Freak

Manual

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Freak Phase Synchronized Dual Oscillator

AUDIO OUT

WAVE 1

Wave Sync On Off Tune CV Level CV In

Wave 1 Out

MODULATOR

Wave Type C0 C1 FM1 FM0 Amount CV Level CV In

Mix Out

WAVE 2

Wave FM1 FM2 2 3 1 0 Octave Color Control

Wave 2 Out

MLU instruments

PITCH

Pitch Fine CV In

Crossfade
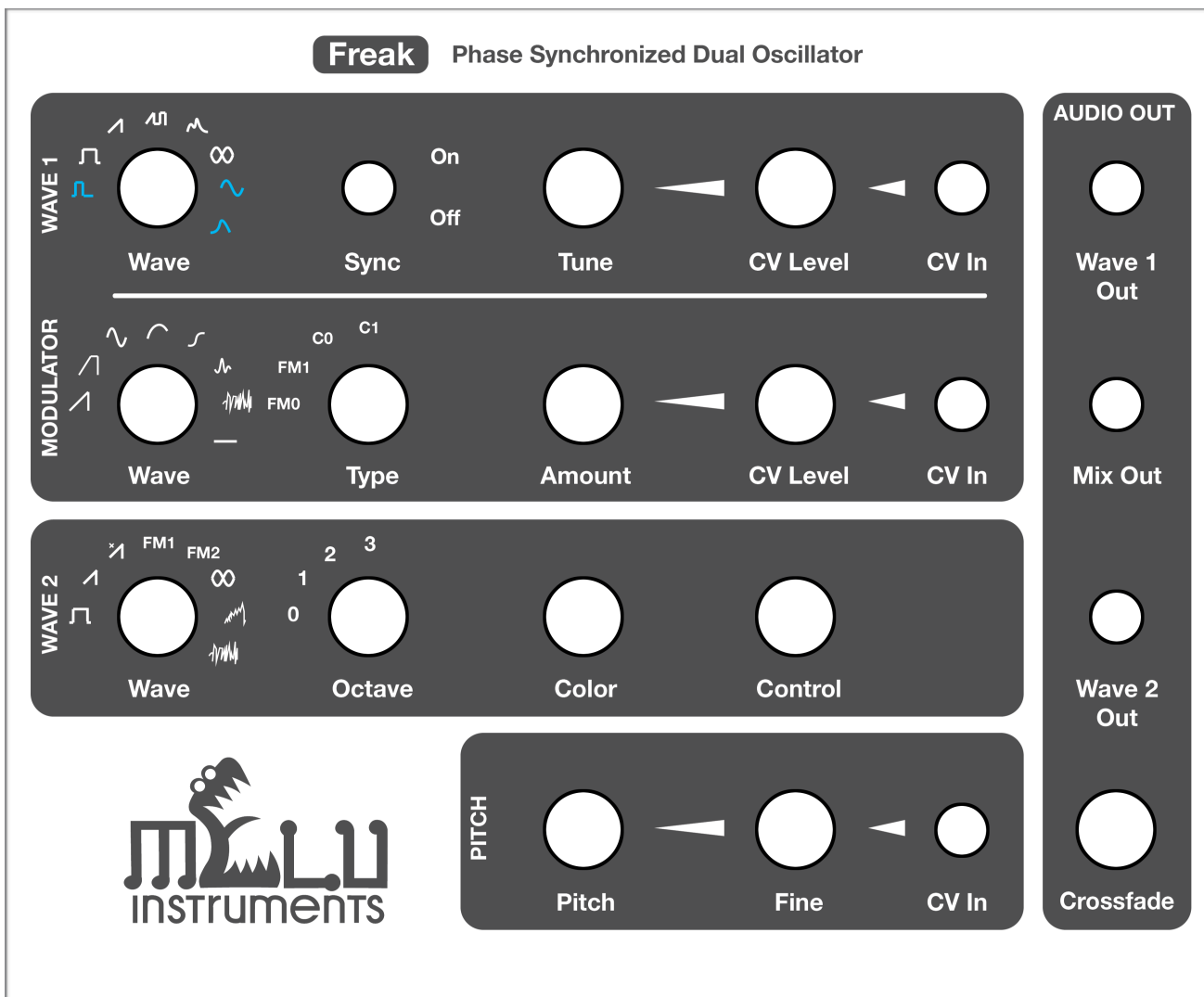
Overview

Modern music production techniques often rely on layering instruments to build the final bass and lead sounds. Drifting phases between layers make the sound less defined and less sharp. If sharpness and definition is the goal, the challenge usually is keeping the sound layers phase synchronised. This can be cumbersome even on modular systems while modulating two oscillators in audio rates. Keeping the layers in sync could become impossible if different synthesis methods are used for each layer. Freak has been designed to address this issue.

Freak is a dual oscillator for Eurorack modular synthesizers. The two digital oscillators can be phase synchronised with each other and have dedicated audio outputs. This makes it easy to process them separately while resulting in sharp and well defined bass and lead sounds. The integrated audio rate modulator creates complex and interesting timbres in an instant.

Several different synthesis methods are used to create a wide palette of layered sounds: virtual analog, frequency modulation, phase modulation and phase distortion. The UI has been designed to make sound design workflow quick, easy and intuitive. Creating sounds with Freak is effortless yet powerful.

Signal Flow
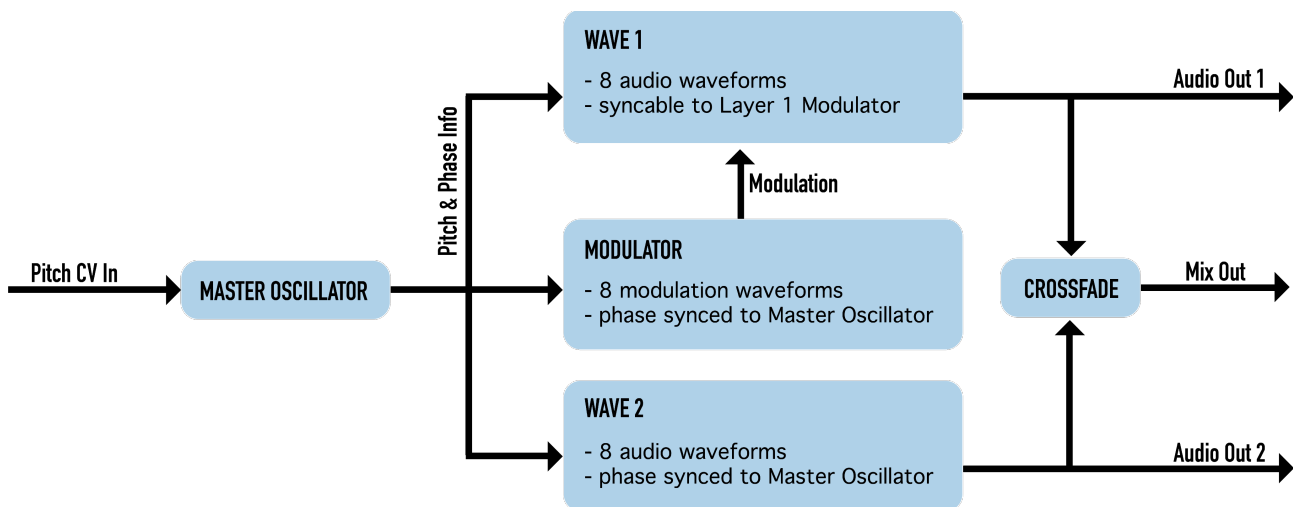
Master Oscillator is at Freak's core. It does not produce sound of its own but keeps the audible oscillators (Wave 1 & 2) and the audio rate modulator (Modulator) phase synchronised to itself.

Wave 1 playing frequency can be offset from Master Oscillator. It can also be hard synchronised to Modulator.
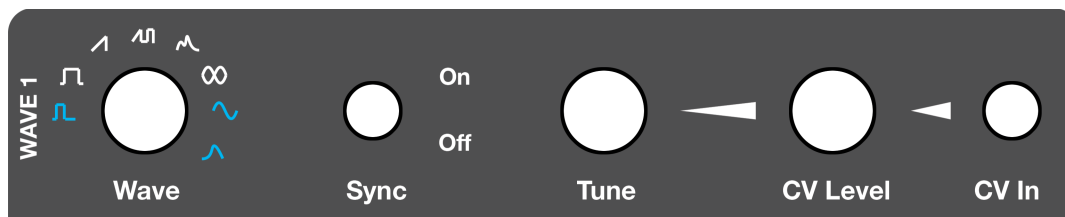
Modulator and Wave 2 always stay phase synchronised to Master Oscillator. Their pitch can be offset by full octaves.

Modulator provides audio rate modulation for Wave 1, creating complex timbres.

Wave 1 & 2 have dedicated audio outputs.

Mix Out provides a crossfaded signal between Wave 1 and Wave 2 for easy layering of the sounds.

WAVE 1 Section

Wave
Select between 8 different waveforms.

White waveforms have the following modulation destinations for Modulator:
- frequency
- phase

Blue waveforms have the following modulation destinations for Modulator:
- frequency
- PWM (first waveform)
- Timbre (last two waveforms)

Sync
Toggle the hard synchronisation to Modulator on/off.

Tune
When Sync is OFF:
- Fine tune the oscillator pitch up.
- When turned further, tune the oscillator pitch up in semitones.

When Sync is ON:
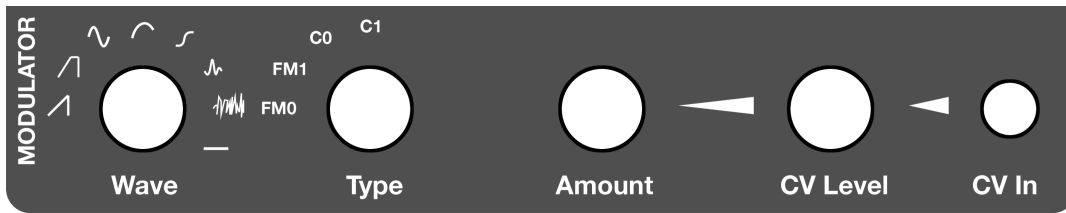- Tune the oscillator pitch up.

CV Level
Set how much "CV In" control voltage is added to Tune.

CV In
CV input for controlling Wave 1 tune.

MODULATOR Section

Wave
Select between 8 different audio rate modulation waveforms.

The last waveform is "DC" (direct current) which is useful for modulating Wave 1 with external CVs without Modulator oscillator effects. Use it for traditional external CV control with ADSR/LFO/sequencer/etc.

Type
Select between 4 modulation modes:
- FM0 = Modulate Wave 1 pitch. Modulator runs at octave 0.
- FM1 = Modulate Wave 1 pitch. Modulator runs at octave 1.
- C0 = Modulate Wave 1 control parameter. Modulator runs at octave 0.
- C1 = Modulate Wave 1 control parameter. Modulator runs at octave 1.

"Control parameter" is the before mentioned phase modulation for white Wave 1 waveforms and PWM/Timbre for the blue waveforms.
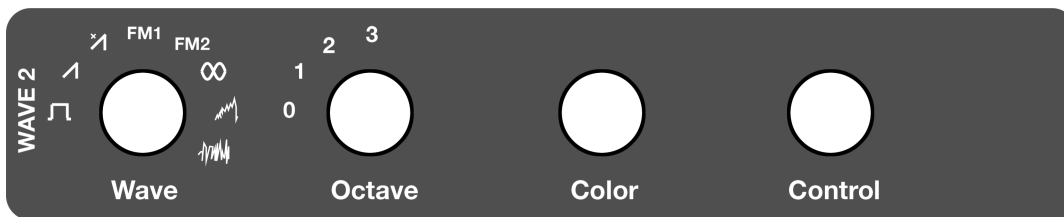
Amount
Set how much Wave 1 is modulated.

CV Level
Set how much "CV In" control voltage is added to Amount.

CV In
CV input for controlling Amount.

WAVE 2 Section

Wave
Select between 8 different waveforms.

Octave
Select tuning between 4 octaves.

Color & Control
Change waveform specific synthesis parameters:
- Pulse = PWM / Phase Modulation
- Double Saw = Saw mix amount / Phase Modulation
- Multisaw = Number of saw waveforms / Wave spread
- Gnarl = FM Timbre 1 / FM Timbre 2
- Whoosh = FM Timbre 1 / FM Timbre 2
- Blip = Phase Distortion / FM Timbre
- Noise Mod = FM noise amount / Crossfade
- Noise = HP Filter Cutoff / LP Filter Cutoff

NOTE:
The two last waveforms (Noise Mod & Noise) are noise based and by definition cannot be phase synchronised to Master Oscillator. Noise is a white noise. Noise Mod is an oscillator whose frequency is modulated by noise.

PITCH Section
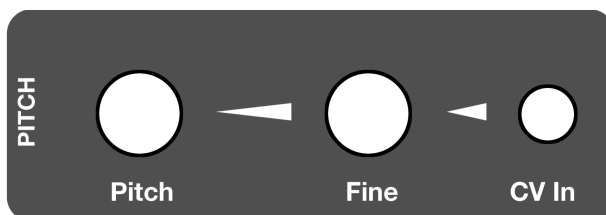
Pitch
Tune Master Oscillator pitch over several octaves.

Fine
Fine tune Master Oscillator pitch.

CV In
CV input for controlling Master Oscillator pitch.
1V/Octave.

AUDIO OUT Section

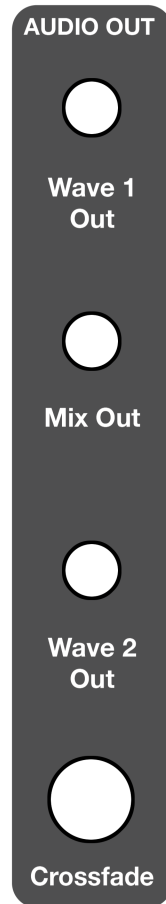## Wave 1 Out
Audio output for Wave 1 oscillator.

Mix Out
Audio output for crossfaded signal between Wave 1 & Wave 2 oscillators.

Wave 2 Out
Audio output for Wave 2 oscillator.

Crossfade
Set the amount of crossfade between Wave 1 and Wave 2 outputs that will be sent to Mix Out.

AUDIO OUT

Wave 1
Out

Mix Out

Wave 2
Out

Crossfade

-12V Red Stripe

Eurorack specifications associate the power connector's -12V pins with the ribbon cable's red stripe. This is to make sure the power cable is plugged into the Eurorack's power supply the right way.

The below image shows the connectors at Freak's back. The -12V pins are circled in blue. This is where the ribbon cable's red stripe should go.