DirectOut TECHNOLOGIES

ANDIAMO 2

Hardware Guide

Version 2.1

Table of contents

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.

This document relates to:

- ANDIAMO 2 - firmware version 6.1

CHAPTER 1: Overview

Introduction

The ANDIAMO 2 is a high quality AD/DA converter for MADI signals. It provides two MADI inputs and outputs and 32 channels analog inputs and outputs.

With one RU height, two redundant power supplies and excellent sounding converters the device offers best and reliable audio quality at a minimal need of rackspace.

Feature Summary

MADI Ports	2 x SC-Socket multi/single-mode (SC/SC) or 1 x SC-Socket multi/single-mode & 1 x coaxial BNC connector, 75 Ω (BNC/SC)
MADI Formats	56/64 channel, 48k/96k Frame, S/MUX 2/4
Sample Rates	44.1, 48, 88.2, 96, 176.4, 192 kHz ±12.5%
Analog I/O	32 x channels analog input and output, balanced via DSUB-25, AES59 compliant
Clock Inputs	1 x Word clock, coaxial BNC, 75 Ω termination switchable, This input also accepts an AES3 frame (AES11).
Clock Outputs	1 x Word clock, coaxial BNC
USB Port	USB 2.0 port for firmware updates and remote control
Routing Matrix	Signal routing on a per channel basis 160 x 160 routing matrix.
Remote Control	Software Remote control via USB, Serial over MADI, MIDI over MADI or DO.Net
Power Supply	This device is equipped with two wide range power supplies (84 V to 264 V AC / 47 Hz to 63 Hz / safety class 1)

Applications

ANDIAMO 2 can be used for conversion, monitoring, recording and routing of analog and digital signals.

Typical applications include:

- monitoring digital audio
- recording line signals
- redundant recording using both MADI I/Os
- signal routing / distribution (160 x 160 cross points)
- format conversion of MADI signals
- ...

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.
- 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.

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.

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 firmware version 6.1.

Intended Operation

ANDIAMO 2 is designed for conversion of audio signals from analog to digital and vice versa. In this context digital audio refers to a MADI signal (AES10).

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 two years 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

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 2002/95/EC.

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,
Leipziger Str. 32
09648 Mittweida
Germany
Only stamped parcels will be accepted!
WEEE-Reg.-No. DE 64879540

Contact

DirectOut GmbH
Leipziger Str. 32, 09648 Mittweida, Germany
Phone: +49 (0)3727 5665-100
Fax: +49 (0)3727 5665-101
Mail: sales@directout.eu
www.directout.eu

Contents

The contents of your ANDIAMO 2 package should include:

- 1 x ANDIAMO 2 (19'', 1 RU)
- 2 x power chord
- 2 x fixing unit for power plug
- 1 x Hardware Guide

To complete the delivery please download from the product page on the DirectOut website (www.directout.eu):

- USB Serial driver
- latest firmware
- Software Guide ANDIAMO Remote
- ANDIAMO Remote application

Two different MADI I/O configurations are available:

1 x SC-Socket
1 x BNC coaxial

2 x SC-Socket

Three different versions with different analog reference levels are available:

- + 6 / + 15 dBu
- + 9 / + 18 dBu
- + 15 / + 24 dBu

The version is marked on the rear panel (I/O level).

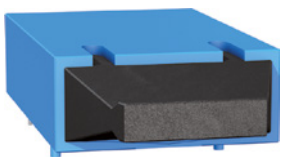
NOTE

Check the I/O configuration (MADI Ports and analog reference level) of your device before proceeding with the installation.

Single-Mode / Multi-Mode

The SC ports are multi-mode as default. It is possible to equip the device with single-mode SC ports. The housing of single-mode ports is colored blue.

multi-mode



single-mode

Accessories

BREAKOUT

The BREAKOUT series is a range of adaptor boxes available in different variants to extend the coverage of the ANDIAMO series. They are equipped with XLR or BNC connectors on the front panel and DSUB-25 connectors on the rear panel. Audio signals are carried passively between the front and rear panels.

The small form factor and angle brackets also allow for mounting the devices on the back of an ANDIAMO unit.

BREAKOUT.AN8 - analog input / output, 8 channels
Article code: DOBOB0719

BREAKOUT.AN16I - analog input, 16 channels
Article code: DOBOB0720

BREAKOUT.AN16O - analog output, 16 channels
Article code: DOBOB0721

BREAKOUT.AES - digital input / output, 8 AES3 ports (16 channels)
Article Code: DOBOB0718

BREAKOUT.AESID - digital input / output, 16 AESid ports (32 channels)
Article Code: DOBOB0722

Patch Chords

Cabling from Cordial provides appropriate connection of the BREAKOUT with your ANDIAMO device to ensure proper transmission of the audio signals.

Name	Description	Article code
DSUB25.AN50	Analog patch cable for connection with BREAKOUT.AN16I, AN16O, AN8, transferring 8 audio channels, length 0.5 m	DOCAA0334
DSUB25.AN100	Analog patch cable for connection with BREAKOUT.AN16I, AN16O, AN8, transferring 8 audio channels, length 1.0 m	DOCAA0335
DSUB25.AES50	Digital patch cable for connection with BREAKOUT.AES or AESid transferring 8 audio channels, length 0.5 m	DOCAA0332
DSUB25.AES100	Digital patch cable for connection with BREAKOUT.AES or AESid transferring 8 audio channels, length 0.5 m	DOCAA0333

CHAPTER 3: Installation

Installing the Device

1. Open the packaging and check that the contents have been delivered complete and undamaged.
2. Fix the device in a 19'' frame with four screws, or place it 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. Remove the protective cap from the optical MADI port(s) before use.

BNC / SC Version

SC / SC Version

NOTE

Retain the protective cap if the optical port is unused. This will protect against soiling which can lead to malfunction.

4. Connect the signal cables for the analog audio signals to the DSUB-25 connectors.

WARNING

Do not connect voltage sources to the analog outputs. This may cause damage at the output stages.

5. Using the power cord provided connect the PSU to a matching power supply:

WARNING

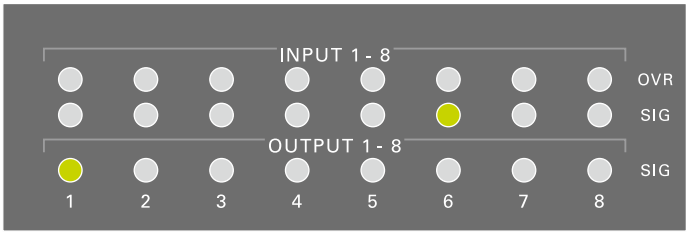
This device must be connected to the mains using the three-cord power leads supplied with the system. Only supply the voltages and signals indicated (84 V – 264 V).

NOTE

This device may operate with only one power supply. To provide power supply redundancy, it is recommended to connect both PSU 1 and PSU 2 to independent power supplies with separate fuses.

6. Turn on the power switch and check the status of PSUs on the front panel:

While the device is booting the currently installed firmware is indicated in the display - e.g. firmware version 6.1.



7. Check if the latest firmware is installed on the device. It is recommended to use the latest version that is available on the product page at www.directout.eu.

8. Optional: Connect an USB cable to the USB port for firmware updates. This requires the USB Serial driver (Windows®) being installed first. The driver and the installation instructions are available at www.directout.eu.

NOTE

To update the firmware an installed USB Serial driver (Windows®) and the Update Tool are necessary. The software and the installation instructions are available at www.directout.eu.

9. Installation of USB Serial driver

- download the USB Serial driver
- download the 'Installation Guide for USB Control
- follow the installation instructions in the 'Installation Guide for USB Control'

TIP

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

10. Installation of 'ANDIAMO Remote' (Windows® / OS X®)

- download the 'Software Guide ANDIAMO Remote'
- download the 'ANDIAMO Remote' application
- follow the installation instructions in the 'Software Guide ANDIAMO Remote'

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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 control on the right of the front panel indicates the power supply. Power switches are on the back panel:

PSU 1 & PSU 2 (rear)	**2 Switches** Enable / disable power supply.
PSU 1 & PSU 2 (rear)	**C13 socket** Connect the power supply here (84- 264 V AC).
PSU 1 & PSU 2 (front)	**2 LEDs (green): indicate the status of both power supply units** LED OFF = Power supply inactive LED ON = Power supply active

NOTE

The green LEDs (PSU 1 & PSU 2) indicate that a working power supply is connected to the power supply unit. Note that an unlit LED does not guarantee that the device is free of voltage. To ensure that the device is completely disconnected from mains voltage, the power chords must be disconnected.

Menu Control

All functions of the converter can be accessed using a simple menu. Two pairs of push buttons are used for navigation and settings.
See „CHAPTER 5: Menu Navigation“ on page 38.

SELECT	**Push button** Press longer than 2 seconds to enter the menu. Press short to cycle through the menu.
SET	**Push button** Only active in menu mode. Press short to adjust a setting. Press longer than 2 seconds to toggle the Matrix Mode.

When the menu mode is active a LED will blink in one of the sections while the remaining LEDs of this section are glowing weak.
This indicates:

- a setting can be adjusted in this section
- the blinking LED(s) is the selected option in this section

After a short period of time the menu mode is exit automatically.

NOTE

Blinking LEDs are also used to indicate an error (e.g. missing sync). Concentrate on the section where one LED is blinking and the remaining LEDs are glowing weak.

The device settings can be adjusted either locally or via remote control.

ANDIAMO Remote offers access to additional settings:

- Routing Matrix (Matrix Mode / Extended Routing)
- Output gain/level trim for individual channels
- AD/DA calibration in 0.1 dB increments
- Configuration of the system fan control
- Redundancy Modes
- USB Embedder
- Preset management
- Display Dark

The settings are stored inside the device.

Clocking

Selectable clock sources are word clock, MADI input or the internal clock. LEDs on the front panel inform about selection and sync state of the selected source. The current system clock is provided at the word clock output.
The clock setting can be altered via remote control or locally -
see „CHAPTER 5: Menu Navigation“ on page 38.

INT	**LED (green): indicates use of internal clock generator as clock source** LED ON = Clock source set to internal clock generator
75 Ω	**LED (yellow): indicates the termination status of word clock input.** LED ON = Termination enabled LED OFF = Termination disabled
WCK	**LED (green): indicates use of word clock as clock source** LED ON = Clock source set to word clock LED blinking = Clock source set to word clock and no signal present LED blinking pattern = signal locked but not in sync
MADI	**LED (green): indicates use of MADI input as clock source** LED ON = Clock source set to MADI input LED blinking = Clock source set to MADI input and no signal present

Clocking to MADI

Lock and sync states of the two MADI inputs are indicated individually by two LEDs (MADI STATE). If both MADI inputs are connected the LED of the unselected input will glow or blink with a reduced intensity (50%).

IN 1	**LED (green): indicates the selection state and lock/sync state of MADI input 1**			
	LED	MADI input is		
	ON (100%)	locked	in sync	selected
	ON (50%)	locked	in sync	not selected
	Blinking (100%)	locked	not in sync	selected
	Blinking (50%)	locked	not in sync	not selected
	OFF	no MADI signal detected		
IN 2	**LED (green): indicates the selection state and lock/sync state of MADI input 2**			
	LED	MADI input is		
	ON (100%)	locked	in sync	selected
	ON (50%)	locked	in sync	not selected
	Blinking (100%)	locked	not in sync	selected
	Blinking (50%)	locked	not in sync	not selected
	OFF	no MADI signal detected		

NOTE

The selection of the active MADI port depends on the set redundancy mode of the device. The redundancy mode is adjusted via remote control.
Default setting 'Standard':
The MADI input that locks first will be selected automatically, switchover at signal loss, no revert when signal is regained.

Sample Rates

The scaling factor and the base sample rate are indicated by three LEDs.

2 FS	**LED (yellow): indicates scaling factor of operation** LED ON = Scaling factor of sample rate set to 2 FS LED heartbeat = Scaling factor of sample rate set to 4 FS LED OFF = Scaling factor of sample rate set to 1 FS
48k	**LED (green): indicates the use of 48 kHz as base sample rate** LED ON = Base sample rate 48 kHz
44.1k	**LED (green): indicates the use of 44.1 kHz as base sample rate** LED ON = Base sample rate 44.1 kHz

NOTE

With the clock set to internal (INT) the sample rate can be adjusted in the menu. All other clock sources (word clock, MADI) define the base rate automatically and the measured frequency of the clock source is indicated then.

The scaling factor of the sample rate has to be defined manually when the clock source is set to internal or word clock.

When a MADI signal is used as clock source, the device will switch to 2 FS operation automatically when a 96k Frame signal has been detected. With 48k Frame signals no distinction is possible between 1 FS or 2 FS or 4 FS - so the scaling factor has to be set manually.

Output Format

The format of the MADI output signal can be defined - allowing for format conversion of the MADI signal. The output signal status is indicated by two LEDs (FORMAT).

56ch	**LED (green): indicates the channel format of the MADI output signal.** LED ON = MADI output set to 56 channel mode. LED OFF = MADI output set to 64 channel mode.
96k	**LED (yellow): indicates the frame format of the MADI output signal @ 2 FS operation.** LED ON = MADI output set to 96k Frame LED OFF = MADI output set to 48k Frame

NOTE

At 2 FS operation 56 ch refers to 28 channels (64ch > 32 channels).

At 4 FS operation 56 ch refers to 14 channels (64ch > 16 channels).

96k Frame is available at 2 FS operation only.

TIP

To convert a 2 FS MADI signal from 48k Frame (SMUX) into a 96k Frame signal, set the converter to 2 FS operation and activate 96k Frame.

Level Settings

The analog reference level of the AD and DA converters can be switched between two settings (high and low) where the analog level corresponds to 0 dBFS.
Two LEDs (LOW LEVEL) inform about the setting that can be adjusted for input and output separately.

IN	**LED (green): indicates the reference level of the A/D converter.** LED ON = +6 dBu (+9 dBu / +15 dBu) LED heartbeat = AD calibration activated LED OFF = +15 dBu (+18 dBu / +24 dBu)
OUT	**LED (green): indicates the reference level of the D/A converter.** LED ON = +6 dBu (+9 dBu / +15 dBu) LED heartbeat = DA calibration activated LED OFF = +15 dBu (+18 dBu / +24 dBu)

NOTE

With the level setting to "low" a digital gain (input) or a digital reduction (output) is applied to adapt the lower analog level (-9 dB).

Depending on the model of the ANDIAMO the reference levels are different. Three versions with different analog reference levels are available:

- + 6 / + 15 dBu
- + 9 / + 18 dBu
- + 15 / + 24 dBu

The version is marked on the rear panel (I/O level).

TIP

Additional settings via remote control:

- Output gain/level trim for individual channels
- AD/DA calibration in 0.1 dB increments

Level Meters

All 32 analog channels have individual signal metering each with three LEDs. As the sensitivity of the converters may be varied the trigger threshold of each LED corresponds to the digital scale (dBFS).

INPUT OVR	**LED (red): indicates an analog input overload.** LED ON = analog input signal equals to more than -0.5 dBFS
INPUT SIG	**LED (green): indicates signal level of channel input.** LED ON = analog input signal equals to more than -80 dBFS The light intensity of the LEDs depends on the audio level.
OUTPUT SIG	**LED (green): indicates signal level of channel output** LED ON = analog output signal equals to more than -80 dBFS The light intensity of the LEDs depends on the audio level.

Signal Routing

Two methods of signal routing are available:

- 'Standard Bank Routing'- signal routing of analog and digital I/Os as a whole.
- 'Matrix Mode'- individual signal routing of all analog and digital I/Os on a per channel basis.

Standard Bank Routing

A block of channels of a MADI stream (Bank) is selected to act as source for the analog outputs (DA) and destination for the analog inputs (AD). The remaining MADI data passes the device unchanged. The bank selection is indicated by two LEDs.

33..64	**LED (green): indicates the selection of the converted audio channels.** LED ON = conversion of audio channels 33 to 64* LED heartbeat = conversion of audio channels 33 to 64* delay compensation active**
01..32	**LED (green): indicates the selection of the converted audio channels.** LED ON = conversion of audio channels 01 to 32* LED heartbeat = conversion of audio channels 01 to 32* delay compensation active**

* 56 ch mode conversion of channels 01 to 28 or 29 to 56

** see „Delay Compensation“ on page 32

NOTE

MADI @ 2 FS = 32 channels, MADI @ 4 FS = 16 channels
Both portions of the MADI stream are used for A/D input and D/A output- no selection possible.

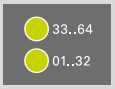
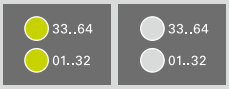
Matrix Mode

Channel based routing can be set up via remote control (ANDIAMO Remote). Each output can be assembled individually from any input sources.

A subset of the Matrix Mode is the Extended Routing feature. It is switchable and enables both MADI I/Os to be used independently to:

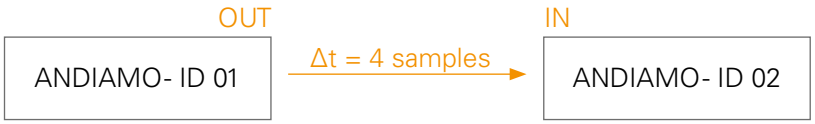
- make full use of all conversion channels at higher sample rates
- double the range of available MADI input channels
- create two individual MADI feeds

The settings of the routing matrix are stored inside the device.
It is possible to toggle between Standard Bank Routing and Matrix Mode without using the remote control. See „CHAPTER 5: Menu Navigation“ on page 38

LED Code	Mode
	Both LEDs on. Matrix Mode active. Extended Routing not active. Both MADI outputs work in parallel. Delay compensation not active.
 2 x	Both LEDs blinking heartbeat. Matrix Mode active Extended Routing not active Both MADI outputs work in parallel. Delay compensation active.
	Both LED columns blinking alternately. Matrix Mode active Extended Routing active MADI outputs may transmit individual signals. Delay compensation not active.
 2 x 2 x	Both LED columns blinking two times alternately. Matrix Mode active Extended Routing active MADI outputs may transmit individual signals. Delay compensation active.

Delay Compensation

For conversion of all 64 channels (@ 1 FS) of a MADI signal two ANDIAMOs may be daisy-chained. Between MADI input and output there is a delay of four samples. To ensure phase locked operation of all audio channels the delay between the two ANDIAMOs will be compensated then.
Delay compensation becomes active, once an ANDIAMO 'sees' another ANDIAMO at its input. The 'second' ANDIAMO will switch to ID 02.



Delay compensation:

	Δt A/D	Δt D/A
ID 01	0	+ 4 samples
ID 02	+ 4 samples	0

NOTE

To ensure proper detection of delay compensation no other device must be connected in between two ANDIAMOs.

Connecting MADI

The MADI ports are used for transmission of 64 audio channels (AES10).
Two different MADI I/O configurations are available:

1 x SC-Socket
1 x BNC coaxial

2 x SC-Socket

MADI 1 OUT	**SC socket (optical)** MADI output (64 ch), connect for MADI output signal here
MADI 1 IN	**SC socket (optical)** MADI input (64 ch), connect MADI input signal here
MADI 2 OUT	**SC socket (optical) or BNC socket (coaxial), 75 Ω** MADI output (64 ch), connect for MADI output signal here
MADI 2 IN	**SC socket (optical) or BNC socket (coaxial), 75 Ω** MADI input (64 ch), connect MADI input signal here

For MADI input selection see „Clocking to MADI“ on page 25.
The MADI outputs may work in parallel or idependent from each other- see “Extended Routing” on page 31.

TIP

Additional settings via remote control:

- Routing Matrix (Matrix Mode / Extended Routing)
- Redundancy Modes

Connecting Word clock

The word clock output provides the system clock that is either derived from 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 or AES3 DARS (Digital Audio Reference Signal) here.

The word clock input also accepts a AES3 frame (AES11).
Termination (75 Ω) for the word clock input is switchable locally or via remote control.

Connecting USB

The USB port is used for firmware updates and for remote control.

USB	**USB socket (Type B)** Connect for firmware updates and remote control here.

The use of the USB port requires the USB Serial driver installed. The driver and the installation instructions are available at the ANDIAMO 2 product page at www.directout.eu.

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Connecting Analog

Eight DSUB-25 ports (4 x input / 4 x output) are used for transmission of the analog audio signals. Each port transmits eight audio channels.

ANALOG OUTPUT 1..8	**DSUB-25 Port** Analog audio output (balanced) - connect audio channels 1 to 8 here
ANALOG OUTPUT 9..16	**DSUB-25 Port** Analog audio output (balanced) - connect audio channels 9 to 16 here
ANALOG OUTPUT 17..24	**DSUB-25 Port** Analog audio output (balanced) - connect audio channels 17 to 24 here
ANALOG OUTPUT 25..32	**DSUB-25 Port** Analog audio output (balanced) - connect audio channels 25 to 32 here
ANALOG INPUT 1..8	**DSUB-25 Port** Analog audio input (balanced) - connect audio channels 1 to 8 here
ANALOG INPUT 9..16	**DSUB-25 Port** Analog audio input (balanced) - connect audio channels 9 to 16 here
ANALOG INPUT 17..24	**DSUB-25 Port** Analog audio input (balanced) - connect audio channels 17 to 24 here
ANALOG INPUT 25..32	**DSUB-25 Port** Analog audio input (balanced) - connect audio channels 25 to 32 here

The pinout complies with AES59 ('TASCAM pinout') - see „Appendix A - DSUB-25 Pin assignment“ on page 44.

NOTE

The pinout of the digital and analog I/O is different. Check for appropriate cabling to ensure proper operation and to avoid damages caused by improper connections.

WARNING

Do not connect voltage sources to the analog outputs. This may cause damage at the output stages. Observe the technical specifications listed in this document.

WARNING

The line output is not servo balanced. Do not connect the negative lead to ground. This may cause damage at the output stage. Observe the technical specifications listed in this document.

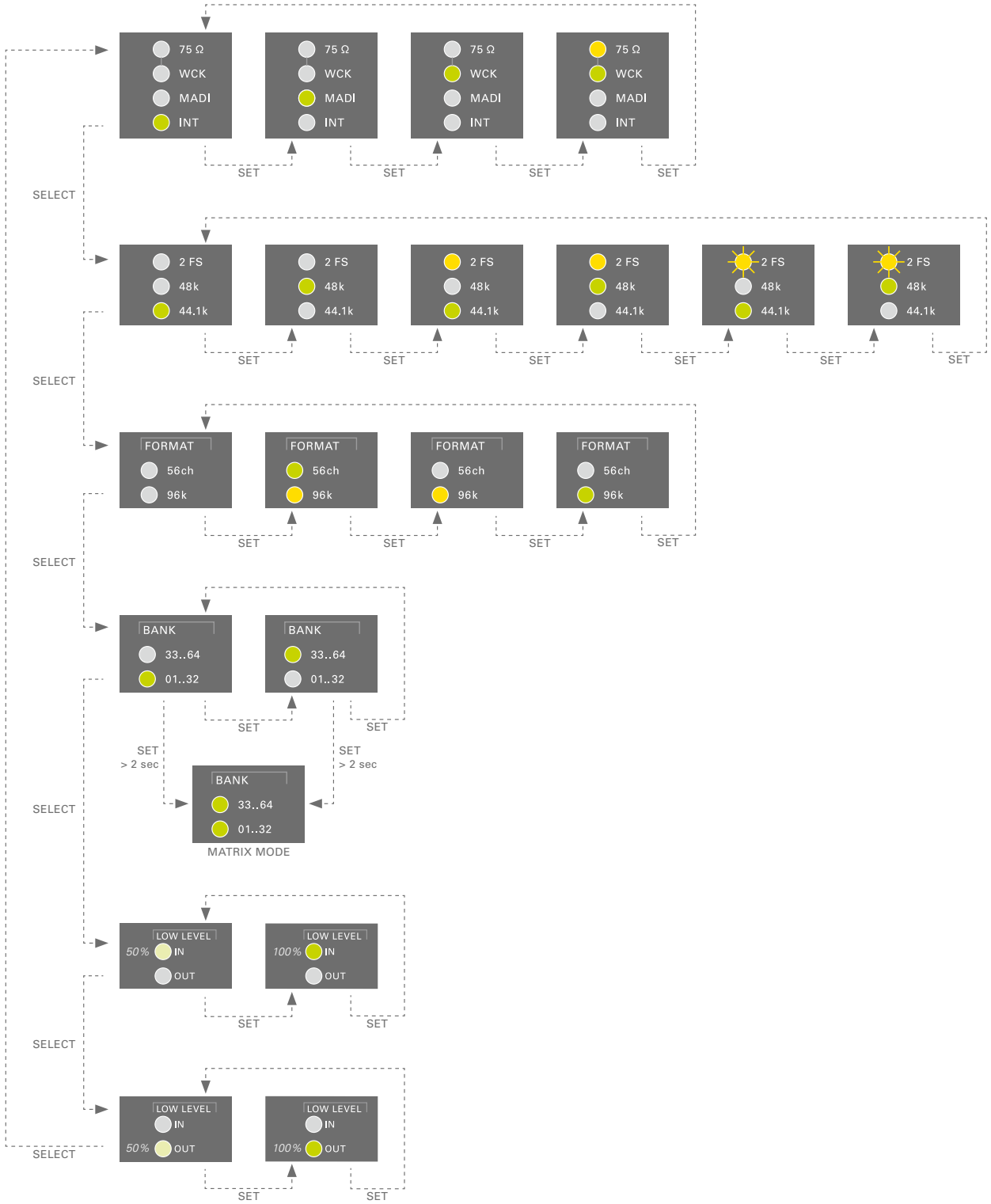
CHAPTER 5: Menu Navigation

To setup the converter the menu mode has to be entered first. The unit will switch back to idle mode automatically after timeout.

- Press the button <SELECT> longer than two seconds to enter the menu mode
- Press <SELECT> to cycle through the menu.
- Press <SET> to change a setting.
- Press <SET> longer than two seconds to toggle the Matrix Mode

NOTE

Blinking LEDs are also used to indicate an error (e.g. missing sync). Concentrate on the section where one LED is blinking and the remaining LEDs are glowing weak.


75 Ω
WCK
MADI
INT
SET
SELECT
2 FS
48k
44.1k
FORMAT
56ch
96k
BANK
33..64
01..32
SET
> 2 sec
MATRIX MODE
LOW LEVEL
50%
100%
IN
OUT

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CHAPTER 6: Troubleshooting and Maintenance

Troubleshooting

To identify a possible defect with the device please consult the following table.
If the fault cannot be resolved using these instructions, please contact your local DirectOut representative or visit support.directout.eu.

Issue	Possible reason	Solution
Device doesn't work.	Power supply is broken.	Check that the power supply switch is on, that the device is connected to the power supply and that the socket is working. Defective fuses must be exchanged by qualified service personal only.
Optical port does not work.	Optic is dirty.	Use an air supply to carefully remove any dust. Never use objects for cleaning.
No signal at the output port.	Connections (input / output) are mixed up.	Check the connections and change the cables if necessary. Check the routing matrix.
No signal at the output port.	Signal cable defective.	Exchange the signal cable.
MADI signal at the input is not stable.	Signal source is defective or bad signal condition (Jitter > 1 ns)- e.g. due to exceeded length or bad screening attenuation of signal cable.	Change the source or use appropriate cables.
Clicks in the audiosignal.	Input source is not in sync with clock master of the box.	Check the status of input led and check clock setting of the connected device.

Maintenance

To clean the device, use a soft, dry cloth. To protect the surface, avoid using cleaning agents.

NOTE

The device should be disconnected from the power supply during the cleaning process.

CHAPTER 7: Technical Data

Dimensions

- Width 19'' (483 mm)
- Height 1 RU (44.5 mm)
- Depth 10'' (254 mm)

Weight

- about 4.1 kg

Power Consumption

- 25 W

Power Supply

- 84 V - 264 V AC / 47 Hz - 63 Hz / Safety class 1

Fuses

- Fuse 250 V - 2 A (slow-blow) – 2 fuses per power supply

Environmental Conditions

- Operating temperature +5°C up to +45°C
- Relative humidity: 10% - 80%, non condensing

MADI Port - (Version BNC/SC)

- 2 x BNC socket (1 x input / 1 x output)
- Impedance: 75 Ω
- 0.3 V up to 0.6 V (peak to peak)

MADI Port - (Version BNC/SC or SC/SC)

- 1 x or 2 x SC socket FDDI (input / output)
- ISO/IEC 9314-3
- Wave length: 1310 nm
- Multi mode 62.5/125 µm or 50/125 µm
- optional: single mode 9/125 µm

Analog Input

- 4 x DSUB-25 (8 analog audio channels each - balanced), AES59 compliant

Analog Output

- 4 x DSUB-25 (8 analog audio channels each - balanced), AES59 compliant
- The outputs are not servo balanced.

A/D Section

- SNR: -115.5 dB RMS (20 Hz - 20 kHz) / -118 dB(A)
- THD @ -1 dBFS: -113 dB
- Frequency response: -0.15 dB (10 Hz) / -0.15 dB (20 kHz)
- Input impedance: 20 kΩ (balanced) / 10 kΩ (unbalanced)
- Input level (depending on model):

Model / Level	High	Low
Model A	+15 dBu	+6 dBu
Model B	+18 dBu	+9 dBu
Model C	+24 dBu	+15 dBu

D/A Section

- SNR: -116 dB RMS (20 Hz - 20 kHz) / -119 dB(A)
- THD @ -1 dBFS: -109 dB
- Frequency response: -0,5 dB (10 Hz) / -0,15 dB (20 kHz)
- Output impedance: < 50 Ω
- Output level (depending on model):

Model / Level	High	Low	Minimum Load Resistance
Model A	+15 dBu	+6 dBu	600 Ω
Model B	+18 dBu	+9 dBu	600 Ω
Model C	+24 dBu	+15 dBu	2.4 kΩ

Sample Rate

- 44.1 / 48 / 88.2 / 96 / 176.4 / 192 kHz ± 12.5 %

MADI Format (I/O)

- 48k Frame, 96k Frame
- 56 channel, 64 channel
- S/MUX 2/4

Latency

- about 1 ms (AD- DA)

Word Clock

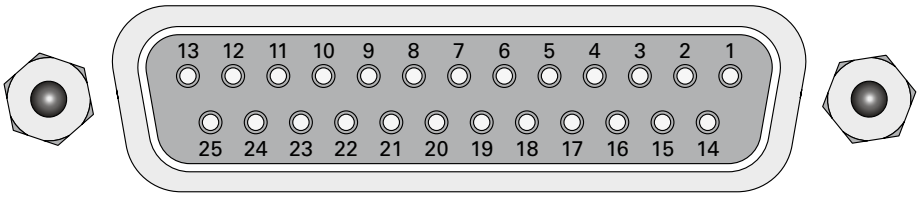
- 1 x BNC socket (75 Ω impedance)- input
- 1 x BNC socket (75 Ω impedance)- output
- Termination 75 Ω switchable
- AES11 (DARS supported)

USB

- 1 x USB 2.0 socket (Type B)

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

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