

OPERATING MANUAL



MC-6

AES3–AES3id–S/P-DIF DIGITAL AUDIO FORMAT AND SAMPLING RATE CONVERTER

V1.2



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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INTRODUCTION

Thank you very much for purchasing the MC-6, Digital Audio Format and Sampling Rate Converter, from MUTECH!

General Function Description

The MC-6 is an extremely flexible, high-performance digital audio format and sampling rate converter for AES3, AES3id and S/P-DIF. All digital audio signals can be processed with sampling rates up to 192.0kHz, whereas unidirectional and bidirectional conversion modes are available. Based on latest FPGA designs, the MC-6 achieves levels of performance regarding its signal quality, unique flexibility, clocking features and the 4 channel sampling rate conversion engine (SRC), which are outstanding in today's industry!

Various operation modes enable the use of the MC-6 in many studio set-ups. Incoming digital audio signals are generally converted to all three audio formats simultaneously, with or without sampling rate conversion. The SRC engine can be locked to Word Clock, AES11 and any digital audio input in both, unidirectional and bidirectional operation modes.

Furthermore, the MC-6 offers an internal, low-jitter clock basis with high accuracy to which the SRCs can be locked to, if no external reference is available. This enables to run the MC-6 in set-ups where no separate master clock system is available. Furthermore, in this operation mode the MC-6's Word Clock output supplies a low-jitter reference clock signal which is of same high accuracy as the internal clock basis. This can be used e.g. as master clock reference for the whole studio.

This all makes MC-6 for sure a unique and the most flexible digital audio format converter in a 9.5" case currently available in the market!

MC-6 Features


- AES/EBU, AES/EBUId and S/P-DIF interfaces in one box.
- Bidirectional format and sampling rate conversions from 32.0kHz to 192.0kHz.
- Converts standalone and bidirectionally with different sampling rates: X-SRC
- Signal improvement through low-jitter clock recovery.
- AES11, Grade 1, internal reference clock (<1ppm).
- Word Clock output can be used as master clock reference.
- Runs standalone without needing an external clock source.
- 4 channel SRC engine for bidirectional conversions.
- Extremely flexible synchronization options.
- Continuous signal supply in absence of the reference audio or clock signal.
- Separate AES11 reference clock input.
- Simultaneous conversions to all output formats.
- Easy configurable.
- User's settings will be stored after switching-off.
- Rack space saving 1/2 19" housing allowing for mounting two devices in one rack unit.
- Built-in international power supply.

MC-6 Applications

- Interconnection of consumer and professional digital audio devices.
- AES3, AES3id and S/P-DIF format and sampling rate conversions.
- Integration of non-synchronizable devices into digital studio environments.
- Clock recovery and digital audio signal regeneration.
- Realtime bidirectional signal transfer between send/returns of digital mixing consoles and effect processors.
- Unidirectional or bidirectional interconnection of computer-based sound cards with professional digital audio equipment.
- Usable within small studio set-ups up to broadcast installations.

The grey boxes contain supplementary information for the corresponding sections in the text columns. The content of the individual box refers to the description in the text column beside the box.



 Boxes which contain a triangle with an exclamation mark inside should be read carefully! These include additional information which are of major importance for the functional descriptions in the text column.



Register your MUTECH Product for Warranty and Support!

We ask you to be so kind to register your MUTC product through our website immediately after purchasing. This ensures full warranty services over a period of two years after purchasing the product. Moreover, for all registered products we offer to our customers technical support. We also will inform you about product updates and new products which may of interest for you (on voluntary base, of course).

Please register your product at:

www.MUTEC-net.com

> SERVICES, > MUTECH Product Registration

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.com
- 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:

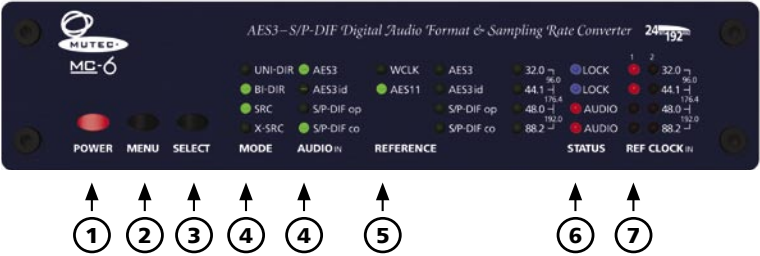
- Optical cables in different lengths from 0.5 m to 20 m for S/P-DIF and ADAT™ transfers.

For all peripheral products please have a look on our website:
www.MUTECH-net.com



CONTROL ELEMENTS AND TERMINALS

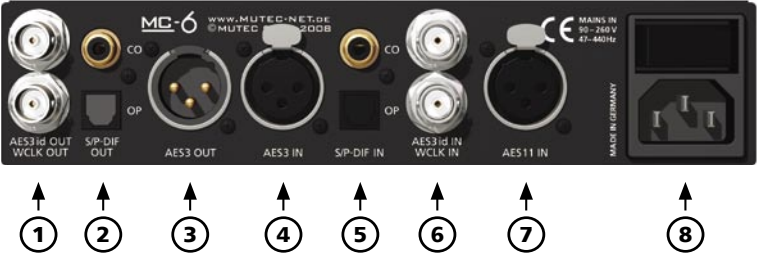
MC-6 Front Panel



- 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 section 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. For details see page 25.
- 7 REF CLOCK IN**
This menu indicates the clock rates of the incoming digital audio signal or of the master clock reference signal. For details see page 25.

Refer to the OPERATIONS chapter for more information.

MC-6 Rear Panel



- 1 AES3id OUT + WCLK OUT**
The first output above transmits an AES3id digital audio stereo signal in compliance with the AES3id–2001 standard. The second output below transmits a low-jitter Word Clock signal based on the selected external reference clock or the internal clock basis. The impedances of both connectors are 75Ω (BNC connectors, female).
- 2 S/P-DIF OUT**
These two S/P-DIF outputs, available as optical (»OP«) and coaxial (»CO«) interfaces, transmit an optical S/P-DIF and an unbalanced electrical S/P-DIF digital audio or blank frame signal in compliance with the IEC 60958 standard. The coaxial interface impedance is 75Ω (cinch connector), the optical interface offers a Toshiba Toslink™ connector, EIAJ standard.
- 3 AES3 OUT**
This AES/EBU output transmits a transformer-balanced electrical AES3 or AES11 signal in compliance with AES3–1992 (R1997) standard. The output impedance is 110Ω (XLR connector, male).

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

4 AES3 IN

This AES/EBU input can receive a balanced digital AES3 or AES11 signal in compliance with AES3–1992 (R1997) or AES11–1997/2003. The input impedance is 110Ω (XLR connector, female).

5 S/P-DIF IN

These two S/P-DIF inputs, available as optical (»OP«) and coaxial (»CO«) interfaces, can receive an optical S/P-DIF and an unbalanced electrical S/P-DIF digital audio or blank frame signal in compliance with the IEC 60958 standard. The coaxial interface impedance is 75Ω. (cinch connector), the optical interface offers a Toshiba Toslink™ connector, EIAJ standard.

6 AES3id IN + WCLK IN

The first input above can receive an AES3id digital audio stereo signal in compliance with the AES3id–2001 standard. The second input below can receive a Word Clock so-called »Super Clock« (Word Clock x256) signal. The impedances of both connectors are 75Ω (BNC connectors, female).

The termination of the WCLK input can be switched off. See page 28 for details.

7 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).

8 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

Additionally, you should make sure that the Word Clock input to be connected to the MC-6'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.

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-6'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!

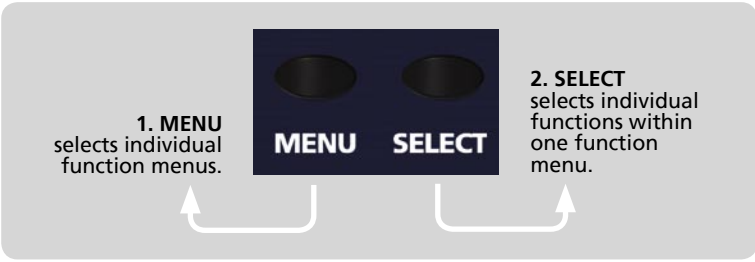


GENERAL OPERATION

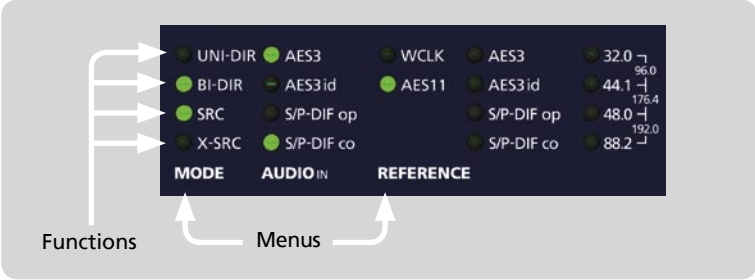
Selecting Function Menus and setting Functions

The device is fully operated using the two toggle switches at the front panel.

- 1 Switching the »MENU« key toggles between different basic function menus.
- 2 Switching the »SELECT« key activates individual functions within one function menu.



MENU + SELECT operation




Function Menus + Functions


Steps of Operation

- 1 First press on »MENU« or »SELECT« key enables the last selected function within the last selected function menu. The corresponding LED is beginning to flash.
- 2 Every press on »SELECT« button will select a new function within a menu. The LED of the selected function flashes accordingly. After the LED stops flashing, the function is activated.
- 3 When the needed function is selected, do not press the switches again! After a period of approximately 4 seconds the LED of the selected function stops flashing.


The »STATUS« and »CLOCK IN« areas are not accessible by using the »MENU« and »SELECT« keys, because they only inform about different conditions of incoming signals.

**Safety Instructions**

For safety reasons, be sure to read the **SAFETY INSTRUCTIONS** and **INSTALLATION** chapters before first powering-up!
We also recommend reading the **CONTROL ELEMENTS AND TERMINALS** chapter for information on how to connect the device!

**Shut-Down of Outputs**

All digital audio outputs are shut-down during function selection!
After a function is finally selected and the corresponding LED lights constantly again, the digital audio outputs are activated for signal transfer.

**User Settings Remain**

All user-specific function settings are available furthermore when power is restored.



Unidirectional Format Conversions

<input checked="" type="radio"/> UNI-DIR	<input checked="" type="radio"/> AES3	<input type="radio"/> WCLK	<input checked="" type="radio"/> AES3	<input type="radio"/> 32.0	96.0
<input type="radio"/> BI-DIR	<input type="radio"/> AES3id	<input type="radio"/> AES11	<input type="radio"/> AES3id	<input type="radio"/> 44.1	176.4
<input type="radio"/> SRC	<input type="radio"/> S/P-DIF op		<input type="radio"/> S/P-DIF op	<input type="radio"/> 48.0	192.0
<input type="radio"/> X-SRC	<input type="radio"/> S/P-DIF co		<input type="radio"/> S/P-DIF co	<input type="radio"/> 88.2	
MODE	AUDIO IN	REFERENCE			



Why a Clock Reference for unidirectional Conversion without SRC?

To allow for e.g. the AES3 format conversion without SRC into AES3id and S/P-DIF, the MC-6 needs to derive a valid clock signal from the incoming audio source. Therefore, the corresponding reference option is activated in the »REFERENCE« menu automatically. This selection can not be changed.

This setting allows for unidirectional format conversion (see »MODE«, »UNI-DIR«) of an AES3 source signal (see »AUDIO IN«, »AES3«) simultaneously to all available output formats. The sampling rate of the source signal will be displayed in the first LED row, marked with »1«, of the »REF CLOCK IN« menu. The AES3 signal will be re-clocked and transferred to the format-same AES3 output. Thus, the original input signal is not lost and available for further use!

Under »REFERENCE« the »AES3« option is selected automatically. Please see the grey box on the left hand side for more information.

Within the »AUDIO IN« menu, you can select with the »SELECT« button the other available digital audio inputs. The reference for the selected audio format will be activated accordingly.

Further Setting Examples

<input checked="" type="radio"/> UNI-DIR	<input type="radio"/> AES3	<input type="radio"/> WCLK	<input type="radio"/> AES3	<input type="radio"/> 32.0	96.0
<input type="radio"/> BI-DIR	<input checked="" type="radio"/> AES3id	<input type="radio"/> AES11	<input checked="" type="radio"/> AES3id	<input type="radio"/> 44.1	176.4
<input type="radio"/> SRC	<input type="radio"/> S/P-DIF op		<input type="radio"/> S/P-DIF op	<input type="radio"/> 48.0	192.0
<input type="radio"/> X-SRC	<input type="radio"/> S/P-DIF co		<input type="radio"/> S/P-DIF co	<input type="radio"/> 88.2	
MODE	AUDIO IN	REFERENCE			

Unidirectional format conversion from AES3id to AES3, S/P-DIF optical + coaxial, AES3id.

<input checked="" type="radio"/> UNI-DIR	<input type="radio"/> AES3	<input type="radio"/> WCLK	<input type="radio"/> AES3	<input type="radio"/> 32.0	96.0
<input type="radio"/> BI-DIR	<input type="radio"/> AES3id	<input type="radio"/> AES11	<input type="radio"/> AES3id	<input type="radio"/> 44.1	176.4
<input type="radio"/> SRC	<input checked="" type="radio"/> S/P-DIF op		<input checked="" type="radio"/> S/P-DIF op	<input type="radio"/> 48.0	192.0
<input type="radio"/> X-SRC	<input type="radio"/> S/P-DIF co		<input type="radio"/> S/P-DIF co	<input type="radio"/> 88.2	
MODE	AUDIO IN	REFERENCE			

Unidirectional format conversion from S/P-DIF optical to AES3, AES3id, S/P-DIF coaxial + optical.

<input checked="" type="radio"/> UNI-DIR	<input type="radio"/> AES3	<input type="radio"/> WCLK	<input type="radio"/> AES3	<input type="radio"/> 32.0	96.0
<input type="radio"/> BI-DIR	<input type="radio"/> AES3id	<input type="radio"/> AES11	<input type="radio"/> AES3id	<input type="radio"/> 44.1	176.4
<input type="radio"/> SRC	<input type="radio"/> S/P-DIF op		<input type="radio"/> S/P-DIF op	<input type="radio"/> 48.0	192.0
<input type="radio"/> X-SRC	<input checked="" type="radio"/> S/P-DIF co		<input checked="" type="radio"/> S/P-DIF co	<input type="radio"/> 88.2	
MODE	AUDIO IN	REFERENCE			

Unidirectional format conversion from S/P-DIF coaxial to AES3, AES3id, S/P-DIF coaxial + optical.

Unidirectional Format and Sampling Rate Conversions

<input checked="" type="radio"/> UNI-DIR	<input checked="" type="radio"/> AES3	<input checked="" type="radio"/> WCLK	<input type="radio"/> AES3	<input type="radio"/> 32.0
<input type="radio"/> BI-DIR	<input type="radio"/> AES3id	<input type="radio"/> AES11	<input type="radio"/> AES3id	<input type="radio"/> 44.1
<input checked="" type="radio"/> SRC	<input type="radio"/> S/P-DIF op	<input type="radio"/> S/P-DIF op	<input type="radio"/> S/P-DIF op	<input type="radio"/> 48.0
<input type="radio"/> X-SRC	<input type="radio"/> S/P-DIF co	<input type="radio"/> S/P-DIF co	<input type="radio"/> S/P-DIF co	<input type="radio"/> 88.2
MODE	AUDIO IN	REFERENCE		
		External Clock References	Internal Clock Reference	

This setting allows for unidirectional format and sampling rate conversion (see »MODE«, »UNI-DIR« + »SRC«) of an AES3 source signal (see »AUDIO IN«, »AES3«) simultaneously to all available output formats. The sampling rate of all outputs now depends on the clock rate of the reference clock signal, which is selected in the »REFERENCE« menu. The above example shows Word Clock (»WCLK«) selected as clock reference, which is the default setting. The following clock references are available for synchronization:

- WCLK, 25.0kHz – 200.0kHz, SCLK 11.2896MHz + 12.288MHz
- AES11, 25.0kHz – 200.0kHz (through separate input at the rear)
- Inputs of AES3, AES3id, S/P-DIF op, S/P-DIF co, each 25.0kHz – 200.0kHz
- 32.0kHz–192.0kHz, internal clock oscillator

To activate a clock source enter the »REFERENCE« menu and press the »SELECT« button repeatedly. When the external reference clock signal is locked by the internal PLL circuit, the first blue LED »LOCK« in the »STATUS« menu lights constantly. The clock rate of the selected clock source is then displayed in the first LED row, marked with »1«, of the »REF CLOCK IN« menu.

Further Setting Examples

<input checked="" type="radio"/> UNI-DIR	<input type="radio"/> AES3	<input type="radio"/> WCLK	<input type="radio"/> AES3	<input type="radio"/> 32.0
<input type="radio"/> BI-DIR	<input checked="" type="radio"/> AES3id	<input checked="" type="radio"/> AES11	<input type="radio"/> AES3id	<input type="radio"/> 44.1
<input checked="" type="radio"/> SRC	<input type="radio"/> S/P-DIF op	<input type="radio"/> S/P-DIF op	<input type="radio"/> S/P-DIF op	<input type="radio"/> 48.0
<input type="radio"/> X-SRC	<input type="radio"/> S/P-DIF co	<input type="radio"/> S/P-DIF co	<input type="radio"/> S/P-DIF co	<input type="radio"/> 88.2
MODE	AUDIO IN	REFERENCE		

Unidirectional format and sampling rate conversion from AES3id to AES3, AES3id, S/P-DIF coaxial + optical, referenced by an externally applied AES11 clock signal.

<input checked="" type="radio"/> UNI-DIR	<input type="radio"/> AES3	<input type="radio"/> WCLK	<input checked="" type="radio"/> AES3	<input type="radio"/> 32.0
<input type="radio"/> BI-DIR	<input type="radio"/> AES3id	<input type="radio"/> AES11	<input type="radio"/> AES3id	<input type="radio"/> 44.1
<input checked="" type="radio"/> SRC	<input checked="" type="radio"/> S/P-DIF op	<input type="radio"/> S/P-DIF op	<input type="radio"/> S/P-DIF op	<input type="radio"/> 48.0
<input type="radio"/> X-SRC	<input type="radio"/> S/P-DIF co	<input type="radio"/> S/P-DIF co	<input type="radio"/> S/P-DIF co	<input type="radio"/> 88.2
MODE	AUDIO IN	REFERENCE		

Unidirectional format and sampling rate conversion from S/P-DIF optical to AES3, AES3id, S/P-DIF coaxial + optical, referenced by an externally applied AES3 signal.

<input checked="" type="radio"/> UNI-DIR	<input type="radio"/> AES3	<input type="radio"/> WCLK	<input type="radio"/> AES3	<input type="radio"/> 32.0
<input type="radio"/> BI-DIR	<input type="radio"/> AES3id	<input type="radio"/> AES11	<input type="radio"/> AES3id	<input type="radio"/> 44.1
<input checked="" type="radio"/> SRC	<input type="radio"/> S/P-DIF op	<input type="radio"/> S/P-DIF op	<input checked="" type="radio"/> S/P-DIF op	<input type="radio"/> 48.0
<input type="radio"/> X-SRC	<input checked="" type="radio"/> S/P-DIF co	<input type="radio"/> S/P-DIF co	<input checked="" type="radio"/> S/P-DIF co	<input type="radio"/> 88.2
MODE	AUDIO IN	REFERENCE		

Unidirectional format and sampling rate conversion from S/P-DIF coaxial to AES3, AES3id, S/P-DIF coaxial + optical, referenced by the internal clock base with 192.0kHz.



Locking so-called »Super Clocks«

Your MC-6 is able to lock to so-called »Super Clock« (SCLK) reference signals. These clock signals are used preferably for older digidesign ProTools™ MX systems. Specified are only two clock rates, 11.2896MHz + 12.288MHz which are the x256 multiple of the Word Clock rates 44.1kHz and 48.0kHz.

When locking to one of these Super Clocks, the rate will be inverted displayed in the »REF CLOCK IN« menu. Due to this, the LED in front of the corresponding base clock rate, that means Word Clock rate, does not light while all other LEDs light (see examples below).

1	2
<input checked="" type="radio"/> 32.0	<input type="radio"/> 32.0
<input type="radio"/> 44.1	<input type="radio"/> 44.1
<input type="radio"/> 48.0	<input type="radio"/> 48.0
<input type="radio"/> 88.2	<input type="radio"/> 88.2
REF CLOCK IN	

Super Clock of 44.1kHz Word Clock

1	2
<input checked="" type="radio"/> 32.0	<input type="radio"/> 32.0
<input type="radio"/> 44.1	<input type="radio"/> 44.1
<input type="radio"/> 48.0	<input type="radio"/> 48.0
<input type="radio"/> 88.2	<input type="radio"/> 88.2
REF CLOCK IN	

Super Clock of 48.0kHz Word Clock

MODE	AUDIO IN	REFERENCE
UNI-DIR	AES3	WCLK
BI-DIR	AES3id	AES11
SRC	S/P-DIF op	S/P-DIF op
X-SRC	S/P-DIF co	S/P-DIF co
		32.0
		44.1
		48.0
		88.2

In this mode, the MC-6 is able to work simultaneously with two different sampling rates. The status of the two input signals is displayed in the »STATUS« and »REF CLOCK IN« menus. To distinguish between the two input signal status, you can see that generally the »LOCK« and »AUDIO« conditions of the first audio input format, seen from above of the LED row »AUDIO IN«, are displayed using the first »LOCK« and first »AUDIO« LED of the »STATUS« LED row. The status of the second audio input format is displayed accordingly with the second LEDs of this menu.

AUDIO IN		REFERENCE		STATUS		REF CLOCK IN	
① AES3	○ WCLK	○ AES3	○ 32.0	① LOCK	① ② 32.0	96.0	
② AES3id	○ AES11	○ AES3id	○ 44.1	② LOCK	① ② 44.1	176.4	
○ S/P-DIF op	○ S/P-DIF op	○ 48.0	① AUDIO	① ② 48.0	192.0		
○ S/P-DIF co	○ S/P-DIF co	○ 88.2	② AUDIO	① ② 88.2			

<input type="radio"/> UNI-DIR	<input checked="" type="radio"/> AES3	<input type="radio"/> WCLK	<input checked="" type="radio"/> AES3	<input type="radio"/> 32.0	
<input checked="" type="radio"/> BI-DIR	<input type="radio"/> AES3id	<input type="radio"/> AES11	<input type="radio"/> AES3id	<input type="radio"/> 44.1	
<input type="radio"/> SRC	<input checked="" type="radio"/> S/P-DIF op		<input checked="" type="radio"/> S/P-DIF op	<input type="radio"/> 48.0	
<input type="radio"/> X-SRC	<input type="radio"/> S/P-DIF co		<input type="radio"/> S/P-DIF co	<input type="radio"/> 88.2	
MODE	AUDIO IN	REFERENCE			

MODE	AUDIO IN	REFERENCE
UNI-DIR	AES3	WCLK
BI-DIR	AES3id	AES11
SRC	S/P-DIF op	AES3id
X-SRC	S/P-DIF co	S/P-DIF op
		S/P-DIF co
		32.0
		44.1
		48.0
		88.2

MODE	AUDIO IN	REFERENCE
UNI-DIR	AES3	WCLK
BI-DIR	AES3id	AES11
SRC	S/P-DIF op	AES3
X-SRC	S/P-DIF co	AES3id
		32.0
		44.1
		48.0
		88.2

Bidirectional format conversion between S/P-DIF optical and S/P-DIF coaxial.

This setting allows to receive an AES3 signal and an AES3id signal simultaneously. The bidirectional format conversion procedure is the same as described before, but you have now to select in the »REFERENCE« menu additionally a clock reference for the sampling rate conversion process, whose clock rate is then displayed under »REF CLOCK IN«. The example above shows Word Clock (WCLK) selected as clock reference.

- WCLK, 25.0kHz – 200.0kHz, SCLK 11.2896MHz + 12.288MHz
- AES11, 25.0kHz – 200.0kHz (through separate input at the rear)
- Inputs of AES3, AES3id, S/P-DIF op, S/P-DIF co, each 25.0kHz – 200.0kHz
- 32.0kHz – 192.0kHz, internal clock oscillator

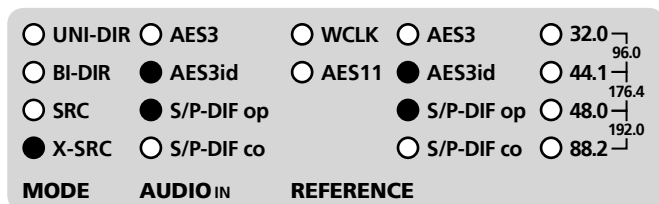
To activate a clock source enter the »REFERENCE« menu and press the »SELECT« button repeatedly. When the external reference clock signal is locked by the internal PLL circuit, the first blue LED »LOCK« in the »STATUS« menu lights constantly. The clock rate of the selected clock source is then displayed in the first LED row, marked with »1«. of the »REF CLOCK IN« menu.

Further Setting Examples

Bidirectional format and sampling rate conversion between AES3 and SIP-DIF optical, referenced by an externally applied AES11 clock signal.

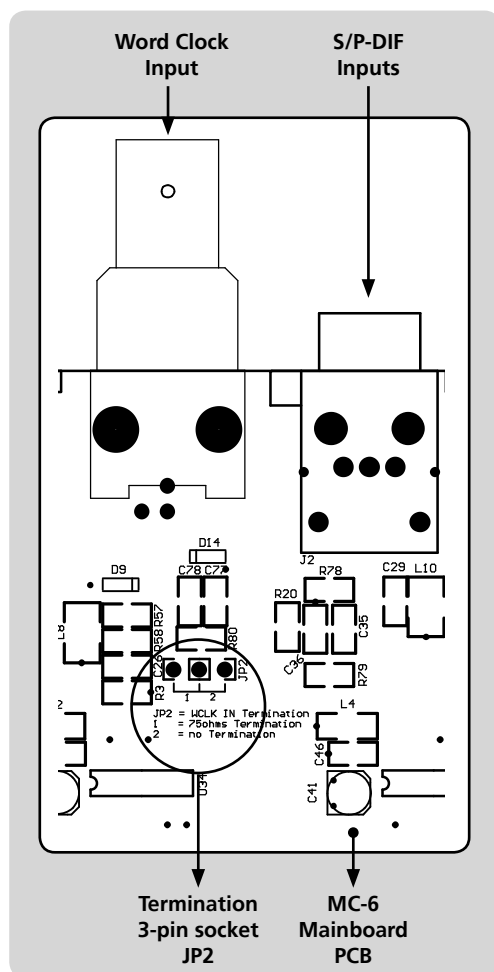
Bidirectional format and sampling rate conversion between AES3id and S/P-DIF optical, referenced by an externally applied AES3 digital audio signal.

Bidirectional format and sampling rate conversion between SIP-DIF optical and SIP-DIF coaxial, referenced by the internal clock base 44.1kHz.



MODE	AUDIO IN	REFERENCE
UNI-DIR	AES3	WCLK
BI-DIR	AES3id	AES11
SRC	S/P-DIF op	S/P-DIF op
X-SRC	S/P-DIF co	S/P-DIF co
		AES3
		AES3id
		32.0
		44.1
		48.0
		88.2

[illegible]



Word Clock Termination

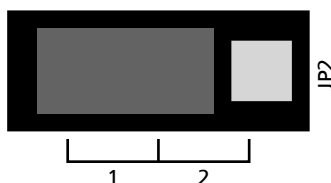
Technical Data

AES3 AUDIO INPUT	
Interface	1 x XLR female, transformer balanced, input impedance 110Ω, 200mV–7.0V
Format, Resolution	AES3–1992/2003, AES11–1997/2003, IEC 60958, 16–24 bits
Lock Range	25.0kHz to 200.0kHz
AES3id AUDIO INPUT	
Interface	1 x BNC, 200mV–7V, unbalanced, input impedance 75Ω
Format, Resolution	AES3id–1995/2001, 16–24 bits
Lock Range	25.0kHz to 200.0kHz
S/P-DIF OPTICAL AUDIO INPUT (OP)	
Interface	1 x Toslink™, EIAJ RC-5720
Format, Resolution	IEC 60958, 16–24 bits
Supported Sampling Rates	25.0kHz to 200.0kHz
S/P-DIF COAXIAL AUDIO INPUT (CO)	
Interface	1 x Coaxial (Cinch/RCA female), unbalanced, 0.5–1.0Vpp @ 75Ω, output impedance 75Ω
Format, Resolution	IEC 60958, 16–24 bits
Supported Sampling Rates	25.0kHz to 200.0kHz
WORD CLOCK INPUT (WCLK)	
Interface	1 x BNC, 200mV–7V, unbalanced, input impedance 75Ω (can be switched off, see above)
Lock Range	25.0kHz to 200.0kHz, 11.2896MHz + 12.288MHz (so-called Super Clocks)

Switching-off the Termination of the Word Clock Input

CAUTION! Disconnect the unit from the mains before opening!
Remount the aluminium cover thoroughly before you attempt to operate the unit!

When MC-6 is shipped, the BNC-based Word Clock input connector is terminated internally with 75Ω. Therefore, one jumper is put on two pins - Position 1 - of the 3-pin socket JP1.



Jumper Position 1
= Termination

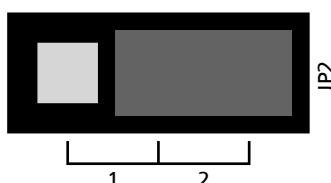
Jumper:



Free Pin:



When moving the jumper from position 1 to position 2, the input termination will be switched-off. Therefore, the MC-6 must be connected in a chain, in which a device with terminated input follows. Otherwise you need to use a BNC-T piece in combination with a 75Ω BNC resistor for terminating the MC-6's input.



Jumper Position 2
= no Termination

For additional information regarding this issue, please refer to page 11.

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