Grimm | AUDIO

MU1 manual

MU1 Software Manual, to be read next to the Hardware Manual

Please read this manual before operating the unit!

For firmware version v1.5.0

1 Table of Contents

2 Introduction

Thank you for purchasing the Grimm Audio MU1 media player. It is designed to be the most sophisticated and best sounding music player on the market and at the same time blend seamless in your daily music playing routine. Core of the MU1 technology is an FPGA processor board of our own design that offers the highest quality oversampling and de-jittering. The amount of work and knowledge that went into this project can hardly be overestimated. All this effort resulted in an elegant box of minimalistic design that humbly steps out of the way for the music. We are grateful that we were allowed to develop this gem and wish you many pleasurable hours of listening.

In this manual you will find all information related to the software of your MU1. Since this software is regularly updated, we decided to offer the MU1 software manual only as download. Your MU1 was shipped with a printed MU1 hardware manual. Please read it carefully for your own safety. You can also download a pdf of the MU1 hardware manual on the MU1 page of our web site grimmaudio.com.

The Grimm Audio Team
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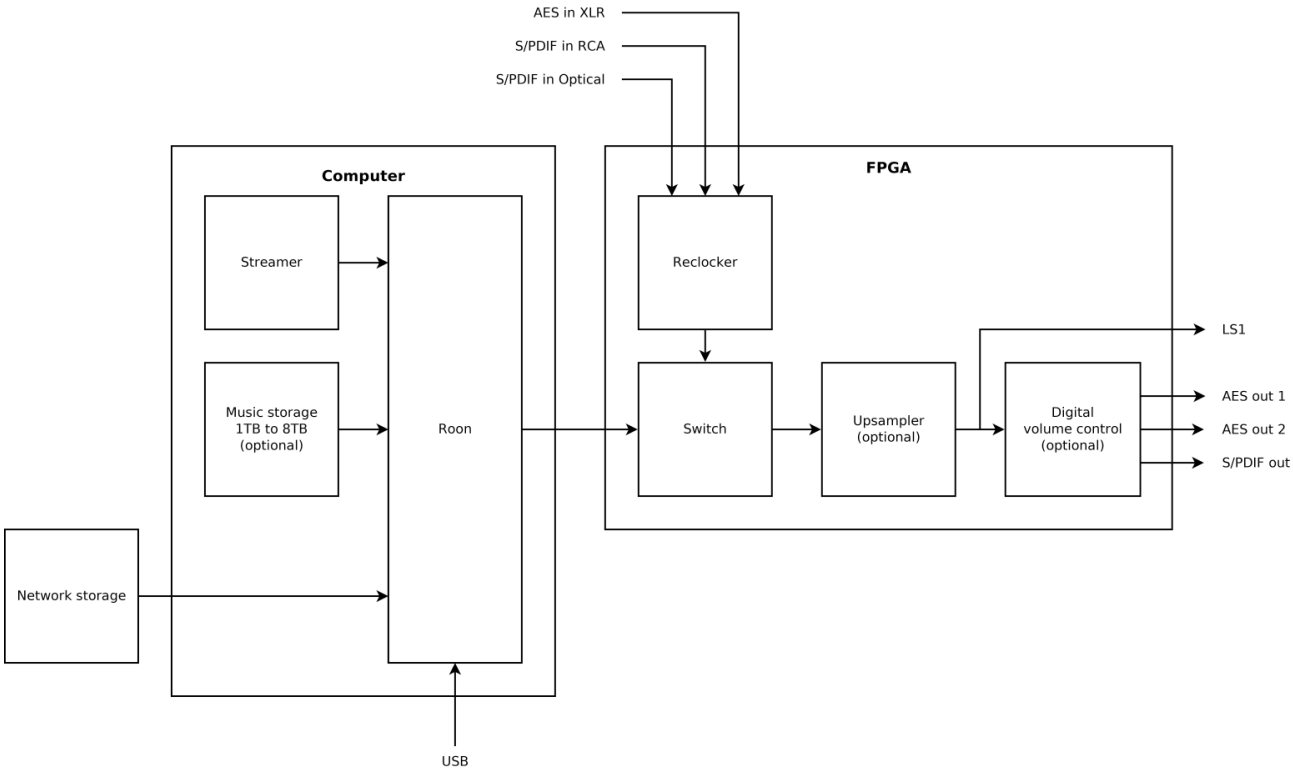
3 Setup

Block Diagram



In the Block Diagram the audio flow in the MU1 is shown. As you can see, a MU1 combines the functions of a streamer, audio file server, audio file player, reclocker, upsampler and digital volume control. The audio file and streaming functions are performed by Roon Labs software. All other software is developed by Grimm Audio.

Interface description

Front:

On the left you find the MU1 activity LED in the ‘i’ of the Grimm logo. The display shows all user information.

The MU1 activity led shows the current activity of the MU1 system. Table 1 below shows the modes.

Off	MU1 is off.
On	MU1 is on or booting.[2]
Fading slowly	MU1 is in stand-by mode.
Fading quickly	MU1 is updating.[1]

[1] The system will only update when the user has manually activated the update. See chapter Settings menu[6/7]: Software Version and Update.

[2] When the system is booting up the display will show an animation.

The display shows information about the system, depending on its state:

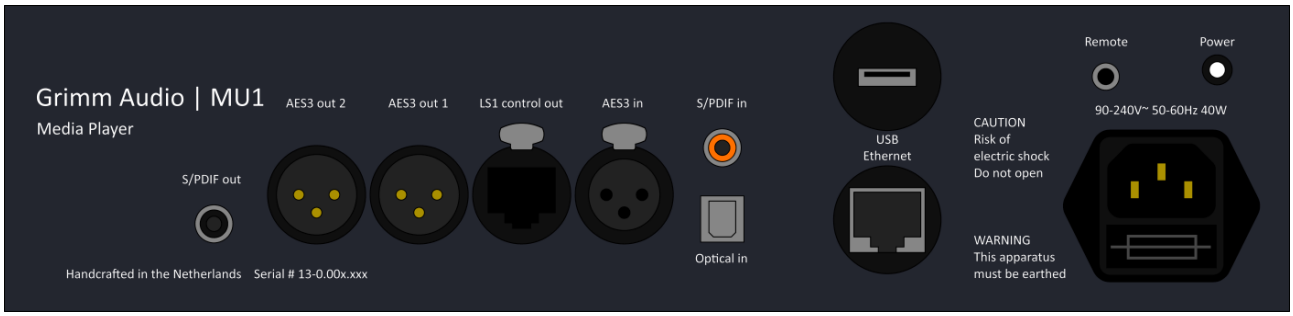
- System Off: display is black, no information.
- System in Stand-by: display is black, no information.
- System is booting up: boot animation is running, after booting the welcome picture is shown until the software is ready.
- System On: this state has different menus where information can be shown and settings can be adjusted. These settings are described in the chapter Main knob control. Note that depending on user settings the display can dim or even turn off

automatically when no user interaction is present for a few seconds. So in the System On state, the display can in certain cases also be black.

- System shutting down: display is showing shutdown animation, with dimmed backlight. It goes to black when the system is fully shut down.
- System in support mode: Display is showing an animation of 3 blue squares.
- System updating: Display is showing an animation of 3 green squares.[3]

[3] *After installing V1.5.0 or higher.*

Rear:



(Note: Models with serial number 13-0.001.xxx and 13-0.002.xxx do not have the S/PDIF output, some models may have the USB port swapped with the ethernet port and some models will have an FM antenna connector).

On the rear of the system various cable connections and the main power switch can be found. From right to left: 1. the mains power connector, 2. a small mains power switch, 3. a 3.5mm socket for an external IR remote sensor, 4. an ethernet network input, 5. USB connection for external storage, 6. three digital audio inputs, 7. four digital audio outputs (two generic AES3, one generic S/PDIF and one Grimm LS1 RJ45). In the following section these connections are described in more detail.

1. The mains power socket (standard IEC60320 model). In case your country has an EU, US or UK type wall outlet, your MU1 was shipped with the corresponding power cord. Otherwise, please consult your dealer.

2. The mains power switch. This is a small recessed switch that triggers the software that turns off and on the system. If the system is off and the power cord is connected, press the switch once using your finger nail to boot the system. If the system is on, press the switch once to shutdown the system. The MU1 is switched off when the power led and the display are both dark. Only then you can unplug the AC power hookup without causing any harm.

Note: The power switch does not respond when the MU1 is updating.

3. Mini jack input for infrared remote sensor. This 3.5mm jack input is intended for use with an IR extension cord with the following pinout:

Tip = Signal
Ring = 5V power
Sleeve = Ground

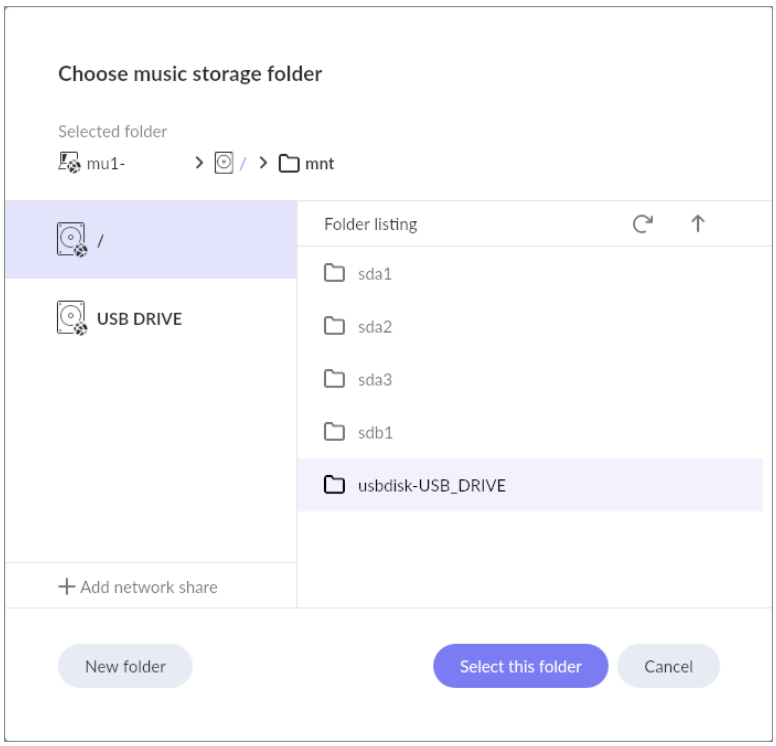
This is the most common pinout for IR extension cables.

See chapter Settings menu[5/7]: Infrared remote programming, to learn how your MU1 can respond to a certain infrared remote. The MU1 supports the following types of IR remotes: RC5, RC6, JVC, NEC, NEC extended, Apple and SIRC. Other protocols may be added in the future, please contact info@grimmaudio.com if your favorite remote is not supported.

4. Ethernet input. Connect your wired local network to the MU1 using this RJ45 connector. The cable type should be at least CAT5e to ensure that loss of network data packets is minimized. Please use high quality cables intended for use with computer systems and avoid cables with claimed special qualities for audio. The MU1 makes use of DHCP. To use a static IP address in the MU1 please consult the manual of the network device that acts as DHCP server within your network (usually the main router).

5. USB input. This general purpose connector may be used for connecting an external USB drive (flash drive, SSD or HDD) for extending the disk space of the MU1 system. You may play music files from this drive. The MU1 supports the following file systems: **FAT32, NTFS, HFS+, exFAT, EXT2** and **EXT4**. When a USB device is plugged in, it will automatically be mounted in the system. Since USB drives are mounted in 'read only mode', it is not necessary to 'safely remove' the USB device from the system, the device is unmounted automatically when you unplug it. This also means you cannot use a USB drive to make Roon backups nor add or delete music from these disks through Roon or the network.

The mounted folder can be found through the Roon storage settings. Go to the *Roon Settings* → *Storage* and press the button "+ *Add Folder*". The following screen will show up:



The USB disk should appear in the menu on the left. The name of the usb disk is shown. If you don't see it here, go to the root directory "/" and open "mnt". Here you will find your usb drive with the preface "usbdisk-". Select this folder to add it.

6. Digital audio inputs. The MU1 has three digital inputs on the back that can receive PCM rates up to 192 kHz and also DoP ("DSD64 over PCM"). These sources can be selected with the main control dial. Read chapter Source selection for instructions about how to do this. The selected source is routed via the FPGA for oversampling and de-jittering and benefits from MU1's high performance rendering.

a) S/PDIF digital input: orange RCA connector, digital input for S/PDIF sources.

b) Optical digital input: black Toslink connector, digital input for S/PDIF sources.

c) AES3 digital input: XLR connector, digital input for AES3 sources.

7. Digital audio outputs. There are three or four digital outputs (depending on your hardware revision). These can be configured as stereo outputs that carry the same audio data or as six individual outputs for surround playback. From right to left:

a) LS1 output: a proprietary connection to the LS1 playback system, carrying both audio data and control data. The cable for this connection is supplied with the LS1 system. Connect this cable to the "Control in" input of the LS1.

Warning: Do not connect a network cable to this connection! Although a normal RJ45 connector fits, this output may only be used for LS1 control connection. Grimm Audio is not liable for damage to a local network system as a result of incorrect wiring by the user.

b) AES out 1: Digital output 1, transformer coupled balanced XLR3 digital output for use in a surround LS1 system or connection to a third-party DAC.

c) AES out 2: Digital output 2, transformer coupled balanced XLR3 digital output for use in a surround LS1 system or connection to a third-party DAC.

d) (*Serial numbers 13-0.003.xxx and higher*) S/PDIF out: transformer coupled unbalanced RCA digital output for use with a third-party DAC with S/PDIF input.

Top:

The top of the MU1 carries the main control knob. It is used for user input to the MU1 via turning and pressing. Depending on the state of the system and the menu selection this knob changes functionality.

The system will boot to the Music View. The use of the main control in this state is:

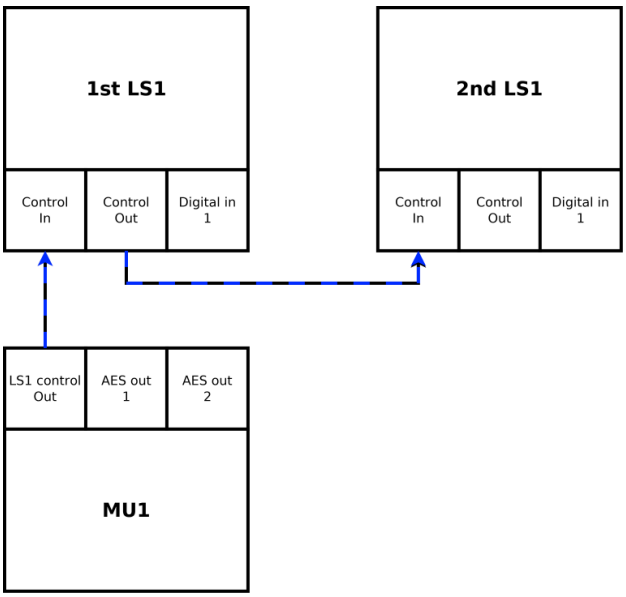
- Volume up (turn right)
- Volume down (turn left)
- Pause/mute (short press)
- Enter menu (long press)
- Press and turn selects the input.

A short press is shorter than 2 seconds, a long press is longer than 2 seconds. How to enter and leave menus is described in the Main knob control chapter.

Stereo system wiring

Wiring the MU1 into your stereo system is straightforward: just connect power, ethernet and a DAC (DA Converter) via AES3 or S/PDIF and you're good to go. If applicable, add extra sources such as CD transports or TV sets to the MU1 digital inputs.

In case you use the MU1 with a Grimm Audio LS1 system, the connections are elegantly minimalistic:



Blue & black = Audio & Control.

Surround system wiring

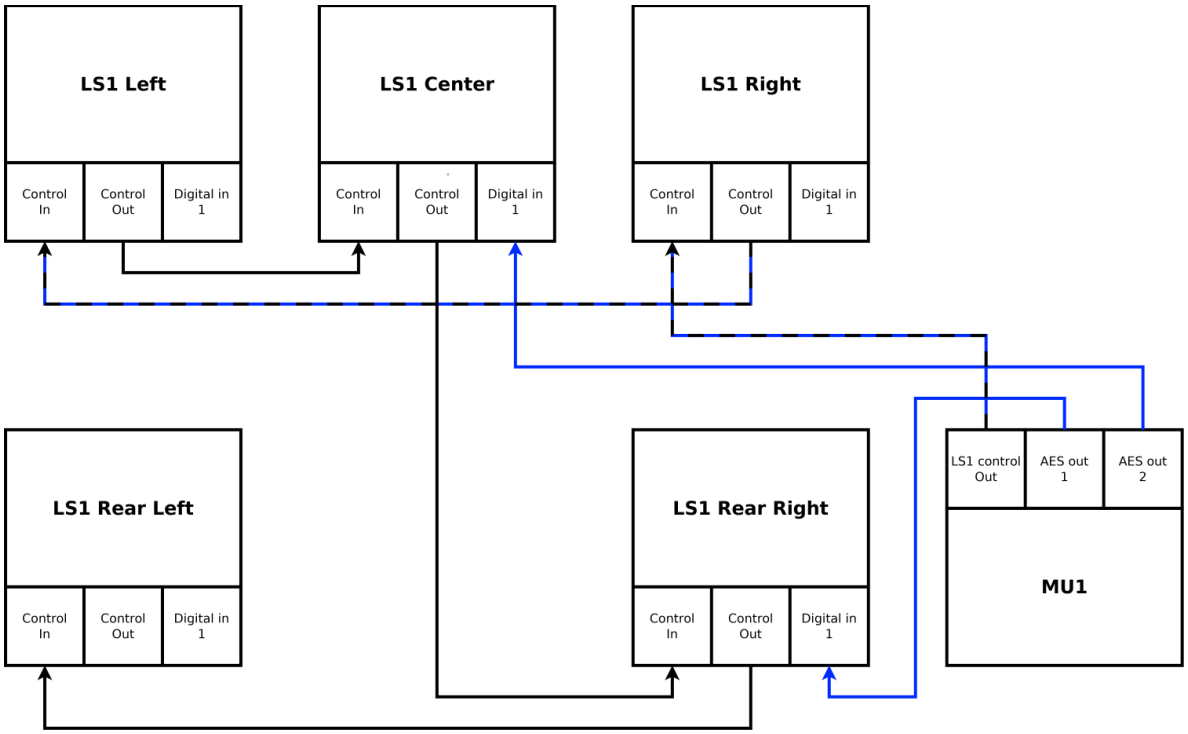
This chapter describes how to wire a surround speaker system with the MU1. It is unavoidable that this is a little more complicated than setting up a stereo system. Still the MU1 offers a pretty elegant integration of functions and is a unique replacement of an SACD player for surround playback. We guide you through the setup in this chapter.

For a surround system with the MU1, you can use LS1s, multiple DACs or a combination of the two. In the chapter GRUI MU1 Web Control: MU1 settings the software setup of your MU1 for surround is explained. In the chapter GRUI MU1 Web Control, LS1 settings you find information about how you can check and change the settings of connected LS1s.

Setup with 5 LS1s

The LS1 uses a proprietary Cat 5 connection, carrying both audio data and control data and sometimes only control data. Such connection carries two channels of audio, which are the main Left and Right channels in your surround system. The control data (like the volume setting) however, is needed for all speakers. Therefore the Cat 5 connection should be linked through to all speakers, in a prescribed order. As said, the audio connection of the Left and Right front speakers comes from the Cat 5 connection of the MU1. The audio connection of all other speakers comes from its AES3 XLR outputs.

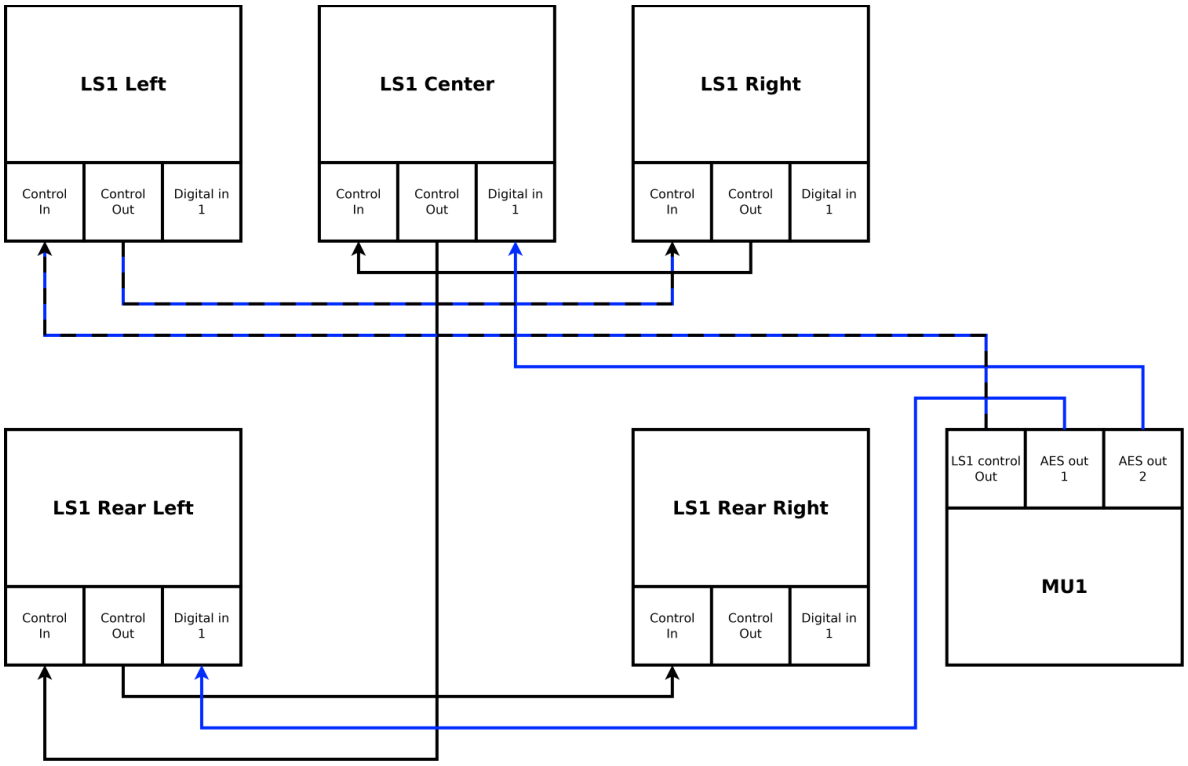
In the graphs below the wiring of the Cat 5 control data system is indicated in black or black & blue, and the AES3 cables in blue. The prescribed order of the Cat 5 connection is to first go from the MU1 to the front speakers, then to the center speaker and then to the rear speakers. For instance if your MU1 is close to your right front LS1, you can use the following wiring diagram:



Blue = Audio. Black = Control. Blue & black = Audio & Control.

You have made the following chain of the Cat 5 cable system: MU1 → LS1 Right → LS1 Left → LS1 Center → LS1 Rear Right → LS1 Rear Left.

If you like to start at the left front LS1 and end at the rear right LS1, it looks like this:



Blue = Audio. Black = Control. Blue & black = Audio & Control.

Now you have the Cat 5 chain: MU1 → LS1 Right → LS1 Left → LS1 Center → LS1 Rear Left → LS1 Rear Right.

You may also swap Rear Left and Rear Right, so all following four Cat 5 chains are possible:

- MU1 → LS1 Right → LS1 Left → LS1 Center → LS1 Rear Right → LS1 Rear Left
- MU1 → LS1 Right → LS1 Left → LS1 Center → LS1 Rear Left → LS1 Rear Right
- MU1 → LS1 Left → LS1 Right → LS1 Center → LS1 Rear Right → LS1 Rear Left
- MU1 → LS1 Left → LS1 Right → LS1 Center → LS1 Rear Left → LS1 Rear Right

For the audio connections of the center and rear LS1 speakers, you should connect a digital XLR cable from the MU1 output AES out 2 to the center speaker AES Digital in 1, and from AES out 1 to the first Rear speaker in the Cat 5 chain. So if you made the following chain:

MU1 → LS1 Right → LS1 Left → LS1 Center → LS1 Rear Right → LS1 Rear Left

The AES out 1 should be connected to the LS1 Rear Right since that is the first rear speaker in the Cat 5 connection chain.

Please refer to the chapter GRUI MU1 Web Control: LS1 settings for information about how to set the presets of the LS1s for your situation.

Surround setup with 4 LS1s

For a setup with four LS1s (with a 'virtual' center speaker) you should follow the setup for five LS1s but skip the center speaker.

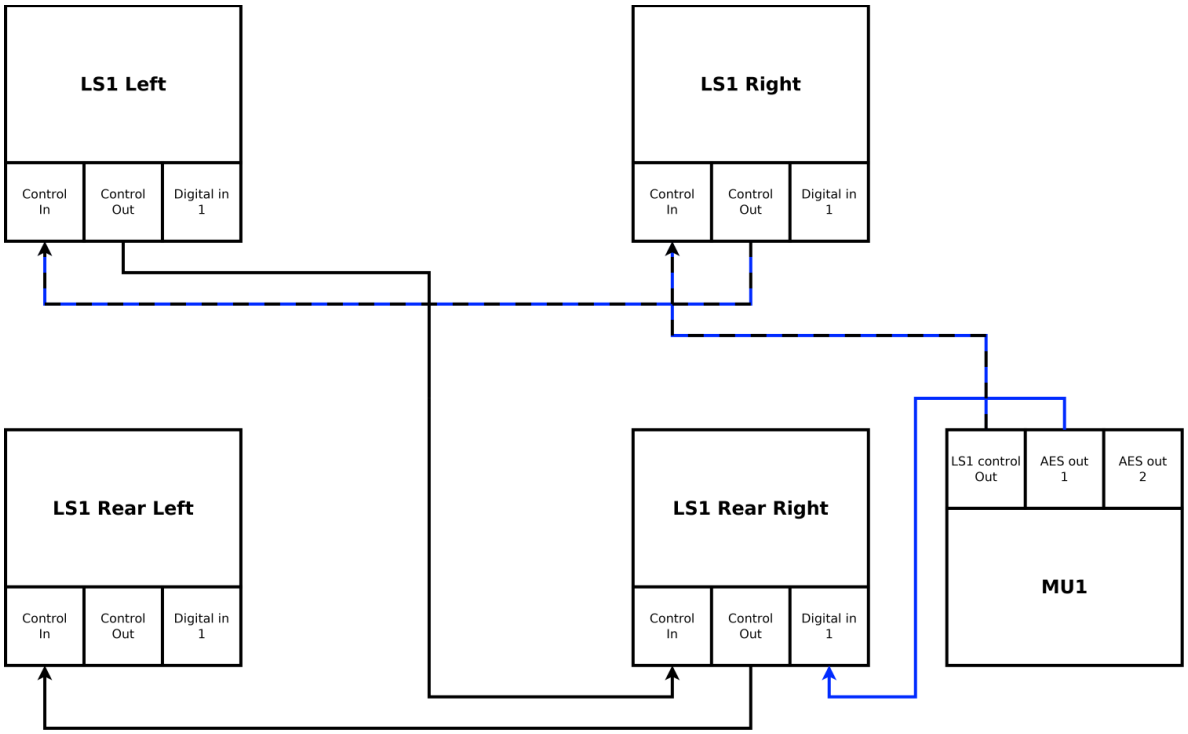
That means that for the Cat 5 connection you can make one of the following chains:

- MU1 → LS1 Right → LS1 Left → LS1 Rear Right → LS1 Rear Left
- MU1 → LS1 Right → LS1 Left→ LS1 Rear Left → LS1 Rear Right
- MU1 → LS1 Left → LS1 Right → LS1 Rear Right → LS1 Rear Left
- MU1 → LS1 Left → LS1 Right → LS1 Rear Left → LS1 Rear Right

The MU1 output AES out 1 should be connect to the Rear speaker that's the first in the Cat 5 cable chain. So if you made the following chain:

MU1 → LS1 Right → LS1 Left → LS1 Rear Right → LS1 Rear Left

The AES out 1 should be connected with the LS1 Rear Right as that is where the Cat connection comes first.

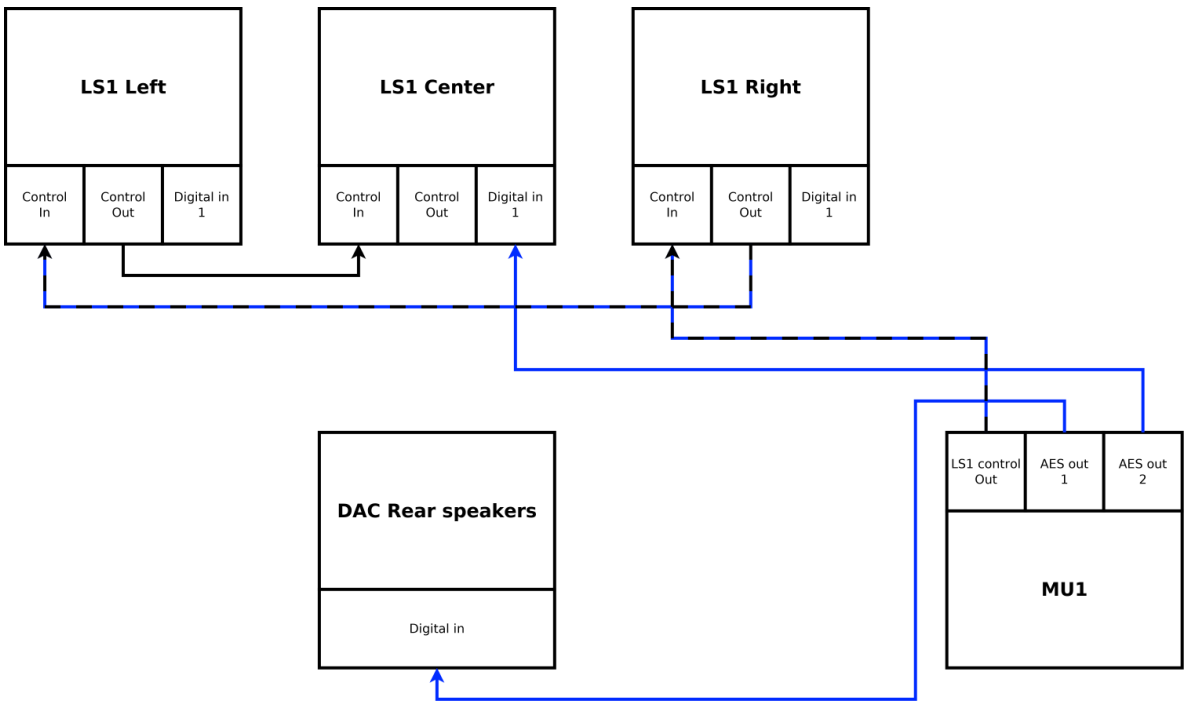


Blue = Audio. Black = Control. Blue & black = Audio & Control.

Please see chapter GRUI MU1 Web Control, LS1 settings for information about how to set up your speakers for the right channel layout.

Surround setup with 2 or 3 LS1s and 3 or 2 other DAC channels

You can use LS1s as your front speakers and use other brand's speakers with digital inputs, or DACs, for the Rear and/or Center channels. In that case, connect the LS1s to the MU1 using the Cat connection as if it were a stereo setup. Digital output AES out 1 contains the Rear Left and Rear Right audio, digital output AES out 2 contains the Center channel and the LFE channel if the source material has 5.1 channel mapping. Please see chapter GRUI MU1 Web Control part LS1 settings and part MU1 settings for information about how to set up your speakers for the proper channel layout and to make sure that the non-LS1 channels are volume controlled in the MU1 FPGA.



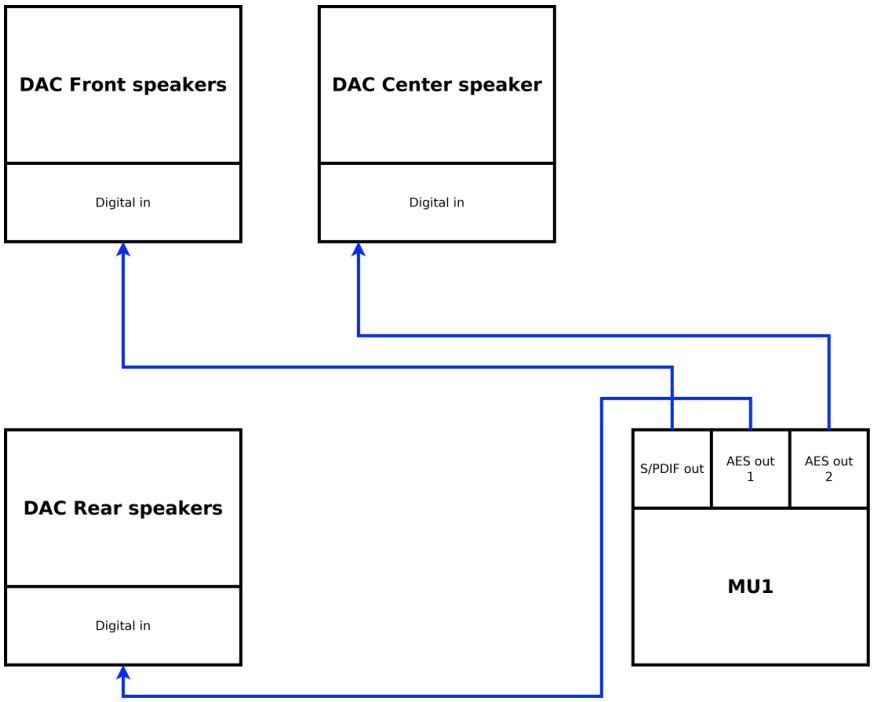
Blue = Audio. Black = Control. Blue & black = Audio & Control.

For a 4-way setup, remove the center LS1 from the diagram.

For a setup with a second 3rd party speaker as center channel, replace the LS1 with the center DAC.

Surround setup with 5 channel DACs or 3rd party speakers with digital inputs

The MU1 can be used as surround source for systems that consist of just 3rd party speakers with digital inputs or 5 channels of DACs. In that case, the Front Left and Right channels are available on the MU1 S/PDIF output, the Rear Left and Right on AES out 1 and the Center (and LFE if applicable) on AES out 2. All channels can be volume controlled via the MU1 FPGA, see chapter GRUI MU1 Web Control part MU1 settings.



4 Roon Labs setup

Grimm Audio selected Roon Labs for the user interface and audio engine for file and stream playback on the MU1 (an alternative UI and engine will be added later). In our opinion Roon offers the best High-End user experience to date, a real must have. Both Roon Core and Roon End Point are pre-installed, so no other computer is needed. Please mark that Roon Labs is a paid subscription so you need to enter your account details via the Roon app. Roon Lab supports Tidal and Qobuz lossless music streaming services. These are separately paid subscriptions. You need to enter your account details of these services via the Roon interface.

Operating the Roon system in the MU1 is identical to that of any other Roon equipped system. First you need to install the Roon remote control software on a tablet, smart phone, PC or Mac to get access to the Roon Core server in the MU1. Please visit the app store of your OS manufacturer, or use this link: https://roonlabs.com/downloads.html. For general operational guide lines of the user interface, we refer you to the Roon Labs documentation: https://help.roonlabs.com. The MU1 can perform all processes that Roon offers, but we recommend to use the MU1 FPGA oversampling and downsampling algorithms instead of the Roon offerings, and use Roon just for audio playback. Roon is a capable multi room system. If you like you can use the Roon Core in the MU1 to stream music to other Roon Endpoints in your network (for instance a system in the bedroom). Please note that the oversampling and de-jittering qualities of the FPGA in the MU1 can only be enjoyed with the digital audio outputs on the MU1.

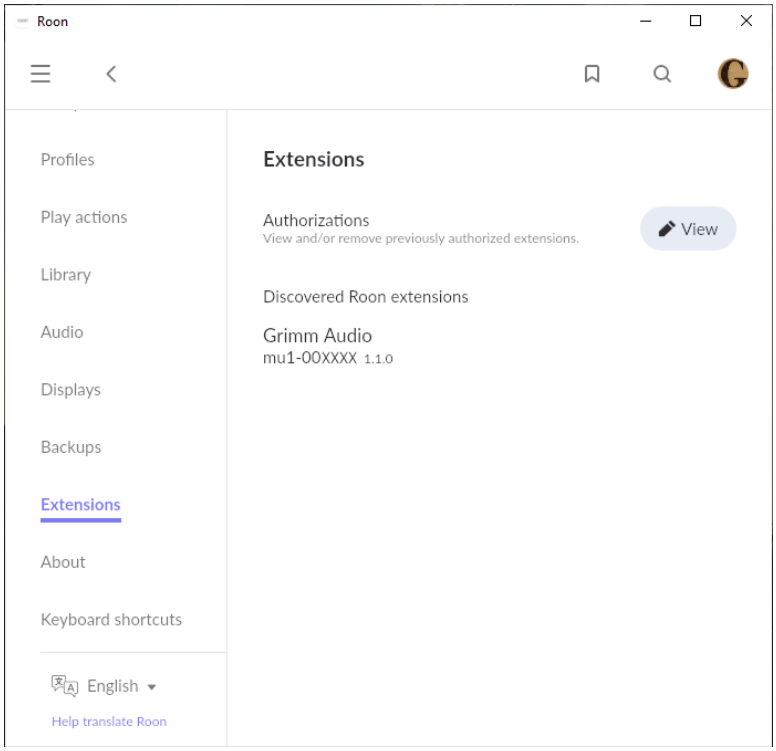
The MU1 can play all file formats that Roon supports, such as wav and flac, and has native support of PCM formats up to 8x the base rate (8FS or “DXD”) and of DSD formats up to DSD256. The FPGA processor in the MU1 can upsample 1FS and 2FS sources to 4FS and downsample 8FS and DSD formats to 4FS. Alternatively the MU1 can upsample 1FS sources to 2FS and downsample 4FS, 8FS and DSD formats to 2FS. This is intended for use with 3rd party systems that only support sample rates up to 96 kHz.

Enabling track information on the MU1 display

To show the song that currently plays on the MU1 display, you need to enable the MU1 software to communicate with the Roon Labs software. This is facilitated by a ‘Roon Extension’. Since Roon Extensions can only be enabled by the account owner of the Roon software, you need to perform this step yourself. Please connect a tablet, smart phone, PC or Mac to the same network as the MU1 and install the ‘Roon’ (not ‘Roon Server’) remote control software: https://roonlabs.com/downloads.html. Make sure all other Roon Core servers in the network are turned off. Next, please follow these steps:

- Switch on the MU1 for the first time.
- Start Roon on the tablet or PC/Mac software, wait until the MU1 pops up as a device and select it.

- Log in with your Roon account.
- Go to the settings menu and select the tab ‘Extensions’.
- Add the Grimm Audio extension to your MU1 by clicking the Enable button in the menu. The extension will contain a part of the serial number as shown in the image below.



Volume control of the LS1 DSP and the FPGA volume control of selected digital outputs should now work via both the Roon app and the MU1 main control. Additionally you will see information about the currently playing track in the display and a progress bar of the running track.

Volume settings

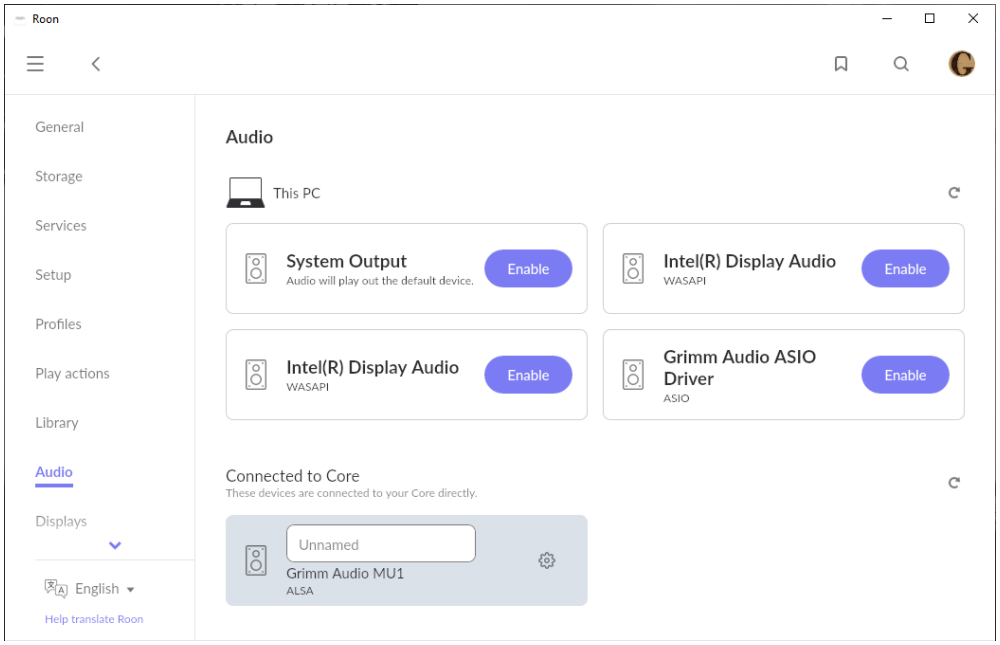
We added a safety limit to the volume control. Whenever you turn the MU1 main control or the Roon app volume fader quickly to the maximum position, the volume will jump back to the lowest level (the fader will stay at the max position though). This will protect your equipment when the controls are set to max by accident. If this happens to you, be careful to pause the music first before touching the fader, since it can still become loud when touching the fader.

As an alternative, we recommend to set a comfort limit for the Roon fader in the device setup so you cannot accidentally set the volume very loud by sliding the volume bar too far to the right. In case you do like to play louder than the limit, you can still press the + or – buttons in the Roon interface to increase or decrease the volume of the LS1 playback system. To set the comfort limit, please click the volume button in the bottom right corner of Roon and then

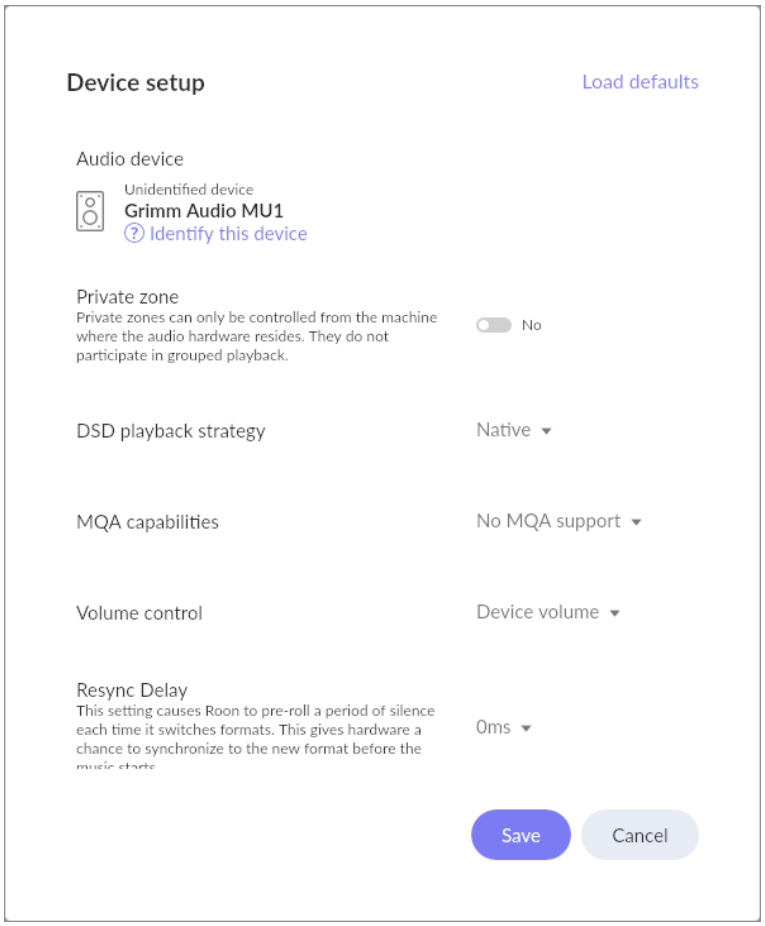
press the cog wheel to enter the Zone settings. Here you press “Volume limits” and set it to ‘64’ which corresponds to an acceptable comfort level for most music. If your taste mainly covers softly recorded tracks, you may decide to set a higher level.

Device Setup

Roon offers various options for connected devices. We walk you through the preferred (or even required) settings for the MU1. Most of these can be restored by pressing the “Load Defaults” button in the top right corner of ‘Device Setup’. To enter Device Setup, browse to the Audio tab of the Roon Settings, tap the ‘cog-wheel’ configuration logo on the right of the ‘MU1’ device and select ‘Device Setup’, as shown in the picture below.



You will then see the following window:



In Device Setup it's usually good to use the default settings, if you have problems you might want to press the 'Load defaults' button in the top right corner.

You can change settings here but some settings will give problems, like changing 'Volume control'. It should always be set to "Device volume".

Other settings in Device Setup are as follows: please leave the 'DSD playback strategy' to "Native". The MU1 FPGA processor has a superior quality DSD downsampler compared to Roon's and we strongly recommend to use this feature to play DSD files to the LS1 system or other PCM DACs. If you connect a DSD capable DAC to the MU1 that needs the 'DoP' format on its AES input, please do not turn on DoP here but in the MU1 settings. The 'DoP' setting of Roon has only impact on the internal data transfer from Roon to the MU1 FPGA board and should be set to "Native".

'MQA capabilities' defaults to 'No MQA support' and that is fine. When playing an MQA stream, the 'unfolds' will be performed by Roon, but in 'No MQA support' mode Roon will not add the MQA metadata into the audio. Since the MU1 FPGA processor will usually modify the audio data due to its upsampling and volume control this metadata is lost, so there was no use for it anyway.

In case you connect a DAC with MQA decoding capabilities and want to use its MQA capabilities, things are different. In that case, please consult the manual of your DAC to find

the recommended Roon setting, and disable all processes of the MU1 such as up- & downsampling, volume control, 3dB headroom and DoP. *Note: If you also play non-MQA material such as (ripped) CD's and high res downloads, you may consider to enjoy the MU1 FPGA processes in stead of MQA and put the 'MQA capabilities' setting to "No MQA support". You will loose the advantages of MQA but gain the advantages of the MU1 FPGA processing.*

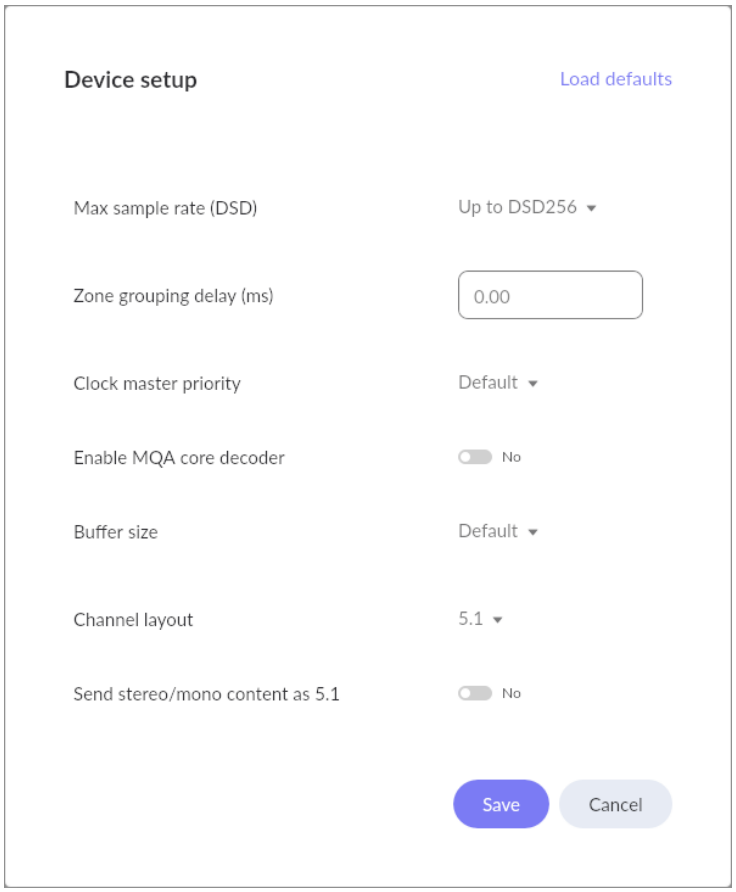
'Resync Delay' is default at 0 ms. In case your DAC needs some time to synchronize after a sample rate change and you miss the starts of songs, you may experiment with higher settings of this delay.

In the 'Advanced' part of the Device setup window (click "Show advanced") you can check whether the max sample rate (PCM) is set to "up to 384kHz" and the max sample rate (DSD) is set to "up to DSD256".

'Clock master priority' should be on "Default", 'Enable MQA core decoder' should be set to "Yes" and 'Buffer size' to "Default".

Surround setup of Roon

In the 'Advanced' part of the Device setup window you can also find the 'Channel layout' options. For stereo this should be set to "2.0". For a surround setup you need to select "5.1".

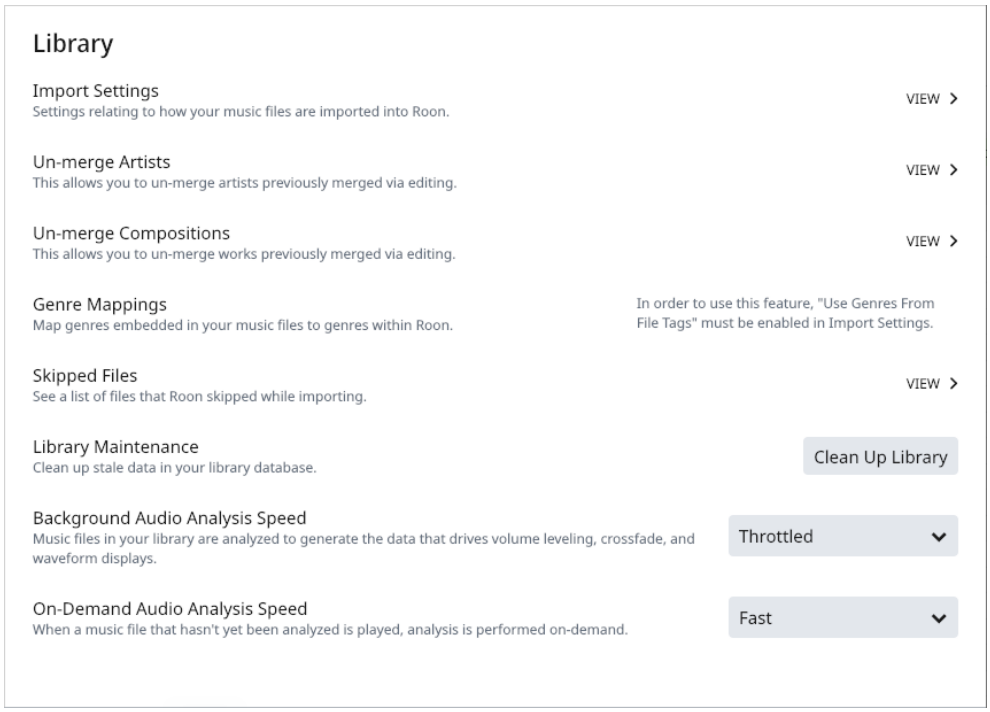


'Send stereo/mono content as 5.1' can be left to the default. There is no influence of the position of this switch in the MU1 playback.

For 'Multichannel mixing' we recommend to set it to "Channel mapping only", this means that Roon will not touch the audio. In case you do not have a separate LFE sub and like to mix the LFE signal into the front channels, you can let the MU1 do this in high quality in its FPGA. Similarly, if you have a 4-channel setup you can let the MU1 mix the center channel into the front speakers. See chapter MU1 settings for instructions about how to setup your MU1 for this.

Background analysis speed

In the Library page of the Settings menu Roon offers several options for the 'Background Audio Analysis Speed'. We recommend to set this to "Throttled" and not to one of the "Fast" options. This makes sure most of the processing power of the CPU is dedicated to audio playback. You may also set it to "Off", Roon will then calculate the waveform of a new file on the fly when it is played.



Updates of Roon software

Roon Labs offers frequent updates to both the Roon Core app in the MU1 and the Roon Remote app in your tablet or smart phone. Updates on your phone/tablet are usually installed automatically. If a Roon Core update is available the Roon Remote app will inform you about that. You are permitted to start a Roon Core update process in the MU1 from the Roon Remote phone/tablet app, but we are not liable for the impact of problems that may occur. Of course we will in that case offer support to help you solve the problem, where possible.

Known issues with Roon on the MU1

#1 Hampered playback when analyzing a large catalog.

When you add a folder with lots of albums, Roon will analyze the files, download artwork etc. It will also do an analysis of the audio data to store waveforms that are shown in the user interface and to store the average loudness of the track for loudness normalization use. During the initial setup, Roon's labor can cause the system to be less responsive. Although it should be possible, we recommend to not use the system for music playback while Roon runs this analysis for the first time on a large set of albums. If you let it run overnight, it is usually finished the next day.

When you add a few albums only, playback is not hampered and this will not affect the playback. Nevertheless we recommend to use the "Throttled" mode for the analysis to keep the CPU load low. This can be selected in the Roon settings, see chapter "Background analysis speed". Consult the Roon manual for more information.

#2 Soft glitches in DSD album playback.

Please mark that when playing albums in DSD format, the end and start of the files are not reproduced 100% gapless by design, which means that a soft glitch can be heard at the start of a new track. This glitch is in the master files and cannot be solved in the MU1 or Roon software. Also, a short moment after playback of a DSD file has stopped, Roon will switch to a 'silent' PCM stream and this also causes a soft glitch.

#3 Adding the root system folder to Roon.

When adding the root directory ("/") or a Roon backup folder in the music storage settings of Roon, problems may occur. Roon tries to index the OS filesystem making it slow and in some cases Roon might even crash. Instead of adding the root directory, please add the music folders as explained in the next chapter.

Internal disk

The MU1 optionally has an internal disk for music files. Adding music to the folders of this drive is done via the network, how to do this is described below for Windows and Mac-OS.

Note: Always use a wired connection between your computer and the network to copy music to the internal disk, doing this via a Wireless connection is slow. Through a wired connection you can expect transfer rates of about 50MB/s.

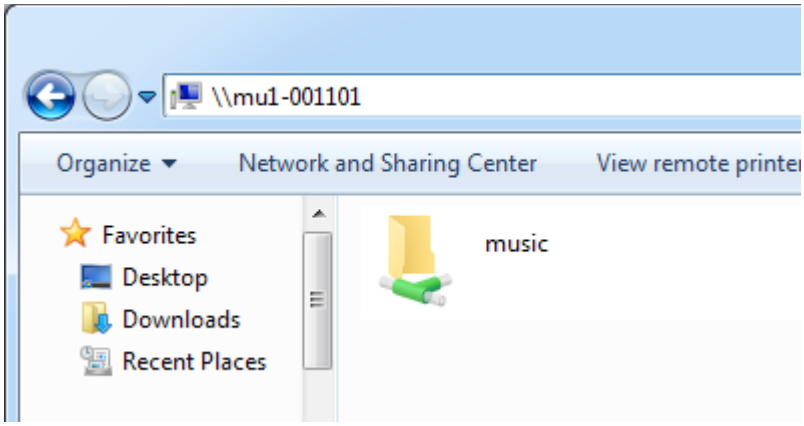
First of all, open the help page of the MU1 menu (see chapter Settings menu[2/7]: Help) and note the hostname and IP-address.

Windows users:

Note: Not all Windows computers can use the hostname for finding an internal disk in the network. This is because "mDNS" is not natively supported by Windows. However, on many Windows computers software has been installed that added support for this protocol and therefore we advice to first try to use the hostname and if this doesn't work, use the IP address.

1. Open the File Explorer (this is done by opening a random folder).
2. Enter ' \\"hostname" ' in the address bar as shown in the image below.
    - If the hostname does not work, try adding '.local' to the hostname.

Note: If you do not have "mDNS" this doesn't work. Use the ip-address: ' \\"ip-address" '

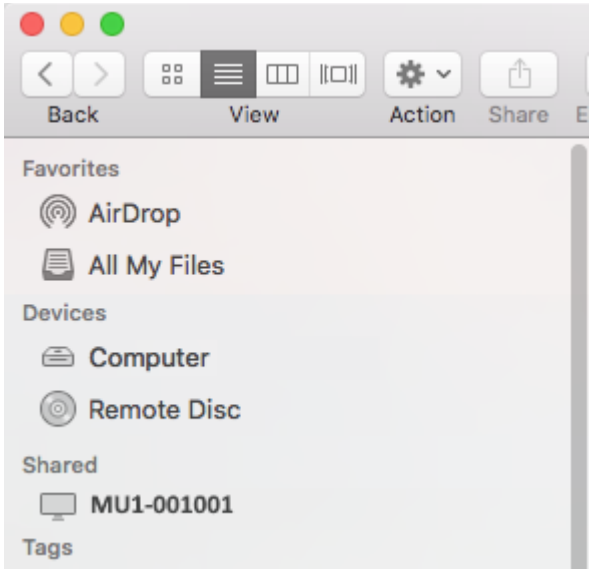


3. The internal disk is now present in the File Explorer. You can now add, delete and move music to the MU1 internal disk from your Windows computer.

Tip: Make a shortcut to this folder so you can easily find it instead of typing in the hostname.

Mac users:

The shared folder can be found in the Finder, in the left hand column under “Shared”.



After selecting this folder, you can add, delete and move music here from your Mac. Please mind to ‘eject’ the mounted folder before disconnecting from the network (for instance with a laptop).

If the MU1 does not show up in the Shared section, press ⌘ - K to open the Connect to Server window. Enter the *hostname* and press Connect. The hostname of your MU1 is indicated on the second page of the MU1 menu, see chapter Settings menu[2/7]: Help of this manual. Connect as “guest” to the Music share folder. In the unlikely event that connecting to the hostname does not work, please enter the IP address of your MU1, which is found on the same menu page of the MU1.

Note: On the internal disk you will find a directory lost+found, you can ignore this folder.

Tip: After mounting you can make a backup of the music that is stored on the MU1 internal drive via your Windows or Mac computer by using your favorite backup application.

It’s good practice to make a subfolder in the music disk for your music and create a separate folder for Roon backups. So please make sure you did not by accident add a Roon backup folder to the music storage.

How to add the internal disk to Roon

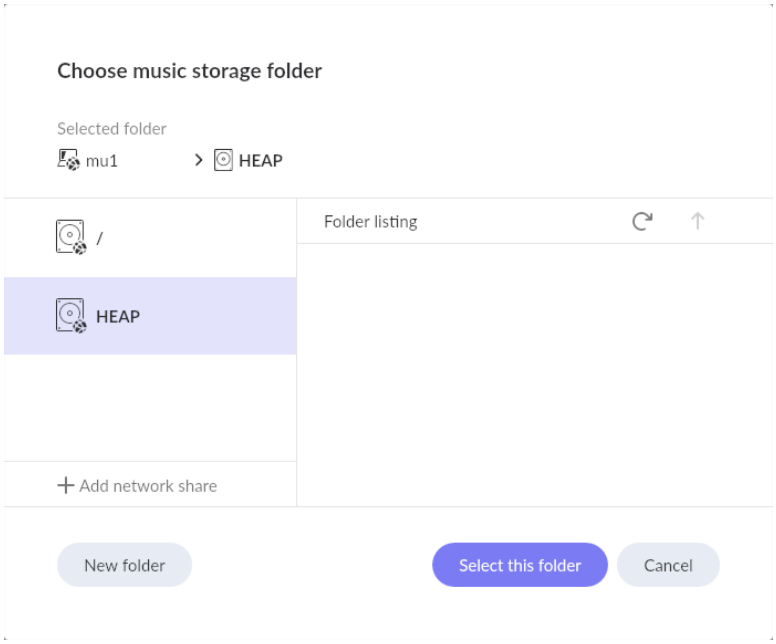
Open the Storage settings in Roon and click on “Add folder”. The internal disk should show up in the menu on the left as “HEAP”. Select this folder to add the disk to Roon as music folder.

If the disk does not appear as HEAP you must add it manually. Please note that the procedure for this is dependent on the serial number of your MU1. For serial numbers starting with

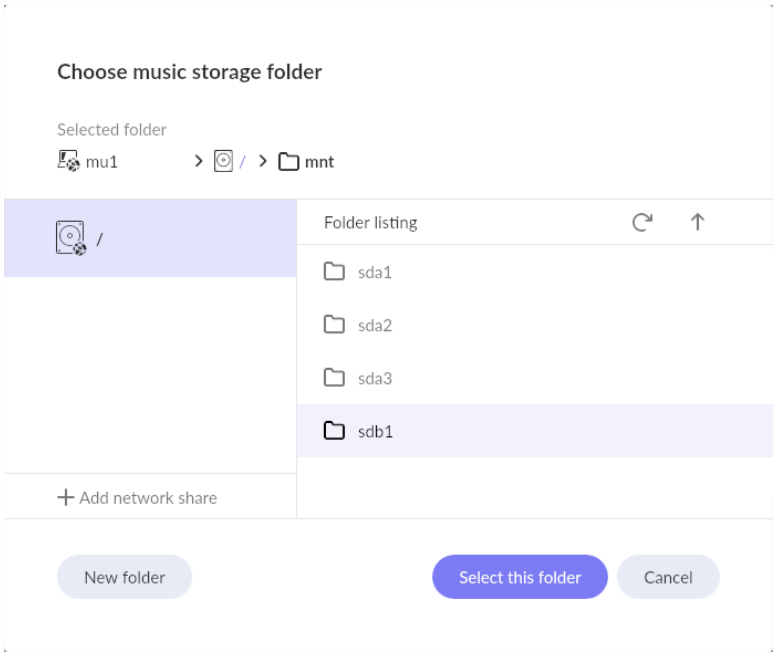
13.0.001.xxx the label is **sda1**. For serial numbers starting with 13.0.002.xxx and higher the label is **sdb1**.

Click on "*Add folder*" and go to the root directory "*/*", open "*mnt*" and choose "*sd**x**1*" (the name of the internal SSD drive, depending on the serial number). Your music folders are on sda1 or sdb1 and will now be added.

Tip: Roon will automatically append music that you later add to your music folder.



Select the HEAP drive if it is available.



Select sda1 or sdb1 (depending on serial number, see above) in "/mnt/" if the HEAP drive is not available.

Roon database access and reset

In case you encounter a problem with the Roon software and consult with Roon Support, they may ask you to view, copy, rename or reset your Roon database. The database folder contains all settings, log files and database items. The MU1 mounts this folder in the network under the share name “roondata”, and it is password protected to prevent accidentally resetting the database. The credentials are as follows:
Username: mu1-user; Password: mu1-pass.
How to mount this internal disk in your PC or Mac is explained in the chapter Internal disk above, use the mount name “roondata” instead of “music”.

In case you need to ‘reset’ the Roon database to solve a problem, the MU1 (GRUI) web interface offers a convenient ‘Roon database reset’ button. This button should be used with care, and only after a Roon Labs or Grimm Audio support engineer instructs you to do it. More information about the GRUI and the Roon database reset button can be found in chapter GRUI MU1 Web Control.

5 Main knob control

This chapter describes the user menus and settings of the MU1 that you can access using the main knob. The next chapter describes how to control these settings via the ‘GRUI‘ web interface.

Music View

The music view is the default view, the MU1 will boot up in this view.

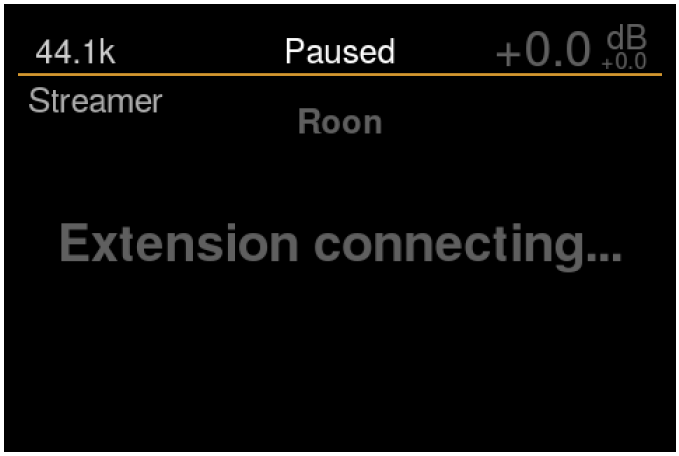
Function of the main control knob:

- Turn left for lowering volume.
- Turn right for increasing the volume.
- Short press pauses or starts playback.
- Long press enters the settings menu.
- Press and turn selects the input.
- [1]Two short presses switches between main out and second out.

A short press is shorter than 2 seconds, a long press is longer than 2 seconds.

[1] This is not default behavior, you can switch this function on in the GRUI as described in the chapter Second Output Toggle.

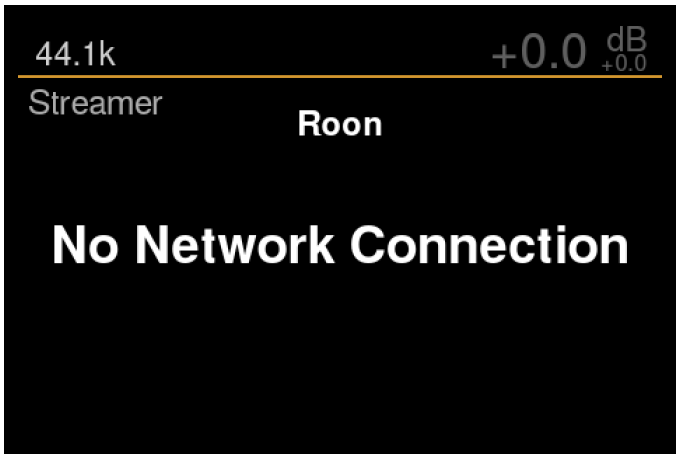
Below is an image of the screen you get when the MU1 is fully booted but still waiting on Roon to start up and connect to the Extension.



If Roon is running but there is no Roon remote (such as your iPad) yet connected, the message changes to “Extension Connected”. If a Roon remote is present, the latest track info

is displayed (see below). If both of these don't happen, please read the chapter Enabling track information on the MU1 display.

On start-up, the MU1 waits for a network connection, it may take a few minutes before the MU1 is given a local IP address by the router. Until this happens you will see "No Network Connection" on the MU1 display.



When a Roon remote such as a tablet is connected to the MU1 Roon Core and music is playing, the track information and progress bar is shown as in the picture below.

In Music View, the display offers the following information:

- Sample rate and format[1]
- Current user set volume in dB[2]
- Offset volume in dB[3]
- Streamer service[4]
- Artist
- Song title
- Album name

- Progress bar
- Current time stamp
- Track length

[1] This is the indicated file or stream information by Roon. The output of the MU1 may run at a higher sample rate because of the optional upsampling in the FPGA of the MU1.

[2] You may disable volume control through the settings menu. When an LS1 is connected you cannot turn off volume control.

[3] The offset shows the difference between the user set volume and the actual volume, for instance when source offsets are applied through the GRUI it can show for instance +8dB. It also indicates a -10 dB attenuation when previewing a source.

[4] At the moment only Roon is supported.

When there is no audio playing and the queue is empty, the progress bar will not be shown.

When turning the MU1 main control knob, the volume changes and the track progress bar at the bottom is temporarily replaced by a bar that indicates the current volume setting.

If an LS1 is connected, the MU1 will send volume control data to the DSP of the LS1 via its proprietary cat5 cable. If volume control is activated for one or more digital outputs, the FPGA

chip performs a volume attenuation at high precision for these output(s). See chapter Settings menu[3/7]: Settings for selecting volume control on the digital outputs.

Mark that volume control is disabled when volume control on the digital outputs is turned off and no LS1 is connected, or when DoP is turned on (see chapter Settings menu[3/7]: Settings for information about DoP).

Also note that the user set volume indication in the top right corner has a max level of +23.5 dB when an LS1 is connected and 0 dB when no LS1 is connected. In the LS1 case, +23.5 dB corresponds to “100” on the volume slider in the Roon app. You would normally never reach this level, it should only be used for music with very low average loudness. Your normal level will be around 0 dB or even lower. For LS1 users, this 0 dB level is adjusted to the traditional acoustic reference playback level in mastering studios and levels above +8 dB will add positive gain in the LS1 DSP.

For users who connected a third-party DAC to digital output 1 or 2 and have no LS1 connected, the scale automatically changes to 0 dB max, which reads as “74” in the Roon app.

Source selection

By pressing, holding down and then rotating the main knob you enter the source selection menu. Here you can select sources. To leave this menu just release the main knob when the desired input is selected.

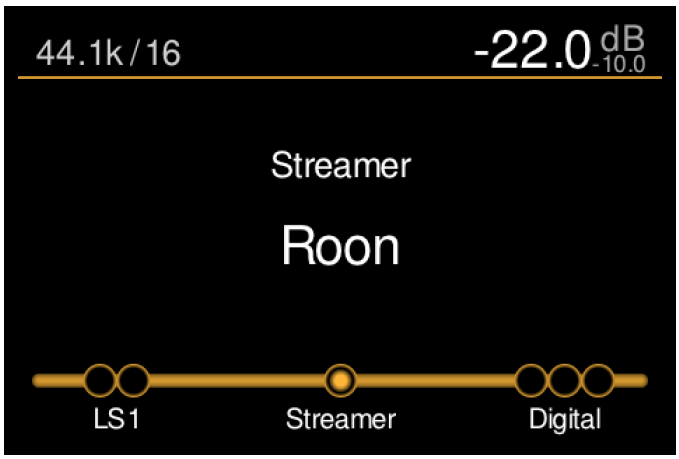
Depending on whether an LS1 is connected there are 2 or 3 source categories visible and each has one or more inputs[4]. The list below shows each category and their available inputs:

- LS1:
  - LS1 Analogue
  - LS1 Digital 1
- Streamer:
  - Roon
- Digital in:
  - AES XLR
  - AES RCA
  - Toslink

[4] You may disable each source through the GRUI, they will not show up when disabled.

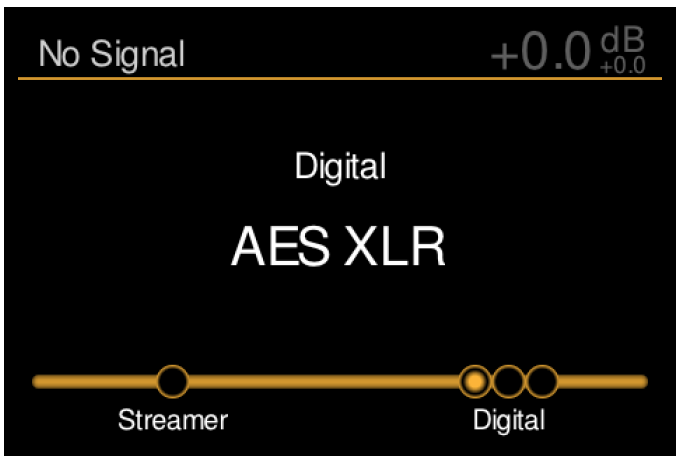
By turning the main knob (while holding it down) the different sources are selected. If you ‘hover’ over a certain input this input will be selected in preview mode after 1 second, this means that you can listen to the selected source (at 10dB lower volume than the current

setting) to check if the music on this input is to your taste. When releasing the main knob the selected input is confirmed and the volume returns to the normal setting.



The MU1 will remember the selected source when shutting down the system. When you power up the MU1 it will try to select this memorized source. If it was a source on the LS1 (Analogue or Digital) this source will be selected as soon as your LS1 is detected. Note that if you operate the MU1 before the LS1 is detected, the MU1 will automatically fall-back to the 'Roon' source selection.

When there is no LS1 connected, the source selection menu will look like the image below. Mark that in this picture the MU1 does not detect a signal on the digital XLR input and "No Signal" is shown top left. When there is a signal the received sample rate is indicated here.

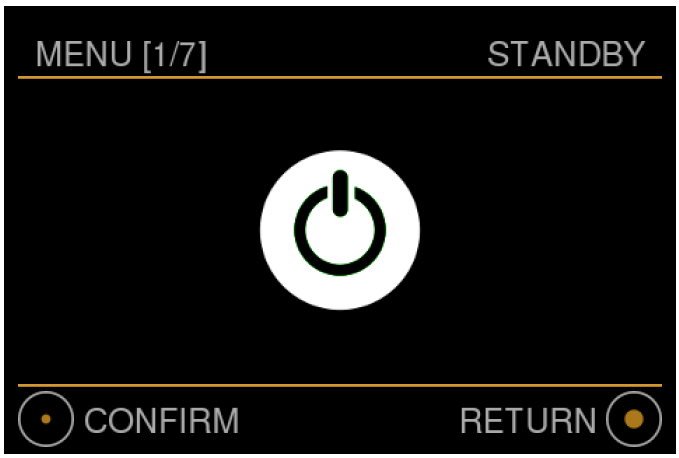


Note: When you select an LS1 or Digital In source, the MU1 will automatically pause Roon. Mark that in this case it is still possible to start Roon playback in the Roon App but you won't hear sound.

Menu View

By pressing and holding the main control knob for 2 seconds or longer, the MU1 display enters the ‘Menu View’ mode.

Settings menu[1/7]: Standby



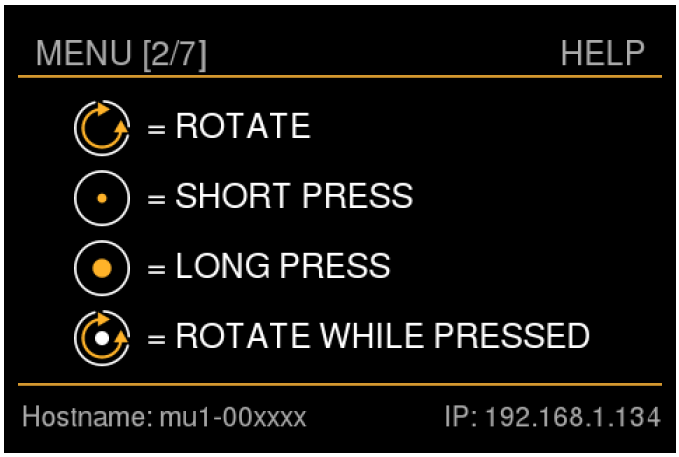
In this first menu you can put the MU1 in standby mode.

- Turn right to go to the second menu.
- A short press (‘confirm’) will put the MU1 in stand-by mode.
    - When the MU1 is in stand-by you can simply press or turn the main control knob to initiate start-up of the system.
- With a long press you will exit the menu and go back to the Music View.

When in stand-by the power consumption decreases and the screen is turned off after a short animation. The internal electronics are mostly shut down, but some of it still functions. If you like to completely turn off the system, switch off the device with the small mains power button on the rear of the device. Always turn off the system before unplugging the power cord to prevent damage to your MU1 computer system!

Hint: The white LED on the front indicates if the device is in stand-by (LED ‘breathes’) or if the MU1 is shut down (LED off).

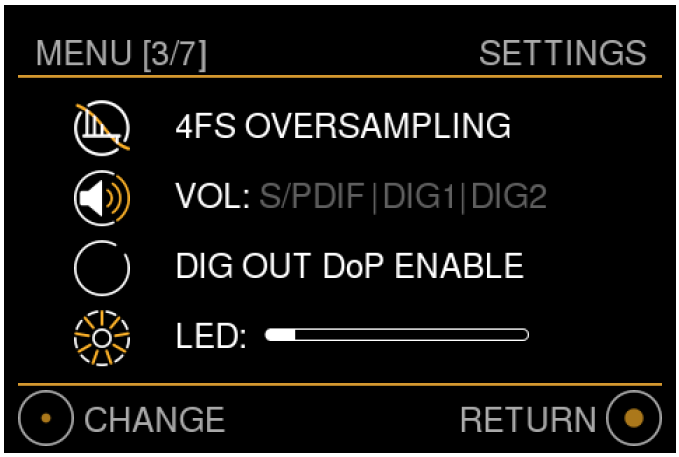
Settings menu[2/7]: Help



This Help menu shows the pictograms that are used in the MU1 for operating the main knob. At the bottom of the screen the current network information is shown. The indicated hostname depends on the serial number of your MU1. If the IP address shows 'unknown' when there is no network connection and in that case the MU1 cannot be found by the Roon App in your tablet or smart phone. Please check the network connection of your MU1.

- Turn left to go to the first menu, turn right to go to the third menu.
- With a long press you will exit the menu and go back to the Music View.

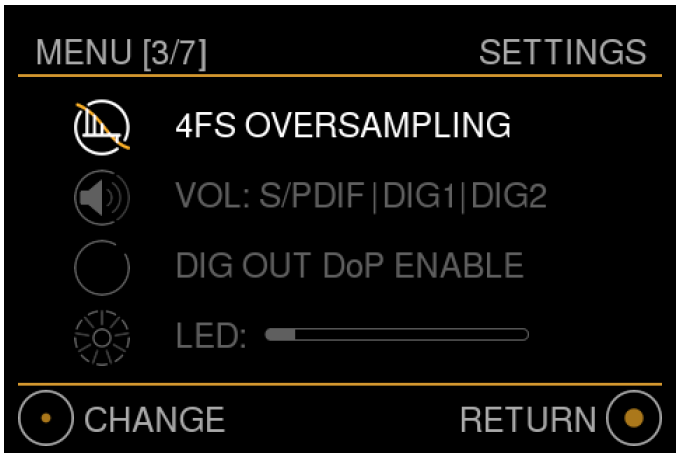
Settings menu[3/7]: Settings



In this menu you can change operational settings of the MU1, note that all of these settings can also be changed via the GRUI.

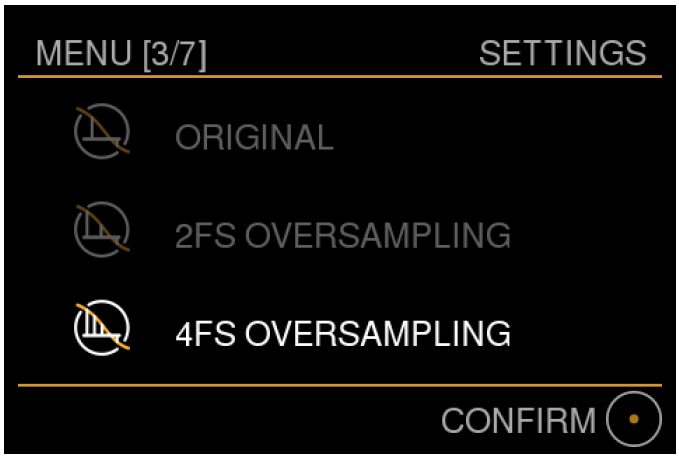
- Turn left to go to the second menu, turn right to go to the fourth menu.
- With a long press you will exit the menu and go back to the Music View.

- To change any of these four settings, apply a short press on the main control knob. You will then enter the menu and the selected option will be highlighted. In the next image you can see that the first option is highlighted.



- To select another option, turn the main knob until the desired option is highlighted. To change it, press the main knob briefly.
- To leave this menu, apply a long press of the main knob.

Oversampling:
There are 3 options for the oversampling option: Original (no oversampling), 2FS (two times oversampling) and 4FS (four times oversampling).



Original means that the FPGA does not touch the bits of the audio when possible. Mark that DSD rates and 8FS (DXD) will still require downsampling to 4FS, and of course the bits will be altered if digital volume control is engaged (see the next menu item).

2FS oversampling means that 44.1 and 48 kHz audio will be upsampled to 88.2 kHz resp. 96 kHz. 4FS, 8FS and DSD (up to DSD256) material will be downsampled to these rates. Audio that is already 2FS will be left untouched. This '2FS' option is intended to be used with DACs or active 'digital' loudspeakers that do not support 4FS or that work better with a 2FS source.

4FS oversampling means that audio will be upsampled to 176.4 kHz or 192 kHz. 8FS and DSD material will be downsampled to these rates. Audio that is already 4FS will be left untouched. This option is the default and recommended setting for the MU1.

To select your desired setting, turn the knob and the selection will be highlighted. Do a short press to confirm and exit. A long press lets you leave the menu without changing the setting.

Volume control on digital out 1, 2 and S/PDIF:
In this menu you can select which digital output should have digital volume control.

Note: volume control on the S/PDIF output cannot be enabled when there is an LS1 connected to the MU1.

Volume control in the MU1 offers a great user experience when combined with Roon's remote control capabilities. This volume control is performed at very high resolution in the MU1's FPGA. You might want to compare its quality to the native volume control of your DAC.

Volume control of the LS1 output is always done in the LS1 and can not be switched off.

Hint: when using the MU1 as a source for a 'digital' loudspeaker that has on board digital processing such as crossover filters, it is recommended to disable the MU1 volume control so that the speaker will receive the audio with widest modulation. Roon volume control is not possible in that case.

- Turn the main knob to select the digital output of which you want to change the setting.
- Use a short press to change the setting, this can be on or off.
- To leave the menu press long on the main button, the shown settings will be saved.

DoP on AES:
"DoP" is brief for "DSD over PCM". It is a standard for transporting DSD64 audio over an AES3 or S/PDIF PCM digital audio connection. All MU1 digital inputs support it. Some DACs can decode this format and the MU1 is able to forward DSD64 material unaltered to these DACs.

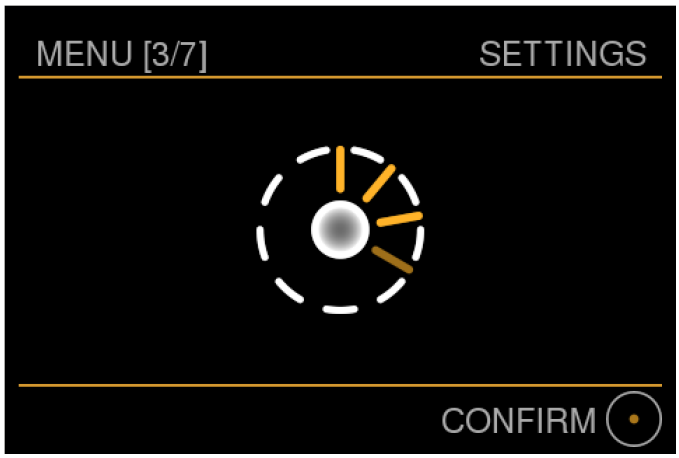
Mark that volume control is impossible on DSD signals, hence the DoP out option is disabled when volume control is enabled on any digital output.

Since the Grimm LS1 does not support DoP, the DoP out option will also be disabled when an LS1 is connected. If DoP out is turned off, DSD material will be decimated to PCM by the FPGA with very high resolution.

Note: This setting has no effect on the Roon DSD playback strategy setting, which should always be set to "Native".

Use a short press to change the current setting.

LED:
The brightness of the LED on the front of the MU1 can be turned down with this option. This influences the brightness both in operation and in stand-by mode.



Turn the main knob clockwise to increase the brightness and anti-clockwise to decrease the brightness. Please note that the LED can not be turned off completely to facilitate showing whether the MU1 is in operation/stand-by or power off.

- A short press confirms the current setting.
- To leave the setting as it was, press long.

Settings menu[4/7]: GRUI control QR

This menu shows the information you need to connect to the Grimm User Interface (GRUI). The GRUI is the web control interface of the MU1. You can scan the QR code with your tablet or mobile device. As an alternative you can manually enter the link shown at the bottom of the screen in your browser. More information about the GRUI can be found in chapter GRUI MU1 Web Control. Mark that this menu page will always be shown at maximum screen brightness for optimal scannability.

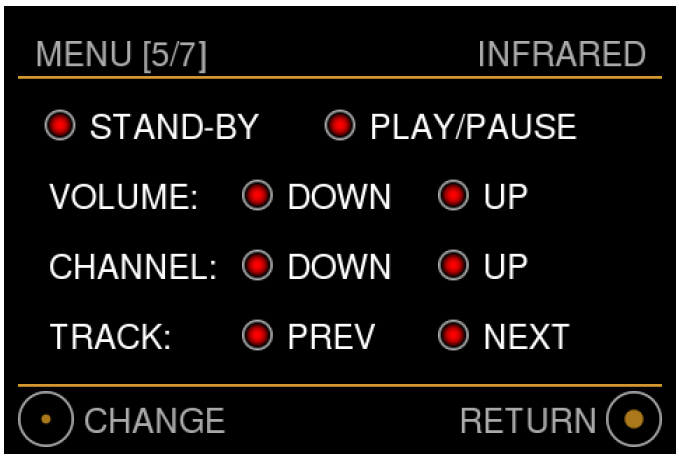
Note: Your browser device must be connected to the same network as the MU1 to be able to connect to the GRUI.

- Turn left to go to the third menu, turn right to go to the fifth menu.
- With a long press you will exit the menu and go back to the Music View.

Settings menu[5/7]: Infrared remote programming

In this menu you can program the MU1's response to an infrared remote, note that this can also be done in the GRUI.

Please make sure to connect an IR extension cord to the 3.5mm jack on the back, as explained in chapter 3 Setup. The following functions can be controlled with a general IR remote: Stand-by, Play/pause (mute when other sources than Roon are selected), volume control, source selection and next/previous track.

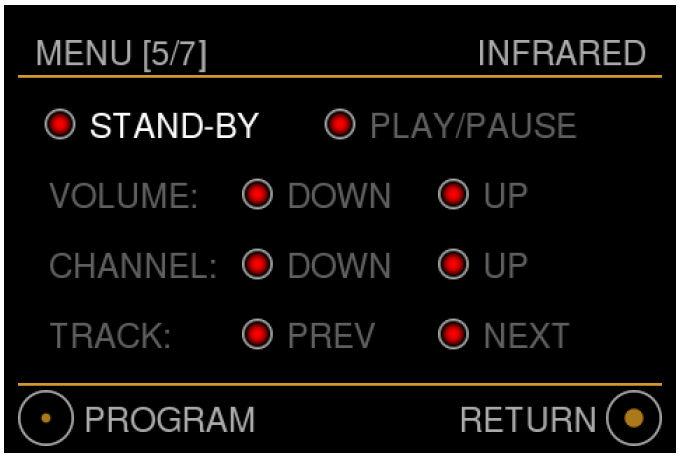


- Turn left to go to the fourth menu, turn right to go to the sixth menu.
- With a long press you will exit the menu and go back to the Music View.
- A short press will enter the menu and highlight the selection function.

The colored dots next to each function can have 3 different colors with the following meaning:

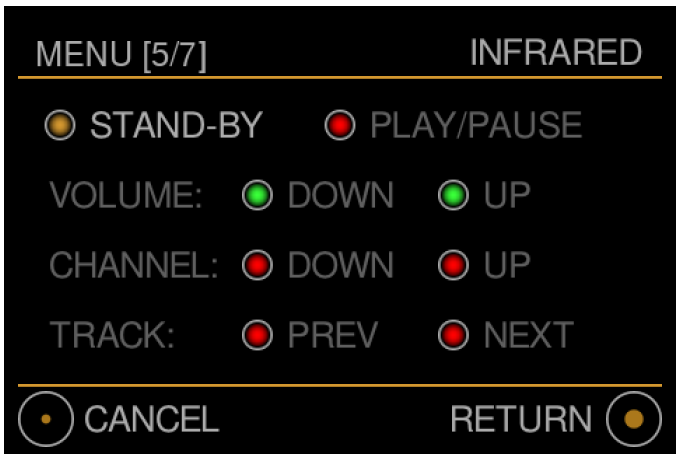
- Red: Function not programmed.
- Orange: In programming mode, waiting for an infrared command.
- Green: Infrared command paired with the function.

The image below shows the Stand-by function selected. Turn the main knob to switch the selection to the desired function. Short press the main knob to start programming the highlighted function.



The dot will turn orange until the MU1 receives an infrared command. Press the desired button on your infrared remote to link this infrared command to the selected function. When the MU1 receives an infrared command the dot will turn green and it returns to the infrared selection menu as shown in the previous image.

The image below shows the menu while programming the stand-by function, note that the volume up and volume functions are already programmed.



Note: Programming stand-by may take a little more time than the other functions.

To cancel, apply a short press with the main knob. The dot of the selected function will turn back to the original (red or green, resp. not programmed or programmed) and no changes are made. To cancel and leave the menu, apply a long press.

One button of the infrared remote can only be paired with one function of the MU1. If you use the same button of your remote for another function, the previous function is overwritten and the new one is paired. The dot of the previously paired function will turn red and the new function will become green.

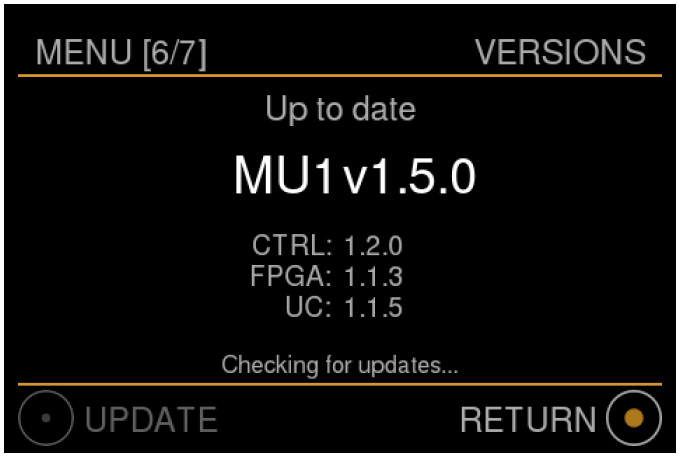
The following functions are available in the various states of the MU1:

	Playing state: Roon	Playing state: Other input	Menu display active
Stand-by	Yes	Yes	No[1]
Play/Pause	Yes, pause	Yes, mute	No
Channel Up/Down	Yes	Yes	No
Volume Up/Down	Yes	Yes	No
Track Prev/Next	Yes	No	No

[1]: Except for the stand-by menu, page 1. By pressing the button on your remote that is paired with the stand-by functionality, the MU1 will enter this stand-by menu page. By pressing the button again the MU1 will go into stand-by mode.

Hint: To verify your button programming, you may press the IR remote buttons while the programming menu is displayed. The function that is paired with the pressed button will be highlighted.

Settings menu[6/7]: Software Version and Update



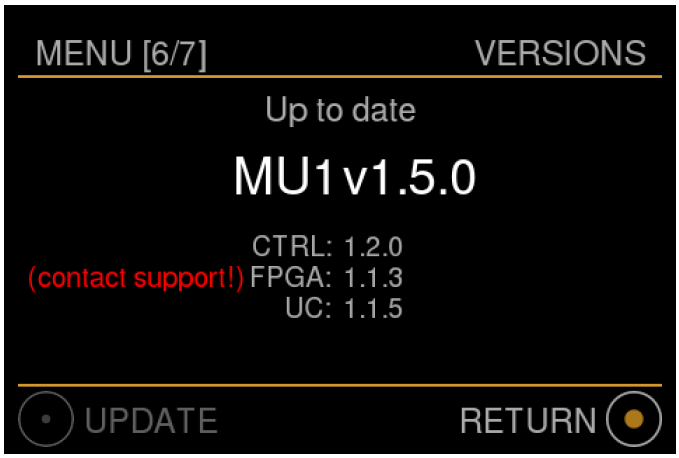
In this menu you can view the current software version and start an update. The MU1 automatically checks for an update every hour and also when entering this menu page from menu page [5/7]. If the MU1 is checking for updates, this is shown at the bottom of this menu.

If your software is up to date this is indicated in the display and the bottom left icon is greyed out.

The software versions of CTRL (Control software), FPGA and UC (Microcontroller) are also shown in this menu. When you experience problems with your MU1 we may ask you to send us this information.

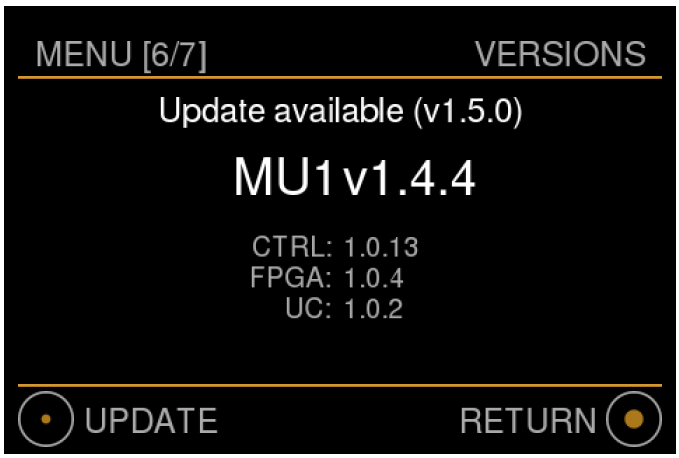
- Turn left to go to the fifth menu, turn right to go to the seventh menu.
- With a long press you will exit the menu and go back to the Music View.

The MU1 does a hardware self-test to check if everything is in order to start the update. In case something is wrong the text “contact support!” is shown in red as shown in the image below.



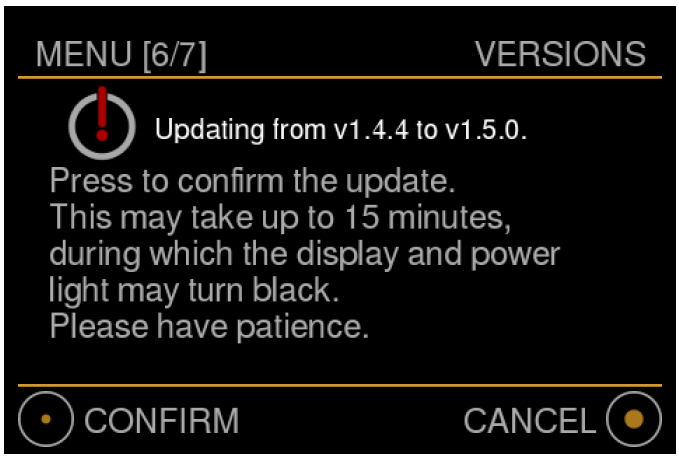
In this case please contact Grimm Audio through our support form at www.grimmaudio.com/support-form and we will help you.

The image below is shown when there is an update available.



In case an update is available and downloaded, the text “Update available” is shown.

- Start the update with a short press. After reading the warning message, confirm with another short press.



Please note: depending on the type of update the install can take up to about 15 minutes. During this time you will not see information on the display, the power LED is off [1] and the power button on the back is disabled. **Please remain patient and do not unplug the device while updating** since this causes the update to fail and the procedure has to start again when the device is powered up.

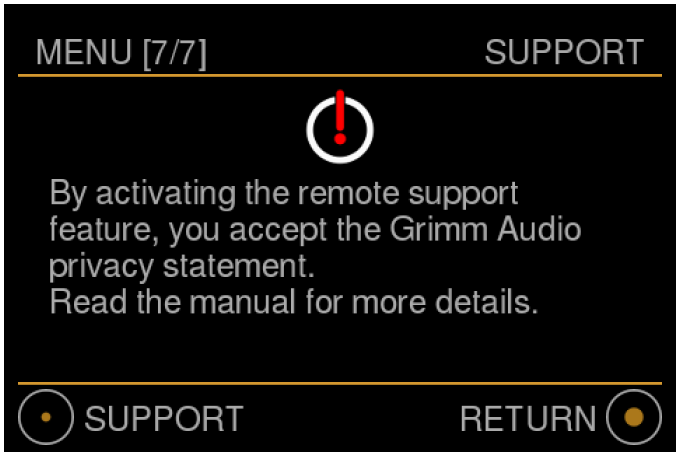
[1] The LED will be fading quickly from firmware V1.5.0.

During the update process the internal PC will shut down and it will reboot at least once. When the update is complete the system will turn back on in normal mode and show the update status briefly.

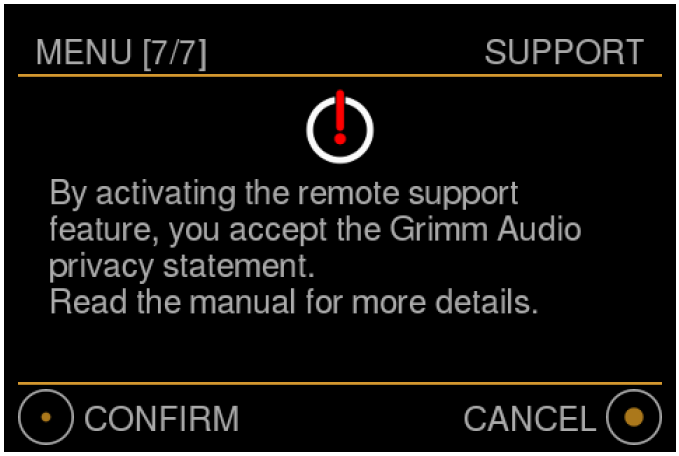
Updates for third party software like Roon is not included in the MU1 software update, this is done separately via the Roon App.

Note: The Music View display will show the text ‘Update available’ when there is a new update.

Settings menu[7/7]: Support



In this menu you can activate Support Mode. This should only be activated when you have reported a problem with your MU1 to Grimm Audio and our people asked you to enter Support Mode. In this mode Grimm Audio engineers can get remote access to your device to help solve your problem.



- Activate Support Mode with a short press on the main control knob, confirm by another short press. The MU1 will reboot in Support Mode and a continuous animation screen with blue instead of white squares is shown on the display.
- With a long press you will exit the menu and go back to the Music View.

Note: While the MU1 is in Support Mode, the blue dot animation will keep running and no other information is shown.

Support Mode privacy statement:

Support Mode reboots the MU1 and establishes a secure connection to a Grimm Audio server. Through this secure connection we can log in to your device, read log files and change settings. Grimm Audio will not copy information from your MU1 in any form without your consent. Grimm Audio will never share your data with any third party.

When you activated Support Mode and wish to return to normal mode, press the power button on the back of the MU1 to turn off the device, and press the power button again to boot the MU1 in normal mode. Grimm Audio has no access to your MU1 any more as soon as you powered off the device.

6 GRUI MU1 Web Control

GRUI stands for Grimm User Interface, it is a web interface for controlling the MU1. There are some extra functions available via the GRUI that cannot be set via the menu system of the MU1 hardware display.

Connecting to the GRUI

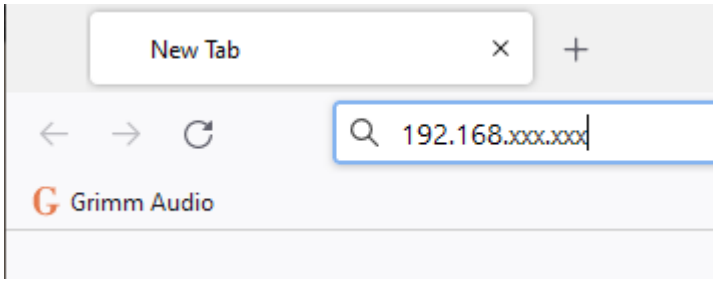
You can connect to the GRUI via a web browser on a device that is connected to the same network as the MU1, just like the Roon Remote.

You can scan the QR code shown in Settings menu[4/7]: GRUI control QR or enter the indicated address in your favorite browser to open the GRUI.

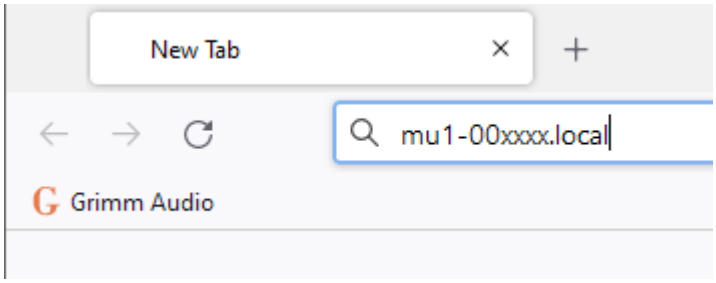
Hint: Once the web page is opened, you may store it for direct access as an icon on the home screen of your iOS or Android device. In iOS this achieved by clicking the 'share' icon (square with arrow), scrolling down and select "Add to home screen". In Android (depending on the browser) you can tap the menu icon (3 dots in upper right-hand corner) and tap Add to home-screen. You'll be able to enter a name for the shortcut and then it will be added to your home screen.

Note that if the MU1 receives a different IP address from your router, the url link in this stored 'app' does not work any more. In that case it does not connect. Please use the QR code again to establish a new connection. You may delete the old icon and create a new one.

Alternatively you can enter the IP address of the MU1 in your browser manually:

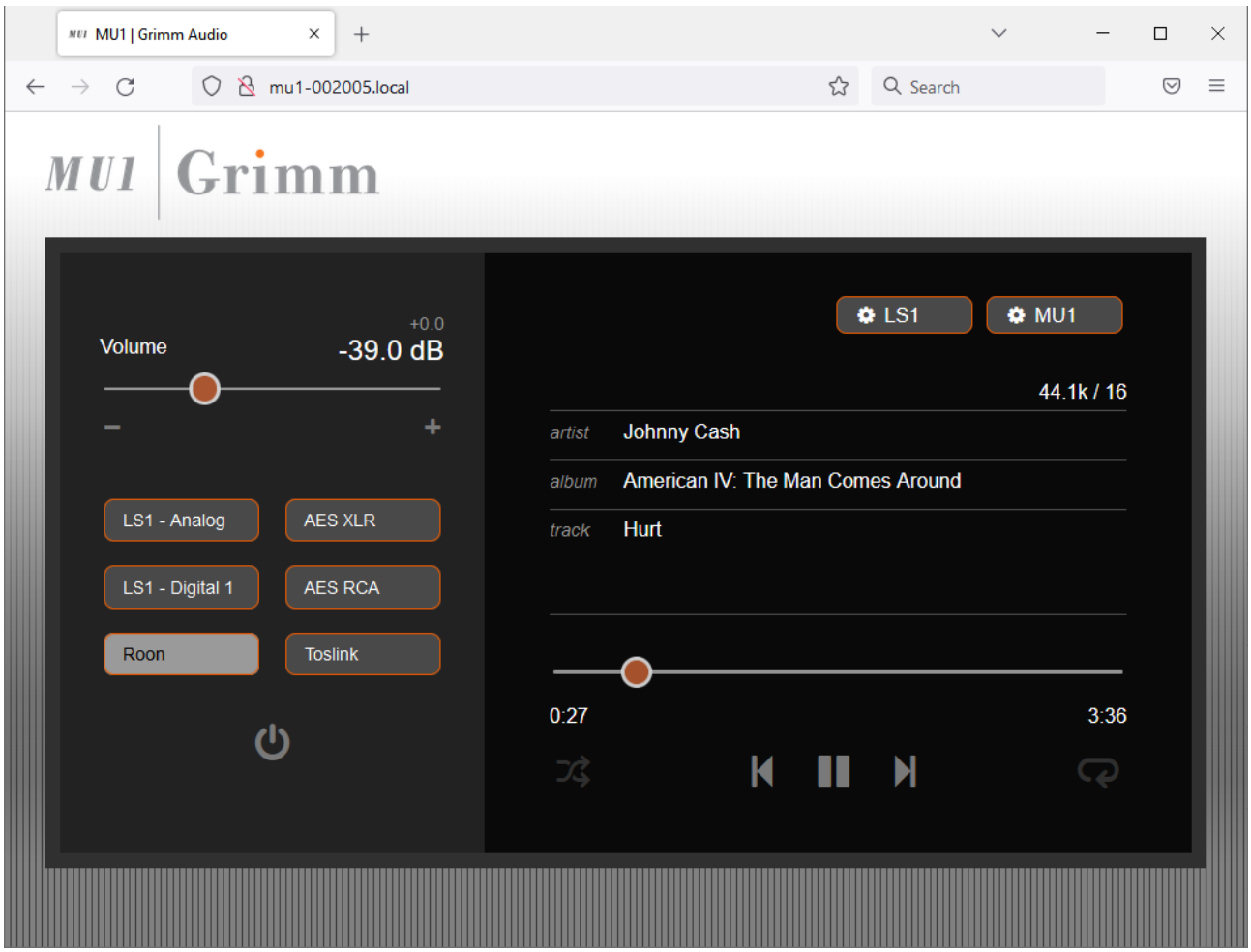


Some devices support connecting using the hostname, you can find the hostname in Settings menu[2/7]: Help in the bottom right corner. Enter the hostname in your browser to browse to the GRUI. Depending on your router settings you might have to add '.local' to the hostname and enter it in your browser as shown below:



Main page

The main page of the GRUI offers access to all basic functions of the MU1. The image below shows how it looks in a desktop environment. On mobile devices the volume control bar and source buttons will be placed below the artist play/pause buttons.



There are two sections: on the left is the control area. You can change the volume and select a source. The LS1 Analog and LS1 Digital 1 inputs are not available when you didn't connect an LS1 to the MU1. Below the inputs you can find the stand-by button.

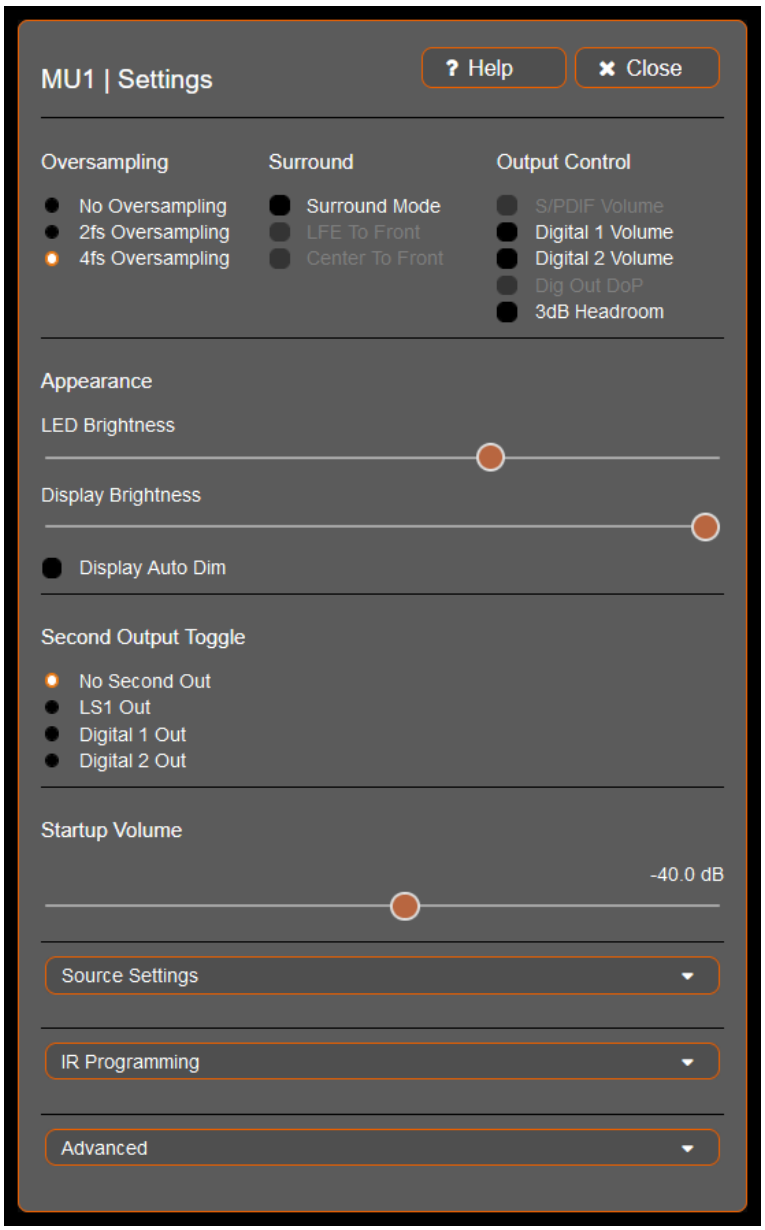
On the right is the track information and playback control. You can move the dot on the progress bar to skip or re-play parts of the current song. With the buttons below the bar you can select play, pause, next track, previous track, shuffle and repeat. These operations are fully synchronized with the Roon interface, the hardware controls of the MU1 and the infrared control of the MU1.

Please note that for the track functions to work, the selected source must be Roon and there needs to be some music in the queue. Mark that the Grimm Audio Roon Extension must be enabled for track information to be shown. If you don't see it, please read the chapter Enabling track information on the MU1 display.

The two cogwheel buttons in the top right offer access to the MU1 and LS1 settings. If you did not connect a Grimm Audio LS1, the LS1 settings are not available.

MU1 settings

The MU1 settings page looks like this:

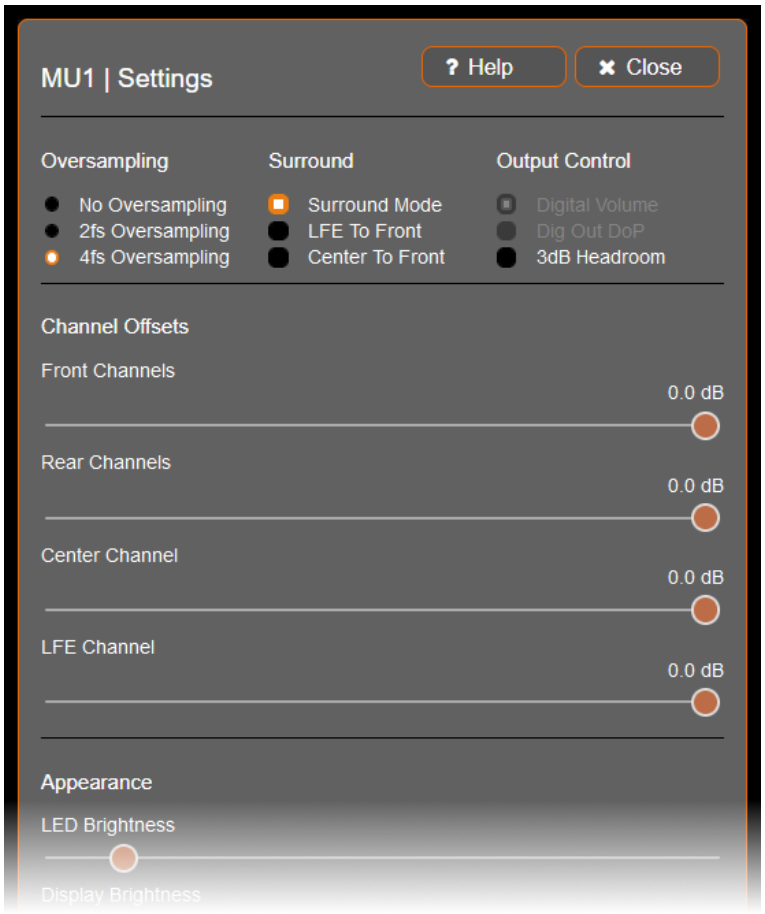


Oversampling

Here you may change the oversampling mode, which can also be changed in the Settings menu on the MU1. For more information about oversampling, see chapter Settings menu[3/7]: Settings.

Surround

The MU1 offers the unique feature to playback surround music files. Enabling ‘Surround Mode’ modifies the functionality of the MU1 digital outputs.



In normal mode all outputs carry the same stereo signal. In Surround Mode the LS1 and S/PDIF outputs carry the Front Left and Right channels. AES out 1 carries the Rear Left and Right channels. AES out 2 carries the Center and LFE channels. When the surround option is enabled you can give volume offsets to the Front, Rear, Center and LFE channel(s). This way you’re able to match the volume difference between different speakers or DACs.

‘LFE to front’ gives you the option to mix the LFE channel into the front speakers. The ‘Low Frequency Effects’ channel is the 6th channel, also known as ‘.1’ channel. In music mixes the LFE is mixed at equal volume as the main channels. In cinema mixes, the LFE has 10 dB more headroom and is mixed 10 dB softer so it needs +10 dB of gain in the playback system. The MU1 LFE level is set for music mixes. Is is mixed at -6 dB to left and right, to obtain an equal level compared to a single real LFE subwoofer.

‘Center to front’ can be enabled if you do not use a center speaker, in other words when you have a ‘quad’ setup of 4 loudspeakers. The center channel will then be mixed into the left and right front speakers, taking the 4 dB loudness difference between a real center channel and a ‘virtual’ center channel into account.

Output control

Most of the Output Control functions can also be found in the Settings menu of the MU1 display. For more detailed info, read chapter Settings menu[3/7]: Settings. In this area FPGA volume control of Digital 1, Digital 2 and S/PDIF outputs can be set, and DoP (DSD64 over PCM) can be enabled if your DAC is capable of decoding this special audio format and you have DSD64 files to play.

Depending on your setup some options can be greyed out. When an LS1 is connected to the MU1 you cannot enable DoP as the LS1 does not support DoP. Along a similar line, DoP is greyed out when volume control of the outputs is turned on, since DoP cannot be used with digital volume control. Finally, Digital 1 and Digital 2 Volume might be greyed out when there are more than two LS1s connected to the MU1 in a surround setup.

'3dB Headroom' attenuates the levels of all output channels (including the LS1 output) by 3 dB. This feature helps to avoid intersample clipping in downstream DACs when no digital volume control is used in the MU1. This also applies to the LS1 since the MU1 sends audio at full scale to the LS1 because its volume is controlled in the LS1 DSP. Intersample clipping is a problem for over two decades when the production masters of pop music were being created at increasingly high loudness. As a result the waveforms of most pop music tracks from this era carry many peaks between the samples that are higher than the full scale sample level. Most DACs do not have headroom to reproduce these kind of signals and will clip. By lowering the digital output level of the MU1 by 3 dB, most clipping is avoided. Please note that when this feature is turned on, the MU1 will sound 3 dB softer than other streamers or CD transports with the same audio data. But the sound quality will be much better with modern pop music.

All mentioned processing is done in the MU1 FPGA with the highest possible quality. When all mixing, volume, headroom and oversampling options are turned off, the output is transparent and bit-perfect. Feel free to disable all these functions if a bit transparent transfer is important to you. But mind that you will miss most of MU1's resolving power by doing so.

Appearance

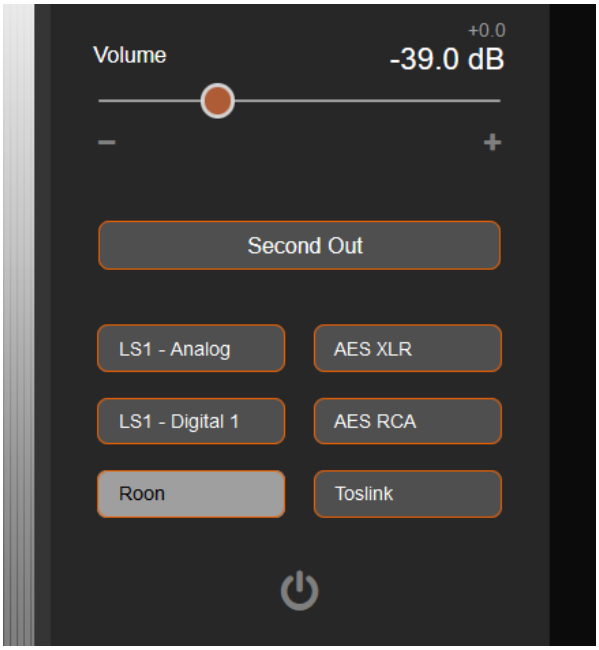
The Power LED brightness and Display brightness can be set here. When enabling 'Display Auto Dim', the display will go to a very low brightness after a few seconds. Whenever you use the main knob or IR remote, it will light up for a few seconds again.

Second Output Toggle

If you wish you can enable the 'second output' option, this feature is for users who like to switch between different outputs of the MU1 without turning off their DAC or unplug cables. This is for instance convenient if you have a separate headphone DAC connected to one of the extra outputs, or when you have a second DAC and speaker set that you like to audition.

The output you have selected as Second Output will be muted until you press the now visible Second Out button in the source selection part. All other outputs will be muted when Second Out is enabled.

You can also toggle between normal use and Second Out by pressing the main dial of the MU1 twice quickly. Note that in case you were listening to live radio via Roon it will be paused for a short while as it has to re-start the stream.



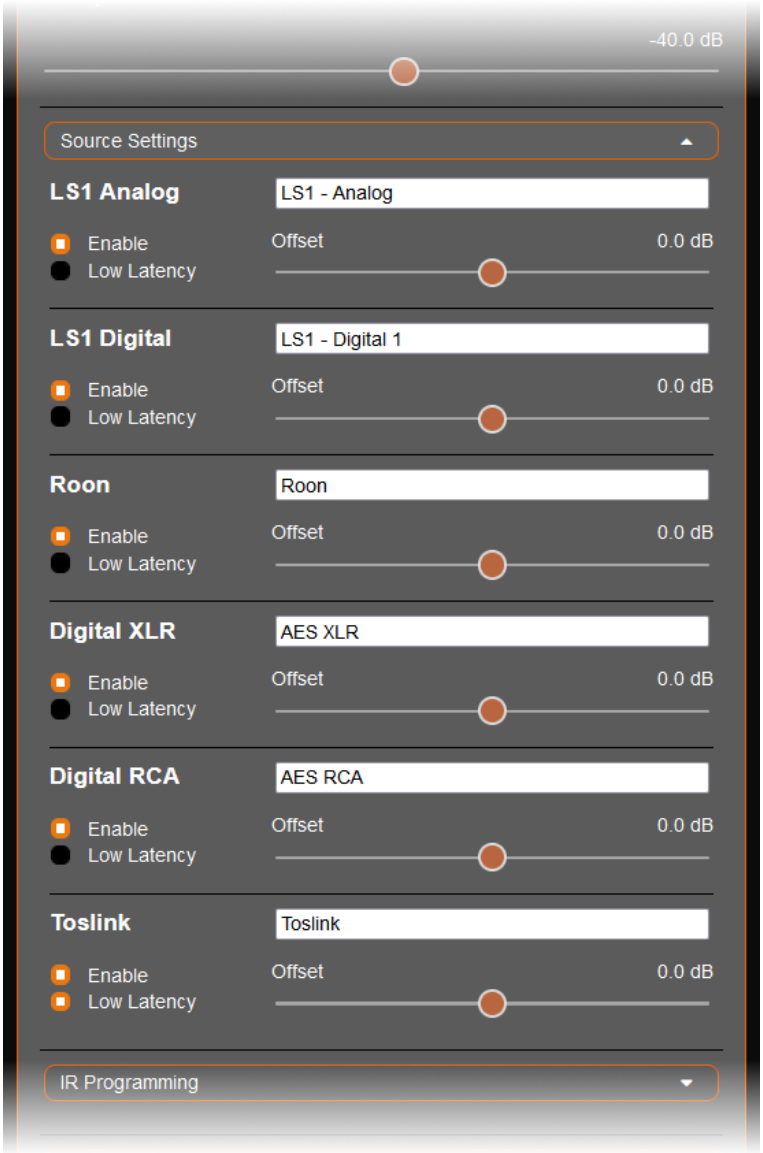
Startup Volume

You can set the default startup volume of the MU1 to a value between -20dB and -63dB. This will only affect the audio if volume control is turned on or if you have an LS1 set connected.

Source Settings

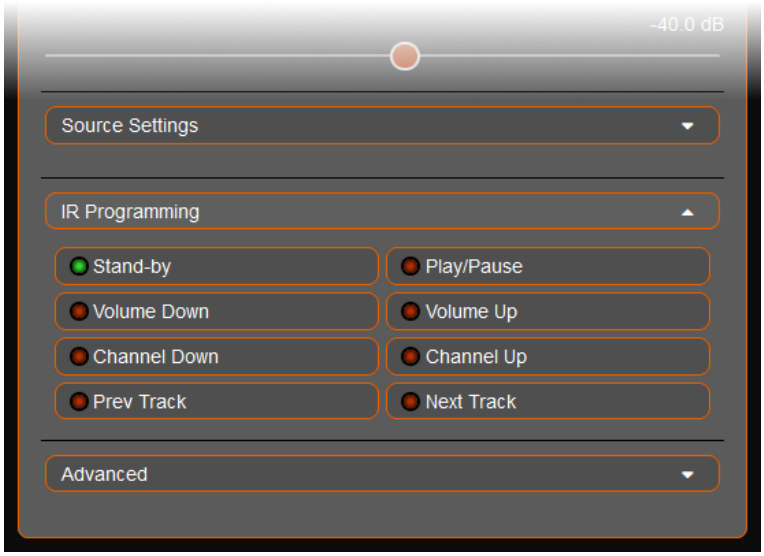
Under Source Settings you can change aspects of the MU1 input behavior. For each source you can set:

- A label: Change the name of the input which appears in the control part of the GRUI and on the display of the MU1.
- Enable or disable a source: Disabling a source removes it from the control part of the GRUI and from the source selection menu in the MU1.
- Turn on Low Latency mode: This option is just for owners of the LS1 system, it will not appear if you have no LS1 connected to the MU1. You can enable the low latency mode in the LS1 per source. Typically, if you have your TV connected to the MU1 via a Toslink cable and you have Low Latency enabled you will have app. one frame less delay between audio and video. In case this delay does not bother you, we recommend to keep 'Low Latency' mode turned off since it disables the phase correction of the LS1 crossovers. Note that changing this setting while music is playing it might create a pretty loud pop.



IR Programming

In this menu you can program your favorite IR remote, just like via the menu. See chapter Settings menu[5/7]: Infrared remote programming for more information.



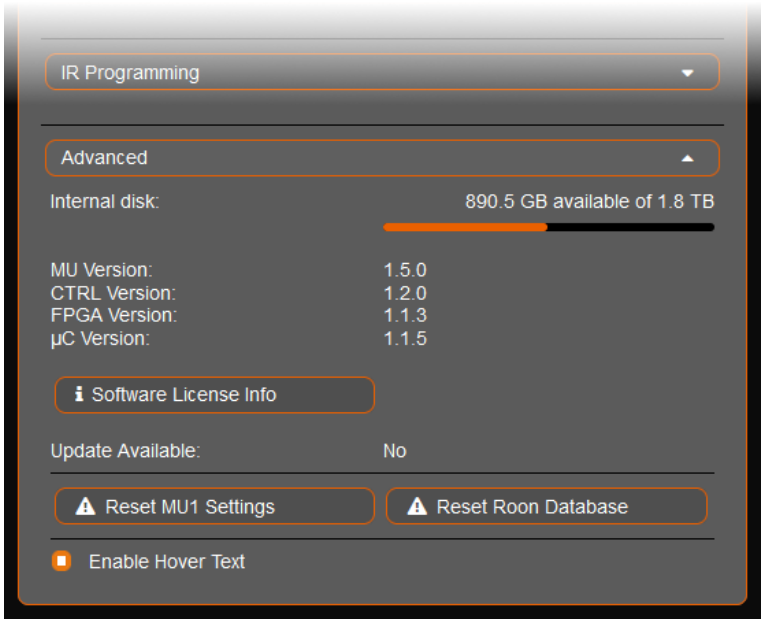
Please make sure to connect an IR extension cord to the 3.5mm jack on the back, as explained in chapter 3 Setup. The following functions can be controlled with a general IR remote: Stand-by, Play/Pause (Mute when other sources than Roon are selected), volume control, source selection and next/previous track.

Press the button of the function that you would like to program, the little dot will go to yellow and the label will fade in and out until you press a button of your remote. When the MU1 receives a command from the remote it will save the button that you pressed under that function. You can cancel by pressing the selected button again, it will return to its last state.

If you already used this button for a different function, that function will turn back to red as you cannot program two functions under one button.

Advanced

If you open the advanced tab you have access to more information about the MU1 and options that reset parts of the MU1 software, please be cautious with these buttons.



In case your MU1 has an internal Music disk, its free space and the total space of the disk are shown. Note that this is in “JEDEC 100B.01” format which differs from the “IDEMA” standard used by disk manufacturers, this will cause the displayed disk space to end up lower than advertised.

Furthermore you can see the exact software versions of each part of the MU1, this information might be requested by a Grimm Audio employee when you run into problems.

The Software License Info button brings you to a page where all the licenses of the software we use are stated, if you are interested.

Below the software license button you can see if there is an update available for your MU1, this will also be shown in the display of the MU1. Note that you cannot start an update from the GRUI, you have to use the main dial and go to the update menu as described in Settings menu[6/7]: Software Version and Update.

The button “Reset MU1 Settings” resets the MU1 settings to the default value. This rolls back all settings you changed in the GRUI and the MU1 menus (including the IR remote settings). You will see a pop-up to confirm that you are sure, please note that your browser may block this pop-up, unblock popups for this page to use the function.

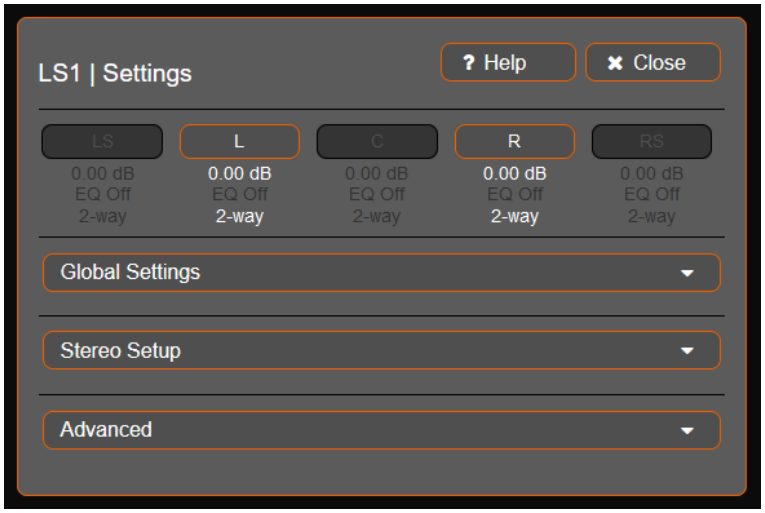
The Reset Roon Database button will stop Roon and erase the complete Roon database from the MU1 and restart Roon. This will reset your login (you will have to press the ‘select different core’ on your Roon remote), playlists (excluding Tidal and Qobuz playlists), favorites, tags, storage settings, MU1 Extension and all other changes you made to Roon in your MU1. Use

this button only when a Roon employee or a Grimm Audio employee tells you to do this. We recommend to make a backup using the Roon backup functionality before executing a reset. You will get a pop-up asking you if you are sure to do this.

The last function in the Advanced tab is to toggle the hover-over help text on and off. This setting is saved in your browser which means the hover-over text will be shown again if you use a different browser or device.

LS1 settings

In this menu you can conveniently control the settings of connected LS1s via the MU1 GRUI. For in depth information about these functions, please consult the LS1 manual that you can find on the Grimm Audio website.

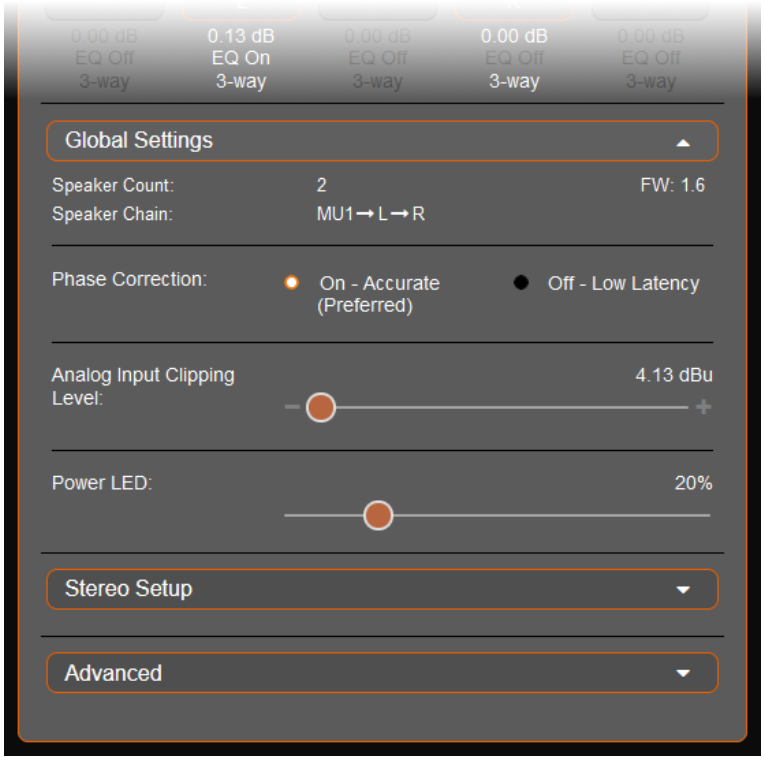


The first row shows a summary of the setup data per LS1. In the top row you see buttons with the names of the detected speakers. You can press these buttons to mute the indicated channel for a few seconds. This LS1 will blink its power LED, so you can easily identify the speaker and see if the wiring and LR switches in your system are correctly set.

Below the buttons an overview of the basic setup of each loudspeaker is given. You can see if a speaker has a volume offset, whether an EQ is engaged and if it is in 2-way or 3-way mode.

Global settings

Clicking this opens a menu with settings that apply to all connected LS1s.



'Speaker Chain' shows how many LS1s, and in what order, are connected. The image above shows that there are two LS1s connected and the wiring goes from the MU1 to the left LS1 and then to the right LS1. In a surround setup with LS1s the indicated chain is important to double check, see chapter Stereo system wiring for the proper surround setup wiring. In this chain 'LS' means Left Surround and is the Rear Left channel, 'RS' is the Rear Right channel, 'C' is the Center channel.

In the top right corner the firmware version of your LS1s is shown. If the firmware of one of your LS1s is not up to date you will be notified here with an exclamation mark. You will need the 'LS1 PC remote' software to perform a firmware update (see the LS1 manual).

'Phase correction' of the crossover filter can be turned off to obtain low-latency playback. The sound quality will decrease but the latency will be shorter. This is useful when you want to synchronize with video, for instance when you have the audio of your television routed through the MU1. The low latency option can automatically be set if you enabled this via the Source Settings menu.

Note: if audio is playing when you change this setting you will hear a pretty loud pop. Please pause your playback first.

In case you have a surround setup with LS1s and some of them are 3-way versions and others are 2-way, the phase correction is automatically disabled. The reason is that the phase linear crossover of a 3-way LS1 system has app. 40 ms latency and the phase linear crossover of a 2-

way LS1 system only 7.3 ms. This will lead to strange stereo image shifts and by disabling the phase correction on all speakers this problem is avoided. The latency is then 5ms for all speakers.

Hint: In case you have a 3-way LS1 speaker on Front Left and Right but all other channels are 2-way LS1s, we recommend to turn off all speakers except Front Left and Right whenever you play just stereo tracks. The MU1 will automatically turn phase correction on if it only sees the two main channels present. This will offer a better sound quality.

'Analog Input Clipping Level' lets you change the maximum input level of the LS1 analog input. Some professional systems use higher analog levels than consumer grade gear and this setting allows to adjust the input level sensitivity to the source. Please note: if the sensitivity is set high and the LS1 volume turned down, you will hear clipping since inside the LS1 the input sensitivity is set before the LS1 volume control. The procedure to set a correct input sensitivity is as follows: first set the playback volume to a normal level. Then play some music into the analog input and adjust the Analog Input Clipping Level fader until the sound plays at normal loudness.

'Power Led' sets the brightness of the LS1 power LEDs.

Stereo Setup | Front Setup, Center Setup and Rear Setup

The LS1 has specific settings that you can change per loudspeaker pair through this submenu.

Note: The Rear and Center settings are not available in a stereo setup, but they have the same options. They appear in the GRUI when the speakers are connected in a surround setup.

The ‘Toe-In Angle’ should be set to follow the LS1 angles of your setup. 30 deg means “aimed directly at listener”, 45 deg means “aimed slightly in front of the listener”. For more info about this technique, please consult the LS1 manual. This setting controls an EQ in the LS1 that corrects the high frequencies for the used angle. The function is not available for the center speaker since it always faces the listener directly, so it defaults to the ‘30 deg’ EQ.

‘Volume Offset’ allows to give each speaker a positive or negative volume offset, to compensate for an acoustic left-right imbalance. For gain alignment in a surround setup you should use the Channel offset functionality in the MU1 menu in the GRUI.

‘High Shelf’ offers an EQ for the high frequencies to tune the system response to taste. This is applied to both front speakers.

‘Low Shelf’ applies a separate low-shelf filter for each speaker, that can be used to correct for influence of room acoustics. You can link the setting for left and right to keep the same offset between the channels.

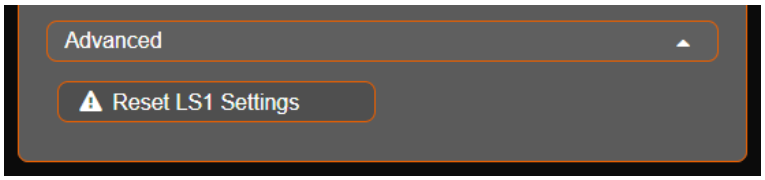
‘Low End Parameters’ offers various options for a subwoofer that is connected to the LS1. There are three options.
Note: Please only change these settings when there is no audio playing to avoid hearing a loud pop.

- None: The subwoofer output on the LS1 is disabled, which means you have a 2-way system. You can change the Low-cut frequency for the 2-way LS1.
- Grimm: The subwoofer output of the LS1 is enabled and set to use with an LS1-s, LS1-s-DMF or SB1 subwoofer. The system will act as a phase corrected 3-way system. You can change the Gain and Delay of each subwoofer and the Low-cut frequency for both subwoofers together.
- 3rd-Party: The subwoofer output of the LS1 is enabled and set for use with 3rd party subwoofers. The full system will act as a 3-way system. You can change the Gain and Delay of each subwoofer and you can change the Low-cut frequency and phase for both subwoofers together.

You can link the Gain and Delay for easier control, the MU1 will then maintain the offset between the two sliders.

Advanced

In the Advanced tab you can reset the LS1 by pressing the Reset LS1 Settings button.



This triggers a reset built in the LS1 firmware. You will see a popup message to confirm that you want to reset the LS1. Use this button only if you experience problems with the LS1s. Please note that you might have to setup your LS1 settings again, especially the 3-way setting, equalizer and toe-in angle.

It is advised to have no music playing when doing a reset of the speaker. We made sure that the MU1 switches to Roon and pauses the music but you could still risk to hear a loud pop if you play music while resetting the speaker. After the reset the volume setting will be re-applied in the LS1, volumes higher than -20dB will be turned down to -20dB.

Grimm Audio, The Netherlands
General questions: info@grimmaudio.com
Support questions: grimmaudio.com/support-form
Tel. +31 40 213 1562

Check grimmaudio.com for news about your MU1.

For software version V1.5.0
J.V. M.S. and E.G. 15/12/22