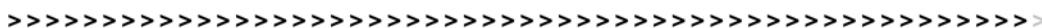


OPERATING MANUAL



MC-4

ADAT™-AES3 DIGITAL AUDIO FORMAT AND SAMPLING RATE CONVERTER



WWW.MUTEC-NET.DE

SAFETY INSTRUCTIONS

General instructions

To reduce the risk of fire or electrical shock, do not expose this appliance to rain or moisture, direct sunlight or excessive heat from sources such as radiators or spotlights. No user serviceable parts are inside. Repair and maintenance must be carried out by qualified personnel authorized by MUTECH GmbH! The unit has been designed for operation in a standard domestic environment. Do NOT expose the unit and its accessories to rain, moisture, direct sunlight or excessive heat produced by such heat sources as radiators or spotlights! The free flow of air inside and around the unit must always be ensured.

Initial operation

Prior to the initial operation of the unit, the appliance, its accessories and packaging must be inspected for any signs of physical damage that may have occurred during transit. If the unit has been damaged mechanically or if liquids have been spilled inside the enclosure, the appliance may not be connected to the mains or must be disconnected from the mains immediately! If the unit is damaged, please do NOT return it to MUTECH GmbH, but notify your dealer and the shipping company immediately, otherwise claims for damage or replacement may not be granted.

If the device is left in a low-temperature environment for a long time and then is moved to a room-temperature environment, condensation may occur on the inside and the exterior. To avoid short-circuits and flashovers, be sure to wait one or two hours before putting the device into operation.

Power supply

The device contains a self-adapting wide-range power supply supporting the majority of global standard line voltages within a range of 90...250 V, with no need for making adjustments. Make sure that your line-voltage source provides a supply voltage within the specified range. In addition, make sure that the device is properly grounded via the local electric installation.

Please use the enclosed power cord (see packaging) to connect the unit to the mains. Switch the unit off before you attempt to connect it to the mains. Connect the power cord to the unit, then to a standard 3-pin mains outlet. To draw the power cord, never pull on the cable but on the mains plug!

The unit must be grounded during operation!

For information on the power-inlet wiring, refer to the »Wiring of connectors« section in the appendix. Disconnect the device from the mains when not using it for an extended period!



This symbol, a flash of lightning inside a triangle, alerts you to the presence of uninsulated dangerous voltage inside the enclosure - voltage that may be sufficient to constitute a risk of shock.



This symbol, an exclamation mark inside a triangle, alerts you to important operating or safety instructions in this manual.

Declaration of Conformity

We herewith confirm that the product complies with the European Commission's standards on electromagnetic compatibility.

Interference emission: EN 50081-1, 1992
Resistance to interference: EN 50082-1, 1992

Presupposed as operation condition is that all clock outputs are connected with high-quality and good shielded BNC 75 ohms cable.



WARRANTY REGULATIONS

§1 Warranty

MUTECH GmbH warrants the flawless performance of this product to the original buyer for a period of two (2) years from the date of purchase. If any failure occurs within the specified warranty period that is caused by defects in material and/or workmanship, MUTECH GmbH shall either repair or replace the product free of charge within 90 days. The purchaser is not entitled to claim an inspection of the device free of charge during the warranty period. If the warranty claim proves to be justified, the product will be returned freight prepaid by MUTECH GmbH within Germany. Outside Germany, the product will be returned with the additional international freight charges payable by the customer. Warranty claims other than those indicated above are expressly excluded.

§2 Warranty transferability

This warranty is extended exclusively to the original buyer who bought the product from a MUTECH GmbH specialized dealer or distributor, and is not transferable to anyone who may subsequently purchase this product. No other person (retail dealer, distributor, etc.) shall be entitled to give any warranty promise on behalf of MUTECH GmbH.

§3 Warranty regulations

The return of the completed registration card, or online registration on one of the websites specified below, is a condition of warranty. Failing to register the device before returning it for repair will void the extended warranty.

- The serial number on the returned device must match the one stated on the registration card or entered during online registration. Otherwise, the device will be returned to the sender at the sender's expense.
- Any returned device must be accompanied by a detailed error description and a copy of the original sales receipt issued by a MUTECH dealer or distributor.
- The device must be returned free of shipping expenses and in the original package, if possible; otherwise, the sender has to provide comparably protective packaging.
- The sender is fully responsible for any damage or loss of the product when shipping it to MUTECH GmbH.

§4 Limitation of warranty

Damages caused by the following conditions are not covered by this warranty:

- Damages caused by every kind of normal wear and tear (e.g. displays, LEDs, potentiometers, faders, switches, buttons, connecting elements, printed labels, cover glasses, cover prints, and similar parts).
- Functional failure of the product caused by improper installation (please observe CMOS components handling instructions!), neglect or misuse of the product, e.g. failure to operate the unit in compliance with the instructions given in the user or service manuals.
- Damage caused by any form of external mechanical impact or modification.
- Damage caused by the user's failure to connect and operate the unit in compliance with local safety regulations.
- Damage caused by force majeure (fire, explosion, flood, lightning, war, vandalism, etc.).
- Consequential damages or defects in products from other manufacturers as well as any costs resulting from a loss of production.

Repairs carried out by personnel which is not authorized from MUTECH GmbH will void the warranty. Adaptations and modifications to the device made with regard to national, technical, or safety regulations in a country or of the customer do not constitute a warranty claim and should be set with MUTECH GmbH in advance.

§5 Repairs

To obtain warranty service, the buyer must call or write to MUTECH GmbH before returning the unit. All inquiries must be accompanied by a description of the problem and the original buyer's invoice. Devices shipped to MUTECH GmbH for repair without prior notice will be returned to the sender at the sender's expense. In case of a functional failure please contact:

MUTECH Gesellschaft fuer Systementwicklung und Komponentenvertrieb mbH
Siekeweg 6/8 • 12309 Berlin • Germany • Fon 030-746880-0 • Fax 030-746880-99 • Tecsupport@MUTECH-net.de • www.MUTECH-net.de

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Peripheral MUTECH Products

Reference Clocks and Master Clocks for Synchronization:

- iCLOCK + iCLOCKdp
iCLOCK and iCLOCKdp are synchronizable, high-precision clock generators which are designed to be the reference in digital audio and video studios as well as broadcast and television stations. For further details please visit:
www.iCLOCK-NET.de
- MC-3
The MC-3 SMART CLOCK is an universal digital audio master clock generator. The unit provides different high-stable and Ultra low-jitter clock signals for synchronization of various digital audio devices.
- MC-3.1
The MC-3.1 SMART CLOCK SD is an universal digital audio and SD video sync master clock generator. The unit provides different high-stable clock signals for simultaneous synchronization of digital audio and SD video devices.
- MC-3.2
The MC-3.2 SMART CLOCK HD is an universal digital audio and SD/HD video sync master clock generator. The unit provides different high-stable clock signals for simultaneous synchronization of digital audio and SD/HD video devices.
- MC-2
The MC-2 is a high-performance digital audio and reference clock signal distribution amplifier and format converter for AES3/11 and AES3/11id signals.
- MC-7
The MC-7 is a flexible, high-performance 8-channel Word Clock distribution amplifier and audio clock converter.

Cables for Digital Audio:

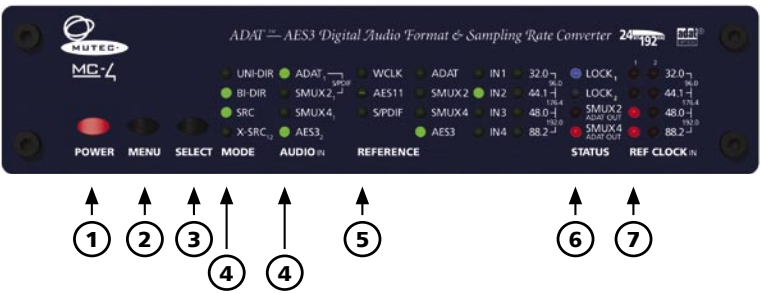
- Optical cables in different lengths from 0.5 m to 20 m for ADAT™ transfers.
- Multicore cable adaptors with 110Ω cable impedance and Neutrik™ XLR connectors from 0.6 m to 5 m.

For all peripheral products please have a look on our website:
www.MUTECH-NET.de !



CONTROL ELEMENTS AND TERMINALS

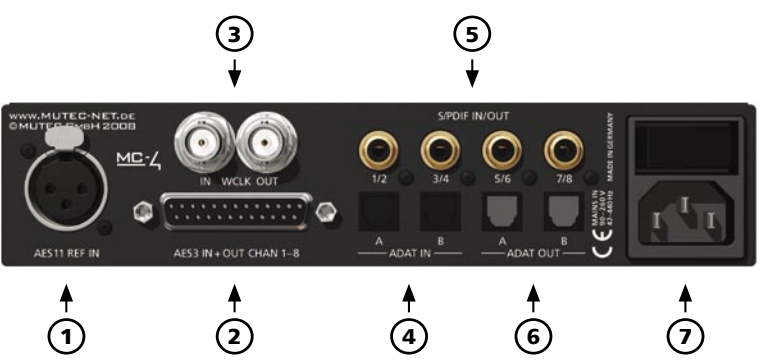
MC-4 Front Panel



- 1 POWER**
This red LED lights up when the unit is switched on with the rear panel POWER switch.
- 2 MENU**
The push-button selects one of the available function menus.
- 3 SELECT**
Use this push-button to select a function within a specific function menu.
- 4 MODE + AUDIO IN**
This function menu allows to adjust all available conversion modes (LED line »MODE«) in combination with the corresponding digital audio formats (LED line »AUDIO IN«).
- 5 REFERENCE**
This function menu allows to select the master clock reference for synchronization of the format conversion sections as well as the SRCs.
- 6 STATUS**
This menu indicates various signal statuses of the incoming master clock reference signal and the digital audio signal as well as the SMUX coding of the ADAT™ output signal.
- 7 REF CLOCK IN**
This menu indicates the clock rates of the incoming digital audio signal or of the master clock reference signal.

Refer to the OPERATIONS chapter for more information.

MC-4 Rear Panel



- 1 AES11 REF IN**
This input receives a balanced digital AES11 blank frame signal in compliance with AES11–1997/2003 as master clock reference for the SRCs. Alternatively, an AES3 digital audio signal in compliance with AES3–1992 (R1997) or a S/PDIF digital audio signal aligned to IEC60958 can be input as well. The input impedance is 110Ω (XLR connector, female).
- 2 AES3 IN+ OUT CHAN 1–8**
This interface receives and transmits 8 channels of AES3 digital audio signals each in compliance with AES3–1992 (R1997). Alternatively, the 8 inputs can also be fed with S/PDIF digital audio signals aligned to IEC60958. The input and output impedances are 110Ω. The pin assignment of the 25pin D-Sub connector complies with Yamaha, AKAI, Mackie and others, too.

For detailed specifications on all terminals, refer to the »Pin Assignment of the Connectors« and »Technical Data« in the chapter »APPENDIX«.

3 IN WCLK OUT

The left hand side connector (IN) receives a Word Clock or so-called »Super Clock« signal as master clock reference for the SRCs. The right hand side connector (OUT) transmits an Ultra low-jitter Word Clock signal based on the internal clock basis or the selected external clock reference signal. The impedances of both connectors are 75Ω (BNC connectors, female).

4 ADAT™ IN

These two optical inputs receive digital audio multichannel signals in compliance with the Alesis ADAT™ format. Input »A« alone accepts ADAT™ signals up to 50.0kHz. For receiving ADAT™ signals with higher clock rates up to 192.0kHz, both inputs »A« and »B« are used simultaneously (Toslink™ connector, EIAJ standard).

5 S/PDIF IN/OUT

These interfaces function as receiver and transmitter for S/PDIF digital audio signals in compliance with the IEC 60958 standard. Their function depends on the selected operation mode, which is displayed on the front panel. The impedance of all connectors is 75Ω (Cinch connectors, female).

6 ADAT™ OUT

These two optical outputs transmit digital audio multichannel signals in compliance with the Alesis ADAT™ format. Output »A« alone transmits ADAT™ signals up to 50.0kHz. For transferring ADAT™ signals with higher clock rates up to 192.0kHz, both outputs »A« and »B« are used simultaneously (Toslink™ connector, EIAJ standard).

7 MAINS IN, Power Switch + Power Inlet

This is the main switch for switching the device on and off. Be sure to make all connections (especially the supplied power cable) properly before turning on the switch. Heed the SAFETY INSTRUCTIONS at the beginning of this manual.

Connect the supplied power cable here. Make sure that the power switch is turned off before connecting the power cable to this inlet and to the power outlet. Line voltages within the range of 90...260V with a frequencies between 47...440Hz can be applied. The internal power supply will automatically make all necessary adjustments.



INSTALLATION

Content of the Box

The unit was packed carefully. Nevertheless we recommend to check the content directly after opening the package:

- 1 x MC-4
- 1 x Power cable
- 4 x Rubber feet
- 1 x Manual
- 1 x Registration card

Placing the Device

The unit should be set up as closely as possible to the devices to which it will be connected, so as to avoid excessive cable lengths. Use the 4 rubber feet enclosed with the appliance and stick them symmetrically on the bottom side of the unit to protect the enclosure and supporting surface from being damaged.

The device can be mounted into a standard 19" rack and will require 1 unit. In this case, the rubber feet cannot be attached. Install the device so that one unit of rack space is left free both above and below the device to allow for sufficient ventilation! The mounting depth including the terminals is 160 mm/6.7". Another 60 mm/2.4" should be added for the required cables.

Additional slide-in rails on the rack inside are recommended for safe installation. This will also avoid long-term mechanical deformation of the housing.

Wiring the ADAT™, AES/EBU and S/PDIF interfaces

ADAT™

Connect the optical ADAT™ interfaces with the help of TOSLINK™-compliant optical fiber cables. Here, you can use both plastic and glass fiber-based cables. When using plastic fiber cables, lengths of 10 meters should not be exceeded, so as to ensure the reliable transmission of signals. Glass fiber cables can transfer data reliably even over greater distances.

AES/EBU

Connect the AES/EBU interface with the help of an electrical 25-cond. cable equipped with 25-pin D-Sub connectors. The specifications stipulate a specific cable resistance of 110Ω. When purchasing the cable ask your retailer for a confirmation that the cable will perform flawlessly in your specific application.

Connect the coaxial S/PDIF interfaces with help of unbalanced electrical cables equipped with cinch connectors on both ends. The specifications stipulate a specific cable resistance of 75Ω. Ask your retailer for a confirmation of this value when purchasing the cables.


Wiring the Word Clock Interfaces


To allow for the synchronization of signals, the interfaces of all devices involved must be properly connected to each other, so as to ensure a logical signal flow. Always be sure to connect the Word Clock output of the MC-4 to the corresponding input of the device you wish to synchronize. Cable lengths should be kept as short as possible to minimize signal losses and/or interferences!

For the transmission of Word Clock signals electrical, unsymmetrical cables with a resistance of 75Ω and BNC connectors on both ends are used. Typically, such cables are marked »RG-59U, RG59B/U«.


Additionally, you should make sure that the Word Clock input to be connected to the MC-4's output have a 75Ω terminating resistor! Most Word Clock inputs allow for enabling/disabling the termination with a so-called »termination-switch«, which may be located on the outside or inside of the device.

The condition of the packaging material and the device should be checked carefully additionally. If there are any damages please refer to SAFETY INSTRUCTIONS, Initial Operation, and WARRANTY REGULATIONS.

 Before installing the unit the section **SAFETY INSTRUCTIONS** located at the beginning of this manual should be read carefully.


 Never expose the device and accessories to rain, moisture, direct sunlight, or excessive heat produced by radiators, heaters, or spot lights! Sufficient air circulation in the environment of the device must be ensured!

MUTEC offers optical cables of various lengths that have been specifically tested for the transmission of ADAT™ signals. Ask your local dealer for those cables!

 We advise you not to buy 25pin D-Sub cables from your computer retailer! Even though such cables may look similar to 25pin D-Sub AES/EBU cables, they may be wired differently!

MUTEC assumes no liability for damages resulting from the use of improperly wired cables!

Especially when working with high AES/EBU clock rates well shielded cables are imperative to avoid increased radiation! Standard cables are normally useable for clock rates up to 50.0kHz. Special shielded cable material should be used for transfer of higher clock rates.

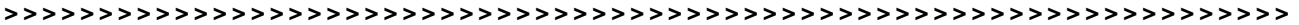
 Please make sure that the cable used has a resistance of 75Ω! If a cable with a different resistance is used, a dramatic deterioration of the signal quality can be the result! In this case, the perfect synchronization could be impaired.

We recommend using high-grade cables with a good shielding. A length of max. 10 meters (approx. 30feet) should not be exceeded!

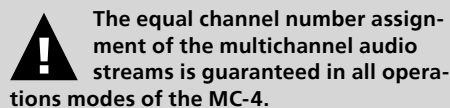
INSTALLATION

For devices which have no termination of the Word Clock input, e.g. RME Hammerfall with Word Clock i/o, Alesis BRC or M-Audio ProFire Light-bridge, you can use an additional BNC-T piece to terminate the input. Plug the T piece with its center connector into the input of the receiving device. Then, connect the cable coming from the MC-4's Word Clock output to one of the lateral connectors, and the other connector of the BNC-T piece to a 75Ω resistor forming the BNC termination.

Basically, you should avoid »looping through« Word Clock leads by means of passive BNC-T pieces to preserve the signal quality, as level drops will be the result. If there is no other way to wire your set-up, please make sure that all Word Clock inputs (except for the last device in the chain) have their terminations disabled! In a serial Word Clock chain only the last clock input should have a termination! Never connect more than three devices in series to one output!







This setting allows to convert an ADAT™ source signal (see »AUDIO IN«) with up to 50.0kHz sampling rate unidirectionally (see »MODE«) into AES3, 5/PDIF and ADAT™ simultaneously. The sampling rate will be displayed in the »REF CLOCK IN« menu. Both optical outputs transmit the same ADAT™ source signal. Thus, the MC-4 functions as ADAT™ signal splitter, too.

Unidirectional Format Conversion from: ADAT™ / SMUX2 to AES3, S/PDIF, ADAT™ / SMUX2

This setting allows to convert an ADAT™/SMUX2 source signal (see »AUDIO IN«) with sampling rates between 50.0kHz and 100.0kHz unidirectionally (see »MODE«) into AES3, S/PDIF and ADAT™/SMUX2 simultaneously. The sampling rate will be displayed in the »REF CLOCK IN« menu.

Under »REFERENCE« the »SMUX2« option is selected automatically.

This setting allows to convert an ADAT™/SMUX4 source signal (see »AUDIO IN«) with sampling rates between 100.0kHz and 200.0kHz unidirectionally (see »MODE«) into AES3 and S/PDIF simultaneously. The sampling rate will be displayed in the »REF CLOCK IN« menu.

Under »REFERENCE« the »SMUX4« option is selected automatically.

Unidirectional Format Conversion from: AES3 to ADAT™ or ADAT™/SMUX2+4, S/PDIF and AES3

<input checked="" type="radio"/> UNI-DIR	<input type="radio"/> ADAT ₁	<input type="radio"/> WCLK	<input type="radio"/> ADAT	<input checked="" type="radio"/> IN1	<input type="radio"/> 32.0
<input type="radio"/> BI-DIR	<input type="radio"/> SMUX2 ₁	<input type="radio"/> AES11	<input type="radio"/> SMUX2	<input type="radio"/> IN2	<input type="radio"/> 44.1
<input type="radio"/> SRC	<input type="radio"/> SMUX4 ₁	<input type="radio"/> S/PDIF	<input type="radio"/> SMUX4	<input type="radio"/> IN3	<input type="radio"/> 48.0
<input type="radio"/> X-SRC ₁₂	<input checked="" type="radio"/> AES3 ₂	<input checked="" type="radio"/> AES3	<input type="radio"/> IN4	<input type="radio"/> 88.2	

MODE AUDIO IN REFERENCE

This setting allows to receive an 8-channel (as maximum) AES3 source signal with sampling rates between 25.0kHz and 200.0kHz. The signal's audio format will be converted into ADAT™, ADAT™/SMUX2, ADAT™/SMUX4, S/PDIF and AES3 simultaneously, whereas the ADAT™ output format depends on the clock rate of the incoming AES3 source signal (see grey box on the right hand side). It is not necessary that all four stereo input channels are carrying a valid AES3 signal. Also a single stereo signal can be converted. It will be transferred to the outputs of the other audio formats correspondingly to its input channel number (1–4).

Under »REFERENCE« the »AES3 + IN1« option is selected initially. By inputting an 8-channel AES3 signal, there is no need to select a different reference option (IN2–IN4). When your input signal contains valid AES3 streams only on e.g. channels 5/6 and 7/8, you need to select either »IN3« for input channels 5/6, or »IN4« for input channels 7/8 as reference signal source. The MC-4 needs to derive a valid clock signal from one of the incoming AES3 channel pairs. So, it is imperative to select one of the reference options »IN1–IN4« as converting reference correspondingly to the input channel pair which carries a valid AES3 digital audio signal.

Unidirectional Format Conversion from: S/PDIF to ADAT™ or ADAT™/SMUX2+4, AES3

<input checked="" type="radio"/> UNI-DIR	<input checked="" type="radio"/> ADAT ₁	<input type="radio"/> WCLK	<input type="radio"/> ADAT	<input checked="" type="radio"/> IN1	<input type="radio"/> 32.0
<input type="radio"/> BI-DIR	<input checked="" type="radio"/> SMUX2 ₁	<input type="radio"/> AES11	<input type="radio"/> SMUX2	<input type="radio"/> IN2	<input type="radio"/> 44.1
<input type="radio"/> SRC	<input type="radio"/> SMUX4 ₁	<input checked="" type="radio"/> S/PDIF	<input type="radio"/> SMUX4	<input type="radio"/> IN3	<input type="radio"/> 48.0
<input type="radio"/> X-SRC ₁₂	<input type="radio"/> AES3 ₂	<input type="radio"/> AES3	<input type="radio"/> IN4	<input type="radio"/> 88.2	

MODE AUDIO IN REFERENCE

This setting allows to receive an 8-channel (as maximum) S/PDIF source signal with sampling rates between 25.0kHz and 200.0kHz. The signal's audio format will be converted into ADAT™, ADAT™/SMUX2, ADAT™/SMUX4 and AES3 simultaneously, whereas the ADAT™ output format depends on the clock rate of the incoming S/PDIF source signal (see grey box on the right hand side above). It is not necessary that all four stereo input channels are carrying a valid S/PDIF signal. Also a single stereo signal can be converted. It will be transferred to the outputs of the other audio formats correspondingly to its input channel number (1–4).

Under »REFERENCE« the »S/PDIF + IN1« option is selected initially. By inputting an 8-channel S/PDIF signal, there is no need to select a different reference option (»IN2–IN4«). When your input signal contains valid S/PDIF streams only on e.g. channels 5/6 and 7/8, you need to select either »IN3« for input channels 5/6, or »IN4« for input channels 7/8 as reference signal source. The MC-4 needs to derive a valid clock signal from one of the incoming S/PDIF channel pairs. So, it is imperative to select one of the reference options »IN1–IN4« as converting reference correspondingly to the input channel pair which carries a valid S/PDIF digital audio signal.

The MC-4's AES/EBU inputs generally accept AES3, AES11 and S/PDIF signal formats for conversion to the available output signal formats.

! Due to the fact, that the function modes described on this page are format conversion modes only, it is imperative that the AES3 or S/PDIF input channels are of same sampling rates!

! When the sampling rate of the incoming AES3 or S/PDIF signal is lower as 50.0kHz, both ADAT™ outputs transmit the same signal and function as ADAT™ signal splitter.

Is the sampling rate of the incoming AES3 or S/PDIF signal between 50.0kHz to 100.0kHz, the ADAT™ output format will be automatically switched over to ADAT™/SMUX2.

When the sampling rate of the incoming AES3 or S/PDIF signal is between 100.0kHz to 200.0kHz, the ADAT™ output format will be automatically switched over to ADAT™/SMUX4.

The corresponding SMUX format of the ADAT™ outputs will be displayed in the »STATUS« menu.

! If a 2-channel stereo AES3 or S/PDIF signal is input for format conversion only, without SRC, it is imperative to select under »REFERENCE« the corresponding input number »IN1–IN4« as converting reference!

The sampling rate of the incoming AES3 or S/PDIF signal will be displayed in the »REF CLOCK IN« menu.

! This is the only mode, in which the S/PDIF interfaces function as inputs, due to the limited number of four interfaces available at the rear for S/PDIF transfers!

Bi-directional Format with Sampling Rate Conversion between ADAT™ / SMUX4 and AES3

☐ UNI-DIR
 ☐ ADAT₁
☐ SMUX2₁
☒ SRC
 ☒ SMUX4₁
☐ X-SRC₁₂

☐ AES3₂

☐ WCLK
 ☐ AES11
 ☐ S/PDIF
 ☐ ADAT
 ☐ SMUX2
 ☐ SMUX4
 ☐ AES3

☐ IN1
 ☐ IN2
 ☐ IN3
 ☐ IN4

☒ 32.0
 ☒ 44.1
 ☐ 48.0
 ☐ 88.2

MODE

AUDIO IN

REFERENCE

96.0

176.4

192.0

This setting allows to receive an ADAT™/SMUX4 signal with clock rates between 100.0kHz and 200.0kHz and an 8-channel AES3 signal between 25.0kHz and 200.0kHz simultaneously. The format and sampling rate conversion procedure is the same as described on page 21. The format of the optical outputs is displayed in the »STATUS« menu, the sampling rate of the incoming clock reference signal is displayed in the »REF CLOCK IN« menu under »1«. The above example shows the internal clock generator running at »96.0k« selected as clock reference.

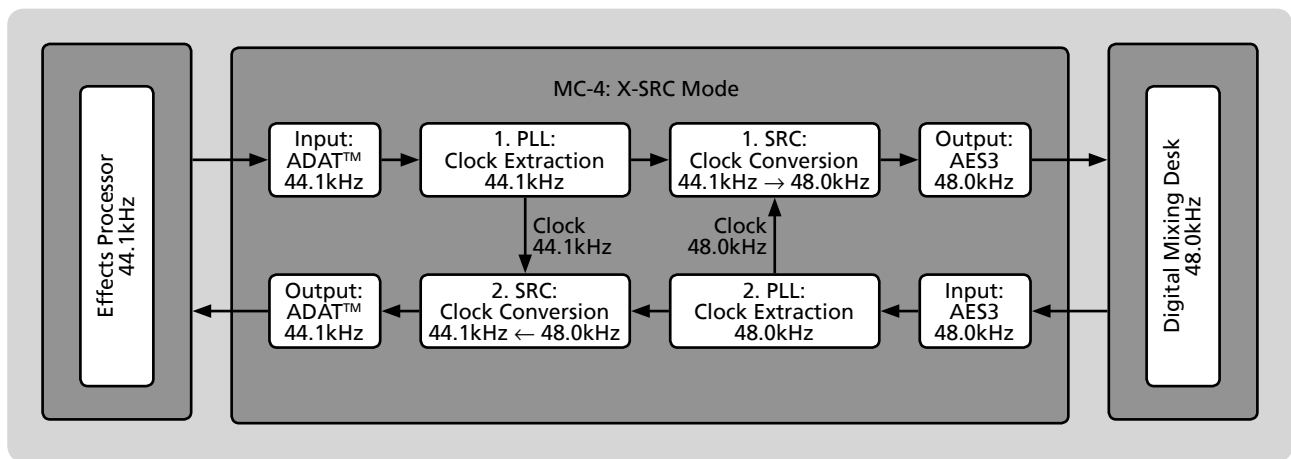
X-SRC Mode between ADAT™ and AES3

☐ UNI-DIR ☒ ADAT₁ ☐ WCLK ☒ ADAT ☒ IN1 ☐ 32.0
☐ BI-DIR ☐ SMUX2₁ ☐ AES11 ☐ SMUX2 ☐ IN2 ☐ 44.1
☐ SRC ☐ SMUX4₁ ☐ S/PDIF ☐ SMUX4 ☐ IN3 ☐ 48.0
☒ X-SRC₁₂ ☒ AES3₂ ☐ AES3 ☐ IN4 ☐ 88.2

This setting is a very special and of course unique function of your MC-4!

The function allows to convert an ADAT™ signal into an AES3 signal and an AES3 signal into an ADAT™ signal at the same time, whereas both conversion streams may consist of different sampling rates. On this occasion, the MC-4 extracts the clock out of the two incoming digital audio signals and uses these clock references to synchronize the SRCs in front of each of the format-same outputs. This is especially useful when interconnecting two unsynchronized digital audio devices, each running on its own internal clock base.

A standard application is the interconnection of a digital mixing desk and a digital multichannel effects processor. Please see the following sketch to get an overview:



! **Format of Optical Outputs**

The ADAT™ optical outputs follow the clock rate of the ADAT™ optical input signal. So both, the ADAT™ input and output are of same format at any time. A conversion from e.g. ADAT™ to ADAT™/SMUX2 is not possible in the X-SRC mode!

This setting allows to receive an ADAT™ signal with up to 50.0kHz sampling rate and an 8-channel AES3 signal between 32.0kHz and 192.0kHz simultaneously. The ADAT™ input signal is converted to AES3 and the AES3 signals are converted to the ADAT™. The clock rate of the incoming ADAT™ signal is extracted by the first PLL synthesizer and supplied as clock reference to the second SRC, which feeds the ADAT™ output. The clock rate of the incoming AES3 signal is extracted by the second PLL synthesizer and supplied as clock reference to the first SRC, which feeds the AES3 output.

- ADAT™, 32.0kHz–50.0kHz (predefined)
- AES3 IN1–4, every of the AES3 stereo inputs, 32.0kHz–192.0kHz

The ADAT™ input is predefined as clock source for the second SRC, that means the ADAT™ output. As for the AES3 outputs, one of the four AES3 stereo inputs needs to be defined as clock source for the first SRC. Therefore enter the »REFERENCE« menu and press the »SELECT« button repeatedly to select one of the AES3 inputs »IN1–4«.

The example on page 22 shows the AES3 input »IN1« selected as clock reference for the first SRC, that means the AES3 signal path.

When the external clock reference signals can be locked by the PLLs, the blue LEDs »LOCK₁« and »LOCK₂« in the STATUS menu will light constantly. The clock rate of the clock sources are displayed in the »REF CLOCK IN« menu under »1« and »2«. The identifier »1« generally indicates the lock status and clock rate of the ADAT™ clock reference. The identifier »2« indicates the lock status and clock rate of the selected AES3 clock reference.



! Using the X-SRC mode, the MC-4 extracts the needed clock rates out of the incoming digital audio signals. Thereby, the system does not need and does not accept any additional external applied clock reference signals.

X-SRC Mode between ADAT™ / SMUX2 and AES3

☐ UNI-DIR
 ☐ ADAT₁
☒ S/PDIF

☐ WCLK
 ☐ ADAT
 ☐ IN1
 ☐ 32.0

☐ BI-DIR
 ☒ SMUX2₁

☐ AES11
 ☒ SMUX2
 ☒ IN2
 ☐ 44.1

☐ SRC
 ☐ SMUX4₁

☐ S/PDIF
 ☐ SMUX4
 ☐ IN3
 ☐ 48.0

☒ X-SRC₁₂
☒ AES3₂

☒ AES3
 ☐ IN4
 ☐ 88.2

MODE

AUDIO IN

REFERENCE

This setting allows to receive an ADAT™/SMUX2 signal with clock rates between 50.0kHz and 100.0kHz and an 8-channel AES3 signal between 32.0kHz and 192.0kHz simultaneously. The format and sampling rate conversion procedure is the same as described above. The clock reference for the ADAT section is predefined with »SMUX2«. The above example shows the AES3 input »IN2« selected as clock reference for the first SRC, that means the AES3 signal path.

X-SRC Mode between ADAT™ / SMUX4 and AES3

☐ UNI-DIR
 ☐ ADAT₁

☐ WCLK
 ☐ ADAT
 ☐ IN1
 ☐ 32.0

☐ BI-DIR
 ☒ SMUX2₁

☐ AES11
 ☐ SMUX2
 ☐ IN2
 ☐ 44.1

☐ SRC
 ☐ SMUX4₁

☐ S/PDIF
 ☒ SMUX4
 ☐ IN3
 ☐ 48.0

☒ X-SRC₁₂
☐ AES3₂

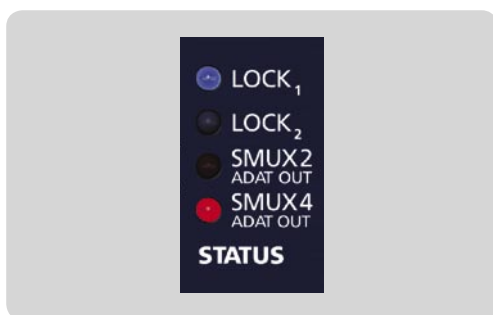
☒ AES3
 ☒ IN4
 ☐ 88.2

MODE

AUDIO IN

REFERENCE

This setting allows to receive an ADAT™/SMUX2 signal with clock rates between 100.0kHz and 200.0kHz and an 8-channel AES3 signal between 32.0kHz and 192.0kHz simultaneously. The format and sampling rate conversion procedure is the same as described above. The clock reference for the ADAT section is predefined with »SMUX4«. The above example shows the AES3 input »IN4« selected as clock reference for the first SRC, that means the AES3 signal path.



ADAT™ OPTICAL INPUT (8 CHANNELS)

AES/EBU AUDIO INPUT (8 CHANNELS)

Interface	1 x Sub-D 25 connector, transformer balanced, input impedance 110Ω, 200mV–7V
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AES/EBU REFERENCE INPUT

Interface	1 x XLR female, transformer balanced, input impedance 110Ω, 200mV–7.0V
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ADAT™ OPTICAL OUTPUT (8 CHANNELS)

Interface	2 x Toslink™, FIA I BC-5720
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AES/EBU AUDIO OUTPUT (8 CHANNELS)

Interface	1 x Sub-D 25 connector, transformer balanced, input impedance 110Ω, 200mV–7V
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S/PDIF COAXIAL INPUT OR OUTPUT (8 CHANNELS)

4 x Coaxial (Cinch/RCA female), unbalanced, 0.5Vpp @ 75Ω, output impedance 75Ω.

WORD CLOCK INPUT

Interface	1 x BNC, 200 mV-7 V, unbalanced, input impedance 75 Ω
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WORD CLOCK OUTPUT

Interface	1 x BNC, 3.5V@22Ω, unbalanced, buffered
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SIGNAL PROCESSING

ADAT™ + SMUX2/4 → AES3 S/PDIF ADAT™ + SMUX2/4

Lock range: 4.0kHz to 213.0kHz

INTERNAL REFERENCE CLOCK SPECIFICATIONS

Oscillator type	TCXO: temperature compensated crystal oscillator
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POWER SUPPLY

Type	Internal, switching power supply
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SYSTEM UNIT COVER

Cover size/material/color	196 x 42 x 156mm without connectors (WxHxD), aluminium sheet 1mm, black
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