



OPERATIONS MANUAL

b40 series

b40
b41
b42
b43
b44
b45

4ch SDI audio converter/router

b44



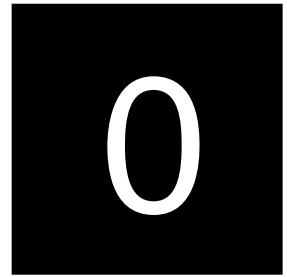
release 1.0

jünger audio

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FOREWORD



Thank you for buying and for using the SDI audio converter / router B44.

Not only you have acquired the latest generation of digital dynamic range processing, but also a piece of equipment which is unique in its design and specification.

Please read this manual carefully to ensure you have all the information you need to use the SDI audio converter / router B44

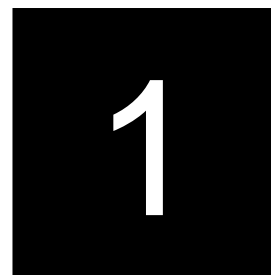
The unit was manufactured to the highest industrial standards and went through extensive quality control checks before it was supplied.

If you have any comments or questions about installing, setting-up or using the b44, please do not hesitate to contact us.

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FUNCTION DESCRIPTION

2

B44 is a powerful and flexible audio converter and router combination. It combines a high quality 4channel A/D- and D/A-converter with a flexible routing matrix. Together with the optional SDI interface any kind of audio conversion between analog, digital and embedded audio is possible.

Any demands regarding sampling rate and word length are to manage using integrated SRC and dither module.

The combination of the converter box b44 together with the other toolboxes from b40 series spreads the use of their advanced digital signal processing also for analog systems. Equipped with the SDI interface b44 is a versatile crosspoint for analog and digital audio signals in todays and tomorrows video production environment.

features

- user friendly and fast recall of routing configurations by using presets
- sophisticated 24 bit ADC and DAC for four channels (44.1 and 48 kHz)
- dithered digital output (24, 20 or 16 bit)
- serial (RS-422) and parallel (GPI) remote capability for switching of presets
- optional: embedded audio processing via SDI-interface incl. group changing, channel selective audio replacement and relais bypass!

In digital video recording technology four digital audio channels are the standard configuration. This channel capacity is used increasingly in production and post-production for surround sound, providing mix options and for multi-lingual productions.

Quite often it is necessary to make corrections or changes to the audio which until now required the use of an expensive digital audio mixer. These tasks can now be easily solved with the Jünger Audio range of digital audio toolboxes. Simple processing for up to four digital audio signals may be carried out quickly and efficiently.

Using the SDI versions (SDI=Serial Digital Interface, digital component video format with 270Mb/s transmission) b40 series can process embedded audio.

The standard allows up to four groups each of four mono audio channels. Usually used by most of D-VTR's and other equipment is Group 1 with 48 kHz synchronous sampling. Synchronous means that the audio clock is genlocked to the associated video. Each channel can have up to 20 bits of resolution per audio sample.

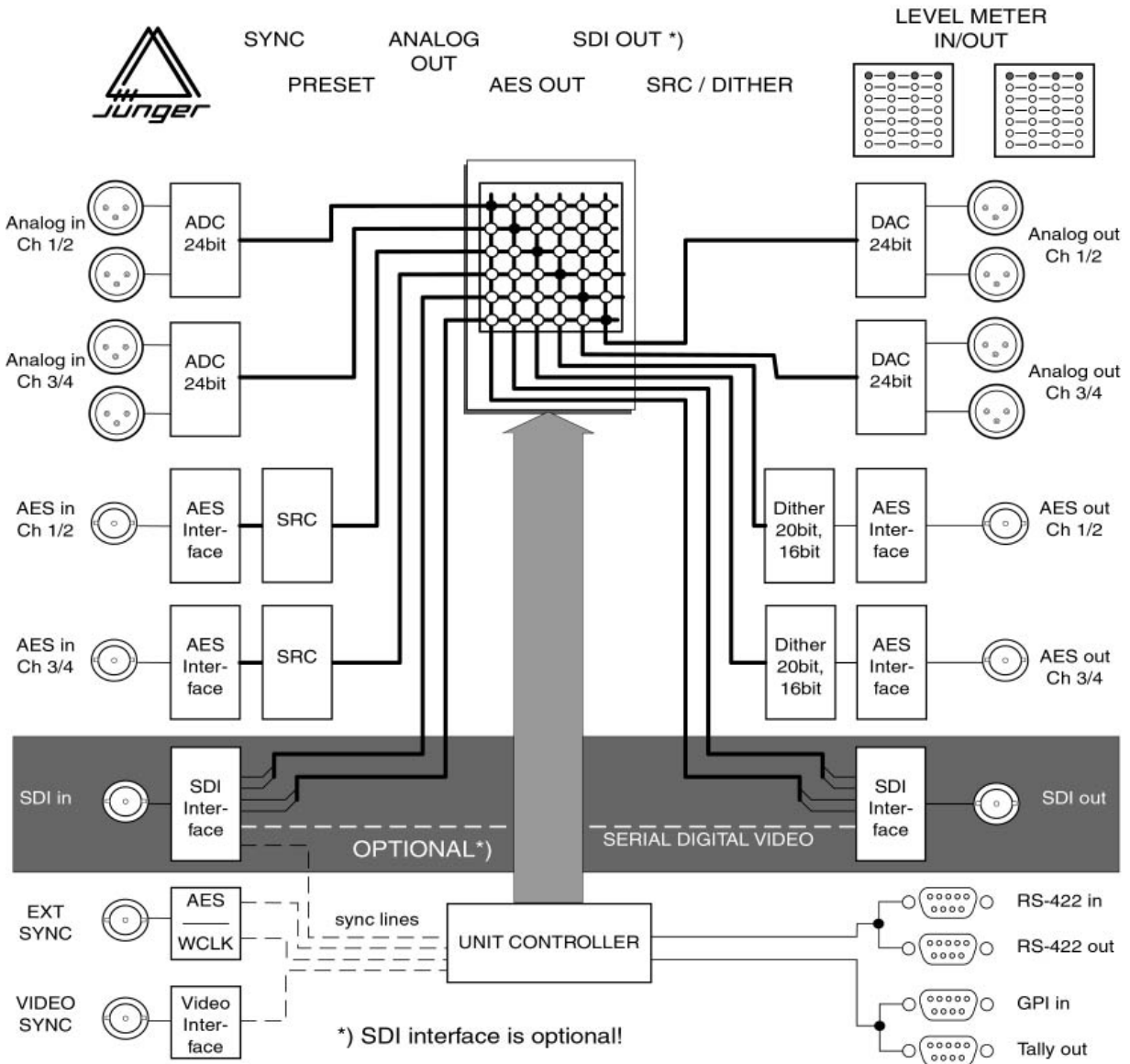
The 4-channel processors of b40 series fitted with SDI-interface are compatibel with the standard SMPTE 272M-AB. They support 48 kHz synchronous audio sampling with 20 bit word length. Group selection is possible (see 4.5). The input for the digital audio processing can be selected between AES/EBU or SDI (serial digital video with embedded audio). The processed signals are always at both outputs present - AES/EBU and SDI.

2.1 BASIC DESCRIPTION

2.2 B40SERIES WITH SDI INTERFACE

2. FUNCTION DESCRIPTION

2.3 BLOCK DIAGRAM



INSTALLATION



The SDI converter/router b44 was carefully packed in the factory and the packaging was designed to protect the equipment from rough handling. Please examine carefully the packaging and its contents for any signs of physical damage, which may have occurred in transit.

The SDI converter/router b44 is a device under the safety category *Schutzklasse 1* in keeping with the VDE 0804 standards and may only be used with power supply installations built according to regulations. Check the voltage details printed at the rear panel are the same as your local mains electricity supply.

The SDI converter/router b44 is equipped with standard connectors (see also chapter 3). Before connecting the SDI converter/router b44 switch the power off at all connected units.

The SDI converter/router b44 is made as standard 19" unit (EIA format). It occupies 1 RU (44 mm height) space in a rack. Please allow at least additional 3" depth for the connectors on the rear panel. When installing the unit in a 19" rack the rear side of the unit needs some support, especially for mounting in flight cases.

The SDI converter/router b44 should not be installed near units which produce strong magnetic fields or extreme heat. Do not install the filter processor directly above or below power amplifiers. If, during operation, the sound is interrupted or displays no longer illuminate, or if abnormal odor or smoke is detected immediately disconnect the power cord plug and contact your dealer or Jünger Audio.

The SDI converter/router b44 has a digital signal outputs. To the problem-free combination of following digital devices, the digital signal processing can be locked to an external clock reference. The selection of the corresponding input is made with the SYNC switch in the MODE section. If the chosen sync input is connected with the sync signal, this signal is used for synchronization automatically. Otherwise the unit is locking to internal 48 kHz. The digital output signal can be clocked with the following clock frequencies:

3.1 UNPACK THE UNIT

3.2 POWER SUPPLY

3.3 CONNECTIONS

3.4 RACK MOUNTING

3.5 OPERATION SAFETY

3.6 SYNCHRONIZATION OF DIGITAL OUTPUT

3. INSTALLATION

- SDI VIDEO** locks with the clock at the SDI input
(internal 48 kHz)
- VIDEO** locks with the clock at the Video sync input
(internal 48 kHz)
- WCLK** locks with the clock frequency at the
external sync input (WCLK, 44.1/48 kHz)
- AES** locks with the clock frequency at the
external sync input (AES/EBU, 44.1/48 kHz)

Note: SDI sync is available only if SDI input is fitted in the box!

3.7 AUDIO CONNECTIONS

The B44 audio inputs are RFI filtered and with the outputs electronically balanced and floating. All the audio connectors are via rear panel mounted connectors. Standard XLR connectors are used. These are allways wired to the AES standard:

pin 1	X	Screenscreen
pin 2	L	Live audio 0°
pin 3	R	Return audio 180°.

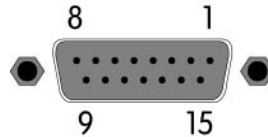
Balanced connections are to be preferred whenever the other equipment provides balanced inputs/outputs. All line level connections should be wired with twin screened cable for low noise and reliability. The screens of the cable should be connected at one end only. Input cable screening therefore needs to be derived from the signal source end as pin 1 is ground lifted at low frequencies for the inputs.

If the equipment driving the B44 has unbalanced outputs then you will need to add a wire jumper such that the screen connection of Pin 1 of the XLR is shorted to Pin 3.

If the equipment being connected to the mpx01 have only unbalanced inputs, then we recommend still to use a balanced (ie. 2 core shielded cable) cable where Pin 1 and Pin 3 are connected in the cable ends away from the B44.

The SDI converter/router b44 can be remote-controlled by means of parallel GPI contacts. The other way b44 can send signals of specific device statuses via parallel Tally lines.

use: remote-controlled changeover of presets and more
connector: D-SUB 15pin, female



pinout
 GPI in

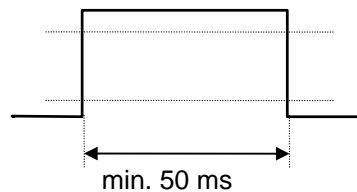
Pin	Signal name	Logic	I/O
1	GPI1+	L/H	I
2	GPI2+	L/H	I
3	GPI3+	L/H	I
4	GPI4+	L/H	I
5	GPI5+	L/H	I
6	GPI6+	L/H	I
7	GPI7+	L/H	I
8	test		
9	GPI1-	L/H	I
10	GPI2-	L/H	I
11	GPI3-	L/H	I
12	GPI4-	L/H	I
13	GPI5-	L/H	I
14	GPI6-	L/H	I
15	GPI7-	L/H	I

TALLY out

Pin	Signal name	alternativ
1	T1, root	
2	T2, root	
3	T3, root	
4	T4, root	
5	T5, root	
6	T6, root	
7	T7/T8, root	
8	T1, open contact	
9	T2, open contact	
10	T3, open contact	
11	T4, open contact	
12	T5, open contact	
13	T6, open contact	
14	T7, open contact	
15	T8, open contact	

Electrical specification:

GPI input On: connection to +3V..+24V
 Off: GND



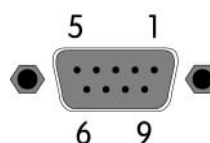
Tally output type: normally open relais contacts
 Contact rating: 1A 24 VDC, 0,5 A 125 VAC
 max. 30 W 62,5 VA
 max. 60 VDC, 125 VAC

The SDI converter/router b44 can be remote-controlled by means of serial remote RS-232/RS-422.

use: remote-controlled changeover of presets

protocol: available on request

connector: D-SUB 9pin, female



3.8 REMOTE CONTROL

3.8.1 GPI/TALLY REMOTE CONTROL (PARALLEL REMOTE)

3.8.2 SERIAL REMOTE CONTROL (RS-232/RS-422)

3. INSTALLATION

3.8.3 CAN BUS REMOTE CONTROL

Pin assignments

SERIAL

Pin	Signal name	Functions
1	RXD + 422	Receive data RS-422
2	TXD-232	Transmit RS-232
3	RXD-232	Receive RS-232
4	Not used	
5	GND	Ground
6	RXD - 422	Receive data RS-422
7	Not used	
8	TXD - 422	Transmit data RS-422
9	TXD + 422	Transmit data RS-422

Electrical specification:

signal in-/outputs

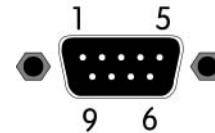
RS-232/RS-422

The SDI converter/router b44 can be remote-controlled by means of serial remote CAN-bus.

use: remote-controlled changeover of presets

protocol: available on request

connector: D-SUB 9pin, male



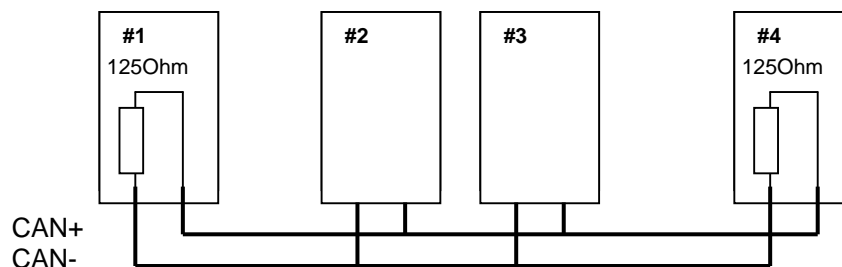
Pin assignments

CAN

Pin	Signal name	Functions
1	Not used	
2	CAN -	CAN low
3	Not used	
4	Not used	
5	GND	GND
6	GND	GND
7	CAN +	CAN high
8	Not used	
9	Not used	

CAN-bus termination

CAN-bus (Controller Area Network) has to be terminated at both ends of the bus chain by 125 Ohms. Therefore termination jumper in the B44 can be used.



LOCATION OF PARTS AND CONTROLS



All control elements gives direct access.

4.1. FRONT PANEL

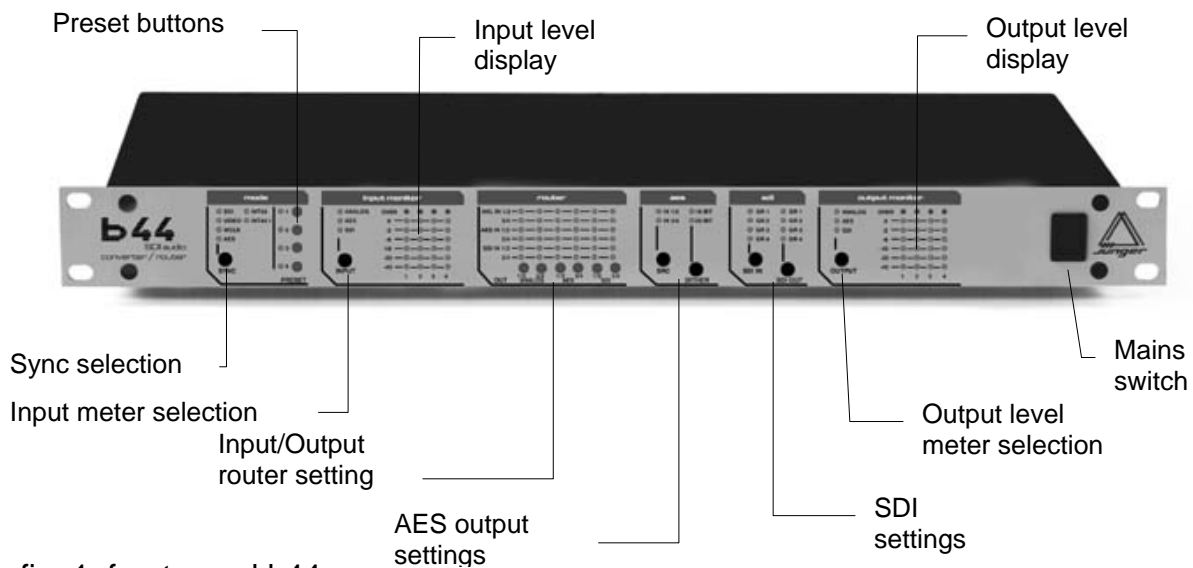


fig. 1: front panel b44

CONTROL ELEMENTS

SYNC	selection of sync input
PRESET 1...4	storage and recall of presets 1...4
INPUT	input meter selection
OUT ANALOG / AES / SDI	output routing related to input
SRC DITHER	sample rate converter for digital input AES dither for digital output AES
SDI IN SDI OUT	group selection SDI input group selection SDI output
OUTPUT	output meter selection

mode

input

router

aes

sdi

output

4. LOCATION OF PARTS AND CONTROLS

4.2. REAR PANEL

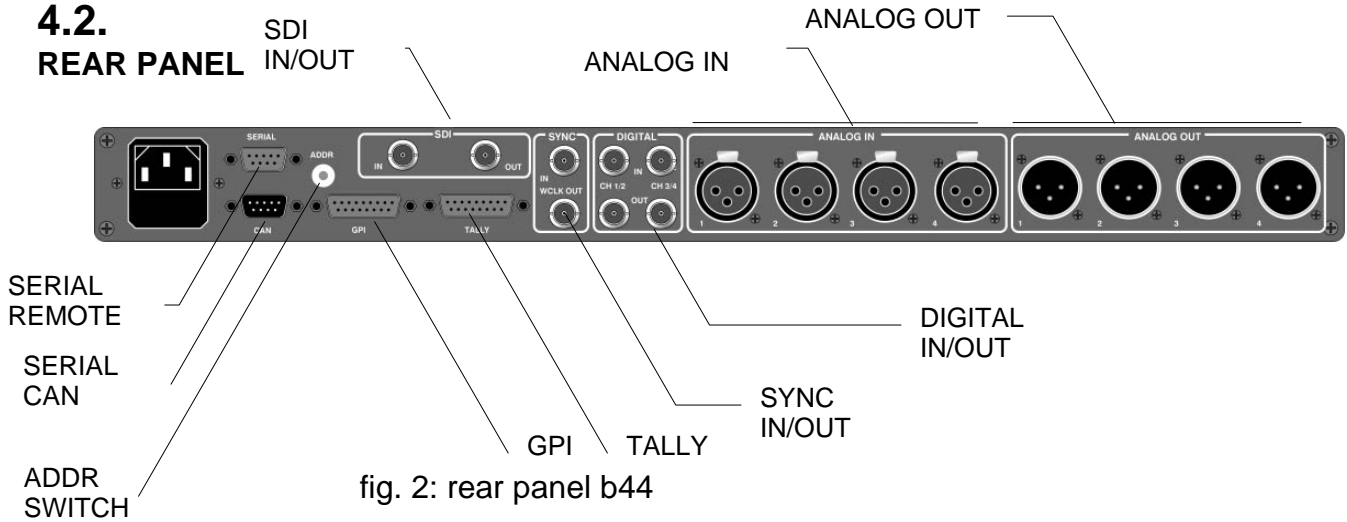


fig. 2: rear panel b44

POWER INPUT

IEC mains input connector 85-265 V, 50 - 60 Hz with integrated fuse

REMOTE

serial remote interface RS-232
connector: 9pin SUB-D, female
serial remote interface CAN
connector: 9pin SUB-D, male
ADDR - for selection of unit address

GPI

parallel remote interface input, TTL-level
connector: 15pin SUB-D, female

TALLY

parallel remote interface output, TTL-level
connector: 15pin SUB-D, female

SYNC

IN input for ext. sync signal (AES/WCLK/VIDEO, unbal)
connector: BNC socket
WCLK OUT output for WCLK
connector: BNC socket

SDI IN / OUT

Input/output for serial digital video (ITU-R BT.601, SMPTE 272M-A)
Format: Video: 270 Mb/s, 525/625 line rate, 75 Ohm,
BNC socket

AES IN/OUT

input for AES/EBU standard format
connector: BNC socket 75 Ohm, unbalanced
output for AES/EBU standard format
connector: BNC socket 75 Ohm, unbalanced, 0.5V pp

ANALOG IN/OUT

Analog input to 24 bit A/D-converter
Input electronically balanced, XLR connector female
Analog output from 24 bit D/A-converter
Output electronically balanced, XLR connector male

Some basic settings are to select by switches on the rear panel or by switches and jumpers at the internal circuit boards of the unit. These settings can occur general changes for operation and should be made by qualified engineering staff only.

Rear panel

ADDR

Selection of the device address for serial remote, 16 device addresses selectable

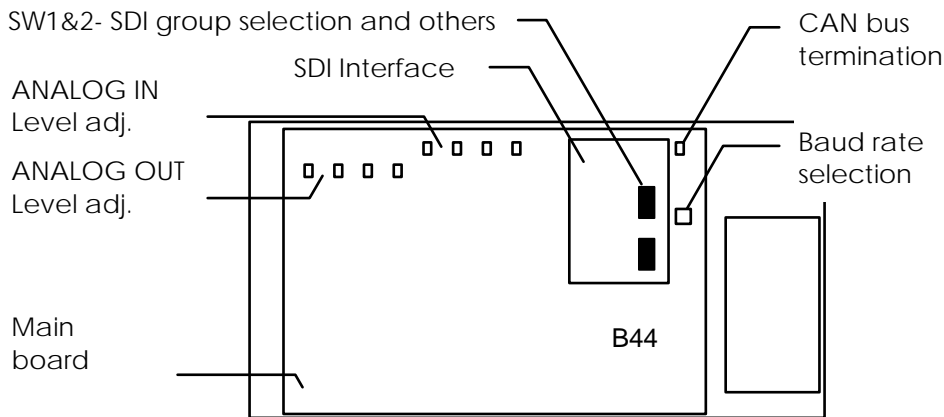
Note: Within a line of remote controlled units every device needs a different address! The selected address is valid after next power-on reset of the unit.

Internal

To set any internal jumper or switches it is necessary to open the unit.

PLEASE DO NOT MAKE ANY ALTERATIONS WITH THE MAINS STILL CONNECTED TO THE UNIT!

Loosen the screws on the top cover and remove. Then you can see all jumper and switches as shown in the drawing below. After setting of jumper or switches reassemble the unit in opposite order.



The 4-channel processors of b40 series fitted with SDI-interface are compatible with the standard SMPTE 272M-AB. They support 48 kHz synchronous audio sampling with 20 bit word length. The standard allows up to four groups each of four mono audio channels. (Usually used by most of D-VTR's and other equipment is Group 1 with 48 kHz synchronous sampling.)

Group selection and other settings are made by the front panel switches. Therefore no switches on the SDI board has to be used.

**4.3
SWITCHES AND
JUMPERS FOR
CONFIGURATION**

**4.4
CONFIGURATION
OF SDI INTERFACE**

OPERATION



The use of the SDI audio converter/router B44 is very easy.

The setup or the programming of the B44 is made by adjustment of various settings.

The description is made related to the functions in the sections.

- 5.1 sync selection
- 5.2 recall and storage of presets
- 5.3 input level display
- 5.4 output routing
- 5.5 digital input AES with SRC
- 5.6 digital output AES with dither
- 5.7 SDI group selection
- 5.8 Output level display

Pushing the SYNC button is changing the sync selection in the following loop:

> SDI > VIDEO > WCLK > AES > internal 44.1 > internal 48 >

If the unit is locking to the sync source the LED of the selected sync input is lighting continuously.

If the unit can't lock to the external sync source the correspondend LED is flashing. The unit automatically works with internal 48 kHz.

All individual settings for all sections can be stored as presets. 4 presets are storable into the unit.

To recall of presets just push the related preset button. As long as the settings of the box are the same as with the preset the related preset LED is lighting.

To store a preset push the related preset button appr. 3 secs continuously. While storing the yellow LED blinks two times.

Note: All former stored preset values are overwritten at the moment of new storage into this preset! Just as after initialization of the unit all presets are overwritten with factory setups.

5.0 DESCRIPTION OF OPERATIONS

5.1 SYNC SELECTION

5.2 RECALL AND STORAGE OF PRESETS

5. OPERATION

5.3 INPUT LEVEL DISPLAY

Pushing the INPUT button changes the input of the input level meter display.

5.4 OUTPUT ROUTING

Pushing the button for one of the six output pairs is changing the connected input pair (selection pairwise). This is shown by the related LED.

One and the same input can be connected to all available outputs at the same time. One output pair can be connected to just one input pair only.

5.5 INPUT AES WITH SRC

Pushing the SRC button is switching the sample rate conversion for the AES inputs ON pairwise:

> OFF > IN $\frac{1}{2}$ > IN $\frac{3}{4}$ > IN $\frac{1}{2}$ and IN $\frac{3}{4}$ > OFF

If the SRC is switched ON the related input is free running. That means any incoming sample rate from 32...52kHz is converted to the sync clock of the box.

5.6 OUTPUT AES WITH DITHER

The digital input signal can have a word length of 24 bit. The information of a 24 bits signal is not more storable linear in most cases. One must shorten 24 bits data word to 20 or 16 bit word length (SDI is capable for 20 bit only!).

Pushing the DITHER button is switching the dither algorithm for the AES outputs:

> OFF > 20bit > 16 bit > OFF >

In order to receive a better sound quality during cut down the data to 20 or 16 bit, one must redither the material. This is done by calculating random numbers (dither signal) and add a random number to every sample. Then it will be cut off to 16 bit. As a result, the bit with least weight (LSB) is put in such a way that it corresponds best to the information of the last bits following available ones no more and makes less distortions as hissing in the signal. Dither is switched off for digital zero signals (auto-blackening).

5.7 SDI GROUP SELECTION

With the SDI IN and the SDI OUT buttons the group selection for the SDI interface can be made. SDI input and output can deembedded and embed with two different groups!

5.8 OUTPUT LEVEL DISPLAY

Pushing the OUTPUT button changes the input of the output level meter display.

TECHNICAL SPECIFICATIONS

sample rate : 44.1/48 kHz
audio data format : 24 bit (AES/EBU), 20 bit (SDI)

DIGITAL IN/OUT

AES/EBU

connector : BNC, 75 Ohm, coaxial
input format : AES professional, AES consumer
output format : same as input format
(only for SDI version)

SDI IN/OUT

connector : BNC, 75 Ohm, coaxial
data rate : 270 Mb/s, 525/625 Line rate
format : serial digital component video 4:2:2
with embedded audio
(ITU-R BT.601, SMPTE 272M-A)

ANALOG IN/OUT

ANALOG IN

Resolution 24bit
sample rate 44.1/48kHz
dynamic range 103dB (RMS)
THD+N <0.002% @ max. input level
frequency response 20Hz...20kHz (FS=48kHz) (+/-0.5dB)
CMRR -80dB @ 50Hz
max. input level +22dBu @ 0dBFS
input impedance 10 kOhm, floating balanced
connector XLR, 1-screen, 2-live, 3-return

ANALOG OUT

Resolution 24bit
sample rate 44.1/48kHz
dynamic range 103dB (RMS)
THD+N <0.002% @ max. input level
frequency response 20Hz...20kHz (FS=48kHz) (+/-0.5dB)
max. output level +22dBu @ 0dBFS
input impedance 30 Ohm, floating balanced
connector XLR, 1-screen, 2-live, 3-return



**digital signal
processing**

**digital
in- / outputs**

**analog
in- / outputs**

6. TECHNICAL SPECIFICATIONS

sync in- / outputs

SYNC IN

WCLK connector : BNC, 1kOhm, coaxial
level : TTL-level
input format : Wordclock
AES/EBU connector : BNC, 75 Ohm, coaxial
level : 0,5 ... 5 Vpp
input format : AES professional, AES consumer
VIDEO connector : BNC, 75 Ohm, coaxial
level : 0...1 Vpp
input format : Blackburst or PAL/NTSC composite video

remote control

REMOTE

serial remote interface RS-232 in/out
level : TTL
connector : 9 pin SUB-D female
serial remote interface CAN
level : 5V CAN
connector : 9 pin SUB-D male
GPI parallel remote
level : opto coupler, 3..24V control voltage
connector : 15 pin SUB-D female
Tally Out
level : relais contact
connector : 15 pin SUB-D female

general

power consumption : appr. 15 VA
dimensions : 19", 1 RU, 250 mm depth
weight : appr. 5 kg
optional : programmable remote control brc4x

WARRANTY AND SERVICE INFORMATION



JÜNGER AUDIO grants a two-year warranty on the

SDI converter router b44

If the unit has to be serviced, please send it, ideally in the original box, to:

JÜNGER AUDIO - Studioteknik GmbH

Justus-von-Liebig-Str. 7

D - 12489 Berlin
GERMANY

Tel.: (*49) -30-677721-0
Fax.: (*49) -30-677721-46



KONFORMITÄTSERKLÄRUNG

DECLARATION OF CONFORMITY

Geräteart : **4ch SDI audio converter/router**
Type of equipment : **4ch SDI audio converter/router**

Produkt / Product : **b44**

Das bezeichnete Produkt stimmt mit den Vorschriften folgender EU-Richtlinie(n) überein:
The aforementioned product complies with the following European Council Directive(s):

89/336/EWG (geändert durch 91/263/EWG und 92/31/EWG)
(changed by 91/263/EEC and 92/31/EEC)
Richtlinie der Rates zur Angleichung der Rechtsvorschriften der Mitgliedsstaaten über die elektromagnetische Verträglichkeit
Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility

73/23/EWG (geändert durch 93/68/EWG)
(changed by 93/68/EEC)
Richtlinie des Rates vom 19. Februar 1973 betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen
Council Directive of February 19th 1973 concerning electrical equipment for operation within certain voltage limits

Zur vollständigen Einhaltung dieser Richtlinie(n) wurden folgende Normen herangezogen:
To fully comply with this(these) Directive(s), the following standards have been used:

EN 55022 : 1987
EN 50082-1 : 1993
EN 60065 : 2002

Dieser Erklärung liegen zugrunde : Prüfbericht(e) des EMV-Prüflabors
Interne Vorschriften zur Sicherheits-Prüfung
This certification is based on : Test report(s) generated by EMC-test laboratory
Internal regulations for safety check

MEB Messelektronik Berlin : Kalibrier- und Prüflabor
accredited EMC laboratory

Aussteller / Holder of certificate : Jünger Audio Studioteknik GmbH
Justus-von-Liebig-Strasse 7
D - 12489 Berlin

Berlin, 18.03.2003
(Ort/Place) (Datum/Date) (Herbert Jünger, Geschäftsführer/Managing Director)



professional audio products

digital dynamics processors d01, d02
accent1, accent2

digital filter processor e07

surround products multichannel digital
dynamics processor ORION
5.1 level controller 206

digital voice processing voice and monitor processor v01
digital voice processor v02
dual channel voice processor v03
digital voice processor v05

digital desktop mixer mix4

transmission signal processing digital transmission processor d07
digital transmission limiter mpx01

4channel processors b40series digital audio toolbox b40
digital audio limiter b41
digital dynamics processor b42
digital audio toolbox b43
SDI audio converter / router b44
digital audio delay b45

digital audio
modular processing system C8000

SDI interface modules SDI20

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