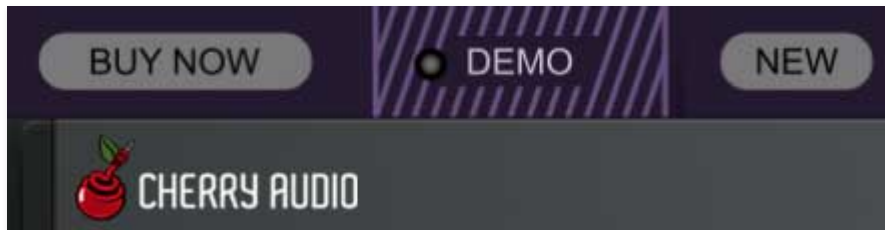The Cherry Audio DCO-106 is a virtual polyphonic synthesizer that precisely models every aspect of the beloved classic Juno-106 synthesizer, from its self-oscillating filter to its dreamy chorus effect. We added a few features such as an arpeggiator (much like the earlier Juno-60), more extensive LFO

features, and delay and reverb effects, but we were very careful to maintain the quick "hands-on" user interface that makes the original Juno synths so easy to use.

Pre-Purchase Demo Mode

If you haven't purchased the full version of DCO-106, 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 DCO-106 is purchased.
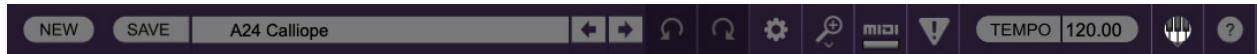
Technical Assistance

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=38

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

https://cherryaudio.kayako.com/

Top Toolbar and Preset Browser

The purple strip at the top of the DCO-106 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:
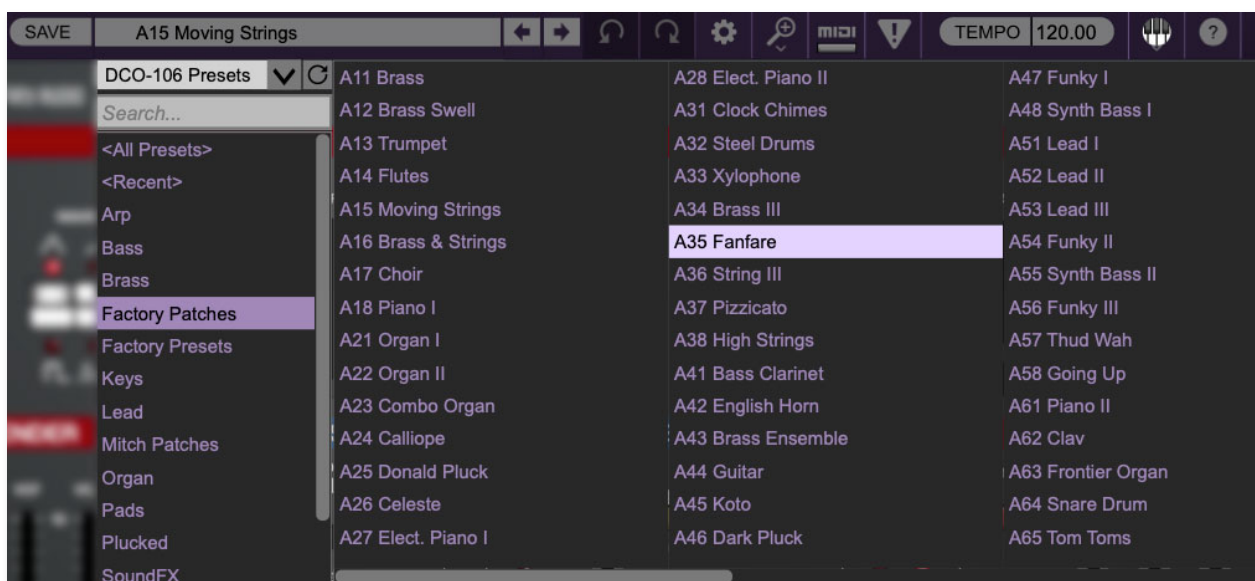
New- Opens a new blank patch preset. If an unsaved patch is currently open or you've modified an existing saved patch, a dialog asks if you'd like to save the patch in its current state. This greatly reduces the possibility of losing an edited unsaved patch.

Save- 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 *DCO-106 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.
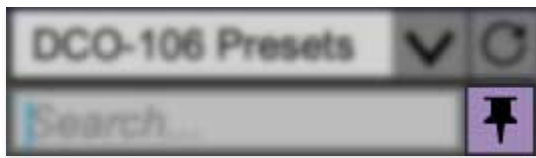
- **Categories**- Within each *Collection* are a number of sound categories. As with collections, you're free to create as many categories as you like. To create a category, click in the *Category* text field of the *Save* dialog window and type a new category name.

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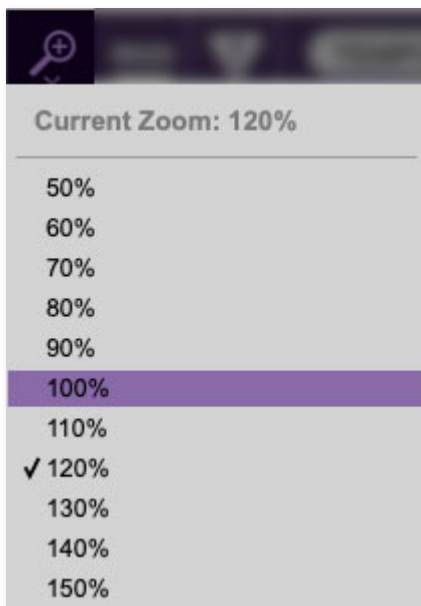
Pin - Clicking the push-pin icon locks the patch selection list open, allowing fast and easy browsing and auditioning of patches. Click the icon again to disable pin mode. when in pin mode, the up and down arrow keys can be used to select patches.

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 DCO-106 interface. Selecting *100%* returns the user interface to native size.
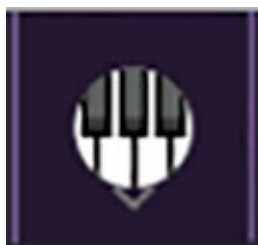
MIDI Tab- Opens the MIDI controllers tab for configuring internal and hardware MIDI controls. See the **MIDI Controllers Setup and MIDI Tab** section for full information.

MPE Tab- Short for "MIDI Polyphonic Expression," DCO-106 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 DCO-106's current internal tempo setting. DCO-106's internal tempo affects the *LFO*, *Arpeggio*, and *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 DCO-106. 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) s**ection.

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

DCO-106 logo (upper-right corner)- Clicking this displays "about" information, and shows the version number and current registered user ID.
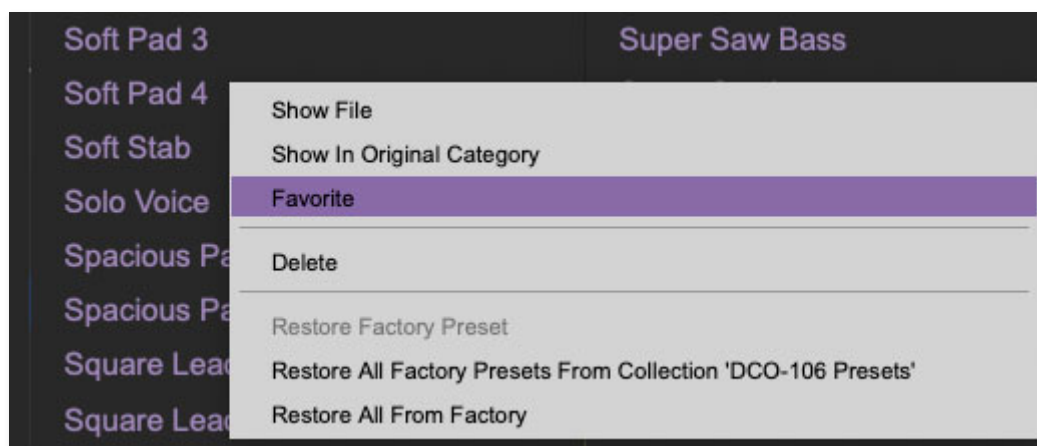
Focus Button

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 DCO-106'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

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 'DCO-106 Presets'- If any patches from the "factory" DCO-106 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 DCO-106 bank mentioned above is the only factory bank, so this function and the *Restore All Factory Presets From 'DCO-106 Presets'* above have the same effect.

LFO Section

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

Mod Wheel Switch- This is a really handy, but potentially confusing feature, so don't skim this section. If the switch is in the *Off* position, the LFO is always "on." Its effects will be immediately audible by moving the LFO sliders in the DCO, 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 very 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 triangle, ramp, sawtooth, square, random, and sine waves. Only one waveform is available at any time.

Rate- Sets the LFO rate from 0.1 to 30 Hz with *Sync* disabled (i.e. free-run mode).

Sync- Engaging the *Sync* button locks the LFO 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.

Delay- Moving this slider up gradually delays the onset of LFO depth. The delay time can be set from 0 to 5 seconds. Because DCO-106 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. The LED above the slider gradually illuminates to visually indicate the fade; the LFO is at full intensity when the LED is fully illuminated.

When the *Mod Wheel* switch is in the on position, the *Delay* slider grays out and is disabled (because you wouldn't want the onset of LFO mod delayed when controlling mod amount with a mod wheel).

DCO Section

DCO-106 accurately models the unique master clock and divider architecture used in the original Juno synth oscillators, as well the quirks of the waveform shapes.

Range- Sets the basic pitch range of the oscillator, displayed in traditional organ footage.

Wave Select buttons- These allow selection of ramp, pulse, or both waves simultaneously.

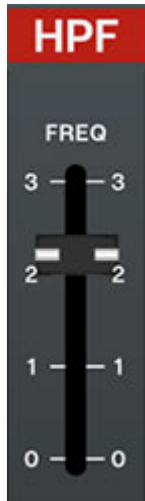**Pulse Width and LFO/Env/Manual Switch-**

- **Man position**- The *Pulse Width* slider sets the width or "duty-cycle" of the pulse wave. Setting the slider to zero outputs a perfect square wave, i.e. 50% duty-cycle. Moving the slider upward narrows its pulse width as well as the thickness of sound until it almost disappears.

- **Env position**- Pulse width is modulated by the envelope generator, and the *Pulse Width* slider determines how much modulation is added (with greater settings thinning the pulse width).

- **LFO position**- Pulse width is modulated by the onboard LFO (often abbreviated to PWM). The modulation depth is set by the *Pulse Width* slider, and the rate is defined by the LFO section Rate slider.

LFO slider- Adds frequency modulation from the hard-wired low-frequency oscillator section immediately to the left of the DCO.

Sub slider- Adds a square wave one octave beneath the current range selection, useful for adding girth to oscillator tones.

Noise slider- Sets the level of the white noise generator. Both oscillator wave buttons can be disabled if white noise only is desired.
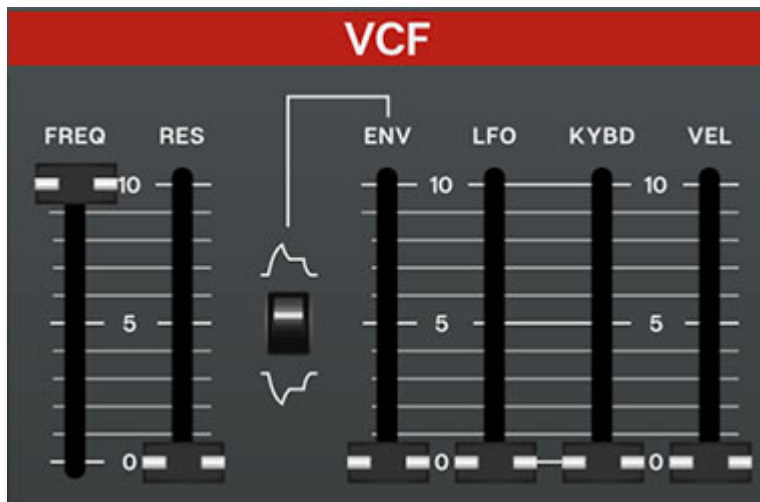
HPF Section

A highpass filter removes low frequencies as its cutoff frequency setting is increased, resulting in a thinning out of sound. The highpass filter section is a simple, non voltage-controlled affair, and acts more like a thickness control than a full-fledged filter.

Freq- Sets where low-frequency attenuation begins, from 0 Hz to 800 Hz.

VCF Section

The VCF section is a 24 db/oct lowpass filter that removes high frequencies as its cutoff frequency setting is decreased from max, resulting in a dulling of sound. DCO-106 features a super-accurate emulation, with particular attention paid to the original Juno's non-linear self-resonating characteristics - phew, that's a mouthful, but all you gotta know is that DCO-106 sounds just like the real thing!

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.

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. DCO-106'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, screamy, dog-terrifying (and speaker blowing) occurrences.
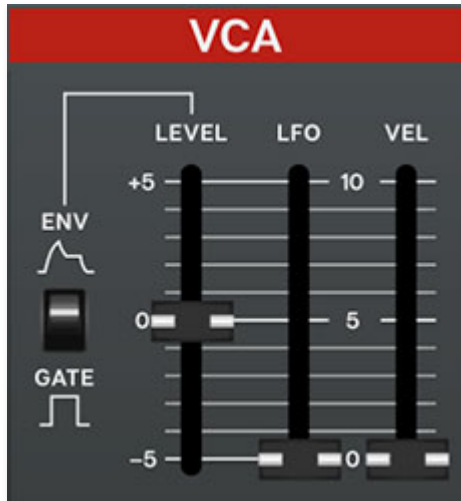
Env Slider and Mod Invert switch- The *Env* slider sets the amount of envelope modulation applied from the envelope generator. With the invert switch in the up position, envelope mod affects the cutoff frequency positively. In the down position, envelope mod is inverted for "reverse" effects.

LFO- Adds cutoff frequency modulation from the onboard low-frequency oscillator section.

KYBD- This is short for "keyboard" and 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* slider adds a rising CV to the cutoff frequency in order to maintain the brightness of notes as higher pitches are played.

VEL- Short for "velocity," this allows keyboard velocity to control the filter cutoff setting. Increasing the amount adds sensitivity; lightly played notes will reduce the filter cutoff setting.

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.
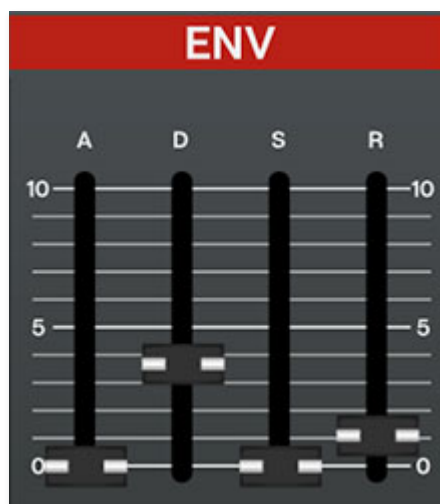
Level- In the original Juno synths, this acted as a master volume control, in order to balance volume levels between presets. Typically this gets set to the center zero setting, and volume can be added or subtracted by moving it up or down.

Env/Gate Switch- The original Juno synths included a single envelope generator that had to perform double-duty, applying to the lowpass filter as well as the VCA sections. In order to add some flexibility, the *Env/Gate* switch effectively disconnects the envelope generator from the VCA. If the *Env/Gate* switch is in the *Env* (up) position, the envelope generator affects amplitude (VCA) and filter cutoff (if the the VCF Env slider is up) simultaneously. If the switch is in the down *Gate* (down) position, the envelope generator still affects filter cutoff, but note amplitude will instantly turn on and off, like an organ.
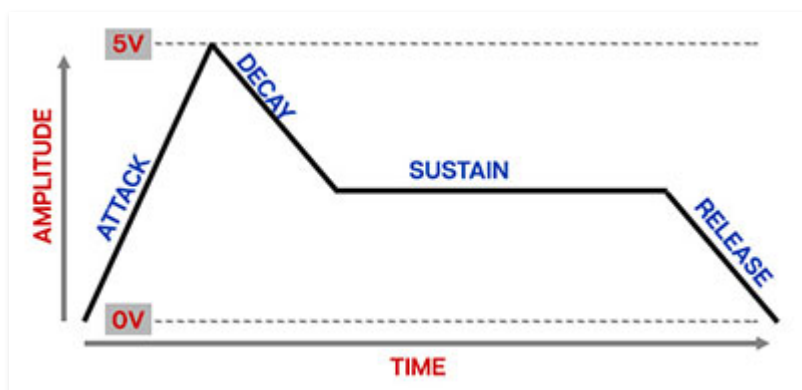
LFO- Adds amplitude modulation from the low-frequency oscillator. Though the original Juno synths did not have an LFO mod slider, it's useful for tremolo and other volume-based effects.

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.

ENV Section

The envelope generator section is a standard ADSR envelope generator used to shape amplitude curves and/or filter CV. If you're not familiar with the operation of envelope generators, here's an overview:

When DCO-106 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.
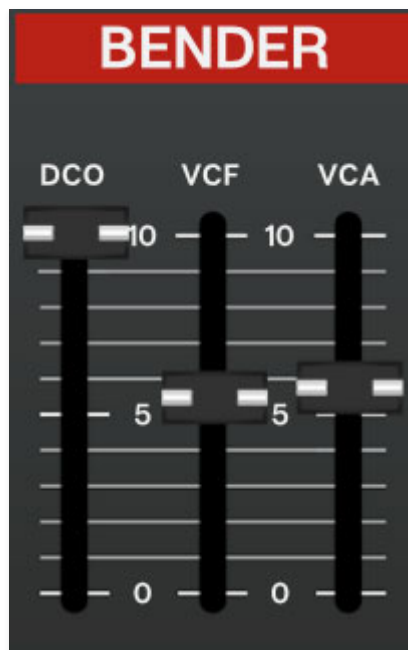
"A" (Attack) slider- Defines the length of time for voltage to rise from 0V to 5V when a key is played.

"D" (Decay) slider- Defines the length of time for voltage to fall from the attack stage 5V peak to sustain stage setting.

"S" (Sustain) slider- Sets the voltage level following attack and decay phases while a note is held.

"R" (Release) slider- Defines the length of time for voltage to fall from sustain level to 0V when a key is released.

Bender

Besides being the bully-turned-preppy-Claire's-boyfriend in "The Breakfast Club," *Bender* allows control of the DCO, VCF, and VCA sections using a controller's pitch bend wheel or joystick.

DCO- Sets the bend depth up to a maximum of one octave up or down.

VCF- Allows control of filter cutoff via pitch bend wheel or joystick. At maximum setting, it covers the entire cutoff range in either direction.

VCA- Allows control of VCA level via pitch bend wheel or joystick. At maximum setting it adds or subtracts 10 db in either direction.

Voice Assign

DCO-106 can play up to 16 simultaneous polyphonic voices. The *Voice Assign* section regulates how these voices are played.

Number Of Voices and LED display- Sets and displays the maximum number of notes that can simultaneously play, from 2 to 16. Increase or decrease the total voices with the up/down arrow keys.

Voice Assign Modes

- **Poly 1**- This is the standard polyphonic mode. If the number of notes played exceeds the current maximum setting, it uses a sophisticated allocation scheme to steal the most recently played notes. In use, this means if you're holding a bass note with your left hand, it won't disappear while playing chords and melodies with your right hand. Suffice to say, running out of polyphonic voices with DCO-106 is far less of concern than with a real Juno synth as DCO-106's polyphony can be set up to 16-voices (compared to a Juno's six voices).

- **Poly 2**- Poly 2's allocation is optimized for use with DCO-106's portamento (glide) function - it does an impressively 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).

- **Mono**- One note can be played a time with one voice sounding. *Number Of Voices* will change to 1 when *Mono* is selected. *Mono* mode uses last-
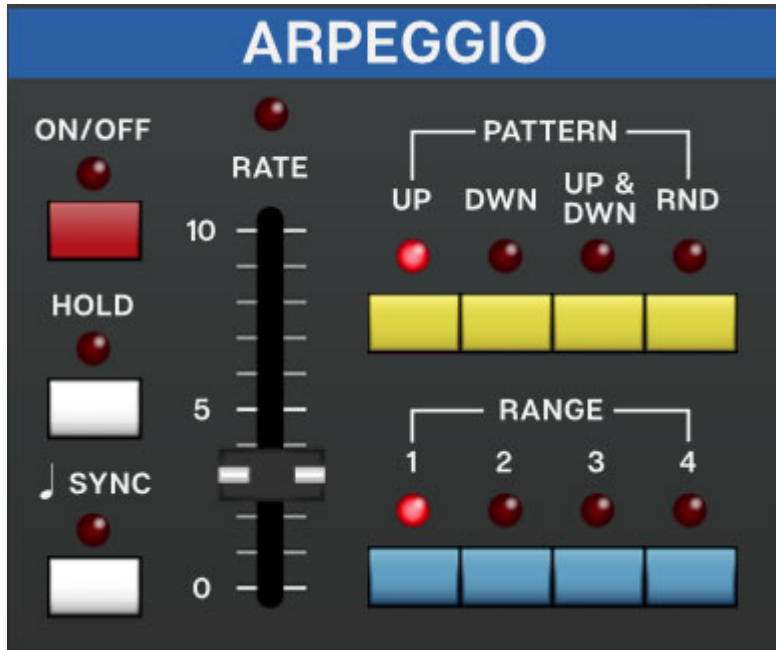
note priority - this means the most recently played note will always sound.

- **Unison button and Detune knob**- One note sounds at a time. Multiple voices will "stack" according to the current *Number Of Voices* setting. The *Uni* button should be used in conjunction with the *Detune* knob which minutely "spreads" the tuning of the oscillators for fat sounds.

- **Chord Memory**- Allows chords to be memorized and played with single keys. To memorize a chord, click the button. The LED flashes to indicate 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.

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.

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. Though the original Juno-106 synth did not have any arpeggiator, the The DCO-106 *Arpeggio* section closely replicates the functionality of the Juno-6/Juno-60.

On/Off- Enables and disables the *Arpeggio* section.

Rate- Sets the rate of the arpeggiator.

Pattern- These buttons select the order in which the notes of the chord will be played. *Up* plays the notes in order from lowest to highest, *Dwn* from highest to lowest, *Up&Dwn* will play the notes from lowest to highest then back to lowest again (the highest and lowest note will be played twice in a row) and *Rnd* will randomly cycle through notes.
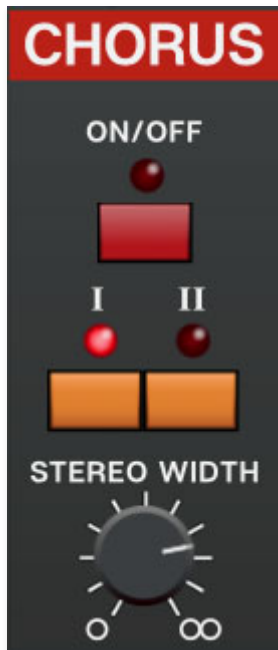
Range- Selects how many octaves the pattern will play before repeating.

Hold- When engaged, arpeggios continue to run without having to continuously hold down keys. This allows you to play a series of chords without the arpeggiator stopping as keys are released. Be aware that it will not stop until you disengage the button again. Mapping this to a sustain pedal or button on a MIDI controller can be useful for conveniently toggling this on and off.

Sync- Engaging the *Sync* button locks arpeggio timing 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.

Effects

Chorus

On/Off- Enables and disables the chorus effect.

I / II buttons- These set the amount of chorus effect. The *I* and *II* positions are very similar, but the mod speed is slightly faster in the II position.

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

Delay

On/Off- Enables and disables the delay effect.

Time- Sets delay time, from 1 to 2000 ms. If the *Sync* button is enabled, time settings snap to synchronized note values. The LED number display shows the current time.

Feedback- Routes the output to the input for additional repeats. Be careful at high settings as this can result in runaway feedback madness.

Damp- Attenuates high-frequencies as the slider amount is increased. Not only does this create more natural sounding decays, it also reduces the "stacking" effect that occurs with high feedback levels.

Mix- Balances the level of dry and wet signal.

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.
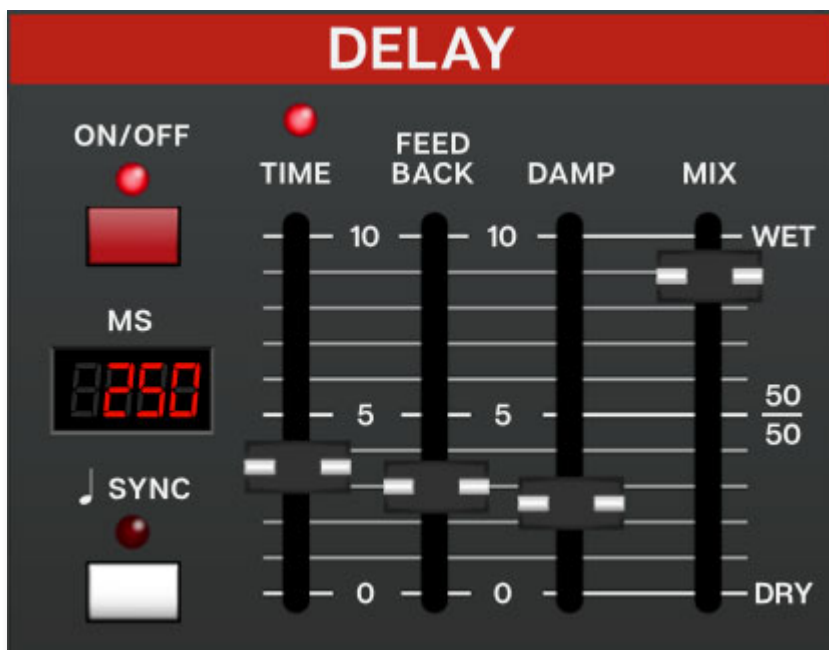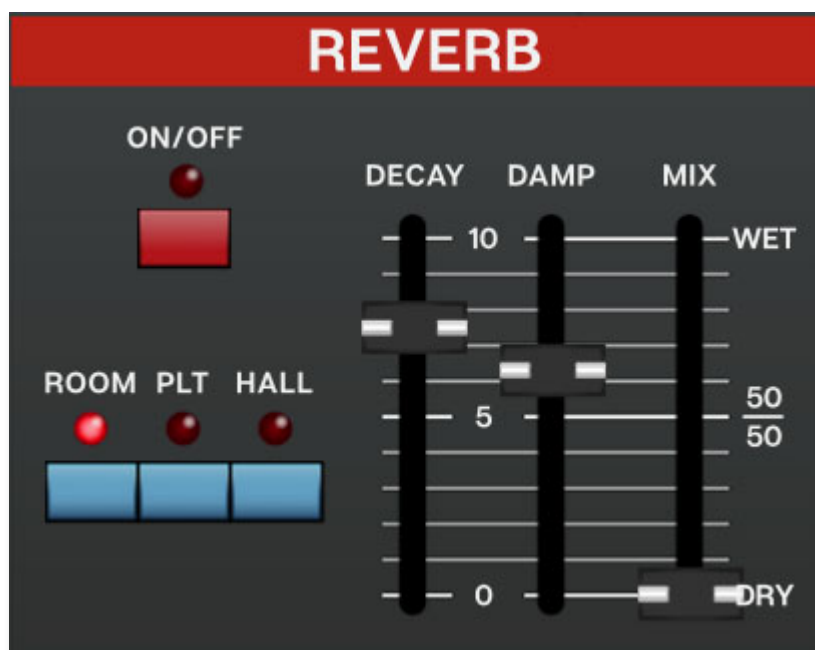
Reverb

On/Off- Enables and disables the reverb effect.

Decay- Sets the overall length of reverb; the actual time varies dependent on the reverb type.

Reverb Type - Room/Plate/Hall- Allows selection of three different types of reverb.

Damp- Attenuates high-frequencies as the slider amount is increased for more natural reverb sounds.

Mix- Balances the level of dry and wet signal.

Master Section

Volume- Sets DCO-106 master volume.

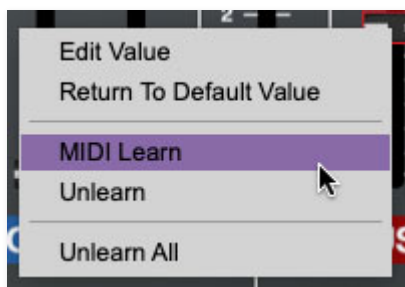**Tuning**- Sets master tuning up or down by a half-step.

Output Meters- Not really a control, but this displays the master output. Like any other meter, it's best to keep this guy out of the red.

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 DCO-106 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 DCO-106'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 DCO-106 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).

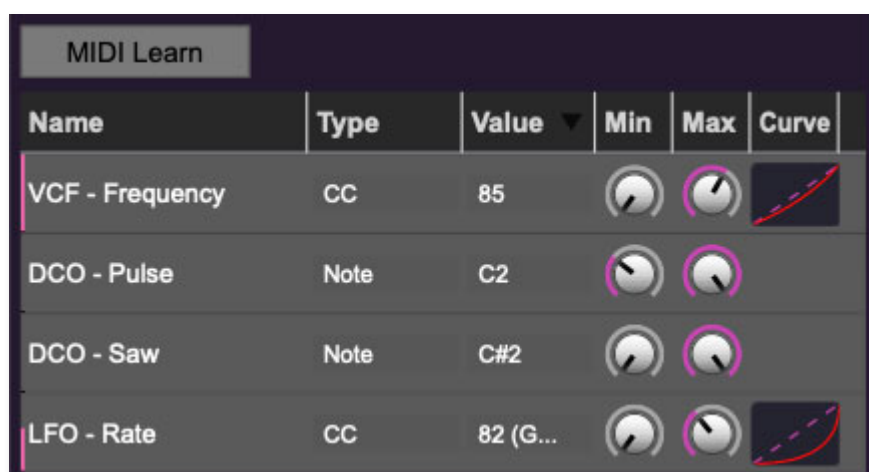Once a MIDI controller has been assigned, in addition to real-time control of a DCO-106 parameter, you'll also be able to record and play back controller data from a DAW.

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 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 DCO-106 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 DCO-106:

- *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 at as button controls for DCO-106'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.
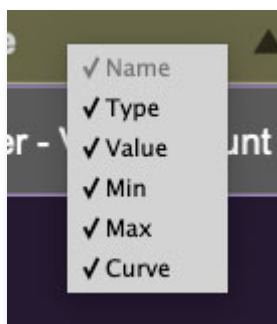
- **Super Tricky Min-Max Tricks***-* Not only can parameter ranges be limited via the the *Min* and *Max* knobs, mapped control destinations can be completely inverted by setting the *Min* knob all the way up and the *Max* knob all the way down (or anywhere in between).

  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 DCO-106's onscreen controls, ranging from exponential to linear to logarithmic curves.

MIDI Tab Column Configuration Right-Click Menus

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. DCO-106 will display a warning dialog prior to deletion in order to thwart potential unlearn-related disasters.
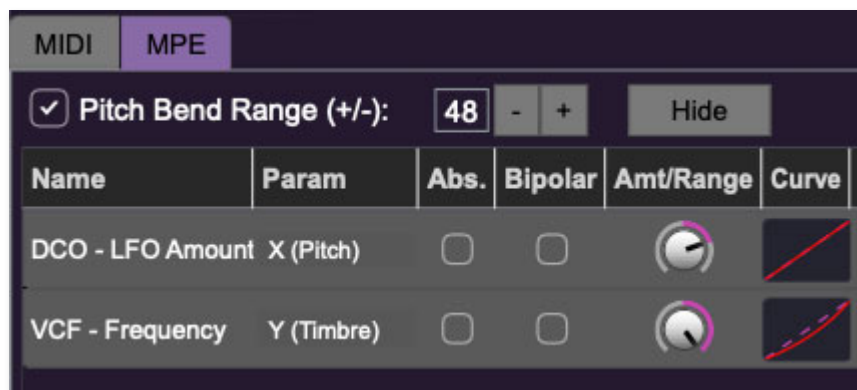
DCO-106 supports MPE, short for "MIDI Polyphonic Expression." It's a specialized MIDI protocol enabling multidimensional controllers for controlling multiple parameters of individual notes. MPE specifies the MIDI messages used for three dimensions of control, regardless of how a particular controller 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), 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. Click the *MPE* button to reveal the MPE configuration tab.
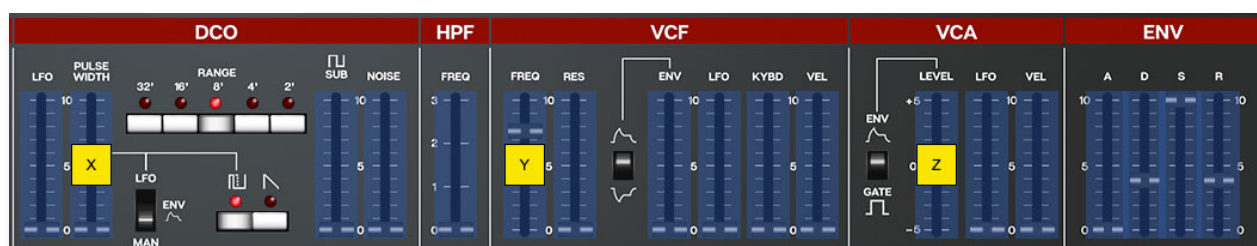

Do not enable MPE mode if you're not using an appropriate MPE controller - DCO-106 won't play correctly with a standard controller while in MPE mode. And don't run by the pool, you'll put an eye out!

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.

ANOTHER IMPORTANT THING: MPE control does not work if the arpeggiator is engaged. This is because arpeggiators essentially place DCO-106 into "mono" keyboard mode.

Show/Hide Button - Clicking the *Show* button in the MPE panel highlights all of the available MPE mappable control sliders for the DCO-106 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. DCO-106 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).*
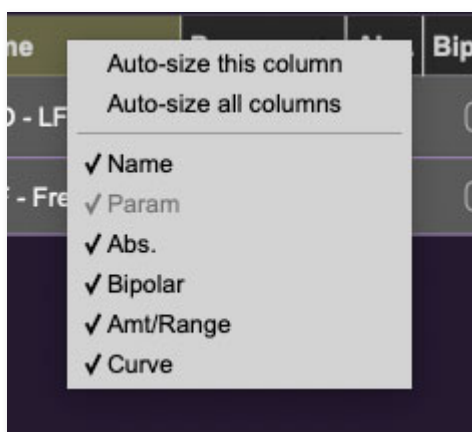
Absolute- Sets the *Amt/Range* of the controller to absolute or relative control.

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 DCO-106's onscreen controls, ranging from exponential to linear to logarithmic curves.

MPE Tab Column Configuration Right-Click Menus

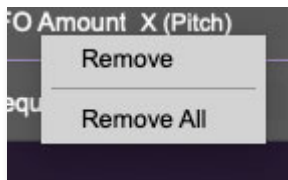Right-clicking anywhere in the top row (*Name*, *Type*, *Value*, etc.) displays the column configuration menu.

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. DCO-106 displays a warning dialog prior to deletion in order to thwart potential disasters.

MPE Mappable Parameters

Below are all mappable DCO-106 MPE parameters. Note that only polyphonic parameters (i.e. parameters that independently affect individual notes) can be mapped with MPE.

DCO LFO Amount
DCO PW Amount
DCO SUB OSC Level
DCO NOISE Level

HPF Frequency

VCF Frequency
VCF Resonance Amount
VCF Envelope Amount
VCF LFO Amount
VCF Keyboard Amount
VCF Velocity Amount

Attack Time
Decay Time
Sustain Level
Release Time

VCA Level
VCA LFO Amount
VCA Velocity Amount

Popular MPE Controller Devices

Following is a list of popular MPE controllers as of 2021. We're sure your persistent Sweetwater rep is just dying to sell you one (and call 26 times to

see, "...how those guitar picks were workin' out for ya?")
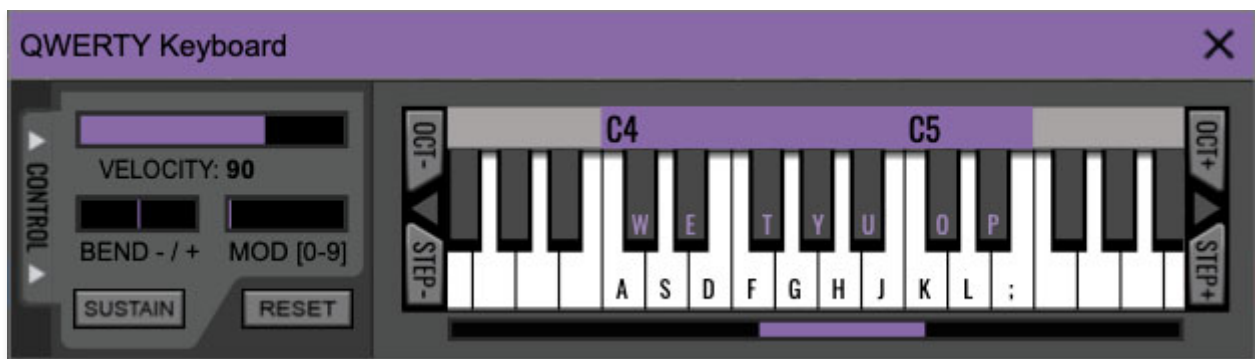
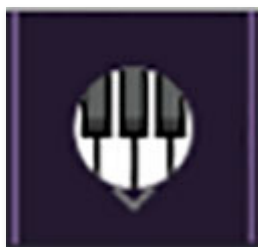*Roli* - Seaboard

Sensel - Morph

Expressive E - Osmose

Haken Audio - Continuum Fingerboard

Roger Linn Designs - Linnstrument

Artiphon - Instrument 1

Roli - Seaboard

Sensel - Morph

Expressive E - Osmose

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 MTL 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 DCO-106 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. This will only be audible if the *VEL* sliders in the *VCF* or *VCA* sections are raised.

Pitch Bend- To pitch a note or notes, press the + or - computer keyboard keys while playing a note. Bend depth is determined by the *DCO* slider in the *Bender* section. 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.
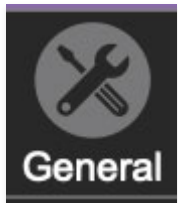
Sustain- The *Sustain* button mimics the functionality of a standard sustain pedal. Click the [TAB] key to engage sustain, or [SHIFT]+[TAB] to lock it. The *Sustain* button can also be engaged by mouse clicking it.

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 DCO-106 standalone version is started.

- **Create A Log File For Usage-** This creates a text doc of all of DCO-106'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 DCO-106 log file docs.

- **Preset Folder-** Displays the current location of DCO-106'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 DCO-106's user interface settings.

- **Reset To Default Window Size-** Resets the DCO-106 workspace to 1347x514 pixels. Use this to reset the window size if DCO-106'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 how mouse movements relate 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 On Any Control Change-** Displays parameter tooltips/values next to controls any time a control is changed, i.e. if a control is moved via an assigned MIDI controller or a *Perform* panel knob, etc.

- **Show Control Tooltips Under Mouse-** Displays parameter tooltips/values when the mouse is hovered over a control or as a control is moved with mouse clicked.

- **MIDI Program Changes Should Change Current Preset-** Allows MIDI program change messages to change DCO-106 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, DCO-106 remembers all MIDI Tab controller settings.

- **Enable MPE Mode-** Short for "MIDI Polyphonic Expression," DCO-106 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**- No, this isn't a place for news and tour dates for yacht rock superstar, Kenny Loggins. Clicking this opens the same email and password login screen you'll see when initially launching DCO-106.

- **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 DCO-106 handles updates.

- **Check For Update-** Click this to see if an updated version of DCO-106 available.

  Status-

- **Automatically Install Updates**- Updates are automatically downloaded and installed.

- **Ask Before Installing Updates**- By default, DCO-106 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 DCO-106 for live performances or other "mission critical" situations.

- **Never Install Updates**- DCO-106 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 DCO-106.**

- **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 DCO-106'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 DCO-106'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.

Roland Juno-106 Control

The original Juno-106 has an often overlooked feature that allows it to send its patches and control position data via MIDI SysEx. We've designed DCO-106 to take advantage of this in two ways - its controls can be used as a "hardware surface controller" for DCO-106, and Juno-106 programs can be instantly copied to DCO-106 by simply selecting them. This makes creating and transferring sounds for DCO-106 really fast and easy.

Keep in mind that because the Juno-106 is an almost 40-year-old analog synthesizer, its calibrations will vary from instrument to instrument. As result, DCO-106 patches recreated with identical control settings may not sound *exactly* the same. Certain parameters may need to be tweaked for a perfect match, but with that said, we very carefully matched all aspects of the original Juno-106 sound and controls, so you should get pretty darn close.

Configuring a Juno-106 To Transmit Control and Patch Data

The *Function* switch on the Juno-106's back panel needs to be set to the *III* position for all this magic to work. Note that because it uses MIDI System Exclusive data, MIDI channel settings won't affect its operation (MIDI SysEx is not channelized and will not have unintended affects on other instruments or plug-ins.)

Control via Juno-106 Sliders, Switches, and Buttons

All Juno-106 sliders, switches, and buttons in the red top section (*LFO*, *DCO*, *HPF*, *VCF*, *VCA*, *ENV*, and *Chorus*) will transmit controller data via MIDI. Changing programs with the blue *Bank* and *Patch Number* buttons will also change DCO-106 programs (if they don't, make sure *Settings>Interface>MIDI Program Changes Should Change Current Preset* is enabled).

Duplicating Juno-106 Patches via MIDI SysEx

If the Juno-106 rear panel *Function* switch is set to position *III*, selecting a patch on the Juno-106 will instantly transmit the patch data to DCO-106 via MIDI SysEx. As discussed in the intro paragraph, the resulting DCO-106 patch may sound slightly different due to instrument age and calibration, but will likely require little tweaking to achieve a very close match.

About SysEx Dumps: Not that the original Juno-106 has no facility for sending or receiving entire patch banks - it can only send and receive single patches. Remember that these were EARLY days of MIDI, and that its patch send and receive capabilities weren't intended for computer MIDI editor/librarians - this function was intended for sending patches back and forth between multiple Juno-106's.

As a result, entire Juno-106 banks cannot be sent to DCO-106. However, Juno-106 single patch SysEx dumps can be recorded to a DAW and "played" into DCO-106.