

UC1 *Mixing and mastering requires a point of reference.
A modern workflow demands for a tailored setup.
UC1: the Swiss army knife of **high quality monitoring**.*



UC1 - manual

Please read this manual before operating the unit.

Grimm | **AUDIO**

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1. Introduction

The UC1 “Universal Converter” combines an 18 I/O channel USB interface with a versatile monitor controller. It offers broad functionality for mixing and mastering at very high audio quality level, in a compact box. Please read this manual before using the UC1 to understand its operation and make optimal use of its versatility.

Applications

The number of application examples for the UC1 is endless. Its main intended use however is to function as the center piece of a modern mixing or mastering setup in a professional audio studio. Let’s have a look at how to use the various inputs and outputs in this context. The back USB is connected to your DAW computer. A main monitor loudspeaker can be connected to one of three options: the digital RJ45 Grimm LS1 / PMC ¹ connector, an analog XLR pair, or the digital AES3 XLR output. In the menu you select to which output your main monitor is connected. A secondary smaller

loudspeaker system can be connected to a dedicated XLR output pair that runs in parallel to the headphone output on the front that offers a third monitor option. Several monitor tools such as mono, side and stereo swap are available.

Next to the monitor paths, the UC1 offers a stereo analog and a stereo digital effect loop. Through these, outboard gear can be used in your DAW project. Audio levels can be monitored on a special meter display with high res peak meters.

Furthermore the UC1 offers inputs that can be used for recording into your DAW or just for monitoring. These are a second stereo digital input on the back, a stereo analog jack input on the front and a second USB input on the front, called ‘i-put’. The stereo jack input has high input impedance, so it is equally well suited for

¹ *The UC1 needs to reboot in PMC mode to send the right instructions to your digital PMC loudspeaker. Please read chapter 4 Signal Connections, under “On the back” for instructions about how to boot the UC1 in PMC mode.*

recording a stereo MP3 player as DI instrument recording.

The UC1 offers a 'Foldback' function on a few inputs, which means it can offer latency free monitoring of these inputs on headphones, mixed with the selected main audio source (for instance from the back USB). A polarity switch makes sure your headphones are in phase with your acoustic sound in case you're using a microphone.

In 'Split mode', the secondary path ('2nd out' XLR's and phones) is disconnected from the monitor path. Hence there will be no phones and 2nd out monitoring anymore. Instead these channels become an extra fixed output pathway, increasing the total USB channel count to 20 I/O channels. If you like, all 6 analog XLR channels are now available for simultaneous USB playback.

Most people will use the UC1 as a USB interface. It is however also possible to use the UC1 as a standalone converter and monitor controller, without computer connection. The 'Standalone' mode engages a fixed

routing setup. In this mode the clock settings need to be changed in the UC1 menu. When using the UC1 with the back USB connector, the computer OS controls all clock options and the clock menu of the UC1 is greyed out.

Last but not least the UC1 offers a BNC word clock input and output to synchronize the UC1 with other converters in your setup. The clock quality equals that of Grimm Audio's CC1 and CC2 master clocks.

2. Important Safety Instructions

Grimm Audio gaat er van uit dat u deze Engelstalige tekst volledig begrijpt. Als u hier moeite mee heeft dient u contact op te nemen met Grimm Audio. Op verzoek sturen wij u een vertaling toe.

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Grimm Audio da por supuesto que el texto en versión Inglesa no ofrece ninguna duda de interpretación y se entiende íntegramente. Si este no fuese su caso rogamos contacte con Grimm Audio quien, a petición, se encargaría de enviarle la correspondiente traducción.

Please follow these precautions when using this product:

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Dangerous voltage is inside this apparatus. Opening is only allowed by qualified service personnel.
6. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

7. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
8. Unplug this apparatus during lightning storms or when unused for long periods of time.
9. Do not use this apparatus near water.
10. Do not use this apparatus outside.
11. Do not expose the apparatus to dripping or splashing. Do not place objects filled with liquids (flower vases, drink cans, coffee cups, etc) on the apparatus.
12. Clean only with a dry, soft, non-fluffy cloth. Do not spray any liquid cleaner onto the cabinet, as this may lead to dangerous shocks. Do not spray any liquid cleaner onto the faceplate, as this may damage the wooden front panel.
13. Install in accordance with the manufacturer's instructions.
14. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat. Avoid exposure to direct sunlight.
15. Use only attachments or accessories specified by the manufacturer.
16. Use only with a cart, stand, bracket, or table designed for use with professional audio or music equipment. In any installation, make sure that injury or damage will not result from cables pulling on the apparatus and its mounting. If a cart is used, use precaution when moving the cart/apparatus combination to avoid injury from tip-over.
17. This apparatus typically runs warm when operated. Install in a normal ventilated area. If the product will be used in a rack, make certain there is sufficient air movement within the rack. Preferably offer some

empty rack space above the unit and do not place it on top of hot equipment.

18. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
19. **WARNING:** To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

3. Installing

Unpacking and Inspection

Your UC1 was carefully packed at the factory and the packaging it came in was designed to protect it from the trials and tribulations of shipping. Keep the box and all packing materials, so that in the unlikely event that you need to return the UC1 for servicing, you can do so safely.

AC Power Hookup

The UC1 has a 'full mains' switch mode power supply that works with all choices of mains voltage world wide. This SMPS is developed by Grimm Audio and offers the highest possible sound quality. For your safety and for optimal sound quality, always use a power outlet with proper safety earth.

The UC1 is shipped with a mains cable. Grimm Audio cannot be held responsible for problems caused by using the UC1 with improper AC wiring.

The UC1 does not have a power switch on the front panel, it needs to be powered down with the mains switch at the back. A convenient way to power down the unit is to use a power strip equipped with a switch, or a power sequencer.

The high sound quality DC coupling of the UC1's analog outputs may result in a popping sound when turning off the unit while the downstream monitor system is still turned on. We recommend to use a manual or automatic power up and power down sequence as follows: first turn the UC1 on and then the monitors. And at the end of your working day, first turn off the monitors and then the UC1.

Mounting the UC1

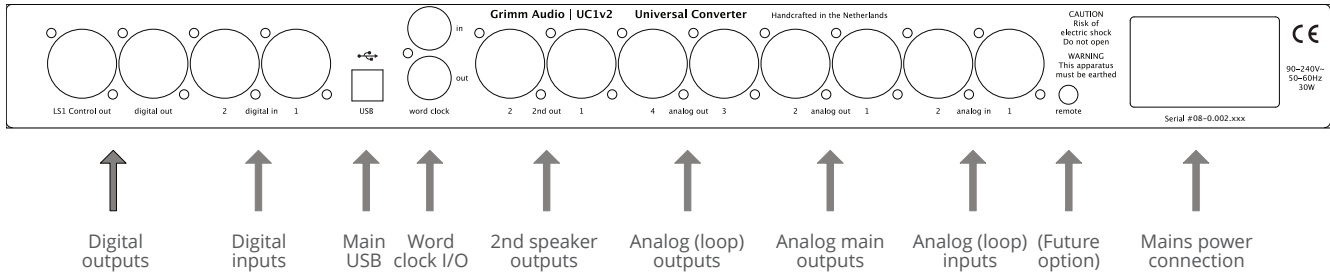
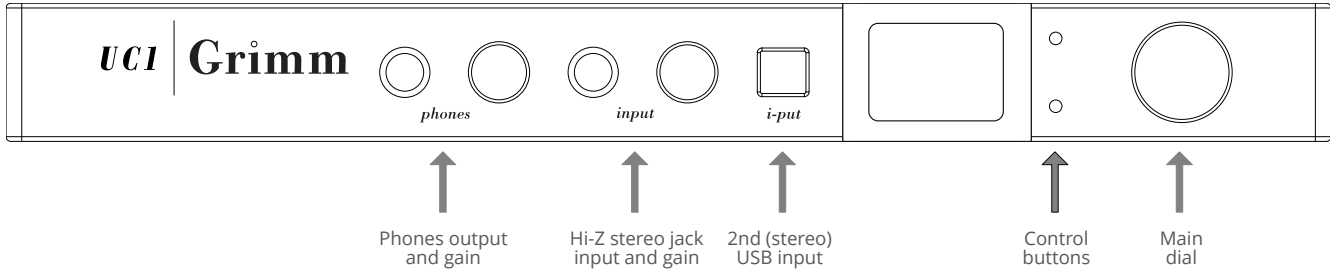
Since high quality audio electronics draw above average current, the UC1 runs warm. Note that the bottom plate is used as a heat sink, there is no active cooling. Please allow for sufficient air movement around the unit.

The UC1 does not produce strong RF fields nor is susceptible to them. You can position it near other digital gear such as computers and disk recorders without worry. In general it is a good idea to keep some distance between monitors (LCD and CRT) and audio cables because of risk of induced low level noise due to stray magnetic fields.

Grimm Audio products have a real wooden face plate that provides a beautiful and vivid appearance. The UC1 front panel is made of Padauk. The panel is finished with an environmentally friendly oil. To maintain the outstanding looks, one is advised to take some precautions:

- Use a dry woolen cloth to clean the wood.
- Do not place the UC1 in very dry environments.
- Do not use chemical or alcohol based cleaner on the wood.
- Avoid exposure to direct sun light, since the padauk wood is susceptible to discolor in UV light.

4. Signal Connections



On the back

The USB connector on the back offers a USB Audio Class 2 compliant interface. It is natively supported by Mac OS, Linux and Windows 10. For Windows 7 and Windows 8 we offer a driver that can be downloaded from the downloads section of the UC1 page of our website grimmaudio.com. Note that it is recommended to install this driver on Windows 10 too.

The UC1 can also be operated without USB, as a high quality multi-input DAC. In that case 'standalone mode' needs to be engaged for a default routing, and the clock source needs to be selected in the UC1 menu in stead of the computer OS. Please refer to the menu chapter, paragraph 'F2' and 'P2', for instructions.

All analog inputs and outputs on the back of the UC1 are XLR's. Our design aim was to avoid sub-D connectors since they are not of the same quality as XLR's. The nominal output voltage of all analog connections is +4 dBu. This is aligned to -14 dBFS, hence the clip level is at +18 dBu. These are common levels in

mastering studios. The analog inputs on the back can optionally be switched to a clip level of +24 dBu so one can drive vintage outboard gear to the max without clipping the UC1 input that receives their signal. Of course the 1:1 relation between output and input level of the UC1 is then lost.

The digital inputs and outputs are in AES3 format. Leftmost is the 'LS1 control out' cat5 connector. This is not ethernet but a proprietary combination of AES3 and midi control data. We share this type of connector with our friends of PMC. If you own a digital PMC loudspeaker such as the TwoTwo, IB2S or QB1 series, the UC1 can be setup to send the right control data and control its volume and mute function. To do this, please follow these instructions:

Boot the UC1 as PMC loudspeaker controller

Directly after turning on the UC1 a progress bar startup display can be seen on the UC1 screen. While this bar is visible, first press the top button, hold it and then press the bottom button. Release when the bar is gone. Your UC1 is

now in 'PMC mode'. In case you like to return to 'Grimm LS1' mode, reset the unit to factory default by only pressing the top button during startup.

UC1's wordclock input provides 75 Ohm termination for a wordclock source. The wordclock output is a 75 Ohm source. The UC1 clock circuitry is of similar reference quality as that of our CC1 and CC2 master clocks.

If you use more than one audio interface with your computer, we recommend to make the UC1 master and slave the extra devices via word clock. Make sure all interfaces are properly synchronized, otherwise glitches occur. To use multiple interfaces in Macintosh computers you need to make an "Aggregate Device" in the 'Audio Midi Setup' app, which combines the inputs and outputs of all devices. For more information read <https://support.apple.com/en-us/HT202000>. In Windows systems it is more complicated. ASIO does not support aggregated devices unfortunately. The workaround is to use the *ASIO4ALL* driver that can combine USB Audio Class 2 devices such as the UC1 and present them as one ASIO device. For more information visit asio4all.org.

The UC1 can slave to word clock, Digital in 1 and Digital in 2. This enables you to monitor and record digital sources that cannot be slaved to the UC1 word clock output such as CD players or digital guitar modellers. Mark that S/PDIF sources can be connected via an S/PDIF to AES adapter cable (that can be found in the Grimm Audio webshop).

The PLL that synchronizes the UC1's internal clock to the external clock is of a very special kind. It achieves lock very fast and then gradually increases its jitter suppression down to very low jitter frequencies, effectively only following very slow drift of the source clock. This proprietary 'Hybrid PLL' technology offers the best of both worlds: instant lock so there is no gap when switching sample rates, and high jitter suppression as well. Standard PLL's will either lock fast or offer high jitter suppression.

The UC1 has two digital stereo inputs. Please note that your DAW can only record data from these sources if they are synchronous with the UC1 clock. To achieve this, you can slave the UC1 system to digital input 1 or 2,

but not to both at the same time. If you like to record from both inputs simultaneously, please make sure that all devices that are not used as clock source are synchronized by means of the UC1 word clock or AES outputs.

On the front

A unique feature of the UC1 is its front USB input, the 'i-put'. It is intended to connect a secondary stereo USB source such as a laptop or smart device to the UC1 and your DAW. This front USB works without driver on Mac OS, Linux, Windows 10, iOS and Android.

Smart devices are often connected wireless to a computer. The advantage of using the i-put with a smart device is that in contrast with wireless connections all sample rates and bit depths are supported and data is transferred bit transparent. It may also offer you a more reliable connection.

To use the USB front i-put, please note these two important instructions:

1. The UC1 sample rate cannot be controlled from the front USB. As a result the UC1 can only play audio from the front USB input if the playback sample rate of the device is the same as the current UC1 sample rate. In case the device playback sample rate does not match the UC1 sample rate, the i-put meters in the main and secondary displays are red lined and the sound is muted.

2. If you like to connect an Apple smart device such as an iPhone or iPad, a special conversion cable called "Lightning to USB3 camera adapter cable" or "USB-C to USB adapter cable" (depending on your device) is needed. These cables carry a chip that enables audio playback to USB from iOS devices. Some cables also provide a means to power the iDevice externally.

The front analog input is a stereo unbalanced 6.3mm jack with a gain control next to it. It can be used for instance when someone brings in an analog MP3 player with a reference track. This input has a high input impedance of 1 MOhm so it doubles as an instrument input to for instance dub a guitar or bass line in your

mix. The monitor system of the UC1 can be set to audition this single channel input mono on both channels.

Leftmost on the front is a 6.3mm headphone output with gain control. The acoustic sensitivity of headphones on the market varies by as much as 30 dB. Consumer ear buds are more or less standardised on a sensitivity of approximately -14 dBu for 100 dBA. Some professional 600 Ohm headphones however may need as much as 15 dBu to reach 100 dBA. The UC1 is targeted at the professional audio market and therefore offers enough gain to drive these headphones.

Please be aware that with sensitive headphones the UC1 can produce sound pressure levels that can cause immediate and serious hearing damage! Grimm Audio does not take any liability to hearing loss when using the UC1. Please act responsibly and protect yourself!

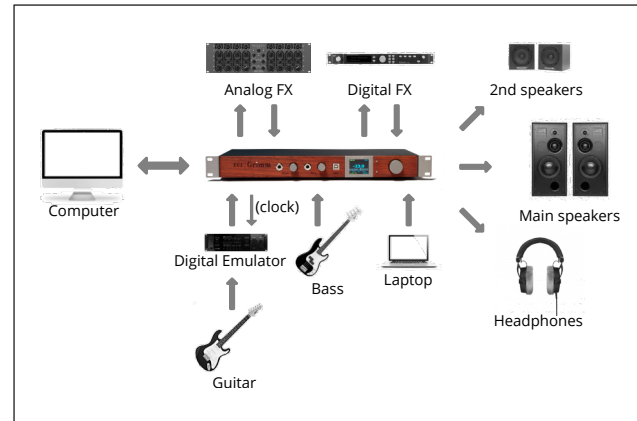


Figure 1. UC1 application example.

Figure 1 shows a typical application example of the UC1. The DAW runs on the *Computer* on the left, but audio can also be played from the *Laptop* to the second USB 'i-put'. A *Bass* guitar is connected directly to the front jack, a *Guitar* via a *Digital Emulator* to a digital input on the back. The *Emulator* is synchronised via word clock, which also improves its sound quality. There's an *Analog* and *Digital effects loop*. Monitoring can be done on *Main* and *2nd* speakers and *Headphones*.

5. Operation

The UC1 functions are controlled with the main dial on the right in combination with the two small push

'Hidden functions' of the UC1

- *Press the main dial briefly to mute the main speakers and turn on the headphone output. Press briefly again to return to the main speakers.*
- *Press-hold the main dial until the indicated source starts blinking. Then turn to change the monitored source. Release to select. Alternatively, release the dial when the blinking starts. Then turn to change source. Press briefly to select.*
- *Press-hold the top control button to enter the metering display. Press-hold again to exit.*
- *Press-hold the bottom control button to exit or enter Foldback mode, when enabled via the menu.*
- *Check chapter 4 Signal Connections, "On the back" for instructions about how to set the cat5 output to PMC digital monitor control or reset the UC1 to factory default settings.*

buttons next to it. But before we look at that in more detail, let's first walk through the internal routing of the device.

Routing

Figure 2 shows the routing diagram of the UC1 in 'normal mode'. All 10 inputs are routed to their respective USB channels transparently without any form of processing. Similarly all 8 USB channels from the DAW flow unaltered to the outputs on the UC1 - except for the 2 USB channels that are associated with the main output. Mark that one can still audition the USB sources of that pair, but only via the monitor path that's described in the next paragraph. We recommend to assign these USB channels to the master channels of your mixing desk.

The yellow blocks in figure 2 show the monitor path of the UC1. All 18 I/O channels can be routed to this monitor path. They can be auditioned in their original stereo form, or in mono (L+R), side (L-R) or in swapped

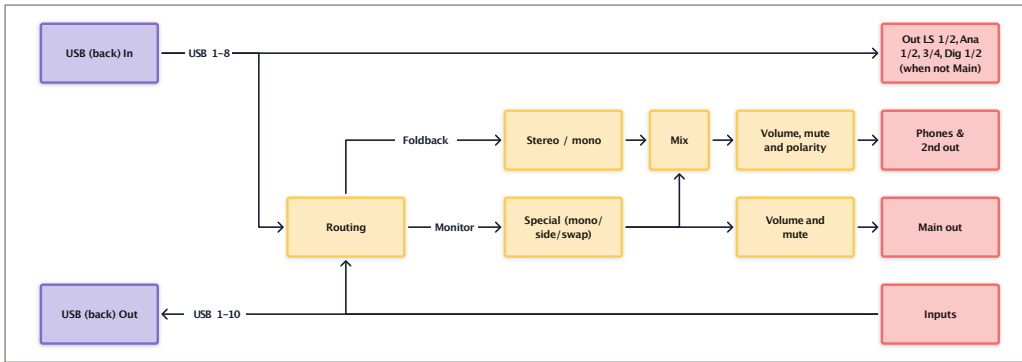


Figure 2. UC1 internal routing in normal mode.

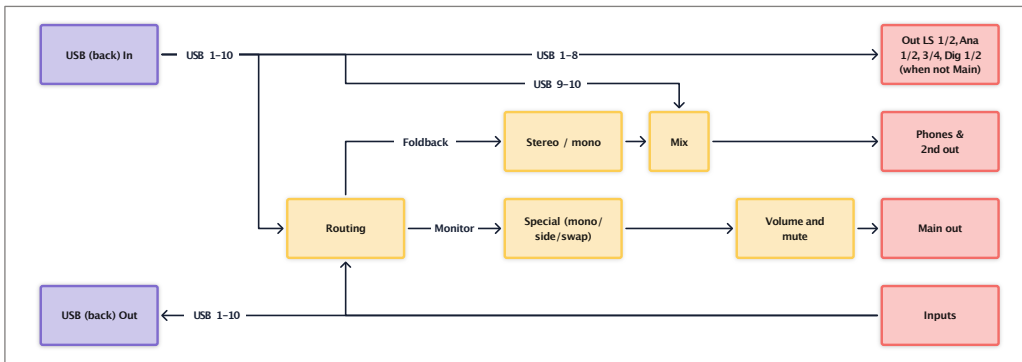


Figure 3. UC1 internal routing in split mode.

channel order form. They then receive digital volume control & mute (both channels or L or R mute).

In a parallel path two other channels can be selected for 'foldback' and mixed with the selected main source. This is most helpful when recording a live instrument or vocals and the latency through the computer OS hampers your performance. The foldback can only be heard on the phones and 2nd speaker output, to avoid possible high SPL feedback. For foldback, the back analog (1&2), front analog (3&4) and back digital (1&2) inputs are available, both in stereo and mono.

The foldback mix is static. To change the balance, please use the faders of your DAW to align the reference channel levels with that of the recording channels. After the mixer block, the monitor gain and mute of the headphones and 2nd speaker output are controlled, plus the polarity of the phones.

Figure 3 shows the routing diagram in 'split mode'. The 'phones & 2nd out' channels are now disconnected from the monitor path. In stead they are directly connected to

USB inputs 9 & 10, without volume control (except for the knob next to the phones jack). It is still possible to mix in a foldback signal. Read more in the Menu chapter, 'P2'.

In case the UC1 is used without computer connected to the back USB, some physical in- and outputs can get a fixed routing by enabling 'standalone mode' in menu P2. Analog in 1&2 is then routed to digital out 1&2 and digital in 3&4 is routed to analog out 3&4. The main out and monitor path selections remain functional for all inputs.

Buttons and display

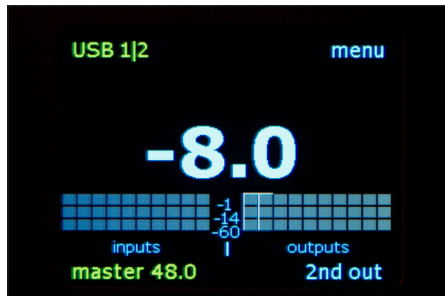
Most functions of the UC1 are adjusted via the main dial and the two control buttons on its left side. Additionally there are knobs for the phones output gain and the jack input gain.

The main dial can be turned and pushed. In normal operation, turning will change the gain of all monitor paths (main, 2nd and phones) and pushing mutes the

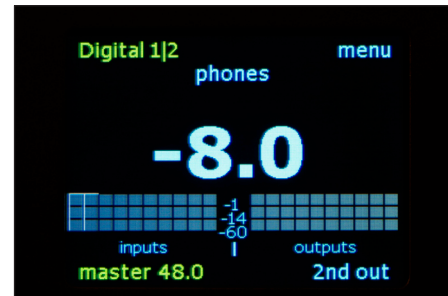
speakers while engaging the headphones output on the front. When press-holding the main dial, the current monitor source (indicated top left of the display) starts blinking. Keep pressing the main dial while turning it to change the monitor source. All inputs and outputs can be selected. Their name is shown in the display and their channels are highlighted in the meter. When releasing the dial the indicated source stays selected. Alternatively, release the dial when the blinking starts. Then turn to select a source and press to confirm.

The large number in the display indicates the current monitor gain level in dB's. The monitor outputs offer 8

dB of clean gain above '0' on the display. In other words: a full scale signal will only reach full scale on a monitor output if the monitor gain is set to +8 dB. This may seem odd, but the idea is that the '0' indication of the display is your reference playback level to which you always return after a louder or softer playback. This is common practice in mastering. The '0' level is usually aligned with an SPL of 79dBC when playing a SMPTE reference noise signal on a single channel. The Grimm LS1 is factory aligned to that, you may adjust the gain of your 3rd party amplifier to achieve the same result - or to select another acoustic SPL that suits you as reference playback level. In case you feel the need to



Main screen, USB 1/2 selected



Main screen, Digital 1/2 selected, in phones mode

adjust the '0' level of the UC1, you can change it in menu P2 (see chapter 6. Menus).

Note that the monitor gain can be set to display values up to +18, which means that there is 10 dB of positive gain available in the UC1 to audition very soft noises. Note that any signal above -10 dBFS will in that case clip – please use this extra gain with caution!

The volume control is in 0.5 dB steps above -17 dB and 1 dB below it. If you have a Grimm Audio LS1 or PMC digitally controlled loudspeaker connected to the cat 5 output on the back, the volume control takes place in the DSP of the loudspeaker. In all other cases the volume control is in the DSP of the UC1. At volume setting '+8' the data to the digital output and built-in DACs is put through transparently. At other levels the digital gain control is properly dithered at 24 bits. Optionally, volume control of the main out can be disabled in the menu. In that case the indicated monitor gain only applies to the 2nd out and phones.

Note that volume control in the internal DSP of Grimm Audio LS1 or PMC loudspeakers that are connected to the cat5 output is always enabled, even when volume control of the Main out is disabled or when Main out is for instance set to Analog 1&2. In the latter case, the cat5 output is always routed from USB 1&2, so it does not follow the monitor selection. But it does still forward the volume setting of the main dial to the speakers.

The knob to the right of the phones jack can be used to align the headphones' acoustic level with that of your main monitor system. The idea is to switch between speakers and phones (taking off your headphones when listening to the speakers) and adjust this knob until speakers and phones sound equally loud to you. From then on just use the main dial for changing your monitor gain and leave the phones control at its calibrated level.

In the bottom left corner of the display the clock status of the UC1 is indicated. When the UC1 is connected to a computer via the USB connector on the back, these

settings are controlled from the computer Operating System.

When the back USB is not connected to a computer, the clock source can be set manually. Please refer to the menu chapter for instructions. If the UC1 is set to slave to an external source (BNC Word Clock, AES Digital 1 or 2), and it is not locked, the clock status turns red and blinks.

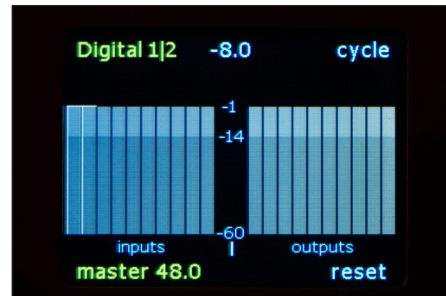
The current function of the two small buttons is indicated by the text on the display next to them. In the main screen the bottom button gives access to the 'soft key' function, like switching to the '2nd out'. The top button brings you into the menu. Since the first menu page offers access to various monitor tools, this button can be used quite regularly. More details can be found in the menu chapter.

Meters

In the main screen a simple three stage meter indicates the current levels for all inputs and outputs and the

current monitor output. The stages are: -1 dBFS to show you're close to clipping; -14 dBFS which is the nominal level of the UC1; -60 dBFS to show presence of signal.

Note: When viewing the 'ana 1/2' inputs on the DAW meters in your computer you may see a static signal when no input signal is present. This is caused by DC offset from the UC1 AD converters (a common thing in most AD converter chips). Grimm Audio has disabled the built-in high pass filters of the chip since they affect the sound quality. The DC offset is calibrated during production and the remainder is at a neglectable level of app. -80 dB. Use a DC offset removal tool in your DAW if it still poses a problem.



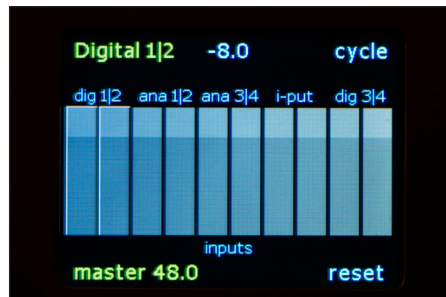
Metering screen, inputs & outputs view

By press-holding the top ‘menu’ button, the display changes from the main screen to the metering screen with higher resolution meters. Another press-hold brings you back to the main screen. In the metering screen the two control buttons have a different function: the top button enables cycling through the three metering screens: inputs & outputs / inputs / outputs (the latter two offer a larger view with more detail, like channel names). The bottom button resets the peak hold.

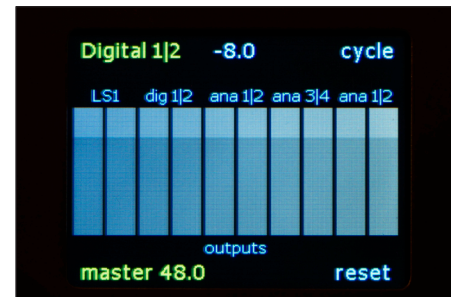
The meters are fast responding sample peak meters, intended for quick evaluation of incoming and outgoing

levels. The nominal level is at -14 dBFS, which is +4 dBu on the analog XLR’s. The rightmost meters in the “inputs & outputs” and “outputs” screens shows the current level and name of the monitor output. In the metering screens the current monitor gain setting and destination are indicated at the top in the middle. The monitor source and clock status are indicated just like in the main screen.

Hint: many mastering engineers use an analog or digital hardware VU meter. When using Grimm Audio LS1’s as monitors, such a meter can be connected to Analog out 1/2. When using 3rd party analog monitors this output is your



Metering screen, inputs view



Metering screen, outputs view

main output. In that case you may consider to assemble a cat5 to AES conversion cable and connect the VU meter (via a spare DAC if the VU is analog) to the 'LS1' cat5 output. This output is always bit transparent from USB. The cat5 pinning layout can be found in the 'Specifications' chapter at the end of this manual.

USB settings in the computer OS

The UC1 can be used with Macintosh, Windows and Linux operating systems. It also works seamlessly with iOS and Android devices, though these will usually only be used with the second (stereo only) USB connector on the front (the 'i-put').

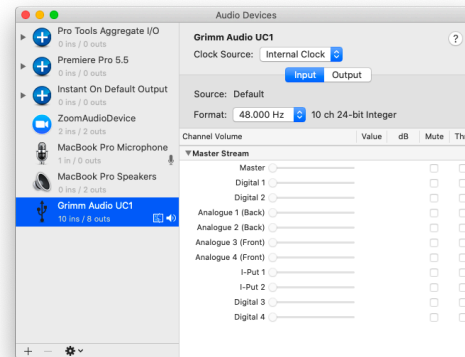
Windows and Linux users, please read the Macintosh description below for general info.

Macintosh

Mac OS offers native support of UC1's USB interface via Core Audio, no driver is needed. All settings are accessible via the Apple 'Audio Midi Setup' app. In the

UC1 'Inputs' page all channels have the names of the linked connectors on the UC1 back and front. Note that 'Digital 1' and 'Digital 2' are from the Digital in 1 XLR and 'Digital 3' and Digital 4' are from the Digital in 2 XLR. All control faders in the driver are disabled since the UC1 driver transfers all inputs transparently.

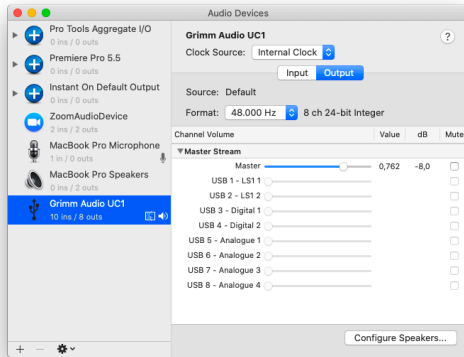
In the 'Outputs' page, the top 'Master' fader controls the monitor path gain in the UC1. When changing the monitor gain in the UC1 you will see this fader move,



Mac OS Audio Midi setup UC1 inputs page.

and when moving the fader you will see the monitor gain number on the UC1 display change. In case you disabled 'PC control of midi/volume' in the UC1 preferences menu, the fader can still be moved, but it does not affect the UC1 monitor gain anymore.

Note that when the UC1 display indicates "0", the driver will show "-8 dB". This is intentional. The '0' level of the UC1 display is a reference level, linked to an acoustic SPL. The '0' level in the OS driver is related to the

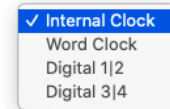


Mac OS Audio Midi setup UC1 outputs page.

amount of digital gain of the monitor path volume control. This is how the OS driver is designed by Apple.

Below the Master fader you see 8 output faders (10 in 'Split' mode). They are disabled (greyed out) since the UC1 transfers the audio data transparent without volume control to the outputs. The channel names in the USB driver carry both the USB channel number and the name of the connected physical output. When monitoring these sources in the UC1, the USB channel numbers are indicated in its display. Mark that 'Digital 1' and 'Digital 2' are the two channels of the single XLR digital output on the back.

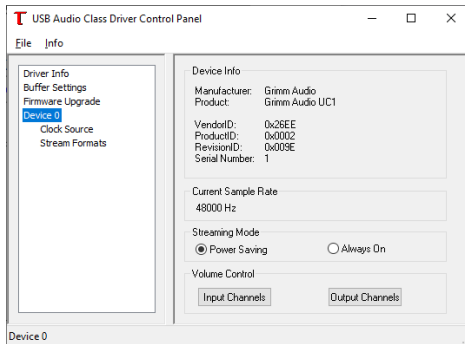
The clock source can be set from the USB driver page. The options are: Internal Clock, Word Clock, Digital 1|2 and Digital 3|4. When the UC1 is in master mode ('Internal Clock'), sample rates from 44.1 to 192 kHz can



Mac OS Audio Midi setup UC1 clock options.

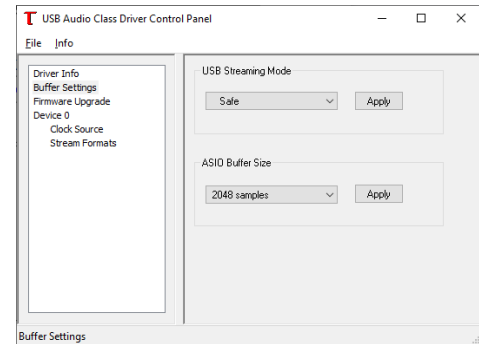
Windows

Windows 10 offers native support of the UC1 via 'USB Audio Class 2'. However, clock selection is not available via this default driver so we recommend to still install the Grimm Audio Windows driver ('Control Panel'). You can find the installer on the UC1 page of the Grimm Audio website. Please mind to keep the UC1 turned on and connected to a USB connector of the PC when installing this driver.

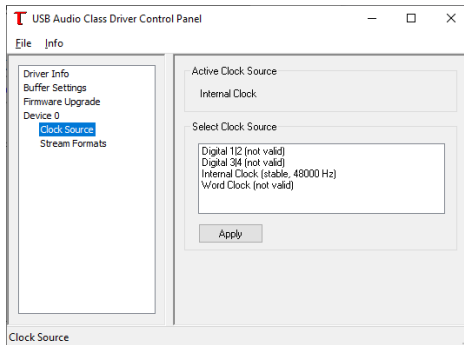


Windows driver Device settings.

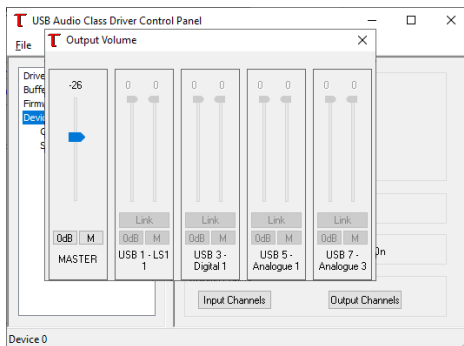
Operating the UC1 on Windows with the Grimm Audio Control Panel is very similar to using it on Macintosh, so please read the previous pages for in depth information. Below you see screenshots of the Windows Control Panel Device settings and the Buffer settings. The optimal ASIO buffer size setting mainly depends on your computer system performance, it may need some experimentation to find the best value. The clock and output fader settings windows are shown on the next page. As said, they behave similarly like on a Macintosh, so please refer to that section for more info.



Windows driver Buffer settings.



Windows driver Clock settings.



Windows driver Outputs settings.

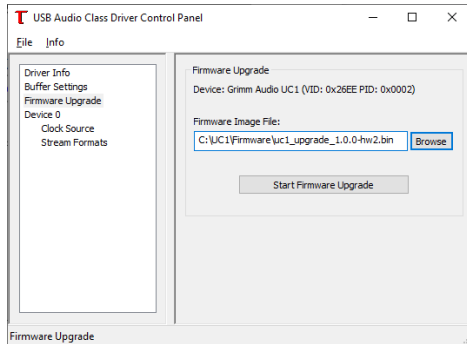
Updating your UC1 firmware

Occasionally we will release an update to the firmware of your UC1. To keep informed about firmware updates, please subscribe to our newsletter at the footer of our website pages. In the downloads section of the UC1 web page at grimmaudio.com the latest firmware can be downloaded. To perform the update you need a Windows computer with the Grimm Audio Control Panel installed. We are sorry that at this moment updating is not possible with a Macintosh or Linux computer.

Before running the update, please check the current firmware version of your UC1 to make sure an update is needed. The firmware version can be found in the UC1 S1 menu (see the next chapter) but also via the OS of your computer. On Windows, open the Grimm Audio Control Panel and select the “Device info” page (as indicated on the previous page). The version is indicated in the “RevisionID” (for instance “0x0100” is version v1.0.0). Compare that to the indicated ID of the update and you will know whether an update of your device is needed.

To check the current firmware version of your UC1 on Macintosh, open the “System Information” app via Spotlight, or go to Apple Menu / About this Mac / System Report. Look for ‘USB’ under ‘Hardware’. Here the UC1 is listed as “Grimm Audio UC1”. Select it and at ‘Version’ you will find the version of your UC1’s firmware.

In case an update is needed, first perform a ‘Factory Default’ reset as described under the next subheading.



Windows driver UC1 Firmware update.

The latest '.bin' firmware update file can be downloaded from the UC1 page at grimmaudio.com. Store it in a folder of choice. Next, open the Windows Grimm Audio Control Panel and click the 'Firmware Upgrade' tab. Select the downloaded .bin file as 'Firmware Image File'. Click 'Start Firmware Upgrade' and wait for the 'Firmware download succeeded' prompt to appear. Do not disconnect the UC1 before the update is finished!

Press 'Finish' to finish the firmware upgrade procedure. Click 'Device 0' in the left column, the 'RevisionID' should now indicate the new firmware number.

Reset your UC1 to Factory Defaults

In case your UC1 shows odd behavior or when you like to restore all menu items to their original settings, you may restore the factory defaults by pressing the top button while the progress bar is visible during power up.

6. Menus

The UC1 has many functions, preferences and system setup items that can be controlled from the menu. To enter the menu, press the top button with 'menu' next to it on the display. You will see a screen with 6 tabs, labeled F1 and F2 for Functions, P1, P2 and P3 for Preferences and S1 for System info. We walk you through all these settings in the pages below. To move to the next tab, press the top button 'next tab'. To exit the menu, press the bottom button 'exit'. Note that the exit button is disabled when an option is selected and its arrow is blinking. Turn the main dial to select a function, press to change it, then turn to browse the options and press again to confirm your choice.

F1 menu

Whenever you enter the menu, the F1 page will be available first. This page gives access to monitor functions that are often used.

- Monitor source. You can select all inputs and outputs here by pressing the main dial briefly (the arrow starts blinking) and then turning the dial. When you reach the last source, the order wraps and the first source appears again. To confirm a choice, press the dial again (the arrow stops blinking). This item does the same as press-hold the main button and then turn. The result is immediately visible in the left top corner of the display, and the selected source becomes audible.

Grimm LS1 customers, please note that the UC1 cannot select the analog and digital inputs of the LS1 as a source. In case you need to access these, please use the

```

Dig In 1|2  -8.0  next tab
| F1 | F2 | P1 | P2 | P3 | S1 |
> monitor source: Dig In 1|2
special: stereo
foldback: off
mute: L | off | R
master 48.0  exit

```

F1 menu.

LS1 PC Remote software with the UC1. It is not possible to combine the UC1 with the LS1r hardware controller and LS1i USB interface. The UC1 replaces these.

- **Special.** After a press of the dial the choices are stereo / mono / side / swap. Note that mono = L+R and side = L-R (they are also known as 'M' and 'S'). "Swap" flips the left and right channels (this changes your mental perspective of a mix which can sometimes help to make decisions). At the end of the dial the order wraps back to stereo again. This makes it possible to AB compare stereo & mono, mono & side and swap & stereo. If you confirm a choice by pressing the dial once more, the arrow stops blinking. If you then exit to the main screen the function is shown in the screen (except for 'stereo', which is the normal state).

- **Foldback.** With this function the signals from Analog 1&2 (on the back), analog 3&4 (on the front) or digital 1&2 (on the back) can be mixed with the selected source. In this menu you choose which signal you like to mix in for foldback. You may choose to mix them as a stereo pair, or select a mono version of one channel. If

foldback is engaged, this is indicated in the main screen. Please mind to not mix the recorded channels into the monitor mix of your DAW or you will hear them double.

When in the main screen - as a quick access feature - a long press of the bottom button turns off and on foldback (in case a foldback source was selected in the menu).

- **Mute.** To mute the loudspeakers from the main screen you just press the main dial. This turns off the selected speakers and turns on the phones at the same time: it toggles between speakers and phones. In some cases however it is helpful to listen to the audio on just one channel. This 'mute' menu item is intended for that. It enables you to either mute the left channel or the right channel so you can listen to the audio on just one speaker (you will see "L" or "R" in the main screen if you confirm your choice, the unmuted channel is shown).

Possible uses for this feature are when you use the UC1 in an improvised setup and you like to check if the sound color of your left and right loudspeaker positions

is similar (please engage 'mono' for that first so both channels have the same audio). Another good use case of mono sound on one channel is mixing on a small '2nd' speaker. Many experienced engineers know that making the initial mix balance in mono on a single small speaker helps to make the right decisions faster.

F2 menu

- Clock. This setting is only available when the back USB is not connected to a computer (normally the USB host controls the UC1 clock). It allows you to choose all sample rates from 44.1 to 192 kHz in master mode, or to slave to word clock, digital in 1 or digital in 2.

- Autoswitch clock. This setting influences the UC1 behavior when in slave mode. When 'yes' the UC1 clock rate will follow any change of the selected clock source. When 'no', the UC1 will maintain the clock rate that it found when first slaving to the selected clock source. If the source then switches sample rate, the clock indication on the display will turn red and start flashing to indicate it lost lock. The 'no' mode is helpful when you

are running a project with a specified sample rate and it should keep running at that rate, even when by accident the source that you sync to changes sample rate.

- 2nd out. This flips the monitor path to the 2nd speaker output XLR's on the back (main and phones are muted).
- Compare mode. This mode is used when comparing two sources at equal loudness, for instance when evaluating the impact of a compressor/limiter in the analog loop. Usually the external processor will have changed the signal's loudness and when flipping between the two sources, this loudness jump hampers

```

Dig In 1|2   -8.0   next tab
| F1 | F2 | P1 | P2 | P3 | S1 |
  clock: master 48.0
> autoswitch clock: yes
  2nd out: off
  compare mode: off
master 48.0   exit

```

F2 menu.

a proper quality judgement. In compare mode the volume setting is memorized for every source individually instead of global.

So if you listen to the first source, adjust the volume to taste, then switch to the second source and adjust that volume to a similar level. Now, flipping between the two sources can be done at equal loudness. To indicate that compare mode is engaged, the volume number turns green.

P1 menu

The P1 menu is the first of three Preference menus. These are settings that are usually only changed to tailor the UC1 to your system setup.

- Main out. Here you select your main monitor output. There are three options: LS1 / PMC on cat5, Dig out 1|2 and Ana out 1|2. The selected output receives volume control and plays the audio from the selected source via the UC1's internal routing. Its 'native' USB channels should be used as main output channels of the DAW.

Playback of these channels will be interrupted when another monitor source is chosen.

- Max in Analog 1|2. This preference let's you choose between 18 dBu or 24 dBu as maximum modulation (0 dBFS) input voltage. The default is 18 dBu, so that an analog loop with 0 dB gain shows the same return level as send level (all UC1 outputs have a maximum modulation at 18 dBu). In case your analog effects loop has a vintage device that you like to drive to maximum swing, you can change this setting to 24 dBu so the UC1 input will not clip on such high signal levels.

```

Dig In 1|2  -8.0  next tab
| F1 | F2 | P1 | P2 | P3 | S1 |
> main out: Ana Out 1|2
max in Analog 1|2: 18 dBu
main out volume: on
pc control (midi/volume): on

master 48.0  exit

```

P1 menu.

- Main out volume. By default it is turned on. Some people prefer to use an external analog volume control in stead of the internal digital one. They can disable the main out volume control here. Volume control of 2nd out and headphones will still work.
- PC control (midi/volume). In some cases apps on your computer can interfere with the Grimm Audio LS1 midi commands that control its DSP functions, or vise versa. In case you experience these kind of problems, you may turn off midi and USB volume communication between the computer and the UC1 entirely by turning the preference 'off'. Please mark that the LS1 'PC remote software' then loses its communication path. If you need to change internal settings of the LS1, you can temporarily enable this preference, run the PC remote, and turn the setting off when you're done.

P2 menu

- Monitor mode. In 'normal' mode the three monitor outputs (main, 2nd speaker and phones) alternate. Only one is active at a time.

In 'split' mode the 2nd speaker and phones paths are decoupled from the monitor system and become an independent path for USB 9&10, without any digital volume control. The 2nd out and phones channels carry the same signal and are always on. The rightmost channels in the meter display now show the USB 9&10 levels in stead of the monitor output levels.

'Split' mode is used in cases where more outputs are needed (all 6 DAC channels are now available independently). A typical use case is a small studio recording setup, where a musician is recorded in a booth. The USB 9&10 path is used to send a dedicated

```

Dig In 1|2  -8.0  next tab
| F1 | F2 | P1 | P2 | P3 | S1 |
> monitor mode: normal
soft key: 2nd out
phones phase: normal
ref level: -8.0dB

master 48.0  exit

```

P2 menu.

mix for the musician to a headphone amp in the booth. The UC1 Foldback function can be used to add his own instrument with low latency to the USB 9&10 mix. The headphones output of the UC1 can be used by the engineer to monitor what the talent is hearing, while the main monitor output plays the final mix, or copies the talent mix by selecting USB 9&10 as monitor source.

In 'standalone' mode a fixed routing is set. This is intended to be used when the back USB is not connected to a computer. Analog in 1&2 is then routed to digital out 1&2, and digital in 3&4 is routed to analog out 3&4. The main out and monitor path selections remain functional for all inputs.

- **Soft key.** Here the function of the bottom button in the main screen can be selected. You can choose between: *2nd out* (switch to 2nd speaker output); *special* (enable the selected 'special' function from menu F1, like mono or side); *dim 12 dB* (attenuate the output by 12 dB); *compare mode* (enable the compare mode of menu F2); *fast 0 dB* (set the volume level to the current reference level).

- **Phones phase.** This flips the polarity of the headphones output. Since there is no official standard for the relationship between the electrical signal polarity and the acoustical pressure polarity of headphones, a positive going electric pulse can result in a pressure increase on some brands' headphones and a pressure decrease on others. The UC1 polarity switch can be used to achieve a positive polarity with your microphone / headphones combination so that an increase in pressure in front of your microphone will result in an increase in pressure inside your headphones.

This option can improve voice foldback monitoring sound quality when using the UC1 with a microphone and mic preamplifier. Since headphones always show some leakage from environmental sounds, selecting the right polarity will improve the coherence of the leaked acoustic sound of your voice with the folded back electric sound. This usually results in a warmer and more pleasant sound experience when singing or speaking. You can find the optimal polarity by talking into your mic with headphones on and foldback

engaged, and then switching between normal and inverted phase. Select the version that has most subjective bass.

- Ref level. When this line is selected, a press on the main dial stores the current volume level as the new '0 dB' reference playback level. The procedure is as follows:

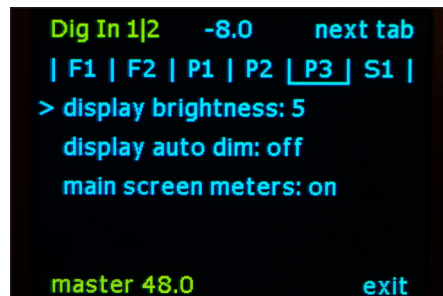
1. In normal operation, set the volume to your liking with the main dial.
2. Enter the menu, select the menu item 'ref level' in P2, and then press the main button. This sets the new ref level of the display.
3. The playback volume does not change, but the display now indicates '0.0' at this volume level. The ref level menu item shows the current attenuation at a 0.0 display.

The default setting of the ref level is -8 dB, which means that the UC1 monitor output has 8 dB of gain available above the reference setting. If you need more or less 'excess gain', you can change it here.

P3 menu

In this menu a few display related settings can be changed.

- Display brightness. This function controls the brightness of the display from 1 to 10.
- Display auto dim. If auto dim is turned on the display will turn off a few seconds after a control is used.
- Main screen meters. This enables or disables the simple 3-stage meter on the main screen.



P3 menu.

S1 menu

This menu shows the hardware and firmware versions of your UC1. It also shows if the UC1 is booted in LS1 mode or PMC mode. Please read chapter 4 Signal Connections to learn how to change the UC1 from LS1 mode to PMC mode or back.

```

Dig In 1|2  -8.0  next tab
| F1 | F2 | P1 | P2 | P3 | S1 |
  about: Grimm Audio UC1
  hardware version: 2.0
  firmware version: 1.1.3
  speaker type: LS1

master 48.0  exit

```

S1 menu.

7. Specifications

- Analogue output specifications
 - Clip level: +18 dBu \pm 0.2 dB
 - THD+N: -100 dB
 - SNR: 114 dB
 - Output impedance: <25 Ohm below 20 kHz
 - Headphone 6.3 mm stereo jack max 15 dBu in 600 Ohm (30 mW)

- Analogue input specifications
 - Clip level: XLR +18 or +24 dBu \pm 0.2 dB, Jack -18 dBu to +18 dBu \pm 0.2 dB
 - THD+N: -105 dB
 - SNR: 115 dB
 - Input impedance: 20 kOhm below 20 kHz
 - 6.3mm stereo jack input impedance 1 MOhm

- Digital input and output specifications
 - AES3 on XLR
 - Impedance 110 Ohm
 - Sensitivity 200 mVpp - 5 Vpp

- Clock specifications
 - Sample rates: PCM 44.1 kHz - 192 kHz
 - Internal intrinsic clock jitter <0.6 ps RMS (> 10 Hz)
 - Clock frequency master mode: 44.1 or 48 kHz \pm 20 PPM, -5 +50 °C
 - BNC Word Clock 75 Ohm input and output impedance, 5V

- General specifications
 - Power supply voltage 90-240 VAC, 50/60 Hz
 - Power consumption: 30 W
 - Fuse: F630 mA
 - Maximum ambient temperature for operation: 40 °C
 - Life expectancy power supply electrolytics > 45.000 hr
 - Weight: 3.5 kg
 - Dimensions: 435 x 230 x 44 mm (ex. rack ears)
 - Wood type of front: Padauk

LS1 cat5 to XLR AES3 conversion cable

In case you do not have a Grimm Audio LS1 or PMC digital monitor, the LS1 cat 5 output stays unused. The LS1 cat5 does not carry ethernet signals, but AES3 for audio plus bidirectional midi for control data like volume. When you need an extra output, this cat5 output can be turned into an extra AES3 XLR output by means of a simple conversion cable. In figure 4 below, the pinout of the cat5 ("LS1") and male XLR connector are given. Please let a skilled technician make such a conversion cable from a cat5 ethernet cable and a male XLR connector.

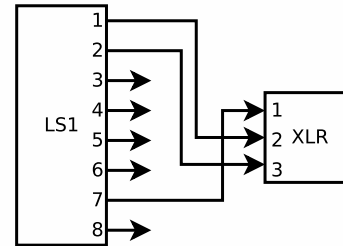


Figure 4. LS1 cat5 to male XLR AES3 conversion cable pinout.

8. Grimm Audio Limited Warranty

Grimm Audio BV (“Grimm Audio”) warrants this product to be free of defects in material and workmanship for a period of two (2) years for parts and for a period of two (2) years for labor from the date of original purchase. This warranty is linked to the serial number of the device and can be transferred to second hand owners if they can show their purchase bill.

The original owner can extend his limited warranty to a period of five (5) years for labor and parts if he becomes member of the Grimm Audio Community and sends his purchase details to the Grimm Audio factory via the webform at grimmaudio.com/warranty. The extended warranty is enforceable only by the original retail purchaser and cannot be transferred or assigned.

During the warranty period Grimm Audio shall, at its sole and absolute option, either repair or replace free of charge any product that proves to be defective on inspection by Grimm Audio or its authorized service representative. In all cases disputes concerning this

warranty shall be resolved as prescribed by law. To obtain warranty service, the purchaser must first call or write Grimm Audio at the address and telephone number printed below to obtain instructions where to send the unit for service. All enquiries must be accompanied by a description of the problem. All authorized returns must be sent to Grimm Audio or an authorized Grimm Audio repair facility postage prepaid, insured and properly packaged. Proof of purchase must be presented in the form of a bill of sale or some other positive proof that the product is within the warranty period. Grimm Audio reserves the right to update any unit returned for repair. Grimm Audio reserves the right to change or improve design of the product at any time without prior notice.

This warranty does not cover claims for damage due to abuse, neglect, alteration or attempted repair by unauthorized personnel, and is limited to failures arising during normal use that are due to defects in material or workmanship in the product.

In no event will Grimm Audio be liable for incidental, consequential, indirect or other damages resulting from the breach of any express or implied warranty, including, among other things, damage to property, damage based on inconvenience or on loss of use of the product, and, to the extent permitted by law, damages for personal injury.

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Grimm Audio UC1 manual v1.2.6v1, 28/9/22

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