SOUNDTRONICS M²SYNTH

User Manual 102

102 Chord VCO

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1

Overview

The 102 Chord VCO is one of the many modules from the Soundtronics modular analogue synth – the M²Synth. While most modules require very little introduction, the 102 Chord VCO has features that users may be less familiar with.

The Chord VCO has four internal analogue voltage controlled oscillators. Keeping four oscillators in tune with each other is managed by way of a microprocessor that will auto tune the oscillators when manually activated by way of a push button. This auto-tune will re-tune the oscillators but not so precisely that the Chord VCO sounds more digital than analogue. There is a de-tune control that the user can deliberately introduce an error between the VCOs.

Chapter

2

Features

Main features and specifications of the 102 Chord VCO.

Size

- Height 5U (222.25mm)
- Width 2U (88.9mm)
- Depth 45mm behind panel

Electrical

- Supply voltage +/-12V
- Supply current J9 +26/-30mA, J10 +64/-36mA (Total +90/-66mA)

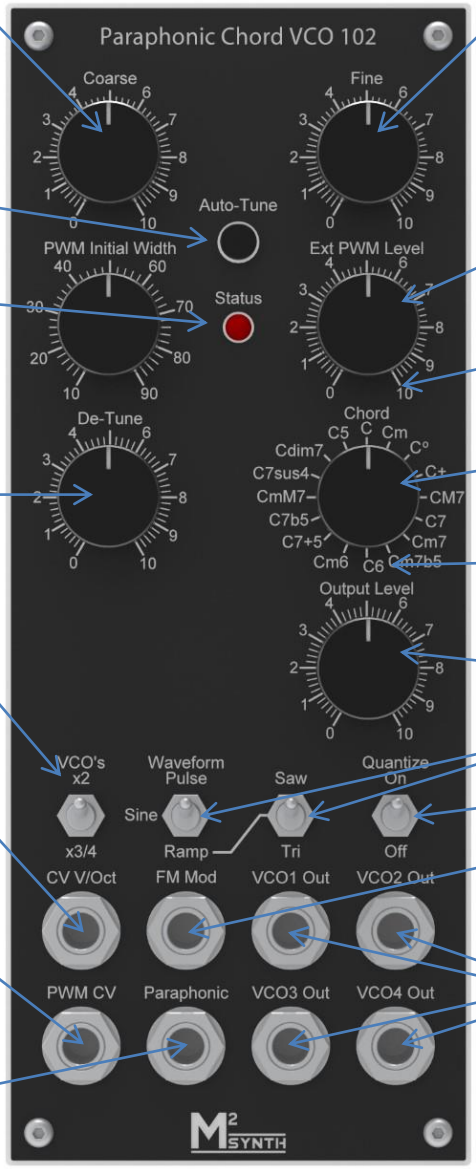
Panel Features

- Coarse and fine frequency controls
- 1V Octave CV Input
- Built in Quantizer in semitone steps
- Auto-Tune
- Range - 88 piano notes
- 16 preset chords
- Selectable pulse, sine, saw and tri waveforms
- Each VCO has its own output
- Combined paraphonic output (chord)
- Switch to mute VCO 3 & VCO 4 for 2 note chords
- FM input for VCO 1
- Manual de-tune control

Chapter

3

Panel Controls



Coarse Frequency Control

Fine Frequency Control

Auto-Tune Button

LED Status, peak brightness indicates optimum frequency for quantizing

External Pulse PWM Level

Press to adjust step auxiliary voltage

De-tune VCOs from each other

Chord Selection

Start / stop sequencer

2 VCOs in chord only or all

Paraphonic Output Level

Waveform selection

Control voltage 1 Volt / Octave

Quantize or free running oscillators

VCO 1 Frequency modulation

Pulse PWN external CV

Individual VCO outputs

Paraphonic output (chord)

Chapter

4

Basic Operation

The Chord VCO 102 is similar to the VCO 101 and VCO 105 except that this VCO contains 4 individual VCOs that are controlled in such a way as to produce preset chords.

As with any analogue VCO, they are not precise unlike their digital equivalents but this is often viewed as an advantage. Tuning 4 VCOs to produce chords and keeping them in tune is not so easy. The 102 VCOs each have built in temperature compensation but also have automatic tuning. The automatic tuning is manually initiated and carried out by a microprocessor. The microprocessor will tune each VCO over the entire range of an 88-note piano. Tuning is close to ideal but not absolute to retain a beat frequency between the VCOs.

To initiate an auto-tune, hold down the auto-tune button, the Status LED goes out, when the LED comes back on, release the button. Tuning will then commence and during this time, the paraphonic output will be muted. Once tuning is complete, the Chord VCO will resume normal operation. Note: ensure the external FM modulation input is disconnected.

It is possible to hear the tuning taking place if you so desire. Initiate the auto-tune as above but rather than release the button when the LED comes back on, keep the button pressed until the LED once again goes off. The paraphonic output will no longer be muted and you will be able to monitor the output and hear the frequencies change as they are tuned 1 octave at a time.

The chord selector switch allows any one of 16 preset chords, the chords are:

{4,7,0},	Major
{3,7,0},	Minor
{3,6,0},	Dimished
{4,8,0},	Augmented Major
{4,7,11},	Major 7th
{4,7,10},	Dominant 7th
{3,7,10},	Minor 7th
{3,6,10},	Minor 7th Flat 5th
{4,7,9},	Major 6th

{3,7,9},	Minor 6th
{4,8,10},	7th Sharp 5th
{4,6,10},	7th Flat 5th
{3,7,11},	Major 7th Flat
{5,7,10},	Dominant 7th Suspended 4th
{3,6,9},	C Diminished 7
{7,12,0},	C5 Power chord

The numbers in the {} indicate the number of semitones above the root note the second, third and fourth VCO frequencies are set. Where the number is a 0, the VCO is muted and does not contribute to the chord. A toggle switch can additionally mute VCO 3 & 4 to leave just the root note (VCO 1) and VCO 2 in the chord.

A detune control forces VCO 2 & 4 frequencies higher and VCO 3 frequency lower without affecting the root frequency of VCO 1. Throughout the detune range, points can be found where the VCOs harmonise for some rather interesting effects.

With the Quantize switch on, the microprocessor will select the note closest to the applied CV to the 1V/Oct input. The Status LED indicates how close the applied CV is to the optimal voltage for a given note. The dimmer the Status LED, the more indeterminate the selection will be. If the CV is linearly raised, the paraphonic output will increment in semitone steps. Taking the CV from the MIDI2CV 140 module should always result in the Status LED being near full brightness irrespective of what note is being played. Use the fine frequency control to initially set the desired note and to set the LED brightness to maximum.

With the Quantize switch set to off, the VCOs will be free running and no longer follow the semitone steps as described above. The frequencies of the VCOs will now closely follow the CV input while still retaining their chord ratios.