MIDIMONO

MIDI-CONTROLLED DUAL-OSCILLATOR MONOPHONIC SYNTHESIZER

MIDIMONO for Voltage Modular is an analog-flavoured MIDI-controlled dual-oscillator monophonic synthesizer module. MIDIMONO is a self-contained instrument that runs inside Voltage Modular - simply connect MIDI in and audio out(s) to your host and you're good to go! MIDIMONO also has an optional stereo processing section, including a version of our popular AULDELAY effects module. Please be sure to check out the included presets to give you an idea of what MIDIMONO is capable of - from big old-school basses and epic leads, to crazy sci-fi effects!

We hope you enjoy MIDIMONO! -Rob and the team @ waverley-instruments.com

OVERVIEW

MIDIMONO is a little unusual for a Voltage Modular instrument module as it is controlled via MIDI instead of CV. In many ways, this is more like having a synth plugin running inside Voltage Modular without needing a separate plugin host module. We created MIDIMONO for those times you need an instantly playable mono synth for a bass or lead sound and you don't want to rely on an external plugin or create a synth from scratch. If you were to create MIDIMONO using basic module building blocks such as oscillators, envelopes, filters and so on, you would need around 20 modules and processors.

We chose MIDI-control as MIDIMONO is an instrument designed very much to be played so things like velocity, pitch-bend and mod-wheel are easily handled. We've also pre-mapped some performance-oriented controls to MIDI CCs - please see the MIDI CC MAPPING section at the end of this guide for details. MIDI will also be useful further down the line for future developments. In cases where you'd prefer to use CV, there are various 3rd-party modules available for converting CV to MIDI.

Note: MIDIMONO LITE *is a reduced feature set version of MIDIMONO without the stereo processing section and numeric patch pad / display.*

CONNECTIONS

Simply connect MIDI either from the host (FROM HOST in the Voltage Modular control panel) or from another MIDI source - a module that generates MIDI for example.

Please note that MIDIMONO is a monophonic synthesizer, i.e. it can only respond to one note at a time. However, it is possible to create a virtual poly synth using multiple MIDIMONOs with our MIDI POLYSPLIT module which is described later in this guide.

You have two options for audio out - mono or stereo. The OUT jack next to the MIDI input outputs a mono audio signal and bypasses stereo processing. Alternatively, the stereo procession section to the right, outputs stereo L/R audio.

Connect these outputs to the MAIN OUTS (to host) jacks or to other modules for additional processing.

TIP: If you don't need the stereo processing and wish to save a little CPU, don't connect anything to the L/R output jacks.

If you require a mono signal but still want to use the DELAY or AMP LFO sections, simply connect to the L(M) output only - in this case stereo SPREAD, PAN and DELAY ping pong will have no effect. ***Note****: Applies to MIDIMONO v1.1 or later*

PRESETS

MIDIMONO comes with 125 factory presets in 5 banks of 25. To select a preset, switch to a bank A-E, then select a preset via the number buttons.

Many thanks to James Dyson of **JD Soundsets** for designing the fabulous presets in banks C and D. A full list of presets is provided in the **PRESETS LIST** section towards the end of this guide.

Note*: Bank E was added in MIDIMONO v1.2 to showcase the new ramp and sine waveforms*

TIP: If you want to create "favourites" or categorise any of the factory presets, you can use Voltage Modular's module preset files. Simple right-click on the module, and select Module Preset > Save As…. This is also a good way to share presets with other MIDIMONO users.

Preset labels in MIDIMONO v1.3 are now editable and will be saved with the module settings. Module Presets saved prior to MIDIMONO v1.3, or empty labels will be replaced with default placeholders MIDIMONO / Module Preset.

OSCILLATORS (VCO 1 & VCO 2)

MIDIMONO has two analog-flavoured oscillators with 5 switchable waveforms - saw, triangle, pulse, ramp and sine (*). These are not digitally “perfect” oscillators and will actually drift a little just like a hardware analog synth. This is a big part of the MIDIMONO character sound.

*(*) **Note:** Ramp and sine waveforms apply to MIDIMONO 1.2 or later.*

- **TUNE** is for fine adjustments in cents.
- **SHIFT** transposes the pitch in semitones.

TIP: Detune one or both oscillators by a few cents for a thick classic beefy saw or pseudo PWM!

MIDIMONO actually has four sound source in total, with the addition of SUB, which adds a square wave an octave below oscillator 1, and NOISE which adds a variable amount of white noise to oscillator 2. Adjust the SUB and NOISE levels to mix in as much or as little as you like.

TIP: Adding SUB is great for bass sounds and adds a little extra “snap” due to the wave cycle being reset with each new note. This is in contrast to the main oscillators which both run free.

ENVELOPE (AMP ENV)

***Note:** All envelope times were increased to 60 seconds in MIDIMONO v1.4.*

MIDIMONO has a traditional 4 stage ADSR amplitude envelope similar to those found on most synthesizers.

- **ATK** varies the fade-in / attack time from 1ms to 60 seconds.
- **DCY** varies the time to reach the sustain level from 1ms to 60 seconds.
- **SUS** varies the sustain level from 0-100%.
- **REL** varies the fade-out / release time when a note is released from 1ms to 60 seconds.

The adjacent LED will glow to reflect the current state of the envelope.

FILTER (VCF)

The MIDIMONO filter is a four-pole lowpass analog-flavoured filter which, when pushed will add harmonics to the oscillators.

- **CUTOFF** varies the filter’s cutoff frequency between 10Hz and 10KHz.
- **RES** varies the amount of filter resonance or emphasis around the cutoff frequency.
- **ENV** controls the amount of filter envelope applied, positive or negative.

The adjacent LED will glow to reflect the current state of the envelope.

TIP: Use the filter envelope in conjunction with the VEL CUTOFF and VCF LFO controls to apply constant tonal shifts to your sounds for each note.

FILTER ENVELOPE (VCF ENV)

The filter has its own dedicated ADSR envelope and works in conjunction with the VCF ENV control.

- **ATK** varies the fade-in / attack time from 1ms to 60 seconds.
- **DCY** varies the time to reach the sustain level from 1ms to 60 seconds.
- **SUS** varies the sustain level from 0-100%.
- **REL** varies the fade out / release time when a note is released from 1ms to 60 seconds.

KEYBOARD

This section contains controls relating to your MIDI keyboard controller and how MIDIMONO responds to MIDI note and controller messages.

The **SUS** LED will light when the sustain pedal (CC #64) is being held down (*added in MIDIMONO v1.4*). All envelopes release stage will be postponed until the sustain pedal is off.

VEL SENS determines the velocity sensitivity to incoming notes. At zero, all notes will be at maximum level with no dynamic range. When set to 100%, the level of notes will very between extremely quiet and maximum, giving full dynamic range according to key velocity.

VEL CUTOFF applies additional variation to the filter cutoff frequency according to key velocity. This allows stronger notes to sound brighter for example. Please note this setting is totally independent from the VEL SENS control.

LEGATO mode determines if envelopes are re-triggered when a new note is played while one or more notes is being held.

BEND UP / DN set the range in semitones of the pitch-bend controller in both directions. The default setting is a whole tone up and an octave down for guitar whammy style wiggles!

GLIDE aka portamento varies the time taken for the oscillators to arrive at the pitch from one note to the next. Please note this is “old school” glide in that is on or off regardless of the LEGATO setting.

MOD VCF determines the amount of control over the filter cutoff frequency from the mod wheel (MIDI CC #1).

LFO MOD VCO determines the amount of control over the VCO LFO depth from the mod wheel (MIDI CC #1).

LFO MOD VCF determines the amount of control over the VCF LFO depth from the mod wheel (MIDI CC #1).

EXP VOL enables control of the overall volume via MIDI expression (CC #11).

VCO LFO (VIBRATO)

The VCO LFO is a low-frequency oscillator that modulates the oscillators' frequencies. The effect can vary from subtle pitch, to vibrato to all-out pitch mayhem. Please note that the LFO will also drift a little like its equivalent in the hardware analog world.

- **RATE** varies the LFO rate between 0.01-100Hz.
- **FADE** varies the time it takes to reach the value set by depth from 0 (off) to 60 seconds.
- **DEPTH** varies the effect amount, with zero being no effect.

The adjacent LED will glow to reflect the current rate of the LFO.

VCF LFO (FILTER)

The VCF LFO is a low-frequency oscillator that modulates the filter’s cutoff frequency. Please note that the LFO will also drift a little like its equivalent in the hardware analog world.

- **RATE** varies the LFO rate between 0.01-100Hz.
- **FADE** varies the time it takes to reach the value set by depth from 0 (off) to 60 seconds.
- **DEPTH** varies the effect amount, with zero being no effect.

The adjacent LED will glow to reflect the current rate of the LFO.

MIX

The MIX section allows you to balance the levels between the two oscillators, including SUB and NOISE.

TIP: When you increase the levels past half-way, wave shaping distortion is applied which emulates the sound of a classic analog synthesizer. This effect is more noticeable on the non-pulse waveforms and opens up further sound design options so we urge you to experiment!

- **VCO 1 / 2**: Sets the level of the first (plus SUB) or second (plus NOISE) oscillator. Distortion will occur when the control is past half-way.
- **DRIVE** applies additional distortion to the combined outputs of VCO 1 and 2. The effect is similar to "the headphone trick" on a classic analog synth and can really thicken and beef-up and otherwise thin sound.

MIDI IN / MONO OUT

MIDIMONO will always require a MIDI input to generate sound. For audio output, you can use either the OUT from this section, or the stereo OUTs described in the STEREO PROCESSING section.

- **IN** takes a MIDI input. The adjacent LED will light when a MIDI message is received.
- **LEVEL** is an audio output attenuation control from 0dB (no attenuation) to -24dB.
- **OUT** is a mono(aural) audio output. The output section has a built-in limiter set to -0.5dB threshold. The adjacent LED will light when the threshold is being hit.

STEREO PROCESSING

Stereo processing is optional in MIDIMONO. Essentially the signal from the OUT jack described above is passed internally to the AMP LFO, PAN LFO and DELAY for further processing. The result of these three stages is output at the L and R jacks. If no connections are made to these jacks, then no stereo processing takes place, saving a little CPU.

AMP LFO (TREMOLO)

The amplitude low-frequency oscillator can be used to create a tremolo effect with variable stereo width. The LFO waveform is sinusoidal which creates a warm analog-like throb - great for atmospheric type sounds!

- **RATE** varies the LFO rate between 0.01-50Hz.
- **WIDTH** varies the relative phase of the left and right channels creating a more pronounced stereo effect as you increase the control.
- **DEPTH** varies the effect amount, with zero being no effect.

The adjacent LED will glow to reflect the current rate of the LFO.

PAN LFO (AUTO-PAN)

The auto-pan low-frequency oscillator can be used to create subtle or dramatic pan effects that can increase in intensity over time.

- **RATE** varies the LFO rate between 0.01-10Hz.
- **FADE** varies the time it takes to reach the value set by depth from 0 (off) to 60 seconds.
- **DEPTH** varies the effect amount, with zero being no effect.

The adjacent LED will glow to reflect the current rate of the LFO.

DELAY

Last but not least, we've added an analog-flavoured ping-pong delay based on our popular AULDELAY module. It is by no means a "perfect" digital delay, adding warm and crunchy lo-fi repeats to sonic proceedings!

- **TIME** varies the delay time between 50ms and 8 seconds. (*)
- **MIX** increases the level of the delayed signal.
- **REGEN** varies the regeneration from one repeat to almost infinite. Note that at maximum settings some audio degradation will occur - this is by design - just like a real analog delay! Also, stereo ping-pong will only occur when regen is > 10%.

For convenience, the delay effect can be toggled on and off with the small button.

*(*) **Note**: Maximum delay time was increased to 8 seconds in MIDIMONO v1.4*

STEREO OUT

This section contains the audio output of the stereo processing section.

- **L(M) / R** jacks are the left and right audio signal. The output section has a built-in limiter set to -0.5dB threshold. If either channel exceeds the threshold, the adjacent LED will light.
- Use the L(M) output for a combined mono signal (*MIDIMONO v1.1 or later*).
- **LEVEL** is an audio output attenuation control from 0dB (no attenuation) to -24dB.

MIDI CC MAPPING

***Note**: Applies to MIDIMONO v1.1 or later*

The following MIDIMONO controls have been pre-mapped to the following MIDI CC numbers. We've selected a subset of all the controls, focussing on performance-oriented tweaking.

For convenience, the mapping also works well with some popular MIDI controllers with 4 pages x 8 sets of encoders.

Page 1/2:

- 14 - AMP ENV ATK
- 15 - AMP ENV DCY
- 16 - AMP ENV SUS
- 17 - AMP ENV REL
- 18 - VCF CUTOFF (*)
- 19 - VCF ENV (*)
- 20 - VCF RES (*)
- 21 - VCF ENV ATK
- 22 - VCF ENV DCY
- 23 - VCF ENV SUS
- 24 - VCF ENV REL
- 25 - VCO 1 SUB (*)
- 26 - VCO 2 NOISE (*)
- 27 - MIX VCO 1 (*)
- 28 - MIX DRIVE (*)
- 29 - MIX VCO 2 (*)

Page 3/4:

- 102 - VCO LFO RATE
- 103 - VCO LFO FADE
- 104 - VCO LFO DEPTH
- 105 - VCF LFO RATE
- 106 - VCF LFO FADE
- 107 - VCF LFO DEPTH
- 108 - AMP LFO RATE
- 109 - AMP LFO WIDTH
- 110 - AMP LFO DEPTH
- 111 - PAN LFO RATE
- 112 - PAN LFO FADE
- 113 - PAN LFO DEPTH
- 114 - GLIDE (*)
- 115 - DELAY TIME
- 116 - DELAY MIX
- 117 - DELAY REGEN

(*) In MIDIMONO v1.5 or later, these parameters have been optimised for high precision timing suitable for sequencer automation. Please note that UI updates will still "lag" due to a lower refresh rate, but processing of MIDI CC messages for these special messages is close to sample rate / realtime, albeit with a small amount of smoothing over a 10ms window.

MIDI CC MAPPING (CTD)

Additional parameters - ***Note****: Applies to MIDIMONO v1.2 or later*:

- 30 - LEVEL (mono out)
- 31 - DELAY (ON/OFF)
- 32 - VCO 1 TUNE
- 33 - VCO 1 SHIFT
- 34 - VCO 1 SHAPE
- 35 - VCO 2 TUNE
- 36 - VCO 2 SHIFT
- 37 - VCO 2 SHAPE
- 38 - KEYBOARD VEL SENS
- 39 - KEYBOARD VEL CUTOFF
- 40 - KEYBOARD LEGATO
- 41 - KEYBOARD BEND UP
- 42 - KEYBOARD BEND DN
- 43 - MOD EXP VOL
- 44 - MOD VCF
- 45 - LFO MOD VCO
- 46 - LFO MOD VCF
- 118 - OUT (stereo out)

PRESETS LIST

Bank A (basic mono - no fx)

1. BASS - 80s Seq
2. BASS - Bruiser
3. BASS - Chewing Gum
4. BASS - Classic Saw
5. BASS - Funky Sizzle
6. BASS - Industrial Suction
7. BASS - Legato Saw Swell
8. BASS - Puncher
9. BASS - Smooth N Moog
10. BASS - Square Flaps
11. LEAD - 80s Mode
12. LEAD - Crazy LFOs
13. LEAD - Mini Splatter
14. LEAD - Organ Failure
15. LEAD - Shakey Pulse
16. LEAD - Soft Saw Wobble
17. LEAD - Steam Driven
18. LEAD - Surgical Power Saw
19. LEAD - Triangular Cheese
20. LEAD - Tubular Squares
21. PERC - Hi Hat
22. PERC - Kick
23. PERC - Snare
24. PERC - Tom
25. PERC - Velocity Smash

Bank B (stereo fx)

1. Beefy Bass Swell
2. Crazy LFOs FX
3. Dancey Glider
4. Hi Hat Echopan
5. Isosceles Bass
6. Mellow Crunch Wobble
7. Micro Feedback Looper
8. Moose Be Deed
9. Organ Failure FX
10. Pulsey Belles
11. PWM Smudge
12. Reedy Prog Rawk
13. Rise N Fall Smash
14. Shekey Pulse FX
15. Sinusoidal
16. Smorgasbord Saw
17. Smudgey Bass
18. Soft Saw Wobble FX
19. Soft Synth Brass
20. Space Bontempi
21. Spaceycopter
22. Steam Driven FX
23. Tin Foil Conspiracy
24. Touchy Filter Chord
25. Warped EP

Bank C (JD Soundsets 1)

1. 7th Waver
2. Ambient Gasps
3. Arcade Lead
4. Dirty 2600 Bass Lead
5. Game 4A Bass
6. Landscapes
7. LeadUsIntoAudioRate
8. Life In 1930
9. Lonely Moods
10. MidiMono Glider Ghouls
11. Mini Leadz
12. Modular Percular
13. Mono Brass Life
14. Morning Light
15. MW Sculpture Moons
16. Non Sensible Canada
17. Odyssey Lead
18. Rouge BooG
19. Sega ACDC
20. Snap Pluck Bobble
21. Soul Sky Mono Pad
22. The Darkness
23. Velocity Party
24. Venus Sci Fi 1945
25. Wheel Percer Plucks

Bank D (JD Soundsets 2)

1. Brass PanDelay
2. Chasing Wobs
3. Cheese Organs
4. Cry 4 Me
5. Dark Fields
6. Dr Strangelove
7. Driller Killa
8. Drive Tribe
9. Drone Me
10. Glow Worms
11. Hip Joint Pop
12. Orch Simples
13. Out Of Light
14. PassDaPopcorn
15. Pending Death
16. Pyramid Lead
17. Sister Sins
18. SlowBlackBulbs
19. Softy Bass
20. Space Cadets
21. Sun Globes
22. The Creeps
23. Troubled Glide
24. Un Snap Me
25. Whine Glass

Bank E (ramp & sine waveforms)

1. Alien Ice Storm
2. Crispy Glider
3. Crunchy Roadz
4. De-Evolution
5. Dirty Big Bass
6. Distant Brass
7. EDM Powakordz
8. Elastic Bass
9. Glass Harmonix
10. Hacksaw Bass
11. Mellopiano
12. Organic Bellz
13. Panomallets
14. Paranormal Sines
15. Phasey Brasso
16. Rounded Square
17. Rubbery Ramps
18. Sandblaster
19. Shallowater Chime
20. Softechoramps
21. Springy Filter
22. Subwoofa
23. Synthetic Vibes
24. Thin N Crispy
25. Windy Woods

MIDIMONO COMPANION MODULES

We have a growing range of MIDIMONO companion modules that are either designed to work specifically with MIDIMONO or that might be useful utilities.

MIDISPLITCH

MIDISPLITCH is a simple MIDI channel splitter utility which allows you to split out MIDI message data specific to a certain channel, and re-direct it to one of four MIDI outputs.

The channel will only be split if a MIDI connection is made to one of the channel split outputs.

The outgoing split MIDI message does not contain channel data, so will appear as a general “omni” message.

MIDI data that hasn’t been subjected to splitting will be passed on untouched to the main MIDI out at the top of the module so MIDISPLITCH can also be used as a channel filter.

If you need to split more than 4 channels, simply pass on the main MIDI out to the input of another MIDISPLITCH module and SPLITCH till your heart’s content!

MIDI POLYSPLIT

MIDI POLYSPLIT is a MIDI utility that splits polyphonic note messages into separate monophonic outputs. For example, you could use MIDI POLYSPLIT to create a virtual poly synth using multiple monophonic instruments. In fact, we created MIDI POLYSPLIT specifically for MIDIMONO users for those times when one note simply isn't enough!

Setup is very straightforward. Connect the MIDI out from your host, DAW or MIDI controller to the MIDI POLY IN input. Then connect as many voices as you need (up to 8) to the MIDI MONO (see what we did there?) OUT outputs. You don't have to connect your instruments in numerical order - MIDI POLYSPLIT checks what's connected and assigns incoming notes to outputs as it sees fit, based on whether the output is in use and when it was last used. LEDs will flash to indicate incoming and outgoing MIDI data.

Please note that all other MIDI messages (i.e. excluding note on / off) get passed on to all of the connected outputs. This means that things like MIDI CC pitch bend and mod wheel etc., get sent to all your virtual poly synth voices intact. MIDI channel data is also stripped from the outgoing messages, i.e. each instrument will see its assigned MIDI messages as generic / omni message data.

If you need a compact mixer for mixing audio for multiple mono voices, you may be interested in our MINIMIX4/8 modules.

Alternatively, if you're looking to split MIDI data based on MIDI channel, say from a sequencer, then MIDISPLITCH may be closer to what you need for that sort of thing.

MIDIMOD4

MIDIMOD4 is a MIDI CC “modulation station” utility for your MIDI-controllable Voltage Modular instruments and effects. If a module has parameters that can be changed via MIDI CC messages, then you can modulate up to four parameters with dedicated LFOs and ASR envelopes via a single virtual MIDI cable connection.

We originally designed MIDIMOD4 as an additional modulation source for our MIDIMONO synthesizer module so we’ll use that as an example for this guide, but because MIDIMOD4 can generate MIDI messages over the entire CC range (1-127) it can be used to modulate pretty much anything that has a MIDI implementation.

First a note about envelopes and connections. In order for the envelopes to work, MIDIMOD4 needs to know about note on / off messages via its MIDI IN input. Typically, you’d connect the MIDI from your host to the MIDI IN of MIDIMOD4, then the MIDI OUT from MIDIMOD4 to the MIDI IN of MIDIMONO. The MIDI OUT also acts like a MIDI THRU so now, MIDIMONO will receive messages from your host as it normally would, plus additional modulation messages targeting specific instrument parameters. Envelopes will also respond accordingly to incoming notes. If your target module is not a playable instrument, then simply connect the MIDIMOD4 MIDI OUT to the MIDI IN of your module. Note however, MIDIMOD4’s envelopes will not work in this scenario.

All four modulation sections have identical controls and they are toggled on and off using the large numbered buttons. Note there is a brief ramp up / down of around 1 second so that modulations don’t end abruptly during live performances for example.

The first step is to select a MIDI CC number that you wish to target by scrolling through with the CC # knob. As you scroll through, tool tips will display common mappings, 1 for modulation, 2 for breath control, 7 for volume etc. As a convenience for MIDIMONO users, all of its parameters are also listed in the ranges 14-46 and 102-118 as per the MIDIMONO v1.2 MIDI implementation.

PLEASE NOTE - it is recommended that you disable the section with the toggle button while scrolling through the CC numbers as you may end up modulating something you didn’t intend to!

Next select the range you would like to modulate over. This is probably something you will need to experiment with to achieve the desired effect. Note that when the section is toggled off, or the envelope is complete, the modulation will end at the left hand “from” value. You can invert this simply by starting your modulation cycle from the higher value.

In the LFO section, select a rate between 0.001-10Hz. Note that the range has been chosen for typical LFO applications, i.e. extremely slow to quite fast. Four different LFO waveforms are available, sine, triangle, square and random / sample and hold. The DRIFT control emulates an analog tendency for oscillator timing to drift slightly. It’s a subtle effect but can add a slightly unpredictable and organic quality to your modulated sonic adventures!

If you only wish to use envelope modulation, set the LFO shape to OFF.

The optional envelope in the ENV section applies additional modulation to either the LFO, or the CC range (if the LFO is off), so the depth can rise and fall over time. The envelope is a conventional ASR configuration with variable attack and release times (1ms - 60 seconds) and sustain level 0-100%. If you don’t wish to use the envelope in a particular section, set the TRIG option to OFF.

When the envelope is enabled it operates in two modes. In standard ON mode, the envelope will re-trigger for every note that is received as a MIDI note on message. Note that this will only work when something is connected to the MIDI in connection. In LEG mode (legato) the envelope will only re-trigger when no notes were previously playing, i.e., if you’re holding down one note and play another, the envelope will not re-trigger.

We hope you enjoy modulating your MIDI things!

MINIMIX4 & MINIMIX8 Mixers

MINIMIX4/8 are 4 and 8 channel stereo / mono mixers with level metering and a built-in optional limiter. Simply connect up to 4 or 8 mono or stereo sources, set mix and master out levels to taste using the channel faders, then send the mix to the main outs to your host or another module for further processing.

To keep output levels in check, engage the LIMIT (brick wall limiter) toggle and set an optional threshold level. If output levels exceed 0dB (+/-5.0V), LEDs above the main outputs will light.

With MINIMIX8, channels can be toggled on and off with the numbered buttons. The CHANNEL FADE IN/OUT time is variable between 50ms and 30 seconds for a relatively fast mute / unmute with no clicks or very gradual fades. MINIMIX8 also has a limiter LED to show when the mixed levels exceed the threshold.