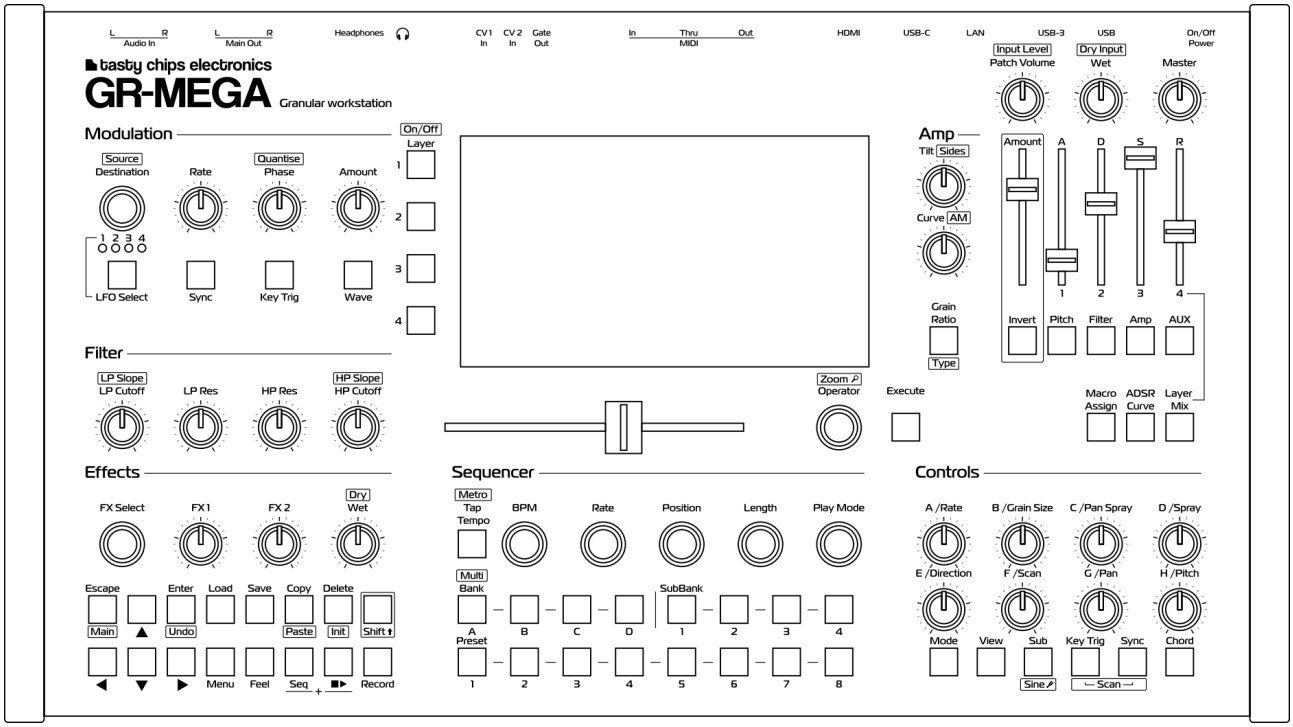
GR-MEGA User Manual



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Illustrations by Luc Derks

2024

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Document version naming

This document’s version is written as:

v<major version>.<minor version>.<patch level>
v<number>.<number>.a-z

The major and minor versions follow the GR-1 firmware versions. The patch level is separate from the firmware version’s patch level (a correction in the manual text vs a software fix in the firmware).

Major version updates involve a complete redesign of the user interface and possible feature additions. Minor version updates involve feature additions.

Firmware patch level updates [0,1,2,3,4,..] purely involve bug fixes.

Document patch level updates [a,b,c,d,e,...] involve additions to documentation: yet undocumented features, typos, and errata.

Document version

1.1.a-DRAFT

Applicable firmware versions

1.1.* (1.1.0; 1.1.1; 1.1.2; etc)

Contents of the box

Congratulations! You are now the proud owner of the Tasty Chips Electronics GR-MEGA granular workstation.

The contents:

• The box with schematic drawing of the GR-1 on its top side. NOTE: this box features a sticker with serial number GME-XXXX!

• External region-independent AC/DC power supply, boxed.

* Region specific AC cord.

• Quick start guide (single A4 sheet).

* USB stick.

• The GR-MEGA unit, with sticker GME-XXXX on the bottom plate.

The display has a protective sticker on it, which may be peeled off if you prefer.

Important safety and maintenance instructions

Important safety and maintenance instructions

Do not use an AC/DC adapter other than the one that comes with the GR-MEGA.

Do not connect high voltage input/output connectors to the GR-MEGA.

Avoid this product from falling. Avoid spillage of fluids. Keep it dust free, and keep it out of damaging environments. Keep your GR-MEGA out of reach of children and pets.

Do not open this product. Please contact Tasty Chips Electronics when (part of) your GR-MEGA does not work (when it freezes or resets). Contact information can be found at the end of this manual.

Please treat your GR-MEGA well.

Power supply and power lead

Power supply

Brand: **Mean Well**

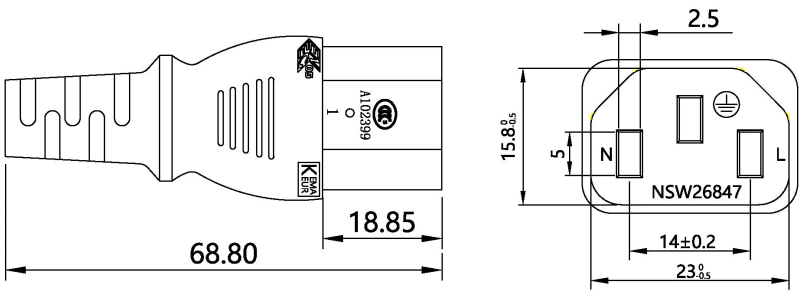
Model: **GSM60A12-P1J**

Power specifications:

Input voltage:	80 ~ 264VAC
Output voltage:	12V
Max output current:	5A
Barrel socket dimensions:	2,1 x 5,5 mm

Factory furnished AC lead

The GR-MEGA comes supplied with a IEC-60230 C13/C14 cable for your country. The so-called “kettle plug”. [https://en.wikipedia.org/wiki/IEC_60320]



Power specification

Please do not use an adapter other than included in the GR-MEGA box. Using another adapter or power source, may cause damage to your GR-MEGA. It is protected against reverse polarity and over voltage, but extreme voltage will still cause damage! The GR-MEGA accepts heavier 12V adapters than the supplied 60W unit, but please contact us before trying!

Reading this manual

How to get the most out of this manual:

The GR-MEGA is a powerful and flexible device, but it is designed to be easy to get into. The display and the controls directly next to the display speak for themselves. But this manual offers a full overview of *all* the controls. This starts in the chapter Global Overview.

This manual also functions as a detailed reference. The Tasty Chips Electronics Youtube channel [youtube.com/tastychips] features tutorials for the GR-MEGA, although this user manual is still more detailed.

In general the flow of this manual is from beginner and global at the start to advanced and specific near the end. Although we felt that we needed to explain some principles before getting to the tutorials.

The first chapter you should probably read is the quickstart chapter. It gets you up to speed with the basics: powering up and getting the first noises out of the GR-MEGA. In the beginning you can just stick to this quick start and basic tutorials. Should you "bump" into things later on, you can come back here to this chapter and get guidance on what part to read, or just Ctrl+F / Cmd+F and use the manual as a reference work.

The Global Overview chapter provides an overview of all physical controls: buttons, knobs, sliders, the display, as well as the sockets on the back panel.

Since the GR-MEGA has sound engines that require more explanation than for instance analog synthesis or wavetable synthesis, we've written an engine chapter especially for this purpose: "Sound Engines". It is recommended to read this if you are not familiar with granular synthesis or spectral synthesis, aka. "phase vocoding". The sound parameters are described for each sound engine.

Once the user is familiar with how to tweak sound parameters, we explain how data is organized in samples, patches (presets), and projects, and various other data types that can be useful. This is the chapter GR-MEGA Data. Logically, this is followed by how to load and save all these data types in the next chapter.

(Network) File sharing is probably the easiest way to transfer samples and other data between your MEGA and your PC/Mac. This is explained in the chapter File Sharing.

We then explain all the options in all the menus, which is the longest chapter.

Only then are were ready for the tutorials.. Although, you can actually skip directly to this chapter after having read the quickstart, we do recommend getting familiar with the data types first.

To get the most out of your GR-MEGA, we've added a chapter about polyphony.

The later chapters deal with tables of control functions, button combos (shortcuts), and MIDI command tables. A chapter about frequently asked questions and troubleshooting concludes the manual.

Warranty

The GR-MEGA comes with a 2 (two) year warranty on factory defects. Warranty is effective from the date of shipping of the unit. There is no need to register your unit with us. You buy it, you own it, even second-hand. As the owner you're always entitled to the unit's warranty, within the limits specified in this chapter.

For instance, if you buy a second-hand unit that's 1 year old, you still have 1 year factory warranty left.

"Factory defects" covers:

• Missing parts (see previous section)

• Broken parts (for instance: cracked screen, broken buttons, knobs or sliders)

• Non-functional unit ("dead on arrival")

• Semi-functional unit with serious defect (for instance: inability to access any USB stick or USB hard disk, left and/or right channels permanently muted).

In case of such defects, you can reach us at info@tastychips.nl, and claim your unit to be repaired. We'll contact you with all the necessary information for return shipping and will refund all postage costs incurred. Please understand that shipping and repairs may take several weeks depending on the severity of the defect and your location in the world.

We'll first attempt to repair your unit. If, and only if, the unit is damaged beyond repair, we'll send a new unit.

In some trivial cases like missing power adapter, or broken SD card, we will send the replacement parts directly to you, because they may be easily replaced.

Note that opening up the unit and tampering will void warranty. There are exceptional cases where we do allow the product owner to open up the unit, typically for a possible quick fix in the studio, but said person will need to have our explicit permission first. Ask here: info@tastychips.nl

Quickstart

1. Hook up the furnished power brick up to your power outlet.

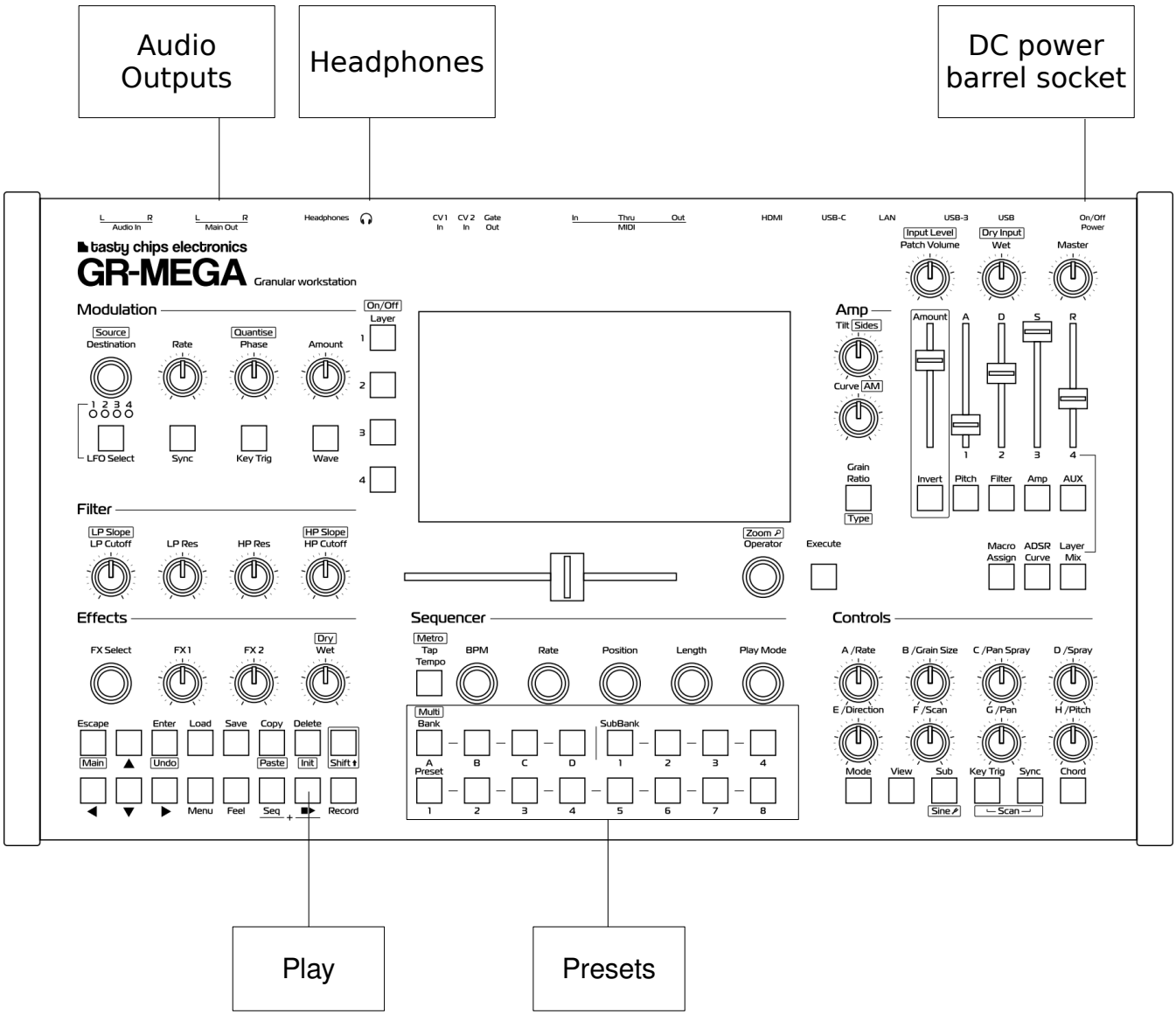
2. Plug the power brick’s barrel jack into the GR-MEGA.

3. The GR-MEGA will now start up, moving through its LEDs one by one. This will take only 2 seconds.

4. After a few seconds more the Tasty Chips logo appears on the screen, quickly followed by progress bar. And then after a few seconds more you’ll see the main sample display.

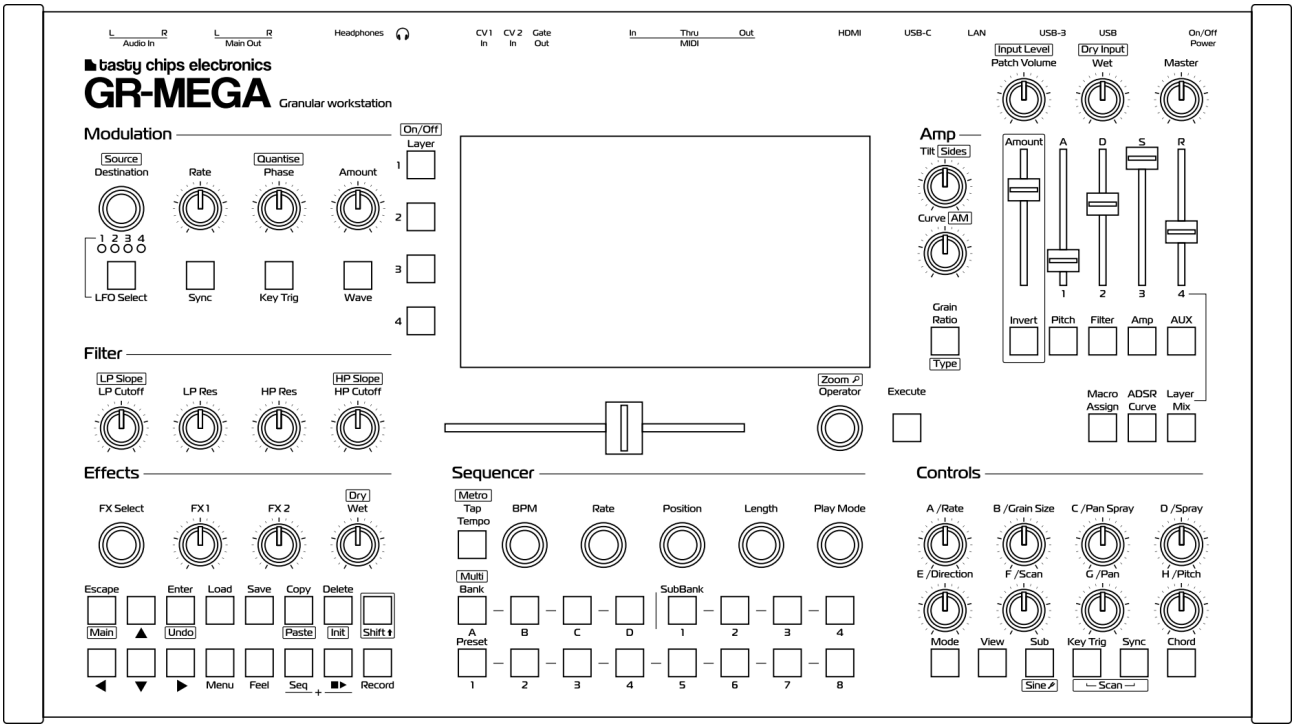
5. Hook up your headphones or your monitor speakers on the back panel. Adjust Master level (top right) to a safe low level.

6. Hit the play button, and try the preset buttons to explore other sounds. Enjoy!



Global Overview

Front Panel



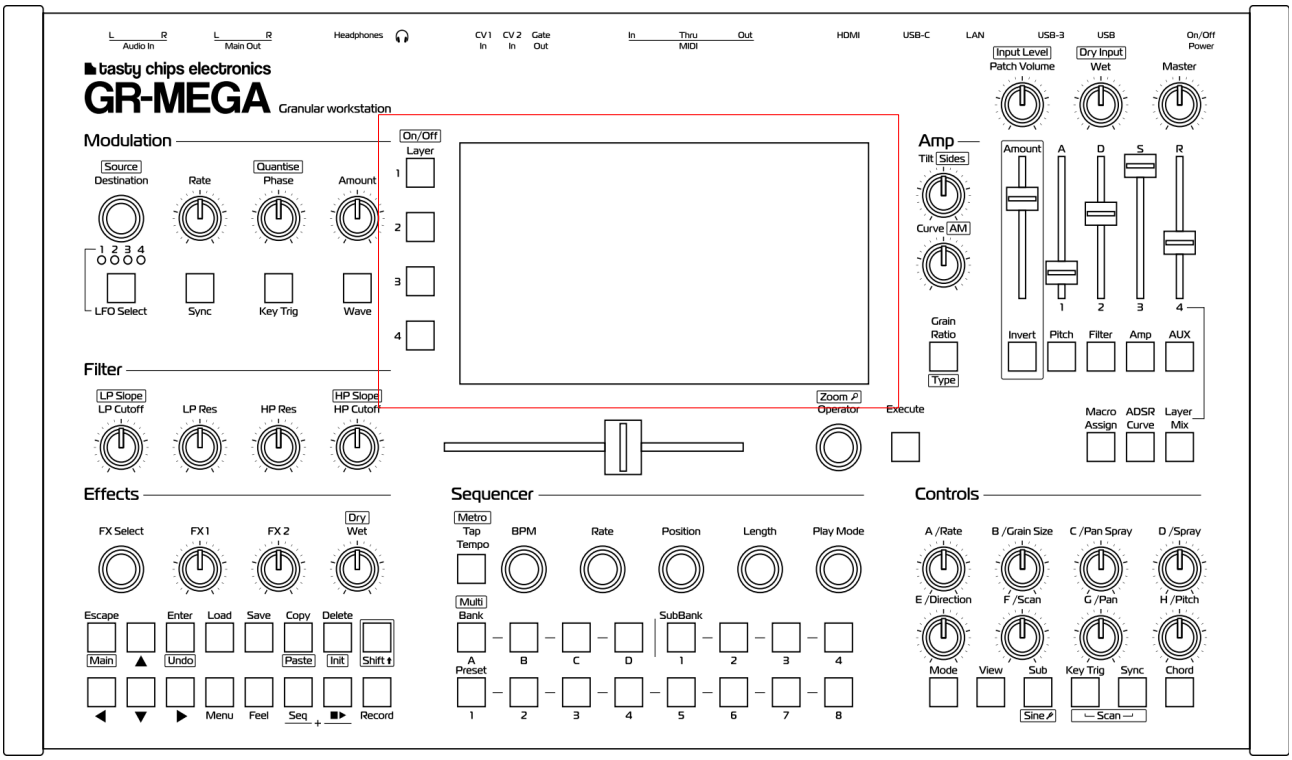
The GR-MEGA front panel offers a rich human interface. Controls are grouped by function. That function is written above the group, along with a separator line. Enough space is present between knobs as to not accidentally touch the neighboring knob.

There’s no signal flow represented in the front panel. Some synthesizers have their flow laid out in a line from left to right: VCO → VCF → VCA. The GR-MEGA doesn’t have this, but instead has the focus on the central screen. It’s easy to start there, and then work your way outwards, starting with the presets (on the bottom) and play button (on the bottom left).

Many controls have got 2 or more functions. Typically you can access the secondary function by holding down [Shift]. Sometimes alternate functions are accessed through *modes*. These are controlled by physical buttons, encoders or GUI menu controls. Shift functions are mentioned in the text on the front panel, and are enclosed by a rectangle.

The following manual sections describe the function groups one at a time, in descending order of importance.

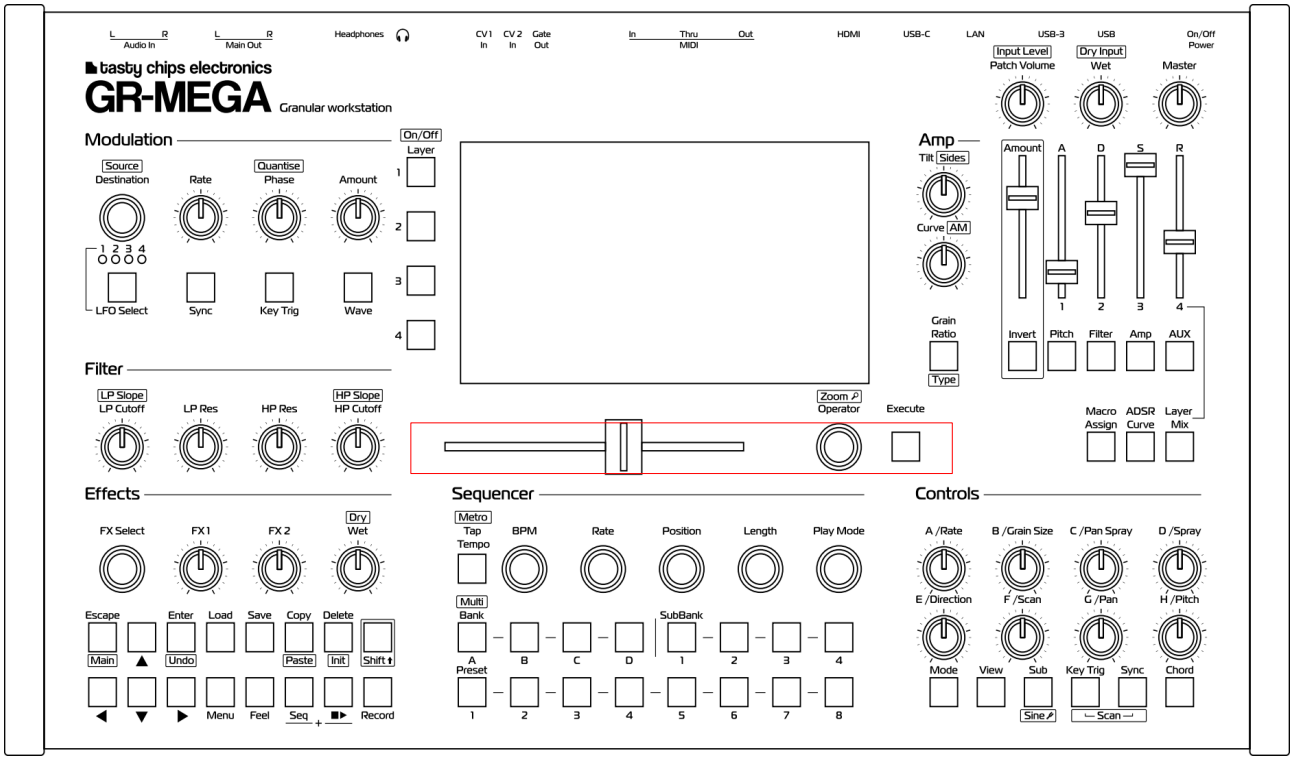
Display



The GR-MEGA display is 7” full color and 1024x600 resolution. It is dimmable, to be suitable for low light conditions. There’s a perspex window on top that is also scratch proof. A new GR-MEGA unit comes furnished with an additional plastic screen protector on top. This can be removed by peeling.

Directly left of the display are 4 layer buttons. Focus on a layer by pressing. Toggle it by holding it down or using Shift + layer button.

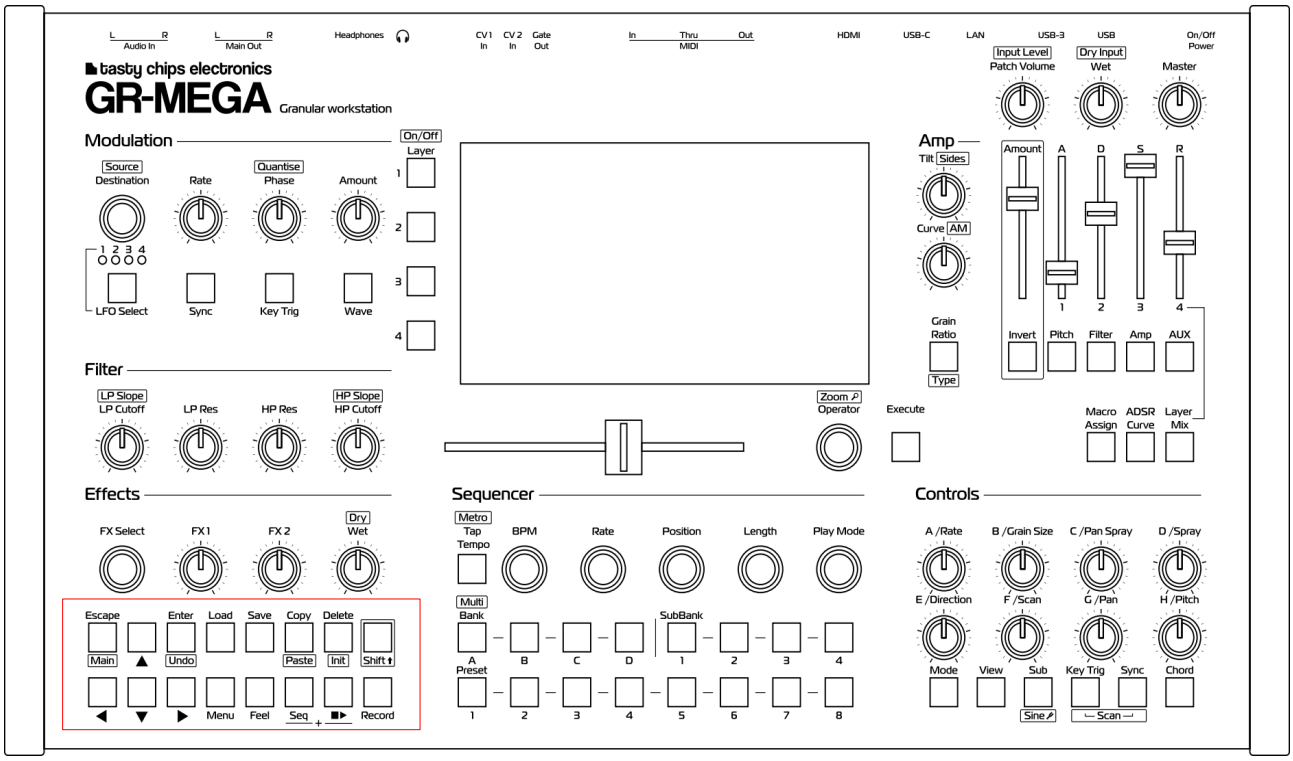
Position slider, and “op” encoder



Directly underneath is the horizontal position slider. The travel of the slider is 100 mm. The position slider is essential for many things. First and foremost for setting play position in your samples. While zoomed in, hold [Shift] and move the slider to scrub through the entire sample. It is also used to dial in values in menus.

Next to the slider there’s the operation encoder (“Op enc”) and the Execute [Exec] button. Turn (Op enc) to select an operation like cropping or setting loop points, then press Exec to execute. Hold [Shift] and turn (Op enc) to quickly zoom in and out. (Op enc) is also used to step values in menus. Holding down shift will typically mean fine adjusting.

Menu, navigation, editing & disk access



On the bottom left of there's a group of buttons for menu navigation, and disk access.

From left to right:

Navigation: On the far left there are the arrow buttons: left, right, up, and down, as well as escape, and enter buttons. These are used to navigate through menus and dialogs. Escape always escapes from the currently focused widget (button, text box, or slider), or escapes from the menu or dialog completely. The enter button is used to enter menus and text boxes (to start entering text).

Load and Save buttons call dialogs to load and save, and when said dialogs are open, press again to perform the actual load or save operation.

Menu: toggles between menu and main screen. Shortcut: Hold down menu button and press preset buttons 1 through 8 to enter one of the menu tabs directly!

Feel: allows you to check all button, knob and slider settings without actually changing them. Just hold down this button and move the control you want to check. The value is displayed on the bottom of the screen.

Copy: used to copy, and to paste: hold down Shift and then press Copy. It of course copies different things depending on the menu tab you are in, or if you are in the main screen; then it copies patches.

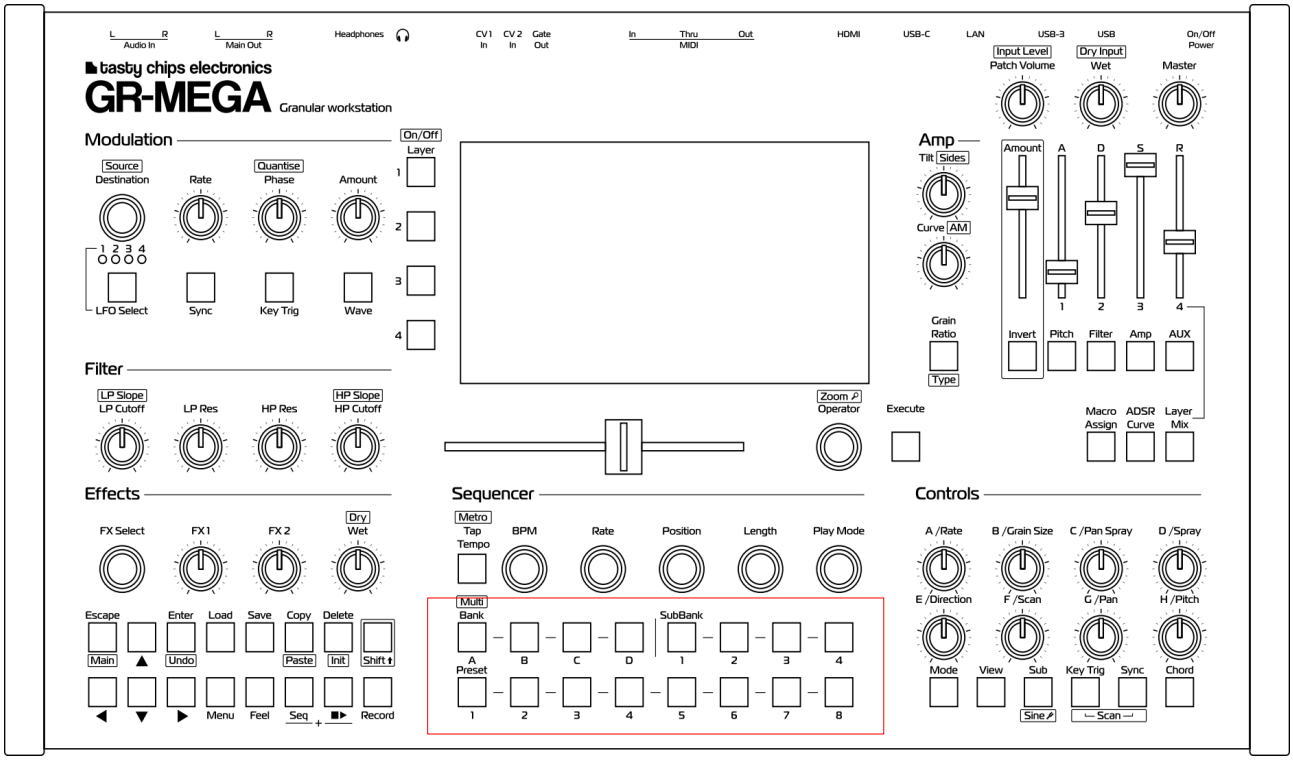
Seq: used in conjunction with Play or Record buttons. Hold it and press Play to play the sequencer instead of just playing a single continuous note. Hold it and press Record to record MIDI notes into the sequencer.

Delete: used to delete or initialize data. In the main screen it initializes the patch. In menu screens it initializes different things such as sequencer notes, mod matrix rows. Inside a text box it acts like a backspace.

Play [▶]: plays and stops (press again) a single continuous note. Hold [Shift] and press [▶] to audition the current sample. Can be used in conjunction with sequencer as well. Hold down [▶] for 3 seconds to turn all sound off, like a panic button.

Record: record audio (when enabled in sampling menu), or record sequencer when Rec button is held down. Press Record again to stop recording.

Presets & banks

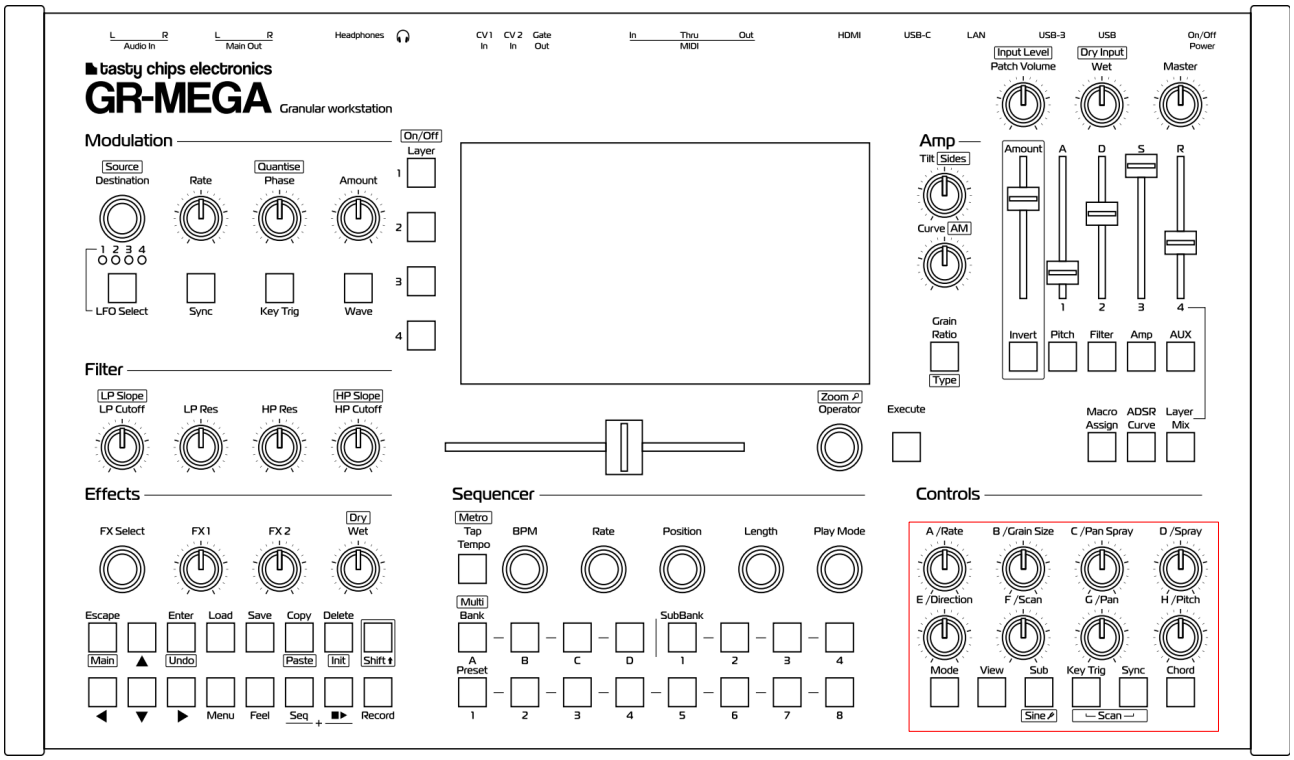


On the bottom center there are 16 buttons. They’re marked: Bank, SubBank, Preset. Each bank has 32 presets, each subbank has 8 presets. In total you can directly switch to 128 presets with these controls.

Holding [Shift] while pressing one of these buttons will switch to multi timbral patch stack 1 .. 16. In the system menu you can toggle “Fast MT Select” to reach all 128 stacks, by pressing bank, subbank, and preset similar to setting a preset (starting firmware 1.1).

These buttons can also be used to change the sequencer position (lower row) or bar (upper row). [Seq] + [▶] have to be lit.

Grain controls (ABC knobs)



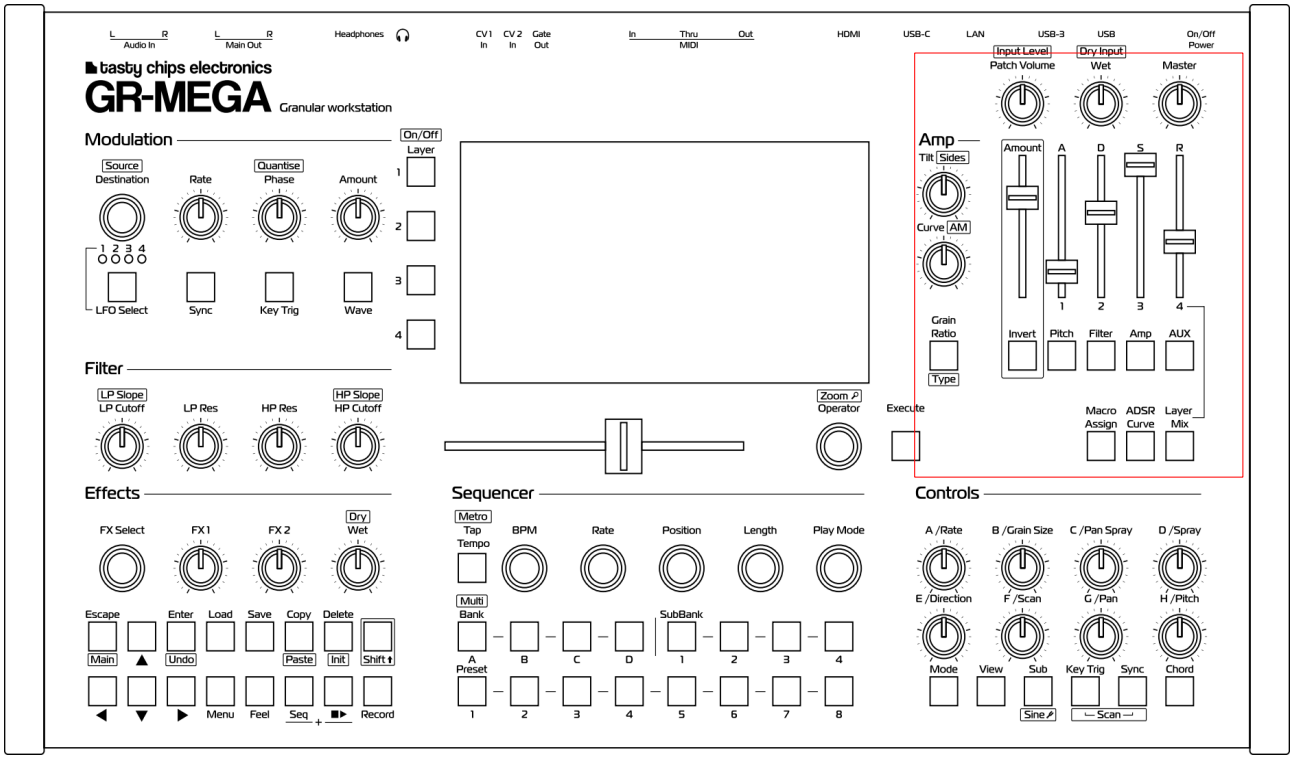
On the lower right you have 8 knobs. These control granular parameters, and are fun and powerful to tweak.

On the bottom there are buttons toggle sync of these parameters, change synth engine, and toggle chord mode.

The top knobs are unipolar: simply taking the setting from 0 to max. The bottom row is bipolar and has a “center detent”. They snap at 12 ’o clock. These have functions like panning and direction: stuff that has a *neutral* center.

Each engine has different functions for these knobs, but they are often very similar. Scan and Pitch are always the same. Once you get to grips with these knobs in one engine (say granular), they make sense in other engines as well (for instance sampler).

Amp section



In the top right we find the grain window and envelope controls.

At the very top there are 3 knobs. These are volume setup, and mixer controls: Patch level, Wet/Dry, and Master:

* Patch level sets patch volume. Hold Shift to change audio input level. This is recalled from a patch.

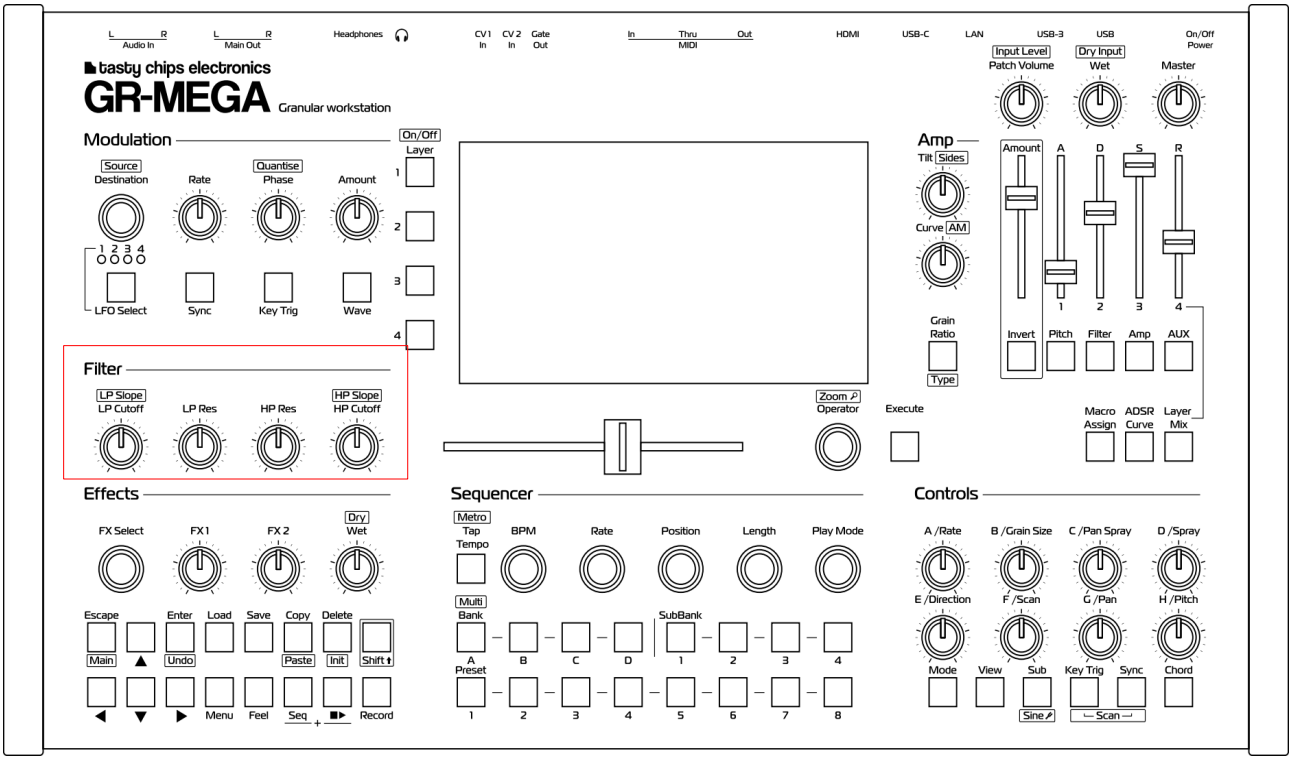
* Wet/Dry sets wet granulated volume. Hold Shift to set dry audio input volume. Useful when the MEGA is used as a (granular) live audio FX unit. This is a system wide setting.

* Master sets the master volume. This is a system wide setting, and a *hard* control that always shows the actual master volume.

The curve and tilt knobs control the grain window. Use shift with these knobs to tweak the window even more. Shift + Ratio mode button (directly underneath these knobs) to toggle between GR-MEGA window type and GR-1 type for compatibility.

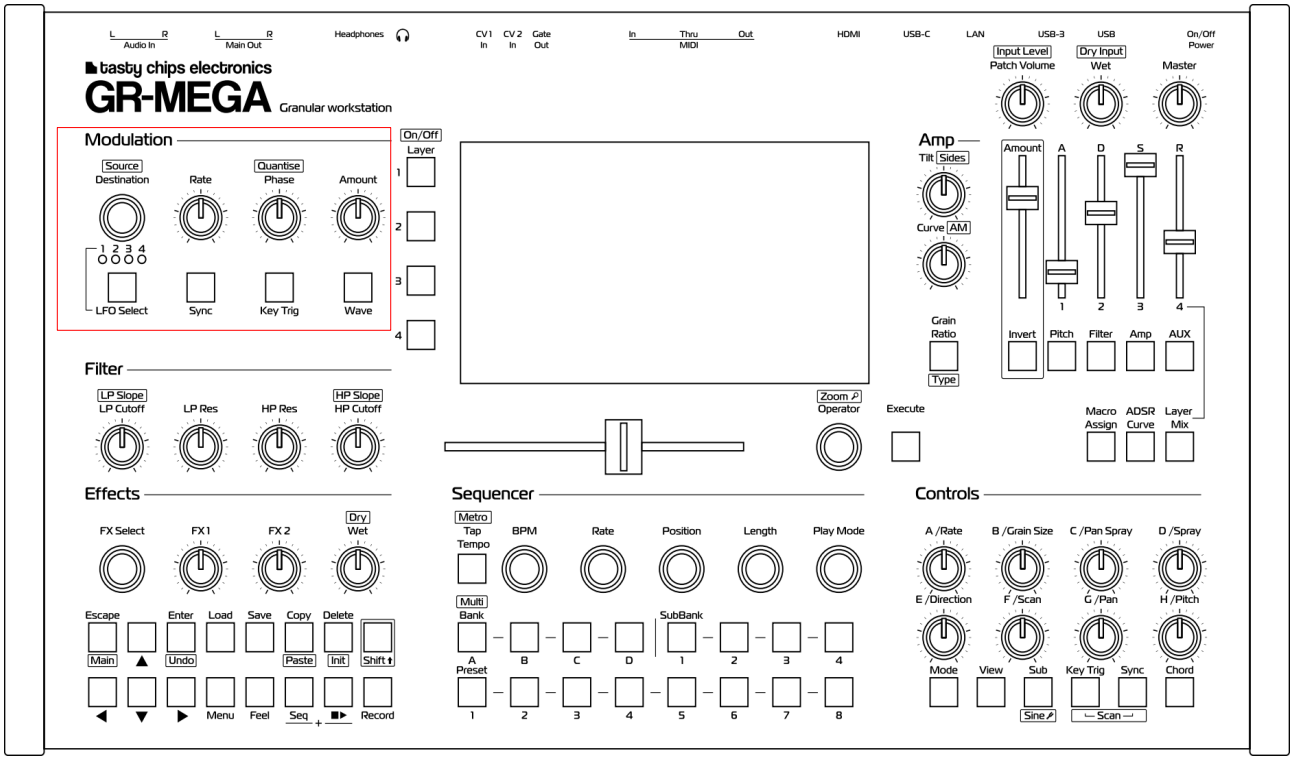
The envelop controls are amount + ADSR. There are several buttons to switch to Pitch, filter, amp, or aux envelope. You can also invert the envelope and you can set the curve on every stage of the envelope.

Filter controls



On the left there are 4 filter knobs: LPF cutoff, LPF resonance, HPF resonance, HPF cutoff. There is one LPF and one HPF filter per voice.

Modulation section



On the top left you'll find 4 knobs and 4 buttons. These allow you to:

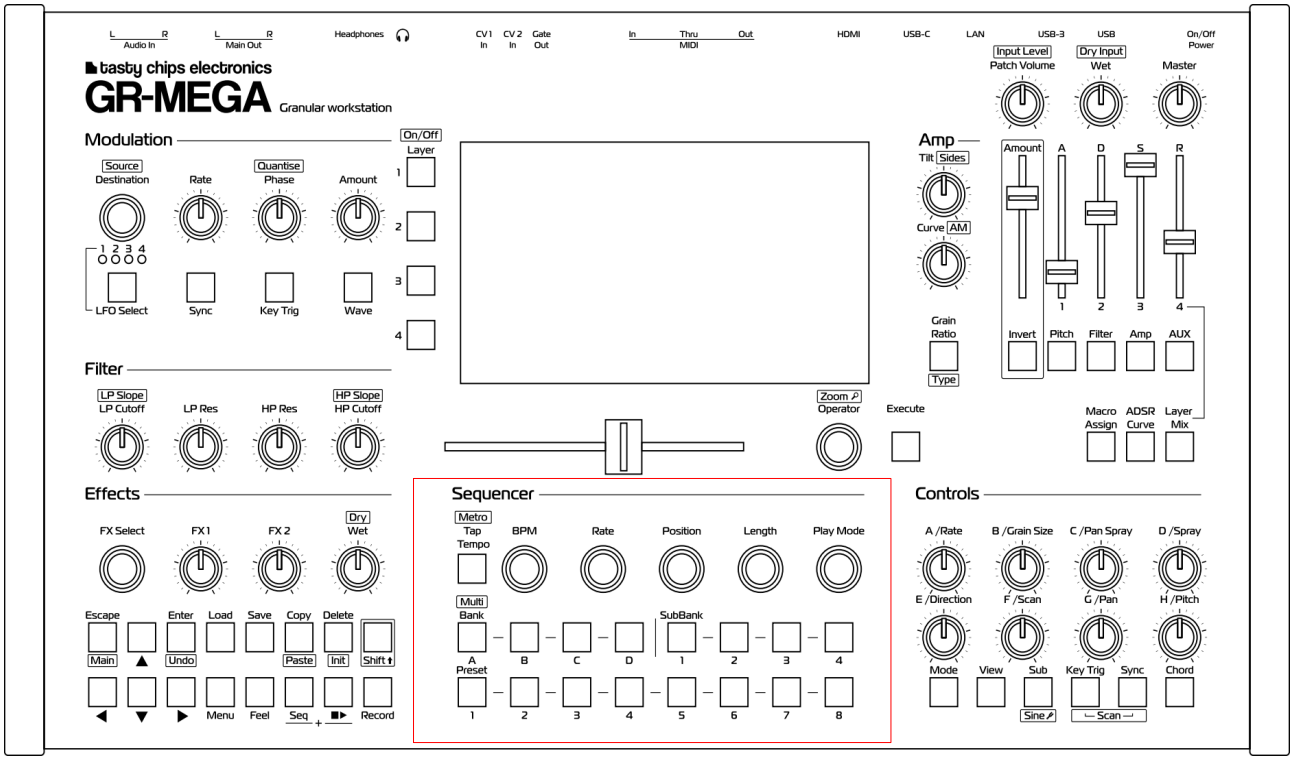
Top row - knobs:

(Destination)	Select destination
[Shift] + (Destination)	Select source
(Rate)	Set LFO rate 0..50Hz, set LFO rate division when sync
(Phase)	Set LFO phase
[Shift] + (Phase)	Quantize LFO phase
(Amount)	Set LFO amount, bipolar: left = -100%, right = +100%

Bottom row - buttons:

[LFO Select]	Select LFO 1..4
Hold [LFO Select] + (knob)	Assign destination to current LFO
[Sync]	Toggle LFO sync
[Key Sync]	Cycle LFO keysync: OFF, LEGATO, ON
[Wave]	Cycle through LFO waveforms: sine, saw up/down, triangle, random, square
[Shift] + [Wave]	Toggle unipolar and bipolar

Sequencer section



In the bottom center there’s a row with a [Tap Tempo] button and 5 knobs: BPM, Rate, Position, Length, Play mode. Most speak for themselves. Rate sets the time signature: ¾, 4/4, 6/8, etc. Play mode does forward, reverse, random, etc.

Press [Tap Tempo] 4 times to accept a new tempo. [Shift] + [Tap Tempo] toggles the metronome ON or OFF.

When the sequencer is running: when both [▶] and [Seq] buttons are lit, you can press Preset buttons to jump to any step, 1 .. 8, in the current bar. The Bank buttons jump to another bar.

Back Panel

TODO: illustration!

Power button & DC adapter

Once the power is plugged in, the GR-MEGA will immediately start up. In detail:

Powering up:

1. Hook up the DC adapter to AC power.

2. Insert the adapter's barrel socket into the GR-MEGA's barrel socket.

3. The GR-MEGA will now power up and show a Tasty Chips logo on the display. It will load the last used project, and then show the main screen with a sample waveform.

WARNING: Do not use an adapter other than the one that comes with the GR-MEGA.

If you insist, please contact us first.

Shutting down:

The barrel jack should not be pulled from the socket without first doing a clean shutdown. This can lead to loss of data! A clean shutdown is done as follows:

1. Make sure the GR-MEGA is up and running. The display should show the graphical user interface.

2. Push and hold the power button, and hold it for 5 seconds. If you let go, the shutdown will be canceled.

3. The GR-MEGA will now save any unsaved changes, and shut down fully. The button lights will dim down slowly.

4. When the lights have fully dimmed down, you can unplug power if you want. If you don't unplug, the GR-MEGA is in stand by. All connected USB devices are powered off. It will consume about 4 Watt, or about half of a modern LED bulb.

Powering up from stand by:

Just shortly press the power button. The buttons will light up after 2 seconds. Then wait about 12 seconds before the display activates.

TODO: illustrations

CV & Gate

There are 2 CV inputs on the GR-MEGA, which can be used as mod matrix modulation sources. The inputs have the typical Eurorack -5V .. +5V range. The inputs are protected and buffered.

The CV's are modulation sources. They're suitable for LFO speeds and low (sub-bass) audio range.

The gate output provides a gate signal (5V) when the GR-MEGA receives one or more note-on messages, or when its [▶] button is active. The gate output is against over current (shorting to ground).

Audio Outputs (L/R)

These are two balanced ¼" (6.35mm) TRS (Tip Ring Sleeve) phono jack sockets, that output the left and right channels of the master mix. We recommend you only use TRS cables, as TS cables are sensitive to noise, especially when they are long. The full output level is "pro level": +4 dBu. The outputs are protected by clipping diodes.

It has close to 114 dB signal-to-noise (SNR) and an almost completely white noise floor.

Headphone connection

This is a 1/8" (3.175mm) TRS (stereo) mini jack socket. Next to it is the volume knob.

The volume level is sufficiently loud, although a bit less than some dedicated external headphone amplifiers. Still, please be careful and keep in mind you can damage your ears over time.

Audio IN (L/R)

These are two balanced ¼" (6.35mm) TRS (Tip Ring Sleeve) phono jack sockets, representing the left and right input channels. We recommend you only use TRS cables, as TS cables are sensitive to noise, especially when they are long. The full input level is "pro level": +4 dBu. TBV!

It has close to 114 dB signal-to-noise (SNR) and an almost completely white noise floor.

Note that these inputs are not pre-amplified. They are not suitable for hooking up your guitar or microphone directly. Please use a pre-amp if you want to do this. Note that amplified output levels should remain below 5VPP, to avoid damage.

MIDI

The GR-MEGA has full set of 3 DIN-5 MIDI sockets: MIDI In, MIDI Out, and MIDI Thru. MIDI thru is a *hard thru*, which means it has almost no latency (in the microsecond range). MIDI in optically isolated as per MIDI standard, meaning there's no chance of noise entering the GR-MEGA from a connected MIDI controller.

DIN MIDI is still common and very reliable, but if you want to send many automations from your DAW, or large sysex dumps, it is recommended to use USB C instead.

USB-A

The GR-MEGA has 3 USB A ports:

1 x USB 3.0 port, which offers 0.9A and up to 5GBps speed. Suitable for fast USB sticks or even drives, and for supporting power hungry audio interfaces (to be supported in future firmware versions).

2 x USB 2.0 ports. These are intended for low power devices such computer keyboards, and MIDI controllers.

The USB A ports offer host mode only. This means that you can only connect USB devices here. Since a PC and Mac are typically USB hosts, that means they cannot be connected here! Use USB C instead.

USB C

The USB C port is intended to connect your PC/Mac to. It runs at USB 2.0 speed: 480Mbps max. Since it is primarily intended for MIDI, this is more than enough. Use it to hook up your DAW to the GR-MEGA. It's ideal to send many quickly varying automations.

USB C is also used for file sharing. You can access the GR-MEGA's files by hooking up your PC/Mac with a single cable.

It also supports multichannel USB audio, but this should be seen as an experimental feature. It is not stable, audio quality is not good, and has even more limitations when used with Mac.

This port is resistant against injection of noise from your PC/Mac.

This port does not power the GR-MEGA. The only way to power the GR-MEGA is via the 12V socket on the extreme right of the back panel.

HDMI

The GR-MEGA can output its internal display over HDMI, so you can hook up a big monitor or TV. The resolution is 1024 x 600, 60 Hz.

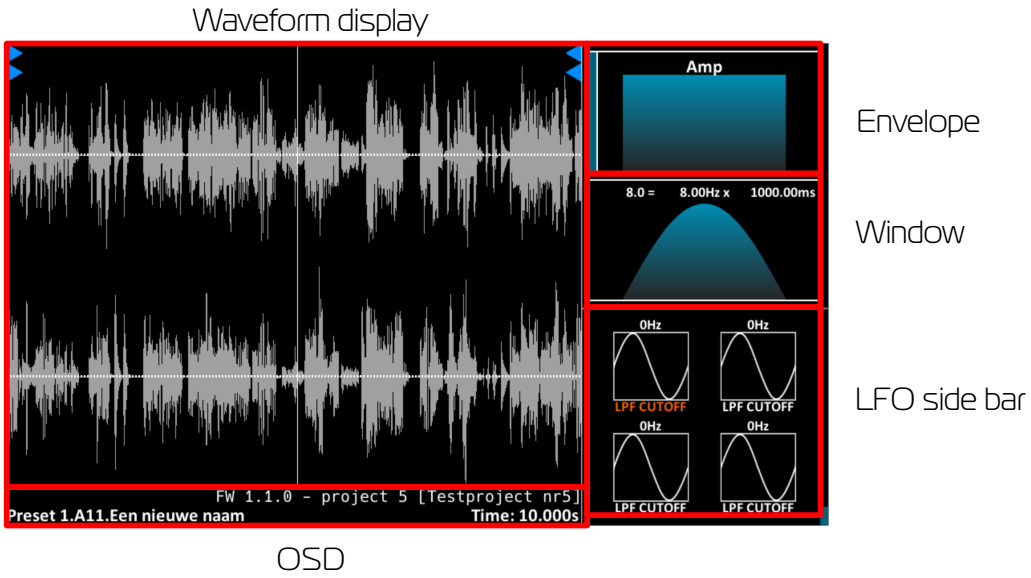
We could potentially support beamer-friendly 720p resolution, but we'll need users to "chime in" for this feature. Please contact us if you're interested.

HDMI allows digital multi-channel audio output as well. It is not used at this point, but again, please contact us if you're interested.

LAN

This is a standard 1 Gbps (gigabit) RJ-45 ethernet interface. It can be used to get firmware updates from our website, and for file sharing: accessing the files on the GR-MEGA from your PC or Mac.

The main screen



Waveform

The biggest part of the main screen is dedicated to displaying the sample. The view mode can be changed from time series to spectrogram using the [View] button. The sample can be zoomed ([Shift] + turn (Op enc)) and scrolled (using ← and → arrows and [Shift] + Horizontal slider).

OSD

The On-Screen Display or OSD is the lower bar beneath the sample waveform. It displays messages like “Spray 0.0023s” and such. Every knob that is turned will display its value here. The same goes for most buttons. Also status messages such as “Loaded” or so will appear here.

The preset name, slot number and code (i.e. A-1-2, for bank A, subbank 1, preset 2) are displayed here. The amount of time in the (zoomed) sample waveform is also displayed here.

Envelope

On the top-right you can find the envelop display. It displays the envelope that’s currently highlighted on the buttons underneath the ADSR section: [Pitch] , [Filter], [Amp] , or [Aux].

Window

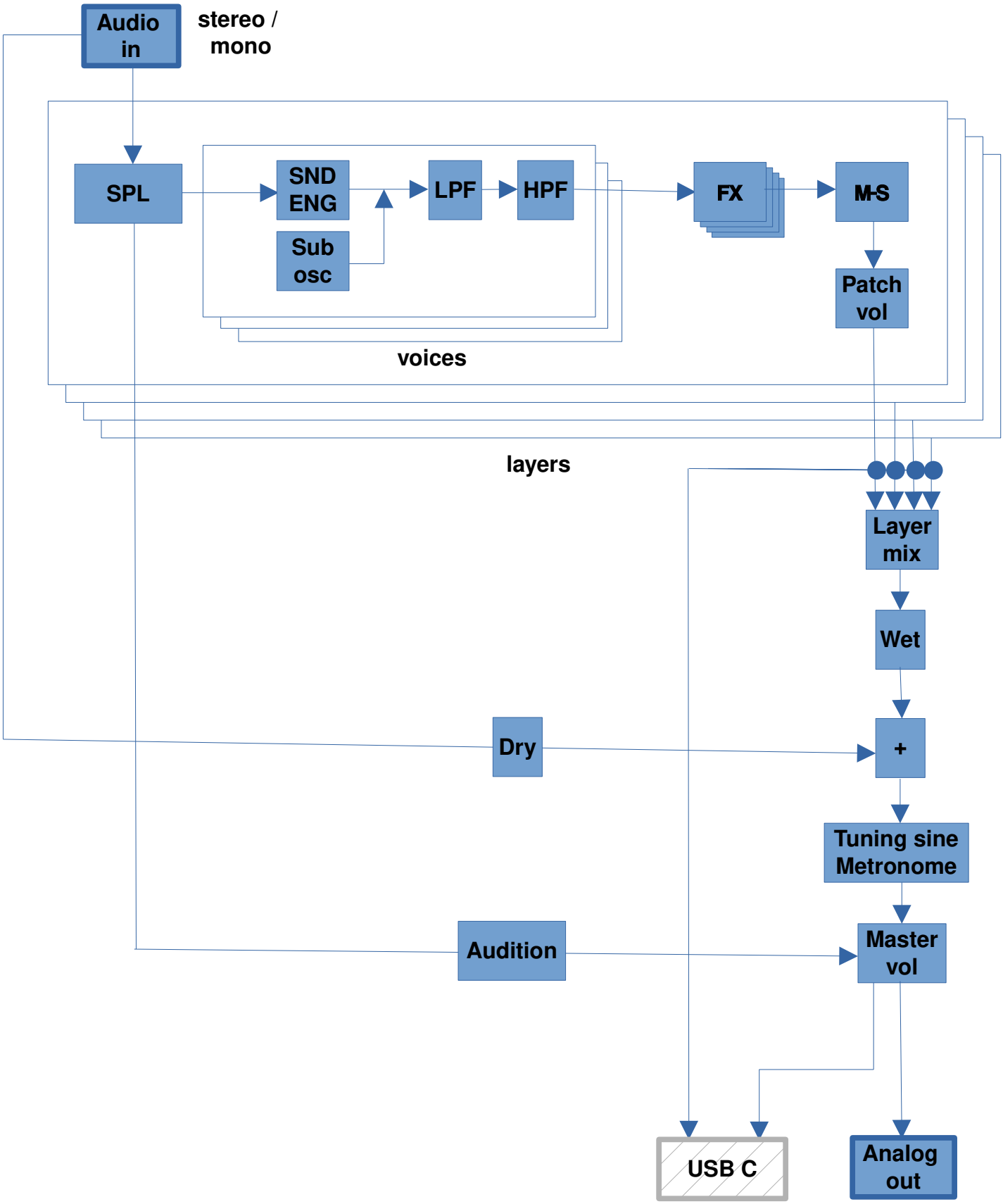
Directly underneath the envelope you can find the grain window display. This displays the shape of the window and the density, rate, and grain size in the equation:

density (grains) = rate (grains/s) x grain size (s)

“LFO” sidebar

On the lower right the LFO’s, CV’s, and other information related to modulation is displayed. The display mode for this section can be cycled with [Shift] + [View], but please note that many of these modes are not yet finished.

Signal path


Audio in
stereo / mono
SPL
SND ENG
Sub osc
LPF
HPF
FX
M-S
Patch vol
voices
layers
Layer mix
Wet
Dry
+
Tuning sine Metronome
Audition
Master vol
USB C
Analog out

Sound Engines

The GR-MEGA has 5 sound engines. Each one has different applications. It is primarily a granular machine (the primary engine), but the other engines are full featured as well. We designed each engine to have interchangeable controls. For instance, the Scan control will have the same function in almost every mode. Chord mode can be used in all modes.

Granular Mode

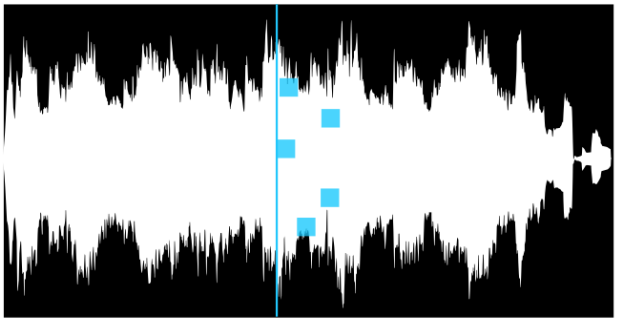
Granular mode is the default engine of the GR-MEGA. It can be used for pads, to make massive spatial clouds, to scatter sounds, and for primitive 90's Jungle style time stretching that works well on non-transient material.

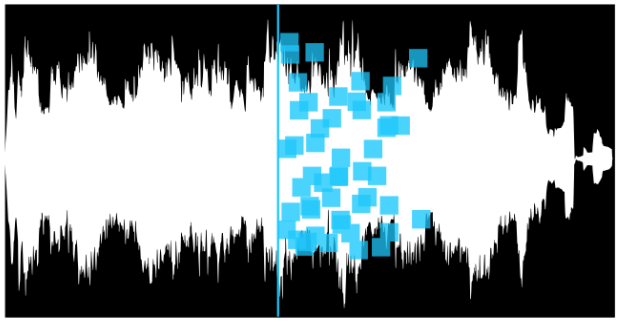
The highly complete and accurate implementation used in this engine opens up the world of micro sounds, where rate can control pitch, and window shape can act as a filter, but that's only the start. A good understanding of microsound can give complete timbre transformations. If you're interested in a deep dive into the world of micro sounds, there's the book by Curtis Roads – Microsounds, ISBN-13 : 978-0262681544

Granular mode is the most flexible of all the modes, evidenced by its large amount of parameters:

Rate

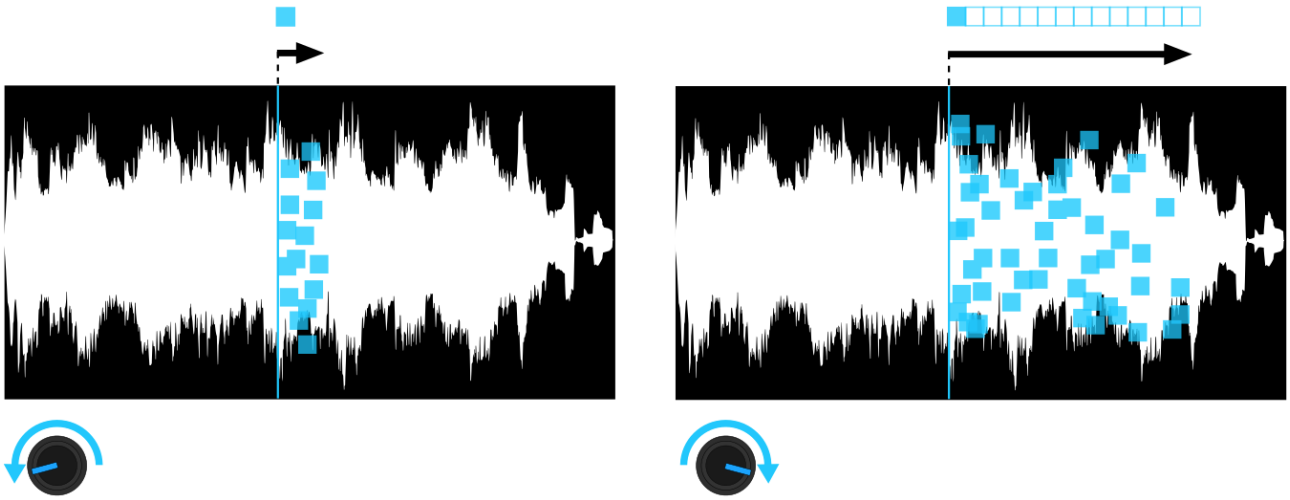
The rate parameter controls the amount of grains per second (Hz). The amount can be set between 0.1-1000 grains per second, with a maximum of 128 grains playing simultaneously, per voice.





Grain Size

The grain size parameter controls the playing length of a grain.
The length can be set between 5-5000 milliseconds.



Rate, size, and density

Internally the granular engine only understands the above two parameters:
* Rate
* Size

To measure how many grains are playing at the same time, we have *Density*:
Density = Rate x Size

This is also used to measure the density of a granular cloud, or sometimes how much overlap there is between grains.

When the Ratio button is set to “Free”, you control Rate and Size directly, and the Density is a result of this. But other ratio modes allow you to control Density directly and Rate or Size can be the result. It’s even possible to mix in other parameters for creative purposes.

To better understand how these Ratio modes influence the granular scheduling, we’ve added a text display just above the grain window:

density = rate x size display

For instance:

3.0 = 30.0 Hz x 100 ms

Pressing the Ratio button will cycle through various grain ratio modes:

Table 1: rate modes

Ratio mode	Knob A function	Knob B function
Free	Rate	Size
DensitySize	Density	Size
DensityRate	Rate	Density
ScanRate	Rate (* Scan)	Size (/ Scan)
ScanOverlap	Rate (* Scan)	Size

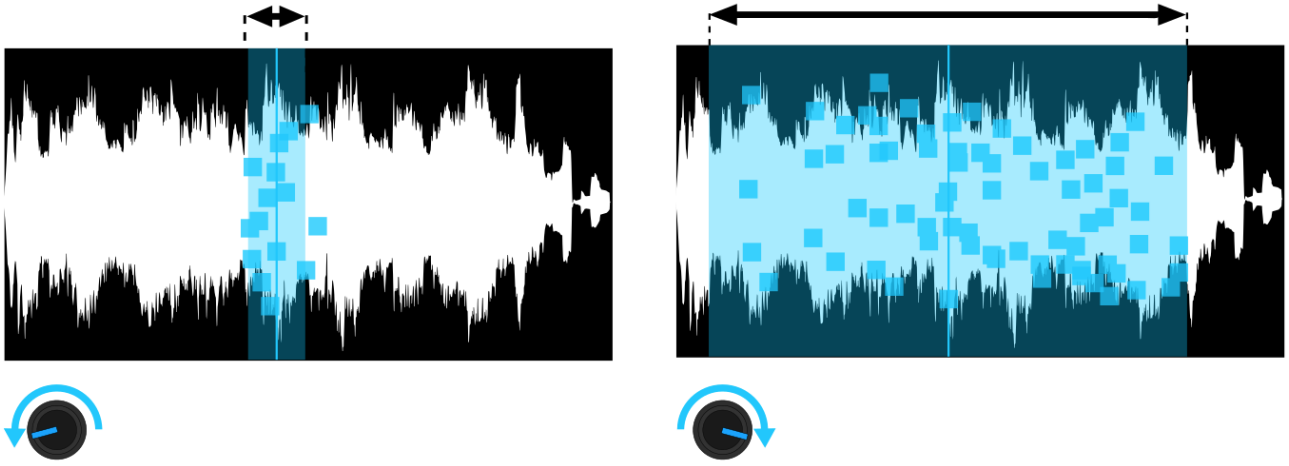
As mentioned above, Free is the default mode and allows full freedom. DensitySize and DensityRate are intended for granular “stretches” where you can keep density constant while tweaking the rate and size with a single knob. This can create powerful rhythmic speed-ups or slow-downs.

ScanRate is used to achieve the same rhythmic effects, but based on scan speed.

ScanOverlap is used to add more grains when Scan picks up speed, to keep the coverage in the original sample constant.

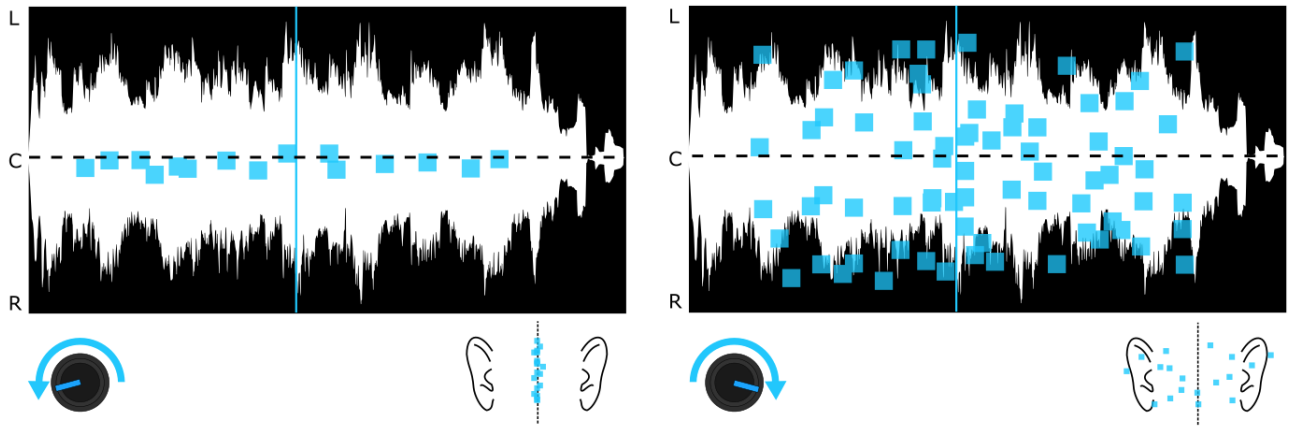
Spray

The spray parameter controls how much a grain’s start position is randomized.



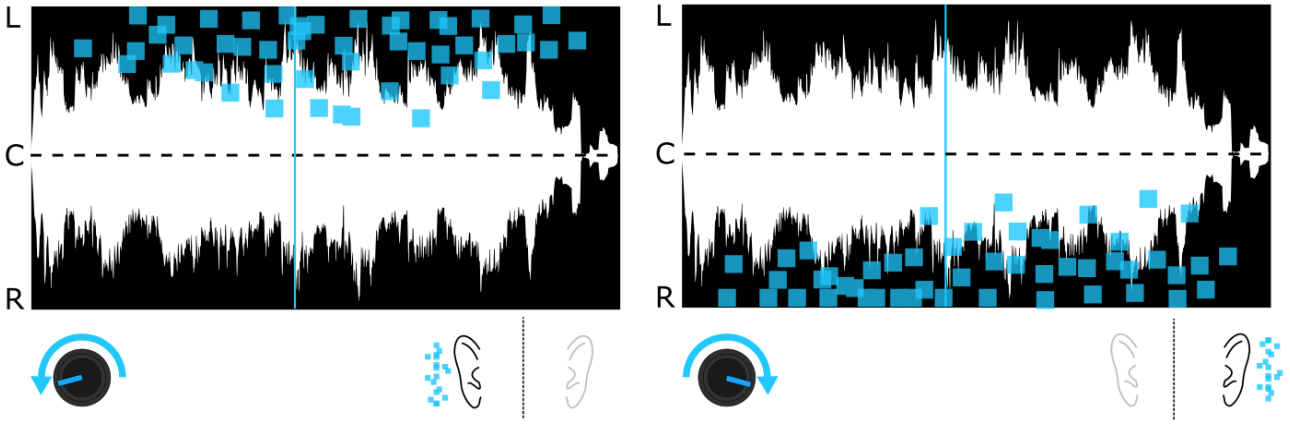
Pan Spray

The Pan Spray parameter controls how much a grain’s stereo panning is randomized. 0 means completely centered. Maximum pan spray means a grain can appear everywhere in the stereo image.



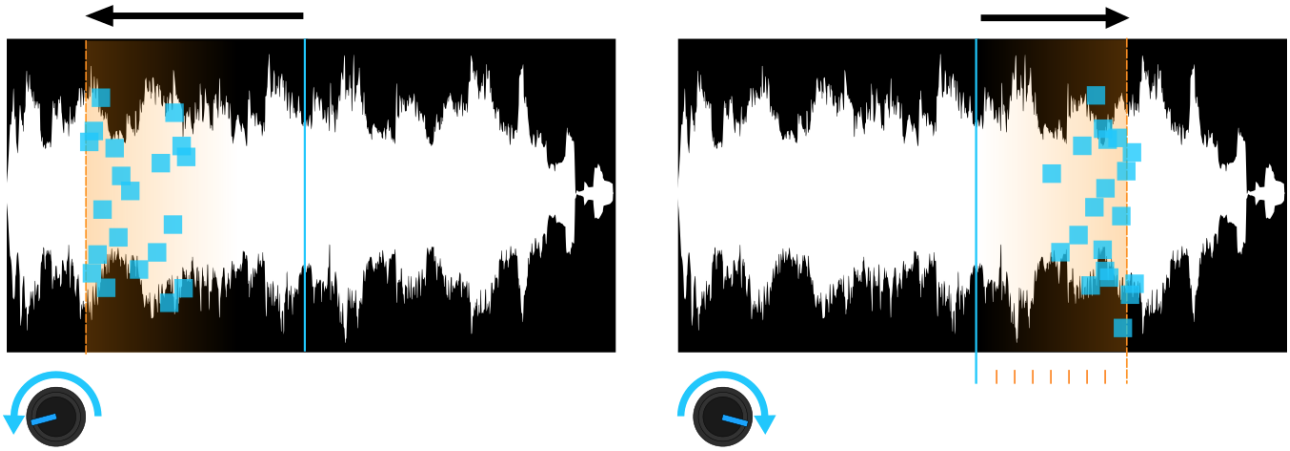
Panning

Shift+Pan knob: The Panning parameter controls how much a grain is panned to left or right.
Can be combined with pan spray.



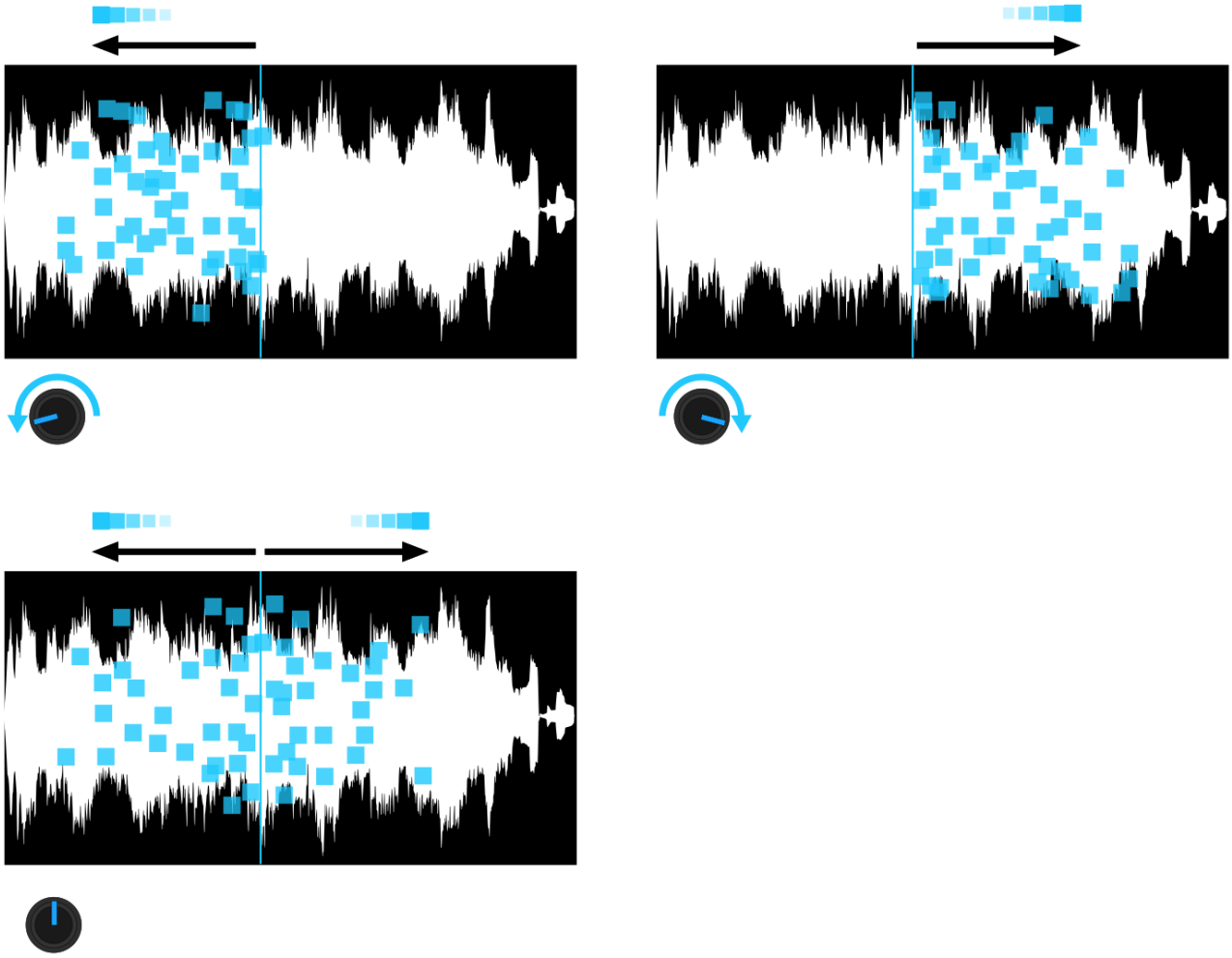
Scan

The Scan parameter sets the movement speed of the grain start position. It can vary from -2 times (reverse motion) the sample play speed to +2 times (forward motion) the sample speed. Scanning responds to stop and loop flags: looping, and pingpong is possible, it can be modulated, and can even be synced to the beat!



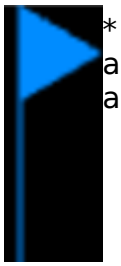
Direction

Grains can run in both forward- and reverse directions. Reverse direction can be used for special effect. Combining both can be used to make the sound more lush. Setting the bias completely left plays all grains in reversed direction. Setting the bias completely right plays all grains in forward direction. The center plays in 50/50% in both directions

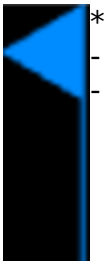


Loop flags

All of the sound engines support looping and stop positions, and cropping. In granular mode. Looping is intended for the scanning motion. These are marked by flags:



* Start flag : high, points to the right. Used for setting the start of the crop area. NOTE: this is not the grain start position. The grain start position is always set by touching the position slider.



* Stop flag : high, points to the left. This has two purposes:
- Sets the end of the crop area,
- Sets the end point for the scan motion.

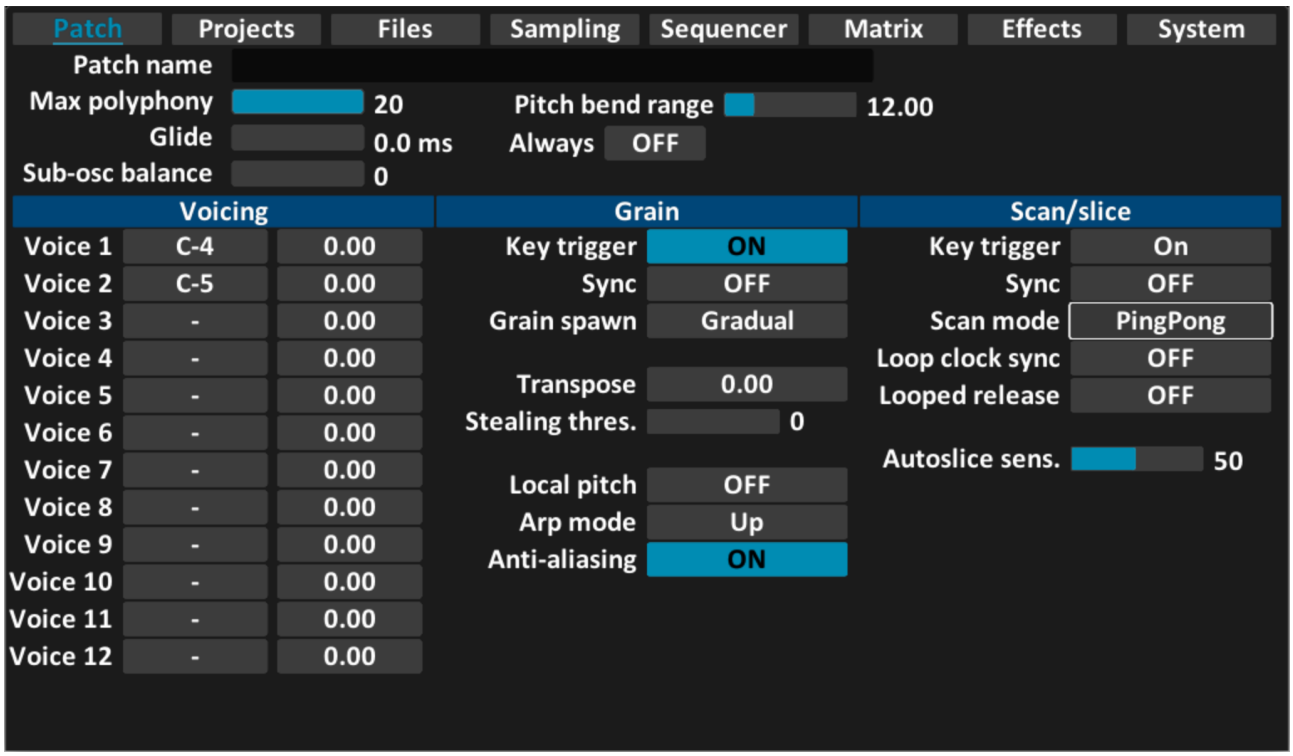
* Loop start flag: low, points to the right. Does what it says.

* Loop end flag: low, points to the left. Does what it says.

A simplified description of looping:

1. Note ON: Scanning motion starts at the white vertical line. That line is stored in the preset, or is set by touching the slider position. Depending on the Scan setting it will move forward or in the reverse direction. You'll see an orange vertical line starting to move.
TODO: illustration

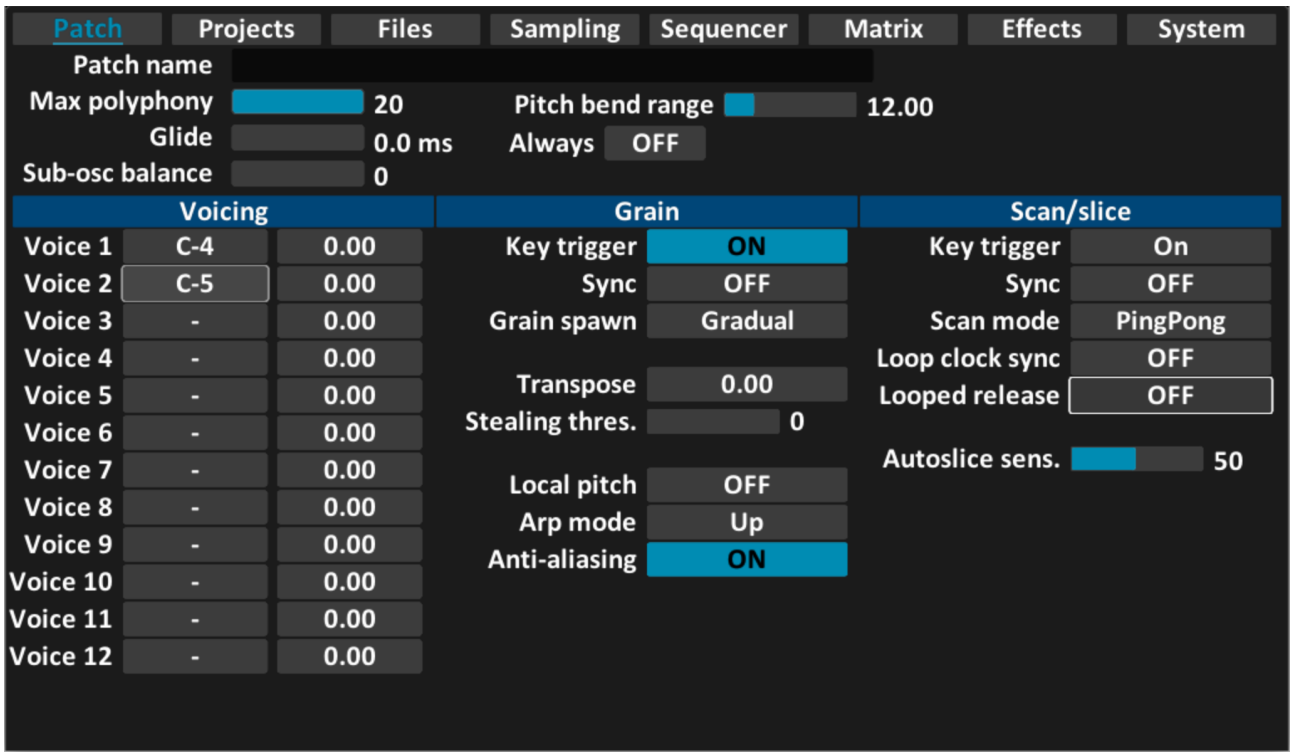
2. At some point the orange line enters the loop area.. when it wants to exit the loop area it chooses depending on the menu setting Menu → Patch → Scan / Slice → Scan mode:
- loop
- bounce
- one shot
TODO: illustrations of motion



3. Note OFF: the scanning motion either keeps looping or bouncing, depending on the menu setting Menu → Patch → Scan / Slice → Looped release
TODO: illustration of motion

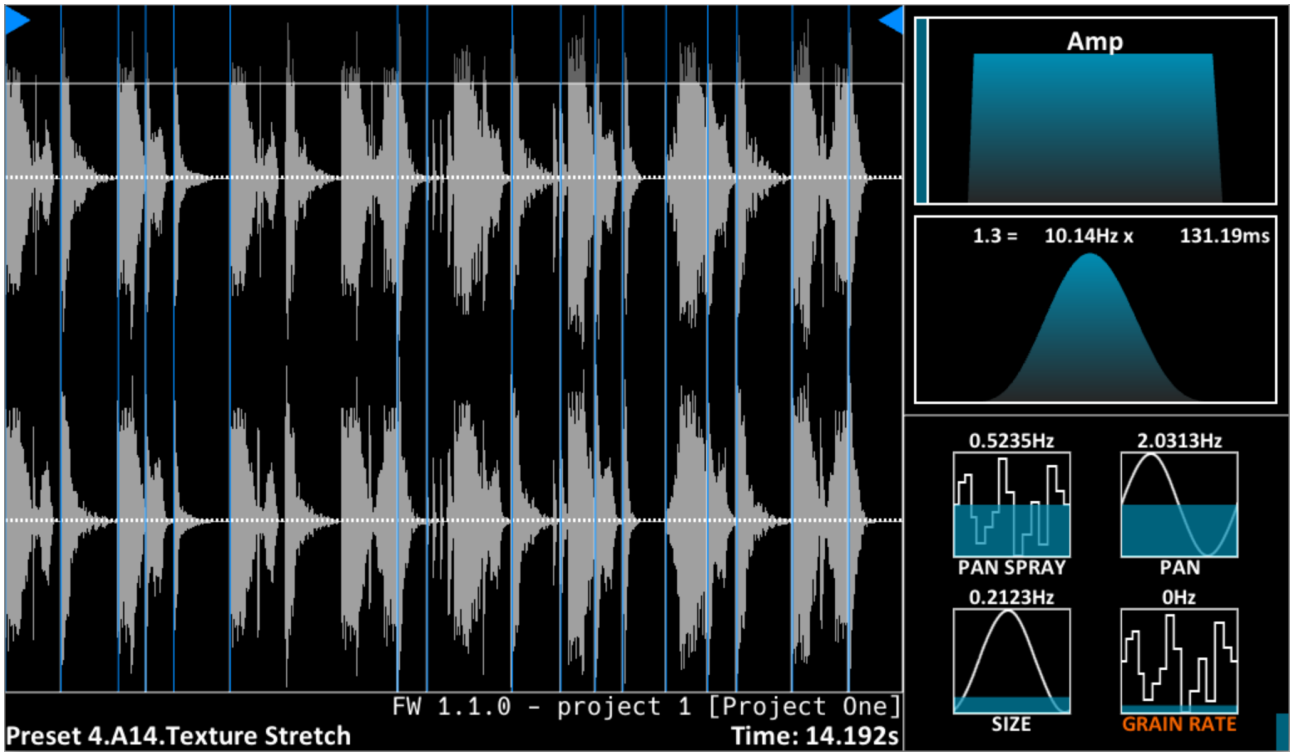
If Looped release is OFF, it will exit the loop area, but only if it has performed an even number (0, 2, 4, 6, ...) of loops or bounces.

If Looped release is ON, it will continue to scan the loop.



Granular Slice Mode

Granular slice mode is very similar to granular mode, with the exception of the samples being chopped up into slices. Slices are mapped to the keyboard: C-2 and up. C-2 plays the left most slice, C#2 plays the neighbor directly to the right, etc.



C-2 C#2 D#2 D-2 E-2 F-2 F#2 G-2 G#2 A-2 A#2 B-2 C-2 C-3 C#3 D-3

Almost all the knobs described in Granular mode also work in this mode, with the exception of the position slider and the scan knob. Since you cannot freely move spawn position in the sample in this mode, these controls have no function. An alternative function may be added to them in newer firmware.

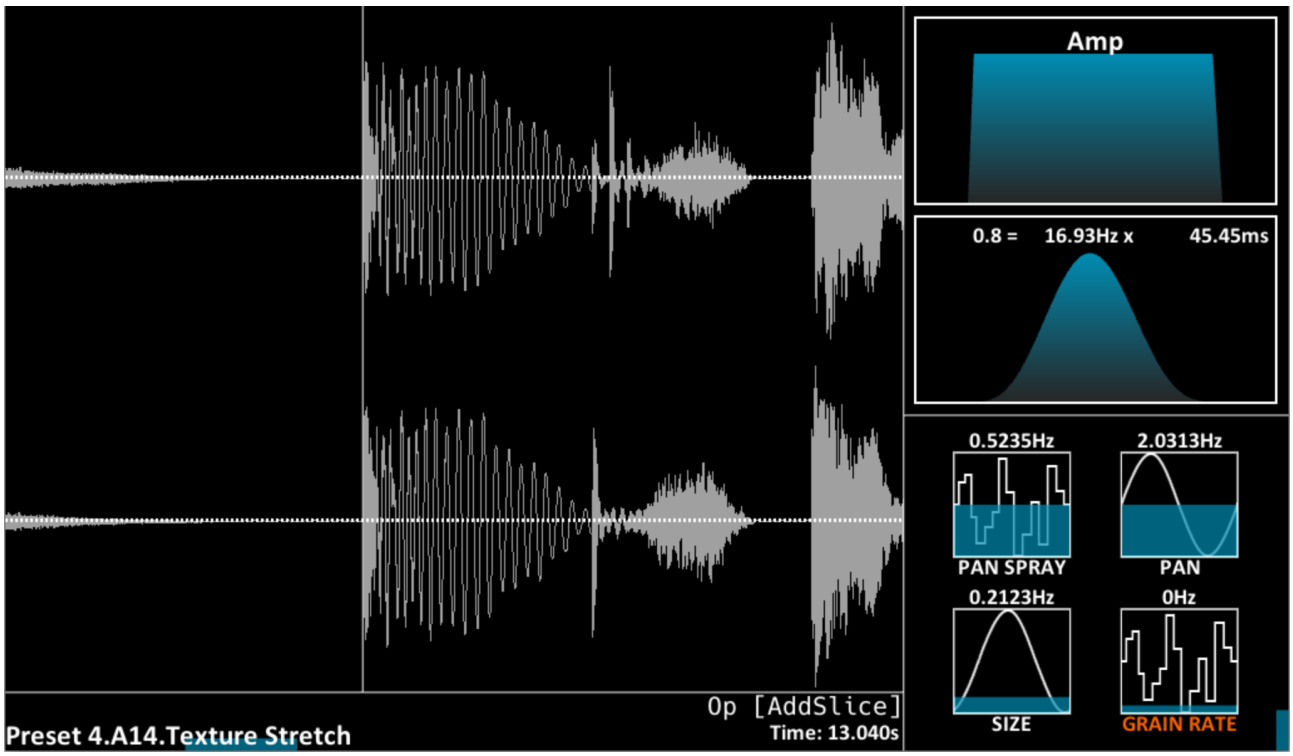
In slice mode, setting slices is key. This can be done in two ways, manually or automatically. We'll now describe both:

Manually. Move the position slider and use the (Operator) encoder and exec buttons next to it:

1. Drag the position slider to where you want in the sample.

2. Turn (Operator) to "AddSlice"

3. Press the Exec button, a white vertical line now appears, and you can already play MIDI or sequencer note C-2 to activate it.



Automatically, by turning (Operator), and exec button:

1. Turn (Operator) to “AddSlice”.

2. Hold Shift.

3. Press Exec. A lot of slices now appear.

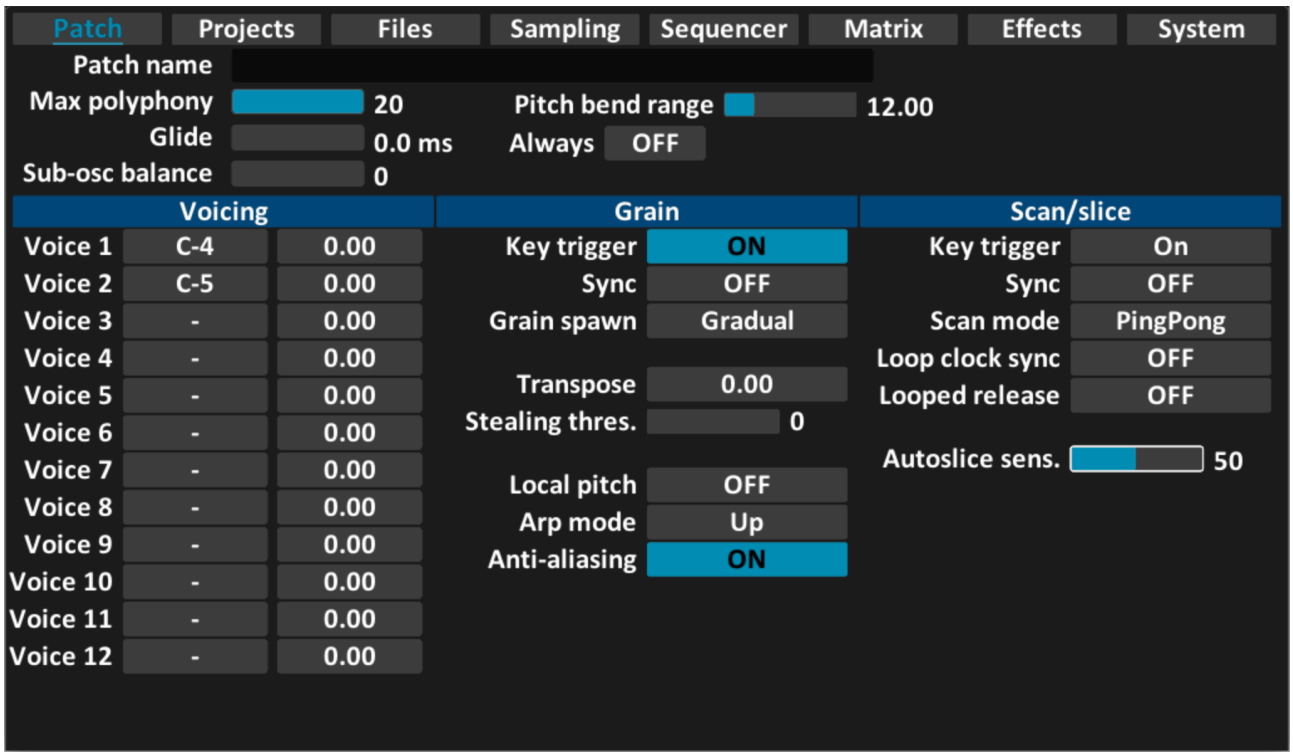
Maybe there are too many slices, or too few? You can adjust auto-slicing sensitivity in the Menu:

1. Hold the Menu button

2. Press Preset button 1 to enter the Patch menu.

3. Navigate to the “Scan / Slice” column with the arrow buttons, at the bottom you’ll find “Autoslice sens.”

4. Navigate to the “Autoslice sens.” slider and adjust the value with the position slider.



You can delete slices with “DelSlice”:

1. Turn (Operator) to “DelSlice”

2. Use the position slider to stand inside a slide. i.e. right of the vertical slice line.

3. Press the Exec button. The slice will disappear.

Combine DelSlice with holding down Shift: this deletes all slices!
Deleting all slices is often useful before doing autoslice.

You can drag slices with “DragSlice”:

1. Turn the (Operator) to “DragSlice”

2. Use the position slider to stand inside a slide. i.e. right of the vertical slice line.

3. Press the Exec button. The slice will seemingly disappear, but you’re now dragging it with the slider position line!

4. Go to the position you want with the position slider.

5. Press Exec again. The slice is moved!

Sampler Mode

Sampler mode basically emulates a traditional sampler, like the AKAI S-series, or Ableton’s Simpler. It is *oldschool* and can not do time stretching. In principle there’s

just one grain per voice, but that can be extended up to 12 by using chord mode notes in the patch menu. Sampler in combination with chord mode also has nice periodic properties, which can create a pitched Euclidean sequencer.

Knobs A (Rate) and B (Size) have no function here.

Controls like Spray and Pan spray do the same as in granular. They can create randomized clouds in both stereo field and sample position. Pitch does the same, but note that pitch also equals play speed! Direction works exactly the same. Scan is an interesting control since it only affects the central spawn position for new grains, and can loop and stop and everything, while grains can also do this… Allowing for creative results.

Nice extras: In this mode, all voices are displayed simultaneously. It also supports playing very large samples (up to an hour).

Grains follow loop flags (markers) like how scan follows them in other modes, including loop, pingpong and one shot modes. This means sample looping is supported, and a note off can released them from the loop: Patch menu → Scan/Slice → Looped release. Note that this kind of oldschool sample looping requires proper loop markers at zero crossings.

Sound Engine Controls

To summarize, here are the knob functions for all the sound engines:

	Granular	Granular Slice	Sampler	Tape	Spectral
Big Slider	Position	Position	Position	Position	Position
A	Rate*	Rate*	- - -	- - -	Amp thresh
B	Grain Size*	Grain Size*	- - -	- - -	FFT Size
C	Pan Spray	Pan Spray	Pan Spray	Pan Spray	Amp smear
D	Spray	Spray	Spray	Spray	Phase smear
D + Shift	Spray	Spray	Spray	Spray	FFT Reducer
E	Direction	Direction	Direction	Tape Slew	Freq shifter
F	Scan	Scan	Scan	Scan	Scan
G	Pan	Pan	Pan	Pan	Pan
G + Shift	Mid-Side	Mid-Side	Mid-Side	Mid-Side	Mid-Side
H	Pitch	Pitch	Pitch	Pitch	Pitch
H + Shift	Pitch	Pitch	Pitch	Pitch	Freq shifter

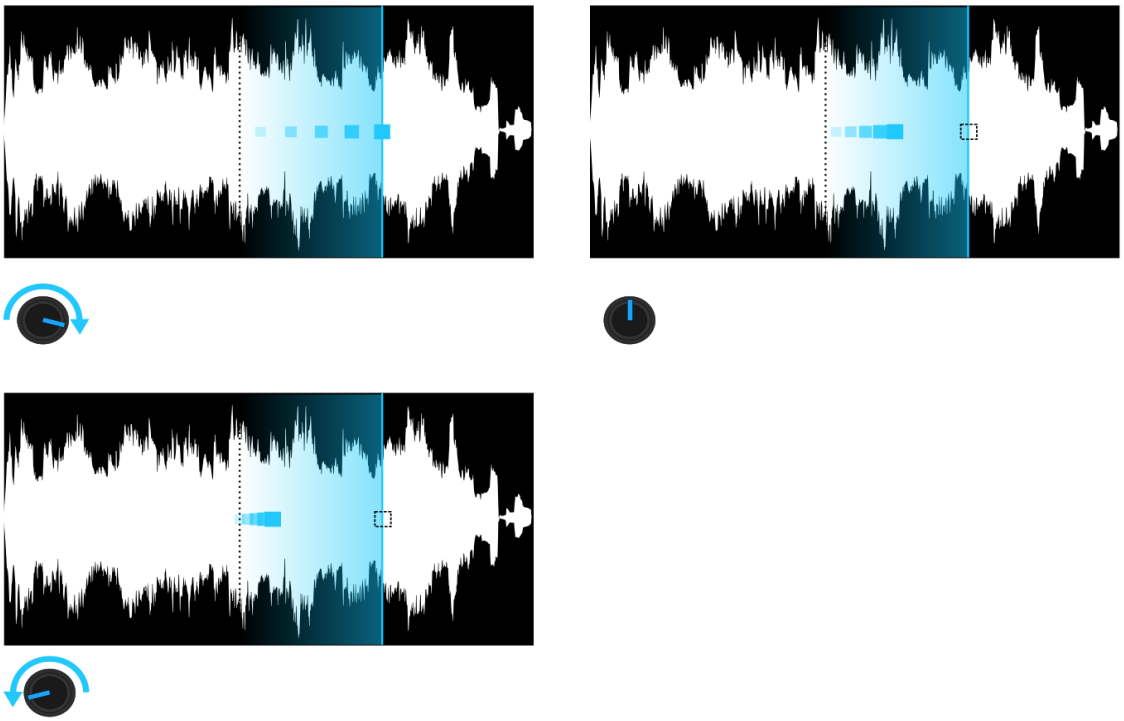
*) Depending on selected Ratio mode. Listed are the controls for Free ratio mode.

Tape Mode

The tape engine simulates an analog play head moving over tape. It operates much like sampler mode, but the play position now controls the play speed, and hence also the pitch. You can easily perform scratches like on vinyl. All position and scan modulation is supported, so scratching can be fully automated.

Tape slew

In tape mode the Pitch knob has now got the function of “slew”. This means how slow or fast the tape head catches up to the modulated position:



Chord mode

When chord mode is active (lower right: Chord button), there can be multiple play heads (grains). Each will have a different pitch like set up in the chord in the patch menu. This can give a pretty wild, but harmonic twist to scratching. The first chord note (TBV: or was it the lowest) always tracks the position. The other chord notes are just pitch-bent copies!

Spectral Mode

This mode allows smooth time stretches. Super long “Paul stretch” style ambient stretches where material is slowed down a thousand times. It also allows auto tuning while preserving the timing. However, it is not intended to be a DJ tool. This engine does not accurately preserve vocals, and has significant ringing. It is instead intended to spectrally manipulate and distort, to your heart’s desire. Think experimental IDM.

Once again, like in all other engines, position can be moved freely without any bumps.

There are no grains in this mode. There’s just blocks that are processed in the “frequency domain”, meaning you can very easily manipulate the spectrum using the knobs A through H.

Position and scanning are the main control for this mode. Polyphony is limited to 3 voices per layer, because of the latency of the underlying Fast Fourier Transform (FFT).

Because this engine is quite different from the others, we’ll discuss the knobs and modes that affect it one by one:

Chord mode

This basically adds pitch-bent versions of the playing sound while completely preserving timing. There’s almost no added CPU cost. This means: while you can have 3 voices per layer, you can multiply this by 12!

Rate knob (A) – amplitude threshold

This sets an amplitude threshold. Turn it up to reduce the harmonics, and eventually only leave the fundamental. Nice for going all whistly. Can be modulated in newer firmware.

Size knob (B) – FFT size

Sets the FFT block size. This is not continuous and takes jumps: 1024, 20248, 4096, 8192. Small sizes have less bass and get ringy more easily, especially when used with the FFT reducer knob. Although the sound is relatively bumpless, this control cannot be modulated. Note that 8192 is MONO! The other sizes are stereo.

Pan spray knob (C) – Phase smear / Reducer

Phase smear is a continuous control that can adds progressive amounts of “smear” to the sound. This can be used to turn transients into slush, and an “T” into an “F”. Very effective for ambient soundscapes. Use in combination with big FFT size.

Hold Shift to use the FFT reducer. This turns your sound into lo-fi MP3 / 90s Realaudio[tm] galore!

Pan spray (D) – Amp smear

A continuous control that Smears the amplitude spectrum. Turn to the left to sharpen the spectrum.

Direction knob (E) – Direction

Not implemented at the time of writing. Potential to reverse playback of the block in randomized fashion.

Scan knob (F) – Scan

Just normal scanning. If scan = 0 and there’s no position movement the sound can bluntly loop through the FFT block, but it can still be randomized by phase smear!

Pan knob (G) – Pan

Just normal panning

Pitch knob (H) - frequency shift

The pitch knob now does a frequency shift. You can easily get very metallic timbres this way.

GR-MEGA Data types

Samples

The GR-MEGA is sample based device. Every sound it makes is made by using samples. The sample is the most basic data type the GR-MEGA understands. It can be loaded from disk as WAV or AIFF files, and saved as a WAV file.

Template

A template means all knob tweaks and menu parameters that influence sound generation. For example: the position in the sample, the number of grains per second, and the low pass filter cutoff. In total this is hundreds of parameters. A template can loaded and saved to/from disk, but it is often only used as a part of a Patch. It’s mostly used to initialize multiple patches at the same time.

Patches

A patch consists of a sample + a template. A template can be very generic, meaning it can have settings that, for instance, suit to some ambient pads, but it can also be highly specific to the used sample. For instance, a drumbeat can be sliced up at very specific points (kick, snare, hi-hat, etc). That’s why each patch comes with its own template data.

A stored patch that’s recalled by button combination and by MIDI is called a “preset”. Let’s say you press bank button A, sub-bank button 2, preset button 7 this will recall preset A-2-7 : preset 16.

Multitimbral stacks

Also called “multi’s” or simply “stacks”, these are configurations of up to 4 layers. The layers refer to presets. Layer volumes are also stored here, because they are important to recall when performing in multi timbral mode. There are a number of stacks you can immediately recall by using Shift + the bank & preset buttons.

Projects

Projects are the biggest collection of data. A project is much like a project in a DAW on PC/Mac. To make things easier, projects are simply stored in a list of 50 slots. Projects can be easily loaded and saved by accessing the project menu, which is basically just a long list of project names. More about this in the Menus Chapter, section Project menu.

A project contains:
* 128 presets (meaning 128 patches = 128 samples + templates)
* 128 stacks
* 128 separate templates
* the project name

System settings

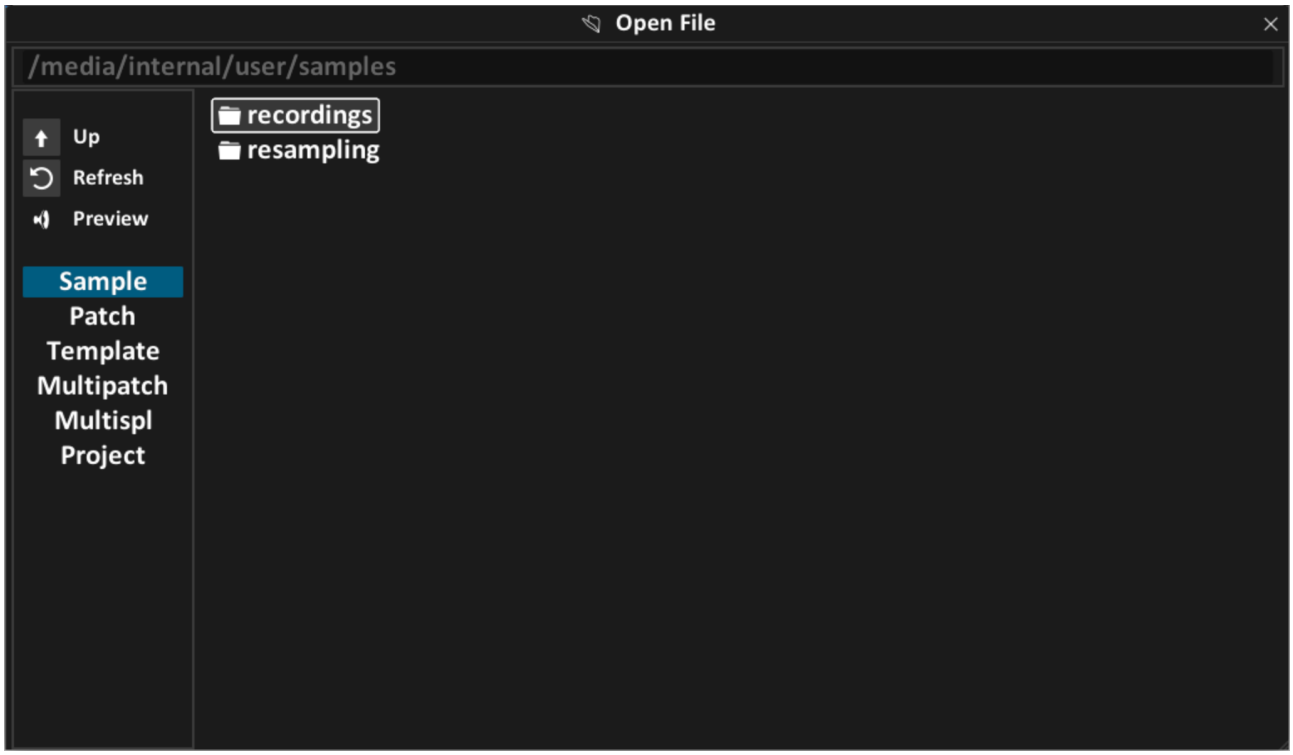
System settings contains things like brightness of the display, and LEDs, MIDI device configuration, clocking settings, etc. Things you typically set up to your own user preference which influence the entire system. System settings are saved in the system menu. They are recalled at startup, and cannot be loaded from or saved to USB.

Multisamples

This means a sample for each key. At the time of writing load and save of this data type is not supported and planned for v1.2.

Saving & Loading

Loading (not to be confused with recalling, which is done with button combos) is typically done with the file chooser. Press the Load button to open it.



On the top left there are navigation options, on the bottom left you can chooser the data type. On the right there's you can navigate through the folder contents. Select a data type, and then navigate to the file you want to load, and press Load again.

Press Enter on the loudspeaker icon ( ) to enable sound previews. You can now hear the wav file under the cursor. Use the horizontal slider to fast forward through the preview.

* Press Load button

* Navigate

* Press Load button again

In 80% of the cases you'll use this to load samples.. Samples that you recorded, or from USB stick, or samples you copied to internal storage earlier on using the File manager.

Other data types are supported as well. You'll sometimes save patches to use (copy) them in another project. The same goes for templates, and because they can be used on to make several patches, you'll want to store them some place central. Multipatch aka multi layer stacks are almost never saved separately, but it's possible to load and save them.

Finally projects can be saved and loaded, most often to make backups to USB.

Supported sample formats

WAV: Loading and saving. Almost all variants, 8,16,24, integer, 32 bit float.

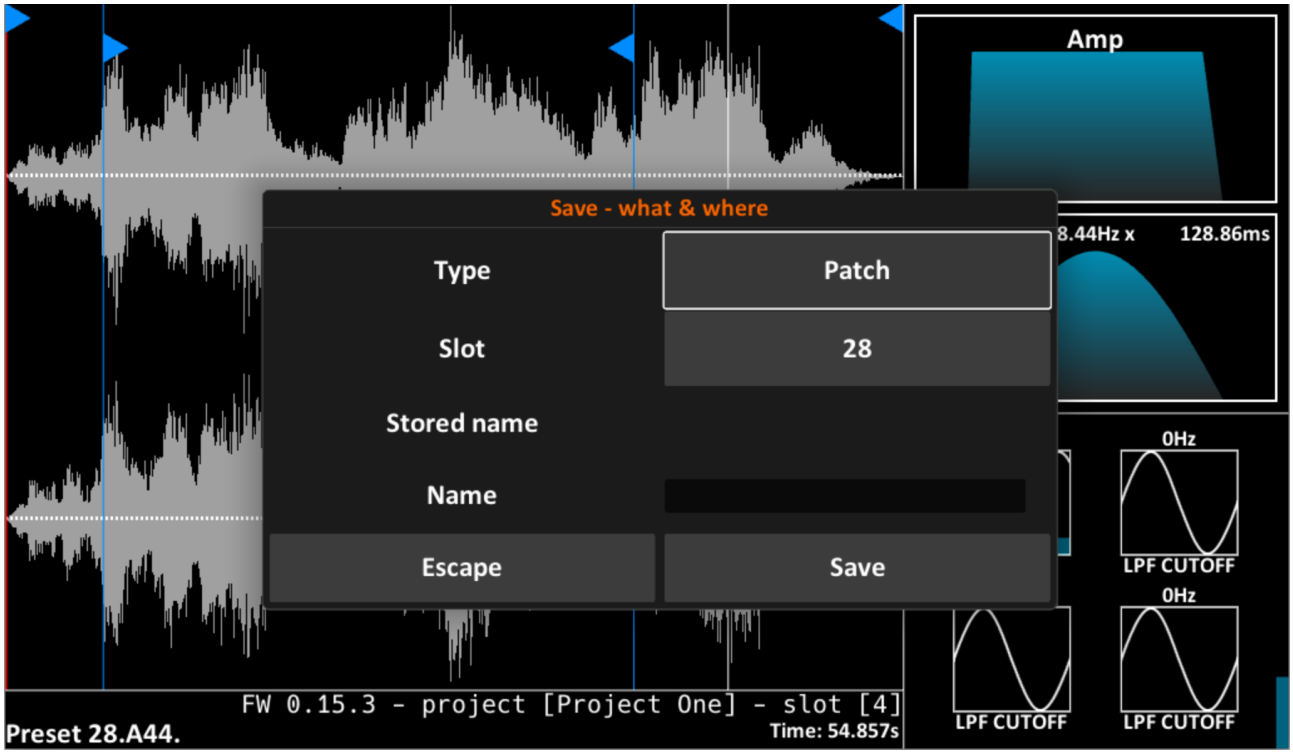
AIFF: Loading only. Most variants, except proprietary Ableton encoding. At the time of writing sound previews are not possible for this AIFF.

Supported patch formats

GR-1: folders with .grp + .wav files. loading only

GR-MEGA: loading and saving

Saving is done with the save dialog.



Most often you'll save edited or recorded samples. Select the Type, name the sample if you want and then press Save. You'll then enter the file chooser (TODO: image) to select a suitable folder to save the sample. Typically this is the user sample folders in the GR-MEGA's internal storage

/media/internal/user/samples/

Patches can be saved to slots with the save dialog. Typically, you'll just save your progress with the current patch this way.

* Press Save

* Select type Patch (or keep it, if it was already selected)

* Press Save again

Typically, that's just pressing save twice.

You can also save to another preset slot to make a sort of backup.

Patches are not saved to custom folders or USB this way. Use the file manager for this.

Multitimbral stacks, and templates can be saved in exactly the same way.

Projects can be renamed and saved to the current project slot or another slot in the same way (Remember: there are 50 project slots and 128 preset slots per project). When the project data type is already Project, you can just press save twice.

Tutorials

This chapter contains a number of tutorials intended to get you started. More advanced tutorials for actual sound design (leading to actually usable and impressive patches) can be found on our Youtube channel:

* Designing a granular patch with the GR-MEGA:
https://www.youtube.com/watch?v=mav7oJWiswA&t=633s

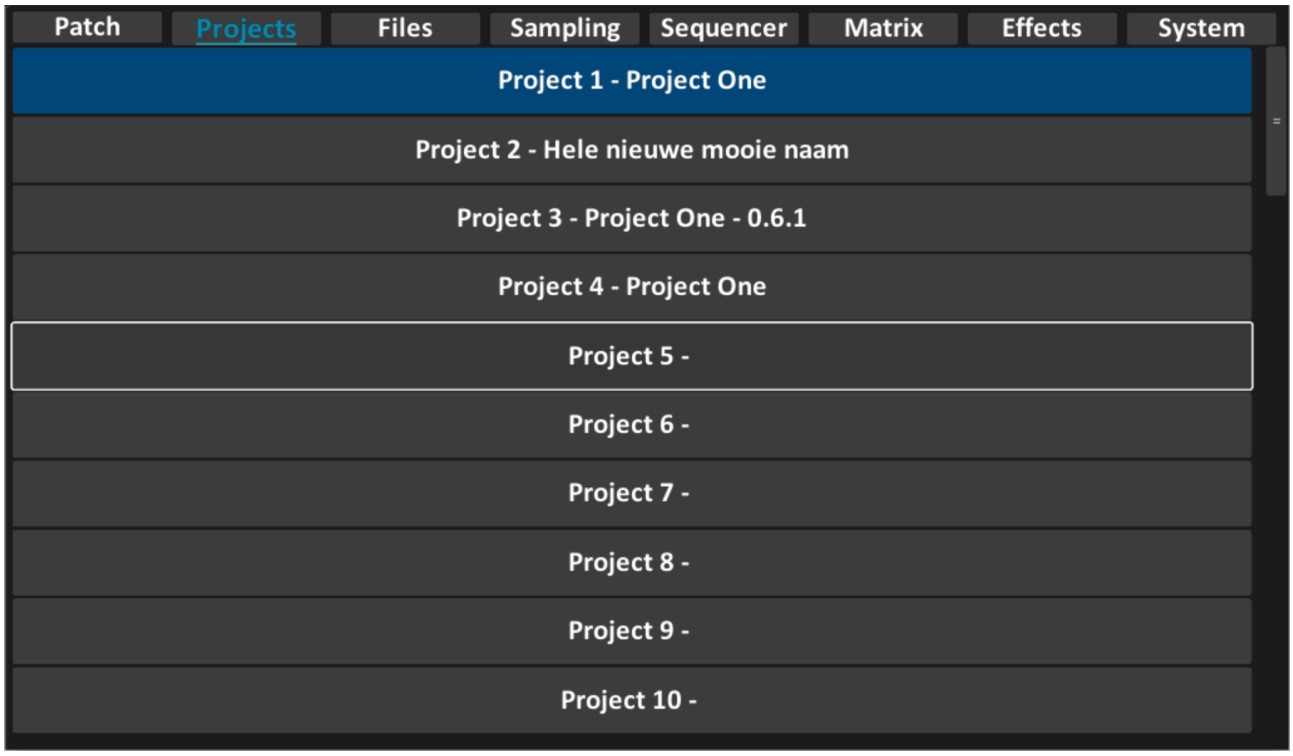
* Setting up the GR-MEGA in slice mode to jam with a groove box:
https://www.youtube.com/watch?v=mav7oJWiswA&t=1003s

.. and in the same video there are many other tutorials to make use of the GR-MEGA's sound engines.

Our earlier video tutorial for the GR-1 is also a good one to watch. It will teach you how to make typical granular patches. The way the GR-1 works in granular and tape modes is very close to the way the GR-MEGA works.

Initializing a patch

1. Open a new project. Either;
    a. Menu → Projects → Navigate to an empty one and press Load.
    b. Or just stay in the main screen to init an existing patch.



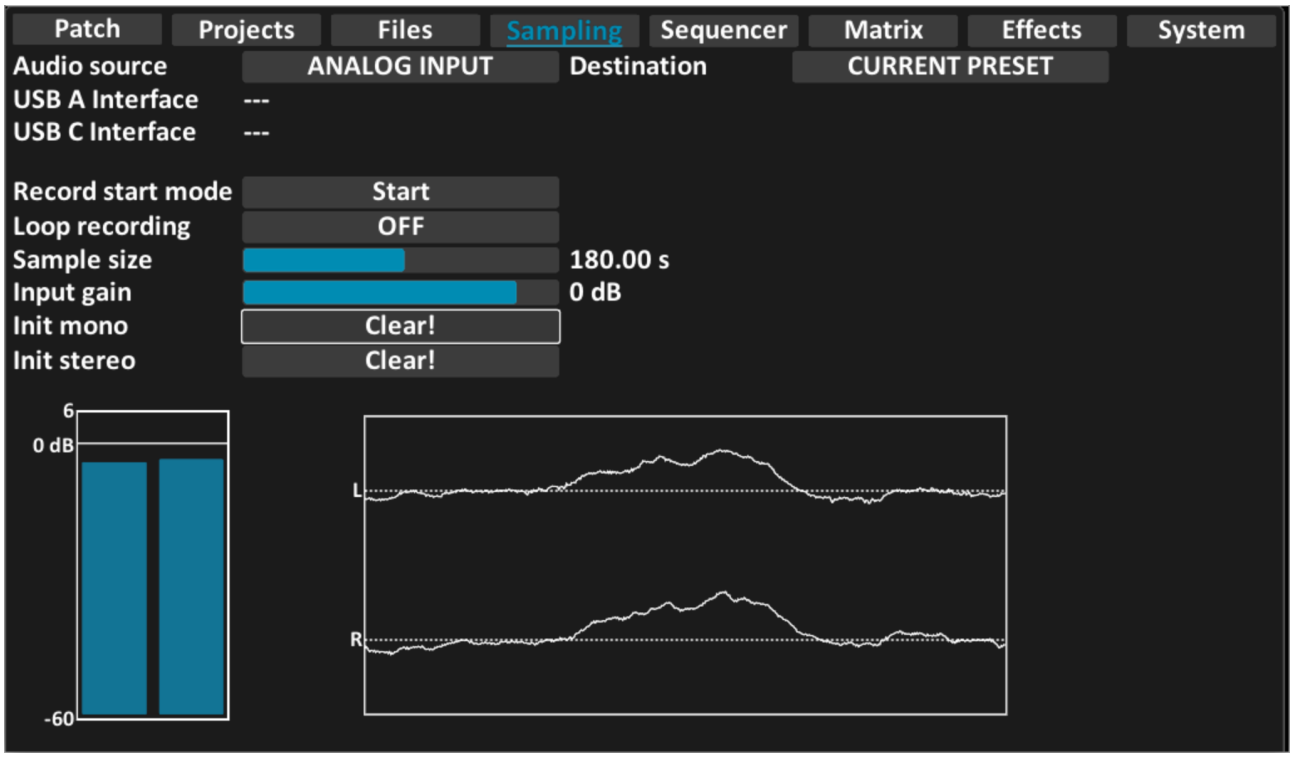
2.A.
    I. Exit back to main screen by pressing Menu.
    II. Hold down Shift and press delete.

The preset will now initialize to 8 seconds of mono sample memory and defaults like granular mode, 120 BPM 4/4 time signature.

2.B

Alternatively, to have more freedom over your sample buffer, you can go to the Sampling menu, and init the sample there:

I. Menu → Sampling (Hold [Menu] and Press [4])
II. Set the sample size
III. Select “Init Mono” or “Init Stereo”



From sample to patch

You can now record into the patch or load a sample into it from USB or internal storage.

Let’s load a sample from internal storage:

1. Press Load, the file chooser will show.

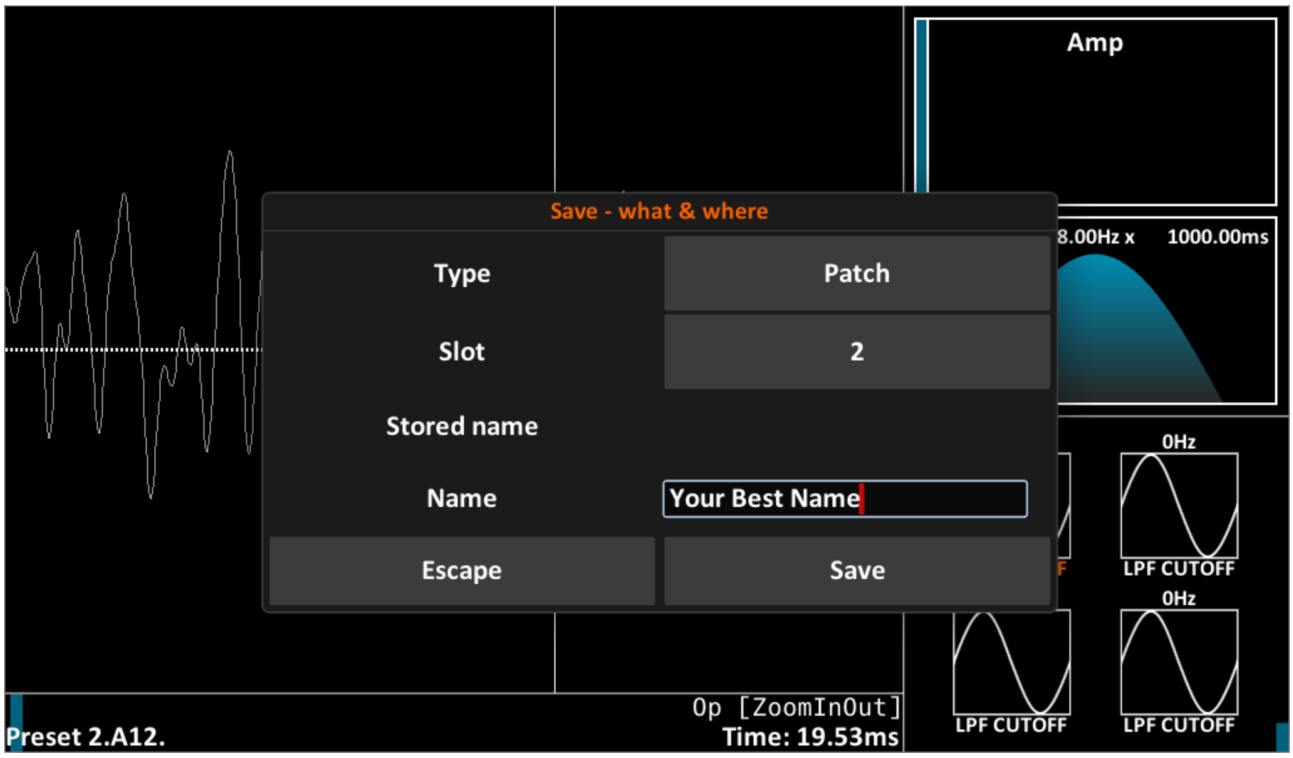
2. Navigate to `/media/internal/factory/`
Use the arrow buttons to or Op Enc to scroll, then press the Enter button to enter a folder.

3. Scroll to the desired wav file using the arrows or (Op Enc), and press [Load]. See the chapter “Saving & Loading” for more details.

4. Use the horizontal slider and play button to find sweet spots in the sample, and adjust granular parameters to your liking.

5. Press Save, and enter a name using the Enter button, the (Op Enc) and [←] [→] [↑] [↓] arrows. Then press Save again. Your first preset is now saved.

If you would like to record audio instead of loading a sample, have a look at the recording section in Sampling Menu chapter.



Modifying a patch

To modify a patch is easy. Just use the knobs and buttons to change sound parameters.

Let’s say you’re in granular mode, and you want to reverse grain direction:

1. Use the Direction knob (knob “E” in the lower right section on the front panel), and turn it all the way left.

2. To store the preset, Press [Save] twice.

You’ve now stored your modified preset. If you skip step 2 and press any preset or bank button, your changes are undone.

Sample editing

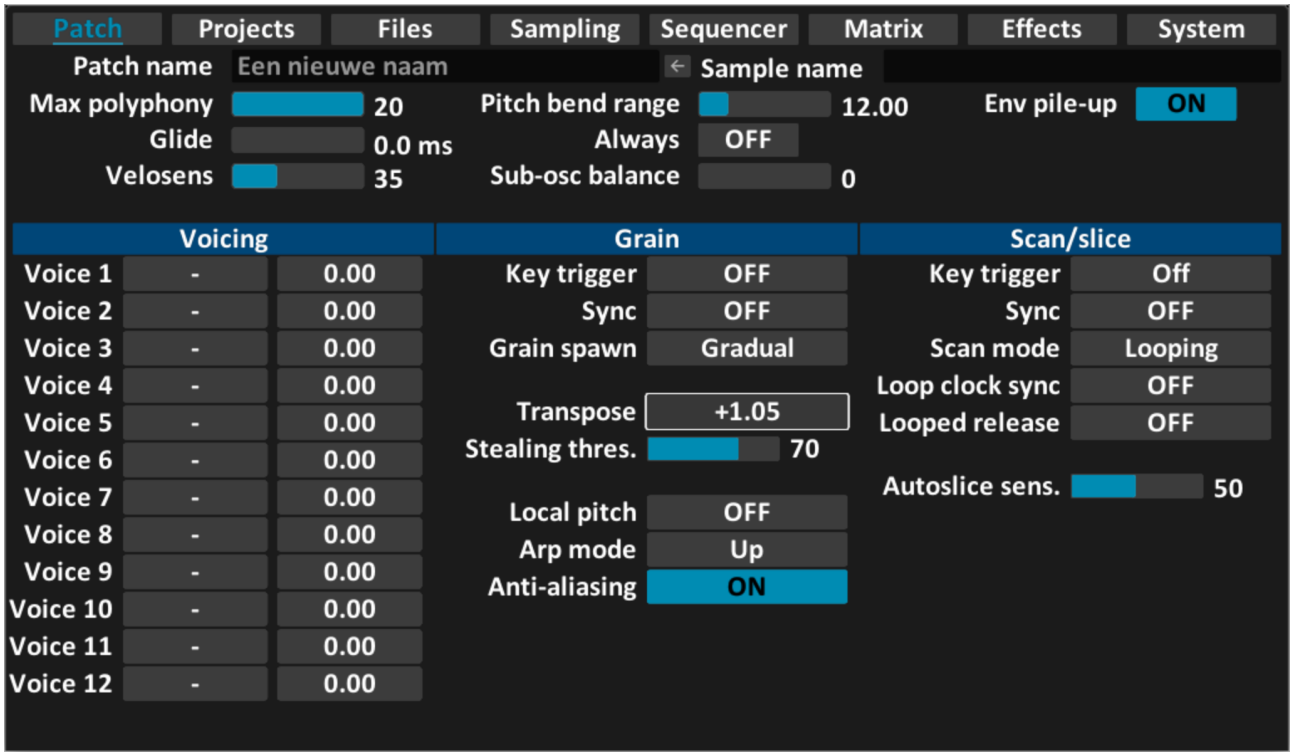
Sample Tuning

1. Go to Menu → Patch (Hold [Menu] and press [1])
2. Navigate to the column called “Grain” and to “Transpose”
3. Use the horizontal slider and/or turn (Op Enc) to transpose your sample in semitones. [Shift] + (Op Enc) fine tunes.

Using your ears you can now tune it using the on-board tuning sine. Hold [Shift] and press [Sub] (in the lower right region of the front plate). The tuning sine will activate, and you’ll hear the central C (approx 261 Hz). You can transpose your sample to match the C.

You can also choose to use the Pitch knob for this purpose, but it’s more often used live for performance.

Here we use the transpose option in the Patch menu to transpose the pitch up by 1 semitone and 5 cents:



Sample Normalize

1. Turn (Op Enc) to “Normalize”
2. Press the [Exec] button next to (Op Enc)

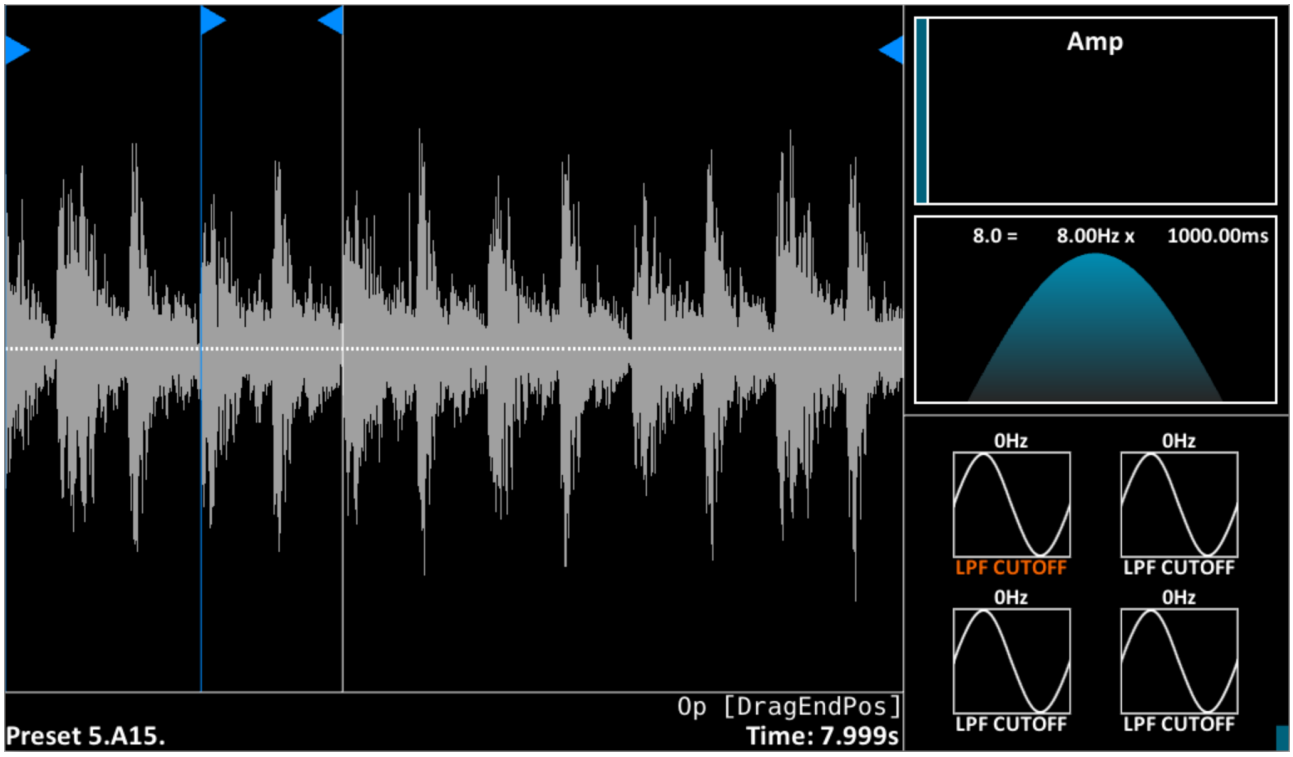
Note: the GR-MEGA can automatically normalize samples when loading them. This means that you don’t need to normalize samples. You’ll probably only need to do it after cropping.

Sample Crop

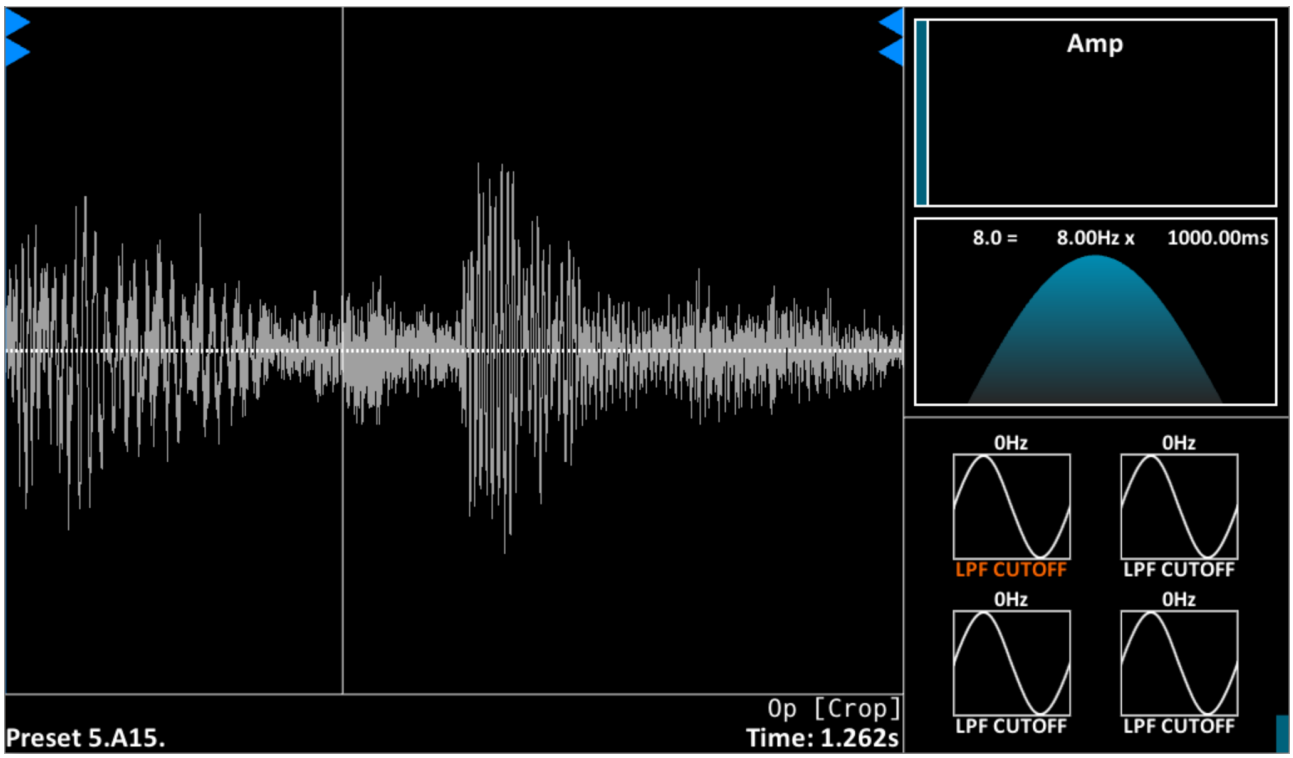
1. Turn (Op Enc) to “DragStartPos”
2. Drag the horizontal slider to the position in the sample you want

3. Press the [Exec] button next to (Op Enc).
4. Turn (Op Enc) to “DragEndPos”
5. Drag the horizontal slider to the position in the sample you want
6. Press the [Exec] button next to (Op Enc).

Hint: You can use zooming to fine tune sample position: Hold [Shift] and turn (Op Enc) right to zoom in. Turn left to zoom out.



5. Turn (Op Enc) to “Crop”
6. Press the [Exec] button next to (Op Enc)
7. Your sample is now cropped to the range between the start and end flags.



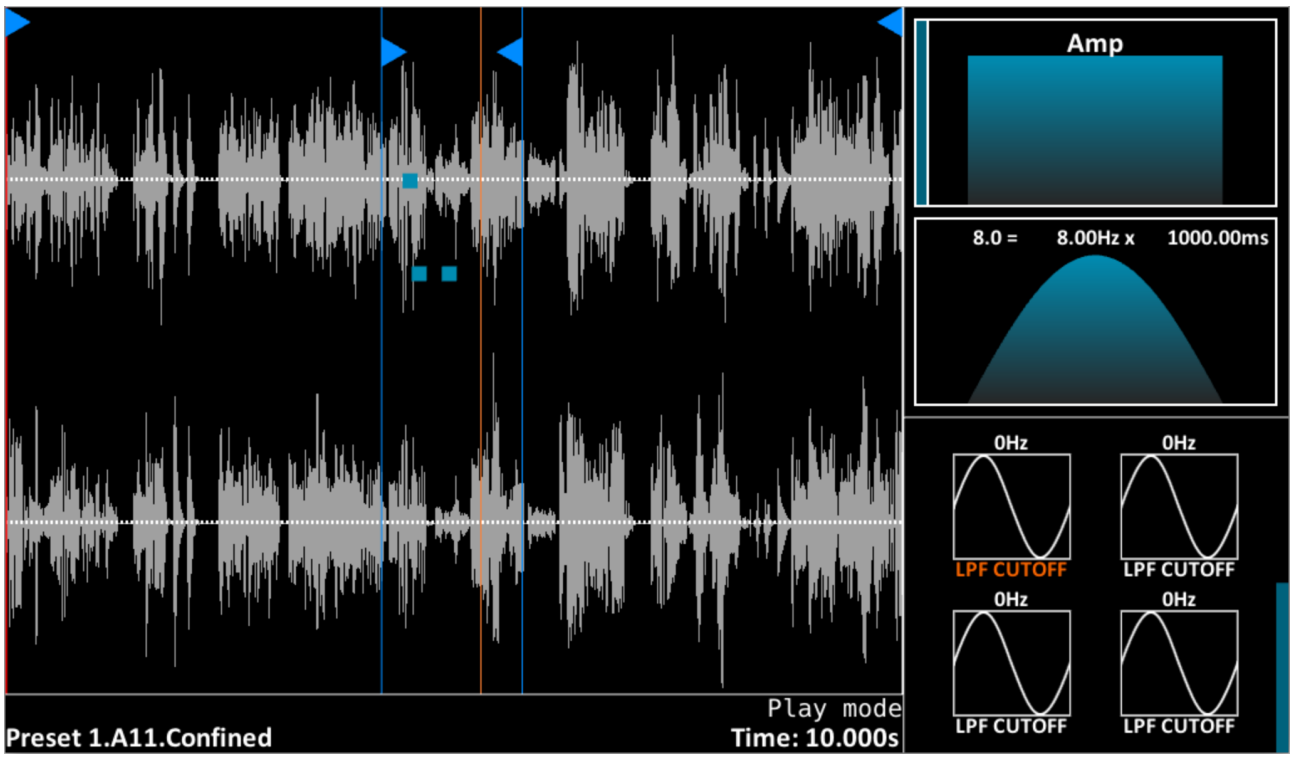
Sample Loop Confinement

You can use the loop flags: loop start, and loop end, to confine sample playback to a specific region.

While the loop flags are used in the Granular and Spectral sound engines to confine scanning, in Sampler and Tape sound engines they are used to confine sample playback. The play heads will stay completely confined between the loop start and loop end. In these sound engines, especially in loop and one shot mode (Patch menu → Scan mode) there may be audible clicks and pops if you do not use zero crossings. Pingpong mode can somewhat remedy this.

1. Turn (Op Enc) to “DragLoopStartPos”.
2. Drag the horizontal slider to the position in the sample you want.
3. Press the [Exec] button next to (Op Enc).
4. Turn (Op Enc) to “DragLoopEndPos”.
5. Drag the horizontal slider to the position in the sample you want.
6. Press the [Exec] button next to (Op Enc).

Press [▶]. You’ll notice all grains / play heads are confined to the region of your interest.
Please note that changing loop start and loop end will only take effect in the sound engine when you play a new note!


Amp
8.0 =
8.00Hz x
1000.00ms
0Hz
LPF CUTOFF
0Hz
LPF CUTOFF
0Hz
LPF CUTOFF
0Hz
LPF CUTOFF
Play mode
Preset 1.A11.Confined
Time: 10.000s

File sharing

The GR-MEGA can share files over the LAN port, but also over USB C. The GR-MEGA can make sound when sharing files, and does not need to be restarted to enable file sharing. A physical connection is all that is required. You can use this as an alternative to the internal File Manager. All actions will be done from your PC/Mac.

Setup

Step 1.

A. USB C (Linux and Mac):

Use a USB C cable to connect your GR-MEGA's USB C port with your PC or MAC. If you have a USB C port on your Mac, it could be you need a USB C → USB A adapter and a USB A → cable.

B. LAN port (Linux,Mac,Windows):

Using a standard RJ45 network cable, hook up your GR-MEGA to your router, modem, or directly to your PC.

Step 2.

In Finder (Mac), Windows Explorer (PC/Windows) or in Files/Nautilus (Linux) you should see the name "GR-MEGA" advertised under "+ Other Locations". On Mac and Linux this is on the left side of the window.

On Windows 11 it seems to be the case that you may need to use the function "Add network location" or "Add network drive" and enter `\\GR-MEGA\internal`

TODO: screen shots

Step 3.

On your PC/Mac click on the GR-MEGA to browse the files in its internal storage ("`/media/internal`"). No user password is necessary, just choose to login as guest. You can read and copy everything to your PC/Mac, but you can write only to the user folder. The factory data and projects are write-protected!

Important

The GR-MEGA does not have a recoverable trash can. A deleted file is permanently gone!

The menus

Pressing the [Menu] button gets you here. Pressing [Menu] again will exit to the main screen. You are presented with 8 sub-menus represented by tabs: “Patch”, “Project”, etc. Use [←] [→] to highlight a tab. Press [Enter] to activate the tab. Pressing [↓] will enter the selected menu tab for navigation. Press [Escape] to exit a tab to navigate the menu bar again.

Patch menu

The patch menu is a large menu that deals with all the patch settings, that typically are not accessible from the physical front panel. It is divided up into 4 sections:

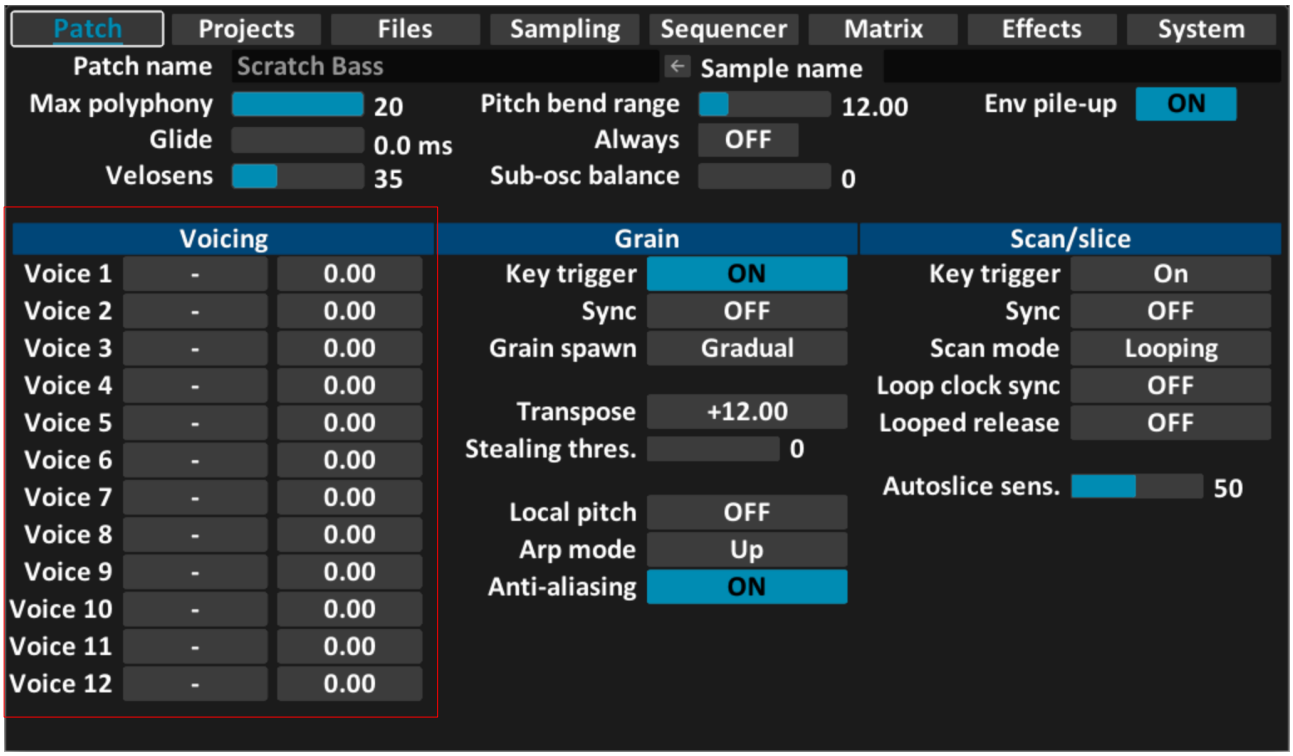
* general: at the top

* voicing: lower left

* grain: lower central

* scan/slice: lower right

General



Name: the preset (patch) name

Sample name: the name of the sample. Use the [←] GUI button in between Name and Sample name to copy the sample name to preset name. This will come in handy.

Polyphony: slide this from 1 (monophonic) all the way up to 20. Please note that the PV (spectral) sound engine will limit this to 3. It will display “PV LIMIT” if that happens.

Pitch bend range: pitch bend range in semitones. NOTE: MPE mode will fix this to 48!

Env pile-up: By default this on. The GR-MEGA reuses the same voice if the same MIDI note is played repeatedly, and just piles up the amp envelope. This mostly works fine, but in sampler mode you may want to turn it OFF.

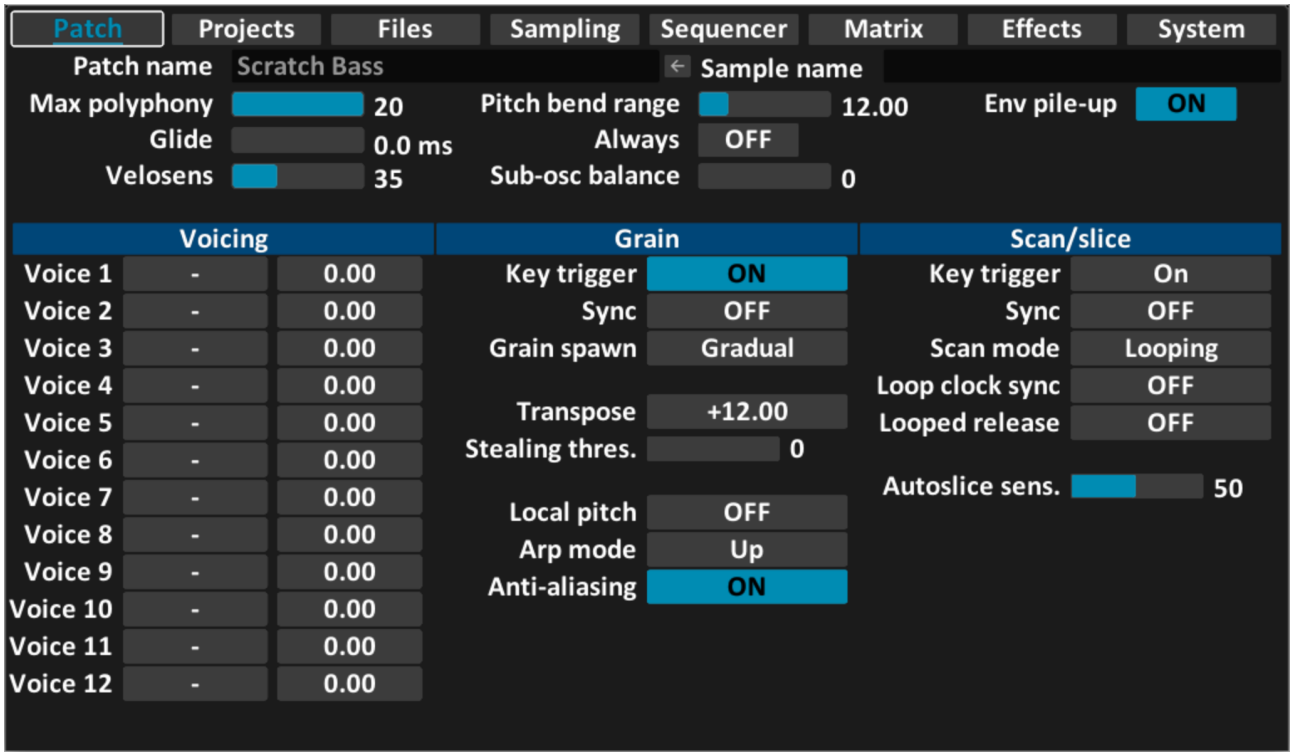
Glide: can go from 0.0 ms up to 2000 ms. 0.0 means there is no audible glide.

Always (glide always): Do you want to glide when you play a new note, after all notes were off?

Velosens: This sets the amp envelope sensitivity to note on velocity. If this is 0, then it means all MIDI notes sound just as loud. If it is 100, then it means it’s totally sensitive and very gently pressed midi note will have low volume, while a fast one, will have max volume.

Sub-osc balance: use this when you’re using the sub-oscillator and playing polyphonically. Drag to the left to place more emphasis on the bass. Drag to the right to place more emphasis on higher pitch.

voicing

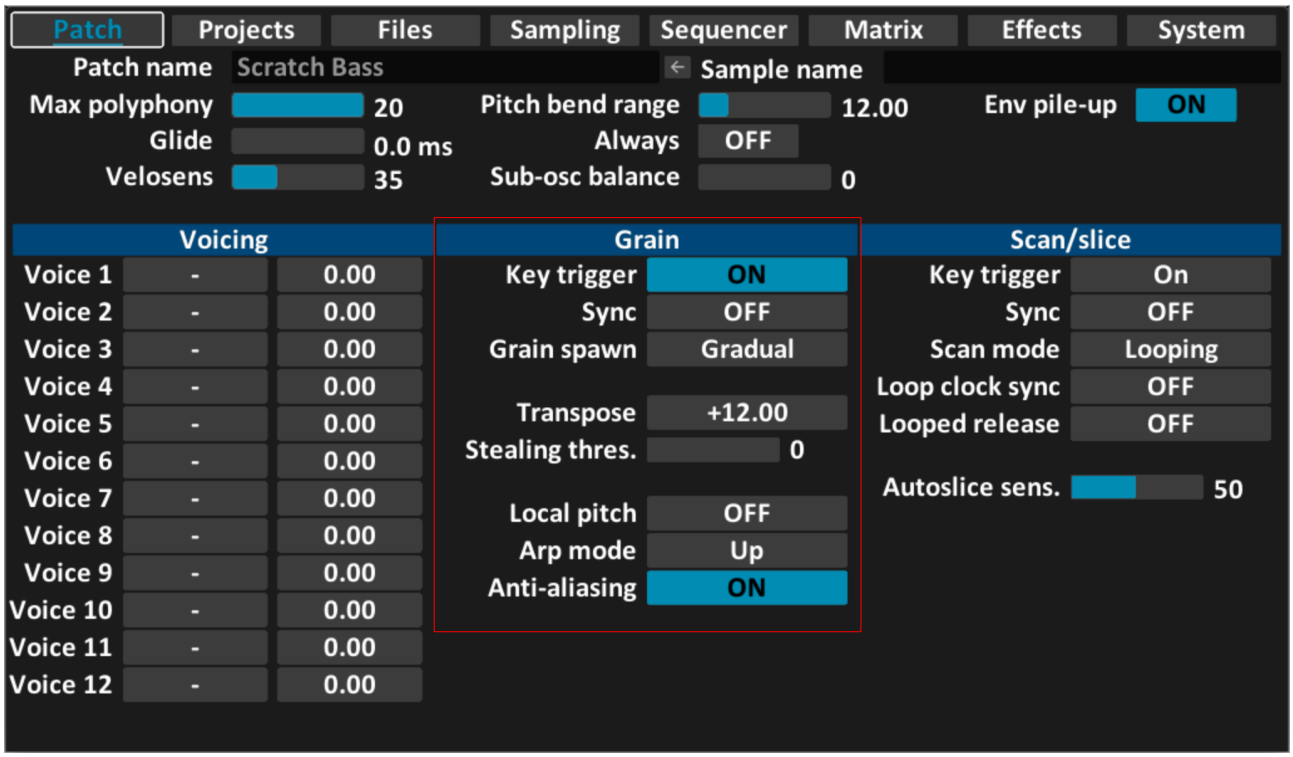


This displays the 12 chord notes and their fine tuning. You can add the same note twice or more to increase the number of times it’s played in the granular arpeggiator, or to increase the chance of getting played when the arpeggiator is set to random. Turn completely to the left (“-”) to disable the chord note.

Note that the lowest note in the chord will match the playing note, and all the other chord notes are transposed up relatively.

In granular sound engines this will split the granular cloud, and distribute each chord note evenly among the grains, leaving total volume unaffected. In other sound engines chord mode will stack, meaning that it will add volume.

Grain settings



Key trigger: When this is on, a grain will trigger directly when a note is played. When this is off the grains sequencing is independent from note triggers.

Sync: ON: let the grains spawn synchronized to the clock, and its clock division, OFF: use the knob setting.

Grain spawn: Set the mode in which the grains spawn:

This tells the granular engine how to spawn grains when a new note is triggered. There are four options:

1. Gradual: gradually generate grains based on the configured clock

2. Direct: Generate a full cloud as if the granular engine had been running continuously in the background.

3. Direct reset: This does the same as direct mode, but with all grains starting within the spray area. This will boost the bass and the volume of the voice.

4. Recycle: Re-use old grains. This can give silly effects.

Only applies to granular and granular slice sound engines. Technical note: spawn mode is a consequence of the energy / CPU saving properties of the engine. When a voice is not playing for a while, the granular scheduler is disabled.

Transpose: how many semitones the patch is transposed.

Local pitch: Independent Pitch per grain ON/OFF

Normally the grains that are playing will play until the end of the set “grain size” at the same note pitch of the note that was played when the grain started playing. When the setting is “OFF” the grains will be tuned to the notes that are played at that very moment.

If you want the grains to follow the played pitch immediately turn this setting “OFF”. If you have longer grains and want to have a granular-chorus like function that glides between notes. Turn it “ON”.

This feature can also be used to create a swarm like sound where all grains have a different pitch. Just try to wiggle the “Pitch” knob, or use an LFO to modulate Pitch. Set the LFO speed high enough and you’ll get a swarm-like chorus effect. LFO amount can add additional dramatic effect.

This was called “granular glide” on the GR-1.

Grain stealing threshold:

Grain stealing kicks in when the 128 grains per voice are used up. The GR-MEGA’s grain stealing is intelligent and results in no crackles or clicks whatsoever. Leave this at 0 to disable grain stealing. With a high combination of density and grain size the grain scheduler will start oscillating. When the slider is set higher than 0.0 it will gradually start stealing grains. The higher the setting, the more aggressively the stealing will be. This will result in shorter grains, but the grains spread will be quite homogeneous. And the way in which this occurs is quite intuitive and natural.

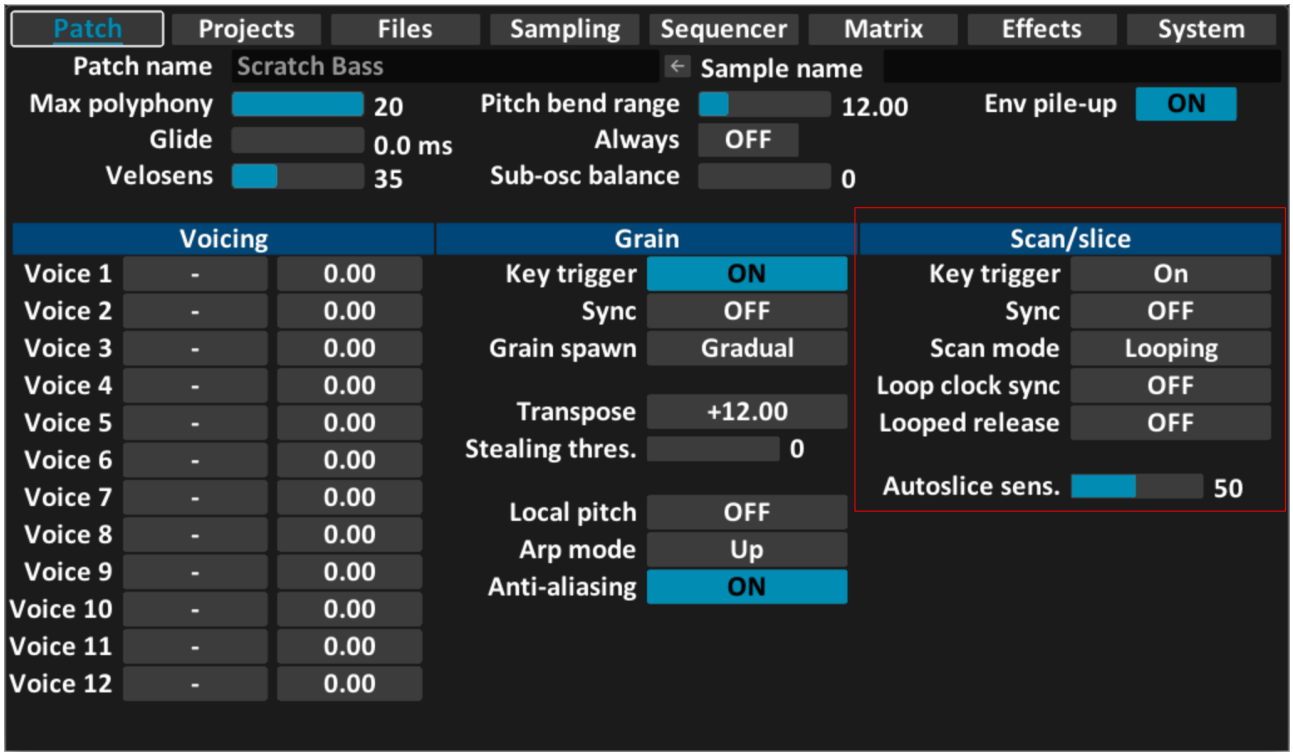
ARP mode: set the mode of the granular arpeggiator:

UP, DOWN, DOWNUP, UPDOWN, RANDOM, SHUFFLE, FORWARD, BACKWARD, FORWARDBACKWARD, BACKWARDFORWARD.

Note that up and down sort the notes in the chord, while forward and backward do not!

Anti-aliasing: Turn anti-aliasing filter ON or OFF. At the time of writing it’s always ON. The intention is in later firmwares to be able to turn it off, and even have better anti-aliasing options, but we need to people to chime in here.

Scan / slice



Key trigger: The scanning through the sample can be reset by a voice trigger/note-on event. When “Off”, scan position is never reset and all voices will have the same scan position. When “On”, the scan position will reset to the “Play position” on every voice trigger/note-on event. “Legato” will only reset the play position on the first note played. “Poly” will reset scanning only for the newly playing note, comparable to envelopes per voice in a traditional polysynth.

Sync: ON: scanning is synchronized to the clock, and its clock division, OFF: use the scan knob setting.

Scan mode:
The GR-MEGA scanning movement has three modes:

- Loop
- One shot
- Ping pong

The scan knob influences speed and direction of all these modes.

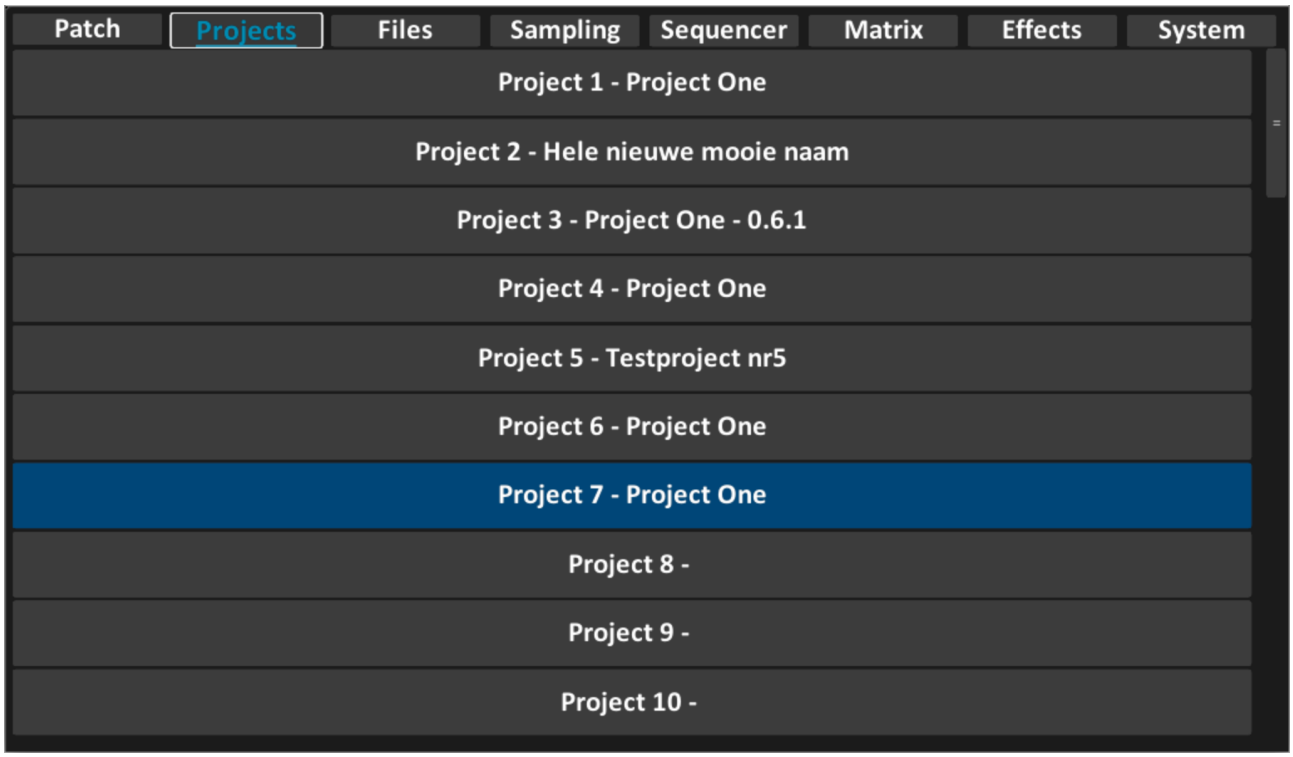
Loop clock sync: Synchronize looping to the beat.
ON: synchronize the scanning motion in the loop to the system clock. This will allow loops to be synced to the beat. OFF: free running.

Looped release: stay in the loop when releasing voice
ON: Eventually exit the loop when releasing the voice. In pingpong mode it will have bounced an even number of times before doing so.
OFF: Stay in the loop when releasing the voice

Autoslice sens.: Autoslice sensitivity - How trigger-happy the autoslicer will get.

At 0 it will probably miss a couple of onsets. At 100 it will probably waste all its slices before the end of the sample.

Project menu



The project menu is simple. You can load, save, and rename projects here. Each row represents a slot in which a project can be stored, numbered 1 through 50. The slot that's BLUE is the actual active project. The one that's enclosed by white rectangle, aka "highlighted", is the one you're looking to do something with.

[↓][↑] Scroll through list, and highlight project.

[Enter] Rename project.

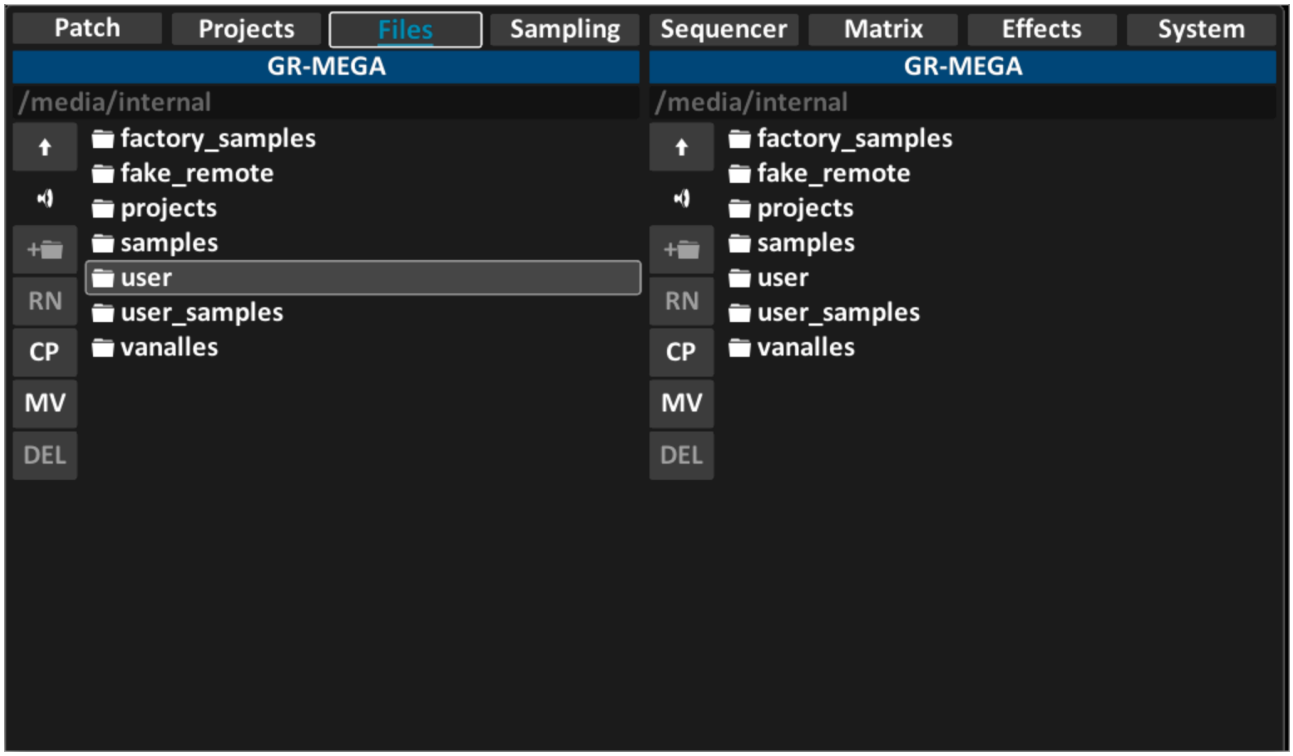
[Load] Load highlighted project. Loading an new project (a slot that was never saved to before) will let you start with an empty project.

[Save] Save current project to highlighted project.

[Delete] Initialize highlighted project.

Any potentially destructive action is protected. You will be prompted with a confirmation dialog when you load or save.

Files menu - the file manager



The file manager allows you to do everything you'd want to do with files:

* Backup your projects to USB stick.

* Import folders of samples to internal storage. For instance to the user sample storage: `/media/internal/user/samples`.

* Reorganize your user samples. For instance, delete groups of samples. Rename and move others.

NOTE: the file manager is a powerful, but also dangerous tool. If you can do things by simply using the save and load buttons in the main screen, then that is easier and safer! If you're restoring projects from USB backup, it's also easier to use the Projects menu!

NOTE: File sharing over USB C or LAN cable can do about the same as the file manager, but file sharing can be harder to set up initially.

NOTE: Factory data and projects are write-protected. They cannot be modified in the file manager.

Here's an overview of all the features of the file manager.

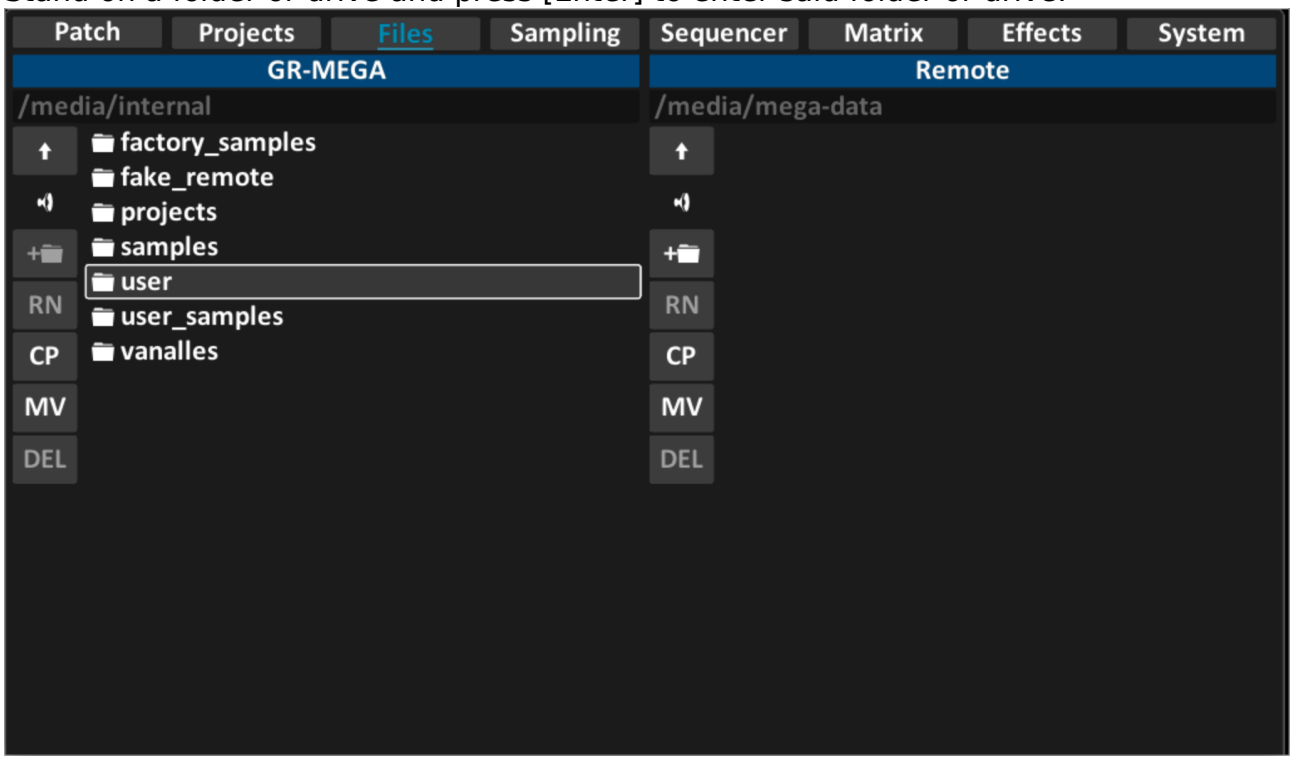
Navigation

The file manager has two sides: left and right. You can edit files on both sides. You can copy and move files from left to right, and also from right to left.

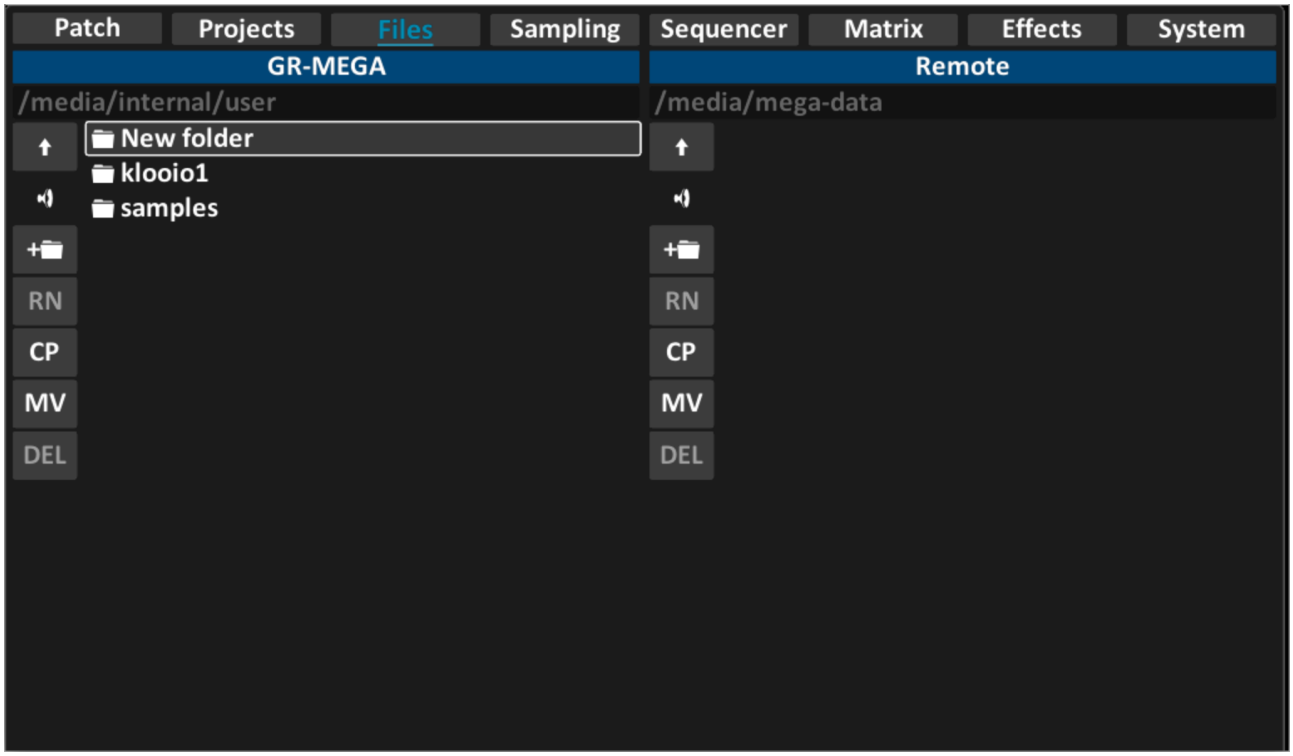
You can easily move the focus from the left side to the right side with the cursor keys [←] [→] [↑] [↓] and [Enter].

Traversing folders

Stand on a folder or drive and press [Enter] to enter said folder or drive.

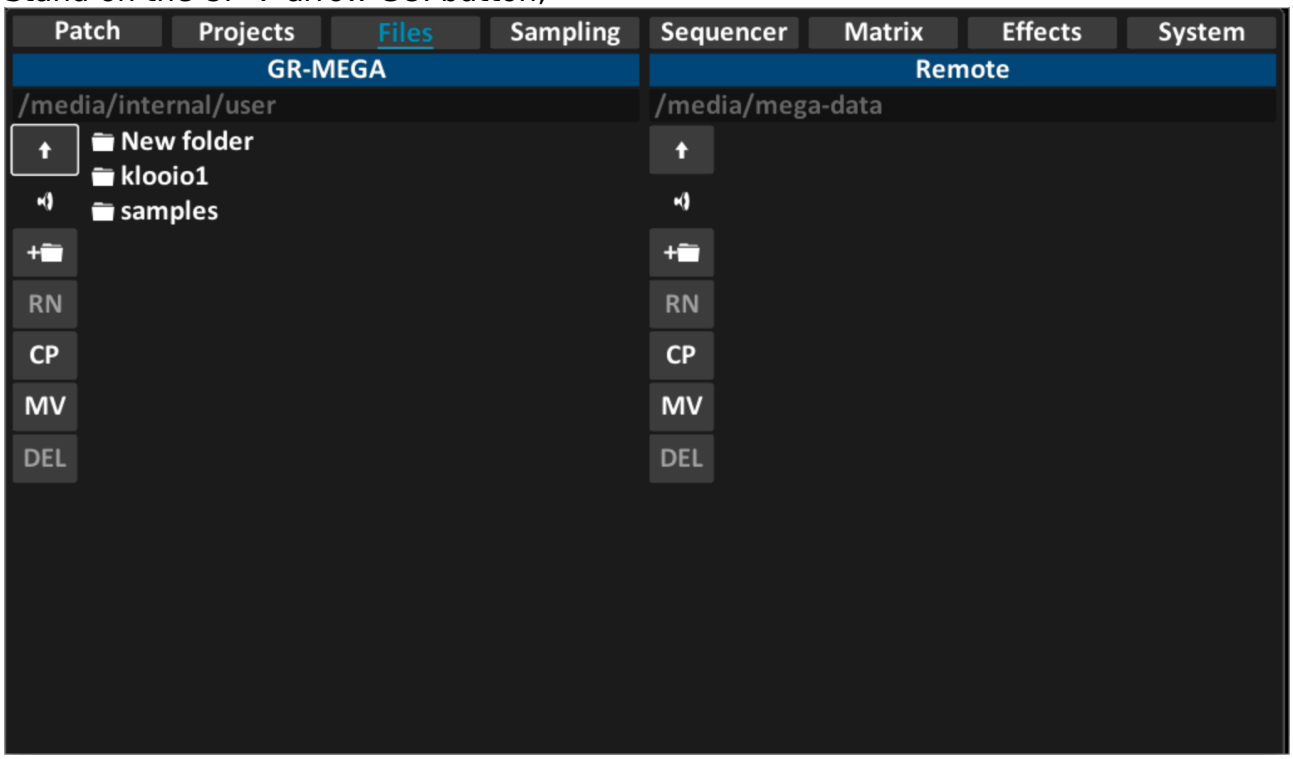


Press [Enter] to enter the folder:

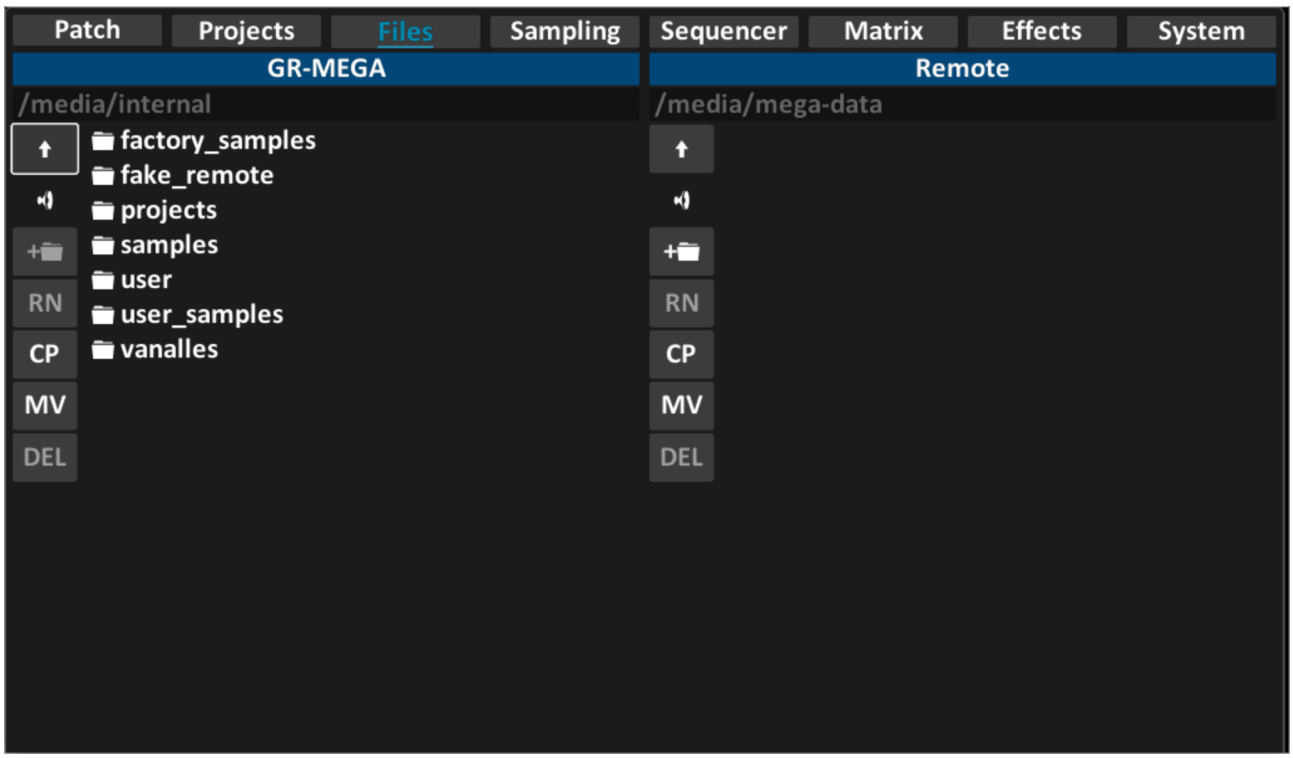


Up to parent folder

Stand on the UP ↑ arrow GUI button,

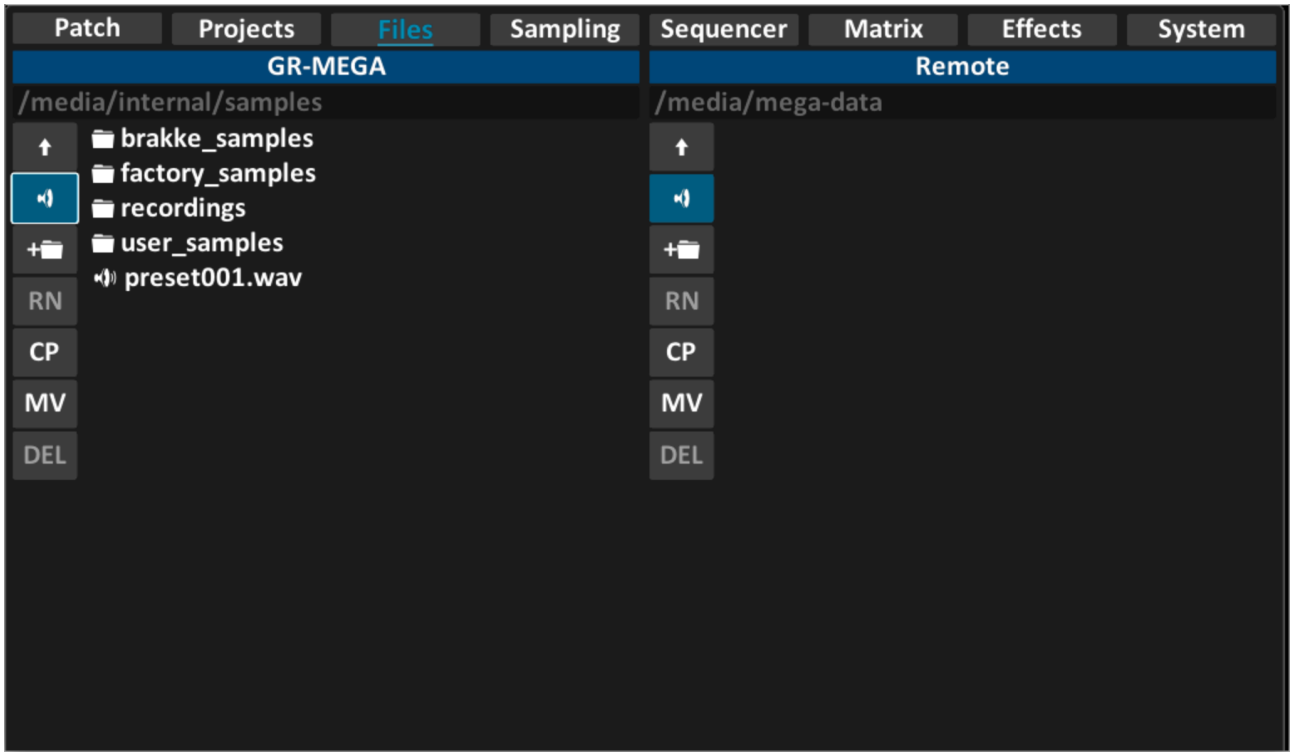


..then press the [Enter] button to go up in the directory tree (to the parent folder):

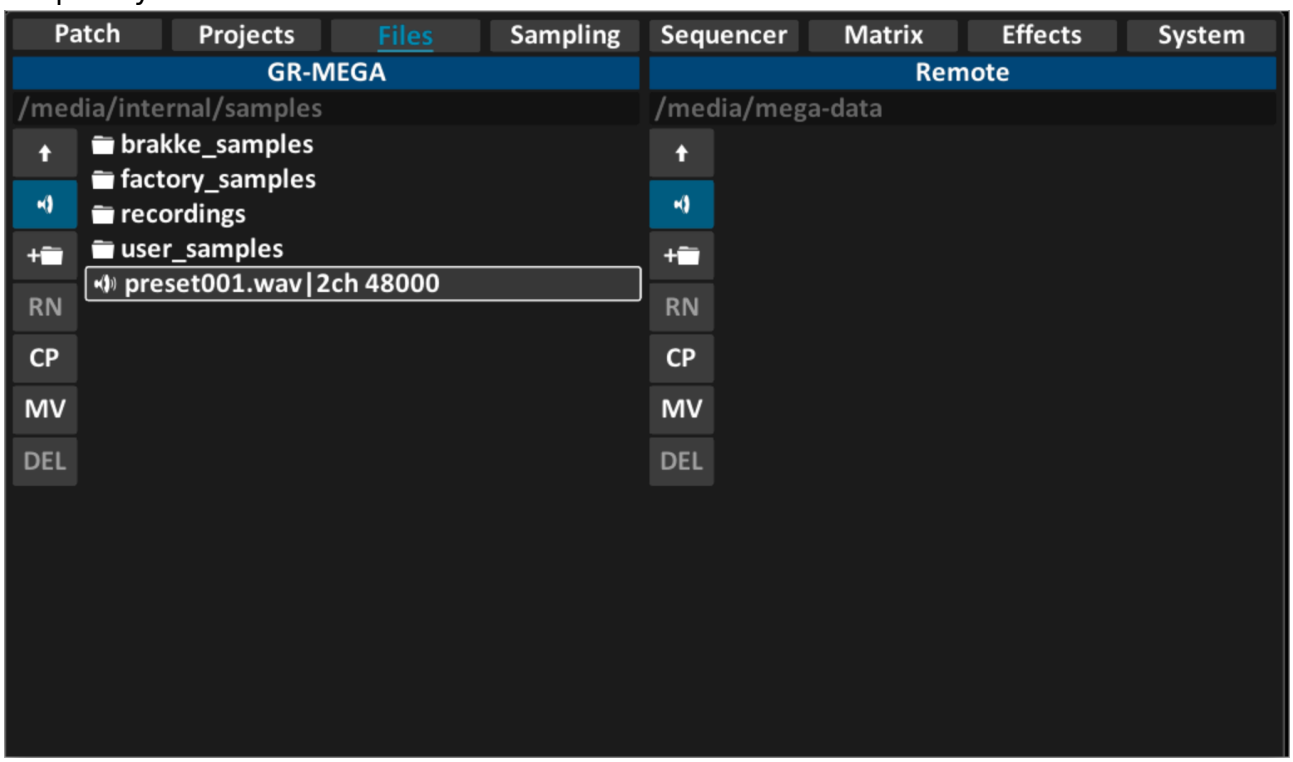

Patch
Projects
Files
Sampling
Sequencer
Matrix
Effects
System
GR-MEGA
Remote
/media/internal
/media/mega-data
factory_samples
fake_remote
projects
samples
user
user_samples
vanalles
RN
CP
MV
DEL
RN
CP
MV
DEL

Sound previews

Stand on the speaker [ ] icon end press [Enter] to enable sound previews for sample files.

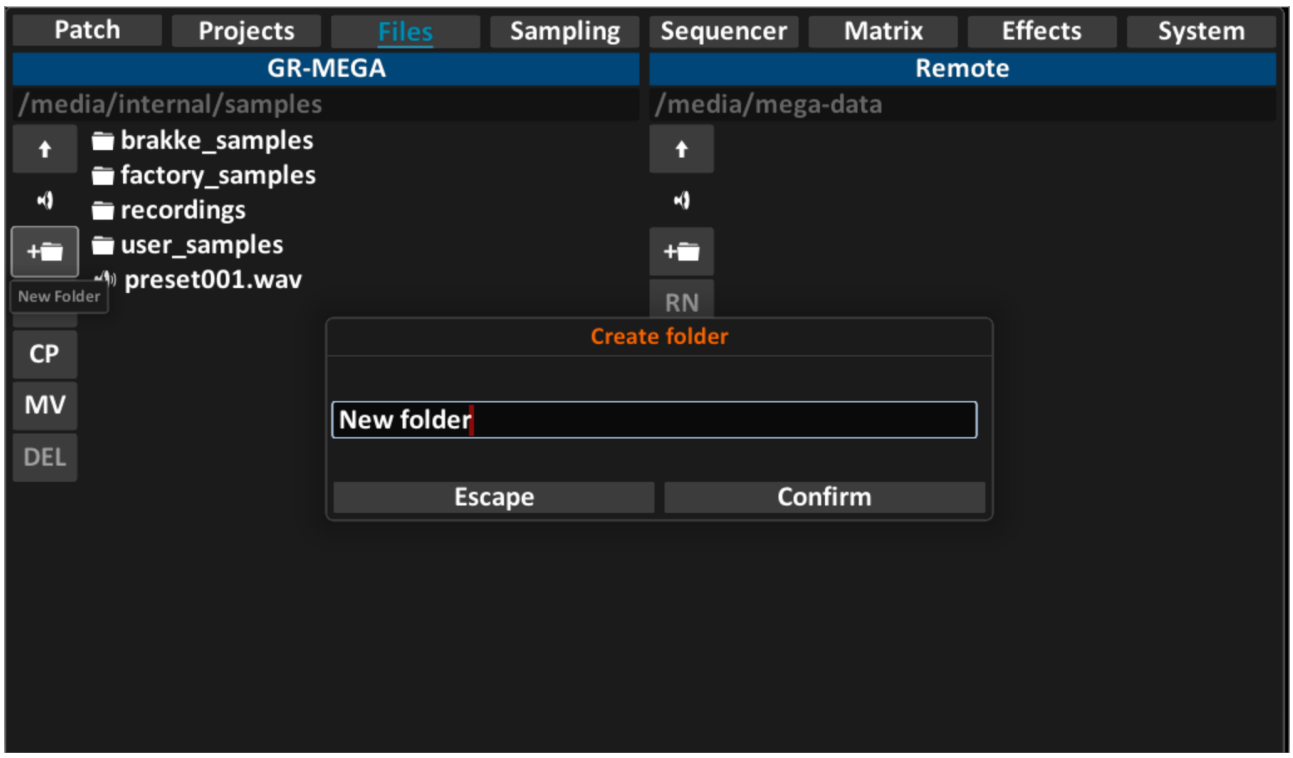


Stand on a sample file, and it will start playing it and also show stats like sampling frequency and number of channels.



New folder

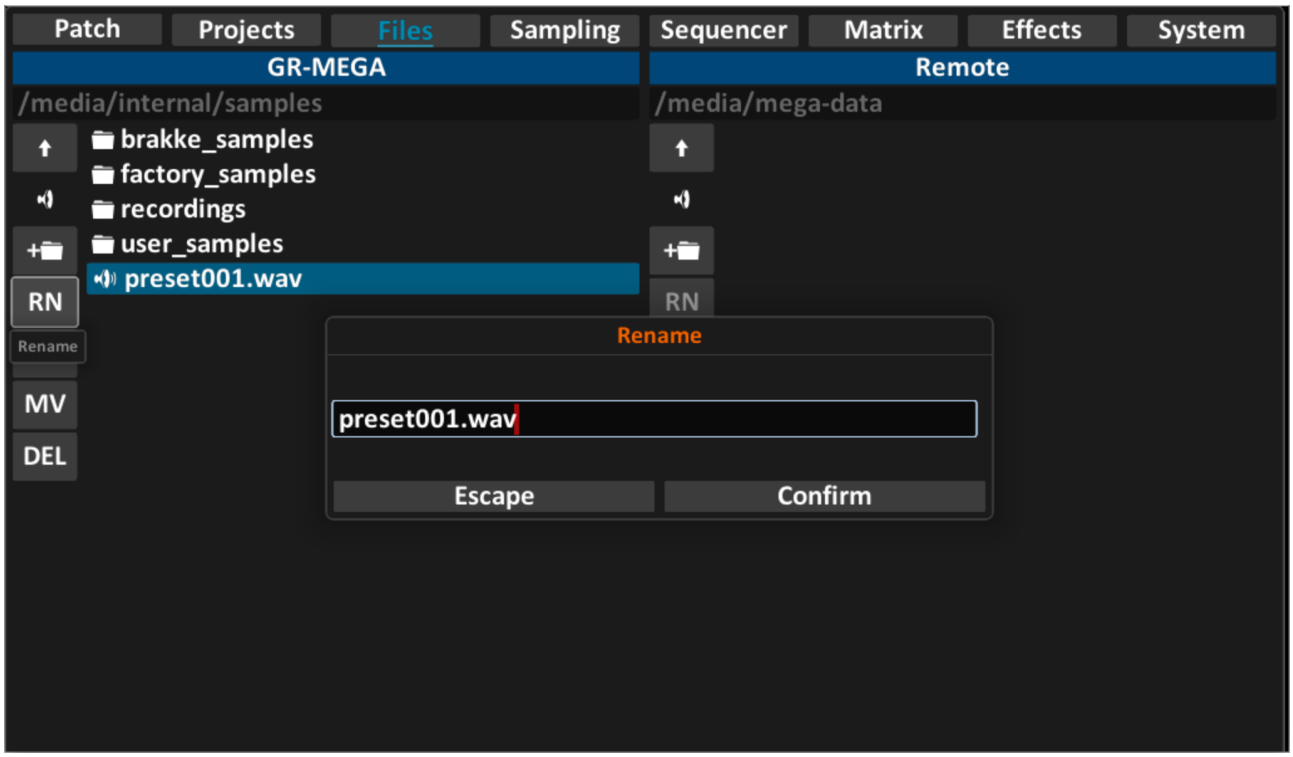
Standing on the [+] icon will let you create and name a new folder:



Rename

Stand on a file and press [Enter] to select it. It will be highlighted in BLUE.

Standing on the [RN] GUI button and pressing [Enter] will open the renaming popup.



Copy and move

Stand on a single file and press [Enter] to select it. If you stand on a folder you have to hold [Shift] and press [Enter] to select it… a plain [Enter] without [Shift] will enter the folder!

Hold down [Shift] and use the arrow buttons [↑] [↓] to drag-select multiple files and folders. They'll all be highlighted in BLUE.

Then press the [CP] GUI button to copy.

Pressing the [MV] GUI button will do the same but will delete the originals after having copied them! This is a powerful feature to organize your files, but beware that's there's NO UNDO or recoverable trashcan like on your PC!

NOTE: Copy and move can transfer stuff from the left to the right, and also from right to left. However, they will refuse to transfer anything if there are files selected on both sides!

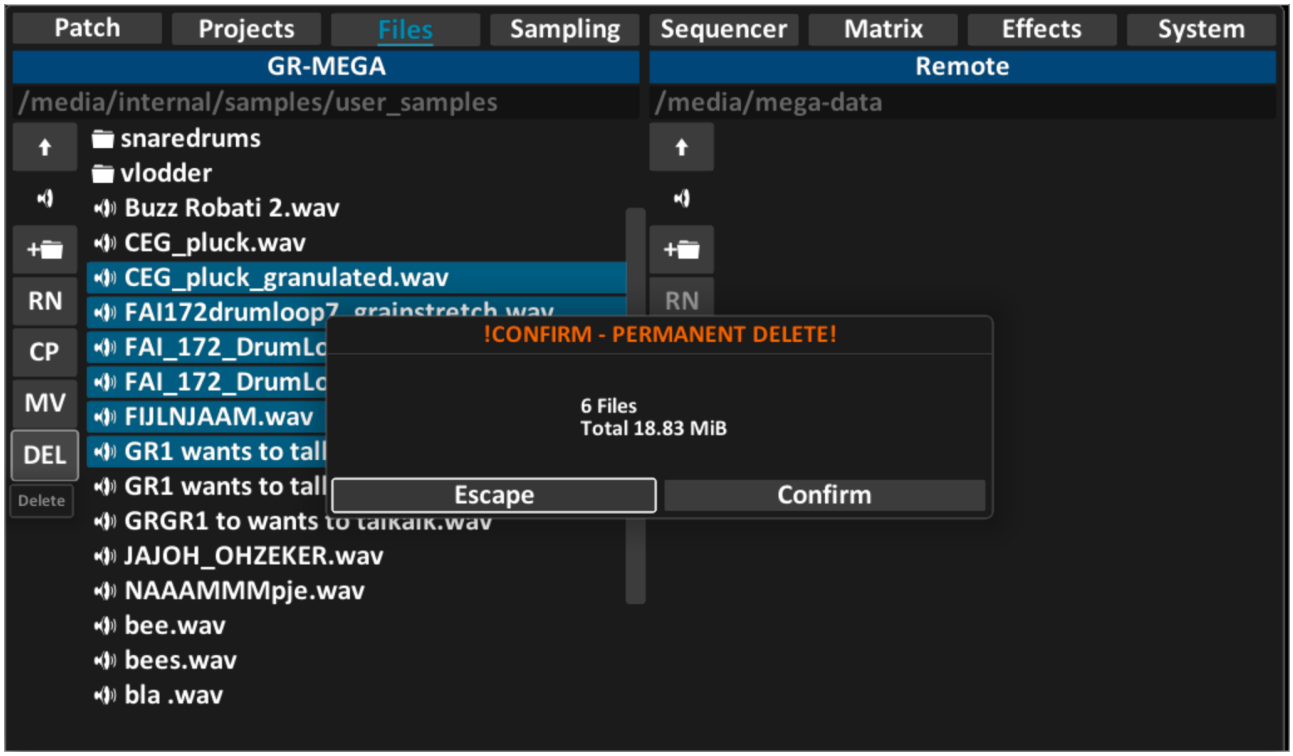
During transfer a progress bar will be displayed. You can abort the transfer with [Escape], although this is not recommended except in cases where you're mistakenly copying a vast amount of data.

Delete

Stand on a single file and press [Enter] to select it. If you stand on a folder you have to hold [Shift] and press [Enter] to select it… a plain [Enter] without [Shift] will enter the folder!

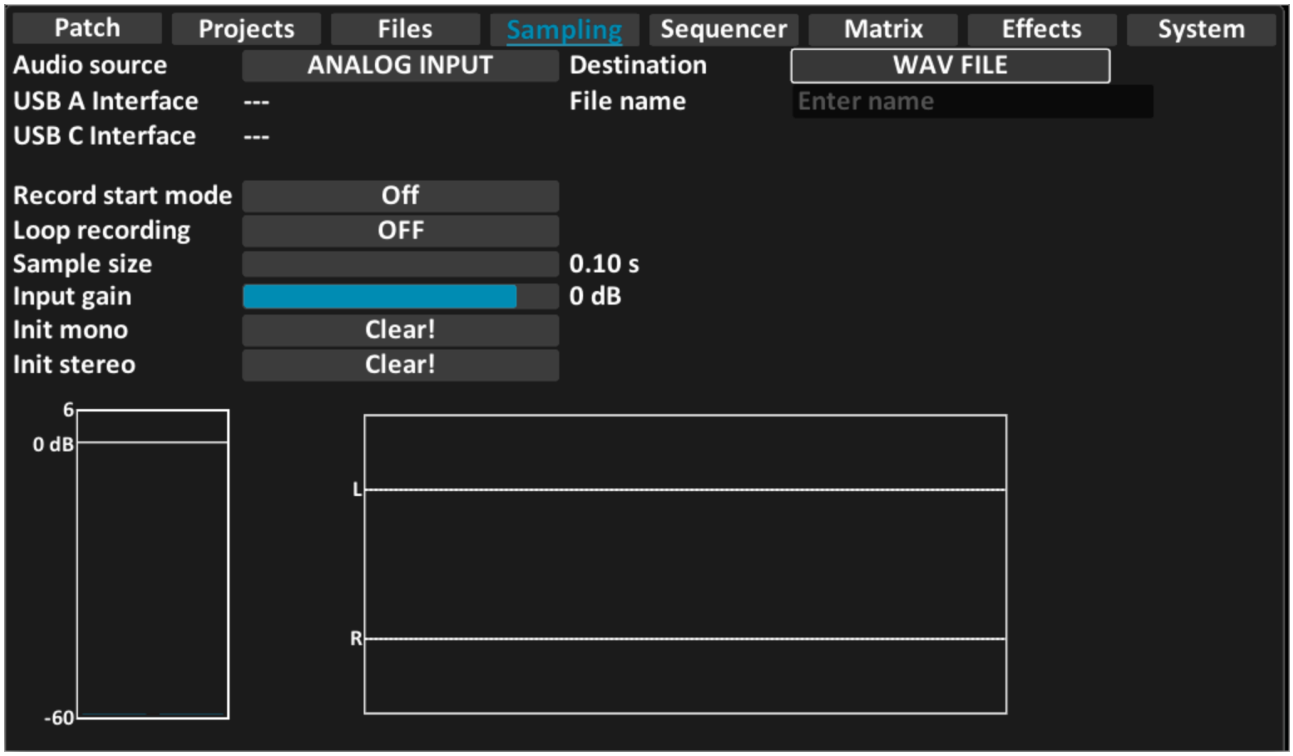
Hold down [Shift] and use the arrow buttons [↑] [↓] to drag-select multiple files and folders. They'll all be highlighted in BLUE.

Then press the [CP] GUI button to copy.



NOTE: Deleting is final! There's no UNDO function. There's no recoverable trashcan like on PC! Be careful. Project and factory data are protected, but in the user folder you can delete anything you want.

Sampling menu



The sampling menu allows you to setup your audio source, the recording destination, sample length, channels, and various things related to looping.

Audio source

* ANALOG INPUT: use the GR-MEGA high quality balanced analog inputs

* RESAMPLING: use the GR-MEGA engine output

* Experimental USB C: use the multitrack UAC2 audio from the USB C port. This is an experimental source and may be prone to high CPU use and crackles. We're working to make this reliable, but there's no telling if or when.

Destination

* CURRENT PRESET: record into the buffer of the current preset. Recommended if you're using an external source (NOT resampling).

* WAV FILE: use this to record to WAV file in the background. In the "File name" text field you can enter a prefix for your WAV file name.

When resampling, it will save to:
`/media/internal/user/resampling/prefixNNNN.wav`

When recording, it will save to:
`/media/internal/user/recording/prefixNNNN.wav`

Where NNNN means a serial number like 0001, 0002, 0003, etc.

Looping rec

With “looping rec” turned off, the recording of the sample will be a one shot recording. Turn “looping rec” on to do continuous recording/real-time processing.

Record start mode

You can turn on the ability to record here and select the start point for recording. The following start points are available:

- Current position: When pausing the recording, recording will start from that same point when activated again
- Wiper: Recording starts from the sample position, when activated
- Start: Recording starts from 0.0s, when activated

Sample size

The sample size or “recording duration” (in seconds) can be set here. Max is close to 6 minutes, as this is the maximum the granular engine can efficiently handle.

Init mono

Press [Enter] on this button to create a new mono sample with the number of seconds set with “Sample size”. If you did this accidentally, press this preset’s button to undo all unsaved changes to sample and/or patch.

Init stereo

Press [Enter] on this button to create a new stereo sample with the number of seconds set with “Sample size”. If you did this accidentally, press this preset’s button to undo all unsaved changes to sample and/or patch.

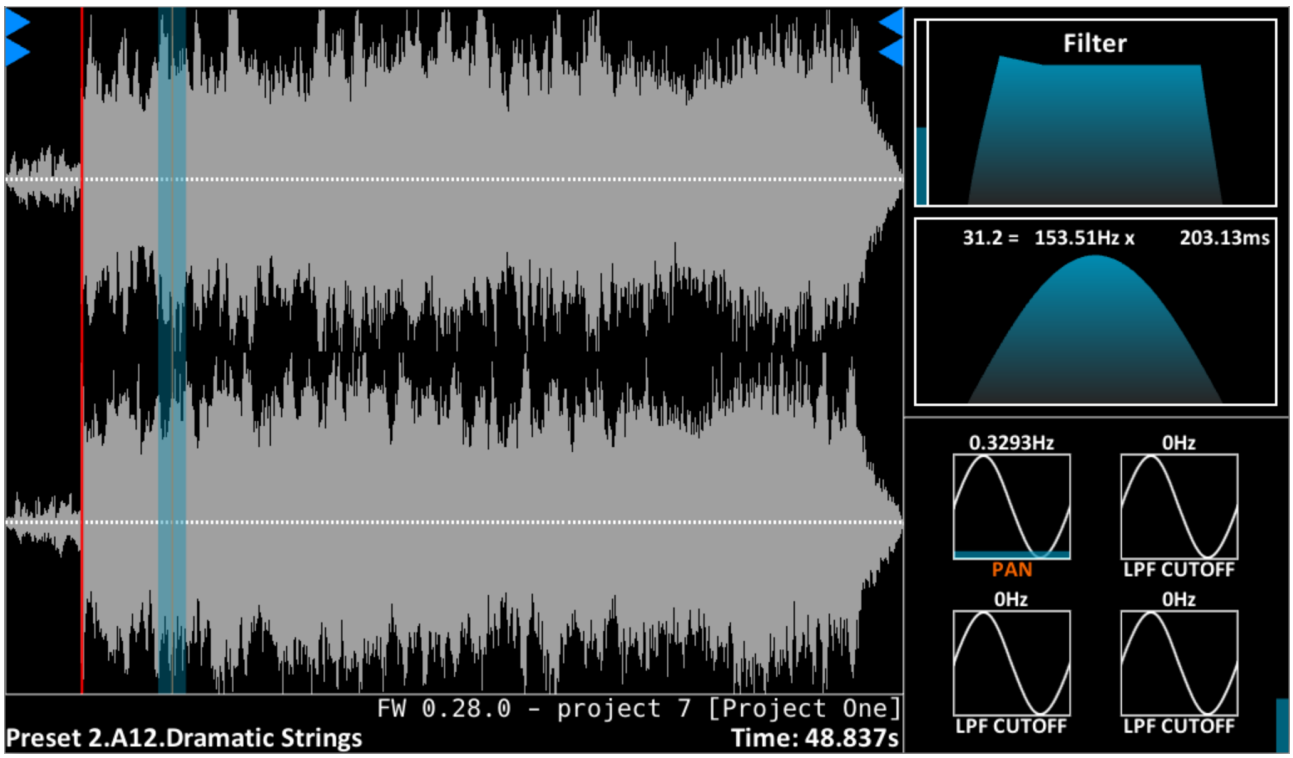
Recording samples

To start sampling first see to it that you’ve used the sampling menu described above, and make sure you enabled sampling start position. You can turn on “looping rec“ as well if you want to use the GR-MEGA as a granular effect: for live sampling and replay simultaneously. It will then keep looping through its sample buffer until the user manually stops it.

Once you’ve configured this menu you can just press the [Record] button on the physical front panel. Stop recording by pressing the [Record] button again, or wait until it has reached the end of the buffer when looping is disabled.

If you press the [Menu] button you’ll go back to the main screen where you can enjoy the action:

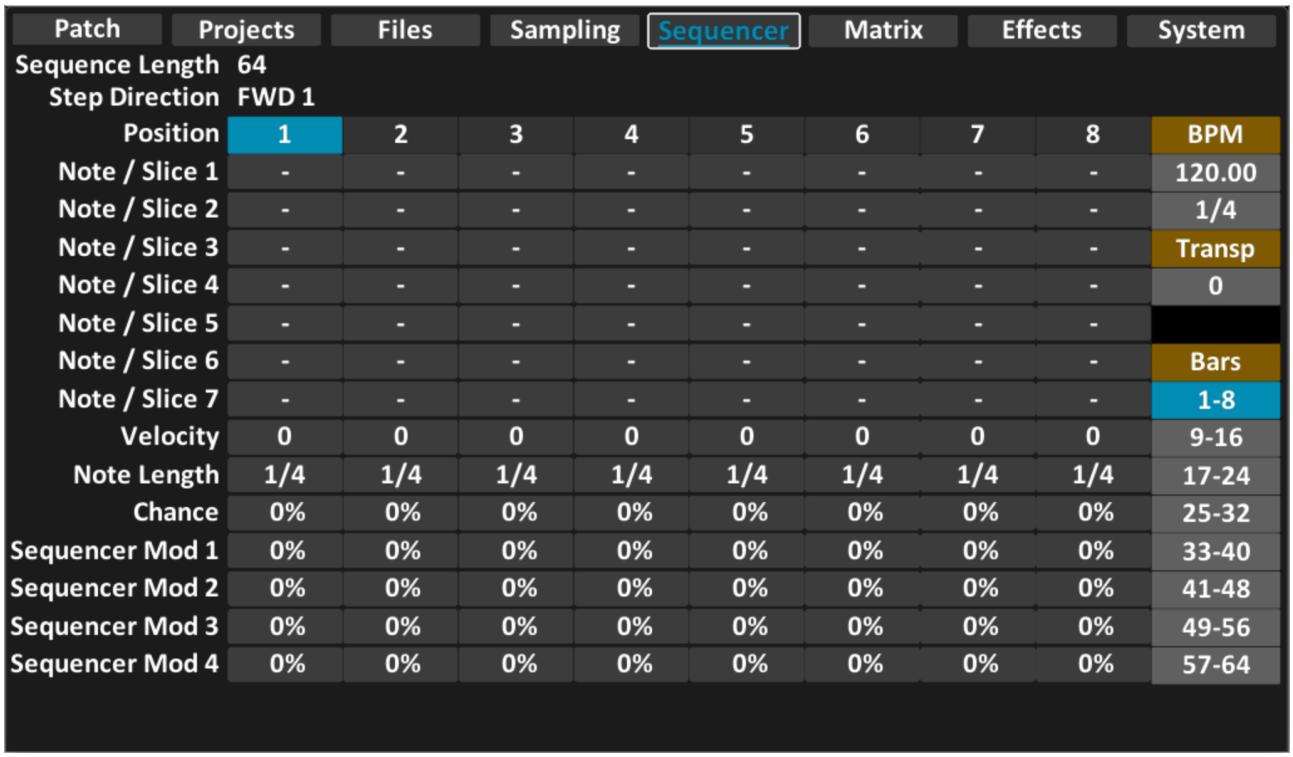
A red wiper should appear and should start running forward. If it stays still, then re-plug the USB cable. The GR-1 will now record the incoming sound into the buffer.



You can use the play button and scan knob to play through the buffer at different speeds, even backwards. You can use the play button, and even the sequencer to directly granulate or phase vocode the incoming live audio signal. All granular parameters and synthesizer parameters are also directly controllable while playing the recording sounds.

To stop recording, press [Record] once more.

Step sequencer



TODO: sequencer filled with notes

The GR-MEGA's step sequencer is present as a menu tab, but also accessible via the front panel. When playing a sequence or when inside the sequencer menu, the preset buttons double as sequence position.

The GR-MEGA's sequencer can be used for chords, but in slice mode it can also be used to trigger slices: like a drum sequencer.

There can be 64 steps as maximum (8 bars of 8 steps), and each step can contain up to 7 chord or slice notes. Each step has a note length, velocity, chance, and 4 modulation settings (for use in the mod matrix). A note is disabled showing only a dash '-'. When you use the horizontal slider or (Op enc) you can change a disabled note to an enabled note of a certain key or slice.

Navigate using the arrow buttons [←] [→] [↑] [↓] to find a cell to edit, when use the horizontal slider for coarse data entry and (Op enc) for fine tuning.

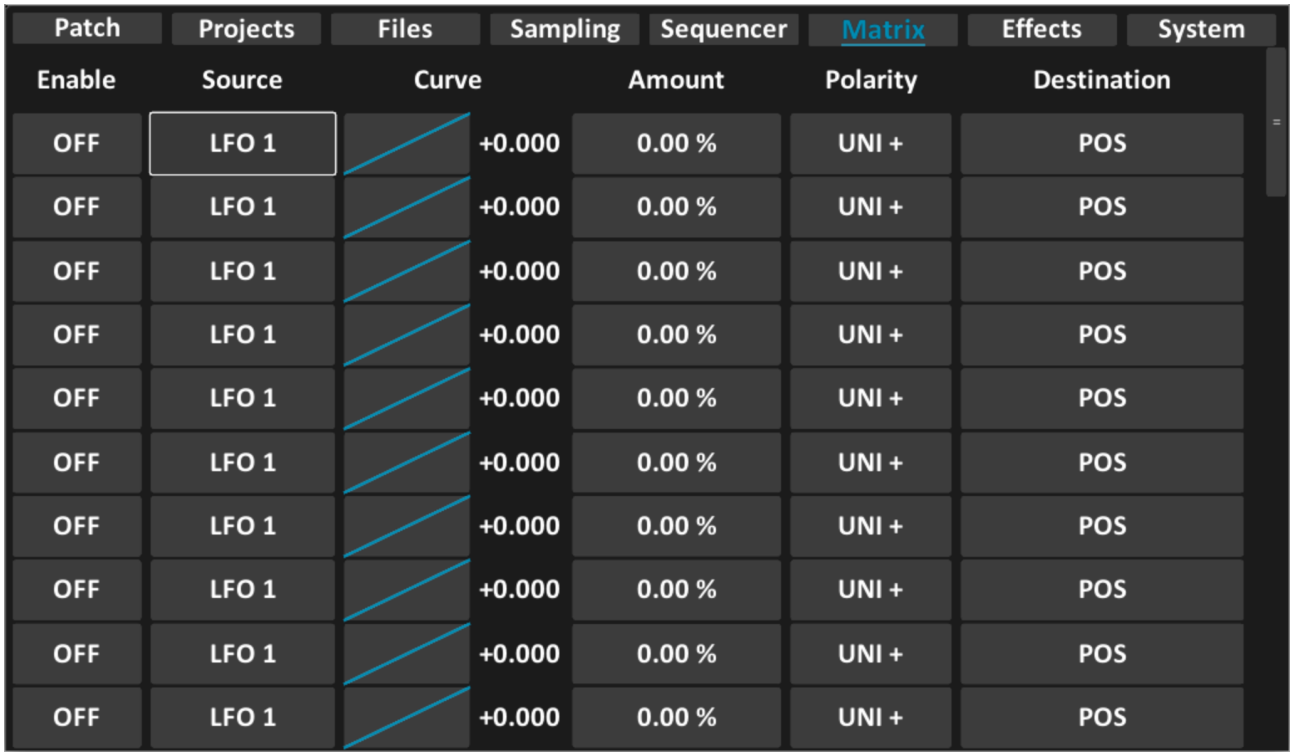
Note that navigating will highlight the step / column to edit in ORANGE. The playing column / step is highlighted in BLUE. Play position [BLUE] has priority over edit position and will hide [ORANGE] if they are on the same step.

You can also use the [Copy] button to copy a column to clipboard and [Shift] + [Copy] to paste it to another column. The [Delete] button initializes a cell, and [Shift] + [Delete] initializes the entire column.

The sequencer is polyphonic. Even a horizontal track is polyphonic. Meaning notes can overlap. When the patch is set to a polyphony of 1 (i.e. monophonic), notes can no longer overlap and will replace each other.. which is useful when glide is enabled.

Modulation Matrix

The GR-MEGA's modulation matrix consists, at the time of writing, of 18 sources by 90 destinations. There's 4 LFO's, CV, MIDI and MPE, and 4 sequencer modulators as sources. The destinations are numerous and listed in table 2.



While the matrix is large, it's quite easy to set up. If you want to set an LFO to modulate a parameter, you can do it completely using the front panel. You don't have to be in the matrix menu:

Hold down the [LFO Select] button in the LFO section, and then turn a knob.. for instance (LPF Cutoff). You've now assigned the currently highlighted LFO to LPF Cutoff! Then turn (LFO Amount), press the [Wave] button to select the appropriate wave. Hold [Shift] + press [Wave] to toggle modulation polarity.

It doesn't need to stop there, because LFO sync options are also represented as physical buttons. There's even LFO phase and phase quantization [Shift] + (LFO Phase).

If you need to access different modulation sources, this can also be done on the front panel, but in the current firmware 1.0 it's easier to do this in the menu.

In the matrix menu, you can just navigate with the arrow buttons [←] [→] [↑] [↓] to a new row in the matrix (up to 50 are supported), and start editing the Source cell. Use the horizontal slider and (Op Enc).

With the Curve column you can smoothly bias the modulation to either extreme of the range.

Amount and polarity do speak for themselves, but [Shift] + (Op enc) maybe nice for fine tuning amount.

Destination is best set with the horizontal slider and then possibly fine tuned with (Op enc).

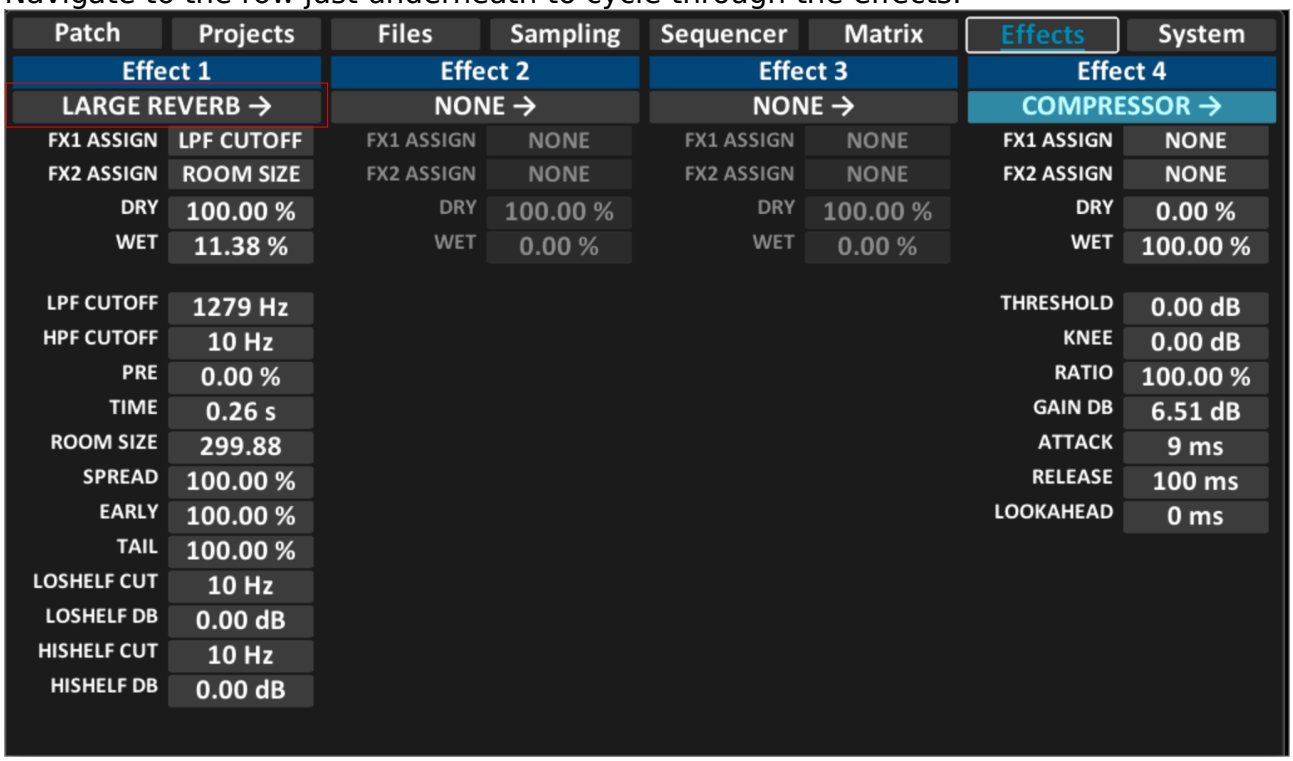
Using the amount curve you can smoothly and subtly (or not so subtly) bias the modulation to one side of the other. For instance:

Effects menu

The GR-MEGA has 4 simultaneous effects (FX slots) per layer. You can choose effects from a list of 7 effects (at the time of writing). Each effect can only be used once per layer.

Enter the Effect menu by Holding [Menu] and pressing [7]. The menu displays the effects chain for the layer that is currently in focus (see and use the Layer buttons 1,2,3,4).

At the top there's a row displaying headers Effect 1, Effect 2, Effect 3, Effect 4. Navigate to the row just underneath to cycle through the effects:



Then standing on a GUI button with and effect name on it (highlighted here in RED), Turn (Op enc) or move the horizontal slider to cycle through the effects.

Note that the LIGHT BLUE denotes the effect that is accessible by (FX1) and (FX2) knobs on the front panel! You can change which effect is accessible by (FX1) and (FX2) by turning the (FX Select) encoder.

Effect types

At the time of writing the GR-MEGA has the following effects:

COMPRESSOR

DELAY

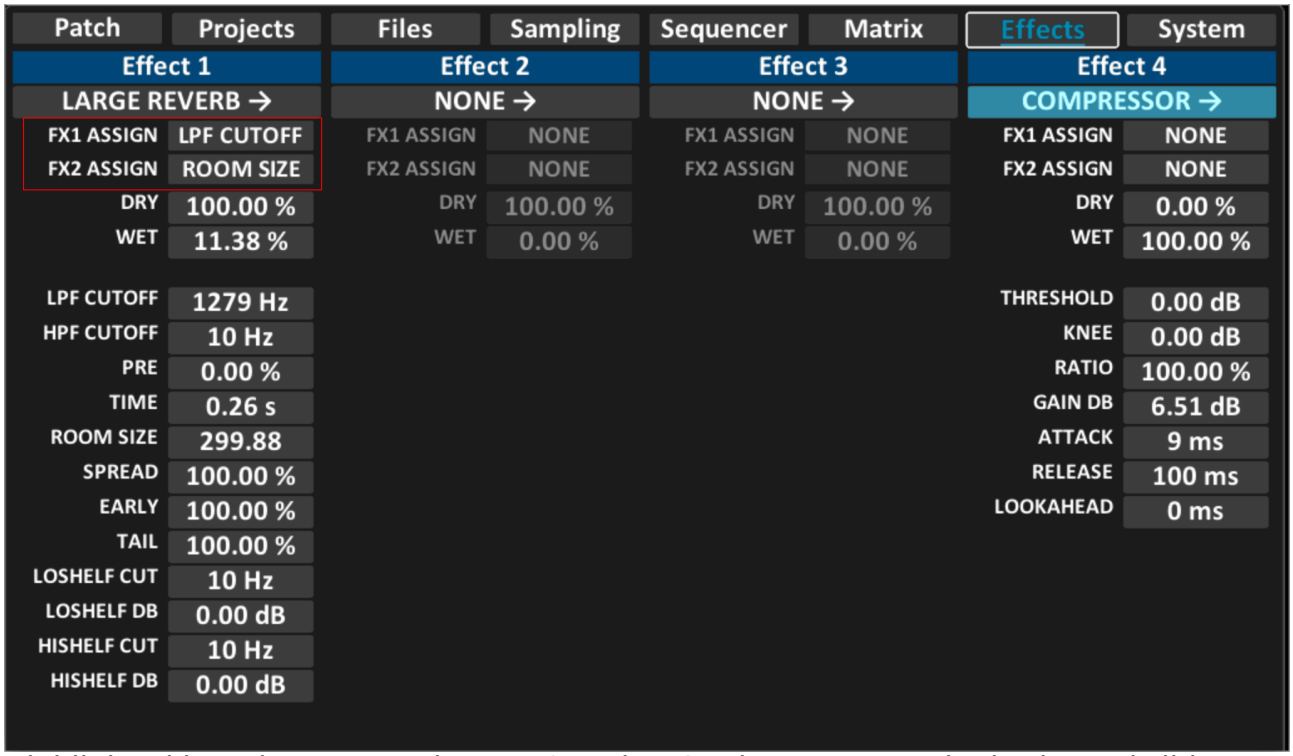
DIST: Distortion

LARGE REVERB: a reverb that can sound huge and organic and has many parameters including an 6 parameter EQ

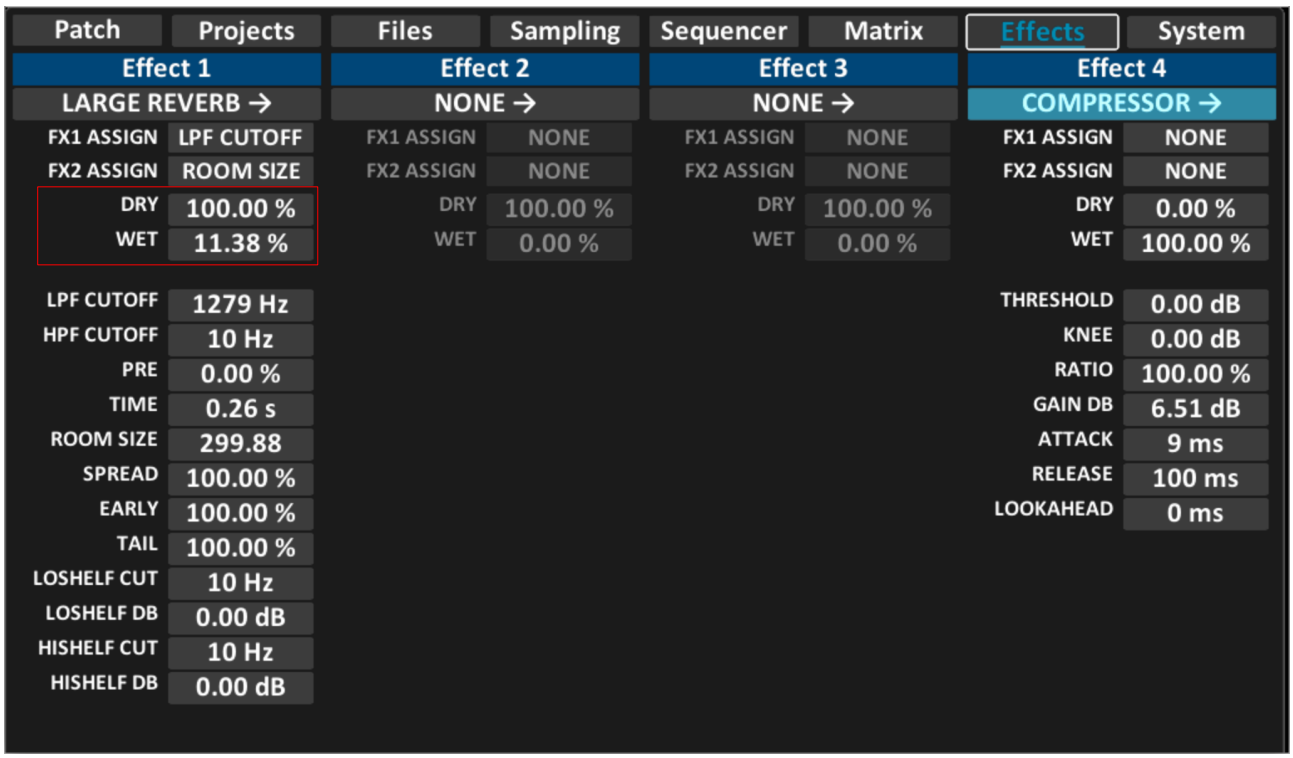
PPDELAY: Ping pong delay

REDUCER: sample rate and resolution reducer

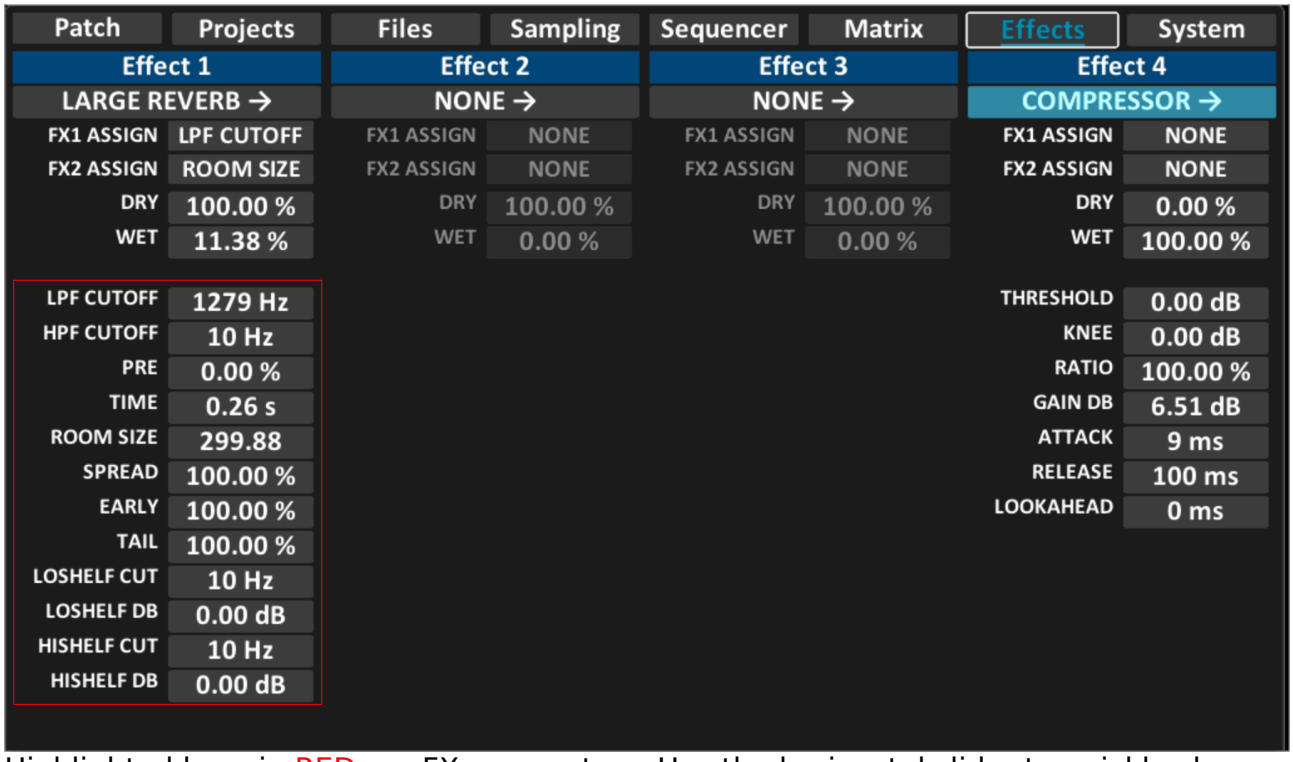
REVERB: a simple reverb that is easy on the CPU



Highlighted here in RED are the FX1,2 assign GUI buttons. Use the horizontal slider or (Op enc) to use assign one of the FX parameters from the list directly below in the same column.



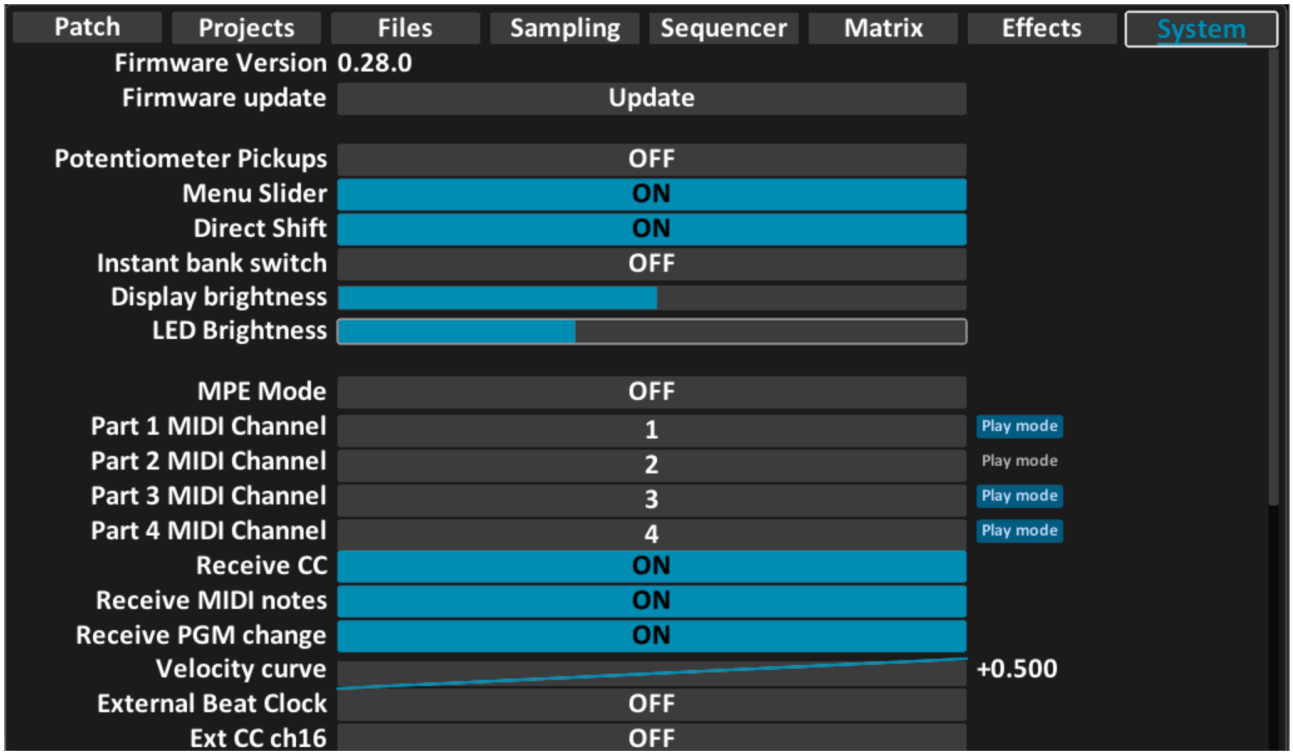
Highlighted here in RED are FX Dry and Wet. These can be changed with the horizontal slider and (Op enc), but also with the physical (Wet/Dry) knob on the front panel.



Highlighted here in RED are FX parameters. Use the horizontal slider to quickly change the value, and use (Op enc) to step the value, for instance by 1% for each encoder tick. Hold [Shift] and turn (Op enc) to change 0.1% for each encoder tick. Some effect parameters like frequencies, times, and amplitudes have a *cubic* curve on them. Meaning the slider will have more precision in the lower range.

System menu

Enter the System menu by Holding [Menu] and pressing [8]. This menu contains settings that are global to the GR-MEGA: settings for how the front panel controls and display should behave, settings for your studio's MIDI setup, and settings concerning loading, saving to/from disk, CPU usage, metronome and tuning volumes.



Firmware update
One button click firmware search and update. See the section Update firmware for details.

Potentiometer pickups
Turn this on to lock pots between preset or layer switches. An alternative to the [Feel] button, and also useful when your MEGA is older and potentiometers may have become dusty without servicing.

Menu Slider
Use the horizontal slider to change the GUI. Turn OFF to keep using the horizontal slider musically while inside the menus.

Direct Shift
When ON, you have to hold down the [Shift] button to access the shift functions of each control. When OFF you can just toggle [Shift] by pressing it. Freeing up one hand. The disadvantage is that you also need to toggle the [Shift] button quite often, depending on what controls you are using.

Instant bank switch

Turn ON so presets switch directly also when you press Bank and Subbank buttons. Turning this OFF will wait for you to press the Preset button to finish the Bank, Subbank, Preset button combo.

Display brightness
Does what it says. This CANNOT go all the way down to black. The GR-MEGA will not let you operate blind. It will remain at a very dim minimum.

LED brightness
Does what it says. This CANNOT go all the way down to black. The GR-MEGA will not let you operate blind. It will remain at a very dim minimum. But it can indeed go very dark for dark studios, without flickering.

MPE Mode
Turn ON to let the GR-MEGA recognize your MPE controller's input. When this ON the notion of MIDI channels is gone, and the MIDI channel-to-layer mapping in this menu is disabled. It will darken to show these settings are then useless. An MPE controller will effectively control all layers.

Part 1..4 MIDI Channel
Allow a MIDI channel to control a layer. Only usable when MPE is OFF.

Play mode [for layer 1..4]
Turn ON to let the MEGA use its [▶] button for the selected layer.

Receive CC
Turn ON to handle MIDI CC messages. Filters them otherwise.

Receive MIDI notes
Turn ON to handle MIDI note on/off messages. Filters them otherwise.

Receive PGM change
Turn ON to handle MIDI program changes. Filters them otherwise.

Velocity curve
Adjust the velocity curve of your keyboard. Typically this should be some square root type function.

External Beat Clock
Turn ON to use MIDI beat clock for all synced parameters in the patches. Turn OFF to use the MEGA's internal master clock for this instead.

Ext CC ch16
NOT YET IMPLEMENTED. Turn ON to map the more exotic NRPNs (CC's >= 128) to CC's in MIDI channel 16.

MIDI CC Visuals
Most MIDI parameters will be reflected on the display directly. This setting may disappear in future firmware.

Send precision CC
Turn ON to let knob turning send 14 bit CC's (NRPN's) instead of the normal 7 bit CC's

Save on shutdown

Turn ON for the the newschool way that almost every app uses nowadays. The MEGA will save all unsaved changes to patches when it shuts down, and also it will save its system settings automatically. Turn this OFF, and you will be forced to save everything manually.

Convert to 48 kHz
Turn ON to automatically convert imported samples to the native 48 kHz. Will take noticeable extra processing time.

Auto normalize
Turn ON to automatically normalize imported samples. Will take some extra processing time.

DSP Metering
Turn ON to display a vertical bar that measures CPU usage in the right corner of the screen. Useful when you're pushing the system.

Incremental Patch Save
To be implemented

Tuning sine volume
Controls the volume of the tuning sine and metronome. In future firmware these volumes will have separate controls.

USB Drive Eject
To be implemented. Will be useful after writing to USB stick.

Save system settings
Does what it says. Reports back almost immediately with a popup saying "saved".

Polyphony

This section explains the GR-MEGA’s forms of polyphony, the voice stealing algorithm, the grain window, and how to make the best of them. This applies to all sound engines, but especially to the granular ones, and the spectral engine which is the most CPU intensive of all.

Forms of polyphony

The GR-1 has two forms of polyphony:

- Grain polyphony: 128 grains per voice
- Voice polyphony: corresponding to playing notes: 20 voices at the time of writing.. and 3 voices for spectral mode.

Voice timbre

A voice may have anywhere from 0 to 128 grains playing at any time. This allows the flexibility to have a single grain playing (sporadically) up to a massive “cloud” of grains. No amount of playing notes will cause the amount of grains to be modified by the engine. The timbre of the voice will be kept intact as much as possible.

The same principle applies to the spectral sound engine. Higher polyphony will never influence the timbre.

Note hold

The GR-MEGA supports the MIDI hold CC. All new notes will remain playing even if your fingers were lifted from the keyboard. This remains this way until hold is turned off again.

Voice stealing

When the GR-MEGA reaches maximum voice polyphony and the user presses yet more notes on the keyboard, it will choose to abruptly remove the oldest playing note, preferably already in release, that is not being held (by the hold CC explained above). It also makes choices based on the position of the notes on the keyboard in relation to each other. This should make note polyphony as full and responsive as possible.

Grain stealing

(Granular sound engines only) When the maximum amount of grains per voice (128) is reached, the grain scheduler will stall until grains have reached their end. This results in an oscillation effect where there’s a big bunch of grains in one place and nothing elsewhere. Grain stealing remedies this effect. It will steal grains in a way that is inaudible to the user: no crackles or clicks. The only drawback is that it (logically) shortens grains. This depends a lot on the Grain stealing threshold setting. See the patch menu.

Audio, and avoiding drop-outs

When pushing the GR-1’s engine, audio dropouts can occur. It is important to remember that granular synthesis is random in nature. Too much and too scattered access to sample memory will result in a high strain on the engine..

- Maximum voice polyphony is caused by long envelope release and fast playing on the keyboard.. Beware, the GR-MEGA allows almost 50 second long envelope release!
- Maximum grain polyphony is caused by high grain size and density.
- High spray and long samples will cause scattering of sample memory access.

A suitable comparison is cooking with only 4 burners on your stove, but having a lot of pans around. The more powerful your hardware is, the more burners you have. The larger the sample, the higher the spray, and polyphony, the more pans you’ll have around. You’ll have to swap out many pans many times which causes slow downs.

The combination of the above factors can cause audio dropouts. The solution is to be aware of them, and apply some practical knowledge:

- If you desire long releases and many playing notes: consider limiting spray and/or choosing shorter samples. Alternatively, choose a short envelope release and use the built-in delay effect or use an external reverb that can generate long releases.
- With longer grains, it’s often enough to have a density of 100 grains per second.
- The on-board play mode can be adequate for drones, by just using 4 voices.
- Anti-aliasing may be turned off. This is not recommended, but the aliasing sounds can be used creatively, in some cases.

Master volume and patch volume

When note polyphony increases the total volume will also increase. There is no compression on the end mix, so it will start hard clipping the output. So keep in mind that you can lower the volume with the master knob.

Grain window modification

For the sake of simplicity and optimization, there is only a single global grain window per part. This means that any change to the window while it is playing might result in crackles. However, if the change is gradual and the window shape is convex (that means not pointy), the crackles will be minimal.

Temperature and the internal fan

When the strain on the engine increases the electrical power consumption of the computer in the GR-MEGA also increases.. which, after a while, leads to higher temperatures. The GR-MEGA has an internal fan which is intelligent and spins faster at higher temperatures. At 20C room temperature and normal work loads it should be almost imperceptible. You may be able to hear it at high polyphony and in warm studios.

Button combinations

On board controls		
Control	**Screen/mode**	**Function in screen**
Display Section		
Position slider	Main	Sample position
Shift + Position slider	Main	Scroll through waveform
Position slider	Menus	Set widget value
Position slider	Text box	Scroll through alphabet
(Operator)	Main	Select sample / sound engine operation
(Operator)	Dialogs	Cycle button options & values
(Operator)	File chooser, File manager	Navigate vertically
Shift + (Operator)	Main	Zoom
[Exec]	Main	Execute selected Operation (with the Op Enc)
[Exec]	Text box	Insert space
[Layer 1] .. [Layer 4]	All	Focus on layer
Shift + [Layer 1] .. [Layer 4]	All	Toggle layer on/off
Hold [Layer 1] .. [Layer 4]	All	Toggle layer on/off
Navigation & Disk Section		
Escape button	All, except main	Escape to previous naming/saving step or screen
Menu	Main	Enter menu
Menu	Menu	Enter main screen
Menu + preset 1..8	All	Enter menu tab
Play	All	Toggle play mode
Play, hold 3 seconds	All	Emergency stop: ALL SOUND OFF
Shift + Play	All	Sample audition mode
Seq + Play	All	Sequencer play/stop
[Enter]	Standing on a button	Use button
[Enter]	Standing on a text box	Start editing text
[Enter]	Editing text	Leave text box
[Enter]	Focused on a file	Load / Save file
Shift + [Enter]	All	Undo

[Load]	All	Open file chooser (for loading)
[Load]	Selecting a file	Load file
[Save]	All	Open save dialog
[Save]	Save file dialog	Confirm overwrite
[↑]	Main	Fine tune last touched control
[↑]	Menu, dialogs	Navigate up
[↓]	Main	Fine tune last touched control
[↓]	Menu, dialogs	Navigate down
[←]	Main (when zoomed)	Scroll left
[←]	Menu, dialogs	Navigate left
[→]	Main (when zoomed)	Scroll right
[→]	Menu, dialogs	Navigate right
[Feel] (hold button down)	Main	Display control value without changing it
[Copy]	Main	Copy preset to clipboard
Shift + [Copy]	Main	Paste clipboard to current preset
[Copy]	Sequencer	Copy step to clipboard
Shift + [Copy]	Sequencer	Paste step data
[Copy]	Matrix	Copy row to clipboard
Shift + [Copy]	Matrix	Paste row
[Delete]	Text box	Backspace
Shift + [Delete]	Main	Init preset
[Delete]	Projects menu	Initialize project in focus
[Delete]	Files menu	Deletes selected files
[Delete]	Sequencer menu	Initialize/delete cell
Shift + [Delete]	Sequencer menu	Initialize column (step)
Seq + Shift + [Delete]	Sequencer menu	Initialize all steps
[Delete]	Matrix menu	Delete modulation row
Shift + [Delete]	Matrix menu	Delete all modulation rows
[Delete]	Effects menu, focus on fx button	Deletes selected effect
Shift + [Delete]	Effects menu	Initializes standard FX chain
Preset Section		
Preset 1..8	All, sequencer stopped	Switch preset
Preset 1..8	All, sequencer playing	Jump to sequencer step
Bank 1..4	All, sequencer stopped	Switch preset
Bank 1..4	All, sequencer Playing	Arm next sequencer bar
Sub bank 1..4	All, sequencer stopped	Switch preset
Sub bank 1..4	All, sequencer Playing	Arm next sequencer bar
Shift + Preset,(sub)bank	All	Switch to multitimbral preset
Preset,(sub)bank	Sequencer menu, not	Set sequencer step, arm

	playing	sequencer bar
Sequencer Section		
Tap tempo	All	Press four times to set BPM
Shift + Tap Tempo	All	Toggle metronome
BPM knob	All	Set BPM
Shift + BPM knob	All	Fine tune BPM
Rate knob	All	Set sequencer rate division
Position knob	All	Set sequencer position
Length knob	All	Set sequence length
Mode knob	All	Set sequencer mode (FWD, REV, etc)
Engine “Controls” Section		
Knobs A..H (Rate, grain size, etc)	All	Varies per sound engine. See table in section “sound engine controls”.
[Mode]	All	Cycle sound engine mode: granular, slice, sampler, ..
[View]	All	Change between time series and spectrogram
Shift + [View]	All	Change side panel: 4 LFO’s, mod destinations, CV’s, ...
[Sub]	All	Toggle sub-oscillator
[Key Trig] (underneath knobs A..H)	All	Key trigger mode for grains: Off, On, Legato
Shift + [Key Trig]	All	Key trigger mode for scan: Off, On, Legato, Poly
[Sync] (underneath knobs A..H)	All	Grain clock sync: On, Off
Shift + [Sync]	All	Scan clock sync: On, Off
[Chord]	All	Toggle chord mode
Shift + [Chord]	All	Start, stop recording chord notes
(Tilt)	All	Tilt grain window left-right
Shift + (Tilt)	All, PowAR window mode	Set grain window sides (make it pointy or square)
(Curve)	All	Set grain window curvature
Shift + (Curve)	All, Raised cosine window mode	Grain window Amplitude modulation frequency
[Grain Ratio]	All	Cycle grain ratio modes: Free, and “locked” modes DensitySize, DensityRate, ScanRate, ScanOverlap
Shift + [Grain Ratio]	All	Cycle window types: PowAR,

		Raised Cosine
“Amp” Section		
Amount slider	All	Set envelope amount
[Invert]	All	Invert envelope amount
A slider	Pitch, Filt, Amp, or Aux envelope. Curve and Layer Mix are OFF.	Set envelope attack time
A slider	[Curve] button lit	Set envelope attack curve
A slider	[Layer Mix] button lit	Set layer 1 mix volume
Shift + A slider	All	Set envelope attack curve
D slider	Pitch, Filt, Amp, or Aux envelope. Curve and Layer Mix are OFF.	Set envelope decay time
D slider	[Curve] button lit	Set envelope decay curve
D slider	[Layer Mix] button lit	Set layer 2 mix volume
Shift + D slider	All	Set envelope decay curve
S slider	Pitch, Filt, Amp, or Aux envelope. Curve and Layer Mix are OFF.	Set envelope sustain level
S slider	[Layer Mix] button lit	Set layer 3 mix volume
R slider	Pitch, Filt, Amp, or Aux envelope. Curve and Layer Mix are OFF.	Set envelope release time
R slider	[Curve] button lit	Set envelope release curve
R slider	[Layer Mix] button lit	Set layer 4 mix volume
Shift + R slider	All	Set envelope release curve
[Pitch]	All	Select Pitch envelope
[Filt]	All	Select Filter envelope
[Amp]	All	Select Amplitude envelope
[Aux]	All	Select Auxiliary envelope
[Macro]	All	To be implemented
[ADSR Curve]	All	Allow ADSR sliders to be used for setting ADSR stage curves
[Layer Mix]	All	Allow ADSR sliders to be used as layer mix volumes
(Patch Volume)	All	Set patch volume
Shift + (Patch Volume)	All	Audio input volume level
(Wet) (top-right “Amp” section)	All	Set volume of granulated audio
Shift + (Wet)	All	Set dry audio volume
Master	All	Master volume
Modulation Section		

(Destination)	All	Set LFO destination
Shift + (Destination)	All	Set MOD source
(Rate)	All	Set LFO rate [0 Hz .. 50 Hz]
(Phase)	All	Set LFO phase
Shift + (Phase)	All	Set LFO amplitude quantization
(Amount)	All	Set LFO amount
Shift + (Amount)	All	Set MOD amount
[LFO Select]	All	Cycle through LFO’s 1..4
[LFO Select] + (Knob)	All	Assigns knob as mod destination to LFO
[Sync]	All	LFO Clock sync on/off
[Key Trig]	All	Cycle LFO Key trigger: off, on, legato
[Wave]	All	Cycle LFO wave form
Shift + [Wave]	All	Toggle LFO unipolar - bipolar
Filter Section		
(LP Cutoff)	All	Set Low-pass filter cutoff
Shift + (LP Cutoff)	All	Set Low-pass filter slope (future firmware)
(LP Res)	All	Set Low-pass filter resonance
(HP Res)	All	Set High-pass filter resonance
(HP Cutoff)	All	Set High-pass filter cutoff
Shift + (HP Cutoff)	All	Set High-pass filter slope (future firmware)
FX Section		
(FX Select)	All	Cycle through active FX : select which FX is controlled by the FX1,2,dry,wet knobs.
(FX1)	All	Set FX1 parameter
Shift + (FX1)	All, [Sub] button lit	Sub-osc frequency
(FX2)	All	Set FX2 parameter
Shift + (FX2)	All, [Sub] button lit	Sub-osc amp
(Wet)	All	Set Wet volume of selected FX
Shift + (Wet)	All	Set Dry volume of selected FX

Entering text with built-in buttons

A USB computer keyboard can be plugged in to make entering names super simple, but the built-in controls also do the trick:

Press [Enter] to enter the text field. Press [Enter] again, or press [Escape] to exit the field and resume navigation.

Once you've entered the text field:

* turn (Operator) or press [↑] [↓] buttons to select character (scroll through the alphabet)

Name
[↓]
Lame
[↓]
Kame
[↓]
.
.
[↓]
Fame

* Press [←] [→] buttons to scroll the cursor through the name and focus on another character

This name
[→]
This name
[→]
This name
[→]
This name

* Press [Delete] acts as a back space and will delete the character left of the cursor.

Backup_
[Del]
Backu_
[Del]
Back_

* Press [Execute] (right next to (Operator)) will enter a *space*, and can be used to extend the size of the name.

Letter_
[Exec]
Letter _
[↑]
Letter a

* Hold [Shift] to change to capitals

caps
[Shift]
Caps

MIDI Command Table

The following table contains all MIDI commands known to the GR-MEGA. This includes all the typical MIDI commands such as note on, note off, pitchbend, aftertouch, program changes, midi beat clock. Sysex is not implemented as the time of writing, but may be added for MTS (MIDI Tuning Standard) to support non equal temperament and non Western tuning.

Precision MIDI: “NRPN”

The GR-MEGA also supports all the CC parameters mentioned below as Non-Registered Parameters Numbers (NRPN). This means you can use the normal 7 bit MIDI values, but also use 14 bit values if necessary. This allows for more than 128 controls, and for control values with 16384 steps instead of the normal 128.

All CC’s above number 127 are available as NRPN. We’re working to also support these “high range” CC’s on MIDI channel 16, in a newer firmware (hopefully 1.1).

All CC’s that have range 0-127 (not the toggles, or triggers) are also available as 14 bit precision NRPN’s. Since the GR-MEGA has many parameters that demand high precision, like sample position or filter cutoff, this feature exposes the full potential of GR-MEGA to MIDI controllers and sequencers.

Note that the GR-1’s large modulation matrix is not fully represented as normal 7 bit CC, but also uses CC’s that are only available as NRPN.

An NRPN is just 4 CC packets being sent:

CC header byte (176 + channel), 99, NRPN parameter MSB (upper 7 bit of CC number from above table)
CC header byte (176 + channel), 98, NRPN parameter LSB (lower 7 bit of CC number from above table)
CC header byte (176 + channel), 6, NRPN value MSB (high 7 bit of the 14 bit value)
CC header byte (176 + channel), 38, NRPN value LSB (low 7 bit of the 14 bit value)

For example, let’s take parameter 2 (sample position) and set that to sample position 98.76% of the total length (16181 as a 14 bit number). We’re using MIDI channel 1 (that’s 0 in the header, since we start counting from 0).

176, 99, 0
176, 98, 2
176, 6, 16181 div 128 = 126
176, 38, 16181 mod 128 = 53

MIDI Command table

MIDI msg.	Parameter name	Command / CC	Value	Range/description	Control curve
Pitch bend	Pitch bend	-	0 - 16383	see CC 2 (pitchbend range)	2^n
Channel aftertouch	Aftertouch				
Poly aftertouch	Aftertouch				
Program change	Switch preset	-	0 - 127	MIDI PGM 0..7 -> Preset 1..8, Sub-bank 1, bank 1; MIDI PGM 8..15 -> Preset 1..8, Sub-bank 2, bank 1; MIDI PGM 16..23 -> Preset 1..8, Sub-bank 3, bank 1; MIDI PGM 24..31 -> Preset 1..8, Sub-bank 4, bank 1; MIDI PGM 32..39 -> Preset 1..8, Sub-bank 1, bank 2; ...	
Note on	Note on	-	0 - 127		Linear (volume)
Note off	Note off	-	0 – 127		
Sysex	System exclusive info		0xF0	We're thinking of supporting MTS with sysex	
Quarter frame	SMPTE time code quarter frame		0xF1	Unimplemented	
Song pos	Song position		0xF2, 0..16383	Song position * 4 (0: pos 1, 16383: pos 4096.. but clips to position 64, which is the maximum sequence length)	
Song select	Song select		0xF3	Unimplemented	
Tune request	Tune request		0xF6	Unimplemented	
End sysex	End of Sysex message		0xF7		
Timing clock	MIDI beat clock pulse		0xF8	The MEGA assumes 24 pulses per quarter note (PPQN)	
Start	MIDI beat clock start		0xFA	Start at position 0	
Continue	MIDI beat clock continue		0xFB	Start where internal sequencer left off	
Stop	MIDI beat stop		0xFC	Sequencer stop	

Active sensing			0xFE	If your sequencer or controller actually sends this, please contact us.	
Reset			0xFF	Unsupported, please contact us if you need it. We recommend CC120 instead as it's less radical.	
CC	Bank change	0	0 – 127	Unused	
CC	Mod wheel MSB	1	0 – 127	Assignable in mod matrix	linear
CC	Pitchbend range	2	0 – 127	0 – 48.0 semitones	linear
CC	Enable & focus layer	3	0 – 127	0 disable, 1 enable, 2 enable & focus	
CC	Subosc pitch	4	0 – 127	Relative sub-osc pitch (64: one octave down, 32: two octaves down)	linear
CC	Subosc amp	5	0 – 127	Sub-oscillator amplitude	linear
CC	NRPN value MSB	6	0 – 127		
CC	Layer volume	7	0 – 127		cubic
CC	Position	8	0 – 127	Start .. end of sample	linear
CC	Rate or density	9	0 – 127	Grain rate or density, depending on grain ratio mode	cubic
CC	Panning	10	0 – 127	0: 100% left, 64: center 127: 100% right	linear
CC	Pan spray	11	0 – 127	0: no spray, 127: full stereo field	linear
CC	Grain size	12	0 – 127	0.1 ms – 5 s	cubic
CC	Spray	13	0 – 127	0.0 s – full sample size, except in spectral mode where max means full FFT block size	cubic
CC	Direction (probability)	14	0 – 127	0: 100% reverse, 64: 50% reverse, 50% forward: 127: 100% forward	linear
CC	Scan	15	0 – 127	0: -2x 64: stop, 127: +2x	linear
CC	Tune	16	0 – 127	0: -1 octave 64: center 127: +1 octave	2^n
CC	M-S	17	0 – 127	0: 100% left, 64: center, 127: 100% right	Linear
CC	Patch volume	18	0 – 127		cubic
CC	Grain clock sync	19	0, >= 1		
CC	Scan clock sync	20	0, >= 1		
CC	Grain key sync	21	0, >= 1		
CC	Scan key sync	22	0..	0: OFF, 1: ON, 2: Legato, 3: Poly	
CC	Patch polyphony	23	0..19	Max number of voices – 1 (meaning: set to 0 to get monophonic, set to 19 to get 20 voices max)	
CC	Glide time	24	0 – 127	0: 0 ms – 127: 2000 ms	cubic
CC	Glide always	25	0, >= 1		
CC	Pitch per grain	26	0, >= 1	0: same pitch for each grain in the voice, 1: each grain can get a new pitch and keeps it until done	
CC	Grain ARP mode	27	0..	0: up, 1: down, 2: updown, 3: downup, 4: random, 5: shuffle, 6: forward, 7: reverse, 8: forward-reverse, 9: reverse-forward	

CC	Start pos	28	0 – 127	0: sample start, 127: sample end	linear
CC	Stop pos	29	0 – 127	0: sample start, 127: sample end	linear
CC	Loop start	30	0 – 127	0: sample start, 127: sample end	linear
CC	Loop end	31	0 - 127	0: sample start, 127: sample end	linear
CC	Scan mode	32	0..	0: looping, 1: oneshot, 2: pingpong	
CC	Mod wheel LSB	33	0 – 127		
CC	Sequencer BPM	34	0 – 127	(only useful in 14 bit NRPN mode)	linear
CC	Sequencer Rate	35	0 – 21	Rate division, see Table 3	
CC	Sequencer Pos	36	0 – 63		
CC	Sequencer Length	37	0 - 63		
CC	NRPN value LSB	38	0 - 127		
CC	Sequencer Mode	39	0 – 3	0: Forward, 1: Reverse, 2: Pingpong, 3: Random	
CC	Record trigger level	40	0 – 127	TODO	TODO
CC	Record sample	41	0, >= 1		
CC	Dry audio input volume	42	0 – 127		cubic
CC	Wet (granulated) volume	43	0 – 127		cubic
CC	Grain window sides	44	0 – 127	0: no sides (square), 127: all sides (triangle shape). PowAR window only!	
CC	Grain window tilt	45	0 – 127	0: left, 64: center: 127: right	linear
CC	Grain window curve	46	0 – 127	0: hollow, 64: linear, 127: bulging all the way to square	linear
CC	Grain window AM	47	0 – 127	Amplitude modulation frequency relative to grain size. RaisedCosing window only!	
CC	Window type	48	0, 1	0: RaisedCosine 1: PowAR	
CC	Granular mode	49	0..	0: Free, 1: DensitySize, 2: DensityRate, 3: ScanRate, 4: ScanOverlap	
CC	LFP Cutoff	50	0 – 127	0: 0.0 Hz, 127: 20.000 Hz	cubic
CC	LPF Resonance	51	0 – 127		linear
CC	HPF Cutoff	52	0 – 127	0: 0.0 Hz, 127: 20.000 Hz	cubic
CC	HPF Resonance	53	0 – 127		linear
CC	Pitch env amount	54	0 – 127	0: -1.0 0:0.0 127: +1.0	linear
CC	Pitch env attack time	55	0 – 127	0: 0ms 127: 45s	cubic
CC	Pitch env decay time	56	0 – 127	0: 0ms 127: 45s	cubic
CC	Pitch env sustain level	57	0 – 127		linear
CC	Pitch env release time	58	0 – 127	0: 0ms 127: 45s	cubic
CC	Filter env amount	59	0 – 127	0: -1.0 0:0.0 127: +1.0	linear
CC	Filter env attack time	60	0 – 127	0: 0ms 127: 45s	cubic
CC	Filter env decay time	61	0 – 127	0: 0ms 127: 45s	cubic

CC	Filter env sustain level	62	0 – 127		linear
CC	Filter env release time	63	0 – 127	0: 0ms 127: 45s	cubic
CC	Sustain pedal	64	0 – 127	< 64 : OFF, >= 64 : ON	
CC	Amp env amount	65	0 – 127	0: -1.0 0:0.0 127: +1.0	linear
CC	Amp env attack time	66	0 – 127	0: 0ms 127: 45s	cubic
CC	Amp env decay time	67	0 – 127	0: 0ms 127: 45s	cubic
CC	Amp env sustain level	68	0 – 127		linear
CC	Amp env release time	69	0 – 127	0: 0ms 127: 45s	cubic
CC	Aux env amount	70	0 – 127	0: -1.0 0:0.0 127: +1.0	linear
CC	Aux env attack time	71	0 – 127	0: 0ms 127: 45s	cubic
CC	Aux env decay time	72	0 – 127	0: 0ms 127: 45s	cubic
CC	Aux env sustain level	73	0 – 127		linear
CC	MPE timbre MSB	74	0 - 127		
CC	Aux env release time	75	0 – 127	0: 0ms 127: 45s	cubic
CC	Mod list row	76	0 – 49	Index of row in modulation list (see matrix menu)	
CC	Mod row enable	77	0, >= 1	Mod entry enable. 0: OFF, >= 1 ON	
CC	Mod source	78	0 - 18	Source for mod entry. See Table 4	
CC	Mod curve	79	0 – 127	0: low flatline → accelerating -> 64: linear → saturating → 127: high flatline	linear
CC	Mod amount	80	0 – 127	Mod entry amount	linear
CC	Mod polarity	81	0..3	0: +uni, 1: -uni, 2: +bi, 3: -bi	
CC	Mod destination	82	0 – 90	Destination for mod entry. See Table 5	
CC	CV1 destination	83	0 – 127	See Table 6	
CC	Glide / porta	84	0 – 127	0: 0.0 ms .. 127: 2000 ms	
CC	CV1 amount	85	0 – 127		linear
CC	CV2 destination	86	0 – 90	See Table 7	
CC	CV2 amount	87	0 – 127		linear
CC	LFO1 clock sync	88	0..2	0: free, 1: MIDI, 2: sequencer	
CC	LFO1 frequency	89	0 – 127	0: Stopped .. 127: 50 Hz	cubic
CC	LFO1 wave	90	0..5	0: sine, 1: triangle, 2: saw, 3: -saw, 4: square, 5: random	
CC	LFO1 amount	91	0 – 127		
CC	LFO1 destination	92	0 – 90	See Table 8	
CC	LFO2 clock sync	93	0..2	0: free, 1: MIDI, 2: sequencer	
CC	LFO2 frequency	94	0 – 127	0: Stopped .. 127: 50 Hz	cubic
CC	LFO2 wave	95	0..5	0: sine, 1: triangle, 2: saw, 3: -saw, 4: square, 5: random	
CC	LFO2 amount	96	0 – 127		
CC	LFO2 destination	97	0 – 90	See Table 9	

CC	NRPN parameter LSB	98	0 – 127		
CC	NRPN parameter MSB	99	0 – 127		
CC	RPN parameter LSB	100	0 – 127		
CC	RPN parameter MSB	101	0 – 127		
CC	LFO3 clock sync	102	0..2	0: free, 1: MIDI, 2: sequencer	
CC	LFO3 frequency	103	0 – 127	0: Stopped .. 127: 50 Hz	
CC	LFO3 wave	104	0..5	0: sine, 1: triangle, 2: saw, 3: -saw, 4: square, 5: random	
CC	LFO3 amount	105	0 – 127		
CC	MPE timbre LSB	106	0 – 127		
CC	LFO3 destination	107	0 – 90	See Table 10	
CC	LFO4 clock sync	108	0..2	0: free, 1: MIDI, 2: sequencer	
CC	LFO4 frequency	109	0 – 127	0: Stopped .. 127: 50 Hz	cubic
CC	LFO4 wave	110	0..5	0: sine, 1: triangle, 2: saw, 3: -saw, 4: square, 5: random	
CC	LFO4 amount	111	0 – 127		
CC	LFO4 destination	112	0 – 90	See Table 11	
CC	Focus layer FX	113	0..3	Focus on FX 1,2,3,4 in chain	
CC	Set layer FX type	114	0..	0: None, 1: Compressor, 2: Delay, 3: Ping pong delay, 4: Distortion, 5: Large reverb, 6: Reducer, 7: Reverb	
CC	FX Dry	115	0 – 127	Dry FX volume	linear
CC	FX Wet	116	0 – 127	Wet FX volume	linear
CC	FX1 knob assign	117	0 – 127	Depends on effect, see table TODO	
CC	FX1 value	118	0 – 127		
CC	FX2 knob assign	119	0 – 127	Depends on effect, see table TODO	
CC	All sound off	120	-	Kills all sound on all layers, including delay and reverb. The MIDI panic button.	
CC	Reset layer CC's	121			
CC	Local keyboard OFF	122			
CC	All notes OFF	123		Releases all notes on this layer. Envelope release will keep running until done. Same for delay and reverb.	
CC	FX2 value	124	0 – 127		
CC		125			
CC	Mono mode	126			
CC	Poly mode	127			

NRPN	Sequencer record	128	0, >= 1		
NRPN	LFO1 Amp Quantization	192	0 – 16383		
NRPN	LFO1 Phase	188	0 – 16383		
NRPN	LFO2 Amp Quantization	193	0 – 16383		
NRPN	LFO2 Phase	189	0 – 16383		
NRPN	LFO3 Amp Quantization	194	0 – 16383		
NRPN	LFO3 Phase	190	0 – 16383		
NRPN	LFO4 Amp Quantization	195	0 – 16383		
NRPN	LFO4 Phase	191	0 – 16383		
NRPN	LFO1 Polarity	196	0..3	0: +uni, 1: -uni, 2: +bi, 3: -bi	
NRPN	LFO2 Polarity	197	0..3	0: +uni, 1: -uni, 2: +bi, 3: -bi	
NRPN	LFO3 Polarity	198	0..3	0: +uni, 1: -uni, 2: +bi, 3: -bi	
NRPN	LFO4 Polarity	199	0..3	0: +uni, 1: -uni, 2: +bi, 3: -bi	
NRPN	Anti-alias	210	0, >= 1		
NRPN	Tape slew	211	0 – 16383		linear
NRPN	Delay time	250	0 – 16383		cubic
NRPN	Reducer bit	269	0 – 16383		inv cubic
NRPN	Reverb time	253	0 – 16383		linear
NRPN	Delay feedback	249	0 – 16383		linear
NRPN	Distortion level	261	0 – 16383		linear
NRPN	Reducer rate	270	0 – 16383		inv cubic
NRPN	Reverb width	279	0 – 16383		linear
NRPN	Reverb dampening	280	0 – 16383		linear
NRPN	Navigate right	283	0 – 16383		
NRPN	Navigate down	284	0 – 16383		
NRPN	Navigate left	285	0 – 16383		
NRPN	Navigate up	286	0 – 16383		
NRPN	Bypass filter	289	0, >= 1	0: filter active, 1: filter bypassed	
NRPN	Rate mode	291	0..	See Table 12	
NRPN	Filter routing	293	0..2	0: LPF only, 1: LPF+HPF, 2: HPF	
NRPN	Input level	294	0 – 16383		cubic
NRPN	Amp attack curve	166	0 – 16383	0.0: low flat → hollow → 0.5: linear → bulging → 1.0: high flat	linear
NRPN	Amp decay curve	167	0 – 16383	0.0: low flat → hollow → 0.5: linear → bulging → 1.0: high flat	
NRPN	Amp release curve	168	0 – 16383	0.0: low flat → hollow → 0.5: linear → bulging → 1.0: high flat	
NRPN	Pitch attack curve	156	0 – 16383	0.0: low flat → hollow → 0.5: linear → bulging → 1.0: high flat	

NRPN	Pitch decay curve	157	0 – 16383	0.0: low flat → hollow → 0.5: linear → bulging → 1.0: high flat	
NRPN	Pitch release curve	158	0 – 16383	0.0: low flat → hollow → 0.5: linear → bulging → 1.0: high flat	
NRPN	Filter attack curve	161	0 – 16383	0.0: low flat → hollow → 0.5: linear → bulging → 1.0: high flat	
NRPN	Filter decay curve	162	0 – 16383	0.0: low flat → hollow → 0.5: linear → bulging → 1.0: high flat	
NRPN	Filter release curve	163	0 – 16383	0.0: low flat → hollow → 0.5: linear → bulging → 1.0: high flat	
NRPN	Aux attack curve	171	0 – 16383	0.0: low flat → hollow → 0.5: linear → bulging → 1.0: high flat	
NRPN	Aux decay curve	172	0 – 16383	0.0: low flat → hollow → 0.5: linear → bulging → 1.0: high flat	
NRPN	Aux release curve	173	0 – 16383	0.0: low flat → hollow → 0.5: linear → bulging → 1.0: high flat	
NRPN	Invert pitch env	159	0, >= 1		
NRPN	Invert filter env	164	0, >= 1		
NRPN	Invert aux env	174	0, >= 1		
NRPN	LFO1 key sync	184	0, >= 1		
NRPN	LFO2 key sync	185	0, >= 1		
NRPN	LFO3 key sync	186	0, >= 1		
NRPN	LFO4 key sync	187	0, >= 1		
NRPN	Grain rate	1006	0 - 16383		cubic
NRPN	Sequencer clock div	1007	0 - 127	1 - 128	
NRPN	LFO3 clock mul	1010	0 – 127	1 - 128	
NRPN	LFO4 clock mul	1011	0 – 127	1 - 128	
NRPN	LFO3 clock div	1012	0 – 127	1 - 128	
NRPN	LFO4 clock div	1013	0 – 127	1 - 128	
NRPN	Sequencer clock mul	1014	0 – 127	1 - 128	
NRPN	Layer 1 preset	175	0 - 127	1 - 128	
NRPN	Layer 2 preset	176	0 – 127	1 - 128	
NRPN	Layer 3 preset	177	0 - 127	1 - 128	
NRPN	Layer 4 preset	178	0 – 127	1 - 128	
NRPN	Layer 1 midi channel	158	0 - 15	1 - 16	
NRPN	Layer 2 midi channel	159	0 – 15	1 - 16	
NRPN	Layer 3 midi channel	160	0 - 15	1 - 16	
NRPN	Layer 4 midi channel	161	0 – 15	1 - 16	
NRPN	Scan layer 1	140	0 – 16383		linear
NRPN	Scan layer 2	141	0 - 16383		linear

NRPN	**Scan layer 3**	**142**	**0 - 16383**		**linear**
NRPN	**Scan layer 4**	**143**	**0 - 16383**		**linear**
NRPN	**Layer bias**	**500**		**To be implemented**	**linear**
NRPN	**Layer spray**	**501**		**To be implemented**	**linear**

..

Rate divisions

Table 13: Rate divisions

Index	Division
0	1/64
1	1/48
2	1/32
3	1/24
4	1/16
5	1/12
6	1/8
7	1/6
8	1/4
9	1/3
10	1/2
11	1/1
12	2/1
13	4/1
14	6/1
15	8/1
16	12/1
17	16/1
18	24/1
19	32/1
20	48/1
21	64/1

Mod sources

Table 14: Mod sources

Index	Modulation source
0	LFO1
1	LFO2
2	LFO3
3	LFO4
4	CV1
5	CV2
6	Seq1
7	Seq2
8	Seq3
9	Seq4
10	Mod wheel
11	Key tracking
12	Note on velocity
13	Pitch (pitchwheel, MPE pitch)
14	Aftertouch
15	Timbre (MPE)
16	Lift (note off velocity)

17	AUX envelope
18	None (= modulation OFF)

Table 15: Modulation destinations

Index	Modulation destination
0	Tune
1	Pos
2	Spray
3	Grain rate
4	Grain size
5	Density
6	Amp
7	Pan spray
8	Sides
9	Tilt
10	Curve
11	Pan
12	Direction
13	Window AM
14	Scan
15	Tape slew
16	Pitch env amount
17	Pitch env Attack time
18	Pitch env Decay time
19	Pitch env Sustain level
20	Pitch env Release time
21	LPF cutoff
22	LPF resonance
23	HPF cutoff
24	HPF resonance
25	Filter env amount
26	Filter env Attack time
27	Filter env Decay time
28	Filter env Sustain level
29	Filter env Release time
30	Amp env Attack time
31	Amp env Decay time
32	Amp env Sustain level
33	Amp env Release time
34	Aux env amount
35	Aux env Attack time
36	Aux env Decay time
37	Aux env Sustain level
38	Aux env Release time
39	LFO1 rate
40	LFO2 rate
41	LFO3 rate
42	LFO4 rate
43	LFO1 amount
44	LFO2 amount
45	LFO3 amount
46	LFO4 amount
47	LFO1 phase

48	LFO2 phase
49	LFO3 phase
50	LFO4 phase
51	Sequencer length
52	FX1 knob value
53	FX2 knob value
54	Reverb room size
55	Reverb dampening
56	Reverb stereo width
57	Reverb Dry
58	Reverb Wet
59	Large reverb time
60	Large reverb size
61	Large reverb dampening
62	Large reverb M-S
63	Large reverb early
64	Large reverb tail
65	Large reverb pre
66	Large reverb Dry
67	Large reverb Wet
68	Delay length
69	Delay amount
70	Delay Dry
71	Delay Wet
72	Ping pong delay length
73	Ping pong delay amount
74	Ping pong Dry
75	Ping pong Wet
76	Reducer bit
77	Reducer rate
78	Reducer Dry
79	Reducer Wet
80	Overdrive amount
81	Overdrive Dry
82	Overdrive Wet
83	Compressor threshold
84	Compressor knee
85	Compressor ratio
86	Compressor Attack
87	Compressor Release
88	Compressor Dry
89	Compressor Wet

Technical Support

GR-Mega Specifications

Feature	**Spec**	**Remark**
General		
Multitimbrality	4 layers	
Polyphony per layer	20 voices	3 in PV engine
Total number of grains	5000	all layers combined, about 4 times as much as the gr-1
Engines	Sampler	(including loop, start end)
	Granular	
	Tape mode	
	Granular slice mode	Sampler slice mode possible
	Spectral	
Preset system		
Number of presets	128	per project
Multitimbral combinations	128	per project, 16 quickly accessible
Number of projects	50	
Sampling and samples		
Audio input	2 channels (stereo)	
Max sample length	60 minutes	3 minutes max in granular, because of polyphony
Sample rate	48 kHz	
Mix resolution	32 floating point	
Sample channels	mono or stereo	
Granular engine		
Max chord size	12	
Max grains per voice	128	
Rate modes	Free, Sync-size, Scan & rate	Free means independent rate and grain size, other modes have synchronized rate and size options
Loop modes	Bounce, wrap, kill	
Arp modes	Up, down, random, shuffle, play order, and more	
Spawn modes	Direct, gradual, recycle	

Phase vocoder

Max polyphony	3	
FFT size	256..8192	
Chord mode	up to 12 notes per voice	

Mod matrix

Number of LFOs	4	4 per layer
Number of modulation sources	18	
Number of modulation destinations	90	and growing
Number of step sequencer modulators	4	

Filters

Filters per voice	LPF and HPF	
Slope	12 dB per octave	Other slopes possible in future firmware

Envelopes

Destinations	Pitch	
	Filter	
	Amplitude	
	Aux	Freely assignable
Length	0.1 ms .. 45 s per stage	
Stages	ADSR	
Shape	Curved: from log to linear to exponential	

FX

Number of simultaneous fx	4	
Effects	Delays	Plain, and ping pong
	Reverbs	Hall and large (algorithmic)
	Distortion	Overdrive, and reducer
	Dynamics (compressor)	
	More effects possible in future firmware	

Step sequencer

Max chord size	7	
Max steps	64	
Step sequencers per	1	In multitimbral mode you’ll get up to

patch		4 step sequencers total

Connectivity

Analog audio output	Stereo TRS 1/4 ” balanced	110 dB SNR
Analog audio input	Stereo TRS 1/4 ” balanced	110 dB SNR
Headphone	1/8 “	
MIDI	DIN (in out thru), USB C (in and out)	
Eurorack interface	1x gate out, 2x CV in (-5V..+5V)	
LAN (ethernet)	Gigabit (firmware update & filesharing)	
Disk / USB sticks	USB A 3.0	
Computer keyboard	USB A 2.0	
HDMI output (monitor or beamer)	1.2 full size	

Storage

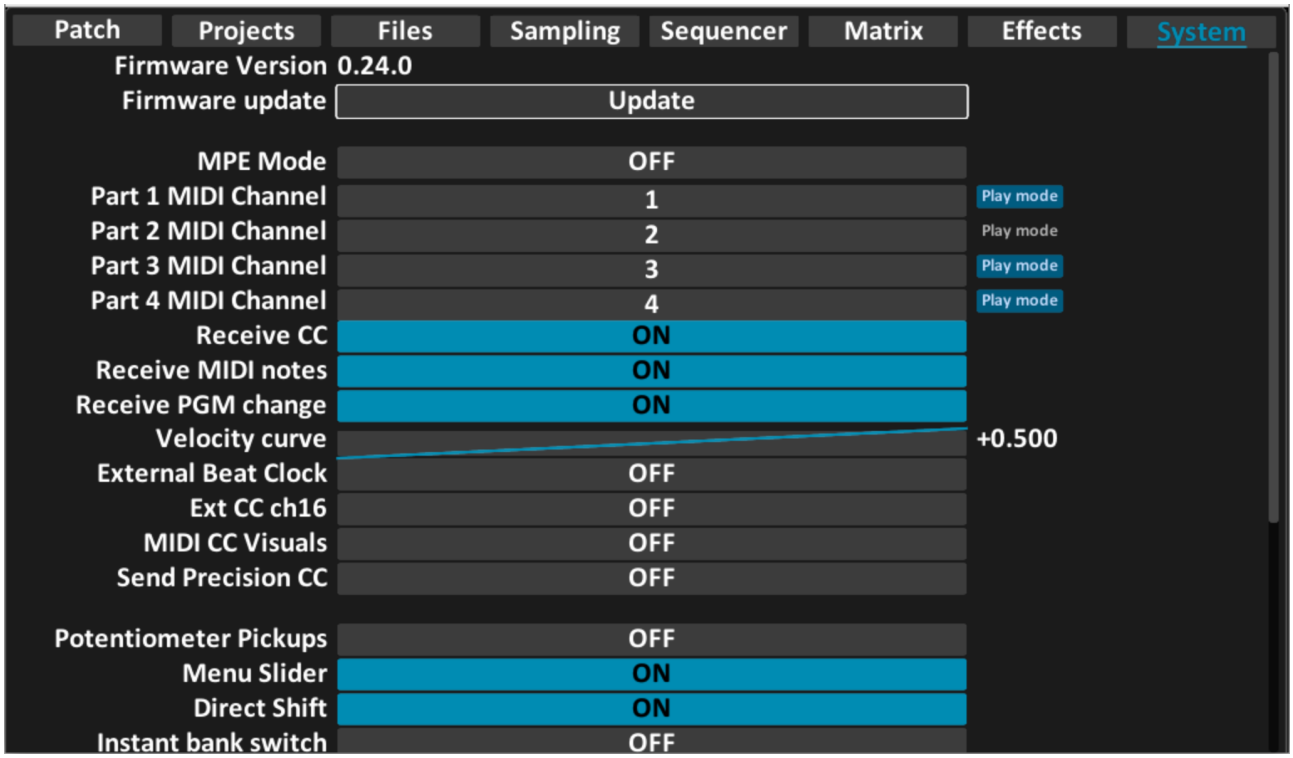
Included USB stick	32GB, USB3, up to 100 MB/s	
Internal storage	512GB, 300 MB/s	
Dimensions	495x270x95	mm WxDxH, including side panels
Weight	~4 kg	

Firmware Updates

We recommend you upgrade to the latest firmware if you're waiting for specific bug fixes. When versions like x.y.0 are released this means new features. When a x.y.1, x.y..2, etc is released this means bug fixes.

Updating the firmware is relatively easy and only involves going into the system menu and pressing one single button. However, the update procedure can take a minute and will reboot your GR-MEGA twice (!)

DO NOT POWER DOWN YOUR MACHINE WHEN FIRMWARE IS UPDATING. DATA LOSS MAY ENSUE!



1. Go to the system menu

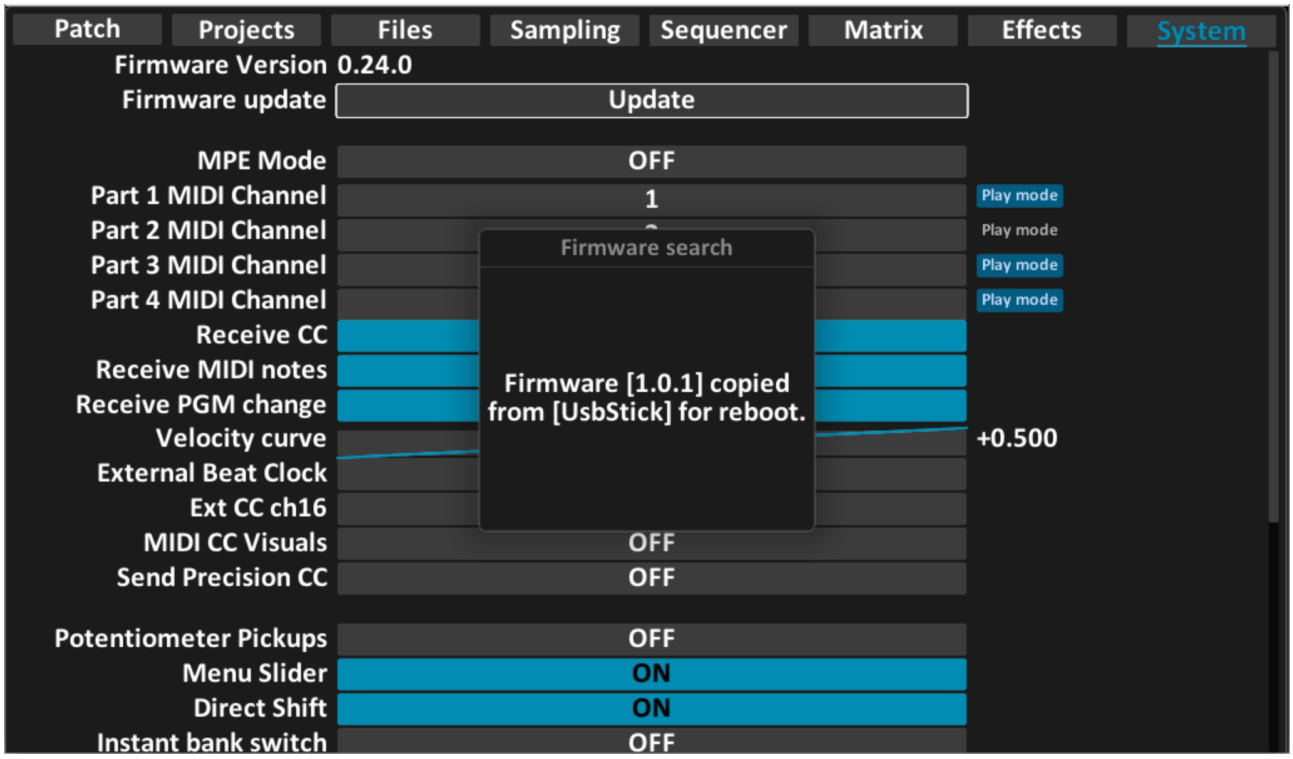
    a. Hold [Menu] and press [8]

    b. Press [Menu]. Navigate right to the System tab and press [Enter]

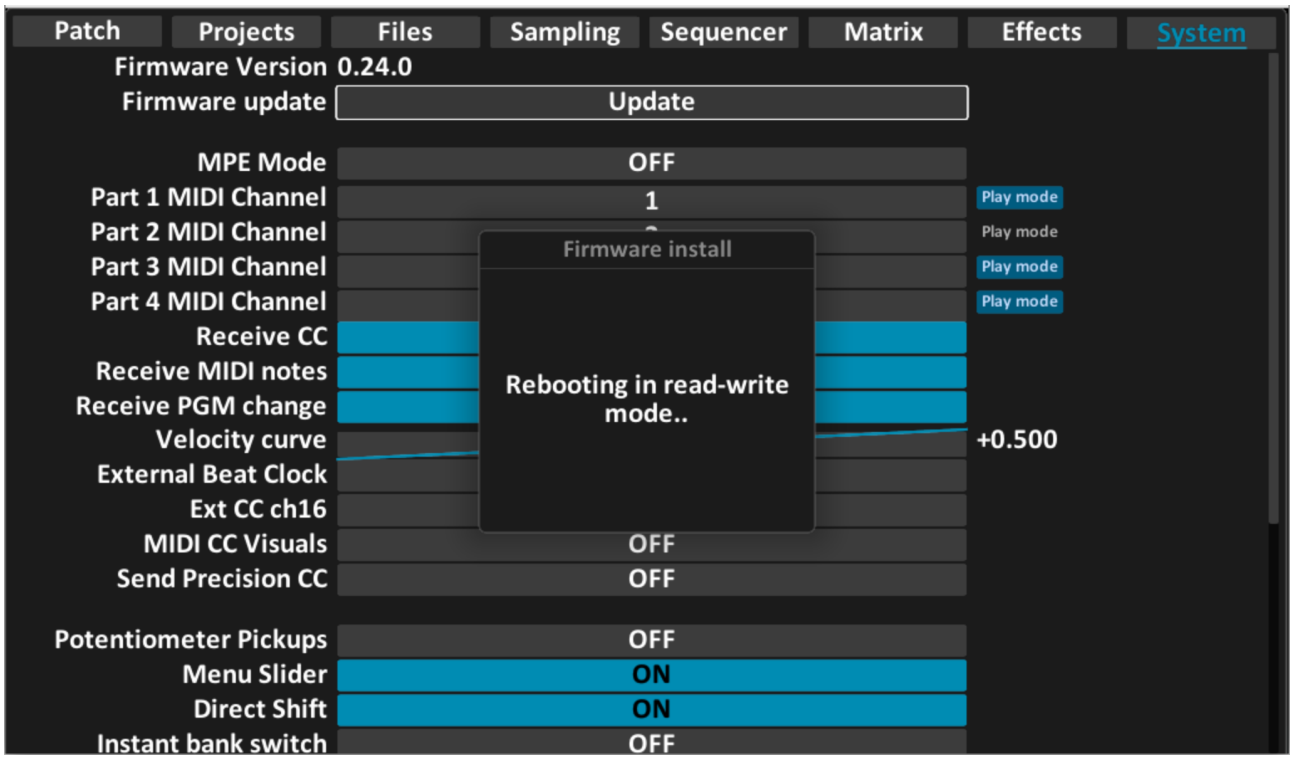
2. Navigate down with the down arrow to the Update GUI button, then press Enter.

When a LAN cable is connected to your internet router, the GR-MEGA will search for the latest firmware on the Tasty Chips site. If there's no LAN cable, it will look for a firmware zip file on the inserted USB stick. This will take a few seconds.

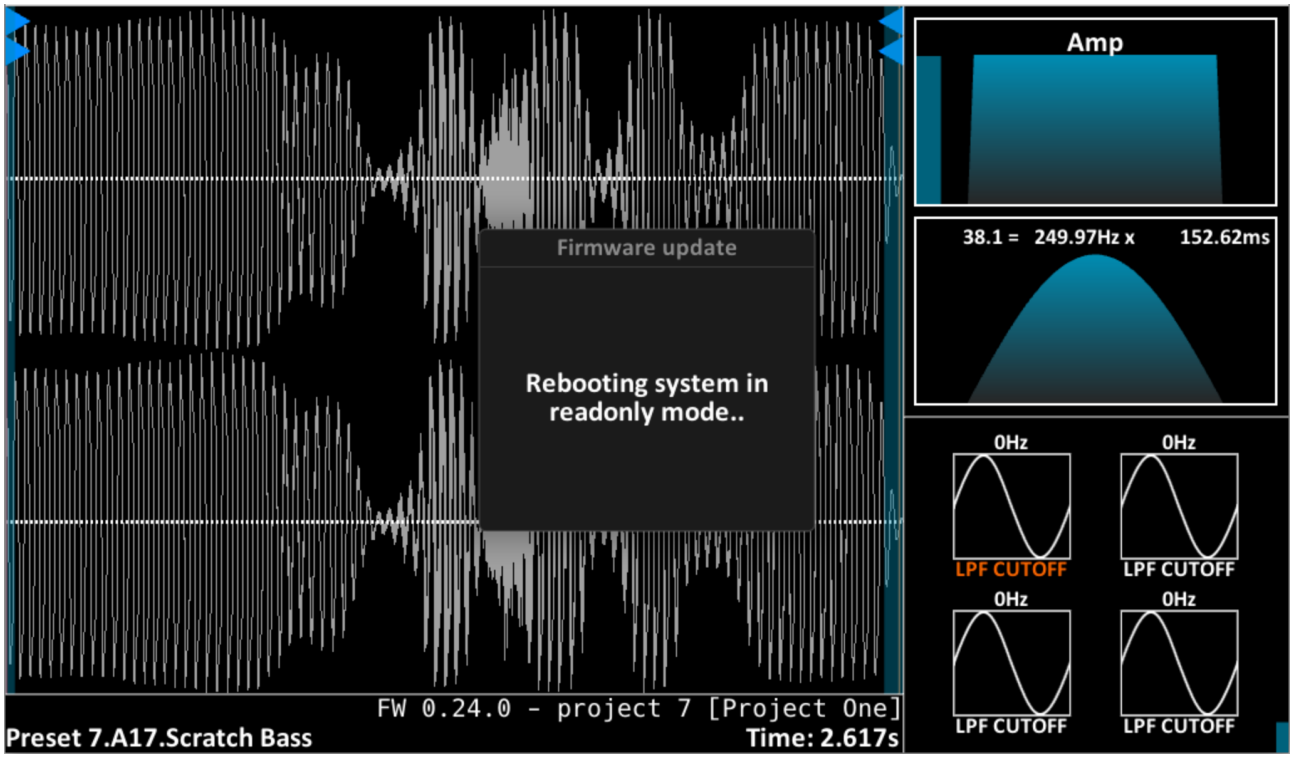
When the GR-MEGA has found a firmware update, it will report what version and where it found it: Internet, or on USB stick.



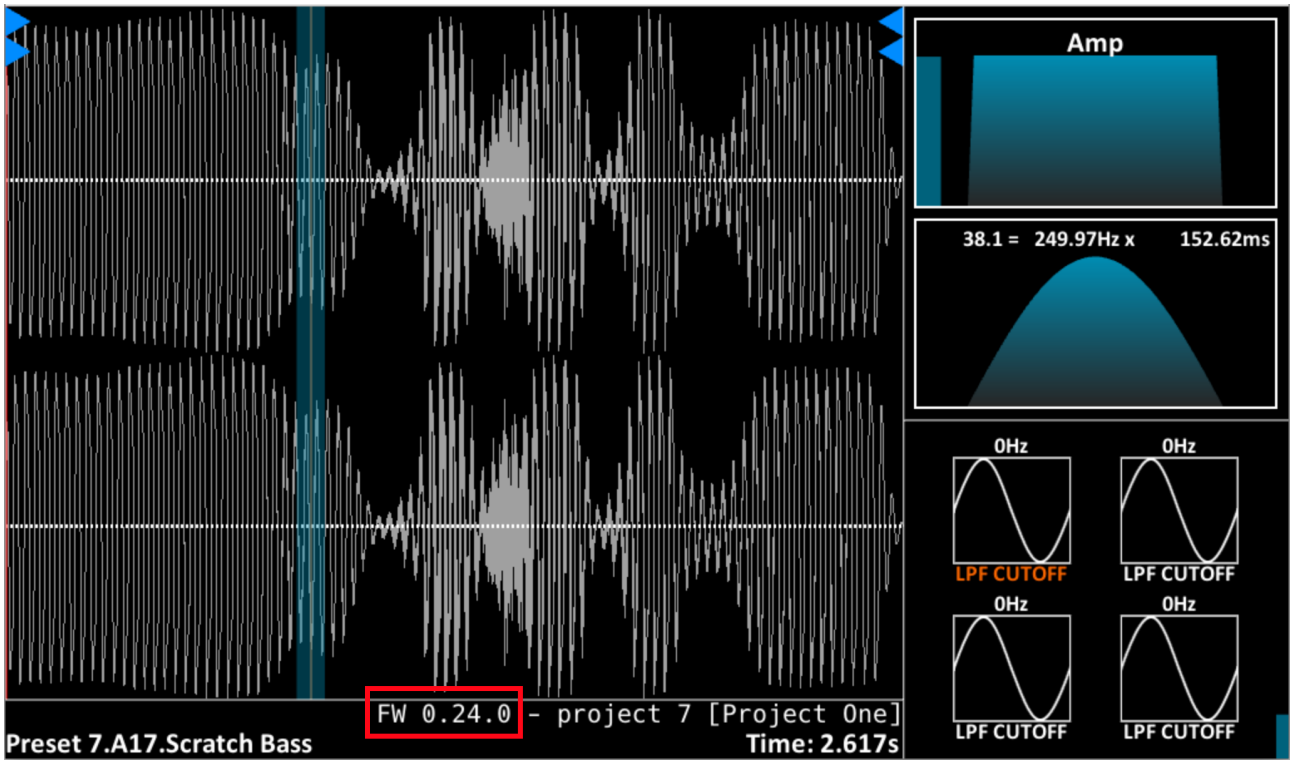
It will then show a popup that it will now reboot. The restart will take about 20 seconds.



After this it will start the actual installation. After this is complete, it will show a popup that it will reboot again.



After the second reboot it will show the new firmware version in the bottom of the screen. You've now updated your GR-MEGA's firmware.



FAQ

Q: Can the GR-MEGA import my old GR-1 patches?

A: It can do this, but it does not support all features yet.

Q: I'm sure my MIDI controller is sending stuff to the MEGA, but it isn't responding?

A: System menu → MPE Mode → OFF

Q: I want a VESA mountable GR-MEGA. Is this possible?

A: We'll consider VESA mounting options is physically possible (the GR-MEGA is quite heavy) and if enough people chime in.

Q: I'm loading this 1 hour long sample and granular mode does nothing. What's up?

A: Granular mode is optimized for shorter samples. Crop the sample down to slightly below 6 minutes and you should be fine.

Q: I'm using a big externally powered USB MIDI keyboard / controller, and unplugging it seems to crash my GR-MEGA??

A: Remove the MIDI controller's power supply. Unplug and replug your GR-MEGA's power to restart it. Only use an external power supply for the MIDI controller if you're using DIN MIDI. If using USB MIDI, please let your GR-MEGA power the MIDI controller! This USB MIDI controller is actually misbehaving and does not conform to the USB spec. A self-powered USB device should not "backpower" a host.

List of tested (USB-)MIDI controllers and keyboards

Akai MPK25
Alesis Q25
Arturia Beatstep
Arturia Keystep
Korg Nanokontrol2
Korg Nanopad2
Moog Sub37
Roli Seaboard Block
...

Troubleshooting

Firmware upgrades

Some things to keep in mind when updating your firmware:

* Please only use the supplied USB stick. There are very cheap, unreliable and slow USB sticks for sale. That’s why we supplied a decent one with the GR-MEGA.

* Place the firmware zip file in the root directory of the USB stick. DO NOT UNZIP IT.

Crashes

Please report all crashes to us at : info@tastychips.nl. Please mention your GR-MEGA serial number, found on the bottom plate of the casing, and your firmware version, found at the top of the system menu.

Slow USB drive or stick

We’ve furnished a quality USB stick with the GR-MEGA for your convenience. Please use it. Don’t use cheap, or second rate sticks, which can slow down loading and especially saving samples down to a crawl, and may cause corruption as well.

Also note that the GR-MEGA’s internal storage is many times more reliable and faster than even a good USB stick. We recommend to only the USB stick for firmware updates and copying files from/to PC/Mac.

Credits for the GR-MEGA

Concept:	Luc Derks, Pieter van der Meer
Software & electronics engineering:	Pieter van der Meer
Prototype code, FX prototypes:	Luc Derks
Hardware prototyping:	Joeri Braams, Mihail Keremedchiev
MCU code:	Joeri Braams, Pieter van der Meer
Mechanical design:	Luc Derks, Pieter van der Meer
Original compressor code:	Niels de Wit
Original (small) reverb code:	“Jezas” (Freeverb)
Original storage hardware design:	Jeroen Bakker
Testing:	Joeri Braams, Luc Derks, Ryder Walsh

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