

MIDI Engines by Instrument

Beta 3.17 - complete for MIDI 1 / MIDI 2; RC2.06 differences marked

Getting started: MIDI 1 or MIDI 2 -> Preset -> Pad 27. In Beta 3.17, Pad 27 opens the engine row on Pads 17-24. Current = bright, others = dim. Pad 27 closes it; Shift + Pad 27 cycles through engines.

Engine row and colours

Pad / colour	Engine	Sound source
17 white	Off / normal MIDI	No internal source; K1-K8 = normal MIDI macros.
18 yellow	Line	Audio input 1 (MIDI 1) or 2 (MIDI 2).
19 green	OSC	VA oscillator, optional OSC 2 / FM / Ring / BITSYNC.
20 red	VA-Drum	One-shot percussion with three decays.
21 magenta	Granular	Up to 16 grains from a sample or capture.
22 cyan	Sample	Pack sample as a pitched one-shot.
23 blue	FX-Sequencer	No sound; triggers Master FX slots.
24 violet	FM - Beta 3.17 only	Four operators, 16 algorithms.

Always: The track continues to send MIDI. Pad 26 = Patch Flip (Program Change per note), mutually exclusive with the engine. Pad 25 = CC/NRPN editor.

Beta note: The project marks Beta 3.17 as not yet hardware-tested. RC2.06 has no FM engine, engine row, tempo LFO, Supersaw, stereo granular or freely assignable page 4.

PATCHES, RESET AND SAVING

Engine patches on Pads 9-24

Gesture / colour	Function
Octave down/up	Four pages x 16 = 64 patches per pack, shared by MIDI 1/2.
Peach dim / bright	Occupied / last loaded.
Violet	Empty.
Tap	Load; the root note sounds while held.
Clear + slot twice	Save; white confirmation first.
Duplicate + A + B	Swap within the pack.
Duplicate + A, another pack, + B	Copy to another pack; Duplicate yellow.

Reset

Gesture	Result
Clear + Pad 1-5	Reset the page, including Shift parameters.
Clear + Pad 6	Matrix off.
Clear + Pad 7	Reset the FM page.
Clear + track button	Reset the entire engine; engine selection is retained.

Storage in Beta 3.17

Content	Engine patch	Project
Engine, values, OSC2, signal path, LFO shape	yes	yes
Mod matrix	yes	yes
Page 4 destinations	yes	yes
FM	yes	yes
Step-Drummer / pattern values	Patch, per project guide	Pattern / project

Compatibility: Older project without synth blocks: current sound is retained. Old patch without matrix: matrix off. Old patch without FM: FM off.

Source baseline: Git 395d9e6, firmware B3.17 / RC2.06; project manual, MIDI reference and implementation cross-checked. Content dated 21 October 2026.

COMMON - Pad 1: VCA, Filter and Effect

Knob	Without Shift	With Shift
K1	Attack	Sustain
K2	Release	Decay
K3	Envelope -> level	LFO -> level
K4	Envelope -> filter	LFO -> filter
K5	Filter cutoff	7 colour zones, left to right: White DJ: K5 left low-pass, centre open, right high-pass. Green LP12: low-pass, 12 dB/octave. Light blue HP12: high-pass, 12 dB/octave. Yellow Band-pass: passes a frequency band. Magenta Notch: rejects a frequency band. Turquoise LP24: steep low-pass, 24 dB/octave. Blue HP24: steep high-pass, 24 dB/octave. Brighter within the zone = stronger key tracking: the filter follows the played pitch.
K6	Resonance	VCA gain up to +18 dB / saturation
K7	LFO rate: left tempo, centre neutral, right free	-
K8	Effect amount	7 colour zones, left to right: Yellow Soft: soft saturation; threshold low -> high. Orange Hard: hard clipping; threshold low -> high. Red Fold: folds peaks back; folding threshold low -> high. Magenta Wavefold: folding; bias negative -> symmetrical -> positive. Violet Ring: metallic modulation; frequency low -> high. Blue Comb: resonant short delay; delay long/low -> short/high. Turquoise Chorus: moving short delay; rate slow -> fast. About 18 clicks per zone; brighter = further right within the zone. K8 without Shift: amount, bypass at far left.

LFO rate in Beta 3.17

Centre: LED dim. Right: free-running, faster clockwise. Left, from centre outwards: 1/16T, 1/16, 1/8T, 1/8, 1/4T, 1/4, 1/2T, 1/2, 1 bar T, 1 bar, 2T, 2, 4T, 4, 8T, 8 bars. Four clicks per setting; cycle starts on the downbeat.

VA-Drum exception: Sustain = pitch decay, Release = filter decay, Decay = amp decay, LFO rate = noise amount; LFO modulation becomes random modulation.

COMMON - Automation, Modulation, Extra Pads

Pad 4 - eight automation lanes

K1	K2	K3	K4	K5	K6	K7	K8
TUNE	Release	Env->Level	Env->Filter	Filter	Resonance	LFO rate	FX amount

Beta 3.17: Shift + K1-K8 selects one of the 33 matrix destinations per lane. Hold Clear first + Shift + knob = factory destination. Pads 9-24 show the destination page and knob. Hold Record + step writes every parameter that differs from its initial value into that step.

Pad 5 - envelope and LFO

Knob	Without Shift	With Shift
K1	Attack	Env -> level
K2	Decay	Env -> filter
K3	Sustain	Env -> pitch
K4	Release	Env -> Shape
K5	LFO rate	LFO -> Shape
K6	LFO -> filter	LFO -> Morph
K7	LFO -> level	Env -> Morph
K8	LFO -> pitch	Left -> right: reverse saw (orange), saw (magenta), triangle (green), square (red), sine (cyan), S&H (white: stepped random), smooth S&H (violet: gliding random).

Shift + K8 LFO shape	Reverse saw orange Saw magenta Triangle green Square red Sine cyan S&H white Smooth S&H violet
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Pad	Function
28	OSC/VA-Drum: one or two oscillators.
29	VCA -> FX -> Filter or Filter -> VCA -> FX.
Shift + 29	Gate retrigger: green on; yellow off = legato.
30	Step-Drummer; Shift + 30 disables it.
31	VA-Drum only: velocity scales the pitch/filter envelope.

Project saving in Beta 3.17: Engine, values, matrix, page 4 destinations and FM are saved for MIDI 1/2. Loading an older project without these data leaves the current sound unchanged.

LINE - Pad 18 yellow

Input 1 for MIDI 1 or input 2 for MIDI 2 -> VCA / effect / filter. Notes open the VCA; MIDI is sent out at the same time.

All applicable sections

Section	Meaning
Pad 1	All common VCA/filter/effect controls; main page.
Pad 2 / 3	No oscillator source; OSC values are not audible.
Pad 4	Automation; TUNE has no source, VCA/filter/FX destinations work.
Pad 5	Output-stage ADSR and LFO; pitch/shape/morph have no source.
Pad 6	Matrix for level, filter, envelopes, LFO and FX.
Pad 28 / 31	No function.
Pad 29	Signal path; Shift + 29 retrigger or legato.
Pad 30	Step-Drummer; pitch destinations are inaudible without a source.

Colours

Indicator	Meaning
Pad 18 yellow	Line active.
Shift + K5	Filter colour from the common table.
Shift + K8	Effect colour from the common table.
K7	Centre dim; left tempo sync, right free-running.
Shift + 29	Green = retrigger, yellow = legato.

Quick start: Attack/Release -> Env->Level -> Filter type -> Cutoff/Resonance -> Effect. For tempo pumping, turn K7 left and raise Shift + K3 or Shift + K4.

OSC - Pad 19 green

Pad 28 enables OSC 2. One note = both in unison; two notes = split between them. With one OSC, last-note priority applies.

Pad 2 - OSC 1

Knob	Without Shift	With Shift
K1	TUNE	FINE
K2	SHAPE	MIX OSC 1 <-> OSC 2
K3	Env -> pitch	White off; light blue Soft Sync: reverse OSC 2 every 1-8 OSC 1 cycles; magenta XOR, yellow OR, red NOR, green AND, turquoise NAND: bitwise sound combinations. Brighter = greater amount within the bit mode.
K4	Env -> Shape	-
K5	LFO -> pitch	-
K6	LFO -> Shape	-
K7	Sine light blue -> triangle green -> saw yellow -> square red; continuous crossfade between shapes.	-
K8	LFO -> Morph	Env -> Morph

WAVE / SHAPE: colours and settings

WAVE	SHAPE left	Centre	SHAPE right
Sine - light blue	Pure	Pure	Wavefold up to about 8x
Triangle - green	Exponential ramps	Pure	Wavefold
Saw - yellow	Normal saw at far left	Medium Supersaw	Full 7-saw Supersaw
Square - red	Pulse down to about 3%	50%	Pulse up to about 97%

Pad 3 - OSC 2

K1	K2	K3	K4	K5	K6	K7	K8
TUNE 2	SHAPE 2	MIX	FM 2->1	FINE 2	White off; light blue Soft Sync: reverse OSC 2 every 1-8 OSC 1 cycles; magenta XOR, yellow OR, red NOR, green AND, turquoise NAND: bitwise sound combinations. Brighter = greater amount within the bit mode.	OSC 2: sine light blue -> triangle green -> saw yellow -> square red; continuous.	RING

BITSYNC	Colour / extra value
Off	White
Soft Sync	Light blue; invert every 1-8 OSC 1 cycles
XOR / OR / NOR / AND / NAND	Magenta / yellow / red / green / turquoise; brightness = amount

VA-DRUM - Pad 20 red

Each note starts a one-shot; note length does not matter. Pitch, filter and level have separate decays.

Pad 1

Knob	Without Shift	With Shift
K1	Level attack	Pitch decay
K2	Filter decay	Amp decay / length
K3	Env -> level	Random -> level
K4	Env -> filter	Random -> filter
K5	Filter	7 colour zones, left to right: White DJ: K5 left low-pass, centre open, right high-pass. Green LP12: low-pass, 12 dB/octave. Light blue HP12: high-pass, 12 dB/octave. Yellow Band-pass: passes a frequency band. Magenta Notch: rejects a frequency band. Turquoise LP24: steep low-pass, 24 dB/octave. Blue HP24: steep high-pass, 24 dB/octave. Brighter within the zone = stronger key tracking: the filter follows the played pitch.
K6	Resonance	VCA gain / saturation
K7	White noise	-
K8	Effect amount	7 colour zones, left to right: Yellow Soft: soft saturation; threshold low -> high. Orange Hard: hard clipping; threshold low -> high. Red Fold: folds peaks back; folding threshold low -> high. Magenta Wavefold: folding; bias negative -> symmetrical -> positive. Violet Ring: metallic modulation; frequency low -> high. Blue Comb: resonant short delay; delay long/low -> short/high. Turquoise Chorus: moving short delay; rate slow -> fast. About 18 clicks per zone; brighter = further right within the zone. K8 without Shift: amount, bypass at far left.

Pad 2 / Pad 3

Page	K1	K2	K3	K4	K5	K6	K7	K8
Pad 2	TUNE/FINE	SHAPE/MIX	Pitch-Env/BITS YNC	Env->Shape	Random->Pitch	Random->Shape	Sine light blue -> triangle green -> saw yellow -> square red; continuous crossfade between shapes.	Random/Env->Morph
Pad 3	TUNE 2	SHAPE 2	MIX	FM	FINE 2	White off; light blue Soft Sync: reverse OSC 2 every 1-8 OSC 1 cycles; magenta XOR, yellow OR, red NOR, green AND, turquoise NAND: bitwise sound combinations. Brighter = greater amount within the bit mode.	OSC 2: sine light blue -> triangle green -> saw yellow -> square red; continuous.	RING

Section	Meaning
Pad 28	One / two oscillators.
Pad 31	On: velocity scales pitch and filter envelopes.
Pad 4	TUNE, filter decay, Env->Level, Env->Filter, filter, resonance, noise, FX.
Pad 5	Attack, amp/pitch/filter decay, noise; K6-K8 random to filter/level/pitch; Shift contains envelope/random destinations.
Pad 6	Additional matrix; the main LFO remains noise.

Starting points: Kick = sine + pitch decay. Snare = noise + short amp decay + BP/HP. Metal = two OSC + FM/RING/Comb.

GRANULAR - Pad 21 magenta

Up to 16 grains. Pad 2 shapes the instrument; Pad 1 is the common output stage.

Pad 2 - all settings

Knob	Without Shift	With Shift
K1	Pitch +/-24 st	Fine +/-1 st
K2	Position	Position spread
K3	Scan: reverse / freeze / forward	Bipolar: left reverse up to 100%, right pitch spread up to +/-24 st
K4	Grain size 5-500 ms	Stereo spread
K5	Density 1-16	Grain window: rectangular (constant) -> triangular (fade in/out) -> percussive (fast onset, decaying).
K6	Scan zone	Pitch: notes transpose. Slicer: notes select 16 slices. Stretch: lengths of 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48 or 64 steps, with independent pitch.
K7	LFO -> position	LFO -> size
K8	Env -> position	Capture red; Drum 1 orange; Drum 2 yellow; Drum 3 violet; Drum 4 turquoise. Dim white = source missing.

Settings and colours

Control	Settings
Shift + K6	Pitch Slicer (16 slices) Stretch: 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48 or 64 steps without changing pitch.
Shift + K8	Capture red Drum 1 orange Drum 2 yellow Drum 3 violet Drum 4 turquoise; dim white = source missing.
Shift + K4	0 = mono; higher = wider random left/right placement. Track pan determines the distribution.

Also: Pad 1 VCA/filter/FX; Pad 4 automation; Pad 5 common ADSR/LFO; Pad 6 matrix; Pad 29 signal path; Pad 30 Step-Drummer. Pads 3/28 have no OSC 2 function.

SAMPLE - Pad 22 cyan

Pack sample as a one-shot. C3 / MIDI 60 = original pitch; one octave up = double speed. Each new note restarts playback; one voice.

Sound parameters

Section	Meaning
Pad 1	Filter, resonance, effect and LFO; VCA remains open for the one-shot.
Pad 2 K1	Sample TUNE.
Pad 2 Shift + K8	Capture red; Drum 1 orange; Drum 2 yellow; Drum 3 violet; Drum 4 turquoise. Dim white = source missing.
Other OSC/grain controls	No additional oscillator/grain function; only TUNE changes pitch.
Pad 4 / 5 / 6	Automation, common filter/LFO destinations, matrix; matrix sample destination selects capture through sample 64.
Pad 29 / 30	Signal path / Step-Drummer.

Selection and sample flips

Gesture	Function / colour
Note twice	Expanded Note View.
Pads 17-32	Selected cyan, others dim.
Octave down/up	Four pages = 64 samples.
Pads 1-16	Peach = flip, dim cyan = none, white = current step.
Step + sample	Set flip; step green, sample yellow.
Sample + steps	Also sets flips (since RC2.04).
Clear + step	Remove flip.
Record + Play + sample	Live-record note 60 + flip.

Sample flips use the track-level automation lane; level automation recorded on that lane can replace flips.

FX-SEQUENCER - Pad 23 blue

No sound of its own. Note steps trigger Master FX slots; MIDI continues to be sent out.

Workflow

Step	Action
1	Master FX: assign effects to Pads 26-31.
2	MIDI -> Preset -> Pad 27 -> Pad 23 blue.
3	Pad 30 opens the FX matrix.
4	Shift + step sets/removes triggers.
5	K1-K8 select the FX slot for each step pair.

Knob settings

Value	Destination
0	No effect
1-5	Master FX Pads 26-30
6	Pad 31
Random - white	Random occupied slot per note step

Rule	Meaning
LED	Effect colour; white random; off no slot.
Unassigned	No effect.
Selector	Slow: about one slot per 48 encoder increments.
Trigger	Only steps containing a note.
Velocity 0	Removes the note; raising it from 0 creates a note on the first step of the pair.
Engine change	Disables the track's Step-Drummer.
Save	FX selection in the pattern; Master FX assignments in the project.

In short: Assign FX slots -> blue engine -> Pad 30 -> triggers -> slot per step pair -> save project.

FM - Pad 24 violet - Beta 3.17 only

Pad 27 -> Pad 24; Pad 7 opens the FM page. FM is an OSC variant: Pad 1, filter, effect and matrix remain applicable. Monophonic, last note wins.

Pad 7 - four operators

Knob	Without Shift	With Shift
K1	Frequency ratio: 0.5 / 0.71 / 1 / 1.41 / 1.5 / 2 / 2.5 / 3 / 3.5 / 4 / 4.24 / 5 / 5.5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15 / 16. Green: integers and 0.5; light blue: other half-integers; turquoise: 0.71 / 1.41 / 4.24.	Attack OP1 - light blue
K2	Frequency ratio: 0.5 / 0.71 / 1 / 1.41 / 1.5 / 2 / 2.5 / 3 / 3.5 / 4 / 4.24 / 5 / 5.5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15 / 16. Green: integers and 0.5; light blue: other half-integers; turquoise: 0.71 / 1.41 / 4.24.	Attack OP2 - light blue
K3	Frequency ratio: 0.5 / 0.71 / 1 / 1.41 / 1.5 / 2 / 2.5 / 3 / 3.5 / 4 / 4.24 / 5 / 5.5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15 / 16. Green: integers and 0.5; light blue: other half-integers; turquoise: 0.71 / 1.41 / 4.24.	Attack OP3 - light blue
K4	Frequency ratio: 0.5 / 0.71 / 1 / 1.41 / 1.5 / 2 / 2.5 / 3 / 3.5 / 4 / 4.24 / 5 / 5.5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 / 14 / 15 / 16. Green: integers and 0.5; light blue: other half-integers; turquoise: 0.71 / 1.41 / 4.24.	Attack OP4 - light blue
K5	Level OP1 - orange	8 clicks each: 1 chain 4->3->2->1; 2 (3+4)->2->1; 3 4->1 + 3->2->1; 4 4->3->1 + 2->1; 5 two pairs; 6 4->1/2/3; 7 4->3 + 1/2 separately; 8 four carriers (1-8 white). 9 Kick, 10 Snare, 11 Metal/Hi-Hat, 12 Tom/Zap (red). 13 Bell, 14 Tubular Bell (turquoise). 15 Strings, 16 Ensemble (green).
K6	Level OP2	Feedback - magenta
K7	Level OP3	Noise - white
K8	Level OP4	Release for all - blue

Ratio colour	Meaning
Range	0.5 to 16.
Green	Integer ratios.
Light blue	Half-integer ratios.
Turquoise	Inharmonic: 0.71 / 1.41 / 4.24.
Carrier level	Volume.
Modulator level	Modulation amount up to 4 pi.

Section	FM behaviour
Pad 1	Full VCA, filter, LFO and effect.
Pad 2	TUNE/FINE, pitch envelope and vibrato remain; WAVE/SHAPE/BITSYNC do not control the operators.
Pad 4 / 5 / 6	Automation, common Env/LFO, matrix.
Envelopes	Attack per OP, shared release; percussive OPs decay even while a note is held.
Velocity	Higher velocity lengthens release.
Clear	Clear + knob = reset value; Clear + Pad 7 = reset the whole FM page.

FM - 16 Algorithms

#	Algorithm	Family / colour
1	4 -> 3 -> 2 -> 1	Classic - white
2	3 and 4 -> 2 -> 1	Classic - white
3	4 -> 1 and 3 -> 2 -> 1	Classic - white
4	4 -> 3 -> 1 and 2 -> 1	Classic - white
5	Two stacks: 4 -> 3 and 2 -> 1; carriers 1/3	Classic - white
6	4 -> 1, 2, 3; three carriers	Classic - white
7	4 -> 3; 2 and 1 separately	Classic - white
8	Organ: four carriers	Classic - white
9	Kick: 2 -> 1; OP4 = pitch drop up to 3 octaves	Percussion - red
10	Snare: 2 -> 1 + noise envelope 3; pitch drop OP4	Percussion - red
11	Metal/Hi-Hat: 2,3,4 -> 1; inharmonic	Percussion - red
12	Tom/Zap: 3 -> 2 -> 1; pitch drop OP4	Percussion - red
13	Bell: 2 -> 1 and 4 -> 3; inharmonic	Bells - turquoise
14	Tubular Bell: 2/3 -> 1; OP4 carrier	Bells - turquoise
15	Strings: two detuned stacks	Strings - green
16	Ensemble: 4 -> 1,2,3; three detuned carriers	Strings - green

Feedback: Shift + K6. Noise: Shift + K7; added after the FM sum and follows the OP envelope determined by the algorithm.

MOD MATRIX - Pad 6 light blue

Each knob is a source. Far left = off. Then 33 destinations; within each destination range, the amount increases from 1/16 to full.

Knob	Source	Shift: settings / colours
K1	Velocity	-
K2	Note; C3 = 0	-
K3	Random per note	-
K4	LFO 2	Triangle green, saw magenta, square red, S&H white, smooth violet; within each shape, left tempo/right free
K5	Env 2	Attack 0 white, short light blue, medium turquoise, long blue; decay 20 ms-4 s
K6	Drum hit	Drum 1 orange, 2 yellow, 3 violet, 4 turquoise; decay within each zone
K7	Pattern position	-
K8	Step random	New value every 1, 2, 4, 8 or 16 steps

Indicator / gesture	Meaning
LED colour	Destination page: orange VCA/VCF, green OSC1, turquoise OSC2; brightness = amount.
Pads 9-24	Destination page bright; 9-16 = K1-K8, 17-24 = Shift+K1-K8; destination bright.
Clear + knob	Source off.
Clear + Shift + knob	Reset Shift parameter to its initial value.
Clear + Pad 6	All sources off.

Bipolar: note, random, LFO 2, step random. Others positive only. Sources routed to the same destination add together. Beta 3.17 saves the matrix in patches and projects.

STEP-DRUMMER - Pad 30

K1-K8 = step pairs 1-2 through 15-16. Octave = pitch/velocity page; 1-16 / 17-32 = pattern half.

Control	Function / colour
Pads 1-16	Bright note, dim empty, white current. Tap to preview; Shift + tap to set/remove.
Pads 17-24	Destination: TUNE, OSC2, WAVE, FM, MIX, Env->Filter, SHAPE, Decay; velocity page has its own destination.
K1-K8	Bipolar around 64; centre neutral/dim, brighter further out; current pair white.
Pad 32	Pitch-Vel: bright green = on. Pitch transposes in scale degrees, velocity sets velocity.
Pad 30	Dim disabled, bright enabled; Shift + 30 disables.

Page	Toggle off	Toggle on
Pitch	Selected engine destination, bipolar.	One scale degree per 8 knob increments; -8 to +8. Engine pitch destination is not applied in addition.
Velocity	Selected destination only; nothing without a destination.	Also sets velocity.

Beta 3.17: In normal Velocity View, Shift + step releases all automation lanes on that step; parameters return to the knob values. With Shift, marked steps are red, others yellow.

With Record, a tapped step is recorded at the currently playing step. In FX-Sequencer, each pair knob selects a Master FX slot.