

EXBOX.AES

User's Manual



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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.

Chapter 1: Overview

Introduction

EXBOX.AES is a handy sized AES / MADI converter for 16 audio channels.



It provides bidirectional conversion between AES3 and MADI (AES10). A built in embedder / de-embedder offers processing of serial data (RS 232).



EXBOX.AES extends MADI environments by offering straightforward AES conversion and simplifies serial data communication with remote devices using the MADI link.

Interfaces:

- 2 MADI I/Os
- RS-232 Port
- USB Port for firmware updates

Feature Summary

MADI Ports*	2 x I/O ports - individually configurable with BNC coaxial, SC optical or SFP
AES Ports	8 x AES3 I/O via DSUB-25, AES59 compliant
Serial Port	1 x RS 232 via DSUB-9
USB Port	USB 2.0 port for firmware updates
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%
Power Supply	external, 2 x Hirose connector (9-24 V)

* See "MADI IO-Modules" on page 44.

Applications

EXBOX.AES can be used for conversion of MADI signals (AES10) to AES signals and vice versa. Serial data can be received at the local RS 232 port or embedded into the MADI output signal from there.

Typical applications include:

- AES frontend for a MADI setup
- Integration of AES based equipment with remote control over RS 232

How it works

16 audio channels of the MADI input signal are routed to the eight AES output ports. The specific bank of the 16 audio channels can be selected by the routing.

The input signal of the eight AES ports is output at both MADI outputs.

The MADI input that locks first will be used as signal and sync source for conversion.

Clocking via AES input is possible by switching the clock source setting.

The scaling factor of the sample rates may be set to match the signal accordingly.

The local RS 232 port offers bidirectional transport of serial data that is embedded in the user bits of audio channels 1-9.

The embedder / de-embedder handles four different baud rates. Further it can be switched off to process user bits of the AES inputs or it can be bypassed to preserve user bits of the MADI input signal.

NOTE



A MADI signal transports 64 audio channels. There are four banks with 16 channels each ($4 \times 16 = 64$).

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.

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.



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.

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.

Intended Operation

The EXBOX.AES is designed for conversion between AES and MADI signals (AES10). It provides further embedding / de-embedding of serial data (RS 232).

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

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 EXBOX.AES package include:

- 1 x EXBOX.AES
- 1 x external power supply unit (9- 24 V)
- 1 x Manual

To complete the delivery please download from the product page on the

DirectOut website (www.directout.eu):

- USB Serial driver
- latest firmware

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Accessory

BOX.MOUNT XL- for optimal rack mount of up to three devices in a 19'' frame (No: DOAPA0886):



Two different optical SFP transceiver are available from DirectOut GmbH:

- Multimode SFP transceiver with LC connectors (No: DOICT0129)
- Singlemode SFP transceiver with LC connectors (No: DOICT0130)

Specification of the optical SFP modules:

SFP	Multimode	Singlemode
Wavelength TX	1310 nm	1310 nm
Wavelength RX	1310 nm	1310 nm
Distance	2 km	10 km
Powerbudget (dB)	11 dB	12 dB

Protocols	Fast Ethernet OC3/STM1	Gigabit Ethernet, Gigabit Fibre Channel
Bandwidth from	100 Mbit/s	1.050 Gbit/s
Bandwidth	155 Mbit/s	1.250 Gbit/s
Laser	FP	FP
Receiver Type	PIN	PIN
Connector	LC	LC
Wavelength TX min	1260 nm	1260 nm
Wavelength TX max	1360 nm	1360 nm
Wavelength RX min	1260 nm	1260 nm
Wavelength RX max	1620 nm	1600 nm
Transmit min	- 19.00 dBm	- 9.00 dBm
Transmit max	- 14.00 dBm	- 3.00 dBm
Receive min	- 30 dBm	- 21.00 dBm
Receive max (Receiver overload)	- 5.00 dBm	- 3.00 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

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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. The delivered pads may be affixed to the bottom of the cabinet. Ensure a clean and dry surface before affixing the pads.

WARNING



The synthetics of the delivered pads might cause stains on damageable surfaces. To avoid staining of furniture surfaces it is recommended to place a protective plate under the device.

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.

3. Remove the protective cap from the optical MADI port(s) before use.



NOTE!

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

4. Connect the AES and serial signals to the device:
AES3 in/out – DSUB-25 connectors
RS 232 in/out – DSUB-9 connector



NOTE



Ensure to use appropriate cabling. To link two serial devices a cross patched cable (so called 'null-modem cable') may be required.

5. Connect signal cable(s) for the MADI signals.



6. Using the power cord of the external power supply provided, connect the device to a matching power supply and connect the output of the power supply to the Hirose connectors at the rear panel.



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.



NOTE

The shipment includes one external power supply unit. Additional power supply units are available from your local DirectOut representative.



WARNING

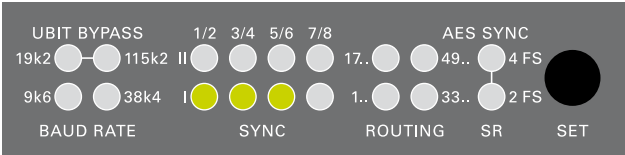
The external power supply must be connected to the mains using the three-cord power leads supplied with the device. Only supply the voltages and signals indicated (9 - 24 V DC) to the device.

WARNING



The connected power supply must provide a current limiting to a maximum of 2.5 A.

7. Check the LED display on the front panel.



While the device is booting the currently installed firmware is indicated in the display- e.g. firmware version 3.0.

- 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.

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



PSU 1	Hirose socket Connect the power supply here (9- 24 V DC).
PSU 2	Hirose socket Connect the power supply here (9- 24 V DC).



NOTE

The device does not provide a power switch. Connecting a working power supply to the device will power up the device immediately.

Menu Control

All functions of the converter can be accessed using a simple menu. A single push button is used for navigation and settings.



SET

Push button

Press longer than 2 seconds to enter the menu mode and to cycle through the menu. Press short to change a setting.

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.

Clocking

The clock source can be either set to MADI input or AES input. It is adjusted in the menu (scaling factor) see „System Menu“ on page 49.

Clocking to MADI

If both MADI inputs are locked an automatic changeover to the other MADI input will occur once the selected input loses its signal.

Selection pattern: the MADI input that locks first will be used as sync and input source for conversion

Clocking to AES

Selection pattern: lowest AES input port detecting a valid signal, if no valid signal is present the next input is used.

Due to the selection pattern ('lowest AES input') a change of the AES input signal condition may result in a different clock source.

Eight LEDs inform about the lock / sync state of each AES3 input port individually.



SYNC I 1/2, 3/4, 5/6, 7/8	<p>LED (green) indicates the lock / sync state of AES3 inputs port 1 to 4:</p> <p>LED OFF = no signal detected</p> <p>LED ON = signal present, in sync</p> <p>LED blinking = signal present, not in sync</p>
SYNC II 1/2, 3/4, 5/6, 7/8*	<p>LED (green) indicates the lock / sync state of AES3 inputs port 5 to 8:</p> <p>LED OFF = no signal detected</p> <p>LED ON = signal present, in sync</p> <p>LED blinking = signal present, not in sync</p>

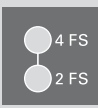
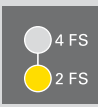
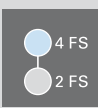
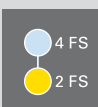
* LED II 7/8 is also used to indicate the activation state of 'force to 64 ch' in menu mode - see „Output Format“ on page 34.

Sample Rates

Depending on the clock setting the scaling factor of the sample rate has to be defined manually (MADI) or is set by the AES input signal automatically.



Two LEDs indicate the scaling factor and the implicit setting of the clock source.

LED	Code	Setting	Clock source
	4 FS = OFF 2 FS = OFF	1 FS	MADI input
	4 FS = OFF 2 FS = ON	2 FS	MADI input
	4 FS = ON 2 FS = OFF	4 FS	MADI input
	4 FS = ON 2 FS = ON	AES	AES input

NOTE



When a MAD1 signal is used as clock source and a 96k Frame signal has been detected the LED 2 FS will blink and 2 FS operation is forced.

As an AES3 signal transports the information about the scaling factor a mismatch between setting and AES input signal state is indicated by a blinking LED (SYNC) of the corresponding AES port.

Output Format

The format (channel mode, frame format) of the MAD I output signal is defined by the input conditions of the used MAD I input and the routing settings.

MAD I input	Setting	MAD I output
56 ch	other	56 ch
64 ch	ignored	64 ch
no signal	other	56 ch
no signal	Routing set to '49.' @ 1 FS or '17.' @ 2 FS or '1.' @ 4 FS and signal present (lock) at AES input > port 5 *	64 ch
56 ch	Routing set to '49.' @ 1 FS or '17.' @ 2 FS or '1.' @ 4 FS and signal present (lock) at AES input > port 5 *	64 ch
56 ch	force to 64 channel mode active	64 ch

* The input condition is used to preserve 56 ch mode at the MADi output while using routing setting '49..' ('17..' or '1..'). The output will switch to 64 ch once there is signal present for the particular MADi channels; e.g.
 @ AES port 5 = MADi channel 57-58 (@1 FS).

** See page 49 to activate the 'force to 64 ch' setting.

LED	Code	Setting
	II - 7/8 blinking 50% other LEDs ON 50%	force to 64 ch not active
	II - 7/8 blinking 100% other LEDs ON 50%	force to 64 ch active

NOTE



The frame mode (48k / 96k Frame) is not altered.

Routing

16 audio channels can be converted between AES and MADI. The routing of the audio signals can be adjusted in the system menu - see page 49.



The remaining MADI channels will pass the device unaltered. Both MADI outputs work in parallel.



NOTE

MADI @ 2 FS = 32 channels,
MADI @ 4 FS = 16 channels




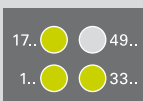
If the selected routing does not fit the chosen scaling factor - due to the reduced number of audio channels - the corresponding LED will blink.

Four LEDs are used to indicate the signal routing based on a scaling factor of 1 FS.

LED	Code	Routing
	1.. = ON 17.. = OFF 33.. = OFF 49.. = OFF	AES IN > MADI OUT 01-16 AES OUT < MADI IN 01-16
	1.. = OFF 17.. = ON 33.. = OFF 49.. = OFF	AES IN > MADI OUT 17-32 AES OUT < MADI IN 17-32
	1.. = OFF 17.. = OFF 33.. = ON 49.. = OFF	AES IN > MADI OUT 33-48 AES OUT < MADI IN 33-48
	1.. = OFF 17.. = OFF 33.. = OFF 49.. = ON	AES IN > MADI OUT 49-64 AES OUT < MADI IN 49-64

MADI Bypass

A bypass mode allows to daisy-chain several devices without altering the MADI output.

LED	Code	Routing
	1.. = OFF 17.. = ON 33.. = ON 49.. = ON	MADI IN = MADI OUT AES OUT < MADI IN 01-16
	1.. = ON 17.. = OFF 33.. = ON 49.. = ON	MADI IN = MADI OUT AES OUT < MADI IN 17-32
	1.. = ON 17.. = ON 33.. = OFF 49.. = ON	MADI IN = MADI OUT AES OUT < MADI IN 33-48
	1.. = ON 17.. = ON 33.. = ON 49.. = OFF	MADI IN = MADI OUT AES OUT < MADI IN 49-64

Embedder / De-Embedder

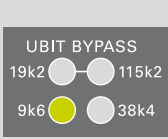
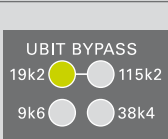
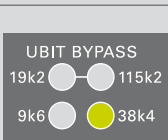
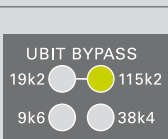
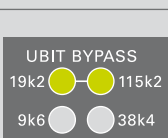
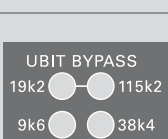
The local RS 232 port can both be used to embed serial data into the MAD1 output signal and to de-embed serial data from the MAD1 input signal. The serial data is tunnelled by using the user bits of audio channel 1 to 9.



RS 232	<p>DSUB-9 socket*</p> <p>Serial data I/O - connect here for embedding or de-embedding RS 232 data.</p>
RS 232 TX	<p>LED (yellow) indicates outgoing serial data at the RS 232 output</p> <p>LED ON = serial data is sent</p>
RS 232 RX	<p>LED (yellow) indicates incoming serial data at the RS 232 input</p> <p>LED ON = serial data is received</p>

* Pinout - see „DSUB-9 - RS 232“ on page 59.

Settings

LED	Code	Mode
	9k6 = ON 19k2 = OFF 38k4 = OFF 115k2 = OFF	active @ 9600 baud (8, n, 1)
	9k6 = OFF 19k2 = ON 38k4 = OFF 115k2 = OFF	active @ 19200 baud (8, n, 1)
	9k6 = OFF 19k2 = OFF 38k4 = ON 115k2 = OFF	active @ 38400 baud (8, n, 1)
	9k6 = OFF 19k2 = OFF 38k4 = OFF 115k2 = ON	active @ 115200 baud (8, n, 1)
	9k6 = OFF 19k2 = ON 38k4 = OFF 115k2 = ON	inactive, bit-transparent pass-through of the MAD1 input signal to the MAD1 output.
	9k6 = OFF 19k2 = OFF 38k4 = OFF 115k2 = OFF	inactive, user bits of AES input signals replace the user bits of the routed channels of the MAD1 output signal.

TIP



The embedder / de-embedder may be bypassed for bit transparent pass-through of the MAD1 input signal to the MAD1 output (UBit bypass).

If the embedder / de-embedder is switched off, the user bits of the AES input signals are copied to the user bits of the routed MAD1 channels.

The AES output signals always transport the user bits of the routed MAD1 input signal.

MADI Signals

The device is equipped with two slots. Each of them can house one of three different i/o-modules.

Available are:

- SC optical multi-mode or single-mode
- BNC coaxial, 75 Ω
- SFP (without module - see "Accessory" on page 18)



MADI 1 OUT / IN	<p>1 x SFP slot*</p> <p>OUT: MADI output, connect for MADI output signal here.</p> <p>IN: MADI input, connect MADI input signal here.</p>
MADI 2 OUT / IN	<p>2 x BNC socket (coaxial)*</p> <p>OUT: MADI output, connect for MADI output signal here.</p> <p>IN: MADI input, connect MADI input signal here.</p>

* configuration example

NOTE

The MADI input that locks first will be used as sync and input source for conversion. This behaviour is overridden when the clock is set to AES input - see „Clocking“ on page 30.

Both MADI outputs work in parallel.

The input signal condition is indicated by two LEDs.

MADI 1 SYNC	<p>LED (green) indicates the use of MADI 1 input and its lock status.</p> <p>LED OFF = no signal</p> <p>LED ON = input is used as clock and input source</p> <p>LED blinking = signal present, not in sync with system clock</p>
MADI 2 SYNC	<p>LED (green) indicates the use of MADI 2 input and its lock status.</p> <p>LED OFF = no signal</p> <p>LED ON = input is used as clock and input source</p> <p>LED blinking = signal present, not in sync with system clock</p>

If both MADI inputs are connected the LED of the unused input will glow with a reduced intensity.

MADI IO-Modules

SC.IO



BNC.IO



SFR.IO

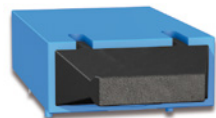


Single-Mode / Multi-Mode

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

The modules can be changed by the user himself. It's not necessary to send the device to factory. However it is strongly recommended to follow the instructions on page 60.

WARNING



Changing the modules ignoring the instructions may damage the modules and the device and may cause health damage.

WARNING!



All module slots must be fitted with a module each. Otherwise live parts become accessible which may cause serious harm to your health. An open housing may also cause inappropriate operation conditions due to an insufficient electromagnetic shielding.

Connecting AES

Two DSUB-25 ports (2 x 4 input / output combined) are used for transmission of the AES3 signals. Each port consists of four AES3 input and output ports itself transmitting eight audio channels (I/O).



<p>AES I/O I</p>	<p>DSUB-25 Port Digital audio input and output (AES3) - Port 1 to 4 - connect audio channels 1 to 8 here</p>
<p>AES I/O II</p>	<p>DSUB-25 Port Digital audio input and output (AES3) - Port 5 to 8 - connect audio channels 9 to 16 here</p>

The pinout complies with AES59 ('TASCAM pinout') - see „DSUB-25 - AES3“ on page 58.



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.

USB



USB

USB socket (2.0, type Mini B)

Connect here for firmware updates

NOTE



Needs DirectOut USB Serial driver to be installed. The driver is available at www.directout.eu.

CHAPTER 5: Menu Navigation

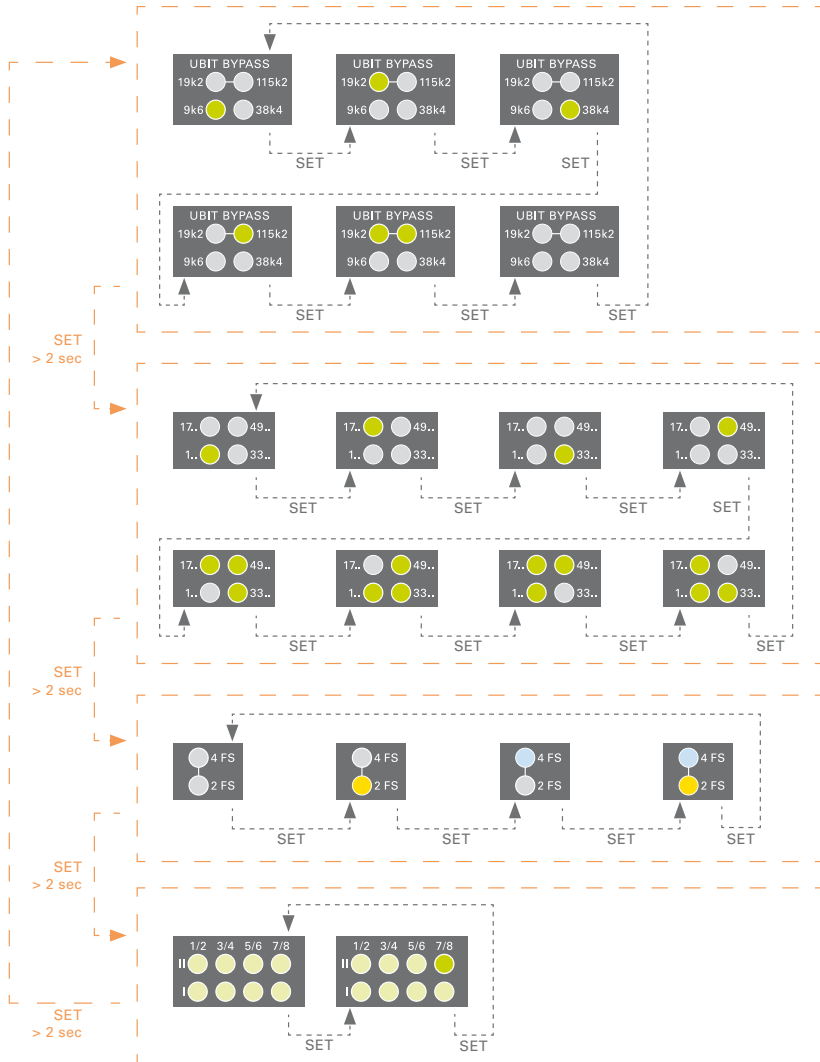
To setup the converter the menu mode has to be entered first. The unit will switch back to idle mode automatically after timeout.

The following page shows the system menu.

Four parameters are available:

- Embedder / De-Embedder - page 39
- Routing (MADI bypass) - page 36
- Scaling Factor (AES Sync) - page 32
- Force to 64 channel mode - page 34

System Menu



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.

Issue	Possible reason	Solution
No signal at the output port.	Signal cable defective.	Exchange the signal cable.
No signal at the output port.	Connectors of the signal cable are dirty.	Use an air supply to carefully remove any dust. Never use objects for cleaning. or 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.
No transport of serial data.	Embedder not active or wrong baud rate	Adjust embedder setting and check the LEDs 'RX' and 'TX'.

Issue	Possible reason	Solution
No transport of serial data.	wrong pin out	Use appropriate cable (see „DSUB-9- RS 232“ on page 59). To connect two serial devices a null modem cable may be required.

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.

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CHAPTER 7: Technical Data

Dimensions

- Width 140 mm
- Height 42 mm
- Depth 146 mm

Weight

- 0.8 kg

Power Consumption

- 5 W (typical)

Power Supply

- 2 x Hirose socket (HR10)
- 9 V- 24 V DC (external)



WARNING

The connected power supply must provide a current limiting to a maximum of 2.5 A.

Environmental Conditions

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

MADI Ports BNC coaxial

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

MADI Ports SC optical

- 1 or 2 x SC socket FDDI (input / output)
- ISO/IEC 9314-3
- Wave length 1310 nm
- Multi-Mode 62.5/125 or 50/125

MADI Ports SFP

- empty cage without module

AES3 Port (I/O)

- 2 x DSUB-25, female, AES59 compliant
(8 x AES3 input / output each)
- AES3 balanced, 110 Ω

Sample Rate

- 44.1 / 48 / 88.2 / 96 / 176.4 / 192 kHz \pm 12.5 %

MADI Format (I/O)

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

RS 232

- 1 x DSUB-9 socket, male
- baud rates: 9600, 19200, 38400, 115200 baud
- format: 8 data bits, no parity, 1 stop bit

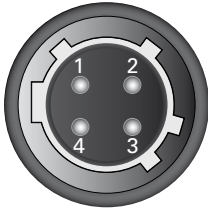
USB Port

- USB 2.0, type Mini B

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Appendix A - Wiring Sketches

Hirose HR10 (DC PSU)



Pin	Signal
1	DC +
2	DC +
3	DC -
4	DC -

NOTE

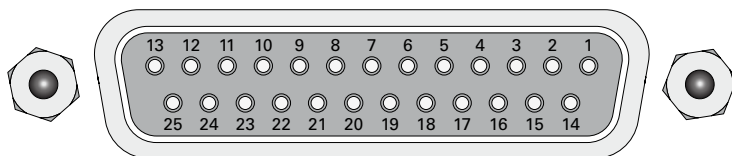


To ensure proper operation all pins should be connected.

Ground is connected with the chassis of the plug (safety class 1).

DSUB-25 - AES3

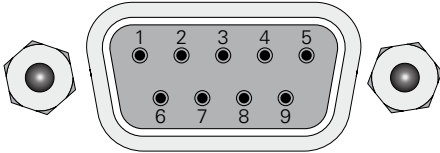
The pinout of the DSUB-25 connectors for the transmission of AES3 audio signals follows the AES59 specification.



jack - female

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

DSUB-9 - RS 232



jack- male

Pin	Signal
1	
2	RX
3	TX
4	
5	GND
6	
7	
8	
9	

NOTE



Ensure to use appropriate cabling. Depending on the remote device a cross patched cable (so called 'null-modem cable') may be required for linking. Consult the operating instructions of the remote device.

Appendix B - Changing Modules

It is not required to open the device. The module is inserted at the rear side of the device.

Requirements

- screwdriver- torx (star) T10
- spudger

Instructions

1. Remove all cables from the device.



WARNING

The device must be free of voltage before opening to prevent damage of your health or the components.



2. Loose both torx screws at the upper left and right side of the plate using the screwdriver.



NOTE

Do not loosen the screws at the bottom of the plate (SC and SFP modules only).

3. Remove the module at the back side of the device. You may pull softly at the plug, if necessary use a spudger carefully for assistance.
4. Insert the module with the pins ahead centered and horizontally to catch proper seat of the pins and the socket. At an overhang distance of 3-4 mm smart pressure is needed to connect the pins of the module with the backplane of the device.

WARNING



Avoid electrostatic charge. Electrostatic discharge of the body may damage the module. Do not touch the module's pcb.

5. Fix the metal plate of the module screwing both screws in the rear panel.

WARNING!



All module slots must be fitted with a module each. Otherwise live parts become accessible which may cause serious harm to your health. An open housing may also cause inappropriate operation conditions due to an insufficient electromagnetic shielding.

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