

# OPERATING MANUAL



**MC-3**  
Smart clock

Digital Audio Sync  
Master Clock Generator



**MC-3.1**  
Smart clock  
SD

Digital Audio + SD Video Sync  
Master Clock Generator





# 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.com • www.MUTECH-net.com

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## Applications

- A/V synchronization
- Low-jitter clock supply for entire studio
- Acoustical improvement of AD/DA converters
- Elimination of »clicks and pops« in audio recordings
- Stellate clock signal supply
- Multiple clock rate synchronization
- Film, video and audio transfers

## Peripheral MUTECH Products

### Signal Distribution Amplifiers:

- MC-2  
The MC-2 is a high-performance digital audio and reference sync signal distribution amplifier for AES3/11 and AES3/11id signals. The unit distributes and converts between the mentioned AES signals and standards.
- MC-7  
The MC-7 is a flexible, high-performance 8-channel Word Clock distribution amplifier and audio clock converter.

### Format and Sampling Rate Converters with internal Master Clock:

- MC-4  
The MC-4 is a high-performance digital audio multichannel format and sampling rate converter for ADAT™, AES3 and S/P-DIF
- MC-6  
The MC-6 is a high-performance digital audio dual channel format converter for AES3, AES3id and S/P-DIF.
- MC-8 + MC-8.1  
The MC-8 and MC-8.1 are 8 channel, high-performance digital audio and sampling rate converters for AES3 and AES3id.

### Cables for Digital Audio:

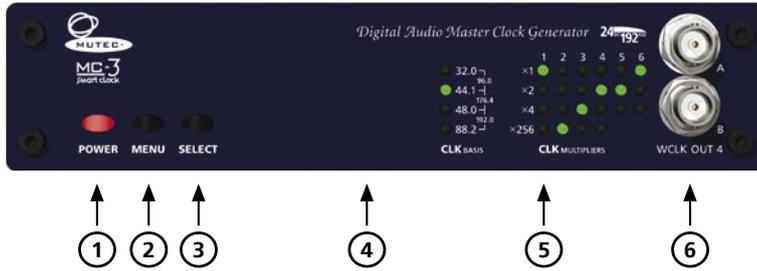
- Optical cables in different lengths from 0.5 m to 20 m for S/P-DIF and ADAT™ transfers.  
MW-05/19
- Set of two rack mounting angles to install one MC product frontally into one unit of a 19" rack.  
MW-03/19
- Set of two rack mounting angles to install one MC product on the rear side of a 19" rack.  
MW-02/19
- Mounting plate to install two MC products side by side into one unit of a 19" rack.

For all peripheral products please have a look on our website:  
[www.MUTECH-NET.com](http://www.MUTECH-NET.com) !



# CONTROL ELEMENTS AND TERMINALS

## MC-3 SMART CLOCK Front Panel

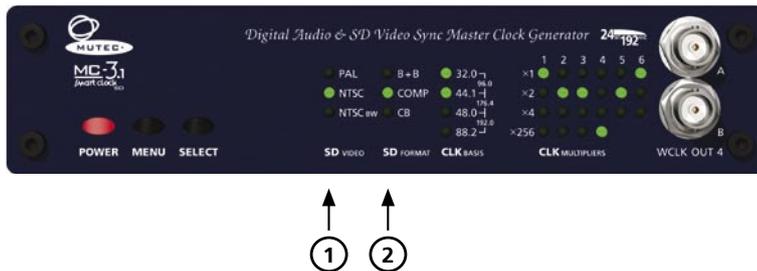


- 1 POWER**  
This red LED lights up when the unit is switched on with the rear panel POWER switch (on condition that the adjusted voltage matches your local voltage).
- 2 MENU**  
Use this key to access the different functional menus.
- 3 SELECT**  
Use this key to select a function from a specific functional menu.
- 4 CLK BASIS**  
This functional menu enables the setting of the base clock rate between 32.0kHz and 192.0kHz.
- 5 CLK MULTIPLIERS**  
This functional menu lets you determine the factor by which the basis clock rate is multiplied additionally. This setting can be made individually for every Word Clock pair of outputs as well as for the AES/EBU and S/PDIF outputs.
- 6 WCLK OUT 4**  
This pair of Word Clock outputs transfers either all standard Word Clock rates as well as Word Clock x 256 for older digidesign ProTools™ systems. Their numbering is aligned to the corresponding functional menu on the front panel. For adjusting these outputs see chapter OPERATION.

Refer to the OPERATIONS chapter for more information.

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

## MC-3.1 SMART CLOCK SD Front Panel



- Basis operation of MC-3.1 SMART CLOCK SD is aligned to this one of previously described MC-3.
- 1 SD VIDEO**  
Within this functional area the standard definition video sync reference generator can be set to output PAL, NTSC or NTSC black + white.
- 2 SD FORMAT**  
Use this key to change the output format of the selected video sync reference signal between Black +Burst, composite sync and color bar.





# 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-3 SMART CLOCK or MC-3.1 SMART CLOCK SD
- 1 x Power cable
- 1 x Manual
- 4 x Rubber feets

## 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 feets 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. When the unit is installed in a rack, the rubber feets cannot be attached to save space.

The device can be mounted into a standard 19" rack and will require 1 unit. For this installation MUTEK offers an optional set of rack ears (MW-05/19, order no. 8020-035). The mounting depth including the terminals is 175mm/6.9". Another 150mm/5.9" 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 Word Clock and Video 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 outputs of the MC-3 SMART CLOCK and MC-3.1 SMART CLOCK SD to the corresponding input of the devices 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 or video 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 or video inputs to be connected to the MC-3 SMART CLOCK's or MC-3.1 SMART CLOCK SD's outputs have a 75Ω terminating resistor! Most Word Clock or video 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-3 SMART CLOCK or MC-3.1 SMART CLOCK SD 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!



**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!**



**It is imperative that the lengths of all cables connected are largely the same, as this is the only way to ensure that all devices will be synchronized in phase (exception: cable tolerances).**

**Please make sure that the cable used has a resistance of 75Ω, in compliance with the specifications! 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 of all devices involved could be impaired.**

**We recommend using high-grade cables with a good shielding for your clock signal leads, in particular, if you need to transmit Word Clock x256 (so-called Super Clock) signals over greater distances. In any case, a length of max. 10 meters (approx. 30feet) should never be exceeded!**



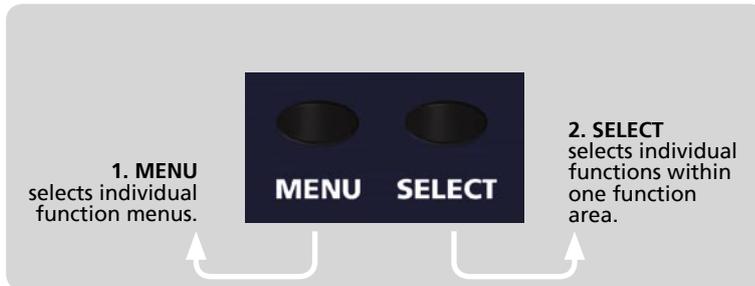


# GENERAL OPERATION

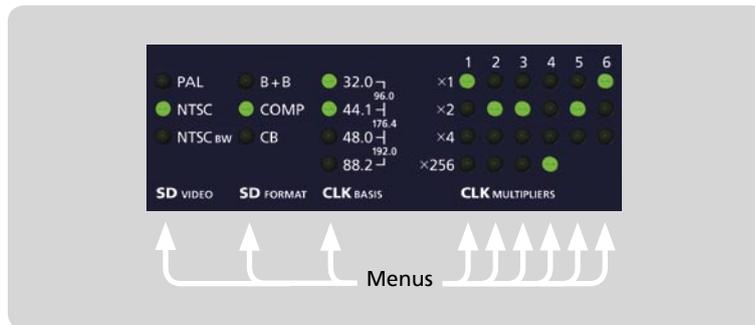
## Selecting Function Menus and setting Functions

Operating the MC-3 SMART CLOCK and MC-3.1 SMART CLOCK SD is very simple! The device is fully operated using the 2 keys at the front panel.

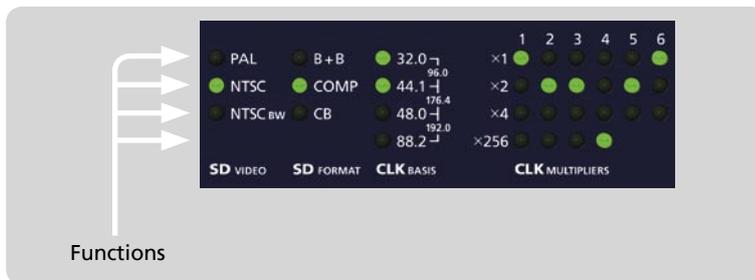
- 1 Switching the MENU key toggles between different basic function menus.
- 2 Switching the SELECT key activates individual functions within one function menu.



MENU + SELECT operation



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 key will select a new function. The LED of every selected function will flash accordingly and the corresponding function is available at once.
- 3 When the needed function is selected, do not press the switches again! After a period of approx. 4 seconds the LED in front of the selected function will stop flashing.

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















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