

An Unofficial Reference for Firmware 1.14

A hand-drawn sketch of a Roland SP-10 Mini synthesizer. The sketch shows the top panel with four knobs, a central display, and a grid of buttons. The buttons are labeled with numbers 1 through 16, and some have additional text like 'BASS SOURCE' and 'HOLD'. The Roland logo and 'SP-10 MINI' are visible at the top.

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Guide Versions

Guide Version	Mk2 Firmware Version	Change Date	Notes
0.11	1.14	Jan 18, 2022	General Edits, remove Company/History sections (for now), added Guitar Pedals section under MIC/GUITAR Input section, Added an Audio Output section, new FAQs, More content in the Audio Input section
0.10	1.14	Jan 17, 2022	Filled out and formatted the Frequently Asked Questions section.
0.9	1.14	Jan 13, 2022	Update about USB-C to lightning, update to Polyphony information (its 32 voice polyphony for mono), Added Polyphony experiment.
0.8	1.13	Jan 11, 2022	Mic/Guitar Experiment, added phono subsection, made Inputs a top level section separate from Sampling, Power section USB-C info/bugs, and battery bugs, added References, fixing nits where possible
0.7	1.13	Jan 10, 2022	Gain Staging to a point, attempt at some guitar info, experiment for digital clipping,
0.6	1.13	Jan 9, 2022	Sampling stubbed Gain Staging, filled out Controls, started MIC/GUITAR
0.5b	1.13	Jan 8, 2022	Reworking sections (Specifications/Sampling)
0.5a	1.13	Jan 8, 2022	Added links/contact info into the Overview section
0.5	1.13	Jan 8, 2022	Finish Spec section, add some contact info, decided to put this out there as a free guide
0.4	1.13	Jan 7, 2022	Move Getting Started to the top, tweak formatting
0.3	1.13	Jan 6, 2022	Flesh out Getting Started/Conventions, and add icons, fill out Specifications section.
0.2	1.13	Jan 6, 2022	Add title page, start Overview/Getting Started
0.1	1.13	Jan 5, 2022	Initial Document Structure and Outline saved

Foreward

Not sure what to put here yet (or remove the section), but Firmware 1.14 just dropped, and that's going to cause me to make some changes to this guide. First big impact, is that there is a pdf manual now, which is going to make it a lot easier to write this document, without having to re-write every detail. This is a great change, and should let me focus more on workflows.

There are also a lot of great changes with the 1.14 firmware, and it is going to take some time for me to absorb them and figure out the best way to discuss using them in various ways.



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Getting Started

You've got this book in your hand, a tablet, or loaded up on your computer, and are wondering how in the world you can get around. Well, the order of sections is somewhat arbitrary, so while I tried to put it together in a way that made the most sense to me, you should absolutely feel comfortable going through it in whatever way makes the most sense for you. Skip through sections, consult what you're interested in now, and come back for the rest later.

To keep things simple, I am creating a dedicated URL on my website, starting a thread on SP-Forums, and using my discord server.

NearTao Blog: <https://neartao.com>

NearTao Guidebook URL: <https://neartao.wordpress.com/neartaos-guide-to-the-sp404-mk2/>

SP-Forums URL: <https://sp-forums.com/viewtopic.php?f=24&t=27232>

Discord Server URL: <https://discord.gg/qMuSpuxC4n>



This guy will show up from time to time to remind me I have a lot more work to do writing this book. Such as

- * How to get updates
- * How to notify people of changes
- * Where more content will go
- * And much much more...

Conventions

The SP-404 mk2 has a lot to keep track of, so I wanted to come up with some consistent conventions for giving directions to operate it. This should help improve the clarity to navigate this device, which while it isn't terribly complicated, does have a decent enough set of controls that I want to have a quick short hand for us to be able to work together. I'll provide pictures where it feels appropriate, but I don't want to over burden this book, and the editing of it going forward with lots of images.

Icons

Throughout this book I will try to remember to use standardized icons to help present important information and warnings as they make sense to note and identify.



Warning: I will use this icon to indicate a brief section as a warning or heads up. This section will contain details that may not be well documented or are not well understood. This will typically indicate something to be aware of on the mk2.



Information: I will use this icon to indicate a brief informative section. This will be something that is nice to know, but may not be essential for the operation of your SP-404 mk2.



Under Construction: this indicates that a section is still being considered, researched, or in the process of being rewritten. Don't be surprised if this information changes, moves, or is just removed.



Experiment: This is indicating that I have (or possibly intend) to run an experiment to get more details on how something works, or more specific information about the operations of the mk2.



Workflow: Indicates a short list of buttons presses or other things necessary to get a desired result



Bug: Indicates that there's something that probably isn't working quite right, not as documented, or not as expected. This is something I would expect Roland to fix on the mk2 eventually.

Controls

(VOLUME|CTRL1-3 CW|CTRL1-3 CCW) will all be referenced within parenthesis ()

- * Where CW is turn the knob clockwise
- * Where CCW is turn the knob counter clockwise

/FX/ will all be referenced within forward slashes / /

|BUTTON| will all be referenced within pipes | |

{VALUE CW|VALUE CCW|ENTER} will all be referenced within curly braces { }

- * Where CW is turn VALUE clockwise
- * Where CCW is turn VALUE counter clockwise
- * Where ENTER is push VALUE

[Pad 1-16|SUB PAD] will all be referenced within brackets []

- * These are velocity sensitive pads that can be effect volume based on how hard they are hit

<AUDIO OUTPUT> will all be referenced within < >

- * Headphone Jacks
- * L/Mono and R

>AUDIO INPUT< will all be referenced within > <

- * L/Mono and R
- * Mic/Guitar



Mic/Guitar & Power Switch?
Mic/Guitar Gain knob?
USB-C port?

`SUB FUNCTION` will all be referenced within back ticks ``

- * This will be used to typically denote functions accessed by hitting a pad/button twice, or pressing pads/buttons at the same time.

-> will denote pressing one pad or button followed by pressing another pad or button

+ will denote holding a pad or button while holding another pad or button

Examples

`CHROMATIC` |Shift|+|Pad 4| - Hold the Shift button and then press Pad 4 to enter Chromatic Mode

`F` |A|->|A| - Press the A Bank button twice to enter the F bank (honestly, don't do this one)



More examples like REC or... ???

Overview

I don't know about you, but I like guides. The *Hitch Hiker's Guide to the Galaxy* and *Zen and the Art of Motorcycle Maintenance* meant a lot to me growing up and I have read both books multiple times. Although I highly doubt that this book will have the level of social influence either of those books have had, I do hope that this book can help drive people to getting the most out of their Roland SP-404 mk2.

Super excited that Roland has launched a pdf manual for the mk2. Hopefully this will make things much easier for me to reference in the future, and be a good way for me to not have to replicate all of the information Roland has put together.

I am writing up this guide with the following goals.

- * Give a solid overview of what the mk2 is and is not
- * Show users how to use the mk2 and point out common pitfalls and mistakes
- * Provide guidance and workflows to help make mk2 users get the most out of their instrument
- * Reference external information where possible for users to do their own further research

Similarly there are a few things I am not trying to do with this book.

- * Replace the existing Roland manual

Specifications

Get ready, this is all of the information from the data sheet, with notes that I have sprinkled around, as well as additional information for context. There are some things I am not entirely sure about, especially for specific language that Roland has chosen to use, or how ranges for some things are managed when driven externally from the mk2. As I get more documented I'll work out some experiments, tests, or do further research and reference back into the manual, community, or anywhere else to try and nail down this information.

Sampling

Polyphony

The mk2 is specified as having a maximum polyphony of 32 voices, but doesn't state whether each voice is monophonic or stereo in the manual. I have confirmed that the 32 note polyphony is for a monophonic sample, so if you use only stereo samples then you're going to have only 16 notes of polyphony since a stereo sample requires two mono voices.



Document an experiment and save off a project for readers to follow along with how we figure out if this is mono or poly.

Guess is that a voice is stereo... and 32 note stereo polyphony is pretty good.

Internal Data

Internally the mk2 appears to handle all samples at a 48kHz sample frequency at a 16-bit linear depth. It is unclear what the file format is for other metadata other than the boot screen(s) which are saved as bump map(sp?) files.



Exporting a project creates many files, but samples are saved as .SMP, and patterns are saved as .BIN. Pictures are saved as .BMP (or bump map(sp?) files), and last but not least there is a PADCONF.BIN file, that presumably contains pad settings for the project.



Could be worth digging into these file formats and seeing what can be changed/modified. Seems like a future set of experiments to run.

Sample Import Format

The mk2 natively supports importing .WAV, .AIFF, and .MP3 files. It is unclear if there are sample rate, bit depth, or other factors that are important to know when importing samples into the mk2.



Seems like some good experiments out there to try different .WAV formats, stereo vs mono (or surround sound), different bit depths and sample rates... could be cool, or might be super messy outside of “standard” values.



Using the Roland Cloud SP-404 mk2 App allows you to import WAV, AIFF, MP3, FLAC, M4A files. Maybe anything else? Could be worth researching...

Sample Export Format

The mk2 only exports files as stereo, 16-bit, 48khz .WAV files.



Warning: Plenty of older devices only support 16-bit at 44.1khz. The older devices may happily play a 48khz file, but it will be out of tune because it will be playing at a different speed than the intended 48khz that the mk2 exports.

Skip Back

The skip back features allows the mk2 to record the last 25 seconds of audio from the final output mix (??? What does Roland refer to this as) into a buffer that the user can access to go back to.



The skip back certainly makes the mk2 an interesting end of chain device as it can let you capture snippets of a performance that you may not have been intentionally recording, but if you're fast enough and want to revisit again to try to recreate or to sample for future use. Over time I think we'll see this as a formative mk2 feature.

Storage

Data

Internally, the mk2 can store up to 16 projects, each project is made up of 10 banks, and each bank can have both 16 samples and 16 patterns. Some basic math lets us know that internally the mk2 can store up to 2,650 samples and 2,650 patterns (16 samples/patterns * 10 banks x 16 projects).

Internal Storage

The mk2 has 16GB of internal storage. From a factory install, only 14.21GB of internal storage is available, and the lost storage is due to preloaded samples and patterns, settings, metadata, factory restore data, and drive format.



From a factory reset, if you delete project 1 which contains the factory samples and patterns, you will have a maximum available amount of free storage of 14.38GB. You will not be able to address more available storage than this as there is no way to remove any of the hidden internal content necessary for a factory restore.

External Storage

The mk2 supports up to a 32GB SDHC card. While it might support the older SD card format that went up to 4GB, it definitely does not support SDXC cards or sizes over 32GB.



Unlike previous SP devices (202/303/404), the mk2 does not support streaming audio off of the SD Card. It can only be used for backups/restoring data, and importing/export projects and samples.

Maximum Sample Time

The mk2 can have a single sample that is up to 16 minutes long, documented as approximately 185MB per sample.

Pattern Sequencer

The Pattern Sequencer has a resolution of 480 parts per quarter note, which is quite good. Some devices do go to 960 parts per quarter note or possibly higher, but there was plenty of gear manufactured that only manages 96 parts per quarter note.



To increase the resolution for parts per quarter note, you can look into doubling the BPM that you record at. If you were originally going to record a piece at 100 BPM, recording at 200 BPM will effectively get you 960 parts per quarter note.

The Pattern Sequencer can record patterns of 1, 2, 4, 8, 16, 32, or 64 bars.



A technique for older gear to extend the pattern length (at the expense of parts per quarter note) is to halve your BPM, which will allow you to double the number of bars you record. By doing this you can go from 64 bars to 128 bars.

The Pattern Sequencer has a BPM range from 40 to 200.



Not entirely sure how it handles ranges outside of this from an external sync source. Worth investigating.



Finally the Pattern Sequencer supports Quantization and you can apply Strength.



Got quite a few questions here... but going to need some time to experiment, read docs, and better understand how this works.

Effects

The information on the tin states that there are 37 Multi Effects that can be used on the Bus FX or EFX (what the heck does this stand for?). There are a further 16 Input Effects, which mostly seem to overlap with the Multi-effects (will need to verify parameters, but there are 3 unique input effects at this time of Auto Pitch, Vocoder, Gt Amp Sim).

This reads like the mk2 actually has 40 effects at this time. I suspect that the 3 unique Input Effects will eventually make it into the MFX section, and Roland has hinted that there are likely more MFX coming, so maybe we'll get an extra page or two in the MFX section. Only time will tell.

Interface

Pads

There are two firsts for the mk2 compared to the SP 202/303/404 product line. First and most noticeably there are now 16 pads instead of 8 (as the 202/303) or 12 (as the 404/404sx/404a). Second, the 16 Pads and Sub Pad are now velocity sensitive, which means that you'll be able to vary how loud a sample plays based on how hard you hit the pads.

Control Knobs

The mk2 has continued the 4 knob tradition since the 303, and has retained it's volume knob, and three CTRL knobs. These knobs are rotary knobs and have a clear start point and end point. This means that the knobs all have a definitive position and value based on where you have the knob set. You can somewhat adjust this behavior in your settings to allow for a more relative feel until the knob value catches up with the parameter value that you are controlling.

Value Knob

Finally the mk2 has added an endless/continuous knob that has a push toggle, to allow for relative input as well as an additional commit/enter command. This means that you can endlessly turn the knob clockwise or counter clockwise and it will adjust the specified parameter based on what the software settings the value knob is currently associated with.



My biggest concern for the mk2 currently is the rotary knob. It gets used very frequently, and is something I expect have issues in the future. If you're going to travel make sure that you don't jam the mk2 into a crowded backpack, or bring a separate custom purpose case to help protect your device.

Display

The mk2 has an OLED graphical display now, which although it is not high resolution by any means, is more than sufficient to display audio data, settings, options, and plenty of other information that makes the mk2 easier to work with than its predecessors.

External Connections

There are a number of connections for the mk2, and I'll do my best to break everything down.

Headphone Jacks

Yes you read that right, the mk2 has multiple (well okay 2) headphone jacks. It has both 1/4" and 1/8" headphone jacks, which is pretty handy for using different headphone types, and might be a good way to collaborate with other people with a single device.



Need to dig into any use cases or collaboration options. Does the mk2 amplify both signals, does one get cut off? Easy to test/check, but need to look into it. I can imagine a few interesting use cases with an iPad/mk2 hooked up together as well.



A word of warning on the headphones, the **(VOLUME)** knob controls both the main outputs and the headphones, so you cannot control this independently. What makes this problematic is that the mk2's USB-C output is also tied to the **(VOLUME)** knob, and is lower than the output for the main/headphone output.

Stereo Output

Interestingly the mk2 has impedance balanced 1/4" TRS L/Mono & R jacks. This gives the mk2 some advantages to reduce the noise floor and eliminate ground loop noises when using the right cables within an impedance balanced studio environment.



The above said, I'm not sure how much this will help the average producer, as they are unlikely to be in a balanced environment, but I guess it is to say that it is a nice feature to have when you can take advantage of it.

Stereo Input

Sadly the 1/4" L/Mono & R jacks are the TS (no ring to provide impedance balance) type and appear to not be balanced.



Personally this doesn't bother me too much, but it is a little bit strange to see balanced outputs and unbalanced inputs. It's probably fine, but if you find running off of batteries or USB adds some noise, try using DC power.

Dual Microphone/Guitar Input

On the front there is dual microphone and guitar jack that is a 1/4" TRS. For a guitar the ring isn't doing anything, so just use a standard TS cable to hook up your guitar and/or pedals. For microphones you'll need a TRS cable, as this is how power is provided to the microphone.



I'm not sure what types of microphones the mk2 supports, going to need to do some research to figure this out.

MIDI Input and Output

The mk2 supports MIDI in and out, using 1/8" TRS jacks. You can buy these cables from Roland as accessories. For supported devices you should be able to connect TRS MIDI out to TRS MIDI in across devices.

Roland lists some optional (not included in the box) accessory cables that you can buy, and I'll dig more into the specifications of them later.



BMIDI-5-35
BMIDI-1-35
BMIDI-2-35
BCC-1-3535
BCC-2-3535



There are two TRS cable formats for TRS to MIDI, Type A and Type B. Roland uses the Type A format. Make sure you get the right format documented here.

USB-C Connection

The mk2 has a USB-C port. It can be used for powering the device, sending and receiving MIDI information, and sending and receiving audio information. It has a lot of utility and I'll be writing about this extensively in sections to come.



As far as I can tell, this is class compliant audio and class compliant midi. This means that you shouldn't need any special drivers to use the mk2 with devices that support class compliant audio and midi.



One oddity with the USB-C connection is that audio seems to be quieter over this connection for some reason. It seems like Roland put in a -12 or -24db (??? Measure) audio level adjustment, making you have to normalize audio to get it back up to a higher level with other content sampled on the mk2.

Power

You can power your mk2 using several options, including the provided AC adaptor, USB-C, or with batteries.

AC Power

The mk2 takes DC power in at the terminal. The power adaptor for the mk2 is an AC (wall wart) adaptor and is specified as a 5.7 volt and 2 amp device, and is center negative. It is noted that the mk2 draws 1.1 amps of power, so the 2 amps from the power adaptor is more than sufficient to handle the power requirements of the mk2.



Older SP models were 9v, and you could swap out power supplies with other SPs or even guitar pedals. This is no longer the case, so make sure when power your mk2 that you use the provided power or something with the same specifications.

USB-C Power

The mk2 can be powered from another USB-C device or power adaptor. This can be helpful if you have a lot of USB-C devices to power or charge, and don't want to carry multiple different power adaptors around with you. One thing to note however, if you are powering over USB-C, the device or adaptor must provide 1.5 amps of power, or the mk2 will default to a different type of power. The older USB standards only provided 500ma of power, and would certainly be insufficient to power the mk2.



My iPad mini has a USB-C port, and it has been able to power my mk2 without any problems. This has been helpful in conserving battery power on the mk2, but does put a bit more strain on the iPad's power supply.



Although you can hook up your iPhone to the mk2, it is unable to supply the necessary 1.5 amps of power over the port. This is fine if the mk2 is plugged in, but if you are battery powered on the mk2, then you are going to get consistent messages about the mk2 using battery power. ??? Fixed in 1.14 ???



I'll get into it more later, but I have found you need a USB-C to USB-C cable to power the mk2 over USB. A USB-C to USB-A only supports 500ma of power which is not enough, and the USB-C to lightning does not provide power or class compliant audio/midi at all, for an iPhone you will need the camera kit.

Battery Power

To power the mk2 off of battery power, you will need 6 Alkaline or Ni-MH batteries. There doesn't seem to be a way to tell the mk2 what type of batteries you have inserted like some

other devices do. Roland specifies that for Alkaline batteries you will get approximately 2.5 hours of use and for Ni-MH batteries you will get about 3.5 hours of usage. If you use rechargeable batteries you can likely expect the amount of time you get between recharges to be lower, but you'll go through less batteries.



I just wanted to note, that it's not a great habit to get into leaving batteries in the mk2 for months or years without checking on them or replacing them. If you're not using the mk2 for extended periods of time consider taking the batteries out in case they leak so that they don't ruin your device.



The mk2 doesn't give any information to let you know about remaining battery power while in the interface. Although a power loss from no longer having remaining battery life may not be the worst, it can still lead to a loss of work or other issues. The mk2 really should have some sub menu to indicated battery life.

SP-404SX/A Project Import

The mk2 is able to import projects from the 404SX and 404A.



I don't have either of these units, so not able to test or try this out at this time. I believe that this needs the Roland cloud app, and not able to be done over the sd card on the mk2.

NOTE: I now have both... need to set aside some time to test.

Data (Types of Data? Structure?)

The SP-404 mk2 has several types of concepts and data that you will want to make sure you understand while you are working with your mk2. This will help ensure that you are managing your mk2 data appropriately.



Draw a picture of Backup/Restore -> Projects -> Banks -> Samples/Patterns???

System Backup/Restore

Backing up your SP-404 mk2 will create a directory structure on your SD Card that contains all of your Settings, Projects, Banks, Samples, and Patterns in one easily referenced place.

Settings

When you enter "**UTILITY**" [**SHIFT**]+[**PAD 13**] you can get to all of your settings for how your SP-404 mk2 will operate. The UTILITY MENU allows you to make SYSTEM changes, PAD SET changes, EFX SET changes, IMPORT (and export) Projects and Samples, BACKUP, and FACTORY reset.

Turning {**VALUE**} will allow you to select which UTILITY MENU you would like to access, and pressing {**ENTER**} will allow you to enter the specific UTILITY MENU that you have selected.

By turning (**CTRL3**) you will be able to scroll through settings for GENERAL, CLICK, MIDI, GAIN, and VERSION.

These settings will effect the overall operation of your SP-404 mk2.



Does this change... project to project... saved with a backup/restore? Experiment to find out!

Projects

A project is the highest level of data that makes up the SP-404 mk2 workflow. Projects contain Banks, Samples, and Patterns within them



Banks

Banks contain Samples and Patterns, and both of these banks can be independent of the other.



Each Bank can contain 16 Samples and 16 Patterns.



Need info on **[SHIFT]+[BANK]** for Bank Volume Settings. Kind of straight forward I guess... but still.

Samples



So is this section just talking about sample data, or also get a bit into the sampling workflow? No need to repeat the Specifications “sampling section” so... gotta think

Patterns



Similar to samples... I don't think this section is a full on breakdown of patterns, but need to sleep on it.

Audio Input

Of the many ways that you may choose to utilize your mk2, probably the most consistent thing that you're likely to do will be to sample from an external source. This section will cover the different types of input, and how you may go about utilizing them within the mk2 and your other devices.



One thing to note about the inputs on the mk2, if you have EXT SOURCE on, or are in REC mode, it will pass through anything on the inputs from the 1/4" ins, MIC/GUITAR, and USB-C. This is good if you want this, but could be problematic as there is no way to switch between the 3 input sources individually if you wanted to.

MIC/GUITAR Level

On the front of the SP-404 mk2 there is a 1/4" TRS jack that can be used to (power/increase signal strength) of a guitar or a microphone. There is a switch labelled MIC/GUITAR, and a GAIN knob that can be turned to adjust the incoming signal boost.



I ran some experiments on over driving a line level signal on the mk2, and there doesn't appear to be anything special about running line level audio into the MIC/GUITAR input, if EXT SOURCE is turning red, then you are definitely digitally clipping your audio.

Microphone

When the MIC/GUITAR switch on the front of the mk2 is set to MIC, you can connect an unpowered microphone to the front INPUT jack.

Just discussing microphones would require a guide on its own, and overall is far too deep of a topic for this section. In this section I will just hit the most important notes.

The mk2 doesn't have a phantom power switch that would enable it to provide power to microphones that require it. As such, this means that you won't be able to directly use a condenser microphone without having a DI box or amplifier that you can plug the microphone into, and then hook that up to the mk2.

If you want to use a microphone with your mk2 then, you are going to want to be looking for dynamic microphones as they do not require power. Dynamic microphones tend to be lower cost, but the transient response and high frequency response tends to be lower than that of a condenser microphone.

Shure makes the SM57 and SM58 which are both solid dynamic microphone choices found on stage and in studios, and I have been using an AKG D880 for years that has worked just fine for capturing a multitude of audio options.

If you really need a condenser microphone, I might suggest looking into the Zoom product line. I have the Zoom H6, it is a small field recorder, supports up to six inputs, and can provide phantom power to microphones, as well as allowing you to record endless amounts of content on its own.



The manual does not make it clear what types of microphones are supported on the mk2, but since there is no phantom power switch, and the manual does not

state that it can provide +12/+24/+48v phantom power I must assume that it cannot. Condenser mics will need power from batteries or another device.



On some older sampling gear a trick was to hook up your line outputs to the microphone inputs to add some distortion. This worked due to the the nature of the AD used. Unfortunately this old school trick doesn't seem to work as you just get the traditional digital clipping instead of getting any interesting distortions.

Guitar

When the MIC/GUITAR switch on the front of the mk2 is set to GUITAR, you can connect high impedance devices like a guitar or bass, as well as guitar pedals if you wanted to add one or more pedal effects to your guitar or bass.



Instrument level brings it's own challenges with noise. I don't have a lot of guitars to choose from (just the 3 string my dad made me)... may need some help beyond doing pedal stuff for thoughts/suggestions here. Hooked it up, and holy smokes is my 3 string noisy... woof. Guess will need to come back here later.



Tried a few things... noise floor straight from a single pedal into the mk2 is *high*, and I'm suspecting it might be a noisy power supply. I switched over to my pedal board and it so far sounds much cleaner, if noisy. I suppose a hold off on this section for the time being is in order, but even for just testing, got some fun results.



The mk2 doesn't have an inbuilt tuner, so if you're trying to tune your guitar or bass you'll need to look elsewhere. There are plenty of good phone apps and battery powered tuners. This is a feature I'm hoping we get in the mk2 at some point though, so we can tune instruments, samples, or whatever else needs tuning.

Guitar Pedals

One thing that is great about the guitar input on the mk2 is that it opens up a wide world of variety for FX. There are so many pedals that range from boutique manufacturers to well established brand names, and the can add so much unique character and sound.

I am not going to go into any deep discussion on impedance or signal levels, but there are a few things that are often worth reading up on with your pedals, or trying on your own. Some pedals will only work at instrument level, and will have to be connected the MIC/GUITAR input port on the front, but there are some that are also happy to function with a line level signal source and then output a line level source. Heck, even some pedals will provide stereo output and occasionally stereo input. It is definitely worth experimentation.

Either way, you can frequently turn the volume way down on a line level output, hook it up to a guitar pedal input, and then hook the pedal output to the mk2 input. You'll monitor your input with EXT SOURCE lit, and slowly increase the gain of your line level device. You'll probably

notice clipping quickly if you go to far, but just pay attention to your levels and you might just find some fun new ways to record material for your mk2.

Line Level

For a lot of people, I expect that the 1/4" inputs on the back are going to be the primary way to get sound into their mk2. Plenty of instruments, radios, phones, tablets, and more output audio at line level.

There are a number of adaptors to get phono, 1/8" or 1/4" TRS, lightning, USB-C, and other connectors to output to line level on 1/4" TS jacks for the L/Mono and R signal. The important part is to make sure that they output at line level.



If you only connect a device to the mk2 L/MONO input, the mk2 will still record a stereo sample. There doesn't appear to be any way to record a mono sample to the mk2, and I'm just guessing that the only way to get a mono sample onto the mk2 is to import ??? or use the companion app ??? Need to test to confirm.

Phono Level

Before I dig into this section it must be noted, that the mk2 does not by itself support phono level on its inputs. While you can technically connect phono level up to the line level input jacks on the mk2, it is going to be incredibly quiet, and the audio will almost certainly have some distorted qualities to it.

Also, just because you have a device with RCA/Phono jacks doesn't mean that your device outputs at phono level, it may be outputting line level. You'll want to make sure you know what the specifications are for the outputs.

That said, most turn tables will output at phono level, and need to have their signal boosted up to line level. This is traditionally done through amplifiers, and is why you will see many people who sample off of vinyl will have a DJ style mixer as part of their setup, which does the job of signal amplification, volume control through the track fader and cross fader, signal equalization, and may even have some other effects.

USB

Possibly the most surprising feature for me out of the box for the mk2 was just how well integrated the USB-C class compliant audio is. Connecting it to a phone, tablet, or computer, with the right cables just works, with minimal setup or fuss.

On the iPhone and iPad, the mk2 becomes your primary input and output device, and it can even see the two inputs and four distinct outputs. This makes it very easy to just connect to one of these devices, load up an audio application, and quickly get to sampling and making music.



There is a system setting to adjust USB output, but there is no system setting to adjust USB input. This is a problem for iPad/iPhones as you won't have any way to adjust the volume for applications that you cannot route through AUM or AudioBus 3.



For the iPhone/iPad at least (don't have Android to test), one issue is that the volume buttons won't adjust your audio levels. For music software you can use AUM or AudioBus 3 as a mixer, but for applications like YouTube, there is no way to adjust your output, so you may be better off using the line inputs instead.

Using a computer will require a bit more work, but from what I have seen it isn't much more. You'll likely need to adjust your audio outputs to direct them to the mk2, and if you are using a DAW you may instead want to configure its audio setup within your preferences. That said, this is still pretty easy, and I'll try and document it some more in a future section.

Gain Staging

When people talk about gain staging, what is generally meant is to have all of your inputs at an equal input signal to each other. This is particularly important in studios with large mixers, because you want to use your mixing console as the master volume control for each audio channel, otherwise you quickly find that each instrument has a varying amount of volume and noise floor, and this leads to making it harder to mix.

Traditionally, for many audio sources, you would run a single sin wave as output for each source, at or near the maximum instrument/device volume without the signal distorting, and then adjust the input gain on the mixer until you hit a target volume such as 0db or -3db for each and every device/instrument. By doing this, you will be maximizing the amount of volume you have the instrument, and in general this will also help to reduce your noise floor. This allows each fader on the mixing desk to be able to control the volume of any sound relative to any other sound.

Now there are a couple things to consider here, first, the mk2 doesn't have any mixer faders, and second most of the volume gain you can do on the mk2 is done in software.



Going to have to come back to this section... I really need to figure out what the threshold is that is triggering the EXT SOURCE pad to light up red.

Controls

Monitor External Sources

When sampling, it is not always necessary to monitor your external sources, but if you don't want to enter record mode, and just want to hear how things will sound, if the sound is too loud or quiet, or if you are getting some kind of clipping or distortion this can be a quick way to hear how your source is sounding. To monitor your mk2 inputs, all you need to do is press **[EXT SOURCE]** and play your audio from your external device.



The experiment **Does EXT SOURCE turning red mean that you are clipping or not?** shows that if you see the EXT SOURCE pad turn red that you are digitally clipping. Unless you are looking for a specific or intentional effect, you should dial your audio source back down so that the EXT SOURCE pad stays amber.

Input Settings

You can adjust your input settings with **`INPUT SETTINGS`** **[SHIFT]+[EXT SOURCE]** which will bring up additional information on your display.

Modifier	CTRL1	CTRL2	CTRL3
None	REC BPM	ROUTING	LEVEL
SHIFT	FINE REC BPM	N/A	PAN

REC BPM (CTRL1) - This sets the BPM that you believe you are recording at in whole number increments. If you are just recording one shot samples then you probably don't need to worry about this too much, but if you are planning on using LOOP or PING-PONG you may be more interested in getting this set properly.

FINE REC BPM [SHIFT]+(CTRL1) - This allows you to adjust the REC BPM value by one tenth (or .1) value at a time instead of adjusting the BPM value by whole numbers.

ROUTING (CTRL2) - This allows you to set either Mix or ExtIn. It does not directly impact what is played, but does impact what will be recorded. If you select Mix, then when sampling all content that is playing, whether it is from pads or from an external input will be recorded. When set to ExtIn, then only audio coming in from the Line In, Microphone, Guitar, and USB-C connection will be recorded.



Although this is undoubtedly useful, I think it would be helpful to have a few extra settings so that you could have a loop playing on a pad to hold a beat or rhythm, and then for example use Chromatic mode to just record a new bass line or piano section. However, this would require additional routing that just does not exist. Pre/Post Bus?

LEVEL (CTRL3) - This adjusts the volume of the sample that will be recorded. 0 is the lowest and will be so quiet that the sound will be imperceptible, and 127 is the loudest volume you can record. If you are approaching or going beyond clipping you may see the **[EXT SOURCE]** light up red.

PAN [SHIFT]+(CTRL3) - Adjust the stereo pan of the incoming signal. C indicates that the signal is centered, so whatever is connected to your inputs will be reflected the same on your speakers. For either an L or R setting a value of 1 is the lowest amount of panning and a value of 50 is the highest amount. At a value of L50 you should only hear the inputs in your left ear, and a value of R50 you should only hear the inputs in your right ear.

Input FX Settings

From the INPUT SETTINGS menu, you can get to the Input FX settings through the value knob by pressing **{ENTER}** to open up the menu. This will break the display down into three sections EFX Type, EFX Settings Row 1, EFX Settings Row 2.

To modify EFX Type when the row is underlined press **{ENTER}** and then rotate **{VALUE}**. To exit modify the EFX Type just press **{ENTER}** again once you are happy with your selection.

To modify EFX Settings Row 1 and EFX Settings Row 2, you only need to rotate **{VALUE}** to underline the row that you want to modify and then use the corresponding **(CTRL)** knob to change the EFX setting's value on that row.

By default the EFX Type will be set to Bypass, which indicates that the incoming signal is clean. There are sixteen EFX that you can select from here, three of which only appear in the Input FX menu.

Unique FX to Input FX - Auto Pitch, Vocoder, Gt Amp Sim.

Common FX to Input FX - Chorus, JUNO Chorus, Reverb, TimeCtrlDly, Chromatic PS, Downer, WrmSaturator, 303 VinylSim, 404 VinylSim, Cassette Sim, Lo-fi, Equalizer, Compressor.

For more details on the individual effects, please see the Effects section.

Audio Output

If you're going to do much of anything with your mk2, you're going to need to hook it up to some outputs. I guess you could technically do some field recordings with a microphone and not hook up the outputs, but this generally seems like an edge case to me.

Line Level

Most gear that has inputs is going to support line level. This is a quite common standard, though you might need adaptors to adapt the cable type from 1/4" to 1/8", phono, or other connection standards.

The L/Mono and R output jacks both provide a panned signal to the L or R channel, neither provides a stereo signal by itself. So it is possible to only connect to outputs to either the L/Mono or the R jack, but you will only be getting a mono output.



It is worth checking your gear to make sure it supports line level inputs. For example, if you want to connect to a DJ style mixer, it will likely have phono jacks which may mean it takes phono level (and not supported by the mk2), but it may have a switch to adapt the connection from phono to line level.



You can adjust your line level output relative to gain by going to **`UTILITY` [SHIFT]+[PAD13]** then **`GAIN` (CTRL3)** and select **`Line Out` {VALUE}** to adjust your line level output gain from 0db to 12db in 6db increments.



The manual states that the mk2 has TRS outputs, which would suggest that the outputs are balanced. I have not confirmed this yet, and will need to do some research to determine if they are in fact balanced, or turn out to just be regular TS outputs.

Headphone

The mk2 has both a 1/4" and 1/8" set of headphone jacks. When you want to use your mk2 with headphones, you don't have to figure out which jack or adaptor you need to use, just plug it into the appropriate hardwired jack on your mk2.

If you have headphones with a high impedance, you may want to increase the gain on your headphones by following the instructions in the info icon below.

Even better, the pair of headphone jacks means that you can have two people connected the mk2 at the same time, which may open up some interesting audio path workflows for both a single person as well as a pair of people to get an audio setup off of a single device.



The experiment **Do the headphone jack outputs share an amplifier?** Indicates that there is a single headphone amplifier, which shouldn't be a direct concern, other than there will be an overall lower listening volume if there are two connections attached the headphone jacks that is worth being aware of.



Although the headphone and line level volume output are linked, as of the 1.14 firmware release you can adjust the headphone gain relative to line level gain by -18db to +12db in 6db increments by going to **`UTILITY` [SHIFT]+[PAD13]** then **`GAIN` (CTRL3)** and select **`Phones Out` {VALUE}** to adjust your headphone gain.

USB

The USB-C audio output on the mk2 is really handy, and is a quick way to get audio from your SP out to your iPhone, iPad, or computer. Any audio that is going out to your main outs is automatically also going out the USB-C port. If you are having problems with the USB-C outputs running too hot, you can lower (but not increase) the relative USB-C output level by going to **`UTILITY` [SHIFT]+[PAD13]** then **`GAIN` (CTRL3)** and select **`USB Out` {VALUE}** to adjust your USB output gain from -24db to 0db in 6db increments.



??? I do need to test if outputs 1/2 are main outs and 3/4 are cue outs ???

Controls

- * Attenuator
- * Noise Gate
- * ...

Sampling

Recording Behavior

- * Count In
- * Metronome
- * Mono/Stereo
- * Naming
- *

Record Controls



Recording

To record a sample is as simple as pressing [REC] when in sample mode, then any free [PAD 1-16] to select a pad to record to, .

Deleting

Protecting

Resampling



Plenty of techniques to discuss, how it manages Bus FX and EFX (ugh this irritates me a bit with double FX). Also reduction in volume through input volume, reducing incoming audio (possible issue in other spaces with -12db setting), and overall needing to normalize *a lot*.

Skip Back



Interesting feature with a lot of potential, how to use the buffer to get good loops, experiment, and all that fun stuff.

Sample Edit

A lot of what is under the SAMPLE EDIT banner on the mk2 is geared toward what I would refer to as sample playback. To me, editing is something you do that destructively changes the characteristics of the sample, and not just changing how the device plays the sample back. Mostly a nit, but I find that it confuses the terminology for people coming from or going to a lot of other devices. At any rate, you'll find the handful of sample editing features that are destructive in the Start/End menu, everything else that you want to do to manipulate or change the actual sample itself you will have to do through Skip Back, Resampling, or offloading to other devices, which I'll go over in the appropriate sections.

To get into any of the options under the Sample Edit banner you simply need to be in Sample Mode(???) and not Pattern Mode(???), and press a pad that has a sample on it, and then



Not a whole lot to edit in the mk2, most real editing will be done with Resampling... but we've got a few things we can do that are worth learning and understanding.

Start/End

!!! Right here, just got tired of copy/pasting in the under construction icon... maybe the under construction icon everywhere is a bit much?

Start/End Value Sub Menu

Normalize

!!! Increases the maximum volume of the entire sample sample to be 0db. This is not just within start/end points.

Truncate

!!! Reduces the sample size between the start/end points. Good for saving sample time, but maybe not great if you want other parts of the sample or to adjust things later

Emphasis

!!! I guess this accentuates the high end... need to read up more on what it is actually doing.

Cancel

!!! Exits out of the menu

Pitch

!!! Range, effect, etc...

Pitch Value Sub Menu

BPM Value Ranges...

Chop

!!! There's plenty of cool stuff here to play with, but I still haven't gotten it to mark/chop and then assign to pads quite the way I'd like, several workflows to attempt and document for sure.

Chop Value Sub Menu

Auto Mark

Assign To Pad

Delete All Marks

Cancel

Envelope

!!! Explain how this works, and how GATE behavior is broken... hopefully a bug. Also why you'd set values a certain way to avoid clicks in the start (and maybe end) of a note.

Envelope Value Sub Menu

!!! There is none... huh...

Mark

!!! Not much to explain here under Sample Edit section... though maybe? I think it makes more sense to dedicate a section to Skip Back

Sample Mode



This whole section is under construction, just taking notes on things that come to mind that will be worth documenting.

BPM Sync

Gate

!!!

Loop

Ping-Pong

Reverse

Roll

Roll Set

- * Mute Groups
- * Chromatic
- * Fixed/Velocity
- * Cue/Monitor
- * Bus

Mixer

- * Diagram
- * Pad Volume
- * Bank Volume
- * Project Volume
- *

Effects

- * Bus/EFX Diagram
- * Bus Effects
- * EFX/Settings
- * Input Effects
- * Customization

Patterns

DJ Mode

System/Config

- Import/Export
 - * File Structure
 - * Projects
 - * Samples

Midi

- * Each midi channel is to address each bank of a mk2 project.
 - * Supports velocity, but doesn't appear to have any other CC automation available.
- Boss (and Roland???) use Type A TRS to Midi cables.

External Connection

- * Midi - channels, controlling external gear (probably needs it's own section really)
- * Phone
- * Tablet
- * Cassette/Turntable/FM Radio
- * Computer

Integration

- * Computer
 - * Reason Studio
 - * Ableton Live
- * Guitar
 - * Electric
 - * Pedals
- * Microphone
 - * ???
- * Hardware
 - * Akai MPC
 - * Mixer
 - * Midi Interface
- * Eurorack
 - * Audio
 - * Midi
- * iPad/iPhone
- *

Customization

Face Plate

Knobs

- * You can change the knobs by pulling up on the knob to slide the current one off, and replace it with a similar knob. Size??? Dealer???

Chroma Caps are well known to work - <https://store.djtechttools.com/collections/chroma-caps-cables/products/chroma-caps-knobs-and-faders>

Display

- * How to update the boot up screen on your display

Cases

Analog Cases has the Pulse case that fits both the SP-404 and the mk2.

- * <https://analogcases.com/products/sp404-pulse-case>

- * Notes: Has room for the power supply and a good amount of cables

Magma Bags has the CTRL CASE SP-404 that will fit an SP-404.

- * <https://www.magma-bags.de/ctrl-case-sp-404.html>

- * Notes: Mk2 is not listed as fits. Does not appear to have room for power or cables.

SP 404 mk2 App (roland cloud?)

Sample Packs

Appendix A - SP Use Cases

- * SP as a buffer
- * SP as a tape recorder
- * SP as an effects box
- * SP as a master bus

Appendix B - Beat/Drum Patterns

Appendix C - Workbook

- * Foley Loops
- * Steps to record a 16 bar loop and chop to pads
- * Musique Concrete
- * Other Tape-Music techniques with unsync'd timing

Appendix D - Finger Drumming

Appendix E - Experiments

Is the mk2 polyphony monophonic or stereo?

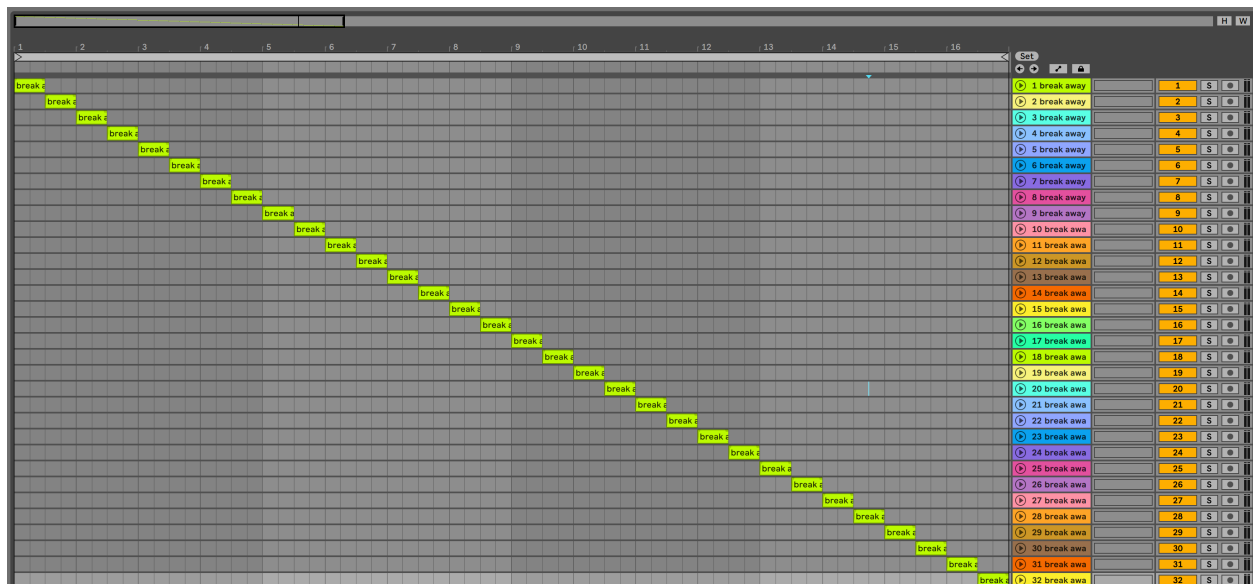
Most devices denote polyphony based on how many simultaneous sounds or differing notes that they can play at the same time. For samplers, this is traditionally how many monophonic samples can play at the same time. A stereo sample requires playing two monophonic samples so that you can get one sound for the left channel and one sound for the right channel.

Theory

I'm not terribly sure here, my hopes and dreams however are that the mk2 is able to play 32 stereo samples at the same time. Time to find out if my hopes and dreams will be crushed or not.

Method

To actually test this out, I have created a silly 32 track Ableton Live track, where each track plays half a bar of a Drum n Bass song I wrote years ago [Break Away](#) (linked if you actually want to hear the song). From here I just kept scrubbing from each track just one half bar section of the song, until I had 16 bars, or 32 half bars. In Ableton Live it looked like this:



With this done, I then exported each track to a separate stem, leaving me with 32 tracks, each with 16 bars in length, that only play one small portion of the song, and loaded up the tracks to my SD card so that I could load them up on the mk2.

Loading them into the mk2 was a little tedious, just because I had to load one stem at a time, and to keep my sanity I loaded track 1-16 to Bank A Pad 1-16, and track 17-32 to Bank B Pad 1-16. One last pass was to turn GATE off for all of the pads, because even though the samples were mostly silence, I wanted to make sure that they played the full length of the sequence.

Pattern Sequence #1

I set the BPM to 84 (which is the BPM of the stems), and created a new 8 bar pattern that would play all of the Bank A pads. 8 bars is only half of the stems, and requires 16 stereo polyphony (or 32 monophonic polyphony) to play.

It loops properly, and there are not dropped notes.

Pattern Sequence #2

Similar to Pattern Sequence #1, I set the BPM to 84, but this time I created a 16 bar pattern that would play all of the Bank A and Bank B pads. 16 bars is the full number of stems, and requires 32 stereo polyphony (or 64 monophonic polyphony) to play.

You can immediately notice dropped notes, as pads that had been lit up, are now randomly (or based on event entered order) are stopped to allow other notes to play.

Further Testing

To be really specific, I would consider running almost the same experiment, but output all of the samples as mono left and right channels. This would give further proof that the mk2 can handle mono samples, and that it is able to output 32 mono voices at the same time.

Conclusion

Sadly, the mk2 is 32 note polyphonic for mono samples, and 16 note polyphonic for stereo samples. I am actually fine with this, I was able to make tons of music with 32 note mono polyphony on the likes of the MPC 500, but my gripe is now that there aren't any direct ways to convert stereo samples to mono samples once you have them loaded into the mk2.

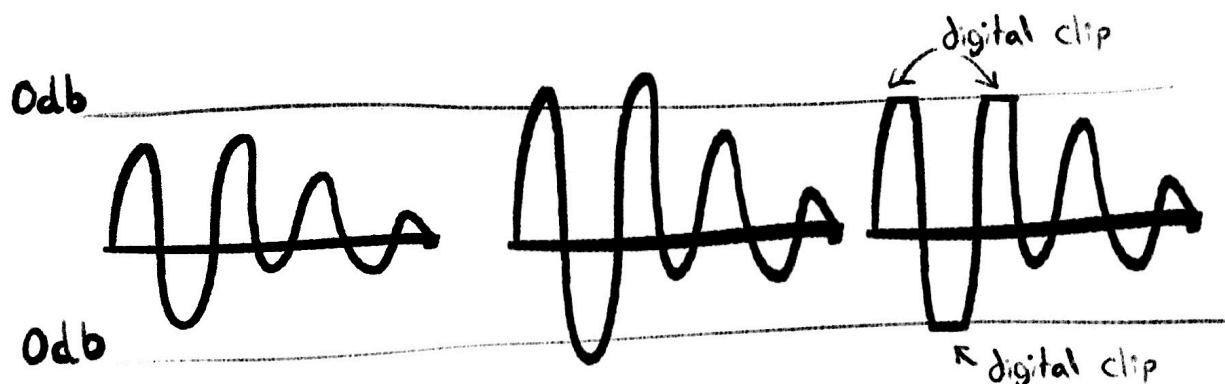


Probably more of a feature request, but I'm marking it as a bug for now (no icon for feature request), that to fully take advantage of your polyphony within the mk2, the mk2 needs to have an option to convert samples to mono... probably under the |**START/END**| menu that you can to with **{PUSH ENTER}**.

Does EXT SOURCE turning red mean that you are clipping or not?

Clipping occurs on audio devices when a signal goes over their maximum threshold. On analog devices, this can sometimes produce interesting results and new harmonics, but on most digital systems, 0db is the maximum for a sound.

Below is a sketch to illustrate what happens when a signal has been digitally clipped, and is a result of the input signal being louder than the 0db maximum. If you see flat tops to your sampled waveforms, unless you are working with square waves, then you're almost certainly experiencing some digital clipping.



Theory

I believe that the mk2 is going to digitally clip on the 1/4" inputs.

Method

I hooked up my trusty Moog Voyager to the 1/4" inputs on the mk2, and dialed the Moog in to a single oscillator with a triangle waveform. This allowed me to pretty clearly visually see if the tips of the triangle were still in tact or not when I was recording samples.

Recording #1

I dialed in the output volume from the Moog Voyager until the EXT SOURCE lit red, and then dialed it back slowly until it went back to the amber color. I then went into the sample and visually inspected the points of the triangles, and as far as I could tell everything was nice and pointy.

Recording #2

For the second recording I adjusted the Moog Voyager output volume until it was just barely triggering the EXT SOURCE to light red and stay red. This took a little bit of slight adjustments because it takes a few seconds of not playing a note for the EXT SOURCE pad to change back to amber, but I was able to dial in the sound where it was staying right on the edge. When I looked at the second sample, I could see that the tips of the triangle waveform were starting to flatten.



As a note, the audible difference is certainly there, but it is barely imperceptible. Also, there are reasons you may want to intentionally do this to a clip as it can add some additional intentional artifacts. I wouldn't do this for a final mix myself, but as part of sound design and creative process why not have some fun?

Recording #3

The third recording I just pegged the Moog Voyager to maximum audio output. This caused some very heavy digital distortion of the audio that was instantly recognizable, and to my ears not terribly appealing unless you want everything to sound like a square waveform. Although I did not have to zoom in to hear this, once I did the damage was incredibly perceptible and it was easy to see just how much of the sound was actually left.

Further Testing

Some more work could be done to export and load the samples into a DAW or audio editor, this would just further confirm if the signals are clipping, or if there are other headroom considerations with the mk2 that are not well documented.

Conclusion

It wasn't too much of a shock to me to see digital clipping on the 1/4" inputs of the mk2, most AD converters take the data straight in and just clip away quite happily. It is confirmed that if you see red on your EXT SOURCE pad, then you are clipping your incoming signal. Whether this is desirable or not is up to you to decide.

Does the mic/guitar input produce analog or digital distortions?

On some old school gear such as the Akai s900/s950, a common way to distort a signal and add some character was to hook up whatever you wanted to sample into the microphone jack

instead of the line input. This would create an analog clipping effect that some people found musically interesting.

Theory

I believe that the mk2 is going to digitally clip on the microphone/guitar input just as it did on the line level input. Still, I think it is worth the experiment just in case this yields something interesting.

Method

I hooked up the Line Level output of my Moog Voyager to the mic/guitar input of the mk2, and set the output level of the Voyager all the way down, and the gain on the mic/guitar was set to 0, since the output from the Voyager is definitely going to be hotter than a microphone or guitar. I then setup the patch on the Voyager to output a single triangle waveform so that it would be easy to determine if there was digital distortion.

Recording #1

My first recording was with the mk2 set to microphone input, and the gain was set to 0. I slowly increased the volume output of the Voyager until the **EXT SOURCE** pad just barely turned red, and then backed it down so that the pad would stay amber. Visual inspection of the waveform showed that it was being recorded as expected with no digital distortion.

Recording #2

The second recording had the same setup as Recording #1, but I decided to increase the volume of the Voyager so that the **EXT SOURCE** would remain lit while I played a note. With this change I could immediately hear the tone of the sound change, and when I inspected the waveform I could clearly see that the audio had been digitally clipped.

Recording #3

For the third recording I set the mic/guitar switch to guitar, and immediately noticed that I had to increase the output volume of the Voyager to get the **EXT SOURCE** pad to light up red, and then back it down again to amber so that I could get my recording. Loading up the waveform on the mk2 I didn't notice any distortion or digital clipping.

Recording #4

The final recording was also set to guitar, and I increased the output volume of the Voyager so that the **EXT SOURCE** pad would light up red. I could immediately hear the distortion as it started making the triangle audio sound more like a square wave. Visual inspection showed that the signal was digitally clipped just like Recording #2.

Further Testing

I suspect using an actual guitar or microphone would give the same results, but for completeness it would likely be good to verify the characteristics with other audio sources.

Conclusion

It appears that both the microphone and guitar inputs digitally clip just like the line level inputs. Other than as a specific type of distortion, I don't think that people will find it useful in general to drive their signal to the point that the **EXT SOURCE** pad lights up red, and causing digital distortion.

However, with all this said, this was just me listening by ear and visually inspecting the waveforms on the mk2. Somebody who wants to devote more time, and go use graphic

equalizers or other techniques may find that there is some additional magic that I was unable to determine.

Do the headphone jack outputs share an amplifier?

The mk2 has two headphone jacks, which opens up the ability for two headphones to be connected at the same time. This may not be ideal though as both jacks are controlled by the same volume knob, and traditionally when using splitters for headphones, the overall volume tends to be lower when two headphones are attached due to the increased power draw.

Theory

My expectation is that Roland only put a single amplifier into the mk2, with the expectation that most people are only going to use a single pair of headphones.

Method

For this test, I connected multiple sources to the headphone jack outputs at the same time, and measured the volume output change on a Zoom H6 which was connected to the outputs.

Two Headphones

This was a pretty basic test, and just listening by ear. I connected a pair of DT 770 Pro 8ohm headphones to the 1/4" jack, and a pair of Apple headphones to the 1/8" jack. By ear, I could hear a small but noticeable increase in volume when I disconnected one of the pairs, and a small but noticeable decrease in volume when I connected a second pair of headphones.

DT 770 Pro 8ohm and Zoom H6

For this test, I plugged the Zoom H6 into the 1/4" headphone jack outputs using a TRS to left and right channel cable splitter. With the H6 and the DTs connected, I then adjusted the gain on the mk2 until I was reading a -6db output volume from a tone sound being played by the mk2. When I removed the headphones, the signal went to roughly -3db, meaning that the DT 770 Pro 8ohm was lowering the overall volume output by about 3db.

Further Testing

To be complete, it would probably be worth getting an assortment of headphones and testing for impedance differences and the impact to the overall output volume.

Conclusion

Personally I'm satisfied that there is likely only a single amplifier for the headphones on the mk2, and you'll just want to be aware of volume changes based on how much of a load you are putting on the output.

Experiment Template

Description

Theory

Method

Experiments/Results

Further testing

Conclusion

Appendix F - System Comparison

Not sure if this is interesting for folks or not... and this list could grow forever... if I get to it this section should probably move *way* down, maybe into an appendix?



Akai MPC Live/X/One

Boss SP-202

Boss SP-303

Boss SP-404

Boss SP-404(SX/A)

PO-33

Blackbox 1010

???

SP-404 (2005) - Sampling frequency 44.1 Signal processing 24 bits

SP-404A (2007) - Sampling frequency 44.1 Signal processing 16 bits

SP-404SX (2009) - Sampling frequency 44.1 Signal processing 16 bits

SP-404MKII (2021) - Sampling frequency 44.1 Signal processing 16 bits ??? 48khz?

Appendix G - Frequently Asked Questions

Hardware

Does the mk2 support velocity sensitivity on the pads?

Yes, the 16 sample pads, as well as the sub pad, are all velocity sensitive?

Does the mk2 support pressure sensitivity?

For velocity of the initial hit yes, but you cannot adjust the pressure of your hit to bend or effect the velocity once the note starts playing.

Similarly, when you are triggering a roll, adjusting the pressure of the pad will not adjust the velocity of future roll events.

Hopefully this will be addressed in a future firmware update.

Does the mk2 have a D-Beam?

No, the mk2 does not have a D-Beam.

Samples

Does the mk2 autodetect zero point crossings?

Possibly to some extent when zoomed out, although it is hard to tell from the display.

Not when zoomed in, the mk2 will happily pick points that will clip and click, but you can typically zoom in far enough to avoid this from being an issue.

If you need to remove a click you can set the attack on the envelope to 1.

Can the mk2 do non destructive slicing?

No, each pad on the mk2 is a unique sample. You could copy a sample multiple times to different pads and adjust start/end points to taste so that the sample stays in tact, but the pads will not all reference the same sample.

Can the mk2 sync sample playback to MIDI Clock?

Yes, if BPM SYNC is enabled for the sample, it will sync the samples playback to a MIDI Clock. If you need time stretching set VINYL MODE to No.

How does the mk2 handle Pitch changes?

Pitch shifting on the mk2 is more like the SP202, where you had a CTRL knob to adjust the pitch speed as a somewhat continuous variable, similar to how variable speed controls work on a cassette player or record player would work. The mk2 also is able to make pitch adjustments in semitone increments similar to how a modern sampler would adjust the pitch of a sample to follow a chromatic keyboard.

Can you change the pitch of an entire bank of samples simultaneously?

??? Research ???

Does the mk2 have a mute group function?

Yes, there are 10 mute groups. You can assign a pad to any of the 10 mute groups, and when a pad on a mute group is triggered, it will/mute choke other pads playing in that mute group.

Can you sample while other samples are playing?

Yes, this is called resampling. The mk2 can resample while you play samples, whether FX are on or off.

Further, the Skip Back function is always recording the last 25 seconds of audio on the mk2, and is another way to get samples from content that has already been played.

Is there a way to assign only some of the chops to pads?

Yes, once you have chopped your sample to taste push ENTER and choose assign to pad. Use CTRL2 to cycle through the chops, and when you are on a chop you want hit a green pad to assign the selected chop to it. When complete, press ENTER again and choose execute.

Are there apps for creating sample chains?

OP-1 Drum Utility, Octachainer, and Sample Crate on the app store are worth investigating.

Sample Create outputs samples at consistent intervals which might be extra handy on the mk2.

Can you resample audio output and line/mic/guitar/usb input at the same time?

Yes, set INPUT SETTING and set ROUTING to MIX to record everything.

Can you start sampling when meeting a threshold?

Yes, press SHIFT+Pad 10 multiple times until you see COUNT-IN WAIT.

Should you normalize your samples?

Maybe. If a sample is not loud enough often normalize will get it to be much louder, but then you may need to reduce the VOLUME under PITCH/SPEED to taste because the sample may now be too loud.

Can you loop pads independently of each other?

Yes. Pads set to loop will play at through their start, end, and loop points as set, regardless of BPM that is set.

Where does end snap set the marker?

End Snap sets the end point of a sample to the previous beat of when the START/END was pressed. If you have a one measure loop, then you will want to press START/END just after the beat of the 2.1.1 and before 2.2.1.

How does reverse work for already playing samples?

Pressing reverse on a sample that is already playing will switch the playback direction and start it again from either the start or end point of the sample depending on whichever direction it is going.

Pads

How many pads can be sent to cue at a time?

Only one pad can be sent to cue at a time ??? Need to confirm ???

Can the mk2 trigger two pads from a single event?

Yes, pad linking can be setup on the mk2 to trigger one or more pads at the same time.

Are there suggested pad settings?

A reddit user posted to try: Curve type log, Threshold 1, Gain 10, Trig Span 5, others seem to be happy with this.

Another poster suggests: Curve Type: Fix; Threshold: 40; Gain: 0; Trig Span: 1

Is there a way to select a pad without triggering it?

Press the ENTER on the encoder and then press the pad.

???This stops the pad from playing???How to select a pad that is already playing???

How can you stop a pad from playing?

Hold EXIT and press the pad that you want to stop playing.

Skip Back

Does Skip Back record external inputs too?

Yes, it records based on your INPUT SETTINGS, whether it is MIX (Outputs, USB-C, MIC/GUITAR, and Line) or ExtIn (USB-C, MIC/GUITAR, and Line).

Can Skip Back be setup to bypass Master FX 3/4?

No.

Effects

Is it possible to have 5 FX at once?

Yes, if you use the Input FX, 2 Bus FX, and 2 Master FX you can use 5 FX at the same time.

Can the FX menu to stay on screen instead of going back to BPM?

Yes, you can get the FX menu to stay on screen by holding REMAIN and then pressing the FX that you want to stay on screen.

What is the delay buffer trick?

Essentially it is an effort to keep a delay buffer at or near infinite sustain to bring new elements into a set, but use the feedback level to adjust how long to keep in elements as well as fade them out.

[DAKIM Boiler Room](#)

[Ways I Use Cheat Codes](#)

??? Can the mk2 do it ???

Can you select an effect by holding MFX and pressing Pad 1-16?

Yes.

Do effects like reverb tail out when a sample is muted?

???test, but should be yes???

Do effects like reverb tail out when the effect is muted?

???test, but probably no???

Do the BUS FX maintain state being power cycles?

No, the BUS FX will always revert to off with default settings between power cycles.

Sequencer

Can you play triplets in a roll?

No, the mk2 currently does not support triplets in a roll, and you create bars that are odd bar lengths. This makes it much harder to do alternate roll patterns other than what will fit with a four on the floor style pattern.

Hopefully a future firmware update will enable dotted, triplet, and other roll patterns.

Does the mk2 have an arpeggiator?

No, although the mk2 has a chromatic mode, this is not currently compatible with pattern mode, and means that there is no arpeggiator.

Hopefully a future firmware update will add an arpeggiator.

Is BPM a global setting, or is it tied to something else?

??? This seems to be global, and not tied to a pattern ???

??? Seems adjustable per bank ???

Does the mk2 have pad mutes?

Yes, as of firmware 1.14 the mk2 has pad mutes.

Does the mk2 pattern sequencer support parameter locks?

No, the only information that the pattern sequencer records is pad number, pad velocity, pad start, and pad end for each event.

Does the mk2 have a step sequencer?

No, there is no step sequencer on the mk2.

Can the mk2 export stems from patterns?

No, the mk2 can only export samples or projects, but does not have a way to export stems to work in another DAW.

??? Is pad mute a workflow workaround ???

??? Bank velocity to zero method ???

Can you resample a pattern?

Yes, the mk2 can resample from a pattern now. While older SPs were unable to this, it is something that has been added to the mk2.

Can the mk2 make events random or have random parameters?

No, the mk2 does not have the ability to make a specific step or event random.

Does the pattern sequencer send MIDI notes?

No. Although pressing a pad will send a MIDI note, the pattern sequencer does not send MIDI notes.

How do you resample a perfect loop from a pattern?

Set pattern chain repeat to off, then when you resample a pattern sampling will stop at the end of the chain.

Does instant pattern change play the next pattern from the play head?

No, when instantly changing to a new pattern it will start playing the next pattern from 1.1.1.

Can you play two patterns at the same time?

No, the mk2 is only able to play one pattern at a time.

Can the mk2 work in other timings than 4/4?

No, the mk2 pattern sequencer and metronome only works in 4/4 timing, but you can record audio/samples in any timing that you would like.

Polyphony

Is the mk2 32 note mono polyphonic or 32 note stereo polyphonic?

The mk2 is 32 note mono polyphonic. You can see the Experiment on polyphony above.

Can an external keyboard play the mk2 polyphonically?

Yes, an external keyboard can trigger more than one pad at a time. This will be effective for drum kits, but will likely need a higher level of sampling and pad setup to set an instrument to work chromatically.

DJ Mode

Do tracks need to be analyzed to play at the correct BPM?

If the BPM of a track drifts, can you adjust the track?

Can you layer additional samples on top of DJ tracks?

No. You cannot play anything other than the content loaded to the two tracks while in DJ mode.

Can you sync tracks in DJ mode to an external Midi track?

Do you have access to the FX while in DJ mode?

Are there track markers in DJ mode?

No, there are no track markers in DJ mode.

Storage

Does the mk2 come with an SD card?

No, the mk2 currently does not ship with an SD card in the box. Retailers may make special offers, but Roland is not including an SD card at this time.

What can the mk2 do with an SD card?

The mk2 can backup and restore, and it can import/export both sample and

What SD Cards are recommended?

SDHC cards up to 32gb will work properly with the mk2.

The mk2 does not work with SDXC cards, which are above 32gb.

What format(s) are compatible with the mk2 and SD card?

Fat32 works.

exFAT and NTFS do not work.

Can the mk2 stream audio from SD like previous SPs?

No, the mk2 cannot stream audio from SD. It can only import and export samples and projects, or backup/restore the entire system from SD.

Can you have a loop playing while you audition samples from SD?

Yes, as of firmware 1.14, while you have a pad playing or looping on the mk2, you can go into the IMPORT/EXPORT menu and use SUB PAD to audition samples while the loop continues to play.

Can I mount the internal storage onto my computer?

No. The only way to get access to the internal storage through your computer is with the dedicated SP-404 mk2 application.

Audio

Can the mk2 be used as an audio interface for iOS or a computer?

As a class compliant audio device, the mk2 is able to be seen as a 4 output and 2 input device by iOS and computers that support class compliant audio.

When the EXT SOURCE lights up red, is my input clipping?

Yes, if you see the EXT SOURCE pad light up red, then the mk2 is digitally clipping anything that goes over the 0db threshold.

Can the mk2 be used as an amplifier for a microphone, bass, or guitar?

Yes, the mk2 can take the input signal from the MIC/GUITAR jack, amplify the signal, be routed through FX, and will then output the signal to the 1/4" outputs, headphone, and USB-C port based on your monitor and cue settings.

Is Thunderbolt compatible with the USB-C connection on the mk2?

Thunderbolt 3 adopted the USB-C standard, and is directly compatible with the USB-C connection on the mk2.

Older Thunderbolt connections require a special adaptor, but I don't know which part of this will work.

Does the mk2 support bluetooth midi or audio?

No, the mk2 itself does not support midi or audio over bluetooth. You could invest in wireless technology that you could plug into the mk2 that would add this functionality though.

Can the mk2 be used as class compliant audio for the MPC Live/X/One?

??? Need to experiment with this ???

Is there a limiter on the mk2?

The manual details that from the Master Volume output, for Line/Phones output there is a limiter that then goes into a clipper. For USB-C audio output the signal goes straight out bypassing the limiter and clipper.

Can you tell if the mix of the mk2 audio output is peaking?

No, besides the EXT SOURCE turning red for external input, there does not appear to be any led or other indicator that the mk2 is peaking overall audio output.

How can you set the input gain for the line level inputs?

You either need to adjust the volume output of your external device, or go into the INPUT SETTING menu and adjust LEVEL.

Is it possible to trim a sample in bars/beats to make seamless loops?

Yes, with the START/END trigger on 1.14.

No on 1.13, but it's possible to trim to the exact length in samples. One quarter note = $(60/\text{BPM}) * 48000$ samples. In START/END mode, hold SHIFT and press ENTER to enter numerical values.

Alternative formula $((240 * \text{bars}) / \text{bpm}) * 48000 = \text{length}$

MIDI

Does the mk2 transmit note and velocity data to the midi out?

Yes, it sends midi note and velocity data. Each bank sends a note on it's associated MIDI channel, meaning Bank A outputs to MIDI channel 1, Bank B outputs to MIDI channel 2, and so on.

Each bank outputs C2-Eb3.

Can the mk2 pass MIDI input/output between MIDI jacks and USB-C?

??? Need to determine this ???

Can an external sequencer play sounds on the mk2?

With proper midi connections an external device can sequence and play samples assigned to pads on the mk2.

Each bank on the mk2 is assigned a midi channel, so Bank A is MIDI channel 1, Bank B is MIDI channel 2, and so on.

??? Pad to MIDI Note mapping ???

Can the mk2 resample while receiving MIDI in?

Yes.

??? Need to test further???

Does the mk2 respond to MIDI CC data?

No.

Can you quantize MIDI after it has been recorded to a pattern?

No, the mk2 does not have a way to quantize notes in a pattern once it has been recorded. You will need to erase the notes you want to quantize and then re-record the parts of your pattern with quantize turned on.

External Sync

Can the mk2 send sync data to an external looper to keep it in sync?

??? This requires that the mk2 probably sends start, sync, and stop data over midi... ???

Does the SP-404 mk2 support AIRA link?

No, the mk2 does not support AIRA link. See the video [Introducing the Roland SP-404 mk2 Creative Sampler and Effector](#).

Does the mk2 receive start, stop, and sync?

??? Need to research this ???

Cables

Will a USB-C to Lightning cable work?

No, the USB-C to Lightning does not provide cable, and it will not allow the mk2 to connect audio or midi to an iPhone or iPad. ???definitely not on iPhone, what about iPad???

To use a lightning port, you will need a USB-C to USB-A cable, and then the Apple Lightning Camera Kit to connect USB-C to Lightning.

Why doesn't my USB-C to USB-A cable work?

Some USB-C to USB-A cables only provide power, and are not intended to transfer data. Confirm that your cable is able to provide both power and data.

Can you hook up two mk2s together over a USB-C cable?

No, the mk2 cannot function as a host, so they will not be able to communicate.

Power

What rechargeable alternatives are there to batteries?

MyVolts has created a solution called ReVolt, that powers a device using standard battery sizes through a USB connection. While similar to USB-C, this may be a good alternative for those who cannot power the mk2 over USB-C with a power bank because it does not have a USB-C output.

USB Rechargeable batteries

What USB Powerbanks work?

Anything that outputs over USB-C and can provide 1,500ma of power or more.

???Look into Birdcord for USB to DC power adaptor(s)???

How long do Eneloop Pro rechargeable batteries last?

Roughly four hours.

Can the mk2 be powered over USB-C from an Apple charger?

Yes, as long as the charger provides 1500ma of power over the USB-C cable.

Firmware Updates

Where do you copy the update files onto the SD card?

You copy the SP404MKII_APP0.bin and SP404MKII_APP1.bin files into the root folder of the SD card and NOT the unzipped folder containing the two BIN files.

Will the mk2 have paid firmware updates?

No, see [BEATPPL Podcast 81](#)

Companion App

Is the companion app available on iOS?

No, it is only available on Windows and OS X at this time.

Can the companion app run on an M1 Mac?

Yes, this is confirmed to work.

Do you need your SP connected for the Companion App to work?

No, the SP is not required to install or launch the Companion App.

Factory Content

Will restoring to factory content change my firmware version?

No, your firmware version will stay at whatever is installed.

How to restore factory content?

The factory content is hidden on the internal 16gb of storage.

To restore to factory defaults with project 1 populated with samples and patterns:

SHIFT+PAD13 (UTILITY) -> FACTORY -> ALL DATA

Please note, this will wipe out any other samples and projects you have on your mk2. So you may need to back that up first if you want to save anything.

Device

Panel

Edit Section

- Volume -
- CTRL 1/Cutoff
- CTRL 2/Resonance
- CTRL 3/Drive

Control Section 1

- Filter+Drive FX
- Isolator FX
- Resonator FX
- DJFX Looper FX
- Delay FX
- MFX
- Display

Control Section 2

- (Pattern Sequencer)
- Pattern Select
- Pattern Edit
- (Sampling)
- Del
- Rec
- Resample
- Exit (Pattern Stop)
- Copy
- Remain (Current Pad)

Control Section 3

- (Sample Edit)
- Start/End (Chop)
- Pitch/Speed (Envelope)
- Mark
- (Push Enter)
- Value Knob
- (Sample Mode)
- BPM Sync
- Gate
- Loop
- Reverse
- Roll (Roll Set)
- (Bank)
- A/F
- B/G
- C/H
- D/I
- E/J
- Shift

Pad Section

- Pad 1 (Fixed Velocity)
- Pad 2 (16 Velocity)
- Pad 3 (Cue)
- Pad 4 (Chromatic)
- Bus FX (Mute Bus)
- Pad 5 (Exchange)
- Pad 6 (Init Param)
- Pad 7 (Pad Link)
- Pad 8 (Mute Groups)
- Hold (Pause)
- Pad 9 (Metronome)
- Pad 10 (Count-In)
- Pad 11 (Tap Tempo)
- Pad 12 (Gain)
- Ext Source (Input Settings)
- Pad 13 (Utility)
- Pad 14 (Import/Export)
- Pad 15 (Pad Settings)
- Pad 16 (EFX Settings)
- Sub Pad (Project)

|DJ Mode|

- |Ch1|
- Pad 1 (Bend+)
- Pad 2 (BPM +)
- Pad 5 (Bend-)
- Pad 6 (BPM-)
- Pad 9 (|<<)
- Pad 10 (Sync)
- Pad 13 (>/||)
- Pad 14 (Cue)
- |Ch2|
- Pad 3 (Bend+)
- Pad 4 (BPM +)
- Pad 7 (Bend-)
- Pad 8 (BPM-)
- Pad 11 (|<<)
- Pad 12 (Sync)
- Pad 15 (>/||)
- Pad 16 (Cue)

Rear

DC In

Power Switch

USB-C

1/8" TRS Midi In/Out

1/4" Line In R & L/Mono

1/4" Line Out R & L/Mono

Front

1/4" Headphone Jack
1/8" Headphone Jack
Mic/Guitar Gain Knob
Mic/Guitar Switch
1/4" Mic/Guitar Jack

Side

SD Card Slot

Bottom

Serial Number
Battery Compartment

Glossary

Polyphony - Specifies the total number of unique sounds that be played at the same time. Traditionally each note of polyphony is a monophonic (not stereo) sound, thus meaning that a stereo sound is normally considered to be two notes of polyphony. The Sp-404 mk2 is specified as having 32 notes of polyphony, which are mono, which means that the mk2 has 16 notes of stereo polyphony.

Volume

CTRL (1/2/3)

MIN/MAX

Pattern

Pattern Sequencer

Sequencer

MFX

Filter

Drive

Cutoff

Resonance

Drive

Polyphony

Index

References

Roland Links

[Official SP-404 mk2 Manuals](#)

[Official SP-404 mk2 Downloads](#) (firmware and skin template)

[Ultimate Guide to Customizing the SP-404 mk2](#)

Unofficial Links

[Downloadable SP-404 mk2 Manual in PDF](#) (firmware 1.10)

Technical

<https://minimidi.world> - Type A and Type B TRS to Midi resource

[Specifications for TRS Adaptors Adopted and Released](#) - Link to TRS Midi Specification

Articles

[Roland Engineering: Designing the SP-404 mk2](#)

Forums

[Elektronauts Roland SP-404 Mk2 Thread](#)

[Elektronauts SP-404 Mk2 Production Tips/Tricks/Problem Solving/Bugs](#)

[MPC-Forums SP-404 mk2 Thread](#)

[SP-Forums SP-404 mk2 Sub Forum](#)

[Modwiggler Roland SP 404 mk2 Thread](#)

[Gearspace Roland SP-404 mk2 Thread](#)

[Reddit SP-404 Sub](#)

[Reddit SP-404 mk2 Sub](#) - Seems dead

Videos

[Official Roland SP-404 mk2 Launch Video](#)

[Introducing the Roland SP-404 mk2 Creative Sampler and Effector](#)

[Loopop SP-404 mk2 Review / 9 Tips & Ideas / Tutorial](#)

[Mike Acosta Roland SP-404 mk2 First Look](#)

[Bo Beats Roland SP-404 mk2 - the new king of creative samplers?!](#)

[Ave Mcree Roland SP-404 mk2 A Hip Hop Producer Review](#)

[Accurate Beats Roland SP-404 mk2 - Beatmaking and First Impressions](#)

[Nonjuror - Making a Beat on the Sp-404 mk2](#)

[Ski Beatz Chopping samples on Roland SP-404 mk2](#)

[Roland SP-404 mk2 x Lionclad](#)

[Roland SP-404 mk2 is Official! Demo & Feature Rundown with Tarnay](#)

[Roland SP-404 mk2 Vocal Tutorial - Soft Blue Magic](#)

[Roland Cloud How-To: Download SP-404 mk2 App and Beat Maker Sample Packs](#)

[LOFI Hip Hop jams on the SP 404 mk2 - spvidz](#)

[Roland SP-404 mk2 Overview // The Upgrade We've All Been Dreaming Of - Jade Wii](#)

[Ave Mcree!! How to make your first beat](#)

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