Liber ex Doctrina



Liber version 2.5.0

Table of Contents

Sanguine Modules Mutants	1
Manual conventions	
Module polyphonic conventions	2
Bypassed module behavior	3
Sanguine Modules themes	4
The Modules	
Aestus – Tidal modulator	6
The Controls	6
Knobs and buttons	7
Inputs and outputs	10
The context menu	
Temulenti – Parasitic tidal modulator	14
The Controls	
Knobs and buttons	16
Inputs and outputs	
The context menu	
Aleae – Bernoulli Gates	
The Controls	24
Knobs and buttons	24
Inputs, outputs and LEDs	25
The context menu	
Vimina – Clock manipulator	27
The Controls	27
Knobs and buttons	28
Inputs, outputs and lights	
Bypassed module behavior	30
Anuli – Resonator	31
The Controls	31
Knobs and buttons	31
Inputs and outputs	34
The ideal Anuli setup	37
The context menu	37
Bypassed module behavior	38
Anuli Module modes	38
Modal Reso	38
Sym. Strings	39
M. I. String	39
FM voice	39
Q. Sym. Str	40
Rev. String	40
Disas. Peace	40
Apices – Multifunction Gap Filler	42
The Controls	42
Knobs and buttons	42
Inputs and outputs	45
The context menu	45

ENVELOPE 46 LFO 46 TAP LFO 46 DRUM GENERAT 47 SEQUENCER [®] 47 TRG. SHAPE [®] 47 TRG. SHAPE [®] 47 TRG. RANDOM [®] 48 DIGL DRUMS [®] 48 NUMBER STAT& 49 BOUNCE BALL@ 49 Parameters. 50 Mortuus - Embalmed multifunction gap filler 51 The changes. 51 Mortuus module modes. 53 D. ATK. ENV# 54 LOOPING ENV# 54 LOOPING ENV# 54 RATK. ENV# 55 R. ATK. ENV# 54 LOOPING ENV# 55 R. ND. FM LFO# 56 V. WAVE LFO# 57 PLO# 56 V. WAVE LFO# 57 PLO# 58 TURING# 58 BYTE BEATS# 59 CYMBAL# 60 RANDOM DRUM# 60 RAND MelliHAT# 60 <td< th=""><th>Apices Module modes</th><th>.45</th></td<>	Apices Module modes	.45
TAP LFO. 46 DRUM GENERAT. 47 SEQUENCER 47 TRG. SHAPE 47 TRG. SHAPE 47 TRG. RANDOM 48 DIGL DRUMS 48 NUMBER STAT& 49 BOUNCE BALL@ 49 Parameters. 50 Mortuus – Embalmed multifunction gap filler. 51 The changes. 51 Mortuus module modes. 53 D. ATK. ENV# 54 LOOPING ENV#. 54 LOOPING ENV# 54 LOOPING ENV# 55 RND. FM LFO#. 56 V. WAVE LFO# 56 R. VW. LFO# 57 PL.O# 57 PL.O# 57 NDN BRUH# 60 RAND. HIHAT# 60 RAND M DRUM# 60 RAND M DRUM# 60 RAND M DRUM# 60 RAND HIHAT# 60 RAND M DRUM# 60 RAND M DRUM# 60 RAND M DRUM# 60	ENVELOPE	. 46
DRUM GENERAT. 47 SEQUENCER 47 TRG, SHAPE 47 TRG, RANDOM 48 DIGI, DRUMS 48 NUMBER STAT& 49 BOUNCE BALL@ 49 Parameters. 50 Mortuus module modes. 51 Mortuus module modes. 53 D. ATK. ENV# 54 R. ATK. ENV# 54 R. ATK. ENV# 55 FM LFO# 55 R ND. FM LFO# 56 V. WAVE LFO# 56 V. WAVE LFO# 56 R. VW. LFO# 56 R. VW. LFO# 57 MDD SEQ.# 58 TIR ING# 58 BYTE BEATS# 59 CYMBAL# 60 RAND MOUND RUM# 60 RAND. HIHAT# 60 RAND. HIHAT# 60 RAND. HIHAT# 60 RAND. MULPO# 56 Steptorator Module sections 63 Buttons 63 Buttons 63	LFO	.46
SEQUENCER 47 TRG. SHAPE 47 TRG. RANDOM 48 DIGI. DRUMS 48 NUMBER STAT& 49 BOUNCE BALL@ 49 Parameters 50 Mortuus – Embalmed multifunction gap filler 51 Mortuus Mode list 52 Mortuus module modes 53 D. ATK. ENV# 54 R. ATK. ENV# 54 LOOPING ENV# 54 LOOPING ENV# 54 LOOPING ENV# 55 FM LFO# 55 RND. FM LFO# 56 R.VW LFO# 56 R.VW LFO# 57 MOD SEQ.# 57 MOD SEQ.# 57 MANDOM DRUM# 60 RANDOM DRUM# 60 RAND MDRUM# 63		-
TRG. SHAPE 47 TRG. RANDOM 48 DIGI. DRUMS 48 NUMBER STAT& 49 BOUNCE BALL@ 49 Parameters. 50 Mortuus – Embalmed multifunction gap filler 51 The changes. 51 Mortuus module modes. 52 Mortuus module modes. 53 D. ATK. ENV# 54 RANDOM ENV# 54 RANDOM ENV# 55 FM LFO# 55 FM LFO# 56 V. WAVE LFO# 56 V. WAVE LFO# 57 MOD SEQ.# 57 MOD SEQ.# 58 TURING# 60 RANDOM DRUM# 60 RAND MDUM# 60 RAND MIHAT# 60 RAND MIL 63 Explorator – Multiple utilities. 63 Buttons. 63 Explorator Module sections.		
TRG. RANDOM 48 DIGI. DRUMS 48 NUMBER STAT& 49 BOUNCE BALL@ 49 Parameters 50 Mortuus – Embalmed multifunction gap filler. 51 The changes. 51 Mortuus Mode list. 52 Mortuus module modes. 53 D. ATK. ENV# 54 LOOPING ENV# 54 R.ATK. ENV# 54 LOOPING ENV# 55 FM LFO# 55 FM LFO# 55 RND. FM LFO# 56 V. WAVE LFO# 57 PL.O# 58 TURING# 58 BYTE BEATS# 59 CYMBAL# 60 RANDOM DRUM# 60 RANDOM DRUM# 60 RANDOM DRUM# 60 RAND HIHAT# 60	SEQUENCER [®]	.47
DIGI. DRUMS 48 NUMBER STAT& 49 BOUNCE BALL@ 49 Parameters 50 Mortuus – Embalmed multifunction gap filler 51 The changes 51 Mortuus Mode list 52 Mortuus module modes 53 D. ATK. ENV# 54 R. ATK. ENV# 54 LOOPING ENV# 54 RANDOW ENV# 55 FM LFO# 55 RND. FM LFO# 55 R ND. FM LFO# 56 V. WAVE LFO# 57 MOD SEQ.# 58 TURING# 57 MOD M DRUM# 60 RANDO M DRUM# 60 RANDO MDRUM# 60 RAND HIHAT# 60		
NUMBER STAT& 49 BOUNCE BALL@ 49 Parameters. 50 Mortuus – Embalmed multifunction gap filler 51 The changes. 51 Mortuus module modes. 52 Mortuus module modes. 53 D. ATK. ENV# 54 R. ATK. ENV# 54 LOOPING ENV# 54 RANDOM ENV# 55 FM LFO# 55 RND. FM LFO# 56 V. WAVE LFO# 56 R.VW. LFO# 57 PLO# 58 TURING# 58 BYTE BEATS# 59 CYMBAL# 60 RANDOM DRUM# 60 RAND. HIHAT# 60 Mutants Blank – Rack sleekerizer 62 Explorator – Multiple utilities 63 The Controls 63 Buttons 63 LOCOCIC Section 64 1:3 section 64 2:2 section 65 3:1 section 66 <td></td> <td></td>		
BOUNCE BALL@ 49 Parameters. 50 Mortuus – Embalmed multifunction gap filler. 51 The changes. 51 Mortuus Mode list. 52 Mortuus Mode list. 53 D. ATK. ENV# 54 LOOPING ENV# 54 LOOPING ENV# 54 LOOPING ENV# 55 FM LFO# 55 RND. FM LFO# 56 V. WAVE LFO# 56 R.V.W. LFO# 57 PLO4 57 MOD SEQ.# 58 TURING# 58 BYTE BEATS# 59 CYMBAL# 60 RANDO M DRUM# 60 RANDO MDRUM# 60 RANDO MDRUM# 60 RAND HIHAT# 60 RAND MOW DRUM# 60 RAND MUBUB utilities 63 The Controls 63 Buttons 63 Explorator Module sections. 64 1:3 section. 64		
Parameters 50 Mortuus – Embalmed multifunction gap filler 51 The changes 51 Mortuus Mode list 52 Mortuus module modes 53 D. ATK. ENV# 54 LOOPING ENV# 54 LOOPING ENV# 54 LOOPING ENV# 55 FM LFO# 55 RND.FM LFO# 56 V. WAVE LFO# 56 V. WAVE LFO# 57 PL.O# 57 MOD SEQ.# 58 TURING# 58 BYTE BEATS# 59 CYMBAL# 60 RANDOM DRUM# 60 RAND. HIHAT# 60 RAND. HIHAT# 60 RAND. HIHAT# 60 RAND. HIHAT# 60 GIN section 63 Buttons 63 Explorator Module sections 63 I 13 section 64 SIGN section 64 SI Section 65 AG		
Mortuus – Embalmed multifunction gap filler. 51 The changes. 51 Mortuus Model list. 52 Mortuus module modes. 53 D. ATK. ENV# 54 R. ATK. ENV# 54 LOOPING ENV#. 54 RANDOM ENV# 55 FM LFO#. 55 RND. FM LFO#. 56 V. WAVE LFO#. 56 V. WAVE LFO#. 57 PL.O#. 57 PL.O#. 57 NOD SEQ.# 58 TURING#. 58 STURING#. 59 CYMBAL# 60 RAND. HIHAT#. 60 MAND. HIHAT#. 60 Moutants Blank – Rack sleekerizer 62 Explorator – Multiple utilities. 63 Buttons. 63 Buttons. 63 Buttons. 64 1:3 section. 64 2:2 section. 64 2:2 section. 65 LOGIC section. 66 StH section. 66 Khobs.	BOUNCE BALL@	. 49
The changes 51 Mortuus Mode list. 52 Mortuus module modes. 53 D. ATK. ENV# 54 R. ATK. ENV# 54 R. ATK. ENV# 54 LOOPING ENV# 54 RANDOM ENV# 55 FM LFO# 55 RND. FM LFO# 56 V. WAVE LFO# 56 R. V.W. LFO# 57 P.L.O# 57 MOD SEQ.# 58 TURING# 59 CYMBAL# 60 RAND. HIHAT# 60 RAND. HIHAT# 60 Mutants Blank – Rack sleekerizer 52 Explorator – Multiple utilities 63 The Controls 63 Buttons 63 Explorator Module sections 64 1:3 section 64 2:2 section 65 Suff Section 65 Motults and outputs 68 Inputs and outputs 68 Inputs and outputs 72 Funes module modes 73		
Mortuus Mode list. 52 Mortuus module modes. 53 D. ATK. ENV#. 54 R. ATK. ENV#. 54 LOOPING ENV#. 54 RANDOM ENV#. 55 FM LFO#. 55 RND. FM LFO#. 56 V. WAVE LFO#. 56 V. WAVE LFO#. 57 PL.O#. 57 PL.O#. 57 MOD SEQ.#. 57 MOD SEQ.#. 58 TURING#. 59 CYMBAL#. 60 RAND. HIHAT#. 60 Mutants Blank – Rack sleekerizer. 62 Explorator – Multiple utilities. 63 Buttons. 63 Explorator Module sections. 64 1:3 section. 64 2:2 section. 65 LOGIC section. 65 LOGIC section. 66 S&H section. 66 Funes module modes. 70 The controls. 68 Inputs and outputs.	Mortuus – Embalmed multifunction gap filler	.51
Mortuus module modes. 53 D. ATK. ENV# 54 R. ATK. ENV# 54 R. ATK. ENV# 54 LOOPING ENV# 55 FM LFO# 55 FM LFO# 55 RND. FM LFO# 56 V. WAVE LFO# 56 R.V.W. LFO# 57 PL.O# 57 MOD SEQ.# 58 TURING# 59 CYMBAL# 60 RANDOM DRUM# 60 RAND MILTHAT# 60 Mutants Blank – Rack sleekerizer 62 Explorator – Multiple utilities 63 Buttons 63 Explorator Module sections 64 1:3 section 64 2:2 section 65 LOGIC section 65 LOGIC section 66 St H section 66 Funes – Macro oscillator 68 Inputs and outputs 70 The controls 68 Inputs and outputs 70		
D. ATK. ENV#		
R. ATK. ENV# 54 LOOPING ENV# 54 RANDOM ENV# 55 FM LFO# 55 RND. FM LFO# 56 R.V.W. EFO# 56 R.V.W. LFO# 57 PL.O# 57 MOD SEQ.# 58 TURING# 58 TURING# 59 CYMBAL# 60 RAND M DRUM# 60 RAND M DRUM# 60 Mutants Blank – Rack sleekerizer 62 Explorator – Multiple utilities 63 The Controls 63 Buttons 63 Explorator Module sections 64 1:3 section 64 2:2 section 65 LOGIC section 66 S&H section 66 S&H section 66 S&H section 66 S&H section 66 The Controls 68 Inputs and outputs 70 The controls 68 Inputs and outputs 70 The context menu 72	Mortuus module modes	.53
LOOPING ENV# 54 RANDOM ENV# 55 FM LFO# 55 RND. FM LFO# 56 V. WAVE LFO# 56 R.V.W. LFO# 57 PL.O# 57 MOD SEQ.# 58 TURING# 58 TURING# 58 SYTE BEATS# 59 CYMBAL# 60 RANDOM DRUM# 60 RAND HIHAT# 60 Mutants Blank – Rack sleekerizer 62 Explorator – Multiple utilities 63 Buttons 63 Buttons 63 Explorator Module sections 64 1:3 section 64 2:2 section 65 LOGIC section 64 2:2 section 65 Git section 66 S& H section 66 S& H section 66 S& H section 66 Subtos 68 Inputs and outputs 70 The controls <td>D. ATK. ENV#</td> <td>. 54</td>	D. ATK. ENV#	. 54
RANDOM ENV#	R. ATK. ENV#	. 54
FM LFO# 55 RND. FM LFO# 56 V. WAVE LFO# 56 R.V.W. LFO# 57 PL.O# 57 MOD SEQ.# 58 TURING# 58 TURING# 59 CYMBAL# 60 RANDOM DRUM# 60 RAND HIHAT# 60 Mutants Blank – Rack sleekerizer 62 Explorator – Multiple utilities 63 The Controls 63 Buttons 63 Explorator Module sections 64 1:3 section 64 2:2 section 65 3:1 section 66 S&H section 68 The Controls 68 Inputs and outputs 70 The context menu 72 Funes module modes 73	LOOPING ENV#	. 54
RND. FM LFO# 56 V. WAVE LFO# 56 R.VW. LFO# 57 P.L.O# 57 MOD SEQ.# 58 TURING# 58 BYTE BEATS# 59 CYMBAL# 60 RANDOM DRUM# 60 RAND ADRUM# 60 Mutants Blank – Rack sleekerizer 62 Explorator – Multiple utilities 63 The Controls 63 Buttons 63 Explorator Module sections 64 1:3 section 64 2:2 section 65 LOGIC section 66 S&H section 66 Funes – Macro oscillator 68 The Controls 68 Inputs and outputs 70 The context menu 72 Funes module modes 73	RANDOM ENV#	.55
V. WAVE LFO# 56 R.V.W. LFO# 57 PL.O# 57 MOD SEQ.# 58 TURING# 59 CYMBAL# 60 RANDOM DRUM# 60 RAND. HIHAT# 60 Mutants Blank – Rack sleekerizer 62 Explorator – Multiple utilities 63 The Controls 63 Buttons 63 Explorator Module sections 64 1:3 section 64 SIGN section 65 3:1 section 65 Sil section 66 S&H section 66 Substant 63 The Controls 65 Alson 64 1:3 section 64 2:2 section 65 Sil section 66 S&H section 66 Substand outputs 68 Inputs and outputs 70 The context menu 72 Funes module modes 73	FM LFO#	. 55
R.V.W. LFO#	RND. FM LFO#	.56
P.L.O# 57 MOD SEQ.# 58 TURING# 58 BYTE BEATS# 59 CYMBAL# 60 RANDOM DRUM# 60 Mutants Blank – Rack sleekerizer 62 Explorator – Multiple utilities 63 The Controls 63 Buttons 63 Explorator Module sections 64 1:3 section 64 2:2 section 65 LOGIC section 65 S&H section 66 S&H section 66 Funes – Macro oscillator 68 The Controls 68 Inputs and outputs 70 The context menu 72 Funes module modes 73	V. WAVE LFO#	. 56
MOD SEQ.# 58 TURING# 58 BYTE BEATS# 59 CYMBAL# 60 RANDOM DRUM# 60 RAND. HIHAT# 60 Mutants Blank – Rack sleekerizer 62 Explorator – Multiple utilities. 63 The Controls. 63 Buttons 63 Explorator Module sections. 64 1:3 section 64 2:2 section 65 LOGIC section 65 3:1 section 66 S&H section 66 Funes – Macro oscillator 68 The Controls. 68 Inputs and outputs. 70 The context menu. 72 Funes module modes. 73	R.V.W. LFO#	. 57
TURING# 58 BYTE BEATS# 59 CYMBAL# 60 RANDOM DRUM# 60 RAND. HIHAT# 60 Mutants Blank – Rack sleekerizer 62 Explorator – Multiple utilities 63 The Controls 63 Buttons 63 Explorator Module sections 64 1:3 section 64 2:2 section 65 JGIC section 65 3:1 section 66 S&H section 66 Funes – Macro oscillator 68 Inputs and outputs 70 The context menu 72 Funes module modes 73	P.L.O#	. 57
BYTE BEATS#59CYMBAL#60RANDOM DRUM#60RAND. HIHAT#60Mutants Blank – Rack sleekerizer62Explorator – Multiple utilities63The Controls63Buttons63Explorator Module sections641:3 section642:2 section65LOGIC section653:1 section66S&H section66Funes – Macro oscillator68The Controls68Inputs and outputs70The context menu72Funes module modes73	MOD SEQ.#	.58
CYMBAL#60RANDOM DRUM#60RAND. HIHAT#60Mutants Blank – Rack sleekerizer.62Explorator – Multiple utilities.63The Controls.63Buttons.63Explorator Module sections.641:3 section.64SIGN section.642:2 section.65LOGIC section.653:1 section.66S&H section.66S&H section.66Substantiation.66Substantiation.66Substantiation.66Substantiation.66Substantiation.66Substantiation.66Substantiation.66Substantiation.66Substantiation.68The Controls.68Inputs and outputs.70The context menu.72Funes module modes.73	TURING#	. 58
RANDOM DRUM#	BYTE BEATS#	. 59
RAND. HIHAT#60Mutants Blank – Rack sleekerizer.62Explorator – Multiple utilities.63The Controls.63Buttons.63Explorator Module sections.641:3 section.64SIGN section.642:2 section.65LOGIC section653:1 section.66S&H section.66Funes – Macro oscillator.68The Controls.68Inputs and outputs.70The context menu.72Funes module modes.73	CYMBAL#	. 60
Mutants Blank – Rack sleekerizer.62Explorator – Multiple utilities.63The Controls.63Buttons.63Explorator Module sections.641:3 section.64SIGN section.642:2 section.65LOGIC section.653:1 section.66S&H section.66Funes – Macro oscillator.68The Controls.68Inputs and outputs.70The context menu.72Funes module modes.73	RANDOM DRUM#	.60
Explorator – Multiple utilities.63The Controls.63Buttons.63Explorator Module sections.641:3 section.64SIGN section.642:2 section.65LOGIC section.653:1 section.66S&H section.66S&H section.66S&H section.66Inputs and outputs.70The context menu.72Funes module modes.73	RAND. HIHAT#	.60
The Controls.63Buttons.63Explorator Module sections.641:3 section.64SIGN section.642:2 section.65LOGIC section.653:1 section.66S&H section.66S&H section.68The Controls.68Inputs and outputs.70The context menu.72Funes module modes.73	Mutants Blank – Rack sleekerizer	.62
The Controls.63Buttons.63Explorator Module sections.641:3 section.64SIGN section.642:2 section.65LOGIC section.653:1 section.66S&H section.66S&H section.68The Controls.68Inputs and outputs.70The context menu.72Funes module modes.73	Explorator – Multiple utilities	.63
Explorator Module sections.641:3 section.64SIGN section.642:2 section.65LOGIC section.653:1 section.66S&H section.66Funes – Macro oscillator.68The Controls.68Inputs and outputs.70The context menu.72Funes module modes.73		
1:3 section.64SIGN section.642:2 section.65LOGIC section.653:1 section.66S&H section.66Funes – Macro oscillator.68The Controls.68Inputs and outputs.70The context menu.72Funes module modes.73	Buttons	. 63
1:3 section.64SIGN section.642:2 section.65LOGIC section.653:1 section.66S&H section.66Funes – Macro oscillator.68The Controls.68Inputs and outputs.70The context menu.72Funes module modes.73	Explorator Module sections	.64
2:2 section.65LOGIC section.653:1 section.66S&H section.66Funes – Macro oscillator.68The Controls.68Knobs.68Inputs and outputs.70The context menu.72Funes module modes.73		
LOGIC section	SIGN section	. 64
3:1 section.66S&H section.66Funes – Macro oscillator.68The Controls.68Knobs.68Inputs and outputs.70The context menu.72Funes module modes.73	2:2 section	.65
S&H section.66Funes – Macro oscillator.68The Controls.68Knobs.68Inputs and outputs.70The context menu.72Funes module modes.73	LOGIC section	. 65
Funes – Macro oscillator.68The Controls.68Knobs.68Inputs and outputs.70The context menu.72Funes module modes.73	3:1 section	.66
The Controls.68Knobs.68Inputs and outputs.70The context menu.72Funes module modes.73	S&H section	.66
Knobs	Funes – Macro oscillator	.68
Inputs and outputs	The Controls	. 68
The context menu	Knobs	. 68
The context menu	Inputs and outputs	.70
FLTRWAVE73	Funes module modes	.73
	FLTRWAVE	. 73

PHASDIST	74
6 OP.FM1, 6 OP.FM2, 6 OP.FM3	74
WAVETRRN [®]	
STRGMACH	75
CHIPTUNE	75
DUALWAVE	75
WAVESHAP	76
2 OP.FM	76
GRANFORM	76
HARMONIC	77
WAVETABL	78
CHORDS	79
VOWLSPCH	
GR.CLOUD	80
FLT.NOIS	80
PRT.NOIS	
STG.MODL & MODALRES	
BASSDRUM [‡]	
SNARDRUM [‡]	
HI-HAT	
Incurvationes – Meta modulator	
The Controls	
Knobs and buttons	
Inputs and outputs	
Bypassed module behavior	
Incurvationes module modes	
Signal route diagram	
Standard mode algorithms	
Crossfading	
Crossfolding	
Diode ring modulation	
Digital ring modulation	
XOR modulation	
Comparison and rectification	
Vocoder	
Frequency shifter mode	
Quadrature cross-modulator	
Distortiones – Doctored meta modulator.	
The Controls	
Knobs and buttons	
Inputs	
Lights	
The context menu	
Module modes	
Binaural Doppler Panner	
Wave Folder	
Chebyschev Wave Shaper	
Frequency Shifter	
Dual Bit Mangler	

Comparator with Chebyschev Wave Shaper	99
Vocoder	100
Variable Rate Delay	100
Meta-mode	102
Mutuus – Experimental meta modulator	103
The Controls	
Knobs and buttons	
Module modes	104
Dual State Variable Filter	
Ensemble FX	
Reverbs	105
Frequency Shifter	106
Bit Crusher	106
Chebyschev Wave Shaper	
Doppler panner	
Delay	
Meta-mode	
Marmora – Random sampler	
The Controls	
Marmora's quick start formula	
The t generator	
Knobs and buttons	
Inputs and outputs	
The Deja Vu section	
Knobs	
Inputs	
The X generator	
Knobs and buttons	
Inputs and outputs	
The Y generator	
Knobs	
Outputs	
Scales	
Selecting scales	
Customizing scales	
Resetting scales	
The context menu	
Marmora tips and tricks	
Nebulae – Texture synthesizer	
The Controls	
Knobs and buttons	
Inputs and outputs	
The context menu	
Bypassed module behavior	
Nebulae module modes	
GRANULAR	
STRETCH	
LOOPING DLY	
SPECTRAL	

Etesia – Spliced texture synthesizer	132
The changes	132
Mode list	133
Module modes	133
GRANULAR	134
STRETCH	135
LOOPING DLY	
SPECTRAL	137
OLIVERB	137
RESONESTOR	140
Fluctus – Grafted texture synthesizer	143
The changes	143
Mode list	144
Module modes	144
SPCT. CLOUDS	
BEAT-REPEAT	
Nodi – Macro oscillator X	150
The Controls	150
Knobs and buttons	
Inputs, outputs and lights	
The context menu	
Nodi module models	
CSAW	
Λ\-	
//	
FOLD	
uuuu	
SUB	
SUB/	
SYN-, SYN/	
//x3, - x3, /x3, SIx3	
RING.	
////	
//uu	
ΤΟΥ*	
ZLPF, ZPKF, ZBPF, ZHPF	
VOSM	
VOWL, VFOF	
HARM	
FM, FBFM, WTFM	
PLUK.	
BOWD [‡]	
BLOW, FLUT	
BELL [‡]	
DRUM [‡]	
KICK	-
CYMB	
SNAR [‡]	
WTBL	

WMAP	165
WLIN	165
WTx4	165
NOIS	166
TWNQ	
CLKN	
CLOU, PRTC	
QPSK	
49	167
Contextus – Resurgent macro oscillator X	
The changes	
New module models	
\\CH,CH, /\CH, SICH, WTCH	169
\\x6,x6, /\x6, SIx6, WTx6	170
SAM1, SAM2	
Velamina – Quad VCA	172
The Controls	172
Knobs and sliders	172
Inputs and outputs	173
Acknowledgments & thanks	175
Contact	
Disclaimer	
Licenses & Copyrights	

Some PDF viewers are, to put it nicely, quirky, so, if this manual has text sections broken up; covered by images, or parts that are unreadable, please view it using your web browser or a different application.



Sanguine Modules Mutants

It is our sincere hope these modules excite you as much as they did us when creating them, and that they fuel all your musical ventures for a really long time!

In a hurry? If you are looking for the instructions for a specific module, use the handy provided table of contents (it is clickable!).

Base modules are presented in alphabetical order, followed by their alternative firmwares, if any are available.

Have fun!

Manual conventions

- This manual uses **bold** text to refer to controls, inputs, outputs and modes.
- This manual uses illustrations to show LEDs, their states and their colors:

LED light off An unlit LED lamp. A non-blinking, lit LED lamp. LED light on The illustrations show the lamp's color	Description	Illustration	LED State
LED light on	LED light off	\bigcirc	An unlit LED lamp.
•	LED light on	0	The illustrations show the lamp's color
Blinking LED light ●↔● (yellow in the provided example). LED lamps that switch between a number of states, the illustrations show the colors of the lit states. In this example, the lamp is cycling	Blinking LED light	◎ ↔ ●	LED lamps that switch between a number of states, the illustrations show the colors of the lit states.
Fast blinking LED Image: Colors of the lit states in this example, the lamp is rapidly cycling between being off and lit red.	•	◎⇔○	LED lamps that switch quickly between a number of states, the illustrations show the colors of the lit states. In this example, the lamp is rapidly cycling

Module polyphonic conventions

Several Sanguine Mutants modules are polyphonic and can handle up to 16 channels.

Module polyphony is always set by port detection: the number of channels carried by a polyphonic cable connected to a detector port sets the number of channels the module handles; the manuals for the different modules explain which ports are detectors: some modules can use more than one port. The one with the highest channel count is used.

If a port has a golden jack, it can handle polyphonic signals.

Knobs and buttons affect every channel processed by the module (except when otherwise noted); but values can be offset or overridden (when noted), per channel, if the parameter has a polyphonic CV port with a corresponding polyphonic cable carrying a voltage for the desired channel.



Bypassed module behavior

Some modules have special behaviors when bypassed that supersede Rack's standard one of stopping signal flow, if a module is internally configured to, for example, transfer signals when bypassed, it will be noted in the appropriate section of its manual.

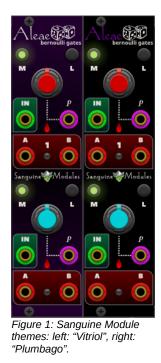


Sanguine Modules themes

Sanguine Modules include two faceplate themes:

- Vitriol: colorful Sanguine Modules theme, this is the default.
- **Plumbago**: dark Sanguine Modules theme.

The image below shows an example using the "Aleae" module; results for other modules are similar.



Every module has the same context menu entries to change themes for the whole plugin and for every individual module instance.

Default theme	Vitriol	•
Module theme	Vitriol	۲

- **Default theme**: sets the theme to be used for every newly created Sanguine module.
 - When a new **Default theme** is selected, the selected module instance applies the theme immediately.
 - Modules shown in Rack's browser will also be displayed using the selected theme (when Rack is reloaded).
 - The selected theme is stored in "SanguineModules.json" in the Rack user folder.



- The selected theme applies to both Sanguine Mutants and Sanguine Monsters.
- **Module theme**: sets the theme for the selected module instance.
 - Module themes can be selected individually for every instance of the same module in the same patch.
 - Module themes for individual modules are stored in presets and patches.

The Modules

Aestus – Tidal modulator

Looping envelopes, a digital oscillator or a wave table synthesizer... all at your beck and call.

Generate single shot AD envelopes or sustained ASR envelopes.

A versatile oscillator: from really slow LFOs to a self contained synth voice.

Find that special modulation with a plethora of signal shaping options.

Continuously interpolate between wave forms in a 2D table and design the sound your next hit craves using the built-in wave folder when the module is configured as the Sheep model.

Based on Mutable Instruments' original "Tides" module and the alternative "Sheep" firmware for it, Aestus combines both firmwares in a user-selectable manner.

We hope this module can ride the currents of creativity right by your side.

The Controls



Aestus offers two different models in the same module:

• **Tidal modulator**: a versatile digital function generator with a large palette of controllable wave forms.

• Sheep – Wave table synthesizer: a wave table synthesizer that provides three banks of waves laid out in a 2D grid; the wave forms can be interpolated.

Controls adjust different parameters depending on the selected model, functions for both models are explained below.

Knobs and buttons

A. Model selection: twist this knob to select the module's model. The selected model is shown in the display to the right of the knob as a single letter, in the knob's tooltip and in the context menu.

Aestus offers two models:

Model	Display
Tidal modulator	E
Sheep – Wave table synthesizer	5

The context menu can also be used to directly select the module's model.

B. SYNC: toggles on and off the Clock sync/PLL mode.

When this mode is enabled, the button's LED turns on and alternates between yellow and red.

$\bigcirc \leftrightarrow \bigcirc$

When **Clock sync/PLL mode** is enabled, the frequency of the signal the module generates can be locked to an external source connected to the **CLOCK** (9) input.

What is the difference between Clock sync and PLL (Phase Locked Loop)? Clock sync is meant for triggers and PLL for audio signals. Aestus can handle both and selects the most suitable one automatically.

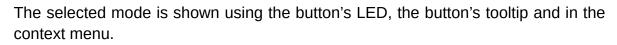
Clock sync/PLL mode is functionally identical in both the **Tidal modulator** and **Sheep** – **Wave table synthesizer** models.

Clock sync/PLL mode will activate automatically when the **Tidal modulator** model is selected and a cable is plugged in the **CLOCK** (9) input: no need to press the button.

Clock sync/PLL mode is disabled by default.

- C. Mode select: the effects of this button are model dependent:
 - Tidal modulator

Pushing this button cycles between the three available operation modes.



The available modes are:

LED	Glyph	Mode
		AD Envelope [‡]
		Cyclic
0		AR Envelope [‡]

• Sheep – Wave table synthesizer

Pushing this button cycles between the three available banks of waves.

The selected bank is shown using the button's LED.

The Sheep – Wave table synthesizer model has no single cycle modes.

The available banks and their LED colors are:

Glyph	LED	Wave table
	•	Additive harmonics (no phasing effect, little aliasing)
	\bigcirc	PWMish (some more aliasing is possible)
	0	Waves from Nodi's WMAP mode

These options can be selected directly using the context menu.

D. FREQUENCY: this is the main frequency control for the module.

Its behavior depends on whether PLL mode is enabled or disabled:

• **PLL mode disabled**: adjusts the signal's frequency.

The knob has a range of ± 4 octaves,

• **PLL mode enabled**: controls the ratio between output frequency and clock frequency.

Both clock division and multiplication are possible.

When the knob is centered, the ratio is 1:1 between the output frequency and the clock frequency.

When the knob is turned clockwise, the following ratios are available:

5/4, 4/3, 3/2, 5/3, 2, 3, 4, 5, 6, 8, 12,16

When the knob is turned counter-clockwise, the following ratios are available:

t This mode requires trigger pulses or gate signals present at the **TRIG** (4) input to generate envelopes.



- 1/16, 1/12, 1/8, 1/6, 1/4, 1/3, 1/2, 3/5, 2/3, 3/4, 4/5
- The LED to the left of the knob shows the amplitude of the generated wave form and its stage:

LED	Mode
0	Attack
0	Decay, sustain, release

This knob behaves the same in both module models.

E. FM attenuverter: controls the polarity and amount of frequency modulation from the signal in the **FM** (7) input.

This knob can also act as a fine frequency control when no cable is connected to the **FM** (7) input.

This knob behaves the same in both module models.

F. Range select: pushing this button cycles between the three available frequency ranges.

The selected range is shown using the button's LED, the button's tooltip and in the context menu.

The available ranges are:

LED	Glyph	Mode
	C	Low
\bigcirc	M	Medium
0	H	High [◊]

Frequency range can be selected directly using the context menu.

This controls frequency range in both module models.

G. SHAPE: this effect of this knob is model dependent:

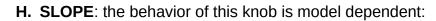
• Tidal modulator

Adjusts the shape of the wave, therefore providing different combinations of curvatures for the rise and fall segments.

• Sheep – Wave table synthesizer

Controls the X coordinate of the wave map.

[♦] This mode is optimized for audio frequencies, so the **SHAPE** (G) and **SLOPE** (H) parameters have different response curves better suited for such frequencies.



• Tidal modulator

Adjusts the balance between the rise and fall time: when the knob is all the way to the left, there is no rise time and the decay segment takes up the whole cycle (decaying envelope); when the knob is all the way to the right, the attack segment takes the whole cycle and the fall is immediate; both phases have equal duration when the knob is centered.

• Sheep – Wave table synthesizer

Controls the Y coordinate of the wave map.

I. SMOOTH: this knob controls how the output wave is transformed: at 12 o'clock, waves are output without modification; turning the knob counter-clockwise progressively attenuates the signal's high frequency content (2-pole low-pass filtering); turning the knob clockwise progressively enriches the signal's high frequency content via wave folding.

The effect of this knob is the same for both module models.

Inputs and outputs

- **1. SHAPE CV**: voltage applied in this input acts as an offset added to the value set by the **SHAPE** (G) knob.
- 2. SLOPE CV: voltage applied in this input acts as an offset added to the value set by the SLOPE (H) knob.
- **3. SMOOTH CV**: voltage applied in this input acts as an offset added to the value set by the **SMOOTH** (I) knob.
- 4. TRIG: pulses received in this port have a different effect that depends on the currently selected mode: in AD envelope and AR envelope modes, they drive the envelope; in Cyclic mode they reset the oscillator's phase.

The effect of this input is the same for both module models. Remember, the **Sheep – Wave table synthesizer** model is cyclic only.

The voltage detection threshold is 0.7V.

5. FREEZE: when a signal of 0.7V or higher is present in this input, the oscillator or envelope stops until the input voltage goes back to 0V.

This input has the same effect on both module models.

6. V/OCT: controls the module's frequency.

This input behaves the same on both module models.

7. FM: voltage sent to this port modulates frequency.

The amount of FM can be controlled by the **FM** (E) attenuverter.

This input is normalled to 0.1V when no cable is connected.

The effect of this input is the same for both module models.

8. LEVEL: the voltage of the UNI (12) and BI (13) outputs can be scaled using this input, which acts as a VCA (input range: 0V to 8V, higher voltages are clipped).

Signals are output at full amplitude when no cable is connected: this port is normalled to 8V.

Both module models react the same to voltages sent to this input.

- **9.** CLOCK: the behavior of this input depends on the selected module model and whether Clock sync/PLL mode is enabled:
 - Tidal modulator
 - The signal in this port will be used to synchronize the internal oscillator.
 - Connecting a cable to this port automatically activates **Clock sync/PLL mode**: this port has no other use in this model.
 - Sheep Wave table synthesizer
 - When Clock sync/PLL mode is disabled, pulses sent to this port will cycle the available wave banks.
 - When Clock sync/PLL mode is enabled, the internal oscillator will synchronize to the signal in this port.
 - The SYNC button toggles the Clock sync/PLL mode on and off.

10. HIGH tide: the behavior of this output is model dependent:

• Tidal modulator

This output goes high at the end of the attack phase and remains in that state until the cycle restarts or the envelope is retriggered.

• Sheep – Wave table synthesizer

This output contains a low fidelity (1 bit) version of the signal.



11. LOW tide: the behavior of this output is model dependent:

• Tidal modulator

This output goes high at the end of the decay/release phase and remains in that state until the cycle restarts or the envelope is retriggered. Both the **HIGH tide** (10) and **LOW tide** (11) outputs can be used to chain envelopes.

• Sheep – Wave table synthesizer

This output contains a -1 octave square sub-oscillator.

- **12.UNI**: the signal in this output has a range between 0V and 8V and is what you expect in both module models: signal goes to 8 volts then back to 0 volts.
- **13.BI**: the signal in this output has a range between -5V and +5V; when the **Tidal modulator** model is selected, its behavior is not exactly what you would expect.

When the module is set to the **Tidal modulator** model, the output signal has two bumps: a positive one and a negative one; the **SLOPE** (H) parameter controls the duration ratio between the two, rather than their rise and fall time. In other words: when **AD envelope** mode is selected, the bipolar output is not "A D"; but "A D -A -D"; when **AR envelope** mode is selected, it is not "A R"; but rather "A D ... -A -D"; this effect is also applied when audio range is selected. Interesting timbral variations can be obtained by crossfading between the **UNI** (12) and **BI** (13) output signals.

An example illustration will help make the produced shapes clearer:

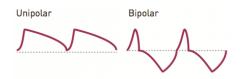


Figure 2: An Aestus envelope signal: **UNI** (12) output on the left, **BI** (13) output on the right.

The context menu

Model	Tidal Modulator	►
Mode	Cyclic	۲
Range	Medium	►

In addition to the standard Rack context menu, the Aestus context menu has several new entries that change dynamically depending on the selected module settings:



- **Model**: select the module's active model directly. This menu is always available.
- Mode: select Tidal modulator modes directly. This menu is present only when the Tidal modulator model is set.
- Wave table: select Sheep Wave table synthesizer wave tables directly. This menu is present only when the Sheep Wave table synthesizer model is set.
- **Range**: select the module's frequency range directly. This menu is always available.



Temulenti – Parasitic tidal modulator

A twisted take on Aestus that adds two new module models: a 16-voice harmonic oscillator and a duophonic random walk generator for more modulation possibilities; it also makes some changes to the **Tidal modulator** model.

Based on the "Parasite" firmware for Mutable Instruments' original "Tides".

We hope this module can help you surf the waves of sound design!

This manual documents the changes and additions Temulenti makes when compared to Aestus; for basic operating instructions and descriptions of the models already present in Aestus (**Tidal modulator** and **Sheep – Wave table synthesizer**) please consult <u>its manual</u>.

Some changes have been made that impact the sound and behavior of the module when the **Tidal modulator** model is selected:

- The **SMOOTH** (I) knob now mutes the sound completely when set all the way to the left. (Feed it an envelope to use it as an LPG, it sounds great.)
- When **RANGE** (F) is set below audio rate (button's LED is either off or green), the logarithmic and exponential wave forms have been accentuated: their effect is more pronounced.
- When RANGE (F) is set to audio rate (button's LED is red), the SLOPE (H) knob has a different effect when going from 7 o'clock to 12 o'clock: it sets the wave's "compression factor": a technique known as Pulsar synthesis which results in nasal or guttural tones. (This effect is prone to aliasing at high frequencies or high spectral contents, so... now you know). The knob's response has also been changed to exponential.
- When RANGE (F) is set to audio rate (button's LED is red), the LOW tide (11) output becomes a square sub-oscillator; when Clock sync/PLL mode is disabled, the CLOCK (9) input acts as a gate and reset for this sub-oscillator: when the signal to the input is high (≥0.7V), the sub-oscillator is stopped until the signal goes low.

The Controls



The controls for Temulenti are the same as the ones for Aestus with one addition.

Temulenti offers four different models in the same module, they are presented below in the order the **Model selection** (A) switches them:

- **Tidal modulator**: the same model explained in the <u>Aestus manual</u>, with the differences noted above and the addition of the quantizer explained below.
- Two bumps Harmonic oscillator: a 16-voice harmonic oscillator¹ with two spectral bumps or notches. Centroids and width can be controlled; harmonics and wave quality selected; it has a sub-oscillator, and 1 bit and harmonics shuffling outputs for unusual, random timbres.

In this model, timbre is shaped by choosing two "center frequencies": the loudest harmonics, and a "width": the amount of harmonics adjacent to the two centers that will also ring. The exact mirror of what was just described can also be obtained, the bumps then become potholes: all harmonics ring by default and the quietest harmonics can be selected, digging a notch of varying width in the spectrum.

• **Two drunks – Random walk**: a complex, duophonic random walk generator with selectable interpolation, driven by two clocks.

This model is extremely versatile and can be used as an oscillator with PLL; a Bernoulli gate; a random trigger delay; a stepped, smooth or wave shaped random voltage generator; a random burst generator; a filtered noise source...

¹ A harmonic generator produces its timbre by summing sinusoidal waves of multiple frequencies (harmonics).



This model is a dual random walk simulator; each walk is timed by an independent clock featuring a form of randomness: one is jittery, with random control; the other simulates a random, biased coin toss, with controllable bias. Both clocks derive from the same, main clock.

Each step leads the walker to a different, nearby place: a new voltage at one of the outputs. The interpolation between the steps can be chosen (square, linear, sinusoidal, bouncy, pointy, woggly²...): a square one will have the effect of sample & hold (on a random walk, not on noise). All the interpolations sound different.

The two output channels share the same knob parameters; but they are inverted³ (for additional fun)! For example: if a knob is fully counter-clockwise, Channel 1 will act according to the knob's setting and Channel 2 will behave as if the knob was set all the way to the right. The only way to make both channels agree is to center a given knob.

• **Sheep – Wave table synthesizer**: the same model present in Aestus and explained in <u>its manual</u> with the quantizer addition.

Controls adjust different parameters depending on the selected model, functions for the new models are explained below.

Knobs and buttons

A. Model selection: twist this knob to select the module's model. The selected model is shown in the display to the right of the knob as a single letter, in the knob's tooltip and in the context menu.

Aestus offers four models:

Model	Display
Tidal modulator	E
Two bumps – Harmonic oscillator	Ь
Two drunks – Random walk	d
Sheep – Wave table synthesizer	5

The context menu can also be used to directly select the module's model.

- **B. SYNC**: same behavior as in Aestus.
- **C. Mode select**: the effects of this button are model dependent:

² Between wiggly and wonky.

³ Knob inversion affects the SHAPE (G), SLOPE (H) and SMOOTH (I) knobs.



• Two bumps – Harmonic oscillator

Pushing this button selects which harmonics can ring.

The selected harmonics mode is shown using the button's LED, the button's tooltip and in the context menu.

The available modes are:

LED	Glyph	Mode	Description
		Odd harmonics	A more metallic timbre closer to a
			square wave
		First 1C hormonics	The default in most harmonic
0	~	First 16 harmonics	oscillators
		Octaves	You'd be forgiven for thinking this
	-	Octaves	sounds like a church organ

• Two drunks – Random walk

Pushing this button cycles between the three available trigger modes.

The selected mode is shown using the button's LED.

The available modes and their LED colors are:

LED	Glyph	n Mode	Description
•	\diamond	Trigger**	A new cycle begins when a trigger is received in the TRIG (4) input.
			The trigger will be delayed or randomly dropped on the clock outputs of Channels 1 / 2
\bigcirc	•	Cycling	The clock ticks away by itself and stops only when a gate is received in the FREEZE (5) input
•		Gate	The main clock cycles while the TRIG (4) input is high.

These options can be selected directly using the context menu.

D. FREQUENCY: the behavior of this knob is model dependent:

• Two bumps – Harmonic oscillator

Sets the fundamental frequency.

Both channels always finish their current step before stopping, and pick up where they left off (unless the square interpolation is set).

Interpolation time is fixed to the main clock: it will not correspond perfectly to the next trigger, and, therefore, will sometimes "stall". If your triggers are a steady clock, you might be better off enabling Clock sync/PLL mode and using the CLOCK (9) input.



• Two drunks – Random walk

Sets the frequency of the main clock.

Clock sync/PLL mode can affect both models by synchronizing their respective parameter to an external source.

E. FM attenuverter: the behavior of this knob is model dependent:

• Two bumps – Harmonic oscillator

Attenuverts the amount of FM applied from the signal in the FM (7) input.

• Two drunks – Random walk

Attenuates the signal in the FM (7) input; it also determines the duration of output gates:

- Channel 1 (jittery clock): sets the random distribution of on and off gate states: when the knob is centered, on and off times for the gate are equal; when the knob is all the way to the left, the gate spends more time being off than on, and when the knob is fully to the right, the gate spends most of its time being on.
- Channel 2 (coin-toss clock): sets the pulse width of each clock tick.
- **F. Range select**: the behavior of this button is model dependent; pushing it cycles between the three available options.

The selected option is shown using the button's LED, the button's tooltip and in the context menu.

• Two bumps – Harmonic oscillator

Selects sine wave quality:

LED	Glyph	Quality	Description
•	C	Low	Sines are interpolated with the least points: a more pronounced effect than the one obtained in Medium quality
\bigcirc	M	Medium ⁴	Sines are interpolated with less points and sound closer to a triangle
0	Ð	High⁵	Maximum quality sine wave interpolation

• Two drunks – Random walk

⁴ Waves are decimated; but the effect is not the same as one obtainable when running the output through a bit crusher (such as the one <u>available in Distortiones</u>): all sine waves are decimated independently, at their own frequency.

⁵ Even in this mode a bit of aliasing can occur due to the low sampling rate.



Sets the frequency range of the oscillator.

Setting the **Range** to **High** can produce an interesting noise generator: crank the frequency to maximum, optionally connect a positive offset signal in the **V/OCT** (6) port and listen! Carelessly wiggling the knobs and self patching can produce fun results!

These options can be set, for both models, using the context menu.

G. SHAPE: this effect of this knob is model dependent:

• Two bumps – Harmonic oscillator

Selects the first central frequency.

• Two drunks – Random walk

Sets the interpolation curve between two steps⁶. It morphs between, from left to right,: square (no interpolation), spiky, spiky and bouncy, linear, sinusoidal, bouncy, and woggly.

H. SLOPE: the behavior of this knob is model dependent:

• Two bumps – Harmonic oscillator

Selects the second central frequency. The effect of this frequency is, intentionally, always less pronounced, for variety.

• Two drunks – Random walk

Sets the behavior of the two clocks⁶.

- Channel 1: acts as a random delay to the main clock: when the knob is fully counter-clockwise, no delay is applied and the channel follows the main clock; as the knob is turned clockwise, the random delay gets bigger and the clock gets slower and more jittery.
- Channel 2: sets the probability that a main clock tick will produce a clock tick in Channel 2; when the knob is all the way to the right, probability is 1 and channel 2 accurately follows the main clock; as the knob is turned to the left, more and more clock ticks are dropped; when the knob is centered, probability is ½; when the knob is all the way to the left, probability is very small (but not 0) and *almost* all clock ticks will be dropped.
- **I. SMOOTH**: the behavior of this knob is mode dependent:

• Two bumps – Harmonic oscillator

⁶ Remember! Knob inversion!

Selects how the timbre is affected by the central frequencies; when the knob is at 7 o'clock, the oscillator is silenced; a little past 7 o'clock to 12 o'clock, only harmonics at the center frequencies ring, with an increasing number of neighbors ringing as the knob is turned; from 12 o'clock to 5 o'clock, all harmonics ring, except those at the centers, with an increasing number of neighbors getting carved.

• Two drunks – Random walk

Sets the maximum size of one step⁷ (step sizes are random); when the knob is all the way to the left, Channel 1 will take very large steps (so large, that it could be considered completely random) and Channel 2 will be almost steady; when the knob is all the way to the right, this behavior is inverted: Channel 2 takes really large steps and Channel 1 is almost steady. Why is this happening? Remember! Knob inversion is fun, and the model is called "Two Drunks".

J. QNTZ: Temulenti has a built-in quantizer that can be used with all module models; twisting this knob turns it on and off and selects the scale it will use.

The selected scale is shown using the LEDs (in binary notation) to the right of the knob, the knob's tooltip and the context menu.

LEDs pattern	Scale
8	Off
8	Semitones
8	Major
8	Minor
8	Whole tones
8	Pentatonic minor
8	Poor pentatonic
8	Fifths

The available scales and their LEDs pattern are the following:

Inputs and outputs

The **SHAPE** (1), **SLOPE** (2), **SMOOTH** (3) and **FM** (7) (normalled to 0.1V) inputs still receive signals that will act as offsets to their corresponding parameter, as in Aestus.

- 4. TRIG: the behavior of this port is model dependent:
 - Two bumps Harmonic oscillator

Triggers randomize the phase of each harmonic and act as a kind of reset.

⁷ The length a walk can travel in one clock tick.



• Two drunks – Random walk

Trigger the clocks.

5. FREEZE: this input behaves differently depending on the selected model:

• Two bumps – Harmonic oscillator

When a gate is received, harmonics sent to the **UNI** (12) output are permuted randomly.

• Two drunks – Random walk

When a high gate ($\geq 0.7V$) is active, all clocks are stalled.

- 6. V/OCT: what you expect.
- 8. LEVEL: the behavior of this input is model dependent:

• Two bumps – Harmonic oscillator

This input acts like a VCA (like in Aestus).

• Two drunks – Random walk

Controls the amplitude of both channels.

9. CLOCK: this input is model dependent:

• Two bumps – Harmonic oscillator

When **Clock sync/PLL mode** is disabled, triggers received in this port will randomize the harmonics distribution and decimation settings. The LEDs in the buttons for **Mode select** (C) and **Range select** (F) will show the selected modes.

When **Clock sync/PLL mode** is enabled, behavior is similar to Aestus.

• Two drunks – Random walk

When **Clock sync/PLL mode** is disabled, triggers received in this port will randomize the range setting. The LED in the **Range select** (F) button will show the selected range.

When **Clock sync/PLL mode** is enabled, behavior is similar to Aestus.

10. HIGH tide: This output is model dependent:

• Two bumps – Harmonic oscillator

The 1 bit version of the **BI** (13) output.

• Two drunks – Random walk

The clock for Channel 1.

- **11. LOW tide**: the output of this port is model dependent:
 - Two bumps Harmonic oscillator

A square sub-oscillator, one octave down from the fundamental.

• Two drunks – Random walk

The clock for Channel 2.

12.UNI: the output of this port is model dependent:

 $\circ~$ Two bumps – Harmonic oscillator

The unipolar, permuted harmonics output.

• Two drunks – Random walk

The random walk of Channel 1.

- **13. BI**: the output of this port is model dependent:
 - Two bumps Harmonic oscillator

The main output of the model.

• Two drunks – Random walk

The random walk of Channel 2.

The context menu



In addition to the standard Rack context menu, the Temulenti context menu has several new entries that change dynamically depending on the selected module settings:

- **Model**: select the module's active model directly. This menu is always available.
- Mode: select Tidal modulator or Two drunks Random walk modes directly. This menu is present only when the Tidal modulator or Two drunks – Random walk models are set.



- Harmonics: select Two bumps Harmonic oscillator ringing harmonics directly. This menu is present only when the Two bumps Harmonic oscillator model is set.
- Wave table: select Sheep Wave table synthesizer wave tables directly. This menu is present only when the Sheep Wave table synthesizer model is set.
- **Range**: select the module's frequency range directly. This menu is always available.
- **Quantizer scale**: enable and disable the quantizer and select its active scale directly. This menu is always available.



A two channel, polyphonic randomizer for your voltages: whenever a trigger is received in one of the two inputs, a virtual coin is tossed, its result affecting the output in different ways.

This handy utility module is great for creating generative patches or adding movement to an existing one.

This module can be driven at audio levels to create a noise generator.

This module will produce a different coin toss for every channel in polyphonic cables connected to the inputs.

Based on Mutable Instruments' "Branches".

We aim for this module to serve your chaotic needs!

The Controls



Aleae consists of two identical sections at the top and at the bottom, only the top section is pictured here.

Knobs and buttons

A. COIN MODE: selects between the two available "coin toss" modes:

LED	MODE	DESCRIPTION
•	Direct mode	Whenever a trigger is received, a virtual coin is tossed, if it lands on "heads" OUTPUT A (3) gets a trigger or gate (if LATCH MODE (B) is enabled); if the result is "tails" the trigger or gate goes to OUTPUT B (4).
0	Toggle mode	In this mode the outcome of the coin toss works as

 follows: "Heads": continue sending the trigger to the same output it was being sent to after the last toss.
• "Tails": the trigger is now sent to the opposite output until a new tails result is obtained.
When the PROBABILITY KNOB (C) is set to its maximum value a trigger toggles between the two outputs.

B. LATCH MODE: toggles **LATCH MODE** on and off.

LED	State	Description
0	Off	When a trigger is received, a trigger is, in turn, sent to the output decided by the coin toss depending on the COIN MODE (A) setting.
•	On	A gate is high in one of the outputs and remains in that state until a trigger that changes the selected output is received or this mode is disabled.

C. PROBABILITY KNOB: changes the odds to obtain a particular result from the coin toss.

Mode	Behavior
Direct mode	Setting the knob all the way to the left makes every trigger go to OUTPUT A (3) ("heads"); turning it all the way to the right selects OUTPUT B (4) ("tails") every time.
Toggle mode	When the knob is set fully counter-clockwise, every trigger goes to OUTPUT A (3); setting it fully clockwise switches outputs on every coin toss.

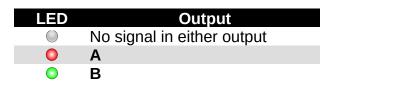
Inputs, outputs and LEDs

1. Trigger input: a trigger here makes the module throw a virtual coin and send a trigger or gate to one of the outputs depending on the result and the module's settings.

This input sets the number of polyphonic channels for its section.

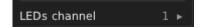
- 2. Probability CV input: change the odds of getting "heads" or "tails" along with the PROBABILITY KNOB (C).
- **3 and 4. Outputs**: a 10V trigger or gate, depending on the **LATCH MODE** (B) settings, will be sent to one of these, according to the rules stated above, whenever a trigger is received in **Trigger input** (1).

The LED lamp between the outputs lights up to indicate the output where the trigger or gate was sent to.



The context menu

÷



Aleae is a polyphonic module and, as such, it can handle up to 16 different channels; yet only two LEDs (one per section) are available to show the currently active output. The solution lies in the context menu: the **LEDs channel** option selects the channel the LEDs show.

Only available channels are shown in the menu.

The module is smart and will select the highest available channel automatically if the last user-selected channel is higher than the currently available ones.

Vimina – Clock manipulator

Swing, multiply and divide up to 16 clock channels, per assignable section, with full manual and CV controlled manipulations in a small package.

Vimina is a polyphonic, flexible dual channel clock modulator module.

Based on the "Twigs" alternative firmware for Mutable Instruments' "Branches".

We hope this module will help you obtain that perfect pace every time you let it take a swing.

The Controls



Vimina derives its morphology from Aleae and shares its context menu: the **LEDs channel** entry is functionally identical; the rest of the module is a different story: its purpose, modes and functions are radically different from Aleae's.

The module provides two almost identical sections that share the **RST.** (1) and **CLK.** (4) inputs.

Sections are referred to **Section 1** and **Section 2** in the module's faceplate and in this manual.

The module offers two different, user selectable, independent modes per section:

• **Clock swing**: modifies incoming triggers/clocks to have musical swing.



• **Clock multiplier/divider**: generates additional triggers or skips beats from those received in the **CLK.** (4) input.

Knobs and buttons

A. Section 1 MODE: sets the active mode for **Section 1**, the selected mode is shown in the button's tooltip and in the button's LED.

LED	Output
0	Clock swing
0	Clock multiplier/divider

Clock swing is the default mode for Section 1.

B. Section 1 **R**: pressing this button sends a reset signal to Section 1; the effect of reset signals is mode dependent:

Mode	Effect
Clock swing	The next trigger received in the CLK. (4) input will be treated as a non-swing one.
Clock multiplier/divider	The next trigger received in the CLK. (4) input will be passed thru and the internal trigger counter will start over.

C. Section 1 parameter: turning this knob sets the parameter for the current section; the parameter's effect is mode dependent:

Mode Clock swing	Effect Sets the amount of swing: 50% (i.e. No swing) when the knob is all the way to the left, to 70% when it is completely to the right.
	As the percentage increases, so does the delay of every other input trigger.
Clock multiplier/divider	Sets the operation to perform on incoming triggers and its factor.
	$x^{3} + x^{2} + x^{3} + x^{3} + x^{4} + x^{5} + x^{6} + x^{7} + x^{8} + x^{8$
	As you can see, when the knob is at 12 o'clock (1 in the diagram), the effect is

bypassed; turning the knob to the left multiplies the clock, up to x8; turning the knob to the right divides it, up to ÷8.

D. Section 2 MODE: sets the active mode for Section 2, the selected mode is shown in the button's tooltip and in the button's LED.

LED and mode behavior is the same as in Section 1.

Clock multiplier/divider is the default mode for Section 2.

- E. Section 2 R: pressing this button sends a reset signal to Section 2; reset signals are functionally equivalent to those for Section 1.
- **F.** Section 2 parameter: sets the parameter for Section 2, its effects are the same as those explained for the Section 1 parameter (C).

Inputs, outputs and lights

- RST: shared reset input for Section 1 and Section 2; triggers received here send a reset signal to both sections; the effects of reset signals are explained Section 1 R (B) above.
- 2. Section 1 CV: voltages received in this port act as an offset to the value set by the Section 1 parameter (C) knob.
- **3.** Section 1 outputs: the resulting manipulated triggers for Section 1 are sent to these outputs; the same output signal is copied to both.

The LEDs reflect where the trigger originated:

LED	Trigger source
\bigcirc	Rest (no trigger)
0	Trigger generated by Vimina
	Trigger copied from CLK (4) (thru)

4. CLK: *shared* clock input for **Section 1** and **Section 2**: signals received in this port drive the clocks for *both* sections.

The number of channels present in the cable connected to this port set module polyphony.

- 5. Section 2 CV: functionally identical to Section 1 CV (2); but for Section 2.
- 6. Section 2 outputs: functionally identical to Section 1 outputs (3); but for Section 2.



Bypassed module behavior

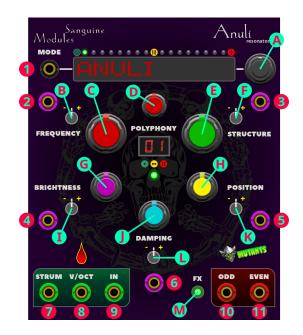
The signal present at the **CLK** (4) input is copied to every available output unaltered.

Anuli – Resonator

Physical modeling turned up to eleven! Strings, membranes, tubes and an organ synthesizer together in a single completely polyphonic Mutant package!

Based on Mutable Instruments' "Rings", spiced with up to 16 channel polyphony.

We hope this module helps keep your art resonating with audiences for a really long time.



The Controls

Knobs and buttons

A. MODE: twist the knob to select the active mode from the available seven.

The selected mode is shown in the display next to the knob, the LEDs above the display, and the knob's tooltip.

Polyphonic channels are represented by the sixteen LEDs above the display; individual lamps light up in the colors listed below to show the selected mode for each active channel.

The mode selected by the knob applies to every polyphonic channel if the **MODE** (1) input port has no cable connected.

The modes are described in detail in the "Anuli Module modes" section.



The available modes, their display names and LED representations are:

LED	MODE	DISPLAY
•	Modal resonator	Modal Reso.
\bigcirc	Sympathetic strings	Sym. Strings
•	Modulated/inharmonic string	M. I. String
$\bigcirc \leftrightarrow \bigcirc$	FM voice	FM voice
$\bigcirc \leftrightarrow \bigcirc$	Quantized sympathetic strings	Q. Sym. Str.
$\bigcirc \leftrightarrow \bigcirc$	Reverb string	Rev. String
$\bigcirc \leftrightarrow \bigcirc$	Disastrous Peace	Disas. Peace

Module modes can also be selected from the context menu.

- **B. FREQUENCY CV ATTENUVERTER:** this knob can function as a fine frequency control when no cable is patched in the **FREQUENCY CV** (2) input; when a cable is present, it attenuverts the signal present at the **FREQUENCY CV** (2) port.
- **C. FREQUENCY:** For most modes, this knob sets the coarse frequency, adjusted by semi-tone increments; for **DISASTROUS PEACE** mode, the knob sets the root note.

The knob spans 5 octaves.

D. NOTE POLYPHONY: sets the number of internal polyphonic voices the module can handle per engine⁸.

The effect Anuli's **NOTE POLYPHONY** has on the output is usually simple: avoid cutting the previous' note tail off (see the note about **NOTE POLYPHONY mode 3** in the table below regarding the mode's divergent behavior).

Do note that generation of some harmonics may be reduced by the module at higher **NOTE POLYPHONY** settings.

The selected mode is shown in the display below the knob, the **NOTE POLYPHONY** LED, and the knob's tooltip.

LED	MODE	NOTES		
	1	1 note can be playing at the same time		
\bigcirc	2	2 notes can be playing at the same time		
●⇔●	3	This mode is different from the others: it is not 3 notes playing at the same time; but, rather, notes bounce between the ODD (9) / EVEN (10) outputs according to an 8-step rhythmic pattern (O E E O E E O E).		
0	4	4 notes can be playing at the same time		

There are 4 **NOTE POLYPHONY** settings:

8 An engine processes a single Rack polyphonic channel, in other words each Rack polyphonic channel requires its own engine.



Do not confuse Anuli's NOTE POLYPHONY with Rack polyphony!

Anuli is a fully polyphonic module, so it can handle up to 16 different Rack channels, each of those channels will be processed by its own engine that respects the module's NOTE POLYPHONY setting.

Example: 5 polyphonic channels are fed to Anuli and the module's NOTE POLYPHONY setting is dialed in at 2.

5 engines will be used (one for each channel) and each of those 5 engines will have an internal NOTE POLYPHONY of 2.

Rack polyphony channels are shown using the LEDs above the display.

NOTE POLYPHONY can also be set using the context menu.

NOTE POLYPHONY is shared by every polyphonic channel.

- E. STRUCTURE: this knob is mode dependent and will be described in the <u>"Anuli Module</u> <u>modes" section</u>.
- F. STRUCTURE CV ATTENUVERTER: attenuverts the signal present at the STRUCTURE CV (3) input.
- **G. BRIGHTNESS:** adjusts the signal's higher harmonics level by applying a simultaneous low-pass filter on the exciter signal and a damping filter (or Q factor of the higher modes).
 - The low-pass filter is fully closed at 8 o'clock and fully open at 12 o'clock.
 - The damping filter is adjusted when the knob is past 12 o'clock.

Low values simulate materials like wood or nylon; high values materials like glass or steel.

- **H. POSITION:** sets the point of excitation on the string or surface; applying excitation to the middle of a surface will cause, by symmetry, even harmonics to cancel each other, producing a "hollow" sound.
- I. BRIGHTNESS CV ATTENUVERTER: attenuverts the signal present at the BRIGHTNESS CV (4) input.
- J. DAMPING: controls sound decay time, from less than 100ms to about 10s.



- K. POSITION CV ATTENUVERTER: attenuverts the signal present at the POSITION CV (5) input.
- L. DAMPING CV ATTENUVERTER: attenuverts the signal present at the DAMPING CV (6) input.
- **M. FX:** this button selects the effect to apply to **Disastrous Peace** audio.

The selected **Disastrous Peace FX** is shown using the button's LED and appears in the button's tooltip as well.

The available **Disastrous Peace FX** and their LED representations are the following:

LED	FX
\bigcirc	No channels are set to Disastrous Peace mode
0	Formant filter
\bigcirc	Rolandish chorus
0	Caveman reverb
$\bigcirc \leftrightarrow \bigcirc$	Formant filter (less abrasive variant)
$\bigcirc \leftrightarrow \bigcirc$	Rolandish chorus (Solinaish ensemble)
$\bigcirc \leftrightarrow \bigcirc$	Caveman reverb (shinier variant)

Disastrous Peace FX can also be set using the context menu.

Effects are ignored in every other module mode.

Disastrous Peace FX is shared by every polyphonic channel set to **Disastrous Peace** mode.

Inputs and outputs

1. MODE: polyphonic voltages sent to this input will directly select the mode for each polyphonic channel (up to 16).

Modes selected using this input override the model selected using the **MODE** (A) knob.

Voltages sent to this port are *not* offsets: mode selection is absolute and direct in the available modes.

Two direct selection modes, chosen using the context menu, are available:

Mode	Description
Direct CV	Voltages in the 0V to 6V range set the mode for a given channel.
	Voltages are mapped as follows:

Voltage	Mode
0V	Modal reso.
1V	Sym Strings
2V	M.I. String
3V	FM Voice
4V	Q. Sym Str.
5V	Rev. String
6V	Disas. Peace

This mode is active when the **C4-F#4 direct mode** selection menu entry is unchecked.

This mode is the default.

Notes starting at C4 and ending at F#4 set the mode for a given channel.

Notes are mapped as follows:

	Note	Mode
	C4	Modal reso.
C4-F#4 direct mode	C#4	Sym Strings
C4-F#4 direct mode	D4	M.I. String
	D#4	FM Voice
	E4	Q. Sym Str.
	F4	Rev. String
	F#4	Disas. Peace

This mode is active when the **C4-F#4 direct mode** selection menu entry is checked.

- FREQUENCY CV: when no cable is connected to this input, the FREQUENCY CV ATTENUVERTER (C) works as a fine frequency control; when a cable is connected the voltage present in this port acts as an offset to the value set by the FREQUENCY (C) knob.
- **3. STRUCTURE CV**: voltages sent to this port offset the value set by the **STRUCTURE** (E) knob.
- **4. BRIGHTNESS CV**: voltages sent to this port offset the value set by the **BRIGHTNESS** (G) knob.
- **5. POSITION CV**: voltages sent to this port offset the value set by the **POSITION** (H) knob.

÷



- **6. DAMPING CV**: voltages sent to this port offset the value set by the **DAMPING** (J) knob.
- **7. STRUM:** when a trigger is received in this input, the module freezes the active playing voice; lets it decay, and starts a note on the next voice.

Normalized to a step detector on the **V/OCT** (7) input and a transient detector on the **IN** (8) input if this port has no cable connected.

The number of channels for module polyphony is set by whichever input has the highest channel count among the **STRUM** (6), **V/OCT** (7) and **IN** (8) inputs.

The **NOTE POLYPHONY** LED blinks when the module's first polyphonic channel is strumming.

8. V/OCT: controls the resonator's main frequency.

The number of channels for module polyphony is set by whichever input has the highest channel count among the **STRUM** (6), **V/OCT** (7) and **IN** (8) inputs.

9. IN: audio input for the excitation signal.

Normalized to a pulse/burst generator that reacts to note changes on the **V/OCT** (7) input if this port has no cable connected.

The number of channels for module polyphony is set by whichever input has the highest channel count among the **STRUM** (6), **V/OCT** (7) and **IN** (8) inputs.

10.ODD: audio output that contains odd partials.

This output, along with the **EVEN** (10) output have different behaviors depending on **NOTE POLYPHONY** (D) and how the outputs are connected.

• Monophonic mode

The outputs carry two complementary components of the signal.

- Odd and even numbered partials with the modal resonator.
- Dephased components due to picking position and pickup placement with the string resonators.

• Polyphonic mode

The signal is split into odd and even numbered strings/plates.

Both outputs need to be connected in order to split the signals, when only one is patched, both signals are mixed together.

10. EVEN: audio output that contains even partials.



See the explanation for the **ODD** (9) output to learn how the module splits signals and splitting requirements.

The ideal Anuli setup

The best way to run Anuli is to feed it 3 input signals:

- A trigger signal to the **STRUM** (6) input: tells the module that the currently playing note should fade away because a new one is starting.
- A CV signal to the **V/OCT** (7) input: controls note frequency.
- An audio signal to the **IN** (8) input: hits, strikes or caresses the resonator.

Making all the connections is not always possible, so Anuli assumes the following:

- **1.** If nothing is connected to the **IN** (8) audio input, the module will synthesize an excitation signal whenever a note is strummed; the signal is either a low-pass filtered pulse, or a burst of noise, depending on the resonator type.
- **2.** If nothing is connected to the **STRUM** (6) input, the module will determine that a new string should be strummed either by:
 - Detecting note changes on the V/OCT (7) input.
 - If nothing is connected to the **V/OCT** (7) input, Anuli will detect sharp transients in the audio signal connected to the **IN** (8) audio input.

The bottom line: if the ideal setup is not possible, Anuli will happily play with just one CV output from a sequencer or S&H module: note changes in the **V/OCT** (7) input will be detected, and the module will produce suitable excitation signals internally for those note changes to be heard! So... don't fret too much.

The context menu

Mode	Modal resonator	۲
Disastrous Peace F	Formant filter	۲
Display channel	1	۲
C4-F#4 direct mode	selection	



In addition to the standard Rack context menu, the Anuli context menu has several new entries:

- Mode: select the module's resonator mode directly.
- **Disastrous Peace FX**: directly selects the active **Disastrous Peace FX**, note that the selected effect is ignored for modes other than **Disastrous Peace**.
- **Display channel**: sets the channel to show in the LED display next to the **MODE** (A) knob.

Only available channels are shown in the menu.

The module is smart and will select the highest available channel automatically if the last user-selected channel is higher than the currently available ones.

• **C4-F#4 direct mode selection:** enables and disables direct mode selection using note voltages.

Bypassed module behavior

The signal present at the **IN** (9) input is copied to both the **ODD** (10) and **EVEN** (11) outputs, like the hardware version does.

Anuli Module modes

The modes are presented with the name that appears on the display and in the order the **MODE** (A) knob selects them to make finding descriptions and parameters easier.

• Modal Reso.

Modal synthesis simulates the phenomena of resonance at play in vibrating structures: the way, for example, a string or plate will absorb certain frequencies and "ring" on others, called "modes".

When a string is plucked; a drum struck, or a tube blown, the short burst of energy of the blow/impact contains many frequencies, some fall outside the modes and are absorbed; some others excite the modes, producing a stable, pitched sound.

Each mode corresponds to a harmonic or partial in the spectrum of the sound and is modelled by a band-pass filter; the Q factor of the filter determines how sustained the oscillations of the corresponding partial are.



Anuli recreates how various materials and structures are characterized by different relationships between the frequencies of their modes.

In **Modal Resonator** mode, the **STRUCTURE** (E) knob controls the frequency ratio between partials (in other words, the perceived structure: plate, bar, string).

• Sym. Strings

Some instruments (like the sitar and sarod), use strings that are not directly excited by the musician; but respond to the vibration of the other strings and add extra overtones or undertones to them.

Anuli simulates this phenomenon with a bunch of virtual strings, made with comb filters, that allow the addition of extra tones to an incoming audio signal.

In **Sympathetic Strings** mode, the **STRUCTURE** (E) knob controls the set of frequency ratios between all strings (with virtual notches at octaves or fifths).

• M. I. String

This mode is based on the extended Karplus-Strong method: an excitation signal is sent to a comb filter with an absorption filter, simulating the multiple reflections of a wave propagating on a string and getting absorbed at the string's ends.

Anuli spices the synthesized sound by adding three ingredients to this classic: a delaycompensated all-pole absorption filter that creates more drastic plucking effects; delay time modulation that emulates the sound of curved bridge instruments (like sitars or tanpuras), and all-pass filters in the delay loop that shift the position of the partials and recreate the tension of piano strings or out of this world inharmonic timbres.

In **Modulated/Inharmonic String Resonator** mode, the **STRUCTURE** (E) knob controls the amount of modulation and detuning of the partials.

• FM voice

Two sine oscillators modulating each other's phase, using the same implementation found in Funes.

This mode changes regular knob behavior:

- **STRUCTURE** (E): controls the frequency ratio.
- **BRIGHTNESS** (G): controls the FM index.
- **DAMPING** (J): controls the FM index and amplitude decay.
- **POSITION** (H): controls the feedback path (no feedback at 12 o'clock).

Signals sent to the **IN** (8) input go into an envelope follower and change the FM index and output amplitude.

• Q. Sym. Str.

÷

In **Quantized Sympathetic Strings** mode, the sympathetic strings are no longer tuned to perfect fifths or octaves; but, instead, to chords.

In this mode, the **STRUCTURE** (E) knob selects the chord.

• Rev. String

The **Reverb String** mode is similar to the <u>Modulated/Inharmonic String Resonator</u> <u>mode</u>; but adds a reverb with absorption and decay that follow those of the string.

In **Reverb String** mode, the **STRUCTURE** (E) knob controls the amount of modulation and detuning of the partials.

• Disas. Peace

Disastrous Peace mode is an an Organ/String machine synthesizer, loosely based on the Roland RS-09.

This mode changes regular control behavior:

- NOTE POLYPHONY (D): sets the chord size. From 10-note fat chords that cannot overlap because they consume all the NOTE POLYPHONY (D) voices, to 3-note chords that can overlap with the previous ones when retriggered; in other words, NOTE POLYPHONY (D) controls the maximum number of successive chords which can overlap: 1, 2 or 4.
- **FREQUENCY** (C): sets the root note.
- **STRUCTURE** (E): sets the chord type.
- **BRIGHTNESS** (I): scans through various registrations, sorted by brightness. Each registration is a different mixture of octaves of square and saw tooth waves.
- **DAMPING** (J): decay time, then attack time; drones continuously when turned all the way to the right.
- **POSITION** (H): FX amount.
- The STRUM (6) input triggers the envelope and allocates a new group of voices for the chord, the previously played chord can still be heard if NOTE POLYPHONY (D) is set to 2 or 4.



- The V/OCT (7) input controls the root note. If nothing is connected to the STRUM (6) input, sudden changes on this input will also trigger the envelope/voice allocation.
- **FX** (M) selects the active effect for the FX processor.
- Signals sent to the **IN** (8) input are simply routed to the FX processor.



Apices – Multifunction Gap Filler

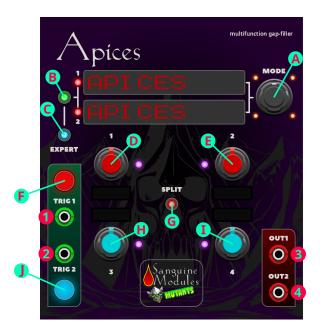
A two-channel multi-mode trigger/gate processor and noise maker. This fun module offers a lot of functionality that is made easier with our no holds barred interface.

Based on Mutable Instruments' "Peaks".

We hope this module can keep your beats kicking!

This manual covers basic operation; but some modes are better understood by connecting the module to a scope and experimenting with it.

The Controls



Knobs and buttons

A. MODE: selects one of the ten available modes for both channels or the currently selected channel (**EXPERT MODE** (B) and (C) dependent).

The selected mode is displayed for each channel using one of the displays to the left of the **MODE** knob and the LEDs around it.

The modes and their display are as follows (hardware "secret" modes are marked with "•" in the display; hardware "Easter-egg" modes are marked with "&", and hardware disabled modes enabled in Apices are marked with "@")

MODE	Display
Envelope	ENVELOPE
LFO	LFO
Tap LFO	TAP LFO
Drum generator	DRUM GENERAT
Sequencer	SEQUENCER
Trigger delay/shaper	TRG. SHAPE
Trigger stream randomizer	TRG. RANDOM
Digital drum synth	DIGI. DRUMS
Number station	NUMBER STAT&
Bouncing ball	BOUNCE BALL@

The different modes and how the knobs affect them are described in the <u>"Apices</u> <u>Module modes" section</u>.

B. CHANNEL SELECT: selects between channels 1 and 2 when **EXPERT MODE** (C) is enabled, when it is disabled this button has no function.

The channel currently being edited is shown using the button's LED and the red LEDs to the left of the mode displays.

LED colors and behaviors follow the table below in the different modes:

Expert LED	Chan. Select LED	Chan. 1 LED	Cha. 2 LED	Editing
0		0	•	Both channels
\bigcirc	\bigcirc	$\bigcirc \leftrightarrow \bigcirc$	\bigcirc	Channel 1
\bigcirc	\bigcirc		$\bigcirc \leftrightarrow \bigcirc$	Channel 2

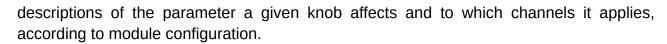
The LEDs around **SPLIT** (G) (see below) change color, following this button, to show the channels the knobs are affecting.

C. EXPERT: enables and disables EXPERT MODE.

This module is quite versatile: when operating in standard mode (**EXPERT MODE** disabled) whatever mode you set using the knob is applied to both channels (indicated by both red LEDs next to the mode displays staying steadily lit). **EXPERT MODE** lets you control each channel independently, selecting modes and parameters separately for each one without affecting the other (check the "Context menu" section below for a note about the knobs).

This mode offers complete, granular control of every parameter for each channel at the expense of complexity.

D, **E**, **H**, **I**: these red and blue knobs set the parameters for the currently selected mode and are dependent on it. The OLED displays adjacent to each knob display terse



Examples:

- The module is set to standard mode (see above) **TWIN** (see below) LFO mode: the knob labeled "1" affects the Frequency for both channels and its display reads "1&2. Frequency", while the knob labeled "3" affects the waveform variation for both channels and its display reads "1&2. Wave. Var.".
- The module is set to standard mode (see above) **SPLIT** (G) (see below) Drum generation mode: the knob labeled "1" affects the tone for the bass drum in channel 1 and its display reads "1. BD Tone", while the knob labeled "3" affects the tone for the snare drum in channel 2 and its display reads "2. SD Tone".
- The module is set to **EXPERT MODE** (C) (see above); channel 2 is selected, and its mode is Envelope: all knobs affect only this channel and, in this case, the knob labeled "1" affects the envelope's attack, its display reads "2. Attack", and the knob labeled "3" affects the envelope's sustain, it's display reads "2. Sustain".
- F, J: manual triggers for channel 1 and 2, respectively.
- **G. SPLIT MODE:** this button switches standard mode (see above) between **TWIN** and **SPLIT** modes. It is disabled in **EXPERT MODE** (see above).

Expert LED	Split LED	Channel Select LED	Red knobs LED	Blue knobs LED	Mode
\bigcirc	\bigcirc	\bigcirc	•	•	TWIN: knobs affect both channels
	۰		•	•	SPLIT: red knobs affect channel 1; blue knobs affect channel 2
•		•	•	•	EXPERT Channel 1: every knob affects channel 1
•		•	0	•	EXPERT Channel 2: every knob affects channel 2

When the module is set to **TWIN** mode, red knobs and blue knobs affect different parameters for both channels of the currently selected mode. In this mode you get more control over every parameter but less granularity between channels.

When the module is set to **SPLIT MODE**, red knobs affect parameters for channel 1 and blue knobs affect parameters for channel 2. In this mode you get more granularity over channel parameters at the expense of less control over individual parameters.

For complete control... use **EXPERT MODE**!

Inputs and outputs

- **1.** Trigger 1 input: receives trigger signals for channel 1 (threshold: $\geq 0.7V$).
- 2. Trigger 2 input: receives trigger signals for channel 2 (threshold: ≥0.7V).
- 3. Channel 1 output: emits channel 1 signals.
- 4. Channel 2 output: emits channel 2 signals.

The context menu

Knob pickup (snap)

Apices offers the standard VCV Rack standard context menu with one addition:

• Knob pickup (snap): when this option is disabled; EXPERT mode is enabled, and the selected channel is switched, the knobs immediately affect the parameters of the newly selected channel with their current positions; to prevent this and make the knobs affect the parameters of the newly selected channel only after they have been moved to their previous value within that channel, enable this menu option

This option is disabled by default.

When EXPERT mode is first set and Knob pickup (snap) is enabled, knobs must be moved all the way to the left before the 2nd channel acknowledges new settings the first time the channel is selected.

Apices Module modes

The OLED displays always show what the knobs affect in your selected configuration.

Whenever a trigger is mentioned below it refers to either a trigger from the jack input or a button press.

÷



Modes are presented as they are displayed on the matrix display.

• ENVELOPE

The classic envelope generator. Triggers start and hold the envelope.

Knobs			
	TWIN & EXPERT SPLIT		
Knob 1	Ch. 1 & 2 Attack	Ch. 1 Attack	
Knob 2	Ch. 1 & 2 Decay	Ch. 1 Decay	
Knob 3	Ch. 1 & 2 Sustain	Ch. 2 Attack	
Knob 4	Ch. 1 & 2 Release	Ch. 2 Decay	

• LFO

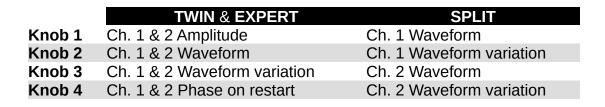
A low-frequency oscillator for all your modulation needs. Triggers reset the waveform cycle.

	Knobs	
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Frequency	Ch. 1 Frequency
Knob 2	 Ch. 1 & 2 Waveform, from left to right: Sine Linear slope Square Steps Random 	Ch. 1 Waveform
Knob 3	 Ch. 1 & 2 Waveform variation: Sine: wave folder Slope: Ascending / Triangle / Descending balance Square: pulse-width Steps: number of steps Random: interpolation method 	Ch. 2 Frequency
Knob 4	Ch. 1 & 2 Phase on restart	Ch. 2 Waveform

• TAP LFO

A pair of low-frequency oscillators with tap tempo. Triggers set the period of the LFO oscillations. Apices can learn irregular trigger sequences.

Knobs



• DRUM GENERAT

A bass and snare drum generator. Triggers start the drum sounds.

	Knobs	
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Base frequency	Ch. 1 Tone
Knob 2	Ch. 1 & 2 Frequency modulation ("Punch" for BD, "Tone" for SD)	Ch. 1 Decay
Knob 3	Ch. 1 & 2 High-frequency content ("Tone" for BD, "Snappiness" for SD)	Ch. 2 Tone
Knob 4	Ch. 1 & 2 Decay	Ch. 2 Snappy

SEQUENCER

Just what it says on the tin.

In **TWIN** and **EXPERT** modes the module is a 4 step mini-sequencer with each knob controlling a step. **Channel 1** is clocked by **Trigger 1** and reset by **Trigger 2**; **Channel 2** is clocked by **Trigger 2**.

In **SPLIT** mode the module is a dual 2 step mini-sequencer. No reset is available and each channel has its own clock controlled by its respective trigger.

Knobs		
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Step 1	Ch. 1 Step 1
Knob 2	Ch. 1 & 2 Step 2	Ch. 1 Step 2
Knob 3	Ch. 1 & 2 Step 3	Ch. 2 Step 1
Knob 4	Ch. 1 & 2 Step 4	Ch. 2 Step 2

TRG. SHAPE

Trigger delayer/shaper. A trigger starts a trigger/gate sequence as configured by the knobs.

Knobs



	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Pre-delay	Ch. 1 Delay
Knob 2	Ch. 1 & 2 Gate duration	Ch. 1 Number of repeats
Knob 3	Ch. 1 & 2 Delay	Ch. 2 Delay
Knob 4	Ch. 1 & 2 Number of repeats	Ch. 2 Number of repeats

• TRG. RANDOM

Trigger stream randomizer. Delay! Repeat! Burst! Get surprised! A trigger has a chance to start a burst of triggers as configured by the knobs.

	Knobs	
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Probability of accepting incoming triggers	Ch. 1 Acceptance/regeneration probability
Knob 2	Ch. 1 & 2 Probability of regenerating triggers after the delay	Ch. 1 Delay
Knob 3	Ch. 1 & 2 Delay time	Ch. 2 Acceptance/regeneration probability
Knob 4	Ch. 1 & 2 Jitter	Ch. 2 Delay

• DIGI. DRUMS■

Synthesized FM drums! Synthesized FM drums! Get your FM drums here! A trigger starts the drum sound.

	Knobs	
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Frequency	Ch. 1 BD presets morphing
Knob 2	Ch. 1 & 2 FM intensity	Ch. 1 BD presets variations
Knob 3	Ch. 1 & 2 FM and AM envelope decay time ⁹	Ch. 2 SD presets morphing
Knob 4	Ch. 1 & 2 Color.	Ch. 2 SD presets variations
	At 12 o'clock, no modification is applied to the oscillator signal.	
	Turn right to increase the amount of noise (for snares).	
	Turn left to increase the amount of	

⁹ The FM envelope has a shorter decay than the AM envelope, but the two values are tied to this parameter.



distortion (for 909 style kicks).

• NUMBER STAT&

Number station. A mode reminiscent of one of those mysterious number stations, it simulates a noisy AM receiver.

A trigger in **Trigger 1** generates one of several digital tones in **Channel 1**.

A trigger in **Trigger 2** generates a voice that speaks one of several different numbers in **Channel 2.**

Knobs		
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Frequency	Ch. 1 Frequency
Knob 2	Ch. 1 & 2 Variation probability	Ch. 1 Variation probability
Knob 3	Ch. 1 & 2 Noise	Ch. 2 Frequency
Knob 4	Ch. 1 & 2 Distortion	Ch. 2 Variation probability

• BOUNCE BALL@

Bouncing ball mode. This envelope generator produces signals not unlike bouncing a ball in a basketball court.

Experiment with the parameters and an oscilloscope to get a feel (and visual representation) of how the different parameters affect the envelope.

A trigger throws the ball.



Figure 3: A sample of the signal generated by **BOUNCE BALL**@ mode using the default knob settings.

Knobs		
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Gravity	Ch. 1 Gravity
Knob 2	Ch. 1 & 2 Bounce	Ch. 1 Bounce
Knob 3	Ch. 1 & 2 Amplitude	Ch. 2 Gravity



Knob 4 Ch. 1 & 2 Velocity

Ch. 2 Bounce

Parameters

- **Gravity:** how fast the ball drops to the ground: the further clockwise the knob is, the floatier the ball gets.
- **Bounce:** how much potential energy the ball keeps when falling to the ground. Setting the knob to high, clockwise values can make your ball bounce forever (paired with a high gravity this can also make your ball bounce really high!).
- **Amplitude:** how much force is applied to the initial ball throw. The further the knob is counterclockwise the lower the ball starts when triggered. A fully counterclockwise knob means the ball doesn't get off the ground at all.
- **Velocity:** how much the ball travels forward initially. Lower, counterclockwise values, produce envelopes with an initial sharper peak.

Mortuus – Embalmed multifunction gap filler

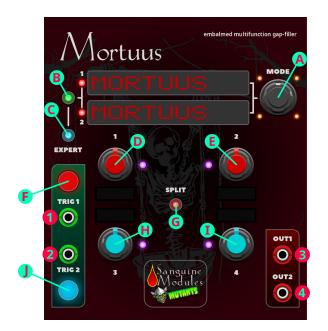
A reworked two-channel multi-mode trigger processor, envelope generator, LFO and noise maker with 25 different modes. This complex module puts a multitude of functions right at your fingertips.

Based on the "Dead Man's Catch" alternative firmware for Mutable Instruments' "Peaks" and the "Cymbal" patch for the alternative firmware.

We hope this module can envelope your musical desires!

This manual documents the changes Mortuus presents when stacked against the basic Apices module; for basic operating instructions and descriptions of the modes already present in Apices consult <u>its manual</u>.

The changes



- New algorithms have been added:
 - Double attack envelope.
 - Repeating attack envelope.
 - Looping envelope.
 - Randomized AD envelope.
 - Frequency modulated LFO.



- Random frequency modulated LFO.
- Varying wave shape LFO.
- Random varying wave shape LFO.
- Phase-locked loop oscillator.
- Mod sequencer.
- Turing machine.
- Bytebeats.¹⁰
- Cymbal.¹¹
- Randomized bass & snare drums.
- Randomized hi-hat.
- The hi-hat is no longer available at the right extreme of the snare drum knobs: it has its own function now.

Module controls remain the same, and their letter or number reference has not been changed in the diagram above, if you need a refresher on their basic functions, check the <u>Apices</u> <u>manual</u>.

A list of all the modes, old and new; their display name; a description of their parameters, and how the knobs alter them follows.

Mortuus Mode list

Original hardware basic modes have no extra markings in the display; original hardware "secret" modes are marked with ""; original hardware "Easter-egg" modes are marked with "&", and Dead Man's Catch firmware (and variants) modes are marked with "#".

The modes are presented in the order they are selected by the **Mode** knob (A).

¹⁰ Many of the available equations may not produce the result you expect: some of them had to be modified to prevent divisions by zero from crashing Rack.

¹¹ Not available in the official Dead Man's Catch firmware.

MODE	Display
Envelope	ENVELOPE
LFO	LFO
Tap LFO	TAP LFO
Drum generator	DRUM GENERAT
Double attack envelope	D. ATK. ENV#
Repeating attack envelope	R. ATK. ENV#
Looping envelope	LOOPING ENV#
Randomized AD envelope	RANDOM ENV#
Bouncing ball	BOUNCE BALL#
Frequency modulated LFO	FM LFO#
Random frequency modulated LFO	RND. FM LFO#
Varying wave shape LFO	V. WAVE LFO#
Random Varying wave shape LFO	R.V.W. LFO#
Phase-locked loop oscillator	P.L.O#
Sequencer	SEQUENCER
Mod Sequencer	MOD SEQ.#
Trigger delay/shaper	TRG. SHAPE
Trigger stream randomizer	TRG. RANDOM
Turing machine	TURING#
Bytebeats	BYTE BEATS#
Digital drum synth	DIGI. DRUMS
Cymbal	CYMBAL#
Randomized bass and snare drum generators	RANDOM DRUM#
Randomized hi-hat	RAND. HIHAT#
Number station	NUMBER STAT&

Mortuus module modes

Only modes new to Mortuus are explained here, for an explanation of modes already present in Apices consult <u>its manual</u>.

The modes are presented as they appear in the display so parameters can be consulted quickly.

Whenever a trigger is mentioned below it refers to either a trigger from the jack input or a button press.

A lot of insight can be obtained by looking at the output of the modes through an oscilloscope.

• D. ATK. ENV#

An ADSAR (Attack-Decay-Sustain-Attack-Release) envelope: the attack stage is engaged when the gate signal rises and also when the gate signal falls.

Knobs		
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Attack	Ch. 1 Attack
Knob 2	Ch. 1 & 2 Decay	Ch. 1 Decay
Knob 3	Ch. 1 & 2 Sustain	Ch. 2 Attack
Knob 4	Ch. 1 & 2 Release	Ch. 2 Decay

• R. ATK. ENV#

This mode repeats the Attack-Decay phases whenever the Decay phase reaches the sustain level and the gate is high.

This produces a series of peaks like in the image below, obtained using short Attack and Decay phases:

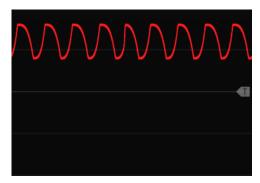


Figure 4: An **R. ATK. ENV**# envelope sample.

The Sustain parameter controls when a new Attack phase begins.

Knobs		
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Attack	Ch. 1 Attack
Knob 2	Ch. 1 & 2 Decay	Ch. 1 Decay
Knob 3	Ch. 1 & 2 Sustain	Ch. 2 Attack
Knob 4	Ch. 1 & 2 Release	Ch. 2 Decay

• LOOPING ENV#

This mode implements an ADR envelope that repeats itself indefinitely whenever the Release phase completes. There is no Sustain phase; the Sustain control sets the inflection point between the Decay and Release phases.



In this mode, triggers reset the cycle back to the start of the Attack phase.

Knobs		
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Attack	Ch. 1 Attack
Knob 2	Ch. 1 & 2 Decay	Ch. 1 Decay
Knob 3	Ch. 1 & 2 Sustain	Ch. 2 Attack
Knob 4	Ch. 1 & 2 Release	Ch. 2 Decay

RANDOM ENV#

This mode implements an AD envelope with random variations in amplitude (at the peak of the Attack phase) and Decay time.

	Knobs	
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Attack	Ch. 1 Attack
Knob 2	Ch. 1 & 2 Decay	Ch. 1 Decay
Knob 3	Ch. 1 & 2 Amplitude variation	Ch. 2 Attack
Knob 4	Ch. 1 & 2 Decay time variation	Ch. 2 Decay

• FM LFO#

This mode's presents an LFO that can be frequency modulated by an internal foldable sine wave.

Frequency modulation parameters set in **TWIN** or **EXPERT** modes continue applying in **SPLIT** mode.

Triggers reset the phase of both the LFO and its internal modulator.

	Knobs	
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 LFO base frequency	Ch. 1 LFO base frequency
Knob 2	 Ch. 1 & 2 LFO wave form preset Left to right: Sine Triangle Sawtooth Square Stepped triangle Random/noise 	Ch. 1 LFO wave form preset
Knob 3	Ch. 1 & 2 LFO FM frequency	Ch. 2 LFO base frequency
Knob 4	Ch. 1 & 2 FM depth CCW pure sine wave 	Ch. 2 LFO wave form preset



	modulation
•	CW folded sine wave
	modulation

• RND. FM LFO#

This mode is mostly the same as **FM LFO**#; but random values are used to modulate the LFO instead of a sine wave. The LFO wave form presets are the same.

		SPLIT
Knob 1	Ch. 1 & 2 LFO base frequency	Ch. 1 LFO base frequency
Knob 2	Ch. 1 & 2 LFO wave form preset	Ch. 1 LFO wave form preset
Knob 3	Ch. 1 & 2 LFO FM frequency (random sampling rate)	Ch. 2 LFO base frequency
Knob 4	 Ch. 1 & 2 FM depth CCW: linear random values interpolation CW cosine interpolation of random values 	Ch. 2 LFO wave form preset

• V. WAVE LFO#

This LFO can be modulated by an internal wave shaper, it also offers different wave forms than those of the standard and FM LFOs.

Frequency modulation parameters set in **TWIN** or **EXPERT** modes continue applying in **SPLIT** mode.

Triggers reset the phase of both the LFO and its internal modulator.

	Knobs	
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 LFO base frequency	Ch. 1 LFO base frequency
Knob 2	 Ch. 1 & 2 LFO wave form preset Folded sine Power-folded sine Overdriven sine Triangle/sawtooth/ramp Square (with pulse-width set table) 	Ch. 1 LFO wave form preset
Knob 3	Ch. 1 & 2 Wave shaper frequency	Ch. 2 LFO base frequency
Knob 4	Ch. 1 & 2 Wave shaper depth	Ch. 2 LFO wave form preset



• R.V.W. LFO#

This mode is functionally identical to the **V. WAVE LFO**# mode described above; but for one important difference: random values are used to modulate the wave shape instead of a sine wave.

	Knobs	
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 LFO base frequency	Ch. 1 LFO base frequency
Knob 2	Ch. 1 & 2 LFO wave form preset	Ch. 1 LFO wave form preset
Knob 3	Ch. 1 & 2 Wave shaper frequency (sampling rate)	Ch. 2 LFO base frequency
Knob 4	 Ch. 1 & 2 Wave shaper depth CCW: linear random values interpolation CW cosine interpolation of random values 	Ch. 2 LFO wave form preset

• P.L.O#'

When a signal is connected to either or both inputs, Mortuus will try to follow the signal(s) present in them.

The channels work independently.

Triggers do not reset phase in this mode.

This mode works best with clean, regular, unfiltered wave forms.

This mode tracks the frequency; but not the phase of the input signals.

An audible "slew" can be heard when changing notes as Mortuus tracks frequencies. It's similar to what portamento does on a Moog or Roland System 100.

The parameters set in **TWIN** or **EXPERT** modes continue applying in **SPLIT** mode.

	Knobs	
	TWIN & EXPERT	SPLIT
	Ch. 1 & 2 Frequency	
	divider/multiplier	
Knob 1	 CCW Lower octaves (up to octaves below the input signal) CW Increase octaves (up t octaves above the input signal) 	Ch. 1 Frequency divider/multiplier

This mode requires an external oscillator connected to the **TRIG 1** (F) or **TRIG 2** (J) inputs.

Knob 2	 Ch. 1 & 2 LFO wave form preset Folded sine Power-folded sine Overdriven sine Triangle/sawtooth/ramp Square (with pulse-width set table) 	Ch. 1 LFO wave form preset
Knob 3	Ch. 1 & 2 Wave shaper frequency	Ch. 2 Frequency divider/multiplier
Knob 4	Ch. 1 & 2 Wave shaper depth	Ch. 2 LFO wave form preset

• MOD SEQ.#

This mode is quite similar to the original **SEQUENCER** mode; but it offers 8 steps instead of 4.

Steps 5 to 8 are the complements of steps 1 to 4; for example if step 2 is set to 4V; step 6 will be -4V.

Clock and reset work the same as in Apices' **SEQUENCER** mode: in **TWIN** and **EXPERT** modes **TRIG 1** (F) clocks channel 1 and **TRIG 2** (J) resets channel 1 and clocks channel 2; in **SPLIT** mode there is no reset and each channel is clocked independently.

	Knobs	
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Voltage for steps 1/5	Ch. 1 Voltage for steps 1/3
Knob 2	Ch. 1 & 2 Voltage for steps 2/6	Ch. 1 Voltage for steps 2/4
Knob 3	Ch. 1 & 2 Voltage for steps 3/7	Ch. 2 Voltage for steps 1/3
Knob 4	Ch. 1 & 2 Voltage for steps 4/8	Ch. 2 Voltage for steps 2/4

• TURING#

Dual turing machines.

While the implementation present in Mortuus is not exactly the same as the original, it is still useful to be familiar with <u>Tom Whitell's explanation of the Turing Machine</u>.

Independent Turing Machines are available in each of Mortuus' channels.

Triggers on **TRIG 1** (F) advance the shift register for the channel 1 Turing Machine that outputs voltages in **OUT 1** (3); triggers on **TRIG 2** (J) advance the shift register for the Turing Machine in channel 2 that outputs voltages in **OUT 2** (4).

The mode retains parameters set in **TWIN** or **EXPERT** modes when operating in **SPLIT** mode.



A few key concepts:

• Probability

The chance that a bit in the LSB (Least Significant Bit) portion of the shift register will be flipped.

The further the knob controlling this parameter is to the left, the lower the probability.

The knob at the rightmost position sets the probability to 1: every bit is flipped on every step; this doubles the sequence length to a maximum of 64 steps.

Low probabilities tend to be the sweet spot.

• Span

The range of voltages¹² the Turing Machine will output: from 0V to 0V by setting the corresponding knob all the way to the left to 0V to 5V by setting the control to its rightmost position.

• Length

The length of the shift register adjusted in 4 bit steps: 8 bits at the leftmost position of the appropriate knob to 32 bits when it is turned all the way to the right.

Length controls how many steps are taken before the pattern loops.

• Clock division

Controls how many triggers are required for the shift register to advance.

When the knob is turned all the way to the left a ratio of 1:1 is set: every trigger advances the register; when it is set completely clockwise a ratio of 8:1 is imposed: 8 triggers are required for the shift register to advance one step.

Knobs		
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Probability	Ch. 1 Probability
Knob 2	Ch. 1 & 2 Span	Ch. 1 Span
Knob 3	Ch. 1 & 2 Length	Ch. 2 Probability
Knob 4	Ch. 1 & 2 Clock division	Ch. 2 Span

• BYTE BEATS#

This mode provides eight different "bytebeats" equations¹³.

¹² Voltages are not quantized.



Information on bytebeats can be found here.

The knobs in this mode are inter-dependant.

Knobs		
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 "Pitch"	Ch. 1 "Pitch"
Knob 2	Ch. 1 & 2 Parameter 0	Ch. 1 Parameter 0
Knob 3	Ch. 1 & 2 Parameter 1	Ch. 2 "Pitch"
Knob 4	Ch. 1 & 2 Equation select	Ch. 2 Parameter 0

• CYMBAL#

A hi-hat modification with different parameters.

Knobs		
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Pitch	Ch. 1 Noise cross-fade
Knob 2	Ch. 1 & 2 Clipping level	Ch. 1 Decay
Knob 3	Ch. 1 & 2 Noise cross-fade	Ch. 2 Noise cross-fade
Knob 4	Ch. 1 & 2 Decay	Ch. 2 Decay

• RANDOM DRUM#

This mode is similar to the regular **DRUM GENERAT**; but it offers controls to get random sound variations when advancing beats.

Knobs			
	TWIN & EXPERT	SPLIT	
Knob 1	Ch. 1 & 2 Pitch	Ch. 1 Bass drum pitch	
Knob 2	Ch. 1 & 2 Tone/decay time	Ch. 1 Bass drum tone/decay	
Knob 3	Ch. 1 & 2 Pitch randomization	Ch. 2 Snare drum pitch	
Knob 4	Ch. 1 & 2 Amplitude randomization	Ch. 2 Snare drum decay/"snap"	

• RAND. HIHAT#

A separate mode to implement the hi-hats that used to be to the "right" of the snare drums in Apices: they are no longer available in **DRUM GENERAT** mode if using Mortuus.

The hi-hats are no longer running at twice the sample rate, so they sound different.

¹³ All but equations 1-3 are altered from the original firmware to prevent Rack crashing following divisions by zero.

÷

The hi-hat in channel 1 is assumed to be closed and the one in channel 2 is deemed open; whether the settings reflect that is up to you; but keep in mind that they are meant to function in tandem: if trigger's are received on both channel 1 and 2, channel 2 will inhibit channel 1 and only channel 2 will play. This is useful for sequences with accent outputs.

	Knobs	
	TWIN & EXPERT	SPLIT
Knob 1	Ch. 1 & 2 Pitch	Ch. 1 Pitch
Knob 2	Ch. 1 & 2 Decay	Ch. 1 Decay
Knob 3	Ch. 1 & 2 Pitch randomization	Ch. 2 Pitch
Knob 4	Ch. 1 & 2 Decay randomization	Ch. 2 Decay



Mutants Blank – Rack sleekerizer

It's not Mutable or Audible; but who doesn't want a lovely goblin sitting on their Rack along with the Mutants logo?

Makes your Rack look sleek.

Mutants don't control, like Machete don't text.

Bypassing the module turns its lights off.



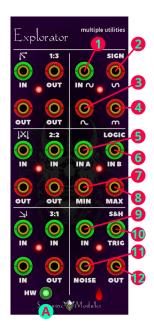
Explorator – Multiple utilities

Multiplex, multiply, mix, sample, invert and subvert audio and CV signals with a polyphonic module that fulfills every mad scientist's dream¹⁴.

Explorator is based on a combination of Mutable Instruments' "Links" and "Kinks", presented in a single module with polyphonic capabilities for every section.

We hope this module multiplies your creativity to infinity.

The Controls



The module is comprised of six different, independent sections; they will be described in the "Explorator Module sections" chapter below, going left to right and top to bottom.

Buttons

A. HW: This button toggles the 3:1 section's hardware emulation on and off.

LED	State
	Off
\bigcirc	On

¹⁴ Mutator general's warning: running audio through some sections in this module may cause undesired effects such as aliasing, DC signals, lo-fi feelings, weird sensations, lycanthropy, philanthropy, apanthropy and, horror of horrors, may cause your audio to experience therianthropy. You've been warned, sternly. Now go experiment!



The 3:1 section in the hardware module averages the mixed signal by applying a 1/3 gain to the mix before it is sent to the output, great for preventing audio clipping!

When this option is enabled, Explorator emulates the hardware's behavior, acting as an averager; when this option is disabled, output signals are just mixed and the result is sent to the output as is.

This option is disabled by default.

Explorator Module sections

The LED lights in the different sections show the polarity and amplitude of the voltages in a given section.

The voltages shown depend on each section and will be explained in the appropriate part for each one.

The lights share the same rules in every section when it comes to light colors:

LED	Channels	Voltage
0	Monophonic	<0V
0	Monophonic	>0V
0	Polyphonic	<0V
\bigcirc	Polyphonic	>0V

Every section accepts audio and CV signals.

1:3 section

A buffered multiple: the signal present at the **IN** port is duplicated to all three **OUT** ports without voltage loss.

Polyphony for this section is set by the number of channels present at the **IN** port.

The LED light shows the voltage present at the **IN** voltage.

SIGN section

This section offers an inverter, a half wave rectifier and a full wave rectifier.

- **1. IN** input for the signal to be processed by the different outputs.
- **2. INVERTED**: changes the sign of input voltages (e.g. An input voltage of 5V is converted to a voltage of -5V).

- **3. HALF WAVE RECTIFIED**: clips the negative half of a signal to 0V. This can add harmonics to audio signals.
- **4. FULL WAVE RECTIFIED:** inverts the negative half of a signal. On symmetrical signals, this can result in an "octaver" effect.

Polyphony for this section is set by the number of channels present at the **IN** input (1).

The LED light shows the voltage present at the **IN** input (1).

2:2 section

A precision adder/mixer that can work as a 1:2 multiple.

The signals present at the **IN** inputs are added and the result is sent to the two **OUT** outputs.

When only one of the inputs is patched, this section can be used as a 1:2 multiple.

An example application for the precision adder is transposing sequences: patch the output of a sequencer to the first **IN** input and the CV output of an instrument to the second **IN** input; patch the output to a VCO with a V/Oct input. The sequence will be transposed by the notes played on the instrument.

Polyphony for this section is set by the **IN** input with highest channel count among the two inputs.

The LED light shows the voltage sum of both **IN** inputs.

LOGIC section

A logic signal processor.

- 5. IN A: input for the first signal to be compared.
- 6. IN B: input for the second signal to be compared.
- **7. MIN:** the minimum signal of the two inputs is sent to this output, behaves like an analog AND.
- **8. MAX:** the maximum signal of the two inputs is sent to this output, behaves like an analog OR.

The following diagram will help make things a bit clearer:

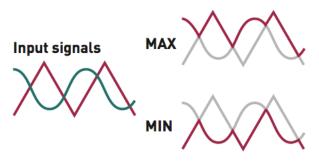


Figure 5: The resulting output of two input signals after passing through the **LOGIC** section.

Due to the way the module behaves, it can produce some interesting results:

- If only one input is patched, it can be used to split signals into their positive and negative halves using the MAX (8) and MIN (7) outputs, respectively.
- The resulting wave forms of audio signals have the same inharmonic partials and side bands that could be obtained from a ring modulator.

Polyphony for this section is set by **IN** input with the highest channel count among the two inputs.

The LED shows the voltage sum of both inputs.

3:1 section

This section acts as a mixer with an optional averager: the signals sent to the three **IN** inputs are mixed together.

If the **3:1** Averager (A) is enabled, a 1/3 gain is applied.

The resulting mixed signal is sent to the **OUT** output.

Polyphony for this section is set by the **IN** input with the highest channel count among the three inputs.

The LED shows the voltage sum of the three inputs.

S&H section

A sample & hold with an internal noise generator¹⁵.

- 9. IN: signal input, normalled to the internal noise generator.
- **10.TRIGGER:** when a trigger is received in this port, the voltage present at the **IN** (9) input is sampled; stored in the module, and sent to the **OUT** (12) output.

¹⁵ All polyphonic channels share the same internal noise generator, if you need different values for every polyphonic channel, an external, polyphonic, signal must be connected to the **IN** (9) input with one channel for each value.

The stored voltage will remain until a new trigger is received and a new voltage sampled.¹⁶

- **11. NOISE:** the internal noise generator's output.
- **12.OUT:** the voltage held in the module is contained in this port.

Polyphony for this section is set by the number of channels present at the **TRIGGER** (10) input.

The LED shows the voltage currently held in the module.

¹⁶ Just like in an analog module, voltage will not be held indefinitely: it will be lost when the module is turned off (i.e. When Rack is closed).



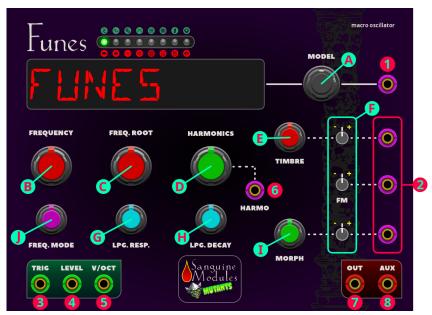
Featuring twenty four synthesis models that range from filtered classic wave shapes to synthetic hi-hats, Funes is a polyphonic macro oscillator that caters to your every musical need.

Funes is based on Mutable Instruments' well known macro oscillator "Plaits", with the last released firmware: 1.2.

We aim for this module to be an endless source of inspiration!

This manual covers basic operation; but a lot of enjoyment comes from experimentation and discovery. Have fun!

The Controls



Knobs

A. MODEL: twist it back and forth to select the synthesis model. The available models are separated in three banks of eight.

Each of the LEDs at the top represents one of the models.

The LEDs reflect both the selected model and its bank using one of three colors.

÷

The model banks are separated as follows: pitched (green LEDs), noise/percussive (red LEDs) and new synthesis (orange LEDs). The character display uses an eight letter code to present your selection.

The available synthesis models are:

Model #	LED	Model	Dicplay	Note ¹⁷
	-		Display	C0
1	0	Classic wave shapes with filter		
2	0	Phase distortion and modulation	PHASDIST	C#0
3	0	6-operator FM 1	6 OP.FM1	D0
4	0	6-operator FM 2	6 OP.FM2	D#0
5	0	6-operator FM 3	6 OP.FM3	E0
6	\bigcirc	Wave terrain synthesis	WAVETRRN	F0
7	\bigcirc	String machine emulation	STRGMACH	F#0
8	0	Chiptune	CHIPTUNE	G0
9		Pair of classic wave forms	DUALWAVE	G#0
10	\bigcirc	Wave shaping oscillator	WAVESHAP	A0
11		Two operator FM	2 OP.FM	A#0
12	\bigcirc	Granular formant oscillator	GRANFORM	B0
13		Harmonic oscillator	HARMONIC	C1
14	\bigcirc	Wave table oscillator	WAVETABL	C#1
15		Chords	CHORDS	D1
16	\bigcirc	Vowel and speech synthesis	VOWLSPCH	D#1
17	0	Granular cloud	GR.CLOUD	E1
18	0	Filtered noise	FLT.NOIS	F1
19	0	Particle noise	PRT.NOIS	F#1
20	0	Inharmonic string modeling	STG.MODL	G1
21	0	Modal resonator	MODALRES	G#1
22	0	Analog bass drum	BASSDRUM	A1
23	0	Analog snare drum	SNARDRUM	A#1
24	0	Analog hi-hat	HI-HAT	B1

Synthesis models can also be selected directly using the context menu (see below).

Depending on the selected model, the module controls change different parameters.

For a more in depth explanation of the specific models and how the controls behave when they are selected, please refer to the <u>"Funes Module Modes" section</u>.

The polyphonic channel to show in the display can be set using the context menu.

B. FREQUENCY (coarse): its range can be adjusted using the "Frequency mode" item in the context menu or the **FREQ. MODE** (J) knob. By default it is eight octaves (C0-C8). "Octaves" and "LFO" modes are also available.

¹⁷ Only available when "C0 model modulation" is checked in the context menu.



- **C. FREQ. ROOT**: when "Octaves" is selected as the "Frequency mode" this knob controls the root note.
- **D. HARMONICS**: model dependent tone control. In general it controls the frequency spread of the tone.
- **E. TIMBRE**: model dependent tone control. In general it controls the "darkness" of the tone.
- **F.** Attenuverters for the TIMBRE, FM and MORPH CV inputs. When the TRIGGER (3) input is patched and the corresponding CV is left unpatched, the attenuverters adjust the modulation amount from the internal decaying envelope generator. So... be warned, if you disconnect a CV input and the TRIGGER (3) is patched, any attenuverter value other than "0" will let the internal envelope to take over.
- **G. LPG. RESP.**: controls the response of the internal low-pass gate from VCFA (counter clockwise) to VCA (clockwise).
- **H. LPG. DECAY**: adjusts the ringing time of the internal low-pass gate and the decay time of the internal envelope.
- I. MORPH: model dependent tone control. In general it controls lateral timbral variations.
- J. FREQ. MODE: sets the range for the FREQUENCY (B) knob, can also be set using the context menu.

Inputs and outputs

- **1. MODEL CV:** this input has two modes of operation that depend on your context menu selection:
 - C0 model modulation (monophonic) unchecked: when the input is patched, two or more LEDs (depending on polyphony) light up. The blinking LED indicates the central value (the selected model) while the steady LEDs indicate the currently active one for each polyphonic channel. The input voltage functions as an offset to the currently selected central value: negative voltages decrease it and positive voltages increase it. This behavior is the closest to the original "Plaits" with the addition of polyphony: every polyphonic channel can have its own offset.

Offset model modulation is the default.

• **C0 model modulation (monophonic)** checked: when the input is patched, the notes C0 to B1 select the current model. Selection is absolute and not influenced by the manually selected model.



In both modes the display updates, by default, to reflect the currently active model for the first, if polyphonic, or only channel connected to the input. This behavior and the channel to display can be adjusted in the context menu (see below).

- 2. CV Inputs for the TIMBRE, FM and MORPH parameters.
- **3. TRIG:** trigger input; it serves four different purposes:
 - Triggers the internal decaying envelope generator.
 - Excites the physical and percussive models.
 - If the **LEVEL** (4) input is not patched, it strikes the internal low-pass gate.
 - Samples and holds the value of the **MODEL CV** (1) input.

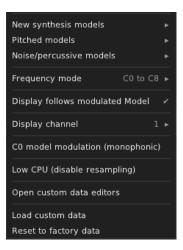
Polyphony for the module is set by the highest channel count among the **TRIGGER** (3) and **V/OCT** (5) inputs.

- **4. LEVEL:** opens the internal low-pass gate; it also acts as an accent control when triggering physical or percussive models.
- **5. V/OCT:** controls the fundamental frequency of the produced sound, from -3 to +7 octaves relative to the root note set by the **FREQUENCY** (B) knob.

Polyphony for the module is set by the highest channel count among the **TRIGGER** (3) and **V/OCT** (5) inputs.

- 6. HARMONICS CV input.
- 7. OUT: main output signal (model dependent).
- **8.** AUX: carries a variant or by-product dependent on the **OUT** (7) output signal (model dependent).

The context menu



The Funes context menu offers the standard VCV Rack standard context menu with several additions:

- Pitched models, Noise/percussive models and New synthesis models: the items in the sub-menus directly select specific synthesis models to use as the module's base engine.
- Frequency mode: sets the range for the FREQUENCY (B) knob; range can be set with the FREQ. MODE (J) knob as well.
- **Display follows modulated model**: when enabled, the LED display changes to reflect the model currently selected by the voltage present in the **MODEL CV** (1) input for the selected channel. If you want the display to change only when a model is selected using the knob or don't like the effect, disable this option. Enabled by default.
- **Display channel**: selects the channel to show in the LED display next to the **MODEL** (A) knob.

Only available channels are shown in the menu.

The module is smart and will select the highest available channel automatically if the last user-selected channel is higher than the currently available ones.

- **C0 model modulation (monophonic)**: when enabled, the selected model is changed by sending note voltage values to the **MODEL** CV input. Selection is absolute. This disables the default Plaits-like behavior and is monophonic only. Disabled by default.
- Low CPU (disable resampling): if your computer is struggling, enabling this will save some CPU at the expense of sound quality.

• **Open custom data editors**: opens the default web browser and points it to the Funes editors website.

The Funes editors are available at:

https://github.com/Bloodbat/Funes-Editors

They have been tested using Firefox.

- Load custom data: loads custom data for one of the following models:
 - The three available 6-operator FM models.
 - Wave terrain synthesis.
 - Wavetable synthesis.

This menu entry appears only when one of the above models is selected.

Data must be prepared as a .bin file using the Funes editors.

• **Reset to factory data**: the models listed above can load and use custom data. This menu option clears it and loads the built-in default.

This menu entry is shown only when a model that can use custom data is selected.

Funes module modes

The modes are presented with the name that appears on the display to make finding parameters easier.

• FLTRWAVE

Classic wave shapes with filter.

	Controls Knobs
	Resonance and filter character:
HARMONICS	CCW: gentle 24dB/octave
	CW: harsh 12dB/octave
TIMBRE	Filter cutoff
MORPH	Waveform and sub level
	Outputs
OUT	LP output
AUX	12dB/octave HP output



• PHASDIST

÷

Phase distortion and modulation.

	Controls Knobs
HARMONICS	Distortion frequency
TIMBRE	Distortion amount
MORPH	Distortion asymmetry
	Outputs
OUT	Synchronized carrier (phase distortion)
AUX	Free running carrier (phase modulation)

• 6 OP.FM1, 6 OP.FM2, 6 OP.FM3*

2 voice, 6 operator FM synthesizer. 3 models with banks of 32 presets each.

	Controls
	Knobs
HARMONICS	Preset selection
TIMBRE	Modulators level
MORPH	Envelope and modulation stretching / time travel.
	Inputs
	The two voices play alternatively when a trigger is received.
TRIGGER	If TRIG (3) is not patched, a single voice plays as a drone and MORPH (I) allows time travel along envelopes and modulations.
LEVEL	Velocity control (loudness or timbre, depending on preset).
	Outputs
OUT	Synchronized carrier (phase distortion)
AUX	Free running carrier (phase modulation)

WAVETRRN*

Wave terrain synthesis. Use 2D maps as sound! Continuous interpolation between eight terrains.

	Controls Knobs
HARMONICS	Terrain
TIMBRE	Path radius
MORPH	Path offset
	Outputs
OUT	Direct terrain height (z axis)

• These modes can load custom data.

AUX Terrain height as phase distortion (sin(y+z))

• STRGMACH

String machine emulation with stereo filter and chorus.

	Controls Knobs
HARMONICS	Chord
TIMBRE	Chorus/filter amount
MORPH	Waveform
	Outputs
OUT	Voices 1&3 predominantly
AUX	Voices 2&4 predominantly

CHIPTUNE

Four variable square voices or arpeggios.

	Controls Knobs
HARMONICS	Chord
TIMBRE	Arpeggio type or chord inversion
TIMBRE attenuverter	Envelope shape
MORPH	PW/Sync
	Inputs
TRIGGER	Arpeggiator clock
	Outputs
OUT	Square wave voices
AUX	NES triangle voice

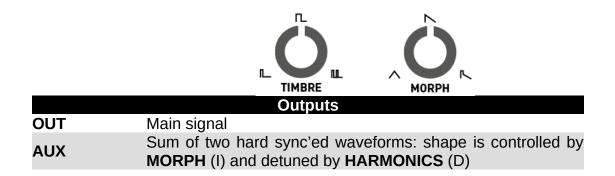
• 🕄 DUALWAVE

Virtual-analog synthesis of classic wave forms.

	Controls Knobs
HARMONICS	Detuning between the two waves
TIMBRE	Variable square: from narrow pulse (CCW) to full square (12 o'clock) to hardsync formants (CW) ¹⁸
MORPH	Variable saw: from triangle (CCW) to saw (12 o'clock) with an increasingly wide notch (Nodi's CSAW). ¹⁹

¹⁸ A narrow pulse results in silence.

¹⁹ A wide notch results in silence.



Silence results from a narrow pulse or wide notch. This can be used to silence one of the two oscillators.

🔹 🔍 WAVESHAP

An asymmetric triangle processed by a wave shaper and a wave folder.

	Controls Knobs
HARMONICS	Wave shaping waveform
TIMBRE	Wave folder amount
MORPH	Wave form asymmetry
	Outputs
OUT	Main signal
AUX	Variant with different wave folder curve

• 🚯 2 OP.FM

Two sine oscillators modulating each other's phase.

	Controls Knobs
HARMONICS	Frequency ratio
TIMBRE	Modulation index
MORPH	Feedback. Operator 2 modulates its own phase (past 12 o'clock: rough) or operator 1's phase (before 12 o'clock: chaotic)
Outputs	
OUT	Main signal
AUX	Sub-oscillator

GRANFORM

A simulation of formants and filtered wave forms through the multiplication, addition and synchronization of sine wave segments.

	Controls Knobs
HARMONICS	Frequency ratio between formants 1 and 2
TIMBRE	Formant frequency
	Formant width and shape.
MORPH	Controls the shape of the window by which a sum of two synchronized sine oscillators is multiplied. $M^{ORPH} \longrightarrow M^{T} + M^{ORPH} \longrightarrow M^{T} $
	Outputs
OUT	Main signal
	Simulation of filtered wave forms by windowed sine waves.
AUX	HARMONICS (D) controls the filter type (peaking, LP, BP, HP).

• 🕲 HARMONIC

An additive mixture of harmonically related sines.

	Controls
	Knobs
HARMONICS	Frequency ratio between formants 1 and 2
TIMBRE	Formant frequency
	Formant width and shape.
	Controls the shape of the window by which a sum of two synchronized sine oscillators is multiplied.
MORPH	O HARMONICS O HARMONICS
	TIMBRE TIMBRE
	بسلاليس بالباليس
	MORPH
	Outputs
OUT	Main signal
AUX	Simulation of filtered wave forms by windowed sine waves.
	HARMONICS (D) controls the filter type (peaking, LP, BP,

HP).

• WAVETABL*

÷

Four banks of 8x8 wave forms, accessible by row and column.

With or without interpolation.

	Controls
HARMONICS	 Controls Knobs Bank selection. The first 4 are interpolated banks (CCW); the next 4 are the same banks, in reverse order, without interpolation (CW). Bank A: harmonically poor waveforms from additive synthesis (sine harmonics, drawbar organ wave forms) Bank B: harmonically rich wave forms from formant synthesis or wave shaping Bank C: wave tables from the Shruti-1 / Ambika, sampled from classic wave table or ROM playback synthesizers. Bank D: a semi-random permutation of wave forms from the other 3 banks. Important! Loaded custom data is available in Bank D and Bank D only.

	Row index.
TIMBRE	
	Waves are sorted by spectral brightness in banks A-C
MORPH	Column index
Outputs	
OUT	Main signal
AUX	Low-fi (5 bit) output

[•] This mode can load custom data.

• • • • CHORDS

Four note chords played by virtual analogue oscillators (emulating a stack of harmonically related square or saw tooth wave forms generated by vintage string & organ machines), or wave table oscillators.

ngan maonines,	
	Controls Knobs Chord type.
HARMONICS	From left to right: • Octave • 5 • sus4 • m • m7 • m9 • m11 • 69 • M9 • M7 • M • M
TIMBRE	Chord inversions and transpositions Wave form.
MORPH	The first half of the knob goes through a selection of string machine like raw wave forms; the second half scans a small wave table with 16 wave forms.

	Outputs	
OUT	Main signal.	
AUX	Root note of the chord.	

• • • VOWLSPCH

A bunch of speech synthesis algorithms.

Controls

	Knobs
HARMONICS	Crossfades between formant filtering, SAM and LPC vowels, then goes through several banks of LPC words.
	Species selection, from Daleks to chipmunks.
TIMBRE	This parameter shifts the formants up or down independently of the pitch, or underclocks/overclocks the emulated LPC chip (compensating to maintain pitch).
	Phoneme or word segment selection.
MORPH	When HARMONICS is past 11 o'clock, a list of words can be scanned by turning this knob or sending CV to its input
FM Attenuverter	Word intonation.
MORPH Attenuverter	Word speed
LPG. RESP. & LPG. DECAY	The low-pass gate affects word production in Funes, to obtain sounds like the ones the hardware module generates, both knobs must be turned clockwise all the way.
TRIGGER	Utter word
	Outputs
OUT	Main signal
AUX	Unfiltered vocal chords signal

• • • GR.CLOUD

A swarm of 8 enveloped saw tooth waves.

	Controls
	Knobs Ditch rendemization
HARMONICS	Pitch randomization
TIMBRE	Grain density
	Grain duration and overlap.
MORPH	When fully CW, grains merge into each other, resulting in a stack of eight randomly frequency modulated wave forms.
Outputs	
OUT	Main signal
AUX	Variant with sine wave oscillators

• ⁽⁰⁾ FLT.NOIS

Variable clock white noise processed by a resonant filter.

	Controls Knobs
FREQUENCY	Filter cutoff frequency
HARMONICS	Filter response: from LP to BP to HP
TIMBRE	Clock frequency
MORPH	Filter resonance
	Inputs
V/OCT	Filter cutoff frequency
	Outputs
OUT	Main signal
	Variant with two band-pass filters; their separation is controlled by the HARMONICS (D) knob.
	O HARMONICS O HARMONICS
AUX	

• PRT.NOIS

Dust noise processed by networks of all-pass or band-pass filters.

Controls Knobs	
HARMONICS	Amount of frequency randomization
TIMBRE	Particle density
MORPH	 Filter type: Reverberating all-pass network before 12 o'clock Increasingly resonant band-pass filters past 12 o'clock
Outputs	
OUT	Main signal
AUX	Raw dust noise

● ● STG.MODL & MODALRES[‡]

A mini Anuli²⁰; please refer to the <u>Anuli manual</u> for more information about inharmonic string synthesis and modal resonators.

	Controls
	Knobs
HARMONICS	Amount of inharmonicity or material selection
TIMBRE	Excitation brightness and dust density
MORPH	Decay time (energy absorption)
	Inputs
	Excite the string or resonator.
TRIGGER	When this input is patched, the string is excited by a short burst of filtered white noise or by a low-pass filtered click; when this input is not patched, the string or resonator is excited by particle noise.
Outputs	
OUT	Main signal
AUX	Raw exciter signal

🔞 BASSDRUM[‡]

Analog bass drum. Behavioral simulation of the circuits from classic drum machines.

	Controls Knobs		
HARMONICS	Attack sharpness and amount of overdrive		
TIMBRE	Brightness		
MORPH	Decay time		
	Inputs		
TRIGGER	When this input is not patched a continuous tone is produced.		
	Outputs		
OUT	Bridget T-network excited by shaped pulse		
AUX	Frequency modulated triangle VCO turned into a sine with a pair of diodes, shaped by dirty VCA.		

This mode uses its own decay envelope and filter. The internal LPG is disabled for it. A TRIGGER input triggers the signal; but doesn't strike the LPG. When the TRIGGER input is patched, the LEVEL input works as an accent control.

²⁰ The processor in the original hardware module is not as powerful as Anulis', so this module is limited to 3 voices of polyphony in inharmonic string modeling mode, and 1 voice of polyphony with 24 partials in modal resonator mode. This module does not let you control the position of the excitation, which is set to 25% of the length of the string/bar/tube.

• **(a)** SNARDRUM[‡]

Analog snare drum. Like a marching band!

	Controls Knobs
HARMONICS	Balance of the harmonic and noisy components
TIMBRE	Balance between the different modes of the drum
MORPH	Decay time
	Outputs
OUT	Bridget T-networks, one for each mode of the shell, excited by a nicely shaped pulse, and some band filtered noise
AUX	Frequency modulated pair of sine VCOs, mixed with high- pass filtered noise.

• 🤤 HI-HAT[‡]

Analog hi-hat. Metallic counter-point

	Controls Knobs		
HARMONICS	Balance of metallic and filtered noise		
TIMBRE	High-pass filter cutoff		
MORPH	Decay time		
	Outputs		
OUT	6 square oscillators generating a harsh, metallic tone mixed with clock noise; sent to a high-pass filter and, finally, through a dirty transistor VCA.		
AUX	3 pairs of square oscillators ring modulating each other, sent through a clean, linear VCA.		

[‡] This mode uses its own decay envelope and filter. The internal LPG is disabled for it. A **TRIGGER** input triggers the signal; but doesn't strike the LPG. When the **TRIGGER** input is patched, the **LEVEL** input works as an accent control.

÷

Incurvationes – Meta modulator

A polyphonic sound sculpting module: blend; combine, and warp two audio signals with a variety of cross-modulation modes, or frequency shift signals to capture that magical feel!

Based on Mutable Instruments' "Warps".

We hope this module can keep your sounds always evolving and twisting in new and different ways.

The Controls



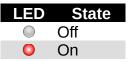
This module is polyphonic and can handle up to 16 channels.

The INT. OSC. (C) setting affects every channel.

Active channels are indicated by the lit leds around the INT. OSC. (C) button.

Knobs and buttons

A. F.S: enables and disables Frequency shifter/Quadrature cross-modulator mode.



This mode, and the modulation algorithms for standard mode are described in detail in the "Incurvationes module modes" section.

Disabled by default.

B. MODULATION ALGORITHM: twist the big knob around to select the algorithm applied to signals in **Standard mode**; the amount of frequency shifting in **Frequency shifter mode**, or the amount of phase shifting in **Quadrature cross-modulator mode**.

Different values light up the knob in different hues.

C. INT. OSC.: cycles between the available internal oscillator states.

The effects of the internal oscillator are mode dependent:

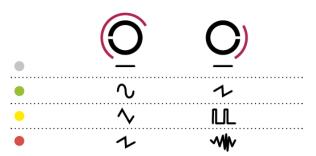
• Standard mode

When the button's LED is off, the internal oscillator is disabled; when the button's LED is lit, the internal oscillator is enabled, its wave form is indicated by the lamp's color.

The internal oscillator provides different wave forms that depend on the algorithm selected by the **MODULATION ALGORITHM** (B) knob: cross-modulation algorithms work best with harmonically simple signals, while vocoders work better with harmonically rich signals.

Sine, triangle and saw tooth wave forms are provided for the cross modulation algorithms, and saw tooth, pulse and low-pass filtered noise are available for the vocoder algorithms.

The graphic below shows the different wave forms and their LED colors in relation to the **MODULATION ALGORITHM** (B) knob's position:



The oscillator's frequency is controlled by the yellow **LEVEL 1** (D) knob and the **LEVEL 1 CV** (2) input; signals received in **INPUT 1** (5) can phase modulate the internal oscillator or provide an external noise source for the low-pass filter.

The AUX (8) output usually contains the signal generated by the internal oscillator.

• Frequency shifter/Quadrature cross-modulator mode

Enables and disables the **Quadrature cross-modulator mode**, and cycles between the three wave forms available for the **Frequency shifter mode**.

The **Frequency shifter mode** requires one of the wave forms to be active; if the internal oscillator is disabled, the module will be set to **Quadrature cross-modulator mode**.

LED	Mode
	Quadrature cross-modulator
0	Frequency shifter: sine
\bigcirc	Frequency shifter: three harmonics
٥	Frequency shifter : "random": 7 harmonics + random amplitudes/phases

D. LEVEL 1:

• Standard mode

When the internal oscillator is switched off, this knob controls the amplitude of the **INPUT 1** (5) signal or the amount of amplitude modulation from the **LEVEL 1 CV** (2) input; when the internal oscillator is on, this knob controls its frequency.

• Frequency shifter mode

This knob controls the amount of feedback.

• Quadrature cross-modulator mode

This knob controls the amplitude of channel 1's signal.

E. LEVEL 2: controls the amplitude of the modulator signal, or the amount of amplitude modulation from the LEVEL 2 CV (3) input. Gains above 1.0 can be achieved using CV for a warm overdrive effect.

F. TIMBRE:

• Standard mode

The effect of this knob is algorithm dependent, check the "<u>Incurvationes module</u> <u>modes</u>" section for more information.

• Frequency shifter mode

This knob controls the balance between the lower and upper side bands; when the knob is at the center, both side bands are present (ring-modulation).

• Quadrature cross-modulator mode

This knob controls the intensity of the high harmonics created.

Inputs and outputs

1. ALGO CV: the voltage present in this input acts as an offset to the position set by the MODULATION ALGORITHM (B) knob.

Polyphonic voltages offset their channels independently.

The active algorithm for each channel sets its indicator LED to the appropriate hue.

2. LEVEL 1 CV input:

• Standard mode

When the internal oscillator is off, this input modulates gain for the signal present at **INPUT 1** (5); when the internal oscillator is enabled, if functions as a V/Oct input for the oscillator's frequency.

• Frequency shifter mode

Modulates the feedback amount.

• Quadrature cross-modulator mode

Modulates gain for the signal present at **INPUT 1** (5).

This input is normalled to +5V.

3. LEVEL 2 CV: modulates gain for the signal present at INPUT 2 (6).

This input is normalled to +5V.

- 4. TIMBRE CV: offsets the value set by the TIMBRE (F) knob.
- **5. INPUT 1:** this input behaves differently depending on how the rest of the module is configured; check the information above for specifics, or the diagram in the "Incurvationes module modes" section to visualize signal paths and their interactions.

This input usually receives the carrier signal.

Polyphony for the module is set by the cable with the highest channel count connected to either this or the **INPUT 2** (6) ports.

6. INPUT 2: this input usually accepts modulator signals; check the diagram in the "<u>Incurvationes module modes</u>" section to visualize signal paths and their interactions.

Polyphony for the module is set by the cable with the highest channel count connected to either this or the **INPUT 1** (5) ports.

7. 1 x 2: this output's behavior is dictated by the module's selected mode:

• Standard mode

The main audio output for the module.

• Frequency shifter mode

The 1×2 and AUX (8) outputs are the opposite of the TIMBRE (F) knob; e.g. If TIMBRE (F) is all the way to the left, 1×2 will output the lower side band and AUX (8) will output the upper side band.

Great for generating wide stereo images!

• Quadrature cross-modulator mode

The real part of the calculated result.

8. AUX: this output's behavior is dictated by the module's selected mode:

• Standard mode

When the internal oscillator is disabled, this output contains the post VCA sum of the **INPUT 1** and **INPUT 2** signals; when the internal oscillator is enabled, this output contains the raw signal from the internal oscillator.

• Frequency shifter mode

Check the information above for the **1** x **2** (7) output.

• Quadrature cross-modulator mode

The imaginary part of the calculated result.

Bypassed module behavior

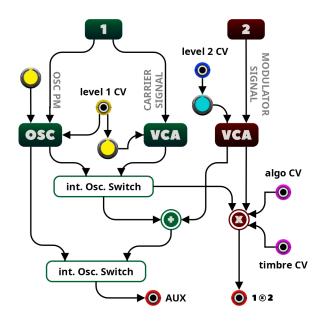
The signal present at **INPUT 2** (6) is sent to the 1×2 (7) output as is.

Incurvationes module modes

Most cross-modulation algorithms distinguish between the carrier and modulator signals: the carrier signal will be filtered or modulated to acquire some of the characteristics of the

modulator signal. Some other algorithms emulate symmetrical circuits and do not make that distinction.

Signal route diagram



Standard mode algorithms

• Crossfading

The carrier and modulator are cross faded into each other using a constant-power law. **TIMBRE** (F) controls where the cross fading occurs: signals are mixed equally at 12 o'clock.

Crossfolding

The carrier and modulator are summed; a little bit of cross modulation product is added, and the resulting signal is sent to a wave folder.

TIMBRE (F) controls the amount of wave folding.

• Oliode ring modulation

The carrier and modulator are multiplied crudely on a digital model of a diode ringmodulator.

TIMBRE (F) post-processes the resulting signal with a variable amount of gain and emulated diode clipping.

• **ODIGITAL PROVIDENT OF CONTRACT OF CONTRACT.**

÷

This algorithm uses proper multiplication and results in a gentler version of the previous algorithm; the resulting sound is more akin to AD633-based analog ring-modulators.

TIMBRE (F) post-processes the signal with a gain boost and soft-clipping.

• ⁽ⁱ⁾ XOR modulation

The carrier and modulator are converted to 16-bit integers; the resulting numbers are XOR'ed bit by bit.

TIMBRE (F) controls which bits are XOR'ed together.

Omparison and rectification

A handful of signals are synthesized through comparison operations.

TIMBRE (F) morphs through the signals, some have an octave pedal flavor.

• 😨 🙆 🍪 Vocoder

Classic implementation of an analog vocoder, with a bank of 20 analysis and 20 synthesis third-octave 48dB filters.

The modulator's sub-band signals are processed by envelope followers to derive the gains for each of the carrier's sub-band signals.

TIMBRE (F) warps the connections between the modulator's envelope followers and the carrier's gain elements, shifting the formants extracted from the modulator signal up or down.

Turning the **ALGORITHM** (B) knob clockwise increases the release time of the envelope followers; when the knob is fully clockwise, the modulator signal is frozen and the carrier is filtered by the formants that were present in the modulator signal before the knob reached this position.

Frequency shifter mode

This mode is selected by enabling both **F.S** (A) and **INT. OSC.** (C).

The **ALGORITHM** (B) knob and **ALGORITHM CV** (1) input change the amount of frequency shifting:

- No shifting at the 12 o'clock position.
- Positive frequencies when turning the knob to the right.
- Negative frequencies when turning the knob to the left.



The control curve is linear until 50 Hz then it becomes exponential.

The response of the **ALGORITHM CV** (1) input, that modulates shifting amount, depends on the position of the **ALGORITHM** (B) knob: it is linear when the knob is near the center, and 1V/Octave-ish when the knob is above 50 Hz or below -50Hz.

The INT. OSC. (C) button selects the carrier wave form.

LEVEL 1 (D) knob and LEVEL 1 CV (2) input: control the feedback amount.

LEVEL 2 (E) knob and LEVEL 2 CV (3) input: control the dry/wet mix.

TIMBRE (F): controls the balance between the lower and upper side bands; at 12 o'clock, both side bands are present (ring-modulation).

INPUT 1 (5) and **INPUT 2** (6) inputs: audio inputs summed together and processed by the frequency shifter.

1 x 2 (7) and AUX (8) outputs: two audio outputs.

Quadrature cross-modulator

This mode is selected by enabling **F.S** (A) and disabling **INT. OSC.** (C).

When this mode is enabled, the module computes the product of the analytic signals obtained from the **INPUT 1** (5) and **INPUT 2** (6) inputs and another complex exponential; the real and imaginary parts of the result are sent to the two outputs.

This mode can be thought of as a form of frequency shifting; but instead of setting the frequency with the knob, a sine wave is directly fed to **INPUT 1** (5) to shift the **INPUT 2** (6) signal; more complex wave forms will shift the signal in **INPUT 2** (6) multiple times and create very complex inharmonic tones.

The **ALGORITHM** (B) knob controls the amount of phase shifting on the result; differences can't really be heard when the knob is moved slowly: for the effect to be actually fruitful, CV modulation should be applied using the **ALGORITHM CV** (1) input.

[•] This mode requires signals to be connected to both **INPUT 1** (5) and **INPUT 2** (6).



Distortiones – Doctored meta modulator

A remixed, polyphonic sound sculpting module and effects processor: add doppler, wave folding, wave shaping, and more, or use any of the Incurvationes modes to achieve the sound you imagine with 7 new modes!

Based on the "Parasite" alternative firmware for Mutable Instruments' "Warps".

We hope this module can help you achieve the quirky, evolving sounds you can't get out of your head.

This manual documents the changes Distortiones makes when compared to Incurvationes; consult the <u>Incurvationes manual</u> for basic operating instructions and descriptions of modes already present in that module: **Frequency shifter/Quadrature cross-modulator mode**, and the **Standard mode** algorithms, available when Distortiones' active **Mode** is **Meta-mode**.

Some adjustments have been made that impact the sound and behavior of the module:

- Different smoothing on the Level CV for a snappier response e.g. fast attacks.
- Increased the TZFM modulation index of the internal sine oscillator (The button's LED for Int. Osc. (C) is green and audio is fed to the CARRIER (5) input).
- In **Meta-mode**, the volume of the wave folder has been lowered a bit, and its phase inverted (avoids phase cancellation between the first two modes).
- The Vocoder's volume has been raised a bit.

A lot of enjoyment for this module comes from experimenting with the modes and listening to the possibilities, rather than reading the manual.

The Controls



The controls for Distortiones are the same as the ones for Incurvationes with two exceptions.

Knobs and buttons

G. MD: this button replaces the F.S button present in Incurvationes, it enables and disables the **MODE SELECT** function.

LED	State
	Off
0	On

Whenever **MODE SELECT** is engaged, the **MODULATION ALGORITHM** (B) knob jumps to the currently active module mode; the knob returns to its last value when **MODE SELECT** is disengaged.

When **MODE SELECT** is enabled, twisting the **MODULATION ALGORITHM** (B) knob changes the module's mode, akin to the mode select feature in the hardware module; in this mode, the knob is notched and will snap to valid modes.

Normal **MODULATION ALGORITHM** (B) knob operation is disabled when **MODE SELECT** is enabled.

The knob glows a different color as modes are changed in **MODE SELECT**.

The selected mode is shown in the context menu.

Modes can also be selected directly using the context menu.

÷

MODE SELECT is disabled by default.

Inputs

9. MODE: polyphonic voltages sent to this input will directly select the mode for each polyphonic channel (up to 16).

Voltages sent to this port are *not* offsets: mode selection is absolute and direct in the available modes.

Two direct selection modes, chosen using the context menu, are available:

Mode Direct CV	Description Voltages in the 0V to 8V range set the mode for a given channel.
	Voltages are mapped as follows:
	Voltage Mode
	0V Binaural doppler panner
	1V Wave folder
	2V Chebyshev wave shaper
	3V Frequency shifter
	4V Dual bit mangler
	5V Comparator with Chebyschev wave shaper
	6V Vocoder
	7V Variable rate delay
	8V Meta-mode
	This mode is active when the C4-F#4 direct mode selection menu entry is unchecked.
	This mode is the default.
C4-F#4 direct mode	
	Notes are mapped as follows:
	Note Mode
	C4 Binaural doppler panner
	C#4 Wave folder
	D4 Chebyshev wave shaper
	D#4 Frequency shifter
	E4 Dual bit mangler
	F4 Comparator with Chebyschev wave

	shaper
F#4	Vocoder
G4	Variable rate delay
G#4	Meta-mode

This mode is active when the **C4-G#4 direct mode** selection menu entry is checked.

Mode selection is polyphonic and every channel can have a different mode.

Lights

- The selected mode for channel 1 is shown using a green LED next to the corresponding mode glyph.
- LED lamps around the **INT. OSC.** (C) button light up for active channels and change color according to each channel's selected mode.

The context menu



Distortiones offers the standard Rack context menu with two additions:

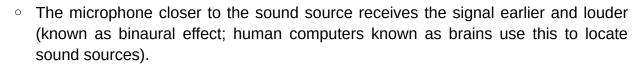
- **MODE:** select the module's operation mode directly, without going through the **MODE SELECT** function documented above.
- **C4-G#4 direct mode selection:** enables and disables direct mode selection using note voltages.

Module modes

• 🗢 Binaural Doppler Panner

Recreate the effect of capturing a moving sound source with two, different microphones separated by a small distance (e.g. Having ears).

The setup described above has several consequences:



- The farther a sound source is to the microphone's position, the more delayed it is... speed of sound and all that.
- Distance affects pitch: the closer a sound source is, the higher its apparent pitch (A.K.A. <u>Doppler effect</u>).

This mode can also be used as a dual cross fader, a panner, a simple delay, or a VCA; but it will feel a little sad: it is at its best when using it as the whole Doppler package.

The **MODULATION ALGORITHM** (B) controls the X coordinate of the sound source.

The **TIMBRE** (F) controls the Y coordinate of the sound source.

Two internal LFOs are present to move the sound source in a circle around the center's X and Y coordinates; the **LEVEL 1** (D) knob controls the LFOs' frequency and the **LEVEL 2** (E) knob their amplitude.

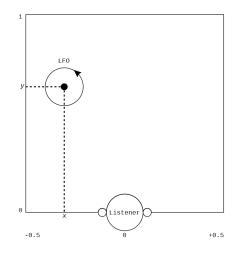
The **INT. OSC.** (C) button controls the size of the simulated space in increasing increments:

LED	Size
\bigcirc	Tiny
\bigcirc	Big
\bigcirc	Bigger
0	Huge

INPUT 1 (5) receives one sound source; **INPUT 2** (6) receives another sound source that is placed symmetrically to **INPUT 1**, on axis, on the other side of the "head".

Outputs 1 x 2 (7) and Aux (8) should be used as a stereo pair.

The diagram below will help illustrate some of the concepts of this mode:



😵 Wave Folder

٠

Fold your waves like clean laundry!

The MODULATION ALGORITHM (B) sets the number of folds.

The **TIMBRE** (F) controls the input bias.

The **LEVEL 1** (D) knob controls the amplitude of the **INPUT 1** (5) signal or the internal oscillator's frequency, if it is enabled.

The LEVEL 2 (E) knob controls the amplitude of the INPUT 2 (6) signal.

The **INT. OSC.** (C) button enables and disables the internal oscillator and selects its wave form:

LED	Oscillator
\bigcirc	Disabled
0	Sine
\bigcirc	Triangle
0	Saw

1 x 2 (7) contains the module's main output.

AUX (8) contains either the sum of the **INPUT 1** (5) and **INPUT 2** (6) signals or the output of the internal oscillator, if it is enabled.

• Ochebyschev Wave Shaper

÷

Shape signals with <u>Chebyschev polynomials</u>; the result is shifting harmonics nonlinearly by harmonics, producing interesting timbres out of simple, harmonically poor ones.

This mode can provide a full synthesis voice, close to additive synthesis and wave folding, when combined with the internal oscillator.

The **MODULATION ALGORITHM** (B) sets the Chebyschev function's order: from 0th to 16th. When the knob is all the way to the left, sound is unaffected (order 0); as the knob is rotated right, input harmonics are increasingly shifted.

The **TIMBRE** (F) knob sets the wave shaper's gain, when fully turned right it will shift the internal sine oscillator's harmonics, so it can be used as a simple additive voice.

The **LEVEL 1** (D) knob controls the amplitude of the **INPUT 1** (5) signal or the internal oscillator's frequency, if it is enabled.

The LEVEL 2 (E) knob controls the amplitude of the INPUT 2 (6) signal.

The **INT. OSC.** (C) button enables and disables the internal oscillator and selects its wave form:

LED	Oscillator
	Disabled
\bigcirc	Sine
\bigcirc	Triangle
0	Saw

1 x 2 (7) contains the module's main output.

AUX (8) contains either the sum of the **INPUT 1** (5) and **INPUT 2** (6) signals or the output of the internal oscillator, if it is enabled.

• [©] Frequency Shifter

This mode is documented in the <u>appropriate section</u> of the Incurvationes manual.

• 🜐 Dual Bit Mangler

Degrade and bit crush audio signals.

The **MODULATION ALGORITHM** (B) sets the bit degradation amount.

The **TIMBRE** (F) controls X-modulation.

Morphs between:



- Dry.
- Bitwise And.
- Bitwise Xor.

The **LEVEL 1** (D) knob controls the amplitude of the **INPUT 1** (5) signal or the internal oscillator's frequency, if it is enabled.

The LEVEL 2 (E) knob controls the amplitude of the INPUT 2 (6) signal.

The **INT. OSC.** (C) button enables and disables the internal oscillator and selects its wave form:

LED	Oscillator
\bigcirc	Disabled
\bigcirc	Sine
\bigcirc	Triangle
0	Saw

1 x 2 (7) contains the module's main output.

AUX (8) contains either the sum of the **INPUT 1** (5) and **INPUT 2** (6) signals or the output of the internal oscillator, if it is enabled.

• *O Comparator with Chebyschev Wave Shaper*

The Chebyschev wave shaper with integrated analog-like comparator functions.

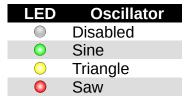
The **MODULATION ALGORITHM** (B) morphs between 8 analog like comparator functions.

The **TIMBRE** (F) sets the Chebyschev function's order.

The **LEVEL 1** (D) knob controls the amplitude of the **INPUT 1** (5) signal or the internal oscillator's frequency, if it is enabled.

The LEVEL 2 (E) knob controls the amplitude of the INPUT 2 (6) input.

The **INT. OSC.** (C) button enables and disables the internal oscillator and selects its wave form:





1 x 2 (7) contains the module's main output.

AUX (8) contains either the sum of the **INPUT 1** (5) and **INPUT 2** (6) signals or the output of the internal oscillator, if it is enabled.

🖻 💿 Vocoder

Versatile synthetic voices!

The MODULATION ALGORITHM (B) controls frequency warping.

The **TIMBRE** (F) sets the release time.

The **LEVEL 1** (D) knob controls the amplitude of the **INPUT 1** (5) signal or the internal oscillator's frequency, if it is enabled.

The LEVEL 2 (E) knob controls the amplitude of the INPUT 2 (6) input.

The **INT. OSC.** (C) button enables and disables the internal oscillator and selects its wave form:

LED	Oscillator
	Disabled
0	Saw tooth
\bigcirc	Pulse
0	Low-pass filtered noise

1 x 2 (7) contains the module's main output.

AUX (8) contains either the sum of the **INPUT 1** (5) and **INPUT 2** (6) signals or the output of the internal oscillator, if it is enabled.

• 🙆 Variable Rate Delay

A model of a tape loop, moving at a defined speed, and two separate heads, one for reading and one for writing, that can be moved along the loop.

Simulate classic tape loop effects with a versatile delay mode!

The **MODULATION ALGORITHM** (B) controls the speed and direction of the tape.

Fully clock-wise, the tape goes forward at full speed, as the knob approaches noon, the tape slows down and delay time increases while sound quality degrades: less ferrite grains present to record audio.

At 12 o'clock the tape is stopped, so delay time is infinitely long and audio quality is infinitely bad, in other words: silence.



Turning the knob to the left reverses tape direction.

The **TIMBRE** (F) knob controls the distance between the read and write heads on the tape loop.

All the way to the left, the write head is right next to the left of the read head: if tape is running forward, delay times will be extremely short as what is read has just been recorded; if the tape is running backwards, delay times will be the longest: the recorded signal has to go through the whole loop before it is played back.

Fully clock-wise, the logic presented above is reversed: longest delay times are achieved running the tape forward and the shortest ones are obtained by running the tape backwards.

At 12 o'clock, the read and write heads have the same length of tape to work with, so delay times are the same when running the tape forwards or backwards.

The **LEVEL 1** (D) knob controls the feedback amount.

The **LEVEL 2** (E) knob sets the dry/wet mix level.

The INT. OSC. (C) controls the delay's topology:

LED Topology	Description
Open feedback loop	INPUT 1 (5) signal is the audio input, 1 x 2 (7) contains the audio output.
	AUX (8) is the feedback output and INPUT2 (6) is the feedback input.
O Dual delay	INPUT 1 (5) and 1 x 2 (7) act as one channel; INPUT 2 (6) and AUX (8) act as another.
	Delay time is shared between the two pairs.
	Tape delay simulation model.
O Dual analog modeled delay	The feedback path goes through LP/HP filters and light distortion, also a little hiss is added.
	Inputs and outputs are paired as in the Dual Delay topology.
Ping-pong delay	INPUT 1 (5)'s signal feedback goes into INPUT 2 (6)'s signal, and vice versa.

• 🞯 Meta-mode

÷

This mode offers every algorithm from Incurvationes' **Standard mode** and mimics their behavior.

The algorithms are documented in the "<u>Standard mode algorithms</u>" section of the Incurvationes manual.



Mutuus – Experimental meta modulator

A convolved, polyphonic flexible sound manipulation module and effects processor evolved from the Distortiones firmware: filter, reverberate, chorus, wave fold, bit crush, and manipulate your signals to obtain that sound you can't get out of your head! 3 new modes, 4 modes from the Distortiones module and, of course, the original Incurvationes modes available in **Metamode**!

Based on the "Symbiote" alternative firmware, an evolution of the "Parasite" firmware, for Mutable Instruments' "Warps".

We aim for this module to provide you with endless sound transformation possibilities and satisfy that craving to contort sounds!

This manual documents the changes Mutuus offers when compared to Distortiones; the <u>manual for Incurvationes</u> and <u>the manual for Distortiones</u> should be consulted for basic operating instructions and descriptions of the modes already present in those modules.

This module is best enjoyed when experimenting with the modes and listening to the results.

The Controls



The controls for Mutuus are the same as the ones for Distortiones with one addition (note: Mutuus sports red selected mode LEDs).

Knobs and buttons

H. ST: enable and disable stereo for the Dual State Variable Filter mode.

LED	State
	Off
\bigcirc	On

Disabled by default.

Module modes

• 오 Dual State Variable Filter

This mode offers two independent State Variable Filters, arranged in default configurations; implemented using the Mutable Instruments' State Variable Filter code.

These filters drive resonance up to distortion levels and sound pretty close to an MS-20 filter.

The low-pass filter is two pole, and the band-pass and high-pass filters are one pole.

The **MODULATION ALGORITHM** (B) controls cutoff frequency for the first filter.

The **TIMBRE** (F) controls the cutoff frequency for the second filter.

LEVEL 1 (D) controls filter 1's resonance.

LEVEL 2 (E) controls filter 2's resonance.

The **INT. OSC.** (C) button switches filter configurations for the outputs, where the signal from filter 1 is contained in 1×2 (7) output and the signal from filter 2 is contained in **AUX** (8).

LED	1 x 2 (7)	AUX (8)
\bigcirc	LP	HP
0	LP	BP
\bigcirc	BP	HP
0	BP	BP

The LEVEL 1 CV (2) input modulates the VCA for Filter 1.

The LEVEL 2 CV (3) input modulates the VCA for Filter 2.

Second Ensemble FX

The Ensemble FX from the <u>Funes String Machine</u>: a low-pass stereo filter with chorus.



MODULATION ALGORITHM (B) controls cutoff frequency.

TIMBRE (F) controls the chorus depth.

LEVEL 1 (D) controls the amplitude of **INPUT 1** (5)'s signal or the internal oscillator's frequency.

LEVEL 2 (E) controls the amplitude of the INPUT 2 (6) signal.

INT. OSC. (C) switches the internal oscillator on and off and sets its wave form.

The **LEVEL 1 CV** (2) input modulates the VCA for the signal in **INPUT 1** (5) or V/OCT for the internal oscillator, if it is enabled.

The LEVEL 2 CV (3) input modulates the VCA for the signal in INPUT 2 (6).

1 x 2 (7) contains the left channel.

AUX (8) contains contains the right channel.

• 📀 Reverbs

A compiled collection of a few Mutable Instrument stereo reverb implementations, based on the configurations for Rings, Clouds and Elements.

This mode adds control over parameters not available in the original implementations.

The four available reverbs are selected using the INT. OSC. (C) button:

LED	Reverb	Origin
	Caveman	Rings' Disastrous Peace mode
0	Rings	Rings' KarplusVerb resonator
\bigcirc	Clouds	Clouds reverb
•	Elements with added input gain control	Elements reverb

The **MODULATION ALGORITHM** (B) controls diffusion.

The **TIMBRE** (F) controls reverb time, when the **Elements** reverb is selected and the knob is completely clock-wise, reverb freeze is achieved.

The **LEVEL 1** (D) knob controls reverb amount for the **Caveman**, **Rings** and **Clouds** reverbs and gain for the **Elements** one.

The **LEVEL 2** (E) knob controls the low-pass filter for **Caveman**, **Rings** and **Elements** reverbs and feedback for the **Clouds** one.

The LEVEL 1 CV (2) input modulates the VCA for the signal in INPUT 1 (5).



The LEVEL 2 CV (3) input modulates the VCA for the signal in INPUT 2 (6).

1 x 2 (7) contains the left channel signal.

AUX (8) contains the right channel signal.

• [©] Frequency Shifter

This mode is documented in the appropriate <u>appropriate section</u> of the Incurvationes manual.

• 🙂 Bit Crusher

This mode is documented in the <u>appropriate section</u> of the Distortiones manual.

• *O Chebyschev Wave Shaper*

This mode is documented in the <u>appropriate section</u> of the Distortiones manual.

• 💿 Doppler panner

This mode is documented in the <u>appropriate section</u> of the Distortiones manual.

• 🙆 Delay

This mode is documented in the <u>appropriate section</u> of the Distortiones manual.

• 🕲 Meta-mode

This mode offers every algorithm from Incurvationes' **Standard mode** and mimics their behavior.

The algorithms are documented in the <u>Standard mode algorithms</u> section of the Incurvationes manual.

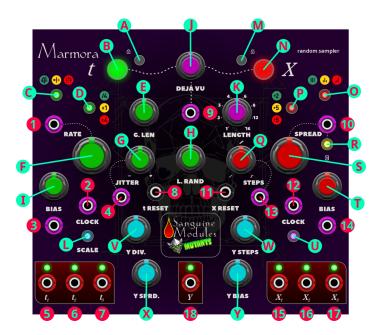
Marmora – Random sampler

Chaos... under your control. Random gates, random voltages and some spice! Use Marmora's internal clock or sync it to an external one, and modify a plethora of parameters to get the perfect combination of elements to capture lightning in a bottle!

Based on Mutable Instruments' "Marbles".

We hope this module helps keep your performances evolving and surprising every one... including you!

The Controls



Marmora's quick start formula

- I. You need a clock, internal or external.
- **II.** Add slight or extreme variations to it: jitter.
- **III.** Generate 2 more random, contrasting rhythmic patterns, that complement the main clock.
- **IV.** Generate random voltages, 3 of them, synced with the rhythms from step 3.
- **V.** Transform those voltages.



VI. Add slight lag processing or quantize them to obtain smooth random modulations or random tunes, respectively.

Steps I-III are taken care of by the *t* generator of the module (the left half).

Steps IV-VI are handled by the *X* generator of the module (the right half).

To top it all off, how about letting everything be managed by a controllable, evolving loop? That's what the top center half of the module does: the **Deja Vu** section.

Marmora is a complex module with many controls and possibilities, so knobs related to a specific section are the same color.

To make explaining sections easier, each one will be described below separately, starting with...

The t generator

The *t* generator produces random gates by either generating a jittery master clock or syncing with an external clock signal (let's call either of these the "base clock")

From the base clock, two streams of random gates are derived.

The base clock is always available in the t_2 (6) output port, the streams of random gates are output in the t_1 (5) and t_3 (7) ports.

Knobs and buttons

A. *t* SUPER LOCK: this button enables and disables Super lock mode for the *t* generator.

When **Super lock** is enabled, the *t* generator behaves as if the **Deja Vu** knob were set at 12 o'clock (locked loop without randomness).

Disabled by default.

B. *t* **DEJA VU:** this button enables and disables influence from the **Deja Vu** section on the *t* generator.

When it is enabled, the settings for the **Deja Vu** section affect the behavior of the *t* **generator**; when it is disabled, the *t* **generator** behaves as if the **Deja Vu** knob were set to its minimum (random without repetition).

t **SUPER LOCK** (A) overrides the settings explained above.

LED	State
	Disabled
0	Enabled

O↔**O** Super lock

C. *t* **CLOCK SPLIT MODE:** this button selects how the clock will be split among the t_1 (5) and t_3 (7) ports.

There are 7 different possible modes; pushing the button cycles among them.

The selected mode is indicated by the button's light color and cycle, and, also, shown in the button's tooltip.

The modes are:

LED	Mode	Description
•	Complementary Bernoulli	Every t_2 (6) pulse generates a coin toss that decides whether the pulse goes to t_1 (5) or t_3 (7). t BIAS (I) controls the fairness of the coin
		toss.
		t_2 (6) is multiplied and divided by a random ratio to generate t_1 (5) and t_3 (7), respectively.
0	Clusters	The ratio is controlled by the <i>t</i> BIAS (I) knob; extreme ratios can be achieved by turning the knob all the way to left or all the way to the right.
•	Drums	Kick/snare drum patterns are generated by alternating the triggers between t_1 (5) and t_3 (7) regularly.
◎⇔○	Independent Bernoulli	t_1 (5) and t_3 (7) are chosen by independent coin tosses, so, both channels or none can be on at the same time.
◎⇔○	Divider	The <i>t</i> BIAS (I) knob selects a clock division or multiplication ratio that is applied to t_3 (7), while its reciprocal is applied to t_1 (5). This mode has no randomness.
○ ↔ ○	Three States	The module randomly selects between a trigger on t_1 (5), on t_3 (7), or no output at all.
	Markov	Heuristics are used to generate "balanced" rhythmic patterns, using 4 basic rules:

• Repeating what was played 8 ticks

÷

ago is favored.

- Pulses appearing on both channels is frowned upon.
- Sparse patterns (no consecutive hits) are favored.
- Patterns in which one channel "echoes" what the other channel played 4 ticks before are favored.

Each rule has an associated "weight" that can be influenced by the *t* **BIAS** (I) knob.

Clock split modes can also be selected using the context menu.

Complementary Bernoulli is the default mode.

D. CLOCK RANGE: divides or multiplies the clock rate by 4. The active factor is indicated by the button's light color and shown in the button's tooltip.

LED	Range
0	Clock divided by 4
\bigcirc	Clock multiplied by 1
•	Clock multiplied by 4

Clock ranges be selected from the context menu as well.

E. G. LEN: sets the length of the gates output by t_1 (5) and t_3 (7), from 1% to 99%; together with the **L. RAND** (H) knob, this control can be used to introduce variation to the gates produced by the *t* generator.

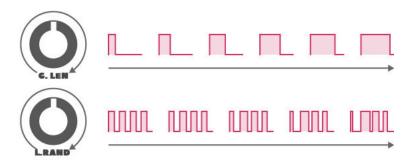


Figure 6: Marmora gate shaping using the **G. LEN** and **L. RAND** knobs.

F. RATE: if the *t* generator's CLOCK (2) input is disconnected, this knob sets the module's clock rate (120 BPM at 12 o'clock); if the CLOCK (2) input is patched, this knob acts as a divider/multiplier for the external clock.



- **G. JITTER:** controls the amount of randomness applied to the clock's timing: from perfectly stable to complete chaos, this applies to both internal and external clocks.
- **H. L. RAND:** controls the amount of length randomness applied to the gates output by t_1 (5) and t_3 (7); check the **G. LEN** (E) section for a helpful diagram.
- **I.** *t* **BIAS:** controls whether gates are more likely to be sent to the t_1 (5) or t_3 (7) outputs; the effect of this knob depends on the **CLOCK SPLIT MODE** (C) setting.

Inputs and outputs

- 2. *t* RATE CV: CV applied to this input modulates the RATE (F).
- **3.** *t* **EXTERNAL CLOCK:** patching this input overrides the internal clock and synchronizes the *t* **generator** to an external source.
- 4. *t* BIAS CV: CV present in this input modulates the *t* BIAS (I).
- 5. JITTER CV: CV sent to this input modulates the JITTER (G).
- **6.** t_1 : one of the random gate outputs; how random gates are generated and how controls affect them is explained above.
- 7. *t*₂: the internal or external clock is always output here, affected by **JITTER** (G).
- **8.** t_3 : one of the random gate outputs; how random gates are generated and how controls affect them is explained above.
- **9.** *t* **RESET:** triggers received in this port will reset the *t* **generator**: all counters, dividers, patterns and step numbers for the *t* **generator** are reset.

A reset can also occur automatically if a long pause (3 seconds or 4 times the interval between 2 clock ticks, whichever is longest) is encountered between triggers received in the *t* EXTERNAL CLOCK (2) input.

Manual or automatic resets in the *t* generator can propagate to the *X* generator if the *X* EXTERNAL CLOCK (12) is not patched.

The Deja Vu section

This section controls module decision making: whenever the module has to make a random choice, it queries this section; the **Deja Vu** section responds by either recycling a previous random choice or sampling fresh random data.

Deja Vu's influence on the *t* and *X* generators can be set independently for each one: **Deja Vu**'s influence on the *t* **generator** is controlled by the *t* **SUPER LOCK** (A) and *t* **DEJA VU** (B)



buttons; **Deja Vu**'s influence on the *X* **generator** is controlled by the *X* **SUPER LOCK** (M) and *X* **DEJA VU** (N) buttons.

Two examples:

- The module can generate a non-repeating sequence of voltages locked to a looping rhythm (**Deja Vu** enabled for the *t* generator and disabled for the *X* generator).
- The module can cycle through the same sequence of voltages on an ever-changing rhythm (**Deja Vu** disabled for the *t* generator and enabled for the *X* generator).

Knobs

- J. DEJA VU: controls the probability of recycling random decisions from the past:
 - From 7 o'clock to 12 o'clock the probability goes from 0, completely random, to 1, a locked loop: the module never generates fresh random data; when the module is in a locked loop state, the *t* DEJA VU (B) and *X* DEJA VU (N) buttons blink, if they are enabled.
 - From 12 o'clock to 5 o'clock, the probability of randomly jumping within the loop goes from 0 to 1, hence, at 5 o'clock, the module plays random permutations of the same set of decisions/voltages.
- **K. LENGTH:** controls how long the internal loop is, in other words, how many values the module can choose from.

Lengths of 5, 7, 10 and 14 can be obtained by setting the knob between the markings printed on the panel.

LENGTH *does not* adjust a global loop length: if that were the case, every system in the module would reset itself after *n* clock ticks.

Setting the loop length to, for example, 3 does not mean that a looping 3 beat pattern will be created; it means that each "decision" (sampling a value from the internal random source) will cycle over 3 possible values.

Please, don't expect that setting LENGTH to *n* will create an *n* beat pattern: *it won't!* It will, however, allow for *n* possible values when the module makes decisions.

Inputs

9. DEJA VU CV input.

The X generator

This section generates three independent random voltages output on X_1 (15), X_2 (16) and X_3 (17).

The voltages can be clocked from the internal clock, using various combinations set by the internal *X* **CLOCK SOURCE** (U) button, or by a common external clock.

Knobs and buttons

M. *X* **SUPER LOCK:** this button enables and disables **Super lock mode** for the *X* **generator**.

When Super lock is enabled, the *X* generator behaves as if the **Deja Vu** knob were set at 12 o'clock (locked loop without randomness).

Disabled by default.

N. *X* **DEJA VU:** this button enables and disables influence from the **Deja Vu** section on the *X* **generator**.

When it is enabled, the settings of the **Deja Vu** section affect the behavior of the *X* **generator**; when it is disabled, the *X* **generator** behaves as if the **Deja Vu** knob were set to its minimum (random without repetition).

X SUPER LOCK (M) overrides the settings explained above.

LED	State
	Disabled
0	Enabled
$\bigcirc \leftrightarrow \bigcirc$	Super lock

O. *X* **MODE:** selects how the X_1 (15), X_2 (16) and X_3 (17) outputs react to the settings dialed on the **STEPS (Q)**, **SPREAD (S)** and *X* **BIAS (T)** knobs, changing the flavor of the random output voltages.

The selected mode is indicated by the color of the button's light and shown in the button's tooltip.

The available modes are:

LED	Mode	Behavior
0	Identical	All channels follow the settings on the control panel.
0	Bump	X_2 (16) follows knob settings; X_1 (15) and X_3 (17) take opposite values.

	Example: if the STEPS (Q) knob is set completely to the right, X_1 (15) and X_3 (17) will be smooth and X_2 (16) will be quantized to the root note and its octaves.
Tilt	X_3 (17) follows the control panel; X_1 (15) reacts in the opposite direction, and X_2 (16) always stays in the middle (steppy, unbiased, bell-curve).

X MODE can also be selected using the context menu.

The default mode is **Identical**.

P. OUTPUT VOLTAGE RANGE: selects the output voltage range for the X_1 (15), X_2 (16) and X_3 (17) outputs.

The selected range is indicated by the color of the button's light and shown in the button's tooltip.

The available ranges are:

LED	Range	Voltages
0	Narrow	0V to +2V.
\bigcirc	Positive	0V to +5V.
0	Full	-5V to +5V.

Voltage range can also be set using the context menu.

Narrow is the default mode.

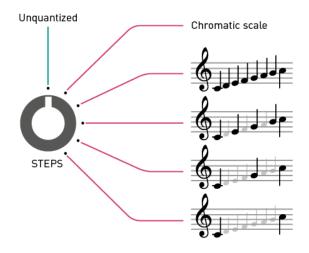
Q. STEPS: controls the horizontal and vertical "steppinness" of the generated voltages.

At 12 o'clock generated voltages follow the typical S&H setups.

Turning the knob to the left generates smoother edges, then random linear segments, then random smooth curves.

Turning the knob to the right quantizes generated voltages to a scale; as the knob is turned right, more and more notes are stripped off the scale, until only the root remains.

An example for the C major scale is shown below.



Marmora comes with 6 prebuilt, selectable, customizable scales, more information can be found in the <u>Scales section</u>.

R. EXTERNAL PROCESSING MODE: enables and disables external CV processing.

LED	State
	Disabled
\bigcirc	Enabled
	Scale Edit Mode

When **EXTERNAL PROCESSING MODE** is enabled, the module's behavior is altered as follows:

- Whenever a random value is needed for one of the *X* outputs, the voltage present at the **SPREAD CV** (10) input will be sampled.
- *X* BIAS (T) acts as a transposition control, shifting voltages up and down, and **SPREAD** (S) controls the transposition's range.
- When the *X* EXTERNAL CLOCK (12) is not patched, the three *X* outputs will contain the same melody; but with some notes frozen/sustained on outputs X_1 (15) and X_3 (17): each output is sampled at its own pace.
- The module can be used as a shift register under a specific set of conditions:
 - X MODE (O) is set to Identical (green)
 - The module is externally clocked
 - External CV is fed to the module

When the above requirements are met, the module switches to shift-register mode and alters its behavior: X_2 (16) contains X_1 (15)'s voltage shifted by one clock tick, and X_3 (17) contains X_2 (16)'s voltage shifted by one clock tick.

- All outputs follow the value of the STEPS (Q) knob. Always. Without regard for X MODE (O).
- Some sequencers do not change their output CVs exactly at the same time as their gate signals, so Marmora tolerates up to 3ms of difference between transitions.

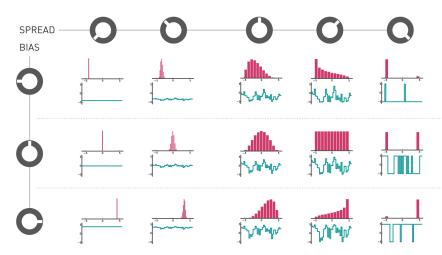
This mode is disabled by default.

This button's LED is also used to indicate when the module is in Scale Edit Mode.

- **S. SPREAD:** controls the width and shape of the voltage probability distribution i.e. How voltages are spread across the selected range:
 - At 12 o'clock, voltages follow a bell curve: they are more likely to occur near the center; but are able to reach the extremes.
 - As the knob is turned left, voltages are increasingly concentrated near the center of the range.
 - When the knob is all the way to the left, constant voltages are output.
 - At 2 o'clock, voltages spread across the entire voltage range, with equal probability.
 - As the knob is turned right, past 2 o'clock, extreme values become more likely.
 - When the knob is turned all the way to right, only minimum and maximum voltages are allowed, turning, in effect, X_1 (15), X_2 (16) and X_3 (17) into random gates.

The graphic below shows the effect of this knob, as it relates to the X BIAS (T) knob, the pink bars show the voltage distribution, with the tallest bar being the most likely outcome, the teal oscillogram is an example sequence of output voltages:

÷



T. X BIAS: skews voltages toward low or high values.

This knob can be thought of as as the probabilistic equivalent of an offset: voltages are not shifted up or down; but decisions are biased toward the bottom or top of the voltage range.

U. *X* **CLOCK SOURCE:** when the *X* **EXTERNAL CLOCK** (12) is not patched, the *X* **generator** gets its clock information from the *t* **generator** of the module, this button controls where that information comes from.

The selected clock source is indicated by the color of the button's light, and also shown in the button's tooltip.

LED	Mode	Description
\bigcirc	External clock ²¹	Pulses received in the <i>X</i> EXTERNAL CLOCK (12) input clock the <i>X</i> generator.
0	$t_1 \rightarrow X_1, t_2 \rightarrow X_2, t_3 \rightarrow X_3$	Pulses from the <i>t</i> generator's outputs directly clock the corresponding <i>X</i> generator output.
	$t_1 \rightarrow X_1, X_2, X_3$	Pulses from t_1 (5) clock every X output.
\bigcirc	$t_2 \rightarrow X_1, X_2, X_3$	Pulses from t_2 (6) clock every X output.
0	$t_3 \rightarrow X_1, X_2, X_3$	Pulses from t_3 (7) clock every X output.

The *X* Clock Source can also be selected using the context menu when no external clock is connected.

 $t_1 \rightarrow X_1, t_2 \rightarrow X_2, t_3 \rightarrow X_3$ is the default mode.

²¹ This mode is automatically enabled when the *X* EXTERNAL CLOCK (12) port is patched. It can't be enabled any other way.

Inputs and outputs

÷

10.SPREAD CV: CV applied to this input modulates the **SPREAD** (S).

11. X RESET: triggers received in this port will reset the *X* generator: all counters, dividers, patterns and step numbers for the *X* generator are reset.

A reset can also occur automatically if a long pause (3 seconds or 4 times the interval between 2 clock ticks, whichever is longest) is encountered between triggers received in the *X* EXTERNAL CLOCK (12) input.

- **12.***X* **EXTERNAL CLOCK:** if an external clock is patched here, every *X* output follows that clock instead of the one selected by *X* **CLOCK SOURCE** (U).
- 13. STEPS CV: CV applied to this input modulates the STEPS (Q).
- 14.X BIAS CV: CV applied to this input modulates the X BIAS (T).
- **15.***X*₁: first *X* generator CV output.
- 16.X₂: second X generator CV output.
- 17. X₃: third X generator CV output.

The Y generator

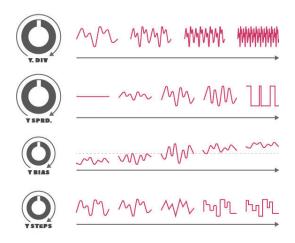
This section is a random voltage source.

By default, it is clocked at 1/16 the rate of X_2 (16), and sends a smooth, full range (-5V to 5V) voltage to the Y (18) output.

Knobs

- V. Y DIV.: sets the division factor relative to X_2 (16) from 1/64 to 1.
- W. Y STEPS: sets the wave form of the voltage sent to the Y (18) output.
- X. Y SPRD.: sets the amplitude of the voltage sent to the Y (18) output.
- Y. Y BIAS: sets the bias for the polarity of the voltage sent to the Y (18) output.

The relation between the knobs and the resulting voltages is illustrated in the diagram below:



Outputs

18. *Y***:** contains the voltage produced by the *Y* generator.

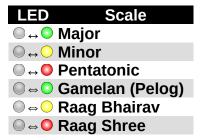
Scales

The voltages output from the *X* generator can be quantized to one of 6 different scales.

Selecting scales

The active scale can be selected using the **SELECT SCALE** (L) button or the context menu and is shown using the button's light color and cycle, as well as the button's tooltip.

Marmora comes with 6 pre-programmed scales:



The default scale is Major.

Customizing scales

Marmora is capable of using custom scales programmed by the user.

To customize a scale:

1. Select the scale to be customized using either the **SELECT SCALE** (L) button or the context menu.



- 2. Connect the CV and gate outputs of a keyboard or MIDI interface to the SPREAD CV (10) and *X* EXTERNAL CLOCK (12) inputs respectively.
- 3. Enable Scale Edit Mode using the context menu.
- **4.** Play a little tune on the connected instrument, 50 notes or more is the recommended length.
- 5. Exit Scale Edit Mode using the context menu.

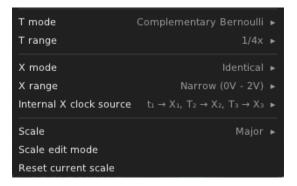
Custom scales are saved with patches and user presets.

Note that while **Scale Edit Mode** is active, the voltage of every *X* **generator** output will be the last note received, and gates received in the *X* **EXTERNAL CLOCK** (12) input will be copied to every *t* **generator** output. This is done so you can hear (or preview, if you prefer) what you are playing.

Resetting scales

The active scale can be reset to the factory default using the context menu item **Reset** current scale.

The context menu



In addition to the standard Rack context menu, Marmora offers a comprehensive context menu:

- T mode: select the t generator's mode directly.
- T range: select the t generator's range directly.
- X mode: select the X generator's mode directly.
- X range: select the X generator's range directly.

- Internal X clock source: select the X generator's clock source (ignored if X EXTERNAL CLOCK (12) is patched).
- Scale: set the module's active scale directly.
- Scale edit mode: engages and disengages Scale Edit Mode.
- Reset current scale: sets the currently selected scale to the module's factory default.

Custom scale edition and management is described in the <u>Scales</u> section above.

Most items available in the menu can also be set using the controls on the module's faceplate.

Marmora tips and tricks

- If **DEJA VU** (J) is past 12 o'clock and **LENGTH** (K) is set to 1, the outputs remain frozen in the same state.
- If **DEJA VU** (J) is around 11 o'clock, the loop will slowly mutate.
- The **DEJA VU** (J) knob has a "virtual notch" around 12 o'clock: even if the knob is not centered exactly, a perfectly non-random loop will still be produced.
- Once a sequence is looping, it is still possible to alter it with **SPREAD** (S) or *X* **BIAS** (T) to map it to a different range of voltages.
- When the *X* generator is not clocked externally, X_1 (15), X_2 (16) and X_3 (17) are rhythmically independent from each other: each output changes voltage at its own pace. For example: setting **LENGTH** (K) to 3, will cause each output to go through a 3-note sequence independently from the other, creating polyrhythmic effects.
- Self-patching Marmora is a rewarding technique! The Y (18) output, in particular, provides a useful, slow modulation source for randomizing other module parameters.



÷



Nebulae – Texture synthesizer

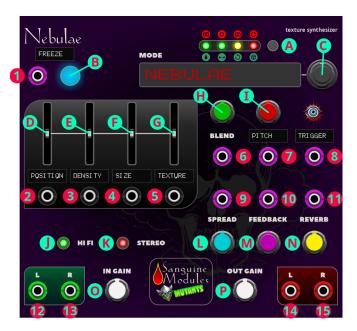
An audio processor that combines multiple overlapping, delayed, transposed and enveloped sound fragments (grains) from a recording buffer.

Generate thick textures in real time from incoming audio signals.

Based on Mutable Instruments' "Clouds"²² and the "Monsoon" version of the hardware with standard firmware.

We aim for this module to help you propel your mix above the stratosphere and beyond.

The Controls



Knobs and buttons

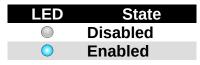
A. LED MODE: this button cycles between the different LED display modes:

- **Input**: the LEDs act as a VU meter that shows the level of the input signal, the input signal is soft-clipped when the last light is on.
- **Output**: the LEDs act as a VU meter that shows the level of the output signal. The signal is *not* clipped or altered in any way when the last lamp is on.

²² The ability to save audio buffers present in hardware is not available in Nebulae. Want to fix that? Drop me a line.



- Modulation values: the LEDs reflect the value of the parameter knobs using different colors and intensities:
 - LED colors go from off for the minimum knob value to green, yellow and finally red for the maximum knob value.
 - The LEDs represent, from left to right, the following knobs:
 - Blend
 - Spread
 - Feedback
 - Reverb
- **B. FREEZE**: this button stops audio buffer recording and lets you manipulate or use the audio in the buffer for different purposes, depending on the selected mode. Its current function is displayed in the OLED display above the button.



This parameter can be controlled by sending gates to the corresponding input (1): the parameter is enabled when the gate is high and disabled when the gate is low; the button's LED light always informs the user of the current state of the parameter.

C. MODE: twist the knob around to select a mode for the module.

The selected mode is shown in the matrix display to the left of the knob.

Modes can also be selected using the context menu.

MODE	Display
Granular mode	GRANULAR
Pitch shifter/time stretcher	STRETCH
Looping delay	LOOPING DLY
Spectral processor	SPECTRAL

Mode descriptions; an explanation of their parameters, and how the controls affect them are described in the "<u>Nebulae module modes</u>" section.

D. PARAMETER 1: this slider controls a parameter for the selected mode. The OLED display below it displays its current function.

This parameter can be modulated with CV using the appropriate CV input (2). The LED in the slider control shows the current CV value: green for positive voltages and red for negative ones.

E. PARAMETER 2: this slider controls a parameter for the selected mode. The OLED display below it displays its current function.

This parameter can be modulated with CV using its corresponding CV input (3). The LED in the slider control shows the current CV value with the same rules that govern **PARAMETER 1** (D).

F. PARAMETER 3: this slider controls a parameter for the selected mode. The OLED display below it displays its current function.

This parameter can be modulated with CV using its CV input (4). The LED in the slider control shows the current CV value with the same rules that govern **PARAMETER 1** (D).

G. PARAMETER 4: this slider controls a parameter for the selected mode. The OLED display below it displays its current function.

This parameter can be modulated with CV using its appropriate CV input (5). The LED in the slider control shows the current CV value with the same rules that govern **PARAMETER 1** (D).

H. O BLEND: this knob controls the dry/wet balance of the signal.

When rotating the knob, the LEDs above the **MODE** display briefly show the current value for this and the **SPREAD** (M), **FEEDBACK** (N) and **REVERB** (O) knobs.

This parameter can be modulated using the appropriate CV input (6).

I. PARAMETER 5: this knob controls a parameter for the selected mode. The OLED display below it displays its current function.

This parameter can be modulated with CV using its appropriate CV input (7).

J. HI FI: Nebulae offers two different resolutions for buffer recording:

LED	Resolution
\bigcirc	8-bit
0	16-bit

16-bit is the default resolution.

This setting, along with the **STEREO** (K) parameter, impacts the length and quality of the recording buffer:

RESOLUTION	CHANNELS	BUFFER LENGTH	GLYPH
16-bit	Stereo	1 second	0
16-bit	Mono	2 seconds	Ο
8-bit μ-law	Stereo	4 seconds	0
8-bit µ-law	Mono	8 seconds	•

Nebulae uses a particular flavor of μ -law companding that makes 8-bit resolution sound more like a cassette or a Fairlight: less hiss, more distortion.

The LEDs at the top briefly display the current buffer settings when changing this and the **STEREO** (K) parameter.

K. STEREO: Nebulae offers two different channel modes for buffer recording:

LED	Channels
\bigcirc	Mono
0	Stereo

Stereo channels is the default.

Buffer channels, along with the **HI FI** (J) setting, impact the length and quality of the recording buffer, consult the <u>table for **HI FI** (J)</u> to get the exact numbers.

L. SPREAD: controls the amount of random stereo panning of the wet signal.

When spinning the knob, the LEDs above the **MODE** display briefly show the current value for this and the **BLEND** (H), **FEEDBACK** (N) and **REVERB** (O) knobs.

This parameter can be modulated using its corresponding CV input (9).

M. SEEDBACK: controls the amount of feedback applied to the wet signal.

When turning the knob, the LEDs above the **MODE** display briefly show the current value for this and the **BLEND** (H), **SPREAD** (M) and **REVERB** (O) knobs.

This parameter can be modulated using its corresponding CV input (10).

N. O REVERB: controls the amount of reverb applied to the wet signal.

When twisting the knob, the LEDs above the **MODE** display briefly show the current value for this and the **BLEND** (H), **SPREAD** (M) and **FEEDBACK** (N) knobs.

This parameter can be modulated using its corresponding CV input (11).

O. IN GAIN: controls input gain for the audio signal present in the L and R inputs (12 and 13).



You can check input levels using the LEDs above the display when they are set to **Input**.

P. OUT GAIN: controls output gain for the audio signal contained in the L and R outputs (14 and 15).

OUT GAIN can function as an attenuator or an amplifier depending on its value²³.

You can check output levels using the LEDs above the display when they are set to **Output**.

Inputs and outputs

- **1. FREEZE** gate input.
- **2-5**. CV inputs for parameters 1 through 4.
- 6-7. BLEND (H) and PARAMETER 5 CV inputs.
- **8. TRIGGER**: input for the Trigger parameter; the result of sending a trigger to this input varies depending on the selected mode.
- 9-11. CV inputs for the SPREAD (M), FEEDBACK (N) and REVERB (O) parameters.
- **12. LEFT** audio input.
- **13. RIGHT** audio input, normalized to the left channel.
- 14. LEFT audio output.
- **15. RIGHT** audio output.

The context menu

Mode GRANULAR: Granular mode 🕨

The Nebulae context menu, in addition to the standard VCV Rack menu, offers one addition:

• **Mode**: module modes can be selected directly using the context menu.

²³ Beware! Save your ears and avoid distortion! Outputs can get loud.



Bypassed module behavior

The signals present at the **Left** (12) and **Right** (13) inputs are sent, unaltered, to the corresponding **Left** (14) and **Right** (15) outputs.

Nebulae module modes

The OLED displays always show what the knobs and inputs affect in your selected configuration.

Modes are presented as they are displayed on the matrix display.

• GRANULAR

This is the default mode for the module.

Textures are created by playing back short, overlapping segments of the audio in the buffer (grains).

Parameter/Input	Display	Function	Usage
FREEZE (Button B and input 1)	Freeze	Freeze	When the parameter is enabled, the module stops recording to the buffer and granularization happens on the last seconds of audio present in the buffer. Since live audio is no longer available, the output signal is routed through delays and all-pass filters while feedback builds up. This gives the sound a reverb like nature.
PARAMETER 1 (D)	Position	Grain position	Selects which part of the recording buffer grains are played from. Set the slider below the center mark to travel back in time.
PARAMETER 2 (E)	Density	Grain density	When the slider is at the center no grains are generated; set the slider above the center mark and will be sown randomly; set it below and grains will be played at a constant rate.
			The closer to the extremes the

PARAMETER 3 (F)	Size	Grain size	slider is, the higher the grain overlap. Grain size in milliseconds. Morph between various grain shape envelopes:
PARAMETER 4 (G)	Texture	Grain texture	 Square (boxcar) Triangle Hann window Setting the slider about ¼ above the middle marker activates a diffuser that smears transients.
PARAMETER 5 (I)	Pitch	Grain pitch	Transposes grains from the base frequency present at the audio source.
TRIGGER (8)	Trigger	Trigger	Generates a single grain. Setting the Density slider at the middle marker and sending triggers to this input lets you control the module like a micro sample player.

• STRETCH

÷

Similar to **GRANULAR**; this mode uses two carefully spliced, overlapping grains synchronized with the most salient period of the sound.

Parameter/Input	Display	Function	Usage
Stutter (Button C and input 1)	Stutter	Stutter	When this parameter is enabled and a trigger is received in the Trigger input, a clock synchronized loop is created.
PARAMETER 1 (D)	Scrub	Scrub audic buffer	Modulating this parameter when Stutter is enabled scrubs through the audio buffer.
PARAMETER 2 (E)	Diffusion	Diffusion	Creates a granular diffusion effect based on all-pass filters.
PARAMETER 3 (F)	Overlap	Overlap	Controls the size of the overlapping windows used for pitch shifting and time stretching: from an extremely grainy "drilling" sound to smooth bits of loops.
PARAMETER 4 (G)	LP/HP	Low-pass/ high-pass	Just what the "Function" column says.

		filter	
PARAMETER 5 (I)	Pitch	Grain pitch	Transposes grains from the base frequency present at the audio source.
TRIGGER (8)	Trigger	Trigger	When Stutter is disabled, a trigger here creates a stuttering effect; when it is enabled; a clock synchronized loop is created.

• LOOPING DLY

In this mode audio is continuously played back from the buffer without any granularization.

Parameter/Input	Display	Function	Usage
FREEZE (Button B and input 1)	Stutter	Stutter	When this parameter is enabled, the content of the audio buffer is looped (stutter).
PARAMETER 1 (D)	Time / Start	Head position	Controls the delay (the distance between the playback and recording heads)
PARAMETER 2 (E)	Diffusion	Granular diffusion	Creates a granular diffusion effect based on all-pass filters.
	Overlan /	Overlapping	Controls the size of the overlapping windows used for pitch shifting.
PARAMETER 3 (F)	Overlap / Duratn		eSet the slider at the top for a smooth result that might smear transients; set it at the bottom for a grainy sound.
PARAMETER 4 (G)	LP/HP	Low-pass/ high-pass filter	Filters!
PARAMETER 5 (I)	Pitch	Grain pitch	Transposes grains from the base frequency present at the audio source.
TRIGGER (8)	Time	Delay time	When Stutter is disabled, trigger pulses here set the delay time (as long as it is shorter than the recording buffer); when Stutter is enabled, a trigger here creates a clock synchronized stuttering loop.

129

÷

• SPECTRAL

÷

In this mode, input signals are converted into "frames" of spectral data that are stored, transformed, recombined, and resynthesized as time domain signals.

Parameter/Input	Display	Function	Usage
rarametermipat	Diopidy		Works in concert with the Buffer slider to select the input or output audio buffer.
			2 to 7 buffers are laid across the Buffer slider, depending on the HI FI and STEREO quality settings.
FREEZE (Button B and input 1)	Freeze	Freeze	When Freeze is disabled, the Buffer slider selects the buffer that receives audio; when Freeze is enabled, the Buffer slider selects the buffer from which output is produced.
			By recording different buffers you are, in effect, creating a "wave table" off F.F.T. Slices that can be interpolated.
PARAMETER 1 (D)	Buffer	Buffer select	Selects the current buffer to record or output from, depending on the Freeze state.
PARAMETER 2 (E)	FFT Upd. / Merge		This parameter determines how the results of the analyzer are passed to the resynthesizer.
			Setting the slider below the center line increases the probability that a given F.F.T. Won't be updated, causing a sort of partial freeze.
			Setting the slider above the center line adjacent analysis frames are increasingly merged together.
			At extreme settings random

PARAMETER 3 (F)	Polynomial	Polynomial coefficients	phase modulation is applied to smooth things out. The polynomial determines how frequencies are mapped between the analysis and synthesis buffers. Spectral shifting and spectral reversal are performed over the course of the slider.
PARAMETER 4 (G)	Quantize / Parts	Spectral quantizer / weak partial amplifier	Setting the slider below the middle line increasingly quantizes the amplitudes of spectral components.
PARAMETER 5 (I)	Transpose	Transpose	This parameter controls pitch- shifting.
TRIGGER (8)	Glitch	Glitch audio	Triggers in this input create different frequency domain glitches associated with corrupted audio files. The effect considers the pulse length of the trigger (or gate) input.





Etesia – Spliced texture synthesizer

A reimagined audio processor, texture generator, reverberator and resonator.

Use your audio signals to generate thick textures; make them reverberate, or resonate at will.

Based on the "Parasite" alternative firmware for Mutable Instruments' "Clouds"²⁴; loaded in the "Monsoon" version of the hardware.

We hope this module can help keep your creativity reverberating!

This manual documents the changes Etesia offers when compared with the Nebulae module; for basic operating instructions and descriptions of the modes already present in Nebulae consult <u>its manual</u>.

The changes



- Two new modes:
 - Oliverb
 - Resonestor
- More grain envelopes
- Smaller grains available

²⁴ The ability to save audio buffers present in hardware is not available in Etesia. Want to fix that? Drop me a line.



- Asymmetrical grain envelopes
- Enhanced Pitch shifter / time stretcher and Looping delay modes
- **REVERSE** audio buffers for certain modes; this is controlled by the new **REVERSE** (Q) button.

LED	State
	Disabled
\bigcirc	Enabled

REVERSE is disabled by default.

• Some of the familiar modes produce different results due to the changes mentioned above and the fact that, internally, they use different tables.

Module controls and the context menu remain the same as they were in Nebulae (with the addition of the **REVERSE** (Q) button and new OLED screens for familiar knobs: they control different parameters in the new modes). Their letter or number reference has not been changed in the diagram above, if you need a refresher of their basic functions, check the manual for Nebulae.

A list of all the modes, old and new; their display name; a description of their parameters, and how the knobs alter them follows; pertinent changes are noted per mode.

Mode list

MODE	Display
Granular mode	GRANULAR
Pitch shifter/time stretcher	STRETCH
Looping delay	LOOPING DLY
Spectral processor	SPECTRAL
Oliverb	OLIVERB
Resonestor	RESONESTOR

Module modes

Modes are presented with the labels used in the matrix display.

Updated or new parameters are indicated by a different background color in the tables below.

• GRANULAR

÷

This is the default mode for the module.

Textures are created by playing back short overlapping segments of the audio present in the buffer (grains).

Parameter/Input	Display	Function	Usage
FREEZE (Button B and input 1)	Freeze	Freeze	Same as in Nebulae.
PARAMETER 1 (D)	Position	Grain position	Same as in Nebulae.
PARAMETER 2 (E)	Density	Grain density	The response curve for this slider has been altered to access slowly sown grains more easily.
PARAMETER 3 (F)	Size	Grain size	Grain size in milliseconds. The range of the slider has been adjusted and can produce quite smaller grains: when the slider is at the bottom grains are barely hearable spikes; when the slider is at the top the maximum size is as it was in Nebulae.
PARAMETER 4 (G)	Texture	Grain texture	Morph between various grain shape envelopes, with new, asymmetric, ones: Square Ramp up Ramp down Triangle Triangle with diffuser When the slider is at the lowest position, the square shape has particularly sharp edges and may click. This behavior is intended. Clicks not your thing? Rise the slider a little.
PARAMETER 5 (I) TRIGGER (8)	Pitch Trigger	Grain pitch Trigger	Same as in Nebulae. Same as in Nebulae.
REVERSE (Q)		Reverse playback	When this parameter is enabled, grains are played back in reverse.

• STRETCH

Similar to **GRANULAR**; this mode uses two carefully spliced, overlapping grains synchronized with the most salient period of the sound.

Parameter/Input	Display	Function	Usage
Stutter (Button C and input 1)	Stutter	Stutter	Same as in Nebulae.
PARAMETER 1 (D)	Scrub	Scrub audio buffer	Modulating this parameter when Stutter is enabled scrubs through the audio buffer. When a clock is sent to TRIGGER (8) this slider becomes a clock
			divider/multiplier for the pre- delay:
			 Middle line position: the clock is used as is. Above the middle line: clock is divided. Below the middle line: clock is multiplied.
			Multiplication and division rates: 1/16 3/32 1/8 3/16 1/4 3/8 1/2 3/4 1 3/2 2/1 3/1 4/1 6/1 8/1 12/1
			Clock synchronization is more

÷

			accurate when the Overlap slider is at the bottom position.
PARAMETER 2 (E)	Diffusion	Diffusion	Same as in Nebulae.
PARAMETER 3 (F)	Overlap	Overlap	Same as in Nebulae.
		Low-pass/	
PARAMETER 4 (G)	LP/HP	high-pass filter	Same as in Nebulae.
PARAMETER 5 (I)	Pitch	Grain pitch	Same as in Nebulae.
TRIGGER (8)	Trigger	Trigger	Same as in Nebulae.
			When STEREO (K) is disabled, this knob cross-fades between the left and right inputs; needless to say, both inputs need to be connected for this to work.
SPREAD (M)	Spread	Spread	When STEREO (K) is enabled, this knob gradually swaps both output channels. When set at the rightmost position, it allows ping- pong delay effects: each time the sound is fed back the channels are reversed.

• LOOPING DLY

In this mode audio is continuously played back from the buffer without any granularization.

Parameter/Input	Display	Function	Usage
FREEZE (Button B and input 1)	Stutter	Stutter	Same as in Nebulae.
PARAMETER 1 (D)	Time / Start	Head position	Controls the delay (the distance between the playback and recording heads). The slider has been tweaked to make obtaining very short delays easier. Delay time changes are faster.
PARAMETER 2 (E)	Diffusion	Granular diffusion	Same as in Nebulae.
PARAMETER 3 (F)	Overlap / Duratn	Overlapping window size	Controls the size of the overlapping windows used for pitch shifting.

÷

			Set the slider at the top for a smooth result that might smear transients; set it at the bottom for a grainy sound. When FREEZE (B) is active and delay time is synchronized to an external clock, this slider controls the repeat time multiplication/division.
PARAMETER 4 (G)	LP/HP	Low-pass/ high-pass filter	Same as in Nebulae.
PARAMETER 5 (I)	Pitch	Grain pitch	Transposes grains from the base frequency present in the audio source. When the knob is at 0, pitch shifting is bypassed completely. This enhances delay quality.
TRIGGER (8)	Time	Delay time	Same as in Nebulae.
REVERSE (Q)		Reverse	When FREEZE (B) and REVERSE (Q) are enabled, the loop plays in reverse.

• SPECTRAL

This mode has no parameter changes; but generated sounds are not the same as those produced by Nebulae due to this mode using different tables.

OLIVERB

This is a full-featured, CV controllable mode-less reverb.

This mode is mono in \rightarrow stereo-out.

Parameter/Input	Display	Function	Usage
FREEZE (Button B and input 1)	Freeze	Freeze	When the parameter is enabled, the reverb is set to (near) infinite decay and the input is muted.
		a large Size (F) is the best way to use this.	
PARAMETER 1 (D)	Pre-delay	Pre-delay	This controls the time it takes for

			the reverb to kick in after audio has been input (from 0 to about ½ second).
			When a clock is input at the TRIGGER (8) port, this slider becomes a clock divider/multiplier for the pre-delay:
			 Middle line position: the clock is used as is. Above the middle line: clock is divided. Below the middle line: clock is multiplied.
			Multiplication and division rates: 1/16 3/32 1/8 3/16 $\frac{1}{4}$ 3/8 $\frac{1}{2}$ $\frac{3}{4}$ 1 3/2 2/1 3/1 4/1 6/1 8/1 12/1 The slider controls the reverb's
PARAMETER 2 (E)	Decav	Decay	tail.
(L)	2000	,	When set near the top the signal is amplified and the reverb enters self oscillation.
PARAMETER 3 (F)	Size	Reverb size	The size of the emulated room: from a small resonator to a huge hall.
PARAMETER 4 (G)	•	Reverb dampening	The slider controls reverb dampening:

			 From the bottom to the middle a low-pass filter is applied, simulating room absortion. From the middle to the top a high-pass filter is applied, this allows for unusual, crystalline effects.
PARAMETER 5 (H)	Dry/Wet	Dry/wet mix	Just what you expect from such a knob.
PARAMETER 6 (I)	Pitch	Pitch shift	 When sound is fed back into the reverb, it can be pitch shifted up to -1 to +1 octaves, as controlled by this knob. When the knob is at 12 o'clock no pitch shifting is applied. Setting the knob to its rightmost position allows for shimmer effects. Size (F) has an effect on pitch shifting: the larger the room, the
	Clock	Clock	better the shift.
TRIGGER (8)	CIUCK	CIUCK	Clocks pre-delay time. Controls the amount of "smoothing" applied to the sound (via diffusers) each time it goes through the loop.
SPREAD (M)	Diffusion	Diffusion	The rightmost knob position produces a more dense, continuous sound; while the leftmost lets you hear the sound being repeated, like a multi-tap delay.
FEEDBACK (N)	Mod. Speed	Modulation speed	Each delay in the reverb can be individually modulated by 9 smoothed, random LFOs; this knob controls their speed; it ranges from ~1/100 Hz to ~100Hz.

			Modulation speed has no effect if the Mod. Amount (O) is set to 0.
Mod.	Mod.	Modulation amount	Controls the amount of modulation from the LFOs mentioned above to the delay time.
REVERB (O)	Amount		Small modulations produce subtle choruses and ghost tones; large modulations random pitch shifts.

• **RESONESTOR**

÷

A dual voice, four part resonator with built-in capabilities for polyphonic Karplus-Strong plucked string synthesis.

When voices are switched parameter changes affect only the current voice: the last voice retains its parameters.

Parameter/Input	Display	Function	Usage
FREEZE (Button B and input 1)	Voice	Switch voice	When this parameter is enabled, the module switches the current voice and prevents further switches when triggers are received in the TRIGGER (8) port.
			Controls the timbre and duration of the noise burst.
PARAMETER 1 (D)	Timbre	Timbre	Below the middle line it will be longer and more dampened; above the middle line it will be shorter and higher in pitch.
			When set at the extremes the burst is inaudible: either too short or too dampened; this can be used to "mute" a voice.
PARAMETER 2 (E)	Decay	Decay	Decay time for the current voice.
			Setting the slider near the top makes decay infinite (you can play the voice like a traditional

		oscillator)
PARAMETER 3 (F) Chord	Chord	Sets the chord for the current voice. The slider morphs gradually between the following: Unison Fat Superfat Fat power Fat octave Octaves Power Major Major7 Minor7 Sus2 Sus4 Minor9 Major9 Major11 Major11
		Controls the filter in the feedback loop of the resonator.
PARAMETER 4 (G) ^{Filter LP-V} Λ-BP	Filter	When the slider is at the middle line no filtering is applied; below the middle line a low-pass with increasingly low cut-off frequencies is applied; above the middle line a band-pass filter at the frequency of the resonator, with increasingly high resonances, is applied.
PARAMETER 5 (H) Distortion	Voice distortion	Randomly distorts the timbre of each of the voices.
		The leftmost position has the most modulation; but filters the noise out entirely, so there is no effect.
		The rightmost position leaves the

			noise unfiltered; but modulation
			noise unfiltered; but modulation is 0, so there is no effect.
			The juicy bits are found in between.
			Sets the base pitch for the current voice.
PARAMETER 6 (I)	Pitch	Voice pitch	At 12 o'clock pitch is A3 (220 Hz).
TRIGGER (8)	Burst	Burst	A trigger in this input switches the voice (if FREEZE (B) is disabled) and sends a short burst of noise to its resonator.
			Assigns each part and voice to an output (L (14) or R (15)).
	Stereo	Stereo mix	Setting the knob fully CCW sends each voice to a different output.
SPREAD (M)	Slereo	Stereo mix	At 12 o'clock voices are mixed equally for each output.
			Fully CW voice parts equally distributed to both outputs for a wide stereo effect.
			Simulates striking the harmonics on a string.
FEEDBACK (N)	Harmonics	String harmonics	Setting the knob at the leftmost position has no effect on the sound, at the rightmost position the 2^{nd} harmonic will ring; at 12 o'clock the third, at 10 the fourth, etc.
			Controls the random delay times before sound hits the resonator for the current voice.
REVERB (O)	Scatter	Scatter	When used for string synthesis with a chord, this will give the impression that strings are being struck sloppily.

Fluctus – Grafted texture synthesizer

A reenvisioned audio processor, texture generator, auto-modulated multiband filter and real time slicer/beat repeater (ported from the Kammerl Kaske VST plugin suite).

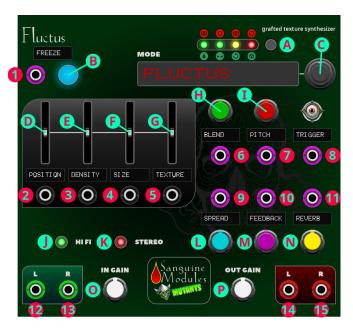
Granulate; stretch; delay; filter, or slice your audio signals to generate the texture your patch needs.

Based on the "Kammerl Kaske" alternative firmware for Mutable Instruments' "Clouds"²⁵; loaded in the "Monsoon" version of the hardware.

It is our sincere hope this module helps you find that perfect beat texture you're looking for!

This manual documents the changes Fluctus offers when compared with the Nebulae module; for basic operating instructions and descriptions of the modes already present in Nebulae consult <u>its manual</u>.

The changes



- Two new modes:
 - Spectral Clouds (replaces Spectral mode in Nebulae).
 - Beat-Repeat

²⁵ The ability to save audio buffers present in hardware is not available in Fluctus. Want to fix that? Drop me a line.

÷

Module controls and the context menu remain the same as they were in Nebulae (with the addition of new OLED screens for familiar knobs: they control different parameters in the new modes). Their letter or number reference has not been changed in the diagram above, if you need a refresher of their basic functions, check the <u>manual for Nebulae</u>.

A list of all the modes, old and new; their display name; a description of their parameters, and how the knobs alter them follows; pertinent changes are noted per mode.

Mode list

MODE	Display
Granular mode	GRANULAR
Pitch shifter/time stretcher	STRETCH
Looping delay	LOOPING DLY
Spectral clouds	SPCT. CLOUDS
Kammerl Beat-Repeat mode	BEAT-REPEAT

Module modes

Modes are presented with the labels used in the matrix display. Only the new modes are documented below; information for the original Nebulae modes can be consulted in the <u>"Nebulae" chapter</u>.

• SPCT. CLOUDS

This mode can create cloud-like frequency spectra using a high resolution filter with randomly modulated bands.

Parameter/Input	Display	Function	Usage
FREEZE (Button B and input 1)	Freeze	Freeze	Same as in Nebulae.
			Controls the probability for a frequency band to be enabled.
PARAMETER 1 (D)	Fq. Bnd Prb.	Grain position	All bands are disabled when the slider is at the bottom.
			You're likely to find a sweet-spot when only a few bands are enabled.
PARAMETER 2 (E)	Flt. Smooth	Filter smoothing	Controls how intense the smoothing is on the frequency

			band division and filter band attenuation when receiving triggers in the RANDOMIZE (8) port.
			When the slider is at the bottom, filter changes apply immediately; when the slider is at the top, the current filter configuration is held.
			Controls the number of filter bands and their frequency width.
PARAMETER 3 (F)	Fq. Bnd. Div.	Frequency band division	When the slider is at the bottom, the frequency spectrum is split into 4 filter bands; at the top it is split into 128 filter bands.
			All divisions are logarithmic to make the filter sound musical.
PARAMETER 4 (G)	Flt. Text.	Filter texture	Controls the degree of randomization in the frequency domain.
			Waveforms with transients are most affected by this.
PARAMETER 5 (I)	Pitch	Pitch	Amount of pitch shifting applied to the output.
			When a trigger is received in this input, the active frequency bands and their attenuation intensity are randomized.
TRIGGER (8)	Randomize	eRandomize	Triggers can be simulated using the Rnd. Flt. Prob (M) knob.
	Morm dist	Warm	Setting the knob all the way to the left disables simulated triggers. Controls the amount of warm distortion applied to the output.
PARAMETER 6 (N)	vvann ust.	distortion	Note: warm distortion is applied post Dry/Wet mixing.

• BEAT-REPEAT²⁶

÷

This mode analyzes incoming clock signals to enable real time slicing of the audio input.

Multiple slices are managed in real time and can be individually selected and played back with different loops, pitches and distortions.

Usage
Then FREEZE (B) is disabled, ice processing is randomly habled based on the SLICE ROB. (H) knob setting.
efines the beginning of the op, relative to the total slice uration. The slider is quantized, to habled in-sync beat repetition, om bottom to top, as follows: 0-1/64 free/unquantized 1/64 1/32 1/16 1/8 1/4 1/3 1/2 1
nables a decreasing loop size wards the end of a slice. This an generate a ping-pong puncing ball effect.
ets the size of the loop terval relative to both the total ice duration and the loop ode (regular/alternating). is quantized as follows, to low in-sync beat repetitions: egular (bottom to middle of e slider)

²⁶ This mode requires a clock signal present in the **CLOCK (8)** input to function.



- [0-1/64] free/unguantized
- 1/64
- 1/32
- 1/16
- 1/8
- 1/4
- 1/3
- 1/2

<u>Alternating (middle to top of the slider)</u>

- 1/2
- 1/3
- 1/4
- 1/8
- 1/16
- 1/32 1/64
- 1/04

• 1/64-0 free/unquantized Controls, along with the **SLICE STEP (G)** CV input **(5)**, the current slice.

The CV input selects one of the most recently recorded slices; the slider selects individual iteration patterns (and is offset by the **SLICE STEP (5)** CV input).

PARAMETER 4 (G) Slice step Slice step

The slider behaves, from bottom to top, as follows:

- Disabled: slices are selected by CV only.
- Slice step 1: repeats the current slice due to synced playback index.
- Slice step 2: skip every second slice.
- Slice step 3: skip two slices.
- Slice step 5: skip four slices.
- Slice step 6: skip five slices.

			 Slice step 7: skip six slices. Random: selects slices randomly.
PARAMETER 5 (I)	Playback spd.	Playback speed ²⁷	Controls playback speed. When the knob is all the way to the left, pitch is zero; at the rightmost position, playback speed is the original. Pitch modulation is determined by the PARAMETER 7 (N) knob.
TRIGGER (8)	Clock	Clock	This mode <i>needs</i> an external clock to function. Clock triggers should be connected to this input.
PARAMETER 6 (M)	Clock div.	Clock divider	Sets clock divider and changes slice lengths accordingly. Available clock divisions are: • 1 • 1/2 • 1/4 • 1/8
PARAMETER 7 (N)	Pitch mod.	Pitch mode	 Selects the pitch modulation mode. Available modulation modes, from left to right, are: Fixed pitch, no modulation. Fixed pitch, reverse playback. Linearly decreasing pitch: from the original pitch to the selected PARAMETER 5 (I) target pitch. Linearly increasing pitch: from the selected

²⁷ This mode does not time correct pitch changes.

PARAMETER 5 (I) pitch

÷

Simulated vinyl scratching: sinusoidal pitch modulation,
 PARAMETER 5 (I) defines the intensity.



Nodi – Macro oscillator X

A deep, powerful digital sound source featuring 47 synthesis models (and a fixed morse code generator).

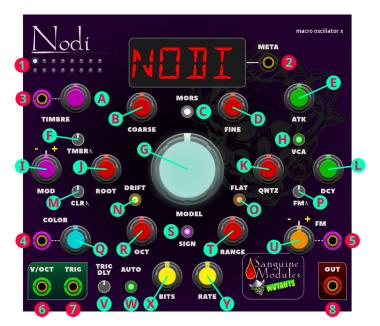
Based on the Mutable Instruments' "Braids".

Nodi includes the sub-oscillator modes from the 1.9 unreleased firmware.

We hope this module can serve as your sonic army knife.

Basic operation is covered in this manual; but playing around and experimenting with the module is sure to be rewarding.

The Controls



Knobs and buttons

- **A. TIMBRE**: controls the main evolution and motion of the timbre.
- B. COARSE: controls oscillator tuning in big steps. Its range is affected by the RANGE (U) knob.
- **C. MORS**: enables and disables the Morse code easter egg from the original module.

LED	State	Effect
	Disabled	Allows selection of regular module models.
0	Enabled	An excerpt from Pynchon's The Crying of Lot 49 is output

as Morse code.

The excerpt is the following:

"The Scope proved to be a haunt for electronics assembly people from Yoyodyne. The green neon sign outside ingeniously depicted the face of an oscilloscope tube, over which flowed an ever-changing dance of Lissajous figures. Today seemed to be payday, and everyone inside to be drunk already. Glared at all the way, Oedipa and Metzger found a table in back. A wizened bartender wearing shades materialized and Metzger ordered bourbon. Oedipa, checking the bar, grew nervous. There was this je ne sais quoi about the Scope crowd: they all wore glasses and stared at you, silent. Except for a couple-three nearer the door, who were engaged in a nose-picking contest, seeing how far they could flick it across the room. A sudden chorus of whoops and yibbles burst from a kind of juke box at the far end of the room. Everybody quit talking. The bartender tiptoed back, with the drinks. What's happening? Oedipa whispered. That's by Stockhausen."

TIMBRE (B) controls symbol duration, and **COLOR** (R) adds some background noise.

Model selection is disabled.

Disabled by default.

- **D. FINE**: controls oscillator tuning in small steps: -1 to +1 semitones.
- E. ATK: controls the attack of the internal VCA AD envelope.[†]
- **F.** TMBR I: controls the amount of modulation from the internal AD to the TIMBRE $(B)^{\dagger}$
- G. MODEL: Rock the big knob back and forth to select the synthesis model.

The knob lights up in different colors depending on the selected model.

The model's abbreviation is shown in the LED display at the top of the module.

The model's full name and abbreviation is shown in the knob's tooltip.

[†] VCA (I) mode must be enabled for the AD envelope to function.

The available models are the following:

Model #	Model	Display
1	Quirky sawtooth	CSAW
2	Triangle to saw	/\\-
3	Sawtooth wave with dephasing	///-
4	Wavefolded sine/triangle	FOLD
5	Buzz	uuuu
6	Square sub	SUB-
3 7	Saw sub	SUB/
8	Square sync	SYN-
9	Saw sync	SYN/
10	Triple saw	//x3
10	Triple square	- x3
12	Triple triangle	 /\\x3
13	Triple sine	SIx3
14	Triple ring mod	RING
15	Saw swarm	
16	Saw comb	//uu
17	Circuit-bent toy	TOY*
18	Low-pass filtered waveform	ZLPF
10 19	Peak filtered waveform	ZPKF
20	Band-pass filtered waveform	ZBPF
21	High-pass filtered waveform	ZHPF
22	VOSIM formant	VOSM
23	Speech synthesis	VOWL
24	FOF speech synthesis	VFOF
25	12 sine harmonics	HARM
26	2-operator phase-modulation	FM
27	2-operator phase-modulation with feedback	FBFM
28	2-operator phase-modulation with chaotic feedback	WTFM
29	Plucked string	PLUK
30	Bowed string	BOWD
31	Blown reed	BLOW
32	Flute	FLUT
33	Bell	BELL
34	Drum	DRUM
35	Kick drum circuit simulation	KICK
36	Cymbal	CYMB
37	Snare	SNAR
38	Wavetable	WTBL
39	2D wavetable	WMAP
40	1D wavetable	WLIN
41	4-voice paraphonic 1D wavetable	WTx4
42	Filtered noise	NOIS

43	Twin peaks noise	TWNQ
44 45	Clocked noise	CLKN
45	Granular cloud	CLOU
46	Particle noise	PRTC
47	Digital modulation	QPSK
48	Paques morse code [◊]	49

Synthesis models can also be selected directly using the context menu.

Depending on the selected model, the module controls change different parameters.

For an in-depth explanation of the specific models and how controls affect them, please refer to the "<u>Nodi module models</u>" section.

H. VCA: enables and disables the internal AD envelope.

LED	State	Effect
\bigcirc	Disabled	TRIG (5) works as a sync/reset input.
•	Enabled	The AD envelope (controlled by the ATK (F) and DCY (M) knobs) affects incoming or auto-generated triggers.

Disabled by default.

- **I. MOD**: controls the amount and polarity of modulation applied to the **TIMBRE** (B) parameter from the **TIMBRE CV** input jack (1).
- **J. ROOT**: selects the root note the quantizer builds scales upon. For the quantizer to function **QNTZ** (L) must be set to a value other than "OFF".

The current root note is briefly shown in the display when the knob's value is changed.

The current note is shown in the knob's tooltip.

The default value is "C".

K. QNTZ: enables; disables, and selects the scale used to quantize voltages entering the V/OCT (6) port.

Voltages can be quantized to semitones or to one of several available scales.

The selected scale flashes briefly in the LED display.

The current quantizer mode is shown in the knob's tooltip.

The available scales and their display representation are the following:

Scale Display

 $[\]diamond$ This mode is only selectable using the **MORS** (D) button.

Off	OFF
Semitones	SEMI
Ionian	IONI
Dorian	DORI
Phrygian	PHRY
Lydian	LYDI
Mixolydian	MIXO
Aeolian	AEOL
Locrian	LOCR
Blues major	BLU+
Blues minor	BLU-
Pentatonic major	PEN+
Pentatonic minor	PEN-
Folk	FOLK
Japanese	JAPA
Gamelan	GAME
Gypsy	GYPS
Arabian	ARAB
Flamenco	FLAM
Whole tone	WHOL
Pythagorean	PYTH
1_4_Eb	EB/4
1_4_E	E /4
1_4_Ea	EA/4
Bhairav	BHAI
Gunakri	GUNA
Marwa	MARW
Shree	SHRI
Purvi	PURV
Bilawal	BILA
Yaman	YAMA
Kafi	KAFI
Bhimpalasree	BHIM
Darbari	DARB
Rageshree	RAGE
Khamaj	KHAM
Mimal	MIMA
Parameshwari	PARA
Rangeshwari	RANG
Gangeshwari	GANG

Kameshwari	KAME
PaKafi	PAKA
Natbhairav	NATB
M_Kauns	KAUN
Bairagi	BAIR
B_todi	BTOD
Chandradeep	CHAN
Kaushik_todi	KTOD
Jogeshwari	JOGE

The default value is "OFF".

- **L. DCY**: controls the decay of the internal AD envelope generator.⁺
- M. CLR I: controls the amount of modulation from the internal AD to the COLOR (R).[†]
- N. DRIFT: enables and disables oscillator drift.

LED	State	Effect
	Disabled	Oscillators play nice.
\bigcirc	Enabled	Oscillators drift, as if they were poorly designed.

Disabled by default.

O. FLAT: enables and disables oscillator flattening.

LED	State	Effect
	Disabled	Ruler-like oscillators.
0	Enabled	Oscillators are detuned at lower and higher frequencies in order to recreate some of the tuning imperfections of VCOs.

Disabled by default.

- **P. FM**(): controls the amount of modulation from the internal AD to the **FM** (V).^{\dagger}
- **Q. COLOR**: controls a second dimension of sound. The specifics for this knob vary from model to model, consult each model's description for more details.
- **R. OCT**: transposes notes by octave (-2 to +2).

The selected transpose value flashes briefly in the display.

Default value is "0".

S. SIGN: enables and disables oscillator imperfections.

 $[\]dagger$ ~ VCA (I) mode must be enabled for the AD envelope to function.



LED	State	Effect
\bigcirc	Disabled	Oscillator output signals are clean.
0	Enabled	Grungy glitches and wave form imperfections are applied to output signals.

Disabled by default.

T. RANGE: chooses the range of the COARSE (C) knob.

The current selected range flashes briefly in the LED display.

The selected range is displayed in the knob's tooltip.

The available ranges are:

Range	Effect Sets the range of the COARSE (C) knob to ±4 octaves around the note received in the V/OCT (6) input.
EXT-	A consequence of this is that when no frequency CV signal is sent to the module (i.e. 0V), the COARSE (C) knob will have a bias towards low frequencies, something not always desirable.
FREE	Sets the range of the COARSE (C) knob to ±4 octaves centered around C3 (261.5 Hz). This is the recommended setting when the module is used with no external signal in the V/OCT (6) input.
XTND	(Extended) provides a larger frequency range, but has the side effect of disabling accurate V/Oct scaling.
440	Locks the oscillator's frequency to precisely 440 Hz. Helpful for tuning another VCOs.

The default range is **EXT-**.

- **U. FM**: frequency modulation attenuverter that controls the amount and polarity of modulation applied to the frequency from the **FM CV input** jack (3).
- V. TRIG DLY: applies a delay between the moment when a trigger is received and a note is "struck" on the physical models.
- **W. AUTO**: enables and disables automatic note change trigger generation.

LED	State	Effect
Disabled	Changes in the VIOCT (4) input are ignored for triggering	
	Disubicu	purposes.

	An external trigger source connected to the TRIG (5) input is required to generate sound in some models and to use the internal AD envelope.
	Changes in the V/OCT (4) input larger than a semitone generate a trigger.
Enabled	Generated triggers are useful, for example, to excite the physical models or to use the internal AD envelope with a note sequencer that lacks gate outputs.

This mode is disabled by default.

- X. BITS: selects the bit-depth of the data sent to DAC.
- Y. RATE: selects the refresh rate of the DAC.²⁸

Inputs, outputs and lights

- **1. MODEL** lights: these lights change color according to the model selected for each of the possible 16 channels of polyphony.
- **2. META**: voltages applied to this input select the active synthesis model for each of the available polyphonic channels.

Voltages act as an offset to the model selected by the **MODEL** (H) knob: negative voltages select lower models and positive voltages select higher models.

Discontinuities may be heard when switching models.

3. TIMBRE CV: control voltage input for the TIMBRE (B).

A value of 0V corresponds to the minimum position of the knob and a value of +5V to its maximum.

This CV is offset by the knob's current position.

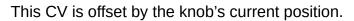
4. COLOR CV: control voltage input for the COLOR (R).

A value of 0V corresponds to the minimum position of the knob and a value of +5V to its maximum.

²⁸ Do note that Rack sampling rate affects this.

A handful of complex models are rendered internally at 48kHz (instead of 96kHz); so the difference between 48kHz and 96kHz might be non-existent for them.

Some of the simpler models are, conversely, rendered internally at 192kHz or 384kHz to reduce aliasing.



5. FM CV: CV input for frequency modulation.

The scale and polarity of this signal is set by the **FM** (V) attenuverter.

6. V/OCT: 1V/Oct frequency CV input.

Polyphony channels for the module are set by the input with the highest channel count among **V/OCT** (4) and **TRIG** (5).

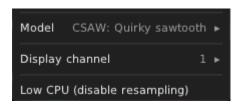
- 7. TRIG: Trigger input; serves three purposes:
 - a) Physical models need to be "excited" by an impulse on this input to produce a sound.
 - **b)** Other models will treat triggers as reset signals, bringing the oscillators' phase to 0.
 - c) This input can also be used to trigger an internal AD envelope applied to the parameters of your choice, to create sound animation and attacks without an external envelope module.

Polyphony channels for the module are set by the input with the highest channel count among **V/OCT** (4) and **TRIG** (5).

8. Signal output. Loudness of the output varies among the different synthesis models.

The context menu

÷



- **Model**: synthesis models (except for the Morse code "Easter egg") can be selected directly.
- **Display channel**: selects the channel to show in the LED display at the top.

Only available channels are shown in the menu.

The module is smart and will select the highest available channel automatically if the last user-selected channel is higher than the currently available ones.

• Low CPU: if your computer struggles with this module, enabling this option can help (at the expense of sound quality).

Nodi module models

Models are presented as they appear on the display to make finding parameters easier.

• CSAW

Quirky saw. Inspired by a quirk/defect of the Yamaha CS80 saw tooth wave shape: a fixed-width "notch" after the raising edge.

	Controls Knobs	
TIMBRE	Width of the notch	
COLOR	Depth and polarity (good for phasing effects)	

• /II-_

Triangle to saw. Produces the classic waveform trajectory from triangle to saw tooth to square to pulse found in synthesizers such as the RSF Kobol or the Moog Voyager.

	Controls Knobs
TIMBRE	Sweep through the wave forms
COLOR	Morph through several tonal characters by increasingly removing high-frequencies with a 1-pole filter, and recreating them with a wave shaper.

• //-_

A blend of a saw tooth wave with dephasing control and a square wave with PWM.

	Controls Knobs	
TIMBRE	Amount of dephashing or pulse width	
COLOR	Morph the wave from saw tooth to square	

• FOLD

Sine and triangle oscillators sent through a wave folder.

	Controls Knobs	
TIMBRE	Wave folder strength	
COLOR	Balance between the sine and triangle waves	

• uuuu

A digital synthesis algorithm that generates a smooth sequence of wave forms.

	Controls Knobs	
TIMBRE	Transition from sine wave to Dirac comb	
COLOR	Detuning amount of the two blended wave shapes	

• SUB-

Square sub-oscillator.

	Controls Knobs
TIMBRE	Pulse width
COLOR	Steppiness

• SUB/

Saw tooth sub-oscillator

	Controls Knobs
TIMBRE	Morph teeth
COLOR	Oscillator phase

• SYN-, SYN/

Synthesis of the classic 2-oscillator hard-sync patches, with both oscillators emitting square or saw waves.

	Controls Knobs
TIMBRE	Interval between master and slave
COLOR	Oscillator balance

• //x3, -_x3, /x3, SIx3

Three saw tooth (or square, triangle, sine) oscillators that can be individually tuned.

	Controls Knobs
TIMBRE	Frequency of the third oscillator relative to the first.
	Quantized to musical intervals.
COLOR	Frequency of the second oscillator relative to the first.

Quantized to musical intervals.

• RING

Three sine wave oscillators ring-modulated together and colored by a wave shaper.

	Controls Knobs
TIMBRE	Frequency of the second sine wave relative to the first
COLOR	Frequency of the third sine wave relative to the first

• ////

A swarm of 7 saw tooth waves.

	Controls Knobs
TIMBRE	Saw tooth detuning
COLOR	High-pass filter

• //uu

Generate a saw tooth wave form and send it to a comb filter (tuned delay line).

	Controls Knobs
TIMBRE	Transposition of the delay line frequency
COLOR	Feedback amount and polarity

TOY*

Traverse a space of timbres typical of circuit-bent electronic musical toys.

	Controls Knobs
TIMBRE	Toy's clock rate
COLOR	Glitches or short-circuits on a converter or memory chip's data lines

• ZLPF, ZPKF, ZBPF, ZHPF

Synthesize in the time-domain the response of a low-pass, peaking, band-pass or highpass filter excited by classic analog wave forms. Rather.

This model aims at building the filtered wave shape from scratch.



The technique has been used in the Casio CZ or the Roland D series, but is extended here to cover different filter types and wave shapes.

	Controls Knobs
TIMBRE	Filter's cutoff frequency
COLOR	Modifiy the wave shape: from saw to square to triangle.

• VOSM

A combination of 3 oscillators arranged in a ring-modulation/hardsync patch to emulate formant synthesis: a technique named VOSIM and described by Kaegi and Tempelaars.

	Controls Knobs
TIMBRE	Relative frequencies of the 2 formants
COLOR	Relative frequencies of the 2 formants

• VOWL, VFOF

Vowel sounds synthesizer.

- **VOWL** recreates early computer speech synthesis.
- **VFOF** is a simplified version of Rodet's FOF synthesis technique.

	Controls Knobs
TIMBRE	Vowel morphing between a, e, i, o, u
COLOR	Shifts the formants frequency

• HARM

Additive synthesis by summing 12 sine harmonics.

	Controls Knobs
TIMBRE	Central frequency
COLOR	Distribution of the amplitudes of each of the harmonics around the central frequency

• FM, FBFM, WTFM

Three different versions of 2-operator phase-modulation synthesis.

• **FM** is a well-behaved implementation.

- ÷
- **FBFM** uses feedback from the carrier to itself to produce harsher tones.
- **WTFM** uses two feedback paths: from carrier to modulator and carrier to itself to achieve droning, unstable tones.

	Controls Knobs
TIMBRE	Modulation amount
COLOR	Relative frequency interval between modulator and carrier

• PLUK[‡]

Raw plucked string synthesis.

	Controls Knobs
TIMBRE	Damping
COLOR	Plucking position

• BOWD[‡]

Bowed string modeling.

	Controls Knobs
TIMBRE	Friction level
COLOR	Bowing position

• BLOW, FLUT

Reed or flute instrument model.

	Controls Knobs
TIMBRE	Air pressure
COLOR	Instrument geometry

• **BELL**[‡]

Risset additive synthesis model to recreate the tone of a bell.

	Controls Knobs
TIMBRE	Sound dampening
COLOR	Sound inharmonicity

t This model needs to be excited by a trigger.

• DRUM[‡]

A variant of the **BELL** model the uses different parameters (partials frequencies and amplitudes) to generate a sound reminiscent of a metallic drum.

	Controls Knobs	
TIMBRE	Dampening	
COLOR	Brightness	

• KICK[‡]

Simulation of the TR-808 bass drum circuit.

	Controls Knobs	
TIMBRE	Decay time	
COLOR	Brightness	

• CYMB

Raw material for cymbal sound synthesis.

	Controls Knobs
TIMBRE	Band-pass filter cutoff
COLOR	Balance between droning sum of square waves and noise

• SNAR[‡]

A simulation of the TR-808 snare drum circuit.

	Controls Knobs
TIMBRE	Balance between the two resonator modes ("tone")
COLOR	Amount of noise ("snappy")

• WTBL

Classic implementation of wave table synthesis.

	Controls Knobs
TIMBRE	Sweep the wave table

‡ This model needs to be excited by a trigger.



Selects a wave table (20 available)

COLOR Wave forms are interpolated when traveling through the same wave table; but not when switching among different ones

• WMAP

Two dimensional 16x16 wave table with 256 wave forms. Similar sounding waves forms are laid out adjacent to each other. X and Y are smoothly interpolated when scanning.

	Controls Knobs
TIMBRE	Scan the table in the X direction
COLOR	Scan the table in the Y direction

• WLIN

One dimensional scanning through every Nodi wave table.

	Controls Knobs
TIMBRE	Move through the waves
COLOR	 Interpolation method: 7 o'clock: no interpolation 10 o'clock: interpolate between samples but not waves 12 o'clock: always interpolate Beyond 12 o'clock interpolation is applied between waves;
	but playback resolution decreases.

• WTx4

Four voice variant of **WLIN**.

	Controls Knobs
TIMBRE	Morph through a small selection of 16 waves
	Select the harmonic structure between the 4 voices, from a predefined set of chords.
COLOR	
	At 7 o'clock all voices play the same note with a variable amount of detuning.



NOIS

Noise through a state variable filter.

	Controls Knobs
TIMBRE	Filter resonance
COLOR	Cross-fade between the low-pass and high-pass outputs of the filter

• TWNQ

A "Twin Peaks" model that generates white noise and processes it with two band-pass filters (resonators). Both filters track the main frequency.

	Controls Knobs
TIMBRE	Q factor of the filters
COLOR	Filter spacing

• CLKN

Generate random samples at a rate determined by the main pitch control.

	Controls Knobs
TIMBRE	Periodicity of the generator (up to a 2 sample cycle)
COLOR	Quantization level (from 2 to 32 distinct values)

• CLOU, PRTC

Granular synthesis models that create natural textures by mixing short grains of windowed sine waves (**CLOU**) or short decaying "pings" (**PRTC**).

	Controls Knobs
TIMBRE	Density and overlap of the grains
COLOR	Grain frequency randomization

• QPSK

Generate, in the audio frequency range, the kind of modulated signals used in digital telecommunication systems.

A 16-byte synchronization frame is sent on every trigger or every 256 data bytes.

Controls



Knobs	
TIMBRE	Bit-rate
COLOR	Sets an 8-bit value which is modulated into the carrier using QPSK modulation.

• 49

This "Easter egg" mode is described in depth in the **MORS** (D) section of the "<u>Knobs</u> <u>and buttons</u>" chapter.



Contextus – Resurgent macro oscillator X

A remixed digital sound source featuring 57 synthesis models.

Contextus is based on the "Renaissance" alternative firmware for the Mutable Instruments "Braids" module.

We hope this module grants you some really tasty and fat sounds!

This manual documents the changes Contextus offers when compared to the base Nodi module; for basic operating instructions and descriptions of the models already present in Nodi, consult its manual in the <u>appropriate section</u>.

The changes



- New algorithms have been added:
 - The Commodore 64 "Software Automated Mouth" (SAM) robotic text-to-speech algorithm.
 - Five diatonic chord algorithms.
 - Five "chord stack" algorithms.
- A few things have been removed:



- The "Easter egg" Morse code is gone, along with the **MORS** button on the face plate.
- The **QPSK** algorithm.
- An algorithm was replaced:
 - WTx4 has been replaced with WTCH, an algorithm that offers more features.
- Contextus differs from the hardware firmware in the following way:
 - The option to reverse the encoder knob is inaccessible: we wired the encoder properly.

The module controls and menus remain the same, and their letter or number reference has not been changed in the diagram above, if you need a refresher on their basic functions, check the <u>manual for Nodi</u>.

A description of the new synthesis models and the parameters the knobs alter for them follows.

New module models

Models are presented as they appear in the display to make finding parameters easier.

• \\CH, -_CH, \CH, SICH, WTCH

Play diatonic chords using different wave forms (saw, square, triangle, sine and wave table).

When the quantizer (**QNTZ** (L) is disabled, this model behaves like Nodi's **WTx4** model; but when it is enabled in one of the diatonic modes (dorian, eolian, etc.) The chords stay in key and pick the correct major, minor or extension based on the selected scale and root note.

	Controls Knobs This parameter controls different aspects depending on the selected waveform:
TIMBRE	 \\CH: detuning between the 2 saw waves that make up each note CH: pulse width of the square wave. /\CH, SICH: the amount of wave folding to apply to each oscillator before summing

WTCH: morph between a small set of wave table entries. The wave table is the same as the one used in Nodi's WTx4 model
 The function of this knob depends on the state of the quantizer:

 Disabled: blend between 16 predefined chords
 Enabled: control chord extensions

• *\\x6, -_x6, /\x6, SIx6, WTx6*

6 oscillators starting at the **V/OCT** input (4), spaced evenly across the currently selected quantizer scale.

TIMPPE	Controls Knobs
TIMBRE	This parameter controls different aspects depending on the selected waveform:
	Ilx6: detuning between the 2 saw waves that make up each note
	 x6: pulse width of the square wave. /\x6, x6: the amount of wave folding to apply to each oscillator before summing
	 WTx6: morph between a small set of wave table entries. The wave table is the same as the one used in Nodi's WTx4 model
COLOR	The function of this knob depends on the state of the quantizer:
	 Disabled: control the space (in semitones) between the 6 oscillators Enabled: control the number of scale steps between oscillators

• SAM1, SAM2

The classic Commodore 64 robotic voice ready to be used in your rack!

Each **SAM** model contains 16 different words and is similar to a granular sampler.

A **TRIG** (5) makes **SAM** play the selected word starting at the current grain. In this case, the **V/OCT** (4) controls both the speed and pitch of the output.

The selected word can be scrubbed with the **TIMBRE** (B) knob. This way an envelope can control the speed without altering the pitch.

SAM1 and SAM2 differ only in their word lists.

	Controls Knobs
TIMBRE	Scrub through the selected word; a fully CCW knob plays the first grain of the word while a fully CW knob plays the last
COLOR	Change the selected word

Velamina – Quad VCA

Four polyphonic VCAs for any and all your signal needs, enjoy the freedom of adjustable response curves; offset control to dial in the needed gains, and a flexible mixer!

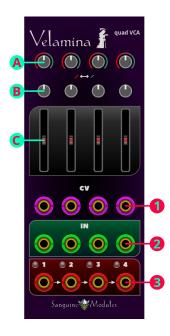
Attenuate or amplify signals using CV and the offset!

Velamina saturates outputs when voltages beyond $\pm 10V$ are encountered.

Based on the revised version of Mutable Instruments' "Veils".

We hope this module inspires you to push envelopes like none have before and unlocks new mixes for your masterpieces.

The Controls



All four channels share the same controls and ports, the descriptions below apply to all four.

Knobs and sliders

A. Response curve: this knob sets the response curve for the channel: continuously variable between exponential (all the way to the left) and linear (all the way to the right).

Remember! Exponential functions grow rapidly, so very high gains can be achieved with an exponential response curve combined with a large positive offset.

B. OFFSET CONTROL: this knob adds a positive offset to the CV signal.



The offset control applies to the voltage present in the **CV** (1) input, in other words, offset is applied to the *modulation*, not the main signal or the output!

C. GAIN: this slider directly controls signal gain when the **CV** (1) input has no cable patched or as a gain control for the **CV** (1) input when a signal is connected to that port.

When the **CV** (1) input is patched, unitary gain is achieved when the slider is set at the top and a voltage of +5V is sent to the **CV** (1) input; voltages above +5V may cause distortion when the signal reaches the saturator threshold.

The slider has an LED light with brightness proportional to VCA gain. The light is red for monophonic signals and yellow for polyphonic ones. When the light is off, the signal is muted.

Inputs and outputs

- **1. CV:** voltages sent to this port modulate channel gain.
- 2. Signal: the main input port for the channel, can handle both audio and CV.
- 3. Signal output: main output for the channel.

When no cable is connected, the signal is routed to the next channel and summed with its signal, this allows the module to also function as a mixer.

The mixer is smart and selects which channels to mix based on the connected cables.

Some examples:

• Example 1:

Signals are connected to the **SIGNAL** (2) inputs of channels 1, 2 and 3.

Cables are connected to the SIGNAL output (3) ports of channels 2 and 3.

- The signal in the output port of channel 2 contains the mixed signal of channels 1 and 2.
- The signal in the output port of channel 3 contains the post-gain signal of channel 3 only.

• Example 2:

÷

Signals are connected to the **SIGNAL** (2) inputs of channels 1, 2, 3 and 4.

Cables are connected to the **SIGNAL output** (3) ports of channels 1,2 and 4.

- The signal in the output port of channel 1 contains the post-gain signal of channel 1 only.
- The signal in the output port of channel 2 contains the post-gain signal of channel 2 only.
- The signal in the output port of channel 4 contains the mixed signal of channels 3 and 4.
- Example 3:

Signals are connected to the SIGNAL (2) inputs of channels 1, 3 and 4.

A cable is connected to the SIGNAL output (3) ports of channel 4.

 The signal in the output port of channel 4 contains the mixed signal of channels 1, 2 (0V, because channel 2's SIGNAL (2) is not connected), 3 and 4.

An LED above every channel shows the current polarity and amplitude of the voltage mix for that channel and every unpatched channel before it.

The LED shows polarity using color: monophonic voltages are red when <0V and green when >0V; polyphonic voltages are purple when <0V and aqua when >0V.

Polyphony for the module is set by the polyphonic cable carrying the highest number of channels that is connected to any of Velamina's **SIGNAL** (2) inputs.

Acknowledgments & thanks

Mutable Instruments for designing such wonderful modules.

Tobi for the initial work on getting the 1.2 Plaits firmware working in VCV Rack.

Hemmer for the work on getting Peaks working in VCV Rack.

jpnielsen for helping with builds.

Fractalgee and VirtualModular for testing; bug reporting, and, above all, encouragement.

gbrandt1 for the work in porting some alternative firmwares and breaking out the controls in some modules.

Tom Burns for the Braids Renaissance firmware.

Mattias Puech for the Parasite firmwares.

Leandro Bolívar for the Symbiote Warps firmware.

Tim Churches for the Dead Man's Catch firmware. DocPolyester for the "Cymbal" mode for Dead Man's Catch.

Ari Russo for the Twigs firmware.

VCV, MindMeld, Venom and Sapphire modules and their authors whose sources inspired the solutions for some of the graphical effects present in the Sanguine Modules plugins.

Everyone in the VCV Rack forum who got excited with my first "Funes" release.

Christy Marx for making me laugh, to this day, whenever I look at the Conquests of Camelot manual cover (and, in turn, inspiring the cover for this one).



Contact

Found a bug? Have a suggestion? A fix?

Please use the issues section at

https://github.com/Bloodbat/SanguineMutants/

Make sure you provide the required information.

Disclaimer

This software is provided "as is", without warranty of any kind, express or implied, including; but not limited, to the warranties of merchantability, fitness for a particular purpose and noninfringement. In no event shall the authors or copyright holders be liable for any claim, damages or other liability, whether in an action of contract, tort or otherwise, arising from, out of or in connection with the software or the use or other dealings in the software.

Slight discrepancies between the images on the package, this manual and the final plugin are possible and should not affect functionality in any way.



Licenses & Copyrights

Sanguine Modules; Sanguine Modules Mutants; Sanguine Modules Monsters, and their respective logos, branding and indications are copyright © 2024 Bloodbat / La Serpiente y la Rosa Producciones.

Sanguine Mutants is free software: you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation, either version 3 of the License, or (at your option) any later version.

This manual is © Bloodbat and licensed under CC BY-NC 4.0. Non-commercial use is allowed with appropriate credit and indication of the original license.

The panel graphics and logos in the res/ folder are copyright © Bloodbat and licensed under CC BY-NC 4.0. Non-commercial use is allowed with appropriate credit and indication of the original license.

The component graphics in the res/components/ directory are copyright © VCV, modified by Bloodbat and licensed under CC-BY-NC 4.0. Non-commercial use is allowed with appropriate credit and indication of the original license.

Mutable Instruments is a registered trademark.

The original Mutable Instruments code license is:

Copyright Emilie Gillet.

Author: Emilie Gillet (emilie.o.gillet@gmail.com)

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT,



TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

The original Mutable Instruments manuals are licensed as CC-BY-SA-3.0 by Émilie Gillet. The modifications in this document are made by Bloodbat. Non-commercial use is allowed with appropriate credit and indication of the original license.

All images from the Mutable Instruments manuals are used with permission via the CC-BY-SA 3.0 license governing those documents.

Dependencies included in the binary distribution may have other licenses. See LICENSEdist.txt for a full list.

Attribution for the ByteBeats equations and links to their origin or further information can be found in the source code for Mortuus (in deadman_bytebeats.cc).

Copyright @ 2024 Bloodbat / La Serpiente y la Rosa Producciones.