USER'S MANUAL

v3.1.73 (April 19, 2025)

THE CENTRE

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Before Start

Software Update

Software Update is the most important process to keep your unit updated with the latest features and bug fixes as well as to keep it safe from breaking during update process. Updating process is fairly simple from user perspective although there might be some issues with downloading files because of specific Internet Browser behaviour during downloading.

1. Download latest firmware release from Github `https://github.com/1V-Oct/3318_the_centre_releases/releases`
2. Copy downloaded firmware file into SD Card (make sure that the filename is: 'the_centre_v4.fwx' and it is in root directory of your card)
3. Insert SD Card into The Centre
4. Power on The Centre or perform Reset
5. Go to [[System Menu]] and check firmware version.

■ *NOTE: Sometimes Safari, Explorer and other browsers add some extra bits to the filename like '(1)' or '_1' to indicate that it is different file than already downloaded. Please rename the file to the correct name.*

Calibration

TL;DR: I came here to calibrate and not read poems... Here is YouTube video that shows Calibration of The Centre:
https://www.youtube.com/watch?v=uEFr7RkuP7k

2.1 Why Calibrate?

In the ideal world things are well... ideal. Although in real world things are not perfect and this is where term tolerance kicks in. Every electronic component has tolerance. Usually measured in percentage and usually this tolerance is like %1 for resistors and %5 for capacitors. Each circuit contains multiple electronic components and tolerances of those components add together making quite a huge percentage tolerance of the circuit. When circuit is operating the tolerances of this circuit do not change. Tolerance just change component properties at manufacturing stage. Therefore the circuit is always stable but might be slightly off.

Of course there are different ways to deal with the non-ideal circuits. Some of them are expensive (on hardware level) and some of them are quite cheap. One of those methods is calibration.

Calibration allows to establish default values returned by circuit under controlled environment and use them as reference points.

2.2 Calibration of music instruments

Many music instruments need calibration. Even tuning the piano or guitar. For digital or hybrid modules like The Centre the calibration process is to connect a well calibrated source of pitch that will provide stable value of voltages at two or more reference points. Usually two points are enough. The software will recalculate all the values and will apply proper algorithms to always generate correct pitch for voltages.

2.3 Calibrating The Centre

The Centre needs two voltages separated by 2V. In other words, the centre needs a Control Voltage (CV) for two C notes separated by 2 octaves. Ideally that would be C1 and C3 but many current MIDI keyboards supply only voltages between 0V and 5V which translates to C2 and C8. Yep, there is no standard for V/Oct assignemnt of voltage to notes so at 1V/OCT we assume that C2 is 0V. It does not matter anyway, because every V/Oct input has Octave and Note correction anyway.

To calibrate V/OCT inputs press two middle buttons (button 2 + 3) and it will bring System Menu. From there select "Calibrate" and press encoder down (select).

Now every channel can be calibrated individually or 4 inputs at the same time. Use encoder to select channel or all channels (when calibrating all channels use signal splitter to send CV voltage for calibration (pitch) to all inputs).

Now follow instructions on screen. First send any note from your keyboard except note C (we calibrate by C notes) and press Start (button 1). Now press any low octave C note (lets say C3) wait 10 seconds for next instructions, move two octaves up and send note C5. Wait 10 seconds and your unit is fully calibrated.

Now you can Save your calibration settings and enjoy your fully calibrated unit.

What's In The Box

Your Eurorack module comes packaged in the box together with:

Accessory bag

There is tiny bag included with your The Centre.

Inside this bag you will find:

1. 8 small caps for knobs
2. 5 sets of washer + nut

https://github.com/1V-Oct/3318_the_centre_releases.wiki/images/accessory_bag.jpg

Knobs Caps

The 8 ”attenuator” knobs are naked because if you want to change face plate those caps sit very tight and they are hard to remove therefore I haven’t installed them. It’s very easy to install. Just position the pot in centre and put the cap pointing to the top. Thats it.

Washer + Nut Sets

I haven’t put all those under big Level knobs. They are not necessary because there is no pressure applied and 4 already secures plate well. If you want all of them attached that’s why they are inside this bag.

BPM

Many modules require clock to ensure synchronisation to given time interval requirements. Whether this is simple Random Note Generator (RNG) or Low Frequency Shaper (LFS) the supplied clock ensures that duration of quarter note in one module equals duration of quarter note in another module. There are multiple standards or just ad-hoc designs defining different number of clock pulses per beat. The most popular one is MIDI standard that estabilished 24 clocks per quarter note (24 PQN).

The Centre by default uses 24 clocks per quarter note (beat) but this value can be changed globally for all modules. That setting can be adjusted in Global Settings and can vary between 24, 12, 6, 4, 3, 2 and 1 clocks per beat.

■ *When using MIDI to control The Centre it is recommended to keep 24 CPQN (Clocks Per Quarter Note) to adhere to MIDI standard.*

Beats Per Minute (BPM) is a measure used in electronic music to define time interval of music. Beat in electronic music is equivalent to quarter note and there are 4 quarter notes to bar (4/4 tempo). The Centre by default configures all modules to work at 120BPM. 120 Beats Per Minute thats 120 beats per 60 seconds and in the end one quarter note duration is half second or 500 milliseconds (ms). To change default tempo it is necessary to provide modules with clock input via Clock CV (CLK) on modules inputs. The clock can be submitted via CVY input, MIDI input or generated internally via Clock Module (CLK). By adding CLK module we can generate Clock for other modules derived from user defined tempo.

Part II
System Overview

Module Overview

The Centre is a multipurpose Eurorack module designed around it's primary function being Wavetable Synthesis and incorporating large number of of functional modules that can operate on it's own or can be connected to create internal patches or presets. The Centre inspired by fully fledged WaveTable Synthesisers in VST format brings that functionality into Eurorack module however with the scalability and flexibility of modular synth.

The Centre can be considered as modular-in-modular as it allows creating instances of virtual modules and making connections between them either through audio or modulation paths. Every module can also be controlled via external CV inputs or physical knobs.

6.1 Patch

The Centre revolves around idea of patch (or preset) which is basically a set of different modules cascaded on top of each other connected via shared outputs and inputs and sharing the phyiscal knobs and CV inputs and audio outputs.

6.2 Physical Connectors

The Centre features:

- **Rotary Encoder** - used for navigating menu system
- **16 knobs** - 8 Level and 8 Attenuators
- **4 V/OCT inputs** - calibrated inputs taking 1V per Octave to control pitch of multiple modules
- **4 CVY inputs** - low latency gate inputs that result only in binary inputs (gate set and not set)
- **8 CV inputs** - higher latency analog inputs with -10V to +10V range.
- **4 VOUT inputs** (DC coupled inputs capable of outputting audio frequency and very low frequencies for modulating external modules)

6.2.1 Rotary Encoder

Rotary Encoder allows navigating through all menu systems. Pressing rotary encoder down executes **[SELECT]** function and rotating encoder is refered to as **[ROTATE]**

6.2.2 Knobs

All knobs in The Centre have are fully configurable and the differentiation on panel for **LVL** - *Level* and **ATT** - *Attenuator* is just for aesthetic and visual purpose (easier to navigate through configured patch). Every knob is fully assignable to any parameter in patch that can be controlled via knob assignment.

6.2.3 V/OCT

V/OCT inputs are preconfigured and calibrated to take -3V to 8V Control Voltage and control it to music notes by applying standard formula of 1V per Octave.
■ 1V per Octave (1V/Oct) is a term of controlling pitch of oscillators in modular synthesisers via control voltage that steps in linear way and every difference of 1 Volt causes difference in pitch of 1 octave.
■ The Centre is calibrated that 0V (or no input) results in note C2 (MIDI note 36)

6.2.4 CVY

CVY are simple gate inputs with very low latency (with the worst case being the standard length of audio slice - 2.7ms). CVY inputs are good for external clock and gates. To sync module to external clock only CVY gates can be used. CV gates will result with unacceptable latency.

6.2.5 CV

CV inputs are standard inputs taking analog signal in range of -10V to +10V. Those inputs have much higher latency than CVY (Gates) inputs and that latency varies at around 10ms being an average.

6.2.6 VOUT

VOUT outputs are physical outputs of patch that are propagated by **OUT** module from VOUT1-4 audio buffers in patch.
■ If multiple modules write to the same audio buffer the output is either mixed or overwritten based on module.

Patch

Patch (also known as preset) is a set of modules that carry following characteristics:

- Connected via audio inputs and outputs
- Connected internally via CV inputs and outputs
- Having set of knobs assigned to control performance
- Having set of assigned external CV inputs (V/OCT, CVY, CV) to control performance from external gear

7.1 Knobs

In **PATCH EDIT** screen the knobs perform actions as assigned in Module Inputs. That means the knobs can be assigned to perform arbitrary functions like control Cutoff of VCF, Frequency of LFO or attenuation of external envelope that goes to VCA.
■ When navigating to different screens the knobs are no longer assigned to the inputs but they perform a function on the screen. In the modules section every screen has knobs explained. The mapping of the knobs and external CV inputs can be seen in the **PATCH** screen as seen below:

Audio Outputs

Audio Outputs is a fundamental mechanism of transferring audio between modules and out of The Centre.

8.1 Physical Outputs

There are 4 output channels via **VOUT1** to **VOUT4** 3.5mm jacks that output audio level signal. VOUTs are DC coupled thus capable of sending output of utility modules such as LFS (Low Frequency Shaper - free shape oscillator) or ENV (AHDSR Envelope) or even triggers and gates. Those outputs are filled as a copy VOUT1-4 buffers respectively at the end of processing patch.
■ Modules in patch are processed in order for every time slice. If there are two modules writing to the same **VOUTx** they may either overwrite the content of mix it. It is strongly suggested to use **VBuf - Virtual Buffers** whenever possible and only produce final result to **VOUTx** channel

8.2 Virtual Audio Buffers

Virtual Buffer Output called in The Centre by shortened name **VBuf** is a concept of transferring audio inside The Centre between modules without occupying outside outputs. VBuf can be understand as a buffer that stores audio that can be then assigned to another module (or a few modules) and further processed indivdually.

The most important part of VBuf is that every module within The Centre has own VBuf. Furhermore VBuf Output of a module can be used as VBuf input to other modules without being modified.

★ WTO can output to VBuf and then VCF processes WTO input. At the end MIX module takes input from WTO VBuf (original oscillator signal) and VCF Vbuf (filtered oscillator signal) and MIX module can act as Dry/Wet Mixer for those two signals. In such scenario WTO VBuf (oscillator output signal) is being sent unmodified to two modules (VCF and MIX).

Audio Outputs are integral part of almost every module. Audio output of some modules can be configured to **Stereo** or **Mono** while some modules will output only single channel (Mono). Certain modules that take input of **VBuf** will detect if the input is Mono or Stereo and process it accordingly.

8.3 Quick Configuration of Audio Inputs and Outputs for Modules

While navigating patch menu press **[MANAGE]** button and enter Input/Output configuration mode. In this mode you can directly configure inputs and outputs of selected module by using **ATT1** to configure primary input of module and use **ATT8** to congfigure output of module.
When the module is configured to output its Audio to Virtual Buffer it will automatically show in the list of Audio Inputs for other modules configuration. The module will have name in inputs as it's own name.

By pressing **[Inputs]** or **[Set]** buttons we can enter Inputs and Settings of selelected module.

■ When having two or more modules of same type they automatically get numbered. The numbers will get automatically assigned in ascending order in list.

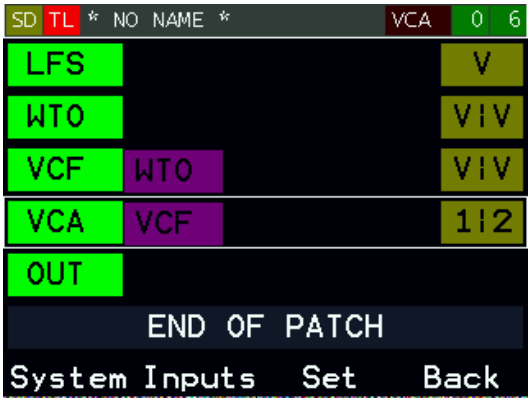


Figure 1: In this example the audio flows from WTO to VCF then to VCA via Virtual Buffers and finally to VOUT1|2

8.3.1 Visual Output Presentatu=ion in Patch View

- **1, 2, 3, 4** - monophonic VOUTx direct output (via OUT module)
- **V** - monophonic virtual buffer **VBuf**
- **V|V** - stereophonic virtual buffer **VBuf**
- **1|2, 2|3, 3|4, 4|1** - stereophonic VOUTx direct output (via OUT module)

CV Internal Outputs

Modules in Thw Centre nopt only output Audio Signal (that can be routed inside the module to other modules or outside of the module). Each module outputs Internal CV Signals that can be routed to other modules and used as CV (Control Voltage) Inputs. See: Module Inputs

★ VCO outputs two CV signals, VCO.OSC (output of oscillator) and VCO.RST (reset signal when phase of oscillator resets). The VCO.RST signal can be used as input of another VCO in Inputs: VCO Hard Sync that resets phase of oscillator. This way two VCOs can run in sync.

Module Inputs

10.1 Overview

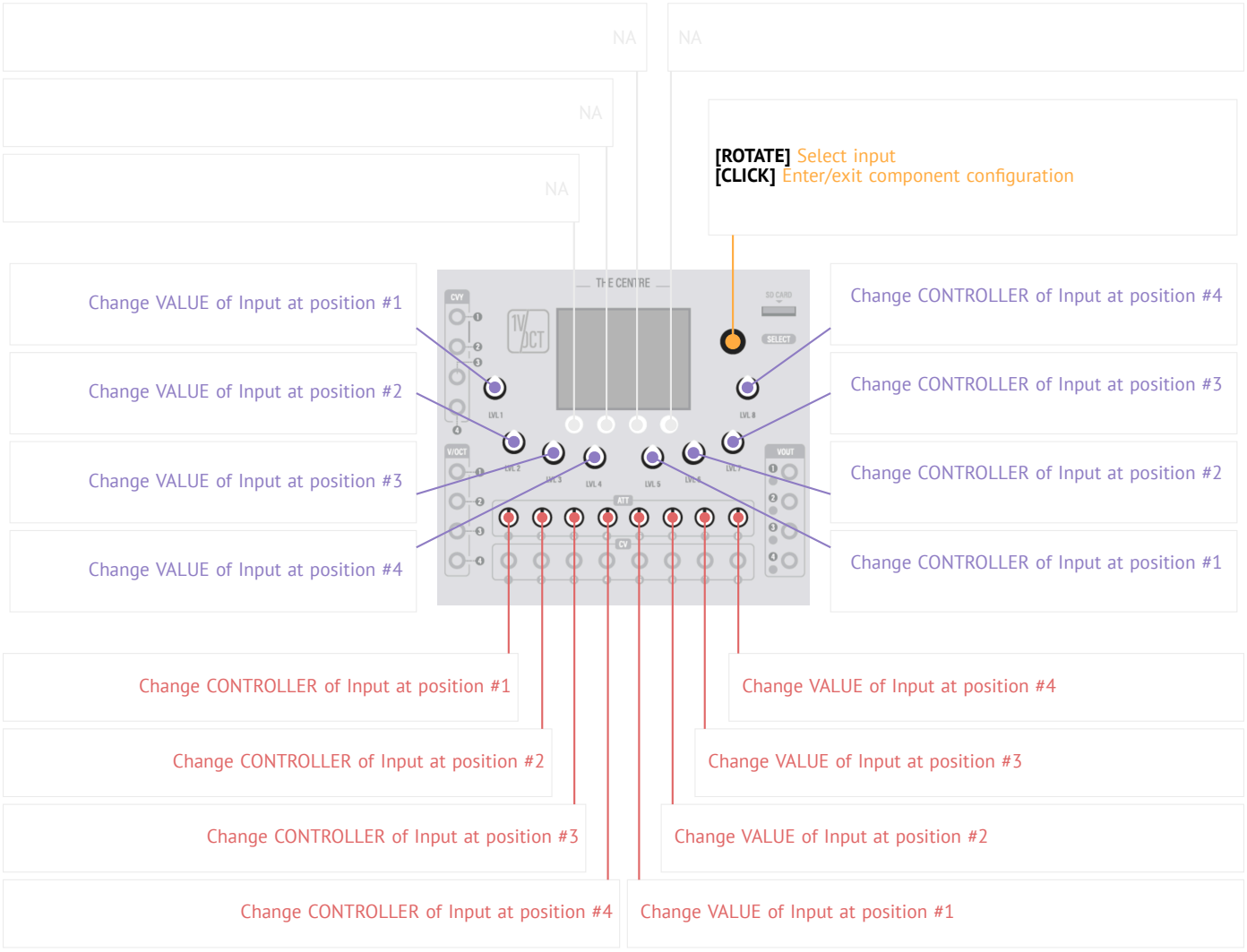
Each module in The Centre has configurable set of inputs. Each input is composed out up to 4 components. Those components are either **VALUE** or **CONTROLLER**. The most common input is a triplet Level-Attenuator-CV. Level and Attenuator components can be represented either by VALUE or by assigned CONTROLLER (knob). CV component can be assigned to either external CV input (3.5mm jacks labelled CVY (gates) and CV (Control Voltage)) or to the internal output of another modules.
★ A good example of internal CV connection: ENV (AHDSR Envelope) Module and VCA (Voltage Controlled Amplifier) module connected via Input:Modulation of VCA to the output of envelope module Output:ENV.ENV.

10.2 Input Configuration Mode

10.2.1 Changing VALUE and CONTROLLER in Input Configuration mode

In the Input Screen of each module, we cam use encoder (SELECT) to navigate through list of inputs and then use knobs to change VALUE or CONTROLLER of component at the selected Input. Please see below diagram to understand mapping of knobs in the Input Screen.

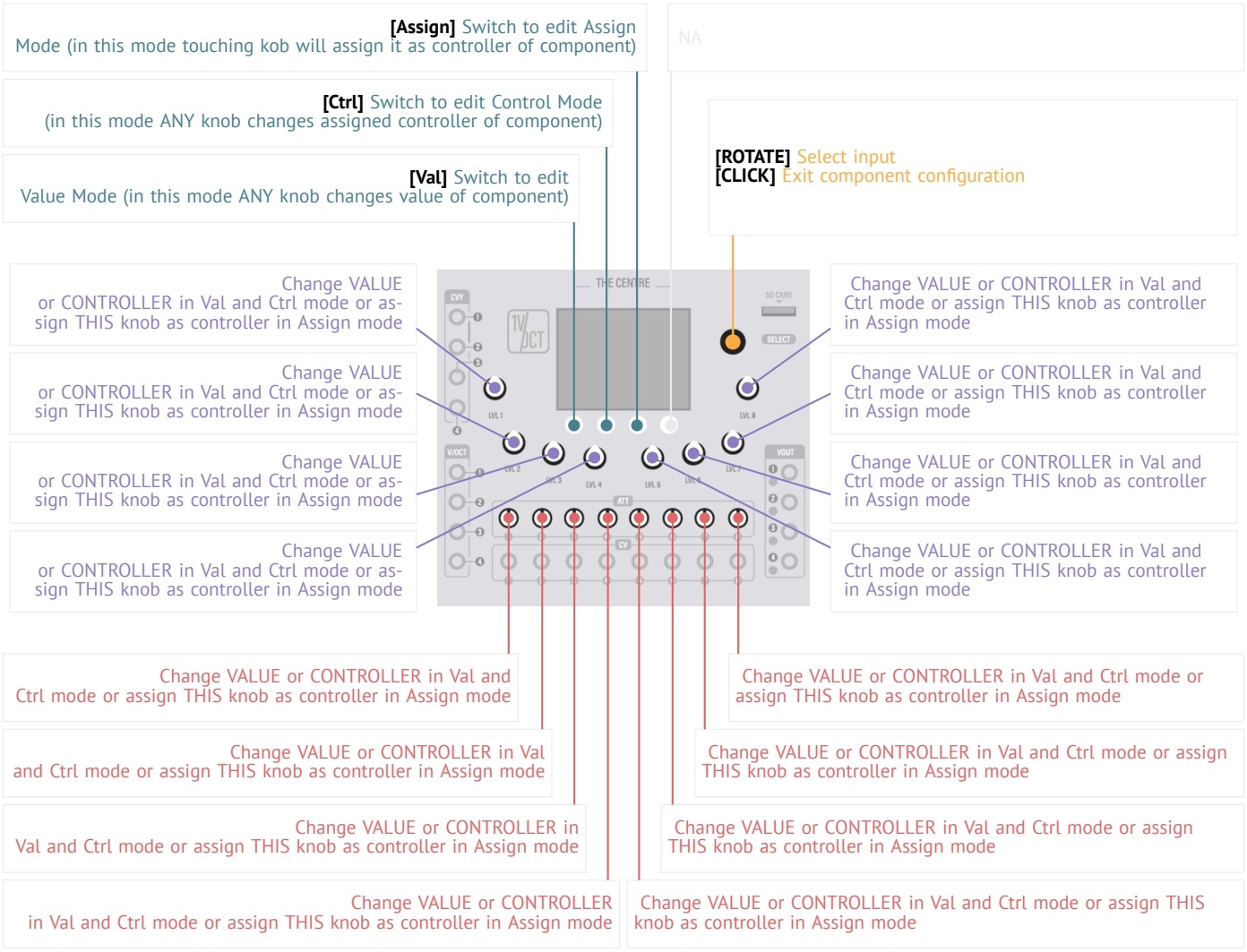
10.2.2 Layout of controls in input menu (Input Configuration)



10.3 Individual Component Configuration Mode

In Individual Component Configuration Mode each Componet of each Input can be configured individually by changing it's Value or assigned Controller.

10.3.1 Layout of controls in input menu (Controller Configuration)



Assigning knobs

Another convenient way of changing knobs assignment is by pressign **Assign** button and switching to individual component setup in Assign Mode. In this mode Encoder (SELECT) navigates through all components of inputs individually and when placed upon Level or Attenuator component it is enough to rotate designated knob slightly to get it assigned to the component. Assign function also allows to assign MIDI CC codes which is described in MIDI section.

Configuring Components

In individual componet configuration pressing buttons Ctrl, Val and Assign switches between operation modes of changing CONTROLLER, VALUE or switching int Assign Mode described above. In those individual mode ANY knob will change either VALUE or CONTROLLER depending on selected mode.

Pitch Control

11.1 Overview

The Centre pitch control affects following modules: WTO, VCO, SMP. Pitch control is generally change of frequency of sound based on configuration of input.

11.2 1V/Oct

1V/Oct is and abbreviation from *"1 Volt per Octave"* and is a method of controlling pitch (frequency) of ociallator where increase of Control Voltage (CV) by 1 Volt doubles the frequency of oscillator effectively increasing pitch by one octave.

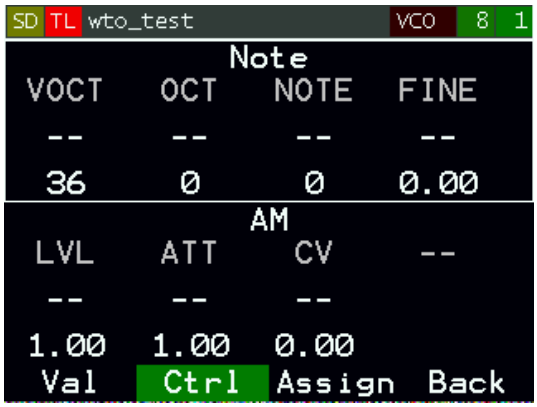
There is no clear standard what voltage results in what note therefore between manufacturers of equipment there are clear differencies on what 0V (zero Volt) results in.

Some suggest that 0V should give "Middle C" note but it is also unclear what Middle C is even in MIDI standard (note 48 or 60 are the most commonly suggested) or maybe the 0V should result in frequency 440Hz which is commonly used as tunning frequency for A note.

The Centre follows Moog standard and defines 0V (zero Volt) for MIDI Note C4 and ultimately frequency of 261.63Hz (assuming concert pitch A4 is 440Hz).

11.3 Note Control in Inputs

The Centre Note Control for Note controlled values is configured in Inputs:NOTE:



VOCT 1V/Oct input for note control. This input can be either set as value (fixed), get input from external modules or synthesisers by V/OCT 1-4 3.5mm input jacks or get input from any other modules CV output. Mostly the output from internal modules should be named .NTE (like: RNG.NTE Random note generator, note output).

■ VOCT is the only dynamically controlled component that controls pitch

OCT Tuning note by octaves +/- 8 octaves

NOTE Tuning note by semitones +12 semitones (one octave)

FINE Tuning note by cents +/- one semitone

12.1 Changing System Settings

To enter System Settings go to System Menu by pressing **[EDIT]** and the **[System]** buttons and then select **Settings** from menu.

Load Last Patch *Audio Output of WTO - Stereo*

On system start (reset) it will load last patch that has been manually loaded by user

Reverse Encoder *Control behaviour of Encoder*

Change encoder behaviour - select from 4 different settings

Clocks PQN *Configure number of clocks (pulses) peq quarter note*

Number of clocks per quarter note (beat). Default to 24 CPQN as MIDI standard

V/OCT Quantise *V/OCT Quantisation*

Turn on quantisatiation of V/OCT incloming pitch to the nearest semitone - nearest MIDI note

On V/OCT pitch will be quantised to the nearest semitone

Off V/OCT pitch will be passed without quantisation

Fast SD Operation *Enables 4x speed for SD Card*

Truns on 4x speed for SD Card access but might be incompatible with some cheap cards.

Multi Patch *Enable Multi Patch (Set)*

Starts The Centre in Multi Patch mode aka Set

Overlay Timer *Timeout for overlays*

Time in seconds for overlays in menus to stay on screen

Pots *Control behaviour of knobs*

When operating knobs in between menu it is often happening that exiting one menu and entering other the physical knob position does not match the setting of the variable. The below are ways to configure pots behaviour

Match Set variable will instantly match (jump) to physical value pointed by the knob upon knob movement

Pickup Variable will not change until knob is roatated to the value of the variable and will be picked up at that point

Scaled Value of the affected input will be changed in scale according to pot movement and the value of the input variable until the knob will be picked up (matched) by physical value of variable

MIDI Thru *Global MIDI Thru Setting*

Will send everything from MIDI in to MIDI out on the same port. WARNING: This setting disables MIDI-OUT

Off MIDI Thru Enabled and MIDI Out Disabled

On MIDI Thru Disabled and MIDI Out Enabled

Part III
Operation

13.1 Overview

Patch aka Preset is the basic operation mode in The Centre where the sound can be built. Upon starting The Centre user is presented with **Patch Edit** menu where individual modules can be added, removed and controlled.

13.2 Basic Operation

The main screen of Patch Edit contains list of modules.
■ The modules in The Centre are executed in the order they are in **Patch Edit** menu.
■ Patch should contain Module OUT - Output

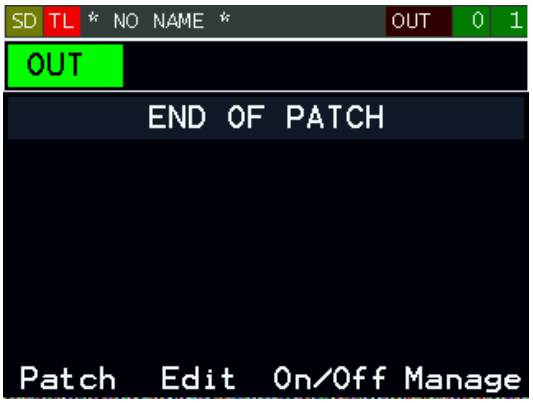


Figure 2: Main Menu of Patch Edit

By pressing **[Manage]** button we change operation mode to Patch Management.

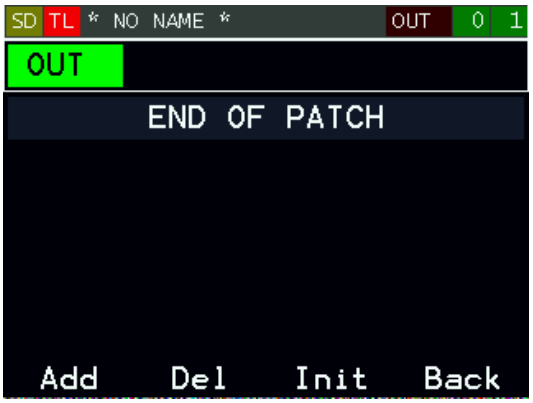


Figure 3: Patch Management Menu of Patch Edit

13.2.1 Initialising Patch

The **[Init]** button will open System Init dialog that allows setting The Centre to clean state and selecting working mode. Two working modes in The Centre are available **Patch** which is described in this section and Multi-Patch aka Set

Figure 4: Initialiasing Patch or Multi-Patch

13.2.2 Adding and Removing Modules

User can add module by pressing **[Add]** button. The module will be inserted *before* selected module. By pressing **[Del]** the selected module gets deleted.

To add module press **[Add]** button that will open Module selection screen and by selecting module with encoder **[SELECT]** the module will get inserted into the selected position of patch editor.

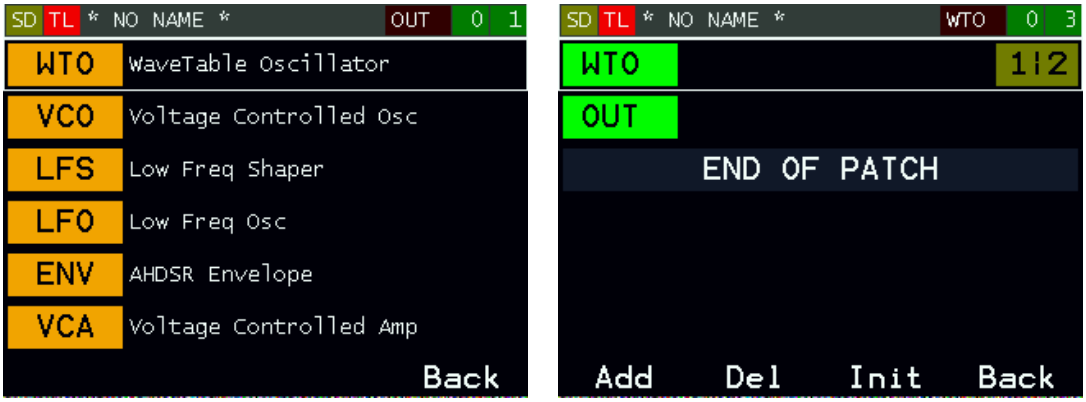


Figure 5: Adding module by Add functions results in inserting module at selected position

13.2.3

14.1 Overview

Multi-Patch also called **Set** is a special mode in an attempt to provide easier access to multi-timbral functionalities of The Centre. Since The Centre has potential (from computation resources side) to run multiple voices also it is designed with 4 Gates, 4 V/OCT and 4 Audio Outputs to be able to provide multi-timbral voice generation.

14.2 Operation

To switch to Multi-Patch mode go to Patch Menu, select **Manage -> Init** and then from selection dialog select **Set**

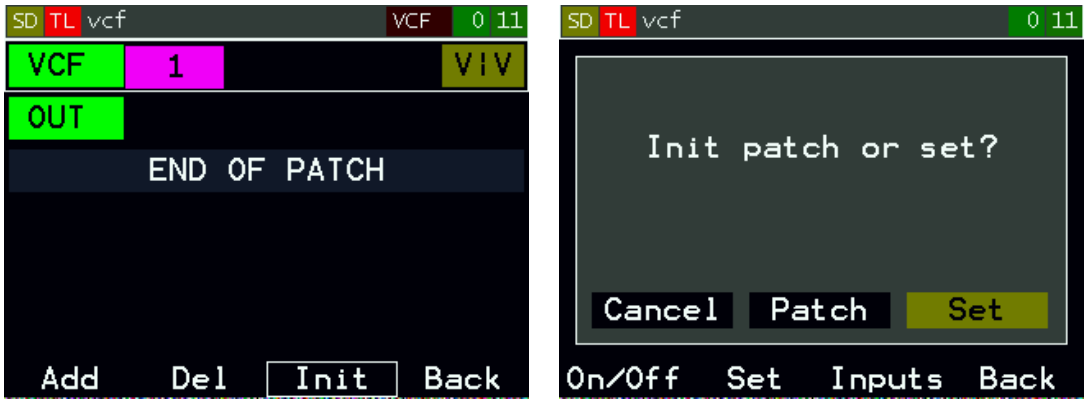


Figure 6: Left: Select Init from Manage submenu. Right: Select Set from dialog box

14.2.1 Operating Set Menu

After initialising module in the Multi-Patch (Set) mode the user is presented with below screen:

Figure 7: Multi-Patch Menu with Set Options

The top line contains the name of the set and when the cursor is positioned on top line the buttons assignment changes and present user with options to Save Set, Init and Auto.

User can select **[Save]** and **[Save As]** functions to save Set.

■ Set is saved in VXS file format while Patch is saved in VXP file format. See File Formats

The Multi-Patch manu contains 4 slots for patches where standard Patch in VXP format can be loaded from the SD Card or edited in Patch Edit menu. Rotating encode and pressing **[SELECT]** on one of the 4 slots user can enter Patch menu for editing Patch in the selected slot.

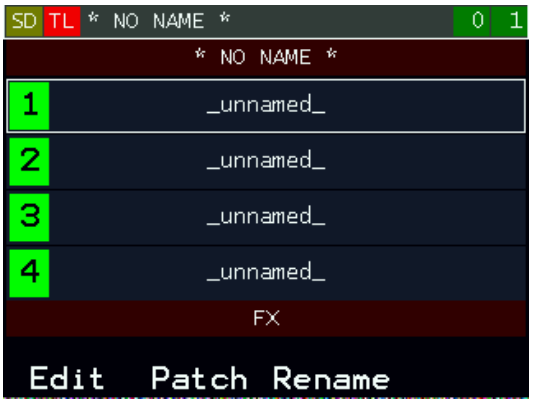


Figure 8: Multi-Patch menu available options for each slot

The top line contains the name of the set and when the cursor is positioned on top line the buttons assignment changes and present user with options to Save Set, Init and Auto.

Polyphony

15.1 Introduction to polyphony

The Centre firmware version 3 introduces polyphony. The polyphony changes behaviour of the whole patch to create multiple voices from the same modules. To keep general compatibility with operation of The Centre as well as with old patches the polyphony has been implemented by turning a whole patch intu multi voice generator. Each module that generates audio output will produce 4 channels of audio. When in Virtual Buffer (VBuf) mode this is fully transparent. However in VOUT mode each module will output each voice on separate output of VOUT.

The whole polyphony concept is based that very VBuf becomes quad-VBuf with every note in separate buffer. Use Mixer Module to MIX multiple Polyphony inputs (several osciallotors) to mix their VBufs or downmix to stereo channels

■ MIX - Mixer Module is critical with polyphony operation as it can either output 4 separate monophonic channels or

■It is stronly recommended to use VBuf everywhere in the patch for polyphonic modules. Most of the processing The Centre does on Stereo channels and using stereo VBuf also known as [V|V] allows to use full 4 channels of stereo polyphony. When using VOUTs in polyphony mode not only stereo

15.2 General operation

In the polyphonic mode it is important to define number of polyphony channels at the beginning. This setting cannot be changed but also this setting affects performance of the module. Every channel of polyphony takes same amount of time for processing so 3 channels of polyphony can contain more spohisticated patch than 4 channels.

15.3 Control Voltage Modules

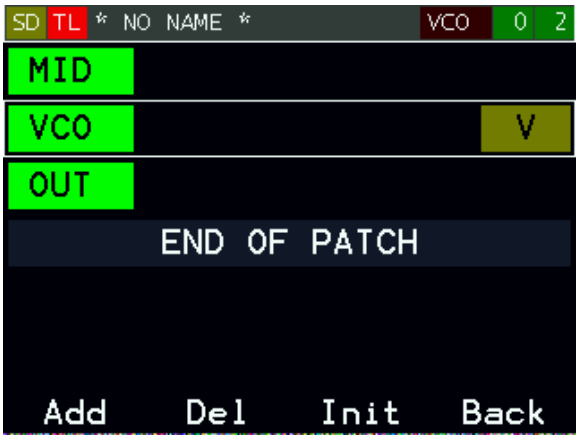
Many modules are providing Control Voltages (CV) and those are modules like LFO, LFS, etc. In Polyphonic mode those modules also provide multi voice output so for example if LFO timing is set to key tracking of notes from MIDI then every voice of LFO will have different frequency and those LFO values can be used to modulate other modules (like VCA-Level).

15.4 EXAMPLE

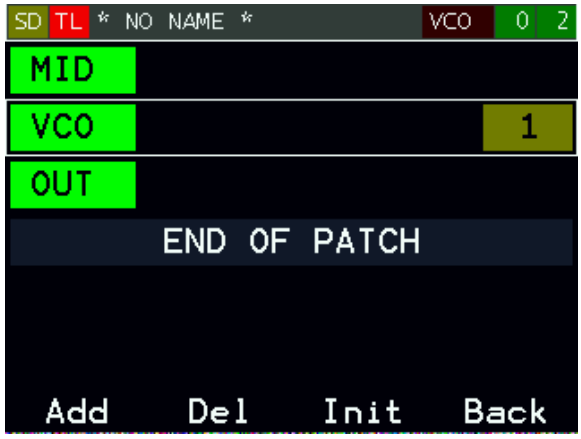
This is the simpliest implementation of polyphonic patch. Please note that VCO should not output polyphonic voices directly into VOUT but to VBuf and then there shoud be Mixer (MIX) that does volume limiting and downmixing. This is less important with monophonic output like VCO but is extremely important for stereo output like WTO because VBufs can be stereo in polyphonic mode while VOUTs are mono only. MIX will properly take into account stereo inputs and will output proper stereo downmix.

1. To create patch in Polyphony mode, go to Manage - Init and Init patch with desired number of polyphony voices. Let's select 3. Now we have patch with 3 polyphony voices.

2. Go to Manage - Add and add MID (MIDI module) and VCO (VCO module)

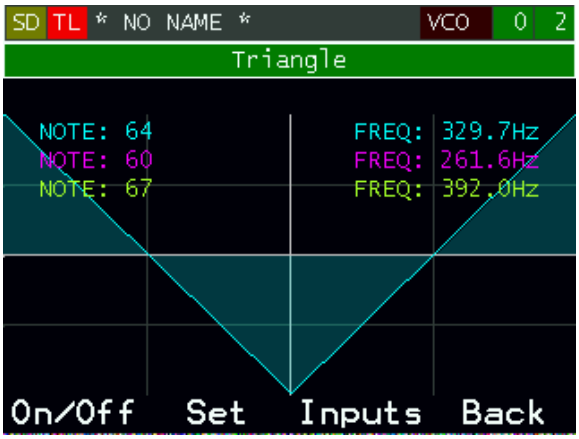


3. Change output of VCO (in Manage screen) use A8 to select 1 instead of V (Vbuf)



4. Go to VCO -> Inputs and change NOTE input to MID-NTE1

5. Now in VCO screen there are notes clearly visible for 3 voices of polyphony. Send 3 note chord by MIDI and you will get 3 voices output. If necessary adjust octave by turning ATT5.


SD TL * NO NAME * VCO 0 2
Triangle
NOTE: 64
NOTE: 60
NOTE: 67
FREQ: 329.7Hz
FREQ: 261.6Hz
FREQ: 392.0Hz
On/Off
Set
Inputs
Back

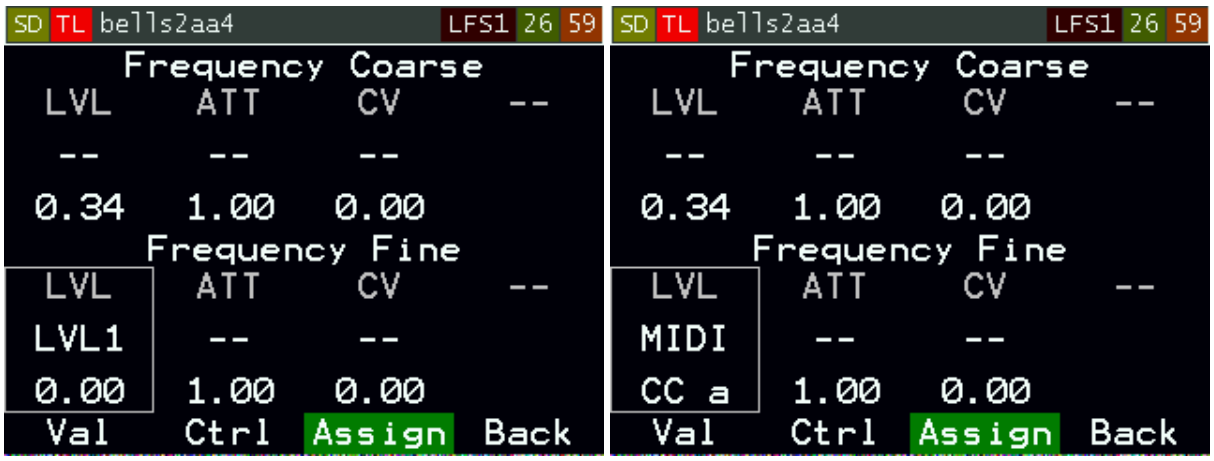
16.1 Introduction to MIDI

Currently The Centre can handle MIDI notes in and out as well as CC codes. The Centre allows to create multiple MID modules to feed midi notes (note, gate, velocity) into other modules. Each MID module can respond on own channel.

Additinally The Centre enables control via CC codes either from PC computer or MIDI controller (via MIDI).

16.2 CC control

To configure CC controlling an input go to inputs and press **[ASSIGN]** button and turn the CC controller on MIDI keyboard or send CC signal from DAW. The Assignment will be shown under selected control. Now sending CC signal will adjust particular settings.

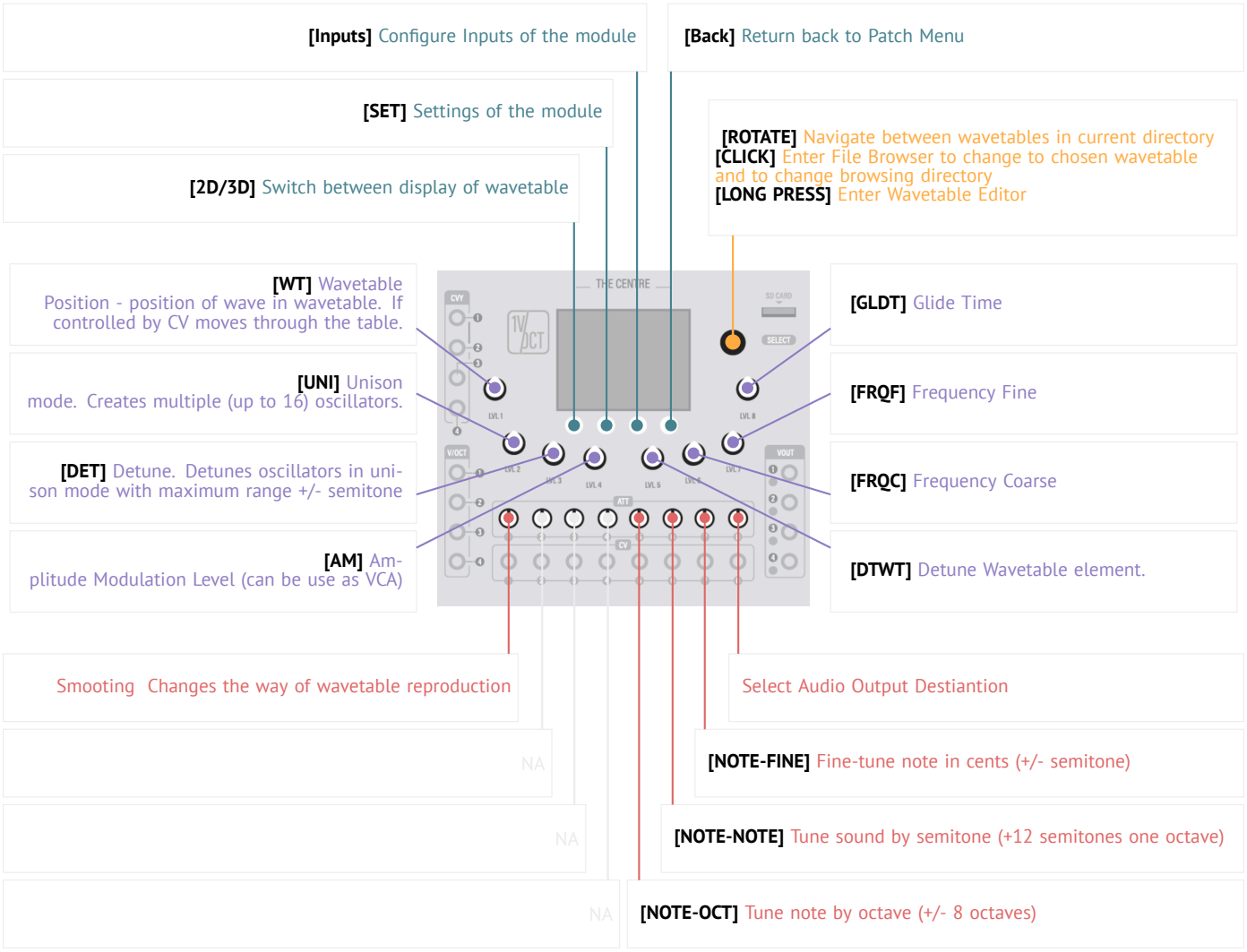


Part IV
Module Reference

WTO - Wavetable Oscillator

Wavetable Oscillator (WTO) is the main building block of The Centre sound. WTO consists of 1 to 16 oscillators working in Unison mode and reproducing loaded wavetable with possibility to detune pitch of oscillators and detune played waveforms at different positions in wavetable.

17.1 Mapping of Controls



WTO - Wavetable Oscillator

Settings

Audio Output *Audio Output of WTO - Stereo*

Selects audio output destination for WTO. All oscillators including Polyphony mode are output through single channel (Mono or Stereo).
See: Audio Outputs

Polyphony *Paraphony mode for WTO oscillator*

1	Paraphony disabled, one pitch control for WTO
2, 3, 4	Paraphony of 2, 3 or 4 oscillators running different pitch. If oscillator 1 pitch comes from V/OCT1 input then pitch for following oscillators will come from corresponding V/OCT2 - V/OCT4 inputs

Glide Scaled *Scaling of Glide Time by distance of pitch*

Off	Glide Time will be same for pitch portamento between any notes
On	Glide Time will change depending on disatnce of pitch. Glide Time set by Input Glide Time (see below in Inputs) will be for disatnce between pitch of one octave. For notes played within same octave with will be in fraction of semitones separating pitch of following notes

Warp Mode *Function used to process waveform during oscillation*

Warp Mode specifies extra function that is used to process waveform according to modulation that is supplied via Input ***Warp Mode***. Currently only one function is enabled.

Off	No processing of waveform
FM	Warp Mode Input will modulate frequency (FM) of waveform

Inputs

NOTE *Pitch control of oscillator*

Note controls pitch or frequency of oscillator.
See: Pitch Control

VOCT	1V/Oct input for note control/
OCT	Tuning note by octaves +/- 8 octaves
NOTE	Tuning note by semitones +12 semitones (one octave)
FINE	Tuning note by cents +/- one semitone

Unison *Unison mode (1-16 voices)*

Enables unison mode and controls number of oscillators running in parallel.

Detune *Detune oscillators*

Detunes oscillators in Unison mode by spreading them equally in Detune range. With detune set at maximum the spread range is 2 semi-tones. With odd number of oscillators the centre oscillator will always be following pitch from Note Input. For even number of oscillators there is no oscillator followin Note and each oscillator is detuned +/- from the center note.

★ *With Unison running two oscillators, detune set to maximum (1.0) and pitch set at note D there is one oscillator playing note C# and one playing note D# (no oscillator is actually playing note C)*

WTO - Wavetable Oscillator

Inputs

Wavetable *Wavetable position*

Adjusts position of waveform in wavetable. When controlled by CV allows changing texture of sound by scanning through set of waveforms contained in wavetable

Reset Osc *Reset Oscillator CV input*

When connected with CV input and set to high level it resets phase of oscillator to 0. Useful to run oscillators in Sync

AM *Amplitude Modulation*

Amplitude modulation changes sound level. Connected with CV signal of Envelope acts as VCA. Connected with LFO creates ring modulator

Detune WT *Detune Wavetable Position for oscillators in Unison mode*

In Unison mode this parameter will detune position of waveform in wavetable for individual oscillators. Each oscillator will reproduce different waveform thus creating more textured sound.

★ *A wavetable with 3 waveforms (triangle, sine, square) and Unison of 3 oscillators and Detune WT parameter set at 1.0, each oscillator will play unique waveform: triangle, sine, square - respectively*

Frequency Coarse *Adjust Frequency of oscillator in big steps*

Adjusts frequency of oscillator in range of 0Hz to 100Hz (in frequency mode) or between 1/256 note and 8bar (in BPM/note duration mode)

Frequency Fine *Fine tune frequency of oscillator*

Adjust frequency of oscillator in very small steps

Glide Time *Portamento (pitch glide) time*

Time to glide from one pitch to another upon change of pitch (Note). Glide time is in range of 0s to 1s.

■ This parameter is affected by Setting *Glide Scaled*. With Glide Scaled set to OFF the time that it takes to glide between two notes is constant and defined by Glide Time, with Glide Scaled turned ON, time is determined by pitch distance of notes played.

Warp Mode *Modulation parameter for waveform modulator*

Warp Mode is modulation parameter usually via CV to be used with Warp Mode function selected in Settings Warp Mode parameter

Outputs

OUT *Output of WTO*

Output of wavetable oscillator

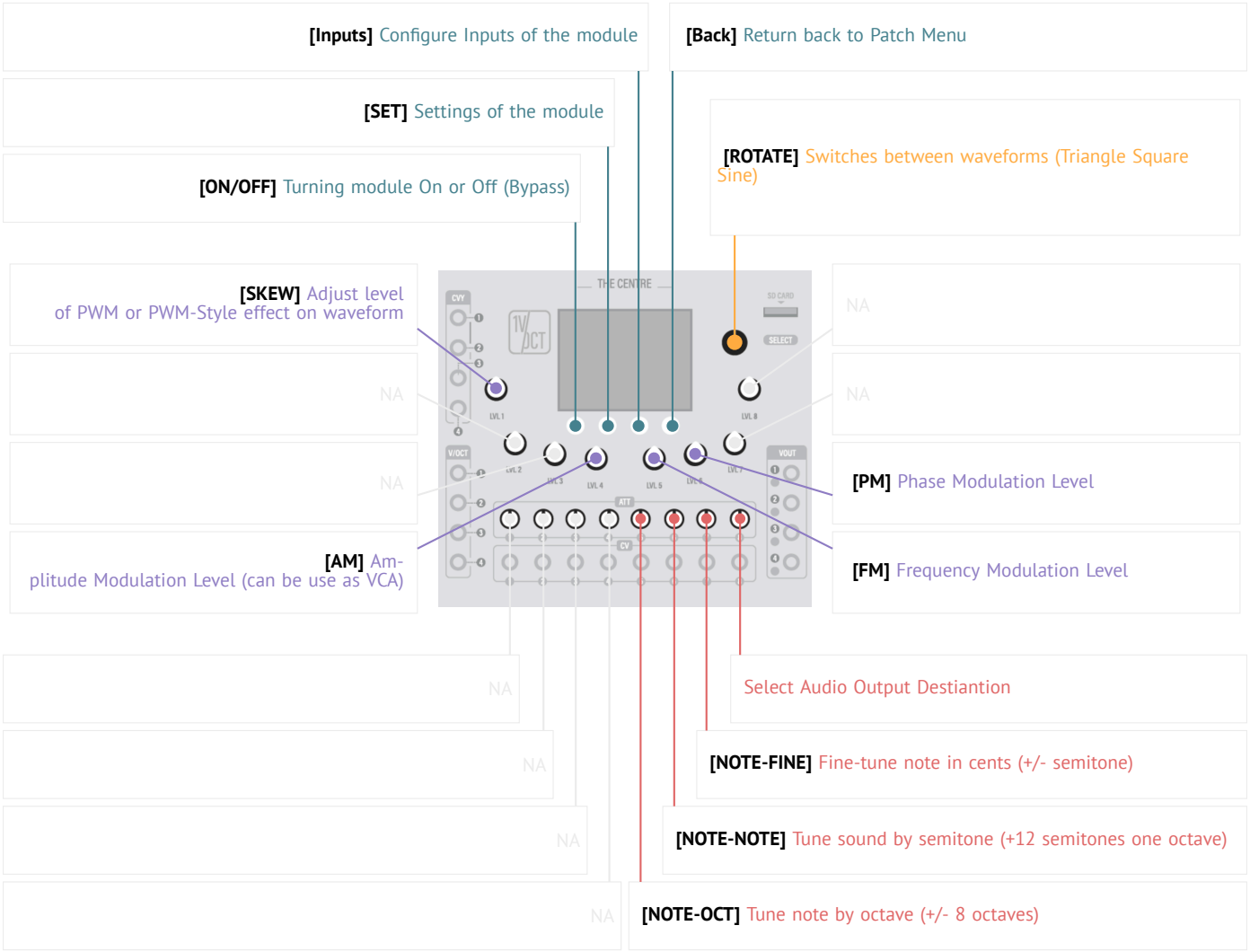
RST *Oscillator reset*

Set to high when oscillator phase resets

VCO - Voltage Controlled Oscillator

Voltage Controlled Oscillator is a sound source generating oscillations of waveforms.

18.1 Mapping of Controls



18.2 Waveforms

VCO takes basic shapes: Sine, Triangle and Square and oscillates the single phase of those waveforms at given frequency. Each **Waveform** can be modified by bending it's pivot params with the Input:Skew CV input. Applying Skew parameter to triangle turns it into either *Ramp* or *Saw*. For Square, Skew parameter adjusts PWM (Pulse Width Modulation) which modifies length of square pulse. For Sine, Skew parameter changes the ratio of phase for positive and negative parts of Sine wave.

VCO - Voltage Controlled Oscillator

Settings

Audio Output *Audio Output of VCO*

Selects audio output destination for VCO.
See: Audio Outputs

Waveform *Selection of Waveform*

Triangle Standard triangle waveform. The waveform is affected by Input: Skew and changes from Ramp through Triangle to Saw

Square Standard square waveform. The waveform is affected by Input: Skew that modifies PWM (Pulse Width Modulation) of the waveform

Sine Standard sine waveform. The waveform is affected by Input: Skew that modifies it to two assymetric sine phases.
■ Adjusting certain ratios of negative and positive half sines by modifying Skew parameter will add very interestic harmonics that go well with Diode Ladder filter.

Inputs

NOTE *Pitch control of oscillator*

Note controls pitch or frequency of oscillator.
See: Pitch Control

VOCT 1V/Oct input for note control/

OCT Tuning note by octaves +/- 8 octaves

NOTE Tuning note by semitones +12 semitones (one octave)

FINE Tuning note by cents +/- one semitone

AM *Amplitude Modulation*

Amplitude modulation changes sound level. Connected with CV signal of Envelope acts as VCA. Connected with LFO creates ring modulator

FM *Frequency Modulation*

Frequency modulation is a change of frequency by modulation.
■ Adding a modulator to CV input of FM and having it running at certain ratio of frequency to the actual VCO will create interesting sound texture

Skew *Modify assymetry of waveform*

Skew affects assymetry of waveform by turning Triangle into Saw or Ram or modyfying PWM of Square wave. See above in Settings: Waveform

Hard Sync *Reset phase of oscillator*

Resets phase of oscillator and starts oscillating from the beginning of waveform.
★ By connecting two VCOs detuned slightly through VCO1 Ooutput: Reset to VCO2 Input: Hard Sync we can create ver rich texture of simple oscillation

PM *Phase Modulation*

Phase modulation allows modulator to modify phase of oscillator. Unlike FM (Frequency Modulation) Phase Modulation can operate oscillator in reverse mode by turning its direction.

Outputs

OSC *Output of VCO*

Output of oscillator signal

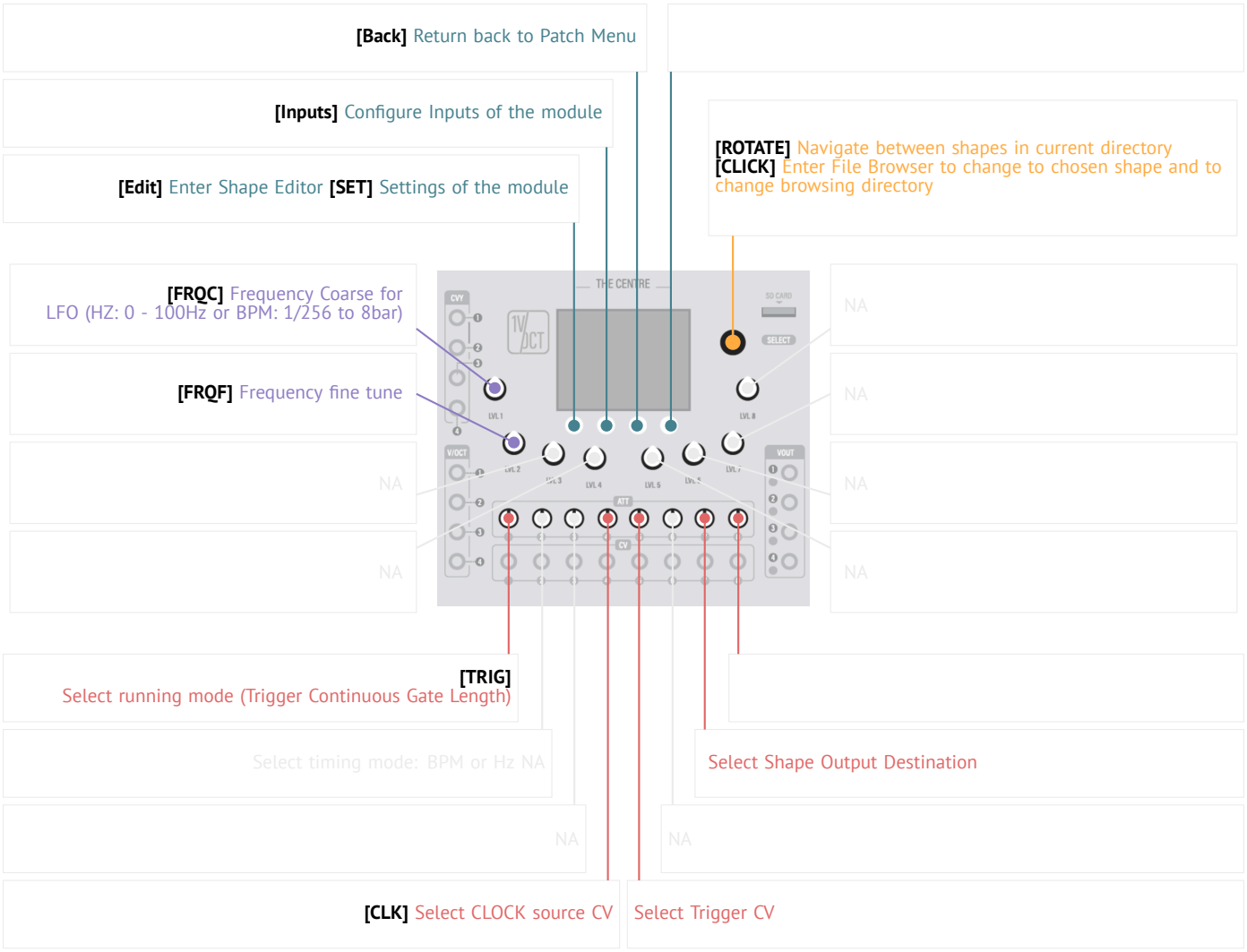
RST *Oscillator reset*

Set to high when oscillator phase resets

LFS Low Frequency Shaper (Low Frequency Oscillator generating irregular shapes)

This module creates low frequency oscillations of irregular shapes. The shapes can be either edited by user or imported from .shp (Serum) and .vitallfo (Vital) formats.

19.1 Mapping of Controls



19.2 Loading Shapes

To load a shape press **[SELECT]** (Encoder down) and navigate in file browser to directory with shapes and press **[SELECT]** again to load the desired shape. Rotating Encoder cycles through shapes in current directory.

LFS- Low Frequency Shaper

Settings

Running Mode *Select type of running mode of low frequency shape*

Continuous Oscillator keeps running and never stops. Gate High (Trigger) signal will reset oscillator phase to 0.

Trigger Oscillator runs once upon the gate signal high and runs complete shape once and stops generation when phase of shape ends. Another trigger signal will reset phase to 0.

Gate length Oscillator runs as long as gate signal is high. Stops immediatelly when signal goes to low.

Timing Mode *Select timing mode for LFS*

Timing for LFS can be either selected to be calculated in Hz for more time based experience or tied to BPM and measured in length of notes or bars.

BPM Timing based on note duration

Hz Timing based on frequency

Polarity *Polarity of output*

Bipolar Outputs shape in range -5V to +5V. Good for Ring Modulation or FM

Unipolar Outputs shape in range 0V to +5V. Good for VCA

Audio output *Output of shape as waveform*

Enables output of shape as waveform. This allows the output to be sent out to VOUT directly or for audio processing (for example Ring Modulation (BRM))

■ Enabling waveform output increases CPU processing and is not recommended when not needed

Disabled Default. Doesn't output shape in any form

Enabled Outputs shape as waveform to be sent out to VOUT or used for audio processing

Inputs

Trigger *Trigger CV input*

Trigger or gate signal that initiates or resets oscillator

Clock *Clock for timing oscillator's phase duration in BPM mode (otherwise 120BPM is used)*

Frequency Coarse *Adjust Frequency of oscillator in big steps*

Adjusts frequency of oscillator in range of 0Hz to 100Hz (in frequency mode) or between 1/256 note and 8bar (in BPM/note duration mode)

Frequency Fine *Fine tune frequency of oscillator*

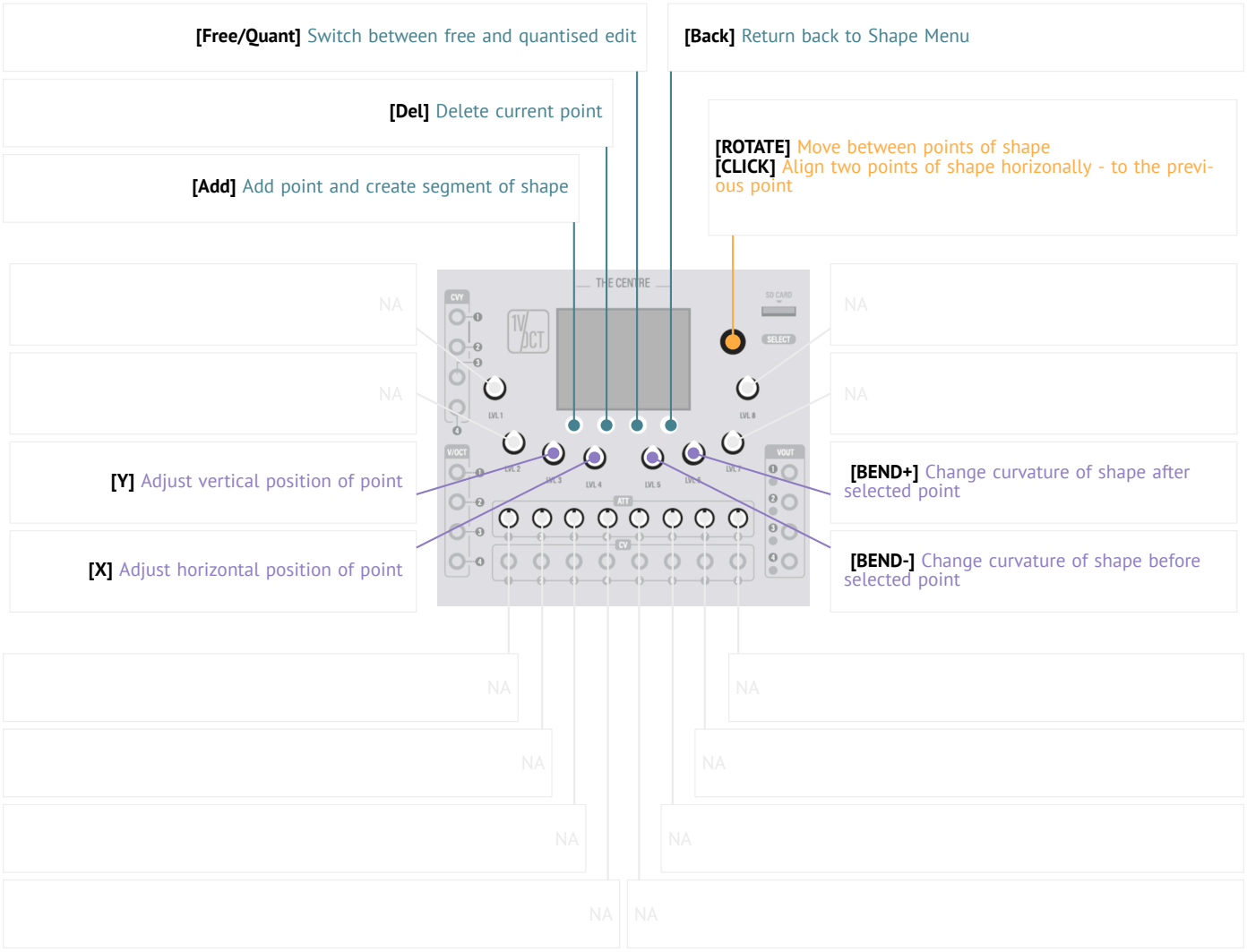
Adjust frequency of oscillator in very small steps

Outputs

SHP *Output of*

Output of shape oscillator that can be used to modulate other signals

20.1 Mapping of Controls



20.2 Editing Shapes

To edit current shape press **Edit** in LFS Screen. Now you can use buttons **Add** and **Del** to add points to the shape (point will be added to between current points - in the middle). Use **LVL3** and **LVL5** to adjust vertical and horizonal position of the point accordingly (NOTE: first and last point horizontal positions cannot be adjusted). **LVL5** will adjust curvature of shape segment prior to selected point and **LVL6** will adjust curvature of segment after selected point.

20.3 Position Quantisation

By pressing button **Free** you can change the mode to Free Editing and then by pressign button **Quant** (the same button) you witch mode to Quantised editing where vertical positions are quantised (aligned) to division of 12 (simulate semitones) and horizontal positions are aligned to divisions of 32 to provide aligment simulating notes lengths.

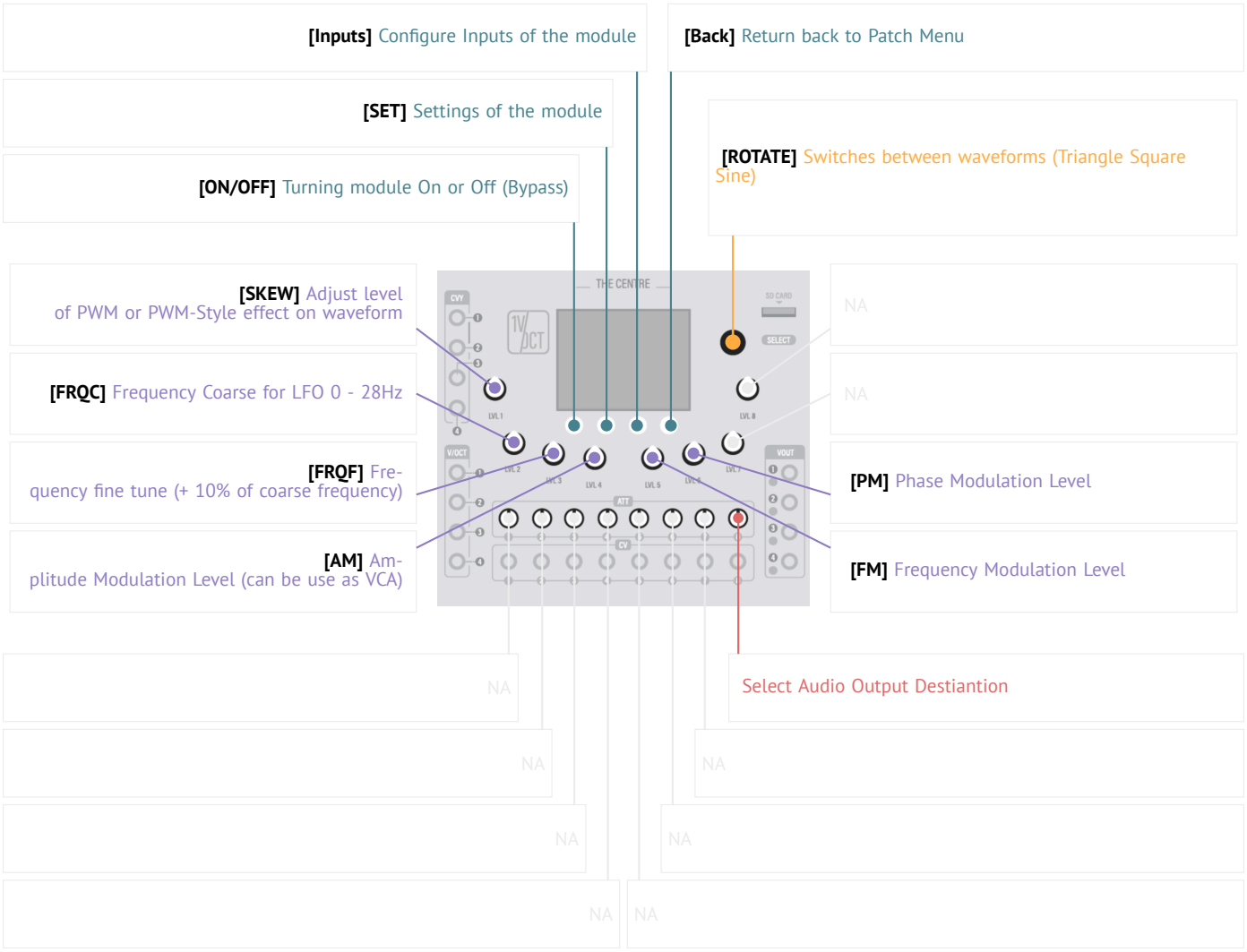
■ Aligment or quantisation does not really align on notes or semitones just helps to have better alignment when the shape is played at the speeds of BPM.

★ Aligned shape can be fed into frequency of VCO or WTO to crteate arpeggiator effect.

LFO - Low Frequency Oscillator

Low Frequency Oscillatoris a source of modulation that oscillates basic waveforms at very low frequencies (usually below audible level).

21.1 Mapping of Controls



21.2 Waveforms

LFO takes basic shapes: Sine, Triangle and Square and oscillates the single phase of those waveforms at given frequency. Each **Waveform** can be modified by bending it's pivot params with the Input:Skew CV input. Applying Skew parameter to triangle turns it into either *Ramp* or *Saw*. For Square, Skew parameter adjusts PWM (Pulse Width Modulation) which modifies length of square pulse. For Sine, Skew parameter changes the ratio of phase for positive and negative parts of Sine wave.

LFO - Low Frequency Oscillator

Settings

Audio Output *Audio Output of LFO*

Selects audio output destination for LFO.
See: Audio Outputs

Waveform *Selection of Waveform*

Triangle Standard triangle waveform. The waveform is affected by Input: Skew and changes from Ramp through Triangle to Saw

Square Standard square waveform. The waveform is affected by Input: Skew that modifies PWM (Pulse Width Modulation) of the waveform

Sine Standard sine waveform. The waveform is affected by Input: Skew that modifies it to two assymetric sine phases.
■ Adjusting certain ratios of negative and positive half sines by modifying Skew parameter will add very interestic harmonics that go well with Diode Ladder filter.

Inputs

NOTE *Pitch control of oscillator*

Note controls pitch or frequency of oscillator.
See: Pitch Control

VOCT 1V/Oct input for note control/

OCT Tuning note by octaves +/- 8 octaves

NOTE Tuning note by semitones +12 semitones (one octave)

FINE Tuning note by cents +/- one semitone

AM *Amplitude Modulation*

Amplitude modulation changes sound level. Connected with CV signal of Envelope acts as VCA. Connected with LFO creates ring modulator

FM *Frequency Modulation*

Frequency modulation is a change of frequency by modulation.
■ Adding a modulator to CV input of FM and having it running at certain ratio of frequency to the actual LFO will create interesting sound texture

Skew *Modify assymetry of waveform*

Skew affects assymetry of waveform by turning Triangle into Saw or Ram or modyfying PWM of Square wave. See above in Settings: Waveform

Hard Sync *Reset phase of oscillator*

Resets phase of oscillator and starts oscillating from the beginning of waveform.
★ By connecting two LFOs detuned slightly through LFO1 Ooutput: Reset to LFO2 Input: Hard Sync we can create ver rich texture of simple oscillation

PM *Phase Modulation*

Phase modulation allows modulator to modify phase of oscillator. Unlike FM (Frequency Modulation) Phase Modulation can operate oscillator in reverse mode by turning its direction.

Outputs

OSC *Output of LFO*

Output of oscillator signal

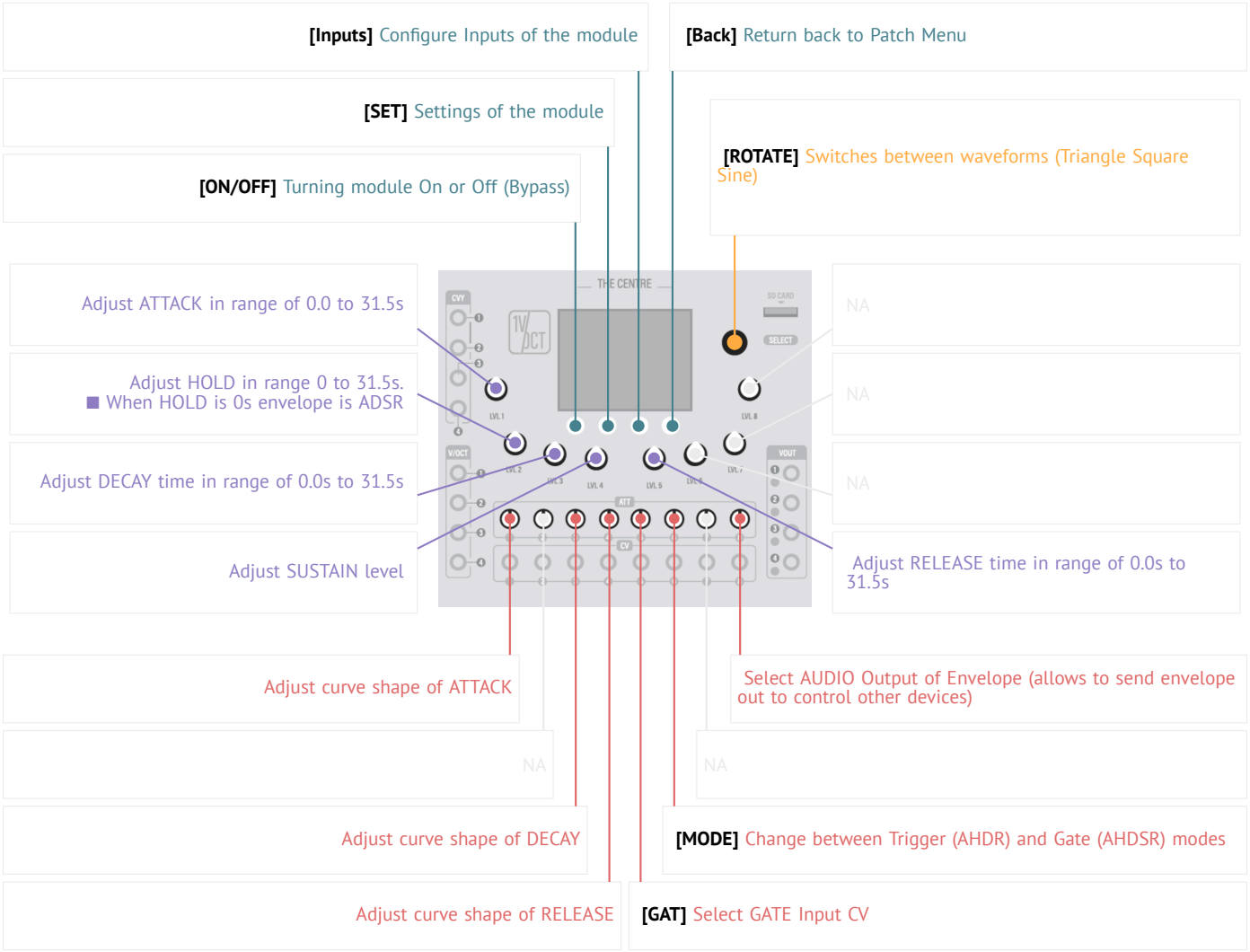
RST *Oscillator reset*

Set to high when oscillator phase resets

ENV - Envelope Generator

Envelope Generator produces a modulation signal that in its substance is of raise and decay at the given rates.

22.1 Mapping of Controls



22.2 Operation

Envelope Generator produces AHDSR (Attack, Hold, Decay, Sustain and Release) or AHDR envelopes that are Control Voltage signals to modulate parameters of modules in the synthesiser (usually, but not limited to, Amplitude of ENV and Cutoff Frequency of VCF).

22.3 Envelope Stages

A: Attack Attack stage is first and the raising stage of signal from 0 to 100% volume of signal during given period of time.

H: Hold Hold stage keeps signal at the highest volume level for a given period of time

D: Decay Decay stage determines the length of time the sound volume will be dropping from **Hold** level to **Sustain** level. The Decay stage length is given as period of time.

S: Sustain Sustain stage determines the volume level at which sound will keep playing before the gate signal that is relative to played note length keeps high signal. Sustain stage unlike other parameters of envelope is not given in duration of time but rather as a level of volume.

R: Release Release is the final stage of sound when it either slowly decays or rapienv ends. Stage is defined as period of time.

★ If the **Gate** signal length (played note length) is shorter than combined length of **Atack** + **Hold** + **Decay** then some of those stages will be skipped all the way to Sustain stage as the Sustain stage starts when **Gate** signal becomes low. Therefore if **Trigger** signal is applied instead of **Gate** signal then all stages (A+H+D) will be skipped and the envelope will be limited to only Release stage.

22.4 Envelope Types

The most popular envelops out there are ADSR (Attack, Decay, Sustain and Release) - this is envelope designed for Gate signal of variable length that is relative to length of played note. The envelope upon raise of gate signal will execute Attack and Decay stages and will keep amplitude at Sustain level until gate signal turns low (note length ends) and the release stage will help amplitude to continue decay. On the contrary, AD envelopes are designed for Trigger signal and they execute both Attack and Decay stage regardless of note length. The length of note is dictated by length of Attack and Decay stages.

Hold stage in **AHDSR** envelope is just extension of typical ADSR envelope where the maximum raised stage (after **Attack**) can be sustained for period of time. With Hold stage period length set to 0s AHDSR envelope becomes standard ADSR envelope.

22.5 Trigger Mode

Envelopes can be generated in two modes which can be activated by switching Setting:Mode btween **Gate** and **Trigger**.

Gate In this mode the envelope is based on the length of provided gate signal being high. When the gate is in high mode the envelope processes through AHD stages and stays in Sustain stage until gate closes (signal turns low) and the Release stage is being processed

Trigger In this mode the envelope is always fully processed however without Sustain element. The envelope is beign triggered by high Trigger (Gate) signal and regardless of length of that signal will execute AHDR stages and the Sustain part will be ommited.
★ This mode is ideal to emulate older AD envelopes by setting stages A and D to desired values and every other stage to 0

Settings

Audio Output *Output of ENV*

Audio Output of processed signal by ENV. Signal has amplitude modulated by sum of two modulators: Level and Sidechain.
See: Audio Outputs

Audio Input *Audio signal to be modulated*

Audio signal (can be any signal) that will have amlitude (level) modulated with modulator Input: Level

Mode *Envelope Mode*

Mode switch between AHDSR (with Sustain) and AHDR (no sustain) envelopes

Gate The envelope lasts as long as the gate signal is open (high) and sustains volume at the Sustain level

Trigger The enevelope only lasts as long as sum of stages AHDR and never keeps note sustained

Inputs

Attack *Attack Stage*
Attack is the raising first stage of envelope. Duration between 0s and 32s

Hold *Hold Stage*
Hold is the full volume level sustained second stage of envelope. Duration between 0s and 32s

Decay *Decay Stage*
Decay is the falling third stage of envelope going from full level of volume to level set . Duration between 0s and 32s

Sustain *Sustain Stage*
Sustain is the level of the sound after AHD stages at which sound is kept as long as Gate is open (high). Level of sound in decibels

Release *Release Stage*
Release is the final stage where the sound decays to level 0. Duration between 0s and 32s

Gate *Gate CV Source*
Gate or Trigger signal to start and sustain envelope generation

Attack Curve *Exponent of Attack stage*
Attack Curve is the exponent of the attack stage to modify stage to exponential rather than linear

Decay Curve *Exponent of Decay stage*
Decay Curve is the exponent of the Decay stage to modify stage to exponential rather than linear

Release Curve *Exponent of Release stage*
Release Curve is the exponent of the Release stage to modify stage to exponential rather than linear

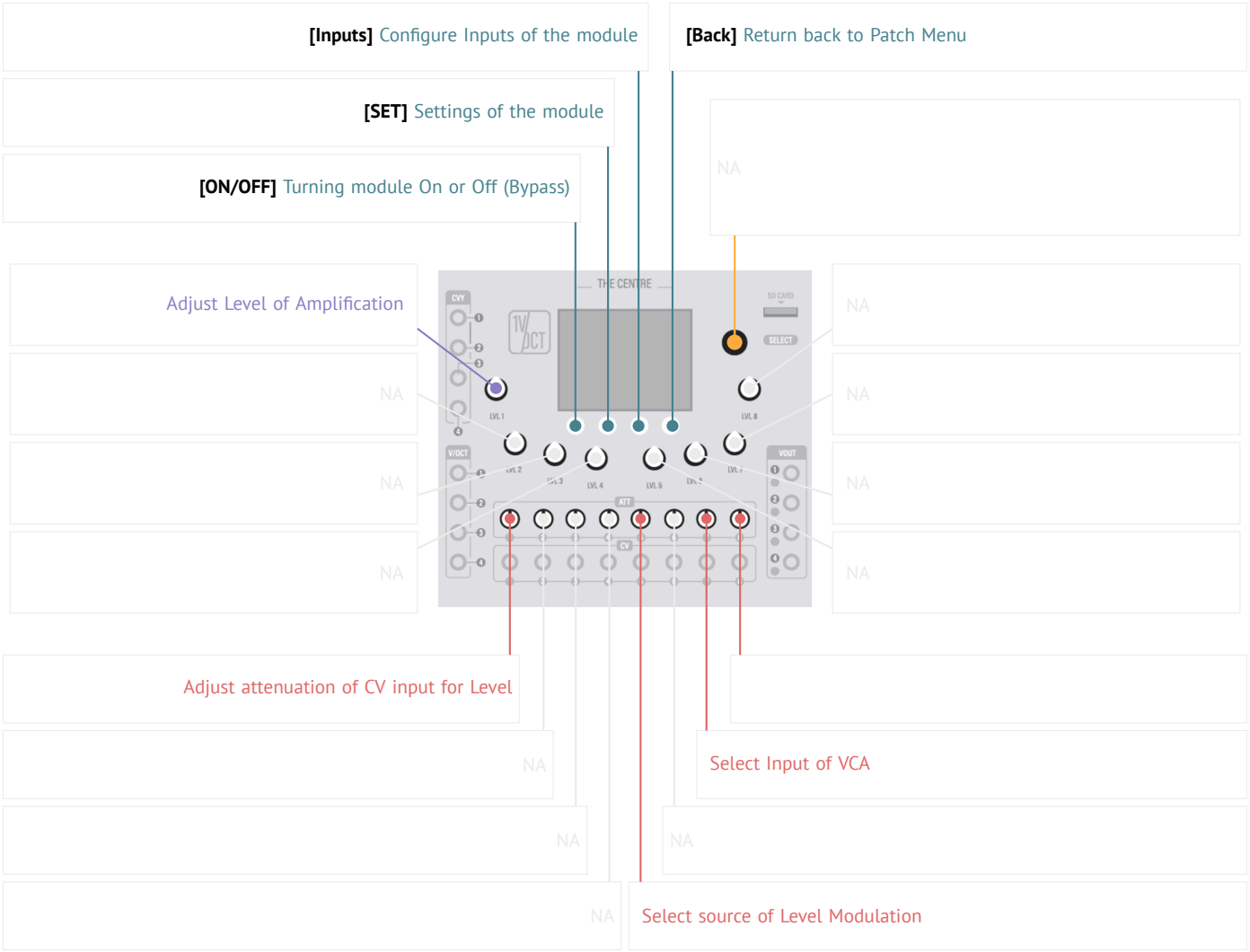
Outputs

Envelope *Output of Envelope*
Output of Envelope signal to be routed to other modules as a Control Voltage

VCA - Voltage Controlled Amplifier

Voltage Controlled Amplifier modulates level of signal with level of modulator.

23.1 Mapping of Controls



23.2 Operation

VCA performs simple Amplitude Modulation of those signal resulting in reduced volume (level) of audio signal. The signal coming in Audio Input is then modulated (attenuated) with a modulator taken from Input:Modulation. In fact VCA operates using principle of Amplitude Modulation however it only takes positive unipolar CV signal to modulate Audio Signal.
★ Usually modulator signal is coming from Envelope Generator (ENV) in from of AD, ADSR or AHDSR envelopes and applied to the uadio signal coming from audio source like oscillator will result in the plucking or raising sound.

23.3 Sidechain

Sidechain is the technique to duck (reduce) audio signal when another audio signal needs to be more prominent. The sidechain modulator is an envelope of the prominent signal and is substracted from envelope of audio signal coming to VCA to reduce level of the secondary signal.
★ Sidechaining is used to reduce level of bassline when kickdrum is being played. Very often both kickdrum/bassdrum and bassline share the same low frequencies and if mixed together they result in muffled sound. By loweering the amplitude of bassline at the point kickdrum plays, kickdrum envelope is send to sidechain input of VCA and VCA will reduce level of bassline by the amount of sidechain. This way low frequencies of kickdrum will be heard over the bassline.

VCA - Voltage Controlled Amplifier

Settings

Audio Output *Output of VCA*

Audio Output of processed signal by VCA. Signal has amplitude modulated by sum of two modulators: Level and Sidechain.
See: Audio Outputs

Audio Input *Audio signal to be modulated*

Audio signal (can be any signal) that will have amlitude (level) modulated with modulator Input: Level

Inputs

Level *Modulation of sound level*

Modulation of level of sound. Amplitude mopdulation with Unipolar (only positive) modulator (usually envelope)

Sidechain *Opposite modulation of level*

Sidechain is a reverse signal to damp the level of primary signal modulation.
★ Usually used to duck the amplitude of bassline when kick drum comes in to remove interferring frequencies

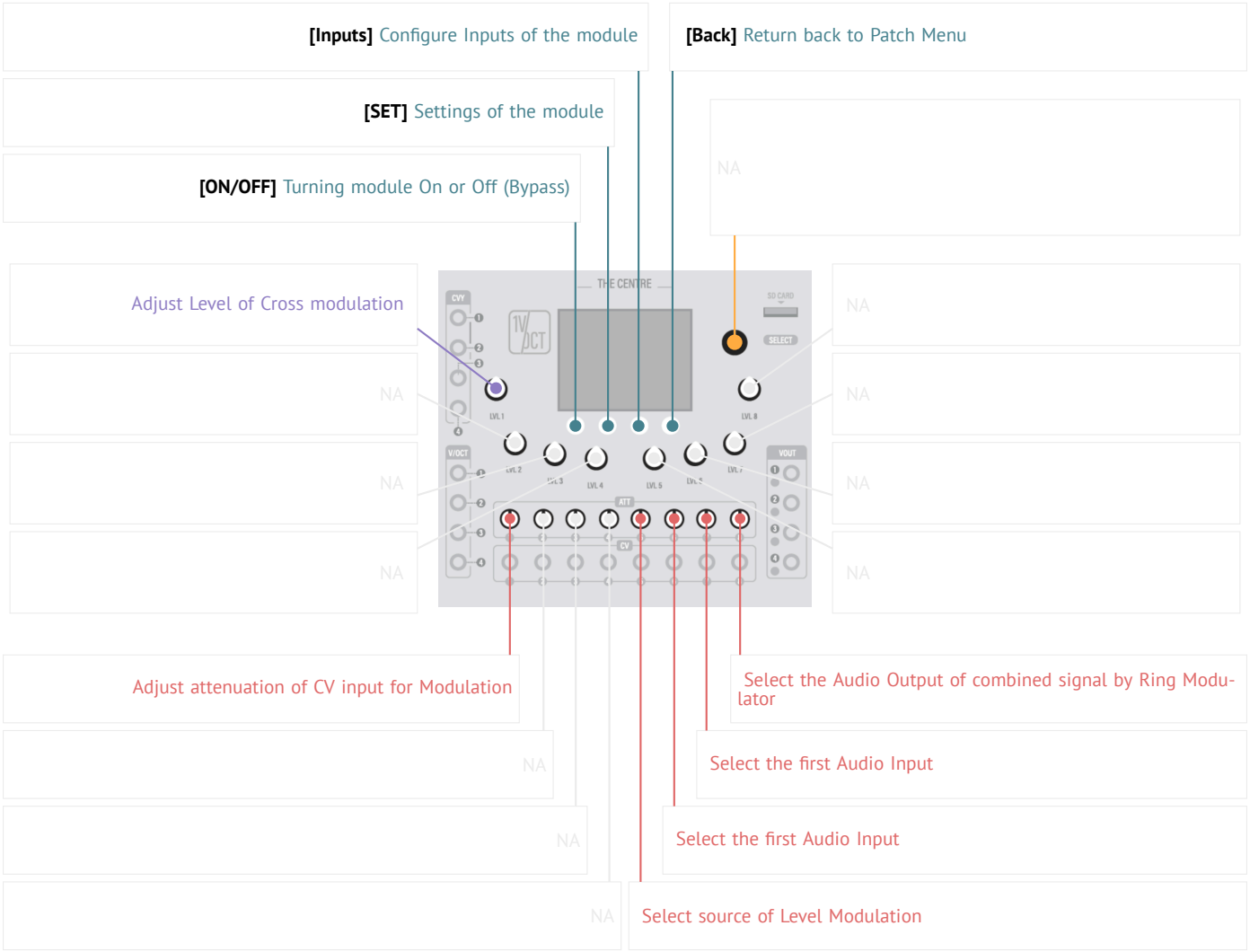
Outputs

NONE

BRM - Balanced Ring Modulator

Balanced Ring Modulator takes two Audio signals and mcombines them to gether producing output signal.

24.1 Mapping of Controls



24.2 Operation

BRM performs cross modulation of two signals by combining Aduio Input 1 with Audio Input 2. The Input:Balance setting is the ratio between those two signals.

BRM - Balanced Ring Modulator

Settings

Audio Output *Output of BRM*

Audio Output of processed signal by BRM. Signal has amplitude modulated by sum of two modulators: Level and Sidechain.
See: Audio Outputs

Audio Input 1 *Input of the first Audio Signal*

Audio signal (can be any signal) That will be combined with the second signal

Audio Input 2 *Input of the second Audio Signal*

Audio signal (can be any signal) That will be combined with the first signal

Balance *Balance between signals*

The ratio between two signals when combining them. The volume level of the signals will be adjusted respectively before combining)

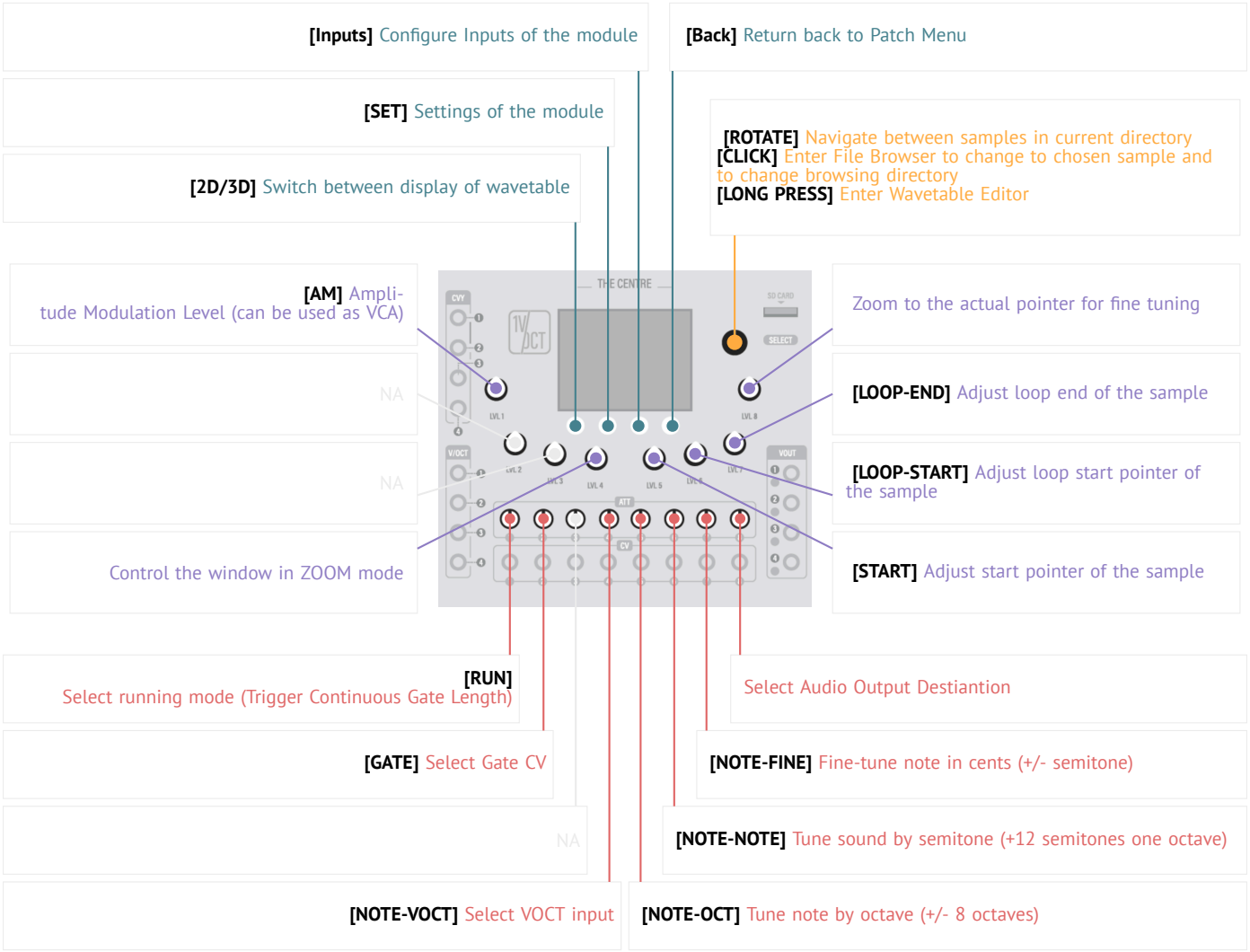
Outputs Inputs

NONE

SMP - Sample Player

Sample Player (SMP) is the sound source generating sound by playing samples at requested pitch.

25.1 Mapping of Controls



25.2 Operation

Sample Player reproduces samples at given pitch provided by Inputs:Note and trigerred by Inputs:Gate. Samples can be loaded from SD Card by pressing encoder (SELECT) down. After the sample is loaded from directory, rotating the encoder allows loading next and previous samples from the same directory.

25.3 Looping Samples and Grains

Sample Player allows creating loops of samples controlled by CV thus converting it into granular sample player. The sample player can be looped by changing Loop Start and Loop End parameters via CV inputs effectively converting it into granular synthesiser. To control loop use knobs:

- **[LVL5 - Start]** start position of sample. When gate signal triggers sample it will start playing from this position. If Start is bigger than Loop Start then Loop Start becomes starting position for sample.
- **[LVL6 - Loop Start]** loop start position, after reaching loop end, sample will start playing from this point
- **[LVL7 - Loop End]** If loop end is set to value above 0 the sample looping will be enabled.

By adding CV control to any of the above parameters the size of grain can be modified during play with CV input for example LFO or LFS.

SMP - Sample Player

Settings

Audio Output *Audio Output of SMP - Stereo*

Selects audio output destination for SMP. All oscillators including Polyphony mode are output through single channel (Mono or Stereo).
See: Audio Outputs

Running Mode *Select type of running mode of low frequency shape*

Continuous Sample playback keeps looping. Gate High (Trigger) signal will reset sample playback to start position.

Trigger Sample plays once upon the gate signal high and runs complete shape once and stops at the end position. Another trigger during playback signal will reset playback to start position

Gate length Sample plays as long as gate signal is high. Stops immediatelly when signal goes to low.

Inputs

NOTE *Pitch control of oscillator*

Note controls pitch or frequency of oscillator.
See: Pitch Control

VOCT 1V/Oct input for note control/

OCT Tuning note by octaves +/- 8 octaves

NOTE Tuning note by semitones +12 semitones (one octave)

FINE Tuning note by cents +/- one semitone

Gate *Gate CV input*

Gate or Trigger signal that initiates or resets playback of sample

AM *Amplitude Modulation*

Amplitude modulation changes sound level. Connected with CV signal of Envelope acts as VCA. Connected with LFO creates ring modulator

Sample Start *Start position of sample*

The starting position of sample that sample player starts playing upon receiving gate or trigger signals

Loop Start *Start of loop*

The restarting position of loop upon completing single phase of playback

Loop End *End of loop*

The final position of sample that will trigger restart of playback from Loop Start

Outputs

OUT *Output of SMP*

Output of wavetable oscillator

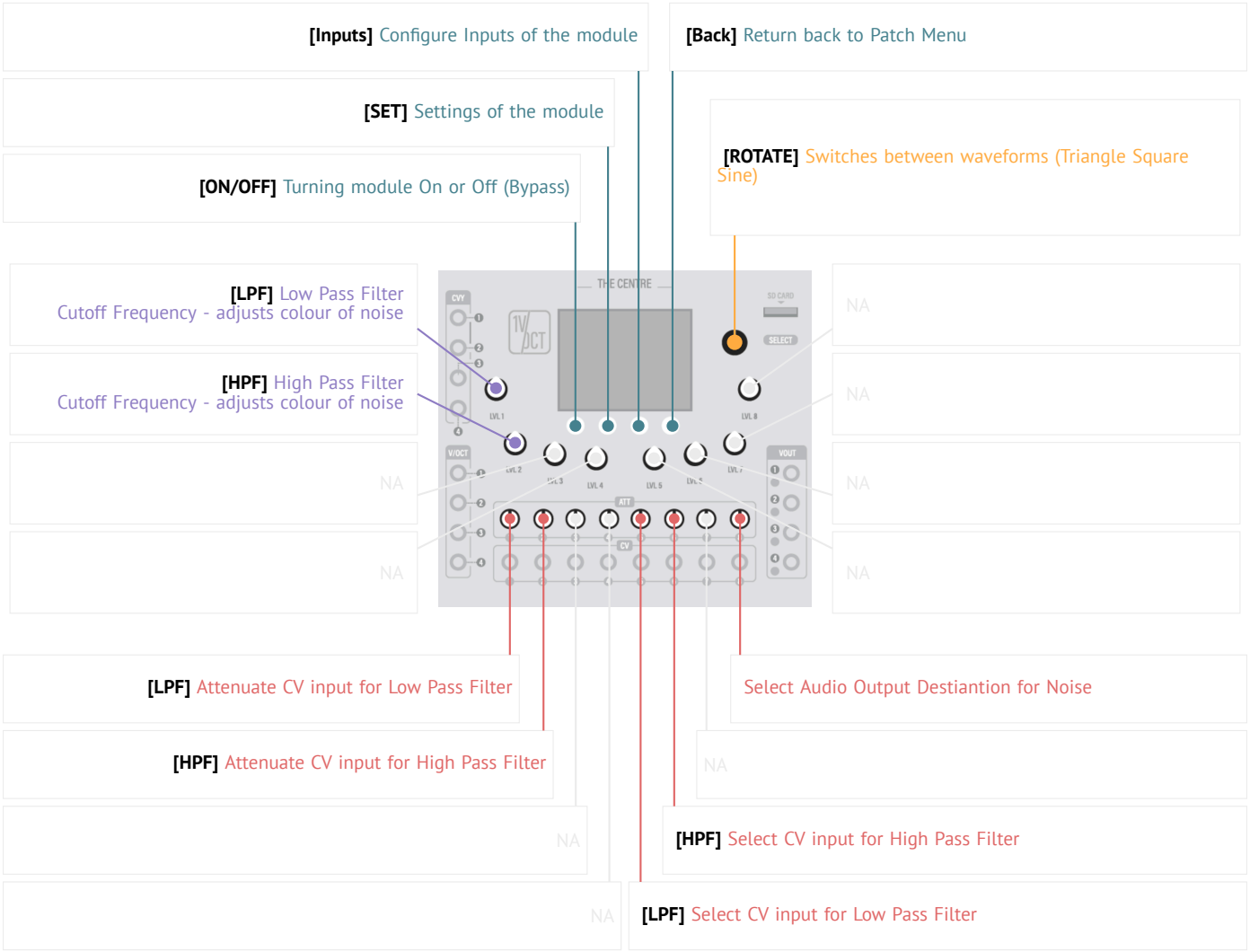
RST *Oscillator reset*

Set to high when oscillator phase resets

NOI - Noise Generator

Noise Generator is a sound source that produces noise of different colour.

26.1 Mapping of Controls



26.2 Waveforms

Noise generator produces White Noise as a base for further filtering. With two incorporated filters (Low Pass Filter and High Pass Filter) the colour of noise can be adjusted with the help of CV Inputs.

NOI - Noise Generator

Outputs Inputs Settings

Audio Output *Audio Output of Noise Generator*
Selects audio output destination for Noise.
See: Audio Outputs

LPF *Low Pass Filter*
Low Pass Filter controlled by CV

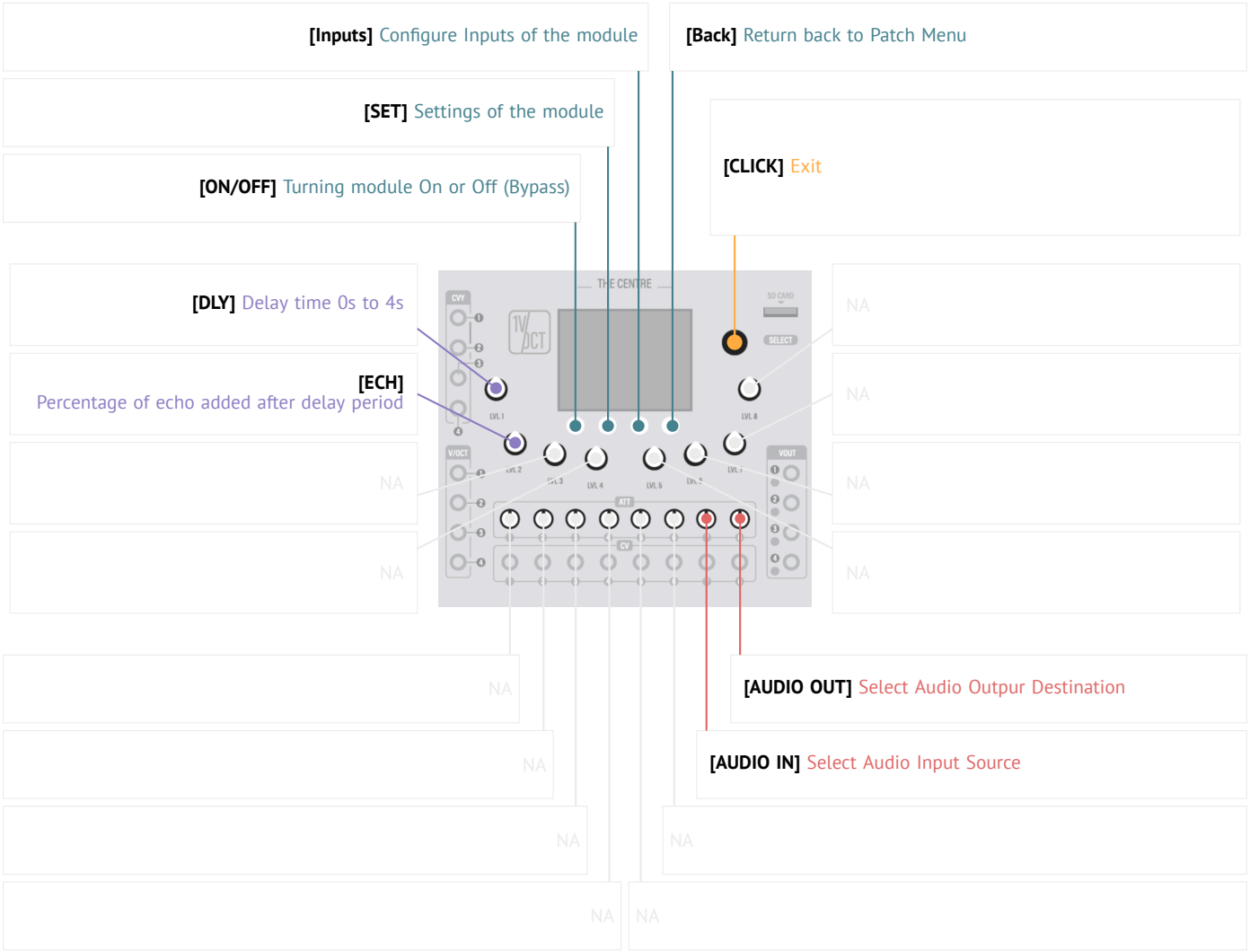
HPF *High Pass Filter*
High Pass Filter controlled by CV

OSC *Output of NOI*
Output of noise signal

DLY - Delay

Delay (DLY) Effect Processor buffers signal and sums it with buffer to provide delayed echo effect.

27.1 Mapping of Controls



27.2 Operation

Delay (DLY) Effect Processor takes input signals and buffers it for requested period of time based on Input:Delay parameter and then sums it with buffered signal at attenuated level givent by Input:Echo parameter. Delay creates audible echo effect.

DLY - Delay

Settings

Audio Output *Audio Output of Delay*

Audio Output of processed signal by Delay. Audio Output is Audio Input signal summed with buffered delayed signal

See: Audio Outputs

Audio Input *Audio Input signal to be delayed*

Audio signal that will be delayed and summed with buffered and attenuated signal to produce echo.

Delay *Delay Period Length*

Length of Delay period betwen 0s and 4s. Delay is the size of the buffer.

Echo *Level of Echo*

Percentage of level of signal to be buffered for further layering

Inputs

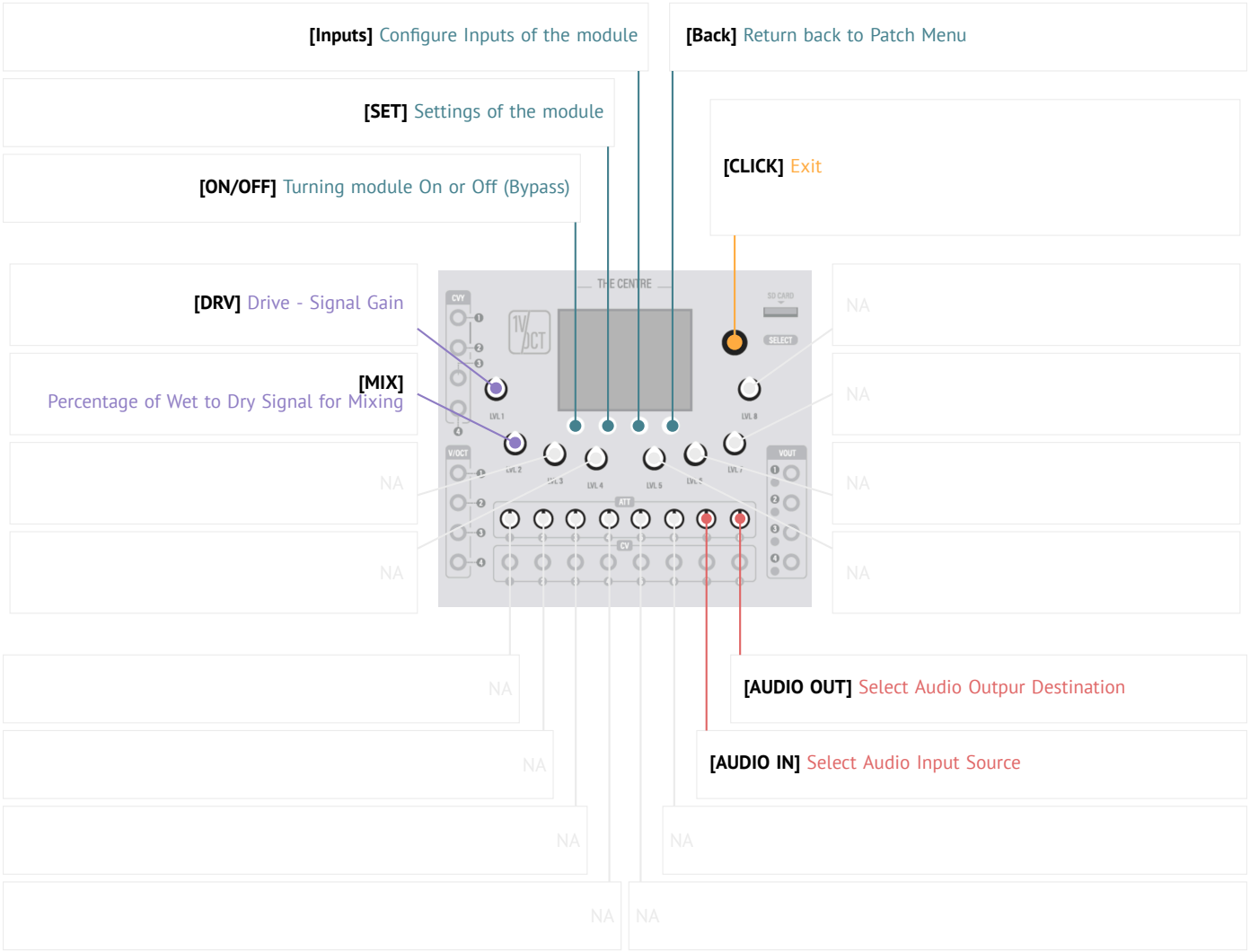
NONE

Outputs

DST - Distortion

Distortion (DST) Effect Processor distorts and damages signal to add rough texture.

28.1 Mapping of Controls



28.2 Operation

Distortion (DST) Effect Processor takes input signal and distorts it by using selected algorithm. Wet Signal (distorted input signal) is then mixed with Dry Signal (unprocessed input signal) by ratio controlled via Input:Mix parameter.

DST - Distortion

Outputs

Audio Output *Audio Output of Distortion*

Audio Output of distorted signal. Audio Output is Audio Input signal distorted with selected algorithm
See: Audio Outputs

Inputs

Audio Input *Audio Input signal to be delayed*

Audio signal that will be delayed and summed with buffered and attenuated signal to produce echo.

Drive *Signal Gain*

Level of gain on Audio Input Signal while processing Distortion making effect more prominent

Mix *Dry/Wet Mix*

Amount of unprocessed (original) Ainput Signal mixed with Distorted Audio Signal

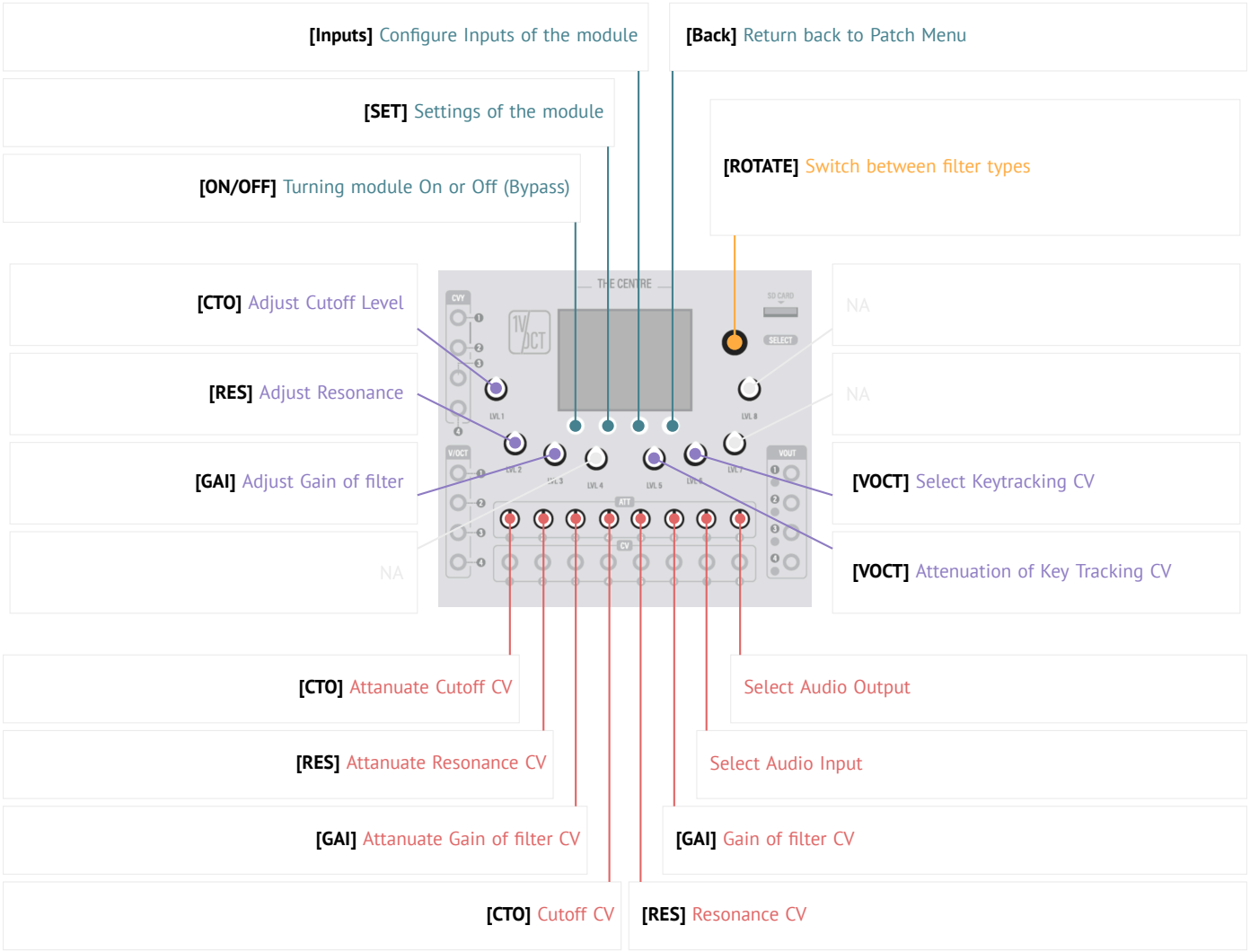
Settings

NONE

VCF - Voltage Controlled Filter

Voltage Controlleed Filter (VCF) is a set of digital filters with control of Cutoff, Resonance and Gain.

29.1 Mapping of Controls



29.2 Operation

Voltage Controlled Filter (VCF) is a set of different filters implemented in digital domain to allow control on limiting frequencies of sound.

29.3 Tracking

VCF implements cutoff frequency tracking mechanism that can be controlled in multiple ways however there are 3 standard parameters to control Cufoff Frequency.

Cutoff CV this is part of Input:Cutoff parameter and control voltage either external or internal can be assigned to modulate base cutoff frequency.

Tracking V/OCT and Tracking CV are two voltage controlled parameters that are part of the same input controll Input:Tracking. Tracking V/OCT can be assigned to pitch from external (V/OCT jack) or internal (NOTE Output of internal modules) and adjusted with its attenuator. Tracking CV in contrary is to be assigned to CV modulator like Envelope or LFO.

★ Assigning the same V/OCT to Input:Tracking of VCF and to Input:NOTE pitch control of VCO or WTO allows to follow the key of played note creating punchy sounds on change of pitch when using Low Pass filters.

VCF - Voltage Controlled Filter

Settings

Audio Output *Audio Output of VCF*

Selects audio output destination for sound flitered through VCF.
See: Audio Outputs

Audio Input *Audio signal to be filtered through VCF*

Audio signal (can be any signal) tthat will be filtered through different type of filter

Filter Type *Selection of Filter*

OP Lowpass, OP Highpass One Pole filters.

BQ Lowpass, Highpass, Bandpass, Low Shelf, High Shelf, Peaking, Notch, Allpass Biquad filters

DL Ladder Diode Ladder filter

MG Ladder MG Type Ladder filter

LD Lowpass 12, Highpass 12, Bandpass 12, Lowpass 24, Highpass 24, Bandpass 24 Ladder filters
12dB and 24dB versions

Inputs

NOTE *Pitch control of oscillator*

Note controls pitch or frequency of oscillator.
See: Pitch Control

VOCT 1V/Oct input for note control

OCT Tuning note by octaves +/- 8 octaves

NOTE Tuning note by semitones +12 semitones (one octave)

FINE Tuning note by cents +/- one semitone

Cutoff *Cutoff Frequency*

Frequency boundary at which filter starts filtering out the signal

Resonance *Resonance*

A level of suppression or enhancement of signal

Gain *Pre-Gain of Signal*

Amplification of signal prior to filtering

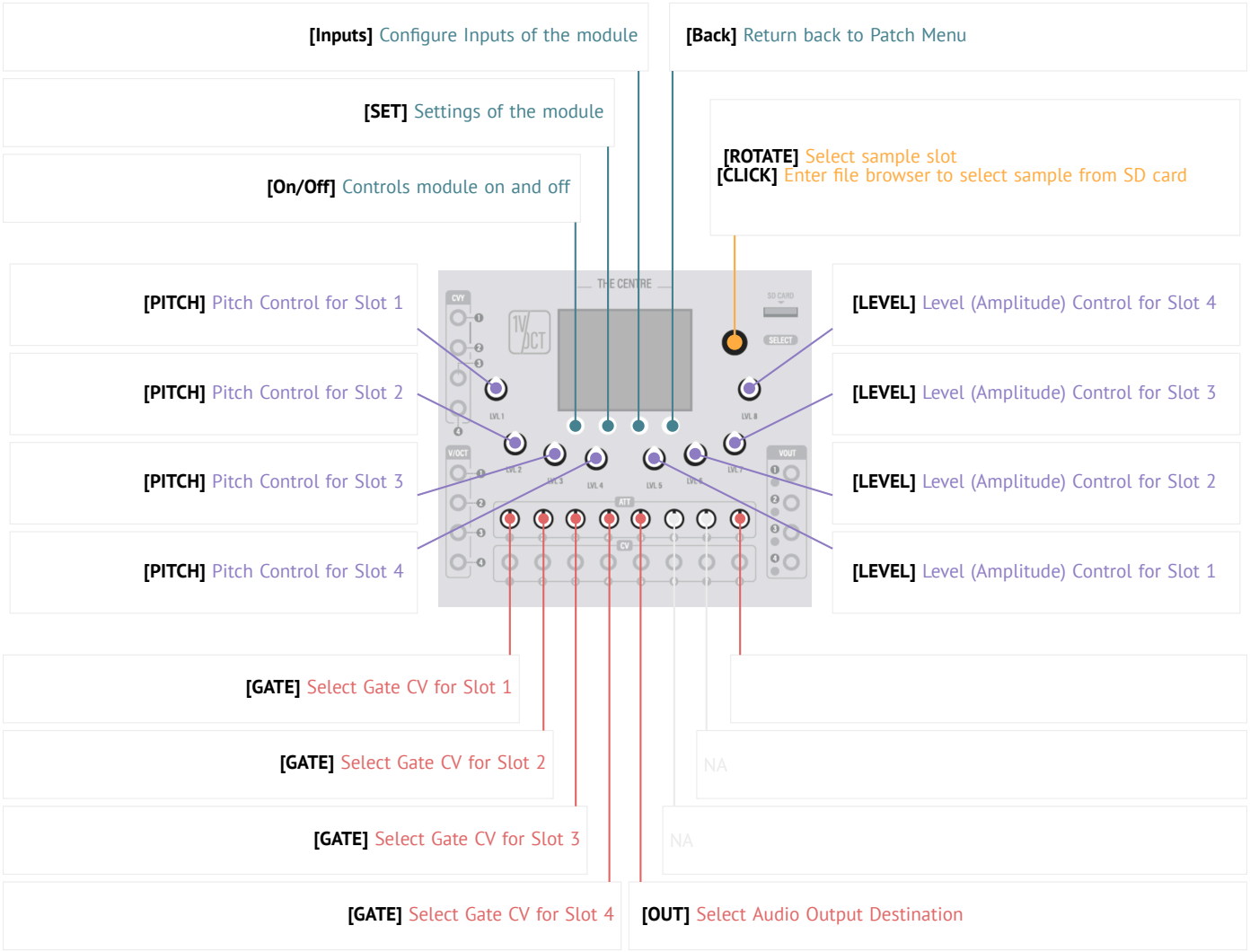
Outputs

NONE

DRC - Drum Rack

Drum Rack (DRC) is a 4 slot simple sample player with pitch adjustment and volume level control (amplitude modulation).

30.1 Mapping of Controls



30.2 Operation

Drum rack consists of 4 slots for loading samples. Upon receiving trigger or gare signal on **GATE** input the sample starts as signle shot. Thera re only two parameters currently to be adjusted and both can be controlled either via setting static value or using CV to modulate them. Those parameters as Volume Level (Amplitude) and Pitch Correction. Pitch correction adjusts pitch of sample by +/- two octaves.

DRC - Drum Rack

Settings

Audio Output *Audio Output of Drum Rack*
Selects audio output destination for DRC. All 4 sample slots are sharing the same audio output where they get downmixed
See: Audio Outputs

Inputs

Gate 1 *Gate CV Input for Slot 1*
Gate or trigger signal that initiates sample playback

Pitch 1 *Pitch Adjustment for Slot 1*
relative pitch adjustment for sample playback

Level 1 *Amplitude (Level) for Slot 1*
Level (Amplitude Modulation) for sample playback

Steps 2 *Number of Steps for Channel 2*
Number of Steps within a channel.

Beats 2 *Number of Beats for Channel 2*
Number of beats within a channel.

Offset 2 *Offest of first step for Channel 2*
Offset of first step for channel

Steps 3 *Number of Steps for Channel 3*
Number of Steps within a channel.

Beats 3 *Number of Beats for Channel 3*
Number of beats within a channel.

Offset 3 *Offest of first step for Channel 3*
Offset of first step for channel

Steps 4 *Number of Steps for Channel 4*
Number of Steps within a channel.

Beats 4 *Number of Beats for Channel 4*
Number of beats within a channel.

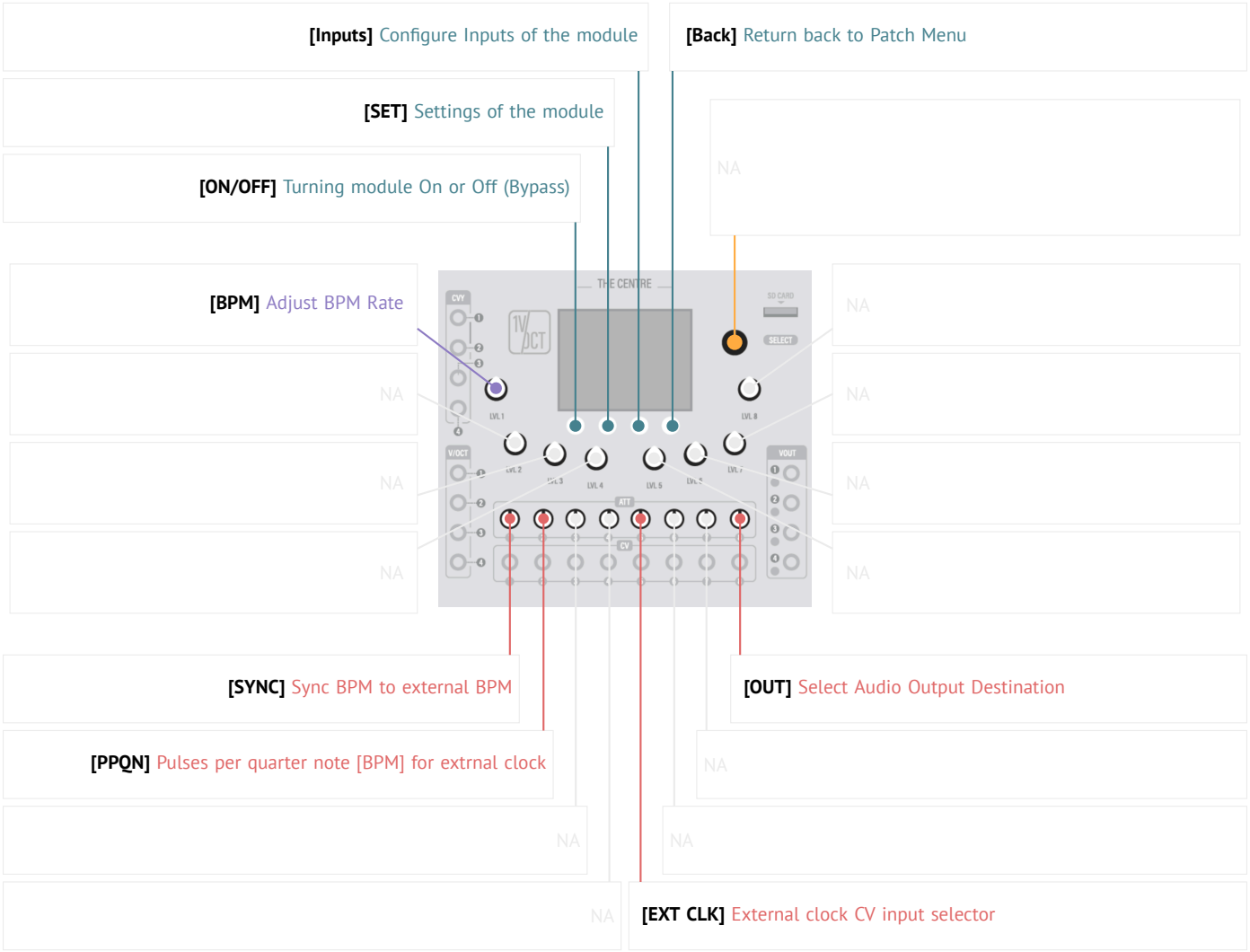
Offset 4 *Offest of first step for Channel 4*
Offset of first step for channel

Outputs

CLK - Clock Generator

Clock Generator (CLK) produces clock pulses based on BPM to synchronise modules.

31.1 Mapping of Controls



31.2 Operation

Clock Generator (CLK) produces steady pulse signal of a rate related to the BPM (Beats Per Minute). Number of generated clocks vary depending on global Setting:Clocks Per Quarter Note (CPQN). BPM determines how many beats are per minute and CPQN determines how many clocks will be generated per beat.

■ MIDI standard sets 24 clocks per quarter note however this value can be modified as different equipment uses different assumptions.

★ Clock should be supplied to modules like LFS - Low Frequency Shaper or PLY - Polyrhythm to change their default timing from 120 BPM to required one set in CLK

31.3 External Clock

When connecting Ext Clock Input **[INPUT:CLOCK]** the module will start displaying external clock BPM in accordance to configured CPQN (Clocks Per Quarter Note) in Settings of the module. After turning **[SET:Sync]** to ON the internal BPM can no longer be configured with the **[Input:BPM]** but it will use the value of external clock BPM

■ When using external clock only usable are CVY1-4 inputs as those are low latency inputs. See: Physical Connectors

31.4 Clock Output

Clock Module can provide master clock to external modules via Clock Output. Clock Output can be configured via settings to one of VOUT1-4 3.5mm outputs or to VBuf Audio Outputs

CLK - Clock Generator

Settings

Clock Output *Clock Output*

Selects audio output destination for CLK. The VOUT1-4 can carry clock out as they are DC coupled. Clock will output square clock signal through the selected output.
See: Audio Outputs

Sync *Sync clock with external clock*

Sync will synchronise clock module with external clock's BPM rate.

Clocks PQN *Clocks Per Quarter Note for External Clock*

Selection of clocks for external source of BPM. User needs to select the number of clocks per BPM the external source generates

Inputs

BPM *Beats Per Minute*

Selection of Beats Per Minute setting

Clock *External Clock Input*

External Clock input used to calculate BPM of external source

- Use only with CVY1-4 inputs

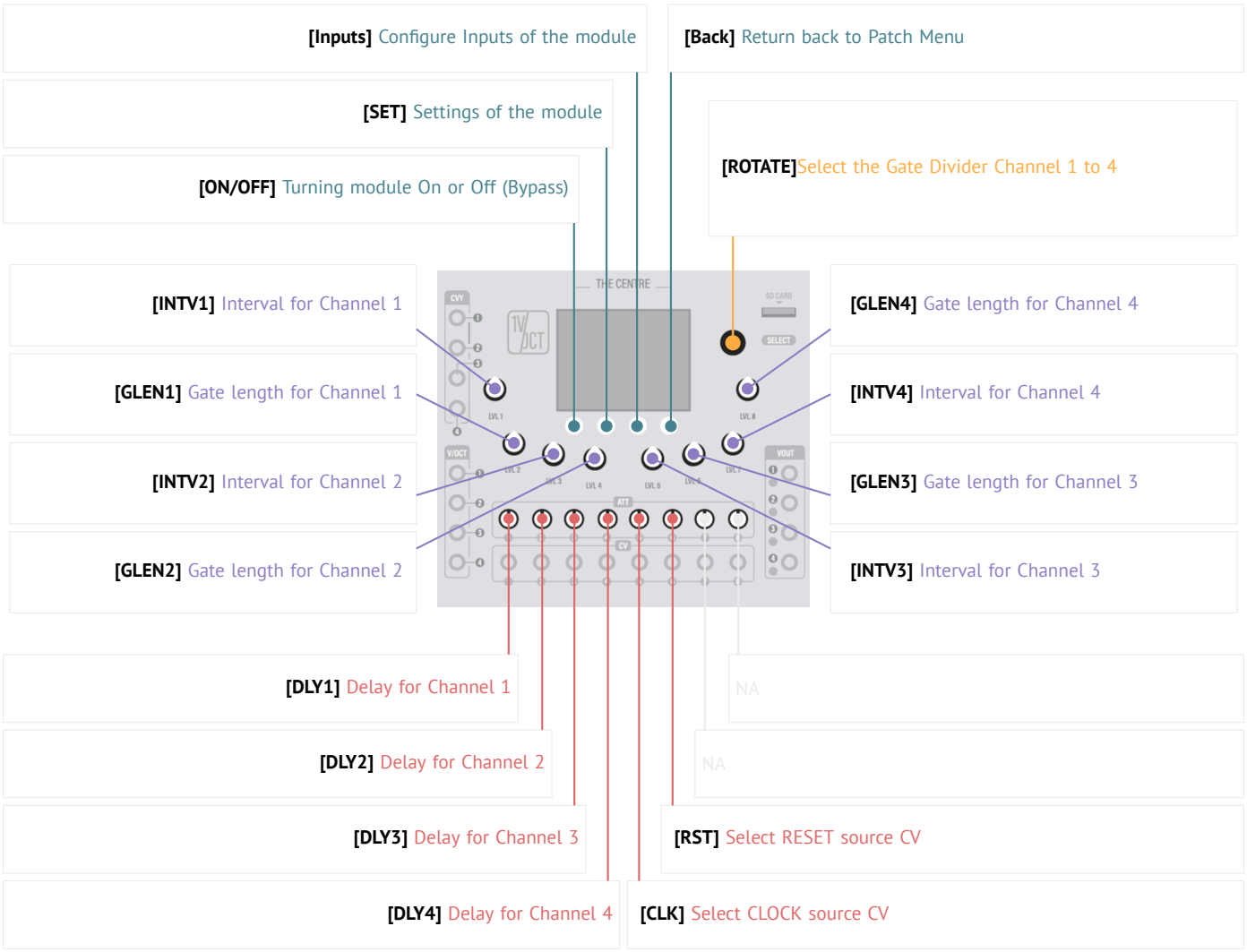
Outputs

Clock *Clock signal*

Output of generated clock signal relative to BPM

GAT - Gate Divider

Gate Divider (GAT) divides pulse clock signal (clock) into longer period pulse clock signals.



32.1 Operation

Gate Divider (GAT) generates pulse signal (square wave with different phase width) upon disecting and dividing input pulse signal (usually clock). The input signal triggers counter in 4 channels and based on set parameters creates longer pulse signals with modified width of phase (both negative and positive).

■ Such division can be seen as turning clock signal into evenly spaced notes with evenly spaced rests or evenly spaced notes triggers with particulat notes lengths.

★ Divided gates are great source of repetetive patterns to be used as repetetive thythm gereator (drum machine). Triggering drum samples from gate divider and setting gate divider divisions to different notes can create regular beat pattern.

GAT - Gate Divider

Settings

NONE

Inputs

Clock *Clock CV Source*
Pulse CV source to base divisions on

Reset *Reset CV Source*
Reset signal to synchronise position of all dividers by setting all positions to start

Intverval 1 *Generated pulse interval*
Interval between gate divisions whn the gate becomes high

Gate Len 1 *Length of pulse*
Number of beats within a channel.

Delay 1 *Delay before triggering pulse*
Delay is the duration before pulse signal turns gate high

Intverval 2 *Generated pulse interval*
Interval between gate divisions whn the gate becomes high

Gate Len 2 *Length of pulse*
Number of beats within a channel.

Delay 2 *Delay before triggering pulse*
Delay is the duration before pulse signal turns gate high

Intverval 3 *Generated pulse interval*
Interval between gate divisions whn the gate becomes high

Gate Len 3 *Length of pulse*
Number of beats within a channel.

Delay 3 *Delay before triggering pulse*
Delay is the duration before pulse signal turns gate high

Intverval 4 *Generated pulse interval*
Interval between gate divisions whn the gate becomes high

Gate Len 4 *Length of pulse*
Number of beats within a channel.

Delay 4 *Delay before triggering pulse*
Delay is the duration before pulse signal turns gate high

Outputs

Gate 1 *Gate 1 Output*
Output of Channel 1 pulse signal

Gate 2 *Gate 1 Output*
Output of Channel 2 pulse signal

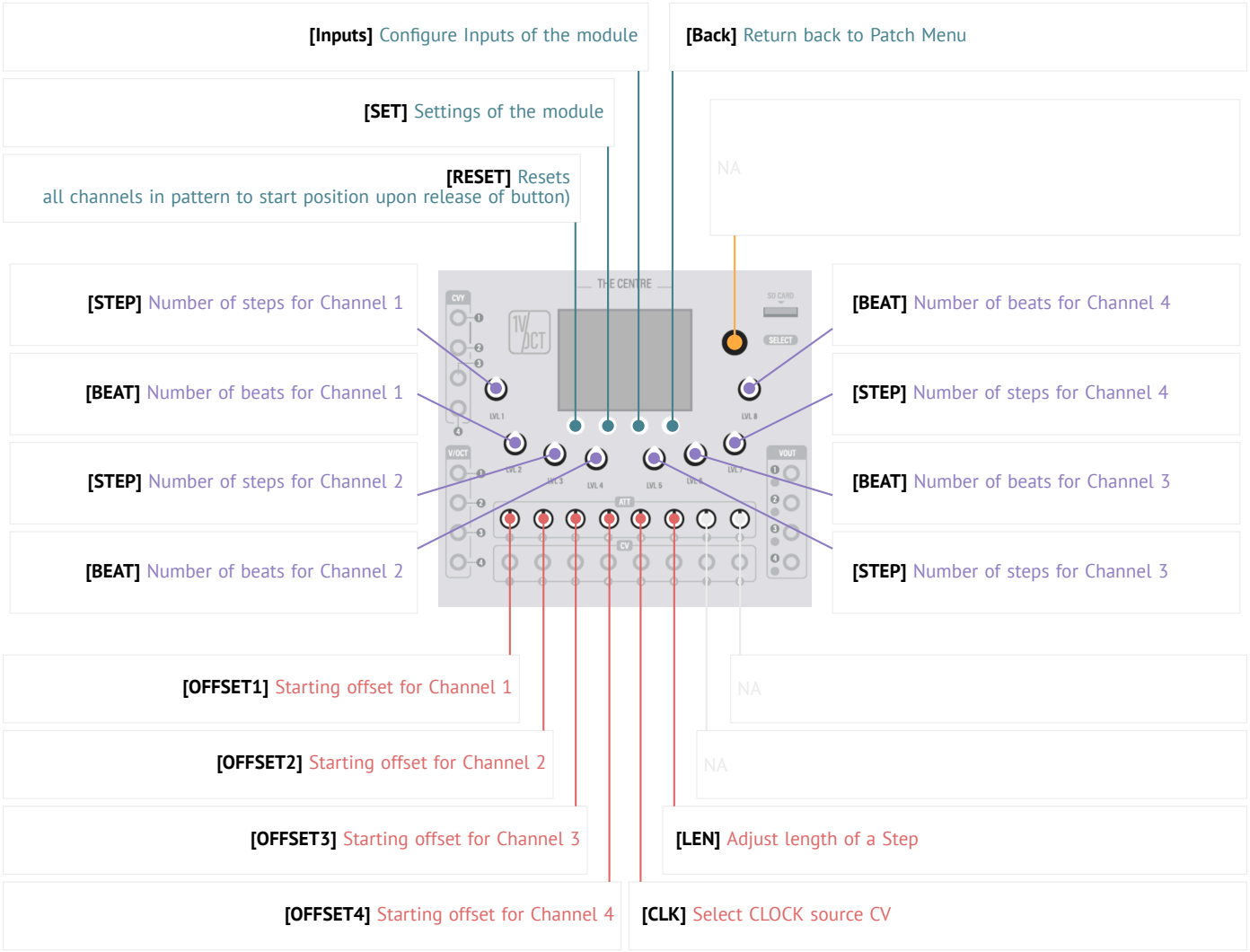
Gate 3 *Gate 1 Output*
Output of Channel 3 pulse signal

Gate 4 *Gate 1 Output*
Output of Channel 4 pulse signal

EUC - Euclidean Rhythm Generator

Euclidean Rhythm Generator (EUC) produces rhythmic pattern based on Euclid's algorithm to divide periods of time into equal parts.

33.1 Mapping of Controls



33.2 Operation

Polyrhythm generates 4 channels of rhythms by dividing pattern duration into equal steps. Pattern is defined as period of time covering number of bars (4 beats or 4 quarternotes) at given BPM (beats). Number of steps in channel can be controlled via Inputs:Beats X (where X is the number of channel 1 to 4).

■ Without clock source the BPM is fixed at 120 BPM the pattern

EUC - Euclidean Rhythm Generator

Settings

Step Length *Length of single Step*
Length of single step, patterns are consisting of arbitrary number of equal length

Inputs

Clock *Clock CV Source*
Clock source to synchronise Poly Rhythm with other modules.

Reset *Reset CV Source*
Reset position for all channels in pattern upon trigger

Steps 1 *Number of Steps for Channel 1*
Number of Steps within a channel.

Beats 1 *Number of Beats for Channel 1*
Number of beats within a channel.

Offset 1 *Offest of first step for Channel 1*
Offset of first step for channel

Steps 2 *Number of Steps for Channel 2*
Number of Steps within a channel.

Beats 2 *Number of Beats for Channel 2*
Number of beats within a channel.

Offset 2 *Offest of first step for Channel 2*
Offset of first step for channel

Steps 3 *Number of Steps for Channel 3*
Number of Steps within a channel.

Beats 3 *Number of Beats for Channel 3*
Number of beats within a channel.

Offset 3 *Offest of first step for Channel 3*
Offset of first step for channel

Steps 4 *Number of Steps for Channel 4*
Number of Steps within a channel.

Beats 4 *Number of Beats for Channel 4*
Number of beats within a channel.

Offset 4 *Offest of first step for Channel 4*
Offset of first step for channel

Outputs

Gate 1 *Gate 1 Output*
Output of Channel 1 setting gate to high upon beat

Gate 2 *Gate 2 Output*
Output of Channel 2 setting gate to high upon beat

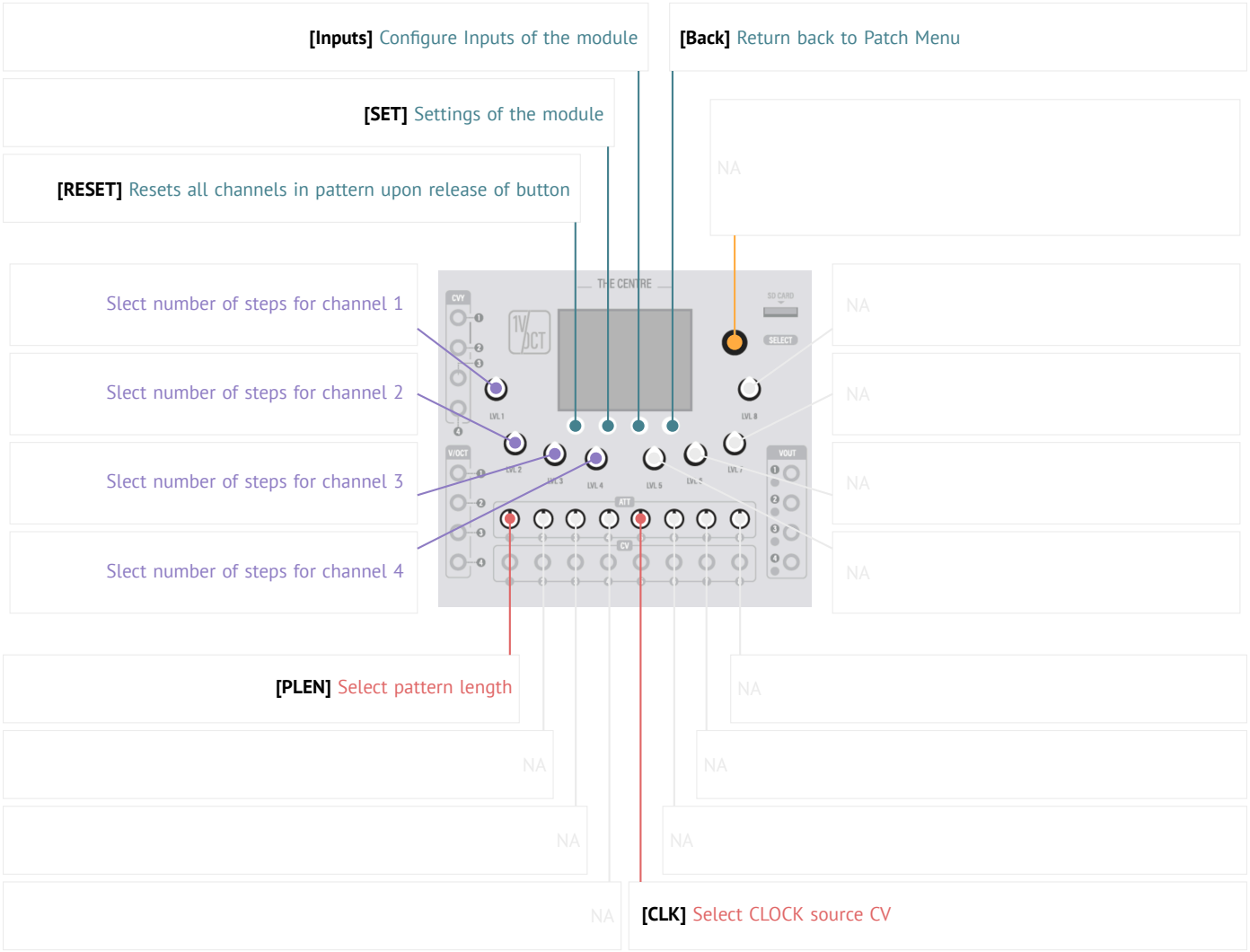
Gate 3 *Gate 3 Output*
Output of Channel 3 setting gate to high upon beat

Gate 4 *Gate 4 Output*
Output of Channel 4 setting gate to high upon beat

PLY - Polyrhythm

Polyrhythm (PLY) generates generates contrasting rhythms within a pattern.

34.1 Mapping of Controls



34.2 Operation

Polyrhythm generates 4 channels of rhythms by dividing pattern duration into equal number of steps decided by input parameter Inputs:Steps. Pattern is defined as period of time covering number of bars (4 beats or 4 quarternotes) at given BPM (beats). Number of steps in channel can be controlled via Inputs:Beats X (where X is the number of channel 1 to 4).

■ Without clock source the BPM is fixed at 120 BPM the pattern

PLY - Polyrhythm

Settings

Pattern Length *Length of pattern in bars*

Length of pattern in bars. Each pattern is divided into number of steps configured by Inputs:Pulses

Gate length *Length of gate*

Trigger Trigger only

Inputs

Clock *Clock CV Source*

Clock source to synchronise Poly Rhythm with other modules.

Reset *Reset CV Source*

Reset position for all channels in pattern upon trigger

Pulses 1 *Number of pulses for channel 1*

Number of steps that the pattern gets divided into and generating a beat at the beginning of each step

Pulses 2 *Number of pulses for channel 2*

Number of steps that the pattern gets divided into and generating a beat at the beginning of each step

Pulses 3 *Number of pulses for channel 3*

Number of steps that the pattern gets divided into and generating a beat at the beginning of each step

Pulses 4 *Number of pulses for channel 4*

Number of steps that the pattern gets divided into and generating a beat at the beginning of each step

Outputs

Gate 1 *Gate 1 Output*

Output of Poly Rhythm setting gate to high upon beat

Gate 2 *Gate 2 Output*

Output of Poly Rhythm setting gate to high upon beat

Gate 3 *Gate 3 Output*

Output of Poly Rhythm setting gate to high upon beat

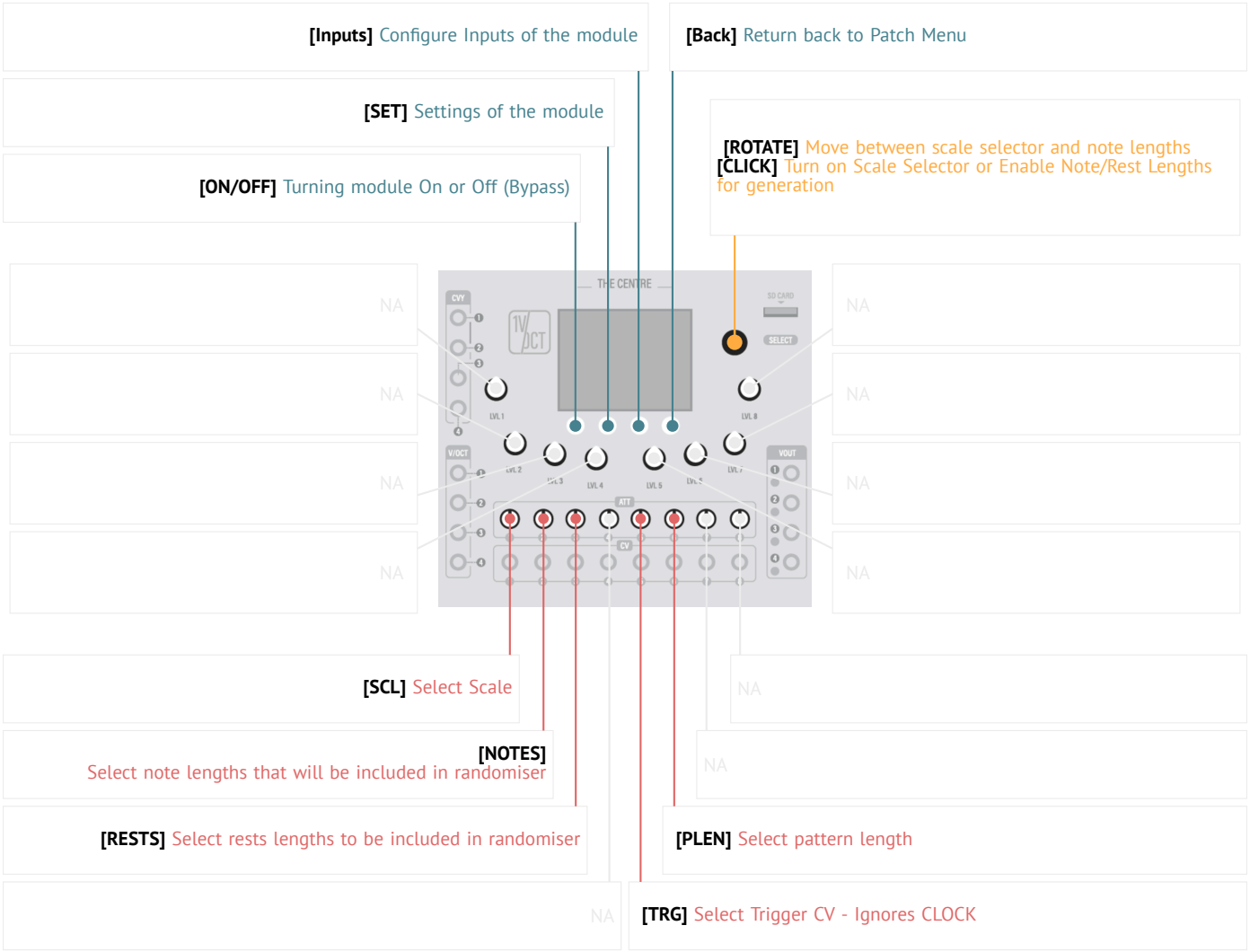
Gate 4 *Gate 4 Output*

Output of Poly Rhythm setting gate to high upon beat

RNG - Rendom Note Generator

Rendom Note Generator (RNG) produces random notes.

35.1 Mapping of Controls



35.2 Operation

Random Note Generator (RNG) produces random values for output of pitch, gate length and velocity. The randomistaion happens every time upon receiving trigger signal at Input:Trigger. The randomisation process can be controlled by selecting range of available notes and rests as well as predefines musical scale to limit generated pitches.

■ Without clock source the BPM is fixed at 120 BPM the pattern

★ The musical scale selection is not necessary as routing output of RNG through QNT (Quantiser) and limit available pitch there gives much better flexibility.

RNG - Rendom Note Generator

Settings

Pattern Length *Length of pattern in bars*

Length of pattern in bars. Each pattern is divided into number of steps configured by Inputs:Pulses

Gate length *Length of gate*

Trigger Trigger only

Inputs

Clock *Clock CV Source*

Clock source to generate notes automatically and measure length of notes

Trigger *Trigger CV Source*

Triggers generation of next note, if Trigger is not connected notes and rests get generated automatically upon their period ends

Outputs

Pitch *Pitch Output of generated note*

Output of generated random pitch limited by setting of selected musical scale

Gate *Gate Output of generated note*

Output of Poly Rhythm setting gate to high upon beat

Velocity *Velocity Output of generated note*

Output of Poly Rhythm setting gate to high upon beat

QNT - Quantiser

Quantiser (QNT) aligns incoming pitch to the predefined required pitches. Quantiser limits the incoming pitch to the requested ongoing limited and predefined set of pitches.

36.1 Operation

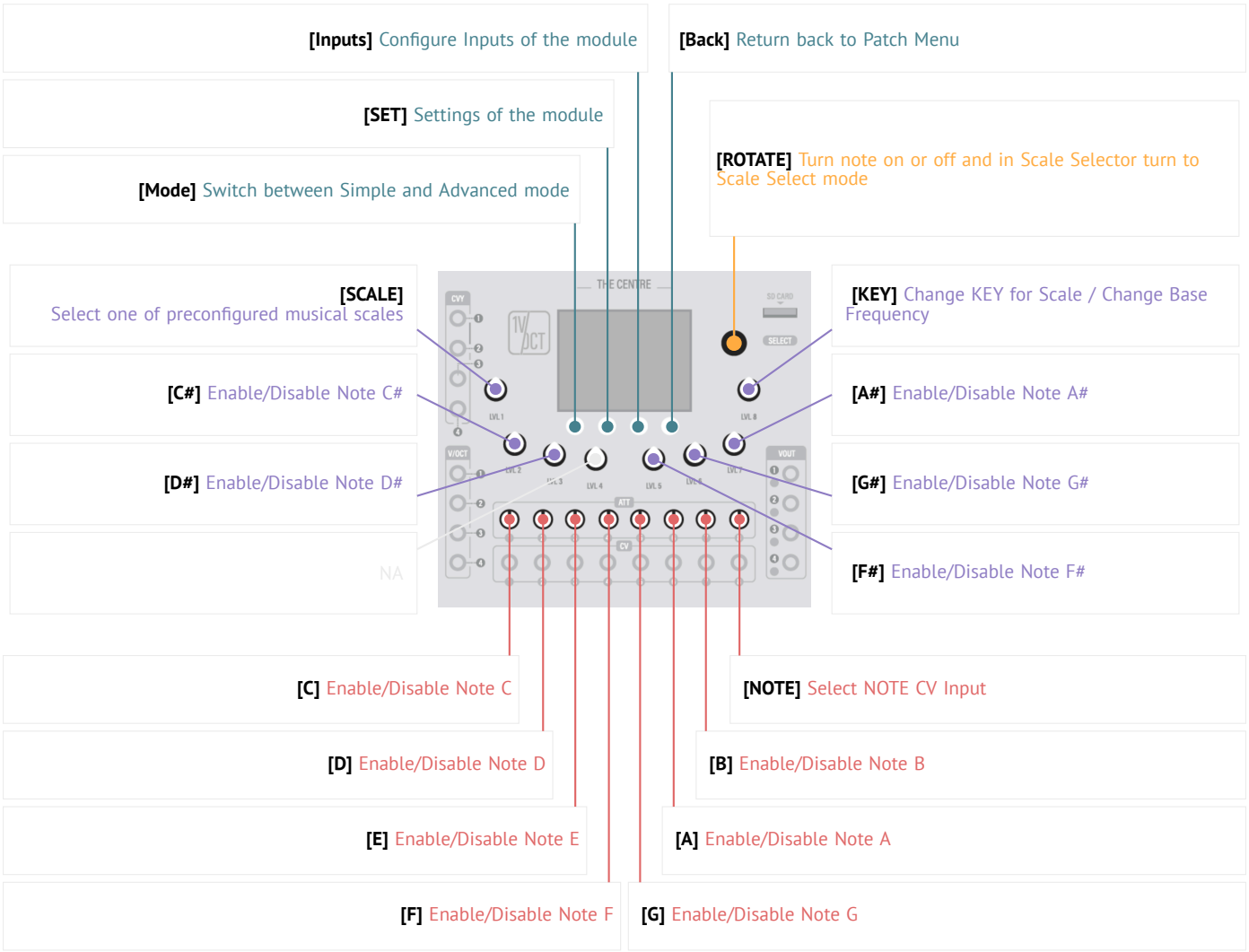
Quantiser (QNT) allows correcting incoming pitch into a selected set of outgoing pitches. Usually it is used to limit number of notes to the notes available only in given musical scale. Quantiser takes pitch from Input:NOTE and finds the closest corresponding pitch in the scale by method of approximation.

36.2 Operating Modes

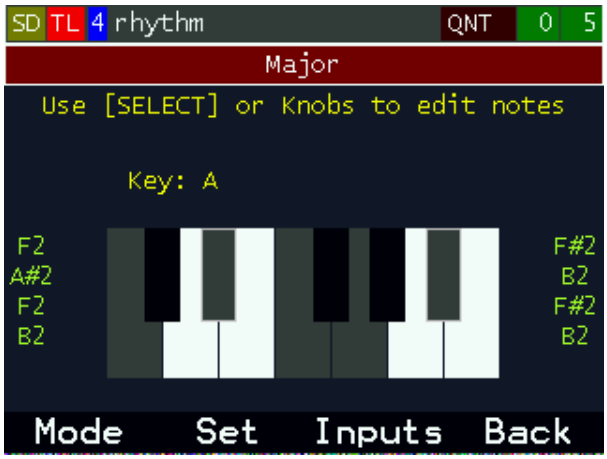
Quantiser can operate in either **Simple** or **Advanced** mode. In Simple mode

36.3 Simple Mode

36.3.1 Mapping of Controls



36.3.2 Operiation in Simple Mode



In simple mode quantiser is visible as a one octave keyboard that can use either predefined scales and key to set the quantised notes or use custom scale. On the left and right side are displayed notes in and quantised notes out (on the picture it is 4 voice polyphony so it shows 4 notes in on the left and 4 notes out on the right). As can be seen note F2 got quantised to F#2 as note F2 is turned off on the keyboard (gray key).

36.3.3 Musical Scales

Currently there are only a few musical scales preconfigured in Quantiser. The preconfigured scale can be selected by clicking and then rortting Encoder **[SELECT]** or using using **[LVL1]** knob. Each preconfigured scale can be also adjusted to the correct **Key** (using **[LVL8]** knob or through settings).

36.3.4 Custom Scales

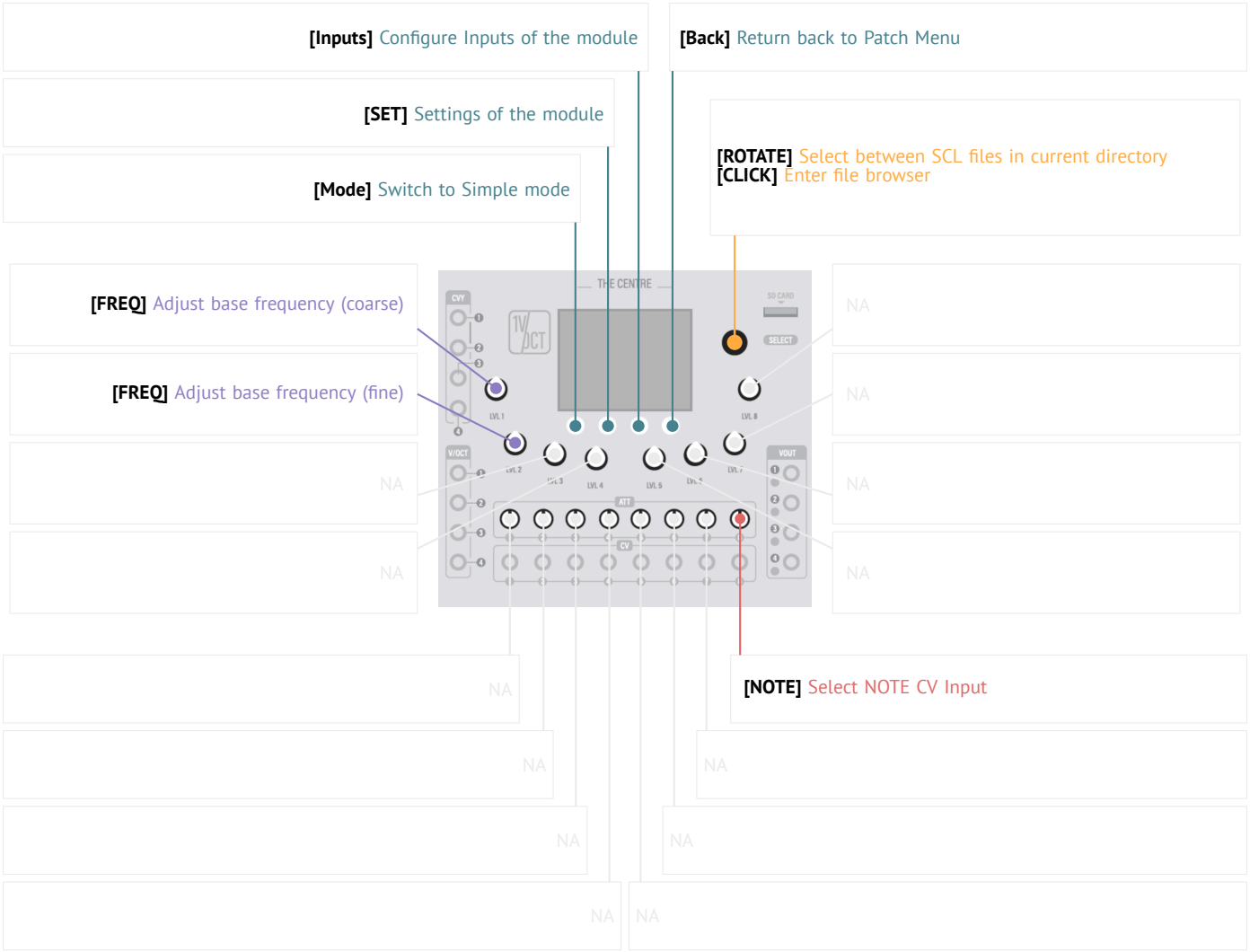
Custom scale is a set of notes configured by user. By turning any knobs corresponding to notes (as pictured on the reference card) the note will be turned ON and OFF. The note configuration can be also done by rotating Encoder **[SELECT]** knob and performing pressing down Encoder on selected notes.

■ Turning knobs or clicking on notes automatically switches module into Custom Scale.

★ If there is only one note selected in the quantiser, for example note C and the input note is E4 then output note will be C4. However for note G4 the output note will be C5 as C5 is closer to G4 than C4 (approximation).

36.4 Advanced Mode

36.4.1 Mapping of Controls



Advanced mode uses Scala (SCL) files that are industry standard for tuning and microtuning synthesisers. The biggest database of of Scala files contains over 5000 files.

■ **WARNING:** The Centre has limited memory and cannot read folders with huge amount of files per folder. Please use Scala prepared files from The Centre repository.

★ Visit: `https://github.com/1V-Oct/the_centre_waveforms/releases/tag/0.0.2` to download scala files broken into individual folders that suit The Centre

Scan below QR Code to visit download location

In this mode user selects the SCL file from the SD card and the screen will show the notes' ratios predefined in the SCL file. Use knobs **LVL1 - Coarse** and **LVL2 - Fine**ı to adjust base frequency.

QNT - Quantiser

Settings

Mode *Mode of Operation*

Simple Mode of operation in which quantisation is based on selectiing notes that the incoming pitch will be aligned to

Advanced Mode of operation when quantisation is based on Scala (SCL) file

Scale *Musical Scale in Simple Mode*

Custom User selected notes

Chromatic Chormatic Scale

Major/Major Scale Natural Minor/Natural Major Scale Harmonic Minor/Harmonic Major Scale Melodic Min
Major/Major Scale Natural Minor/Natural Major Scale Harmonic Minor/Harmonic Major Scale Melodic Minor/Melodic Major Scale

Key *Change Key for a selected Scale (except for custom scale)*

Change Key for a selected Scale (except for custom scale)

Inputs

NOTE *Note input for quantisation*

Mote input that will be quantised. The incoming note can be adjusted and tuned before quantisation.
See: Pitch Control

VOCT 1V/Oct input for note control/

OCT Tuning note by octaves +/- 8 octaves

NOTE Tuning note by semitones +12 semitones (one octave)

FINE Tuning note by cents +/- one semitone

Outputs

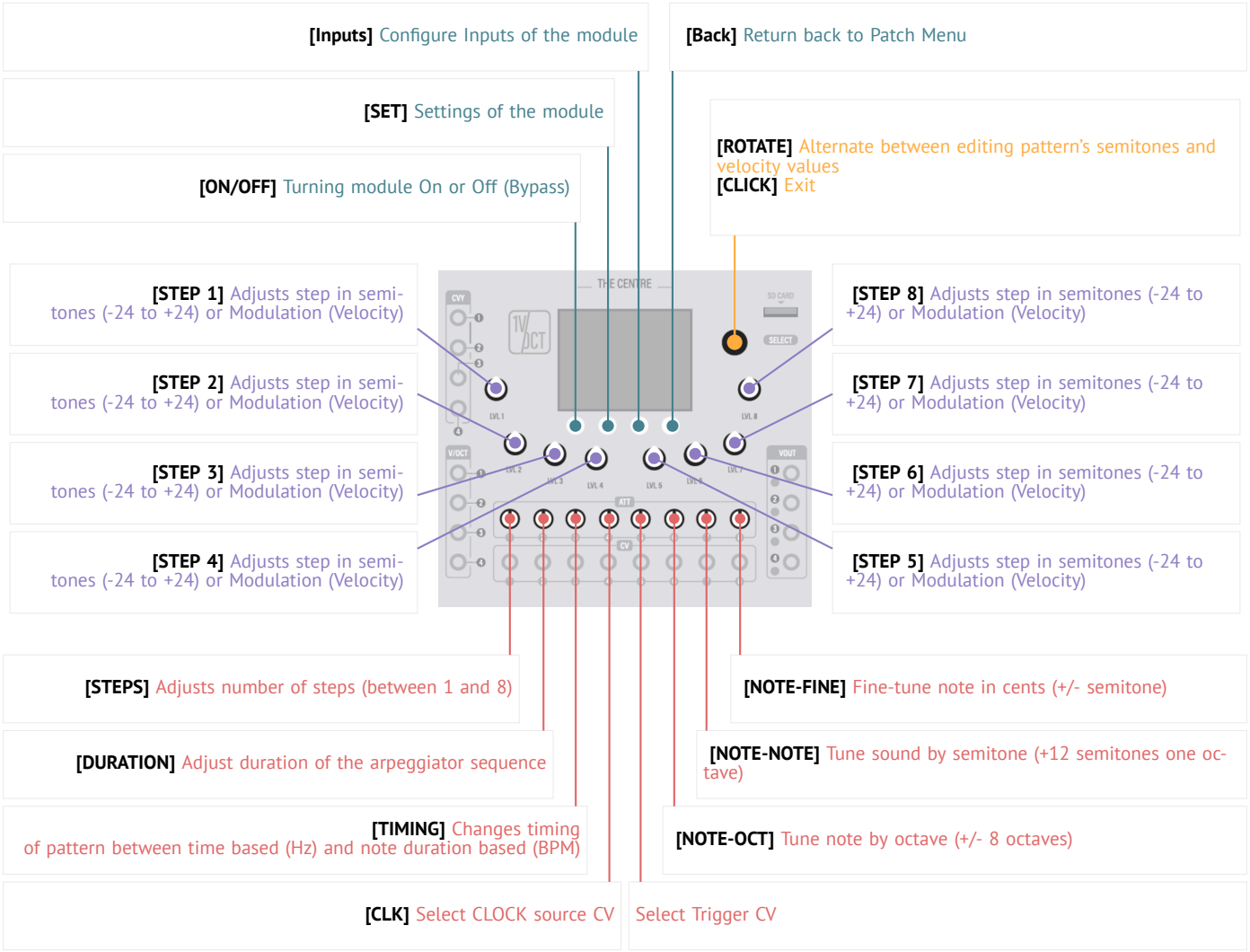
NOTE *Quantised Note*

Quantised note (note that has been aligned to the closest pitch of quantisation scale)

ARP - Arpeggiator

Arpeggiator (ARP) cycles though a set of notes defined in short pattern of defined duration.

37.1 Mapping of Controls



37.2 Operation

Arpeggiator (ARP) is a pitch manipulation utility that creates a repeptetive music pattern conisiting of up to 8 notes that are defined as a difference in semitones to the played note. The steps can be adjusted with knobs and the number of steps can vary between 1 and 8 steps. Duration of the pattern can be set by specyfying duration of whole pattern by frequency of oscillation of pattern in Hertz (Hz) or duration of pattern measured in length of notes or bars based on timing coming from clock source (BPM). Use encoder (SELECT) to change between editing pattern's semitones and velocity values.

■ Every step Arpeggiator will generate Gate signal that lasts for the whole duration of the step.

■ Velocity value is just an arbitrary value assigned to each step and can be used for modulating any parameter within The Centre.

37.3 Arpeggiator Screen

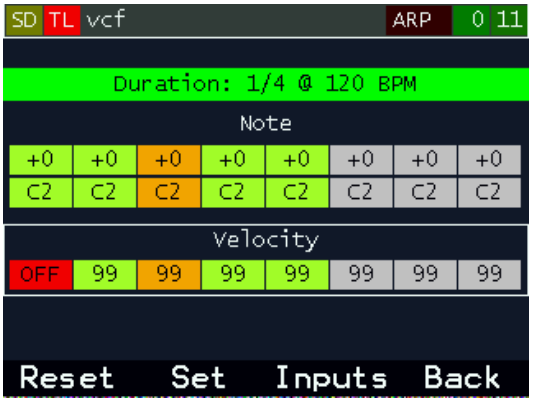


Figure 9: Arpeggiator with rest set on STEP 1

Arpeggiator menu description:

- **GRAY** - inactive steps
- **YELLOW** - Active steps
- **ORANGE** - Currently played note
- **RED** - For velocity set to **OFF** the gate signal will not be set

Elements on the screen:

- **GREEN BAR** Duration of note or pattern depending on setting **SET:Note Length**
- Note part contains a number of semitones that output note for given step will differ from input note
- Below semitone parts it shows actual output note for the step
- Velocity is the value assigned with note that can be used to modulate any parameter. If this value is set to OFF, the given step will not output GATE for this step.

37.4 Control arpeggiator position from external source

Arpeggiator position in default setting increases position with every step. Use Position CV to set position of arpeggiator according to external CV source.
■ By setting external CV source, arpeggiator will output only TRIGGER and not GATE signal on GATE Output. Furthermore CLOCK will be ignored and externally controlled position will determine position of arpeggiator.
■ Only positive values of CV input will affect position. Negative values will be clipped to position 0. Use either positive CV source or modify source with Attenution and Level.
★ Use LFO TRIANGLE input with ATTENUATOR set to 0.5 and LEVEL set to 0.5 to create TRAINGULAR input for arpeggiator to work in PING-PONG mode.
★ Change LFO to RAMP or SAW (LFO Skew) and arpeggiator will work either in ascending or descending mode respectively.

37.5 Adding rests

Velocity (modulation) values can have range between 0 to 99 however when the editing knob is tuned fully to the left the velocity value will be marked as **OFF**. When Velocity is set to **OFF** the gate will not be set at this step.

37.6 Duration

Arpeggiator operates in fixed length either for a sequence of notes or fixed length of note. Operation mode of arpeggiator can be selected by **Setting:Note Length**

ARP - Arpeggiator

Settings

Timing Mode *Duration of arpeggiator pattern*

BPM Timing based on note duration calculated from BPM which is controlled by steps

Hz Frequency at which pattern repeats

Note Length *Fixed note or pattern length*

Switch between fixed note or pattern duration

Off Fixed **Pattern** length is selected, note duration is pattern duration divided by number of steps

On Fixed **Note** length is selected, pattern duration equals note duration times number of steps

Inputs

NOTE *Base note*

Input note that is a base note for arpeggiator to create sequence.
See: Pitch Control

VOCT 1V/Oct input for note control/

OCT Tuning note by octaves +/- 8 octaves

NOTE Tuning note by semitones +12 semitones (one octave)

FINE Tuning note by cents +/- one semitone

Clock *Clock CV Source*

Clock source to synchronise with other modules.

Reset *Reset CV Source*

Reset position to step 0

Duration *Length of Pattern*

Duration of pattern measured either in frequency (Hz) or note duration (BPM)

Position *Position CV Source for pattern step*

External CV to control position of pattern

Outputs

NTE *Pitch Output of generated note*

Output of current step's pitch calculated by adding step's semitones to played note

GTE *Gate Output of generated note*

Output of Poly Rhythm setting gate to high upon beat

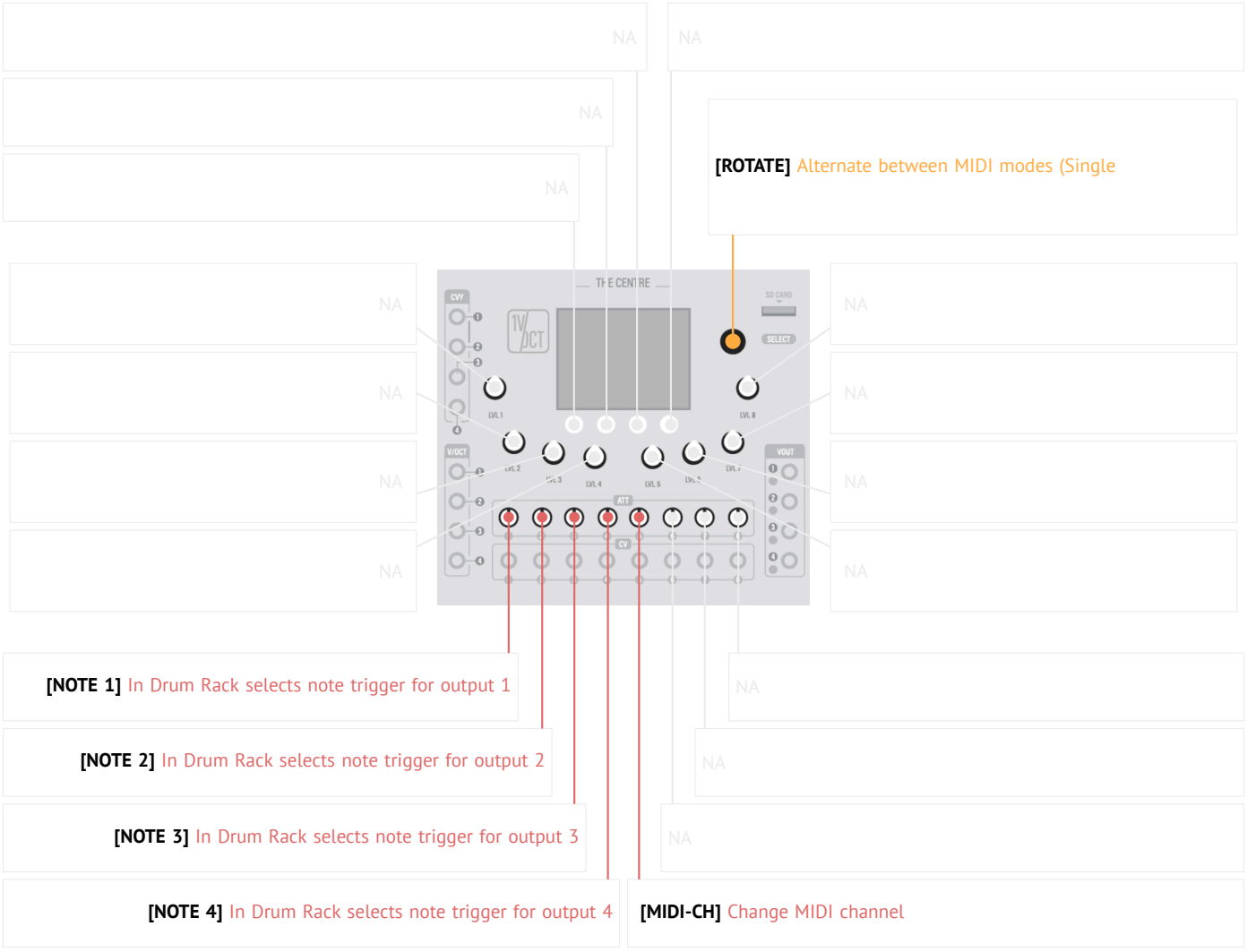
VEL *Velocity Output of generated note*

Output of velocity/modulation parameter associated with current step

MID - MIDI

MIDI (MID) Allows processing external MIDI input and converting it into internal signals

38.1 Mapping of Controls



38.2 Operation

MIDI (MID) is an utility that allows converting external MIDI input into NOTE, GATE and VELOCITY signals. External MIDI input requires extension for The Centre. Those extensions currently are 1V/Oct's Tamar and Taipo modules.

- MIDI Note velocity will be sent on Output VEL
- There can be multiple MIDI modules running at the same time responding on different channels

38.3 Operating Modes

Use **[ROTATE]** to alternate between MIDI modes: Single Note, Polyphony, Drum Rack.
■ Intensity of GREEN colour indicates the velocity of the note.

38.3.1 Single Note

In this mode every new incoming MIDI note replaces current note and generates single output of pitch, gate and velocity.

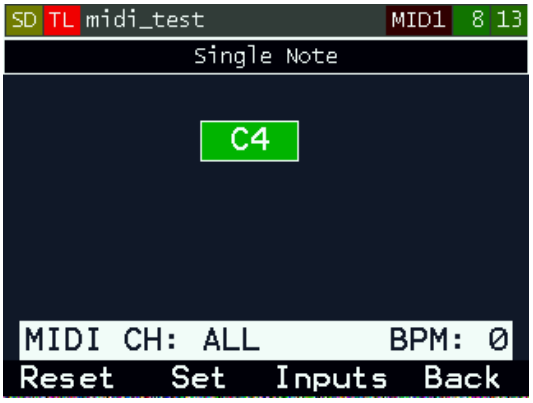


Figure 10: MIDI module in Single Note mode

38.3.2 Polyphony

Polyphonic mode allows 4 MIDI notes to be processed at the time and generate for outputs consisting of note pitch, gate and velocity named NTEx, GATx, VELx with x being respectfully within 1 and 4. The notes won't be replaced and will occupy the given output until the MIDI note is released (send MIDI NOTE OFF message). That means pressing 5th and subsequent notes on MIDI controller will not replace notes unlike Single Note mode.
★ Create 4 WTO modules each one Note-VOCT input routed from MID.NTEx All 4

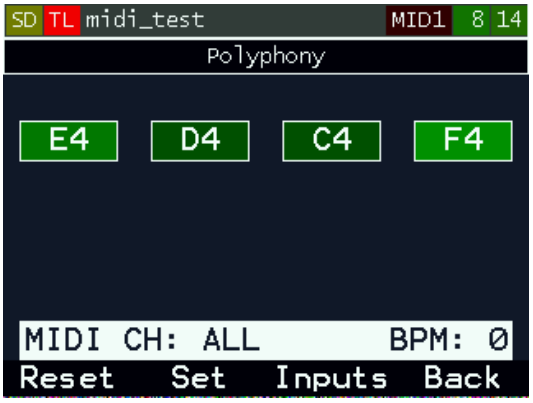


Figure 11: MIDI module in Polyphony mode

38.3.3 Drum Rack

Drum Rack allows allocating (fixing) the notes that will respond to MIDI notes being sent. This means 4 channel output consisting of NTEx, GATx and VELx (with x being in range 1 to 4) will be only triggered when the requested note is being sent. For example setting note C2 (General MIDI - Bass Drum 1 as on below picture) in output number 1, will only trigger gate when that note is being sent by MIDI. Please be aware that BeatStep Pro from Arturia sends different notes in Drum mode and D is sent as C-sharp, E as D, etc. Each output can be then routed to different modules, for example 4 Sample (SMP) modules playing different samples of drums.
■ In Drum Rack mode attention need to be paid to select a MIDI channel that Drum Rack operates on to not pickup notes from other channels.

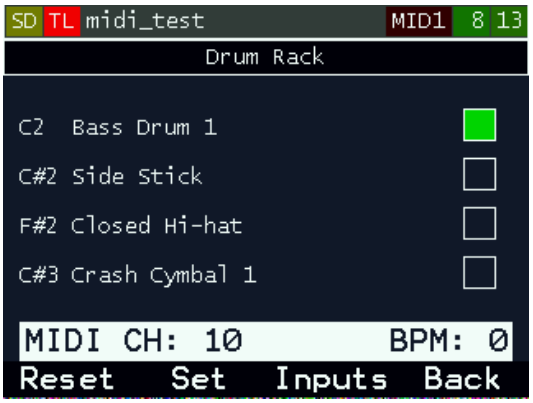


Figure 12: MIDI module in Drum Rack mode

■ In Drum Rack menu use ATT1-4 knobs to change notes for each drum channel respectively. Use ATT5 to change MIDI channel.

Settings

Channel *MIDI Channel to receive messages*

ALL Listen on all channels and any note arriving on any channel will trigger gate action

1-16 Selected MIDI channel

MODE *Mode of MIDI operation*

Switch between different modes of operation

Single Note Operation in mono mode with every new note generating outputs on NTE1, GAT1 and VEL1 outpus

Polyphonic Switches outputs to 4 outputs and consecutive notes on on 4 channels arriving will generate signals on outpus NTE1-4, GAT1-4 and VEL1-4

Drum Rack Drum rack mode when NOTE is being matched with output channel number and on MIDI NOTE ON the gate and velocity are set

Drum Note 1-4 *Assigned note to output in Drum mode*

Assigns note to channel in Drum Rack mode. The note when matched only will allow Gate (GATx) and Velocity (VELx) of channel to be set.

Inputs

Level 1-4/Volume Level for channel/Volume Level for channel or Amplitud

Level 1-4/Volume Level for channel/Volume Level for channel or Amplitude Modulation LevelPan 1-4/Balance for channel/Balance (Left-Right panning) for channel 1-4

Level 1-4/Volume Level for channel/Volume Level for channel or Amplitude Modulation LevelPan 1-4/Balance for channel/Balance (Left-Right panning) for channel 1-4

Outputs

NTE1-4 *Pitch Output of received note*

Note coresponding to MIDI note on given channel

GTE1-4 *Gate Output of received note*

Output of gate

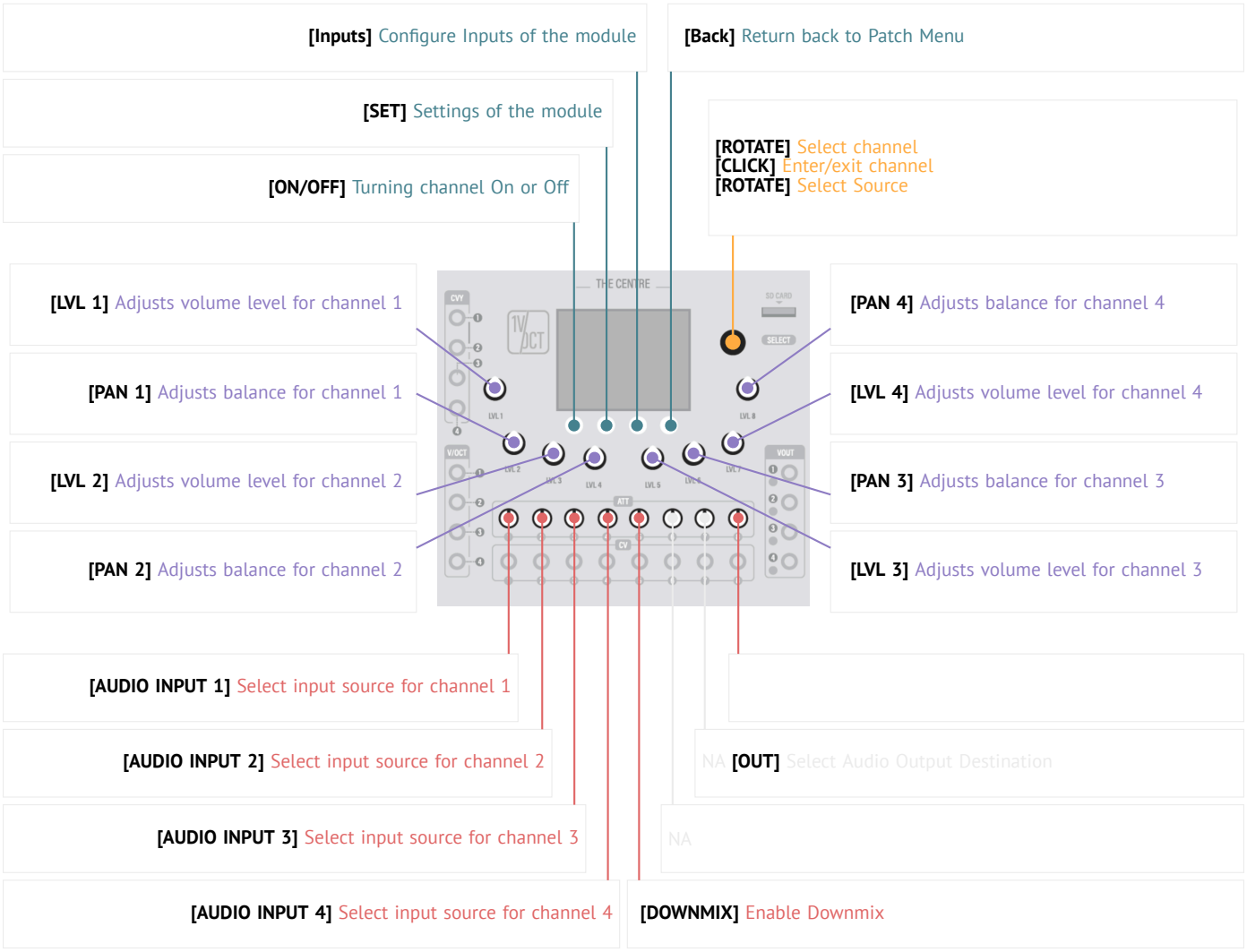
VEL1-4 *Velocity Output of received note*

Output of velocity

MIX - Mixer

Mixer (MIX) is a stereo 4 channel mixer that allows mixing (prefereably virtual buffers - VBuf) of 4 input modules into single output while applying levels and panning. Levels and panning can be controlled by CV. In fact Mixer module is a quad stereo VCA.

39.1 Mapping of Controls



39.2 Operation

Mixer (MIX) starts with 4 panels (channels) in off mode. **SELECT** encodser allows navigating over those 4 channels. By pressing **SELECT** down we are entering control of channel. Now encoder allows to select a source for that channel. Alternative method of controlling input source of channel is to select channel with encoder, enable channel by pressing button **On/Off** and then use coresponding attenuator knob ATT1-4 to select input source for different channel.

Level and stereo balance (left-right panning) can be achieved by using coresponding LVL knobs.

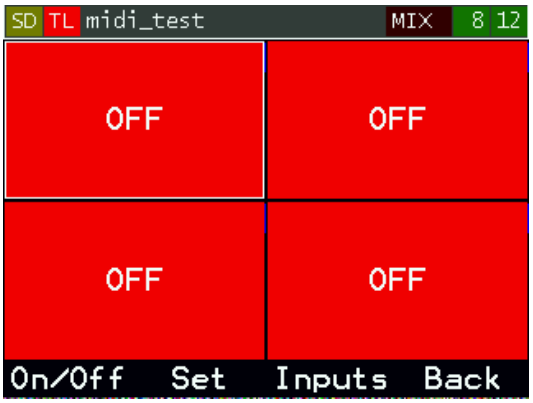


Figure 13: MIX with all channels disabled

■ Mixer starts with all channels off. Rotate encode **SELECT** and press **On/Off** button to enable channels.

■ Use Attenuator ATT8 to select output of mixed channels.

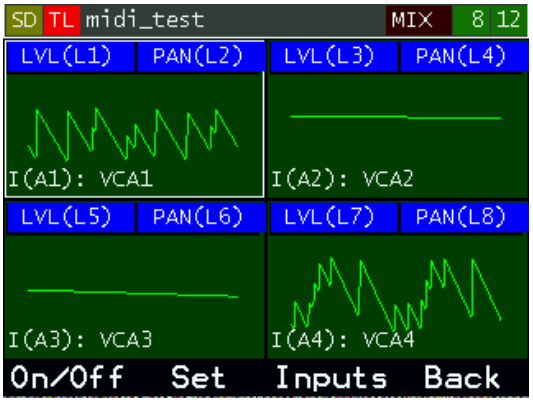


Figure 14: MIX with all channels enabled

■ There are hints on every channel to use Level and Attenuator knobs to control channel. For example for channel 1: L1 controls Level, L2 pan and A1 allows selecting input source.

39.3 Polyphony and Downmix

Mixer (MIX) in Polyphony mode will mix 4 inputs each consisting of 4 channels of polyphony and output 4 channels of polyphony or **downmix** of polyphony to stereo output available in VOUT1 and VOUT2 outputs. Downmix can be enabled either in Settings or by using attenuator A5 on Mixer module screen.

■ Downmix is disabled when output is directed into VBuf or when module is in monophonic mode.

■ Downmix is disabled by default and needs to be enabled to allow downmixing otherwise output is quad polyphonic individual channels.

MIX - Mixer

Settings

ChanAudio Outputnel *Audio Output of Mixer*
Audio Output of Mixed 4 channels from Input Sources

Audio Input 1-4 *Audio Input for Channel 1 to 4*
Source of Audio Input for corresponding channel number.
★Please note that channel must be enabled or input source has no effect

Enable 1-4 *Input Enable for Channel 1 to 4*
Enables corresponding channel for mixing

Downmix *Downmix of polyphony*
Enable or disable downmix of polyphony channels into dual stereo output.
★Please note that downmix only works in VOUT mode by outputting left channel in VOUT1 and right in VOUT2. Downmix is disabled in monophonic mode or when output is directed to VBuf

Inputs

LVL1-4 *Level for channels 1-4*
CV input for channel 1-4 volume level (AM)

PAN1-4 *Balance for channels 1-4*
CV input for balance of channels 1-4

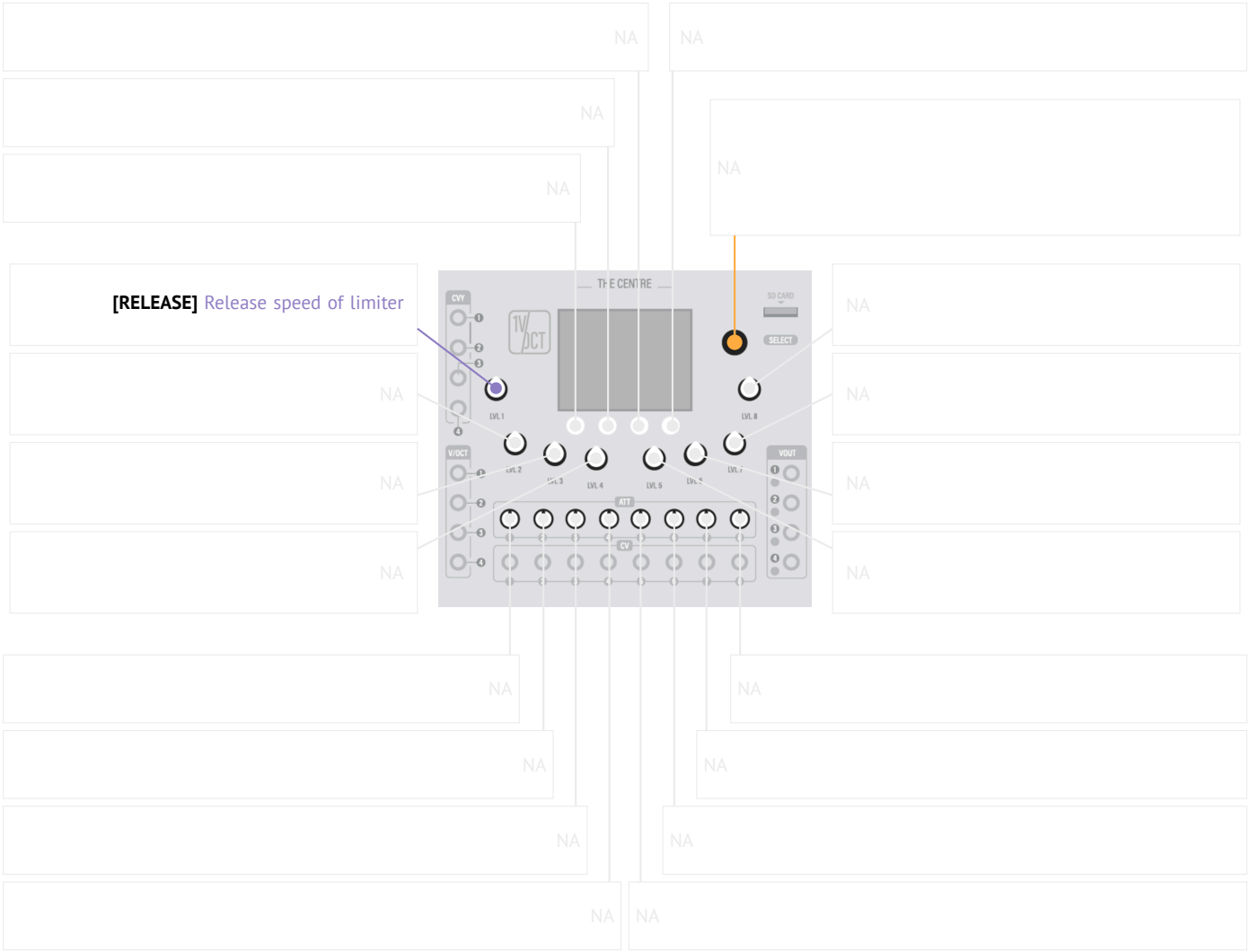
Outputs

MIX *Mixed output level*
Level of mixed channels

OUT - Output

Output (OUT) is a limiter and clipper for oversteered audio levels.

40.1 Mapping of Controls



40.2 Operation

Output module acts as limiter and when the audio signal exceeds reproducible range it ducks (limits) audio signal with instant reaction (quick Attack mode) and then releases ducking according to **RELEASE** input setting. The high value of Release (short time) will bring the audio level back quickly thus making limiter behave like a siplistic compressor. Longer Release rates (smaller value) will make limiter produce slightly wobbly sound for audio levels that peak above limit.

Release *Release for Limiter*
Release rate for limiter

Part V
Appendix

41.1 VXP - Patch File Format

VXP file format contains all definitions of a patch, connected modules, inputs, outputs and settings. This is the basic binary format of data in The Centre and his completely tied with definition of modules. See: Patch

41.2 VXS - Multi-Patch format

VXS format contains multiple patches (4) and effects patch. The VXS format can only be opened and saved from the Multi-Patch (Set) mode. See: Multi-Patch aka Set