

# OPERATING MANUAL



## **MC-5** SD/HD Video Routing Matrix and Distributor





# 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 for purchasing the MC-5, SD/HD Video Routing Matrix and Distributor, from MUTEC GmbH.

Please keep this manual for future reference!

## General Function Description

The MC-5 is an extremely high-flexible routing matrix and distributor for standard definition (SD) bi-level and high definition (HD) tri-level video signals.


The unit offers simultaneous routing and distribution of SD and HD video signals, regardless of the frame rates and formats of the incoming video references. In this process, the input signals are distributed according to your settings directly to the selected outputs without any alteration or amplification.

For this, the MC-5 provides 4 BNC inputs which can be routed individually to 12 BNC outputs. One input reference signal can be distributed to one, but also on up to 12 outputs. When inputting more signals the available number of outputs will be reduced accordingly. But due to the routing capabilities of MC-5, the number of the outputs for the individual input signals can be assigned free.

Additionally, the unit offers a preset management which allows to store and to switch over 4 different settings of all outputs. So, MC-5 enables to configure the exact needed number of outputs for every video distribution application very easily.

A new designed, simple user interface enables to install the MC-5 without longer training time. Thus, the MC-5 provides an ideal output expansion for MUTEC's video clock generator products, e.g. iCLOCK, iCLOCKdp, MC-3.1, MC-3.2 and MC-3.3.

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.**

## Features

- Routing matrix and signal distribution functionalities in one box
- Compatible to HD tri-level and SD bi-level PAL, NTSC, SECAM
- Accepts four independent video input signals simultaneously
- Built-in 4-way preset management
- Distributes HD test pattern component signals
- All adjustments are retained after power-down.
- Simple, new user interface.
- Built-in international power supply.

## Applications

- Stellate SD video and HD tri-level signal distribution
- Mixed video signal distribution
- Free assignment of the outputs to the individual inputs
- Distribution of HD test pattern component signals
- Output expansion for MUTEC's iCLOCK, iCLOCKdp, MC-3.1, MC-3.2 and MC-3.3

## Peripheral Products

### 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](http://www.iCLOCK-NET.de)

### 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-3.3

The MC-3.3 SMART CLOCK VR is an universal and high accurate SD/HD video sync master clock generator. This unit supplies different high-stable SD bi-level and HD tri-level reference signals for simultaneous synchronization of SD/HD video devices in television stations, video editing suits or film/video copy studios.

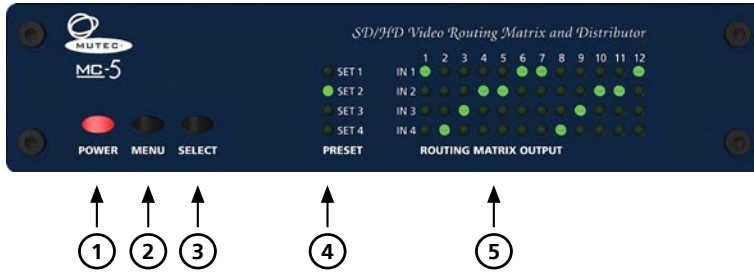
For all peripheral products please have a look on our website:  
[www.MUTEC-NET.de](http://www.MUTEC-NET.de)!





# CONTROL ELEMENTS

## MC-5 Front Panel

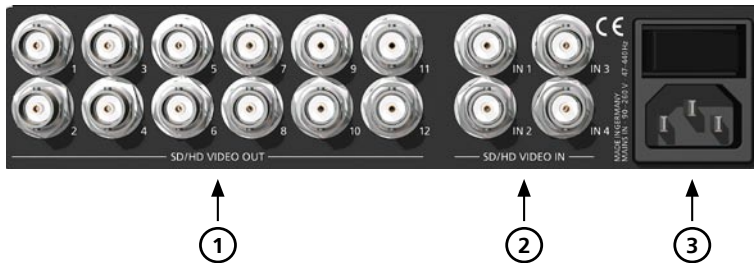


- 1 POWER**  
This red LED lights up when the unit is switched on with the rear panel POWER switch (on condition that the adjusted voltage matches your local voltage).
- 2 MENU**  
Use this key to access the different function menus.
- 3 SELECT**  
Use this key to select a function from a specific function menu.
- 4 PRESET**  
This functional menu lets you choose one of the four available output presets.
- 5 ROUTING MATRIX OUTPUT**  
Within this functional menu you can route the four inputs individually to the 12 outputs.

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-5 Rear Panel



- 1 SD/HD VIDEO OUT**  
These outputs transfers SD bi-level or HD tri-level video signals. Every of the four inputs can be individually assigned to one or more of these outputs. For adjusting these outputs see chapter OPERATION.
- 2 SD/HD VIDEO IN**  
This inputs can receive SD bi-level or HD tri-level video signals. They can be individually routed to one or more of the 12 outputs. For routing of these inputs see chapter OPERATION.
- 3 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...260V 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!





# 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-5
- 1 x Power cable
- 1 x Manual
- 4 x Rubber feets
- 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 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 one 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 Video Interfaces


To allow for the distribution 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 video outputs of the MC-5 to the corresponding inputs of the devices you wish to feed with the distributed video signal. Cable lengths should be kept as short as possible to minimize signal losses and/or interferences!

For the transmission of 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 video inputs to be connected to the MC-5's outputs have a 75Ω terminating resistor! Most 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 video input, 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-5 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« video 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 video inputs (except for the last device in the chain) have their terminations disabled! In a serial video 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 or feeded 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 or feeding of all devices involved could be impaired.**



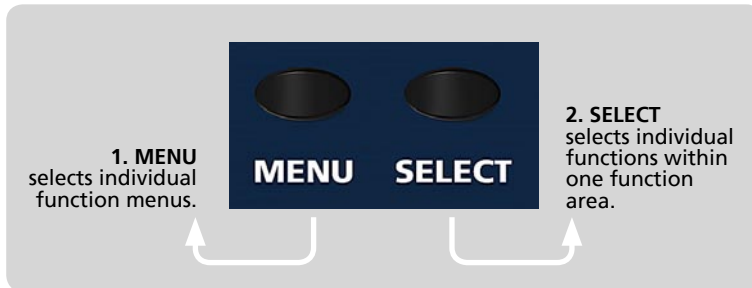


# GENERAL OPERATION

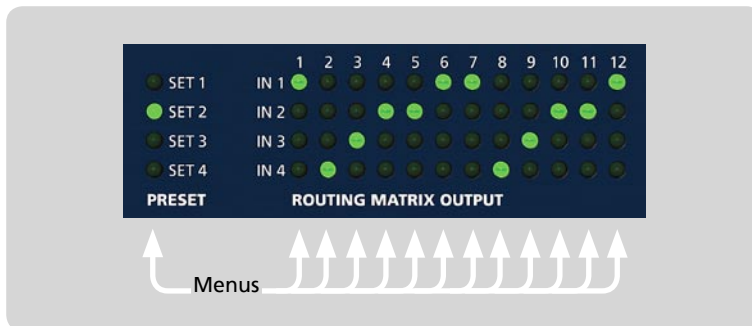
## Selecting Function Menus and setting Functions

Operating the MC-5 is very simple! The device is fully operated using the 2 keys at the front panel.

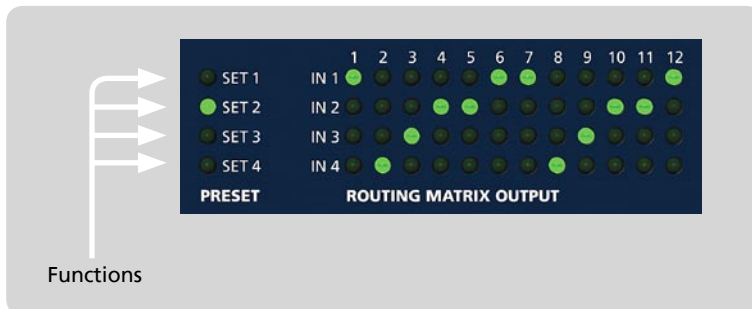
- 1 Switching the MENU key toggles between different basic function menus.
- 2 Switching the SELECT key activates individual functions within one function menu.



MENU + SELECT operation



Menus



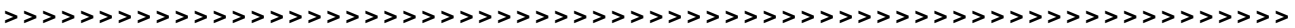
Functions

## 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.

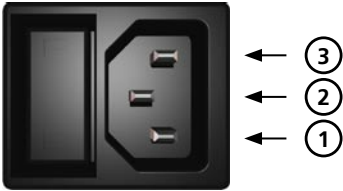




## APPENDIX

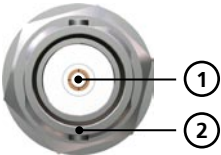
### Pin Assignment of the Connectors

#### Mains

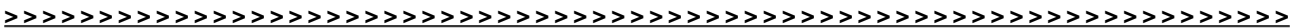


- 1 Neutral (blue; USA: white)
- 2 Protective earth (green/yellow; USA: green)
- 3 Live, phase (brown; USA: black)

#### SD/HD Video BNC Input and Output



- 1 Signal
- 2 Ground



**Technical Data**

<b>SD/HD VIDEO IN 1-4</b>	
Interface	4 x BNC female, unbalanced input impedance 75Ω
Input Level Range	0.2–5.0V (p-p)
Video Input Formats	SD bi-level (PAL/SECAM + NTSC), HD tri-level, all video standard and frame rate combinations
<b>SD/HD VIDEO OUT 1-12</b>	
Interface	12 x BNC female, unbalanced, output impedance 75Ω, individually buffered
Output Level	0.2–5.0V (p-p), no amplification
Video Output Formats	SD bi-level (PAL/SECAM + NTSC), HD tri-level, all video standard and frame rate combinations
<b>SIGNAL PROCESSING</b>	
Signal processes	No alteration, no amplification
<b>POWER SUPPLY</b>	
Type	Internal switching power supply
Input voltage	90V–260V (automatic adjustment), 47 Hz–440 Hz
Power consumption	max. 10W
<b>SYSTEM UNIT COVER</b>	
Cover size/material/color	196 x 42 x 156mm without connectors (WxHxD), aluminium sheet 1mm, black
Front panel size/material	198 x 44 x 2mm (WxHxD), aluminium
Weight	~ 800g







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