pin1 → -12V
0V
0V
key → 0V
+12V
+5V (if fitted in your case)
n/a

cranial saw dual vco

Cranial Saw is a dual VCO with Sync, Sub Osc, Glide, Cross mod and more!

It is based on modified old circuit designs from the mid 1970s - giving a very full and vintage sound.
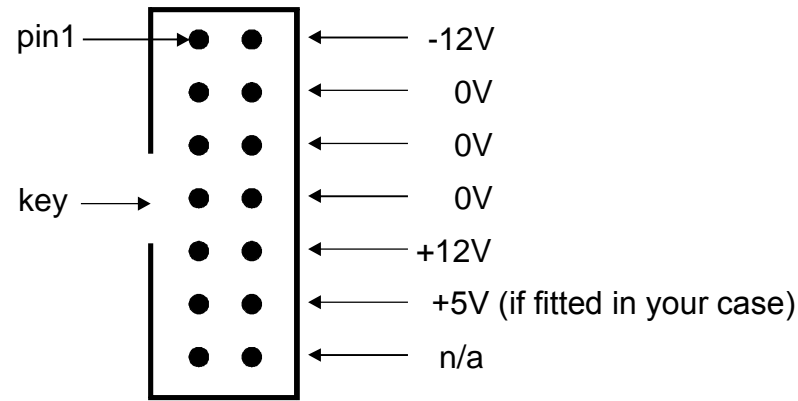
Mounting/Connection tips;

The supplied power cable is keyed. That means it can only be fitted one way! (Unless you use excessive force).

Pin one is at the top on our modules (Doepfer fit their sockets upside-down).

Medic Modules use a 14 pin 'boxed' header on the PCB.

The two ends of the power cable are different. Plug the 14pin socket end into the Module power header.

Plug the larger 16pin socket into your case power supply.

Note: Physically disconnect your power supply/case from the mains electricity.

Ensure you connect up the module correctly!

Ensure it is screwed into the case.

Ensure no metal parts can short out the solder joints on the rear.

Ensure your case is 100% functional before fitting the module.

It has been found over the last 15 years of making modules, that around 90% of module problems have typically the following user problems;

Power cable connected wrong, faulty power supply, other poor quality modules fitted in the case affecting other modules.

DETUNE Slider
This slider is used to detune VCO2 relative to VCO1.

VCO2 Mod Slider
This slider is used to attenuate the CV signal patched to the **VCO2 CV socket** below.

PW1 & PW 2 Sliders
These two sliders allow the pulse width of each VCO's square wave to be manually set.

TUNE Slider
This slider sets pitch for both VCOs

VCO1 / VCO2 / SUB Sliders
These sliders set the level of the above audio sources that are sent to the mixer.

GLIDE Control / Switch
The rotary control sets the Glide (portamento) time for both VCOs. But if the Toggle switch is up, then Glide is only applied to VCO2. The normal mode would be down so Glide works on both VCOs. Scaling for VCO1 will be a little out when Glide for VCO1 removed since a whole circuit gets disconnected - but this should not be an issue since this mode is more for sound effects.

WAVE Switches
The position of these swiches determines whether each VCO's saw or square wave is sent to the mixer.

SUB OSC Output
This is the audio output from the Sub Osc, pre-mixer.

PITCH CV input
This is the main pitch CV input. It will affect both VCOs, and is sent pre-Glide.

VCO1 FREERUN
When this switch is up, then VCO will no longer track the PITCH CV input socket.

SYNC
When the switch is up VCO Sync is enabled. When enabled the Detune range is increased to allow extremee

VCO1 / VCO2 Square Wave Outputs
These are the square (PW) audio outputs from each VCO, pre-mider.

MIX Output
This is the audio output from the mixer. Signal sources for the mixer are each VCO and the Sub Osc.

MOD CV Inputs
These CV input sockets allow the pitch of each VCO to be modulated. The lower socket is a direct input. The signal sent to the upper socket can be attenuated using the BOTH slider.

VCO1 / VCO2 PW Inputs
Each VCO has a Pulse Width CV input, to allow external control over the pulse width of each VCO's square wave.

Controls In More Detail and Setup Ideas

TUNE slider
This is the master tune control to change the pitch of both VCOs.

DETUNE slider
This slider allows you to detune VCO2 relative to VCO1. This allows a richer sound to be created, setting up beats, or full de-tunings. When Sync is enabled, the range of this control becomes much wider, allowing more extreme Sync effects when manually moving this slider.

GLIDE rotary control
This applies portamento to both VCOs. When applied it causes the oscillators to move smoothly through frequencies between the last note and new note played.

GLIDE toggle switch
It is possible to disconnect VCO1 from the Glide circuit, so that only VCO2 will be affects.

The reason to disconnect VCO1 from Glide is for extreme and unusual effects when using either Sync, or setting up a patch to do cross-modulation (see later) between the VCOs. By applying Glide to just one VCO when using cross-mod or Sync, as the master Pitch is changed you will get a difference sound each time (a new harmonic content).

FREERUN toggle switch
When this switch is down (Freerun enabled) VCO1 is disconnected from the master PITCH CV input sockets. So the VCO is just free-running and will not track incoming pitch. Only VCO2 will continue to track. This again, like the GLIDE disconnect switch outlined above, would be used for creating extreme cross-mod and Sync effects by only applying pitch changes to one VCO.

PITCH CV input socket
This is the master pitch control input. It is calibrated to 1V/octave. Range is approx 5 octaves, and the VCO performs its best at low to middle ranges.
Note that when VCO1 is set to bypass the Glide circuit, calibration is put a little out. This is because literally a whole circuit is removed from the pitch CV patch to VCO1. In normal use, always leave the GLIDE switch set to both VCOs (the down position).

BOTH slider and top MOD CV socket.
MOD CV is a pitch modulation CV input. This is used to change the pitch of both VCOs using an external CV, such as a LFO triangle wave (to create vibrato) or an EG (to create percussion sounds). The BOTH slider sets the depth of modulation.

bottom MOD CV socket
This is a 2nd pitch CV input that will also modulate both VCOs. This one does not have a depth slider.

VCO2 slider and VCO2 CV socket
This is similar to the MOD CV sockets outlined above, but this socket is used to modulate just VCO2. The slide sets the depth of modulation. The reason to just modulate VCO2 is for extreme effects, particularly when a cross-mod patch is set up, or when using Sync.

SYNC toggle switch
When this switch is down oscillator Sync is enabled. It forces VCO2 to start a new cycle whenever VCO1 does. This means VCO2 can only play the harmonics of VCO1. Particularly interesting effects can be created by only using Glide on VCO2, modulating the pitch of VCO2 only, or manually moving the DETUNE slider.

PW 1 / PW 2 sliders
Each VCO has a manual pulse width slider. This allows the shape of the square wave to be adjusted. When the Pulse Width is changed, a large change in harmonics is created.

VCO1 PW / VCO2 PW input sockets
Each VCO has Pulse Width modulation CV input sockets. This allows the Pulse Width to be modulated by an external signal. Eg, use a LFO triangle wave to give a chorusing style effect which thickens up the sound, or, use an EG signal to give brass style sounds.

VCO1 / VCO2 Square Wave audio output sockets
These are direct outputs from each VCO, and are taken before the mixer.

Sub-Oscillator
This is a special waveform that tracks the pitch of VCO1, but one whole octave down. It has a square wave. It is really effective at giving the sound more grunt. It is most effective with bass sounds.

SUB audio output socket
This socket is not labelled as such. It can be found under the SUB sockets and they are connected by an arrow.
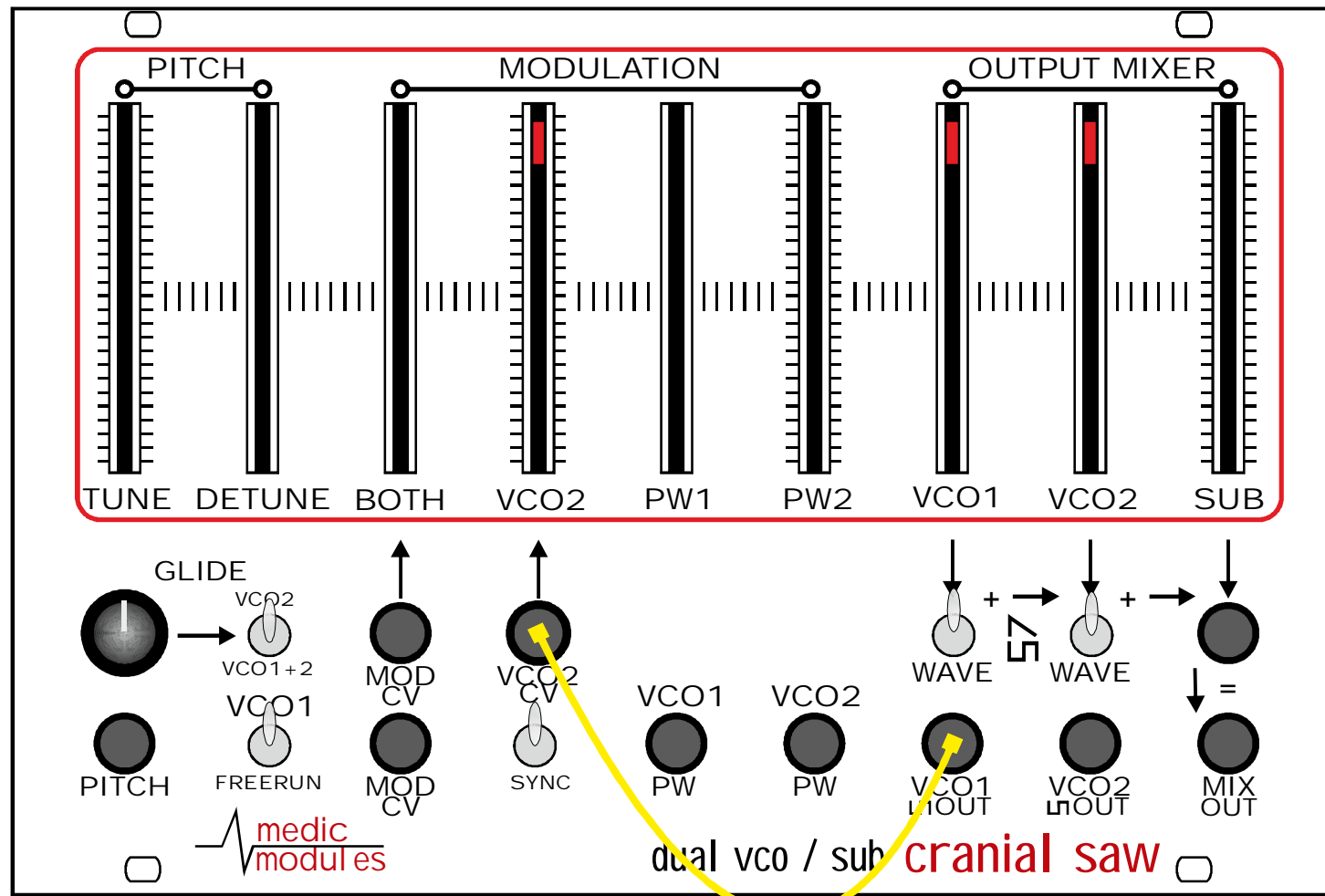This is a direct output from the Sub-Oscillator.

Mixer
Cranial Saw has a built in audio mixer. The signals from each oscillator and the sub-osc can be mixed and are output at the OUT socket.

VCO1 / VCO2 / SUB sliders
The three audio sources each have their own level slider.

VCO1 WAVE / VCO2 WAVE toggle switches
The position of these switches sets whether Sawtooth wave or Square wave is sent to the mixer, via the level slider.

PITCH MODULATION OUTPUT MIXER

TUNE DETUNE BOTH VCO2 PW1 PW2 VCO1 VCO2 SUB

GLIDE

VCO2

VCO1+2

VCO1

PITCH FREERUN

MOD
CV

VCO2
CV

SYNC

MOD
CV

VCO1
PW

VCO2
PW

WAVE WAVE

VCO1
OUT

VCO2
OUT

MIX
OUT

medic
modules

dual vco / sub **cranial saw**

Cross Modulation Patch.
Patch the audio out of VCO1 to VCO2 CV so that VCO2 pitch is modulated by VCO1's audio.
The intensity of the effect is changed using the VCO2 Modulation slider. Play around with
levels, relative pitches, etc to hear the range of sounds. It works best if you have continually
changing relative pitches. This can in part be achieve using the FREERUN toggle switch or
disconnecting VCO1 from the GLIDE circuit.