

GenoQs Octopus - *Reference Manual*



*Octopus Community Edition Operating System version 5.30*

*September 2023,*

*Based on the original Navigation Guide by.....*

genoQs Machines, Stuttgart, Germany ©2009



# Original Introduction

Welcome, and sincere congratulations to the purchase of your new sequencer, a genuine genoQs Machines Octopus!

You now own one of the definitely finest MIDI instruments ever built. We proudly put in your hands a device built to drive your creativity and provide you joy for years to come.

Octopus is conceived as a living instrument with long-lasting value, to help you search and discover new sonic territory, rewarding you with an unequalled haptics experience.

We invite you to explore the capabilities of Octopus as you like and provide this manual as a start-up guide. Herein, you will recognize many known terms and concepts. However, others may be used slightly differently from what you would expect and some may be entirely puzzling.

This is why we recommend that once you are over the first wave of pushing buttons, flashing lights and turning knobs you read this guide end-to-end carefully - and we are aware that no-one likes to read the manual.

Taking a step back, we do appreciate the complexity that Octopus is able to provide. Don't get intimidated! You will soon discover fast ways of operation to best suit your style and preference, the comfort zone where you are most productive.

But remember that only few clicks away await things that you had never thought of doing or achieving. This is what Octopus is about - at every stage and no matter what - you are encouraged to experiment, explore and push the boundaries!

Gabriel Seher and Marcel Achim  
Stuttgart, Germany 2009

Please check our web site regularly for latest news, software and documentation  
<http://www.genoqs.net>

## Basic Reference:

Middle C:	Note number 60 = C5
In Track view:	To move to a different Track just turn the desired Track MIX encoder.
MCC:	If set to any value other than "none" then the chase light will be orange rather than red.
MCC Attribute:	At Track level sets the MCC control for that Track, i.e. '10' = Pan. At Step level sets the amount of 'Pan' (in above case), 64' = 'centre'.
OS Version & Device Mode:	Reboot machine whilst holding Esc button, the version will show on the matrix.
Clear Grid of all Pages	Reboot machine whilst holding Clear button. Note, this does not clear the stored 'flash memory' unless a subsequent Save operation is applied.
LED comparison	Red = Blue Green = Yellow Orange = Purple

This updated reference includes all new features added in CE OS v5.30

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# 1. Community Edition version 5.30

This operating system for the Octopus sequencer is essentially a follow-on from Community Edition v5.00. It contains all the features of that operating system, fixes several bugs and also adds many new features as noted below.

## New Features in v5.30

Toggle Step Skip in Step Zoom	- Page 14
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## Bug Fixes

Chord stacking using a keyboard can lose notes when inverting the root.

Effector Note Pool computations incorrect when using multiple Feeders.

Hypertrack Step VEL values inverting when offsets take their values below zero.

Using x1.5 Track Speed within a Track Chain causes timing errors.

Restarting a Paused Track with a Speed multiple > x1 will Play the Track at x1 speed

Skipped Steps & Hypersteps not displaying properly in Step Zoom.

When sequencer is stopped, not possible to set track multiplier to 1/1.5.

## Legacy changes

To accommodate On-The-Measure Mode there have been the following changes to legacy behaviour (v5.00 & earlier):-

View/Mode	Legacy	Version 5.30	Relevant to Feature(s)
<u>Page View</u>	Track Mode led Off	Track Mode led Green	On-The-Measure Mode
<u>Track Zoom</u>	When Track Solo'd - Main MUT flash Green	When Track Solo'd - Main MUT led Green  Main MUT flash Green when armed for Solo (OTM)	On-The-Measure Solo, Track-Across- Cluster Solo
<u>Page View</u>	All Track's Chain Solo'd when any track in chain Solo'd	Now only possible using main SEL button	On-The-Measure Solo, Track-Across-Cluster Solo
<u>Page View</u>	Inversion of Track Chain Solo's when partial chain solo used	No Longer Available*	

\*Can be achieved using new Step Event Track Toggles

### Changes to '200' button operation

#### **Legacy Operation (v0.99 to v1.63 & CE v5.00):**

200 - Orange - Master Midi Clock Send  
Single-click  
200 - Off - Master No Clock Sent  
Double-click  
200 - Green - Slave No Clock Sent  
Single-click  
200 - Red - Slave Clock Send (echo'd)

#### **CE v5.30 operation:**

200 - Orange - Master Midi Clock Send  
Single-click  
200 - Red - Slave Clock Send (echo'd)  
Double-click  
200 - Off - Master No Clock Sent  
Single-click  
200 - Green - Slave No Clock Sent

### Custom Direction Maps

Track Direction Map edit is no longer accessible from Step Mode. As per legacy operation it remains available from Track Mode via double-click of the track DIR selector.

### Step 'Mask' value

Certain features reference a new Step 'mask' value, this value is used to prevent an action being applied to a specified step. The Step AMT attribute value of -127 is the 'mask' value.

Step Mask is available in the following functions:-

Effector Step Mask - Page 63

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## 2. Step Mode

### Step Mode Index:

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### Step Zoom

From Page View mode, holding the Step Mode button and pressing any key in the matrix selects the corresponding step into the zoom focus of the STEP mode. Alternatively, if you want to edit a step in the same track, you may press its corresponding button in the bottom row to switch view to that particular step.

### Operations in Step Zoom

When in Step Zoom, click the required Step on track row 0 to make it the "selected Step", it will flash to show it has been selected.

### Step Copy

When zoomed into a Step simply click the Copy button to copy all of the step attributes.

### Step Paste

Clicking the Paste button will paste the previously copied step at the currently selected step location. The paste operation is confirmed by the step led which ceases to flash once the paste operation is complete.

### Step toggle (TGL)

Press the TGL mutator to turn the selected step on and off.

### Step clear (CLR)

Pressing this will recall the pre-set values for the attributes of the selected step and will also turn the step of, if it was turned on before.

The default Step attributes values are:

VEL offset = 0  
PIT offset = 0  
LEN = 1/16  
STA offset = 0  
AMT = 0  
MCC = none

### Step randomize (RND)

This will assign most step attributes random values. The randomization takes place based on the actual Step value and using 50 as randomization amount. The GRV and POS attributes that are not affected by this function.

### Step skip

A skipped step means that the chase-light will simply ignore the step and just move to the next un-skipped one.

In step zoom, the selected step may have its Skip condition turned On or Off by clicking the Main Mute button. The LED of a skipped step is shown red. If a selected step is set to "skipped" then the Main Mute button led will show the condition of the underlying step, as follows:-

Step Status	Selected Step LED	Main Mute LED
Off	Flash Red	Off
Off & Skip	Flash Red	Red
On	Flash Green	Off
On & Skip	Flash Red	Flash Green
Chord/Event	Flash Orange	Off
Chord/Event & Skip	Flash Red	Flash Orange (*Orange)
Hyperstep	Shine_Red	Off
Hyperstep & Skip	Flash Red	Shine_Red

*\*If Event & Skip but the underlying step is toggled off*

In Page View, to skip a step, press and hold the step button in question and click on the MUT button. You will see the step LED turn red. Repeat the procedure for as many steps as you would like. To un-skip a step and let it play again, just press it once and the red light will go off.

### Step zoom (ZOM)

In STEP mode the LED is lit up in Red. Pressing the ZOM key will exit the STEP mode and return you back into the PAGE mode.



## Step Shift

When zoomed into a Step, turning the DIR encoder will either advance all steps to the right of the step flashing in row 0 one complete step, or will move all steps to the right of the flashing step one complete step closer to the flashing step (provided the first step to the right of the flashing step is toggled off and not a Skip Step or Step Event).

Any steps that are advanced beyond Step 16 will be lost unless an 'over-run track' is configured, see Page Edit Preview mode for further information.

*Note: The position of a hyper-step does not change, shifted steps 'hop-over' a hyperstep.*

## Exiting STEP mode

If you want to exit the STEP mode, you may press ESC anytime to find yourself back in the PAGE mode. Another option is to go back to the PAGE mode by pressing the PAGE mode button in the MODE selector section of the front panel.

## Step attributes

Going over the front panel from left to right, you see all LEDs lit up in the SEL column.

### Step velocity (VEL)

The contents of the VEL row may look familiar - a number is represented here, with the Red LEDs counting the tens and the Green LED pointing to the ones value. This value may be changed in a more conventional fashion by simply turning the VEL knob.

The step velocity offset may be a positive or negative number. Negative offsets are shown in the same manner as positive offsets, but additionally the 3 LEDs in columns 14-16 are lit Green.

Please note that the total velocity of a step is determined by adding the individual step velocity offset to the base Track velocity. This allows a wide range of velocities in a track while still giving you one place (the track velocity) to adjust them all up or down and still maintain the relationships set for each step.

### Step pitch (PIT)

As you may expect, the PIT row shows the pitch value for the step.

The number displayed is really an offset that the step applies to the track pitch. The combined pitch of the track and the step is shown in a musical fashion in the inner circle.

Turning the PIT knob will now cause the obvious - it will change the pitch for the step, which you will hear once the step is played.

Just as for velocity, step pitch may be a positive or negative offset relative to the base track pitch. Negative offsets are shown in the same manner as positive offsets, but additionally the 3 LEDs in columns 14-16 are lit Green.

### Step length (LEN)

The same principles apply to all the other step attribute values in the page, except for the display of their values.

Change the length on the step by turning its LEN knob. As you increment the value (turning the knob clock-wise) you will see a Green dot advancing up to 11 after which the Red value will be incremented.

Each Green increment corresponds to 1/192 of a note and each Red value corresponds to 12/192 = 1/16 of a note.

The minimum step length is 1/192. A decrement beyond that point will light the last 4 LEDs Green. This means that the step is set to legato mode - i.e. no note off MIDI signal will be played for this step.

The natural maximum length of a step is one full note - 192/192.

However, Steps have a LEN multiplier, allowing them to play up to 8 times their actual length.

The step LEN multiplier value is in the range 1-8. The step multiplier value is shown (and editable) in STEP mode in the transport area, using the pattern used for track clock multipliers.

The maximum step length is therefore 8 full notes at master clock speed. The multiplier can be adjusted manually, and is computed automatically when recording notes in a track (as shown below). This allows for recording long-holding notes to a remarkably large degree.

Multiplier	Hold	Click	>	>>	>>>>
1		>			
1.5	>>	>			
2		>>			
3	>	>>			
4		>>>>			
5	>	>>>>			
6	>>	>>>>			
7	> >>	>>>>			
8	>>>>	>>			

Alternatively, hold the circle TEMPO (XII) key and the Step LEN multiplier value is shown red in the LEN row of the matrix, available multiplier values are shown in orange - use the matrix keys to edit the value.

Additionally, with the circle TEMPO key held the Transport Stop & Play buttons are available.

### Step start (STA)

This row denotes the start of a step. By default you will see that the STA line is empty.

Turn the STA knob clockwise and you will see a Red bar go from left to right - you are just delaying ("pushing") the step - every time by 1/192 of a note. The maximum push is 5/192.

Turn the knob back until you reach the default position, i.e. all LEDs are of. Now turn the knob further back and you see now a Green bar growing from right to left starting on position 16 of the row - you are pulling the step to the front of the beat.

The current maximum pull is 5/192. Note that the real effect of this setting is directly dependent on the value of the track STA attribute.

### Step amount (AMT)

The next parameter in line would be AMT (amount). We will get into the details later, for now it is enough to mention that this indicates the amount to which an event programmed on this step will affect the current track.

### Step phrasing (GRV)

A Step may be enriched at playtime by a certain amount of notes determined by phrases that are pre-programmed into something we call phrases. There are three banks of 16 phrases, for a total of 48. They are roughly covering delays, rhythmic delays and note intervals respectively.

As you turn the GRV encoder to the right you will see the phrase number increase from 1 to 16 (0 means no phrase is selected). Once 16 is reached in a bank, the colour of the pointer LED will switch to the next bank, as you can tell from the colour.

### Step phrase time compression (POS)

The POS value will become visible as soon as a phrase is selected from the pool for the respective step and represents the time compression value for the particular step phrase. A value of 8 is neutral.

Values lower than 8 will speedup the playback of the phrase, while values greater than 8 will slow down the playback.

### Step MIDI continuous controller (MCC)

The MCC value represents the amount of MIDI CC sent at this particular step position. This of course only applies when the track is told to do so. \*More on this in the TRACK view.

The display uses a decimal representation similar to that used for VEL, with the exception that it has a "void" value, indicated by 4 Green LEDs in the last positions of the track. This means that no value is sent out on that track - since 0 would be a valid value for a MIDI continuous controller.

If set to any value other than "none" then the chase light will be Orange rather than Red.

*\*Attribute at Track level sets the MCC control for that Track,*

*i.e. '10' = Pan.*

*Attribute at Step level sets the amount of 'Pan' (in above case),*

*i.e. '64' = 'centre'.*

### Quick Step Attribute edit via matrix keys

When in Step zoom it is possible to edit Step attribute value with either their respective edit knob or via entering values with the matrix keys.

For attributes that have integer values (VEL, LEN, AMT, MCC) a double-click will set a 10's value & a single-click will set a 1's value. Additionally, the following 'quick keys' are available:-

	Step 13	Step 14	Step 15	Step 16
Attribute	Click	Double-click		
Velocity	Invert value	Clear	Clear	Clear
Pitch	Invert value	Default	Octave - (8vb)	Octave + (8va)
Amount	Invert value	Clear	Clear	Value -127 (mask)
MCC	-	Clear	Clear	Clear

*Double-click of a Step Phrase (GRV) button will advance to the next Step Phrase Group.*

### Ghost toggle

Press and hold pressed two or more step buttons placed in separate rows but in the same column. Let's use for instance the rows 3 and 4.

Press a step in row 3 and at the same time a step in row 4 - and make sure you do not release the buttons yet.

Now toggle steps in row 3 - and you will see that the steps in the same column of row 4 will be toggled as well. Or you may press steps in row 4 and see the steps in row 3 toggle as well. We call this behaviour "ghost toggle".

## Working with step selections

### Inverse step selection editing

In PAGE mode, active step selections are edited using the EDIT encoders for the respective attribute.

Additionally, when a step selection is active, the steps that are not selected, in the tracks that contain selected steps, may be edited as well, using the MIX encoders of the respective attribute.

For example, assuming a step selection is active with steps selected in tracks 2 and 4, the EDIT encoder PIT modifies all steps in the step selection, while the MIX encoder will modify the pitch of all steps that are not currently selected in the tracks 2 and 4.

### Step selection stores

In PAGE mode, active step selections are stored for later recall in one of 5 stores available per page. This allows to group steps and modify them at once beyond track boundaries.

The stores 1-5 are accessible while a step selection is active via the buttons labelled 1,2,3,4,5 in the MIX TARGET row below the matrix.

For example: To make a step selection hold the SEL button pressed and click on at least one active step (Green) in the page. You should see the selected step flash Green and the current selection indicated by the flashing light in the MIX TARGET row. By default it should be 1.

Now press the 2 key in the MIX TARGET area and the selection will disappear. This is because step selection 2 is empty. Let's fill it. Press and hold the SEL button and select another step or more and watch them flash.

Press the 1 in the MIX target area and you should see your previous selection flash active. You can toggle between your selections at will using the MIX TARGET buttons, and use the encoders to really bend your material.

A track selection occupies the same 'virtual space' as a step selection, however a track selection is 'stored' on the Sel button (Sel led Red), and if all tracks are de-selected the Sel led is off (no track selection stored). On the other hand, whilst holding the Sel button, Step Selections may be stored on locations 1 to 5 – however, although these step selections may be de-selected they still remain in the allocated store location AND with that store location selected it is not possible to make a track selection!

Therefore, it is important to not store step selections to all 1 - 5 locations, leave one empty, if the multiple track selection function is wanted on that page.

### Remove Step Selection Store

With a step selection active, simply click the ESC button and the SEL button will effectively be disengaged and the current step selection will be deleted from the current store location.

*Rebooting the sequencer will delete all step selection stores, whereas a track selection is stored with the page.*

### Add all active Steps to the current Step Selection

With a Step Selection active, double-click on the current Selection Slot button (flashing Orange) to add all Steps that are toggled On to the current Selection.

*This can be used as an alternative way to correct any Slave Clock Recorded latency (using the STA rotary).*

### **Remove Step Selection Store**

If the current Step Selection already contains all Steps that are toggled On, then double-clicking the current Selection Slot button will remove all steps from the Selection (and thus remove the Step Selection stored).

### **Step Swap**

With a Step Selection active, and provided that all Step(s) in the Selection are on just one Track, turning the DIR encoder will swap the Step(s) in the Selection with the step(s) either in the Track above or the Track below.

It should be noted that if the Step Selection or the swap destination contains a Hyperstep, then that Step will be automatically removed from the current Step Selection (if the Main Rotary encoder is turned).

### **Step Swap in Operation**

It is possible to move the Selected Step(s) vertically through all Tracks in the matrix, however, as the 'swap' passes through multiple Tracks it does not restore them to their previous state.

For example: If a Step Selection on track 3 is swapped with track 4, and then again with track 5, the steps from track 3 are now on track 5 - however, the steps previously on track 4 remain on track 3.

For non-adjacent Tracks, or where the above behaviour is not desirable, the user can specify which Tracks are to be available for Step Swap. If two or more Tracks have an AMT attribute value of '0' they will only 'swap' with each other.

*Note: A Step Selection on a Track with an AMT attribute value other than '0' can still be independently 'swapped'. It will not 'swap' with a Track whose AMT attribute is '0'.*

## Step chords

Steps may play more than one pitch at a time, effectively forming chords. Chords can be directly programmed in, or directly recorded from, a MIDI keyboard (see the section on MIDI IN Recording) into a step.

The next section will assume we are working in STEP mode. To follow along, please make sure to enter STEP mode before we move on.

To set the stage, while in STEP mode, notice the CHORD button block at the bottom right of the front panel. By default the single note chord button should be lit Orange.

### Chord Modes

There are two Chord modes, Chord View mode - which is the original mode unchanged, and Octave View mode, they both display chord note data but in two different ways.

As before, when zoomed into a step, holding any of the Chord buttons will display the Chord notes in the inner circle - but now, the Select led is Orange and clicking the Select button (whilst continuing to hold a Chord button), will switch to the new chord mode and the Select led will change to flashing Orange - indicating you are now in chord "Octave View"

- when in Chord View mode everything looks and works, as it did before

- when in Octave View mode you can navigate between the chord octave layers by clicking one of the 3 highlighted 'octave' buttons at the bottom of the inner circle, labelled MOD, SEL & CAD (default octave 1 selected) moving between 1-3 octaves respectively, the current octave will be flashing Orange.

Entering a Step Chord containing a note which is the same 2 or more several octaves may only be done in Octave View mode.

By default the original Chord View mode is shown when clicking a Chord button, however, it is possible to double-click any chord button to enter Octave View directly (make sure you continue to hold the Chord button after the double-click). With a Chord button held its the Select button that switches between chord modes.

### Chord ground rules for Chord View mode

Step chords are formed of up to 7 notes which may range over up to three octaves. The chord is made up of the step pitch as the base and additional notes that are stacked "on top" and which are always higher than the base pitch. This means of course that changing the PIT offset of the step will also transpose the chord.

The chord display should be read as follows: the base pitch of the step flashes Orange. Notes within one octave (12 semitones) of the base pitch will light Orange. Notes in the second octave up light Green, and notes in the third octave up light Red.

To toggle the notes manually in and out of the chord following toggle sequence applies: off > Orange > Green > Red > off.

### Building chords in Octave View Mode

It should be noted that the note colour scheme is radically different in Octave View mode as much more information is being conveyed when viewing the chords 'octave view'.

Enter Octave View mode by double clicking (and continuing to hold) any Chord button, the Select led will flash Orange. Assuming the step is turned on and contains a single note, the root note will be flashing Orange - also the MOD led will be flashing Orange, the SEL & CAD leds will be lit Green, this is telling you that you are view octave 1 of the chord. Other notes (in this octave) may be turned on or off by clicking their respective buttons - if turned on their led(s) will be Orange.

Now click the SEL button and its led will change to flashing Orange - this means we are now looking at the octave above the root note (octave 2) and any notes that were entered in octave 1 will now be shown with Red leds (the chord root note will be flashing Red).

The Red led(s) simply means that the note exists in a different octave to the one you are currently viewing.

Again steps can be toggled on and off, and again when turned on they will be Orange unless the note already exists in octave 1 in which case the note led will turn Green - signifying that the note is on in this octave and also another octave.

Now click the CAD button and its led will change to flashing Orange - this means we are now looking at the next octave up (octave 3), which works in similar matter to the previous octaves. The led of a note that exists in all three octave will Shine\_Green and if the root note exists in all three octave will Shine\_Red.

See chart below for Octave View mode note signalling:-

### Chord Octave View Note Input

When viewing the Chord Octave UI the inner circle displays the 12 note status within chord that is relative to the selected octave.

UI Location	State Description
Note LED ORANGE	Note IS set <u>ONLY</u> in currently viewed octave
Note LED GREEN	Note IS set in currently viewed octave <u>AND</u> also in another octave
Note LED RED	Note <u>NOT</u> set in current octave, but IS set in one or more of the another octave(s)
Note LED ORANGE FLASH	Chord root note
Note LED SHINE_GREEN	Note IS set in <u>ALL</u> 3 Octaves (full stack)
Note LED SHINE_RED	Note IS set in <u>ALL</u> 3 Octaves (root note full stack)

*Note: Although chord notes may be turned on or off in either chord mode if the root note is 'stacked' then they can only be turned off in Stack View mode.*

### Adding Octave spaced notes

If there are no notes at a pitch in any of the available octaves then double-clicking the note will turn-on that pitch in all three octaves.

### Removing Octave spaced notes

From any 'octave view', if there are notes at a pitch in other octaves (i.e. led, Red, Green or shine\_Green) then, double-clicking the note will turn that note on in the current octave, and any note(s) at that pitch off in the other octaves. Removing notes at the octaves above the root note is accomplished by turning them off in their respective octaves.

*Note: Although chord notes may be turned on or off in either chord mode if the root note is 'stacked' then notes at the other octaves can only be turned off in Octave View mode.*

## Strumming chords

To strum a chord, zoom into the step containing the chord, hold any of the chord buttons pressed and turn the main rotary clock-wise. You will be able to set a strum level between 0 and 9 shown as Green values. This also means that the chord will be strummed up.

Turning the main rotary counter-clockwise will show the Red values -9 to 0, which are indicating that you are now strumming the chord down.

Octopus comes with a pre-set strum configuration which affects the note start values. The strum effect increases exponentially with the strum level chosen as shown below:

Chord Strum Timings in Ticks									
Strum	1	2	3	4	5	6	7	8	9
Note 2	0	+1	+1	+2	+2	+3	+3	+4	+5
Note 3	+1	+2	+3	+4	+5	+6	+7	+8	+10
Note 4	+1	+2	+4	+6	+8	+9	+10	+13	+17
Note 5	+2	+3	+5	+9	+11	+13	+15	+19	+23
Note 6	+2	+3	+6	+12	+15	+18	+21	+27	+30
Note 7	+3	+6	+9	+16	+19	+24	+29	+36	+45

*Note: A strum can also be set on a single note step (i.e. no chord), setting a strum on a single note step will result in the note being played followed by 6 duplicate notes played at the set strum timing.*

## Step polyphony

Step polyphony offers an exciting playground for experimentation and variation, especially with regard to dynamic pitch variation, as in random note picks from the chord pool.

Assuming you have built the C-E-G chord as described earlier, let's think about polyphony. The natural polyphony of the step is of course 3, since it is playing 3 notes at the same time.

However, polyphony may be adjusted independently of step chord contents, i.e. without changing the number of notes in the chord. The step chord size, i.e. the number of notes in a step, is indicated by a Red LED in the chord block. The step polyphony is indicated by a Green LED in the chord block. When chord size and polyphony are the same you see an Orange LED in the chord block at the respective position.

## Random note picks from chord pool

A step whose polyphony and chord size are the same, will play a chord in the traditional sense, as you would expect it.

When step polyphony and chord size are different, the number of played chord notes is always the smaller of the two values (i.e. chord size or polyphony). Here the actual notes are chosen at random from a pool composed as follows:

- When chord size is greater than polyphony, the note pool is made up by all notes that make up the chord.
- When polyphony is greater than the chord size, the note pool is made up by the chord notes plus a number of rests ("empty" notes).

The number of rests is given by the difference between the polyphony and the chord size.

For example: Chord is C-E-G, therefore chord size is 3 therefore:

- A polyphony of 3 will consistently play the chord C-E-G.
- A polyphony of 2 will play two elements picked at random from the pool C, E & G.
- A polyphony of 5 will play 3 elements picked at random from the pool {C, E, G, rest, rest}.



### Random note picks for random step rest

The principle of Random note picks from chord pool can also be used without a chord, i.e. on single notes, thus effectively giving the chance of a note or a rest on a specific step as follows:

Zoom into a step with just one note and set the polyphony on the chord buttons to 2, then effectively the step is {note, rest} and when playing the step there is a 50% chance of a note being played & 50% chance of a rest, likewise if the polyphony is set to 4 the step is {note, rest, rest, rest} hence a 25% chance of the note being played.

*Note: Step GRV will not function as expected on a step set to random step rest.*

## Step phrases

### Overview

There are the four main attributes (VEL, PIT, LEN, STA) of all 8 phrase notes. In addition, there is phrase polyphony and phrase type.

The available phrase types are as follows:

- Type 1: Forward: notes are played in the order 1,2,3..
- Type 2: Reverse: notes are played in the order 8,7,6..
- Type 3: Random pitch programmed notes pitches are played in random order, determined at playtime.
- Type 4: Random all: programmed note attributes played in random combinations, determined at playtime.

The Octopus default Step Phrases fall into the following categories:

Phrase's Green 1 to 16:	Delays and rhythmic delays
Phrase's Red 1 to 16:	Pitched delays and arpeggio's
Phrase's Orange 1 to 4:	STA wobbles
5 to 8:	VEL wobbles
9 to 12:	Combined STA & VEL wobbles
13 to 16:	Combined STA, VEL & PIT wobbles

The charts below show the attributes values of each default Step Phrase. If the Polyphony attribute is shown as 'x' then the phrase polyphony is not defined, but still may be set at step level if desired.

## Step GRV Phrase Reference - Default (Green)

	Phrase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Type	1	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Poly	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Note 8	VEL					0											
	PIT					0											
	LEN					0											
	STA					80											
Note 7	VEL				0	0											
	PIT				0	0											
	LEN				0	0											
	STA				102	72											
Note 6	VEL				0	-50			-40		-50	-50	-50	-50	-40	-50	-50
	PIT				0	0			0		0	0	0	0	0	0	0
	LEN				0	0			0		0	0	0	0	0	0	0
	STA				80	60			104		120	120	128	108	120	120	120
Note 5	VEL				-40	-40			-20		-40	-40	-40	-40	-34	-40	-40
	PIT				0	0			0		0	0	0	0	0	0	0
	LEN				0	0			0		0	0	0	0	0	0	0
	STA				60	48			80		84	96	96	84	108	96	84
Note 4	VEL			-30	-30	-30	-20	-20	-17	0	-30	-30	-30	-30	-30	-30	-30
	PIT			0	0	0	0	0	0	0	0	0	0	0	0	0	0
	LEN			0	0	0	0	0	0	0	0	0	0	0	0	0	0
	STA			72	42	36	48	72	60	36	72	60	80	72	96	72	36
Note 3	VEL		-20	-20	-20	-20	-30	-30	-30	-40	-20	-20	-20	-20	-20	-20	-20
	PIT		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	LEN		0	0	0	0	14	14	14	0	0	0	0	0	0	0	0
	STA		48	48	26	24	36	48	36	72	36	48	48	24	24	60	24
Note 2	VEL	-10	-10	-10	-10	-10	-39	-39	-39	0	-10	-10	-10	-10	-10	-10	-10
	PIT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	LEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	STA	24	24	24	12	12	12	16	12	15	24	12	32	12	12	24	12
Base Note 1	VEL						0	0	0	-30							
	PIT						0	0	0	0							
	LEN						26	26	22	0							
	STA						0	0	0	0							
	Phrase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

## Step GRV Phrase Reference - Default (Red)

	Phrase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Type	1	1	3	3	3	1	2	2	3	3	3	2	1	1	1	1
	Poly	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Note 8	VEL																
	PIT																
	LEN																
	STA																
Note 7	VEL							-49				-49					
	PIT							0				0					
	LEN							0				0					
	STA							60				120					
Note 6	VEL				-39		-43	-43				-43	-32				
	PIT				0		24	0				0	3				
	LEN				0		0	0				0	0				
	STA				108		75	24				48	144				
Note 5	VEL		-37	0	-36	-27	-27	-27	-40	-40	-33	-27	-40		0	0	0
	PIT		7	0	12	8	0	0	0	12	12	0	5		19	19	20
	LEN		0	0	0	0	0	0	0	0	0	0	0		0	0	0
	STA		96	0	96	16	21	6	80	96	48	12	160		0	48	48
Note 4	VEL	-50	-40	-40	-40	-50	-46	-50	0	-30	-36	-50	0	0	0	0	0
	PIT	12	12	7	7	7	-12	12	5	7	12	12	5	12	12	12	12
	LEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	STA	72	72	120	60	72	108	36	64	72	108	72	128	36	36	36	36
Note 3	VEL	-40	-30	-30	-30	-40	-40	-40	-21	-36	-40	-40	-21	0	0	0	0
	PIT	7	7	12	5	5	0	5	12	5	3	5	12	28	24	24	24
	LEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	STA	48	48	96	48	48	72	24	37	48	72	48	78	24	24	24	24
Note 2	VEL	-20	-20	-20	-20	-20	-20	-20	-30	-10	-20	-20	-30	-20	-20	-20	-20
	PIT	0	5	9	2	-2	12	-7	4	5	12	-7	4	12	12	12	0
	LEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	STA	24	24	24	12	24	36	12	36	24	36	24	64	12	12	12	12
Base Note 1	VEL	0				0	0	0	0	0	0	0	0				
	PIT	12				3	0	7	-7	2	12	7	-7				
	LEN	0				0	0	0	0	0	0	0	0				
	STA	0				0	0	0	0	0	0	0	0				
	Phrase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

## Step GRV Phrase Reference - Default (Orange)

	Phrase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Type	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Poly	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Note 8	VEL				0								0	0	0	0	0
	PIT				0								0	19	19	19	19
	LEN				0								0	0	0	0	0
	STA				9								9	0	0	0	9
Note 7	VEL				0			-35	-50				-35	0	0	0	-50
	PIT				0			0	0				0	12	12	12	12
	LEN				0			0	0				0	0	0	0	0
	STA				7			0	0				7	0	0	0	7
Note 6	VEL				0			35	50				35	0	0	0	50
	PIT				0			0	0				0	17	17	17	17
	LEN				0			0	0				0	0	0	0	0
	STA				5			0	0				5	0	0	0	5
Note 5	VEL				0		-20	-20	-35		-20	-20	-35	0	-20	-20	-35
	PIT				0		0	0	0		0	0	0	19	19	19	19
	LEN				0		0	0	0		0	0	0	0	0	0	0
	STA				4		0	0	0		0	0	4	0	0	0	4
Note 4	VEL			0	0		20	20	35		20	20	35	0	20	20	35
	PIT			0	0		0	0	0		0	0	0	12	12	12	12
	LEN			0	0		0	0	0		0	0	0	0	0	0	0
	STA			3	3		0	0	0		0	3	3	0	0	3	3
Note 3	VEL		0	0	0	-10	-10	-10	-20	-10	-10	-10	-20	-10	-10	-10	-20
	PIT		0	0	0	0	0	0	0	0	0	0	0	24	24	24	24
	LEN		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	STA		2	2	2	0	0	0	0	0	2	2	2	0	2	2	2
Note 2	VEL	0	0	0	0	10	10	10	20	10	10	10	20	10	10	10	20
	PIT	0	0	0	0	0	0	0	0	0	0	0	0	12	12	12	12
	LEN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	STA	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1
Base Note 1	VEL																
	PIT																
	LEN																
	STA																
	Phrase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

## Editing step phrases

### Enter The Phrase Editor

To enter the phrase editor, double click a step, and then double click the GRV button in the SEL column. The phrase editor mode is easily recognized, since all of the 7 chord note LEDs on the right are lit.

Equally, you may access the phrase editor by entering track mode (double click one of the track selectors), and then double click the GRV button on the SEL column.

### The bottom row (Row 0)

The bottom row of the matrix (row 0) shows the index number of the phrase currently being edited, by a flashing LED of the corresponding colour. If you see nothing shown there, you're looking at phrase #0, the default setting for a step, and which has no effect, i.e. plays the step as is. Turn the main- or GRV rotary to change phrases and switch the view accordingly.

The 7 Green note LEDs are mostly there to tell you that they may be pressed: to set the optional phrase polyphony, press one of the note buttons to make it flash Orange. To restore the phrase to normal, full polyphony, press the flashing note button again, and the flash will disappear.

### The Matrix

The matrix shows one of the four main attributes (VEL, PIT, LEN, STA) of all 8 phrase notes together, one note per row. Row #1 shows the data for phrase note #1, row #2 shows note #2, etc. A Green LED lit at the end of the row means that the phrase has a note defined for that line. If you don't see any Green LEDs lit on those lines, you know the phrase has a zero note count. A Red LED is shown there only for phrase #0, which is read-only.

Top row always shows the phrase type coded as a number of Orange LEDs. The available phrase types are as follows:

- |         |   |
|---------|---|
| Type 1: | Forward: notes are played in the order 1,2,3..  |
| Type 2: | Reverse: notes are played in the order 8,7,6..  |
| Type 3: | Random pitch programmed notes pitches are played in random order, determined at playtime.     |
| Type 4: | Random all: programmed note attributes played in random combinations, determined at playtime. |

For example, 4 Orange LEDs means the phrase has type Random all, as described above.

### MIXER Block

The top four Orange LEDs in the MIXER block indicate the attributes available for editing, which are VEL, PIT, LEN and STA in top-down order. The currently active attribute is flashing Orange. To select another attribute, simply press the associated button. This will change the content shown in the matrix.

The rotaries in the MIXER block are used to change the currently selected attribute for the note on the matching row. The rotary of row #9 at the top is used to change the phrase type.

### Mutator block

The following buttons in the MUTATOR block are supported:

#### CLR

The CLR button will clear the whole phrase to empty, if the phrase was non empty. When pressed again (in an empty phrase), it will restore to the factory pre-set phrase.

*When pressed while grabbing one of the four Orange attribute buttons in the MIXER block, CLR will only clear the data of the selected attribute.*

## **RND**

The RND button will randomize the whole phrase. *When pressed while grabbing one of the four Orange attribute buttons in the MIX block, RND will randomize the data of the selected attribute.*

## **CPY and PST**

The CPY and PST buttons will allow phrases to be copied and pasted between slots in the phrase pool. Note that phrase #0 can only be copied from.

## **EDIT Block**

Some of the rotaries in the EDIT block are supported:

## **POS**

The POS knob changes the groove of the current phrase in a very nice way. When turning to the right, it stretches the timing to the next available straight-, triad- or dotted version of the original, and when turned to the left it does a similar thing by compressing the phrase tempo. This allows one to try a triad or dotted version of the phrase just by experimenting with the GRV knob.

*Note that if POS doesn't understand the timing of the current phrase, it uses a simple factor two multiply or division for the new groove. POS uses the STA offset of the first non-zero phrase note to analyze the timing.*

## **GRV**

The GRV knob (like the main knob) selects another phrase from the pool for editing.

## **Save Your Work**

The phrase pool is saved as part of the global Grid object, along with other global data. The grid object is saved when the full machine state is saved. To save the full machine state do this:

1. Go to GRID mode.
2. Stop the machine.
3. Press GRID + Program.
4. Wait for the progress lights to complete the circle.

*Note: Best practice is to use GRV steps in a different Track to the un-GRVed steps. This will allow the GRV steps to be muted when changing the settings.*

Using Phrase Type 4 with a polyphony of 1 (or VEL of -127) will facilitate Random Note picks when used with the PIT attribute and Random Step pick when used with the STA attribute.

## Step GRV Phrase Reference - Custom

	Phrase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Type																
	Poly																
Note 8	VEL																
	PIT																
	LEN																
	STA																
Note 7	VEL																
	PIT																
	LEN																
	STA																
Note 6	VEL																
	PIT																
	LEN																
	STA																
Note 5	VEL																
	PIT																
	LEN																
	STA																
Note 4	VEL																
	PIT																
	LEN																
	STA																
Note 3	VEL																
	PIT																
	LEN																
	STA																
Note 2	VEL																
	PIT																
	LEN																
	STA																
Base Note 1	VEL																
	PIT																
	LEN																
	STA																
	Phrase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

## Step GRV Phrase timing with reference to POS number

POS = 1				POS = 2				POS = 3				POS = 4			
				Dotted				Triplet				Dotted			
Bar	Step	Tick		Bar	Step	Tick	Change	Bar	Step	Tick		Bar	Step	Tick	Change
1	1	0		1	1	0		1	1	0		1	1	0	
1	1	3		1	1	6	-3/32	1	1	8		1	1	9	-5/64
1	1	6		1	1	12	-6/32	1	1	16		1	1	18	-5/32
1	1	9		1	1	18	-9/32	1	1	24		1	1	27	-15/64
8x Speed				Quad Speed											
POS = 5				POS = 6				POS = 7				POS = 8			
1/2 Step				Triplet				Dotted				Neutral			
Bar	Step	Tick	Change	Bar	Step	Tick		Bar	Step	Tick	Change	Bar	Step	Tick	
1	1	0		1	1	0		1	1	0		1	1	0	
1	1	12	-1/16	1	1	16		1	1	18	-1/32	1	1	24	
1	1	24	-2/16	1	1	32		1	1	36	-2/32	1	2	0	
1	1	36	-3/16	1	2	0		1	2	6	-3/32	1	2	24	
Double Speed								Doubling Echo 1/16 notes				1/8 note/step GRV Phrase			
Note: 1/16 note/step GRV Phrase will have this as Neutral (ie POS 8), effectively all ticks halved.															
POS = 9				FOS = 10				FOS = 11				POS = 12			
Triplet				Dotted				On-Beat				Triplet			
Bar	Step	Tick		Bar	Step	Tick	Change	Bar	Step	Tick	Change	Bar	Step	Tick	
1	1	0		1	1	0		1	1	0		1	1	0	
1	1	32		1	1	36	+1/16	1	2	0	+1/8	1	2	16	
1	2	16		1	2	24	+2/16	1	3	0	+2/8	1	3	32	
1	3	0		1	3	12	+3/16	1	4	0	+3/8	-	-	-	
				Doubling Echo 1/8 notes				1/2 Speed							
FOS = 13				FOS = 14				POS = 15				POS = 16			
Dotted				On-Beat				Triplet							
Bar	Step	Tick	Change	Bar	Step	Tick	Change	Bar	Step	Tick		Bar	Step	Tick	
1	1	0		1	1	0		1	1	0		1	1	0	
1	2	24	+4/16	1	3	0	+6/16	1	3	32		Same as 15			
1	4	0	+8/16	-	-	-		-	-	-		-	-	-	
-	-	-		-	-	-		-	-	-		-	-	-	
				1/4 Speed											



## Hypersteps

Let's start with a short background, to help explain the idea of hypersteps. Normally steps trigger notes in the following sense: they provide the start, the velocity, and the length (playtime) of the played note.

Now imagine that the played note is not "only" a note but rather a note sequence. And imagine the step is now providing the start, velocity and playtime of the note sequence, such that the note sequence always plays to its end, always time-adjusted to the given playtime.

The final bit of the picture here is that our presumed note sequence may be a track which is controlled by a step in the manner described.

We call such a step a hyper step. In short, hypersteps are steps that do not trigger notes, but trigger tracks in their respective page.

Therefore, if a track is linked to a hyperstep, once the hyperstep is played, the track is being triggered to play at a speed corresponding to the step absolute length (in 1/192), and taking over the hyperstep's velocity and pitch offset.

On making a step a hyperstep its LEN is automatically set to 192/192 and on destroying a hyperstep the step LEN is reset to the default value of 12/192.

Scaling the Track LEN of the track containing the hyperstep will scale the hyped-track tick length, speeding up the hyped-track. The maximum length of a hyped-track is 192 ticks, however Step LEN within the hyped-track can be increased by 'skipping' steps. - see Hyperstep LEN Reference below:

By muting steps in the hyperstep track the number of steps played in the hyped-track is also reduced.

### Hyperstep PIT and VEL

In addition to a 'Hypedtrack' being controlled by the Hyperstep LEN, the Hyperstep PIT and VEL also control the hypedtrack pitch and velocity. Therefore, the hypedtrack will assume both the pitch and the velocity values of the hyperstep.

Changes to the hyperstep PIT and VEL will influence the hypedtrack in real-time – hence changing the hyperstep PIT or VEL offsets will influence the hypedtrack steps at the position of the chase light !

### Engaging hypersteps

To use hypersteps, go to PAGE mode, hold a track selector down, and at the same time designate the hyperstep in the matrix, in a row other than the track's (by pressing it down as well). You will see that both the track selector and the hyperstep start flashing between green & orange.

There can be multiple hypersteps in one track (pointing to different hyped-tracks) but a hyped-track can only have one associated hyperstep.

Hypersteps cannot be 'nested', i.e. it is not possible to have a hyperstep within a hyped-track.

### Destroying hypersteps

To disengage or destroy the hyperstep of a hyped track, hold the respective track selector of the hyped track pressed and then press any step button in the matrix row of the hyped track. The association between the step and the track will be removed.

Scaling the Track LEN of the Track containing the Hyperstep will speed up the playing of the Hyped-track (effectively, reducing the number of ticks in each hyped-track step), and Skipping steps in the hyped-track will slow down the hyped-track, thus increasing the number of ticks in each hyped-track step.

The chart below shows the effect of scaling the Track LEN of the track containing the hyperstep (i.e. speeding up the hyped-track), however, the chart below shows the effect of skipping steps in the hyped-track (Track LEN at neutral 8).

We can see that with a Hyperstep LEN of 192, by reducing (skipping) the number of hyper-track steps from 16 to 12 then each step will be 16 ticks - hence the hyped-track speed is  $\times 0.75$  (3/4). Likewise, by further reducing the number of steps to 6 then each step will be 32 ticks - hence the hyped-track speed is  $\times 0.375$  (3/8).

We can say that if the Hyperstep LEN / 12 is greater than the number of steps in the hyped-track then the hyped-track will play slower than  $\times 1$  speed, and if the Hyperstep LEN / 12 is less than the number of steps in the hyped-track then the hyped-track will play faster than  $\times 1$  speed.

Hyperstep Step LEN (Ticks)	Hyperstep Track LEN (Scaling)	----- Number of Steps in Hyped-Track -----															
		16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
192	8	12				16				24		32		48	64	96	192
180	8		12			15		18	20			30	36	45	60	90	180
192	7	11					16			22				44		88	176
168	8			12		14				21	24	28		42	56	84	168
192	6	10						16		20			32	40		80	160
156	8				12	13						26		39	52	78	156
192	5	9				12			16	18		24		36	48	72	144
132	8					11	12					22		33	44	66	132
120	8		8					12		15		20	24	30	40	60	120
192	4	7		8						14	16			28		56	112
108	8					9			12			18		27	36	54	108
192	3	6				8				12		16		24	32	48	96
192	2	3				4				6		8		12	16	24	48
192	1	1								2				4		8	16
Track of 16 steps		-- Hyped-Track Step LEN in Ticks (integers only shown) --															

By 'Scaling' the Hyperstep Track LEN the Hyped-Track can be speeded up (8, neutral - 1, fastest). Scaling 9 - 12 will get the same result as 8 and 13 - 16 will get the same result as 1 - 4 respectively.

### **Identify the Hyperstep associated with Hyped-Track**

When there are multiple Hypersteps on the page, or if a Hyperstep is skipped, it is possible to identify the location of a Hyperstep - in Page View simply click & hold the Hyped-Track select button and the associated Hyperstep will Shine Red.

### **Variable Step Sequences**

By using hypersteps we can vary the number of steps played in the hyped-track each time the hyperstep is triggered.

Here's how:- Set up a hyperstep (on step 1) and its associated hyper-track, on the hyped-track mute steps 9 -16 (so it will only play 8 steps).

On the hyperstep track mute steps 5 - 16 (so it will only play 4 steps) and set the hyperstep track LEN to 8 (default), then zoom into the hyperstep and change the step length from 192/192(default) to 48/192 (4 steps). Now zoom into step 4 (last step) of the hyperstep track and set up a step event for LEN with an AMT of -1.

Each time the hyperstep track plays it will 'scale' the LEN on the hyped-track, so in the above configuration the number of steps played will vary between 5 steps and 8 steps - the length time taken to play will be the same.

By populating some of the hyped-track steps with MCC we effectively have something very similar to a Sample & Hold LFO

### **Aligning Indeterminate Length Sequences**

If a sequence has an indeterminate length, such in the case of a track with a brownian DIR then if using that sequence as the hyped-track we can re-align the sequence every time the Hyperstep is triggered.

## Step events

Steps may be used to generate so called events. Events are simply automated changes that happen at runtime. In general terms, an event is a programmed change of the attributes of a track and is attached to a step. All track attributes may be modulated by events.

The finer definition is however, that for the DIR, POS, and MCH events the track attribute value changes, while in the case of the other attributes, (VEL, PIT, LEN, STA, AMT, GRV, and MCC) what changes is really the attribute map factor of any steps having offsets from the track value. Please refer to the section on attribute maps for details.

### Creating events

To create an event, double click on a step to zoom into it, and select one of the attributes in the SEL column. As discussed earlier, initially these are all lit, waiting to be selected. Once selected as an event, they will flash.

You will notice that some are coloured Orange, some Green. The Orange attributes indicate that their events will influence the attribute map factor, while the events for the Green ones will change the attribute value directly.

The step led of an event will be Orange.

*Note: If the 'Play' button is set to flashing Orange (Play Mode) then the events will not be retained when the sequencer is 'stopped'.*

### Set event values

The amount (AMT) value of the step determines the change in the track attribute every time the step is played.

In the case where the set amount is larger than the possible value range of the target, a modulo operation will be carried out to bring it into the range. Note that the changes can be positive or negative, according to the amount value.

### Random event values

Random event values, via a non-zero value of the GRV attribute for the step generating an event, is a disabled feature in version 1.6203 and later.

### Clearing events

Events may be cleared from a track by zooming into the step and pressing the flashing SEL attribute button so it is solid Orange or Green again.

### Event range settings

Sometimes it makes sense to limit the range in which the event change occurs to a value below the size of its natural range. Those MAXIMUM values are 17 for each of the attribute map factors, 16 for DIR and 32 for MCH.

POS Step Event changes the Track POS, not the Step POS(GRV)

DIR Step Event will change on the following step (this is only relevant when using a custom DIR with multiple steps per slice).

To change the size of the interval used by events, proceed as follows:

Go into STEP mode, i.e. zoom into your respective step. Activate an event and you should see the current size of the event interval for the selected attribute displayed numerically in the numeric field of the outer circle. Use the main rotary to adjust it to your desire.

What you should notice is that the changes produced by the events will be bound between the base value of the track for that attribute and the sum of the base and the interval size.

### Event execution

Another detail that may be of interest is that events will always execute exactly on the beat and not be influenced by the step's STA value to be pulled or pushed against the time line.

### Step event offset reset

Finally, a step AMT of 0 (zero) will discard the offset that was produced by a step event.

### AMT events

You may have noticed that while the AMT value of a step determines the effect an event has on its respective attribute, the AMT map factor may be modified by events as well.

By creating AMT events, you are effectively able to have dynamic changes in the actual amount of change that is being applied to an attribute map factor, so we will be seeing changes to the change rate!

This is a powerful instrument to create evolving and to a large degree unpredictable sequences.

Maximum Event Range	<i>Track Attribute Map factor Scaling shown in <b>Green</b> for compress and <b>Red</b> for expand</i>															
<b>16 (1)</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>15 (2)</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>14 (3)</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>13 (4)</b>	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	2
<b>12 (5)</b>	0	0	0	0	0	1	1	1	1	2	2	2	2	3	3	3
<b>11 (6)</b>	0	0	0	1	1	1	2	2	2	3	3	3	4	4	5	5
<b>10 (7)</b>	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	8
<b>9 (8)</b>	0	0	1	2	3	4	5	5	6	7	8	9	10	10	11	13
<b>8 - Neutral</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>16</b>
<i>Numbers in Blue are the actual Step Attribute Offset</i>																
<b>7 (2) A</b>	0	1	2	3	4	6	7	8	9	10	12	13	14	15	17	19
<b>6 (3) B</b>	0	1	2	4	5	7	8	10	11	12	14	15	17	18	20	23
<b>5 (4) C</b>	0	1	3	5	6	8	10	11	13	15	17	18	20	22	23	27
<b>4 (5) D</b>	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27	31
<b>3 (6) E</b>	0	2	4	6	8	11	13	15	17	20	22	24	26	29	31	35
<b>2 (7)</b>	0	2	5	7	10	12	15	17	20	23	25	28	30	33	35	40
<b>1 (8) F</b>	0	3	6	9	12	16	19	22	25	29	32	35	38	42	45	51
<b>0 (9)</b>	0	4	8	12	16	20	24	28	32	36	40	44	48	52	56	64
<i>The maximum Event Range is 17, however it is shown 0...16 as represented by the numeric circle</i>																

## Understanding Step Events

Step offsets changed by Step Events are influenced by 3 things, Track Attribute Scaling, Step Event Range and the Step Event AMT.

*Step Events will only influence steps whose attributes have been offset from their respective track values.*

The default value of Step Event Range is 17 (0 - 16), however this is slightly misleading as the actual Event Range is dependant on the amount a Track Attribute Scaling, which can be represented as follows:

$$\text{Available Step Event Range} = 17 - \text{Track Attribute Scaling Factor}$$

The default value of the Track Attribute Scaling Factor is 8, therefore the available Step Event Range is 9 (17 - 8), highlighted in **yellow** the Default Track Attribute Range in the chart below.

Reducing the Track Attribute Scaling Factor to '**(4)**' will compress the Step Attribute Offset value but will extend the potential Step Event Range, highlighted in **green** below.

Conversely, increasing the Track Attribute Scaling Factor to '**(12)**' will expand the Step Attribute Offset value but will reduce the potential Step Event Range, highlighted in **red** below.

Maximum Event Range	<i>Track Attribute Map factor Scaling shown in <b>Green</b> for compress and <b>Red</b> for expand</i>															
<b>16 (1)</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>15 (2)</b>	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2
<b>14 (3)</b>	1	1	1	1	2	2	2	2	3	3	4	4	5	5	6	6
<b>13 (4)</b>	2	3	3	4	5	5	6	6	7	8	9	10	11	12	13	14
<b>12 (5)</b>	4	5	6	7	8	9	10	11	13	15	17	19	21	23	24	26
<b>11 (6)</b>	7	8	10	11	12	14	15	17	20	23	25	28	31	34	37	40
<b>10 (7)</b>	10	12	14	16	18	20	22	24	29	33	37	41	45	49	54	58
<b>9 (8)</b>	16	20	23	26	30	33	36	40	47	53	60	67	73	80	87	94
<b>8 - Neutral</b>	<b>20</b>	<b>24</b>	<b>28</b>	<b>32</b>	<b>36</b>	<b>40</b>	<b>44</b>	<b>48</b>	<b>56</b>	<b>64</b>	<b>72</b>	<b>80</b>	<b>88</b>	<b>96</b>	<b>104</b>	<b>112</b>
<i>Numbers in Blue are the actual Step Attribute Offset</i>																
<b>7 (2) A</b>	24	29	34	39	43	48	53	58	68	78	87	97	107	117	126	127
<b>6 (3) B</b>	28	34	40	46	51	57	63	69	80	92	103	115	126	127	127	127
<b>5 (4) C</b>	34	40	47	54	61	68	74	81	95	108	122	127	127	127	127	127
<b>4 (5) D</b>	39	47	54	62	70	78	86	94	109	125	127	127	127	127	127	127
<b>3 (6) E</b>	44	53	62	71	80	89	98	107	125	127	127	127	127	127	127	127
<b>2 (7)</b>	51	61	71	81	92	102	112	122	127	127	127	127	127	127	127	127
<b>1 (8) F</b>	64	77	90	103	116	127	127	127	127	127	127	127	127	127	127	127
<b>0 (9)</b>	80	96	112	127	127	127	127	127	127	127	127	127	127	127	127	127
<i>The maximum Event Range is 17, however it is shown 0...16 as represented by the numeric circle</i>																

Step Event AMT value simply changes the Track Attribute Scaling Factor (within the Step Event Range) each time the Step Event is executed.

If Step Event AMT is greater than the Step Event Range then the AMT will be divided by the Step Event Range and the remainder will be applied to the Track Attribute Scaling amount.

#### **Example for attributes (VEL, PIT, LEN, STA, GRV, AMT & MCC):**

Assume Track Attribute Scaling Factor is at default (Neutral), and the Step Event Range is set to 3. With the Step Event AMT set to 0 the neutral values (shown blue on the chart below) will be applied to the attribute, if the Step Event AMT is set to +1 then the following occurs:

The track attribute will be scaled by +1 each time the step event is executed, therefore the offset in row 7 (9) of the chart will now be applied, then row 6 (10) then row 5 (11) - as the Step Event Range is set to 3 the next Step event will cause the offset in row 8 (neutral) to be applied. So in this example, if the initial step offset was '12' then the sequence of the step offsets would be 12, 14, 17, 20, 12, 14, 17, 20, 12 and so on.

An AMT of -1 will result in the same offsets except the sequence will be in reverse order, thus, 12, 20, 17, 14, 12, 20, 17, 14, 12.

#### **Using AMT to scale AMT**

Firstly, for step event with an AMT of 1 the changes that would occur by adding an additional step event for the AMT attribute will be reflected in the column of offset [1] A to F. If the step event has an AMT of 4 then the changes that would occur by adding an additional step event for the AMT attribute will be reflected in the column of offset [4] A to F.

It should be noted that changes to the Track Attribute Scaling Factor of the AMT attribute are only available with event range of 6, shown on the chart above and marked A to F. The designation of A to F are fixed, therefore if the Track Attribute Scaling Factor for AMT is scaled to, say, (11) then changes will be limited to C to F.

*Note: If the Track Attribute Scaling Factor for AMT is compressed then Step Events using AMT to scale AMT will not work as expected (as AMT will compress itself) - therefore, scaling the Track attribute map factor for AMT is best avoided.*

#### **Example of using AMT to scale AMT**

Take a step offset of VEL +8 and change the Track Attribute Scaling Factor of VEL, compress to (4), now add a Step Event for VEL with an AMT of +4, this will render the sequence change in VEL values (from the chart above [8]), 1, 8, 15, 32, 6, 13, 25, 4, 11, 20, 2, 9, 17, 1 and so on.

Now, by adding a Step Event AMT of AMT +1 to the track the VEL AMT of +4 will be scaled from A to F (as in the chart above [4]), in other words, rather than the Track attribute map factor changing by +4 it will change by 4, then 5, then 6, then 7, then 8. then 12, before repeating.

We can count these scaling changes against the VEL offsets (from the chart above [8]), and see that it will render the sequence change in VEL values as follows:

1, Amt+4(neutral)=8, Amt+4(A)=15, Amt+5(B)=1, Amt+6(C)=11, Amt+7(D)=1, Amt+8(E)=15, Amt+12(F)=13, Amt+4(A)=25, Amt+5(B)=6, Amt+6(C)=17, Amt+7(D)=6, Amt+8(E)=25, Amt+12(F)=20, 2, 11, 32, 11, 2, 1, 8 etc.



## Step Event Track Toggles

By using Step Event Track Toggles certain Track conditions can be controlled on a per step basis, toggle options are Mute, Solo, Record, Pause and Rotate. It should be noted that unlike Step Events which effectively 'scale' an attribute, Track Toggles are a 'one time' toggle of the relevant track condition.

### Creating Track Toggle Events

To create an event, double click on a step to zoom into it, then click one of the Map select buttons below the matrix (lit orange) as follows:-

- Mix Target MAP 1 button will activate a Track Mute Toggle
- Mix Target MAP 2 button will activate a Track Solo Toggle
- Mix Target MAP 3 button will activate a Track Record Toggle
- Mix Target MAP 4 button will activate a Track Pause Toggle

When activated the relevant led will be flash orange and subsequently the chosen Event values will be used to set the Event to either an 'On' toggle (e.g. Mute On) or an 'Off' toggle (Mute Off).

Alternatively, the Track Toggle Event may be configured to 'flip-flop' mode, whereby each time the Toggle Event is triggered the Track will Toggle to the opposite condition.

To activate 'flip-flop' mode double-click the relevant Mix Target Map button - once activated in 'flip-flop' mode, the relevant led will be shine\_green.

The step led of an event will be orange.

### Track Rotate

Track Toggle Rotate is not mentioned above as it works in a slightly different manner, it is simply a Rotate Event which is applied to the Track ('On', 'Off' & 'flip-flop' concepts are not applicable).

To create a Track Rotate event, double click on a step to zoom into it, then double-click the POS attribute button once selected it will shine\_green. To clarify, a single click of the POS attribute button will setup a Step Event POS (led will show orange), or a double-click will activate a Track Rotate Event (led will shine\_green).

*Note: Switching between Step Event POS & Track Rotate will reset the AMT attribute to default.*

A Track Rotate Event will move all steps (including Step Events & Track Toggle Events), with the exception of Skipped Steps or Hypersteps.

Additionally, steps can be 'masked' (excluded) from the Track Rotation !

Steps included in the Track Rotation will 'hop-over' Steps that are excluded thus the sequence will change to a greater or lesser amount depending on the number of 'excluded steps'.

To 'mask' a step from the Rotate Event, set its Amount (AMT) attribute to -127 (as in the Effector Step Mask option). Step Events can also be 'Masked' by setting their VEL attribute to -127.

*Note: If the 'Snapshot' button is set to red (Snapshot Mode) then the events will not be retained when the sequencer is 'stopped'.*



## Track Skip Rotate

Track Skip Rotate works in a similar way to Track Rotate, except only the skip condition will Rotate, not the steps themselves.

To create a Track Skip Rotate event, double click on a step to zoom into it, then double-click the DIR attribute button once selected it will shine\_green. To clarify, a single click of the DIR attribute button will setup a Step Event DIR (led will show orange), or a double-click will activate a Track Skip Rotate Event (led will shine\_green).

*Note: Switching between Step Event DIR & Track Skip Rotate will reset the AMT attribute to default.*

When rotating the Step(s) Skip condition it is possible to apply Step Mask in two ways, firstly, a Step whose AMT attribute is -127 will not have the Skip condition applied, and secondly, if a Skipped Step has its AMT attribute set to -127 will not rotate.

Additionally, Step Events can also be 'Masked' by setting their VEL attribute to -127.

## Track Toggle Event Values settings

The amount (AMT) value of the step determines which track the Track Toggle Event will be applied to - thus the Event Track Toggle can be applied to tracks' other than itself.

In the case of Mute/Solo/Record & Pause track toggle, a positive value is an 'On' toggle and a negative value is an 'Off' toggle.

For example, a Track Toggle Mute Event with a value of +3 will Mute Track 3, likewise a Track Toggle Mute Event with a value of -4 will Un-Mute Track 4.

*Note: An AMT value of zero is an 'off' value therefore to apply a Track Toggle Event specifically to the lowest track in the matrix (Track 0), use AMT value = '10'*

In the case of a Rotate track toggle, a positive value will rotate the track in a forward direction and a negative value will rotate the track in a backward direction.

## Track Toggle Event Range settings

The Range attribute is used to configure the number of tracks that will be toggled by the chosen Event. For example, a Track Toggle Mute Event with a value of +3 & Range value of 2, will Mute Track 3 & Track 2.

Range has a maximum value of 10 (all tracks).

Please note that Range value will 'wrap' to higher tracks in the matrix, therefore if a Track Toggle Mute Event has an AMT Value of +1 & Range value of 4, then Tracks 1 & 0 and Tracks 9 & 8 will be Muted.

*Range is a track attribute, and as such, it is only possible to set one Range value per track per Track Toggle type.*

*Note: In a change to legacy behaviour Step Event POS can be applied to additional tracks using the Range Value.*

## Controlled Muting of Track Toggle Event(s)

Track Toggle Events occur whether or not the track is muted. There is however, one exception that enables extended control of Track Toggle Events, as follows:-

If the Toggle Events on a Track only influence other tracks in the matrix (i.e. the Track containing the Toggle Event(s) is not within the Range value of the Event) then muting the Track will effectively prevent the Track Toggles from being applied to the target tracks.

## To Pause or not to Pause

A Paused Track cannot be Un-Paused by itself, it can only be switched back to the Play condition by either a Track Toggle Un-Pause Event by a track which is playing, or manually (keyed).

## Understanding Event execution

Another detail that may be of interest is that events will always execute exactly on the beat and not be influenced by the step's STA value to be pulled or pushed against the time line.

Additionally, a Track Toggle Event is executed before the step plays - which means that if a Track Toggle Mute 'On' Event is placed on Step 5 then the Mute Toggle occurs before the step plays, so no note will be sent (provided the note itself has not been pulled against the timeline).

*All tracks are processed by the sequencer in a top-down manner, this means that when a Track Toggle Event is applied to tracks higher in the matrix it will be executed on the following step.*

## Clearing events

Events may be cleared from a track by zooming into the step and pressing the flashing MAP attribute button so it is green again (or setting its Event AMT value to 0).

### Step Event Considerations:

1. If the Velocity is 0 then the note is not transmitted.
2. When 'shifting' maps (Track POS) a step event will remain on its original step, it will not 'shift', hence the AMT attribute of all steps remain on its original step.
3. Attributes DIR, POS & MCH are absolute, i.e. if DIR is 6 a Step Event of '+2' will change it to 8.
4. Step AMT of '0' will not reset POS, DIR or MCH values. These must be reset using the opposite amount of the values by which they were changed.
5. Track attribute AMT scales its own offset and is therefore best left at the 'neutral' value.
6. DIR Step Event will change on the following step (this is only relevant when using a custom DIR with multiple steps per slice).
7. DIR will default to the Track attribute amount when the sequencer stops and changes made using Step Events may be viewed as they occur in Page ATR view and in Track Zoom.
8. MCH will also default to the Track attribute amount when the sequencer stops and but changes made using Step Events may only be viewed as they occur in Track Zoom.
9. POS does not restore to the start POS(ition) when stopping the sequencer.
10. POS Step Event changes the Track POS, not the Step POS(GRV).
11. v5.30... POS Step Event can now be applied to additional tracks using the Range Value.

### Step Event Track Toggle Considerations:

1. Tracks are processed by the sequencer in a top-down manner, this means that when a Track Toggle Event is applied to tracks higher in the matrix it will be executed on the following step.
2. **Unlike rotating the track using the POS encoder (or a POS Step Event) the underlying value of the Step AMT attribute is also rotated, this allows any Step Event to be rotated.**
3. If a track is part of a Track Chain it may be toggled to Pause even if a different member of the Track Chain is currently playing.
4. Track toggles of Mute & Solo when a track is part of a Track chain will be dependant on the condition of the Track Base switch.
5. Track Toggle Events of Mute & Solo are subordinate to the On-The-Measure mode condition of the Page.

## 3. Track Mode

### Track Mode Index

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### Operations

#### Signaling

A lit up mutator indicates that it is available. Please note that all mutator functions described here are also available from the PAGE mode, as soon as a track is selected.

#### Track toggle (TGL)

This simply toggles the track on or of. It is equivalent to muting or un-muting the track when in PAGE mode.

#### Track solo (SOL)

Pressing the SOL button solo's the track within its page.

Note that no other pages playing concurrently will be affected. Pressing it again will un-solo the track in the page.

#### Track clear (CLR)

CLR will recall the preset values for the selected track.

Only the MIDI Channel assignment (MCH) will remain unchanged.

The pitch is set to the default value of 60. Note that the factory pitch assignment can be recalled by calling the CLR mutator upon a PAGE. If you are at the PAGE level and grab a Track and clear it, everything is reset.

### **Track randomize (RND)**

This will create a random step pattern in the track, not affecting the other parameters in the track.

### **Track FLAT (FLT)**

The FLT function is used mainly to combine the pitch content of several tracks into just one track in the same page.

This function was conceived as a creative tool and not as a track space-saving feature, as it may appear at first sight. In some instances it may be useful as such, but just in some. Please keep this in mind!

FLT will only become available when you have selected two or more tracks in a page. There is a notion of a destination track, which is always the one from the selection with the lowest index. Applying FLT to the track selection will fill the destination track with content from the source tracks.

For every active step in any of the source tracks, you will get the corresponding step activated in the target track. Skipped steps will simply be ignored.

If more than one step is active in the same column across the selected tracks, the lowest 7 pitches of active steps will get stacked to form a chord on the respective step in the destination track.

Note that if source track steps contain chords already, only their base pitch will be considered for FLT. The additional chord data in the source tracks will be ignored.

The base pitch of the resulting chord will be the lowest pitch encountered in the respective column, with the other found pitches being stacked on top.

Another detail worth mentioning is the influence of FLT on the VEL, LEN and STA values of the steps in the destination track. FLT always carries over the VEL, LEN and STA attributes of the last encountered active step for a particular column/position inside the destination track.

Also something to realize is that FLT is MIDI channel agnostic - you may FLT different tracks playing on different channels, but the result will always play on the MIDI channel of the destination track.

With that in mind, let us suggest two best practice usage methods for FLT. Firstly, before you are applying FLT to your track selection, make sure the target track is muted.

This way you do not get any double notes playing if the target track is set to the same MIDI channel as any source tracks. You then can do a smooth blend-in of the new material, which may be useful when playing live for example.

Secondly, you may want to make sure the target track MIDI channel is different from any of the source tracks before you apply FLT. This will effect the obvious - the new material is going to sound fresh right away. And of course you can use both of these techniques combined to achieve the result that is best for you!

*Step GRV is always reset to '0' when using FLT unless source and destination tracks have the same GRV settings.*

### **Track zoom (ZOM)**

The ZOM key is used to zoom into and out of certain views - in this case it would zoom out of the Track mode and back into the Page mode. The fact that you are zooming out is indicated by a Red LED light, as opposed to a Orange one.

When in page mode, hold one track selector down and press ZOM to zoom into the track - this has the same effect as a double click on the track selector. We will talk a bit more about the ZOM mutator when we describe the MAP mode.

## Track remixes (RMX)

The track remix is used to generate variations of a track without altering it too much. It does have some random elements which are influenced by the value indicated in AMT.

Below is an overview of what the RMX function does:

Influenced Map*	Random Shift Map	Random Step Offset
VEL	+	+
PIT	+	
LEN	+	+
STA	+	+
POS	+	

*\*see section on track attribute maps for details on what this means.*

## Track Copy and Paste

Copying and pasting tracks has already been described earlier.

A track is selected and copied into an internal clipboard and from there pasted into the chosen destination.

*Note: You have not copied the full track data, but only a reference to it. This means that at the time of the paste operation you will get the most recent data of the just copied track and not the data at the time of the copy operation. Therefore, any changes between the copy and the paste operation are permanent and not recoverable.*

## Track attributes

### Track pitch (PIT) and velocity (VEL)

Pitch and Velocity values are displayed in the same manner we have seen in STEP mode.

The meaning of the values is interesting - they represent the base value and are to be seen in the context of the values pertaining to the steps in the particular track.

### Under the hood

When playing, the values of the steps in that track are added to the base track pitch or velocity. As a consequence, the baseline for a track is set by the track pitch and velocity. Step values are just offsets to this base. Octopus uses the convention that middle C (MIDI note #60 decimal) maps to C5. The default Track PIT values for Tracks 9 - 0 are as follows:

C3, D3, E3, G3, A3, C5, D5, E5, G5, and A5

### Quick Track Attribute edit via matrix keys

When in Track zoom it is possible to edit Track attribute value with either their respective edit knob or via entering values with the matrix keys as follows:-

	Step 13	Step 14	Step 15	Step 16
Attribute	----- Double-click -----			
Velocity	Default	Zero		
Pitch	Default	Middle C (C5)	Octave - (8vb)	Octave + (8va)
Amount	Default	Zero	Clear	

## Track LEN and STA factors

The Length and Start rows show visually the values for the length and start factors of a track. The STA and LEN factors are simply multipliers that are applied to the STA and LEN offsets of the steps in a track.

This means, that a high factor value will result in the effect of the STA or LEN offsets being amplified, while a low factor value will result in the effect of the step offsets being diminished or voided altogether.

In the middle setting of 8, the effect of the map is unchanged and therefore played "through".

In the zero setting, the STA and LEN step offsets will be ignored altogether, while in the 16 position the step offsets will be amplified by a total factor of roughly 2.

As an example, have a track play some default length notes, and simply turn the LEN knob to the left. You will hear that the note lengths are decreasing as you go, and quite the opposite will happen as you turn the knob to the right.

For the STA factor, use a track with notes playing of the beat (so you hear the effect). Reducing the factor will play the notes closer to the "on the beat" time, effectively quantizing the play, while increasing the factor will move the steps further away from the on the beat position (see below).

On a side note, in order to modify the actual length and start point of a track, use the step skip option.

*Note: If a Step STA is advanced (Pull), then the Step will not play if the preceding step is skipped and a Track STA of less than 8 will have no effect on this behaviour.*

## Track LEN Reference Chart

Track LEN	Step LEN (lengthen)										Ticks		Mult
<b>16</b>	6	12	18	24	48	96	144	192	192	192	192	192	x2
<b>15</b>	5	10	15	21	42	84	126	168	192	192	192	192	
<b>14</b>	4	9	13	18	36	72	108	144	180	192	192	192	x1.5
<b>13</b>	3	8	12	16	33	66	100	132	166	192	192	192	
<b>12</b>	3	7	11	15	30	60	90	120	150	180	192	192	
<b>11</b>	3	7	10	14	28	57	85	114	142	171	192	192	
<b>10</b>	3	6	10	13	27	54	82	108	136	162	188	192	
<b>9</b>	3	6	9	12	25	52	76	102	126	152	178	192	
Step LEN	<b>3</b>	<b>6</b>	<b>9</b>	<b>12</b>	<b>24</b>	<b>48</b>	<b>72</b>	<b>96</b>	<b>120</b>	<b>144</b>	<b>168</b>	<b>192</b>	
<b>7</b>	2	5	8	11	22	46	68	90	112	134	156	180	
<b>6</b>	2	5	7	10	21	42	63	84	105	126	148	168	
<b>5</b>	2	4	6	9	18	36	54	72	90	108	126	144	3/4
<b>4</b>	1	3	5	7	15	30	45	60	76	90	104	120	
<b>3</b>	1	3	4	6	12	24	36	48	60	72	84	96	1/2
<b>2</b>	1	1	2	3	6	12	18	24	30	36	42	48	1/4
<b>1</b>	1	1	1	1	1	4	4	6	7	9	10	12	
<b>0</b>	1	1	1	1	1	1	1	1	1	1	1	1	
Track LEN	Step LEN (shorten)										Ticks		

Track LEN 8 Neutral (shown in blue)

## Track STA Reference Chart

Track STA	Step STA(advance- pull)						Step STA (retard- push)					
16	-12	-10	-7	-5	-2	0	+2	+5	+7	+10	+12	
15	-11	-9	-6	-4	-2	0	+2	+4	+6	+9	+11	
14	-10	-8	-6	-4	-2	0	+2	+4	+6	+8	+10	
13	-9	-7	-5	-3	-1	0	+1	+3	+5	+7	+9	
12	-8	-6	-4	-3	-1	0	+1	+3	+4	+6	+8	
11	-7	-5	-4	-2	-1	0	+1	+2	+4	+5	+7	
10	-6	-4	-3	-2	-1	0	+1	+2	+3	+4	+6	
9	-5	-4	-3	-2	-1	0	+1	+1	+3	+4	+5	
Step STA	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	
7	-4	-3	-2	-1	0	0	0	+1	+2	+3	+4	
6	-4	-3	-2	-1	0	0	0	+1	+2	+3	+4	
5	-3	-2	-2	-1	0	0	0	+1	+2	+2	+3	
4	-3	-2	-1	-1	0	0	0	+1	+1	+2	+3	
3	-2	-2	-1	-1	0	0	0	+1	+1	+2	+2	
2	-2	-1	-1	0	0	0	0	0	+1	+1	+2	
1	-1	0	0	0	0	0	0	0	0	0	+1	
0	0	0	0	0	0	0	0	0	0	0	0	
Track STA	Step STA (advance- pull)						Step STA (retard- push)					

### Track STA 8 Neutral (shown in blue)

If Track STA 14 then Step STA multiplied by 2

*Note: When using track multipliers of less than 1 (reduced speed) the maximum Step STA advance (Green) will be -12 ticks with reference to the x1 speed.*

### Track position (POS)

The POS line will show the pattern of set steps in the track at hand.

Turning the POS knob will shift the steps around, depending on the turn direction, modifying the contents of the play window, just to use the same terms.

### Track direction (DIR)

This line indicates the chosen play direction for a track. Consider it as an index into the following default mapping:

1 - Forward play

2 - Reverse play

3 - Ping-Pong

4 - Brownian, i.e. 2/3 probability forward, 1/3 probability reverse play

5 - Random order

6-16 - Same as 1, however: the track play directions 6-16 may also be individually edited and changed as needed.



### Track amount (AMT)

AMT represents the amount of randomization applied to the track when the RMX function is called. Additionally, AMT is applied in the Step Shift feature to control 'over-run' track.

### Track groove (GRV)

The GRV value determines how much shuffle is applied to the track, the range is 0 - 16.

Shuffle means that the steps with an even index in the track (i.e. 2, 4, 6 .... 16) will be played with a delay. Generally, the larger the GRV amount, the longer the delay that makes up the shuffle.

One other intricacy is that the odd GRV values will produce steady shuffle delays, while the even GRV values will produce delays that are variable within one 1/192 and which are determined at runtime. The delay values applied are as shown below:

Setting	Delay (1/192)	Setting	Delay (1/192)
1	1	9	5
2	0-2	10	4-6
3	2	11	6
4	1-3	12	5-7
5	3	13	7
6	2-4	14	6-8
7	4	15	8
8	3-5	16	7-9

### Track MIDI continuous controller (MCC)

The MCC row determines whether or not this track sends MCC.

The "none" flag is represented as four Green LEDs in the positions 13- 16. The value range here is of course 0-127 and please keep in mind that a value of 0 does indicate a valid controller value.

Two exception are the BENDER and CHANNEL PRESSURE flags.

The BENDER flag is shown as a Red dot in position 16 of the MCC row and is indicating that the track will be sending MIDI pitch bend messages according to the MCC values stored in that track's steps.

The CHANNEL PRESSURE flag is indicated by two Red dots in the positions 15 and 16 of the MCC row, and is telling us that the track will be sending CHANNEL PRESSURE messages according to the MCC values stored in that track's steps.

If a track has an MCC parameter value other than "none" (i.e. the 4 Green LEDs in the positions 13-16), its chase light colour in the matrix will be Orange, while the tracks whose MCC values are set to "none" have a Red chase light.

### Track MIDI channel (MCH)

The MCH row indicates the MIDI channel for this track. Default value for all tracks is channel 1 on port 1. This is represented by a Green light in the 1 position.

Now turn the MCH rotary encoder slowly to the right until you reach 16. Turning it once more to the right will light the LED in position 1 Red. This means that channel 1 on port 2 is now selected.

Therefore, Green 1-16 assigns a track to MIDI port 1 and

Red 1-16 to MIDI port 2.

### Track pitch direct entry

You may have noticed that the pitch value is also indicated in the pitch inner circle on the right hand side, as you change it and otherwise. Pressing the upper C key in the circle will transpose the track one octave up; pressing the low C key will first transpose it to the C, then one octave down.



## Track chaining

### Track chains explained

A track chain is simply a defined sequence of playing tracks from a page, in a given consecutive order. Track chains are always configured in PAGE mode and are useful in creating structures longer than 16 steps per page.

### Playing considerations

Chain configurations may or may not influence the set track parameters. Each track can be played as it is, or each track's steps may be played using the same set of track parameters as its base. While the pre-set chain modes were covered in the start-up section, we shall now look closer at flexible track chain configurations.

### Selecting chain members

While in PAGE mode, define first the group of tracks that you would like to chain by creating an appropriate selection.

### Creating a track chain

While the selection is active (flashing Orange), press the 'X' (XXVIII) button to build the chain made up by these tracks.

You will now see that they start playing in sequence. The play sequence is per default top to bottom (i.e. row 9 to row 0).

There are cases when you will see this order changed as a result of some more interaction with the chain structures inside a page. This has to do with the way a chain is defined internally.

### Under the hood

Every chain has a head and a tail. The head is a track, while the tail may be made of none, one or more other tracks.

When you create a selection, the top track of a selection will be defined as the head of the new chain, and the other selected tracks will make up the tail.

Should any of the newly chained tracks have been part of a chain before (regardless if head or tail); they will be removed from their original chain(s) and added to the new one. The original chains will simply get reduced by the tracks re-allocated to the new chain.

### Showing track chains

Once a track chain has been created, you can also easily see how it is spread across the page. Simply select a track that is part of a chain, and you should see the following information in the selector LED column.

The track selected (one you have your finger on) is flashing Orange.

Other track members may be lit Green and Red. In Red you can recognize the head track of the chain, in Green the other chain members that are not the head.

If the head and the selected track are the same, you will only see a flashing Orange LED.

### Removing Track Chains

Press the Track button of the Track you wish to remove from the chain and click the 'X' (XXVIII) button

### What about pre-set chains?

By now you may wonder, what about the pre-set chain configurations on offer? Well, they are nothing more than pre-set chain configurations with shortcut buttons.

### **Track base switch**

You can switch the track base of a chain from using individual track base values to using the track base values of the head track.

Simply toggle the chain selection indicator between Orange and Red.

Orange means that tracks are being played in their natural state but in chained order.

Red means that the tracks will be played taking over the values held in the head track as a base reference.

Note that this switch will work equally for pre-set and custom chain configurations.

*When changing the Track Base status any muted tracks on the page will be un-muted.*

### **Muting chained tracks**

One more thing to mention about the track base for a chain - in the context of muting or un-muting tracks that are actually part of a chain. If the chain head is the base of the chain, then the mute operation of any chain members will apply to all tracks in that chain. Note that it will be a toggle operation, so it will invert the mute pattern of the set of chained tracks.

### **Track follow**

There is also an automated way of switching the track in the view - that is the FOLLOW mode.

When Follow is active and you are zoomed into a track that is part of a chain, the view will always follow the chase light in the respective track chain, in the sense that it will always show the track that is currently played by the chase-light.

Activate Follow by pressing the Green follow button (XXVII) to turn it Red.

Deactivate Follow by toggling it back to Green.

## Track tempo multipliers

To change a track's tempo multiplier, go to Track mode, and use the play buttons with one, two or four triangles in the transport bar.

For example, by double clicking on the >> and >>>> buttons, the tempo will be set to 1/2 and 1/4 respectively of the master tempo.

The table below shows the available multipliers and the key press combinations needed to get to them:

Multiplier	Hold	Click	Double Click	>	>>	>>>>
16	>> >>>>	>				
8	>>>>	>>				
7	> >>	>>>>				
6	>>	>>>>				
5	>	>>>>				
4		>>>>				
3	>	>>				
2		>>				
1.5	>>	>				
<b>1</b>		>				
1/1.5	>>		>			
1/2			>>			
1/3	>		>>			
1/4			>>>>			
1/5	>		>>>>			
1/6	>>		>>>>			
1/7	> >>		>>>>			
1/8	>>>>		>>			
1/16	>> >>>>		>			

The values selected for a track are indicated as follows: In general, Red led's denote multipliers and Green led's denote divisors of the cardinality.

For example, having the led's off and lit Green at the same time denotes a divisor of 5, meaning a track multiplier of 1/5.

Exceptions to the rule include the 1.5, 1/1.5, 8, 1/8, 16 and 1/16 multipliers, covered below.

The 1.5 multiplier is, as it may be obvious already, essential for easy triplet creation - a triplet being three notes played instead of two. It is shown as a Orange 2 and a Red 1. Its inverse, the 1/1.5 multiplier, is shown as a Orange 2 and a Green 1.

The 8 multiplier is shown as a Orange 4 and a Red 2 LED. 1/8 is shown as a Orange 4 and Green 2. The 16 multiplier is shown as Orange 4 and 2 plus a Red 1, and 1/16 is indicated as a Orange 4 and 2 and a Green one.

Alternatively, hold the circle TEMPO (XII) button and the Track multiplier value is shown in the MCH row of the matrix, available multiplier values are shown in orange - use the matrix keys to edit the value, a single-click sets a multiplier value (shown Red) and a double-click sets a divisor value (shown Green). The Transport Pause button will set the track condition to paused, or from paused to Play.

Additionally, with the circle TEMPO button held the Transport Stop & Play buttons are available.

Please note that during play, switching the clock multiplier is effective immediately with no quantization with regard to the master tempo.

Realignment of the tracks may always be done by using the ALN functionality available.

Note that when the sequencer is playing, the changes of the track clock multiplier are effective on the next 1/16th beat of the master clock and not immediately. This provides better track alignment and improves the general feel of the sequence without the need to explicitly align after a track clock switch.

*Note: When using track multipliers of less than 1 (reduced speed) the maximum Step STA advance (Green) will be 12 ticks with reference to the x1 speed.*

### **Track Pause/re-trigger**

A track may be paused by grabbing the track (holding the appropriate track selector pressed) and pressing the Pause transport button. The procedure applies also to a selection of more than one track.

To move a paused track back to the Play condition, hold the appropriate track selector and click the transport Play button.

*Note: If more than one track is paused any step advance, or restart, will be applied to all paused tracks.*

### **Track Pause/Play Alignment**

In a change to legacy behaviour - when moving a track from Pause to the Play condition, the track will commence to play on the next 1/16 beat of the global clock. This ensures that the track remains synchronized with the other tracks without the need to explicitly align the track after the change.

*Advancing a paused track by re-trigger (via the pause button) remains immediate.*

### **Reset any Paused Track(s) to Play**

With the sequencer stopped, double-click the Pause button to un-pause any paused track(s) ready for the next sequencer Play operation

### **Set Track Pause condition**

With the sequencer stopped, zoom into a track - click the Pause button to set the track condition to paused, or from paused to Play.

## **Track program changes**

### **MIDI program change**

In Track mode, you may have noticed that the Program LED is lit in Orange and the Select LED next to it is lit in Green. Also, the numeric field is not showing the global tempo value anymore, as it does in the PAGE mode.

We are using that area to edit and send MIDI program changes to the channel of the selected track. First, select the MIDI channel you would like to send the program change on as the track MIDI channel.

Next, dial in a program number, using the rotary encoder on the top right. Alternatively, you may want to key in the number of the program you want to select. Once selected, press Program and you should hear / see the program change occur.

A couple of side notes are necessary here. First, consider that not all synthesizer manufacturers use the same numbering scheme for their programs, i.e. some start counting at 1, some at 0.

However, the underlying values are always in the range 0-127.

The Octopus convention is to display values in the range 0-128, where a value of 0 means that no program change message is sent.

Therefore, the program changes are numbered in the range 1-128.

Secondly, a program change message will be sent every time the Program key is pressed in TRACK mode, regardless of all other circumstances.

However, if you keep the Program key pressed while turning the knob, the program change messages will get sent as you increase or decrease the PC number via the main knob.

Furthermore, all program changes contained in the tracks of a page will be sent (once) as soon as that page is enabled for play - either as part of a cluster, or by manual intervention.

### **MIDI bank changes**

You can also issue bank change messages. This is done simply by pressing the Select button and turning it Orange.

In that case the number displayed will correspond to the bank number, and the bank change message will get sent as soon as you press the Select button again.

Bank change messages will be sent also when a page is activated for play, but not when you send program change messages from Track mode.

## **Track attribute maps**

Now that we have looked in some detail at the mutators while in TRACK mode, you may wonder what is going on to the left of the matrix - in the selector column.

### **The selector column**

You see that some of the LEDs are lit up, and some aren't. Each lit button represents something we call an attribute map for the track.

There are attribute maps for the following attributes: VEL, PIT, LEN, STA, AMT, GRV, and MCC.

### **What is an attribute map?**

Simply put, an attribute map is a view of a particular step attribute for the entire track.

Let's look at an example: the VEL map would be the view that shows you the velocity offset of all steps of a track at once.

This is true with one exception - that is the DIR line. In the case of DIR we do not have a map per se, but rather the capability to edit the direction configuration for the sequencer. The details are explained in the chapter dealing with directions and we will disregard it in this section.

For example: Press VEL and you will notice that keeping it pressed will make it flash Orange and the mutator column will make CLR, RND and

ZOM available. Briefly - CLR and RND will affect the track VEL map and either clear it to default value or pick a random value. Now the interesting one:

### **Showing attribute maps**

With the VEL selector still pressed, press the ZOM mutator to get to the MAP mode. What you now see is the VEL map of the track you are working on.

You can also enter MAP mode by double-clicking the attribute button (VEL in this example).

## Working with attribute maps

The matrix display is built up starting at row 0 with the pattern of the track under consideration. Here you may toggle, select and skip steps as you would in PAGE mode, as already described in the introductory section - also holding them and tweaking their parameters will work - but leave that for a moment to avoid confusion.

If the sequencer is playing, you also see a Red chase-light in the row of the track currently being worked on.

### Reading attribute maps

You may think of the area made up by rows 1-9 as divided into 16 columns, one for each step represented in row 0.

For each step, the column will display a bar corresponding to the value of the attribute whose map we are seeing. Remember that this is the attribute value of the steps, before the steps are affected by any sort of track offset.

### Representation

For values that can be negative or positive (VEL, PIT, STA), a zero value is represented by a line of LEDs on row 5. Positive values are above the line and negative values are below.

Now press any button in row 6 - as an example. You will see that the bar for the step in the column of your press will jump to the position of the button you have pressed.

### Reading the real values

The real value of the step attribute offsets can be read out easily by holding the respective step pressed in row 0.

For this purpose, you may also want to (temporarily?) use the preview mode (toggle the EDIT LED to flashing Green or flashing Orange), such as to not affect the toggle state of the steps you are viewing.

The value is displayed in the numeric quadrant of the circle, and is always shown as a sum of the track and step value for that particular attribute.

Also note that while the meaning of the large circle value is changing, the pitch circle is always dedicated to showing the pitch. This is just a quick but very powerful way of entering data for the steps of a particular track.

Values may also be entered using the keys of the circle fields, i.e. entering a velocity value for a step is similar to entering a tempo value.

You will see the new value reflected in the matrix display.

### Reading the pitch display

The way to read the display is the following: the Red dots will indicate the octave and the Green dot will indicate the note in that octave. For example three Red dots starting at C and a Green dot at G mean the pitch is G in octave 3. Exception: two Red dots starting at C and a Orange dot at D mean that the pitch is D in octave 3.

### Entering pitches

Entering pitches is done by pressing the appropriate note. In order to transpose octaves use the left and right keys labelled "C".

### **Finding your way around the maps**

The selector column allows you to jump directly between the available track maps. The mutator column allows you to use some functions on the map.

CLR will restore default values, RND will choose random values for each column, and RMX allows you to call and actually observe what the RMX operation is doing to your track parameters. ZOM, which is now lit Red, will take you back to the track mode without un-selecting VEL, and pressing ZOM again from there will bring you again into the map mode.

### **Shifting maps**

The POS knob in the Editor block is also assigned a function - turn it and you will see your attribute map just shift around the track, without affecting the step toggle states or the other attribute maps, but having certainly surprising effects on your sequence.

### **Switching tracks**

You may fetch any track into the map view by simply ticking (to the left or right - it doesn't matter) the mix encoder corresponding to the map you want to fetch into the display.

## **Track CC map resolution**

Track CC maps have a specific property associated with them, and that is resolution.

Per default, Track CC messages are sent on each step, according to the respective track and step MCC values. In addition, intermediate CC messages may be sent between CC steps. This effectively increases resolution of the CC stream, resulting in smoother controller flows.

In MAP mode, with MCC as the selected attribute, the resolution for the current track may be selected by using the chord button block.

The minimum (and default) value is 1, meaning that one Track CC message is sent per step.

A value of 5 for example, denotes that 5 messages will be sent for this step. The first one right on the step, the other 4 distributed evenly across the interval of time until the next step is triggered. The intermediate values automatically create a linear slope to the next value.

### **Map factors**

Maps are useful in the sense that we can see and edit a particular step attribute for all steps at once.

### **Step attribute scaling**

There is another advantage we get from maps - and that is the easy factoring or scaling of step attribute effect on the play result.

Using a scaling factor for each map of a track, we can now determine to what degree a map is applied to the play data.

In fact, the track attributes LEN and STA themselves are really scaling factors for the corresponding attribute maps.

### **Map factor setting**

In all cases, the middle setting of the scaling factor will play the steps unaffected, while tighter settings (lower values) will reduce the effect of the played map values. Looser settings will amplify the effect of a map on the played result.

The value range for the map factors is numerically between 1...17, with 9 being the neutral setting. Note that due to the way the display is set up, the values for LEN and STA shown in the TRACK mode are depicted as 0.....16, with 8 being the neutral value.

Lower than neutral values have a reducing effect, higher than neutral values have an amplifying effect.

The neutral value is displayed as a Orange 1, reducing values shown using a Green bar, and amplifying values shown using a Red bar.

### **Working with map factors**

In order to view the scaling factor of a particular map, go to track mode, and press and hold the corresponding attribute selector. The numeric quadrant in the outer circle will display the scaling factor.

An Orange dot at the 1 position indicates the middle setting. Turning the main rotary will either render a Red bar up, or a Green bar down, depending on the turn direction.

Note that the map factors may also be accessed directly from the MAP mode. Use the main rotary encoder to modify the respective value.

#### *In Use*

*The Scaling Factor will only effect 'offsets', therefore steps that are not offset from the Track attributes will not be changed - with the exception of DIR, POS and MCH.*

#### *In Use with Step Events*

*Step Events are changes to the Scaling Factor and again the scaling factor changes will only effect 'offsets'.*



## Attribute Scaling Reference Chart

Expand (Red)											
9	0	4	8	12	16	32	64	96	127	127	x4  x3 Lower Values  x2 Lower Values
8	0	3	6	9	12	25	51	77	103	127	
7	0	2	5	7	10	20	40	61	81	102	
6	0	2	4	6	8	17	35	53	71	89	
5	0	1	3	5	7	15	31	47	62	78	
4	0	1	3	5	6	13	27	40	54	68	
3	0	1	2	4	5	11	23	34	46	57	
2	0	1	2	3	4	9	19	29	39	48	
Value	0	1	2	3	4	8	16	24	32	40	x1
8	0	0	1	2	3	6	13	20	26	33	/2 Lower Values    /8
7	0	0	1	1	2	4	8	12	16	20	
6	0	0	0	1	1	2	5	8	11	14	
5	0	0	0	0	0	1	3	5	7	9	
4	0	0	0	0	0	1	2	3	4	5	
3	0	0	0	0	0	0	0	1	1	2	
2	0	0	0	0	0	0	0	0	0	0	
1	0	0	0	0	0	0	0	0	0	0	
Compress (Green)											
Expand (Red)											
9	127	127	127	127	127	127	127	127	127	127	x4
8	127	127	127	127	127	127	127	127	127	127	
7	122	127	127	127	127	127	127	127	127	127	
6	107	125	127	127	127	127	127	127	127	127	
5	94	109	125	127	127	127	127	127	127	127	
4	81	95	108	122	127	127	127	127	127	127	
3	69	80	92	103	115	126	127	127	127	127	
2	58	68	78	87	97	107	117	126	127	127	
Value	48	56	64	72	80	88	96	104	112	120	x1
8	40	47	53	60	67	73	80	87	94	100	/2 Lower Value    /8
7	24	29	33	37	41	45	49	54	58	62	
6	17	20	23	25	28	31	34	37	40	43	
5	11	13	15	17	19	21	23	24	26	28	
4	6	7	8	9	10	11	12	13	14	15	
3	2	3	3	4	4	5	5	6	6	7	
2	0	1	1	1	1	1	1	2	2	2	
1	0	0	0	0	0	0	0	0	0	0	
Compress (Green)											

## Track direction editing

As we have seen in earlier sections, each Octopus track may be assigned its own running direction. This is exciting, but neither new, nor spectacular.

What may catch your attention though, is that on the Octopus you can not only specify what direction a track should play, but in most cases also edit that direction to your particular gusto. Directions 1-5 are read-only, while directions 6-16 are user editable.

To see how all this works, let's take a quick step back and realize a couple of things. Then you will see how the pieces fall into place.

### A general view on directions

To begin, have a track run at the default forward direction (Direction 1). Let it run for a few cycles in the forward direction, then stop.

Think about what you just saw: the forward direction is really "the sequence of chaser light positions in each of 16 slices of time it takes to play all steps in a track". Makes sense? Realizing this is the key to understanding how editing directions works.

### Triggers and slices

Each of the 16 slices needed to play a track from end to end (no skips for now) specifies its own chaser light position trigger. For the forward direction, in slice 1 we have a trigger for chaser light position 1, in slice 2 a trigger for position 2, etc.

In simple terms, when a track is played, the chaser light will be moved according to the triggers specified by the slices that make up that particular direction. For example, the reverse direction has the trigger sequence [16, 15, 14... 1] assigned to its slices.

### Full and empty slices

To take it one level further, a slice is not restricted to holding only one trigger, but may hold up to nine triggers. These nine triggers will be played in sequence every time the respective slice is being played. This implies that a slice may take as long as nine times to play completely, because it fires up to nine triggers.

So what do we get from empty slices, i.e. where no trigger is specified? Well, every time Octopus gets an empty slice, it will pick a trigger for you at random\*, and play it normally.

### Certainty\_next

The sequence of slices is per default set to be a solid 1, 2, 3 ...16. But you can change that. Each slice has an associated „certainty\_next" parameter, which is expressed as a percentage.

A setting of 100% means that the next slice will be the one following naturally (i.e. slice 3 will be followed by slice 4, etc.).

A setting of 0% will specify that the next slice will be the naturally previous one (i.e. slice 3 will be followed by slice 2).

Any value in-between will produce the obvious: for example, a setting of 50% will mean that there is a 50/50 chance by which the next or the previous slice will be called - and then its triggers played.

Note that the certainty\_next parameter applies to the switch between slices, but does not apply to the trigger set and sequence inside a particular slice.

For example: Let's assume slice 4 has a certainty\_next of 50% and a trigger set of 2, 5, and 8. Once started, the slice will first fire up its triggers (2, 5, 8) and then decide which slice to call next - slice 3 (previous one) or slice 5 (next one).

### **Playing direction maps**

So now, how do you work with all of this? The answer is "Direction Maps". From Track Mode (of any track), select for that track the direction you would like to program.

Make sure to choose a direction between 6 and 16, since directions 1-5 are read-only and cannot be modified.

After choosing the direction, double-click on the DIR attribute button to enter the direction map. In this view, you will see in row 0 a Orange light, reminding you of the index of the position you are just about to edit.

Press some of the keys in row 0 and you will see a Green flashing light following your presses - the Green flashing light is showing you the index of the slice that you are just editing. When the flashing Green and the Orange light overlap, you will get a flashing Orange light.

### **Editing trigger sets**

The area above row 0 (i.e. rows 1-9), will show none, one, or more Red lights, which specify the triggers contained in the selected slice.

You may select triggers at will by simply toggling them in the Matrix, but there can be only one per row: the trigger sequence is naturally given by the rows you select them in. Therefore, a row will only hold one trigger.

Rows holding no trigger will simply be ignored at runtime. But remember, if all rows are empty, you will get a random\* trigger to play in that slice before the next slice is called.

### **Editing Certainty\_next**

While editing, you may jump between trigger sets using the key of row 0 as you like. Last thing to mention is the certainty\_next probability.

This is simply the number shown in the numeric field of the circle, in the top left quadrant. The number is edited as expected, using the top right rotary encoder, in addition to the buttons in the numeric quadrant.

Here, some key combinations may be of interest: double clicking 5 will produce a 50, clicking (simple) 100 will produce 100, and double clicking 100 will produce a 0.

For the rest, it is left as an exercise to the reader to look at how the five default directions are programmed, in order to get the final clarification or confirmation on having understood how the Octopus direction model works.

Please also refer to the dedicated tutorial in the back section of this manual or available as a separate document on our web site.

### **Remarks**

The direction map is no different to the other maps we have seen so far: press ESC at any time to return to the page mode, but be aware that any change you make to the direction will be permanent, like any other change on the Octopus. However, unlike with regular MIDI data, there is no "PLAY" capability for the directions. You may however use CLR to restore the forward direction in slots 6-16. In fact, remember that directions 1-5 are read-only and not editable.

Finally, when you need an inspiration boost, go into a direction map and start using RND. That one may get you going.

## Custom Direction Maps

DIR #			Description:															
Step	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Slice	
Next %																		
Play Step																	1	
Notes:																		

DIR #			Description:															
Step	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Slice	
Next %																		
Play Step																	1	
																	2	
																	3	
																	4	
Notes:																		

DIR #			Description:														
Step	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Slice
Next %																	
Play Step																	1
																	2
																	3
																	4
																	5
																	6
																	7
																	8
																	9
Notes:																	

## The Effector

One mutator button was not mentioned yet, and that is the EFF mutator. What is EFF?

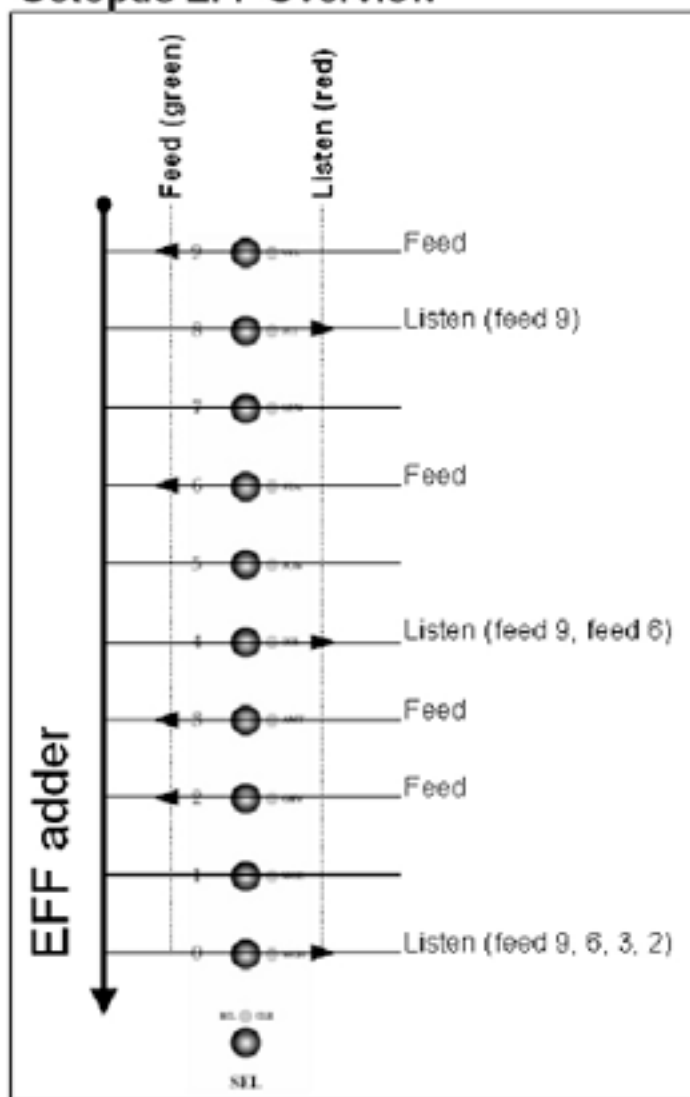
To be precise, EFF is not as much a function as it is a state switch, enabling the track to participate in cross modulation across the PAGE. Some additional explanation is needed here, so let's start with the theory.

In each Octopus page there is the notion of an Effector. In simple terms, the effector is a mechanism allowing tracks inside a page to modulate other tracks inside the same page.

Modulation here refers to projecting Step attribute offsets from one track to another at a time at which the modulator track is being played.

The affected Step attributes are Step VEL, PIT, LEN and MCC.

### Octopus EFF Overview



## The EFF mechanism

The modulation is always happening "top-down", i.e. upper tracks may modulate lower tracks, but not vice-versa.

Here "upper" and "lower" refers to the respective track index. For example, track 9 may modulate all other tracks but track 0 cannot modulate any other track.

### Feeders, Listeners and Listening Feeders

Modulator tracks are called "feeders" and modulated tracks "listeners", for a better distinction of terms.

Because the effect of the feeder tracks is additive down the track indexes, you may picture the feeder tracks as feeding the effector and listener tracks listening to whatever is in the effector at their particular index slot.

A track may also be both a listeners and a feeder, which we call a listening feeder. This means that if that track itself is playing notes, then the attributes of those notes are modulated, while the resulting values will modulate the corresponding listeners below it.

### Effector dry-run

In the example below, Track 9 is feeding its Step offsets for VEL, PIT and LEN into the effector. This means that all listeners in the page may be modulated by those offsets. In this example we have set tracks 8, 4 and 0 as listeners, and therefore to be modulated by track 9's offsets.

Assuming that Track 9 is currently at a Step whose PIT offset is +3, and assuming no other feeders exist, the notes played in the tracks 8, 4, and 0 will be played 3 semitones higher than defined in those tracks for the current position.

But: track 6 is also a feeder, and modulates all listeners below it, i.e. Tracks 4 and 0. Assuming that the current Step in track 6 has a PIT offset of -1, listener tracks below will see a total PIT modulation effect of  $+3 - 1 = +2$ .

Similarly, Tracks 3 and 2 are set as further feeders, which means that the last listener, Track 0, is being modulated by four feeders: Tracks 9, 6, 3, and 2.

Assuming Tracks 3 and 2 each have a Step PIT offset of -2, this means that the net PIT offset for row 0 is:  $+3 - 1 - 2 - 2 = -2$ .

### Remarks

The values fed into the effector are really the deltas between the actual step offset for a given attribute and the default value of that attribute. In the above example the default step offset was always 0.

The first remark here is that the offsets fed into the effector may obviously be both positive and negative.

The second remark to make is that the attribute values fed into the effector by both feeders and listening feeders will be influenced by the factor set for that particular track.

*When using step events to scale both the feeder track and the listener track, the feeder offsets are only applied to the listener after the listener has itself been scaled.*

### Using EFF with events

The effector may be used in conjunction with using events to modulate the track attribute map factors.

We will not elaborate further on the possible results, and leave it as an exercise to the reader, but this does open quite new ways of cross modulation among the page tracks.

## Playing the Effector

### Feeders

On to the operation of the Effector. Just as a reminder, the Effector is a track specific attribute and as such it must be toggled either in TRACK mode, or from PAGE mode by grabbing the track and pressing the TGL button in the MUT column.

Setting a track to be a feeder is done by pressing its EFF mutator and toggling its EFF state to Green.

It is important to note that a Feeder track need not contain any active Steps, i.e. need not play any notes in order to act as a modulator for other tracks.

### Listeners

In order to set a track to be a listener, click its EFF mutator to toggle it Red. Pressing a Red EFF button will toggle it Orange, making the track a listening feeder.

### Listening feeders

A listening feeder gets modulated first and then amplifies the incoming modulation with its own effector feed.

Pressing the EFF button will toggle it off, with the track not participating in Effector modulation.

### Playing

For the Effector to work, it is merely the offsets of its Steps that count, and it is completely irrelevant whether those steps are generating MIDI notes or not.

However, if an effector feeder does contain active steps, these will be played regularly, as they would independent of the effector.

### Muting

If a feeder track is muted, it will not have any effect on listener tracks. Toggling feeder tracks is a quick way to introduce changes to a track and then to go back to the original sound.

### The Effector at work

Designate a feeder track. Set step 1 in the feeder track and pitch it up or down.

Now select a track with an index smaller than the effector feeder (this is essential) and build a pattern into it involving lots (if not all) steps.

Make sure that step 1 is set as part of the pattern and play the pattern.

Now make this track listen to the effector by toggling its EFF mutator to Red by double clicking on the EFF button.

You should now hear that the step in column 1 of the listening track is now played differently, with the PIT offset from the Feeder track applied to it.

The popular thing to do now is to start changing the track lengths for feeder and listener to get long-running modulation results.

*Note: The Feeder steps will only pass a MCC value if the Feeder Track is set to an MCC (the step MCC is passed - not the track MCC), therefore, to avoid unexpected effects, set the Feeder track to a different MCH from the listener(s). The process is only additive as the MCC attribute cannot be set to a negative offset.*

*If a Feeder step LEN attribute is set to legato then the listener track(s) will output their step LEN attribute at the minimum step length (not legato).*

## Effector Considerations

A feeder step which has its STA attribute retarded ('pushed' - Red) will influence the listener but a feeder step which has its STA attribute advanced ('pulled' - Green) will not influence the listener. Likewise, if a Listener step has its STA attribute retarded ('pushed' - Red) will be influenced by the feeder step, however a Listener step that has its STA attribute advance ('pulled' - Green) will not be influenced by the feeder step.

For Feeder & Listener Tracks that have differing Speed multiples, it should be remembered that a Feeder step has a default 'maximum influence' time of 12 ticks (i.e. One Step length at x1 Track Speed)\*.

Furthermore, this '12 tick influence' is effectively 'reset' every 12 ticks - the relevance of this, and its creative value is described below\*\*.

### Feeder and Listener Tracks both at x1 Track Speed

Track Speed			Ticks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Feeder	x1	Feeder offset	12																
Listener	x1	Influence	12																

### Feeder at 1/2 and Listener at x1 Track Speed

Track Speed			Ticks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Feeder	1/2	Feeder offset	24																
Listener	x1	Influence	12																

At 1/2 Track Speed the number of ticks before the next Feeder step is 24 ticks, however, the Listener is only influenced for 12 ticks.

### \*Feeder at x1 and Listener at x2 Track Speed

Track Speed			Ticks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Feeder	x1	Feeder offset	12																
Listener	x2	Influence	6																

At x2 Track Speed the Listener Step has a length of 6 ticks, therefore, 2 Listener Steps are influenced by each Feeder step.

### \*Feeder at x1 and Listener at x4 Track Speed

Track Speed			Ticks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Feeder	x1	Feeder offset	12																
Listener	x4	Influence	3																

At x4 Track Speed the Listener Step has a length of 3 ticks, therefore, 4 Listener Steps are influenced by each Feeder step.



**\*\*Feeder at x1 with 3 tick time delay and Listener at x4 Track Speed**

**Feeder Measure 1** ( X = Skip Step )

Track Speed		Ticks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Chain	x4		3		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Feeder	x1	Feeder offset	12															
Listener	x4	Influence	3															

On Measure 1, the head track of the Feeder Track Chain introduces a '3 tick' time delay to the Feeder Track.

The Feeder attribute offset is applied to the Listener on Step 2 onward....

At x4 Track Speed the Listener Step has a length of 3 ticks, however, only 3 Listener Steps are influenced by each Feeder step as there is effectively a 'reset' on the global step (x1).

**Feeder Measure 2** ( X = Skip Step )

Track Speed		Ticks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Chain	x4		3		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Feeder	x1	Feeder offset	12															
Listener	x4	Influence	3															

On Measure 2, the head track of the Feeder Track Chain introduces an additional 3 tick time delay to the Feeder Track.

The Feeder attribute offset is applied to the Listener after 6 ticks (3+3), on Step 3 onward....

**Feeder Measure 3** ( X = Skip Step )

Track Speed		Ticks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Chain	x4		3		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Feeder	x1	Feeder offset	12															
Listener	x4	Influence	3															

On Measure 3, the head track of the Feeder Track Chain introduces an additional 3 tick time delay to the Feeder Track.

The Feeder attribute offset is applied to the Listener after 9 ticks (3+3+3), on Step 4 only.

**Feeder Measure 4** ( X = Skip Step )

Track Speed		Ticks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Chain	x4		3		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Feeder	x1	Feeder offset	12															
Listener	x4	Influence	3															

On Measure 4, the head track of the Feeder Track Chain again introduces an additional 3 tick time delay to the Feeder Track.

The Feeder offset Track is now 12 ticks, or a global (x1) step delayed, therefore, the Listener Track will have all 4 steps influenced by the feeder... and so on.

## Effector Listener Step Mask

If a Listener (or Listening/Feeder) step has a Step AMT attribute value of -127 then that Listener step will not be influenced by the Feeder.



## 4. Page Mode

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### Page Mutator Functions

When in PAGE mode, holding the PAGE key pressed will make some mutator functions available for the page itself - the expected results should be quite obvious. Applying them is a matter of pressing the appropriate mutator button.

#### **TGL**

Pressing TGL will toggle the page play status in the grid.

#### **SOL**

Page will be solo-ed and un-solo-ed. When solo-ed, the Page LED in the circle will flash Green as opposed to Orange

#### **CLR**

Using CLR on a page will reset the page to the default page values, including resetting the tracks to their forward moving direction.

#### **RND**

This will fill the page with random step patterns on all tracks. Note that the track attributes are not affected, just the step patterns.

#### **RMX**

All tracks in the page will be applied the RMX function. See track mode for details.

## **CPY**

Page can be copied to the copy buffer. The copy operation will include the chain configuration local to the page at the time of copy.

## **PST**

Copy buffer will be pasted into the present page position.

## **Page POSITION in GRID**

Another function available is jumping to another page of the grid. As you press the PAGE key you will notice a Orange LED flash in the Matrix. This indicates the position of the current page in the grid.

## **Switching pages**

Holding PAGE pressed and pressing a matrix key other than the one flashing and in any row other than row 0 will take you directly to the page associated with that key in the grid.

This is especially useful when you are working on musical structures spanning several pages.

Holding PAGE pressed, the current matrix Page will flash Orange, when pressing a new matrix Page the newly selected page will flash Orange and the previous Page will be Green (as it is still the 'current' page playing) - now, whilst still holding the Page button press TGL and (at the end of the Track the newly selected Page will turn Green and the previously selected Page will turn Red.

## **Play mode**

The PLAY mode provides the capability to try new things in a page, in a non-destructive manner. Activating the PLAY mode is equivalent to taking a snapshot of the currently playing page in a bank for later recall, in case the results of your editing do not live up to your expectations. Notably, the play mode snapshots include track mute patterns of the respective pages. Also note that engaging the PLAY mode may be done from both page mode and from grid mode.

## **Engaging play mode**

To activate the PLAY mode press the Green PLAY button in the MODE block and you should see it flash Orange. Also you will notice that the Program button will be lit Red.

Now make all the changes and editing that you need to make to your page until you reach a point of satisfaction, or possibly slight regret.

*Use EDIT state PREFORM (flashing Green)*

## **Make changes permanent**

To keep the page, simply press Program to make the changes permanent.

## **Discard changes**

To discard the changes, press PLAY again, exiting the PLAY mode and recalling the state of the page from just before you started.

Note that upon stopping the sequencer you will also lose any changes made during PLAY mode.

## On-the-Measure Mode

On the Measure mode allows certain actions that previously could only be effected instantaneously to now be programmed to occur 'on-the-measure'.

A measure is 16 steps at x1 speed, or if a page has a Page Length of less than 16 then the Length of Measure will be equal to the Page Length.

In Page View with the Track Mode led Green, click the Track Mode button and the led will change to Orange indicating that On-the-Measure mode is engaged.

### On-The-Measure Track Mute Toggle

To mute/unmute a track press its 'Mute' button in the usual way - the action will take effect at the beginning of the next measure.

The Track Mute led will flash red indicating that the track will toggle 'on-the-measure'. The operation can be cancelled at any time before the measure occurs.

The above operation applies to individual track mutes and to mute patterns using the Main MUT button.

### On-The-Measure Track Solo Toggle

To solo a track double-click its Mute button - the action will take effect at the beginning of the next measure.

The Track Mute led will flash green indicating that the track will Solo toggle 'on-the-measure'. The operation can be cancelled at any time before the measure occurs.

To turn off track solo click the Mute button of the track or the main Mut button.

The track can also be Solo'd in the 'legacy' manner by clicking the Solo button when in either Track Zoom, or when the track is selected using the Sel button

### On-The-Measure Note-Stream Record

Arm a Track for Record then with the sequencer playing, click the transport Record button - the led will shine red indicating that the sequencer will commence recording at the start of the next measure. Once recording commences the record led will (as usual) flash red.

If the sequencer is currently recording then click the transport Record button to stop recording at the end of the current measure (the record led will again shine red until the record operation ends).

*Note: On-the-Measure mode is relevant to Page Banks - this allows the Page On-the-Measure condition to be saved to memory.*

## EDIT state

Octopus provides a quick way of previewing steps, in the sense that you can immediately hear what they contain, and how they would play under the chase-light.

This is particularly interesting of course when you are tweaking something to sound just right.

By default, in PAGE mode the EDIT LED button lights steady Green. Click on it once to toggle it to flashing Orange.

When the EDIT LED is lit steady Green, everything behaves as you know it: the step buttons toggle the step states. When turned to flashing Orange you are in the EDIT state.

To return to the default state (steady Green), press the EDIT button twice (again - twice, and not double-click!).

## EDIT PREVIEW state - Editing Steps (*Flashing Orange - Edit Realtime*)

First make sure the EDIT LED is flashing Orange.

Now press some buttons in the matrix. You will notice that no steps will be set (as we have done it before), but that the MIDI data of the steps is played out of the MIDI port as it is.

Grab a step and now tweak its attributes, for example pitch, to take the most obvious one: you will hear that with every click of the encoder the steps is re-triggered and played such that you can hear the change in real time.

The step velocity is shown and editable in the numeric quadrant of the outer circle, the pitch in the inner circle.

*In this mode the step length may also be adjusted in the matrix, by holding the step to be adjusted and pressing another button at a distance to denote the length in 1/16th intervals or alternatively by holding the step to be adjusted and clicking a button in the same column(above or below) to set the held step to a LEN of 192/192.*

### Editing Tracks

Pressing the track selectors in preview mode will produce a result similar to the steps buttons.

The note played will basically reveal the tracks velocity and pitch settings, producing a result equivalent to having a non-modified step playing in that track.

## EDIT PERFORM state (*Flashing Green - Berlin*)

*Use this mode for tweaking Steps.*

An alternative and quite rewarding mode of working with a step sequence (depending on your style and preference) is that of tweaking a set sequence of steps in realtime, while the sequence keeps playing.

You can also do this to some degree without a special mode, but EDIT PERFORM takes this to perfection.

EDIT PERFORM is actually similar to the EDIT state, with the exception that no MIDI data is transmitted when you operate on the matrix. This is particularly interesting for the Berlin School type of performances.

By default, in PAGE mode the EDIT LED button lights Green. Click on it once to toggle it to flashing Orange, and once more to make it flash Green.

Again, when the EDIT LED lights steady Green, everything behaves as you know it: the step buttons toggle the step states. When EDIT flashes Orange you are in EDIT mode, and when EDIT flashes Green you are in EDIT PERFORM mode.

*In this mode the step length may also be adjusted in the matrix, by holding the step to be adjusted and pressing another button at a distance to denote the length in 1/16th intervals or alternatively by holding the step to be adjusted and clicking a button in the same column(above or below) to set the held step to a LEN of 192/192.*

## Step Shift in EDIT PERFORM state

Holding a step in the matrix and turning the DIR rotary will either advance all steps to the right of the held step one complete step, or will move all steps to the right on the held step one complete step closer to the held step (provided the first step to the right of the held step is toggled off and not a Skip Step or Step Event).

Any steps that are advanced beyond Step 16 will be lost unless an 'over-run track' is configured.

*Note: Step Shift is also applied to Step Events. The position of a hyper-step does not change (adjacent steps when shifted will 'hop over' a hyperstep).*

### 'Over-run Track' considerations:

An Over-run Track is always lower in the matrix.

If a Track has an AMT attribute value of '100' then any steps that are advanced beyond Step 16 will 'over-run' to the next track lower in the matrix.

Hence, if all tracks are set to value '100' then the 'overrun' will flow through all tracks in the matrix. *To avoid any conflicts the above features are only available if there is no Step or Track Selection active.*

## Editor ATR state

In Page mode, an ATR may be temporarily assigned to the EDIT knob group.

### **Engage**

This is done by holding the selector of the respective attribute to select the attribute, and at the same time pressing the EDIT master button to make the actual assignment. The indicator for the Knob group will light Orange, indicating activity.

In this mode the EDIT knobs will behave just like another group of MIX knobs for the just selected attribute.

### **Disengage**

Pressing the EDIT master button once will cancel the assignment and return to the legacy mode of operation.

## Editor MCC state

The EDIT button has one more state - that is the MCC send state.

This is used to make the editor knobs send MCC data.

### **Sending MCC data**

The MCC amounts sent will be on the MIDI channel and controller chosen in their corresponding tracks. See section on Track Attributes if you don't remember the details for setting up Track MIDI CCs.

### **Engage**

To activate the MCC state, double-click on the EDIT button turning it Red.

### **Disengage**

To deactivate the MCC state, just press the EDIT button once.



## Musical scales

Each page can be associated with a particular musical scale. Once that association is done and a scale is active, all page notes are forced to play in the chosen scale.

### Force to scale

Force to scale for a page is enabled by going to PAGE mode and simply pressing the Green lit SCALE SEL button. Coming from the default state, you will see its LED turn Red and all scale notes light up, with the exception of upper C.

Conversely, force to scale is disabled by pressing the Red SCALE SEL button, which indicates that force to scale is engaged.

So, in general, the Red LED of SCALE SEL is indicating that the page pitches are forced into the scale, a Green LED indicates that the page is playing the pitches as they are.

The lower C LED is also lit Orange. What you see here is that all notes are selected in the scale, and that C is the base tone of this scale. Let's now modify the scale to get more interesting effects:

### Composing scales

While having force to scale active as described above, press the Select button (in the outer circle, button XIV) and it should flash Orange, while the Chr. scale LED (XX) is lit Orange.

This picture is telling us that the chromatic C scale is currently active, but that we may select any notes in our current scale.

The Select button you have just pressed is used to let you select the notes that you would like to add to your scale. Now press any of the note keys in the scale circle to toggle the corresponding notes into and out of the scale, putting together any scale you like.

Once you are done selecting the scale notes, you may press SCALE MOD again, and now you can modify (again) the base pitch of the scale you have just selected.

Another way to select a scale is to press any of the scale buttons in the outer circle, to get the scale structure associated with their label, always on the base tone indicated by the Orange LED.

### Changing the scale base

In order to change the base tone, press the SCALE MOD button to enter the scale modulation mode. Here you may select any of the current scales tones as the new scale base.

As you change the scale base you will see the scale signature carry over to the new base as well.

### Scale cadence mode

Another way of operating the Scale data is to combine it with the CAD functionality. What this means is that any changes done to the scale will translate into immediate mappings onto the track pitches in the page at hand.

To activate the SCALE CAD, please activate force-to-scale if not already active, and then press CAD (so it flashes Red indicating operation).

In order to make the effect clearly visible (on top of audible) you may also want to select the MIX mode for the track pitches (double click on the ATR key in the MIX TARGET field, then select PIT).

Now modify the scale as described and you should see the changes to the track pitches as they materialize in the matrix.

### Locking the page scale

You may want to have your page notes forced to the selected scale, but not see the details behind that and also prevent any unintended changes to the scale, essentially locking it.

In that case, while in SCALE mode, press ESC to leave the page forced to the scale, but to exit the SCALE mode. You will notice that the SCALE SEL LED will flash Orange, indicating that the page is forced to scale. To go back into the scale edit mode, simply press the Orange flashing SCALE SEL LED.

### **The grid scale**

The GRID may be assigned a scale, in the same manner that a scale is assigned to a page, except the GRID scale will act globally.

To operate the GRID scale, switch first to GRID mode. Use the SCALE SEL button and proceed as already described in the section describing the PAGE Scale operation.

### **Exempting pages from the grid scale**

Note that by definition, the GRID scale is overruled by any other scales active in particular pages. Therefore, an easy way to exempt a page from the grid scale is to force that page to a chromatic scale. This may be particularly useful in the case of percussive material for example.

### **Force to Scale - Quick Guide**

Scale SEL Lit Green - No Force to Scale.

Scale SEL Lit Red (or flashing Orange) - Force to Scale Active.

Press Scale SEL to activate Force to Scale, LED turns Red then either select scale with Outer Circle button (Maj, Min etc) or press Select (XIV) button and choose notes.

The Scale base note is shown in Orange, to change the base note press Scale MOD button then choose a new base note - press Select (XIV) button again to go back to choosing scale notes.

Pressing Scale CAD will change Track default notes to the defined scale (not a good idea as this will change to default note octave also).

*Pressing ESC will leave Force to Scale active and Scale SEL LED will flash Orange (notes of scale will no longer show).*

## **The Mixer block**

### **Viewing the MIX map**

Double click the ATR button. This brings you to the MIX TARGET assignment, where a parameter can be assigned to the MIX encoder group.

The Mix Target LEDs light all up, indicating the selected target in flashing Orange. Also, the matrix is showing in every row the value respective to the corresponding track for the chosen attribute. This type of display is called a MIX map, showing the behaviour of the tracks with respect to a particular attribute, which can be adjusted using the MIX encoder block.

As a matter of fact, clicking on any of the MIX target buttons will open a MIX map view, with the respective values showing, and ready to edit. We will describe this in the next sections in more detail.

### **Mix attribute quick assign**

A very quick way to assign an attribute to the MIXER BLOCK is to select the attribute (i.e. to select GRV, press and hold the selector of row 2), while pressing the MIX button. Or vice versa - hold the MIX button pressed and press the track selector corresponding to the wanted attribute. By pressing the MIX button you will notice that the selected attribute has been changed - the current selected mix attribute is flashing Orange in the selector column.

### **Using the MIX block to rotate the Step Skip condition**

By selecting the POS attribute (as described above) all Steps of the Tracks may be rotated using the Mix knobs. With the MIX button held and the POS led flashing orange, click the POS button again and the led will change to Shine Red - this indicates that the Mix knobs will now rotate only the Skip condition of the Tracks (and the position of the actual Steps will not rotate).

*Note: When saving the Page the MIX block is stored as the POS attribute not as Skips 'rotate'.*

## **Working with Mix maps**

While viewing MIX maps, you can work with a particular track attribute value directly, for all tracks at once. You may tweak the value of any one track, or apply some functions to all tracks in the page.

### **Clear**

Clear the MIX map using the CLR button - this will reset the MIX map to default values for each track in the page, all at once.

### **Randomize**

You may randomize the displayed values using the RND button. This will assign random values to all tracks at once - for the selected attribute of course.

### **Align**

Using the ALN function you may re-order the tracks in the page, sorting them in the page by the values of the selected MIX MAP attribute. The sorting will be done such that the track with the highest value will be placed on the top row. Try it out!

### **Copy / Paste**

Finally, if you have composed a page whose MIX map you would like to replicate, you may use the CPY / PST functionality to replicate that attribute assignment across the tracks.

For example, assuming you have a page whose pitch structure creates a certain mood or harmony; you can apply the same mood to an entirely unrelated page or pattern, by simply copying the PIT map from one page to the other.

## **Mix map targets**

Going back to editing, there are three classes of targets: attributes (ATR), preset MIDI CC's (any of VOL, PAN, MOD, EXP), and MIDI Control Maps (MAP 0-5). Some explaining is due here.

## Attributes

If the ATR type is selected by a double click, the SEL buttons will light up Green, indicating that any of them may be selected. The already selected attribute will flash Orange.

The matrix will show the value relevant for the respective rows.

All rotary knobs act upon the same attribute on their respective track. For example if PIT (pitch) is selected, every rotary will change the pitch of its assigned row.

## Preset MIDI CC's

The MIDI CC's behave the same as the ATR targets. The CC's used are: VOL (7), PAN (10), MOD (1), EXP (11).

## MIDI Control Maps

Using a MIDI Controller Map, any MIX knob can be assigned an individual CC on a chosen MIDI channel.

As an example, double click on MAP 0 to select MIDI Controller Map 0. You will notice that the AMT button will flash Orange indicated that AMT is selected. The matrix shows the per-track AMT values, which is really the CC amount set on each of the tracks.

Press the MCC button. Here the Matrix shows the actual Midi Continuous Controller assigned to each of the tracks.

You can modify the CC for every individual track using the MIX knobs. Remember that four Green LEDs in positions 13, 14, 15, and 16 indicate that no CC has been assigned.

Now press the MCH button. This view allows you to assign the MIDI channel on which the CC signal is sent.

Note that this is not the MIDI channel of the Track - the track's MIDI channel is an entirely independent parameter.

Finally, the settings that you have just made are stored as a MIDI Controller Map. There is a total of 6 MIDI Controller Maps, and they are global. This is useful because you can have MIDI map operate beyond the context of a page, as they fulfil a global function.

## Playing MIDI Controller Maps

MIDI Controller Maps may be edited and operated directly from both the GRID and the PAGE level.

Select one of the MIDI Controller Maps, 0-5. You will see that the LED for the corresponding map is lit Orange to show that it is currently active.

## Timeout

The MIXER block may be used at any time during PAGE mode operation. In order to make the effects visible, once you operate any of the MIX encoders in PAGE mode you will see its value displayed briefly in the corresponding matrix row.

The value will disappear shortly after you have performed the last click, to clear the view for the regular contents of the track.

## Midi Control Map Values

The AMT values are effectively the 'start point', turning the encoder will send out the value + or - the Map AMT 'start-point' value.

*Note: Once a Midi Control Map has been changed during a performance the only way to reset to the stored map values is via a 'hard reset'.*

## MIDI Control Map Setups

Map	Instrument	Parameter	Track	M.Ch	MCC	AMT (default)
<b>0</b>			<b>9</b>			
			<b>8</b>			
			<b>7</b>			
			<b>6</b>			
			<b>5</b>			
			<b>4</b>			
			<b>3</b>			
			<b>2</b>			
			<b>1</b>			
			<b>0</b>			

Map	Instrument	Parameter	Track	M.Ch	MCC	AMT (default)
<b>1</b>			<b>9</b>			
			<b>8</b>			
			<b>7</b>			
			<b>6</b>			
			<b>5</b>			
			<b>4</b>			
			<b>3</b>			
			<b>2</b>			
			<b>1</b>			
			<b>0</b>			

Map	Instrument	Parameter	Track	M.Ch	MCC	AMT (default)
<b>2</b>			<b>9</b>			
			<b>8</b>			
			<b>7</b>			
			<b>6</b>			
			<b>5</b>			
			<b>4</b>			
			<b>3</b>			
			<b>2</b>			
			<b>1</b>			
			<b>0</b>			

## MIDI Control Map Setups

Map	Instrument	Parameter	Track	M.Ch	MCC	AMT (default)
<b>3</b>			<b>9</b>			
			<b>8</b>			
			<b>7</b>			
			<b>6</b>			
			<b>5</b>			
			<b>4</b>			
			<b>3</b>			
			<b>2</b>			
			<b>1</b>			
			<b>0</b>			

Map	Instrument	Parameter	Track	M.Ch	MCC	AMT (default)
<b>4</b>			<b>9</b>			
			<b>8</b>			
			<b>7</b>			
			<b>6</b>			
			<b>5</b>			
			<b>4</b>			
			<b>3</b>			
			<b>2</b>			
			<b>1</b>			
			<b>0</b>			

Map	Instrument	Parameter	Track	M.Ch	MCC	AMT (default)
<b>5</b>			<b>9</b>			
			<b>8</b>			
			<b>7</b>			
			<b>6</b>			
			<b>5</b>			
			<b>4</b>			
			<b>3</b>			
			<b>2</b>			
			<b>1</b>			
			<b>0</b>			

## Bank view

When in PAGE mode, by default you see a Green lit Select LED in the top right quadrant of the circle, along with the Orange Tempo LED.

They indicate the two available modes for the main knob and the numeric field: one of them (default one) is to show master tempo in the numeric field of the circle, the other one is what we call the bank view.

A bank is the set of 16 pages that live on the same Grid row, and which are mutually exclusive at playtime, meaning that only one page may play per bank, at any time.

### Entering bank view

Pressing Select will allow you to see in the numeric field the banks that are currently playing (i.e. contain a playing page) as Green lit buttons.

The Orange flashing one is the bank currently in your matrix editor.

Note that this says nothing about which column in the bank is currently playing, as a bank only says something about the Grid row that a page resides on.

Pressing any of the Green lit buttons will take you directly to the currently playing page in that bank.

Turning the main knob will incrementally take you through the playing pages.

*This is just a way of jumping between the (up to 9) concurrent pages playing.*

### Exiting bank view

Press the Tempo button to return to the standard Tempo display.

## Keyboard Transpose

Tracks can now be Transposed using a keyboard or another sequencer, transpose may be absolute or relative with regard to the Tracks' Pitch attribute.

### **Setup Transpose Midi channel and an associated Track**

On a Midi keyboard set the output Midi channel you wish to use to transpose the Octopus.

In Page mode, hold main SEL button and Select one or more Tracks to be available for Transpose.

With the Track Selection active, turn the bottom left Mix encoder to set the Midi channel, so it corresponds with the Midi keyboard.

Led Green is midi port 1 (1-16), and led Red midi port 2 (1-16) - turning the encoder left will turn off transpose listen and step 1 led will momentarily flash Red.

### **Choose Transpose Mode**

Transpose may be either Relative to the Pitch Offset of the Track, or Absolute - which forces the Track Pitch offset to the pitch of the incoming note.

With the Track Selection still active you will see the Scale Sel led flashing, click the Scale button to chose between Relative Transpose (Led Red) or Absolute Transpose (Led Green).

Start the sequencer, now press a note on the keyboard to transpose the track.

### **Restore Original Track Pitch Offset**

When a track is first Selected the Pitch Offset is stored so that if any key (on keyboard) is struck harder (Midi Velocity >88) it will toggle the Track back to its original Pitch offset prior to any transpose.

### **Editing the 'Original' Pitch Offset**

The Pitch Offset is stored only when a Track is Selected, when in Track zoom any edits to the Pitch Offset can be confirmed by holding the Scale Sel key and clicking the PIT attribute button - thus the currently shown Pitch Offset will now be the 'Restore' Pitch.

### **Saving State:**

The Transpose Midi input channel of each Track is stored with the page.



## 5. Grid Mode

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### Operations

#### Grid Clear - Resetting to start-up defaults

Please note that doing this will erase any changes you have made and possibly want to keep, so use this with extreme caution!

Press and hold the GRID mode button, while pressing the Clear button. Again, this only clears the RAM (volatile) memory contents and leaves the content of the FLASH (non-volatile) memory untouched.

#### Other Operations

In Grid Edit modes to following operations are available, Page Clear, Page Solo, Page Copy, Page Paste & Page Remix. Simply hold the relevant Page in the Matrix and click the required mutator.

### Grid Modes

#### Grid EDIT mode

Furthermore, you should take quick notice of the EDIT LED. It should light flashing Orange to indicate that we are currently operating in Grid EDIT mode.

#### Grid LIVE mode

The Grid live mode is more suited in the cases where you are playing your material live, hence the name. In Grid live mode the matrix buttons will act as toggles for the respective pages. This provides more immediate and intuitive handling of material in live situations.

Switching to Grid live mode is quite easy if the EDIT LED is flashing Orange (default state) press it once to turn it Green.

Operating in Grid live mode is easily explained. In principle, the page buttons now act as page toggles, much similar to the way things work in page mode, where buttons act as step toggles.

For Example: Pressing a page button that is Red (page is not playing), will turn that page on. Pressing the button of a playing page (Green) will turn that page off.  
*There are two page switch modes, "on the beat" and "immediate". To toggle between them simply press the Tempo button. "On the beat" is denoted by a Red master clock indicator, "immediate" by a Green one.*

## Grid-Track mode

The GRID-TRACK mode may be imagined as a sub-mode of the GRID Mode. The GRID-TRACK mode provides most of the GRID functionality described above, allowing a different view on your MIDI data.

Here, matrix buttons represent tracks (as opposed to pages) and have the functionality of track selectors, as described for the PAGE Mode.

We may refer to them as virtual track selectors.

### Entering the Grid-Track mode

To enter the GRID-TRACK mode, enter the GRID mode first (by pressing GRID) and then press the Green-lit TRACK button.

The TRACK button will flash Orange, and the GRID button will stay lit in Orange. This indicates that you are in the GRID-TRACK mode.

### Virtual track selectors

The Matrix will slightly change its contents and some explanation is necessary to what it now conveys.

For each page playing in the GRID, you will see a lit bar of 10 LEDs, from position 4 to position 13, leaving three blank columns of buttons on each side.

Each lit button acts as virtual track selectors and the LEDs indicate the toggle state of the corresponding track.

### Hands-on

As an example, let's assume there is only one page playing in the GRID in bank 1 of the grid and no tracks are muted in that page. You should see a bar of 10 Green LEDs in row 1, positioned in the centre of the row (3 unlit LED's to each side of the 10-LED bar).

### Working with tracks

Moving from here is easy: press and hold any of the virtual track selectors and you will see that two mutator functions become available: TGL and SOL.

Also, the EDIT block indicator flashes Orange, as you may use the encoders to modify the track selected via the virtual selectors.

When exactly one track is selected in GRID-TRACK mode, the pitch of that track becomes visible and editable in the inner circle, just as we have seen it in PAGE mode.

### Quick track toggle

Sometimes all you want to do in GRID-TRACK mode is to toggle tracks on the fly. There is a quick way to do that by holding any button that belongs to columns 1-3 or 14-16 while pressing a virtual track selector. The virtual track selector now directly toggles the mute status of the respective track.

### Zooming into tracks

You may do much lower-level editing of tracks, simply by double-clicking a virtual selector to enter TRACK mode for that track, i.e. zooming into that track.

To return from TRACK mode to GRID-TRACK mode simply press the GRID and TRACK mode buttons at the same time - this proved to work well.

### **Grid-Track live mode**

The GRID-TRACK live mode is much similar to the live mode in Grid mode. It is activated by pressing the EDIT button LED such that it is lit Green.

When in live mode, the matrix buttons will act as toggles for the respective tracks. This provides more immediate and intuitive handling of material in live situations.

### **Toggle Page Mute Pattern in GridTrack Live & Edit Modes**

If a Page has a stored Mute Pattern then step 16 of the GridTrack row will be lit either Red or Green depending on whether the Track Mutes are active or not. Clicking the step 16 button will toggle the Mute Pattern in the same way as clicking the Main Mut button when in Page View.

### **Global Toggle of Mute Pattern(s) in GridTrack Live & Edit Modes**

Clicking the Main Mut button in GridTrack Mode will Toggle the Mute Pattern of all concurrent Pages. The action will occur either instantaneously, or On-The-Measure, depending the respective Pages' OTM status.

### **Solo / Un-Solo Tracks in GridTrack Live Mode**

In addition to Track Mute toggles, a Track may be Solo'd by double-clicking the relevant Track button. Single click to Un-Solo. The Track led will be shown Orange when a Track is Solo'd, or if the Page is in OTM Mode the Track led will flash Orange when armed for Solo. As in the legacy OS, double-clicking a Track button in GridTrack Edit mode will enter Track Zoom.

### **Leaving Grid-Track mode**

In order to exit the GRID-TRACK mode, press either the GRID or the TRACK button. Both of them will simply take you back to GRID mode.

## Page Clusters

### Building clusters

In order to play two or more pages consecutively they have to be situated next to each other in the GRID. You can achieve this easily by using CPY / PST / CLR mutator functions in order to create what we shall call page clusters.

A page cluster is therefore a group of two or more adjacent pages surrounded by either empty pages or grid margins.

### Cluster activation

Create a page cluster consisting of three pages in a row of your choice. Once the cluster is built, make sure the sequencer is playing and toggle one of the pages in the cluster to Green (i.e. make it play).

The page will keep on playing.

Activate cluster play for the row in which the cluster exists by pressing the SEL button of that row once - toggling it from Red to Green.

When Green, you will notice that once the currently playing page is finished playing the next page in the cluster starts to play and so forth.

### Cluster Page Hold

With an active Page Cluster any page can be made a 'hold page', cluster play will not advance beyond the 'hold page' until the 'hold' is turned off - see Page Repeats (STA). When a Cluster Hold Page is playing it will be shown in the Grid as flashing Green.

### Bank mute toggles

In GRID mode, the buttons in the MUT column act as bank mute toggles. Pages in muted banks will continue playing in sync with all active ones, but their output will not be sent out to MIDI. This provides more immediate and intuitive handling of material in live situations.

## Track-Across-Cluster operations for Mute and Solo

This mode is used to toggle a Mute or Solo condition across all pages of the current cluster. In Track-Across-Cluster Mode both the individual Track Mute/Solo buttons and the main MUT button influence all pages within that cluster.

In Grid mode the Cluster select button now has three states:-

Cluster Mode **Off** - led Red (v5.00 & earlier)

Cluster Mode **On** & Track-Across-Cluster **Off** - led Green (v5.00 & earlier)

Cluster Mode **On** & Track-Across-Cluster **On** - led Flashing Orange

In Grid mode to activate Track-Across-Cluster double-click the Cluster select button - the led will flash orange indicating that the banks' Pages are operating in Cluster mode and that Track-Across-Cluster is also in operation.

A single click will turn off cluster operation, or a double click will switch back to Cluster mode On (led Green) and Track-Across-Cluster Off.

*Please note that when Track-Across-Cluster mode is active, any changes to Mute (or Solo) 'pattern' on the current page will arbitrarily apply the current mute pattern to all other pages in the cluster.*

## Using Track-Across-Cluster with On-The-Measure

Both Track-Across-Cluster and On-The-Measure may be used at the same time....

When Track-Across-Cluster is engaged in Page View the Track Mode led will flash Orange if On-the-Measure mode is also engaged. Additionally, the Track Mute leds will Shine Red (armed for mute/unmute) or Shine Green (armed for Solo) when both modes are active.

## Page play parameters

### Page repeats (STA)

Page clustering can become even more fun, as you can set the number of repetitions individually for each page. For example, page A can play 4 times, page B 2 times and page C 1 time. The number of repetitions can be any value between 0 and 16, where 1 is the default value.

In order to set the repetition value for a page, simply keep it pressed and select the number of repetitions in row 0 - for any number between 1 and 16. You may press on a page's key and you will see the repetitions value along with the currently left number of repetitions for play (double-click to set value 0). Another way of modifying a page's number of repeats is to hold the page in the grid, while turning the STA knob in the edit block.

*Note: Page STA value of 0 is a special value that signifies a Cluster Hold Page, i.e. Cluster Page Play will not advance to the next Page until the 'held' page STA is changed to a value other than 0.*

### Page length (LEN)

When pages play, they are set per default to play 16 step positions, after which they play another 16 steps and so on. These rather natural sixteen 16th positions make up what we call the length of the page, i.e. how many positions until the track "wraps around".

However this value may be changed to a number higher or lower than the natural 16. For example, assuming length 12 for a modified page playing along with a reference page with length 16, the modified page will play its first 12 positions, after which it will play once more its first 4 positions. After that it will start over from position 1 and so on.

Let's see briefly how this may be used: As we have seen, clustering pages is a way to create structures spanning more than one page. If you have worked with pages that contain tracks of different lengths and had these be part of clusters, you may have wondered what determines the moment of switching from one page to the next.

To set the page length of a page, make sure you are in GRID mode, and from there press and hold the button of the page whose length you want to read or modify. When pressing the page button, notice that the SEL LED in row 0 will be lit and can be pressed to change colours between Red and Green. Make sure to set it to Green. The default is a Red LED in the first position of row zero. This indicates that the page is playing a full 16-step cycle. In order to change that, use the row zero buttons and click / double-click them to achieve the desired result. Note that the maximum length of a page can be set up to be 8 cycles, or 128 step lengths(at x1 speed).

### Page trigger behaviour

Page lengths below 16 steps will cause the page to re-trigger every time a start is invoked. This is useful when you create chopped-up beats and the like. If the page length is 16 or greater, the page will continue playing on new starts and will not re-trigger. Hence, for Page STA with Page LEN values below 16 then the Page STA acts as a page repeat but when used with a Page LEN of 16 or more then effectively Page STA acts as a Page LEN multiplier.

A Page LEN of less than 16 will influence a Page whether or not it is activated for cluster play.

### **Page transposition (PIT)**

When a page is selected in the grid, you may notice that the pitch circle lights up. It indicates the page's pitch offset and lets you modify it, in order to transpose the entire page content in one place. Alternatively you may use the PIT encoder to adjust it as well.

To transpose the page by one full octave respectively, you may use the High C and Low C keys in the circle.

### **Page velocity factor (VEL)**

Similar to the factors we see in conjunction with the track attribute maps, there is a page velocity factor that may be adjusted from the grid mode. The page velocity factor is a master determinant of the velocity produced by note content in a particular page. Assuming the patch on your sound source is velocity sensitive, you should be able to easily create fade-ins and fade-outs using this functionality.

Select a page in the grid, and while selected, turn the VEL encoder. The row 1 will display the factor value.

## **Page follow**

At any time during play in GRID mode you may zoom into any page you would like by the methods described already.

If the page is part of a cluster and some page in the cluster other than the zoomed one is playing, you may want to see the position of the chase-light in the cluster.

Press the Green Follow key to enable the follow page function, turning it Red. You will notice that the matrix display will always switch to the page that is currently playing, essentially following the chase-light as it moves forward through the pages of the current bank.

This is particularly useful when you are working on structures longer than one page. Pressing the Follow button again will freeze the view on the page currently showing.

An easy way to remember the colour coding could be:

Red: stick to the Red chase-light, Green: stick to the Green steps.

## **Page sets**

When you have a certain number of pages in the GRID, which you are tweaking and playing in various combinations, you will eventually find combinations that you would like to recall quickly.

### **Concurrent page activation**

Octopus can store the pointers of all active pages at a given time in what we term a Page Set. Activating or switching between Page Sets can then be done by the press of a button at playtime. The operation is equivalent to and a shortcut to toggling a set of pages on - with all the rules that apply: only one page per bank will play, banks determine cluster behaviour, page length is determined in the pages.

### **Working with Page Sets**

Simply activate in the matrix the set of pages that you would like to store for recall.

Once they are all playing, press and hold the Green SEL button, while you press any of the 16 buttons in row 0. The buttons in row zero represent memory slots for storing your page sets.

You will notice that once you have stored a set, into a slot, its corresponding LED turns Green - indicating that the set of that slot is now playing in the grid.

Now press the button of an empty slot - you will see that all pages stop playing, the slot LED lights Orange (it is empty), and the previously saved slot is lit Red - because it is not playing.

Pressing the Red slot button will recall the page combination you had defined before for this particular slot.

### **Deleting a Page Set**

With that Page Set selected toggle all pages to Red(off) and the selected Page Set LED will then flash Orange. Now hold SEL and click the selected PAGE Set button and the selected Page Set LED will flash Green (empty).

### **Page Set as Midi Controller**

When in Grid View the row zero grid selection Page Sets are now able to send MIDI notes on-the-measure, to control a drum machine or another device that is responsive to MIDI notes.

In Grid View, to select Midi Control double click the Row 0 'MCH' button and the led will flash Red.

Press and hold the MCH button and use the MCH encoder to set the Midi channel for the note-out, which should be set to match the drum machine MIDI event-IN channel (the MCH is global for all Scenes).

Select a step in row 0, it will flash orange - now whilst holding the MCH button, use the PIT encoder to set the note out value which will be shown in the note circle.

When in Drum Control View the MCH led will flash orange if the selected step (Midi Control) has a note-out stored, or will flash red if the step (Midi Control) is empty.

## **Grid Musical Scale**

### **The grid scale**

The GRID may be assigned a scale, in the same manner that a scale is assigned to a page, except the GRID scale will act globally.

To operate the GRID scale, switch first to GRID mode. Use the SCALE SEL button and proceed as already described in the section describing the PAGE Scale operation.

### **Exempting pages from the grid scale**

Note that by definition, the GRID scale is overruled by any other scales active in particular pages. Therefore, an easy way to exempt a page from the grid scale is to force that page to a chromatic scale. This may be particularly useful in the case of percussive material for example.



## Force to Scale - Quick Guide

Scale SEL Lit Green - No Force to Scale.

Scale SEL Lit Red (or flashing Orange) - Force to Scale Active.

Press Scale SEL to activate Force to Scale, LED turns Red then either select scale with Outer Circle button (Maj, Min etc) or press Select (XIV) button and choose notes.

The Scale base note is shown in Orange, to change the base note press Scale MOD button then choose a new base note - press Select (XIV) button again to go back to choosing scale notes.

Pressing Scale CAD will change Track default notes to the defined scale (take care, as this will change to default note octave also).

*Pressing ESC will leave Force to Scale active and Scale SEL LED will flash Orange (notes of scale will no longer show).*

## Utility functions

### Chase-light align

There are many reasons why your chase-light in a page may become misaligned in a visual sense. Sometimes that's what you want, but sometimes not.

In order to line up all tracks in a page, simply press the ALN button. This will re-synchronize all tracks to the Octopus global master-clock, as explained in the section on the GRID mode.

As a side comment, the chase-light will also be realigned whenever you Stop and then play a sequence. Pause and Resume (pressing pause again) will not realign the chase-light

### Interface locking

Sometimes you may want to hide the Octopus from preying eyes or even un-authorized button pressers.

At any time, regardless of the playing status of the machine, you can engage the interface lock by holding GRID and pressing ESC at the same time.

The result will be that only the tempo LED will remain lit and flash at the rate of the internal clock. All other LEDs will be turned off, and seemingly all keys will be disabled. The only operating knob will be the tempo knob.

In order to unlock the machine you may double click on the GRID mode button to return to normal operation in GRID mode.

### Bypassing memory reload

If you hold the CLR button down while powering up the machine, Octopus will not load the FLASH memory contents, but will simply start with the factory defaults.

The default Track PIT values for Tracks 9 - 0 are as follows:

C3, D3, E3, G3, A3, C5, D5, E5, G5, and A5

### Where are you from?

If you press the PAGE key you will notice a Orange LED flash in the Matrix. This indicates the position of the current page in the grid.



## 6. Recording

### Recording Index:

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### Note stream recording

Octopus is capable of recording incoming MIDI note, MIDI controller, pitch bend and channel pressure data onto its tracks, at (sequencer) runtime.

Note recording is polyphonic, meaning that chords may be recorded in from an external keyboard onto a track. Not only that, but you may also record on more than one track at a time.

Moreover, Octopus is capable of forcing MIDI input into its scale without actually recording the output, and a few tricks more.

#### Arm recording

To record a track, got to PAGE mode, press the REC key to activate the Recording mode, and then simply hold a Track SEL button while pressing the REC key again, to arm that track for recording. Press Play to start the sequencer if it was not playing, and you are ready to start MIDI recording. Use any external MIDI controller to record MIDI data on the selected track. Note that with one track armed for recording the MIDI input is automatically re-channelled to the channel of the armed track.

While in stop mode this provides for a comfortable way to pre-listen to what the tracks will output, or to trigger their connected MIDI destination. This is especially convenient as all data, including notes, pressure, pitch bend and CCs are being routed through.

You can browse through the tracks in a page by selecting them one by one and have the record selection state move along. Together with the noted re-channelling behaviour you can use a single MIDI keyboard to play and hear all tracks, in both Stop and Record mode.

#### Anti-Echo - Disable MIDI Note and MCC Playback During Recording

In Page (or Grid) mode, to disable MIDI Note & MCC playback whilst Recording press the MAP button. If MIDI Note & MCC playback whilst Recording is disabled the MAP led will flash red. This condition is global to all pages and is saved with the machine state.

### **Record rehearsing**

Sometimes you may just want the re-channel capability described above but without the actual recording being done. This is useful when you want to play along an instrument of a given track but do not want to record straight away.

To enter record rehearsing, make sure all record activity is off (no track SEL flashing Red, the REC key is not flashing Red). Now hold a track SEL button pressed and click on the REC button. The Track SEL LED will flash Red, indicating rehearse mode. Pressing the REC key again will finally enable recording for the armed track.

### **Multitrack recording**

In order to record on more than one channel at a time, you may make a multi-track selection and press the REC, just as above.

However, note that in multitrack recording the MIDI source to be recorded needs to send on the same MIDI channel as that of the destination tracks - i.e. the one you have just armed for recording. Also, make sure to send the MIDI data into the correct MIDI IN port on the Octopus, i.e. the one that the track is set to send on (IN 1 or 2).

To cancel multitrack recording press a track selector in combination with the Stop key to disable track record selection for all tracks in all pages. This basically allows for record re-channelling the next time a track is armed for recording.

### **Recording chords**

A track will stack the note data input such that you can make up chords by simply playing one note on top of another. Of course, you will need to be good on timing with this one. Playing chords directly on your keyboard will also generate a chord on the Octopus step under the chase-light, making it very easy.

When stacking notes up to make up a chord, you will notice that the length, velocity and start value of the step will use the values of the last played note for all notes in the chord.

### **Disable recording**

To disable recording for the track in question, simply press the flashing REC button, to return to rehearse mode. From there press REC again to return to normal operation.

## **Step note recording**

Octopus offers an alternative to note stream recording, and that what we term step-note recording. Note that this is not the same as step recording in other sequencers, therefore the slightly different name.

The idea is simple. Once a page is armed for recording, you hold down a step button, play a note on your keyboard (or whatever MIDI controller you're using), and voila! The step is entered. This only requires the page to be armed for recording. Simple!

### **Arming a page for recording**

With no track selected, hold down the PAGE button and then press the REC key, and you should see the REC LED flash Orange. You have now armed the page for recording, allowing you to perform step-note recording and more.

### **Step-note recording**

Holding a step on the matrix, and playing a key on your keyboard will assign the note data (including velocity) to the selected step.

To record more than just one step in a take, simply keep playing on your keyboard and you should see the played notes fill in one after another. They will default to length 1/16 and will simply follow the flow of the respective track.

Also note that the recording of MIDI data will follow the pattern described in the following.

### **Fresh recording**

If you step-note record on a step that is turned off (i.e. you pressed it once on, then off again and did not release the button yet), the step will be freshly assigned the value of the incoming note.

### **Stacked recording**

Step-note recording on a step that is turned on will stack the incoming pitch on top of the already existing data, letting you effectively create chords.

### **Chord recording**

You may record chords directly, in the same manner as simple notes. You can record chords stacking on top of what's there already, or starting from scratch.

### **Track live transposition**

Finally, if a track is selected while a page is armed for recording (a track selection may also be locked in using the SEL button), you will dynamically and directly change the pitch assignment for that particular track effectively transposing it a playtime.

With only one track selected, and holding the track selector pressed, you may observe the change in pitch assignment directly in the pitch circle.

## **Step real-time entry**

There is a simple way to tap steps into a track in real time.

Simply grab the track you would like to tap into - you will notice that the STEP LED in the MODE block turns Red.

### **Step tapping**

While the sequencer is playing, tap the STEP key as you go and you will see that the steps under the chase-light get toggled on as you tap.

In fact they are placed into the track at the precise position of the tap, within a 1/192 resolution, trying to reflect to the greatest extent possible what you have entered.

If you are less than satisfied with the results of your play, you may clean up the mess by simply clearing the track as we have already seen before.

### **Quantized recording**

In the section on attribute map factors, we have described the workings of the factoring mechanism. One application is non-destructive quantization of track content, including recorded material as you record it during a live session.

In order to get quantized output, you may want to set the STA factor for the track to the lowest possible value, in which case the map is not in effect.

Note that you may always increase the factor for the STA map in order to gradually increase the amount by which steps are pulled or delayed during play.

### **Chained track recording**

At any time, only one track will be recorded into, and that will be the recording armed track of the current page.

In order to record takes that are longer than 16 steps, simply build a track chain and enable one of the chain tracks for recording.

### **Chained page recording**

In complement to the above, you may record takes longer than 128 steps too, by using the page clustering function.

Simply cluster the necessary number of pages, set their track chain configurations, and enable in each of the pages the recording tracks.

Generally, when a recording track is part of a chain, the recording "lock" (flashing Red selector LED) will carry along with the chase-light in that track and move from one track of the chain to the next.

Note that the Track DIR setting will be followed even during MIDI recording.

### **Recording re-take/overdub**

If you absolutely do not like what you have recorded you can always use the Clear functionality, as we have seen it before.

Alternatively, you may overdub to a track, and there are two other options as follows:- Whilst the sequencer running, clicking the Play button will delete the track under the chase light - and, if recording to a track chain a double-click of the Play button will delete all notes in the track chain.

### **Data intervals**

There is a limitation on the range of data that may be recorded.

While the MIDI protocol allows for pitch and velocity values to be in the range 0...127, this range is constrained by the internal architecture of Octopus.

## **MIDI Controller stream recording**

Generally, MIDI controller data is recorded as it is coming in, similar to a note stream. Arming and disabling tracks for recording works in exactly the same way.

Once you have set a track for recording, your controller movements will be recorded onto the recording track. Also, the description below applies equally to recording pitch bend and channel pressure data.

### **Auto-sensing**

The track's MIDI CC parameters are auto-sensing the controller and the associated data and will perform the recording of the controller accordingly.

A fun exercise may be to enter MAP mode and observe the MCC values while turning a knob on your controller and watch the MIDI CC input being recorded as it comes in.

Please note that tracks whose MCC value is other than "none" (i.e. 4 Green LEDs in the positions 13-16) will have an Orange chase light in PAGE mode.

### **Considerations**

Remember that a track may only play one controller at once.

Therefore, if you have created a controller map for some controller and then operate some other controller, the map will play the controller data for the last auto-sensed controller.

This includes pitch bend and channel pressure, which are handled by Octopus in a similar fashion to a controller.

Note that pitch bend data is recorded using two value bytes (as specified in the MIDI protocol), essentially with an available resolution of 14 bits.

However, when editing the MCC data you will currently only operate on the most significant 7 bits of the value. This allows working with bender data to fit the model of working with MIDI CC data. When clearing the Track CC map (CLR) note that also the least significant 7 bits will be cleared.

## MIDI Control Map learning

While somewhat unrelated to what we have discussed so far, another aspect of MIDI recording is the ability to have a MIDI Control Map learn from the MIDI input.

### Entering MIDI Control Map mode

Enter the MIDI Control Map mode by first disabling any recording mode (if necessary), and double clicking on one of the MIDI Control Map selectors (0-5) at the bottom of the matrix field.

### Arm MIDI Control Map learning

While in MIDI Control Map edit mode, press the REC key to arm the learn mode. As soon as you press the REC key you will see that a Red flashing light will appear in the selector column of the page.

### Select target

Pressing across the selector buttons will move the position of the Red light, and effectively select the encoder for which we want to make the assignment.

Per default you will see the amounts of the map displayed, and this is the most spectacular place to be: if you are turning knobs on an external controller you will see the amounts of the learning encoder go up and down immediately.

However, note that the MIDI channel and the controller number are recorded as well.

### Disable MIDI Control Map learning

Simply press the REC key again to exit MIDI Control Map learning mode, and you may switch the view of the MIDI Control Map accordingly, to verify your results.

## External force-to-scale

### Forcing MIDI notes to an Octopus scale

While in page mode, with the page armed for recording (press and hold PAGE while clicking REC), your external MIDI input will be forced to the scale of the current page. Of course, this is assuming you have a scale enabled for the respective page.

This is especially interesting in performance situations, obviously.

### MIDI merge

By selecting a chromatic scale for your page you can effectively implement a MIDI merger functionality of the data your Octopus is producing and the data that you provide on the MIDI in port.

Note that this is only applying to note data, and not to other MIDI data, such as controllers.

## External scale editing

In the chapter on scales we have explained how to build and modify a scale. We have used the Octopus pitch circle to select the notes of the scale, or the base pitch of the scale accordingly. However, you may do the same changes using MIDI notes on the Octopus MIDI in port. These could be generated by a MIDI keyboard for example, or even another sequencer - or the other Octopus MIDI port!

### **Arming external scale edit**

To do that, arm the page for recording (hold PAGE and press REC), then simply enter scale mode by pressing SCALE SEL.

All notes received on the MIDI IN will be interpreted in the same way that key presses in the pitch circle will be interpreted.

### **Disabling external scale edit**

Press the REC button again to disable this mode. Or simply disable the scale by pressing SCALE SEL again.

## 7. MIDI

### MIDI Index:

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### MIDI clock synchronization

#### MIDI clock selection

Per default, Octopus does not send or react to MIDI Clock information. However, Octopus may act as a MIDI clock source in your setup, or will synchronize to some other source.

The MIDI clock state is selected and indicated by the button / LED numbered "200" in the top part of the outer circle.

When Octopus is MIDI clock master, MIDI Clock signal will be sent out of both MIDI ports.

When Octopus acts as MIDI clock slave, MIDI clock will be received on a single port. The MIDI port that receives MIDI Clock will be automatically detected and requires no explicit selection by the user.

The MIDI Clock state is remembered as part of the machine state, when the machine state is saved. See the "Instrument State Save" section on saving the Octopus state.

#### Master

An unlit clock indicator LED means that Octopus is not sending and not receiving MIDI clock information.

Pressing the clock selector turns it Orange - indicating that Octopus is sending MIDI Clock as well as associated transport commands out both MIDI ports. Another press toggles it back to of (default mode).

#### Slave

A double click turns it Green or Red (more on that below), meaning that Octopus is now listening to the MIDI clock and that is acting as a MIDI slave.

Change of clock selection (switching between master and slave mode) is possible only in GRID and PAGE mode.

#### MIDI Clock echo (in slave mode)

MIDI clock that is received while the machine is in MIDI slave mode can be sent out to the MIDI out, so other devices can be slaved along the same chain.

When switching to slave mode using the 200 key, the default colour of the 200LED is Green.

Pressing it once toggles it to Red, with a Red setting meaning that the clock information is passed through.

#### '200' button operation

<i>Led colour</i>		<i>Led Colour</i>
200 - Orange - Master Midi Clock Send --- Single-click ---		200 - Red - Slave Clock Send (echo'd)
	<i>Double-click</i>	
200 - Off - Master No Clock Sent ----- Single-click ----		200 - Green - Slave No Clock Sent



### **ALL NOTES OFF message**

When the sequencer is not running but is defined as MIDI master or slave (the 200 LED is lit either Orange or Green), pressing the Stop button will send out an ALL NOTES OFF message (controller 123) on each of the 32 MIDI channels.

### **External force-to-scale**

Forcing MIDI notes to an Octopus scale

While in page mode, with the page armed for recording (press and hold PAGE while clicking REC), your external MIDI input will be forced to the scale of the current page. Of course, this is assuming you have a scale enabled for the respective page.

If recording to a track, and even though the incoming notes will be forced-to-scale, the incoming note pitch will be recorded. Therefore, if force-to-scale is turned off then the actual recorded note pitches will play.

### **MIDI merge**

By selecting a chromatic scale for your page you can effectively implement a MIDI merger functionality of the data your Octopus is producing and the data that you provide on the MIDI in port.

Note that this is only applying to note data, and not to other MIDI data, such as controllers.

### **External program change**

Octopus allows external control of page toggle states via program change messages. The program change messages received will be interpreted according to the channel they arrive on. The MIDI port however does not matter.

*Note: External Program Change is only available if the Octopus is in Slave Clock mode.*

### **Arming program change listening**

To activate program change listening, you need to go to grid mode, hold the GRID key pressed and then click the REC key. You will see the REC LED flash Orange. Pressing REC once again will switch the listening of again.

### **Grid set selection**

Program change messages received on channel 10 will trigger grid set selections in the GRID. It is equivalent to pressing a grid set selection key in the matrix. The grid set index will be computed as a modulo function of the incoming program change message.

For example, MIDI program changes 0-15 will select grid sets 1-16 respectively. A MIDI program change message of 33 will select grid set 2, which is computed as follows:  $(33 \% 16) + 1 = 1 + 1 = 2$ .

### **Page toggles**

Program change messages received on MIDI channels 1-9 will act as toggle signals for pages in the respective banks.

Let's take an example: a program change of 33 on MIDI channel 7 will toggle page 2 of bank 7. If some page other than page 2 was playing in bank 7, page 2 will be activated for play and the previously playing page will be muted.

Similarly, if page 2 was indeed playing, it will get turned off and no other page in bank 7 will be playing.



## 8. Load/Save

### Load/Save Index:

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### Saving the instrument state

Octopus can save the full instrument state for later recall - all settings are stored to FLASH memory and automatically recalled upon power-on.

Note that only one state may be saved to FLASH, replacing any previously saved machine state.

Also note that in order to perform this operation the sequencer has to be stopped.

#### **WARNING:**

Please make sure that Octopus is not turned of or reset during the save operation!

### **Saving the machine state**

To perform a save of the machine state go to GRID Mode and press and hold the GRID button.

While you hold down the GRID key, the Program LED will start to flash.

Pressing the Program key will start the save operation. Expect the save operation to take about 5-10 seconds.

### **Saving individual pages**

Occasionally it may be useful to save individual pages only, as opposed to the full instrument state. For this to work the machine has to be stopped, and you have to be in GRID mode.

While in GRID mode, make sure that the EDIT LED is lit up flashing Orange, otherwise press it once to make it light flashing Orange.

Now press and hold the matrix button corresponding to the page you are about to save. This will reveal a Red flashing Program button (among others).

While holding the matrix button pressed, click on the Red flashing Program button to save the respective page to memory.

### **Loading individual pages from flash**

To recall an individual page from flash memory, go to PAGE mode of the page you want to recall from flash first.

Now press and hold the PAGE button, and press the Green flashing ESC button. Note that this operation may be performed at playtime, i.e. the sequencer does not have to be stopped for this operation.

## Save Progress

The progress of the save operation is depicted in the note inner circle, and operation completion is signalled by a complete circle.

NOTE: If a save operation does not complete, the saved memory contents will be irreversibly lost and the previously saved instrument state will likely become corrupted as well.

## Things to remember

Some of this is repeating information, but it may be a good time to remember it.

You can always revert back to the last saved state by simply pressing the reset button found on the bottom pane of Octopus (just underneath the Tempo knob).

This will clear all changes made since the last save operation. If you power up Octopus while holding the CLR button, you will start without loading the saved state from memory, starting of with a virtually fresh machine.

To completely clear the Octopus RAM memory back to the factory default, go into GRID mode, press and hold GRID, and then press the CLR Mutator button. This does not affect the machine state saved in FLASH memory in any way.

## Exporting memory content to MIDI

Octopus may export content of its memory by the means of MIDI system exclusive (SYSEX) dumps.

This is particularly useful when you would like to archive data on a computer, or even share memory content across Octopus machines.

Before you continue, please make sure that the sequencer is stopped.

Connect the MIDI Out 1 port of your Octopus with your receiving device, considering that SYSEX data will be export out of the Octopus port 1 only.

### Export content mode

Three types of SYSEX export streams are available: PAGE, BANK and GRID.

In order to trigger the export operation (SYSEX dump operation), you need to be in the EXC mode on the Octopus.

To enter the EXC mode, press and hold GRID while pressing the Green flashing EXC / ALN button. You should see the EXC LED turn Orange and flash steadily.

To exit the EXC mode you may press ESC and return to GRID mode.

### Page export

A PAGE export will output the full contents of a page as MIDI SYSEX stream.

To trigger a page save, while in EXC mode simply press the button of the page that you would like to export. Only lit matrix buttons will have an effect, basically preventing you from accidentally dumping empty pages.

Notice that the circle is used as a progression indicator, and pages sent have their LED turned from Green to Orange (this is true for all dump types) for the duration of the data transfer. A single exported page should take on the order of 10 KB.

### Page import

When played back to the Octopus, a previously exported page will be reloaded into its original and natural location in the grid, i.e. the position it was in at the time of its export. This means also that it will overwrite any content in that location.

Note that playback of SYSEX content to the Octopus may occur at any time, including while the sequencer is running.

Once the page is received, the machine will switch to GRID mode and the page data is pasted from the incoming SYSEX buffer into the page memory. This operation is equivalent to a page copy.

### **Bank exports**

A bank export will export all non-empty pages in a bank, and behaves very similarly to exporting page content, basically chaining several page export operations.

To trigger a bank export, simply press the button of the bank you would like to export, in the SEL column.

The duration of a bank export is dependent on the number of pages that will be exported, but as an indicator, the size of a full bank is on the order of 160KB. Here as well, the circle acts as an indicator to show progression of the transmission.

### **Grid exports**

The GRID export is covering all the data that is not page related, but has an influence on the overall machine behaviour. This includes parameters like strum levels for example.

To initiate a grid export, simply press the Green lit MIX button on the bottom left side of the front panel.

The exported GRID content will take on the order of 37K, and the circle is used to show the progression of the transmission.

### **All pages and full machine state export**

Two more options are available for SYSEX dump: dump all pages at once via the SEL key, and dump the full machine state at once via the EDIT key.

The same results may be achieved by several partial dumps as described above.

### **Data transmission rate**

The throughput of SYSEX data is dependent on the tempo set at transmission time. Adjusting it knowingly may be useful in cases where your external periphery needs a lower transmission rate than Octopus is potentially capable of providing. Obviously, a lower transmission rate will result in more time required by the dump to complete. You may want to experiment a bit to find the rate that is best suited for your particular setup.

### **Remarks**

Note that you can use the export functionality only while the sequencer is stopped. This is a measure to ensure concurrent data integrity of the SYSEX dump and timing stability of the material played.

You may however, receive SYSEX data while the sequencer is playing.

This makes it particularly convenient to substitute memory content on the fly, during performance.



## 12. Appendix

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### Device Mode Options

#### Device View

Enter Device View as before, reboot Sequencer holding the Esc button. The matrix will show the OS version number and from default the Grid Mode led will be Red and the Scale led will be Green.

#### Start-up Mode\*

To change the Sequencer boot-up mode the Grid Mode click the Grid Mode button and the led will change to Green, now click the flashing Red Record button to confirm the change. The Sequencer will now start in Grid Mode.

#### Midi Port Priority\*

If the Scale led is Green Midi Port 1 will have priority, clicking the Scale button will give Midi Port 2 priority and the Scale led will change to Red, confirm the change by clicking the Record button. Changing the Midi Port priority can be useful if the machine is running as a MIDI slave controlled by a DAW. The DAW can send the MIDI clock to Midi Port 2. Additionally, the MIDI clock and transport events can be sent from Midi Port 2 to 'timing sensitive' machines such as a drum machine.

It should be noted that having either Midi Port 1 or 2 as the priority does not imply that the machine introduces clock or event jitter, or is in any way unstable. This is simply a way to manage event-queue growth and delay as new steps and MCC events are added to a song. You may want your clock and percussion to play consistently at the same predictable time, regardless of what you record and play on the machine.

*Note: Changing the Midi Port priority does not change the sysex send port - which remains Out 1.*

**\*Changes made in Device View will reset the Grid to default, any custom settings will need to be re-loaded via sysex.**

# I. Octopus Techniques

This section provides some ideas for using the Octopus in ways that may not, at first, be obvious.

## Sequence Variation

Octopus has a variety of ways of adding subtle, or not so subtle, variations to a sequence.

### Random step rest

The principle of Random note picks from chord pool can also be used without a chord, i.e. on single notes.

Here's how:- Zoom into a step with just one note and set the polyphony on the chord buttons to 2 this will effectively give a 50/50 chance of the note being played on the step, or a rest.

#### Example 1

Set up a Track as follows:

Turn on steps 1, 3, 5, 7, 8 (all as single notes) and Mute steps 9 to 16

Now zoom into step 3 and set the polyphony on the chord buttons to 2, do the same for step 7.

Zoom into step 8 and set the polyphony on the chord buttons to 4.

### Step phrase note variations

Setting the Step phrase to type 4 will randomize all programmed note attributes so we can have a random note selection.

Here's how:- Zoom in to phrase edit and chose a phrase you want to edit, set the type to 4, then set note 2 to PIT +7 and set the polyphony to 1.

With a track set up as in example 1 above zoom into step 5 and set the step to the phrase number you have just created.

You will hear that step 5 will sometimes play the step note and sometimes the step note +7 semitones.

More variation can be added by increasing the number of PIT offsets in the phrase.

### Step phrase timing variations

Again by setting the Step phrase to type 4, we can introduce a timing variation.

Here's how:- Zoom in to phrase edit and chose a phrase you want to edit, set the type to 4, then set note 2 to STA +12 and set the polyphony to 1.

With a track set up as in example 1 above zoom into step 1 and set the step to the phrase number you have just created.

You will notice that sometimes the step 1 note plays on step 1 and sometimes it plays on step 2.

Taking this a little further, set up a phrase as follows:

set the type to 4,

set note 2 to STA +12 and PIT +7

set note 3 to STA +24 and set the polyphony to 2.

Now, we change step 1 in example 1 to this new phrase and the following variations can occur:-

Step 1 & step 2 play, or step 1 & step 3 play, or step 2 & step 3 play, AND one of the steps may, or may not, be offset by +7 semitones.

## Variable Step Sequences

By using hypersteps we can vary the number of steps played in the hyped-track each time the hyperstep is triggered.

Here's how:- Set up a hyperstep (on step 1) and its associated hyper-track, on the hyped-track mute steps 9 -16 (so it will only play 8 steps).

On the hyperstep track mute steps 5 - 16 (so it will only play 4 steps) and set the hyperstep track LEN to 8 (default), then zoom into the hyperstep and change the step length from 192/192(default) to 48/192 (4 steps). Now zoom into step 4 (last step) of the hyperstep track and set up a step event for LEN with an AMT of -1.

Each time the hyperstep track plays it will 'scale' the LEN on the hyped-track, so in the above configuration the number of steps played will vary between 5 steps and 8 steps - the length time taken to play will be the same.

By populating some of the hyped-track steps with MCC we effectively have something very similar to a Sample & Hold LFO

## Using Step phrases with Chord stacks

When using a Step phrase on a step that holds a chord - the phrase attributes will influence the notes of the chord, for example, if the phrase has STA timings specified, the notes of the chord will be played with those STA timings - hence a phrase can be used to create an arpeggio of the chord. The other phrase attributes can also be used to influence the notes of the chord.

With Step phrases types 1, 2 & 3 - provided the number of notes in the phrase is the same, or greater, than the number of notes in the chord a simple up, down or random order arpeggio will be played. If the number of notes in the phrase is less than the number of notes in the chord then the additional notes will be played on the first step and single notes will be played on the rest of the arpeggio.

For Step phrases type 4 more variation can be added, for example, when using a 3 note chord with a 4 note phrase - the 3 notes of the chord will be played along with an added note rest. Let's set that up:

Zoom in to phrase edit and chose a phrase you want to edit, set the type to 4, then set note 2 to STA +12, note 3 to STA +24, note 4 to STA +36 and set the polyphony to 4.

Now set up a track as follows:

Turn on steps 1, 5, and Mute steps 9 to 16. Now zoom into step 1 and create a 4 note chord then zoom into step 5 and create a 3 note chord - set both steps to the phrase number we have just created.

With the above set up then chord on step 1 will 'arpeggio' and play on steps 1, 2, 3 and 4 and the chord on step 5 will play its 3 notes plus 1 rest in random order across steps 5 to 8.

A similar effect can be created across steps 1 to 4 by using the chord buttons to change the step 1 polyphony from 4 to 3.

## Setting the Loop Length of an Indeterminate Length Track Direction

A Track with a DIR containing brownian slices will effectively have an indeterminate length. It may be musically desirable to fix the loop point of such a track, and this can be done putting the indeterminate length Track on a separate Page and using the Page Cluster Page LEN function.

## II. System load handling

### **Natural bottlenecks**

The flexibility for composition offered by Octopus translates into possibly huge amounts of data being generated at a given time.

This makes two natural bottlenecks visible: the bandwidth of the MIDI pipe and the capacity of the Octopus central processing unit (CPU).

### **Load monitoring and dropping**

Octopus is built with timing stability in mind. However, too high loads of data would result in potentially massive glitches. To prevent that Octopus constantly monitors its load.

Should any of the two bottlenecks be full, load will start to get ignored. This is indicated to the user, which may choose to reduce load in general - or not, being aware of what is going on.

### **Overload signalling and overload protection**

The CHORD block of the panel is used to indicate overload or potential overload as follows:

Overload on the MIDI1 port is indicated by a Red lit CHORD1 LED.

Overload of the MIDI2 port is indicated by a Red lit CHORD2 LED.

What the lights really tell you is that the respective MIDI port pipe is too full to carry additional load, and some MIDI data was potentially dropped. One way to work around this is to make sure you use both MIDI ports and distribute the load accordingly between the two.

CPU load is a bit trickier, since the CPU has many tasks to complete.

For all practical purposes, CPU overload means that not all data may have been processed by the CPU in a timeframe that would allow timing to stay relatively stable (our subjective impression).

CPU (over-) load is indicated in the CHORD3 to CHORD7 LEDs in two stages:

Stage One indicates that CPU is at about 80% load.

This is shown by the CHORD3-CHORD5 LEDs being Orange.

Stage two indicates that the CPU is overloaded,

indicated by CHORD6 and CHORD7 LEDs lit up Red.

All data that was not processed was obviously ignored.



III. Octopus Grid Usage Chart

Start Date:	
Sysex Filename:	
Previous Sysex Filename:	

Bank	----- Page -----															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
9 (I)																
8 (H)																
7 (G)																
6 (F)																
5 (E)																
4 (D)																
3 (C)																
2 (B)																
1 (A)																
0																

Notes:

### III. Octopus Grid Usage List

Bank	Page	Song / Instrument	BPM	Page	Song / Instrument	BPM
<b>9 (I)</b>	<b>1</b>			<b>9</b>		
	<b>2</b>			<b>10</b>		
	<b>3</b>			<b>11</b>		
	<b>4</b>			<b>12</b>		
	<b>5</b>			<b>13</b>		
	<b>6</b>			<b>14</b>		
	<b>7</b>			<b>15</b>		
	<b>8</b>			<b>16</b>		

Bank	Page	Song / Instrument	BPM	Page	Song / Instrument	BPM
<b>8 (H)</b>	<b>1</b>			<b>9</b>		
	<b>2</b>			<b>10</b>		
	<b>3</b>			<b>11</b>		
	<b>4</b>			<b>12</b>		
	<b>5</b>			<b>13</b>		
	<b>6</b>			<b>14</b>		
	<b>7</b>			<b>15</b>		
	<b>8</b>			<b>16</b>		

Bank	Page	Song / Instrument	BPM	Page	Song / Instrument	BPM
<b>7 (G)</b>	<b>1</b>			<b>9</b>		
	<b>2</b>			<b>10</b>		
	<b>3</b>			<b>11</b>		
	<b>4</b>			<b>12</b>		
	<b>5</b>			<b>13</b>		
	<b>6</b>			<b>14</b>		
	<b>7</b>			<b>15</b>		
	<b>8</b>			<b>16</b>		

### III. Octopus Grid Usage List (cont.)

Bank	Page	Song / Instrument	BPM	Page	Song / Instrument	BPM
<b>6 (F)</b>	<b>1</b>			<b>9</b>		
	<b>2</b>			<b>10</b>		
	<b>3</b>			<b>11</b>		
	<b>4</b>			<b>12</b>		
	<b>5</b>			<b>13</b>		
	<b>6</b>			<b>14</b>		
	<b>7</b>			<b>15</b>		
	<b>8</b>			<b>16</b>		

Bank	Page	Song / Instrument	BPM	Page	Song / Instrument	BPM
<b>5 (E)</b>	<b>1</b>			<b>9</b>		
	<b>2</b>			<b>10</b>		
	<b>3</b>			<b>11</b>		
	<b>4</b>			<b>12</b>		
	<b>5</b>			<b>13</b>		
	<b>6</b>			<b>14</b>		
	<b>7</b>			<b>15</b>		
	<b>8</b>			<b>16</b>		

Bank	Page	Song / Instrument	BPM	Page	Song / Instrument	BPM
<b>4 (D)</b>	<b>1</b>			<b>9</b>		
	<b>2</b>			<b>10</b>		
	<b>3</b>			<b>11</b>		
	<b>4</b>			<b>12</b>		
	<b>5</b>			<b>13</b>		
	<b>6</b>			<b>14</b>		
	<b>7</b>			<b>15</b>		
	<b>8</b>			<b>16</b>		

### III. Octopus Grid Usage List (cont.)

Bank	Page	Song / Instrument	BPM	Page	Song / Instrument	BPM
3 (C)	1			9		
	2			10		
	3			11		
	4			12		
	5			13		
	6			14		
	7			15		
	8			16		

Bank	Page	Song / Instrument	BPM	Page	Song / Instrument	BPM
2 (B)	1			9		
	2			10		
	3			11		
	4			12		
	5			13		
	6			14		
	7			15		
	8			16		

Bank	Page	Song / Instrument	BPM	Page	Song / Instrument	BPM
1 (A)	1			9		
	2			10		
	3			11		
	4			12		
	5			13		
	6			14		
	7			15		
	8			16		

IV. Page Set List

Page Set	----- Bank / Page (A1-I16) -----								Song Name
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									

## V. Page Note Chart

Song Name:

Tempo:

Date:

Page Length:

Page	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Page Reference:
Bank	1(A) 2(B) 3(C) 4(D) 5(E) 6(F) 7(G) 8(H) 9(I)																

	Synth/Sound:																	
	Step	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Trk	Mch	----- Note -----																DIR
9																		
8																		
7																		
6																		

	Synth/Sound:																			
	Step	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
Trk	Mch	----- Note -----																DIR		
5																				
4																				
3																				
2																				

	Synth/Sound:																			
	Step	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
Trk	Mch	----- Note -----																DIR		
1																				
0																				

Mark this column when tracks chained ^

## VI. Song Grid Reference Chart

Song Name:

Tempo:

Date:

### List of Concurrent Pages:

	Bar #:/	Bar #:/	Bar #:/	Bar #:/	Bar #:/	Bar #:/	Bar #:/	Bar #:/
Bank	Page	Page	Page	Page	Page	Page	Page	Page
9	/	/	/	/	/	/	/	/
8	/	/	/	/	/	/	/	/
7	/	/	/	/	/	/	/	/
6	/	/	/	/	/	/	/	/
5	/	/	/	/	/	/	/	/
4	/	/	/	/	/	/	/	/
3	/	/	/	/	/	/	/	/
2	/	/	/	/	/	/	/	/
1	/	/	/	/	/	/	/	/

### List of Page Clusters:

Bank	Page Cluster, Bank - First Page:	Page Cluster, Bank - Last Page:





## Sysex transfers between Octopus & Nemo, or between Nemo & Octopus

The Octopus and the Nemo have the same motherboard which means that although the user interface(UI) is different, and will thus generate creative distinctions, communication should not be a problem if the UI differences are respected.

### Page and Track numbering

Looking at the Octopus we see the rows are numbered top to bottom (9 to 0) and the Nemo rows are numbered top to bottom (1 to 4). Assuming we are using Nemo x2 (CE OS v5 onward) - the second matrix view will show 4 more tracks which we can number 5 to 8.

In a sysex transfer of a page from the Octopus to the Nemo, or from the Nemo to the Octopus rows will be represented on each machine as follows:

Panel Numbering	Octopus	Nemo	Panel Numbering
<i>Top Row</i>	9	1	<i>Top Row</i>
	8	2	
	7	3	
	6	4	<i>Bottom Row</i>
	5	5	<i>Top Row</i>
	4	6	
	3	7	
	2	8	<i>Bottom Row</i>
	1		
<i>Bottom Row</i>	0		

**Danger Note:** Octopus pages contain 10 tracks therefore any notes (or other data) on Octopus tracks 1 & 0 will be received by the Nemo will play that data! even though it will not be possible to access that data (to delete or mute).

See below: **Imported Page Conversion Mode** option to clear tracks 1 & 0

*It is important NOT to send pages from the Octopus to the Nemo that contain data outside the Nemo UI constraints.*

*The same is true for Grid Banks!*

### Custom Nemo Step Phrases

By sending the Octopus 'Grid Only' data (via MIX button) to the Nemo via sysex we can effectively replace the default Nemo Step Phrases with custom phrases previously created and stored in the Octopus.

### Grid Only data Considerations

When sending 'Grid Only' data from the Octopus to the Nemo it is prudent to not send any data that is not relevant to the Nemo, for example, clear all Page Sets and clear CC Maps (Sound Control) beyond what can be accessed by the Nemo. Although the data itself should not cause any OS problems, its best to be cautious.

### **Sending Nemo Pages to the Octopus**

Any Nemo Flow Factors are stored as step offsets in their respective tracks and will thus be applied when the page is imported into the Octopus.

### **Sending Octopus Pages to the Nemo**

If a Octopus Page with Active Scale is transferred to Nemo the Octopus Page Scale goes with the Page - hence Nemo Scale button convention will be:-

1. Grid Scale Off (green) and Page Scale off(green) will play Octopus Page Scale.
2. Grid Scale Off(green) and Page Scale On(red) will play the Page chromatically(i.e. turn off Octopus imported page scale).
3. Grid Scale On(red) and Page Scale On(red) will lock page to grid scale.

### **Imported Page Conversion Mode**

When a Octopus Page is imported via sysex into a Nemo (or when a Nemo Page is imported into an Octopus), and Step Event(s) PIT or Step Event(s) VEL exist on the pages transferred then the Event(s) themselves will be reversed due to the UI. Additionally, Step Event Track Toggles (v5.30) event values will potentially point to incorrect tracks.

Once a Page has been imported, the above values may be converted to match the sequencer UI, as follows:

In Grid Edit mode, click & hold matrix Page key, click Mix Master key once to arm 'Import Convert' (led will show shine\_red), then click a second time to effect Conversion - when complete Mix Master led will shine\_green.

Note: When the Nemo converts an imported Octopus page the following rules are applied:-

- (i) *Step Event Track Toggle attribute AMT values greater than 8 are changed to 0 (off)*
- (ii) *Step Event Track Toggle Range values 9&10 reduced to 7&8 respectively*
- (iii) *Tracks 9 & 10 are Cleared*

# Using LFO-type modulations

LFOs are so deeply rooted into traditional synthesis systems that users feel they should have the same type of functionality in a sequencer!

---

## Goal

Octopus does provides on-board tools to create modulations that are typically created using LFOs - low frequency oscillators.

Our example shows how to modulate MIDI CC data using LFO type modulations, but the described technique applies equally to using targets such as velocity, pitch, and other attributes.

## Basic setup

1. Switch to page mode.
2. In the page, choose a track and set it up to send out MIDI CC data on a chosen CC# and a chosen MIDI channel.
3. Zoom into the CC map of your chosen track, where you will be able to draw or program the desired “shape” of the modulation.
4. Set the appropriate speed relation to other tracks (to get a higher resolution of sending out the data) on the same MIDI channel.
5. Use the remaining tracks of the page to create the musical sequence you would like the modulation applied to.
6. Make sure that you set the note-holding tracks to the same MIDI channel as the modulator track in order to hear the effect.

Once you have succeeded with the above, you may take your modulations to the next level. This means, you can start to modify the amplitude, the period, or both.

Here is a quick reference on the tools you have:

## Changes to the modulation amplitude

The amplitude of the modulation can be adjusted by various means:

- By modifying the shape of the modulation map itself
- By adjusting the map factor, manually or by using step events
- By adjusting the map position, using track position events
- By using the Effector to apply dynamic changes to the map
- All of the above combined

### Changes to the modulation period

The period of the modulation can be adjusted by various means:

- By adjusting the length of the host track (skipping some steps towards the end, or anywhere for that matter)
- By modifying the tempo multiplier of the track.
- By chaining tracks to create modulations longer than 16 steps.

### Advanced use

On the Octopus you can have up to 9 pages playing concurrently. Try to split note information and modulation sources on separate pages.

This allows you to modify and interact with the modulators as you would with any other track or object.

This also implies the ability to have modulators evolve and change over time, using step events for example.

Finally, you can modify the modulators on the fly, during performance, giving you capabilities at hand which are yet to be matched!

# Editing track directions

Besides offering a state-of-the art set of track run directions, Octopus allows direction editing by the user. Here we introduce this unique feature hands-on.

---

Diving right in, let's start with an empty page. Select an empty page and zoom into a track (use track 9 for this example).

## Getting prepared

- Use the DIR edit knob to select direction 6.
- Double click on the DIR Selector button.
- While the below may be carried out with the sequencer running or stopped, we recommend you stop the sequencer to minimize distractions while editing.

You should see a flashing DIR SEL light, a flashing LED in row 0 (indicating the time slice or position to be edited), and a solid orange LED in step 0 (the direction map you are editing – 6 in this example).

## Step double-play

Let's start with a simple variation – have steps 1, 5, 9, and 13 play twice.

- Select slice 1 in row 0. The red LED in position 1 of row 1 indicates that when the first position is played, step 1 triggers.
- We want step 1 to trigger twice, so toggle position 1 of row 2 on.
- Make sure the LEDs in all other rows are off.
- Now click on button 5 of row 0. You should see a similar situation – position 5 of row 1 is on – toggle position 5 of row 2.

Repeat for steps 9 and 13. Slow the tempo way down and start the sequencer – you should see it 'pause' on steps 1, 5, 9, and 13. It is actually playing these steps twice.

You can exit out to Page mode, activate some steps on Track 9 (including steps 1, 5, 9, and 13), and listen as it plays.

Since you added 4 step triggers (doubling steps 1, 5, 9, 13), at the end of 1 pass, that track will be 4 steps behind the rest of the sequence (i.e. – when it cycles back to position 1, the rest of the tracks will be on position 5). This is either good or bad, depending on what you wanted to do.

One way around this is to mute steps 14, 15, 16 and set step 13 to only a single trigger to get back to 16 steps per cycle.

If you know you're going to truncate the sequence, you don't have to program stuff in the steps you'll be muting.

If this is part of a larger chain of tracks, you can always mute steps in the other parts of the chain to get back to a multiple of 16.

Since you are modifying the directions steps play in, you cannot create a sequence of less than 16 triggers using the direction editor. You will need to use mute/skip steps to reduce the number played on each slice.

### Double-play variation

- Go back into direction editing for direction 6 on track 9.
- Edit slices 5 and 9 and toggle off the red LEDs in rows 1 and 2.
- Watch as the chase-light jumps around whenever it hits steps 5 and 9. Since no LEDs are on in any rows for steps 5 and 9, Octopus picks a random step to go to next.

### Playing tracks inside out

The next example is more involved. The goal is to play the track from inside out.

- Stop the sequencer
- Clear the extra toggles from positions 1, 5, 9, and 13.
- Press button 1 of row 0. The plan is to have the sequence start from the middle (position 8) and alternate sides moving towards the end positions (1 and 16). After reaching the ends, it will reverse and go back to the middle. Remember - row 0 is the index for which position(s) to trigger at each slice of time.
- So, for slice 1, toggle position 8 in row 1 and position 9 in row 2. This means when the sequence starts, it will play step 8 then step 9.
- Press button 2 in row 0. Toggle position 7 in row 1 and position 10 in row 2. Continuing:

Button 3, position 6 in row 1, 11 in row 2;

Button 4, position 5 in row 1, 12 in row 2;

Button 5, position 4 in row 1, 13 in row 2;

Button 6, position 3 in row 1, 14 in row 2;

Button 7, position 2 in row 1, 15 in row 2;

Button 8, position 1 in row 1, 16 in row 2;

Button 9, position 1 in row 1, 16 in row 2;

Button 10, position 2 in row 1, 15 in row 2;

Button 11, position 3 in row 1, 14 in row 2;



Button 12, position 4 in row 1, 13 in row 2;

Button 13, position 5 in row 1, 12 in row 2;

Button 14, position 6 in row 1, 11 in row 2;

Button 15, position 7 in row 1, 10 in row 2;

Button 16, position 8 in row 1, 9 in row 2.

- Exit out to Page mode.
- Select the default track chain of 10 separate tracks (XXIX). Press Play and adjust the tempo to see the effect.

If you keyed it in correctly, you should see the chase-light for track 9 start in the middle, bounce to the end and then go back to the middle again.

For an even more striking effect, edit the direction for all 10 tracks to use direction 6 and crank the tempo to the maximum.

While you're here, try other track chains. XXX and XXXI in particular play out nicely with this pattern.

### Random step selection

One other thing to mention about steps – if no position is toggled in any row, the trigger for that time slice will be selected randomly by Octopus.

In a sequence, if you have a random step, Octopus will play normally until it hits that step. At that point, it will jump to some other position for the duration of that step.

### Certainty\_next

Now let's play with certainty\_next.

- Go to track mode
- Select direction map 7.
- Click on button 1 of row 0 if that's not selected. Notice in the outer circle, where tempo normally is located, the 100 position is lit. This indicates a certainty that the next step will be step 2 of 100%.
- Set each slice's certainty\_next to 0 by selecting it in row 0 and then double clicking on 100.
- Press play - notice that the sequence is now playing backwards. (16, 15, 14...1).

To prepare for the next example, either reset the certainty\_next value back to 100 (single click on 100) or use a different direction pattern (for example, 8).

### Brownian motion

If `certainty_next` is not 100 or 0, Octopus will decide whether to play the next step or the previous step based on the percentage set for that step.

If `certainty_next` is 90, then approximately 90% of the time Octopus will play the next step and 10% of the time it will play the previous step. This is how the Brownian motion preset direction is created.

### Track single trigger

The next few hints and tricks also involve `certainty_next`.

If you put a step with a `certainty_next` set to 0 in the middle of other steps with `certainty_next` set to values above 0, the track will get stuck at that point. This may be what you want sometimes.

For example, using direction 7 with all slices set to 100% `certainty_next`, change slice 9 to have `certainty_next` set to 0.

Exit to Play mode and start the sequence running. As soon as step 8 is completed, it will play step 9. Step 9 says to always go back to the previous step (step 8). So after step 9, it plays step 8, then 9, then 8, and repeats this forever. This leads to a couple of interesting ideas.

### Infinite loop and back

You can create a random sequence with just 2 slices.

Set slice 1 to be random (no rows toggled on). On slice 2 toggle position 1 in row 1 on and set `certainty_next` to 0%. Now when the sequence plays, it will keep selecting random positions.

You can use either the infinite loop from above or the randomization in a live setting by muting the 'special' steps and then un-muting them when you need the special effect.

If you get tired of the infinite loop, you can just mute the steps again.



# Real-time MIDI CC control

The Octopus encoders may be used to send MIDI CC data and hence control both external gear and internal sequences. Here's how to put them to work.

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## Standard implementation

Octopus has a standard MIDI CC implementation that spits out a CC amount per step. To set this up is a three step process:

1. Go into Track mode and set the MIDI CC (MCC) to a particular controller number.
2. Either zoom into a particular step, or else bring up the Track attribute Map for MCC. This is done by pressing the MCC Selector button then pressing ZOM to bring up the MCC map.
3. Set the MCC amount for any step or steps in the track.

As the track plays, you'll hear the MIDI CC affecting your sound. Remember to set your synthesizer to respond to that CC message.

In addition to this method, Octopus gives you real-time control for sending MIDI CC data.

## Real-time MIDI CC

Using the MIX knobs in Page mode, you have control of up to 10 different MIDI cc streams PER MAP PER PAGE.

That means with the touch of a button, you have control over 50 MIDI CCs on a page.

## Setting it up

- In Page mode select a Page that has some active steps.
- Double-click on the MAP 1 button under the matrix. You should see 3 SEL buttons light up (AMT, MCC, MCH) and one (AMT) should be blinking.
- For this tutorial, skip changing the AMT and press the MCH button. This allows you to set the MIDI channel for each knob.

The MIDI channel selected here does not have to match the Track channel. The MIX knobs are completely independent of the Tracks.

After setting the channels, press the MCC button. This is where you set the MIDI CC number for each knob. ESC out and try it.

With the sequencer running, start twisting the MIX knobs and listen to what happens. You should hear the MIDI CCs having an effect on the synthesizer.

### Advanced tweaking

- Go back to Grid mode (press the GRID button).
- Turn on Page Clustering (press the SEL button for that row turning the LED green).
- Activate a second page next to the current one by double-clicking on the next button in the same row.
- Program some steps in that page as well.
- Go back to Grid mode.

When the sequencer starts, you should see the two adjacent Page LEDs changing as first one page is played then the next. For now, turn Follow off (green LED) and go back into the first page you set up (with the MIX MIDI cc knobs).

Start the sequencer and watch as the chase light plays this page and then disappears while it plays the second page in the cluster. Now try turning the MIX MIDI cc knobs.

You will find that the MIDI cc changes will have an effect even if the Octopus is playing another page in the cluster. This allows you to make real-time changes to a track or tracks even if you have many pages clustered together.

### Interesting side effect

There is an interesting and useful side effect to this behavior. If you set up different MIX mode cc maps on different pages, they will only be active when that page data is displayed in the matrix.

So, by turning Follow on and off, or by leaving Follow off and directly selecting pages with a double-click, you can freeze different pages (and hence different MIDI CC maps) in the display. This gives you quick access to a lot of MIDI CC potential while the song is playing.

Note that each page allows up to 5 CC maps to be defined and the currently selected map is saved with each page so you can have Page 1 with map 1 selected, Page 2 with map 2, and Page 3 with map 5 selected and the display will update accordingly with each page change.

### Banks

Octopus has a setup for banks (a row of pages) to let you make some global changes to a group of pages when you're in Grid mode.

That frees you up from being on a specific page, but it constrains you to a specific set of MIDI controllers at that point (although you can still have 5 different MIDI maps and switch between them using the row of buttons under the matrix).

You set up the MIX knob functionality for the Grid CCs the same way you did for Pages.



