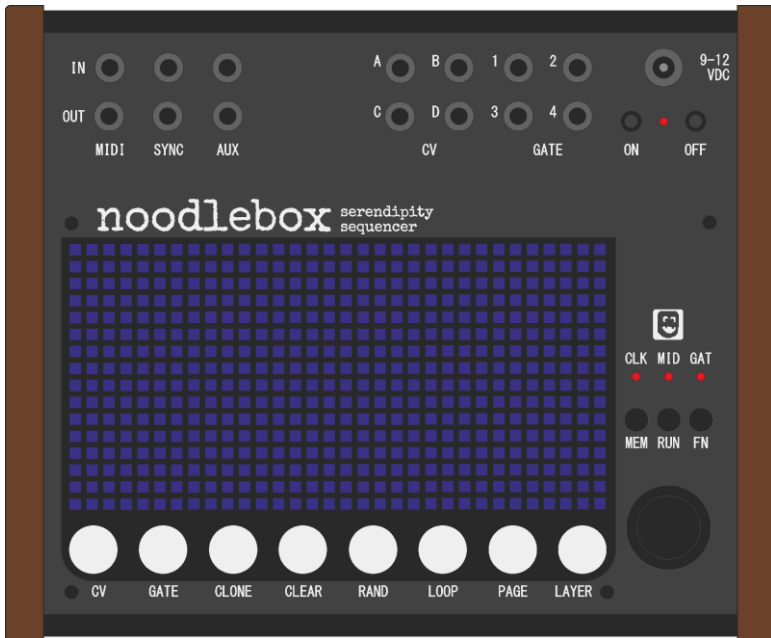




# noodlebox

serendipity  
sequencer



USER GUIDE  
V1

## introduction

Noodlebox is a **four part sequencer** for making electronic music. It has analog CV/Gate outputs for each part and it supports MIDI.

**Fun and intuitive** – Edit your synth lines in the bright clear graphical LED matrix - just like using an Etch-a-Sketch - and tweak them live while they play.

**Great for jamming** – Quickly loop and reverse sections of a sequence, jam with pitch transposition, crank crazy pitch randomness up and down then snap back to the original notes, incrementally add Euclidean gates... editing features common to many sequencers take on new creative and expressive meaning!

**Quick for live arranging** – Capture variations of a pattern into four different 'pages' and arrange them to cycle automatically in any order, all while still jamming live and without missing a beat. Quickly save compositions to memory and recall them later.

**Powerful and flexible** – Noodlebox is like having four step sequencers in one box, each with CV/Gate and MIDI output, and you can use it exactly like that. Or you can dive into the new possibilities opened up by the internal routing, cross-modulation and scaling of the four parts.

**Solid construction** – Comes as standard with lovely, solid oak end cheeks and powder-coated, extruded aluminium side rails. Reassuringly weighty!

**No HP in the rack!** – Why isn't Noodlebox a Eurorack module? Well, by staying on the desktop, it saves valuable space in your Eurorack setup, and you can move it around to where it's needed. Not to mention that a horizontal control surface is just so much more comfortable to use!

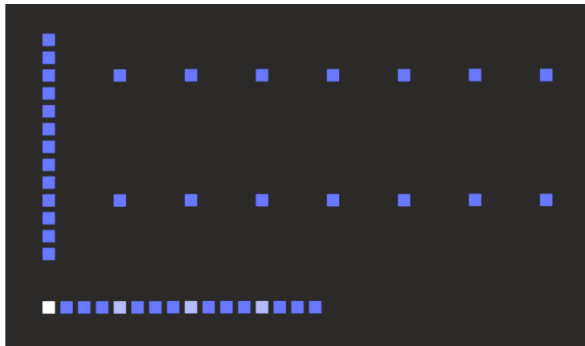
We hope you enjoy using Noodlebox!

## a first noodle

**Power up noodlebox** by plugging in the power supply and holding the ON button. A start up animation is shown for a couple of seconds and you need to keep the button pressed until that finishes. Power will now stay on when you take your finger off the button.

**Turn noodlebox off** by pressing and holding the OFF button until the screen shows the shutdown animation. This is the correct way to shut down the Noodlebox; it makes sure that any changes you have made to the configuration are saved. If you just pull the plug you will lose these changes.

Following power-up the firmware version is shown briefly, then you will see a screen like this. This is a **page**, where we can start to create a new sequence.



Each page is made up of **32 steps**. The noodlebox screen shows all 32 steps of the page at once.

The pattern of dots along the bottom row of the screen is called the **loop ruler** and defines the **loop window**; the set of steps that will actually be played when the sequencer runs.

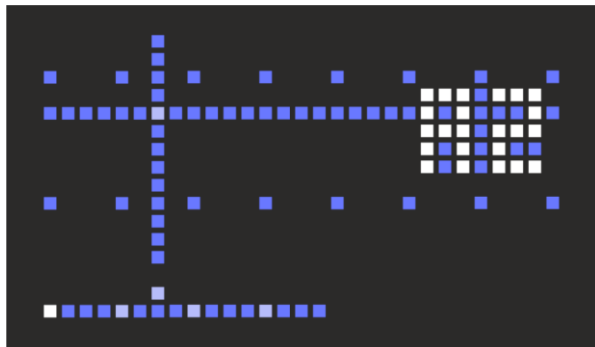
The active step (the one which is currently playing) is indicated on the loop ruler in full brightness. Initially this is the first step. Every fourth step along the ruler is indicated in medium brightness

The loop window starts out as the first 16 steps of the page. However, it can be set to any number of continuous steps up to the full page, and it can play in either direction.

The vertical bar shown at the left of the display is the **cursor**, which we use for the various editing functions. The cursor can be moved from left to right by turning the **encoder knob**.

The top 13 rows of the display (the height of the cursor) are where we enter the data values for each step. The two horizontal dotted lines that are already there are part of a grid showing the "C" notes at the start of each octave. These are to help you find your way around!

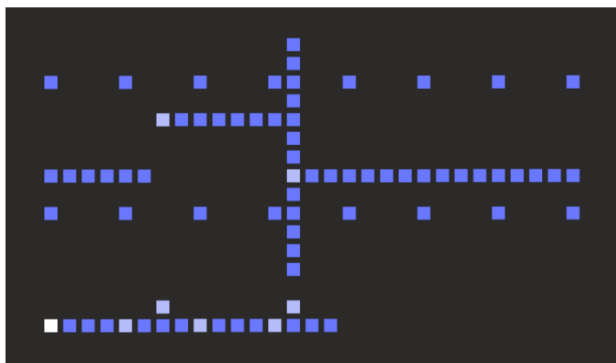
So, let's enter a note... move the cursor into the middle of the loop window by turning the encoder knob to the right. Hold down the CV button and turn the encoder again. A bright point appears along the cursor (this is the note we added) together with a text box showing the name of the note (e.g. "A2" – the A note in octave 2). By keeping the CV button pressed and turning the encoder we can set the note to any pitch we like (see how the screen scrolls up and down when the note reaches the edge).



When we release the CV button, the note has been set. A new point has also been added at the bottom of the screen, just above the loop ruler – this is a **trigger point**, which indicates we'll send a pulse to the gate output when this step is played.

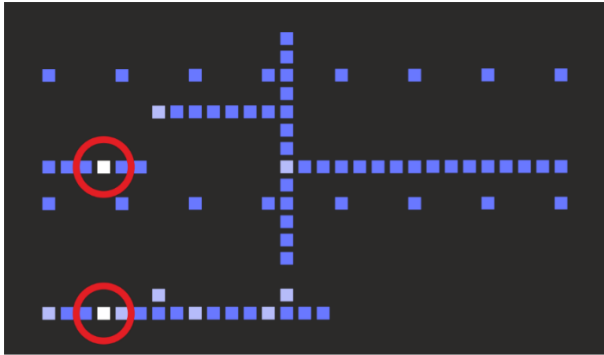
We also now have a horizontal line spanning the whole display. This represents the control voltage (CV) output. Since we have only one note defined, the CV output will send the pitch CV for this note continuously (Pitch CV never "turns off", it must always be set to something!)

Now add another point... move the cursor to a new position and hold CV and turn the encoder. Initially the note picks up the CV value in that column and we can then drag it around.



So here we have a sequence of A2 and E2 notes. The steps we actually edited are shown in a brighter colour to show that they are user-entered **data points**. The dimmer points follow the data points automatically and are called **fill points**.

Now let's play this sequence... press the RUN button (above the encoder). Now we see the active step marker count along the loop window bar (and return back to the start when it reaches the end). The current data or fill point and trigger point (if any) are also shown in the brighter colour.



Patch up GATE 1 and CV A to your synth to hear it play! If you want to use the MIDI output, click the LAYER button to show the menu. Use the encoder to scroll down to the entry MID NONE and hold the CV button while turning the encoder to select MID NOTE. Now change the MIDI channel if needed. Press the LAYER button to return to the main display.

## general operating conventions

Noodlebox packs a lot of functionality behind just 11 buttons and an encoder knob... We've tried to avoid too much menu diving but there are some special moves it will definitely help to know ...

- When we say **click** a button we mean you just press and release it
- When we say **hold** a button we mean you keep it pressed down. This may be while you click another button or turn the encoder knob
- In some situations, the first four buttons (CV, GATE, CLONE, CLEAR) double up as **number keys 1, 2, 3, 4**. For example you can select layer 3 by holding LAYER and then clicking CLONE(3). The same applies for selecting pages A, B, C, D – for example you can select page B by holding PAGE and clicking GATE(2)
- A lot of the 'deeper' noodlebox functions require **two buttons to be held** along with a turn of the encoder knob. The buttons must be pressed in the correct order and kept held down. For example, holding GATE then holding LOOP and turning the encoder adjusts gate retriggering. We'd mark this in the instructions as "GATE+LOOP". The order is important - *holding GATE+LOOP is not the same as holding LOOP and pressing GATE... that would be LOOP+GATE*

As much as possible we've tried to keep the basic labels of each button easy to remember. For example, CLEAR+PAGE clears pages, GATE+RAND sets gate probability.

Learning these combinations might be a bit of a challenge, but we decided to go this way rather than menu diving, and we've tried to keep the most common functions accessible without needing combination of buttons. Hope that's OK :)

- Above the encoder is the FN (function) button. This is mostly used in conjunction with the eight large buttons to access special settings.
- There are also two **menus**. They are only one level deep though and we tried to keep them short and easy to whizz through in a live situation. The **layer menu** is accessed by clicking LAYER. The **global menu** is accessed by holding FN and clicking LAYER.

When a menu is open, use the encoder to **select the menu option**, then hold the CV button and use the encoder to **change the value** of the option. Changes in menu settings are not applied until you release the CV button.

## creating and adjusting data points

Before the first data point is added to a page, the CV value at every step is zero

To create a data point, use the encoder to move to a column and press the CV button. Move the encoder with CV held to create and adjust the data point.

The *very first* data point to be create on a page in a **pitch** layer starts at a default value of C2. In **modulation** and **offset** layers, the default value of the first data point is zero.

After the first data point is set, all the other steps in the page take on a value which depends on the **fill mode** (which can be changed by pressing FN+CLONE)

- **PAD** – after a data point is set, its value is filled out into subsequent steps until the next data point is reached. The value will wrap around from the last step in the page back to the first. PAD is the default behaviour for pitch and offset layers.
- **INT** (Interpolated) – Works like PAD if there is only one data point. With two or more data points, the fill points are calculated along the sloping straight line between each pair of data values. This is the default behaviour for modulation layers.
- **OFF** – all steps have a zero fill value unless a data point has been created there

Now when you create data points in new step, they initially pick up the fill value of the step and you can then adjust the value by holding CV and turning the encoder.

You can change the value of existing data points by selecting the step with the cursor, holding CV and turning the encoder to the left or right.

## automatic creation of gate points

In a pitch layer, a new gate point is usually **created automatically** each time a new data point is created. This is useful when entering notes, as typically you would want to trigger an envelope on your synth with each change of note. Noodlebox also uses the gate point to determine where a new MIDI note begins.

Gate points in **modulation** and **offset** layers would usually be created manually (Editing of gate points will be described in a later section)

You can use the **auto gate** setting (FN+GATE) to decide, for a given layer, whether new gates will be automatically created with new data points:

- **AUT** (Auto) means that a new gate point will be created when a **new** data point is inserted (not for adjusting an existing one) . Pitch layers have this mode by default.
- **MAN** (Manual) means you must add gate points manually. Modulation and offset layers have this mode by default

Gate information can be edited or deleted manually in either mode. Gate editing is described fully later on.

## about data point values

Each data point can have a value between 0 and 127. The way that the data values are displayed and edited depends the layer mode:

- In **pitch** mode the values are displayed as *note names*, from C-1 (0) to G9 (127). These names are made up of the note (A, A#, B, C, C#, D, D#, E, F, F#, G, G#) and the octave number (-1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9).
- In **modulation** mode the values are shown directly (000 to 127)
- In **offset** mode the 'internal' values 0-127 are mapped to offset values between -64 (0) and +63 (127).

Values are preserved for existing data points when you change the type of a layer. For example, if you create a data point on page in an offset layer with a value of +00 then switch the layer type to modulation, you'll see the value 64. If you switch to pitch you'll see the note E4.

## fine adjustment of data points

When you edit the value of a data point, you always move the point up and down one display row at a time. However, this might not always mean you are changing the value by 1 unit...

- In **pitch** mode it depends on the **rows layout** setting which can be **scale** or **chromatic** (FN+CV to change it). In rows layout of chromatic, each display row maps to one unit and there are 11 rows to an octave. However, in rows layout of scale, there are only 7 rows to an octave - 4 notes (those which are 'out of key') cannot be accessed in the usual way.
- In **modulation** mode each row covers 10 units, so the entire range 0-127 will fit within 13 rows of the display without scrolling. Moving a value by a single row makes it jump by up to 10 units at a time.
- In **offset** mode there is always 1 unit per row

To be able to select the 'skipped' values you can **fine adjust** the data point by holding down the GATE button in addition to the CV button while turning the encoder.

## clearing data points

To **clear a single data point**, click the CLEAR button. A single click on CLEAR will remove the data point, and any corresponding gate information.

To **clear multiple data points** and corresponding gate information, hold the CLEAR button down and move the encoder knob to the left and/or right.

These actions will clear the data points and any gate information at the same step positions. As the data points are removed, fill points on the page will be recalculated as needed.

- It is possible to clear multiple data points *without clearing gate information* by holding CLEAR+CV while turning the encoder
- Conversely, it is possible to clear the gate information on multiple data steps *without clearing data points* by holding CLEAR+GATE button while turning the encoder.

## cloning data points

An **existing step** (both step value and gate information), can be cloned into one or more adjacent target steps by selecting it with the cursor, then holding the CLONE button and turning the encoder knob left or right. The data point and gate information are copied into the new cursor locations, replacing any existing content.

A **continuous range of steps** (value and gate information) can be cloned by first setting the **source position** by pressing and releasing the CLONE button. The marker (a bright pixel) appears below the bottom of the cursor. The cursor can then be moved to the **target position** (which may be on a different page or even in a different layer). Press CLONE again and move the encoder left or right to copy data from the source position to the target position (replacing any existing content). The source marker will move left and right in step with the cursor movement. Once CLONE is released, the action is finished. Once the source position is set, pressing any button except CLONE, PAGE+(page) or LAYER+(layer) will cancel the action.

These actions will copy both data points and any gate information at the same step positions. As the data points are removed, fill points on the page will be recalculated as needed. If you copy a fill point, a new data point will be created if needed to preserve the copied value.

- Clone single or multiple data points *without affecting gate information* by pressing the CV button while CLONE is held at the target step location.
- Clone gate information on single or multiple data steps *without affecting data points* by pressing the GATE button while CLONE is held at the target step location.

If you have set the clone source position and want to cancel the action, simply click CLONE again.

## shifting data points

The entire page of data points can be shifted around vertically (i.e. in pitch) or horizontally (i.e. in time)

- While holding CV, hold RAND and use the encoder to **move all data points up or down**. Initially the display shows VERT then the offset from the original position. With ROWS: SCA set (FN+CV) in pitch mode, the points increment to the next or previous note in scale otherwise they increment by one unit.
- While holding CV, hold CLEAR and use the encoder to **move all data points left or right**. Initially the display shows HORZ then the offset from the original position. You can shift up to 32 steps in either direction (data wraps around, so +/-32 steps is equal to the start position)

The loop window does not move during this operation, so it is a useful creative technique to set a small loop window and shift data points into and out of it.

## transposing data

One way to transpose data points is simply to move them around via the vertical shift function. However, there are also menu options that you can use.

The **TRN** option in the layer menu allows the output to be transposed in semitone increments by up to 2 octaves in either direction, before any forcing to scale. This setting can be controlled by an external MIDI keyboard (see later)



The **OCT** option in the layer menu allows the output to be transposed in octave increments by up to 5 octaves in either direction.

Although described in terms of pitch, you can also apply transposition to modulation and offset layers.

## quantization of data points (force to scale)

The output from any type of layer can be **forced** into a musical scale using the QUA (quantize) option in the layer menu

- **QUA:OFF** – no quantization of output voltage (MIDI notes quantized chromatically)
- **QUA:CHRO** – output voltage and MIDI notes for the layer are forced into a chromatic scale
- **QUA:SCAL** – output voltage and MIDI notes for the layer are forced into a diatonic scale

The actual diatonic scale that is used for the latter option is common to all layers and is defined in the global settings menu (FN+MENU)

- **SCA** – defines the musical “mode” of the scale
- **ROO** – defines the root note of the scale

The musical modes determine the position of tone and semitone steps in the scale. Each one could be played on consecutive white notes of a piano, starting with a different first note (for example starting on C gives us the major scale, or Ionian mode)

- **IONI** - Ionian mode (major scale)
- **DORI** - Dorian mode
- **PHRY** - Phrygian mode
- **LYDI** - Lydian mode
- **MIXO** - Mixolydian mode
- **AEOL** - Ionian mode (minor scale)
- **LOCR** - Locrian mode

The quantized value is converted to an output CV based on the VLT setting selected in the layer menu. Usually this would be one of the pitch scaling modes (1V/oct, 1.2V/oct, Hz/V). However, if you are using a Volts-range scaling mode instead (e.g. 5V), then the output CV is always scaled using 1V/oct.

Although described here in terms of pitch, you can also apply quantization to modulation and offset layers. MIDI notes are always quantized (chromatically or to scale)

## voltage slew (glide)

A **slew** can be applied to the **voltage output** of a layer, which means that the output will “glide” at a constant rate to the step voltage **during the step** and only reach it at the end of the step.

Slew is enabled for a layer via the SLW menu setting:

- **SLW:OFF** – slew is disabled
- **SLW:ON** – slew at all steps
- **SLW:TIES** – slew only during steps that have tie enabled (see below)

Slewing between data points that are more than 1 step apart can be achieved by using the FILL: INT mode to add interpolated fill points to the intervening steps, slewing between the fill points.

MIDI output note is unaffected by slew

## gate information

As well as a data point, each step has **gate** information associated with it. This says whether the voltage at the gate output socket associated with the layer will be OFF (0V) or ON (10V) when the step plays. There are two settings at each step that control the gate output.

- **Trigger** (trig) – at a step that has a trig enabled, the gate output for the layer will always switch from OFF to ON when that step plays. It is the OFF->ON transition that triggers the envelope in a synth.

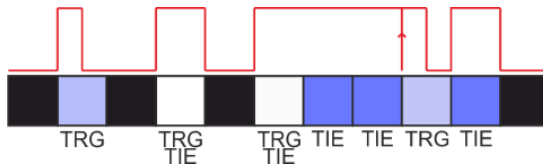
If the gate output was already ON, a trig point will cause it to switch ON->OFF->ON so that there is still an OFF->ON transition at the start of the step.

The gate output remains ON for the proportion of the step time defined by the DUR setting (gate duration) in the Layer menu.

- **Tie** – at a step that has tie enabled, the gate output for the layer will be ON for the whole duration of the step. If the gate output was ON at the start of the step then there is no OFF->ON transition *unless* trig is also enabled for the step. Ties can therefore be used to keep the gate open (ON) for time durations longer than a step.

Gate information is shown on the second to bottom row of the screen. Trigs are shown in medium brightness level and ties in dim level. The combination of a trig and tie is shown in full brightness.

Here is an example of the gate information at a sequence of steps, and the gate output that would result (assuming DUR is set at half a step)



The main things to notice are that

- Every step that has **trig** set will begin with an OFF-ON transition
- If **tie** is set, the gate output is ON for the entire step duration.
- If **trig** is set without tie, the gate remains open based on DUR setting

A **tie** point will still cause an OFF-ON transition if the gate was previously OFF

Ties affect MIDI note output from a layer in a similar way; MIDI note duration is extended according to gate state, and changes to the note pitch while the gate is open will result in legato play (i.e. the MIDI note off message for an old note is sent after the note on message for a new note)

Tie points can also be used to selectively “glide” or slew CV between different values, based on the **slew** setting for the layer. In this case the voltage will glide between the previous step output and the new one. This glide will take place over the full step duration of the current step, with the step CV only being reached at the end of the step.

## editing trigs and ties

Gate information may be edited separately from CV information in all layer modes.

Clicking the GATE button while the cursor is on a step toggles the **trig** setting of that step.

Holding GATE while turning the encoder modifies the **tie** setting. Turning the encoder one click in a clockwise direction enables tie. Turning the encoder in an anti-clockwise direction disables tie.

A tie can be extended over multiple steps by holding GATE and keeping turning the encoder clockwise. After tie is set at the first step, the cursor will move to the right and tie can be set at the following step. This can be continued until the end of the page is reached.

This process also works in reverse to clear ties from multiple steps. Start by placing the cursor on the right-most tie that you want to clear, then hold GATE and keep turning the encoder to the left until all the required ties have been cleared or the left side of the screen is reached.

## additional gate settings

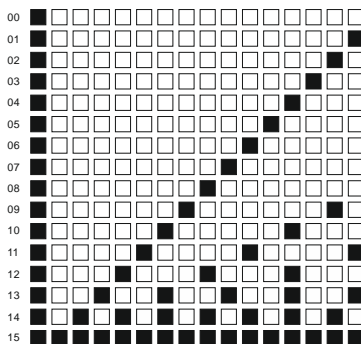
As well as trig and tie, the following gate settings can be made per step

- **Probability** – an element of chance can be attached to a gate point, which allows the data point and gate information for a step to be ignored.

To set the probability for a gate, hold GATE and press RAND. While held, all gate points with nonzero probability settings are shown in a bright colour. Continuing to hold the keys while turning the encoder sets the probability for the selected gate point.

Probability can be set to 0 (always play) or to a number between 1-15 where 1 is least likely to play (on average 1 time out of 16) and 15 is most likely (average 15 times out of 16).

- **Retrig** – a gate or tie point can be set to retrigger multiple times during the duration of a single step. Retrig can be set from 0 for no retrigger, or to a number 1-15. This number is based on the sixteenth fraction of the full step period. The following diagram shows the number and distribution of retriggers during a single step period. After each retrigger, the gate stays open according to the duration setting



To set the retrigger for a gate press GATE+LOOP. All gate points with nonzero retrigger settings are shown in a bright colour. Continuing to hold these keys while turning the encoder sets the retrigger for the selected gate point.

Retrig applies only to Trig points. Applying retrigger to a step will also create a trig point if needed.

- **Accent** – each gate point has an **accent** setting which can be set to ON or OFF. This is mainly useful when a pitch layer is sending out MIDI notes. In this case the MIDI velocity for accented notes is taken from the ACC setting in the layer menu, rather than the usual VEL setting. This allows you to make certain notes louder (or softer) and vary their velocity independently of the other notes.

A second use for **accent** is to set an accent gate output which could be used to control the voicing of specific steps on your synth. An accent gate can be set on the SYNC OUT and/or AUX OUT outputs. These will fire when an accented step is played on any layer and will remain ON for the entire step duration.

To set the accent for a step, hold down GATE and then CV. All steps with accent are shown in a bright colour. Turning the encoder knob with the buttons held will set accent ON for a step where turning the knob to the left will turn accent OFF.

## midi output

Each layer can output MIDI messages. This is controlled by the MID setting in the layer menu

- **MID:NONE** – No MIDI output from the layer
- **MID:NOTE** – Output MIDI note messages
- **MID:CC** - Output MIDI continuous controller (CC) messages

When MID is set to NOTE or CC, other options become visible in the menu

- **CHO** – MIDI channel for output
- **VEL** – MIDI Note velocity (MID:NOTE only)
- **ACC** – Note velocity for accents. Accents are defined in the gate information and described below (MID:NOTE only)
- **CC** – Controller number (MID:CC only)
- **SMO** – CC data smoothing (MID:CC only). This generates additional MIDI CC messages for interpolated values between the CC values at consecutive steps.

## playing a sequence

To **start** playback, click the RUN button above the encoder knob. Click the RUN button again to **stop** playback. Pressing RUN again will **continue** playback from the current position.

To **restart** playback of all layers from their first steps, click CV+RUN. You can do this whether stopped or playing.

To immediately move the play position of the current layer to any step in the current page, click the LOOP button.

## tempo and clock division

To change the tempo of playback, press the LAYER button to show the layer menu and scroll to the end of the menu to the BPM item. Hold CV and turn the encoder to change the BPM. The tempo changes when CV is released

Note that **the BPM option is only available when running from the internal clock**. Clocking options are described below.

As well as BPM, the playback of each layer is determined by its clock division (rate). This can be changed in the menu using the RAT option. The values are listed as musical note divisions from 1 (1 full note = 4 clock beats) to 32 (1/32 note = one eighth of a beat). The divisions are listed from largest (i.e. slowest count) to the smallest (i.e. fastest count). A typical setting is 16 (1/16 note = one quarter beat).

The full list of clock divisions in the RAT menu item are as follows

- **1:** Full note (4 beats)
- **2D:** Dotted half note
- **2:** Half note
- **4D:** Dotted quarter note
- **2T:** Half note triplet
- **4:** Quarter note (1 beat)
- **8D:** Dotted eighth note
- **4T:** Quarter note triplet
- **8:** Eighth note
- **16D:** Dotted sixteenth note
- **8T:** Eighth note triplet
- **16:** Sixteenth note (default)
- **16T:** Sixteenth note triplet
- **32:** 32nd note

## clocking options

In addition to being able to run from an internal BPM, noodlebox allows various external clock sources to be used. The clock source is set from the CLK option in the global menu, which has the following possible values:

- **INT** – Internal clock, based on the BPM setting. When selected, the BPM option is shown in the layer menu. It is hidden otherwise.
- **MCLK** – External MIDI clock is used for BPM but transport (i.e. start, stop, reset) must be controlled from the front panel. MIDI transport message are ignored.
- **MTRN** – External MIDI clock and transport messages are accepted. Front panel transport functions (i.e. stop, start, reset) can also be used.
- **PCLK** – External pulse clock via SYNC IN socket. The expected clock rate is set via the **SYI** option

To keep noodlebox in phase with the master clock, start the sequencer with the reset (CV+RUN) command while the external clock is already running

## loop window

The **loop window** defines the block of steps in the page that will play when the sequence is running. While there are always 32 steps in the page, the loop window can be anything from 1 to 32 steps in length. By default, the loop window is 16 steps long.

The loop window is indicated on the bottom row of the screen by a continuous row of pixels of low brightness with every fourth step (starting from the loop start position) shown in medium brightness. This pattern of pixels is called the **loop ruler**.

To set the loop window, use the encoder to move the cursor to the new loop start position, then hold down the LOOP button and move the cursor to the new loop end position. The new loop window does not become effective until the LOOP button is released.

When the sequencer is running, playback counts from the loop start position to the loop end position, then jumps back to the loop start position again. The loop start position may be to the right of the end position, in which case the **playback will run in reverse**.

Usually each of the four layers has a single loop window set, which is shared between the four pages in the layer. This can be changed via the loop points setting (FN+LOOP)

- **LOOP:LAY:** All pages in a layer share a single loop start and end point
- **LOOP:PAG:** Each page in a layer has individually set loop start and end points

When switching into PAG mode, page 1 will be the source for the initial loop points for pages 2, 3, 4

## off-gridding

Usually Noodlebox plays every step “on grid” according to the clock division for the layer. However, there is also the ability to move steps “off grid” to add rhythmic variation.

Off-gridding is controlled by two settings; the **off-grid mode** is selected from the OFG option in the layer menu and the **off-grid amount** is adjusted by holding GATE and then LAYER and turning the encoder. The OFG option has the following values

- **SWNG – swing** mode – even numbered steps are moved by the specified amount but odd numbered steps remain on grid
- **SLID – slide** mode – all steps are moved off grid by the specified amount
- **RAND – random** mode – steps are moved randomly. The larger the swing amount (away from 50 in either direction) the larger the random movement off grid.

Each step can be moved off-grid by up to half the step time in either direction (i.e. before or after grid time). The **off-grid amount** range is enumerated on screen as a number between 25 and 75 with 50 being the 'on grid' default (This follows an established standard for describing swing settings)

It is not possible to move any step off grid by more than half the step time, which ensures that steps cannot be made to play out of order. To increase the actual amount of time you can "off-grid" you may also want to consider reducing the clock division (RAT). For example, to have swing on the even numbered eighth beats, set the division for the layer to 8.

## layers

So far we've been focused on working within a single **page**. Noodlebox actually has four **layers** (numbered 1, 2, 3, 4), each made up of four **pages** (named A, B, C, D)

Each layer has its own CV/gate output socket and can also output MIDI messages on its own MIDI channel.

Generally speaking, each layer is independent from all the others, although they all share a common clock input. Later, we will come back to how layers can interact with each other, but for now let's consider each layer to be self-contained.

## navigating layers and pages

To **select a layer**, hold down the LAYER button and press one of the leftmost four buttons

- CV (1)
- GATE (2)
- CLONE (3)
- CLEAR (4)

To **select a page** within the selected layer, hold down the PAGE button and press one of the leftmost four buttons.

- CV (A)
- GATE (B)
- CLONE (C)
- CLEAR (D)

Each time the selected layer or page is changed, the top right of the display shows the current selection. For example, "2C" means page C in layer 2. If the output for the layer is muted, a small x is shown after the page.

To **view the current layer/page selection** without changing it, just click the PAGE button.

Each layer remembers the current page when you switch away from the layer. Changing the page selected on one layer will not change the currently selected page on other layers.

## edit actions for layers and pages

A common use of pages is to create variations of a sequence. This is rather like the A/B pattern variations in many drum machines.

Noodlebox has a quick way to build variations of a pattern by **copying the contents of a page into the pages that follow it**. This is done by holding the PAGE button and turning the encoder. A list of the pages in the current layer is shown, up to the highest named page that has previously been edited (e.g. "ABC")

- By turning the encoder to the left, we can **clear multiple pages**. For example, if we change "ABC" to "AB" this means we will clear page C. If page C was selected, page B will become selected.
- By turning the encoder to the right, we **copy the page** at the end of the list into one or more following pages. For example, if we change "AB" to "ABCD" this means the contents of page B will be copied into pages C and D.

These copy and clear actions take place when PAGE is released.

A typical use of this feature is to **copy page A into pages B, C, D** ready to make pattern variations. This can be done with the following quick sequence of actions: hold PAGE, turn encoder to the left, release PAGE, hold PAGE, turn encoder to the right, release PAGE.

Alternatively, **a page can be copied into any other page location in any layer**, by holding CLONE+PAGE and selecting the target layer and page with the encoder. Turning the encoder fully to the left so ?? is displayed will cancel the action.

**All the data points on a page can be cleared** by simply holding CLEAR and turning the encoder to move the cursor the full length of the page. Alternatively, you can hold CLEAR+PAGE and use the encoder to confirm the action by selecting **SURE? YES**.

**A layer can be copied into another layer location**, by holding CLONE+LAYER and selecting the target layer with the encoder. Turning the encoder fully to the left so ?? is displayed will cancel the action. Copying a layer copies all the pages and all the menu settings for the layer.

**A layer can be cleared** by holding CLEAR+LAYER and use the encoder to confirm the action by selecting **SURE? YES**. Clearing a layer clears all the pages and also sets the menu settings back to defaults. If you just want to clear all the pages, the multiple page clear action described above is more appropriate.

## playback of pages

**Usually the current page in each layer (the one you are viewing or editing) is the one that will play when the sequencer is running.** This is pretty intuitive and allows you to quickly flip between playback of different pages in a layer by simple selecting different pages, as well as hearing your edits as soon as you make them.

However, this isn't what you always want – you might want to work on a page while another page carries on playing in the background and only then switch to the new page when you have finished your edits.

**To set the current page to play in the background**, press LOOP+PAGE. The display shows “=BKG”. You can then switch over to other pages and make changes to them while the selected page continues to play.

**To cancel background play**, press LOOP+PAGE again. The display shows “=OFF” and playback immediately resumes on the currently displayed page.

Noodlebox also allows **background playback of a list of pages that you can cue up in any order you like**. To do this, hold the LOOP button and enter a list of pages using the first four buttons

- CV (A)
- GATE (B)
- CLONE (C)
- CLEAR (D)

As each page is cued, the *length* of the cued list is shown (for example “=02”). There are 16 slots available. If you try to exceed the allowed length “=INVL” (invalid) is shown.

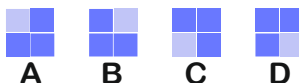
The cued list will start playing after the current page ends. The list will play repeatedly. This gives a quick way to build arrangements of patterns or variations that repeat over long periods.

A quick way to **cue up all the existing pages in the layer to play in order** (i.e. up to highest named page that has been edited) is to press LOOP+LAYER (“=ALL” is shown). This replaces any existing cued list for the layer.

**To cue the existing pages in a random order** press LOOP+RAND (“=RND” is shown). Each time a page ends a new one (which could be the same one) is selected at random.

**To select a new page but only have it start to play after the current page ends**, hold LOOP and press the appropriate page button as shown above (i.e. setting up a cue list of a single page)

Every time a new page starts playing in the background, **the background playback indicator is shown to the lower right of the screen**. This made up of four pixels, the brighter one of which indicates the page that has just started to play



## replace gates

Noodlebox has a feature to **generate a gate pattern based on a “Euclidean distribution”**; This means that a selected number of triggers are distributed within the count of steps defined by the loop window.

The distribution is as even as possible, but all the triggers are placed “on grid”. If the number of triggers divides evenly into the number of steps (e.g. 8 triggers in 16 steps) then the resultant pattern is a regular sequence of triggers. However, for an uneven division (e.g. 10 triggers into 16 steps) the pattern takes on a more interesting groove. The ability to quickly increase and decrease the number of triggers makes this a very playable way to change the feel and intensity of a groove.

Start replacing gates by holding GATE+PAGE. The loop window is used to define the number of steps for the distribution, and the loop window content defines the initial number of triggers. These two numbers are shown on the screen (e.g. “07:16”)

Turning the encoder increases or decreases the number of triggers from 0 to the number of steps (e.g. “00:16” to “16:16”). At each click of the encoder the gates are recalculated by generating the Euclidean distribution then repeating the resultant pattern over all 32 steps for the page. The new gate pattern starts playing immediately.

Please note that using this feature **replaces all the existing gate information in the current page** (ties, retrig, probability etc.)

## add randomness to existing data

To **randomise the existing data points on a page** (while keeping gate information), hold RAND and turn the encoder. When you turn the encoder to the right, the data becomes incrementally more random, with data points being shifted up and down from their start positions.

**Randomness is reversible.** You can also turn the encoder the other way and dial the randomness back down, until the data points get back to their initial positions. You can even keep going negative and add the mirror image randomness!

When you release the RAND button the **data points immediately snap back** to their start positions. This non-destructive and incremental randomness is a great creative tool live.

Each time you press and hold RAND, a new set of randomness is created that you scale with the encoder. This means the data points will follow the same path as the encoder is turned in each direction. To generate a new set of randomness release and press RAND again.

If you want to **keep the random data and make the changes to the page permanent**, press PAGE (while still holding RAND). You can also **save the random data to a different page** (not the current one) by selecting the target page while holding RAND:

- CV (A)
- GATE (B)
- CLONE (C)
- CLEAR (D)

## create new random data

You can **create entirely new random page data**, including both random data points and gate information by holding RAND+LOOP and turning the encoder. Each time you hold RAND+LOOP, 100 new random pages are made available and you can use the encoder to step through them

When you release the buttons, the page returns to the initial data. If you want to **keep the random page data**, while keeping RAND held release LOOP then press PAGE.

## save and load sessions

Noodlebox has eight memory slots which can be used to save the entire state of all four layers (a “session”) for recall at a later time.



To **save the state of the current session to one of the memory slots**, hold MEM and press one of the eight command buttons:

- CV (1)
- GATE (2)
- CLONE (3)
- CLEAR (4)
- RAND (5)
- LOOP (6)
- PAGE (7)
- LAYER (8)

While this combination is held down, the display shows "M1:LOAD" (or whichever memory slot you selected). While the buttons are still held, turn the encoder to the right so that the display says "M1:SAVE", then release the buttons. The display shows "OK"

To **load a session from one of the memory slots**, perform the same procedure but release the buttons while "M1:LOAD" is displayed. The session is loaded and the message "OK" is displayed. If any layers were muted when saved "OK MUTES" is displayed. If there is no session in the location then "EMPTY" is displayed and the current session is left unchanged.

To **cancel a load or save operation** while the buttons are still held, turn the encoder to the left until "M1:CXL" is displayed. Now release the buttons.

## initialising a new session from a template

There is an additional memory slot which is accessed in the same way as the standard eight, however this slot stores the menu settings without the page data, allowing it to be used to **initialise a new session to your commonly used settings**.

For example, if you like to have a pitch on layer 1, transpose offset on 2 and modulations on 3 and 4 you can save this setup as a template and load it when you want to initialise a new session.

Press MEM+FN for the session template memory slot ("TM"). Turn the encoder to select "TM:SAVE", "TM:LOAD" or "TM:CXL" just like for a normal slot. When the template is loaded "INIT" is shown.

## mixing layers

A fun feature of noodlebox is the ability for layers to modulate each other's outputs via the MIX feature. This enables you to do things like sequencing the transposition of a single pattern over several bars or mixing two melody lines together. It also allows for a lot of experimentation and the creation of complex unpredictable patterns.

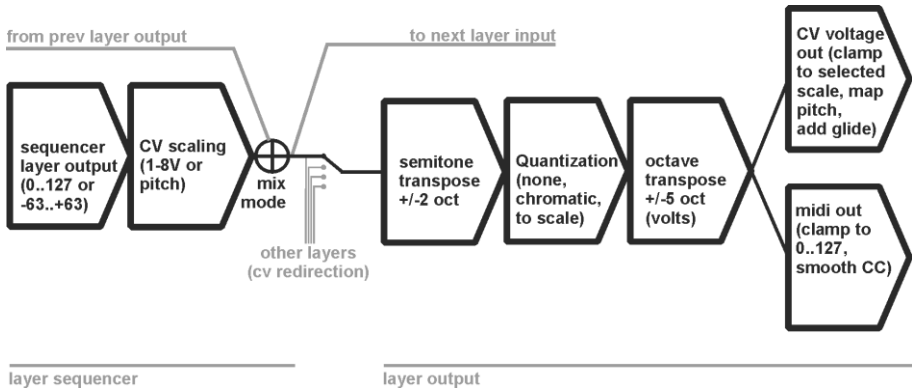
All type of layers (pitch, modulation, offset) can be mixed with the output of the previous layer using the MIX setting on the layer menu (**Note that the layer menu for layer 1 does not have a MIX option, since there is no previous layer**)

- **MIX: OFF** – Only output the layer's own data
- **MIX: ADD** - Output the sum of the previous layer and this layer's data
- **MIX: MASK** – If there is a data point at the current step, output this layer's data otherwise output the previous layer's data
- **MIX: MASK** – If there is a data point at the current step, output the sum of both layers' data otherwise output just the previous layer's data

The output received from the previous layer depends just on its sequencer and its voltage scaling (VLT) setting. Transposition and quantisation are applied afterwards. This is described in more detail below!

## signal path

This diagram shows how the CV information is processed in a layer



Going from the left, the information comes from the step that is currently playing the sequencer. The layer could be set up as pitch, offset or modulation, but each step starts off with a value between 0 and 127 (or -64 to +63 for offset) as entered on a page.

This value is then scaled into the voltage range selected via the VLT setting. If a voltage scaling (1-8V range) is selected for a layer, it is applied to the CV value before any mixing. For these selections, the CV value (0..127) is scaled such that there are 12 points per octave. For example, a CV value of 78 is internally scaled to  $12 \cdot (78/127) = 7.37$  (fractional and negative values can be passed around internally)

If the VLT selection is a 1VO, 1.2V or HZV the sequencer value is unchanged at this point.

Now, depending on the MIX mode, the output from the previous layer may be added. The sum at this point is made available for MIX to the next layer. Let's call this value the output for the **layer sequencer**.

The sequencer output is now passed along to the next stage in the path and appears as the layer outputs. But... not always... until you are pretty familiar with the Noodlebox you might want to skip over the next paragraph :)

We might be using **output redirection**, which could mean that the layer output is actually based on another layer's sequencer output. Conversely another layer might use this layer's sequence output. This is why it is useful to think of each layer as having two parts; the sequencer and the output (Usually these are simply joined together). Being able to think of them and deal with them separately can be very useful!

Now we are at the **layer output** stage and we transpose and quantize the value, based on menu settings as follows

Any selected chromatic transposition is then applied by directly adding it to the input value.

If a quantization is selected, the CV value is rounded to a whole number and, if quantization to scale is selected, the CV is forced into the selected scale.

Volt/octave shift is then added. Each voltage offset point equates 12 being added or subtracted from the CV value.

The resulting CV is then used for the CV and MIDI outputs for the layer:

- For pitch modes (V/Oct and Hz/Volt modes) the CV value is scaled appropriately and is forced into the voltage range of the analog output (0-8.192V) by adding or subtracting octaves (12 CV points).
- For non-pitch modes (1-8V range) the output is "clamped" (clips at selected voltage value)
- CV slew (glide) is added at the voltage output

- For MIDI notes the CV value is forced into the 0..127 range by adding or subtracting octaves. MIDI notes are delineated based on gate data
- For MIDI CC the CV value is clamped into the 0..127 range.

Gate information is processed in a similar way, and it is possible to redirect gates in the same way as CV values.

## output redirection

When you are playing with the layer mix features of Noodlebox, there are some situations where you might want to use the CV output from one layer along with the gate output from a different layer...

For example, if you have a bassline on layer 1 which you are transposing with an offset on layer two, you would want to use the transposed pitch (from layer 2) along with the gate pattern from the original bassline (layer 1).

This is easily done with patch cables (i.e. just use layer 1 gate output socket and layer 2 CV output socket). However, there is no easy fix for the equivalent MIDI output and, besides, you might not want to physically swap cables mid-performance and have pitch cut out while you swap over cables.

Noodlebox allow you to internally route CV and/or Gate information from one layer's sequencer to the outputs (analog or MIDI) of a different layer. This is done using the CV and GAT items in the global menu for the layer whose outputs you want to use.

- **CV** allows you to select the layer from which the current layer will take CV information for analog or MIDI output.
  - **NORM** – Normal mapping, just use this layer's sequencer
  - **L1, L2, L3, L4** – Use sequencer info from another layer (can be same)
- **Gate** allows you to select another layer (can be the same) from which the current layer will take gate information for analog or MIDI output.
  - **NORM** – Normal mapping, just use this layer's sequencer
  - **L1, L2, L3, L4** – Use sequencer info from another layer (can be same)

## muting layers

The mute feature mutes the outputs from a layer. This means that gate output stops, CV output is frozen and MIDI output stops. The sequencer for the layer continues to run, and if the sequencer output is passed to the next layer via the MIX function, or to the output for another layer via output redirection, this continues as normal.

To **display layer mutes**, hold the LAYER button and click PAGE. The list of layer numbers is shown, with layer number replaced by an 'x' if the layer is muted. For example, "L12xx" means layers 3 and 4 are muted and layers 1 and 2 are unmuted.

To **mute or unmute the currently selected layer**, click PAGE again while still holding the LAYER button.

To **mute or unmute any layer**, click (1/2/3/4) while still holding the LAYER button.

Releasing the LAYER button hides the mute statuses.

## using a midi keyboard

Noodlebox can be controlled by MIDI notes from an external MIDI keyboard to allow **note recording** or **interactive transposition by MIDI note**.

To use the MIDI input, you must first **select the MIDI input channel** using the **MDI** setting in the global settings menu. OMNI means that notes can be taken from any MIDI channel. **Select the layer** that you want to control with MIDI by making it the active layer in the editor

Click FN+RAND to select the **recording mode**

- **REC:NONE** – MIDI input disabled

- **REC:CV** – Note recording MIDI note input will replace CV data within the current page. Gate data will not be replaced.
- **REC:TRAN** – MIDI note input will transpose the CV data by changing the TRN setting (any previous TRN setting for the layer is replaced). Transposition depends on the MIDI note that is pressed – middle C (MIDI note 60) is no transpose. Transposition can be applied up to two octaves in either direction.

Click FN+PAGE to **arm or disarm recording**

- **ARM:OFF** – Input from MIDI notes will be heard while you are holding the notes but will not replace the data points in the layer
- **ARM:ON** – Input from MIDI notes will be heard while you are holding the notes and will also replace the data points in the layer

Transposition by MIDI note is not recorded step by step. If you want to automate transposition as part of a sequence, you should create an offset layer to modulate a pitch layer, you can then record into the offset layer.

## cv calibration

Each of the four CV outputs on Noodlebox has calibration settings which are used to correct for analog voltage errors in the DAC output and buffer. **These are 'factory set' and generally do not need to be changed.** Messing them up can put your CV outputs out of tune so do not modify the values unless you know what you are doing.

To manually calibrate the outputs, you will need a good, accurate voltmeter with at least millivolt (0.001V) precision. Note that each output has a finest resolution of 2mV so calibration is about getting the best result possible within this constraint.

The **calibration settings of each output can be adjusted manually** via the global settings menu. Usually a single item **CAL OFF** is displayed. If you modify this menu item you can select a reference voltage 1V, 2V, 3V, 4V, 5V, 6V, 7V or 8V. The selected reference voltage is output through all four CV sockets and any CV data from the sequencer is ignored.

When the menu is closed, or the menu item is changed back to CAL OFF, calibration mode ends and each output is set to 0V. If the sequencer is running, the outputs will pick up the CV from the running sequence.

While a reference voltage is selected, the global settings menu includes the following additional items directly below the CAL setting. **These relate to the CV output for the currently selected layer.**

- **SCL** – Scale correction. This is a value between -99 and +99 which represents the number of 2mV DAC units by which the full DAC range (8.192V) will be extended or compressed. This should be adjusted so that there is as close to 1.000V measured between each reference voltage as possible
- **OFS** – Offset correction. This is a value between -99 and +99 which represents the number of 2mV DAC units by which the output voltage is offset up or down. This should be adjusted after scaling so that each reference voltage measures as close as possible to the correct voltage on the meter.

While the menu is open you can **switch between layers without closing the menu** by pressing LAYER+(1/2/3/4). This lets you calibrate all the outputs without closing the menu,

**When you have made changes to the calibration you must shut down Noodlebox using the power button for these changes to be saved.** If you simply disconnect power the changes will not be saved.

Tip: Focus on the accuracy of voltage points at the middle of the range (i.e. 3V, 4V, 5V) if you find it is not possible to get consistent accuracy across the whole range (This is quite normal)

## sync and aux sockets

Noodlebox has an external pulse clock input (SYNC IN) plus one configurable input (AUX IN) and two configurable outputs (SYNC OUT and AUX OUT) for control functions.

SYNC IN can receive an external pulse clock when CLK is set to PCLK in the global menu. The expected clock rate is set via the SYI in the same menu and can be one of the following

- **8:** Eighth clock (e.g. Korg Volca)
- **16:** Sixteenth clock
- **24PP:** 24 pulses per quarter note

The clock is interpolated internally to derive finer timing increments.

AUX IN can be configured to receive one of the following control functions, which are set via the **AXI** option in the global settings menu.

- **STST:** Consecutive trigger pulses at AUX IN will alternately stop and start the sequencer. When starting, playback will resume from the current position.
- **RUN:** While a gate voltage is present at the input, the sequencer will run. It will stop when the voltage is removed. When starting, playback will resume from the current position.
- **RES:** A trigger pulse received at the socket will reset all layers back to their start position.

SYNC OUT and AUX OUT can be configured to provide clock or control signals. Both sockets have equivalent functionality with SYO global setting controlling SYNC OUT and AXO controlling AUX OUT,

- **ON:** Output pulse clock
- **RUN:** Output pulse clock when running
- **STAR:** Send a pulse out when starting
- **STOP:** Send a pulse out when stopping
- **STST:** Send a pulse out when starting or stopping
- **RES:** Send a pulse out when resetting
- **RNNG:** Output is high while the sequencer is running
- **ACC:** Output is high during a step while has an accented step on any unmuted layer. The accent gate is set high before any note trig from the step so it can be used to modulate accented steps.

For the ON and RUN settings the clock rate is set separately via the SCK option (SYNC OUT) or ACK option (AUX OUT) in the global menu. The same options are available as for input clock

- **8:** Eighth clock
- **16:** Sixteenth clock
- **24PP:** 24 pulses per quarter note

The input sockets expect positive voltages of between 5V and 10V for HIGH and 0V for LOW.

The output sockets send +10V for HIGH and 0V for LOW.

## saving global settings

The settings in the global menu are automatically saved when you shut Noodlebox down as long as you **shut off using the OFF power button**. If you simply disconnect power you will lose these changes.

## Key Commands

### CV

#### click: show data value

Click the CV button to display the value of the data or fill point at the cursor position. If the data or fill point was out of view, the display will scroll so that it is visible.

#### encoder: edit data value

Hold down the CV button and turn the encoder to change the value of the data point at the cursor position.

If there was a fill point at that position it will automatically be changed to a data point. If the **auto trigger setting** is active a trigger will be created at the same time (if none exists)

If there are no existing data points on a page, the new point assumes a default initial value. The value depends on the layer type (C2 for pitch, 0 for modulation/offset)

### CV+GATE

#### encoder: fine adjust value

Change the CV value of the selected data point by +/-1 unit. This allows out of scale notes to be entered in scaled pitch view, or for specific values to be entered in the modulation view.

If there was a fill point at that position it will automatically be changed to a data point. If the **auto trigger setting** is active a trigger will be created at the same time (if none exists)

### CV+CLONE

#### encoder: scroll display

Scroll the display without making any changes to data points. This command is not applicable to modulation mode (which does not scroll)

### CV+CLEAR

#### encoder: horizontal shift

Move all CV and Gate data for all 32 steps in a page to the left or right by a single step, wrapping around up to a total of +/-32 steps (where it arrives back at the original position). The data points themselves are not changed.

### CV+RAND

#### encoder: vertical shift

Change all data points by +/-1. Once all data points (modulation layers) or any single data point (other layers) reach the 0 (minimum) or 127 (maximum) values, no further vertical movement is possible. The Gate data is not changed.

### CV+PAGE

#### press: auto scroll

Click this combination to set the scroll for the window using an average of all the data point values.

### GATE

#### click: toggle trigger

Clicking GATE toggles the trigger setting of the current step.

#### encoder: tie gates

Holding GATE while turning the encoder in clockwise direction enables the tie setting of the step. If you keep turning the encoder clockwise, ties will be added to subsequent steps (increasing the duration of a note)

Turning the encoder anti-clockwise removes the tie setting from the current step. If a clockwise rotation has just been made this will 'back up' again, removing the added ties. The two actions together provide a quick way to 'scrub away' ties.

### GATE+CV

#### press: show accents

When this combination is held, gate points which have accent are highlighted.

#### encoder: set accent

Turn the encoder to the right to set accent ON for the current step. Turn it to the left to turn accent OFF.

## GATE+RAND

### **press – show probability**

While this combination is held, steps which have a probability assigned to them are highlighted.

### **encoder: set probability**

Turn the encoder to change the probability of the selected step playing. By default, the probability shows as 00 which means the step will always play. You can select a value from 01-15 using the encoder. Higher values mean that the step is more likely to play.

## GATE+LOOP

### **press: show retrig points**

While this combination is held, steps which have a retriggering assigned to them are highlighted.

### **encoder: set retrig of gate point**

Turn the encoder to change the retrigger delay in 1/16 fractions of the step duration. The shorter the delay the more retriggers will happen. Retrigs occur over full step duration with each holding gate open according to DUR menu setting.

## GATE+PAGE

### **encoder: replace trigs**

As the encoder is turned, all the gate points on the page are replaced with new trigger points calculated based on a 'Euclidean' algorithm. In this scheme a selected number of trigs are divided across a selected number of steps, but quantized to the step grid

The number of steps is determined by the size of the loop window, and the encoder is used to select the number of trigs. The resulting trig pattern is repeated so that it fills all 32 steps of the page. The display shows the number of trigs and steps.

## GATE+LAYER

### **encoder: off-grid amount**

Depending on the OFG menu setting, the swing or slide applied to gate timing can be set between 25 (half grid step early) and 75 (half grid step late). A setting of 50 means play on grid.

## CLONE

### **click: set source step for block clone**

You can clone (copy and paste) data from a range of steps to another range on the same page or on a different page or different layer. Start a block clone action by marking the source step by clicking the CLONE button.

### **encoder: clone steps**

After moving the cursor to the new location (which could be on a different page or layer) hold the CLONE button again and turn the encoder. Data is copied from the source to the new location one step at a time as you turn the encoder.

Data points, gate points, probability, accent and retrig are copied. When a fill point is copied to a new step that has a different CV value, the fill point is automatically converted to a data point to ensure its value is preserved

To clone a single step, you don't need to set a clone source – simply move the cursor to the source step and press and hold CLONE, then turn the encoder to start copying.

If you have set a clone source and want to cancel the operation, simply click CLONE again. Any other operation other than a change of page or layer also cancels the operation

## CLONE+CV

### **encoder: clone data values only**

To clone just data values without copying gate information, hold this combination when turning the encoder during one of the above steps.

## CLONE+GATE

**Encoder: clone gate information only**

To clone just gate information without copying data values, hold this combination when turning the encoder during one of the above steps.

## CLONE+PAGE

**encoder: copy entire page**

You can copy all the contents of a page to another location in the same or a different layer. While holding this combination, turn the encoder to select the destination page.

Release the buttons to complete the action and overwrite the destination page (DONE is displayed) or turn the encoder fully to the left (so ?? is displayed) to cancel the action.

If you copy to a new page in a different layer which is beyond the last existing page for the layer (e.g. only page A exists and you copy into page D) the intervening pages (e.g. B, C) are created with blank content.

When copying pages between layers that are in different modes, the page takes on the mode of the target layer.

## CLONE+LAYER

**encoder: copy entire layer**

You can copy all the contents of a layer to another layer. While holding this combination, turn the encoder to select the destination layer.

Release the buttons to complete the action and overwrite the destination page (DONE is displayed) or turn the encoder fully to the left (so ?? is displayed) to cancel the action.

All layer settings, including those in the layer menu and output redirections, are replaced in the target layer.

## CLEAR

**click: clear current step**

Click CLEAR to clear the data point and the gate information (including accent, probability and retrigger) from the current step

**encoder: clear multiple steps**

Hold down CLEAR and turn the encoder to clear multiple steps

## CLEAR+CV

**click: clear data value**

Clear data value from a step without affecting gate information

**encoder: clear multiple data values**

Clear data value from multiple steps without affecting gate information

## CLEAR+GATE

**click: clear gate information**

Clear gate information from a step without affecting data value

**encoder: clear multiple step gate information**

Clear gate information from multiple steps without affecting data values

## CLEAR+PAGE

**encoder: clear page**

Turn the encoder to confirm. All data points and gate points are cleared from the current page and loop points are reset to default.

## CLEAR+LAYER

**encoder: clear layer**

Turn the encoder to confirm. All pages are cleared from the current layer.

## RAND

**encoder: create randomness**



Turning the encoder adds or removes randomness (points shift up or down by various amounts and new data points are created). Each time RAND is pressed a new set of "paths" is generated. While RAND is held points will shift up and down along the same paths so the action is reversible.

The page snaps back to previous state when the button is released unless you commit it with another button press (see below)

## RAND+ (ABCD)

**click: save randomness to a specific page**

Commits the current randomisation to a specific page slot while continuing. Select the page slot A/B/C/D using the first four command buttons (CV/GATE/CLONE/CLEAR)

Please note this command cannot be used to save to the current page (use RAND+PAGE instead)

## RAND+LOOP

**encoder: create random page**

Turning the encoder fills the page with random data (with both gate and CV data points).

Each time RAND is pressed a new set of random pages is generated. While RAND is held you can move backwards and forwards between these pages using the encoder.

The page content snaps back to previous state when the button is released unless you save it (You must release LOOP while keeping RAND pressed to use a save command)

## RAND+PAGE

**click: save randomness to current page**

Commits the current randomisation to the current page and exits from the mode

## LOOP

**click: Set play position**

Clicking LOOP during playback sets the current play position for the layer to the current page and step. If you are in cued playback mode, the arrangement will carry on after the current page finishes playing.

**encoder: set loop window**

Move the cursor to the start position and hold the LOOP button. Turn the encoder to select the end position of the loop window. The new loop window takes effect when the button is released.

The loop window may not span the edge of the page; however, you can set the start position to the right of the end position to play the loop in reverse

## LOOP+ (ABCD)

**click: cue page for playback**

Keep LOOP pressed and tap one or more page buttons to cue up an arrangement of up to 16 pages to play in the background. Select pages A/B/C/D using the first four command buttons (CV/GATE/CLONE/CLEAR)

## LOOP+RAND

**click: cue random pages for playback**

A random and non-repeating sequence of pages from the active page range are cued for background play.

## LOOP+PAGE

**click: start / cancel background play**

If pages are not playing in the background, the current page is cued to play in the background so you can go and edit other pages without them immediately playing.

If pages are already playing the background, background play is cancelled and the currently selected page immediately starts to play from the current step position.

## LOOP+LAYER

**click: cue all pages**

All the active pages in the layer are played in sequence

## PAGE

**click: identify page**

Click the PAGE button to display the name of the page and layer you are viewing. Pages are labelled A, B, C, D and layers numbered 1-4, so 2B is page B in layer 2. An x is shown after the page name if the layer is muted.

**encoder: quick add/clear pages**

the currently defined pages are shown (e.g. ABC). Turn the encoder left and release the button to clear pages (from the right). Turn the encoder to the right and release the button to copy the rightmost page into the following slot.

## PAGE+ (ABCD)

**click: select page**

Select pages A/B/C/D using the first four command buttons (CV/GATE/CLONE/CLEAR)

## PAGE+LAYER

**encoder: reorder layers**

Use this function to change the order of layers 1,2,3,4. Select the new position for the current layer or turn the encoder anticlockwise to the CXL option to cancel.

Once the move is complete the layers are renumbered, for example moving layer 2 to the position after layer 4 results in it being renumbered 4, and the old layer 4 renumbered to 3.

## LAYER

**click: layer menu**

Display the layer menu

## LAYER+ (1234)

**click: select layer**

Select layers 1/2/3/4 using the first four command buttons (CV/GATE/CLONE/CLEAR)

## LAYER+PAGE

**click: mutes**

When this combination is clicked, the mute status of each layer is shown, for example "L12x4" means layer 3 is muted. Mutes stay displayed until LAYER is released.

While keeping LAYER held down you can mute and unmute current layer by releasing and clicking PAGE

While keeping LAYER held down you can mute or unmute other layers 1/2/3/4 using the first four command buttons (CV/GATE/CLONE/CLEAR)

## RUN

**click: start / stop / resume playback**

Start and stop playback. Playback resumes from the position where it was stopped.

## CV+RUN

**click: restart playback**

Start playback or reset playback to the first step on all layers.

## MEMO+ (1 . . 8)

**hold down: display current memory slot**

Show the last accessed (for load or save) user memory slot (if any)

**encoder: load or save memory slot**

Select one of the eight memory slots by holding MEMO and pressing one of the eight command buttons.

Release the MEMO button to load from the slot. To save to a slot, first turn the encoder to the right so SAVE is shown on the display. To cancel the action, turn the encoder to the left so CXL is shown.

## MEMO+FUNC

[encoder: load or save session template slot](#)

Works in the same way as memory slots 1-8 except that no page information is saved, just layer settings. Use this slot to save a template for your sessions.

## FN+CV

[click: set row spacing for pitch mode](#)

**ROWS:CHR** – Each row is a chromatic scale point and there are 12 rows per octave

**ROWS:SCA** – Each row is a diatonic scale point (according to the selected scale) and there are 7 rows per octave. Use fine adjust to select CV values which are not in the selected scale

## FN+GATE

[click: automatic gate creation mode](#)

**TRIG:MAN** – gate points must always be created manually

**TRIG:AUT** – when creating a new data point, a gate point is added automatically

## FN+CLONE

[click: fill point mode](#)

**FILL:PAD** – fill points maintain the value of the previous data point

**FILL:INT** – fill points interpolate between data points

**FILL:OFF** – fill points are not generated. Non data points are left at value zero

## FN+CLEAR

[click: pitch grid](#)

**GRID:HID** – grid is hidden

**GRID:SHO** – grid is shown

## FN+RAND

[click: midi record mode](#)

Sets the function of the MIDI input (the sequencer must be running for the changes to be heard)

**REC:NONE** – MIDI input is ignored

**REC:CV** – MIDI notes on the appropriate input channel override the notes from the sequencer, time-quantized to each new step. Whether these notes are recorded into the sequence, replacing the previous notes, depends on the Record Arm setting.

Gates are not affected; an existing gate must be present in the sequencer for the note to play.

**REC:TRAN** – MIDI notes on the appropriate input channel are used to change the TRN setting in the layer menu, allowing a chromatic transpose of +/- 2 octaves. Middle C (MIDI note 60) is the 'no transpose' position. When the key is released, the layer jumps back to zero transposition unless Record is Armed.

## FN+LOOP

[click: loop point mode](#)

**LOOP:LAY** All pages in layer share loop points

**LOOP:PAG** Pages have own individual loop points

## FN+PAGE

[click: midi record arm](#)

Determines whether MIDI input is recorded into the layer

**ARM:OFF** – Changes from MIDI input override layer data only while MIDI keys are pressed

**ARM:ON** - Changes from MIDI input replace existing layer data

## FN+LAYER

[click: global settings menu](#)

Display the global settings menu

## layer menu

This menu is accessed by clicking pressing the LAYER button. It contains settings that relate to the current layer, plus a couple of global settings such as clock source and BPM. This is the most commonly used menu.

You can select another layer while the menu is open by holding LAYER and clicking one of the four left most buttons. Click LAYER to exit from the menu.

### TYP

Select the **type of layer** (determines how the pages in the layer are displayed and edited)

- **PTCH** : Pitch layer
- **MOD** : Modulation layer
- **OFFS** : Offset layer

### DUR

Select the **gate duration** for each step in the layer

- **TRIG**: Short trigger pulse only
- **01-15**: 1/16 fractions of step duration
- **FULL** : Full step duration

### RAT

Select the **step rate** for the layer, which determines how the length of each step is related to the clock tempo

Options are **1, 2D, 2, 4D, 2T, 4, 8D, 4T, 8, 16D, 8T, 16, 16T, 32** where the number represent fractions of a whole note (e.g. 4 is quarter note), D represents dotted time (1.5 times normal) and T represents triplet time.

Typically, a sixteenth division is used, and 16 is the default value.

### OFG

Select the **off-grid mode** for the layer. Off-gridding provides a way for steps to be timed so that they play before or after the normal grid position.

- **NONE**: Notes play **on-grid**
- **SWNG**: **Swing**, move even steps +/- amount
- **SLID**: **Slide**, move all steps +/- amount
- **RAND**: Move all steps **randomly** up to +/- amount

The actual **amount** of off-gridding is set using GATE+LAYER command..

### VLT

Select the **voltage scaling** mode for the layer.

- **1,2,3,4,5,6,7,8** : The volts over which the 0-127 range of data values is scaled. Allows microtonal output via CV.
- **1VO** : Output is scaled as **1V/octave**
- **1.2V** : Output is scaled as **1.2V/ octave**
- **HZV** : Output is scaled as **Hz/volt**

Specific voltage scaling (1-8V) affects the output passed to the next layer if via MIX (if appropriate)

Please note that when applied to a pitch layer, voltage down-scaling means the note names shown in the editor will be incorrect.

### MIX

Sets how the scaled sequencer output from the previous layer is mixed with the sequencer output from the current layer

- **OFF** : Output this layer's CV data
- **ADD** : Output this layer's CV data plus the previous layer CV data

- **MASK** : Output this layer's CV data where there is a data point at the current step, otherwise use the previous layer CV output.
- **BOTH** : Output this layer's CV data plus the previous layer CV data where there is a data point at the current step, otherwise use the previous layer CV output.

This option is available for layers 2,3,4 only.

## TRN

Sets an optional **chromatic transposition** for the layer. A value from -24 through +24 semitones (+/- 2 octaves) can be entered.

Transposition via MIDI input changes this setting.

## QUA

Select **quantization of output CV into a scale**

- **OFF** : No quantization (microtonal data allowed)
- **CHRO** : Quantize chromatically
- **SCAL** : Force to diatonic scale

## OCT

Shifts the output voltage **up or down by a whole number of volts (octaves)**. A value of **-5 through +5** can be selected

## SLW

Selects **voltage slew** for this layer's CV output

- **OFF** – no slew applied
- **ON** - slew applied to all steps
- **TIES** – slew applied to steps with tied gates

## MID

Select **MIDI output mode** for the layer (i.e. how the CV and gate outputs are translated into MIDI)

- **NONE** – No MIDI output from the layer
- **NOTE** – CV/gate mapped to MIDI notes
- **CC** – CV mapped to MIDI CC

## CHO

Select **MIDI output channel, 1-16**

## VEL

Select **MIDI note velocity** (0-127) for note information output from this layer. This option is shown only if the MID option is set to NOTE

## ACC

Select **accented MIDI note velocity** (0-127) for note information output from this layer on steps which have gate accent set. This option is shown only if the MID option is set to NOTE

## CC

Select **MIDI continuous controller (CC) number** (000-127) for output from this layer. This option is shown only if the MID option is set to CC

## SMO

Enable **smoothing for continuous controller (CC) values** on this layer.

- **OFF** – do not interpolate CC output.
- **ON** – interpolate CC output

## BPM

Set the **tempo of the internal clock** (030-300 BPM). This option is only shown if the clock source (selected on the global menu) is set to internal.

## global menu

This menu is accessed by holding the Function (FN) button and pressing the LAYER button. Most items in this menu have affects that are common to all layers, however the CV/Gate remapping and Calibration functions apply to the selected layer.

You can select another layer while the menu is open by holding LAYER and clicking one of the four left most buttons. Click LAYER to exit from the menu.

## SCA

Sets **diatonic scale mode** for the QUA:SCAL option in the layer menu. All layers share the same scale. Scale mode can be selected from **IONI, DORI, PHRY, LYDI, MIXO, AEOL, LOCR**

Note that IONI (Ionic) is major scale, AEOL (Aeolian) is minor scale

## R00

Sets **scale root note** for the QUA:SCAL option in the layer menu. All layers share the same scale. Scale root note can be selected from **C,C#,D,D#,E,F,F#,G,G#,A,A#,B**

## CLK

Sets the **clock source** for the sequencer

- **INT**: internal BPM clock
- **MCLK**: external master clock via MIDI
- **MTRN**: external clock and transport via MIDI
- **PCLK**: external pulse clock via SYNC IN

## SYI

Sets the **pulse clock input rate** for the SYNC IN socket. This option is shown only if PCLK is selected for CLK.

- **8**: Eighth notes
- **16**: Sixteenth notes
- **24PP**: 24 pulses per quarter note

## SYO

Sets the **output socket function for SYNC OUT**

- **OFF**: No output
- **ON**: Continuous pulse clock
- **RUN**: Pulse clock when running only
- **STAR**: Start trigger
- **STOP**: Stop trigger
- **STST**: Start or stop trigger
- **RES**: Reset trigger
- **RNNG**: Run gate
- **ACC**: Accented note (any layer) gate

## SCK

Sets the **pulse clock output rate for SYNC OUT**. This option is shown only if ON or RUN are selected for SYO.

- **8**: Eighth notes
- **16**: Sixteenth notes
- **24PP**: 24 pulses per quarter note

## AXO

Sets the **output socket function for AUX OUT**

- **OFF**: No output
- **ON**: Continuous pulse clock
- **RUN**: Pulse clock when running only
- **STAR**: Start trigger
- **STOP**: Stop trigger
- **STST**: Start or stop trigger
- **RES**: Reset trigger

- **RNNG**: Run gate
- **ACC**: Accented note (any layer) gate

## ACK

Sets the **pulse clock output rate for AUX OUT**. This option is shown only if ON or RUN are selected for AXO.

- **8**: Eighth notes
- **16**: Sixteenth notes
- **24PP**: 24 pulses per quarter note

## AXI

Sets the **input socket function for AUX IN**.

- **OFF**: No input
- **STST**: Start/stop toggle control
- **RUN**: Run gate control
- **RES**: Reset trigger control

## MCK

Set the **MIDI Clock output mode**

- **OFF**: Do not send MIDI clock
- **ON**: Send MIDI clock at all times
- **ON+T**: Send Transport + MIDI clock at all times
- **RUN**: Send MIDI clock only when running
- **RN+T**: Send transport + MIDI clock when running

## MDI

Set the **MIDI input channel** for note recording

- **1...16**: Specific channel
- **OMNI**: Any channel

## CAL

Set **CV output calibration mode** for all layers

- **OFF**: Normal running mode
- **1V .. 8V**: The CV output for each layer is set to a fixed output voltage for testing and calibration purposes.

## SCL

**Adjust CV calibration scale setting**. This is hidden when CAL is OFF.

- **-99 .. +99**: Scale adjustment for the CV output for the layer

## OFS

**Adjust CV calibration offset setting**. This is hidden when CAL is OFF.

- **-99 .. +99**: Offset adjustment for the CV output for the layer.

## CV

Configure **CV redirection for this layer**

- **NORM**: Normal mode, no redirection
- **L1..L4**: The CV socket for the current layer outputs the CV from the specified layer's sequence (after applying this layers TRN, QUA, OCT, SLW settings)

## GAT

Configure **gate redirection for this layer**

- **NORM**: Normal mode, no redirection
- **L1..L4**: The GATE socket for the current layer outputs the GATE from the specified layer's sequence.

## Firmware Updates

Noodlebox has a bootloader program installed which enables the update of the device firmware using specially created MIDI SYSEX files containing the program code.

To update the noodlebox firmware over MIDI you keep the OFF button held when you press ON. You should see the CLK and MID LEDs light. Use the MIDI input to receive the firmware SYSEX file sent from a suitable program on a computer (such as MIDI-OX on PC or Sysex Librarian on Mac), making sure that there is no other MIDI activity at the time you are sending the update

During the upload the CLK light blinks regularly and MID is on solid. The upload may take several minutes. When the upload completes, the CLK and MID lights blink alternately and GAT is off. If GAT is blinking then an error has occurred. The GAT LED will blink a number of times followed by a short delay, then the sequence repeats. The specific codes have the following meaning

Blink code	Description
1	Sysex Framing error
2	Sysex ID incorrect
3	Sequence number error
4	Checksum error
5	Serial interface error
6	Flash programming error
7	Data overrun

Blink code 1 or 2 can mean that you are sending a file that is not a valid noodlebox firmware file. Check that you have the correct file and retry the update.

Blink codes 3,4,5 would usually mean that the upload has been interrupted. Check that there has been no power interruption, ensure all cables and connections are OK (maybe try a different cable or use some isopropanol to clean the socket). Try the update again.

Blink codes 6, 7 should not normally happen, but there is a chance they could be caused by an corrupted upload or power supply problem. Check everything and try again.

A partial upload could leave the device in an unstable or unusable state, so be sure to try the programming again.

## Calibration Messages

Noodlebox allows certain MIDI messages to change the CV calibration settings. These are used for automated factory calibration of the CV outputs.

Before these messages will be accepted, the noodlebox must be put into calibration mode via the CAL setting in the global menu (FN+LAYER). Selecting any reference voltage places the device into the calibration mode.

Now the following NRPN messages can be used to change the calibration settings

Parameter number MSB	Parameter number LSB	Data entry MSB	Data entry LSB	Description
CC#99	CC#98	CC#6	CC#38	
21	15	0	1-8	Set reference voltage output for all layers (1 through 8 volts)
21	98	0-1	0-99	Scale correction A (Layer 1 SCL)



21	99	0-1	0-99	Offset correction A (Layer 1 OFS)
22	98	0-1	0-99	Scale correction B (Layer 2 SCL)
22	99	0-1	0-99	Offset correction B (Layer 2 OFS)
23	98	0-1	0-99	Scale correction C (Layer 3 SCL)
23	99	0-1	0-99	Offset correction C (Layer 3 OFS)
24	98	0-1	0-99	Scale correction D (Layer 4 SCL)
24	99	0-1	0-99	Offset correction D (Layer 4 OFS)
1	100	0	0	Save all the configuration settings (including updated calibration)

For each scale or offset setting, the MSB of the data entry value is the sign of the calibration value. When data MSB is 0 the value (0-99) of the LSB is positive. When data MSB is 1 the value (0-99) of the LSB is negative.

## hardware specifications

- **Input sockets:** MIDI In (3.5mm TRS jack. MMA standard "type A"), Sync In (3.5mm mono jack. 5-15V pulses, selectable function), Aux In (3.5mm mono jack. 5-15V pulses, selectable function)
- **Output sockets:** MIDI Out: (3.5mm TRS jack. MMA standard "type A"), Sync Out (3.5mm mono jack. 10V pulses, selectable function), Aux Out (3.5mm mono jack. 10V pulses, selectable function), 4 x Gate Out (3.5mm mono jack. 10V pulses), 4 x CV Out (3.5mm mono jack. 0-8V range, 12-bit resolution, V/Oct, Hz/V and selectable linear voltage scaling)
- **Display:** custom LED assembly, 32 x 16 pixels (128 x 64mm), 3 brightness levels
- **Indicators:** LEDs for tempo, MIDI activity, gate activity, power
- **Controls:** 11 buttons, rotary encoder, power on and off switches
- **Processor:** 32-bit ARM Cortex M0+ running at 48MHz, with 128k FLASH/16k SRAM. Firmware user-updateable by MIDI system exclusive (SYSEX) message
- **Power:** 9-12V DC centre negative barrel, 200mA or greater capacity, 2.1mm pin (guitar pedal type).
- **Enclosure:** aluminium extrusion top/bottom, solid oak sides, 1.6mm composite PCB material front/back
- **Size:** approx. 185 x 155 x 24mm (40mm height including encoder knob)
- **Weight:** approx. 515g
- **Included accessories:** 1 x wall-wart type power supply with mains pins for your region (UK, EU and US type supply available), 2 x 3.5mm TRS to 5-pin MIDI breakout adaptors

## credits

Noodlebox is a product of Sixty Four Pixels, designed and hand assembled in Brighton, UK.

Beta Testing and Ideas: Gareth Millar, Guy Schneerson, Chris Calcutt.

Creative Input and Ideas: Scott Pitkethly, Lorah Pierre, Lee Stephenson

Product Video: Darren Stockford

Daisy Artwork: James Parsons

Hardware design, firmware programming, documentation: Jason Hotchkiss