



Cherry Audio's Mercury-4 is a polyphonic synthesizer based upon the classic Roland Jupiter-4 synthesizer. Originally released in 1978, it was the second synth made that combined voice-assign polyphony with digital patch storage (following the Sequential Circuits Prophet-5, released in 1978). When we say, "digital patch storage," we mean the ability to store and recall patch settings saved to a digital memory and recall them at the touch of a button. By "voice-assign polyphony," we're referring to instruments with a finite number of independent synthesizer voices (four, in this case) that digitally scan the keyboard and assign played notes to each synth voice. These days, voice-assign polyphony and digital patch storage are taken for granted, but this was a HUGE deal in the late 70s when options for polyphonic synthesis were mostly limited to paraphonic instruments (i.e. limited synthesis parameters and note envelopes weren't independent) derived from organ technology, and patch recall was generally limited to how fast you could twirl knobs and flick switches!

Arguably, the Jupiter-4 is something of an underdog. It was certainly overshadowed by the *first* voice-assign polysynth with digital patch storage - the Prophet-5. Not only was the Prophet first, but on paper, its specs are more impressive (five-voice polyphony vs. Jupiter's four, two oscillators per voice vs. Jupiter's one, 40 or 128 user patch storage locations depending on revision vs. Jupiter-4's eight user patch locations, etc.). Appearing soon thereafter, Roland's later Juno-6/60/106 series also outshined the Jupiter-4 with greater polyphony, more user patch storage locations, superior tuning stability, and more.

But as is often the case, specs don't tell the whole story. Put plainly, the Jupiter-4 sounds fantastic, with a raw, raunchy tone not found in any of the other beloved Juno and Jupiter synths. Its analog oscillators (not DCO's) were implemented in a somewhat odd fashion, giving them a uniquely aggressive tone quality, the built-in sub oscillator adds girth, its oddly fast and deep LFO modulation capabilities allow it to create uniquely whacked out modular synth-like tones, and Roland's famous stereo chorus "ensemble" circuit is beautifully implemented, adding a boatload of width and dimension to the Jupiter-4's single-oscillator tones.

The original instrument had its share of caveats, including a meager eight user patch locations, no edit mode for stored patches (the front panel controls went dead when a factory or user preset was selected!), only four voices of polyphony, it weighed a ton (a portly 42 lb!), and its lack of autotune meant a cold breeze could send the whole thing careening out of tune. Cherry Audio's Mercury-4 addresses every one of these issues with up to 16-voice polyphony, infinite patch storage, easy patch editing, and much more. In addition to recreating the Jupiter-4's idiosyncratic oscillator and filter tonality, Mercury-4 precisely replicates the stereo ensemble effect and adds a spot-on "Space Echo"-style tape echo with multiple reverb modes.

### **Pre-Purchase Demo Mode**



If you haven't purchased the full version of Mercury-4, it will run in demo mode. All functions will work, but inharmonic tones will occasionally sound (the LED next to *Demo* in the top toolbar will illuminate when the ugly tones are sounding). We've also added a handy button to make purchasing easy, so

you've got no excuse! As you might expect, all this demo nonsense disappears once Mercury-4 is purchased.

### **Technical Assistance**

Cherry Audio's unique online store and automatic updating should make operation a smooth experience, but if you run into any issues or have questions, you can discuss issues online at the Cherry Audio forums at:

<https://forums.cherryaudio.com/viewforum.php?f=55>

... or you can communicate directly with our ~~clever and irritable~~ outgoing and friendly tech support staff at:

<https://cherryaudio.kayako.com/>

# Top Toolbar and Preset Browser



The purple strip at the top of the Mercury-4 interface is where you'll load, save, and create sound presets. It also contains utility functions such as undo/redo, UI zoom and *Focus* controls, under-the-hood settings, and more. Let's go over them:

**New**- Opens a new blank patch preset. If an unsaved patch is currently open or you've modified an existing saved patch, a dialog asks if you'd like to save the patch in its current state. This greatly reduces the possibility of losing an edited unsaved patch.

Save Preset

Collection:  
Mercury-4 Presets

Category:  
Brass

Name:  
Lowdown

Keywords:

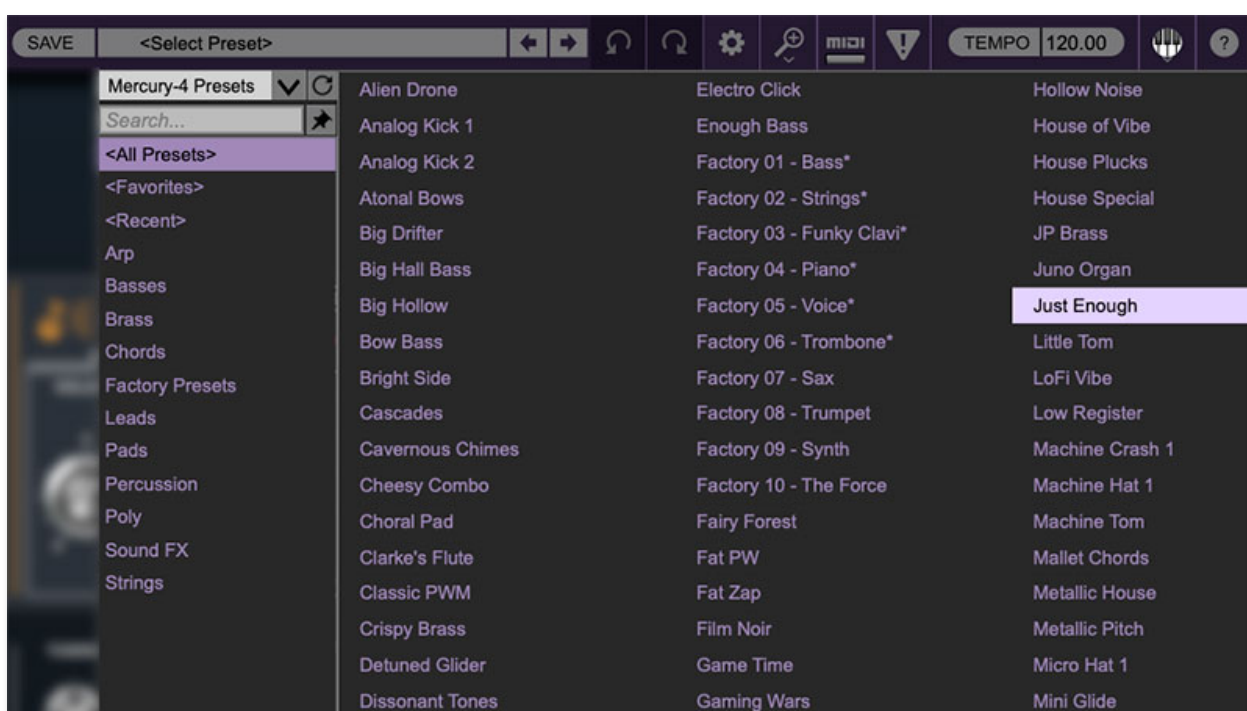
Save Cancel

**Save**- Use this to save patches. There are a couple of levels of hierarchy:

- **Collection**- This is the top level of organization, and contains entire “sets” of presets. The *Mercury-4 Presets* are the main included collection. We also include a *User Presets Collection* for storing your own presets, but you're free to create your own collections. To create a new collections, click in the *Collection* text field (where it says *User Presets* above) and

type a name. User-created sounds can be freely saved to any collection; we like to keep 'em separated for organizational purposes.

- **Categories**- Within each *Collection* are a number of sound categories. As with collections, you're free to create as many categories as you like. To create a category, click in the *Category* text field of the *Save* dialog window and type a new category name.
- **Patch**- A patch is an individual sound. To save a patch, simply type the name in the *Name* field and click *Save*.
- **Keywords**- You can add descriptive words such as "huge," "noisy," "poly," etc., to patches to make them appear when terms are typed in the *Search* field. Use commas to separate multiple keywords entries.

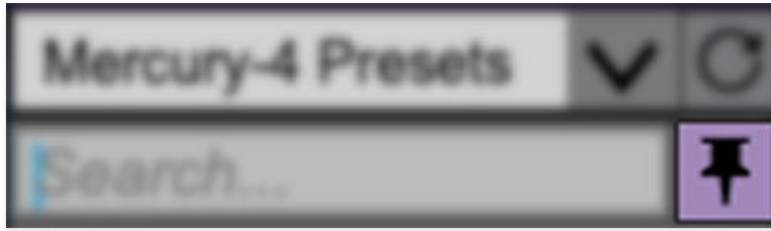


**Browsing Patches**- Patches can be browsed by clicking the *<Select Preset>* field. To select a preset collection, click in the area that says *<All Collections>* or on the downward-facing arrow next to it.

Clicking on the left-side categories narrows down which patches are displayed.

- **<All Presets>** will show presets from all collections and categories.
- **<Recent>** displays recently used presets.
- **Refresh**- This is the circular arrow button to the right of the downward arrow; clicking this checks the Cherry Audio server for new or updated

presets.

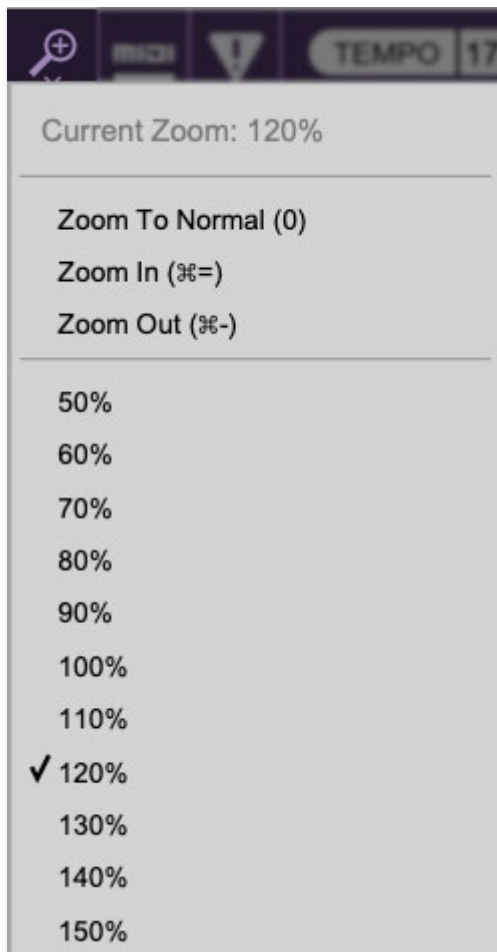


**Pin**- Clicking the push-pin icon locks the patch selection list open, allowing fast and easy browsing and auditioning of patches. Click the icon again to disable pin mode. when in pin mode, the up and down arrow keys can be used to select patches.

**Preset- Step Back/Forward Arrows**- These step to the previous or next preset. macOS [⌘+left/right arrow key] or Windows [CTRL+left/right arrow key] will navigate through presets back and forth in the currently selected collection/category.

**Undo/Redo**- These circular arrows will undo or redo the last action. It remembers many steps, so if you really loused something up, keep on clickin'...

**Settings**- This is where user preferences for user interface, audio interfaces, user account, and more are configured. See the **Settings** section for full information.



### **Importing Presets with drag-and-drop**

Presets can be imported singly or en masse (as a single compressed ZIP file) simply by dragging and dropping from the desktop anywhere on the user interface.

If a single \*.preset file is dragged and dropped, the sound is immediately loaded and the standard Save Preset dialog appears; this lets you save the sound to the instrument's preset browser. Note that you don't have to save the sound to preset browser; if you just want to hear and play the sound, click the Cancel button in the Save Preset dialog - the sound will still be loaded.

Compressed zip files containing multiple sounds can also be drag and dropped onto the UI. This works the same as with single sounds, but instead of the Save Preset dialog, you'll see the Import Preset Collection dialog. The presets will be added as a new collection and available in the categories for which they were tagged.

**Zoom Magnifying Glass** - Click to resize the Mercury-4 interface. Selecting *100%* returns the user interface to native size.

**MIDI Tab**- Opens the MIDI controllers tab for configuring internal and hardware MIDI controls. See the [MIDI Controllers Setup and MIDI Tab](#) section for full information.

**MPE Tab**- Short for "MIDI Polyphonic Expression," Mercury-4 supports MPE, a specialized MIDI protocol enabling multidimensional controllers for controlling multiple parameters of individual notes. See the [MIDI MPE Settings](#) section for full information. **The MPE Settings toolbar icon is only visible if *Settings>Interface>Enable MPE mode* is checked.**

**! (MIDI Panic)** - Click to send an all-notes-off message in case of, "why won't this thing stop making noise?!?" stuck-note incidents.

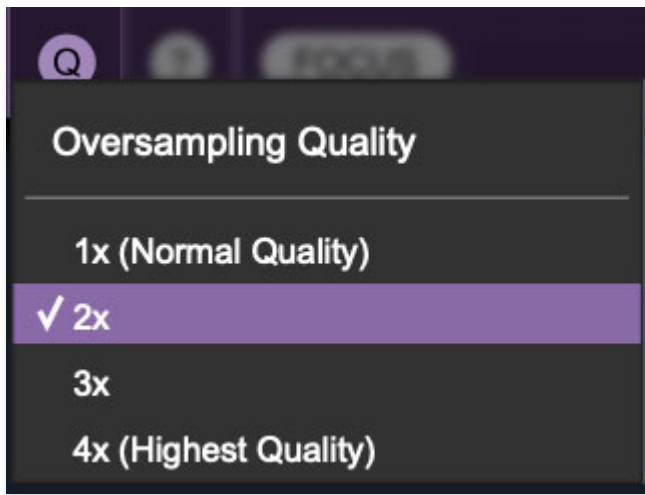
**Tempo (Standalone Version Only)**- Displays Mercury-4's current internal tempo setting. Mercury-4's internal tempo affects the *LFO*, *Arpeggio*, and *Tape Delay* sections when their corresponding *Sync* buttons are toggled. The tempo setting can be changed by moving the mouse up and down anywhere in the tempo section, or by double-clicking the number and entering the desired BPM value.

***The tempo display only appears in the standalone version of Mercury-4. VST, AU, and AAX plug-in versions receive tempo data from their host DAW app.***



**QWERTY Musical Typing Keyboard**- Opens an onscreen keyboard allowing a standard QWERTY computer keyboard to be used for playing music notes. For more information, see [QWERTY Musical Typing Keyboard \(MTK\)](#) section.



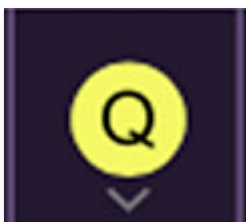


**Oversampling Quality (Q)**- The Q button sets Mercury 4's internal oversampling rate; the higher the setting, the better audio fidelity will be, with the caveat that more computer processing power will be required.

Internal processing can be set to *1x* (same rate as the current sample rate of the host DAW or in the *Settings>Audio/MIDI* window for the standalone version) or to *2x*, *3x*, or *4x* the current sample rate. The sample rate is downsampled at the instrument output stage to match the current host sample rate.

For example, if the current DAW/instrument sample rate setting is 48 kHz, and oversampling is set to *2x*, Mercury 4's internal processing runs at 96 kHz, and is then reduced back to 48kHz at the output stage.

If the current DAW/instrument sample rate setting is 192 kHz and oversampling is set to *4x*, Mercury 4's internal processing will run at 768 kHz, and you will very briefly hear the most ameeeeezing synthesizer sound quality ever experienced by mankind before your computer instantaneously explodes in a fiery, white-hot supernova blaze. Ok, maybe we're exaggerating... a lot.



When oversampling is set to any multiple greater than *1x*, the Q button glows yellow.

Dependent on a number of factors (audio system D/A converter quality, monitor speakers, the nature of the current Mercury-4 patch, etc.), you may not hear a big difference with higher settings. Generally speaking, audible differences may be noticeable when using sounds with a great deal of high harmonics.



**Help-** Clicking this launches your web browser and opens the help document you're currently reading, which is a really meta concept.

**Cherry Mercury-4 logo (upper-right corner)-** Clicking this displays "about" information, and shows the version number and current registered user ID.

## Focus Button

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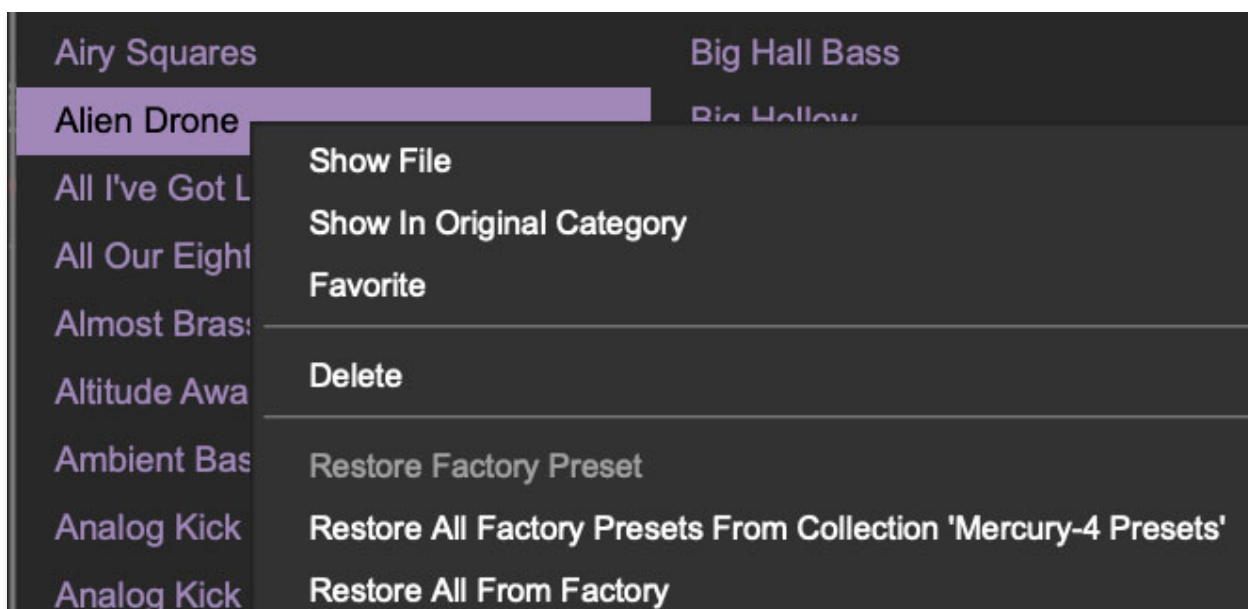
If you're using a tiny laptop, the user interface can potentially be hard to see. With this in mind, the *Focus* button conveniently blows up Mercury-4's view to roughly twice its normal size within the current window size. Unlike the *Zoom* "magnifying glass" function, *Focus* doesn't affect the current window size. By default, the patch panel section fills the current window, but the view can be scrolled vertically and horizontally with a mouse wheel, track pad, or Apple Mighty Mouse finger-scrolling. Or if you're the last person on earth still using a single-button mouse, scroll bars will appear at the window edges when in *Focus* mode. (Drop us a line from your SBC Global email account, umkay?)

Using *Focus* mode couldn't be easier - just click the *Focus* button the top menu bar. To return to standard view, click *Reset*. **There's also a superfast key shortcut** - on Mac, hold the ⌘ [COMMAND] key and click the mouse; in Windows, hold the [OPTION] key and click the mouse. Focus can be reset with the same key shortcuts.

## Preset List Right-Click Functions

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**Show File**- This displays the selected preset in the Mac or Windows folder containing it. This is useful for backing up or sending a preset file to another user.

**Show In Original Category**- Selects the preset within its category, i.e. the category will highlight in the left preset menu. The *Show In Original Category* command only displays if the preset was selected within the *<All Presets>*, *<Favorites>*, or *<Recent>* categories.

**Favorites**- Favorited presets will show in when the *<Favorites>* category is selected. A star will display next to the preset name. Right-click on the preset and reselect *Favorite* to un-favorite it. (Or say something nasty about its mother.)

**Delete**- Deletes the selected preset.

**Restore Factory Preset**- If one of the factory (i.e. not user) patches is edited and saved, selecting this command restores the patch to its unaltered "factory" setting. This menu will be grayed-out for user bank patches.

**Restore All Factory Presets From 'Mercury-4 Presets'**- If any patches from the "factory" Mercury-4 bank are edited and saved, selecting this command restores *all* of them to their unaltered "factory" setting.

**Restore All From Factory**- If any patches from the "factory" banks are edited and saved, selecting this command restores *all* of them to their unaltered "factory" setting. At the time of writing, the Mercury-4 bank mentioned above is the only factory bank, so this function and the *Restore All Factory Presets From 'Mercury-4 Presets'* above have the same effect.

# VCO Section



Mercury-4 accurately models the somewhat odd Jupiter-4 oscillator implementation. Its square wave is relatively standard, but the sawtooth has a uniquely "stepped" wave that changes shape across the frequency spectrum, with the waveshape becoming coarser as notes get higher.

**Range-** Sets the basic pitch range of the oscillator, displayed in traditional organ footage. Note that range is also affected by the position of the three-position *Transpose* switch to the left of the keyboard.

**Sub switch-** Adds a square wave one octave beneath the current range selection, useful for adding girth to oscillator tones. We don't know why they made the switch positions backwards.

**(LFO) Mod-** Adds frequency modulation from the LFO (low-frequency oscillator) section immediately to the left of the VCO.

## PW 1•2•3•4 (Pulse Width) Manual/Mod switch



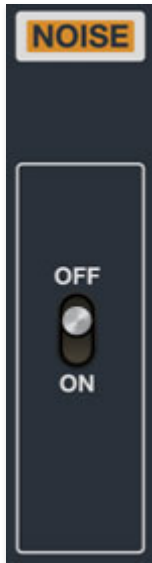
- **Manual**- Pulse wave width or "duty-cycle" is fixed (i.e. not modulated) and is set using the four-position *PW* slide switch.
- **Mod**- Pulse width is modulated by the onboard LFO (generally referred to as "PWM"). The modulation depth is set by the four-position *PW* slide switch, with position *1* being no mod, and position *4* being the deepest mod. Mod rate is defined by the LFO section *Rate* slider. A unique Jupiter-4 quirk is that the pulse wave mod depths are slightly different depending on which LFO waveform is used (you can hear this by setting the LFO to a very slow setting, or see it with an oscilloscope, if you're super nerdy like us).

**Wave Form knob**- Yes, we know "waveform" should really be a single word, but we went for authenticity here.



- **Off**- Main oscillator waves make no sound. The *Sub* oscillator still works in this position; the *Off* position is also useful when noise or filter resonance are used as sound sources.
- **Ramp**- Oscillator produces a ramp wave.
- **Square**- Oscillator produces a perfect square wave (well, as "perfect" as analog synthesis can do).
- **Pulse**- Oscillator produces a pulse wave with pulse width defined by the aforementioned *PW Manual/Mod* and four-position *PW* switches.

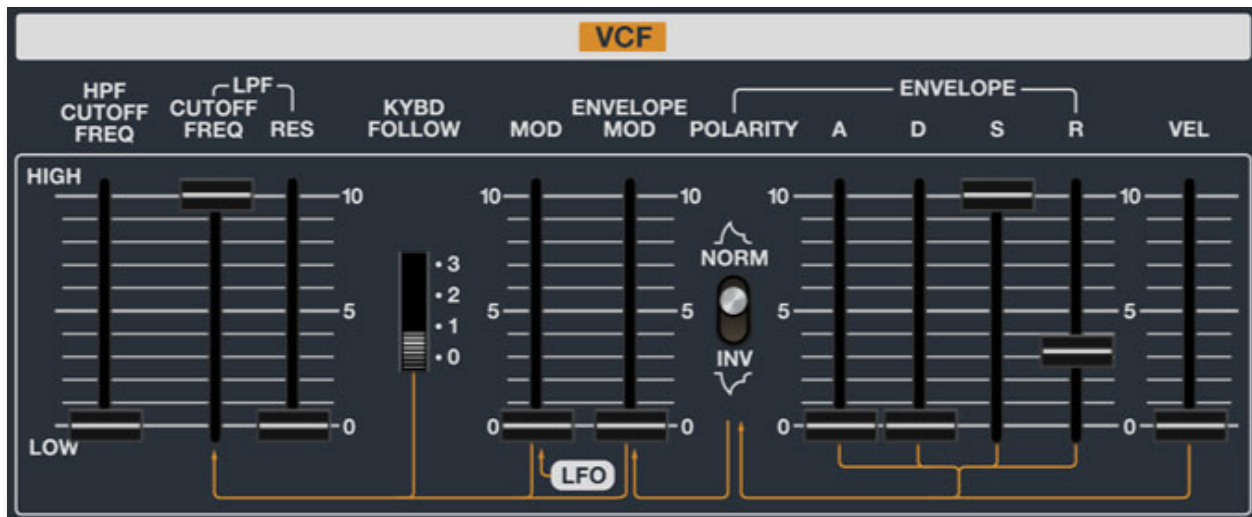
# Noise Section



That's right, an entire section dedicated to a single switch! White noise is a random signal in which all frequencies across the frequency spectrum are represented equally. It's useful for wind and surf effects.

**Noise**- Enables or disables the onboard white noise generator. For noise only, Set the VCO *Wave Form* control to the *Off* position.

# VCF Section



The VCF section consists of a simple 6 db/oct non-resonant highpass filter and a resonant 24 db/oct lowpass filter. The highpass filter (*HPF*) removes low frequencies as the slider its cutoff slider increased, while the lowpass filter (*LPF*) removes high frequencies as its cutoff frequency setting is decreased from max, resulting in a dulling of sound.

**HPF Cutoff Freq-** Sets the frequency where high-frequency attenuation begins, from 20 Hz up to 24,000 Hz. This is a "one-pole" design with a 6dB/oct curve, which means its slope is very gradual - this translates to relatively gentle filtering of low frequencies.

**LPF / Cutoff Freq-** Sets the frequency where high-frequency attenuation begins, from 20 Hz up to 24,000 Hz. Though it seems odd to have a cutoff control that goes 4000 Hz above human hearing threshold, remember that all filters have a "slope" to their response, so that extra range guarantees you won't hear any filtering at maximum setting. Mercury-4's lowpass filter has a 24db per/octave resulting in a relatively steep "slope" (as well as more pronounced character with the resonance knob turned up).

**LPF / Res-** Short for "resonance," this emphasizes sound energy at and around the current cutoff frequency by adding feedback from the filter's output back to its input. At lower settings, this can be used to create mild resonances such as those heard in acoustic instruments.

Mercury-4's implementation is fully self-oscillating - at extreme settings, it can be used as a sine wave generator, but be careful because high resonance settings can result in loud, screaming, dog-terrifying (and speaker

blowing) occurrences. Fun Jupiter-4 feature: its self resonance is particularly loud at low frequencies (i.e. below 150 kHz), which makes it especially well suited for creating booming 808-style kicks, and Mercury-4 accurately replicates this.

**Kybd Follow**- Commonly known as "keyboard tracking," this causes the cutoff frequency to increase as ascending notes are played on a keyboard. The idea behind this is, because actual note frequencies rise as higher pitches are played, the *Kybd Follow* switch adds a rising CV to the cutoff frequency in order to maintain the brightness of notes as higher pitches are played. The four switch positions are as follows:

- **Pos 0**- No keyboard tracking; cutoff frequency stays constant across keyboard range.
- **Pos 1**- Cutoff frequency rises roughly four half-steps per octave.
- **Pos 2**- Cutoff frequency rises roughly eight half-steps per octave.
- **Pos 3**- Cutoff frequency rises in 1/2 steps (i.e. same as oscillator pitch). When *Res* is near or at maximum setting, this position can be used to "play" the filter as a sine wave oscillator in 1/2 steps (use the *Cutoff Freq* slider to dial in tuning).

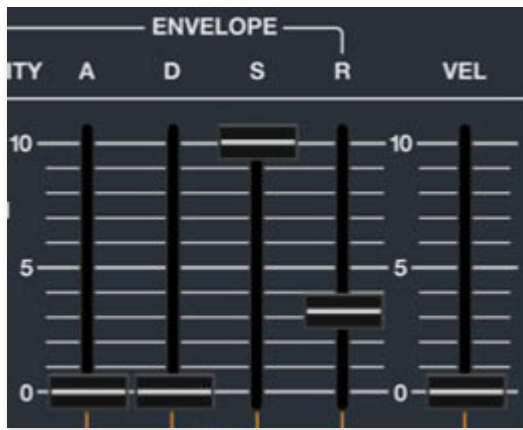
**(LFO) Mod**- Adds cutoff frequency modulation from the low-frequency oscillator section.

**Envelope Mod and Polarity switch**- The *Envelope Mod* slider sets the amount of envelope modulation applied from the filter's dedicated envelope generator. With the *Polarity* switch in the *Norm* position, envelope mod affects the cutoff frequency positively. In the *Inv* position, envelope mod is inverted for "reverse" effects (i.e., cutoff frequency is reduced as envelope values increase).

Fun Jupiter-4 feature #2: The filter envelope mod range is enormous, like a modular synth - about 10 octaves. Combining this with the filter's aforementioned loud low-frequency self resonance makes for absolutely wicked res "zaps" that'll knock you across the room. Trust us, this isn't common with softsynths!

**Filter Envelope**- Mercury-4 includes a dedicated envelope for modulating the filter cutoff frequency. If you're not familiar with the operation of an ADSR envelope generator, please see [How An ADSR Envelope Generator Works](#) in the **VCA section**.





- **Attack**- Defines the length of time for voltage to rise from 0V to 5V when a key is played.
- **Decay**- Defines the length of time for voltage to fall from the attack stage 5V peak to sustain stage setting.
- **Sustain**- Sets the voltage level following attack and decay phases while a note is held.
- **Release**- Defines the length of time for voltage to fall from sustain level to 0V when a key is released.

**Vel**- Short for "velocity," this defines how much the envelope affects the filter cutoff frequency via keyboard velocity. When set to zero, keyboard velocity has no effect on cutoff frequency; all the way up results in maximum control range.

# VCA Section

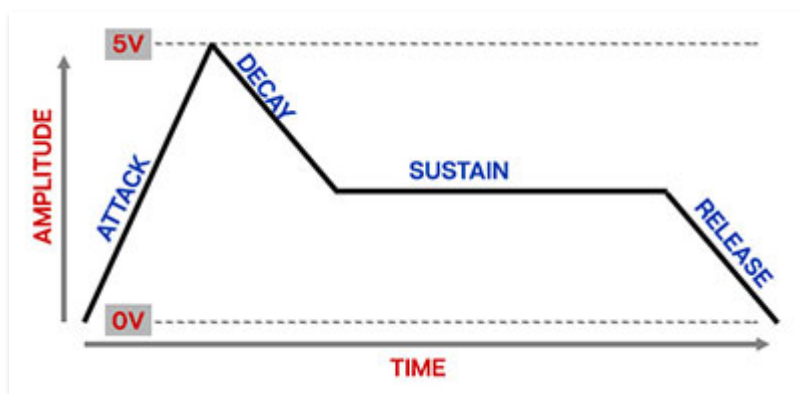
VCA is short for “voltage-controlled amplifier,” and for all intents and purposes, you can think of it as an automated volume knob.

**(LFO) Mod-** Adds amplitude modulation from the low-frequency oscillator. It's useful for tremolo effects at low LFO rates, and can create pretty wild amplitude modulation effects at fast LFO rates.

**VCA Envelope-** This shapes the amplitude curve of notes.

## How An ADSR Envelope Generator Works

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When Mercury-4 sees a gate voltage from a note, the envelope generator outputs a dynamically changing voltage, according to the settings of its four stages. The attack stage defines how long it takes for the output voltage to rise from 0 to 5 volts. Once the attack stage reaches 5V, it moves to the decay phase, which defines how long it takes to fall from 5V to the setting of the Sustain phase. Unlike the attack, decay, and release phases, which define times, sustain simply sets the held voltage level following the attack and decay phases - this equates to the envelope output level while holding down a key. Finally, the release slider defines the the length of time it takes for the voltage to fall back to 0V when the gate input voltage is removed, i.e. when the key is released.

- **Attack-** Defines the length of time for voltage to rise from 0V to 5V when a key is played.
- **Decay-** Defines the length of time for voltage to fall from the attack stage 5V peak to sustain stage setting.

- **Sustain**- Sets the voltage level following attack and decay phases while a note is held.
- **Release**- Defines the length of time for voltage to fall from sustain level to 0V when a key is released.

**Vel**- Short for "velocity," this allows keyboard velocity to control the volume of sounds. Increasing the amount adds sensitivity with lightly played notes getting quieter.

**Level and clip LED**- In the original Jupiter-4, this acted as a programmable volume control, in order to balance volume levels between presets. The master volume (the big knob all the way on the left) was *not* programmable - it didn't save with presets. Both the VCA *Level* slider and the master *Volume* knob are stored in Mercury-4 patches.

Roland analog synths are known to be conservative with their gain-staging, that is, they generally don't tend to distort very easily, but the Jupiter-4 was the exception. It's real easy to distort a Jupiter-4 with the VCA *Level* control, and Mercury-4 very accurately replicates the raunch, firestarter. We've included the LED clip indicator, which is kind of silly - it's real obvious when it's breaking up! You'll quickly find that optimal gain-staging is a balancing act between the VCA *Level* slider and the master *Volume* knob. It should go without saying that you're free to distort the heck out of this thing if you like the way it sounds!

# LFO Section



The LFO (low-frequency oscillator ) generates sub-audio range signals intended for modulation purposes.

**Sync-** When the *Sync* button is enabled, LFO speed will lock to host tempo when using Mercury-4 within DAW software, or to the current tempo in the top menu bar when using the standalone version.

**Mod Wheel-** This is a really handy, but potentially confusing feature, so don't skim this section. If the button is in the *Off* position, the LFO is always "on." Its effects will be immediately audible by moving the LFO sliders in the VCO, VCF, and VCA sections. Clicking to the *On* position enables control of LFO depth with an external keyboard controller mod wheel. If the mod wheel is all the way down, LFO depth is zero. This makes setting up a mod wheel to add vibrato or wah effects really easy. If it seems like the LFO isn't working, check if the *Mod Wheel* switch is engaged.

**Waveform-** Selects the repeating pattern of the LFO. Available waveforms are sine, square, ramp, and inverted ramp. One time I skated an inverted ramp, and it was super gnarly.

**Rate-** The *Rate* slider sets the speed of the LFO, from 0.25 to 830 Hz (with *Sync* switch off) or from 8 beats up to 1/64th note triplets (*Sync* switch on). We've replicated the insanely fast LFO speed of the original Jupiter-4 (well into the audio range) enabling all manner of clangorous, raunchy sounds to be created. The LED beside the *Rate* slider flashes at the current modulation rate.

**Delay**- Moving this slider up gradually delays the onset of LFO depth. The delay time can be set from 0 to 5 seconds. Because Mercury-4 includes separate LFO's for each polyphonic voice, onset delay is independent for each note, which is a nice effect when playing melodies or arpeggiated note passages.

When the *Mod Wheel* switch is in the on position, the *Delay* slider grays out and is disabled (because delaying the onset of LFO mod when turning up the mod wheel would be super confusing).

## JP-4, The "Modifier" Section, and the Confusing "LFO Bend" Controls

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This section isn't essential to using Mercury-4, but if you're familiar with the original instrument, it'll clarify some of the changes we made to the front panel. Either way, it's interesting if you're into synthesizer history. When we say "JP-4" we're always referring to the original Roland Jupiter-4, btw.

The original Jupiter-4 was one of the first instruments produced with digital patch storage. It had extremely limited computing power and digital memory (a whopping 1K - half of the average Atari game cartridge of the era), and the general concepts of how a poly synth would handle patch storage and recall weren't firmly established. Notably, the Jupiter-4 had no "edit" mode. This is such a ubiquitous and obvious feature in modern synths that most people probably don't even know what an "edit" mode is, but to illustrate, here's how patch storage and recall works in the original Jupiter-4:

To create and edit sounds, the *Manual* button must be pressed - this means that the sound conforms to the current front panel settings. To save a sound, the user presses the *Write* button, followed by one of the eight *Compu-Memory* user preset buttons. Pressing any of the user or factory preset buttons mechanically deactivates the *Manual* button, and all controls in the *Programmable* section go dead (i.e., almost all of the synthesis parameters). You read that right... the front panel goes DEAD. Wanna tweak the filter cutoff of a saved patch and re-save it? Tough luck. The only way to accomplish this is to carefully reverse-engineer the control positions by switching back and forth between *Manual* mode and the saved patch, and then re-save the patch. Super-duper not fun, and it should be clear why we decided to skip this part of vintage Jupiter-4 (non) functionality.

In just about any other modern synth, moving a control causes its value to instantly jump to the current control position (or increase/decrease if it uses

endless rotary encoder-type pots). For all intents and purposes, modern synths are *always* in edit mode, which is why "edit mode" is rarely acknowledged in the first place. It should go without saying that this is how Mercury-4 works - we didn't think anybody would miss the original instrument's paint-in-the-butt, no-edit-mode implementation.

### **Modifier vs. Programmable Parameters**

With this "parameter lockdown" in mind, the designers of the Jupiter-4 wanted to give users the ability to manipulate modulation destination, amount, and speed for factory and user patches. This explains the impressive flexible implementation of the joystick for controlling pitch bend, filter cutoff, VCA amplitude, and oscillator, filter, and amp LFO modulation - these left-hand control settings are always live and not stored with patches on the original JP-4 (but they *do* get stored with Mercury-4 patches).

With this in mind, the Jupiter-4's top panel controls are divided into two sections: Modifier controls at the left of the panel (i.e. always-live controls *not* stored with patch memory), and Programmable controls at the right of the panel (i.e. controls stored with patch memory that go dead when a preset is selected). Like the left-hand mod controls described above, the idea behind the Modifier section controls was that these would still be live and usable for stored patches. These consist of the Trigger section (still present in Mercury-4, see the **Trigger** section for more info), and the Delay/Bend section, which has been (mostly) removed from Mercury-4.

### **LFO Bend Controls**

Here's where it gets interesting. The Modifier Delay/Bend section of the JP-4 included a Delay Time slider which simply delays LFO mod onset; we relocated this to Mercury-4's LFO section. It also had two LFO Bend controls - a center-detented slider with 0 in the middle, along with a two-position Norm/Wide switch. These essentially acted as additional LFO speed controls that could add or subtract from a preset's saved LFO rate value - in this way, you weren't stuck with the stored LFO rate. If you wanted the stored LFO rate, the LFO Bend slider could be clicked into its center-detented 0 position, or it could be sped up or slowed down by moving the slider. Combining this control with the left-hand control settings allowed full control of LFO speed and depth, even for saved "dead panel" sounds.

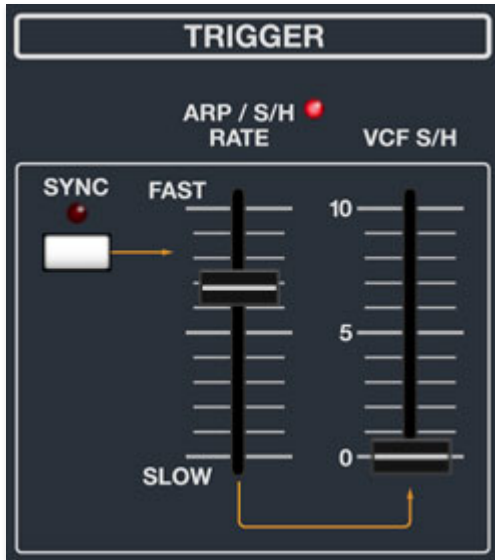
(As an aside, the Jupiter-4 didn't have a mod wheel, so the "*Bend*" part of the Delay/Bend section was meant to imply that the bender joystick controlled the overall amount of LFO mod, not that anything was actually being "bent." Confusing, right? Don't feel bad, I've owned my JP-4 for roughly 15 years and

only properly figured all this out when we had to design and document Mercury-4.)

### **How Does This Affect Me? I Just Want To Use Mercury-4!**

Glad you (didn't) ask. Since every single parameter of Mercury-4 is programmable and saves with stored patches, all this clunky and confusing *Modifier vs. Programmable* parameter business goes riiiiight out the window. The extra LFO "Bend" adder/subtractor slider and range switch are redundant, so we eliminated them. With that said, they expand JP-4's already-huge LFO speed range even further, so we extended the range of Mercury-4's LFO section *Rate* slider to reflect this. In other words, the minimum speed of Mercury-4's LFO section *Rate* slider is equivalent to JP-4's LFO *Rate* slider set to its slowest setting *and* the LFO Bend slider at its lowest setting, and Mercury-4's fastest LFO *Rate* setting is equivalent to JP-4's LFO *Rate* slider set to its fastest setting *and* the LFO Bend slider at its fastest setting. And since the LFO *Rate* slider has such a large range, we kept the *Norm/Wide* switch to make it easier to dial in.

# Trigger



Obviously *Trigger* isn't a common synthesizer section; a more appropriate (and admittedly less catchy) name might be "LFO Clock For The Arpeggiator and Filter Sample and Hold," but as you can see below, it didn't look so hot on the front panel... so *Trigger* it is.



Unlike most vintage synths, this means the arpeggio rate is independent of the LFO rate. It's particularly useful when creating bizarro modular-like patches where the arpeggio is running super slow while the LFO is running at crazy-fast audio rates and modulating oscillator pitch, filter cutoff, VCA amplitude, or some combination thereof.



**Sync**- When the *Sync* button is enabled, Trigger speed will lock to host tempo when using Mercury-4 within DAW software, or to the current tempo in the top menu bar when using the standalone version.

**Arp / S/H Rate**- The *Arp / S/H Rate* slider sets the clock rate of the arpeggiator and filter sample and hold, from 0.25 to 20 Hz (with *Sync* switch off) or from 8 beats up to 1/64th note triplets (*Sync* switch on).

**VCF S/H**- The original instrument includes a "hidden" sample and hold mod source for filter cutoff. We say hidden because the original front panel is cryptically labeled VCF Mod, so we changed it to something more descriptive. For those unfamiliar with what a sample and hold does, it grabs voltages from a sample source (in this case, the noise generator, for random voltages) and holds them at durations specified by a clock source. The *VCF S/H* slider defines how much of this mod gets applied to the filter cutoff frequency.

To hear its effect, set the filter frequency to its lower region, and turn up *VCF S/H* slider; try turning up the *Res* slider as well and you'll hear the sound that spawned a thousand sci-fi robots.

# Master Controls



The master controls affect overall volume, pitch, and drift. Like all Mercury-4 controls, these settings save with patches.

**Master Volume**- Controls the overall instrument volume.

**Master Tune**- Sets the overall tuning for the entire instrument up or down by just over five semitones.

**Drift**- Applies a random amount of tuning drift independently to all oscillators for a more realistic analog character.

# Effects

## Ensemble

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This is the glorious full stereo, dual-voice chorus, just like the original instrument. Don't feel guilty for leaving it on all the time!



Unlike other more "watery" chorus implementations, the Jupiter-4 chorus was a little more subtle and "flangey," and we've accurately replicated this in Mercury-4.

**On/Off**- Enables and disables the chorus effect.

**Stereo Width**- Sets the audible stereo width of the effect. At a setting of zero, the signal will be mono.

## Tape Echo

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Mercury-4's Tape Echo section reproduces the effect of a vintage "space echo" tape delay. Far from being super-pristine, vintage tape echoes have a lovely limited frequency response, and wow and flutter for a natural thickening effect. We've also replicated the multiple tape head configurations for rhythmic echo effects.



**On/Off**- Enables and disables the delay effect.

**Input knob, VU Meter, and Peak Level LED**- Set level near the red for optimal response (the VCA *Level* slider is best for this). If the *Peak Level* LED

illuminates, back off the input level.

**Sync**- Engaging the *Sync* button locks the delays time to master tempo. When engaged, the *Rate* slider snaps to note values ranging from 1/64th note triplet to 8 beats. *Sync* mode locks to the tempo in the top toolbar when using the DCO-106 standalone version or the current project tempo when the plug-in version is used in a DAW.

**Heads LEDs and Mode Selector**- Determines what combination of the three virtual "tape heads" are currently active; the LEDs illuminate to show the currently active heads. Head 1 is the shortest delay, head 3 is the longest. The time ratios of the heads are like a vintage Space Echo unit as follow:

HEAD NUMBER	TIME MULTIPLIER
1	base time
2	base time x 1.94
3	base time x 2.85

**Repeat Rate**- Sets delay time, from 1 to 2000 ms (for head 3, the longest one). If the *Sync* button is enabled, time settings snap to synchronized note values. Note that the tooltip (the popup value display you see when turning a knob) always shows the delay time for head 1. To determine the delay times for heads 2 and 3, you'll need to multiply that by the values shown in the table above - easy! If you stink at math, just click the *Sync* button, and futz with the *Mode Selector* and *Repeat Rate* knobs and we promise something fun will happen.

**Intensity**- Routes the output to the input for additional repeats, typically referred to as "feedback." We've carefully modeled the unique feedback tones that happen with a real tape echo - they sound awesome (try mapping hardware knob or slider controllers to the *Intensity* and *Repeat Rate* knobs for echo feedback madness).

**Echo Volume**- Sets the volume of the echo signal. The dry level is not affected (this is how classic Space Echo units operate).

## Reverb

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**On/Off**- Enables and disables the reverb effect.

**Reverb Type**- Allows selection of *Spring*, *Plate*, or *Hall* reverb types.

**Decay**- Sets the length of reverb release time/size of room.

**Reverb Volume**- Sets the level of wet signal.

## Bass and Treble Controls

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These affect the wet signals of the Tape Echo and Reverb sections. These do not affect the dry signal.

**Bass**- Sets the overall amount of low frequencies in the wet reverb signal.

**Treble**- Sets the overall amount of high frequencies in the wet reverb signal.

# Arpeggio



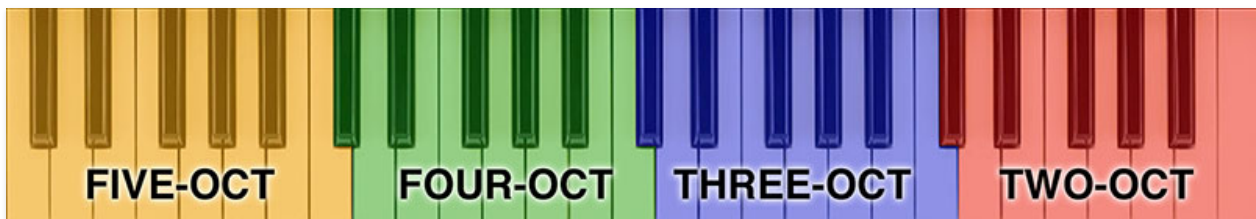
An arpeggiator is basically a step sequencer that plays each note of a chord individually in an ascending or descending pattern across one or more octaves.

## Assign Mode and Arpeggio Controls

A unique aspect of the Jupiter-4 design is that the arpeggiator does not have an "on/off" switch, per se. Instead, the white *Arpeggio* section direction buttons interact with the blue *Assign Mode* buttons - only one of these buttons is active at any time, so **pressing any of the *Arpeggio* or *Assign Mode* buttons disables any other currently selected mode buttons.** At any given time, Mercury-4 is either in a "live play" mode (one of the blue *Assign Mode* buttons pressed), or one of the *Arpeggio* direction buttons is pressed, enabling the arpeggiator.

## Jupiter-4/Mercury-4 Arpeggio Range

The Jupiter-4 arpeggiator's implementation is unique in that it doesn't have a range control; **range is dependent on where notes are played on the keyboard.** This is easier explained visually, so have a look at this festive image that took me a while to draw in Photoshop...



Arpeggios play in the octave of keys pressed plus one octave above the top C key, as follows:

- **Octave Four (red)**- Notes play in a two-octave range (played notes + one octave above).
- **Octave Three (blue)**- Notes play in a three-octave range (played notes + two octaves above).
- **Octave Three (green)**- Notes play in a four-octave range (played notes + three octaves above).
- **Octave One (orange)**- Notes play in a five-octave range (played notes + four octaves above).

If notes are played "across" ranges like this inverted Dm triad:



... then arpeggio ranges will depend upon each note played. In other words, the A note would have a three-octave span, but the D and F notes would have a two-octave span.

## Arpeggio Controls

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Following are the Arpeggio section controls. You may have noticed that there's no rate slider - the arpeggio rate is controlled by the *Arp S/H Rate* slider in the Trigger section at top left.

**Pattern**- These buttons select the order in which the notes of the chord will be played. Another JP-4 quirk to be aware of is that the arpeggiator actually plays notes in the order you play them on the keyboard, but the *Pattern* setting then affects the order of the octaves that pattern moves in. (We know, it's kinda weird.)

- **Up**- Notes play from lowest to highest.
- **Down**- Notes play from highest to lowest.
- **Up & Dwn**- No play from lowest to highest then back to lowest.
- **Rnd** - Notes play in random order. If you want to impress your 80s friends, select Random, and the factory "Bass" preset, hold down an E2 chord and it's instant Duran Duran "Rio."

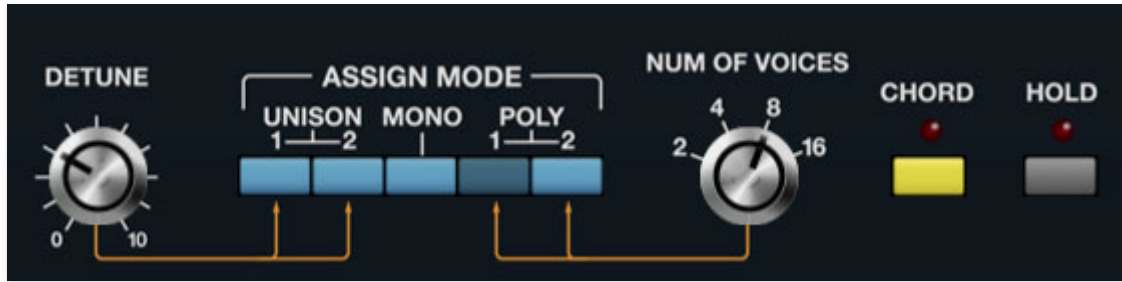
(And if they're super hardcore Durannies, put the arpeggiator in *Up* mode, set the clock speed really slow, select the factory "Voice" preset, play an E minor triad, and they'll be waiting, for the "Night Bo-oat." Nick Rhodes loved his Jupiter-4!)

**Range Set button and Arp Top Note display**- In the preceding *Jupiter-4/Mercury-4 Arpeggio Range* section, we explained that the highest note that can be played by a real Jupiter-4 arpeggiator is one octave above the very top note of the keyboard (C5). But this doesn't totally work in virtual synth world, because Mercury-4 doesn't know what the top note of your MIDI controller is... hence *Range Set* button/*Arp Top Note* display.

This may seem complicated, but we promise, it's easy - to set the very top note the arpeggiator can play, click the *Range Set* button, then hit the key on a MIDI keyboard controller you'd like to be the top arpeggiator note. Unlike the original, notes played within one octave of the top note will play across a one octave range (unlike the original's two-octave minimum arpeggio range). Notes within a two-octave range beneath the top note will play a two-octave arpeggio range and so forth.



# Assign Mode



Mercury-4 can play up to 16 simultaneous polyphonic voices. The Assign Mode section determines the total number of available voices and how these voices are played.

**Detune-** Sets the amount of pitch spread of voices when using *Unison 1* or *Unison 2* mode. This can be used for mild chorusing effects, or vintage rave "hoover" sounds.

**Assign Mode-** These determine voice allocation.

**IMPORTANT:** Unlike just about any other poly synth we can think of, the Jupiter-4 arpeggio section does not have an on/off switch. This means Jupiter-4/Mercury-4 is always in either one of the live play modes described below, OR it's in one of the **arpeggio modes**. In other words, the various up, down, etc. arpeggio should be thought of as additional voice modes, just like unison, poly, etc. If you've never had your hands on an original Jupiter-4, only one of the various arpeggiator and Assign Mode buttons can be on at any time - pressing one pops the others off like an old Zenith television. Hooray for the 70s!

- **Unison 1-** One note plays at a time (i.e. "mono mode") with the number of stacked simultaneous voices determined by the *Number Of Voices* setting. Use the *Detune* knob to "un-tune" the voices for fat sounds.
- **Unison 2-** If single notes are played, this behaves the same as *Unison 1*, but if more than one note is played simultaneously, voices are distributed dependent upon the number of notes currently played and the *Num Of Voices* setting. This is sometimes referred to as "unison share" mode.

For example, If *Num Of Voices* was set to 4, and a single note is played, all four available voices will sound for that note. If two notes are played, two voices will sound for each note. If four notes are played, one voice will sound for each note.

The *Detune* knob applies here as well - it affects voices regardless of the number of notes currently played under each key - this can lead to really out-of-tune chords, so go easy on this guy, especially if the *Drift* knob is turned up.

Check out the main chord figure in the vintage Human League tune "Seconds" for a fabulous demonstration of Jupiter-4 *Unison 2* mode.

- **Mono**- One note can be played a time with one voice sounding. Though the knob position won't change, the *Number Of Voices* is always 1 when *Mono* is selected. *Mono* mode uses last-note priority - this means the most recently played note will always sound.
- **Poly 1**- This is the standard polyphonic mode. Unlike most polyphonic synths, **if the number of currently held notes exceeds the number of available voices (i.e. the *Num Of Voices* setting), notes are *not* "stolen."** (It will steal notes with longer release times that are still ringing.) Please have a look at the *(Lack Of) Voice Stealing and The Jupiter-4* section below for more information.

The original Jupiter-4 had only four-voices, so if four notes were held down, no new notes would be heard until one of the original four keys was released, but you're unlikely to run into this if Mercury-4's *Num Of Voices* control is set above 8 (unless you have a freakishly high number of fingers).

- **Poly 2**- Poly 2's allocation is optimized for use with Mercury-4's portamento (glide) function - it does a good job of "knowing" which notes to glide from and to when holding notes while playing melodies (regardless of whether notes are played legato or separately).

**Num Of Voices**- Sets and displays the maximum number of notes that can simultaneously play, from 2 to 16.

**Chord**- Allows chords to be memorized and played with single keys. To memorize a chord, click the *Chord* button. The LED flashes showing that it's in learn mode. To learn a chord, play up to 16 notes (this is limited by the current *Number Of Voices* setting); when the last note is released, the LED stops flashing and the chord is memorized. To disable *Chord* mode, click the button again.

Note that *Chord* mode isn't just for "chords" per se; it can be used for octaves, fifths, or any desired combination of notes.

**Hold**- Notes play continuously. VCF and VCA envelopes operate as normal, with the caveat that their release phases are ignored. *Hold* can also be used in conjunction with the Arpeggio section, ideal for "standing-there-looking-fabulous-while-the-synthesizer-plays" New Wave 80s moments.



**Portamento On/Off and Speed knob**- Also known as glide, *Portamento* causes notes to slide smoothly from one pitch to the next. Toggling the switch enables *Portamento*, and the *Speed* knob slows glide speed as it's increased. Portamento works in all voice modes; if you'd like to use it polyphonically, we recommend using *Poly 2* mode.

## ***(Lack Of) Voice Stealing and The Jupiter-4***

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This is important, hence all the bigness and italics. When assigning keyboard notes to voices, most analog poly synths makes use of "voice stealing" in order to optimally utilize a limited number of voices (i.e. how many notes can sound at once).

For example, a Prophet-5 synthesizer can simultaneously play a maximum of five notes. If five notes are held and a sixth note is played, the earliest note played gets shut off, and the most recent played note "steals" that voice in order to sound. This makes the instrument feel more responsive, and often gives the audio illusion of an instrument that can play more simultaneously playable notes than the actual number of onboard voices (five, in the case of the Prophet-5).

However, because the Jupiter-4 is a very early poly synth with limited computing power, it doesn't have any kind of voice stealing. Being a four-voice synth, ***if four notes are held and a fifth note is played, the fifth***

***note will not sound until one of the previous four notes is released*** - hence, no voice stealing.

When playing a real Jupiter-4, one tends to adjust their playing technique to account for the lack of voice stealing. In the interest of authenticity, Mercury-4 retains this "no voice stealing" behavior. But unlike the original Jupiter-4, Mercury-4 quadruples the maximum number of simultaneously sounding voices - up to 16 notes (depending on the current *Num Of Voices* setting), so the lack of voice stealing is far less noticeable than with the original instrument. That said, if you want the true Jupiter-4 experience, set the *Num Of Voices* control to 4 and dig into the limited-fingers world of early 80s Simple Minds/Human League/Yaz(oo).

# Performance Controls

These are the controls to the left of the virtual keyboard. They affect how Mercury-4 responds to incoming pitch bender control messages (the Jupiter-4's pitch bend joystick could affect much more than just pitch), portamento, and master transposition.

## Bender Section

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The original Jupiter-4 had a joystick bender control that moved on a horizontal axis; it had no performance control for initiating modulation. Roland made up for the lack of mod control with a clever joystick implementation that allowed the joystick to control VCO pitch, VCF cutoff, VCA volume, or LFO mod to VCO, VCF, or VCA. The joystick mod can be combined dependent on the switch positions, and can be a very a musical and creative approach

**Bender Sensitivity**- Globally sets maximum bend depth for VCO, VCF, and VCA switches set to the *Bend* position.

**Bender LFO Amount**- Globally sets maximum LFO modulation amount for VCO, VCF, and VCA switches set to the *LFO* position.

**VCO switch**- Determines how incoming pitch bender messages affect oscillator pitch.

- **LFO**- Pitch bender applies LFO modulation to oscillator pitch. Upward bends adds positive modulation; downward bends add negative modulation.
- **Off**- VCO mod disabled.
- **Bend**- Behaves like a standard pitch bender with upward making notes sharp and downward bends making notes flat.

**VCF switch**- Determines how incoming pitch bender messages affect the lowpass filter (LPF) cutoff frequency. The highpass filter (HPF) is unaffected.

- **LFO**- Pitch bender applies LFO modulation to filter cutoff frequency. Upward bends adds positive modulation; downward bends add negative modulation.
- **Off**- VCF mod disabled.

- **Bend**- Upward bends opens filter cutoff frequency; downward bends add negative modulation.

**VCA switch**- Determines how incoming pitch bender messages affect the lowpass filter (LPF) cutoff frequency. The highpass filter (HPF) is unaffected.

- **LFO**- Pitch bender applies LFO modulation to amplitude. Upward bends adds positive modulation; downward bends add negative modulation.
- **Off**- VCA mod disabled.
- **Bend**- Upward bends increase overall amplitude; downward bends decrease overall amplitude.

**Portamento On/Off and Speed knob**- Also known as glide, *Portamento* causes notes to slide smoothly from one pitch to the next. Toggling the switch enables *Portamento*, and the *Speed* knob slows glide speed as it's increased. Portamento works in all voice modes; if you'd like to use it polyphonically, it works best (i.e., most predictable) in *Poly 2* mode.

**Transpose**- Transposes the pitch of the entire instrument up or down one octave.

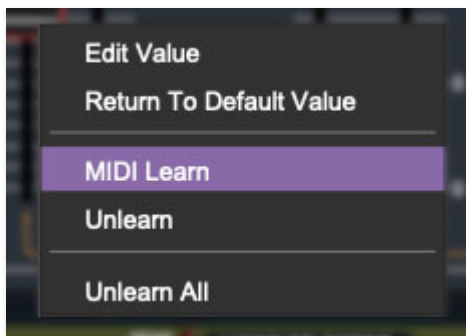
# MIDI Controllers Setup and The MIDI Tab

Assigning internal and external hardware controls adds a whole new dimension of control and musicality to patches, and it's really easy to do. The MIDI Tab is where all controller assignments can be viewed and tweaked. First we'll show how to assign an external hardware controller to a Mercury-4 control, then we'll go over all parameters in the MIDI Tab.

## Basic External Hardware Control Assignment

This is the quick, "I just want to assign a hardware control right now!," section. We recommend reading this whole section to best take advantage of Mercury-4's swift MIDI control assignments. We also recommend reading "*A Tree Grows In Brooklyn*" by Betty Smith, but that's not important right now.

In this example, we'll assign a hardware slider control to the filter cutoff frequency.



Begin by right-clicking on the *Freq* slider in the *VCF* section and selecting *MIDI Learn*. A transparent purple overlay appears over the slider indicating that it's in learn mode. Now move the desired hardware control device. The purple overlay disappears and the hardware control will move the onscreen slider. If you get cold feet (or accidentally put the wrong control into learn mode), learn mode can be aborted by right-clicking and selecting *Stop Learning*.

This is the basic procedure for assigning hardware controllers to almost any Mercury-4 control.



When in MIDI learn mode, any previously assigned controller numbers will show in squares. These indicate the MIDI continuous controller number of the assigned hardware control (these are also displayed in the *MIDI* library tab at left).

Once a MIDI controller has been assigned, in addition to real-time control of a Mercury-4 parameter, you'll also be able to record and play back controller data from a DAW.

## The MIDI Tab

This is command central for all MIDI controller assignments. Here you'll be able to see information about all currently assigned controllers and adjust control ranges.



To view or hide the MIDI Tab, click the *MIDI* button in the top toolbar.



MIDI Learn					
Name	Type	Value	Min	Max	Curve
VCF - LPF Cutoff Freq...	CC	1 (Mo...			
VCO - Range	CC	73 (S...			
VCO - Mod Depth	CC	75 (S...			
Master Volume	CC	73 (S...			
Trigger - Sync	Note	F2			

*MIDI Learn button*- This is almost exactly the same as enabling MIDI learn mode by right-clicking a control. Click the *MIDI Learn* button to enter learn mode (all controls turn purple). Unlike right-clicking on specific knobs, where Mercury-4 automatically exits controller assignment mode, clicking the *MIDI Learn* knob "stays on" to enable assignment of multiple hardware controls. This is handy for quickly assigning a bunch of sliders or the buttons of a grid-style controller.

To assign multiple controls, click *MIDI Learn*, click an on-screen control, move the desired hardware knob or slider, continue clicking and assigning on-screen controllers until all desired controls are assigned, then click *Stop Learning* to exit learn mode.

Remember that a single hardware knob/slider/button isn't limited to controlling just one parameter - a single hardware controller can simultaneously operate as many controls as you'd like.

## MIDI Tab Columns

*Name*- Displays the name of the parameter being controlled.

*Type*- There are five possible types of controller automation in Mercury-4:

- *Note*- Notes played on a MIDI keyboard controller, expressed as C-1 to G9
- *CC (MIDI Continuous Controller)*- The standard 128 MIDI controller numbers as defined in the MIDI spec. More specifically, these are the controllers transmitted by hardware knob and slider controls. MIDI CC's can be used to control parameters in real-time or recorded and played back within DAW software.

- *MMC (MIDI Machine Control)*- The MIDI control protocol for tape machine-style transport controls. Back in the dark ages, this was used to control wonky old Tascam and Fostex reel-to-reel monsters, but it's useful if your MIDI controller has tape-style transport control buttons.
- *Aftertouch*- Besides sounding like a 1979 Neil Diamond record, some keyboard controllers transmit controller data when keys are pressed and released as they're held down. The vast majority of keyboard controllers with aftertouch transmit "mono" aftertouch only; in other words, aftertouch data is the sum of all keys to one single data stream.
- *Key*- This allows keys of the computer QWERTY keyboard to act as button controls for Mercury-4's onscreen controls.

*Value*- Displays the specific automation controller. In the case of a *Note* this would show a MIDI note number (C-1 to G9, for a MIDI CC, this would be the MIDI CC controller number, etc. Clicking on the value opens a pop-up menu where all values are displayed and can be selected.

*Min*- Sets a limit on the lowest value any automation control can set a mapped controller to. This actually recalibrates the range of the automation controller to the remaining parameter range.

*Max*- Sets a limit on the highest value any automation control can set a mapped controller to. This actually recalibrates the range of the automation controller to the remaining parameter range.

- ***Super Tricky Min-Max Tricks***- Not only can parameter ranges be limited via the the *Min* and *Max* knobs, mapped control destinations can be completely inverted by setting the *Min* knob all the way up and the *Max* knob all the way down (or anywhere in between).

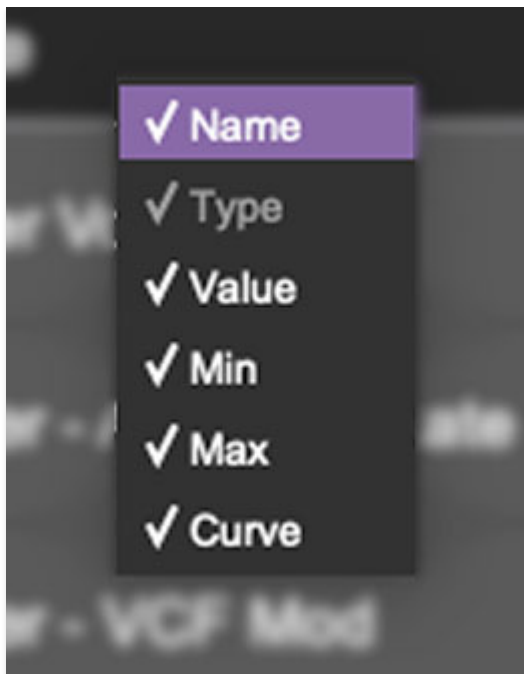
Limiting and inverting parameter ranges with the *Min/Max* controls is particularly useful when multiplexing a single hardware control to operate multiple parameters. Along with the *Curve* control, the customization possibilities are super flexible.

*Curve*- These allow the customization of how incoming MIDI CC controls affect the movement of Mercury-4's onscreen controls, ranging from exponential to linear to logarithmic curves.

## MIDI Tab Column Configuration

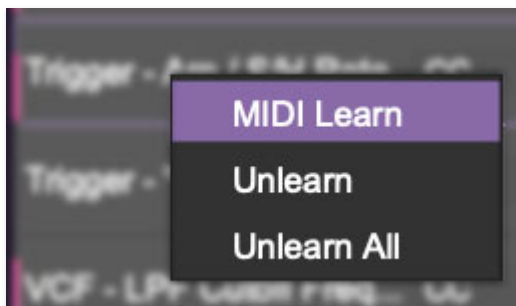
### Right-Click Menus

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Right-clicking anywhere in the top row (*Name*, *Type*, *Value*, etc.) displays the column configuration menu. Checking/unchecking these allows hiding and display of each column. This has no effect on assignments.

## MIDI Tab Parameters Right-Click



Right-clicking on an assigned parameter opens the menu above.

*MIDI Learn*- This is used to change the controller assigned to a particular parameter.

*Unlearn*- Deletes the selected automation parameter.

*Unlearn All*- Deletes all controller assignments for the patch. Mercury-4 will display a warning dialog prior to deletion in order to thwart potential unlearn-related disasters.

Mercury-4 supports MPE, short for "MIDI Polyphonic Expression." It's a specialized MIDI protocol enabling multidimensional controllers for controlling multiple parameters of individual notes. MPE specifies the MIDI messages used for three dimensions of control, regardless of how a particular controller physically expresses them. MIDI channel 1 is used as a master channel for global pitch bend, aftertouch, etc.; MPE utilizes MIDI channels 2-15 for the remaining controller data.

To enable MPE mode, click the *MPE* icon in the top tool bar (next to the *MIDI* assignment button). If you don't see the *MPE* button in the tool bar, you'll need to enable MPE in settings by clicking the *Settings* gear (next to the magnifying glass in the purple top menu strip), clicking *Interface*, then checking the *Enable MPE Mode* box at the bottom. Exit the *Settings* menu by clicking the *X* at the top right.



## MPE Control Tab

With MPE mode enabled, the *MPE* icon will be visible in the top tool bar, next to the *MIDI* button.

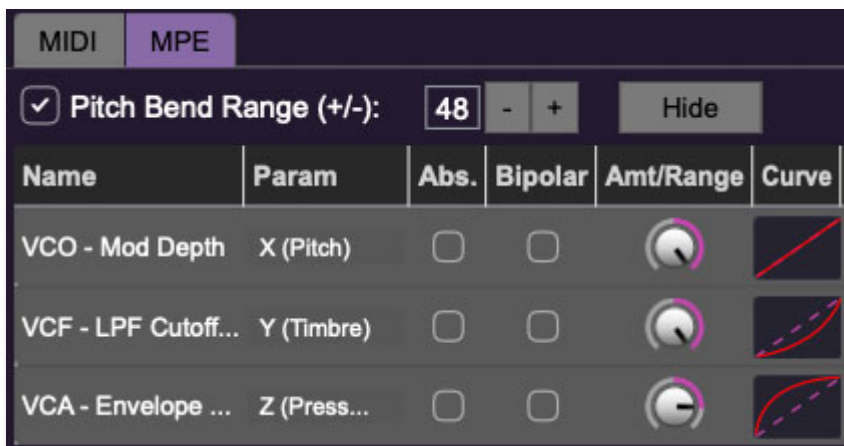
**Do not enable MPE mode if you're not using an appropriate MPE controller - Mercury-4 won't play correctly with a standard controller while in MPE mode.**

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A *MPE Enabled* icon appears beneath the *Assign Mode* buttons to make things extra clear.

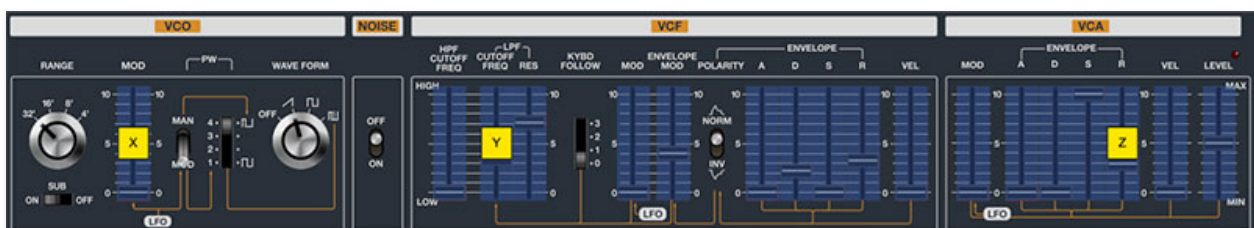


Click the *MPE* button in the purple top menu strip to reveal the MPE configuration tab.



**Pitch Bend check box and Range controls-** At the top of the tab is a checkbox which enables pitch bend; to its right is the pitch bend range control. Its default setting is 48 semitones (four octaves). For best results you will need to match this number with your MPE controller's pitch bend setting (most MPE controllers default to 48 semitones).

**IMPORTANT:** If MPE mode is enabled, you must use a MPE controller set to "Lower Mode" to achieve full MIDI control. If you're using a non-MPE MIDI Controller, or the QWERTY Musical Typing keyboard, only one mono voice will trigger.



*Show/Hide Button* - Clicking the *Show* button in the MPE panel highlights all of the available MPE mappable control sliders for the Mercury-4 with blue overlays. Click the *Hide* button to hide them. To map a control slider, right-click or [OPTION]+click (Windows)/ [CONT]+click (Mac) the slider you wish to map. This reveals the controller mapping menu. Select *MPE Assign*.

Options are:

*X (Pitch)*

*Y (Timbre)*

*Z (Pressure)*

**Note:** Some MPE controllers such as the Roli Seaboard may have as many as five dimensions of expression. Mercury-4 utilizes the three standard dimensions: *Pitch*, *Channel Pressure*, and *Timbre*. Also, not all MPE controllers are equipped with a master/global pitch bender.

Once mapped, the *Name* and *Parameter* will be visible in the MPE tab. A yellow square indicator (X,Y,Z) also appears atop each of the mapped controls.

### **MPE Tab Columns**

*Name*- Displays the name of the parameter being controlled.

*Parameter*- Displays and allows selection of the three controller types: *X (Pitch)*, *Y (Timbre)*, and *Z (Pressure)*.

*Absolute*- Sets the *Amt/Range* of the controller to absolute or relative control.

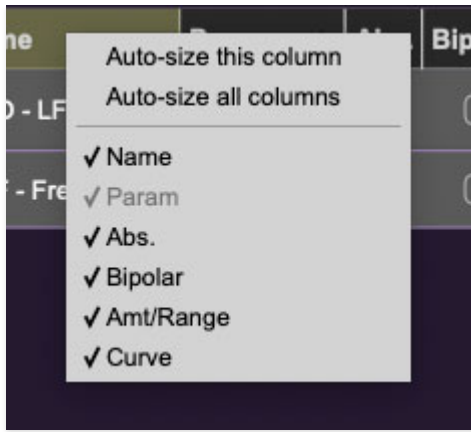
*Bipolar*- Enables bipolar controller, i.e. the ability to add and subtract the parameter amount, as opposed to positive only.

*Amount/Range*- Sets the intensity of control range. If set to *Absolute* mode, two knobs appear for min/max settings.

*Curve*- These allow the customization of how controller data affect the movement of onscreen controls, ranging from exponential to linear to logarithmic curves.

## **MPE Tab Column Configuration**

### **Right-Click Menus**



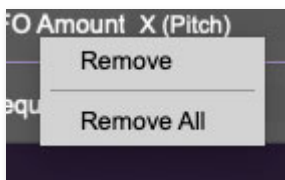
Right-clicking anywhere in the top row (*Name, Type, Value, etc.*) displays the column configuration menu.

*Auto-size This Column*- Automatically resizes so that all text in this column is visible.

*Auto-size All Columns*- Automatically resizes all columns simultaneously so that all text visible.

*Column View Filters*- Clicking any of these will hide or show the respective columns.

## MPE Tab Parameters Right-Click



Right-clicking on an assigned parameter opens the menu above.

*Remove*- Deletes the selected MPE controller parameter.

*Remove All*- Deletes all MPE controller assignments for the patch. Mercury-4 displays a warning dialog prior to deletion in order to thwart potential disasters.

## MPE Mappable Parameters

Below are all mappable Mercury-4 MPE parameters. Note that only polyphonic parameters (i.e. parameters that independently affect individual notes) can be mapped with MPE.

<b>SECTION</b>	<b>PARAMETER</b>
VCO	LFO MOD AMOUNT
NOISE	NOISE LEVEL
HPF	CUTOFF FREQUENCY
LPF	CUTOFF FREQUENCY
LPF	RESONANCE
LPF	LFO MOD AMOUNT
LPF	ENVELOPE MOD AMOUNT
LPF	ATTACK TIME
LPF	DECAY TIME
LPF	SUSTAIN LEVEL
LPF	RELEASE TIME
LPF	VELOCITY AMOUNT
VCA	LFO MOD AMOUNT
VCA	ATTACK TIME
VCA	DECAY TIME
VCA	SUSTAIN LEVEL
VCA	RELEASE TIME
<b>SECTION</b> VCA	<b>PARAMETER</b> VELOCITY AMOUNT



## Popular MPE Controller Devices

Following is a list of popular MPE controllers as of sometime in 2021. We're sure your persistent Sweetwater rep would love to sell you one (and later rattle you with 26 followup phone calls, just to check, "...how those Hosa™ dual 1/4" TRS cables were workin' out for ya?").

*Roli* - Seaboard

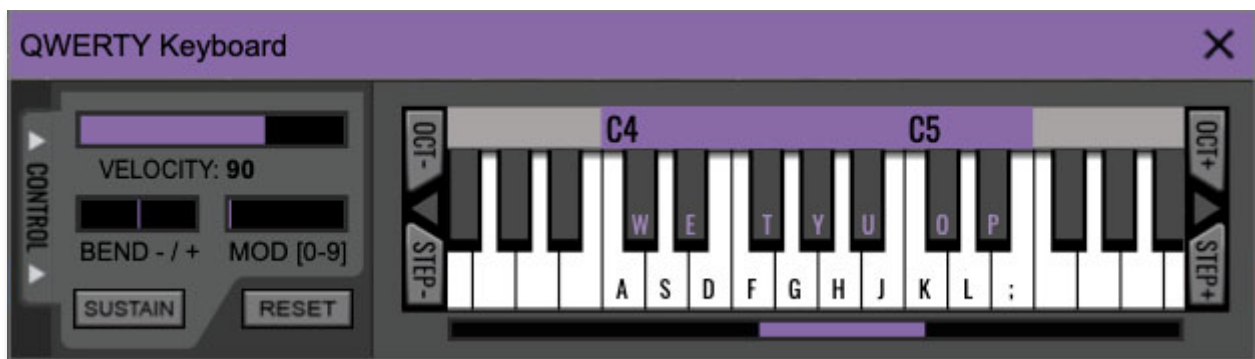
*Sensel* - Morph

*Expressive E* - Osmose

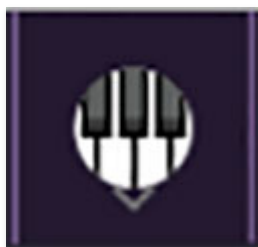
*Haken Audio* - Continuum Fingerboard

*Roger Linn Designs* - Linnstrument

*Artiphon* - Instrument 1



If you don't have a MIDI keyboard attached to your computer, the standard QWERTY computer keyboard can be used to play notes - we're pretty sure you've got one of those! We'll refer to this as the "MTK." Following is a list of MTK keyboard modifiers and functions:



**Opening and Closing the MTK** - click the the circular keyboard icon in the top toolbar. To close the MTK, click the keyboard icon in the top toolbar, or click the X in the top right corner.

**Play Notes-** To trigger notes, simply press the corresponding computer keyboard key or mouse click the onscreen keys.

**Adjust Currently Visible MTK Range-** Slide the purple scroll bar horizontally to adjust the currently visible keyboard range.

**Adjust Overall Visible Keyboard Range-** Clicking and dragging the right edge of the MTK window allows the overall size of the window to be adjusted. This lets you view more or less of the onscreen keyboard. Note that the MTK window's borders cannot exceed the overall outside dimensions of the Mercury-4 window.

**Shift Range Up/Down Octave-** Click the *Oct-* and *Oct+* buttons at the top left and right of the onscreen MTK. The current range is displayed above the keyboard.

**Shift Range Up/Down Semitone-** Click the *Step-* and *Step+* buttons at the bottom left and right of the onscreen MTK. The current range is displayed above the keyboard.

**Hide/View Controllers-** Clicking *Control* at the far left hides and displays velocity, bender, mod, and sustain control parameters. Hiding the control view makes more space available for the keyboard.

**Set Note Velocity-** Move the purple *Velocity* bar to adjust the output velocity of notes.

**Pitch Bend-** To pitch a note or notes, press the + or - computer keyboard keys while playing a note. Notes will bend up to an octave. Notes can also be pitchbent by clicking the mouse in the *Bend* area.

**Mod Wheel-** To add mod wheel modulation, press the number keys from 0-9 (above the character keys) while playing a note. The modulation amount will vary from none (0) to full modulation (9). Note that modulation will "stick" at the selected number; to disable modulation, click the 0 key. Mod can also be engaged by clicking the mouse in the mod bar area.

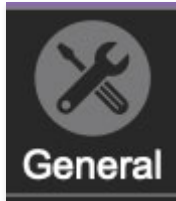
**Sustain-** The *Sustain* button mimics the functionality of a standard sustain pedal. Click the [TAB] key to engage sustain, or [SHIFT]+[TAB] to lock it. The *Sustain* button can also be engaged by mouse clicking it.

**Reset-** Initializes all MTK parameters including keyboard range and control parameters.

# Settings

Clicking the settings gear opens a window with multiple tabs for configuring various "under-the-hood" settings. These are mostly set-and-forget kind of parameters - all the stuff you'll want to tweak is on the front panel, as the heavens intended!

## General



- **Add Undo For Control Changes With The Mouse**- Enabling this allows undo of knob/slider/button adjustments. You'll want this on if you want the ability to undo all aspects of patch editing and programming.
- **Load Last Preset On Startup (Standalone Only)**- Automatically loads the last preset used when Mercury-4 standalone version is started.
- **Create A Log File For Usage**- This creates a text doc of all of Mercury-4's internal and routines during use. It is mainly intended for our tech staff should you experience any issues. Clicking *Show Log Folder* opens the folder containing Mercury-4 log file docs.
- **Preset Folder**- Displays the current location of Mercury-4's sound presets. This can be changed by clicking and typing in the field.
  - **Browse...** - Displays the current location of preset folder in the file manager.
  - **Set Default**- Sets the current displayed *Preset Folder* path as the default location
- **Clear Cache Files**- Deletes all log files, temporary sounds, and the image cache.



# Interface

Allows customization of Mercury-4's user interface settings.

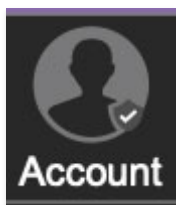
- **Reset To Default Window Size-** Resets the Mercury-4 workspace to 100%. Use this to reset the window size if Mercury-4's workspace somehow becomes too large for your display and can't be resized.
- **Tooltip Delay-** Tooltips are those informative bits of text that pop up when hovering over a control (go ahead and try it, we'll wait...). The *Tooltip Delay* setting defines how long you must hover before the tooltip pops up.
- **Knob Movement-** Defines which how mouse movements related to turning onscreen knobs. It defaults to *Vertical Drag*, but can be changed to *Horizontal Drag*, or *Rotary Drag* if you're one those folks that cut their teeth on the *Steinberg Model E VST* back in 2000.
- **On Control Double-Click-** Defines what happens when the mouse is double-clicked on a control. If *Edit Value* is selected, an exact number can be entered by typing the number and hitting [ENTER] or [RETURN]. If *Sets Default Value* is selected, double-clicking a control resets it to its default value.
- **Mouse Wheel Adjusts Control Value-** Enabling this lets you adjust knob, slider, and switch values by moving the mouse wheel. This works great with a standard mouse wheel, but you'll want to disable it if you're using an Apple Magic Mouse (which will move the control AND scroll the window).
- **Show Tooltips When Adjusting Controls With Mouse-** Displays parameter tooltips/values when the mouse is hovered over a control or as a control is moved with mouse button down.
- **Show Tooltips When Automating Controls-** Displays parameter tooltips/values next to controls a if a control is moved via an assigned MIDI controller or automation.
- **MIDI Program Changes Should Change Current Preset-** Allows MIDI program change messages to change Mercury-4 patches.
- **Ask To Save Modified Presets-** This opens a dialog window asking if you'd like to save changes if a patch has been edited and a new patch is selected. If you're the type that likes to click through presets and tweak a control here and there, it can be annoying to have a window pop-up

asking if you'd like to save every time you switch presets - if you're that person, keep this off.

- **Remember MIDI Mappings For New Plug-in Instances-** When enabled, Mercury-4 remembers all MIDI Tab controller settings.
- **Enable MPE Mode-** Short for "MIDI Polyphonic Expression," Mercury-4 supports MPE, a specialized MIDI protocol enabling multidimensional controllers for controlling multiple parameters of individual notes. Clicking this checkbox enables MPE mode and displays the MPE icon in the top toolbar

To use MPE mode, you'll need a MIDI hardware controller capable of transmitting MPE (such as the Roli Seaboard, Haken Continuum, etc.).

See the **MIDI MPE Settings** section for full information.



## Account

Settings for your personal login information and account.

- **Email-** Displays the email address of the current login.
- **Update Login Info-** Clicking this opens the same email and password login screen you'll see when initially launching Mercury-4. Click [here](#) for updates about yacht rock superstar, Kenny Loggins.
- **View Account Settings-** This opens your personal account page on the Cherry Audio Store website containing information about modules purchased and more.

### Software Update

- We often fix bugs and make improvements; below are options defining how Mercury-4 handles updates.
- **Check For Update-** Click this to see if an updated version of Mercury-4 available.

### Status-

- **Automatically Install Updates-** Updates are automatically downloaded and installed.
- **Ask Before Installing Updates-** By default, Mercury-4 automatically downloads new versions of modules when available. Checking this box defeats automatic updates and will ask if you'd like to install updates when they become available.

We'll never make changes that can potentially "break" existing patches but we recommend enabling *Ask Before Installing Updates* if you're using Mercury-4 for live performances or other "mission critical" situations.

- **Never Install Updates-** Mercury-4 never automatically installs updates.
- **Show Updates On Toolbar-** Checking this will display an icon in the toolbar next to the logo letting you know there's an update available.

**Show Notifications From Cherry Audio-** We occasionally will fire off in-app advertisements; disabling this checkbox will hide them. We hate repetitive, annoying ads as much as you, so we won't use this feature too often. When we do, it'll be for something super cool (like a killer sale), so we recommend leaving it on.



## Audio/MIDI

Settings for audio and MIDI hardware input and output.

**This tab is only visible in the standalone version of Mercury-4.**

- **Output-** Use this drop-down menu to choose a physical audio output source. This defaults to *Built-In Line Output*, i.e. your computer's onboard system audio, but you'll get better fidelity with an external professional audio interface. The biggest audible difference is usually reduced background noise or hum, but external audio hardware also offers greater flexibility in terms of number of inputs and outputs and built-in mic or low-level instruments pres (i.e. electric guitars). These are especially useful if you're using Mercury-4's external inputs to process sound. The *Test* button

will produce a sine wave when clicked; this will help with troubleshooting, aka, “WHY THE HECK ISN’T THIS MAKING ANY NOISE?!?”

- **Sample Rate-** This sets Mercury-4’s global sample rate. Lower sample rates offer better performance, but if you have a fast computer, high sample rates may offer slightly improved fidelity.
- **Audio Buffer Size-** As with any digital audio app, this defines performance vs. note latency, and will largely depend upon computer CPU speed. A professional external audio interface will almost always exhibit better performance than “built-in” system audio. Lower settings will result in less latency (in the form of faster response to notes played), but will increase the chances of audio gapping or crackling noise.
- **Active MIDI Inputs-** Displays all available MIDI input sources, i.e. keyboards, pad controls, MIDI knob/fader control surfaces, etc. Check boxes to enable one or more devices. **If notes aren't playing when using Mercury-4 in standalone mode check to make sure your USB/MIDI controller is checked in this area.**