DirectOut TECHNOLOGIES

MADI.SRC

User's Manual

Version 2.0

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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.

This document relates to:

- MADI.SRC (BNC / SC)
- MADI.SRC (SC / SC)

CHAPTER 1: Overview

Introduction

The MADI.SRC enables real time sample rate conversion of a complete MADI stream. It includes 32 high quality stereo sample rate converters, and supports all source and destination sample rates from 30 kHz to 50 kHz and their multiples, for all MADI formats (48k/96k Frame, 56/64 channels, S/MUX).

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

Feature Summary

MADI Ports	1 x SC-Socket multi/single-mode & 1 x coaxial BNC connector, 75 Ω (BNC/SC) or 2 x SC-Socket multi/single-mode (SC/SC)
MADI Formats	56/64 channel, 48k/96k Frame, S/MUX 2/4
Sample Rates	32 kHz to 50 kHz and their multiples
Clock Inputs	1 x Word clock, coaxial BNC, 75 Ω termination switchable This input also accepts an AES3 frame (AES11). 1 x Video coaxial BNC, 75 Ω termination switchable, black burst (PAL, NTSC)
Operating Modes	Normal Mode: one input active, outputs parallel Split Mode: inputs and outputs combined
USB Port	USB 2.0 port for firmware updates
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)

How it works

The MADI input signal is buffered and routed via the sample rate converters (32 stereo SRCs) to the output. The output signal is reclocked by the selected reference (internal, MADI, Video, word clock or AES3id). The output format (56/64 ch, 48k/96kFrame of the MADI input signal can be also modified with the SRCs switched off.

By activating the Split Mode, the inputs and outputs can be used in combination to make use of all 32 stereo SRCs at higher sample rates. Depending on the SRC's setting this allows for conversion of more than 32 (@96 kHz) or 16 (@192 kHz) channels.

Applications

The MADI.SRC is designed for use in environments where the highest possible quality sample rate conversion is at a premium. The stream is processed in real time and all output channels are phase and sample accurate to each other.

Further the MADI.SRC can be used as a decoupling device to connect two asynchronous systems without any loss of audio quality.

With the SRC switched off, the device works as a simple format converter, and provides different MADI formats at the output ports (48k/96k Frame, 56/64 channel).

Typical applications include:

- Broadcast environments using different clock masters.
- Dubbing of multichannel signals for archiving
- Combination of two high sample rate streams to a single lower sample rate stream (e.g. 2 x 32 channels @ 96 kHz into 1 x 64 channels @ 48 kHz).
- Format conversion of signals (e.g. 48k Frame S/MUX into 96k Frame).
- ...

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 document refers to firmware version 2.5.

Intended Operation

The MADI.SRC is designed for conversion of format and sample rate of 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 MADI.SRC package should include:

- 1 x MADI.SRC (19'', 1 RU)
- 2 x power chord
- 2 x fixing unit for power plug
- 1 x User's Manual

Two different MADI I/O configurations are available:

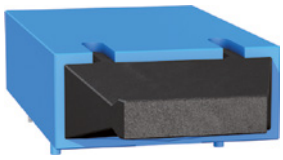
1 x SC-Socket & 1 x BNC coaxial (Version BNC / SC)

2 x SC-Socket (Version SC / SC)

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

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.

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

(Version BNC / SC)

(Version SC / SC)

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 MADI and clock signals to the device.

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

WARNING

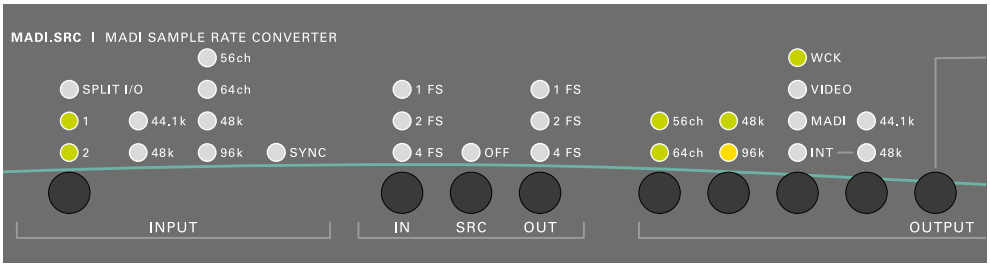
This device must be connected to the mains using the three-cord power leads supplied with the system. Only supply the voltages and signals indicated (84 V – 264 V).

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 2.5.



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.

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.

TIP

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

This page is left blank intentionally.

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.

Device Lock

The device can be locked against to prevent from accidental modification of the settings.

LOCK KEYS	**LED (red): indicates state of Keys Lock** LED OFF = keys lock not activated LED ON = keys lock activated
LOCK KEYS	**Push button** Press and hold the LOCK KEYS button for more than 2 seconds to change the key lock status. With lock activated, the device cannot be controlled locally from the front panel.
LOCK REMOTE*	**LED (red): indicates state of Remote Lock** LED OFF = remote lock not activated LED ON = remote lock activated
LOCK REMOTE*	**Push button** Press and hold the LOCK REMOTE button for more than 2 seconds to change the remote lock status. With lock activated, the device cannot be controlled via remote control

* not implemented

Firmware Update

The firmware can be updated via a USB connection. The software and the update instructions are available at www.directout.eu.

USB	**USB socket (type B)** Connect for firmware updates here.

Input Section

These controls select the operating mode and MADI input, and indicate the sample rate and format of the MADI input signal.

Two operating modes are provided:

- Normal Mode = either MADI input may be selected.
- Split Mode = both MADI inputs can be used depending on the combination of the input and output SRC selections.

INPUT	**Push button** Press short to select either input 1 or input 2 for conversion (in normal mode). Press and hold longer than 2 seconds to toggle between normal mode and split mode.
INPUT SPLIT I/O	**LED (yellow): indicates the operating mode** LED OFF = normal mode active LED ON = split mode active
INPUT 1	**LED (green): indicates the selection of MADI input 1** LED ON* = input 1 selected LED blinking = input selected but no signal detected
INPUT 2	**LED (green): indicates the selection of MADI input 2** LED ON* = input 2 selected LED blinking = input selected but no signal detected
INPUT 44.1	**LED (green): indicates the use of 44.1 kHz as base sample rate** LED ON = Base sample rate 44.1 kHz
INPUT 48	**LED (green): indicates the use of 48 kHz as base sample rate** LED ON = Base sample rate 48 kHz

* in split mode both input leds are lit

INPUT 56 ch	**LED (green): indicates the channel format of the MADI input signal** LED ON = 56 channels
INPUT 64 ch	**LED (green): indicates the channel format of the MADI input signal** LED ON = 64 channels
INPUT 48k	**LED (green): indicates the frame format of the MADI input signal** LED ON = 48k Frame (S/MUX at higher sample rates)
INPUT 96k	**LED (yellow): indicates the frame format of the MADI input signal** LED ON = 96k Frame
INPUT SYNC*	**LED (green): indicates the sync state of selected input (SRC OFF) or indicates sync to unselected MADI input:** LED OFF = no lock LED ON = selected input signal is in sync with chosen clock reference. LED blinking = selected input signal is not in sync with chosen clock reference (SRC OFF). In Split Mode, a flashing led indicates that MADI inputs 1 and 2 are not in sync with each other.

* see „Appendix A: Clocking to MADI“ on page 38

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.

SRC Section

The SRC controls define the scaling factor of input and output sample rate, and switch the SRCs in or out of circuit.

IN	**Push button** Press to define the scaling factor of the input signal.
IN 1 FS	**LED (green): indicates scaling factor 1 FS for input signal** LED ON = 1 FS is selected
IN 2 FS	**LED (yellow): indicates scaling factor 2 FS for input signal** LED ON = 2 FS is selected LED blinking = input signal with 96k Frame detected and 2 FS is not selected*
IN 4 FS	**LED (white): indicates scaling factor 4 FS for input signal** LED ON = 4 FS is selected
SRC	**Push button** Press short to toggle the SRCs on or off. Press longer than 2 seconds to toggle bypass mode - - see „Bypass Modes“ on page 23.
SRC OFF	**LED (red): indicates the activation state of the SRCs and the bypass mode:** LED OFF = sample rate conversion active LED ON = sample rate conversion inactive, normal bypass active LED blinking = sample rate conversion inactive, true MADI bypass active

* The 96k Frame format defines a 2 FS signal.

NOTE

The sub code of a MADI signal does not transmit the scaling factor of the sample rate reliably, and therefore it must be selected manually.

OUT	**Push button** Press to define the scaling factor of the output signal.
OUT 1 FS	**LED (green): indicates scaling factor 1 FS for output signal** LED ON = 1 FS is selected
OUT 2 FS	**LED (yellow): indicates scaling factor 2 FS for output signal** LED ON = 2 FS is selected
OUT 4 FS	**LED (white): indicates scaling factor 4 FS for output signal** LED ON = 4 FS is selected

NOTE

If the Auto Clock Range Select option is active, the scaling factor will follow the word clock or AES3id signal - „Auto Clock Range Select (ACRS)“ on page 32.

Bypass Modes

When the SRCs are switched off, the input signal is is buffered, refreshed and processed transparently.
Two bypass modes:

- Normal - no sample rate conversion is applied, the signal is refreshed/ reclocked.
  Sync settings are relevant.
- True - no sample rate conversion is applied, only the MADI carrier is refreshed, the data format remains unchanged.
  Sync settings are irrelevant.

NOTE

Bypass mode ‘Normal’ still allows for format conversion:
48k Frame <> 96k Frame, or 56 ch <> 64 ch.

Check the sync status of the MADI input and clock reference using the SYNC LED- see „Input Section“ on page 20.

The SRC processing delay amounts to about 2.5 ms. The delay is equal for every channel; there is no change in phase between channels.

Output Section

These controls select the sample rate, format and clock reference for the MADI output.

MADI Output Format

The channel mode and the frame format can be specified.

OUTPUT 56 ch / 64 ch	**Push button** Press short to toggle the channel mode between 56 ch and 64 ch.*
OUTPUT 56 ch	**LED (green): indicates 56 channel mode for MADI output** LED ON = 56 ch mode active
OUTPUT 64 ch	**LED (green): indicates 64 channel mode for MADI output** LED ON = 64 ch mode active
OUTPUT 48k / 96k	**Push button** Press short to toggle the frame format between 48k Frame and 96k Frame.**
OUTPUT 48k	**LED (green): indicates 48kFrame format for MADI output** LED ON = 48kFrame active (= SMUX at 2 FS or 4 FS)
OUTPUT 96k	**LED (yellow): indicates 96kFrame format for MADI output** LED ON = 48kFrame active

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.

Clock source

The MADI.SRC offers a variety of clock references for the MADI output signal.

OUTPUT WCK / VIDEO / MADI / INT	**Push button** Press short to adjust the clock reference for the MADI output.
OUTPUT WCK	**LED (green): indicates the use of WCK IN as clock reference for MADI output** LED ON = word clock is selected as clock reference LED blinking = word clock is selected as clock reference, but no signal is detected
OUTPUT VIDEO	**LED (green): indicates the use of VIDEO IN as clock reference for MADI output** LED ON = video is selected as clock reference LED blinking = video is selected as clock reference, but no signal is detected
OUTPUT MADI	**LED (green): indicates the use of MADI IN as clock reference for MADI output*** LED ON = MADI is selected as clock reference LED blinking = MADI is selected as clock reference, but no signal is detected LED blinking fast = sync to unselected MADI input and no signal present at one input. LED heartbeat = sync to unselected MADI input and signal present at both inputs.
OUTPUT INT	**LED (green): indicates the use of the internal clock generator as clock reference for MADI output** LED ON = internal clock generator is selected as clock reference

* see „Appendix A: Clocking to MADI“ on page 38

Sample rate

The base rate can be adjusted if the clock reference is set to INT or VIDEO. It is defined automatically by the word clock or MADI input signal if the clock reference is set to WCK or MADI.

OUTPUT 44.1 k / 48 k	**Push button** Press to define base rate when clock source is set to INT or VIDEO. Press to toggle between selected and unselected MADI input when clock source is set to MADI.*
OUTPUT 44.1 k	**LED (green): indicates the use of 44.1 kHz as base rate for MADI output** LED ON = base rate is set to 44.1 kHz
OUTPUT 48 k	**LED (green): indicates the use of 48 kHz as base rate for MADI output** LED ON = base rate is set to 48 kHz

* see „Appendix A: Clocking to MADI“ on page 38.

Connecting Video / Word clock

Word clock or a video signal may be connected as external clock reference.

WCK IN	**BNC socket (coaxial), 75 Ω** Connect a word clock signal or AES3id DARS (Digital Audio Reference Signal / AES11) here.
VIDEO IN	**BNC socket (coaxial), 75 Ω** Connect video reference signal (PAL or NTSC) here. The video standard is detected automatically.
OUTPUT 75 Ω	**Push button** Press to enable or disable termination for the currently selected clock reference.
OUTPUT 75 Ω (WCK IN)	**LED (green): indicates the termination state of the word clock input** LED OFF = termination inactive LED ON = termination active
OUTPUT 75 Ω (VIDEO IN)	**LED (green): indicates the termination state of the video input** LED OFF = termination inactive LED ON = termination active

NOTE

Termination can be set independently for both inputs.

To ensure proper operation of the device, an appropriate termination status must be selected.

Connecting MADI

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

Version BNC / SC

Version SC / SC

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

NOTE

SC Ports may be equipped with multi-mode or single-mode modules
- see page 12.

Chapter 5: Operating Modes

Introduction

The MADI.SRC provides 32 stereo sample rate converters resulting in 64 audio channels available for sample rate conversion.

As a MADI signal is limited in bandwidth to a maximum of 64 channels at 1 FS, the number of available channels is governed by the chosen scaling factor:

- 64 channels at 1 FS
- 32 channels at 2 FS
- 16 channels at 4 FS

To take optimal advantage of the available SRCs at higher sample rates the MADI.SRC offers the Split Mode.

Two operating modes:

- Normal Mode - one input is used and both outputs operate in parallel.
- Split Mode - both inputs and outputs are operated combined

Normal Mode

In Normal Mode only one MADI input can be used at a time and both outputs transmit identical signals in parallel.

The table below lists the available combinations and explains the signal flow:

Input FS	Output FS	Used SRC channels (in / out)	MADI IN 1 or 2 range	MADI OUT 1 range	MADI OUT 2 range
1 FS	1 FS	64 / 64	01 - 64	01 - 64	01 - 64
1 FS	2 FS	64 / 32	01 - 64	01 - 32	01 - 32
1 FS	4 FS	64 / 16	01 - 64	01 - 16	01 - 16
2 FS	1 FS	32 / 32	01 - 32	01 - 32	01 - 32
2 FS	2 FS	32 / 32	01 - 32	01 - 32	01 - 32
2 FS	4 FS	32 / 16	01 - 32	01 - 16	01 - 16
4 FS	1 FS	16 / 16	01 - 16	01 - 16	01 - 16
4 FS	2 FS	16 / 16	01 - 16	01 - 16	01 - 16
4 FS	4 FS	16 / 16	01 - 16	01 - 16	01 - 16

NOTE

Depending on the combination of input and output scaling factor not all input channels might be available at the target (output) sample rate.
Example '1 FS to 4 FS': 64 channels @ 1 FS > 16 channels @ 4 FS

Split Mode

In Split Mode both MADI inputs may be used at a time and the outputs may transmit different signals to make optimal use of all available SRC channels.

The table below lists the available combinations and explains the signal flow:

Input FS	Output FS	Used SRC channels (in / out)	MADI IN 1 range	MADI IN 2 range	MADI OUT 1	MADI OUT 2
1 FS	1 FS	64 / 64	01 - 32 (3)	01 - 32 (3)	01 - 64 (1+2)	01 - 64 (1+2)
1 FS	2 FS	64 / 64	01 - 64	-	01 - 32	33 - 64
1 FS	4 FS	64 / 32	01 - 64	-	01 - 16	17 - 32
1 FS	2 FS	64 / 64	-	01 - 64	01 - 32	33 - 64
1 FS	4 FS	64 / 32	-	01 - 64	01 - 16	17 - 32
2 FS	1 FS	64 / 64	01 - 32	01 - 32	01 - 64 (1+2)	01 - 64 (1+2)
2 FS	2 FS	64 / 64	01 - 32	01 - 32	01 - 32 (1)	01 - 32 (2)
2 FS	4 FS	32 / 32	01 - 32	-	01 - 16	17 - 32
2 FS	4 FS	32 / 32	-	01 - 32	01 - 16	17 - 32
4 FS	1 FS	32 / 32	01 - 16	01 - 16	01 - 32 (1+2)	01 - 32 (1+2)
4 FS	2 FS	32 / 32	01 - 16	01 - 16	01 - 32 (1+2)	01 - 32 (1+2)
4 FS	4 FS	32 / 32	01 - 16	01 - 16	01 - 16 (1)	01 - 16 (2)

(1+2) = both outputs transmit identical combination of input 1 & 2
(1) = input 1
(2) = input 2
(3) = combines channels 01-32 of both inputs into one stream.
To combine without SRC processing, deactivate SRCs (SRC OFF).

NOTE

Two higher rate inputs may be combined into one lower rate output.

One lower rate input may be split into two higher rate outputs.

Once there are more input channels than output channels, one of the MADI inputs must be selected manually (1 FS to 2 FS, 1 FS to 4 FS, 2 FS to 4 FS).

Channel mapping - if both inputs are available and input 2 is fed only, the mapping of the output channels remains unaffected. Example '2 FS to 1 FS': channels 01-32 are empty (input 1) and channels 33-64 active (input 2).

Auto Clock Range Select (ACRS)

Normally, the scaling factor of the base sample rate is defined manually for input and output from the SRC controls. However, the MADI.SRC offers an option to switch the output scaling factor automatically – Auto Clock Range Select (ACRS).

The input frequency of the word clock (or AES3id) signal is detected automatically. When the option is active, the scaling factor for the output follows a change in this frequency.

Example (clock reference WCK):

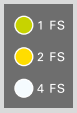
- word clock input = 48 kHz, MADI output is set to 1 FS
- word clock input = 96 kHz, MADI output changes to 2 FS

Activate ACRS

1. Switch on the device.
   Initially all the LEDs on the front panel illuminate. After about 2 seconds, only a few LEDs are lit (indicating the firmware revision of the device).

2. At this point, press the button 'OUT' in the SRC section. This turns the ACRS mode on or off.

The status is indicated by the SRC output LEDs:

Code	ACRS status
	ACRS ON (all three leds lit)
	ACRS OFF (no led lit)

Serial Data

Firmware version 2.5 introduces a serial de-embedder / embedder to preserve embedded serial data which otherwise would be altered due to the sample rate conversion.

How it works

Serial data means the user bits of audio channels 1 to 9, which is also known as 'Serial over MADI'.

The serial data is de-embedded from the selected MADI input signal and embedded into the converted MADI output signal.

So the conversion process is bypassed for the serial data.

NOTE

'MIDI over MADI' (user bit of channel 56) is not supported by the (de-)embedder.

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.
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 (75 Ω, screening attenuation better than 85 dB.)
Output port does not transmit the desired signal.	Wrong input selected.	Change the input using the push button on the front panel.
LED SYNC is blinking	Input signal is not in sync with the selected clock reference.	Check the input signal source or change the clock reference or activate SRC.

Issue	Possible reason	Solution
LED SYNC is blinking	Signal of input 2 is not in sync with input 1 (Split Mode).	Check the input signal source or disconnect input 1 or disconnect input 2.
Scaling factor of output sample changes automatically.	Auto Clock Range Select is active and the frequency at the WCLK input has changed.	Deactivate Auto Clock Range Select - see page 32
Device cannot be controlled locally.	Keys lock is active.	Check the KEYS Lock LED, and deselect Keys lock- see page 19.

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 3.7 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

Word Clock (I)

- 1 x BNC socket (input)
- Impedance 75 Ω (termination switchable)
- Word clock or AES3id (DARS)

Video

- 1 x BNC socket (input)
- Impedance 75 Ω (termination switchable)
- Black Burst or FBAS (PAL 25 Hz, NTSC 29.97 Hz or 30 Hz)

Sample Rate

- 30 kHz to 50 kHz and their multiples 2 FS and 4 FS

MADI Format (I/O)

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

SRC Performance

- THD+N 140 dB
- Frequency response ripple < 0.025 dB
- Latency < 140 samples

USB

- 1 x USB 2.0 socket (type B)

Appendix A: Clocking to MADI

When clocking to MADI mostly the signal of the selected input is used as clock reference. However in some scenarios it may help to use an extra MADI signal that is fed to the 'other' input as clock reference.

So MADI may be used as clock reference from:

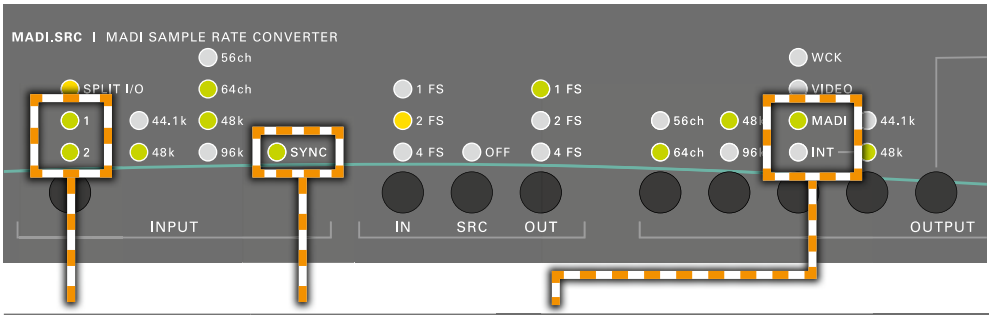
- the selected MADI input
- the unselected MADI input

Toggle between selected or unselected input

1. Set clock reference to MADI.

2. Press the button 'OUTPUT- 44.1k / 48k' in the MADI OUT section.

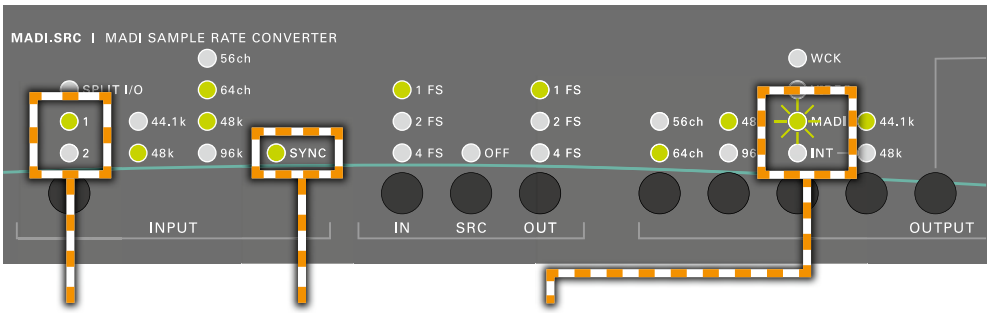
Clock to selected MADI input



MADI IN	SYNC	MADI OUT	Condition
blinking fast	off	blinking fast	no signal
on	on	on	signal present only on selected input
blinking fast	off	on	signal present only on unselected input
on	on	on	signal present on both inputs

Clocking to MADI input is useful when the clock should be maintained while the scaling factor changes; e.g. down sampling from 2 FS to 1 FS.

Clock to unselected MADI input



MADI IN	SYNC	MADI OUT	Condition
blinking fast	off	blinking very fast	no signal
on	on	blinking very fast	signal present only on selected input
blinking fast	off	blinking very fast	signal present only on unselected input
on	on	blinking heartbeat	signal present on both inputs

Clocking to the unselected MADI input enables the use of the second MADI input as clock source. This is useful to retrieve sync from the device receiving the SRC signal.

NOTE

Don't worry about the tables - they are quite similar and differ only in the MADI OUT section.

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DirectOut GmbH

Leipziger Strasse 32
09648 Mittweida
Germany

T: +49-3727-5665-100
F: +49-3727-5665-101
www.directout.eu