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

MUTEC

MUTEC PART NO. 8015-065 (MC-3) + 8015-066 (MC-3.1)

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 MUTEC 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 MUTEC 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.



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.

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!

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
MUTEC 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, MUTEC 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 MUTEC 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 MUTEC 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 MUTEC GmbH.

§3 Waranty 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 MUTEC 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 MUTEC 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 MUTEC 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 MUTEC GmbH in advance.

§5 Repairs
To obtain warranty service, the buyer must call or write to MUTEC 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 MUTEC 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:

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

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INTRODUCTION

Thank you for purchasing a MC-3 SMART CLOCK or MC-3.1 SMART CLOCK SD, Digital Audio & Video Sync Master Clock Generator from MUTEC GmbH.

Please keep this manual for future reference!

General Function Description

SMART CLOCK and SMART CLOCK SD generate different clock signals for synchronization of digital audio and SD video devices such as hard-disk recorders, A/V workstations, digital mixing consoles, AD/DA converters, musical instruments and sound cards. Simultaneous use of all available clock signals enables each device in the recording studio to be individually synchronized. In addition, different clock rates of all audio-related clock signals can be simultaneously output. Thus, new devices with higher clock rates may be integrated into an existing studio set-up without difficulty. It is also possible to supply various workstations in the same room with different clock rates.

MC-3 SMART CLOCK offers 7 basis Ultra low-jitter Word Clocks from 32.0kHz up to 192.0kHz, which are then independently distributed to four clock output pairs with multipliers x1, x2 and x4 for a maximum clock rate of 768.0kHz. For the synchronization of older digidesign ProTools™ systems, the respec-tive Word Clock frequencies can be transferred as Word Clock x 256 (also called Super Clock). AES/EBU and S/PDIF (optical + coaxial) blank frame sync signals are available from 32.0kHz up to 192.0kHz.
Every Word Clock output pair as well as the AES/EBU and S/PDIF outputs can be set to a different clock rate, based on one common clock frequency.

MC-3.1 SMART CLOCK SD offers same audio clock functionalities like MC-3 SMART CLOCK, but includes a standard definition (SD) video sync reference generator supporting PAL or NTSC SD video sync signals as Black + Burst or composite sync as well as the respective color bars. Two additional video outputs are available on the rear side of the housing. Thus, audio clocks and video sync references are all available at the same time to synchronize complete audio/video facilities.

The design advantage of the SMART CLOCKs is its high-precision frequency generator, from which all clock signals are simultaneously derived. As a result, the individual clock signals generated are synchronized to each other in phase, and hence feature the same frequency accuracy and time base! The frequency generation is accurate to < ± 1ppm and thus complies with AES 11, Grade 1, as well as broadcast specifications.

For larger equipment set-ups, which require more AES/EBU clock outputs than are provided by the SMART CLOCKs, MUTEC offers a complementary AES/EBU signal distributor which is called: MC-2. Therefore, please have a look on our website: www.MUTEC-NET.de !

Features

- **Generation of 7 Ultra low-jitter basis Word Clock frequencies ranging from 32.0kHz up to 192.0kHz.**
- **Word Clock outputs can be multiplied with factors x1, x2, x4 and x256 for a total of 15 different Word Clock frequencies.**
- **Simultaneous output of different clock rates.**
- **Frequency accuracy in compliance with AES11, Grade 1.**
- **Generation of PAL/NTSC + NTSC b/w SD video sync signals as Black + Burst, composite sync or color bar with MC-3.1 SMART CLOCK SD.**
- **Phase-synchronized generation of S/PDIF and AES/EBU blank frames.**
- **All adjustments are retained after power-down.**
- **Simple, new user interface.**
- **Built-in international power supply.**

The grey boxes contain supplementary informationen 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 MUTEC Product for Warranty and Support!

We ask you to be so kind to register your MUTEC 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 regsiter your product at:

www.MUTEC-net.com

> SERVICES, > MUTEC Product Registration

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 MUTEC 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 distribute s 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 lenghts from 0.5 m to 20 m for S/P-DIF and ADAT™ transfers.

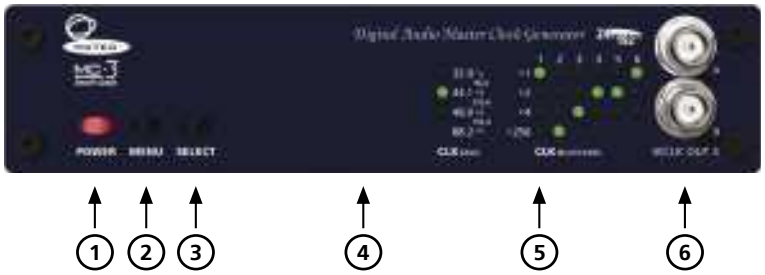
MW-05/19

- 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.MUTEC-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.

MC-3 SMART CLOCK Rear Panel



Refer to the »Generatable Word Clock Frequencies« and »Generatable AES/EBU and S/PDIF Frequencies« sections in the APPENDIX for a full list of all Word Clock, AES/EBU and S/PDIF clock rates that can be generated.

1 WCLK OUT 1–3
These 3 pairs 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 menus on the front panel. The individual BNC connectors of an output pair are marked as A and B; this allows, for example, for a simple documentation of the connected devices. For adjusting these outputs see chapter OPERATION.

2 AES/EBU OUT 5
These 2 AES/EBU outputs transmit a transformer-balanced electrical blank-frame clock signal. Their numbering is aligned to the corresponding functional menu on the front panel. The individual XLR connectors of this output pair are marked as A and B; this allows, for example, for a simple documentation of the connected devices.For adjusting these outputs see chapter OPERATION.

3 S/PDIF OUT 6
This 2 S/PDIF outputs, available as optical and coaxial interfaces, transmit an optical S/PDIF blank frame signal and an unbalanced electrical S/PDIF blank frame signal. Their numbering is aligned to the corresponding functional menu on the front panel. For adjusting these outputs see chapter OPERATION.

4 MAINS IN, Power Switch + Mains connector (IEC)
This is the main switch for switching the device on and off. Connect the supplied IEC power cable to the device's mains connector. Make sure that the power switch is turned off before connecting the device to your power source finally. Line voltages within the range of 90…260 V with a frequency of 50 or 60 Hz can be applied. The internal power supply will automatically make all necessary adjustments.

Heed the SAFETY INSTRUCTIONS at the beginning of this manual.

MC-3.1 SMART CLOCK SD Rear Panel



All audio clock outputs are the same as previously described for MC-3.

1 SD VIDEO
These 2 video outputs transmit a standard definition video sync reference signal which can be PAL, NTSC or NTSC black + white. For adjusting these outputs see chapter OPERATION.

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

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.

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.

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

The device can be mounted into a standard 19" rack and will require 1 unit. For this installation MUTEC 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.

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!

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!

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.

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 Lightbridge, 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!

We recommend using high-grade cables with a good shielding for your clock signal leads, in particular, if you need to transmit Word Clock x 256 (so-called Super Clock) signals over greater distances. In any case, a length of max. 10 meters (approx. 30 feets) should never be exceeded!

Since some manufacturers offer optimized cables for the transmission of digital S/PDIF and AES/EBU audio signals, it will be a good idea to ask your retailer for specific cables.

Especially when working with high AES/EBU clock rates well shielded clock lines 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.

MUTEC offers optical cables of various lengths that have been specifically tested for the transmission of S/PDIF and ADAT™ signals (retailers and distributors only)!

Wiring the AES/EBU and S/PDIF Interfaces

Connect the AES/EBU interfaces with the help of balanced electrical cables equipped with XLR connectors on both ends. The specifications stipulate a specific cable resistance of 110Ω (ask your retailer for a confirmation of this value when purchasing the cables).

Connect the coaxial S/PDIF interface with the 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).

Connect the optical S/PDIF interface with the help of Toshiba 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.

GENERAL OPERATION

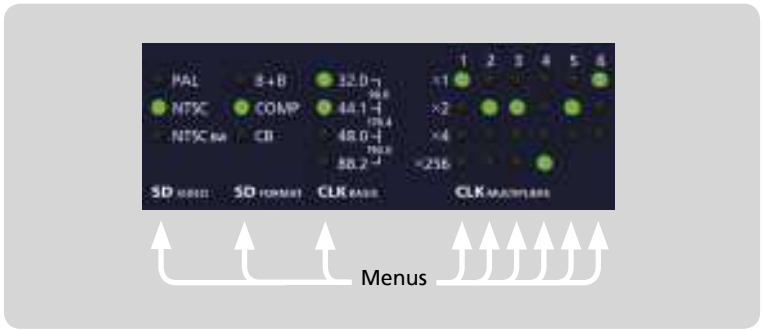
Selecting Function Menus and setting Functions

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.

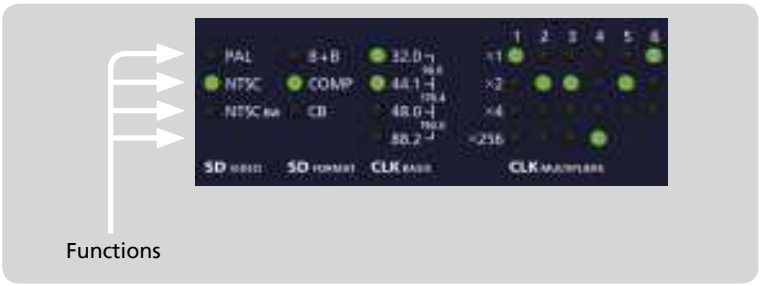
1 Switching the MENU key toggles between different basic function menus.
2 Switching the SELECT key activtes individual functions within one function menu.



MENU + SELECT operation



Menus



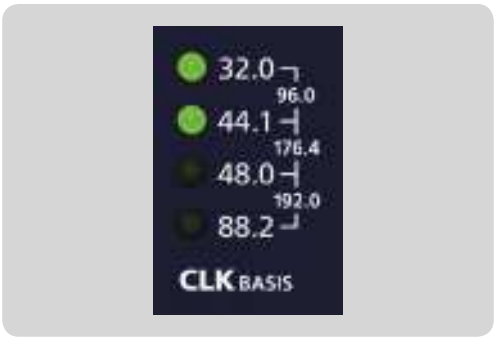
Functions

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.

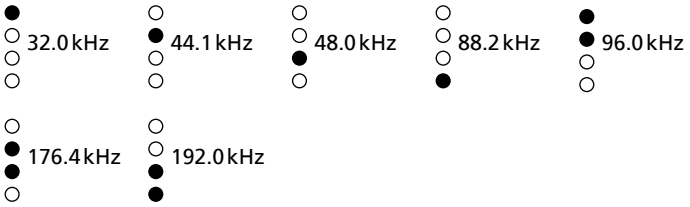
MC-3 + MC-3.1 AUDIO CLOCK SETTINGS



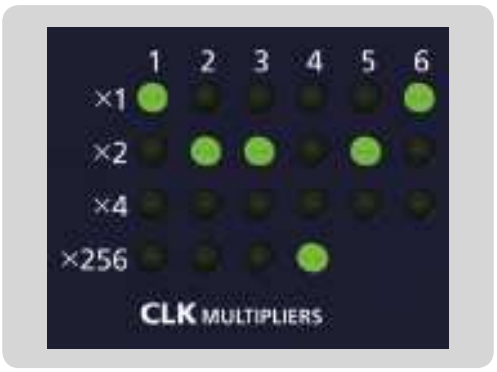
CLK BASIS

CLK BASIS

Within this function menu you may select the required basis clock (CLK) frequency for your studio set-up. This selection serves as the basic setting for all WCLK output pairs as well as the AES/EBU and S/PDIF outputs. There are 7 different basis clock rates adjustable by pressing the SELECT key for different times. The LEDs display the selected clock rate as follows:



The factory default is set at 44.1kHz.



CLK MULTIPLIERS

CLK MULTIPLIERS

These multiply functions are separately available for all 4 Word Clock output pairs as well as for the AES/EBU and S/PDIF outputs. Their numberings are aligned to the output numbers. Select the prefered output with the MENU key and choose the needed multiply factor by pressing the SELECT key accordingly. The factory default is set to x 1.

CLK multipliers 1 – 4
For every of these Word Clock output pairs are 4 multipliers available:

x 1, x 2, x 4, x 256

The multiply functions »x 1, x 2, x 4« multiply all available basis clocks up to the highest possible Word Clock rate of 768.0kHz (192.0kHz basis clock x 4). The function »x 256« multiplies only the basis clocks 44.1kHz and 48.0kHz to output the so-called Super Clock rates necessary for older digidesign ProTools™ MX systems. If a different basis clock is selected, the »x 256« function is not acceccible.

The factory default is set at x 1.

CLK multiplier 5
For the AES/EBU output pair are 3 multiply functions available:

x 1, x 2, x 4

Due to the maximum possible AES/EBU clock frequency of 192.0kHz, the functions of these multipliers are dependent on the adjusted basis clock.

Example 1
The basis clock runs at 32.0kHz, 44.1kHz or 48.0kHz:

x 1: AES/EBU outputs run at 32.0kHz, 44.1kHz or 48.0kHz
x 2: AES/EBU outputs run at 64.0kHz, 88.2kHz or 96.0kHz
x 4: AES/EBU outputs run at 128.0kHz, 176.4kHz or 192.0kHz

Example 2
The basis clock runs at 88.2kHz or 96.0kHz:

x 1: AES/EBU outputs run at 88.2kHz or 96.0kHz
x 2: AES/EBU outputs run at 176.4kHz or 192.0kHz
x 4: AES/EBU outputs run at 176.4kHz or 192.0kHz

Example 3
The basis clock runs at 176.4kHz or 192.0kHz:

x 1: AES/EBU outputs run at 176.4kHz or 192.0kHz
x 2: AES/EBU outputs run at 176.4kHz or 192.0kHz
x 4: AES/EBU outputs run at 176.4kHz or 192.0kHz

The factory default is set at x 1.

CLK multiplier 6
Both S/PDIF outputs, optical and coaxial, receive same clock rate settings. For the S/PDIF output pair are 3 multiply functions available:

x1, x2, x4

Due to the maximum possible S/PDIF clock frequency of 192.0kHz, the functions of these multipliers are dependent on the adjusted basis clock.

Example 1
The basis clock runs at 32.0kHz, 44.1kHz or 48.0kHz:

x1: S/PDIF outputs run at 32.0kHz, 44.1kHz or 48.0kHz
x2: S/PDIF outputs run at 64.0kHz, 88.2kHz or 96.0kHz
x4: S/PDIF outputs run at 128.0kHz, 176.4kHz or 192.0kHz

Example 2
The basis clock runs at 88.2kHz or 96.0kHz:

x1: S/PDIF outputs run at 88.2kHz or 96.0kHz
x2: S/PDIF outputs run at 176.4kHz or 192.0kHz
x4: S/PDIF outputs run at 176.4kHz or 192.0kHz

Example 3
The basis clock runs at 176.4kHz or 192.0kHz:

x1: S/PDIF outputs run at 176.4kHz or 192.0kHz
x2: S/PDIF outputs run at 176.4kHz or 192.0kHz
x4: S/PDIF outputs run at 176.4kHz or 192.0kHz

The factory default is set at x1.

MC-3.1 VIDEO SETTINGS

SD VIDEO

This menu enables you to set the internal standard definition (SD) video sync reference generator to 3 different video sync signal standards:

1) PAL: 25fps, 625 lines
2) NTSC: 29.97fps, 525 lines
3) NTSC BW: 30fps, 525 lines (black + white)

The video standard settings apply to both video outputs simultanuously.



SD VIDEO

SD FORMAT

Within this menu, you can choose a specific output format of the previously set video sync signal standard:

1) B+B:
Black + Burst, this function outputs a SD video composite sync signal with inserted color bust.

2) COMP:
Composite Sync, this function outputs a SD video composite sync signal without color bust.

3) CB:
Color Bar, this function outputs a SD video color bar signal.

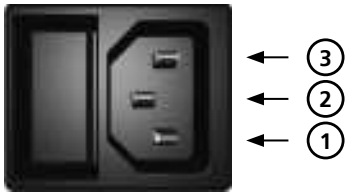
Video and Audio Signal Relations

MC-3.1 auto-detects integer relationsships between the adjusted video standard and basis clock rate. This applies especially when PAL is selected as video reference and the basis clock rate (CLK BASIS) is set to 48.0kHz, 96.0kHz or 192.0kHz. In that case, the AES/EBU and S/PDIF generators use the video frame to lock the Z-preamble of the AES channel block start, aligned to AES11-1997/2003 and EBU R83-1996.

APPENDIX

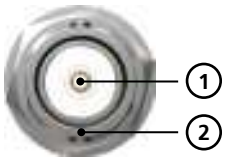
Pin Assignment of the Connectors

Mains



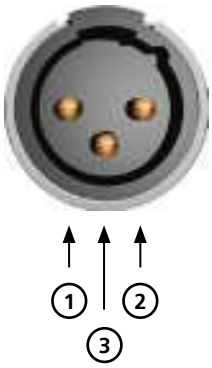
1 Neutral (blue; USA: white)
2 Protective earth (green/yellow; USA: green)
3 Live, phase (brown; USA: black)

Word Clock + SD Video BNC Output



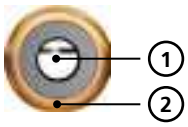
1 Signal
2 Ground

AES/EBU XLR Output



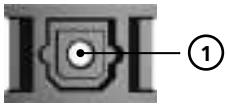
1 Ground
2 a conductor (hot / +)
3 b conductor (cold / -)

S/PDIF Cinch Output



1 Audio signal
2 Audio ground

S/PDIF Optical Output
TOSLINK Standard



1 Optical signal

Technical Data

WORD CLOCK SYNC OUTPUT 1–4	
Interface	8 x BNC female, unbalanced, individually buffered, adjustable in pairs
Output levels	3.5V (p-p) @ 75Ω, output impedance 22Ω
AES/EBU SYNC OUTPUT 5	
Interface	2 x XLR male, transformer balanced, 3.5Vpp @ 110Ω, output impedance 110Ω, individually buffered
Format	AES 11–1997/2003
Resolution	24bits
S/PDIF SYNC OUTPUT 6	
Interfaces	1 x Coaxial (Cinch/RCA female), unbalanced, 0.5V (p-p) @ 75Ω, output impedance 75Ω, individually buffered
	1 x Toshiba Toslink™, EIAJ RC-5720
Format	IEC 60958 blank frame
Resolution	24bits
VIDEO SYNC OUTPUTS (only MC-3.1)	
Interface	2 x BNC female, unbalanced, output impedance 75Ω, individually buffered, adjustable in pairs in Paaren anpassbar
Output levels	300mVpp ±7mV burst level @ 75Ω
	300mVpp ±7mV H/V sync level @ 75Ω
VIDEO GENERATOR SPECIFICATIONS (only MC-3.1)	
Generated SD video sync signal standards	PAL 25fps, 625 lines, ITU-R.BT470
	NTSC 29,97fps, 525 lines, SMPTE170M
	NTSC 30fps, 525 lines, SMPTE170M
Generated video formats	Black + Burst, Composite video sync, 100/75 EBU PAL + 100/7.5//75/7.5 NTSC Color bar
INTERNAL REFERENCE CLOCK SPECIFICATIONS	
Oscillator type	TCXO (temperature compensated crystal oscillator)
Clock accuracy (shipped)	< ± 1.0ppm
Clock stability vs. temperature	< ± 1.0ppm within -10°C to +60°C
Operating temperature	-10°C to +60°C
Clock jitter	< 10ps (RMS)
POWER SUPPLY	
Type	Internal switching power supply
Input voltage	90V–260V (automatic adjustment), 47Hz–440Hz
Power consumption	max. 10W
SYSTEM UNIT COVER	
Cover size/material/color	196 x 42 x 156mm without connectors (W x H x D), aluminium sheet 1mm, black
Front panel size/material	198 x 44 x 2mm (W x H x D), aluminium
Weight MC-3	~ 700g
Weight MC-3.1	~ 780g

Generatable Word Clock (WCLK) Frequencies

WCLK BASIS	x 1	x 2	x 4	x 256
32.0kHz	32.0kHz	64.0kHz	128.0kHz	–
44.1kHz	44.1kHz	88.2kHz	176.4kHz	11.2896MHz
48.0kHz	48.0kHz	96.0kHz	192.0kHz	12.2880MHz
88.2kHz	88.2kHz	176.4kHz	352.8kHz	–
96.0kHz	96.0kHz	192.0kHz	384.0kHz	–
176.4kHz	176.4kHz	352.8kHz	705.6kHz	–
192.0kHz	192.0kHz	384.0kHz	768.0kHz	–

Generatable AES/EBU and S/PDIF Frequencies

WCLK BASIS	x 1	x 2	x 4
32.0kHz	32.0kHz	64.0kHz	128.0kHz
44.1kHz	44.1kHz	88.2kHz	176.4kHz
48.0kHz	48.0kHz	96.0kHz	192.0kHz
88.2kHz	88.2kHz	176.4kHz	176.4kHz
96.0kHz	96.0kHz	192.0kHz	192.0kHz
176.4kHz	176.4kHz	176.4kHz	176.4kHz
192.0kHz	192.0kHz	192.0kHz	192.0kHz

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