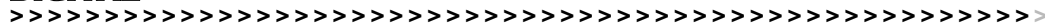


SMART MERGE

8-CHANNEL DIGITAL LINE MIXER
AND ROUTING MATRIX



SMART
DIGITAL



WWW.MUTECH-NET.DE

SAFETY INSTRUCTIONS

General safety instructions

Do not remove the cover or back. No user serviceable parts inside; refer servicing to qualified personnel. 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. 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.

The unit has been designed for operation in a standard household environment. Before you attempt to operate the unit, please make sure that your local voltage matches the voltage required by the unit! The fuse holder can be found on the rear of the unit, just below the compartment marked "230 V (115 V)". Use the fuse holder to adjust the required mains voltage.

Ex factory, the unit is equipped with a 230-V mains fuse. If the unit needs to be adjusted to 115 V, the fuse must be replaced as described in the appendix, section "Replacing the mains fuse".

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!

The mains socket wiring is described in the appendix, section "Wiring of connectors".

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 outputs are connected with high-quality and good shielded cables.



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.

Continent	Mains voltage (V) and frequency (Hz)	Mains fuse
Europa	220V - 230V, 50Hz	230V
USA & Canada	115V, 60Hz	115V
Australien	240V, 50Hz	230V

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 30 days. 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

- To be protected by this warranty, the buyer must complete and return the warranty registration card to MUTECH GmbH within four (4) weeks of the date of purchase. Failure to return the card in due time (date as per postmark) will void any extended warranty claims.
- The serial number indicated on both the returned product and warranty registration card must be identical, otherwise the product will be returned freight collect to the consignor.
- The product/warranty registration card must be accompanied by a copy of the original invoice issued by the MUTECH specialized dealer or distributor.
- The product must be returned in its original shipping carton or a packaging of similar design and quality. MUTECH GmbH assumes no liability for any damage to or loss of the product during transit.

§4 Limitation of warranty

Damages caused by the following conditions are not covered by this warranty:

- Damage caused by normal wear and tear (e.g. potentiometers, faders, switches, connecting elements, printed labels, cover glasses 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, 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 unauthorized personnel will void the warranty. Always ensure proper ventilation of the product. When installing the product in a rack, leave one unit of rack space free both above and below the unit for ventilation!

§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. In case of a functional failure please contact:

MUTECH Gesellschaft für Systementwicklung und Komponentenvertrieb mbH

Siekeweg 6/8 • 12309 Berlin • Fon 030-746880-0 • Fax 030-746880-99 • tecsupport@mutec-net.de • www.mutec-net.de

MUTECH GMBH ASSUMES NO LIABILITY FOR ANY INCORRECT INFORMATION GIVEN IN THIS MANUAL. PLEASE NOTE THAT ALL SOFTWARE/HARDWARE PRODUCT NAMES ARE REGISTERED TRADEMARKS OF THEIR RESPECTIVE OWNERS. NO PART OF THIS MANUAL MAY BE REPRODUCED, COPIED OR CONVERTED TO A MACHINE-READABLE FORM OR ELECTRONICAL MEDIA WITHOUT A WRITTEN PERMISSION OF MUTECH GMBH. WE RESERVE THE RIGHT TO CHANGE OR IMPROVE OUR PRODUCTS WITHOUT NOTICE. © MUTECH GMBH 2000

■ CONTENT

■ INTRODUCTION

Features	5
Functional description	5
Functional principle	5
Applications.	5

■ CONTROL ELEMENTS AND CONNECTIONS

SMART MERGE front panel	6
SMART MERGE rear panel	6

■ INSTALLATION

Setting up.	8
Wiring the digital audio inputs	8
Wiring the Word Clock interfaces	8

■ OPERATION

Connecting the devices	9
Synchronization	9
The first mix	9
Monitor function	10
Signal output	10

■ SET-UP EXAMPLE

Set-up example.	11
-------------------------	----

■ APPENDIX

Pin assignment of the connectors	12
Replacing the mains fuse	12
Technical data.	13



CONTROL ELEMENTS AND CONNECTIONS

SMART MERGE front panel



1 POWER

This red LED lights up when the device is turned on using the main switch at the rear (POWER) and the country-specific mains voltage is supplied.

2 INPUT STATUS

These four red LEDs indicate the signal status for the respective digital input.

3 LOCK STATUS

These two blue LEDs indicate the lock status of the complete unit in relation to a reference clock source.

4 SINGLE / MASTER

With this switch, the two playback functions of the master output can be switched over.

5 MONITOR

These five green LEDs indicate which of the inputs is currently routed to the monitor output.

6 SELECT

With this button, each input and the master output may be routed to the monitor output for pre-listening.

7 VOLUME

With this dial, the output volume for the monitor output can be individually regulated.

8 MONITOR OUT

This is the monitor output used for connecting headphones (stereo phone jack, Ø 6,3mm).

SMART MERGE rear panel



1 AES/EBU IN

This input interface receives a balanced, digital audio or empty frame signal in AES/EBU format, electrically based on the specifications of the AES 3-1992 standard (R1997). The input impedance is 110Ω (XLR connector, female).

Consult the »Wiring the Connections« section of the appendix for more information on the wiring of all connections.

CONTROL ELEMENTS

2 S/PDIF COAX IN

These four input interfaces receive an unbalanced, digital audio or empty frame signal in coaxial S/PDIF format, electrically based on the specifications of the IEC 60958 standard (cinch connector). The input impedance is 75 Ω .

3 S/PDIF OPT IN

This input interface receives a digital audio signal in S/PDIF format, optically based on the specifications of the IEC 60958 standard (Toshiba Toslink™ connector, EIAJ standard).

4 AES/EBU OUT

This interface transmits the mix signal in balanced, digital AES/EBU format, electrically based on the specifications of the AES 3-1992 standard (R1997). The output impedance is 110 Ω (XLR connector, male).

5 WORD CLOCK IN / OUT

This input receives a Word Clock or Word Clock x 256 clock signal (known as Super Clock for ProTools™ systems) to synchronize the SMART MERGE.

6 230V (115V)

The mains voltage fuses are located behind this shutter. These must be inserted properly according to the voltage of the country in which the unit is to be used! Please consult the safety tips, particularly the section entitled »Initial Operation« as well as the section »Changing the Mains Voltage Fuses« found in the appendix.

7 SWITCH

This is the main on/off switch for turning on the power supply to the unit. The main on/off switch should only be set to its ON position after complete and professional wiring of the unit. In particular, ensure that the enclosed power cord is properly connected and that the correct voltage for the country has been selected (it may be necessary to change the mains voltage fuse). Please consult the safety tips for more information.

8 MAINS INPUT

Connect the enclosed power cord here. Before plugging the cable into the mains input and wall outlet, ensure that the main on/off switch is turned off and that the correct fuse, according to the country-specific voltage, is inserted.

INSTALLATION

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!

Keep cable lengths as short as possible to minimize loss and possible interference from other devices!

Optical cables, specially tested for the transmission of S/PDIF and ADAT™ signals, are available in various lengths from your MUTECH dealer!

It is imperative to ensure that the output resistance of the Word Clock cable used is 75 Ω, according to specifications! Using cables with a different specific resistance can lead to a drastic deterioration of the signal quality! This would also jeopardize the perfect synchronization of the devices connected to it.

You should generally avoid »daisy chaining« Word Clock lines using passive BNC T connectors for reasons of signal quality or resulting loss of levels. Should such routing prove to be unavoidable, no more than three devices should be routed or connected to one Word Clock output.

Setting up

The device should be placed as close as possible to the devices to which it will be connected in order to reduce the amount of cable needed. To avoid damaging the device chassis and the set-up area, stick the enclosed rubber feet (4x) evenly to the underside of the device. When installing the unit in a rack, the rubber feet should not be used for reasons of space!

For installation in 19" racks a corresponding rack-mount kit, MW-01/19, is an optional extra (order no. 8020-005). In this case ensure that the unit is placed in the rack in such a way that one height unit is kept free, or equipped with panels, both above and below the chassis body to allow for proper air circulation!

Wiring the digital audio inputs

Before using the unit, the interfaces of all units used in the set-up must be appropriately stacked and connected according to the right format. The four coaxial S/PDIF inputs should be connected with electric, unbalanced cables using cinch connectors. According to specifications, the specific resistance of the cable must be 75Ω.

The optical S/PDIF input should be connected using optical cables in compliance with Toshiba's TOSLINK™ standard. The cables used may be made of plastic or glass fiber. In the case of plastic fiber, do not use any more than ten meters for reasons of transmission safety. Glass fibers, on the other hand, can easily transfer data across much greater distances. The AES/EBU interface should be connected with electric, balanced cables using XLR connectors. According to specifications, the specific resistance of the cable must be 110Ω.

Wiring the Word Clock interfaces

Electric, unbalanced cables with BNC connectors are used to transmit Word Clock signals. Typically, the corresponding cable qualities are labeled »RG-59U or RG-59B/U«.

Do not use cables labeled »RG-58U«!

The SMART MERGE Word Clock input is internally terminated with 75Ω, according to specifications. This termination must be disabled if the connected Word Clock cable is to be daisy-chained to other devices as only the last device in a chain may be terminated. Proceed as described in the appendix under »Disabling the termination«.

If the SMART MERGE Word Clock output is used to synchronize other devices, ensure that the Word Clock inputs of the connected devices are properly terminated, except in the case of a daisy chain. On most devices, the termination of the Word Clock inputs may be activated or interrupted using a so-called »termination switch«. This switch can be found on the outside or inside of the device in question.

In the case of devices that do not feature a termination of the Word Clock input, e.g. RME Hammerfall with Word Clock i/o or Alesis BRC, it is possible to terminate the connection with an additional BNC-T connector. Using its middle connector, plug the T connector into the input of the receiving device. The cable carrying the clock signal is then connected to one of the side connectors and a 75Ω resistance is connected to the other side of the BNC-T connector, acting as a BNC terminal connector.

OPERATION

Thanks to its clear structure and fully automatic functioning, operating the SMART MERGE is incredibly easy.

Connecting the devices

When selecting which of the SMART MERGE digital audio inputs to use to connect the devices please note that there are two interfaces available for each of inputs 1 + 2. Input 1 enables the connection of a S/PDIF or AES/EBU signal source whereby switching between the two connections is automatic. The priority here is the AES/EBU input. The presence of a valid AES/EBU signal precludes reception of any other signal at the S/PDIF input. If the AES/EBU input is not connected, the S/PDIF input is automatically enabled. Input 2 enables the connection of a coaxial or an optical S/PDIF signal source. The optical S/PDIF input has priority here and switching between interfaces also occurs automatically, as previously described.

If the inputs receive usable digital audio signals, this is indicated via the LEDs labeled INPUT 1+4 on the front panel (see figure opposite). If the LED corresponding to the input is not constantly illuminated, a faulty incoming signal may be the cause. This could then lead to disruption of the AES/EBU master signal!

Synchronization

The SMART MERGE does not have its own clock reference. The device must thus be externally synchronized. This can be done by supplying a Word Clock or Word Clock x 256 signal (known as Super Clock for ProTools™ systems). If there is no available Word Clock signal, the first digital audio input automatically serves as clock reference for the SMART MERGE. The device cannot function if there is no Word Clock signal supplied and, at the same time, the first digital audio input is not connected with a usable signal!

Should a clock signal be present at the Word Clock input and at the same time a usable audio signal present at the first digital audio input, the Word Clock signal always has first priority! Accordingly, the AES/EBU master signal is output synchronously to the incoming Word Clock signal.

A usable Word Clock signal at the Word Clock input is indicated by the blue LED LOCK WCLK on the front panel (see figure opposite). If no Word Clock signal is connected and the first audio input is therefore serving as the clock reference, the blue LED LOCK INPUT 1 will light up on the front panel. If the LOCK LED connected to the clock source does not stay lit, continuous transmission at the AES/EBU master output is not possible!

As the SMART MERGE is completely equipped on the input side with sampling rate converters, incoming digital audio signals may be asynchronous. The AES/EBU master signal is thus output synchronously to the respective reference clock signal - regardless of the clock rate of the incoming signal!

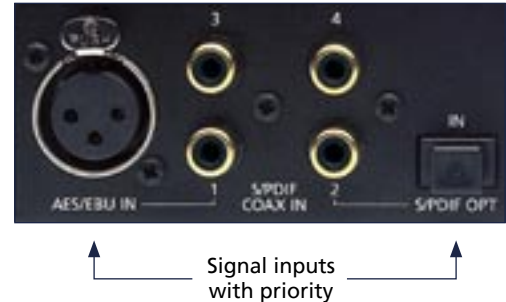
Thus, in addition to its actual function as a digital mixer, SMART MERGE enables the integration of non-synchronizable devices in a clock synchronous studio environment, functioning both as a multi-channel sampling rate converter and a format converter.

The first mix

Before listening to the first mix signal, the SINGLE / MASTER switch (see figure opposite) should be set to MASTER in order to make the complete mix signal available at the AES/EBU master output.

If the signal sources to be mixed as well as a reference clock signal necessary for synchronization are connected and if the front LEDs indicate the usability of all signals, SMART MERGE begins the mixing process automatically – no further settings are necessary!

Signal Inputs



When connecting the SMART MERGE always ensure that the first digital audio input is given priority! When no Word Clock signal is available, the signal present on the first digital audio input serves as clock reference for the device.

Input- + Lock-Status-LEDs



Monitor-Status-LEDs



Monitor function

In addition to individual listening, the monitor function integrated in the SMART MERGE also enables the patching of the individual input signals on the AES/EBU master output. Both of these functions are selected using the SINGLE / MASTER switch.

If the SINGLE / MASTER switch is set to MASTER, as recommended under »The first mix«, the internally generated mix signal is continually output through the AES/EBU master output. Meanwhile, it is possible to individually route each of the input signals (INPUT 1-4) to the monitor or headphones output using the SELECT button. Once the MASTER OUT position has been reached, the mix signal is also routed to the monitor output. The volume of this output can be adjusted using the adjacent VOLUME dial. This does not affect the level of the AES/EBU master output!

When the SINGLE / MASTER switch is set to SINGLE, the internally generated mix signal is *not* output constantly through the AES/EBU master output as is the case with the MASTER function. Just as with the monitor output, each input signal is isolated and routed to the AES/EBU master output. This allows the connected units to be selectively routed to the master output. When set to the MASTER OUT position, the mix signal is available at the master output as usual.

It is possible to change the type of function while the device is running.

Signal output

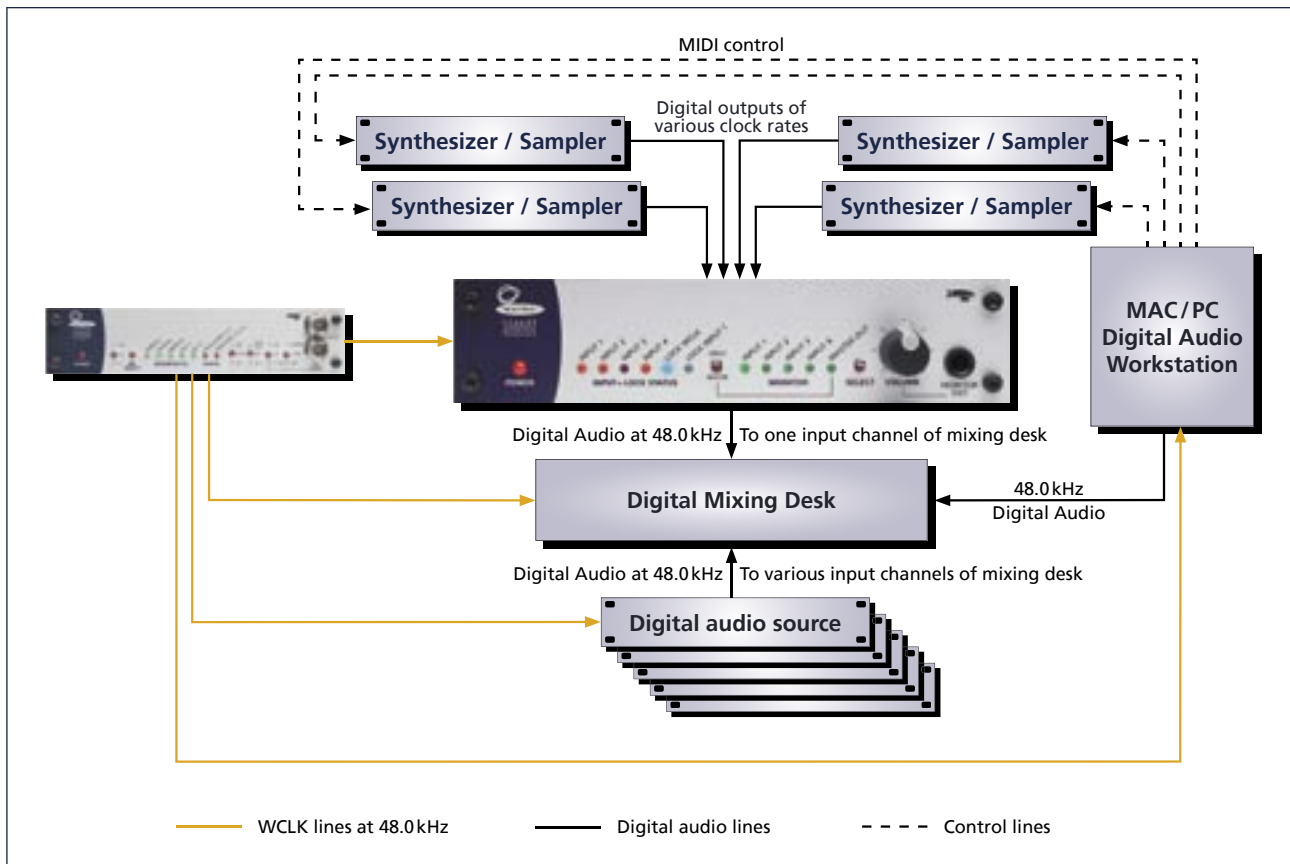
Mix signals or single input signals are reproduced via the AES/EBU master output with a maximum level of –0.5dBfs – regardless of the single or master level of the incoming signals.

The signal output is generally aligned to the AES/EBU3-1992 (R1997) format. This means that the S/PDIF input signals will be converted to the AES/EBU format as a standard. SMART MERGE does not only an electrical conversion, but also a »real« format conversion from S/PDIF to AES/EBU!

SET-UP EXAMPLE

SET-UP EXAMPLE

This diagram shows SMART MERGE as a digital submixer for various musical instruments.



The digital outputs of the synthesizers and samplers are working with different clock rates. These get synchronized through the inputs of SMART MERGE. A separate Word Clock generator, here MUTEK's SMART CLOCK av, is synchronizing the SMART MERGE which feeds in his mix signal into the mixing desk. Thus the asynchronous output signals of the musical instruments are integrated into the synchronous studio set-up. Moreover only one input at the mixing desk is used for all instruments.

[illegible]



WWW.MITEC-NET.DE