



D.O.TEC[®] MA2CHBOX.XT

Manual



Version 1.2

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About This Manual

How to Use This Manual

This manual guides you through the installation and operation of the MA2CHBOX.XT.

Use the Table of Contents at the beginning of the manual or Index Directory (see *page 55*) 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 tips and short cuts.



Notes – are used for important points of clarification or cross references.



Warning

Warnings – alert you when an action should always be observed.



Chapter 1: Overview

Introduction

Welcome to the MA2CHBOX.XT, D.O.TEC's headphone amplifier for monitoring MADI and AES signals:



The MA2CHBOX.XT can monitor any mono channel or any stereo pair of 64 audio channels from a MADI stream or the incoming AES signal. The signal is fed to the headphone and AES output in parallel. The MA2CHBOX.XT provides the following interfaces:

- Standard MADI I/O (coaxial, BNC and optical, SC)
- two ExpressCard I/Os for use with RME MADI-face
- AES I/O (adaptor DSUB-9 to XLR male / female)
- USB Port for transmission of RS 232 data (virtual serial port) and firmware updates.
- Headphone output (stereo)

Applications

The MA2CHBOX.XT can be used for monitoring one or two channels out of 258 channels (4 x 64 channels MADI + 1 x 2 channels AES3).

Typical applications include:

- external monitors - the selected channel pair for monitoring is copied to the AES output feeding e.g. external digital monitors.
- recording with redundant systems - the incoming MADI signal (main input) is mirrored to both ExpressCard outputs feeding two RME MADIfaces.
- playback from an ExpressCard to the MADI chain, thus allowing a virtual soundcheck (EC Mode).
- signal control of MADI signals within a signal chain; e.g. on stage for line check.

How it works

The input is selected in the menu. By turning the encoder knob, the desired channel pair is accessed or the volume adjustment is done. Two modes (normal mode / EC mode) allow different signal routing. The USB port for RS 232 data transmission is switchable. Thus allowing a transparent signalflow through the MA2CHBOX.XT.

Feature Summary

MADI Ports	2 x MADI input and output (Coaxial BNC connection and optical SC port)
ExpressCard Ports	2 x IEEE 1394a connector, proprietary protocol (no Firewire), compatible with RME MADiface ExpressCard
AES	1 x AES3 input and output (adaptor DSUB-9 to XLR male/female)
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%
Headphone Output	6.3 mm TRS jack, stereo
Serial Communication	RS-232 via USB (virtual COM Port for Windows XP, Vista, 7)
Power Supply	1 x internal, C13 connector (safety class 1) or 2 x external, Hirose connector (HR 10)

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 heat 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 local service 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 in for repair. See „Chapter 7: Troubleshooting and Maintenance“ on page 51 for assistance with troubleshooting.

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.

Contents

The contents of your MA2CHBOX.XT package should include:

- 1 x MA2CHBOX.XT
- 1 x Power chord (*AC-Version*)
- 1 x external PSU (*DC-Version*)
- 1 x Adaptor DSUB-9 to XLR
- 1 x Manual

Updates

D.O.TEC® products are continually under 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 1.9.

Intended Operation

The **MA2CHBOX.XT** is designed for monitoring MADI signals (AES10) or AES signals (AES3) via headphones or AES.

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.



Warning

The use of headphones at high volumes may damage your hearing.



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.



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:

IMM Elektronik GmbH,
Leipziger Strasse 32
09648 Mittweida, Germany



Only stamped parcels will be accepted!

WEEE-Reg.-No. DE 93924963

Contact

Sales:

DirectOut GmbH, Leipziger Strasse 32,
09648 Mittweida, Germany

Phone: +49 (0)3727 6205-333

Fax: +49 (0)3727 6205-56

www.directout.eu

Manufacturer:

IMM Elektronik GmbH, Leipziger Strasse 32,
09648 Mittweida, Germany

Phone: +49 (0)3727 6205-0

Fax: +49 (0)3727 6205-56

www.imm-gruppe.de

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. Watch 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

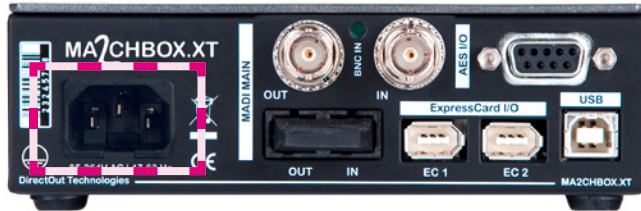
Avoid damage from condensation by waiting for the device to adapt to the environmental temperature. Proper operation can only be guaranteed between temperatures of 5° C and 45° C and a maximum relative humidity of 80%, non-condensing.

Ensure that the unit has sufficient air circulation for cooling.



AC-Version (a)

3a. Using the power cord provided connect the device to a matching power supply:

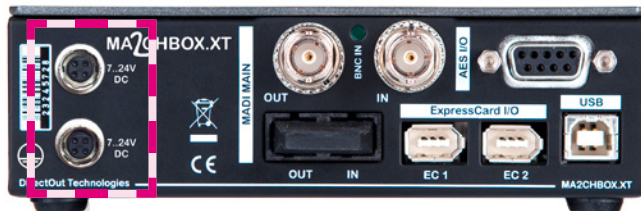


Warning

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).

DC-Version (b)

3b. Connect the external PSU to a matching power supply and plug in the Hirose connector (HR 10) to the device:



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.

The shipment of the DC-version includes one external power supply unit. Additional power supply units are available from your local D.O.TEC® 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.



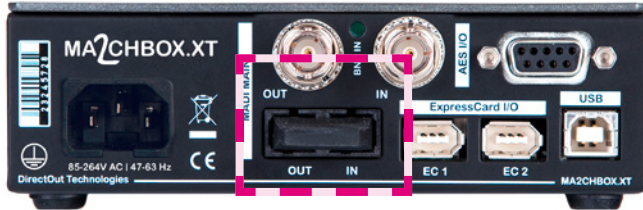
4. Turn on the power switch:



The first seconds after switch-on, the actual firmware version of the device is displayed.

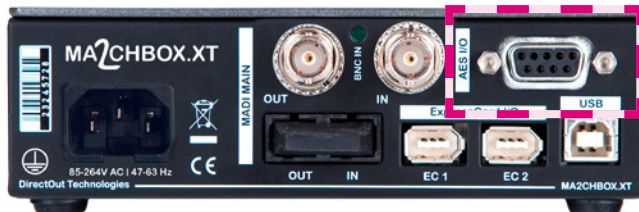


- Remove the protective cap from the optical MADI port before use:



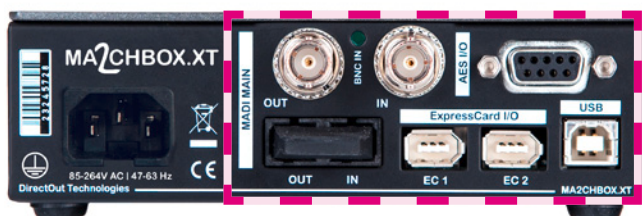
Retain the protective cap if the optical port is unused. This will protect against soiling which can lead to malfunction.

- Connect the delivered adaptor to the DSUB-9 plug.



7. Connect the MADI, AES and USB signals to the device:

- MADI IN/OUT – coaxial and optical connectors
- EC 1 & EC 2 – ExpressCard connectors
- AES IN/OUT – XLR connectors (adaptor)
- optional: USB – USB connector (*needs D.O.TEC USB driver to be installed - see page 42*)



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 = 1 FS; 88.2 kHz = 2 FS; 176.4 kHz = 4 FS

or

- 48 kHz = 1 FS; 96 kHz = 2 FS; 192 kHz = 4 FS

Global Controls



On/Off Switch	Press to turn the power supply on or off.
Encoder knob (Volume)	<p>Press and turn for all operations (channel selection, volume, menu settings).</p> <p>Press short to toggle between volume and channel selection (Vol/Ch) or to navigate through the menu.</p> <p>Press for more than 2 seconds to toggle between Vol/Ch and the menu.</p> <p>Press twice (“double click”) to mute / unmute the headphone output.</p> <p>Turning the encoder knob at volume selection will also unmute the output.</p>



Mute and Volume control are applied to the headphones output only and do not affect the MADI or AES signal.

Input / Sync



Input

Five I/Os are available:

- MADI - optical (MAIN)
- MADI - coaxial (MAIN)
- ExpressCard 1 (EC 1)
- ExpressCard 2 (EC 2)
- AES (AES)

For both the coaxial and the optical MADI port the term “Main input” is used.



Sync

The MA2CHBOX.XT automatically syncs to an input signal.

Four priority sequences are selectable:

- Main ⇄ EC1 ⇄ EC2 ⇄ AES
- AES ⇄ Main ⇄ EC1 ⇄ EC2
- EC1 ⇄ Main ⇄ EC2 ⇄ AES
- EC2 ⇄ Main ⇄ EC1 ⇄ AES

See „S<x> (MENU)“ on page 34.

If no valid signal is present the next input is used.

If no input detects a valid signal, all four LEDs will pulse.

LED MAIN	<p>This LED indicates the use of the main input and its sync status.</p> <p>LED OFF = no signal</p> <p>LED flashing = signal present, asynchronous (LOCK)</p> <p>LED ON = signal present, synchronous (SYNC)</p>
LED EC 1	<p>This LED indicates the use of the EC 1 input and its sync status.</p> <p>LED OFF = no signal</p> <p>LED flashing = signal present, asynchronous (LOCK)</p> <p>LED ON = signal present, synchronous (SYNC)</p>
LED EC 2	<p>This LED indicates the use of the EC 2 input and its sync status.</p> <p>LED OFF = no signal</p> <p>LED flashing = signal present, asynchronous (LOCK)</p> <p>LED ON = signal present, synchronous (SYNC)</p>
LED AES	<p>This LED indicates the use of the AES input and its sync status.</p> <p>LED OFF = no signal</p> <p>LED flashing = signal present, asynchronous (LOCK)</p> <p>LED ON = signal present, synchronous (SYNC)</p>

Clock independent AES monitoring

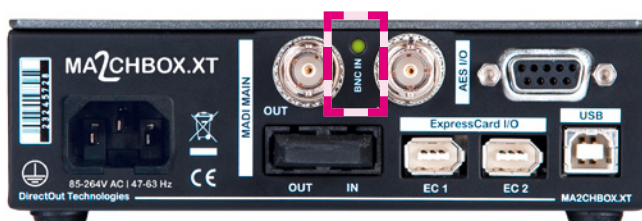
Once AES input is selected (parameter <AA>, page 32), the AES input signal clocks the D/A converter of the headphones output irrespective of the actual sync source of the MA2CHBOX.XT.

Therefore an AES signal can still be monitored even if it is not in sync with the clock source (e.g. “Main input”) of the device.

Switching the input to AES does not affect the MADI signal routed through the device.

Input priority

For both the coaxial and the optical MADI port the term “Main input” is used. The priority behaviour among both ports is defined in the menu - parameter <Px> (see page 33).



LED BNC IN

This LED indicates the use of the coaxial MADI input (BNC).

LED OFF = optical input has priority and/or is used as signal source

LED ON = coaxial input has priority and/or is used as signal source

If one of the MADI inputs fails the other one takes over - click free.



Display / Menu

The 7 segment display indicates the selected channel pair, adjusted volume, level, menu settings.



The display is used in two modes:

- idle mode - volume selection or level metering
- menu mode - menu settings

After a short period of time without using the encoder knob the **idle mode** becomes active; i.e. the menu is left automatically and the display switches back to **level metering** or **vol selection**.



Display content	Meaning
<Number> + Decimal point(s)	<p>The selected channel (pair) is indicated.</p> <p>In <i>stereo mode</i> odd numbers are indicated only; e.g. <05.> is selected = monitoring of MADI channels 05 (left) and 06 (right)</p> <p>In <i>mono mode</i> all channels are indicated.</p> <p>Blinking of left decimal point indicates: Mute active.</p> <p>Blinking numbers indicate: channel not available (at scaling factor 2 FS or 4 FS or in 56ch mode)</p>
<Number> only	<p>The adjusted volume level is indicated.</p> <p>The signal can be varied within a range of -96 dBFS to 0 dBFS in steps of 1 dB. An additional boost up to 9 dB can be applied.</p> <p>Blinking numbers indicate: Mute active.</p>

The channel mode (56ch or 64ch) of the MADI signal is detected automatically and remains unchanged.



Press the encoder knob for more than 2 seconds to enter the **menu**.

Display content	Meaning
A<x> (MENU)	<p>Selected audio input for monitoring is indicated.</p> <p>Values: AM = Main / A1 = EC 1 / A2 = EC 2 / AA = AES</p> <p><i>AM (Main) refers to the active MADI input depending on the priority setting. See „P<x> (MENU)“.</i></p>
E<x> (MENU)	<p>Selected operating mode is indicated.</p> <p>Values: E0 = EC mode off / E1 = EC mode on</p>
F<x> (MENU)	<p>Selected input scaling factor is indicated.</p> <p>Values: 1 = 1 FS / 2 = 2 FS / 4 = 4 FS</p> <p><i>A 96k Frame signal will override the setting and force the scaling factor to 2 FS temporarily. The set value is restored once a 48k Frame signal is detected. Override is indicated by blinking display of 1 FS or 4 FS.</i></p>
L<x> (MENU)	<p>Level metering during idle mode.</p> <p>Values: 0 = off / 1 = on</p> <p>After a short period of time without using the encoder knob the idle mode is activated.</p> <p>The display then indicates the input level for the left and right channel individually. The three horizontal bars of the segment display mark the values -30 dBFS, -18 dBFS and -6 dBFS. The decimal point indicates a signal different from digital zero.</p>

Display content	Meaning
U<x> (MENU)	<p>Mode and BAUD rate of USB serial Embedder/Deembedder is indicated.</p> <p>Values: 0 = off / 1 = 19.200 kbps / 2 = 38.400 kbps / 3 = 115.200 kbps</p>
C<x> (MENU)	<p>Monitor mode is indicated.</p> <p>Values: M = mono / S = stereo</p> <p>Monitoring of either a stereo pair or a single mono channel.</p> <p>Stereo => odd channels to left and even channels to right.</p> <p>Mono => left and right are identical.</p> <p><i>This setting affects the indication of channels too (see <Numbers> + Decimal points).</i></p> <p><i>Using AES as input source (<AA>) will override the setting and force to stereo temporarily.</i></p>
P<x> (MENU)	<p>Priority of MAD1 inputs is indicated.</p> <p>Values: Po = optical / Pb = coaxial</p> <p>Both MAD1 ports are addressed as "Main". This setting affects the priority behaviour; i.e. which input is used when both inputs carry a signal.</p> <p><i>If one of the MAD1 inputs fails the other one takes over - click free.</i></p>

Display content	Meaning
M<x> (MENU)	<p>Mode of AES to MADI embedder is indicated.</p> <p>Values: MM = embedder off / MA = embedder on</p> <p>The AES input signal may be embedded into the MADI stream, replacing the specific channel pair at the MADI output that is selected for monitoring.</p>
S<x> (MENU)	<p>Sync priority behaviour is indicated.</p> <p>Values: SM = Main ⇄ EC1 ⇄ EC2 ⇄ AES S1 = EC1 ⇄ Main ⇄ EC2 ⇄ AES S2 = EC2 ⇄ Main ⇄ EC1 ⇄ AES SA = AES ⇄ Main ⇄ EC1 ⇄ EC2</p> <p><i>If no valid signal is present the next input is used as sync source.</i></p>
t<x> (MENU)	<p>Transparency mode for channel status bit is indicated.</p> <p>Values: 0 = status bit is not preserved / 1 = status bit is preserved</p> <p>The channel status bit is preserved:</p> <ul style="list-style-type: none"> • from AES input to MADI output • from MADI input to AES output <p><i>User bit and validity bit are always preserved.</i></p>
A<x> (MENU)	<p>Level of AES Output</p> <p>Values: AF = output level fixed AL = output level variable (follows the volume setting)</p>

Once the Embedder is switched off (0), all MADI streams are processed bittransparently. Embedded MIDI over MADI is processed bidirectional in EC Mode.



A scaling factor of 2 FS (4 FS) will reduce the number of channels to 32 (16) channels.



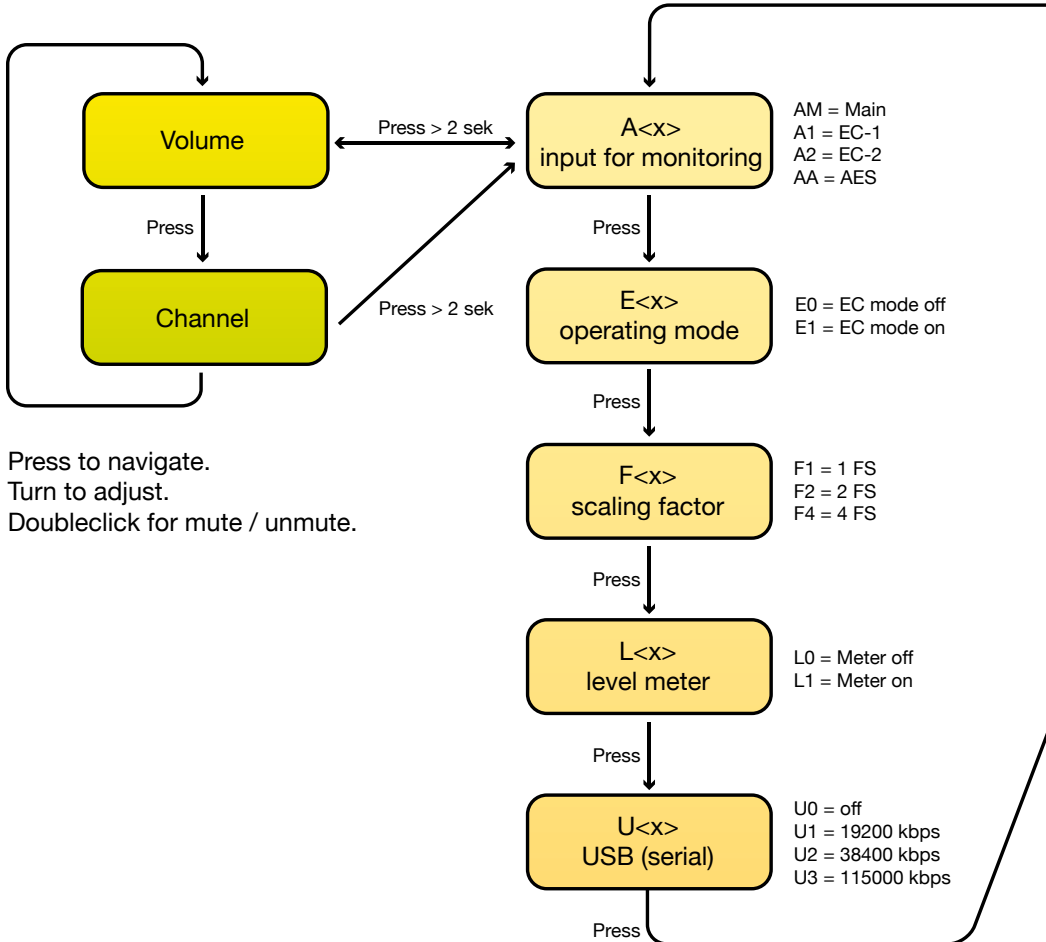
Volume settings greater than 0 dB can cause distortions in the monitor signal for high signal levels.



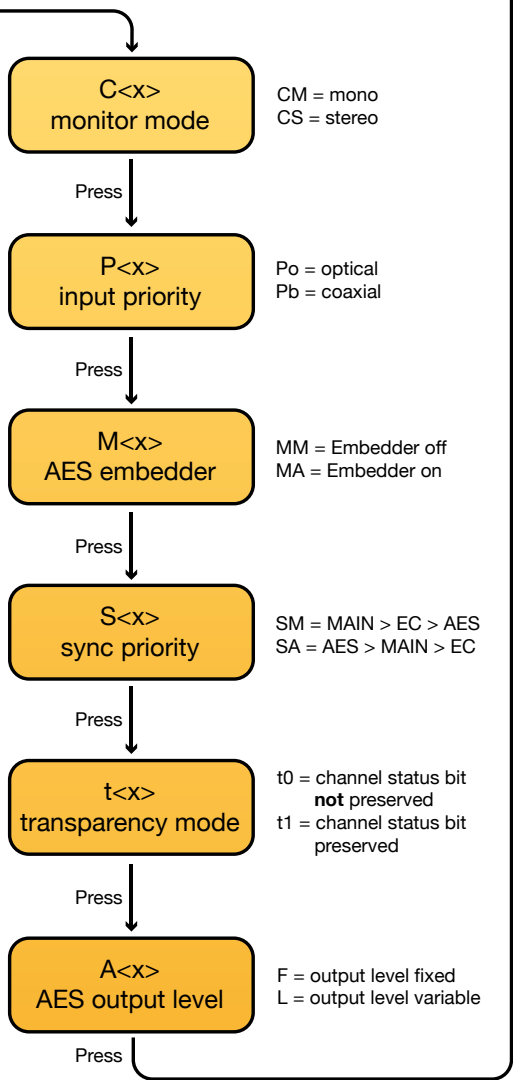
Menu Map

Normal

MENU



Press to navigate.
 Turn to adjust.
 Doubleclick for mute / unmute.



Output Headphones

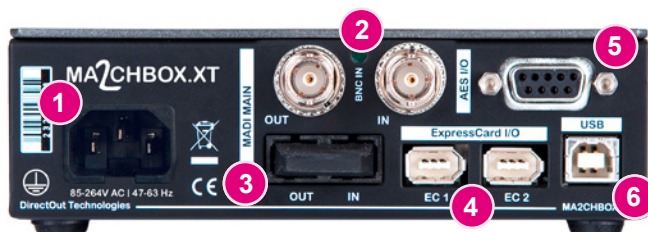


Phones

6.3 mm TRS jack, stereo.

Connect the headphones here to monitor the selected channel pair.

The Rear Panel (AC version)



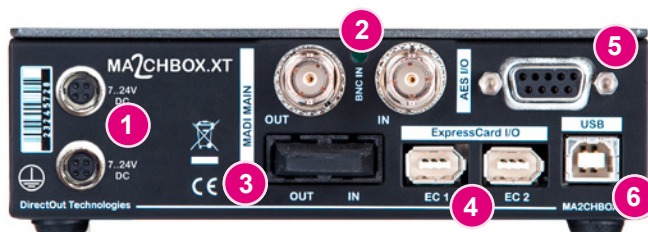
Power supply (1)	C13 socket Connect the power supply here (84V - 264V).
MADI OUT (2)	Coaxial socket for Main output Connect for MADI Main output signal here.
MADI IN (2)	Coaxial socket for Main input Connect MADI Main input signal here.
MADI OUT (3)	Optical socket for Main output Connect for MADI Main output signal here.
MADI IN (3)	Optical socket for Main input Connect MADI Main input signal here.
EC 1 IN / OUT (4)	IEEE 1394a socket for EC 1 input/output (proprietary protocol, no FireWire) Connect the RME MADiface ExpressCard here.
EC 2 IN / OUT (4)	IEEE 1394a socket for EC 2 input / output (proprietary protocol, no FireWire) Connect the RME MADiface ExpressCard here.

AES IN / OUT (5)	DSUB-9 socket Connect adaptor DSUB-9 to XLR male / female here. XLR male (IN) = connect AES input signal XLR female (OUT) = connect AES output signal
USB (RS 232 Host) (6)	USB 2.0 socket (Type B) Connect here for RS 232 transmission and firmware updates.



For USB control please read the guide “Installation USB control”. See: www.directout.eu

The Rear Panel (DC version)



Power supplies (1)	2 x Hirose socket (HR 10) Connect external power supply (DC) here (7V - 24V).
MADI OUT (2)	Coaxial socket for Main output Connect for MADI Main output signal here.
MADI IN (2)	Coaxial socket for Main input Connect MADI Main input signal here.
MADI OUT (3)	Optical socket for Main output Connect for MADI Main output signal here.
MADI IN (3)	Optical socket for Main input Connect MADI Main input signal here.
EC 1 IN / OUT (4)	IEEE 1394a socket for EC 1 input/ output (proprietary protocol, no FireWire) Connect the RME MADiface ExpressCard here.
EC 2 IN / OUT (4)	IEEE 1394a socket for EC 2 input / output (proprietary protocol, no FireWire) Connect the RME MADiface ExpressCard here.

AES IN / OUT (5)	DSUB-9 socket Connect adaptor DSUB-9 to XLR male / female here. XLR male (IN) = connect AES input signal XLR female (OUT) = connect AES output signal
USB (RS 232 Host) (6)	USB 2.0 socket (Type B) Connect here for RS 232 transmission and firmware updates.



For USB control please read the guide “Installation USB control”. See: www.directout.eu

Chapter 5: Operating Modes

Introduction

The MA2CHBOX.XT provides two operating modes:

- Normal Mode
- EC Mode

In both modes the USB to serial embedder / deembedder can be activated to embed RS 232 data from the USB input. The position of the embedder / deembedder may be varied (*see page 47*).

The input signal source of the headphone and AES output is selected in the menu and therefore independent from the operating mode.



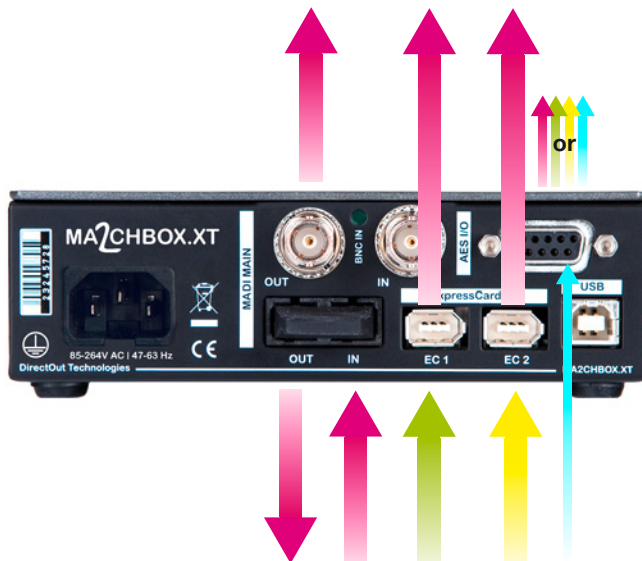
Legend for the following illustrations:

- large arrow = MADI signal
- small arrow = AES signal

Normal Mode

The input signal of the Main input is processed to all MADI outputs.

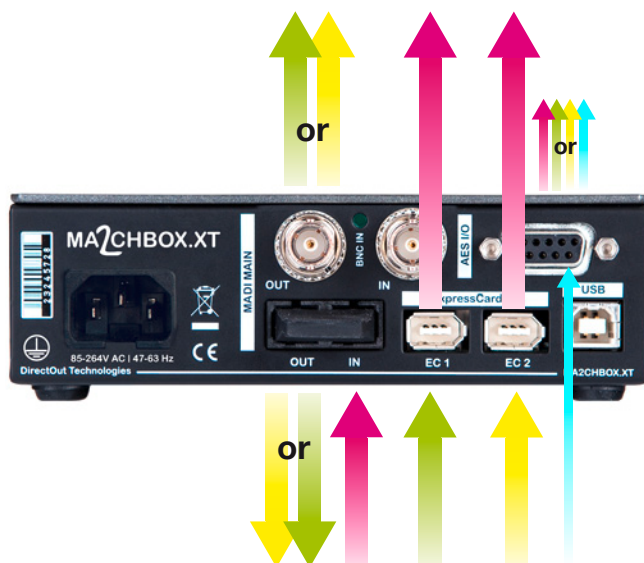
Output	gets signal from input
Main	Main + AES + Serial data (if particular embedders are active)
EC 1	Main + AES (if AES embedder is active)
EC 2	Main + AES (if AES embedder is active)
AES	Monitor signal (= selected channel pair of selected input)



EC Mode

The selected input signal (EC 1 or EC 2) is routed to the main output. The signal from the main input is still routed to the EC outputs.

Output	gets signal from input
Main	EC 1 or EC 2 EC 1 has priority
EC 1	Main + AES (if AES embedder is active)
EC 2	Main + AES (if AES embedder is active)
AES	Monitor signal (= selected channel pair of selected input)

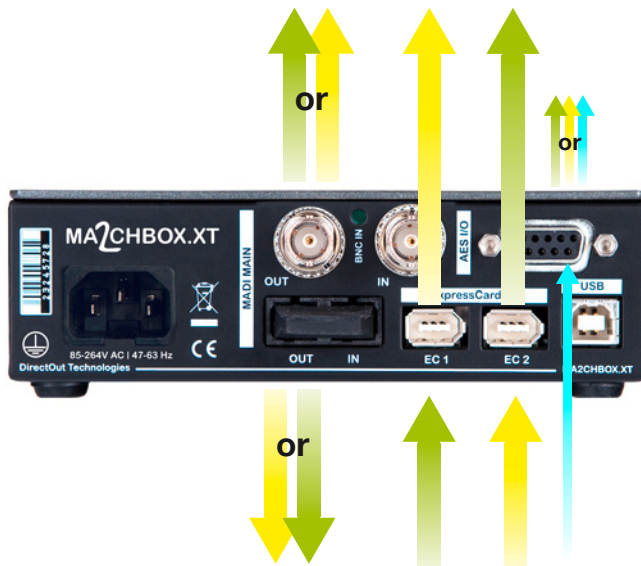


Extended Routing

The MA2CHBOX.XT can be used together with the interface box of the MADiface bundle.

For this application the signal routing is extended once there is **no signal present at the main input**:

Output	gets signal from input
Main	no signal (Normal Mode) or EC 1 or EC 2 (EC-Mode)
EC 1	EC 2
EC 2	EC 1
AES	Monitor signal (= selected channel pair of selected input)



Serial Embedder / Deembedder

Serial data can be tunnelled within a MADI signal. The MA2CHBOX.XT provides a virtual serial interface using a USB port.

Depending on the operating mode and input signal condition of the main input the position of the serial embedder / deembedder may vary as follows:

Mode	Input signal - main input	Embedder @ port
Normal	yes	Main
EC-Mode	yes	Main
Normal	no ^{*)}	EC 1
EC-Mode	no ^{*)}	EC 2

^{*)} = extended routing

The signal condition at the main input “moves” the serial embedder / deembedder between main port and the EC ports. The operating mode selects the used EC port.

The order of the connected devices is significant as the sync source priority - regarding the EC ports - follows a fixed order: EC 1 ⇔ EC 2



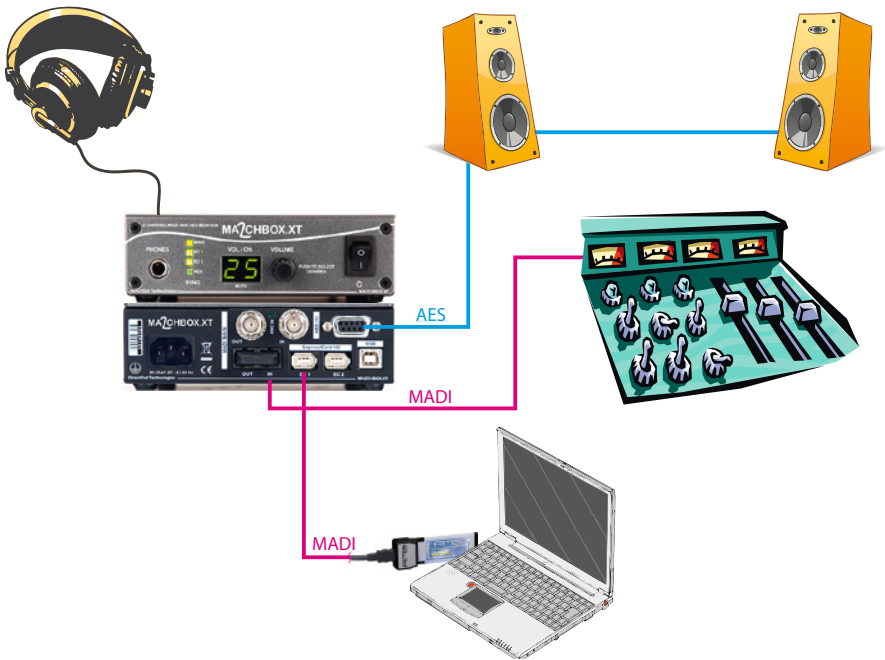
Chapter 6: Application Examples

Introduction

This chapter describes how the MA2CHBOX.XT device could be used.

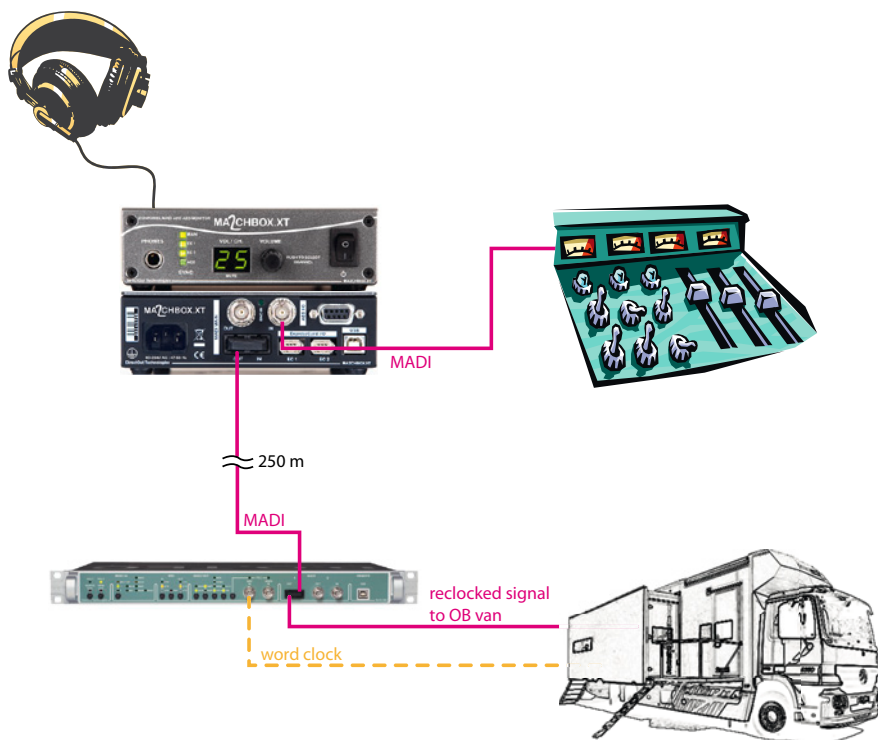
Example 1: External Monitors

The MADI signal from the mixing desk is fed to the MA2CHBOX.XT. The selected channel pair is output at the AES3 port feeding e.g. digital studio monitors. An EC port is connected to a laptop to record the MADI signal.



Example 2: Signal conversion + Observing

The MA2CHBOX.XT may help observing the signal from stage direct behind the stage mixer. It is converted from coaxial to optical and fed to a MADI.SRC (for clock decoupling) in the OB van.

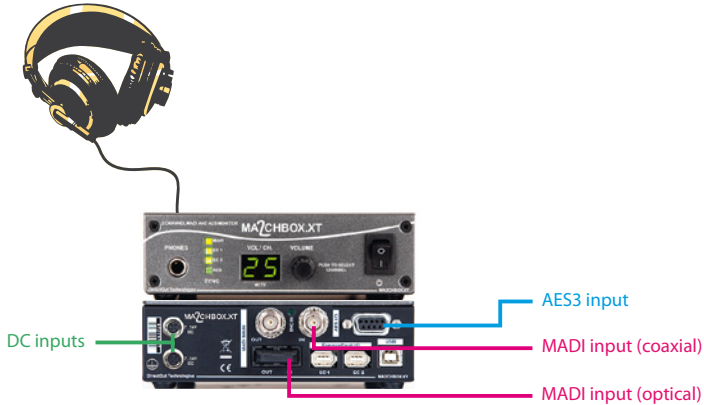


The (mostly) remaining fiber string could be used to return a control signal to the optical input. In case the coaxial input fails the box will switch to the other MADI input making a loop between OB van and stage then.

Setup: Pb = coaxial input priority

Example 3: Mobile Line Check

Battery powered the MA2CHBOX.XT may act as mobile monitoring solution. Input selection between MADI coaxial or MADI optical or AES3.



Chapter 7: 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 D.O.TEC® 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.
Output port does not transmit the desired signal.	Wrong operating mode active.	Check the operating mode and change the mode in the menu.
No signal at the output port.	Connections (input / output) are mixed up.	Check the connections and change the cables if necessary.
No signal at the output port.	Signal cable defective.	Exchange the signal cable.

Issue	Possible reason	Solution
Input LED is always blinking.	Input signal is not in sync with device or input signal is not stable 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 (see „ <i>Technical Data</i> “ on page 53).
Clicks in the audio signal.	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.
Display blinking in CH selection.	Channel is not available, due to scaling factor or 56 ch mode used.	Check the scaling factor in the menu or check the input signal.
Display is black.	No signal is present and level meter during idle mode is enabled.	Check input signal or switch off level meter (see page 32).

Maintenance

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



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

Technical Data

Dimensions

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

Weight

- 0,8 kg

Power consumption

- 5 watts, standby power < 0,5 watts (efficiency level V)

Power supply

- AC Version: 84 V - 264 V AC / 47 Hz - 63 Hz / Safety class 1 / C13 connector
- DC Version: 7 V - 24 V DC / Hirose connector (HR 10)

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 - coaxial

- BNC connection (input/output)
- Impedance: 75 Ω
- 0.3 V up to 0.6 V (peak to peak)
- Maximum Signal Jitter < 1 ns

MADI Port - optical

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

ExpressCard Ports

- 2 x IEEE 1394a connector (proprietary protocol, no FireWire)
- compatible with RME MADIface ExpressCard

AES Port

- 1 x DSUB-9 connector (female)
- AES3 balanced (input / output)

Headphone Output

- 6,3 mm TRS jack, stereo

Output Level

- max. +12dBu
- SNR: 114dB RMS unweighted / 117dBA
- THD@0dBFS: -95dB / 600 Ω

Serial Communication

- RS-232 via USB (virtual COM-Port for Windows XP, Vista, 7)

Cable Specifications

- coaxial cable - impedance 75 Ω , screening attenuation better than 85 dB

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Symbole

96 kHz *see input scaling factor*

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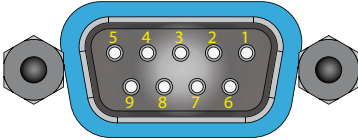
X

Y

Z

Appendix A - Wiring Sketches

DSUB-9 (AES Port)



Pin	Signal
1	AES IN +
2	Ground
3	NC
4	AES OUT +
5	Ground
6	AES IN -
7	NC
8	Ground
9	AES OUT -

Hirose HR10 (DC PSU)



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



To ensure proper operation all pins should be connected.