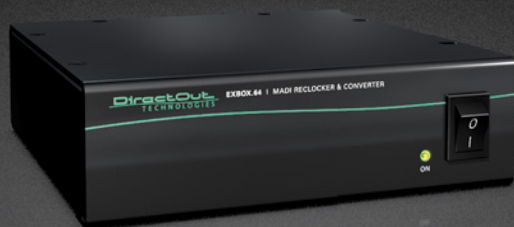




EXBOX.64

User's Manual



Version 2.0

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Table of contents

About This Manual	5
How to Use This Manual	5
Conventions	5
Chapter 1: Overview	6
Introduction	6
Feature Summary	7
Applications	8
How it works	8
CHAPTER 2: Legal issues & facts	10
Before Installing This Device	10
First Aid (in case of electric shock)	11
Defective Parts/Modules	12
Updates	12
Intended Operation	13
Conditions of Warranty	14
Conformity & Certificates	15
Contents	16
Contact	16
Accessory	18
Chapter 3: Installation	19
Installing the Device	19
CHAPTER 4: Operation	25
Introduction	25
Global Control	26
Connecting MADl	28

USB	30
CHAPTER 5: Application Examples	31
Signal Conversion	31
Range Extension	31
CHAPTER 6: Troubleshooting and Maintenance	32
Troubleshooting	32
Maintenance	34
CHAPTER 7: Technical Data	36
Appendix A - Wiring Sketches	38
Hirose HR10 (DC PSU)	38
Index	39

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.64 is an active signal converter and re-clocker for MADI signals.



Two MADI I/Os (1 x optical SC and 1 x coaxial BNC) enable MADI signals to be converted from optical to coaxial and vice versa.



The input signals, which are not required to be in sync with each other, are cross patched to the corresponding output. The output signal is re-clocked at the output, thus refreshing the signal for cable length extensions.

Feature Summary

MADI Ports*	2 x SC multi-mode connectors or 1 x SC multi-mode connector 1 x coaxial BNC connectors
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 $\pm 12.5\%$
Power Supply	external, 2 x Hirose connector (9 - 24 V)

* The device is available in two different versions
- see page 17.

Applications

EXBOX.64 can be used for conversion and refreshing of MADI signals (AES10) and dialects of MADI.

Typical applications include:

- conversion of MADI signals (coaxial <> optical)
- refreshing the signal for cable length extension (bridging the optical port)

How it works

The input signals are cross patched: i.e. input of the coaxial port is output at the optical port and vice versa.

The output signal is re-clocked and - at the coaxial port - refreshed electrically. Both input signals are not required to be in sync to each other.

The frame structure of the MADI signal is kept unchanged- bittransparent signal flow. This means that even proprietary adaptations of MADI (AES10) will pass through the unit in their native state.

Both output ports don't carry a signal unless a valid input signal has been detected at the corresponding input ports.

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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 for conversion, re-clocking and refreshing MADI signals (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 EXBOX.64 package include:

- 1 x EXBOX.64
- 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

Two different MADI I/O configurations are available:



1 x SC-Socket, 1 x BNC coaxial



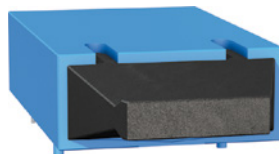
2 x SC-Socket

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

Accessory

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



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 MAD1 port(s) before use.



SC/SC Version



BNC/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 signal cable(s) for the MAD1 signals.



5. 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.

6. 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.

7. 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.

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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



0 / 1	Switch Enable / disable power supply.
ON	LED (green): indicates the status of both power supply units LED OFF = Power supply inactive LED ON = Power supply active



NOTE

The green LED (ON) indicates 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.



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

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.

NOTE

Both output ports don't carry a signal unless a valid input signal has been detected at the corresponding input ports.

MADI 1 SYNC	LED (green) indicates the use of MADI 1 input and its lock status. LED OFF = no signal LED ON = signal present
MADI 2 SYNC	LED (green) indicates the use of MADI 2 input and its lock status. LED OFF = no signal LED ON = signal present

USB



USB

USB socket (2.0, type Mini B)

Connect here for firmware updates

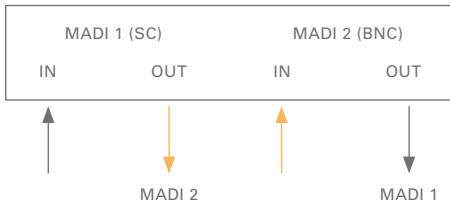


NOTE

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

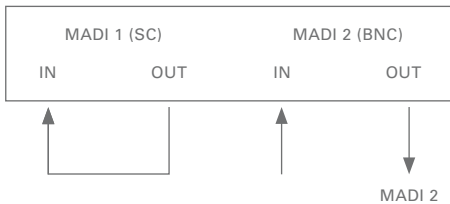
CHAPTER 5: Application Examples

Signal Conversion



The input signal from MADI 1 input (optical) is fed to MADI 2 output (coaxial). MADI 2 input (coaxial) is fed to MADI 1 output (optical).

Range Extension



The input signal is fed to MADI 2 input (coaxial). As the MADI 1 port (optical) is bridged the signal is output at the MADI 2 output (coaxial). It is refreshed electrically and re-clocked offering a range extension of cable length.

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.

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.

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 Port BNC coaxial (BNC/SC version)

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

MADI Port 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

Sample Rate

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

MADI Format (I/O)

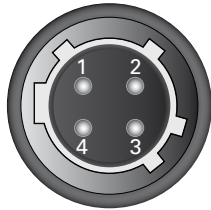
- 48k Frame, 96k Frame
- 56 channel, 64 channel
- S/MUX 2/4

USB Port

- USB 2.0, type Mini B

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).

Index

A

Accessory 18

B

BOX.MOUNT XL..... 18

C

Conformity & Certificates

CE..... 15

RoHS 15

WEEE 15

Contact 16

Contents 16

Conventions..... 5

D

Defective Parts/Modules 12

Dimensions..... 36

E

Environmental conditions ... 19

F

First Aid 11

I

Intended Operation..... 13

M

MADI formats..... 7

P

Power supply 7

R

Range Extension..... 31

S

Sample Rate 37

Scaling Factor 25

Single-/Multi-mode 17

Sketch

Hirose HR10 (DC PSU) .. 38

Support 32

T

Technical data 36

Troubleshooting 32

U

Updates 12

W

Warranty 14

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