

manikk Motion VCO

User manual
v1.02

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Overview

The manikk motion VCO is a monophonic voltage controlled oscillator that generates and outputs multiple waveforms.

It has four modes:

- Off: All digital features turned off and it works like an ordinary analogue oscillator.
- Env - Envelope: Each waveform has its own envelope, that can be looped.
- Swi - Switch: The motion modulation input jack, controls which waveform that is playing loudest. Fade in and fade out can be set for each waveform for morphing.
- Gng - Gang: The motion modulation input jack controls the volume level for all the waveforms at the same time.

For pitch and FM modulation it has two inputs, each with its own gain knob. An octave selector is present that allows for selection of one of four octaves.

Individual waveform outputs for the following waveforms:

- Square
- Pulse (adjustable pulse width)
- Sawtooth
- Triangle
- Sine
- Noise

Mix out gives a mix of all waveforms except squarewave (but pulse is included).

It has both hard and soft sync inputs.

The gate input controls the envelopes.

1V/octave input controls the overall pitch.

Playable and contrrollable by MIDI. It has som extra features that only are available via MIDI.

Details follows in the following chapters!

Enjoy!

Navigation

The module has some buttons, a rotary encoder and some visualisation-leds.

Octave

Press the Oct-button to cycle the four octave selections. A led shows the selected octave.

Mode

Press the Mode-button to cycle and select one of the four main-modes: Off, Envelope, Switch and Gang.

Parameter

Press the Param-button to cycle and select a valid parameter for the selected main-mode. A led shows the selected parameter.

Channel

Press the Chan-button to cycle and select a channel. Each waveform is a channel, the pulsewidth (PW) is a channel, and the second frequency modulation input is also a channel. So there is 7 channels in total. A led shows the selected channel.

Editing parameters

First make sure you have selected the main-mode you want to use.

Then you select a parameter for a channel by using the Param and Chan buttons.

Then you adjust the selected parameter with the rotary encoder, and the current value will be visualized by the horisontal line of leds that usually shows parameter and mode. The value is visible for about a second and then the leds returns to show the parameter and channel selected. If you press the encoder knob, the value will be visualised again for about a second.

Longpress

The buttons have a special function when you press and hold the button for some second. This is called a longpress.

- Oct: Enters the octave tuning mode. Use the rotary encoder to finetune the correct octave-constant. Play notes from a keyboard and use the oct-button to select octaves while you fine tune this constant with the rotary knob. This constant is then used by the module to set octaves and also to play correct pitches when you play it via MIDI. Press any other button to exit tuning mode and store the tuning constant.
- Encoder-button: Enter Load-mode to load patches or presets. Read more about loading and saving in the Memory storage chapter below.
- Param: Enter Save-mode to save patches. Read more about loading and saving in the Memory storage chapter below.

- Chan: Enter MIDI-channel select mode. Use the rotary encoder to select a midi channel between 1 and 16. Press any button to exit and save the selected midi channel.
- Mode: Enter Parameter-sync mode. In this mode you can turn on a feature that sets some Envelope-parameters simultaneously for all the waveform-channels. The parameters that are synced are Delay, Attack, Hold and Release. To turn it on, you turn the encoder to the right. Turn this feature off by turning the rotary knob left.

Envelope parameters

Dly, Delay

Delay time before the attack starts.

Att, Attack

Attack time is the time it takes for the envelope to reach maximum amplitude. The gain knobs are used to set the maximum levels.

Hld, Hold

Hold time in maximum level.

Depending on the loop-mode, the envelope may stay in this state as long as the gate is held, or it will loop and leave the hold state after the set hold time.

Rel, Release

Release time to fade the amplitude back down to zero again.

Lop, Loop

Select loop mode from one of the following:

- Off, no loop: Normal gated behaviour.
- Loop-Dly: Loops back to delay phase after release. Always starts with delay and keeps looping as long as gate is held.
- Loop-Att: Loops back to attack phase after release. Always starts with delay and keeps looping as long as gate is held.
- Loop-Hld: Loops back to hold phase after release. Always starts with delay and keeps looping as long as gate is held.
- One-shot: Runs through all phases and stops after release. Not gated.
- Freerunning-Dly: Loops back to delay phase after release. Not gated. Freerunning.
- Freerunning-Att: Loops back to attack phase after release. Not gated. Freerunning.
- Freerunning-Hld: Loops back to hold phase after release. Not gated. Freerunning.

Inv, Invert

The envelope output is inverted. Maximum becomes zero and zero becomes maximum. No negative values.

Ena, Enabled

Sets the envelope enabled. When off/disabled a constant maximum value is output by the envelope.

Min, Minimum

Sets the lowest level that the envelope will have. Normally this will be set to zero, but you can bias up the signal. This is useful for increasing the lowest level for the pulsewidth envelope or set a minimum volume for some waveforms.

Input jacks

Hardsync

When driven high, the oscillator is reset to the start of its cycle, irrespective of oscillator phase. Feed it with the output of another oscillator.

Softsync

An AC-coupled pulse will cause the falling slope of the triangle to reverse direction if the voltage on the oscillators internal capacitor is at or below the level of the sync pulse. Feed it with the output of another oscillator. This has a softer effect than the hardsync.

CV PW

Control the pulsewidth with a control voltage of about 0-4V. You can adjust the gain with the knob above the CV-jack.

CV Pulse

Control the pulse mixout-volume with a control voltage of about 0-5V. You can adjust the gain with the knob above the CV-jack.

CV Saw

Control the saw mixout-volume with a control voltage of about 0-5V. You can adjust the gain with the knob above the CV-jack.

CV Tri

Control the triangle mixout-volume with a control voltage of about 0-5V. You can adjust the gain with the knob above the CV-jack.

CV Sine

Control the sine mixout-volume with a control voltage of about 0-5V. You can adjust the gain with the knob above the CV-jack.

CV Noise

Control the noise mixout-volume with a control voltage of about 0-5V. You can adjust the gain with the knob above the CV-jack.

1V/oct

Control the pitch of the oscillator from a keyboard or sequencer. Note that the final pitch also is affected by the octave selector and the two frequency-modulations. If you use MIDI, the latest note played via MIDI will also be added to the final pitch.

Fmod1

Frequency modulation nr 1. The amount knob is located in the upper area of the module.

Fmod2

Frequency modulation nr 2. The amount knob is located in the upper area of the module. When no cable is inserted in this input, the frequency-envelope-channel is normalized to this jack and you can use the Frequency envelope to create some effects. The gain knob sets the maximum frequency modulation from the input jack or from the frequency envelope.

Gate

In envelope mode, this jack controls the states of the envelopes. It starts and ends the envelopes.

Motion

Control voltage to set the module in motion:

- In Envelope mode, it squeezes the envelope times for the volume channels.
- In Switch mode it selects which waveform to switch focus to.
- In Gang mode it sets the volume for all the waveforms simultaneously.

MIDI

MIDI input. 3.5mm TRS jack.

On the backside there are two solder-switches that can be used to change between MIDI-TRS type A and type B.

See the chapter about MIDI for details about how MIDI can be used.

Knobs

Encoder

This is the encoder knob that changes the parameter selected by the channel and parameter buttons. The value is visualised by the leds when the knob is turned. After a short while the leds will return to showing the selected channel and parameter. Press the encoder knob to show the current value.

Tune

Fine tune the pitch.

Fmod1

Gain knob for the frequency modulation input jack 1.

Fmod2

Gain knob for the frequency modulation input jack 2. When no cable is inserted in Fmod2 jack, the Frequency modulation envelope is used instead and this knob sets the maximum envelope level.

PW

Pulse width from about 1% to 99%. When a cable is inserted in the PW CV jack, this knob is used as a gain knob for the input cv signal.

Pulse

Sets the maximum amplitude for the Pulse waveform.

Saw

Sets the maximum amplitude for the Saw waveform.

Tri

Sets the maximum amplitude for the Triangle waveform.

Sine

Sets the maximum amplitude for the Sine waveform.

Noise

Sets the maximum amplitude for the Noise waveform.

RV1

Trimmer on the backside for the lowest frequency you want when 0V is inserted on the V/oct jack.

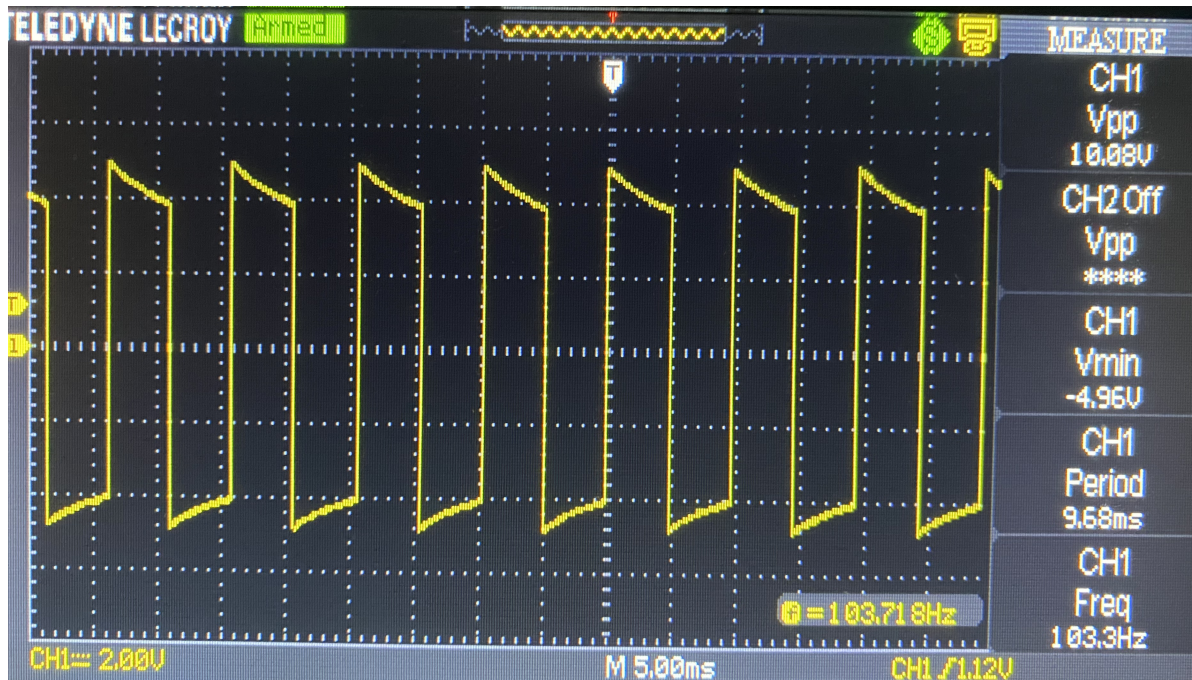
RV2

Trimmer on the backside for V/octave scaling.

Output jacks

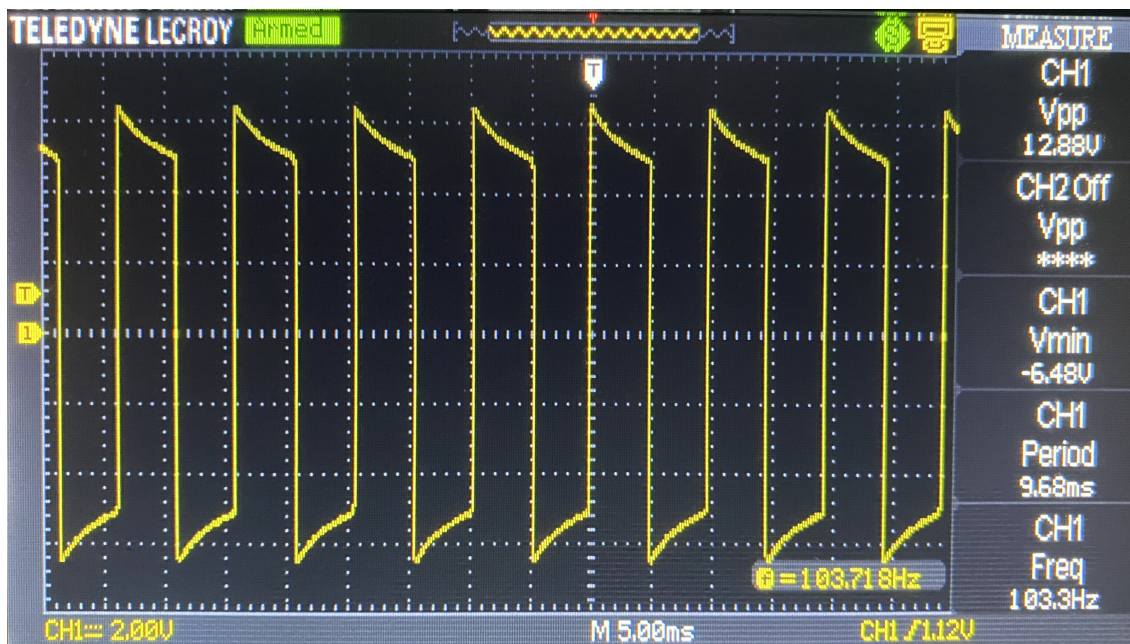
Sqr

Squarewave audio output.



Pulse

Pulse audio output.



Saw

Sawtooth audio output.



Tri

Trianglewave audio output.



Sine

Sinewave audio output.



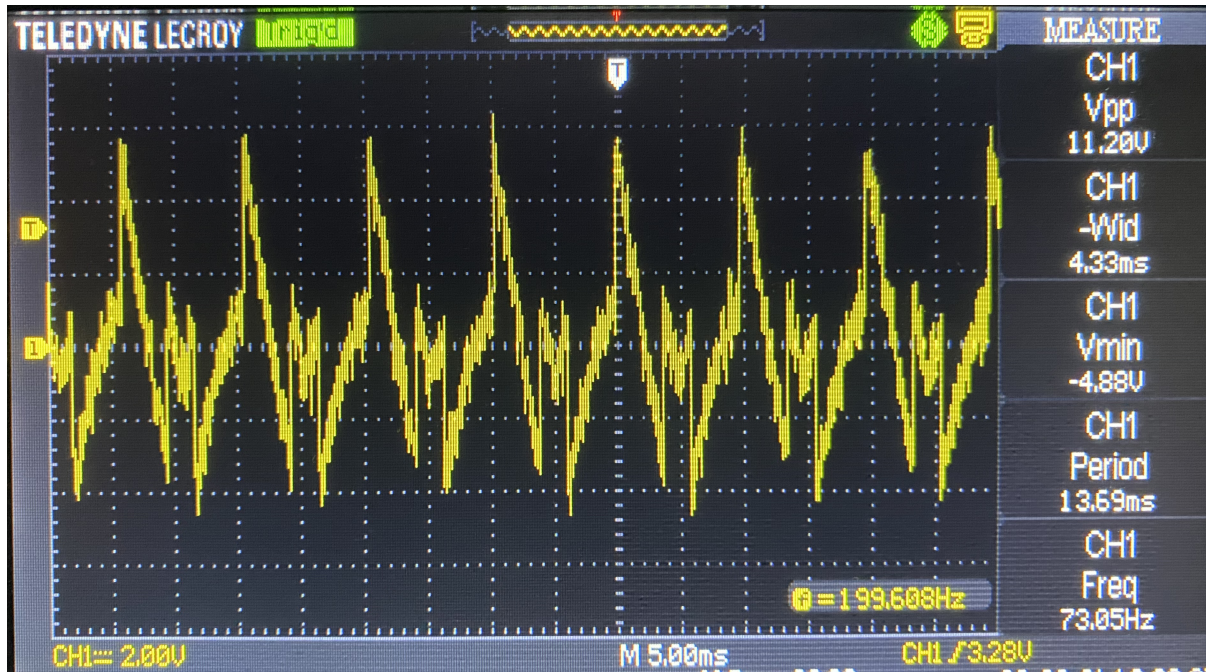
Noise

White noise audio output.



MixOut

Mix audio output. Outputs a mix of all waveforms except the squarewave. Exactly which waveform and how loud it will be, depends on the main-mode, all the parameters and the manual gain-knobs.



Main modes

The main-mode can be changed by pressing the Mode-button.

If the CV-inputs are used, they will override the selected mode and "take over" that channel.

Env - Envelope

Envelope mode can be used to create moving and evolving waves, by controlling each waveforms amplitude and also the pulsewidth and frequency modulation with the seven individual envelopes.

The envelopes are triggered by the gate input and the durations can be squeezed by the motion-cv-input.

The loop-mode for the individual envelopes decides if the envelope should loop and how the gate is used.

The envelope maximum amplitude can be attenuated via the manual gain knobs.

The envelope minimum amplitude can be set via the parameter "Min".

Swi – Switch

In switch mode, the motion cv input is used to select which waveform to output to the mix output. A low voltage selects the pulse waveform and a 5 volt input selects noise for output.

The parameters Attack, Hold and Release can be used to fade (morph) the selected channel in and out and the hold parameter makes it wider:

- Delay: Not used.
- Attack: Sets the fade-in from the left.
- Hold: Controls the width of the selected waveform.
- Release: Sets the fade-out to the right.
- Loop: Not used.
- Invert: Inverts the amplitude.
- Enable: When enabled it is part of the switching. When disabled it is constant at full amplitude.
- Minimum: Set the lowest amplitude for the channel.

Gng – Gang

In Gang-mode the motion cv input is used to set the volume for all the waveforms in the mix output. The parameters have the following effect in Gang-mode:

- Delay: Not used.
- Attack: Sets an attack time when the amplitude level is going up for the channel.
- Hold: Not used.

- Release: Sets a release time when the amplitude level is going down for the channel.
- Loop: Not used.
- Invert: Inverts the amplitude.
- Enable: When enabled it is part of the gang. When disabled it is constant at full amplitude.
- Minimum: Set the lowest amplitude for the channel.

Off

In Off-mode, the module behaves like an ordinary oscillator without any envelopes or motions. You can of course use all the input jacks to modulate it, except for the motion and gate jacks.

Memory storage

The module has 24 user memories for storing parameters and an additional 8 presets patches.

A tip for using the module is to always use the first memory slot as a work memory. When you have a nice patch ongoing, then save it to slot 1.

The last saved or loaded slot will be loaded back when you power off and on the module.

There are some MIDI-parameters that are NOT saved with the patch. That is because when working with MIDI, you store all your parameters in your DAW and recall them all when loading your song. You can read more about this in the MIDI-chapter.

Saving a patch

Press and hold the Param button for some seconds (longpress) to enter the Save-mode.

Now you can use the rotary encoder to choose one of the 24 memory slots.

The octave leds shows the bank and each bank have 8 memoryslots. The memoryslots are visualized by the param-leds. The mode-leds shows the mode for the saved patch in the currently selected slot, which can be good to know before you save to a slot.

When you have selected the slot with the encoder, press the encoder knob to save at that memory slot.

Loading a patch

Press and hold the Encoder knob for some seconds (longpress) to enter the Load-mode.

Now you can use the rotary encoder to choose one of the 24 user slots in bank 0-2 and the 8 presets in bank 3.

The octave leds shows the bank and the parameter-leds shows the slot in that bank. The mode-leds shows the mode for the patch that is already stored in the selected slot.

When you have decided which patch to load, just press the encoder knob to load it.

MIDI

All the parameters in this module can be controlled via MIDI, except for the manual gain knobs.

When using MIDI you will also get some extra features and parameters that can only be reached by MIDI.

Ableton Live

An Ableton Max for live controller exists that you can download from the website. With this controller you can adjust all the MIDI-parameters. Within Ableton you can also save and load patches and also store your settings with your song. Very useful!

It is recommended to have all the physical channel gain knobs on maximum when using this panel, because you can instead control the maximum level for each channel with the Max-parameters.

The pitch envelope, at the far right on the panel, must still be attenuated with the physical Fmod2 knob if you want small and subtle effect. You can also use the FreqFullRange button on the panel to select if the FreqEnv should have full or half range.



Modulation source selection:

- MW+: Modwheel increases
- MW-: Modwheel decreases
- Vel+: Velocity increases
- Vel-: Velocity decreases
- MW+AT: Modwheel sets level then Aftertouch increases
- MW-AT: Modwheel sets level then Aftertouch decreases

Send button: Sends all parameters at once to the MotionVCO.

Save1 button: Saves current parameters into memory slot 1 (workmemory) on the MotionVCO.

Clearing the MIDI parameters

If you want to clear all MIDI parameters to their default unused settings you can use any of these methods:

- Load a new patch from the frontpanel (loading via program change does not clear them)
- Extra long press on the "Mode" button.

MIDI channel

Use longpress on the "Chan"-button to edit the selected MIDI channel.

Playing notes

The normal note on and note off messages will play notes that will be added to the note that is currently playing from the 1V/oct input.

If you press more than one key, a small buffer inside the module remembers which keys you have played and the latest key is played.

The gate from a midi-note will be merged with the gate-input jack and the gate led will light up.

Pitch bend

Pitch bend allows you to bend one octave up and down.

Program change

Program change	Function
1-24	Load patch from memory
90	Envelope mode
91	Switch mode
92	Gang mode
93	Off mode
94	MIDI Panic, resets all MIDI parameters
99	Save to memory slot 1

CC – Control change

CC number	Function
1	Modwheel
5	Portamento time
7	Volume
8	PW Dly
9	PW Att
10	PW Hld
11	PW Rel
12	PW Lop
13	PW Inv
14	PW Ena
15	PW Min
16	PW Max
17	Pulse Dly

18	Pulse Att
19	Pulse Hld
20	Pulse Rel
21	Pulse Lop
22	Pulse Inv
23	Pulse Ena
24	Pulse Min
25	Pulse Max
26	Saw Dly
27	Saw Att
28	Saw Hld
29	Saw Rel
30	Saw Lop
31	Saw Inv
32	Saw Ena
33	Saw Min
34	Saw Max
35	Triangle Dly
36	Triangle Att
37	Triangle Hld
38	Triangle Rel
39	Triangle Lop
40	Triangle Inv
41	Triangle Ena
42	Triangle Min
43	Triangle Max
44	Sine Dly
45	Sine Att
46	Sine Hld
47	Sine Rel
48	Sine Lop
49	Sine Inv
50	Sine Ena
51	Sine Min
52	Sine Max
53	Noise Dly
54	Noise Att
55	Noise Hld
56	Noise Rel
57	Noise Lop
58	Noise Inv
59	Noise Ena
60	Noise Min
61	Noise Max
62	- NOT USED -
63	- NOT USED -
64	Hold pedal
65	Portamento on
66	Frequency Dly
67	Frequency Att
68	Frequency Hld
69	Frequency Rel

70	Frequency Lop
71	Frequency Inv
72	Frequency Ena
73	Frequency Min
74	Frequency Max
75	Select channel or input digit via Shifts
76	Shift 1
77	Shift 2
78	Shift 3
79	Motion modulation source
80	Octave
81	Mainmode
82	Frequency modulation half or full range

Connectors and solderswitches on the backside

Power connector (J23)

Normal eurorack modular power connector. Red stripe (-12V) is marked on the PCB with a text on the correct side of the connector.

MIDI input (J24)

If you don't want to use the MIDI-jack on the front, then you can inject your midi signal here. This can clean up a lot of cable mess if you use a lot of MIDI. You can get the MIDI signal from the backside of a "manikk Otto MIDI" module, that is a very helpful MIDI thru module on only 2HP. If you use this method, please desolder the solder switches to inactivate the front jack. The pins are found top left on the backside.

MIDI TRS solder switches

On the backside of the PCB, top left there are two solder switches. These are used to select what kind of MIDI-TRS cable you are using for the MIDI jack on the frontside:

- Type-A: Top switch is soldered 1-2 and bottom switch is soldered 2-3. This is the default factory setting.
- Type-B: Top switch is soldered 2-3 and bottom switch is soldered 1-2.
- None: Desolder both switches. This is used when you feed the MIDI-in-signal to the J24 pins.

Gate output

On the backside of the PCB, bottom left there are 2 pins that outputs the gate signal. One pin is the signal and the other pin is GND. You can use a spare jack on a "manikk Otto MIDI" to output this gate signal. You can also use a "manikk Passive Mono" to have another solution for creating a breakout panel with a jack for this signal.

Tuning procedure

Prerequisites

Remove MIDI input (or make sure it is not used).

Select Off-mode.

Use the Sine individual output jack as output and measure the frequency here.

Set Fmod1 and Fmod2 to zero and remove any patch cables from the Fmod input jacks.

Set the tune knob in the center.

Set the octave selector to zero (0).

Make an extra long press (10 sec) on Mode button to clear all MIDI parameters.

Set 0.00V in for 1V/oct jack or remove that cable. If no cable is inserted it will be 0V.

Study the list of frequencies below.

Main analogue tuning procedure

Adjust RV1 on the backside, until you get 8.175 Hz out. This sets the lowest pitch that the oscillator will provide with 0V in and no midi-note played.

Set 5.00V in for 1V/oct jack by inserting a patch cable from a CV source of 5V. You can use other voltages according to the list of frequencies below, but then you need to measure another output frequency.

Now adjust RV2 until you get 261.63 Hz out (for 5V).

Set 0.00V in for 1V/oct jack again (or remove the cable) and control that you still have 8.175 Hz out. You may have to repeat the trimming of RV1 and RV2 a couple of times until you get the correct frequencies.

MIDI and digital tuning procedure

Connect MIDI and play note 0 on a MIDI keyboard (the absolute lowest key). You probably have to transpose your midi keyboard down.

MIDI note 0 (lowest C) should also give 8.175 Hz out (when 0V is at the 1V/oct input jack or cable removed).

MIDI note 60 (C five octaves up) should give around 261.63 Hz out (when 0V is at the 1V/oct input jack or cable removed). To adjust this factor, press and hold the Oct-button to enter the midi-octave-tuning-mode. Then adjust the factor with the rotary encoder and replay note 60. Press any other button to save your adjusted midi-tuning-factor and leave midi-tuning-mode.

List of frequencies

Octave	Volt	Frequency	Key	Note
0	0.00V	8.175 Hz	C-1	
1	1.00V	16.35 Hz	C0	
2	2.00V	32.70 Hz	C1	
3	3.00V	65.41 Hz	C2	Low C for basses
4	4.00V	130.81 Hz	C3	Tenor C
5	5.00V	261.63 Hz	C4	Middle C
6	6.00V	523.25 Hz	C5	Tenor high C
7	7.00V	1046.50 Hz	C6	Soprano high C
8	8.00V	2093.00 Hz	C7	