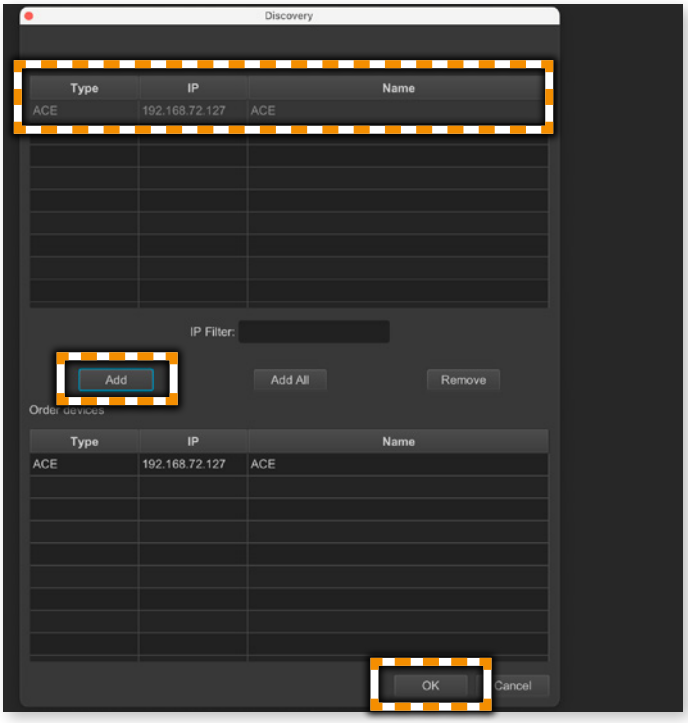
To access all functions the use of globcon is required - see page 12.

11. Launch globcon control

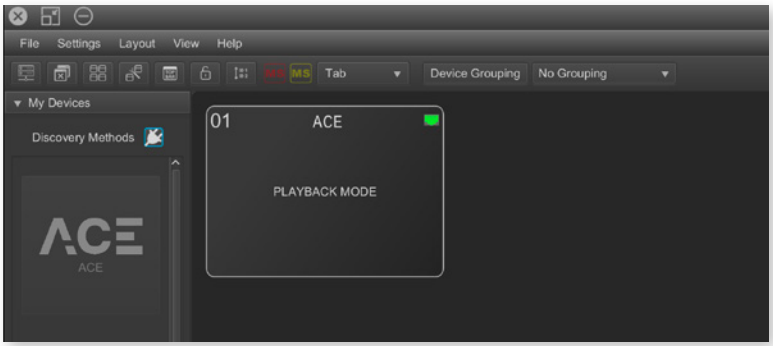
My Devices - click icon Discovery Methods and select Ethernet



Select the device from the list and click 'ADD' and 'OK'.



12. The device is displayed in the overview of globcon (here in PLAYBACK Mode).



Double-Click the icon of the device to open the control.

NOTE

For globcon control of the device the network infastructure is required to have ports 5002, 5003 and 5004 unfiltered for TCP traffic.
Since the device discovery uses multicast-DNS (mDNS), the device may be discovered but cannot be controlled if the ports 5002, 5003 and 5004 are filtered.

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CHAPTER 4: Operation

Introduction

This chapter describes the basic operation of the device.
Note that throughout this manual, the abbreviation FS refers to sample rate or sample frequency. So, when dealing with scaling factors, the following sample rates can be written as:

- 44.1 kHz or 48 kHz = 1 FS
- 88.2 kHz or 96 kHz = 2 FS
- 176.4 kHz or 192 kHz = 4 FS

Global Control

The display on the front panel indicates the power supply. To switch on or off the device, press and hold the encoder on the front for more than 3 seconds.

CONTROL	**Encoder to adjust values and confirmation.** Enable / disable power supply, press and hold more than 3 seconds.
POWER 1 & 2	**LED RGB - indicates state of power supply** (OFF) = power supply not working (ON, green) = power supply working (blinking, green) = power supply active after failing (blinking, red) = power supply was active and is now inactive.

POWER 1 & 2	**USB socket (Type C, lockable) for power supply.** Connect the external power supply here.

NOTE

The USB-C ports 'POWER' only provide power supply to the device and cannot be used for charging other devices. Only connect power supplies from DirectOut to these ports.

Managing Device

The device is equipped with a touch-display, an encoder and two push buttons for local control. For remote operation a network socket is provided at the rear panel to operate the device via a browser based GUI or via globcon.

MENU	**Push-button to access / exit the MENU.** Press shortly to call the top menu.
BACK	**Push-button to return to previous page.** Press shortly to return to the previous page.
Display	**Touch-Display to navigate the menu, adjust settings and for monitoring.** tap, swipe to operate
CONTROL	**Encoder to adjust values and confirmation.** Rotate to modify values. Press to confirm a setting.

USB Control

ACE provides two USB ports to manage the device via tablet devices. This provides a compact, wired control surface without requiring a separate network infrastructure.

USB Type A	**USB 2.0 socket (Type A)** Connect here for remote control via tablet device.
USB Type C	**USB 3.1 socket (Type C, lockable)** Connect here for remote control via tablet device.

WARNING

The USB-C port is intended for control connection only. It provides limited power for connected tablets/hosts and must not be used as a primary charger. For reliable operation, especially with power-hungry devices, use the device's own power supply.

Networking

ACE uses separate network links for managing the device and network audio transmission.

MGMT **1**	**1 x RJ 45 socket (1 Gbit/s)** Network interface - connect here for network control and firmware updates.
MGMT	**LED orange - indicates the link state of the network connection.*** (ON) = device link active (OFF) = device link not active
MGMT	**LED green - indicates the activity state of the network connection.** (ON) = data sent or received (OFF) = no data transmission
AUDIO NETWORK PORT 1 / PORT 2 **2**	**2 x RJ 45 socket (1 Gbit/s)** Network interface - connect here for network audio transmission.

* Some possible reasons that lead to an inactive link
- device switched off
- connected device switched off
- cabling issue

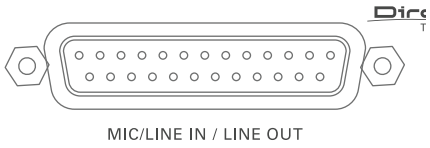
Connecting audio - rear

ACE features various types of inputs and outputs for audio:
analog Mic/Line, AES3, MADI (AES10), network audio (Dante, MILAN)
USB audio is available via USB.MADI, which is an SFP transceiver being plugged to MADI SFP port.

MIC/LINE IN / LINE OUT **1**	**1 x DSUB-25 Port (AES59 pinout)*** Analog audio input (balanced)- connect mic / line level audio source here. Analog audio output (balanced)- connect for line level audio here
AES3 IN / OUT **2**	**1 x DSUB-25 Port (AES59 pinout)*** Digital audio input and output (AES3)- connect for digital audio here
MADI 1 to MADI 4 **3**	**4 x SFP cage** Insert 'SFP transceiver MADI' (see page 14) here and connect MADI input/output, or insert 'SFP transceiver USB.MADI' (see page 13) here and connect USB audio input/output.
AUDIO NETWORK PORT 1 / PORT 2 **4**	**2 x RJ 45 socket (1 Gbit/s)** Network interface - connect here for network audio transmission.

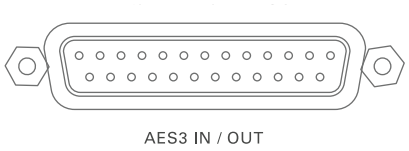
* To connect audio via the DSUB-25 port you may use the supplied breakout to XLR cable (DSUB25.AES59).
See "Appendix A- DSUB-25 Pin assignment" on page 50.

Mic/Line input / Line output



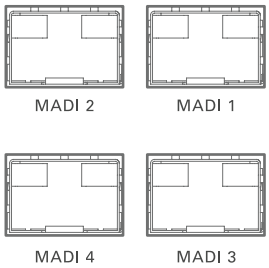
Input	4 audio channels via DSUB25.AES59
Output	4 audio channels via DSUB25.AES59

AES3 input / output



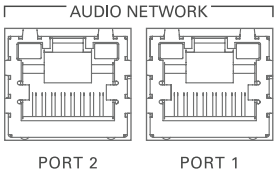
Input	8 audio channels via DSUB25.AES59
Output	8 audio channels via DSUB25.AES59

MADI input / output



Input	64 audio channels MADI (AES10) via SFP transceiver
Output	64 audio channels MADI (AES10) via SFP transceiver

Audio Network



Input	64 audio channels Dante or MILAN
Output	64 audio channels Dante or MILAN

Connecting audio - front

ACE provides four headphone output for local monitoring.

PHONES 1 to 4	**4 x 6.3 mm TRS jack, mono / stereo** Connect headphones for monitoring output here.
PHONES 1 (alt.)	**1 x 3.5 mm TRS jack, mono / stereo** Connect headphones for monitoring output here.

NOTE

Either one of the Phones outputs 1 may be connected at a time.

NOTE

Headphone routing - the headphone output (Phones 3/4) is hard-linked to Line Out 1–4. It always carries the same source signal at the same level as the corresponding line outputs and cannot be configured independently.

WARNING

High volume levels at the headphone output may cause hearing damage. Always use safe listening level.

Word Clock

The word clock output provides the system clock that is either derived from PTP / Network Audio input, AES input, word clock input, MADI input or internal clock generator.

WCK OUT	**BNC socket (coaxial), 75 Ω** System clock output- connect for word clock output signal here.
WCK IN	**BNC socket (coaxial), 75 Ω** Connect word clock here.

Termination (75 Ω) for the word clock inputs is switchable locally or via remote control.

GPIO

General Purpose Input and Output
Two MOSFET switches (2 x GPO) can be triggered. A power supply (12 V, max. 200 mA) is also provided. This allows to remote control external devices; e.g. a recording light.

Two GPIs can be triggered by connecting the input pin with ground (GND) or by a voltage source between input pin and ground. The high level of the voltage may range between 2 V and 30 V due to a safety limiter in the input.

GPIO	**DSUB-9 socket (female)** Connect for GPIO application here.

Observe the pin out - see “Appendix B- DSUB-9 Pin assignment” on page 51.

Front panel control - MENU

The front panel provides a touch display, push buttons and an encoder to adjust basic device functions. Press the button MENU to access or exit the menu- see “Managing Device” on page 34 for a description of all controls

Phones / Monitors	Phones 1 to 4	Source
		Volume
		Mute
Management Configuration	Current Configuration	
	Change Configuration	
	Interface Speed	
Snapshot	Current	
	Recall	
	Mode	
Sync	Status	
	Clock Source	
	Factor	Follow Factor
		Multiplier
	SRCs	MADI 1 to 4 FastSRC
		SLOT A FastSRC
Settings	Brightness	
	Remote Shutdown	
	PIN	Enable Time Out
		Change Time Out
		Change PIN
		Remove PIN
Info	Version	
	System License	
	Licenses	
	OSS	

Phones / Monitors
Control of phones or monitoring output

Management configurationl
Setup of network control settings and interface speed of MGMT port

Snapshot
Display, recall of stored device settings. Toggle between Show or Config mode.

Sync
Clock settings, scaling factor and sample rate conversion

Settings
Display settings, access protection (pin, remote shutdown)

Info
Installed system version, licenses

Operating Modes (ACE / PRODIGY)

ACE operates in either one of the following modes:

- ACE modes – simplified, application-oriented configurations using a dedicated user interface in globcon
- PRODIGY mode – advanced configuration via globcon for experienced users

Modes - Display

The active operating mode is displayed at the front panel.

ACE Mode PA

ACE Mode PLAYBACK

PRODIGY Mode

The availability of each mode depends on the licenses installed on the device.

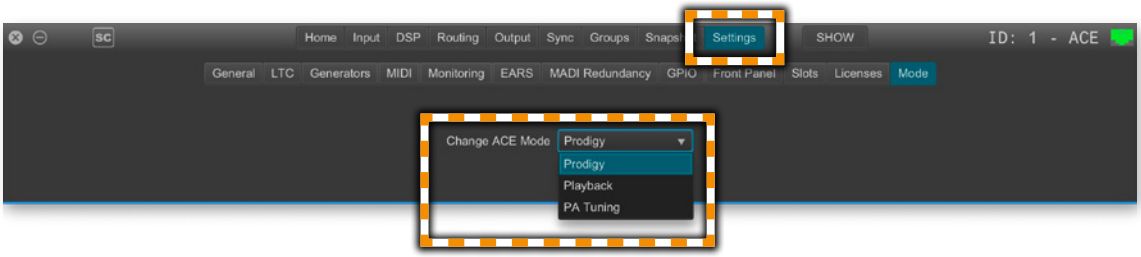
Minimum license requirements for each mode:

Mode	DSP Pack	EARS	Full Routing
ACE - PA4	1		
ACE - PA8	2		
ACE - PLAYBACK		yes	yes
PRODIGY			yes

Modes - Switching

To switch between modes:

- use globcon
- navigate to the tab ‘Settings - Mode’.



NOTE

Switching between modes will require a reboot of the system and interrupt audio.

CHAPTER 5 : Technical Data

Dimensions (sketch on page 52)

- Width 310 mm / 315.6 mm
- Height 44 mm
- Depth 210 mm / 239 mm
- Weight about 3.7 kg

Power Consumption

- 60 W

Power Supply

- external via USB (Type C, lockable), 20 V DC
- C14 socket, 65 W USB-C, PD 3.0 with centric screw
- certified according to:
  TÜV/GS, CE, UKCA, C-ETL-US (Kanada / USA),
  FCC (USA), ROHS, ERP, REACH, DoE Level VI

Environmental Conditions

- Operating temperature +5°C up to +45°C
- Relative humidity: 10% - 80%, non condensing
- Altitudes up to 3000 m above sea level

Display

- 3.5" Backlight LED LCD, IPS Transmissive
- Touch display
- Resolution: 340 x 800 px

Control

- 1 x Encoder knob with push functionality
- 2 x Push-Buttons

Network

- 1 x RJ45 (1 Gbit/s)
- for managing the device (remote control)

NOTE

For 1 Gbit/s network transmission use Cat 5e or higher twisted-pair Ethernet cables with RJ45 connectors. Use shielded cables (STP) in environments with increased electromagnetic interference. Using unsuitable cabling may result in transmission errors or degraded performance.

Remote Control

- globcon software control
- integrated web server with UI (HTML, JavaScript)
- tablet, via USB (type A and type C, lockable)

Word Clock / Video

- 2 x BNC socket (input / output)
- Video sync: analog, black burst or tri-level
- Impedance: 75 Ω (termination switchable)

NOTE

For video or word clock transmission use only high-quality 75 Ω coaxial cables (e.g., Belden 1694A or equivalent) with proper shielding. Incorrect or unsuitable cables may lead to signal loss or interference.

Sample Rate

- 30 - 50 kHz @ 1 FS
- 60 - 100 kHz @ 2 FS
- 120- 200 kHz @ 4 FS

USB

- 1 x USB socket (Type A)
- 1 x USB socket (Type C PD), lockable with top-screw plug
- for control from a tablet device

GPIO

- DSUB-9 socket, female
- 2 x GPI (MOSFET switch)
- 2 x GPO (MOSFET switch)

MADI Port SFP

- 4 x SFP (empty cage without module)
- 64 channels @ 1 FS, 32 channels @ 2 FS, 16 channels @ 4 FS
- SFP power consumption: 1 W (3.3 V, max 300 mA)

MADI Format (I/O)

- 48k Frame, 96k Frame, S/MUX or Native
- High Speed or Legacy
- 56 channel, 57 channel, 64 channel

Analog Input

- 4 channels MIC/LINE input, balanced, via DSUB-25 (pinout AES59)
- Input sensitivity:-55 dBu to +24 dBu
- 9 dB PAD (switchable)
- THD @-1 dBFS:-113 dB
- SNR @ 0 dB Gain:-118 dBFS RMS (20 Hz- 20 kHz)
- EIN @ 60 dB Gain:-118 dBu (20Hz Hz- 20 kHz)
- Frequency response:-0.5 dB (10 Hz to FS/2)
- +48 V phantom power (switchable)

Analog Output

- 4 channels LINE output, balanced, via DSUB-25 (pinout AES59)
- SNR:-119 dB (20Hz- 20kHz)
- THD+N @-0 dBFS:-109 dB (@ 24 dBu)

AES3 Input / Output

- 4 x AES3 ports input / output, via DSUB-25 (pinout AES59)
- 8 audio channels (input / output)

NOTE

For analog or AES3 transmision only use high-quality multicore audio cables (e.g., Cordial CMD 8 or equivalent) with adequate shielding. Improper or low-quality cables may cause interference or signal degradation.

Phones Out 1 to 4

- 4 x 6.3 mm TRS jack, mono / stereo
- Output level: max. +18 dBu
- SNR:-118 dB RMS (20 Hz- 20 kHz)
- THD+N @ 0 dBFS:-109 dB @ 600 Ω

Phones Out 1 (alt.)

- 1 x 3.5 mm TRS jack, mono / stereo
- Output level: max. +18 dBu
- SNR:-118 dB RMS (20 Hz- 20 kHz)
- THD+N @ 0 dBFS:-109 dB @ 600 Ω

Network Audio

- 2 x RJ45 socket (1 Gbit/s)
- for audio transmission (Dante or AVB/MILAN)
- 64 channels @ 1 FS, 32 channels @ 2 FS, 16 channels @ 4 FS

NOTE

For 1 Gbit/s network audio transmission use Cat 5e or higher twisted-pair Ethernet cables with RJ45 connectors. Use shielded cables (STP) in environments with increased electromagnetic interference. Using unsuitable cabling may result in transmission errors or degraded performance.

DSUB-9 / DSUB-25 internal thread

- 4-40 UNC thread

Index

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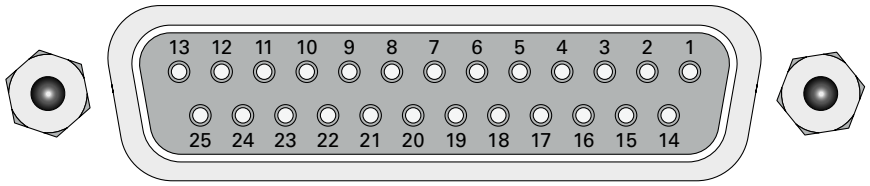
Appendix A - DSUB-25 Pin assignment

The pinout of the DSUB-25 connectors for the transmission of analog and AES3 audio signals follows the AES59 specification.

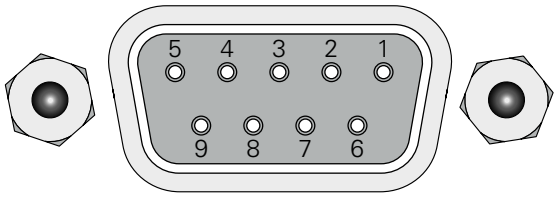


jack- female

PIN	Signal analog	Signal digital
1	CH 4 OUT +	CH 4 OUT +
2	GND	GND
3	CH 3 OUT –	CH 3 OUT –
4	CH 2 OUT +	CH 2 OUT +
5	GND	GND
6	CH 1 OUT –	CH 1 OUT –
7	CH 4 IN +	CH 4 IN +
8	GND	GND
9	CH 3 IN –	CH 3 IN –
10	CH 2 IN +	CH 2 IN +
11	GND	GND
12	CH 1 IN –	CH 1 IN –
13		
14	CH 4 OUT –	CH 4 OUT –
15	CH 3 OUT +	CH 3 OUT +
16	GND	GND
17	CH 2 OUT –	CH 2 OUT –
18	CH 1 OUT +	CH 1 OUT +
19	GND	GND
20	CH 4 IN –	CH 4 IN –
21	CH 3 IN +	CH 3 IN +
22	GND	GND
23	CH 2 IN –	CH 2 IN –
24	CH 1 IN +	CH 1 IN +
25	GND	GND

Appendix B - DSUB-9 Pin assignment

The pinout of the DSUB-9 connector for the GPI (General Purpose Input) and GPO (General Purpose Output).



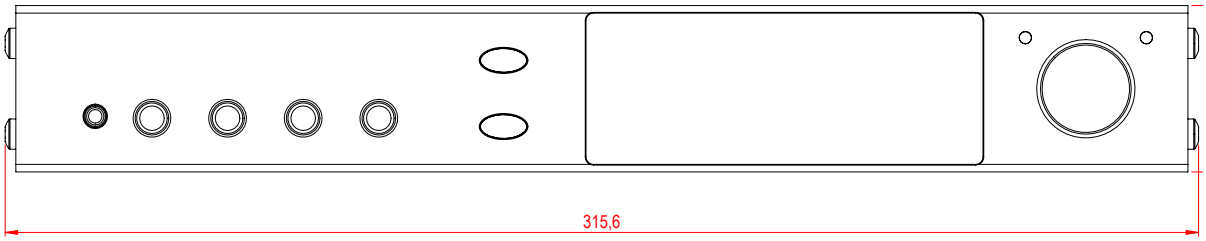
jack- female

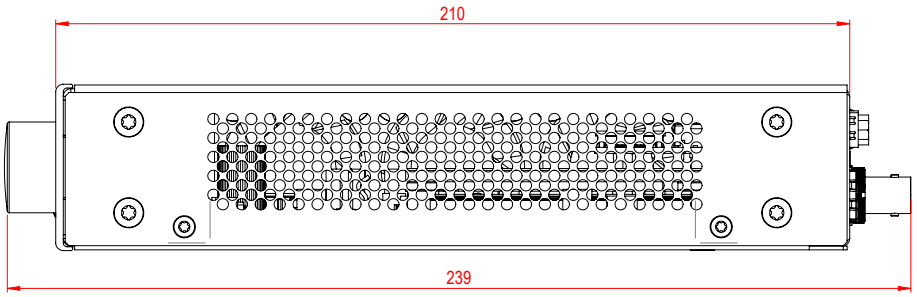
PIN	Signal GPIO
1	GND
2	GND
3	GND
4	+ 12 V
5	+ 12 V
6	GPI 2
7	GPI 1
8	GPO 2
9	GPO 1

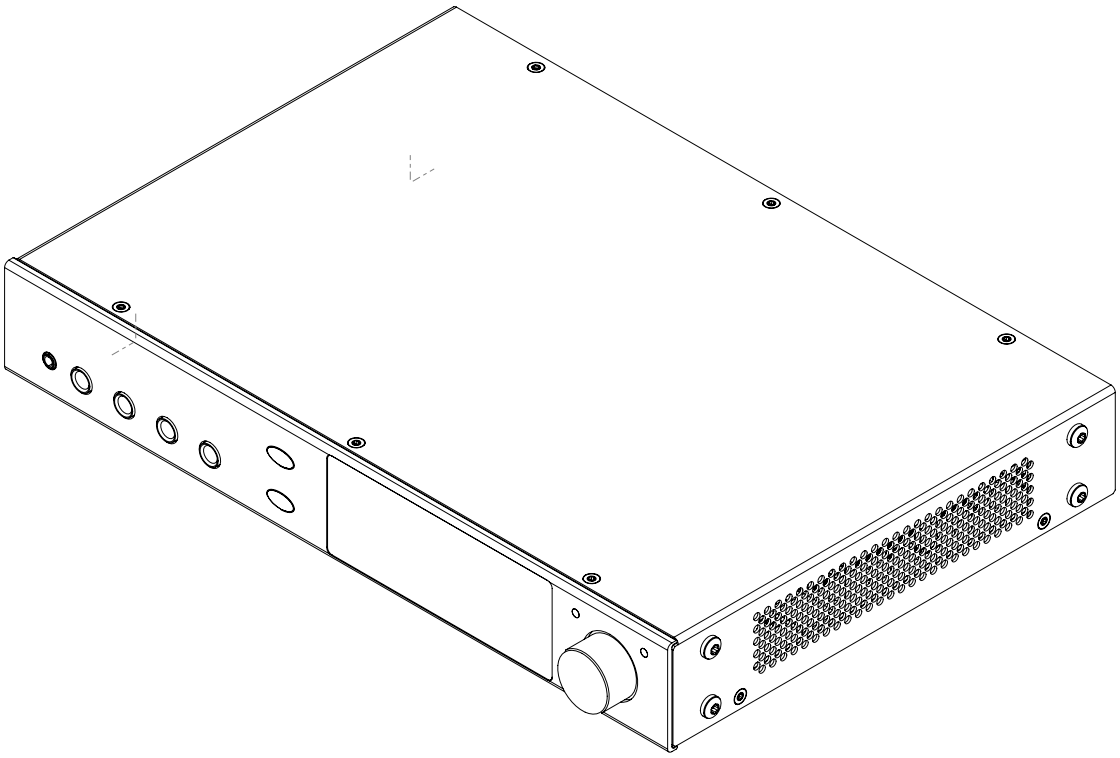
GPI - 3.3 V CMOS compatible, low active
Can be triggered by connecting the input pin with ground (GND) or by a voltage source between input pin and ground.
Input voltage: max 30 V DC

GPO - Open drain MOSFET switch - max. 30 V, max. 200 mA.
Power supply: + 12 V, max. 200 mA (in total)
The pinout (3, 4, 5, 8, 9) complies with the GPO of PRODUCER.COM

Appendix C - Dimensions







Appendix D - System Update & License Installation

To update the system of ACE or to install a license use the Live Installer.

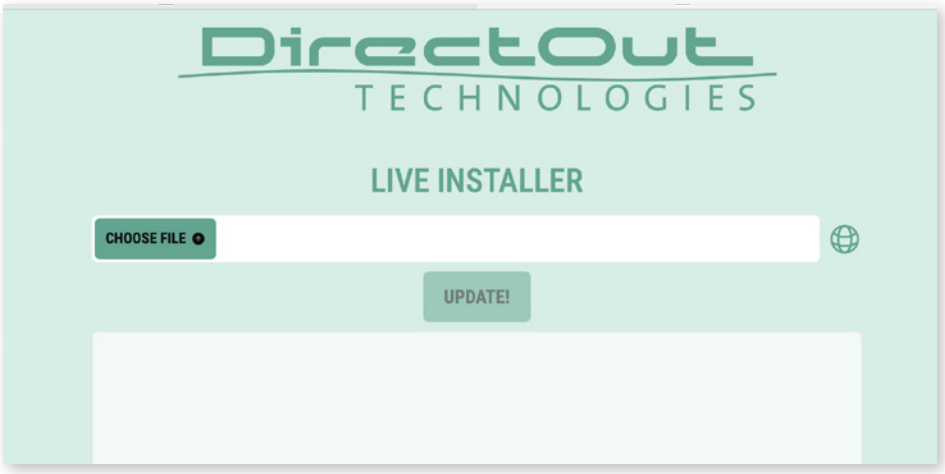
WARNING!

It is strongly recommended to backup the device configuration before running any update.

NOTE

During the update the device will reboot and audio will be interrupted

1. Download image archive from the support page at support.directout.eu
2. Enter the device's <IP address>:8080 (Live Installer) in your browser (Mozilla Firefox or Google Chrome). The IP address is displayed in the front panel display.
3. Choose the downloaded file for upload (*.ace) and start with 'UPDATE!' The entire update may take a couple of minutes.



Once the update has finished sucessfully the device will become offline, reboot and become online again.

WARNING

Do not disconnect the power supply during the update process.

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