flight of harmony

Sinner

Waveshaper Eurorack Module
v1

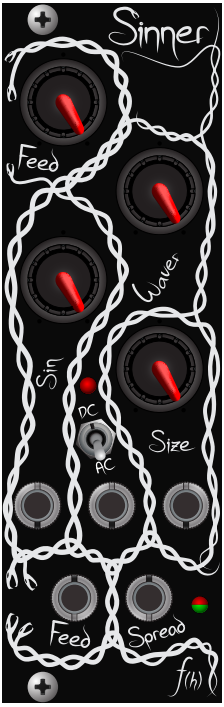

fig.1: Sinner front panel.

Components

1	Assembled Sinner waveshaping module
1	DC power cable – 9" Ribbon cable (Doepfer standard)
2	M3x0.5x6mm Stainless-Steel machine screws
2	M3 Nylon washers

Specifications @ ±12VDC

Supply Voltage	±12VDC[1]	
Supply Current (max draw @ ±12V)	I_{+12V}= 27mA	I_{-12V}= -22mA
Max. Input Voltage	±5V / $10V_{p-p}$	
Max. Output Voltage	±6V / $12V_{p-p}$	
Input & Ouput (I/O) coupling	Direct	
Max. output DC bias	±4.8V	
Output Impedance	1kΩ	
Control Voltage (CV) inputs	±5V / $10V_{p-p}$	
CV input coupling	Direct	
CV input impedance	100kΩ	

[1] Has been tested and performs well with supply voltages from ±9VDC to ±15VDC.

FYI

As with all f(h) products, the Sinner was engineered towards maximizing functionality while keeping cost as low as possible. If some aspects of the unit seem awkward, it is most likely due to this. The goal is to make unique, useful, enjoyable, and affordable instruments, not just hoover[1] out your bank account.

And remember: every instrument has its quirks and unexpected aspects, so RTFM[2]! All the way through! Specific quirks are mentioned in the description of the particular feature they apply to, so please read this through before emailing!

What is it?

Sinner is based on a sine-shaping circuit that applies logarithmic distortion to the input signal, causing ramp, saw, triangular, and similar, signals to be more rounded and approximate a sine wave. Pretty freaking boring when you read it like this, so it has a few extra features that allow you to twist and wring your signal into much more excruciating and exciting shapes. Part of this is accomplished via a four-quadrant multiplier (4QM), which also offers ring modulation (RM) as well as typical voltage-controlled amplifier (VCA) capability.

Sinner is direct-coupled (DC) all the way through, so you can use it to control and process control voltages (CV) and other DC signals in addition to sculpting audio. If, after blowing a few speaker cones, you decide you've had enough of *that* fun, it also has a full-bypass toggle switch to change the output to capacitive coupling (AC) and block the DC bias from the signal. The LED above the switch is lit in DC mode, and off in AC mode. The output LED is bicolor: red for positive signals, green for negative, and gives you something fun to stare at, at 3:50 am, when you haven't slept in two days, and your vision is a blurry tunnel and the fuzziness in your head is pulsing to the sounds and your fingers and cheeks are tingling and probably warning you of something important but *wow* that flashy thing is hypnotic, isn't it?

The secret message of the Sneks[3]

Them twisty Sneks tell you the basic function of the controls and jacks:

- Heads curling in like fangs: signal inputs and their controls
- Tails curving out: signal outputs and their controls
- Completely encircled: CV and internal device functions

Feature summary:

- Waveshaping
- Sine shaping
- CV processing
- Ring modulation
- Amplitude modulation
- Has Sneks

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1) Hoover is a company that manufactures vacuum cleaners.
2) RTFM = Read The F*cking Manual!
3) Snakes

Controls and Behavior

Usage note: **Feed**, **Sin**, and **Size**, can each reduce output to 0V when turned fully CCW.

Feed: Input level attenuator. Clockwise (CW) to increase, counterclockwise (CCW) to decrease (fig. 2). This control is mainly for reducing strong signals to give more responsiveness to the other controls, so it is recommended to leave this fully CW for standard usage.

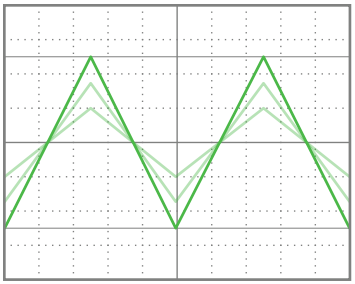

fig.2: Effect of increasing Feed control.

Sin: Amount of rounding applied to signal. CW for more, CCW for less. **Sin** also affects the amplitude of the signal (fig. 3). The amount of rounding applied also depends on the signal amplitude, which is controlled by **Feed** (fig. 4).

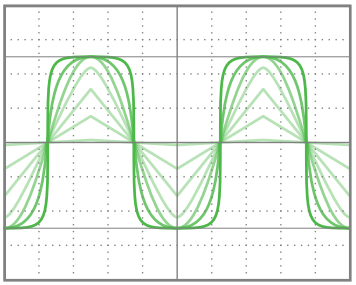

fig.3: Effect of increasing Sin control.

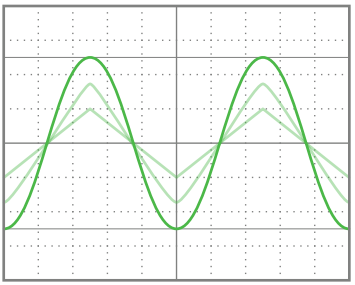

fig.4: Effect of Feed on Sin.

Waver: Applies from 0 to ±4.8VDC bias to the signal. CW for positive, CCW for negative.

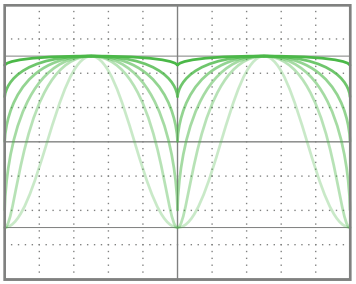

fig.5: Effect of Waver positive increase.

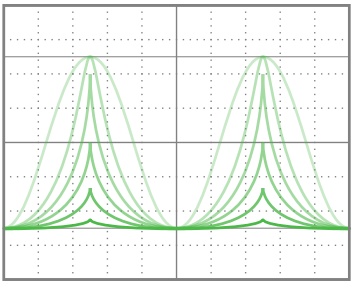

fig.6: Effect of Waver negative increase.

Size: Post-effect gain, the amplitude of the output signal. CW to increase, CCW to decrease.

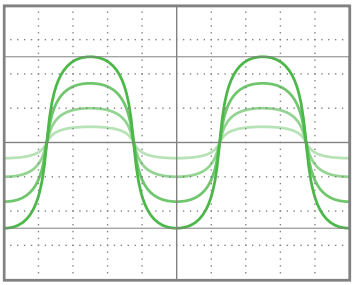

fig.7: Effect of Size control.

Jacks

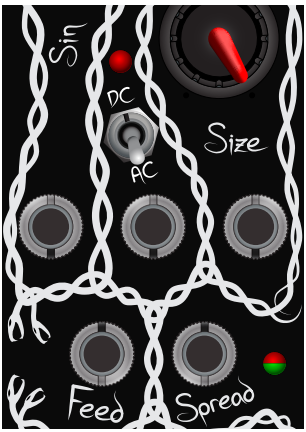

fig.8: Jacks.

The jacks are linked to their associated control knob (if any) by the Sneks. All hail Snek.

Signal Input

Feed: Signal input, either AC or DC. Level adjusted (0-100%) by the **Feed** knob.

CV Input

Sin: CV Version of **Sin** control knob. Positive increases rounding, negative decreases rounding. Knob and CV levels are summed.

Waver: CV version of **Waver** control knob. Positive applies positive bias, negative applies negative bias. Knob and CV levels are summed.

Size: CV version of **Size** knob. Positive increases gain, negative decreases gain. Knob and CV levels are summed.

Usage note: Some compromises occur when trying to maximize options for user control. One such situation: With control knobs and CV inputs, when both are used, when one is towards either extreme, the other will have less effect. Example: Negative signal at Sin CV input has little to no effect with Sin control fully CW. Whichever control is most extreme takes priority over the other. Just nudge whichever is largest back a bit to increase the range of the smaller.

Output

Spread: Signal out. Led indicates bias of output relative to 0V; red for positive, green for negative.

Output coupling

DC-AC: Selects if out put is DC- or AC-coupled. Lever up for DC, which will also light the LED, when process CV or when DC is not otherwise a concern. Flip

down for AC coupling, which turns the LED off, to remove any DC bias from the signal and protect speakers.

In case you have not heard the speaker thing before, a DC signal present in a signal can (and eventually *will*) damage a speaker receiving it. Speakers are driven by a coil that generates a magnetic field. This field then reacts with the magnetic field generated by the large magnet around the coil. The coil field is generated by current travelling through the coil, and a DC bias causes current to flow when it normally would not, which increases the generated field strength and causes the coil to work harder than it should. This can often exceed the intended limits of the speaker and burn out the coil, warp the coil, overextend the cone travel and damage the support web, or all of the above.

tl;dr: don't drive a speaker directly from Sinner in DC mode. Sinners are known for doing bad things.

Power

The power connector header is a 2x5/10-pin shrouded box header which accepts the standard Doepfer power cable. This header style is polarized, meaning the connector can only be inserted one way, to prevent connecting the power backwards and damaging the unit.

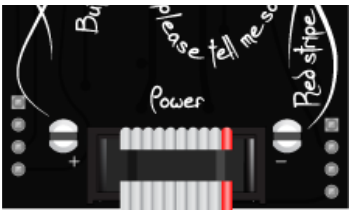

fig.8: Power cable orientation.

This assumes that you are using either the supplied cable or one manufactured by Doepfer.

Looking at the rear of the module, the negative supply (red stripe) is on the left, positive supply is on the right (see fig.8).

Stuff

Eternal gratitude to the Mountain Wizard for suggesting this module! History will blame you.

Further gratitude and indebtedness to the f(h) Inquisitors for testing and evaluation!

A big thank you to those who have sent in suggestions and comments, keep them coming!

Comments, samples, suggestions, complaints to: flight@flightofharmony.com

http://www.flightofharmony.com

From now on, whatever may be...