

CRUMAR[®]

MOJO
Classic Suitcase

**THE ULTIMATE
TONEWHEEL ORGAN
EXPERIENCE**

USER'S MANUAL

Firmware version 1.00

www.Crumar.it

Congratulations for purchasing your new Crumar Mojo. You made the right choice. Crumar Mojo is a modern classic, is built around the most recent technologies but feels and sounds as authentic as the real thing. We wish you years of enjoyment and good music with your new digital tonewheel organ. Make sure you read through this useful manual to explore its capabilities and, most importantly, have fun!



SAFETY AND WARRANTY INFORMATION

- Do not open the instrument. The instrument can be opened and repaired only by qualified personnel. Unauthorized opening voids the warranty.
- Do not expose the instrument to rain or moisture.
- Do not expose the instrument to direct sunlight.
- Be careful not to infiltrate powders and liquids inside the instrument. Nor on the outside.
- If liquids get inside the unit, remove the power immediately to prevent the risk of electric shock and contact a service center as soon as possible.
- Do not clean using abrasive cleaners as they may damage the surfaces.
- Please keep all packaging in case you need to transport the instrument to a service center.
- The instrument can be used in any Country that has a mains voltage between 100 Vac and 240 Vac.
- Mojo Suitcase wooden enclosure is not compliant with A.T.A. regulations, as such it can't be loaded in the hold of a plane without a proper A.T.A. case.
- All external parts (handles, hinges, locks, edge protectors, lid) are subject to wear and are not covered by this warranty.
- The paint job is subject to wear and is not covered by this warranty.
- Crumar Mojo is subject to 12 months manufacturer's warranty.
- Warranty extensions are at the discretion of the retailer.
- Damages caused by misuse, improper maintenance or transportation are not covered by this warranty.
- During the warranty period, the customer is entitled to repair or replacement of any parts considered defective at no charge.
- The possible replacement of the entire product is at the manufacturer's discretion.

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NOTES ABOUT THIS MANUAL

This manual can be considered a live document, as it may be updated in future according to possible changes introduced in new firmware updates. We recommend to keep an eye at the support section of the Crumar website and check for new versions of both the manual and the instrument's firmware.

You will find that some concepts might be repeated more than once, this happens because there could be a mention in a chapter, and a detailed explanation in a later chapter.

We recommend you to read this manual with the instrument in front of you, so you can put into practice what you are reading and can have an instant feedback of the notions here explained.

VB3-II virtual tonewheel organ



The sound of Crumar Mojo is based on the same “core” of the virtual instrument GSi VB3-II. While the virtual instrument runs on regular computers, Mojo is built on a new dedicated DSP platform, supposedly designed by Crumar for the new Mojo line. This means that with Mojo not only you have access to a familiar and intuitive organ interface controlling one of the most realistic tonewheel organ simulations, but you also have access to a detailed and extensive parameter set that lets you customize the organ sound in order to match your preferences any way you like.

Sound Engine main features:

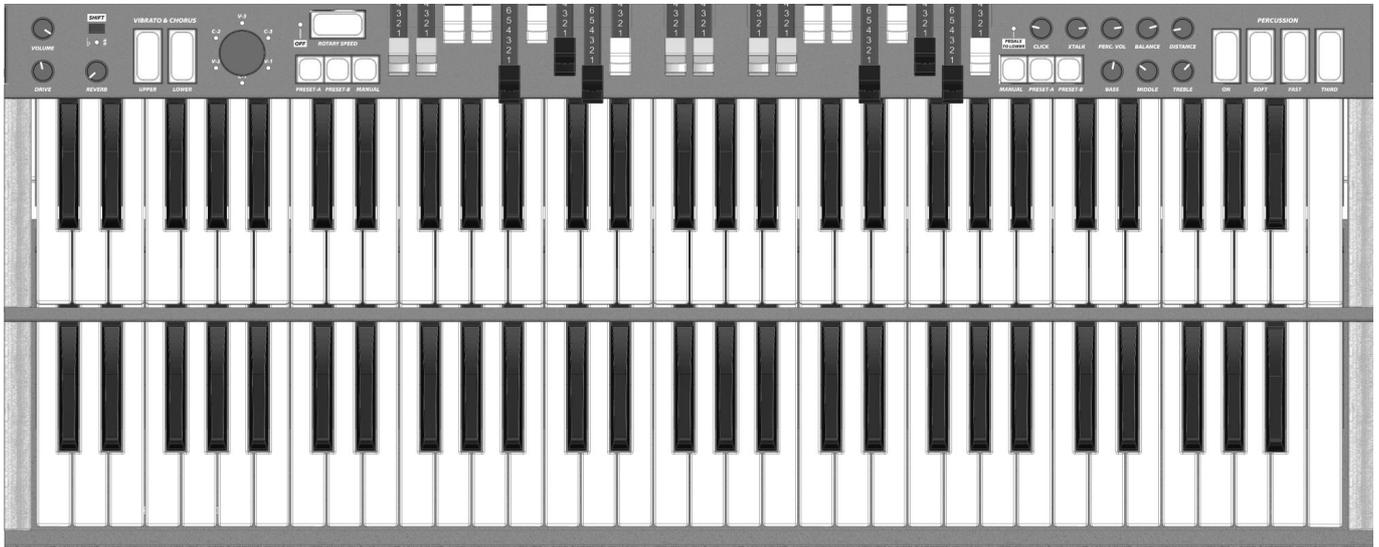
- Full polyphony (61 upper + 61 lower + 25 pedals = 147 notes)
- 91 modeled tonewheels with accurate phase synchronization
- Adjustable leakage noise and cross modulation between tonewheels
- A total of 22 different tonewheel generators to choose from
- Generator shaping for a total of 154 generator combinations
- Adjustable global tuning from 430 to 450 Hz
- Foldback on 16" deactivatable
- Complex wheels
- Resistor wiring with multiple options
- Realistic “run” motor wow & flutter
- Busbars and 9 key contact simulation
- String Bass with adjustable release time
- Loudness "robbing" effect
- Single triggered percussion with natural capacitor discharge/recharge
- Adjustable Percussion Level & Decay
- Vibrato/Chorus virtual scanner
- Adjustable Vibrato Scanner depth & mix
- Dynamic tube overdrive simulation
- Digital stereo reverb
- Rotary speaker simulation with virtual microphone positioning, tube overdrive, tube feedback
- Rotors "Front Stop" brake position with adjustable preferred position
- Upper and Lower manuals SPLIT with adjustable split point
- Supports pedal sustain

Hardware main features

- Dual Manual Organ with two 61-note 5 octave C - C waterfall semi-weighted velocity sensitive keyboards
- External optional Wi-Fi antenna for accessing the editor Web-App
- Online USB wired editor
- Two Groups of 9 Real Drawbars plus 2 pedalboard drawbars
- Knobs for Volume, Drive, Reverb, Keyclick, Crosstalk, Percussion Volume, Balance, Distance, Bass, Middle, Treble
- Four dedicated buttons for Tonewheel organ percussion.
- Dedicated buttons for Vibrato on/off
- Vibrato type knob
- Drawbar HOLD mode for alternate drawbar settings
- Two drawbar presets per manual with easy storage mode
- Dedicated button for rotary effect speeds
- Pedal to lower function (adds the sound of pedalboard to lower manual)
- Shift button for alternate functions (transpose, rotary bypass)
- MIDI IN and OUT connections
- USB Type B (device) for MIDI IN/OUT
- 2 USB Type A (host) for software updates and wifi module
- Balanced Audio outputs
- Headphone jack
- Expression pedal input
- Sustain pedal input
- Halfmoon or Footswitch input with dedicated selector
- AC in 100-240V

2. THE COMMAND PANEL

In this chapter we explore the command panel of the Mojo. Most of the controls on the panel are familiar to veterans of the tonewheel organs. If you fit that category, you've probably already recognized the drawbars, upper on the left, lower on the right, pedalboard in the middle; then the controls for the "Vibrato Scanner", the four tablet switches for the percussion, and you've also noticed that everything is right where it belongs.



2.1 – LEFT SIDE KNOBS

On the left side you find the 3 knobs: volume overdrive and reverb. Having these three on the left side is kind of tactical, so you can keep playing with your right hand while adjusting the three most important parameters before starting your performance.

2.2 - VIBRATO/CHORUS

The Vibrato/Chorus controls, which belong to this side of the console, are presented exactly like on a vintage tonewheel organ. There are two large buttons for turning the effect on or off on the upper or on the lower manual independently, and a large knob that lets you choose the type of effect to use between the 6 possible combinations: V1, C1, V2, C2, V3, C3 whereas the 'V' produce just a vibrato effect and the 'C' produce a chorus effect. In the Mojo the selector is a rotary encoder with 6 LEDs that indicate the current selection.

PLEASE NOTE: As opposed to mechanical "rocket" switches, these are push-push yellow illuminated buttons, about the size of the vintage tablet switches, that work exactly the same way. You can hit them in any point to activate them, no need to reach for the exact middle point. Furthermore, when the C/V effect is turned on for the lower manual, it's also applied to the pedalboard tones.

2.3 – ROTARY SPEED BUTTON

The large horizontal button labeled ROTARY SPEED is used to control the built-in Rotary Speaker simulator. When the simulator is on, push this button to switch between the slow and the fast speeds; push and hold for about half a second for braking the rotary speaker (stop position). When in brake, push again to return to the previous speed. The light will blink smoothly slow or fast, or will remain still, to indicate the current speed.

Use this button in conjunction with the SHIFT button for enabling/disabling the Rotary Speaker simulation (see below).

PLEASE NOTE: *if this button seems unresponsive, check the **HM/FS** selector on the back of the instrument. In order to use this button, the selector must be in the FS (FootSwitch) position. This button cannot be used if an Half-Moon switch is in use. Connections are explained later in this manual.*

2.4 – THE SHIFT BUTTON

The small **SHIFT** button on the top left side of the control panel is used for a few alternate functions:

1. Push and hold the SHIFT button along with the ROTARY SPEED button to disable or enable the internal Rotary Speaker simulation. If the simulation is **OFF**, the red LED next to the ROTARY SPEED button becomes lit.
2. Push and hold the SHIFT button along with the MANUAL button of the lower section, next to the **PEDAL TO LOWER** indication, to activate or deactivate the pedal-to-lower function that brings the pedalboard tones to the lower manual. If this function is active, the red LED will become lit;
3. Push and hold the SHIFT button along with notes, on the upper manual, from the second C note to the fourth C note to activate the transposition. If a transposition is active, the red LED next to the SHIFT button will become lit. To cancel the transposition, hold SHIFT and play the third C note (middle C).

PLEASE NOTE: *when the transposition is active, certain notes that are outside the 61-note playable range will not be available any more. For example, since the last note is C, if the transposition is up by one semitone, C becomes B, so the C key will become silent.*

2.5 – UPPER PRESET

Crumar Mojo offers two presets for each manual, plus the CANCEL position, the HOLD function, and of course the manual drawbar mode.

PLEASE NOTE: Presets will only store the drawbar position, and nothing else. Also, when a preset is active, the percussion is turned off on the upper manual. This behavior reflects exactly what happens on the real tonewheel organs, with just a few changes.

- To select a preset, just push the desired button A or B;
- To use the live drawbars, push the MANUAL button;
- To store a preset: once you've set the drawbars to the position you wish to store, push and hold one of the two preset buttons, A or B, for about 2 seconds until the light goes off and on again.

The **HOLD** mode will let you prepare an alternate drawbar registration while holding the current registration active. When the MANUAL button is active, press the MANUAL button again, it will start blinking. While it's blinking, move the drawbars to prepare your alternate registration, you'll notice that the sound will not reflect the changes you're applying to the drawbar registration. Once done, press the MANUAL button again to apply the change. The light will stop blinking.

The **CANCEL** mode will turn the whole manual off while enabling the note transmission on the MIDI output ports. To enable the CANCEL mode, push and hold the MANUAL button until the light goes off. To resume from the CANCEL mode, push the MANUAL button or one of the A or B preset buttons.

2.6 – LOWER PRESETS

Lower presets work exactly like for the upper section, with the only exception that you have no percussion on the lower manual, so selecting a preset will not turn the percussion off.

2.7 – RIGHT SIDE KNOBS

On the top row we have:

- **CLICK:** use this knob to adjust the amount of *keyclick* noise, which is the typical noise you hear at the attack of each note, that on a real tonewheel organ is caused by electrical contacts underneath the keyboard;
- **XTALK:** use this knob to adjust the amount of *cross-talk* effect. Also this is an effect found in the original tonewheel organ, mostly caused by the large amount of wirings that interconnect all the parts of the electronic circuit;
- **PERC. VOL:** this comes handy to adjust the volume of the percussion sound in case it becomes too loud or too soft, which is a condition that may vary according to the type of amplification being used. Sometimes the percussion is just right, but its perception may change when the speakers are set to a different position, or when just using a different set of speakers;
- **BALANCE:** when the internal Rotary Speaker simulation is active, this knob adjusts the balance between the upper horn and the bass rotor;
- **DISTANCE:** when the internal Rotary Speaker simulation is active, this knob adjusts the distance between the virtual speakers and the virtual microphones, varying the amount of perception of the Doppler effect and other acoustic phenomena that happen in a rotary speaker.

The knobs on the bottom row are BASS, MIDDLE and TREBLE. Nothing but an efficient and handy 3-band equalizer useful to balance the sound according to the type of amplification system used, its positioning in the venue, also the kind of venue, possible resonances or unwanted reverberations. When all three knobs are in the middle position, the sound can be considered “flat”, i.e. with no frequencies added to or subtracted from the original sound.

2.8 - PERCUSSION

Like on the vintage tonewheel organs, the command panel features the four percussion switches that have the following functions, from left to right:

1. Turn the percussion on or off.
2. Select between soft or normal percussion volume.
3. Select between fast or slow decay.
4. Select the harmonic applied to the percussion tone.

PLEASE NOTE: *the percussion is only present at the upper manual. Also, when the percussion is active, the 1' drawbar will be muted.*

3. THE REAR PANEL



All the connections are present at the back panel. From left to right:

- **HEADPHONES:** plug your headphones here to practice without an external speaker. This output is paralleled with the stereo line output.
- **AUDIO L & R:** these are TRS jacks carrying balanced line outputs at a +4 dB level, but can also accept TS (mono) jacks for unbalanced signal. If you have to use long cables, we suggest to use all balanced connections.
- **SWELL:** this TRS Jack input accepts an expression pedal with linear potentiometer in the range 10 ~ 50 Kohm; we suggest to use the original Crumar expression pedals, but other pedals from other manufacturers may be compatible.
- **SUSTAIN:** if you have a sustain pedal like those used for digital pianos, you can connect it here for controlling the Rotary Speaker speeds (see configuration in the Editor chapter) or for sustaining notes.
- **HALFMOON or FOOTSWITCH:** This section includes a TRS Jack input and a 2-way selector. You can connect either a *Crumar Dual Footswitch* or a *Crumar Halfmoon* (optional accessories) for controlling the Rotary Speaker speeds.
- **MIDI IN – OUT:** use these ports to connect to other MIDI equipment using standard MIDI cables.
- **USB MIDI I/O:** use this USB “device” port to connect the instrument to your computer or mobile device for accessing the Editor or for DAW integration. This port carries only MIDI signals. Use this port to connect a USB cable for USB online editor.
- **SYSTEM USB:** these are two USB “host” ports that can accept the USB Thumb drive for installing future firmware updates, or for connecting the optional Wi-Fi Dongle, or even for MIDI-USB controllers such as the *Crumar MojoPedals 2018* pedalboard, as explained later in this manual.
- The last two are the Power button and the AC plug.

PLEASE NOTE: When the HM/FS Selector is in HM position (for Half-Moon switch), the Rotary Speed button on the top panel is unresponsive. Set this to FS for using an external Footswitch and/or the integrated button. This also applies to the sustain pedal functions.

4. ACCESSING THE EDITOR

Since the Crumar Mojo is based on **GSi VB3-II**, there's a load of parameters that can be adjusted to obtain the desired organ sound. These parameters are accessible through the Editor software.

Mojo offers two editors:

1. The remote MIDI editor, accessible through the MIDI-USB port and a computer or mobile device connected to the Internet.
2. The internal editor, accessible through a Wi-Fi connection. The Mojo will function as an hot-spot that creates its own private network to connect to.

4.2 – OPTION # 1 – USB online Editor

You need a USB cable connected to the USB MIDI I/O port (like those used for connecting a printer to a computer), use it to connect the Mojo to a computer, or to an Android device using an OTG adapter, or to an iPad using Apple's Camera Connection Kit. Once done, launch your CHROME browser and navigate to this website:

<https://www.gsidsp.com/mojoclassic>

PLEASE NOTE: if you don't have CHROME, install it from Google, or from the Play Store (Android) or from the App Store (Apple). Other browsers may not be compatible.

4.1 - OPTION # 2 – Wi-Fi Editor

Using the optional USB Wi-Fi dongle. Connect it to one of the two SYSTEM USB ports **when the Mojo is turned off**, then turn on the instrument and wait until it's ready. Use your computer or your mobile device and scan for new Wi-Fi networks. You should be able to find a SSID like "Mojo-xxxxxx", accessible without password. Access this network, and if your mobile warns you that there's no internet available with this network (which is quite obvious), dismiss the warning and continue.



Now you can launch your favorite web browser and navigate to the following URL:

<http://192.168.1.1/>

PLEASE NOTE: the internal Wi-Fi access point accepts only one connection at a time, so if you can't get to connect to the Mojo, check that you haven't left another device connected. Also, if you don't want someone else to connect to your Mojo, just make sure the dongle is not present before you turn on the instrument.

4.3 – EDITOR HOME PAGE

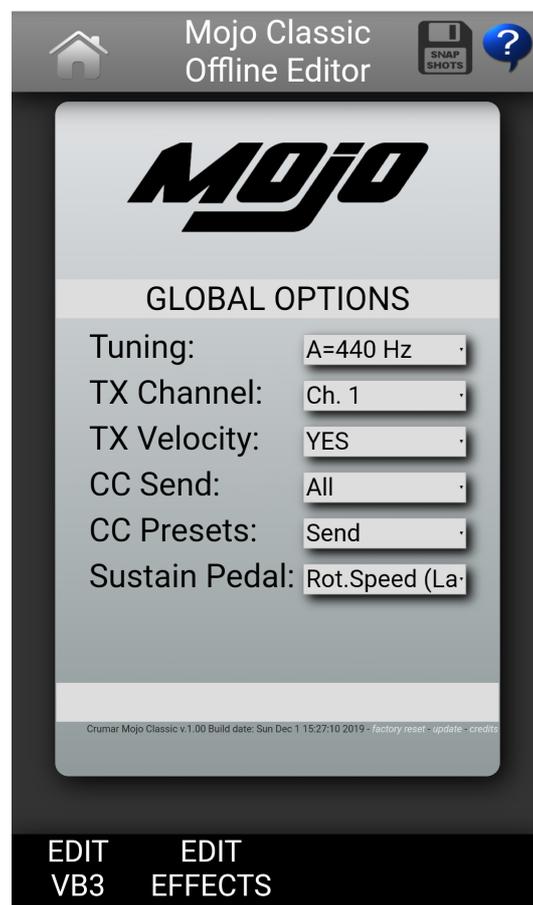
When the connection is done and the Editor loads into your web browser, you should be able to see the main screen, like the picture here.

On the top bar you can see an HOME icon. Tap here every time you need to return to this screen (don't use the BACK function of your browser). On the top right there are two more icons: one is for saving/loading snapshots, the other is for viewing an help page.

The bottom bar contains links to other pages.

In the middle of the screen you have the Global Options:

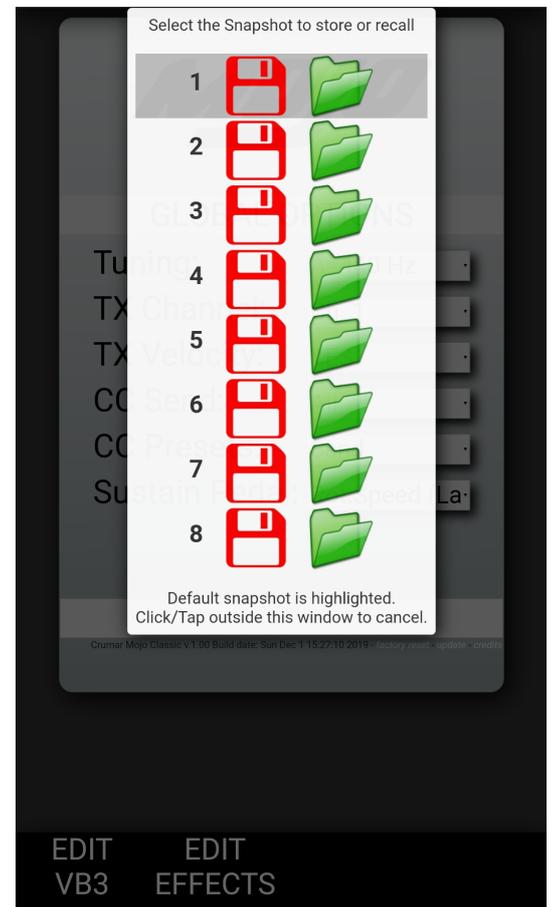
- **Tuning;** This is the global tuning, where the reference A note can be set to a frequency between 430 and 450 Hz. The default value is 440 Hz.
- **TX Channel:** select the MIDI Basic Channel for transmitting events to the MIDI output port.
- **TX Velocity:** set this to YES if you want the velocity information is always transmitted. If this is set to NO, velocity information is fixed at 127 and the “high trigger point” is used for both keyboards. High trigger point is always used for the internal sound generator.
- **CC Send:** choose whether you wish to send all MIDI *Continuous Controller* messages, only messages related to the pedals, or none.
- **CC Presets:** choose whether you wish to send all drawbar MIDI CC messages when an organ preset is selected. If this is on *Send*, CC messages will be sent each time you switch to a different preset, for both manuals.
- **Sustain Pedal:** select the function to be assigned to the internal SUSTAIN connector:
 - **Rotary Speed (Latch):** use the sustain pedal to switch between rotary speeds in latched mode, i.e. the speed changes each time the pedal is pushed and released;
 - **Rotary Speed (Mom.):** use the sustain pedal to switch between rotary speeds in momentary mode, i.e. hold the pedal down for slow, release for fast;
 - **Sustain Upper, Lower, All:** decide whether to use the sustain pedal to sustain notes on the upper manual only, or on the lower manual only, or on both manuals.



4.4 - SNAPSHOTS

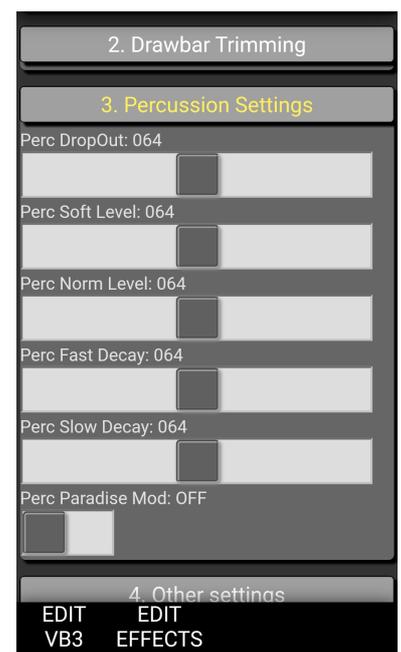
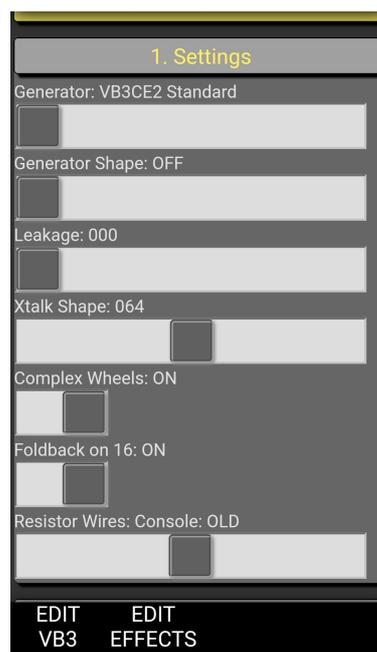
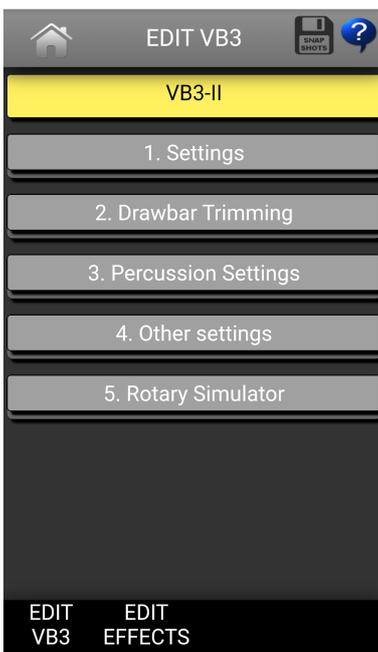
Mojo can save and recall up to 8 snapshots. A snapshot stores the values of all editing parameters, and can be used to store a particular setting that you might want to recall or for alternating between different settings. It's like having different tonewheel organs at your disposal.

Tap the Snapshot icon on the top right of the editor screen if you wish to save (the red floppy disk icon) or recall (the green folder icon) one of the available snapshots. Everytime a snapshot is recalled, is set as the default snapshot and will always be recalled when the instrument is turned on.



4.5 - PARAMETER EDITING

Tap on the links on the bottom bar to open the parameter pages for the organ part and for the effect section. Parameters are presented under the form of large horizontal sliders with a readout value. Scroll sliders left or right to vary the values. Scroll the page up or down to reveal the entire content. Click the yellow title bars to collapse or expand a section.



5. ORGAN EDIT PARAMETERS

Parameters for the organ part:

- **Generator:** select a tonewheel generator from this list. Each generator is based on actual values as measured from real console organs of the B/C/A series.
- **Generator Shape:** select between OFF (no shaping) or 3 levels of CUT and 3 levels of BOOST. These will modify the amplitude chart of the generator values according to different positions along the generator. This parameter does not apply any equalization to the sound. Levels 1 can boost or cut starting from wheel n. 25; levels 2 start from wheel n. 52; levels 3 start from wheel n. 72.
- **Leakage:** adjusts the background hum & hiss.
- **Crosstalk:** adjusts the amount of crosstalk caused by the analog circuitry. This is a very important element of the tonewheel organ sound.
- **Xtalk Shape:** since the crosstalk consists of both bass and treble tones, this parameter mixes between the presence of one or the other, left towards a "rumble" noise, right towards a "brilliant" noise.
- **Complex wheels:** are special tonewheels only used for the first 12 tones wired with the pedalboard. Unselecting this parameter will use standard sinus tonewheels.
- **Foldback on 16':** the first 16 wheels wired to the keyboards are usually folded back, thus starting from wheel n.13 rather than from wheel n.1. If you wish to use the first 12 wheels on the manuals, uncheck this option but you should also uncheck the Complex wheels.
- **Resistor wires:** are the small wires that in the vintage organ connect the keyboards to the generator. This parameter offers three different values: "Console: NEW", as specified by the original B3 specifications; "Console: OLD", resulting in a more present low-end; "Spinet", same as "Console NEW" but without the foldback.
- **Drawbar trims:** the 9 parameters under this section can be used to adjust the presence of each drawbar. This will apply on top of the actual drawbar registrations for both the upper and the lower manual.
- **Percussion settings:** set the parameters of the percussion circuit such as the level when it's on normal or soft, the decay time when it's on slow or fast, the overall level, and the loudness loss when the volume tab is set to normal.

- **Perc Paradise Mod:** this is a “hack” that causes the percussion to never decay. What's special in this is that if you activate the scanner vibrato effect, you'll notice that the vibrato is applied to the rest of the drawbars but not to the percussion tone.
- **Other settings:** here you can adjust the depth of the vibrato circuit and the mix amount that affects the chorus settings, plus some parameters related to the generation of the KeyClick noise.
- **Preamp Bass / Treble:** adjust the frequency response of the organ's built-in preamp circuitry.

Parameters for the Rotary Speaker are:

- **Horn slow / fast:** adjust the speed offset of the horn for when the speed is on slow or on fast.
- **Bass slow / fast:** same as above but for the bass rotor.
- **Horn up / down:** adjust the acceleration and deceleration times of the horn for the transitions between the slow and fast speeds. When the brake is engaged, the power is taken off from the motor so the horn slows down until stopping only driven by the centrifugal force, so the time between fast and stop may be longer than from fast to slow.
- **Bass up / down:** same as above but for the bass rotor.
- **Ambience:** a real amplifier stays in a real environment causing the microphones to capture the sound reflections as well as the direct sound coming from the speakers. This parameter adjusts the amount of environmental reflections.
- **Cabinet:** adjusts the amount of resonances caused by the wooden cabinet.
- **Mic Angle:** adjusts the angle between the two microphones at the horn, ranging from 0 (both microphones in the same spot) to 180 degrees (microphones at the opposite sides of the cabinets). This simulation considers only three microphones, two for the horn and one for the bass rotor.
- **Horn EQ:** not all vintage rotary speakers have the same quality for what concerns the sound coming from the horn, some are brighter, some are duller or maybe just well balanced. This parameter lets you adjust the treble response of the horn sound.

- **Mid reflections:** adjusts the amount of sound reflections happening in the middle of the stereo field.
- **Doppler intensity:** the so called “Doppler” effect is the fundamental of the “Leslie” effect that causes the sound to be cyclically untuned while the sound source (the speaker) gets farther or nearer to the listener; this parameter lets you adjust the amount of this effect that is mostly caused by the sound reflections over the walls around the amplifier.
- **Dry Leak:** some of the dry sound coming from the speakers does not reach the rotating elements and is mixed with the rotating sound. Use this parameter to adjust the amount of dry signal you want to be mixed in.
- **Bass Port:** a real Leslie cabinet has a hole in the back that serves for two reasons: 1) lets the heat from the motors ventilate out from the cabinet and 2) acts as a bass tuning port, like those found on modern speakers. If you put a microphone in front of this hole you get nothing but sub-bass frequencies. Use this parameter to adjust the amount of sub-bass you want to get into the mix.
- **Tube feedback.** This is a very important parameter that works on an aspect of the whole amplification system that can drastically vary both the dynamic response and the frequency response, as well as have an impact on the overdrive. When a Leslie cabinet is set very close to the Hammond organ and is played at a high volume, there's some sort of feedback between the tubes, the transformers and the pickups of the Hammond and the speakers of the Leslie, resulting in a sound that tends to get “fatter”, the attack is “punchier” and the distortion is aggressive, giving you the feeling that some sort of energy is looping between the organ and its amplifier. Now, a genuine Leslie 122 or 147 is only 40W of power, but if you try to connect your Hammond organ to a 100W guitar amp such as a Marshall JCM900 or a Fender Twin you'll notice that the amp starts going in feedback even if you don't play any note on the organ. This is... pure analog power! Try this parameter at small steps, it can drastically change the sound in both a pleasant or unpleasant way, according to your tastes.
- **Stop Position:** you can use this parameter to find a position where the horn and rotor should “preferably” stop when you set the speed lever in the brake position and the “Front Stop” option is enabled. Please consider that not always the position you've set is reached with precision, it depends mostly on the Ramp Down times you've set... after all it's virtual reality, baby! It takes into account the kinetic energy, the gravity, the belt friction...
- **Noises:** well, a real rotary effect is far from being a quiet amplifier. Your microphones will pick up not only the sound but also the wind generated by the rotating elements, and the relays that switch between the fast and slow motors. Use this parameter to adjust the amount of audible noises.

- **Memphis Style:** check this parameter to unplug the motors that drive the bass rotor. This way, the bass stays motionless while the horns keep spinning.
- **Front Stop:** this very sought after function causes the horn and the bass rotor to stop always in a “sweet” spot every time the brake is engaged. VB3-II uses a simple algorithm that produces this effect in a very pleasant and seamless way that you won't even notice when you're braking the rotors.

Notes on the rotation speeds.

All parameters in the edit pages, whenever moved, display the readout value in either MIDI or actual value, when available. As for the Rotary speaker's rotation speeds and times, values are shown in Hz and Seconds. To convert Hz to RPM (revolutions per minute), just multiply the Hz value by 60. For example, the horn, when the Horn Slow parameter is set at 64, rotates at 0,77 Hz which translates in 46,2 RPM. All the speed values can be varied between 50% and 150% of the center value. The ramp up and ramp down times are in seconds, and can be varied between 50% and 500% of the center value.

Center values are:

- Horn slow: 0,77 Hz → 46,2 RPM
- Horn fast: 6,9 Hz → 414 RPM
- Bass slow: 0,72 Hz → 43,2 RPM
- Bass fast: 6,4 Hz → 384 RPM
- Horn ramp up: 1 second
- Horn ramp down: 0,8 seconds
- Bass ramp up: 6 seconds
- Bass ramp down: 3,5 seconds

These times are average values as measured by a wide sample of well working and serviced vintage Leslie 122, 142, 147 and 145 models. Due to centrifugal energy, when the Rotors ramp down from fast to brake and the Front Stop option is disabled, they take a bit longer to get to full stop position.

6. EFFECT EDIT PARAMETERS

Mojo features a built-in high quality stereo digital reverb that can be adjusted in a variety of ways in order to reproduce virtually any kind of artificial environment.

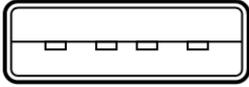
Reverb settings are:

- **Decay:** adjusts the average reverb tail length.
- **Damp:** simulates various types of reflecting walls, from tiles to absorber panels.
- **Diffusion:** adjusts the diffusion of traveling waves across the reflecting surfaces.
- **Pre-delay:** adjusts the time between the direct sound and the early reflections.
- **Room size:** adjusts the size of the virtual room, from a small cabinet to a large tunnel.
- **High / Low shelf:** adjust the amount of treble or bass frequencies to be cut off the sound before starting to reverberate.

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7. THE USB PORTS

SYSTEM USB



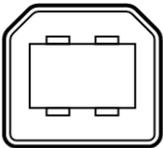
Mojo includes 2 Type-A “host” USB 2.0 ports. These are mainly used for updating the software, for file functions, for connecting the Wi-Fi USB dongle or for accepting external MIDI accessories. An interesting use for a USB system port is the possibility to connect a “Class-compliant USB-MIDI device”, i.e. one of the many MIDI devices that don't need special drivers when they are connected to a conventional computer. The Mojo will recognize USB-MIDI devices and will use them along with any other MIDI equipment connected to either one or both the classic MIDI inputs located on the rear panel.

*Please avoid connecting unsupported devices to this port. Please note that this port can supply a max of 250 mA of current. **Don't use this port to charge mobile devices.***

Original CRUMAR accessories that can be connected to the SYSTEM USB ports:

- Mojopedals 2018
- G.M.LAB D9U – d-i-y drawbar controller
- G.M.LAB D9X – d-i-y drawbar controller with extended features
- G.M.LAB MJU – d-i-y Midi Jack USB

MIDI-USB



An additional Type-B USB 2.0 port is present at the back side of the Mojo that provides Class-compliant USB-MIDI IN/OUT connection to your computer. Use this port to connect the Mojo to your computer software. No drivers are needed for Windows, OS X and Linux.

8. MIDI MAP

| PARAMETER NAME | C.C. NUMBER | REMARKS | PARAMETER NAME | C.C. NUMBER | REMARKS |
|--------------------|-------------|---------|------------------------------|-------------|--|
| Drawbar Upper n.1 | 12 | | Volume | 7 | |
| Drawbar Upper n.2 | 13 | | Drive | 76 | |
| Drawbar Upper n.3 | 14 | | Reverb | 91 | |
| Drawbar Upper n.4 | 15 | | Key-click | 75 | |
| Drawbar Upper n.5 | 16 | | Bass | 8 | |
| Drawbar Upper n.6 | 17 | | Middle | 9 | |
| Drawbar Upper n.7 | 18 | | Treble | 10 | |
| Drawbar Upper n.8 | 19 | | Vibrato Type | 73 | Values = 0, 25, 50, 76, 101, 127 |
| Drawbar Upper n.9 | 20 | | Vibrato Upper Switch | 31 | |
| Drawbar Lower n.1 | 21 | | Vibrato Lower Switch | 30 | |
| Drawbar Lower n.2 | 22 | | Pedals-to-lower | 55 | |
| Drawbar Lower n.3 | 23 | | Pedalboard release time | 56 | |
| Drawbar Lower n.4 | 24 | | Rotary Effect Switch | 85 | |
| Drawbar Lower n.5 | 25 | | Rotary Effect Slow/Fast | 1 | Values: 0 = slow, 127 = fast |
| Drawbar Lower n.6 | 26 | | Rotary Effect Run/Stop | 68 | Also sends CC#1 value 64 when speed = stop |
| Drawbar Lower n.7 | 27 | | Leakage | 86 | |
| Drawbar Lower n.8 | 28 | | Crosstalk | 87 | |
| Drawbar Lower n.9 | 29 | | Crosstalk Shape | 88 | |
| Drawbar Pedals n.1 | 33 | | Percussion Level | 89 | |
| Drawbar Pedals n.2 | 35 | | Rotary Speaker Balance | 90 | |
| Percussion On | 66 | | Rotary Speaker Mic. Distance | 93 | |
| Percussion Soft | 70 | | Rotary Speaker Horn EQ | 94 | |
| Percussion Fast | 71 | | | | |
| Percussion Third | 72 | | | | |

9. SPECIFICATIONS

Technical specifications:

- power rating: 100 ~ 240 Vac
- output level: +4 dBu
- headphone output max load: 32 ohm
- Mojo Classic dimensions: cm 95 x 55 x 17
- Mojo Suitcase dimensions: cm 94 x 52 x 17
- weight: 18 Kg



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