

OPERATING MANUAL

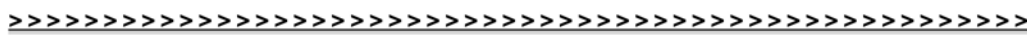


MC-3.3

Smart Clock VR

SD/HD Video Sync Master Clock Generator

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.



CAUTION
RISK OF
ELECTRICAL SHOCK!



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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INTRODUCTION

Thank you for purchasing the MC-3.3 SMART CLOCK VR, SD/HD Video Sync Master Clock Generator, from MUTECH GmbH.

Please keep this manual for future reference!

General Function Description

The MC-3.3 SMART CLOCK VR is an universal and high accurate SD/HD video sync master clock generator for standard definition (SD) bi-level and high definition (HD) tri-level video sync signals.

The unit provides different high-stable SD video and HD tri-level sync reference signals for simultaneous synchronization of SD/HD video devices in television stations, video editing suits or film/video copy studios. Referring to this, the MC-3.3 offers extremely high flexibility, 12 outputs in total and a new designed, simple user interface.

One of the design advantages of the MC-3.3 SMART CLOCK VR is its high-precision clock frequency basis, from which all video reference signals are derived simultaneously. As a result, the individual sync clock signals generated feature the same frequency accuracy and time base! The frequency generation is accurate to $\pm 0.5\text{ppm}$ and thus complies with AES 11, Grade 1, as well as broadcast specifications.


The SD bi-level video reference generator supports PAL 25fps, PAL 24fps (so-called 'Slow-PAL') NTSC 29.97fps and NTSC 30fps as Black + Burst, composite sync and color bar. Especially for the PAL 24fps standard a pull down factor of 0.1% can be set additionally to output PAL 23.98fps.

The HD tri-level video reference generator offers 720p, 1080i and 1080p formats with various frame rates. Furthermore, MC-3.3 generates different HD tri-level test patterns as YPrPb component or RGB signals.

The SD and HD video generators are independently adjustable at the same time. A total of six outputs is available for each video standard at the rear. Phase relations of the generated signals will be recognized and tuned automatically.

A new designed, simple user interface enables to install the MC-3.3 without longer training time. Thus, MC-3.3 SMART CLOCK VR offers a flexible solution for every video editing and post production facility.

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 MUTECH 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.MUTECH-net.com
> SERVICES, > MUTECH Product Registration

INTRODUCTION

Features

- Generates SD bi-level and HD tri-level syncs simultaneously
- All SD/HD video sync reference signals are coupled to one AES11, Grade 1, reference clock (<0.5ppm)
- Generates HD tri-level test patterns
- Supports Slow-PAL and NTSC b/w
- All adjustments are retained after power-down.
- Simple, new user interface.
- Built-in international power supply.

Applications

- SD bi-level and HD tri-level synchronization simultaneously
- Mixed video signal distribution
- Film and video transfers
- Stellate video sync clock signal supply.

Peripheral Products

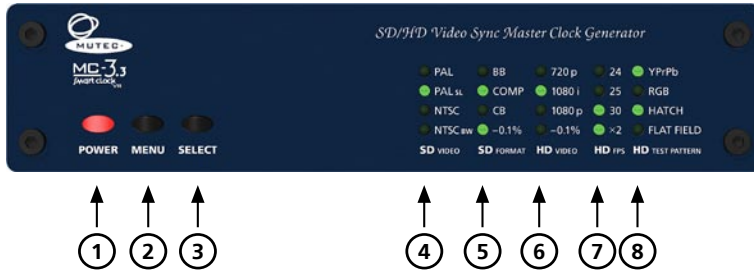
- MC-5
For set-ups, which require more SD/HD video sync outputs than are provided by the MC-3.3 SMART CLOCK VR, MUTECH offers a complementary 12-channel SD/HD video routing matrix and signal distribution amplifier which is called: MC-5.

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



CONTROL ELEMENTS

MC-3.3 Front Panel

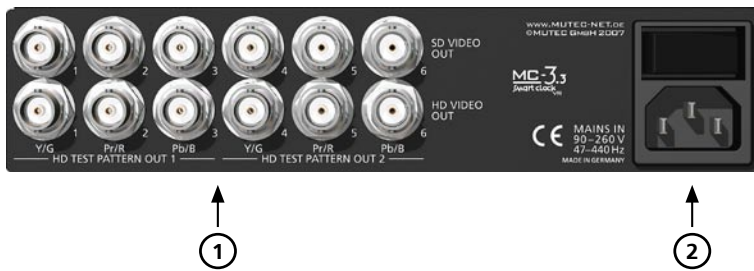


- 1 POWER**
This red LED lights up when the unit is switched on with the rear panel POWER switch (on condition that the adjusted voltage matches your local voltage).
- 2 MENU**
Use this key to access the different function menus.
- 3 SELECT**
Use this key to select a function from a specific function menu.
- 4 + 5 SD VIDEO + SD FORMAT**
These two functional menus are working simultaneously together and let you choose between different SD bi-level video standards (SD VIDEO) in combination with different output formats and frame rates (SD FORMAT).
- 6 + 7 HD VIDEO + HD FPS**
These two functional menus are working simultaneously together and let you choose between different HD tri-level video standards (HD VIDEO) in combination with different frame rates (HD FPS).
- 8 HD TEST PATTERN**
Within this functional menu you can choose between different HD tri-level test patterns which are available at the HD outputs as YPrPb component or RGB signals.

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-3.3 Rear Panel



- 1 SD VIDEO OUT + HD VIDEO OUT**
The outputs 1 to 6 of the upper interface row transmit SD bi-level sync signals, the outputs 1 to 6 of the lower interface row transmit HD tri-level video sync signals.
The lower row of interfaces can be also used to output different HD tri-level test patterns two times, marked as HD TEST PATTERN OUT 1 + HD TEST PATTERN OUT 2.
- 2 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.

Refer to the »Technical Data« section in the APPENDIX for a full list of all available SD and HD video format and frame rate combinations.

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-3.3 SMART CLOCK VR
- 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-3.3 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-3.3'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-3.3 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.

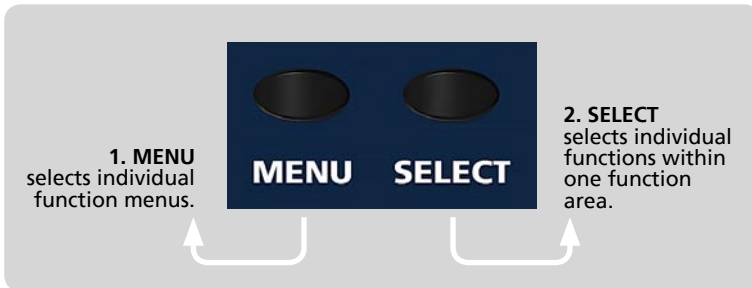


GENERAL OPERATION

Selecting Function Menus and setting Functions

Operating the MC-3.3 is very simple! The device is fully operated using the 2 keys at the front panel.

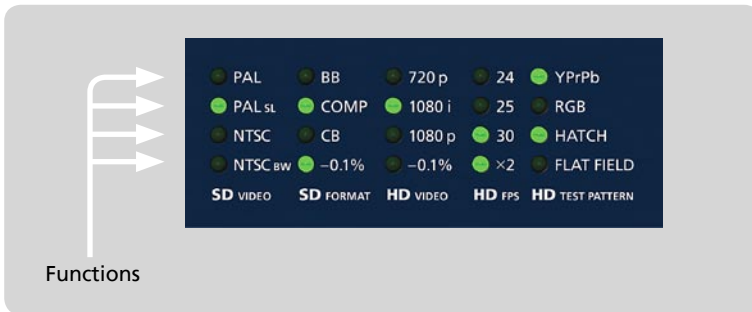
- 1 Switching the MENU key toggles between different basic function menus.
- 2 Switching the SELECT key activates individual functions within one function menu.



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.

OPERATING THE MC-3.3 SMART CLOCK VR

SD VIDEO + SD FORMAT

This menu enables you to set the internal SD bi-level video sync reference generator to different standards, formats and frame rates. It is a multifunctional menu which means, the two LED rows 'SD VIDEO' and 'SD FORMAT' indicate together the different possible settings. The selected video standard is transferred to all of the six SD video sync outputs at the rear.

The names of the LEDs in this menu:

- PAL: 25fps, 625 lines
- PAL SL: 24fps, 625 lines
- NTSC: 29.97fps, 525 lines
- NTSC BW: 30fps, 525 lines
- BB: Black + Burst, this function outputs a SD video composite sync signal with inserted color burst.
- COMP: Composite Sync, this function outputs a SD video composite sync signal without color burst.
- CB: Color Bar, this function outputs a SD video color bar signal. Both LEDs in front of a video standard light simultaneously.
- 0.1%: Pull down for PAL SL with 0.1%, 23.98fps, 625 lines

You can choose the different functions within this menu by pressing the SELECT button repeatedly. The factory default is set to PAL / BB.



SD VIDEO + SD FORMAT



During switch-over of the SD video standards or formats, a short interruption in all output signals occurs for maintaining correct phase relations at the outputs.

<input checked="" type="radio"/> PAL	<input checked="" type="radio"/> BB	This setting outputs a PAL Black + Burst video sync reference signal.	<input type="radio"/> PAL	<input type="radio"/> BB	This setting outputs a so-called 'Slow-PAL' composite video sync reference signal pulled down with 0.1%.
<input type="radio"/> PAL SL	<input type="radio"/> COMP				
<input type="radio"/> NTSC	<input type="radio"/> CB				
<input type="radio"/> NTSC BW	<input type="radio"/> -0.1%				
SD VIDEO	SD FORMAT		HD VIDEO	SD FORMAT	
<input checked="" type="radio"/> PAL	<input type="radio"/> BB	This setting outputs a PAL composite video sync reference signal.	<input type="radio"/> PAL	<input type="radio"/> BB	This setting outputs a so-called 'Slow-PAL' color bar video reference signal pulled down with 0.1%.
<input type="radio"/> PAL SL	<input checked="" type="radio"/> COMP				
<input type="radio"/> NTSC	<input type="radio"/> CB				
<input type="radio"/> NTSC BW	<input type="radio"/> -0.1%				
SD VIDEO	SD FORMAT		SD VIDEO	SD FORMAT	
<input checked="" type="radio"/> PAL	<input type="radio"/> BB	This setting outputs a PAL color bar video reference signal.	<input type="radio"/> PAL	<input checked="" type="radio"/> BB	This setting outputs a NTSC Black + Burst video sync reference signal with 29.97fps.
<input type="radio"/> PAL SL	<input type="radio"/> COMP				
<input type="radio"/> NTSC	<input checked="" type="radio"/> CB				
<input type="radio"/> NTSC BW	<input type="radio"/> -0.1%				
SD VIDEO	SD FORMAT		SD VIDEO	SD FORMAT	
<input type="radio"/> PAL	<input checked="" type="radio"/> BB	This setting outputs a so-called 'Slow-PAL' Black + Burst video sync reference signal.	<input type="radio"/> PAL	<input type="radio"/> BB	This setting outputs a NTSC composite sync video reference signal with 29.97fps.
<input checked="" type="radio"/> PAL SL	<input type="radio"/> COMP				
<input type="radio"/> NTSC	<input type="radio"/> CB				
<input type="radio"/> NTSC BW	<input type="radio"/> -0.1%				
SD VIDEO	SD FORMAT		SD VIDEO	SD FORMAT	
<input type="radio"/> PAL	<input type="radio"/> BB	This setting outputs a so-called 'Slow-PAL' composite video sync reference signal.	<input type="radio"/> PAL	<input type="radio"/> BB	This setting outputs a NTSC color bar video reference signal with 29.97fps.
<input checked="" type="radio"/> PAL SL	<input checked="" type="radio"/> COMP				
<input type="radio"/> NTSC	<input checked="" type="radio"/> CB				
<input type="radio"/> NTSC BW	<input type="radio"/> -0.1%				
SD VIDEO	SD FORMAT		SD VIDEO	SD FORMAT	
<input type="radio"/> PAL	<input type="radio"/> BB	This setting outputs a so-called 'Slow-PAL' color bar video reference signal.	<input type="radio"/> PAL	<input type="radio"/> BB	This special setting outputs a NTSC composite sync video reference signal (black + white).
<input checked="" type="radio"/> PAL SL	<input type="radio"/> COMP				
<input type="radio"/> NTSC	<input checked="" type="radio"/> CB				
<input type="radio"/> NTSC BW	<input type="radio"/> -0.1%				
SD VIDEO	SD FORMAT		SD VIDEO	SD FORMAT	
<input type="radio"/> PAL	<input checked="" type="radio"/> BB	This setting outputs a so-called 'Slow-PAL' Black + Burst video sync reference signal pulled down with 0.1%.	<input type="radio"/> PAL	<input type="radio"/> BB	
<input checked="" type="radio"/> PAL SL	<input type="radio"/> COMP				
<input type="radio"/> NTSC	<input type="radio"/> CB				
<input type="radio"/> NTSC BW	<input checked="" type="radio"/> -0.1%				
SD VIDEO	SD FORMAT		SD VIDEO	SD FORMAT	

OPERATION

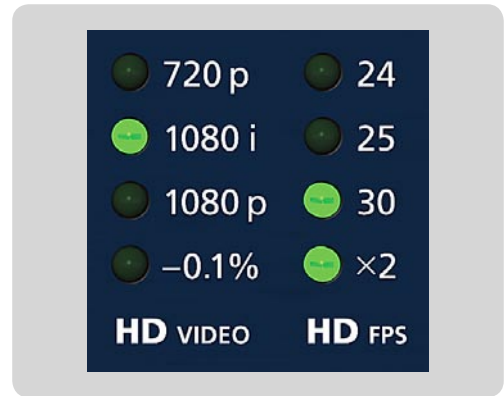
HD VIDEO + HD fps

This menu enables you to set the internal HD tri-level (HD) video sync reference generator to different standards. It is a multifunctional menu which means, the two LED rows 'HD VIDEO' and 'HD FPS' indicate together the different possible settings. The selected video standard is transferred to both HD video sync outputs at the rear.

The names of the LEDs in this menu:

- 720p: 720 lines, progressive
- 1080 i: 1080 lines, interlaced + progressive segmented frame
- 1080 p: 1080 lines, progressive
- 0.1%: Pull down for all HD tri-level standards with 0.1%
- 24: 24fps rate
- 25: 25fps rate
- 30: 30fps rate
- x2: Doubling of the previously mentioned frame rates

You can choose the different functions within this menu by pressing the SELECT key repeatedly. The factory default is set to 720p/24fps, 0.1%.



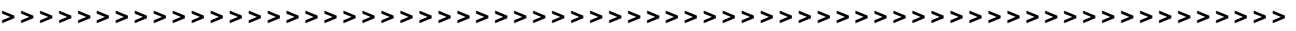
HD VIDEO + HD FPS

- | | | | |
|---|---|---|--|
| <input checked="" type="radio"/> 720p <input type="radio"/> 24
<input type="radio"/> 1080i <input type="radio"/> 25
<input type="radio"/> 1080p <input type="radio"/> 30
<input type="radio"/> -0.1% <input type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 720 lines progressive HD tri-level reference signal with 23.98fps. | <input type="radio"/> 720p <input checked="" type="radio"/> 24
<input type="radio"/> 1080i <input type="radio"/> 25
<input type="radio"/> 1080p <input type="radio"/> 30
<input type="radio"/> -0.1% <input checked="" type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 1080 lines progressive segmented frame (PsF) HD tri-level reference signal with 23.98fps. |
| <input checked="" type="radio"/> 720p <input type="radio"/> 24
<input type="radio"/> 1080i <input type="radio"/> 25
<input type="radio"/> 1080p <input type="radio"/> 30
<input type="radio"/> -0.1% <input type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 720 lines progressive HD tri-level reference signal with 24fps. | <input type="radio"/> 720p <input checked="" type="radio"/> 24
<input type="radio"/> 1080i <input type="radio"/> 25
<input type="radio"/> 1080p <input type="radio"/> 30
<input type="radio"/> -0.1% <input checked="" type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 1080 lines progressive segmented frame (PsF) HD tri-level reference signal with 24fps. |
| <input checked="" type="radio"/> 720p <input type="radio"/> 24
<input type="radio"/> 1080i <input checked="" type="radio"/> 25
<input type="radio"/> 1080p <input type="radio"/> 30
<input type="radio"/> -0.1% <input type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 720 lines progressive HD tri-level reference signal with 25fps. | <input type="radio"/> 720p <input type="radio"/> 24
<input checked="" type="radio"/> 1080i <input checked="" type="radio"/> 25
<input type="radio"/> 1080p <input type="radio"/> 30
<input type="radio"/> -0.1% <input checked="" type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 1080 lines interlace HD tri-level reference signal with 50fps. |
| <input checked="" type="radio"/> 720p <input type="radio"/> 24
<input type="radio"/> 1080i <input type="radio"/> 25
<input type="radio"/> 1080p <input checked="" type="radio"/> 30
<input type="radio"/> -0.1% <input type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 720 lines progressive HD tri-level reference signal with 29.97fps. | <input type="radio"/> 720p <input type="radio"/> 24
<input checked="" type="radio"/> 1080i <input type="radio"/> 25
<input type="radio"/> 1080p <input checked="" type="radio"/> 30
<input type="radio"/> -0.1% <input checked="" type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 1080 lines interlace HD tri-level reference signal with 59.94fps. |
| <input checked="" type="radio"/> 720p <input type="radio"/> 24
<input type="radio"/> 1080i <input type="radio"/> 25
<input type="radio"/> 1080p <input checked="" type="radio"/> 30
<input type="radio"/> -0.1% <input type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 720 lines progressive HD tri-level reference signal with 30fps. | <input type="radio"/> 720p <input type="radio"/> 24
<input checked="" type="radio"/> 1080i <input type="radio"/> 25
<input type="radio"/> 1080p <input checked="" type="radio"/> 30
<input type="radio"/> -0.1% <input checked="" type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 1080 lines interlace HD tri-level reference signal with 60fps. |
| <input checked="" type="radio"/> 720p <input type="radio"/> 24
<input type="radio"/> 1080i <input checked="" type="radio"/> 25
<input type="radio"/> 1080p <input type="radio"/> 30
<input type="radio"/> -0.1% <input checked="" type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 720 lines progressive HD tri-level reference signal with 50fps. | <input type="radio"/> 720p <input checked="" type="radio"/> 24
<input type="radio"/> 1080i <input type="radio"/> 25
<input checked="" type="radio"/> 1080p <input type="radio"/> 30
<input type="radio"/> -0.1% <input type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 1080 lines progressive HD tri-level reference signal with 23.98fps. |
| <input checked="" type="radio"/> 720p <input type="radio"/> 24
<input type="radio"/> 1080i <input type="radio"/> 25
<input type="radio"/> 1080p <input checked="" type="radio"/> 30
<input type="radio"/> -0.1% <input checked="" type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 720 lines progressive HD tri-level reference signal with 59.94fps. | <input type="radio"/> 720p <input checked="" type="radio"/> 24
<input type="radio"/> 1080i <input type="radio"/> 25
<input checked="" type="radio"/> 1080p <input type="radio"/> 30
<input type="radio"/> -0.1% <input type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 1080 lines progressive HD tri-level reference signal with 24fps. |
| <input checked="" type="radio"/> 720p <input type="radio"/> 24
<input type="radio"/> 1080i <input type="radio"/> 25
<input type="radio"/> 1080p <input checked="" type="radio"/> 30
<input type="radio"/> -0.1% <input checked="" type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 720 lines progressive HD tri-level reference signal with 60fps. | <input type="radio"/> 720p <input type="radio"/> 24
<input type="radio"/> 1080i <input checked="" type="radio"/> 25
<input checked="" type="radio"/> 1080p <input type="radio"/> 30
<input type="radio"/> -0.1% <input type="radio"/> x2
HD VIDEO HD FPS | This setting outputs a 1080 lines progressive HD tri-level reference signal with 25fps. |

! Generally, there is no difference between the standards 1080i and 1080PsF when using them for sync signals only. The progressive frame is divided into two segments. These segments are comparable to interlaced fields, but there is no motion between the two fields which make the video frame.

! When using one of the two progressive segmented frame formats, it is not possible to generate and output HD tri-level test patterns.

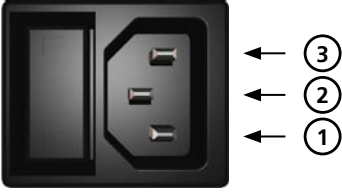
! During switch-over of the HD video standards or frame rates, a short interruption in all output signals occurs for maintaining correct phase relations at the outputs.



APPENDIX

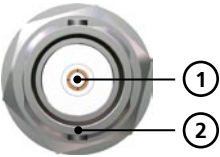
Pin Assignment of the Connectors

Mains



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

SD/HD Video BNC Output



- 1 Signal
- 2 Ground



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