KLANG:fabrik

Front panel:
- USB
- 3D IN-EAR MONITORING
- STAGE
- FADERS
- METER
- CONFIG
- MASTER VOLUME

Rear panel:
- OUTPUT:1 left right
- OUTPUT:2 left right
- OUTPUT:3 left right
- OUTPUT:4 left right
- OUTPUT:5 left right
- OUTPUT:6 left right
- OUTPUT:7 left right
- OUTPUT:8 left right
- ZERO LATENCY:IN 1 2
- KLANG:fabrik by KLANG:technologies GmbH — Engineered and manufactured in Germany.
- CE FC
- Dante™ 1 2
- CONTROL net
- WORD CLOCK in term. out
- OPTICAL AUDIO INPUT 1 2 3 4
- OPTICAL AUDIO OUTPUT 1 2 3 4
- POWER SUPPLY

KLANG:vier

Front panel:
- USB
- OUTPUT:1 +12dB -12dB
- OUTPUT:2 +12dB -12dB
- OUTPUT:3 +12dB -12dB
- OUTPUT:4 +12dB -12dB

Rear panel:
- POWER SUPPLY
- Dante™ 1 2 NET
- WCLK out
- OPTICAL INPUT 1 2 3
- KLANG:vier by KLANG:technologies GmbH — Engineered and manufactured in Germany.
- OUTPUT:1-4 balanced line level outputs 8 channels

USER MANUAL | ENGLISH

1   WELCOME TO THE KLANG:FAMILY !

We would like to thank you for choosing KLANG:fabrik / KLANG:vier. We are convinced that you will have the same positive sound experience we have by using the KLANG system in your professional daily work – live on stage, in the studio, in the rehearsal room.

> **!**   **PLEASE READ THIS MANUAL CAREFULLY AND ENTIRELY. INPROPER USE MIGHT RESULT IN SERIOUS RISKS, DAMAGES OR PROBLEMS IN COMBINATION WITH ADDITIONAL EQUIPMENT.**

This manual guide is designed to assist you in setting up your KLANG:fabrik / KLANG:vier as a professional headphone monitoring system.

If you experience any problems in setting up the system please contact us at **support@KLANG.com**

> **!**   **PLEASE MAKE SURE THAT YOU HAVE THE FOLLOWING EQUIPMENT AVAILABLE:**

- **KLANG:fabrik or KLANG:vier.**
- **Mixing Desk** – Dante enabled or compatible with ADAT, or Analog to Dante/ADAT converters or **Computer** (Windows or Mac OS X) with a multi track playback software including **Dante Virtual Soundcard** (DVS)
- WiFi **Router** or network access.
- **2 network cables** with RJ45 connectors (no Neutrik EtherCon cables required) – one for Dante running to the computer, one for Control going to the WiFi router.
- **KLANG:fabrik only: Headphone amplifier, e.g. KLANG:quelle** and cables with female XLR connecting KLANG:fabrik to your headphone amp or direct connecting cables for high impedance headphones to the KLANG:fabrik or wireless audio transmitters.
- **Pair of headphones.**

Smartphone or **Tablet** running KLANG:app 2 (can be used to demonstrate orientation tracking, if no KLANG:vektor is present). A computer can also work as a remote control interface. KLANG:app 2 is available for free at www.KLANG.com

> **!**   **MAKE SURE THAT THE FIRMWARE REVISION NUMBER IS COMPATIBLE WITH THIS DOCUMENTATION.**

Current KLANG:fabrik | KLANG:vier Firmware Revision: 2.0.x versions.

2 INTEGRATING KLANG:fabrik / KLANG:vier INTO EXISTING SETUP

The KLANG:fabrik / KLANG:vier can be connected directly to an FOH mixing desk or a monitor desk as well as studio mixing consoles. The 3D In-Ear Monitoring system is commonly inserted into an existing setup between mixing desk and headphone amp or wireless in-ear transmitters.

With Dante and optical audio compatible with ADAT most digital mixing desks can be connected directly. For mixing consoles with MADI several converters to Dante and ADAT are available. For consoles using only AVB an ADAT and AVB to MADI converter can be used. For all other mixing consoles analog outputs can be connected to an Analog to Dante or Analog to ADAT converter.
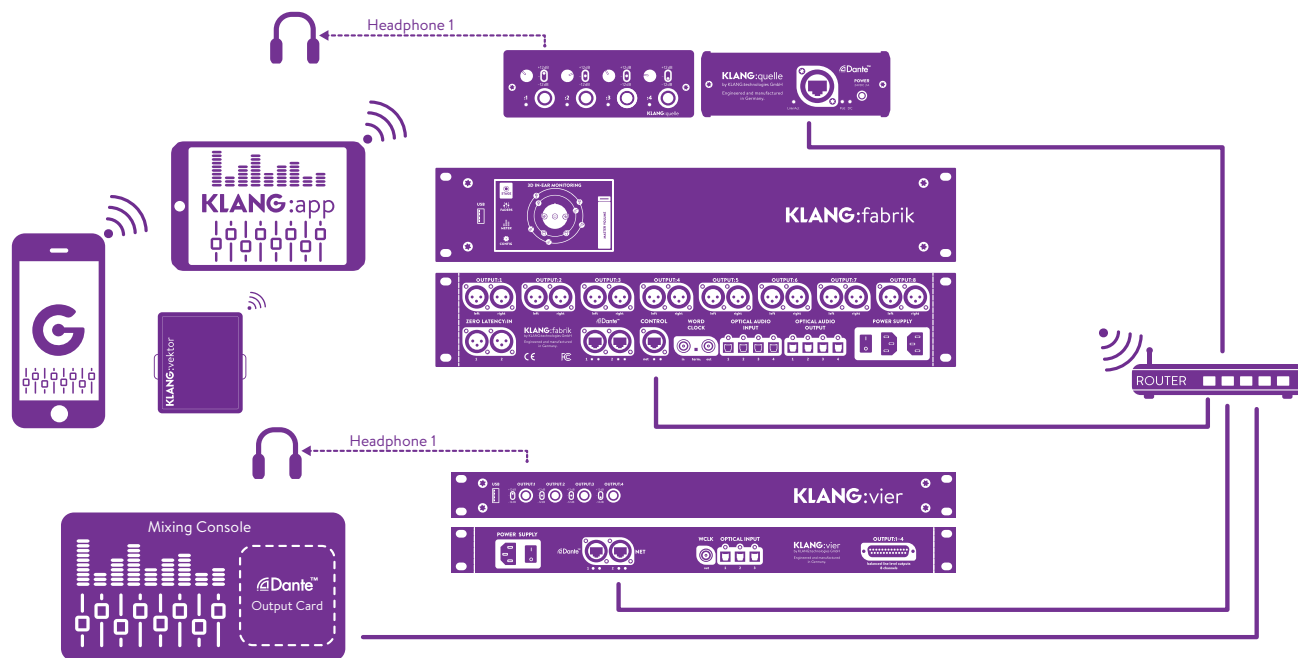
3 CONNECTION OVERVIEW & TECH SPECS
KLANG:fabrik / KLANG:vier

ANALOG OUTPUTS
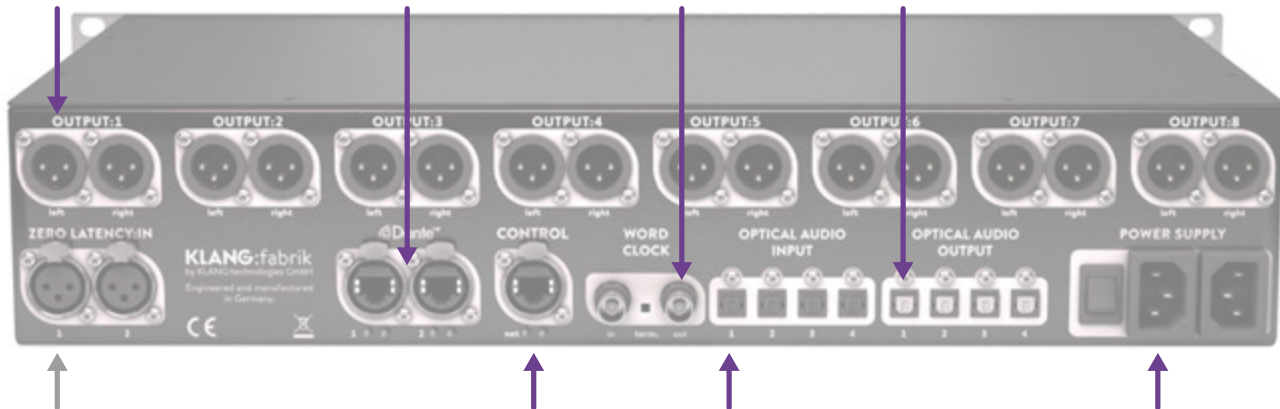Connect to your headphone amp or wireless transmitter.

DANTE
Gigabit network for audio transmission.

CLOCK OUT
Connect to e.g. optional ADCs.

OPTICAL OUT
Connect to optional DACs. 8 channels per connector.

ANALOG INPUTS
Optional. Connect line level inputs for analog stereo mix.

CONTROL
Connect to your PC | MAC, and WiFi router for remote.

OPTICAL INPUT
8 channels each, compatible with ADAT, connect optional ADCs.

POWER SUPPLY
Connect power cable. Switch on KLANG:fabrik.

ANALOG INPUTS (Optional | KLANG:fabrik only)

• KLANG Zero-Latency Inputs. 2 balanced XLR (NEUTRIK® connectors) audio line level inputs. Additional analog mixing to all 16 analog output channels without any AD/DA conversion. (No meter information available). Only stereo mixing for these inputs. Frequency range 10Hz to 30kHz ±0.1dB.

ANALOG OUTPUTS (KLANG:fabrik)

• Analog line level monitoring outputs. 16 balanced XLR (NEUTRIK® connectors) analog line level outputs with flat frequency response starting from 5 Hz. Upper roll-off frequency depending on sampling rate. (16Hz-20kHz ±0.1 dB). Nominal output level +4 dBu, max. +22 dBu. Output impedance 75 Ω.

HEADPHONE OUTS & ANALOG OUTPUTS (KLANG:vier)

• 4 stereo headphone outputs at the front side (suitable for in-ears and standard headphones). Gain switch for highly sensitive in-ears (-12 dB), normal headphones (0 dB), low output headphones (+12 dB)

• Analog line level outputs in SUB-D breakout at the rear side with flat frequency response starting from 5 Hz. Upper roll-off frequency depending on sampling rate. (16Hz-20kHz ±0.1 dB).   Nominal output level +4 dBu, max. +22 dBu. Output impedance 75 Ω. Output level depending on gain switch at the front. Pin layout is not standard format.

• D-Sub pin out: 01|4L-, 02|GND, 03|4R-, 04|3L-,05|GND, 06|3R-,07|2L-, 08|GND, 09|2R-, 10|1L-, 1|GND,12|1R-, 13|n.c., 14|4L+, 15|4R+, 16|GND, 17|3L+, 18|3R+, 19|GND, 20|2L+, 21|2R+, 22|GND, 23|1L+, 24|1R+, 25|GND.

DANTE | CONTROL

• 3 (KLANG:fabrik) high class network interfaces with locking NEUTRIK® EhterCon connectors. 3 different configurations (Dante redundant, 3 equal ports, separate control and Dante) can be chosen in Dante Controller software.

• 2 (KLANG:vier) high class network interfaces with locking NEUTRIK® EhterCon connectors. 2 different configurations: 2 equal network ports (switch attached control), separate control and Dante ports (switch detached control) can be chosen in Dante Controller software.

• Dante module with 64 input and 64 output channels (Routing and configuration over Dante Controller software). Currently the firmware only allows routing of 32 (Channel 1 to Channel 32) input and output channels of the Dante Stream inside KLANG:fabrik and 24 input channels in KLANG:vier

• KLANG:vier uses a fixed routing scheme. Hence, user output 1–5 are always routed to the Dante module.

WORD CLOCK

• 2 BNC connectors for input and output (KLANG:fabrik) and 1 BNC connector for output (KLANG:vier). Input with switchable termination (75 Ω). Output clock is always connected to internal DSP processing clock. Prefer using professional clock cabling with word clock output connected to e.g. optional AD converters over clock recovery from optical audio inputs.

OPTICAL AUDIO

• 4 input and 4 output (KLANG:fabrik) and 3 input (KLANG:vier) optical audio compatible with ADAT. Each optical audio interface can handle 8 channels   at 44.1 / 48 kHz with 24 bit precision. Optical audio connectors are non-locking.

FRONT (KLANG:fabrik only)

• USB connector for pen drive support (import / export of settings, backup, firmware update)

• 5 inch / 12.7cm color capacitive touch display with 800x600 pixels.
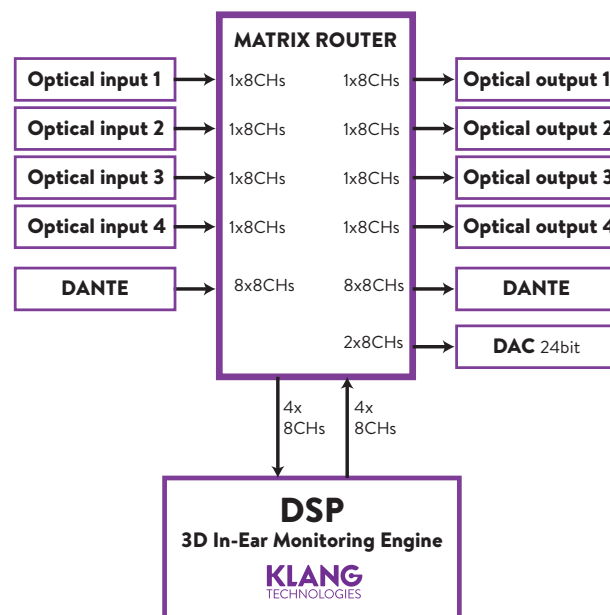
DIMENSIONS AND WEIGHT – KLANG:fabrik

• Weight: 5 kg

• Size (W/H/D): 44.5 / 9.0 / 23.0 cm

• Front panel (width): 48.5 cm

• 2HE , 2 Rack units, gap between rack bolts (W/H): 46.5 / 7.5 cm

DIMENSIONS AND WEIGHT – KLANG:vier

• Weight: 3 kg

• Size (W/H/D): 44.5 / 4.5 / 18.5 cm

• Front panel (width): 48.5 cm

• 1HE , 1 Rack unit, gap between rack bolts (W/H): 46.5 / 7.5 cm

ROUTING (KLANG:fabrik only)

Flexible audio routing of all available inputs and outputs (sampling frequency must match, Clock sync). KLANG:fabrik can act as an additional audio data router while working as a 3D In-Ear Monitoring system, without causing additional processing load. E.g. Dante and optical audio streams (in blocks of 8 channels) can be routed to the 3D in-ear monitoring engine. At the same time optical can be routed directly to Dante and vice versa.

MATRIX ROUTER

Optical input 1	→	1x8CHs	1x8CHs	→	Optical output 1
Optical input 2	→	1x8CHs	1x8CHs	→	Optical output 2
Optical input 3	→	1x8CHs	1x8CHs	→	Optical output 3
Optical input 4	→	1x8CHs	1x8CHs	→	Optical output 4
DANTE	→	8x8CHs	8x8CHs	→	DANTE
			2x8CHs	→	DAC 24bit

4x 8CHs   4x 8CHs

DSP
3D In-Ear Monitoring Engine
KLANG TECHNOLOGIES

4 NETWORK SETUP AND CABLES

• Connect the KLANG:fabrik / KLANG:vier from the port CONTROL to a WiFi router | network switch. This is only used for control messages coming from WiFi and going to the KLANG:fabrik / KLANG:vier. A DHCP server must be running.

! **PLEASE NOTE: SOME WIFI ROUTERS CAN ONLY OPERATE WITH 100MBIT/S AND NOT GIGABIT AS RECOMMENDED FOR DANTE BY AUDINATE!**

• A Dante audio network should be connected to either one of the ports on KLANG:fabrik **DANTE 1** or **DANTE 2** or KLANG:vier **DANTE 1**.Internally the KLANG:fabrik / KLANG:vier has a Gigabit network switch and all Ethernet Ports have the **same functionality (factory default)**.

• Advanced port settings, like redundant ports or separated control ports, can be set using Dante controller.
Data is routed internally from the **CONTROL** port (might operate at 100 MBit due to WiFi router) to the Gigabit Dante.

! **PLEASE NOTE: THE IP ADDRESS OF THE DANTE AUDIO MODULE INSIDE THE KLANG:fabrik / KLANG:vier HAS ANOTHER IP ADDRESS AS IT ACTS AS AN INDIVIDUAL NETWORK DEVICE.**

• The 8 digit serial number starting with **KF... / K4...** is shown on the rear panel of the KLANG:fabrik / KLANG:vier. A device is **recognizable** by this unique alpha numeric number.

! **USE HIGH CLASS NETWORK CABLES WITH CAT6 COMPATIBILITY AND PREFER NEUTRIK ETHERCON CONNECTORS TO AVOID UNWANTED DISCONNECTS.**
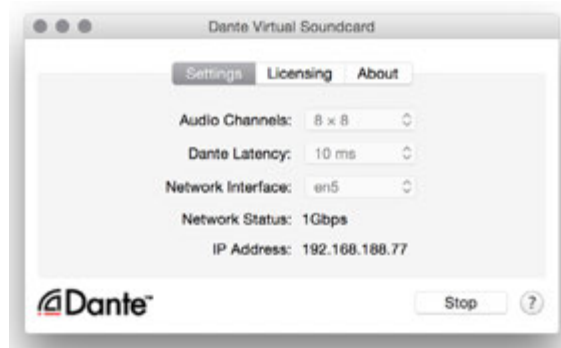
5 DANTE

- Audinate® Dante™ is a sophisticated audio network protocol for the professional transmission of audio with a multitude of channels, high sampling rates and it can also provide redundancy.

> **!** **PLEASE NOTE:** **AVOID TRANSMITTING UNNECESSARY DATA** ON THE DANTE NETWORK, E.G. SHARING BIG CHUNKS OF DATA BETWEEN COMPUTERS TO ENSURE HIGHEST STABILITY FOR THE AUDIO NETWORK.

DANTE VIRTUAL SOUNDCARD

- License available under: **https://www.audinate.com/products/software/dante-virtual-soundcard**

- In order to activate the virtual sound card, **click on the power button** on the left as shown in the following screenshot. If it turns green, the sound card is active.

- Make sure the network connector is green and shows **1G indicating a Gigabit** connection. It does not work properly with 100 MBit/s. In case you have 100 Mbit, modify the network cable connection to connect your computer directly to KLANG:fabrik, e.g. to **DANTE 1 port** .

DANTE CONTROLLER AND ROUTING

• Available under: **https://www.audinate.com/products/software/dante-controller**

• Start the **Dante Controller** on your compatible operating system and proceed with the following settings.

• Connect the audio output of your computer's **Dante Virtual Soundcard (DVS)** to KLANG:fabrik / KLANG:vier.

• Please note: The Dante module starts with the same serial number (**KF.../K4...**) as KLANG:fabrik / KLANG:vier.

!   PLEASE NOTE: HIGHLIGHTED DEVICE NAMES IN RED INDICATE PROBLEMS WITH THE DANTE SETTINGS.

• Please disable distracting multiple connections to the same network, e.g. by **disabling WiFi** on your Mac or PC while using a network cable for Dante streaming.

DANTE LATENCY AND SETTINGS

• Although Dante is built for low latency, it is important to monitor the settings and the behavior after setup. In case the **Dante latency exceeds** the specified latency (e.g. of the DVS for streaming playback data from e.g. Logic, Reaper or ProTools to KLANG:fabrik / KLANG:vier) audible drop outs are likely to appear.
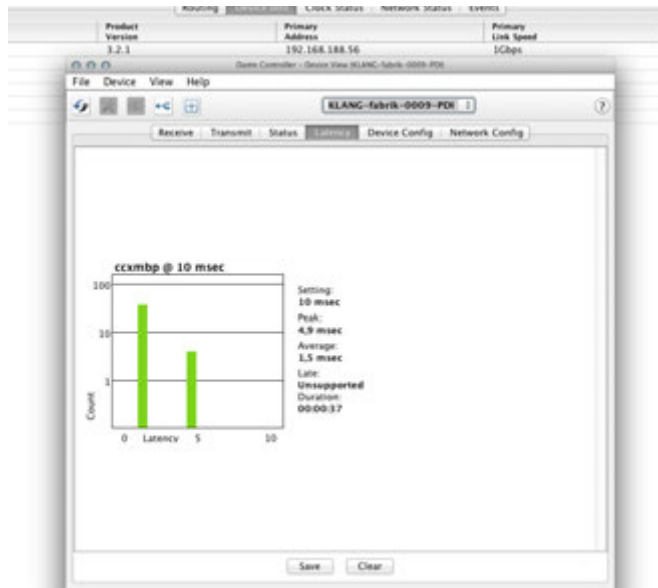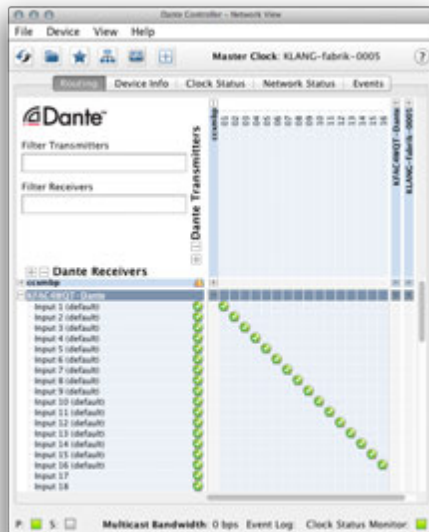
6 CONFIGURATION OF MAIN SYSTEM

• KLANG:app 2 can tweak all settings. The touch display on KLANG:fabrik is for status feedback only (slow response). Enter Admin mode (press and hold CONFIG button) to tweak the settings. Navigate to CONFIG menu.

AUDIO ROUTING

The audio routing of the KLANG:fabrik / KLANG:vier. Click on **ROUTING** tab. This routing screen uses blocks. **Each block contains 8 consecutive channels** of audio. The audio **source** is shown on the **left**. The audio **sink** is shown in the **top** line. The white square with an arrow in it, shows that a particular source is connected to a sink. KLANG:fabrik routing options:

• Optical 1–4 sources are coming from the optical input connectors of KLANG:fabrik. Each has **8 channels** of audio in 44.1 kHz or 48 kHz sampling rate with 24 bits precision.

• Dante 1–4 sources are in total 32 audio channels. Dante 1 contains channel 1–8, Dante 2 channel 9–16, etc.

• Firstly, we connect **incoming audio streams** inside KLANG:fabrik to the audio processor called **DSP** (top line). DSP1 represents input channels 1-8 e.g. as seen in the remote software KLANG:app . DSP2 represents channels 9-16 and so on. In the normal configuration KLANG:fabrik uses 16 input channels (hence, DSP1 and DSP2) only.

• In order to route the channels 1-8 of Dante to the channels 1-8 of the **3D in ear monitoring system** we push the arrow to appear in the cell 9 from left to right and the cell 5 from top to bottom. Dante channels 9-16, hence Dante 2 to DSP2 for the input channels 9-16.

• The **users' 3D audio mixes** can then be routed to different sinks. Here we choose users 1-4 to appear on the analog outputs called users 1-4 be routing DSP1 (left legend) to DA1 (Digital to analog conversion)(top legend). Additionally the outputs for the users 1-4 are mirrored to the optical out 1 (Opt 1, top legend) and Dante output channels 1-8 of the Dante module (Dan 1, top legend).

• This setup could be used e.g. to stream 16 channels of audio recordings with the Dante Virtual Soundcard to KLANG:fabrik.

• Let's assume we want to change the routing to connect different audio channels, e.g. an analog to digital converter to route live channels e.g. 8 channels of drums. Click on the cell Optical 1 (left) and DSP1 (top).

• To disconnect a sink from a source, just click on the name of the sink in the top legend. This means no audio is routed to this sink.

• **KLANG:vier routing options:**

• Routing in KLANG:vier is simpler with less options. The input to the DSP can be chosen from optical and Dante. Also mixed configurations (Matching sample rates and sync required) are possible. The outputs of the DSP's 3D in-ear engine User 1–4 are in a fixed connection with Headphone outs 1–4 and the analog line level outputs of the SUB-D break-out. The outputs of all 5 users are also available on Dante.

- Please ensure a correct **Clock** setting at the bottom of the view. Use one device as clock master and synchronize all other devices to this master.

- **No resampling** is used and hence all inputs and outputs have the same sampling rate and must be synchronized. To verify your clock settings: Red colored text means no signal, yellow represents signal with a different clock and green shows signals with the same clock. Only inputs with a locked clock are unmuted. Inputs with unlocked clock are **muted** to avoid loud artifacts.

CHANGE NUMBER OF USERS (KLANG:fabrik only)

- Navigate to CONFIG and then to SYSTEM tab.

- The number of outputs | users can be specified between 8 and 32. The number of available output channels with this configuration is shown below.

- 6 users | 32 channels

- 7 users | 27 channels

- 8 users | 24 channels

- 9 users | 21 channels

- 10 users | 18 channels

- 11 users | 16 channels

- 12 users | 15 channels

- 16 users | 12 channels

- Push the RESTART button to apply changes and wait until the KLANG:fabrik reboots.

7   KLANG:APP 2

KLANG:app 2 is available for **iOS** on the Apple AppStore. **Android**, **Windows** and **Mac OS X** versions are also available directly from KLANG.com.

Become a beta tester by contacting the KLANG developers under support@KLANG.com.

!   **PLEASE MAKE SURE TO TURN OF MISLEADING NETWORK CONNECTIONS. E.G. DISABLE UMTS DATA TRANSMISSION ON A TABLET OR SMARTPHONE IF CONNECTION CANNOT BE ESTABLISHED.**

CONFIG | TWEAK CHANNEL SETTINGS

• Go to CONFIG and to the ROUTING tab and click/press the first instrument channel. Each Group **(1)** has associated channels **(2)**. Channels can be moved up and down and associated with other groups by the handler **(3)** (See left screenshot for details).
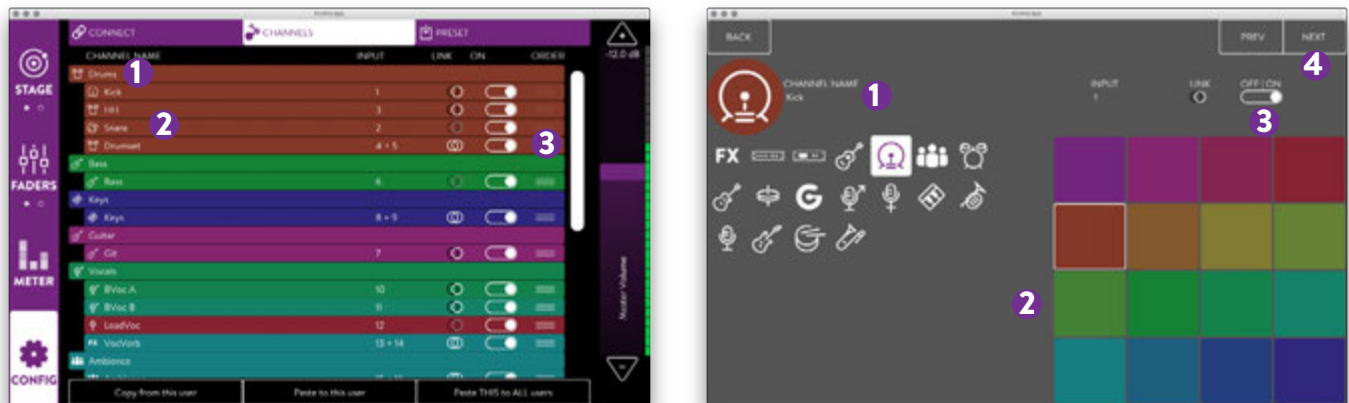
• Choose a **symbol** (1) according to the instrument, a **color (2)**, set **stereo** linking (3) option and, most importantly, switch it on or off (4).

• When you're done, click "**NEXT**" to repeat this process with EACH channel. (See right screenshot for details).

CONFIG | SWITCH USER MODES

• KLANG:app supports **3 modes** that distinguish musicians, technicians and administrators.   These modes can be switched by holding down the **CONFIG button** for more than **5 seconds**.

• **Technician mode** allows to log into an arbitrary user of KLANG:fabrik / KLANG:vier, change channel names, colors, icons, order, link, etc. In this mode settings can also be stored and recalled. Additionally it allows for fast user switching as well a "listen to" feature. This feature allows to copy (clone) the sound output of a particular user to another user, e.g. for pre-listening and mixing for monitor engineers.

• **Administrator mode** enables all features of the previous modes and allows to assign motion trackers and rename the users.

• **Musicians mode** lets the user concentrate on playing his instrument and disables distracting features that are used to configure KLANG:fabrik / KLANG:vier. This mode mainly allows to mix and position the pre-defined inputs for one chosen user of KLANG:fabrik / KLANG:vier. In musicians mode, the **CONFIG** button is **not shown**, but it is invisible on the same position as in administrator or technician mode.

CONFIG | CUE MODE

• In technician or administrator mode, there is a line for **fast user switching** in the top of the KLANG:app 2. This allows you to immediately log into another user and adjust its settings. In order to "listen to..." the sound the musician for whom you are mixing hears, just connect yourself to a free user output of the KLANG:fabrik / KLANG:vier. To **enter the CUE mode**, click onto your user ID on the top bar and hold this button down for **3 seconds**. You will notice a **purple frame** around this button.

• Now click on **another user**. The monitoring mix is mirrored to your output and you are instantaneously logged into that particular user. Just adjust the mix and proceed to the next musician.

• To **quit the CUE mode**, hold down your user ID button for **3 seconds** again. The purple frame will disappear.

8 LOAD & SAVE USER SETTINGS

CHANNEL SETTINGS

• Let's assume the instrument audio streams are arriving at KLANG:fabrik / KLANG:vier and the routing is already correct for the purpose. We want e.g. to have 8 individual users and 24 pre-configured input channels (default).

• **Open KLANG:app 2**, switch to **administrator or engineer/technician mode**.
Name all channels, choose an icon and deactivate all unused channels. Link stereo channels to clean up the appearance. Position the instruments on the i3D or 3D orbit mainly. For bass drum or bass a mono setting inside the head might be sufficient as the human ears have difficulties locating low frequency content.

SETTINGS FOR THE USER

• For musicians, use the **musician mode**, but log into technician mode first to setup the system correctly.

• Under **CONFIG** choose a user.

• Then switch to musician mode by pressing and holding the **CONFIG** button for more than **5 seconds**.

• On iPad you can ensure that no other app is used by switching the iPad to Kiosk Mode. E.g., for iPad click 3 times quickly on the home button to enter. Check your operating system for similar feature if needed.

• Please note: Remember the password, this is really important to quit the mode later on!

• Please consider connecting the remote device to a power supply to avoid unwanted power off. The use of professional smartphone or tablet holder is suggested.

10 ANNOUNCEMENTS

WARNINGS AND PRECAUTIONS

- TO REDUCE THE DANGER OF ELECTRICAL SHOCK DO NOT REMOVE COVERS. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.
- CLASS I device: Connect only to mains socket outlets with protective earth.
- Do not expose this product to rain or other types of moisture. To avoid the hazard of electrical shock, do not handle the power cord with wet hands.
- Operating Temperature: 0 °C to 50 °C (32 °F to 122 °F). Avoid exposition this device to sources of heat.
- Apparatus shall not be exposed to dripping or splashing. No Objects filled with liquids, such as vases, bottles and glasses shall be placed on the apparatus.
- Unplug the main power cord to ensure an all-pole disconnection. Keep the main power socket easily accessible.
- Using any audio system at high volume levels can cause permanent damage to your hearing. Set your system volume as low as possible. Avoid prolonged exposure to excessive sound pressure levels.

COMPLIANCE

The KLANG:fabrik has been tested and complies with:

- EN55103-1:2009 EN 55103-2: 2009.
- EN 55022:2006 / CISPR 22:1997 CAN/CSA-CEI/IEC CISPR 22:02 FCC 47 CFR, Part 15.

SAFETY

- UL 60065, 7th Edition, Rev.: 09/21/2012; CAN/CSAC22.2 No. 60065:03 (R2012).
- RoHS Compliant and Pb-Free.

WEEE – RECYCLING

According to RL2002/96/EG (WEEE – Directive on Waste Electrical and Electronic Equipment) electronic equipment has to be recycled and does not belong in the standard waste. If you are unsure how to recycle this product please contact us and we will recycle the device for you.

AUDINATE PATENT AND RIGHTS

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KLANG
TECHNOLOGIES