Mono/Fury

VST™ Software Synthesizer

Version 1.0

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Introduction

The *Mono/Fury* is a VST™2.4 software synthesizer plug-in for Microsoft® Windows® emulating the classic KORG *Mono/Poly* analog synthesizer of the early 1980's. It is written in native C++ code for high performance even on "lighter" systems. The main features are:

- Close emulation of behavior and all controls
- Monophonic/quadrophonic keyboard action
- Four band-limited oscillators
- Four-pole lowpass filter with self-oscillation
- "Effects" section including Cross modulation and hard sync
- Arpeggiator with sync-to-host option
- Additional tweak section
- Plug-in comes in 32 bit and 64 bit versions
- Fully compatible with SM Pro Audio's V-Machine™

A Warning to the Potential User

1.   The *Mono/Fury* does not sound like it's famous analog archetype.

I own the *Mono/Poly* since 1984 and I am aware that there *is* a difference – however, I think the *aura* is captured pretty well. While testing and recording some songs with the *Mono/Fury* I immediately felt home.

2.   The *Mono/Fury* is no extended polyphonic oversized buzz-and-bells has-nothing-to-do-with-the-original recreation.

Why that? Because the *Mono/Fury* is an *emulation* – I wanted to do something *close* to the original, not something more or less. The layout of the *Mono/Poly* offers some unique features but also has some limitations. To me this combination was and is a source of creative inspiration.

3.   Hey, but neither Velocity nor Panorama control!?

Yes. Because the *Mono/Poly* has a single mono output and static keyboard action. Be grateful, I do spare you the five to ten minutes warm-up time until all four VCOs would be in tune. And I'm pretty sure you will find a pan in your favorite host – or in the kitchen.

4.   Damn, why should I ever download or even use this crap?

Damn, you're right. Better go and download the real thing.

Architecture

The *Mono/Fury* features four band-limited oscillators (*VCO*[1]), each with four selectable waveforms (triangle, sawtooth, pulse with modulated and fixed width), four octave ranges (16' to 2'), individual tuning and volume controls. The VCOs and an optional white noise generator feed a classic four-pole low-pass filter (*VCF*) with resonance up to self-oscillation. Two envelope generators (*EG*) control the contour of the filter cutoff and the amplifier (*VCA*) respectively.

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1 VCO = **V**oltage **C**ontrolled **O**scillator. Of course the modules of the *Mono/Fury* are not voltage-controlled in the same way as in analog synthesizers, but I will stick to this neat old-fashioned acronyms.

In the *Effects* section, the VCOs can be Cross-modulated and/or hard-synchronized as well as frequency-modulated by the VCF EG or the first modulation generator (*MG1*). MG1 features four waveforms (triangle, falling and rising sawtooth, square) and is also capable of modulating the overall pitch, the pulse width of the VCOs, and the VCF cutoff frequency.

Modulation generator 2 (*MG2*) produces a triangle waveform used to modulate the VCOs' pulse width. Additionally, it is used to control the speed of the built-in arpeggiator. The latter offers three modes (up, down, and up & down), three key ranges (1, 2 or 4 octaves), and can be latched.

Key Assignment Modes

Although the *Mono/Fury* is a monophonic instrument, it offers two "polyphonic" keyboard modes where the VCOs can be played individually (resulting in a four-voice "pseudo-polyphony"; mind that there still is only *one* VCF and only *one* VCA!). Furthermore, the *Chord Memory* mode allows to play a chord of up to four notes (one per VCO) by a single key. This function compensates the lack of a dedicated control for interval-tuning of the VCOs.

The following key assignment modes are available:

Unison	Monophonic keyboard action: The VCOs are stacked and play the same key.
Unison/Share	Polyphonic keyboard action: The pressed keys *share* the VCOs, i.e. if one key is pressed all VCOs will play the same note; if two keys are pressed each note will be played by two VCOs. If more than two keys are pressed each note will be played by one VCO.
Poly	Polyphonic keyboard action: Each key is played by one VCO. If the arpeggiator is activated each note will be played by one VCO while the next note will be played by the next VCO in row.
Chord Memory	Monophonic keyboard action: The VCOs are stacked and play the relative notes defined by the Chord Memory function.
Round Robin	*Tweak mode – see section* Tweaks! Monophonic keyboard action: The pressed key is played by one VCO while the next key is played by the next VCO in row (similar to *Poly* when the arpeggiator is activated).

Trigger Mode and Auto Damp

Since there is only one filter and one amplifier the parameters *Trigger* and *Auto Damp* are of special interest when playing one of the two polyphonic modes (*Unison/Share* or *Poly*).

On key press, *Single Trigger* will restart the envelopes only when no other key is pressed (legato) while *Multiple Trigger* will restart them always.

If *Auto Damp* is set to *Off* the VCOs will play until all keys have been released (even if their assigned keys are already released). If set to *On* a VCO will be muted as soon as its assigned key is released.

Programming the Chord Memory

Of course this has to be done as with the *Mono/Poly*! Play a chord on the keyboard and click the *Chord Memory* button at the same time. Or activate the *Hold* button, play the desired keys one for one, and then click the *Chord Memory* button. Or set the relative chord notes directly via the hosts' built-in plug-in parameter dialog (if available).

Tweaks

At some places I decided to insert some minor additions or *tweaks* to the *Mono/Fury* which are not part of the original design. The purist will cry out loud but I think these tweaks are quite useful. Some tweaks are obvious: You can save a plug-in program, you have an integrated MIDI interface, it does not take minutes until the VCOs have warmed-up, the plug-in weights just some hundered kilobytes and not kilograms... ;-)

Here, I'm talking about some new *controls*. These tweak controls will be shown when the "Danger / High Voltage" symbol at bottom left of the panel is clicked.

Mod Wheel Override	The amount of modulation by MG 1 is controlled by the modulation wheel. However, the position of the mod wheel cannot be stored with the plug-in's programs. This tweak parameter fixes this issue by emulating an initial position of the mod wheel.
Arpeggiator Trigger Source	The arpeggiator is usually triggered by MG 2 while the *Mono/Poly* provided a clock input jack for external triggering. This tweak parameter can be used to synchronize the arpeggiator to the host tempo.
Arpeggiator Tempo	If the arpeggiator is synchronized to the host, this tweak parameter is used to set the tempo in note lengths.
Key Assign Mode Reset By Effects Button	When you activate the Effects section, the key assignment mode will be reset to *Unison*. On the *Mono/Poly* it was possible to avoid this behavior by setting a specific jumper on one of the circuit boards. Here, you just set this tweak parameter to *Off*.

Round Robin   This is an additional monophonic key assignment mode not to be found on the *Mono/Poly* (see section *Key Assignment Modes*). *Round Robin* schedules only one VCO to a key; however, when the next key is pressed it will be scheduled to the *next* VCO in row (similar to the *Poly* mode when the arpeggiator is activated).

Pitch Shift of Slave VCOs by X-Mod   Actually this consists of two tweak parameters for the *Single* and *Double* Effects modes respectively and needs a bit more explanation.
The Effects section provides Cross modulation which is equivalent to amplitude modulation of one or more slave VCOs by a master VCO; the modulation intensity is controlled by the *X-Mod* parameter (for maximum *X-Mod* the Cross becomes Ring modulation).
However, when I compared the sound of the *Mono/Fury* to the original, it turned out that on the *Mono/Poly* the *X-Mod* parameter does not only control the Cross mod intensity but also causes a *pitch shift* of the slave VCOs, i.e. the higher *X-Mod* the higher the pitch[2], and the amount is different for *Single* and *Double* mode.
This may not happen on every model of the *Mono/Poly*, thus I decided not to hard-code the pitch shift amount into the Cross mod algorithm but to add these two little tweak parameters.

Patches

The *Mono/Poly* does not have any preset or patch memory to store and recall sounds by a few clicks (thanks to advances in quantum physics, the *Mono/Fury* does have this capability). Instead, the manufactures often provided *patch sheets* for their products – small diagrams on real paper with parameter settings of "factory presets".

The *Mono/Poly* was delivered with a booklet of such *Setting Charts*, and I have integrated those 24 presets into the program memory of the *Mono/Fury*. They are identified by the prefix "Chart:" in the patch name followed by the original English preset name as given in the booklet (except on the patch "Elektronengewehr" where I used the German preset name).

In some cases I had to tweak the patches a little bit since the original charts missed one or more parameter values (for example "Synthetic Guitar" or "Elektronen-gewehr"); I hope I have captured the original sound designer's intention here.

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2 A quite similar effect will occur if one pushes the panel of the *Mono/Poly* close to the *X-Mod* control. This is obviously no feature but related to the analog circuit board mounted directly under the panel. Anyway, I decided not to emulate this behavior.

Parameters

Global

parameter	description
Volume	the overall volume
Range	*Off* (no output), *Low* and *High*
Master Tune	overall tuning of the VCOs
Detune	detunes VCO2 in negative and VCO4 in positive direction
Portamento	portamento time (0 to 5 seconds)

Keyboard Assignment Modes

parameter	description
Key Assign Mode	five modes are available: *Unison*, *Unison/Share*, *Poly*, *Chord Memory*, and *Round Robin* (tweak mode)
Hold	if set to *On* the pressed keys will be held until *Hold* is set to *Off*
Trigger	two trigger modes are available: *Single* and *Multiple*
Auto Damp	switches *Auto Damp* mode on or off

Oscillators (VCO 1 – 4)

parameter	description
Tune	(VCO 2 – 4 only) fine tuning
Waveform	four types are available: triangle, sawtooth, pulse with modulated and fixed width
Octave	the footage of the VCO (16', 8', 4', or 2')
Volume	output volume of the VCO
PW	controls the fixed pulse width for all VCOs
PWM	amount of pulse width modulation for all VCOs
PWM Source	source of the pulse width modulation (*VCF EG*, *MG1*, or *MG2*)

Noise

parameter	description
Volume	output volume of the white noise generator

Filter (VCF)

parameter	description
Cutoff	cutoff frequency of the filter
Resonance	feedback amount of the filter; high values will cause self-oscillation
EG Intens	amount of cutoff frequency modulation by VCF EG (positive or negative)
KBD Track	amount of keyboard tracking

Envelopes (VCF EG and VCA EG)

parameter	description
Attack	attack time of the envelope
Decay	decay time of the envelope
Sustain	sustain level of the envelope
Release	release time of the envelope

Modulation Generators (MG1 and MG2)

parameter	description
Waveform	(MG1 only) four types are available: triangle, falling and rising sawtooth, and square
Rate	rate of the MG

Effects Section

parameter	description
On/Off	switches the effects on and off
X-Mod	amount of Cross modulation of slave VCOs (if *Mode* is set to *S&X* or *XMod*)
Freq Mod	frequency modulation of slave VCOs
Freq Mod Source	source of frequency modulation (*VCF EG* or *MG1*)
Mode 1	three types affecting the slave VCOs are available: *Sync*: hard sync *S&X*: hard sync and Cross modulation *XMod*: Cross modulation
Mode 2	selection of slave VCOs: *Single*: VCO 1 modulates slave VCOs 2 – 4 *Double*: VCO 1 and 3 modulate slave VCO 2 and 4 resp.

Wheels Section

parameter	description
Bend Intensity	intensity of pitch bend modulation (source is the pitch bend wheel)
Bend Destination	destination of pitch bend modulation: *VCO 1* or *Slave VCOs* (depending on effects *On/Off* state), *Pitch*, or *VCF*
MG1 Intensity	intensity of modulation by MG1 (controlled by the mod wheel)
MG1 Destination	destination of modulation by MG1: *VCO 1* or *Slave VCOs* (depending on effects *On/Off* state), *Pitch*, or *VCF*

Tweaks

For a detailed description of the tweak parameters see section *Tweaks*.

parameter	description
Mod Wheel Override	overrides the mod wheel to provide a MG1 modulation intensity parameter value of the plug-in
Arpeggiator Trigger Source	sets the arpeggiator clock source to *MG2* (internal) or *External* (VST host)
Arpeggiator Tempo	if *Arpeggiator Trigger Source* is set to *External this parameter* selects the tempo of the arpeggiator in note lengths
Key Assign Mode Reset By Effects Button	if switched to *Off* the *Key Assign Mode* will not be automatically reset to *Unison* when the *Effects* section is activated
Round Robin	additional key assignment mode with cyclic VCO scheduling
Pitch Shift of Slave VCOs by X-Mod	two parameters controlling the frequency shift of the slave VCOs by the *X-Mod* parameter for *Single* and *Double* mode individually

Frequently Asked Questions

Before you read on here, please make sure that you also have read my statements regarding the *Mono/Fury*'s capabilities and limitations at the beginning of this manual (see section *A Warning to the Potential User*).

How do I install the Mono/Fury *(32 bit version)?*

Just copy the file `monofury.dll` from the ZIP archive you have downloaded to your system's or favorite DAW's VST plug-in folder. Your DAW should automatically register the *Mono/Fury* VST plug-in the next time you start it.

How do I install the Mono/Fury *(64 bit version)?*

Just copy the file `monofury64.dll` from the ZIP archive you have downloaded to your system's or favorite DAW's VST plug-in folder. Your DAW should automatically register the *Mono/Fury* VST plug-in the next time you start it.

Note: You may have to remove any existing (32 bit) `monofury.dll` from your VST plug-in folder or else your DAW may screw the versions up...

What is the VST plug-in ID of the Mono/Fury?

The ID is 1416.

Will you support the Mono/Fury?

Yes. If you have problems, found a bug, or have some suggestions about the *Mono/Fury* please send me a mail: `full.bucket@gmx.net` .

How can I prevent output clipping (for example when I use high Resonance values)?

Turn down the volume or select the *Low* output range (*Output Range* switch on the left of the panel).

How can I tune the VCF frequency to the note played on the keyboard?

Turn the *KBD Track* parameter to 6.4 and play MIDI key F#1 to adjust the *Cutoff* parameter so that the VCF is in tune with the oscillators. Or use the patches 29 ("Chart: Whistle") or 45 ("Duophonic Madness") as a base class of your sound.

Ups, I cannot find the tweak parameters on the panel...!?

Click the "Danger / High Voltage" symbol at bottom left of the panel and you will.

If the MG rates are pretty high their associated LEDs on the panel will not blink in sync! Why?

This effect is called *aliasing*. Never mind, I never thought they would work at all!

Will you someday provide a "true" polyphonic version of the Mono/Fury?

No. I would add a more flexible modulation infrastructure and velocity sensitivity as well, but that would be a new synth like the *blooo* and not a "bigger" *Mono/Fury*.