

Notes for the M3 Oscillator Collection (please see 1.6.1 addendum)

Acknowledgements

The collection was originally ported by Peter Allwin, from Emilie Gillet's amazing work! I've merely built on top of their exemplary work.

Synopsis

The original collection contains twelve oscillators derived from Mutable's Instruments Plaits Product and a simplified version of Elements. This work¹ currently only addresses Plaits. Most of the Plaits models provide for four inputs, and originally provided a sine wave LFO in addition to routing the main logue's LFO. This work replaces the LFO (LFO2), with a simple AD/AR envelope generator with multiple modes of operation simulating an ADSR. This is an exploratory work for a future 3 OP Multi-menu with multiple modulators and modulator types.

Models

Twelve ports were provided, each encapsulating one select type of model from the original Plaits software. Information to assist in interpreting the controls is provided here only. Please see original authors product manuals for descriptions of model operation: <https://mutable-instruments.net> Also, please see the original ports README.md and code repository for all base software: <https://github.com/peterall/eurorack-prologue/releases>

To aid in programming the M3 models, I've included a brief summary here for convenience and an appendix. For a complete description of model behavior please refer to documentation mentioned above. Additional description has been provided later in this document.

Shape	Shift-Shape	Parameter 1	Parameter 2	Model Name
Index Harmonic	Bump Shape	Number of Bumps	Hammond	mM3_add
Modulation Index	Frequency Ratio	Feedback 2->1->2	Subosc Intensity	mM3_fm
Formant Freq Ratio	Formant Freq	Formant Shape	Filter Intensity	mM3_grn
Decay Time	Dust Density	(In)Harmonics	Attenuation	mM3_string
Variable Saw	Variable Square	Detune	Hard Sync	mM3_va
Wavefolder	Waveshaper	Asymmetry	Curve	mM3_wsh
Column Index	Row Index	Interpolate	Low-fi	mM3_wta-wtf

Parameters

The parameter set consists of four Input Bias controls for setting static levels for each of the four model inputs, where provided; an Index defining defining the modulation targeting configuration, and three Envelope Generator timing and Intensity controls. The four Bias controls are distributed across Shape, Shift-Shape, and Parameter 1 and Parameter 2 of the 'Logue's PROGRAM EDIT Button 7 MULTI ENGINE menu. The configuration Index and EG controls are defined in the remaining sections.

Envelope Generator

M3 versions contain a single Attack/Decay generator with Intensity control, in addition to the main LFO routing. The AD envelope generator contains hooks to simulate a Sustain and Release state. Although there are no continuous controls to adjust Sustain Level or Release Time, menu space allows a selection of pre-programmed Sustain and Release options. Additionally, LFO modulation is available either as an independent modulator, or modulated by the envelope generator for delayed vibrato-like effects result. The LFO and EG targeting are combined in the same control as follows:

Shape	SShape	Param1	Param2	Modulation	LFO Slope	EG Slope	Sustain %
1	26	51	76	EG	Flat	Flat	AD
2	27	52	77	LFO + EG	Flat	Flat	AD
3	28	53	78	LFO * EG	Flat	Flat	AD
4	29	54	79	LFO + EG	+	-	AD
5	30	55	80	LFO * EG	+	-	AD
6	31	56	81	LFO + EG	-	+	AD
7	32	57	82	LFO * EG	-	+	AD
8	33	58	83	LFO + EG	Flat	Flat	30%
9	34	59	84	LFO * EG	Flat	Flat	30%
10	35	60	85	LFO + EG	+	-	30%
11	36	61	86	LFO * EG	+	-	30%
12	37	62	87	LFO + EG	-	+	30%
13	38	63	88	LFO * EG	-	+	30%
14	39	64	89	LFO + EG	Flat	Flat	70%
15	40	65	90	LFO * EG	Flat	Flat	70%
16	41	66	91	LFO + EG	+	-	70%
17	42	67	92	LFO * EG	+	-	70%
18	43	68	93	LFO + EG	-	+	70%
19	44	69	94	LFO * EG	-	+	70%
20	45	70	95	LFO + EG	Flat	Flat	AR
21	46	71	96	LFO * EG	Flat	Flat	AR
22	47	72	97	LFO + EG	+	-	AR
23	48	73	98	LFO * EG	+	-	AR
24	49	74	99	LFO + EG	-	+	AR
25	50	75	100	LFO * EG	-	+	AR

Key Tracking

This feature allows a cross fade between modulation sources. The Envelope Generator and LFO are always assigned opposite slopes. The slope range is matched against the 61 key limits of the Prologue 16 keyboard; C1 to 6. Match your low C to C1 with the Korg Octave switch normalize the low range to your keyboard. Or Match your High C to C6 on the high end.

EG Timing Controls

Attack and Decay values are range from 0 to 10 sec. The values are mapped as follows:

Attack

Value	Period
0	0 secs
1-50	0.1 to 1 sec
50-100	1-10 secs

Decay

Value	Period
0	0 secs
1-50	0.1 to 1 sec
50-99	1-10 secs

Release

Value	Period
0	0 secs
1-50	0.1 to 1 sec
50-99	1-10 secs

Appendix A - Model Synopsis

mM3_add – Harmonic Oscillator.

Additive mixture of harmonically-related sinewaves. Generates sounds ranging from rippling narrow band spectra, to warm fuzzy sweeps.

Shape: Index of the most prominent harmonic.

SShape: Bump Shape, from flat to wide to peaked and narrow.

Param1: Number of Bumps in spectrum.

Param2: (AUX) variant including only a subset of harmonics present in the draw bars of a Hammond organ.

mM3_fm – Two operator FM.

Two sinewave oscillators modulating each other's phase. Classic FM synthesis of electric piano tones, horn, string and marimba to wild buzzing bone saws.

Shape: Modulation Index.

SShape: Frequency Ratio of OP1 and OP2.

Param1: Feedback topology:
1:49 : Operator 2 modulates Operator 2 phase.
50:100 : Operator 2 modulates Operator 1 phase.

Param2: (AUX) sub-oscillator.

mM3_grn – Granular Formant Oscillator

Simulation of formants and filtered waveforms through the multiplication, addition, synchronization of sinewave segments. Warm tones to buzzy sweeps.

- Shape: Formant Frequency Ratio between Formant 1 and Formant 2.
- SShape: Formant Frequency.
- Param1: Formant Width and Shape.
- Param2: (AUX) Simulation of filtered waveforms by windowed sine waves – a recreation of Braids' Z*** models. (Shape controls the filter type [peaking, LP, BP, HP]).

mM3_string - Inharmonic String Model.

String model excited by dust noise. Finely elaborated string model with random noise excitation. Tone can vary from buzzy twangy to muted pizzicato, to clangorous cow bells. Set Param1 to -50 for the harmonic/inharmonic tonal knee. Add a little Decay to Param1 and +30 Intensity for pitchy twang.

- Shape: Decay Time (energy absorption).
 0:50 Side stretching geometric morph between triangle and saw.
 51:100 PWM morph between Saw and 0% Pulse.
- SShape: Excitation brightness and dust density.
- Param1: Amount of inharmonicity, or material selection.
- Param2: (AUX) Raw exciter signal.

mM3_va

Virtual Analog synthesis of classic waveforms. Full set of Virtual Analog waveforms. Sweeping Variable Square produces the classic PWM effect.

Shape: Variable Square.

0:50 side stretching geometric morph between triangle and saw.

50:100 PWM morph between saw and 0% pulse.

SShape: Variable Saw.

0:50 Pulse sliding geometric morph between triangle and saw.

50:100 Wide notch filter (Braids' CSAW) morph from saw to triangle.

Param1: +/- 2 octave Detune.

1:100 +1 cents to +2 octaves.

-1:-100 -2 octaves to -1 cents.

Param2: (AUX) sum of two hardsync'ed waveforms.

mM3_wsh

An asymmetric triangle processed by a waveshaper and wavefolder.

Shape: Wave folder.

SShape: Wave shaper.

Param1: Waveform Asymmetry.

Param2: Curve, a second wave folder curve.

mM3_wta-wtf

Wavetable Oscillator(s). Oscillators wt[a,b,c,d,e,f] each contain 32 wavetables. arranged as 8 columns of harmonically related waves, by 4 rows of family related wavetables.

Wta: Additive (2x sine, quadratic, comb)

Wtb: Additive (pair, triangle stack, 2x drawbar)

Wtc: Formantish (trisaw, sawtri, burst, bandpass formant)

Wtd: Formantish (formant, digi_formant, pulse, sine power)

Wte: Braids (male, choir, digi, drone)

Wtf: Braids (metal, fant, 2x unknown)

Shape: Column Index.

SShape: Row Index.

Param1: Interpolation on/off

Param2: Low-Fi output.

Notes:

1. This is the final version of this four input collection. If it's your first time checking in, have fun! If you're back looking for an update, the Index of the final M3 series has changed, so it will not match any previous preset programming. However, this version does much more than the old one did.
2. 1.6.1 Addendum. Files marked with 1.6.1 are canonical wavetable version derived from Peter's recent 1.6 update. Thank you Peter!