



StudioCube



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SAFETY PRECAUTIONS



Note

Read this user manual completely.

Here you will find all information you need for operating the device.



Note

Any tampering with or modifications on the unit will void the warranty. Use the device only in accordance with the user manual.

Use only accessories specified by the manufacturer.



Mains Connection

The device can be operated on a mains voltage of 100 – 240 VAC / 50-60 Hz. The mains connection is made with an external wall plug transformer (switching power supply) which delivers the operating voltage for the **StudioCube**. Primary mains adaptors, which are optionally available, ensure a worldwide use of the device.

- Use no faulty adaptors or connection lines!
- Disconnect the power supply from mains before opening the unit!



Moisture

To avoid any hazard through fire or an electric shock, this unit must not be exposed to rain or moisture. Spraying water or dripping liquids must not get into the unit, either. Do not place any objects containing liquids such as beverages or vases on the device.

When the device is taken from a cold to a warm place, water condensation may occur inside.

Only connect to mains after the device has warmed up to room temperature.



Mounting

The surface of the device may become hot during operation. Make sure to provide for a sufficient air circulation. Avoid direct sunlight and close proximity to radiators, radiant heaters and similar heat sources.

When mounting the unit into a rack, make sure to provide for a sufficient air flow and do not mount it directly above/under a power amplifier.



Danger through high Listening Levels

With headphones unhealthy volume levels can be achieved.

So before putting on your headphones, always check that the selected volume level is not too high.

For detailed information see page 12.

INTRODUCTION

We thank you for your trust which you have shown us with the purchase of the **StudioCube**. The **StudioCube** has been designed to give the demanding musician a detailed and transparent monitoring experience in the studio or on stage. The perfect combination of high-grade technology and practical features makes the **StudioCube** the perfect partner for your monitoring applications.

Should you have any questions or suggestions concerning the product you're welcome to contact us. And we are always happy to learn about your successful productions.

TECHNOLOGY

The **StudioCube** features a special architecture of discrete components and integrated circuits. The use of high-quality components and its functional design have resulted in a device which together with the entirely balanced layout and the low-artefact gain stages ensures the unequalled sound that **Lehmannaudio** is famous for:

- Exceptional transparency
- Perfect transient reproduction
- Extremely low noise

OUTLINE / FEATURES

The **StudioCube** is a compact headphone amplifier with a flexible signal processing and level control.

The following characteristics complement the practical features of the **StudioCube**:

- Input with Neutrik combo socket
 - Allows variable connection options
- THRU output with balanced Neutrik jack socket
 - Allows to link several **StudioCubes** and to feed them with the same audio signal.
- Source switch for mono signals
 - Channel 1 (Left) is assigned to both headphone signals, irrespective of any other connected devices
- High gain mode
 - Increases the gain by +6 dB for the connection of low-level signal sources
- High input level capability
 - High-level audio signals of up to +22 dBu may not connected with no distortion to the **StudioCube**
- Power supply overload protection
 - Automatic fuse (Poly-Fuse)
- Special accessories
 - Yoke for mounting the **StudioCube** on a microphone stand

INSTALLATION

UNPACKING

After unpacking the **StudioCube** please check the device for potential transport damage. In case of visible damage you must under no circumstances connect the device to mains. Please contact your dealer immediately then.

Scope of Delivery:

- **StudioCube** device
- Wall plug power supply with connection lead
- Country-specific AC primary adaptor
- Configuration jumper
- User manual
- Guarantee card



Note

We recommend you keep the whole packaging material for a dispatch at a subsequent date. Thus you will avoid transport damage.

By no means use “styrofoam chips” or similar packaging material.

During transport the device will “joggle” its way down to the bottom of the box and damage may occur!

If the original packaging is missing, it’s best to use bubble foil in which to wrap the device generously. Then pack the whole issue in a solid cardboard box.

SETUP

Always put the **StudioCube** on a solid base. Alternatively you can mount the unit on a stand or under a table by using the optional yoke.

Its compact size and low weight make the **StudioCube** also very easy to transport.



Note

- Do not expose the device to rain or moisture!
- Do not expose the device to extreme temperatures!
- Do not place the device near strong electric or magnetic fields!
- Avoid using too short connection cables.

CONNECTION

First connect the **StudioCube** via its mains connector (POWER) with the wall plug power supply, then connect the power supply to mains.

The external wide-range switching power supply of the **StudioCube** will adapt automatically to different mains voltages around the world. A travel set with primary adaptors for other countries and mains outlets is optionally available.

Please follow the SAFETY PRECAUTIONS on page 4!

QUICKSTART

Up-and-Running in a hurry...

1. Read the SAFETY PRECAUTIONS on page 4!
2. Connect the **StudioCube** with its power supply to mains (blue LED will go on).
3. Connect the monitor outputs of your mixing desk or signal source to the inputs (IN L/R) of the **StudioCube**. For this use either the XLR or jack sockets. More on cabling see pages 9/13.
4. Turn the level control (VOLUME) fully counterclockwise (minimum).
5. Push the MONO switch to its "lower" position ↓.
6. Connect your headphone lead to one of the headphone sockets (A/B) on the front panel of the **StudioCube**.
7. Set the desired listening volume with the volume control. Avoid excessive listening levels and always make sure the **StudioCube** is correctly driven.

A word about cables...

Most users of the **StudioCube** have invested much time and money in their selection of the right headphone set, mixing console or monitor speakers.

But please consider also the quality of the relevant connection cables.

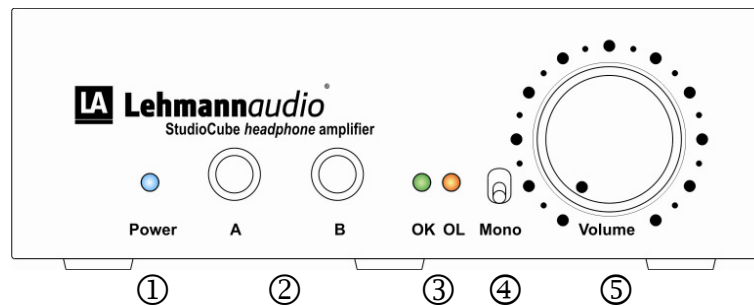
- Use only high-quality cables with low electrical capacitance. Audio cables with an outer mesh screen and 4 additionally shielded inner conductors (quad cables with braided shielding) are less interference-prone. Such high-grade cables are offered by manufacturers like Canare, Mogami and others.

CAUTION:

Some „house brand“ cables are made by renowned manufacturers and have a good quality. However, this must not always be the case.

- Studio tests have revealed that those indeed somewhat „esoteric“ super audio cables do actually sound better. An audible difference, but of course for a stiffer price. Therefore just check out your cables before you buy them.
- Use only cables with quality connectors (Neutrik, Switchcraft, etc.).
- Avoid excessive cable length.
- Replace damaged cables and connectors.

CONTROLS – Front Panel



① Power LED

The Power LED (blue) indicates the operating status of the device. It lights up when a correct supply voltage is applied.

② Headphone Outputs A/B

The **StudioCube** offers two parallel headphone outputs with original Neutrik 6.3mm stereo jack sockets and goldplated contacts.

NOTE:

*If you want to plug in two headphones into the **StudioCube**, make sure that both models have the same sensitivity, or otherwise the volume levels of the two headphones may be widely different.*

③ OK/OL Input Level Indicator LEDs

Use these two LED indicators to perfectly match the output level of your signal source to the **StudioCube** and to avoid signal overload. The input level indicators will always show the send level of the connected source, irrespective of the position of the output level control (VOLUME).

- The “OK” LED indicates a present input signal and will go on when this signal reaches a level of -30 dBu.
- The “OL” LED (Overload) will go on when the input signal exceeds +15 dBu. The **StudioCube** still has approx. 7 dB as reserve (headroom) below its maximum level of +22 dBu then.

NOTE:

*Too high an input level on the **StudioCube** will reduce the effective adjustment range of the output level control (VOLUME) and result in a poorer channel balance. Therefore always drive the **StudioCube** in such a way that the “OL” LED will not or only rarely flash during operation.*

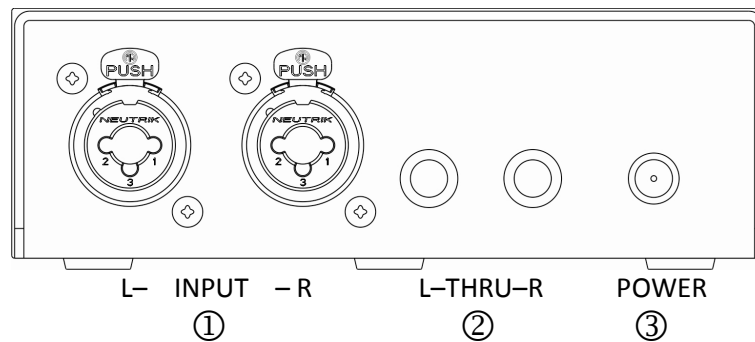
④ Mono Switch

The Mono switch allows you to select the appropriate input channel for mono or stereo operation. In STEREO mode both input channels (IN L+R) are routed to their corresponding headphone channel (L/R), in MONO mode only the left input channel is routed to both headphone channels (L+R). Audio signals looped to other **StudioCubes** (THRU) will not be affected. MONO mode is activated (ON) when the Mono switch is in its “upper” position ↑.

⑤ Output Level Control - VOLUME

This rotary control is used to set the required monitoring level in your headphone. The listening volume depends on the selected gain setting inside the device; as standard this is equivalent to +6 dB at the right-hand stop of the volume control. (See also page 10 – device configuration). 0 dB unity gain is achieved at about the 01:30 position of the control.

CONNECTORS – Rear Panel



① Input – INPUT L/R

The inputs of the **StudioCube** are fitted with Neutrik combo sockets where both balanced and unbalanced audio signals can be connected.

Pin assignment of the combo sockets:

XLR socket:

Pin 2 > positive (+)

Pin 3 > negative (-)

Pin 1 > shield (ground)

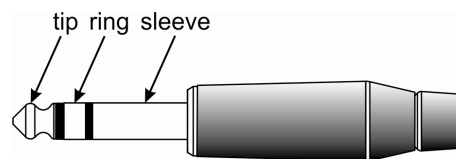


Stereo jack socket (TSR):

Tip > positive (+)

Ring > negative (-)

Sleeve > shield (ground)

**NOTE:**

When connecting unbalanced signals to the input of the **StudioCube**, they will also be output unbalanced at the THRU outputs, even if you use balanced cables.

② Output – THRU L/R

For an easy linking of other audio devices or for daisy-chaining several **StudioCubes** the THRU output has been designed as a balanced Neutrik stereo jack socket.

Be sure to avoid ground loops when cascading devices! (See page 10/13 also).

NOTE:

At the THRU output the input signal (IN) is passively decoupled. Therefore if you connect unbalanced cable links (mono jack) to the THRU output of the **StudioCube**, all other signals will be passed on unbalanced; even if balanced cables are partly used.

③ Power Supply Connection - POWER

Here the supplied wall plug power supply of the **StudioCube** is connected. This is a high-quality wide-range switching power supply which you can use worldwide with our optional primary mains adaptors.

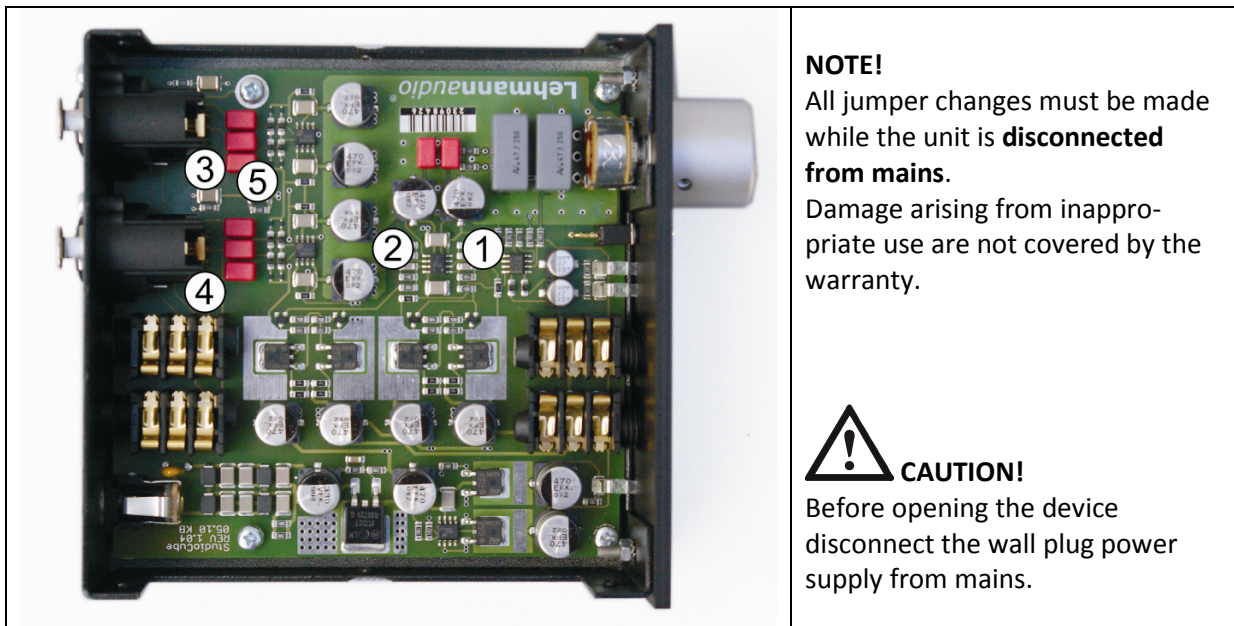
The power supply conforms with the latest European ECO design directive and is energy-saving.

DEVICE CONFIGURATION

Via internal jumpers the basic gain (+6 dB) of the **StudioCube** can be increased by another +6 dB and is thus adaptable to various headphone models.

In case of hum problems, the signal ground (GND) may also be detached from the housing ground (EARTH).

Jumper Position



Gain Setting

① Jumper – Left Gain

This jumper increases the gain for the left channel by +6 dB.

② Jumper – Right Gain

This jumper increases the gain for the right channel by +6 dB.

Ground Setting for Input Channels

③ Jumper – Left GND

This jumper connects Pin 1 of the left input (i.e the jack plug sleeve of the left channel) with the audio ground (GND).

④ Jumper – Right GND

This jumper connects Pin 1 of the right input (i.e the jack plug sleeve of the right channel) with the audio ground (GND).

⑤ Jumper – Audio GND / Housing

This jumper connects the audio ground (GND) with the housing of the **StudioCube**.

NOTE:

*In its delivery status the jumpers 3-5 of the **StudioCube** are open. Setting the GAIN jumpers has no effect on the maximum input voltage of the device nor on the level indicators.*

Headphones/Sensitivity

When it comes to studio headphones, we are confronted with an immense variety of choice. Standard headphone models have an impedance between 30 ohms and 600 ohms. Notwithstanding the above, headphones have very different sensitivity specs and thus convert the signal voltage delivered by the headphone amplifier more or less efficiently into acoustic energy.

The measure of **efficiency** used for headphones is the achieved sound pressure level in dB at 1mW of output power.

The following table chart shows some of the most common studio headphone models with their technical specifications.

	Impedance	Sensitivity dB @ 1mW	Voltage for 100dB SPL	Power for 100dB SPL
AKG				
K-141 MKII	55	101	209mV	0.8mW
K-240 Studio	55	91	661mV	7.9mW
K-271 MKII	55	91	661mV	7.9W
Audio Technica				
ATH-M30	65	100	255mV	1mW
ATH-M40	60	100	245mV	1mW
ATH-M50	38	99	219mV	1.3mW
Beyerdynamic				
DT100	16	94	253mV	4mW
DT770 PRO	80	96	800mV	2.6mW
DT880 PRO	250	96	800mV	2.6mW
DT990 PRO	250	96	800mV	2.6mW
Grado				
SR80	32	98	225mV	1.6mW
SR125	32	98	225mV	1.6mW
SR225	32	98	225mV	1.6mW
Sennheiser				
HD-25 SP	60	90	800mV	10mW
HD-280 PRO	64	90	800mV	10mW
HD-380 PRO	54	97	318mV	1.9mW
Sony				
MDR-7506	63	106	126mV	0.3mW
MDR-7509	24	107	69mV	0.2mW
Ultrasone				
HFI-580	32	101	160	0.8mW
PRO 550	64	102	201mV	0.7mW
PRO 900	40	96	317mV	2.5mW

Besides other factors like transmission behaviour, wearing comfort and sound proofness, the crucial point with studio headphones is whether the chosen model can reproduce the desired loudness distortion-free. For this reason do not only look at the sensitivity specs of a certain headphone model, but also at its maximum power handling (see manufacturer data sheet).

Aural Strain

But no matter how much we love music listening – especially when using headphones we should definitely pay attention to the healthiness of our own ears.

A prolonged overstressing by loud listening volume levels will only do damage to our hearing. So we'd rather lower the listening volume and go easy on our sensitive organ, because healthy ears are the most essential working tool of every musician.

Sound Pressure Level (SPL)

The sound pressure level is a logarithmic measure to describe the strength of a sound incidence. Usually it is measured in dBA (A-weighted).

The following table chart shows comparison in terms of SPL.

dBA	Sound pressure level
150	Big firecrackers
140	Jet engine
130	Jet plane at takeoff
120	Rock concert/Live band
110	Disco/walkman/jackhammer
100	Rehearsal room/car radio
90	Factory/heavy truck traffic
80	Road traffic
70	Restaurant
60	Conversation

Exposure Time

The principle of energy equivalence means that hearing loss is a function of sound pressure level and exposure time (duration).

- The greater the sound pressure level, the shorter the exposure time until damage occurs
- The permissible exposure time is halved for each 3 dB increase of sound pressure level

Permanent hearing damage will occur beyond 85 dBA sound pressure level, if the hearing is continuously* exposed to this strain. (*more than 8 hours per day)

Depending on the sound pressure level, the following permissible exposure times will arise as a result.

SPL dBA	85	88	91	94	97	100	103	106	109	112	115	118	121
Max. Duration h	8	4	2	1									
Max. Duration min.					30	15	7,5						
Max. Duration sec.								225	112	56	28	14	7

These maximum timespans should be taken seriously, since otherwise your ears may suffer from hearing loss in case of prolonged exceeding.

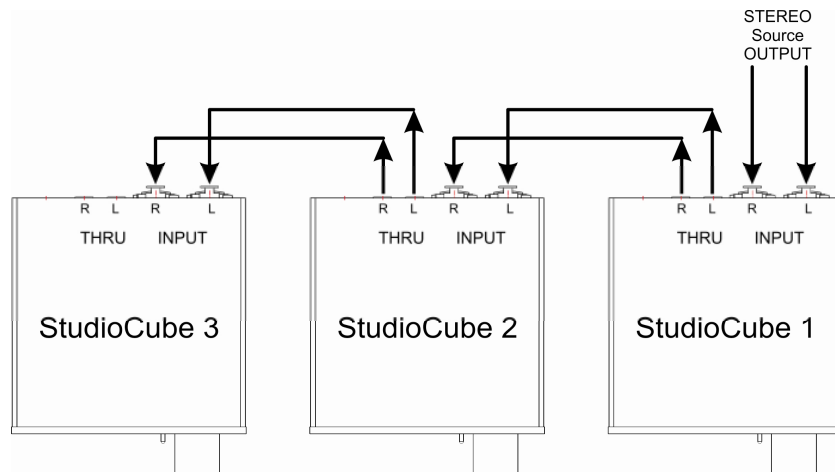
NOTE for practical applications:

- Before putting on a connected headphone make sure that the listening level is low. Turn down the volume control before!
- If possible use an automatic level limiter for the monitor paths on stage or in the studio.

MULTI-UNIT OPERATION

If necessary, several **StudioCubes** can be easily driven by a common audio source. Simply connect the THRU output of the first “sending” device to the input of another “receiving” unit. You can do this cascading in stereo mode and in pure mono mode as well.

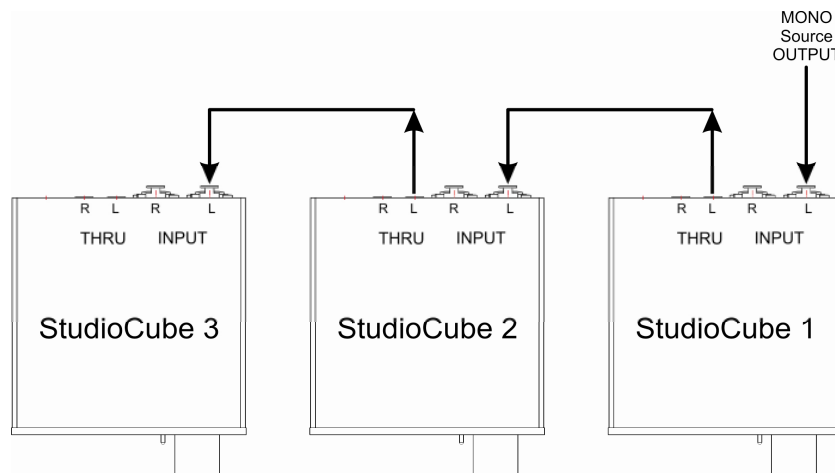
Stereo Mode



NOTE:
MONO switch on all devices in the „lower“ position.

In some cases it can happen that there are not enough stereo channels available to act as source signals. The **StudioCube** can also be driven by a mono signal then. To avoid a single-sided channel reproduction in the headphone, the MONO switch must be activated.

Mono Mode



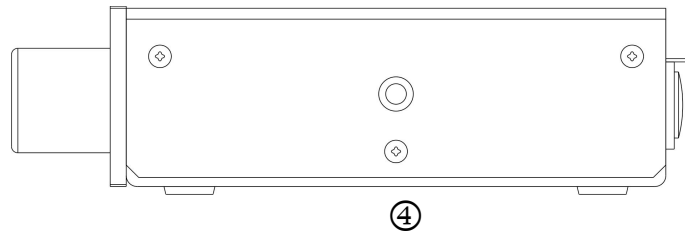
NOTE:
MONO switch on all devices in the „upper“ position.

NOTE:

Always use all cascaded devices only in the same operation mode and do not mix balanced with unbalanced cable connections.

*Do not connect more than **4 devices**, as the signal is passively decoupled at the THRU output. For linking more than 4 devices and for long transmission paths we recommend using a signal splitter (available as optional accessory).*

ACCESSORIES/MOUNTING



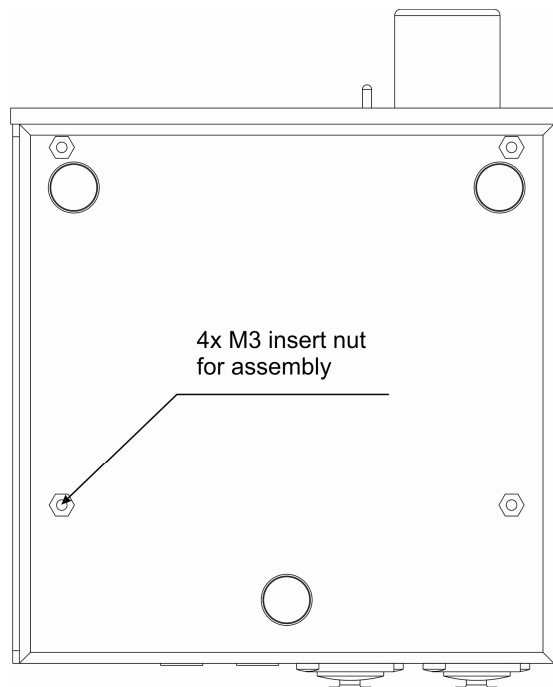
④ Mounting Thread

The **StudioCube** has an insert nut on each side for easily fixing a yoke with knurled-head screws. This holder is available as an optional accessory (item No.30009EU or No.30009US) and allows to mount the device either under table or on a microphone stand.

Stand Mounting



For a universal mounting of the **StudioCube**, e.g. in a rack tray, we have also built in four M3 insert nuts on the bottom side of the device.



NOTE:

When screwing the device into place, mind the maximum depth of the threaded sleeves!

TECHNICAL SPECIFICATIONS**StudioCube**

- Input Impedance	22 KOhm, balanced
- Max. Input Level	+22 dBu
- Adjustable Gain	+6 dB / +12 dB (with jumpers)
- Frequency Response	10 Hz – 40 KHz (-0.5 dB)
- S/N Ratio	-90 dBu @ 6 dB gain
- THD	< 0.02 % (+0 dBu @ 32 Ohm)
- Channel Separation	> 30 dB @ 10 KHz
- Channel Imbalance	< 0.3 dB @ max. volume
- Output Power	200 mW @ 33 Ohm
- Output Impedance	5 Ohm
- Max. Output Level	+12 dBu
- Connectors – Audio/Input	2x XLR/TRS combo socket, balanced
- Connectors – Audio/Output THRU	2x ¼" TRS jack socket, balanced
- Connectors – Headphones/Output	2x ¼" TRS jack socket
- Operation Voltage / Current	22-26 VDC / 120 mA
- Idle Power Consumption	< 3W
- Fuse	Internal, self-resetting, > 250 mA
- Dimensions	130x43x132 mm / 5.12"x1.69"x5.2" (W x H x D) (housing dimensions)
- Weight	0.88 Kg / 1.94 lbs (without power supply)

Power Supply

- Primary Input Voltage	100 – 240 VAC / 50 – 60 Hz
- Secondary Output Voltage	24 VDC
- Max. Output Current	420 mA

LEGAL PROVISIONS

Warranty

Each Lehmann*audio* device is individually tested and submitted to a comprehensive functional check. The exclusive use of super-grade components allows us to warrant our products for a period of two years.

For any warranty claims a valid proof of purchase is required. The product registration can also be done online at www.synthax.de/. Damages arising from incorrect mounting or inappropriate handling are not covered by warranty and will only be repaired at the owner's expense. The right to claim damages of any kind, particularly for secondary failures, is reserved.

Liability beyond the merchandise value of the device shall be excluded.

The terms and conditions of the company apply:

Synthax GmbH
Am Pfanderling 60
85778 Haimhausen
Phone: +49 (0) 8133-9181 -0 Fax: -19
www.synthax.de

State of the Art

To ensure the highest audio quality, Lehmann*audio* devices are constantly updated to the latest state of the art. Necessary alterations in design or circuit layout will be made without prior notice. Technical specifications and visual aspect can therefore differ from the present user manual.

Trademarks

All trademarks and registered brand names used in this manual are property of the respective rightholders.

Copyrights

This manual is protected by copyright. Any duplication or reprint, even in excerpts, is only permitted with the written authorisation of Synthax GmbH. This also applies to the pictures and graphics used.



We, the Lehmann*audio* Vertriebs GmbH, Richard-Zanders-Str. 54, D-51469 Bergisch Gladbach, Germany, declare in our sole responsibility that the above-described device complies with the following standards and directives:

StudioCube

- EN 60065
- DIN EN 55103-1&2
- 2006/95/EG
- 2004/108/EG

Power Supply

- EN 60950-1
- EN 55011
- EN 55022
- 2009/125/EG

Bergisch Gladbach, Oct. 1st, 2010
Norbert Lehmann, Managing Director

The relevant technical documents are maintained at the company headquarter of the Lehmann*audio* Vertriebs GmbH in Bergisch Gladbach.

Any modification of the device which was not authorised by us will void this CE declaration.



This product was made in accordance with the 2002/95/EG directive.



WEEE

According to the Directive 2003/108/EG on Waste Electric and Electronic Equipment (WEEE) the owners of old equipment are legally bound to dispose of their old appliances separately from their household waste.

Please support us and contribute your share to protect our environment. More information on the disposal of this device can be obtained at your nearest recycling depot.

TROUBLESHOOTING

The blue POWER LED is not on.

- Check if mains voltage is present
- Check if the power supply is connected to mains
- Check if the power supply connection lead is connected to the **StudioCube**

No headphone signal – mono mode

The green OK LED is not on.

- Check the audio connection lines between **StudioCube** and signal source
- Check the correct connection of the headphone, if necessary the connection cable as well
- Check if a mono signal is present at input 1 (L) and if the mono switch is active (UPPER position)
- Raise the input level on the **StudioCube**
- Check the volume setting

No headphone signal – mono mode

The green OK LED is on, but there is no sound.

- Check the volume setting
- Check the correct connection of the headphone, if necessary the connection cable as well
- Check if a mono signal is present at input 1 (L) and if the mono switch is active (UPPER position)

No headphone signal – stereo mode

The green OK LED is not on.

- Check the audio connection lines between **StudioCube** and signal source
- Check the correct connection of the headphone, if necessary the connection cable as well
- Check if a stereo signal is present at inputs 1 and 2 (L/R) and if the mono switch is disabled (LOWER position)
- Raise the input level on the **StudioCube**
- Check the volume setting

No headphone signal – stereo mode

The green OK LED is on, but there is no sound.

- Check the volume setting
- Check the correct connection of the headphone, if necessary the connection cable as well
- Check if the mono switch is disabled (LOWER position)

Only mono signal

- Check the correct position of the mono switch (LOWER position)
- Check the audio connection cables for both inputs, if necessary for the outputs as well
- Check the inputs for interchanged cables and the right channel assignment

Distorted headphone signal

The red OL LED is not on.

- Check if a very low-Z headphone is connected which might overload the output stage.
 - If necessary, use another headphone model
- Lower the overall gain (by removing the jumpers inside the device)

Distorted headphone signal

The red OL LED is on.

- Lower the audio level at the input/s
- Check the volume setting
- Reduce the overall gain (by removing the internal jumpers)

Audible hum

- Check the connection cables, particularly their shielding and the connectors
- Disconnect the ground signal of the connection cables single-sided on the **StudioCube** by means of the corresponding jumpers

Radio interference audible in the background

- Check the shielding of the cables in use
- Check the protective earth (PE) on the preceding mains lead or mains distributor.
 - Never stick adhesive tape over the protective earth!
- Make sure that no HF-emitting appliances (mobile phones, radio equipment etc.) are in close vicinity.

Distributor:

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GmbH

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