flight of harmony

V'Amp

Barebones Pack
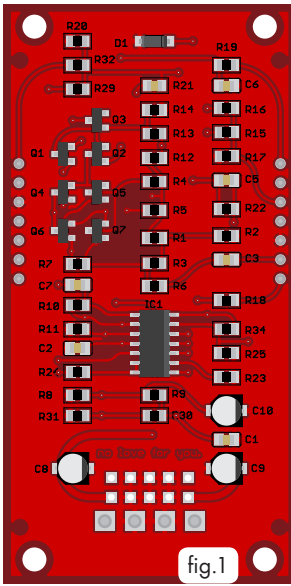~rev1.0~

fig.1
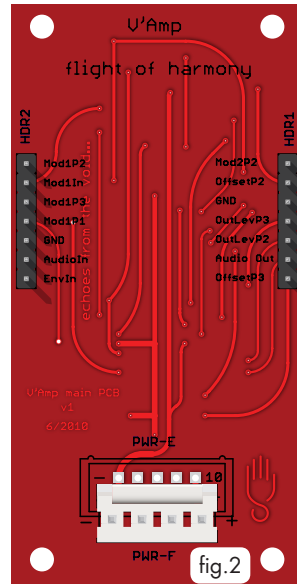

fig.2

Components

1	Assembled V'Amp main PCB
1	DC power connector – MTA156 4-pin (standard)
2	Panel connectors – MTA100 7-pin
1	B10k potentiometer + washer & panel nut (Mod1)
4	B100k potentiometers + washers & panel nuts
5	Soft-touch T-18 knobs
5	3.5mm phone jacks + knurled nuts

Specifications

Supply Voltage	$\pm$12VDC[1]	
Supply Current (max draw @ ±12V)	I_{V+}= 33mA	I_{V-}= -11mA
Max. Input Voltage (@ ±12V)	$10V_{p\text{-}p}$	
Max. Output Voltage	$12V_{p\text{-}p}$	
Input & Output (I/O) coupling	A.C.	
Output Impedance	1kΩ	
Control Voltage (CV) inputs	$\pm V_{supply}$	
CV input coupling	Direct	
CV input impedance	47kΩ	

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

What is it?

The V'Amp is a combined voltage-controlled amplifier (VCA) and ring modulator (A.K.A. ring "mod"), with a little bit extra. The effect of a VCA is known as amplitude modulation (AM), while a ring mod is a frequency mixer, an effect known as heterodyning.

Heterodyning takes two frequencies — traditionally known as the "carrier" and the "modulator" — and mixes them, producing the frequencies that are sum and difference of these two at the output, i.e., if the carrier is 220Hz and the input is 400Hz, the sum frequency will be 620Hz and the difference frequency will be 180Hz. Ring modulation is used to generate non-harmonic (not an integer multiple of the base frequency — 2x, 3s, etc.) frequencies, which are necessary for, say, metallic sounds like cymbals. A perfect heterodyning will have neither the carrier nor the modulator present in the output. While achievable on paper, this is extremely difficult to accomplish in reality, so some bleedthrough of one or the other (or both) is often present to some small degree.

While typical ring mod devices are designed specifically for frequency mixing, the V'Amp allows you to not only change the degree of the mixing and the level of the bleedthrough, but can also be used as a VCA at the same time. The mixing can be varied from VCA (carrier only), into ring mod, then out of ring mod into inverting VCA (inverted carrier).

Mod1 is the modulator. Envelope and Mod2 should be thought of as VCA (AM) inputs, but separate. Envelope is a straight VCA control voltage (CV) input, while Mod2 is an attenuated/variable CV input.

The morphing of the Mod1 function is not fully controllable by CV and must be varied using the knob to access the full range of variation. However, experimentation has shown that a DC offset voltage applied to the Mod1 input can be used to voltage-control a small range of the function morphing.

As with all f(h) products, the V'Amp 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, so each module requires a little patience and experimentation before their secrets become apparent.

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!

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

Controls

Mod1: This is the magic knob, controlling the frequency mixing as described in the introduction. Mod1 varies the amount that the Mod1 signal modulates the input signal, as well as controlling the polarity of the output: positive from 7:00 to 12:00, negative from 12:00 to 5:00.

Mod2: This is the Mod2 input attenuator control.

Offset: Think of this as an internal gain control. The Offset can be used to raise or lower the general level of the output signal, but it also can be used to fine-tune the interaction of the various CV inputs. Try it, you'll understand.

Input: This is the input level control. Just like a volume knob – clockwise increases level, counter-clockwise attenuates the signal level.

Output: Output level control. Acts the same as the Input control.

Jacks

Inputs

Env in: Unattenuated VCA CV input.

Mod1: Modulator signal and/or CV input.

Mod2: Attenuated VCA CV input.

Input: Signal (or carrier) input.
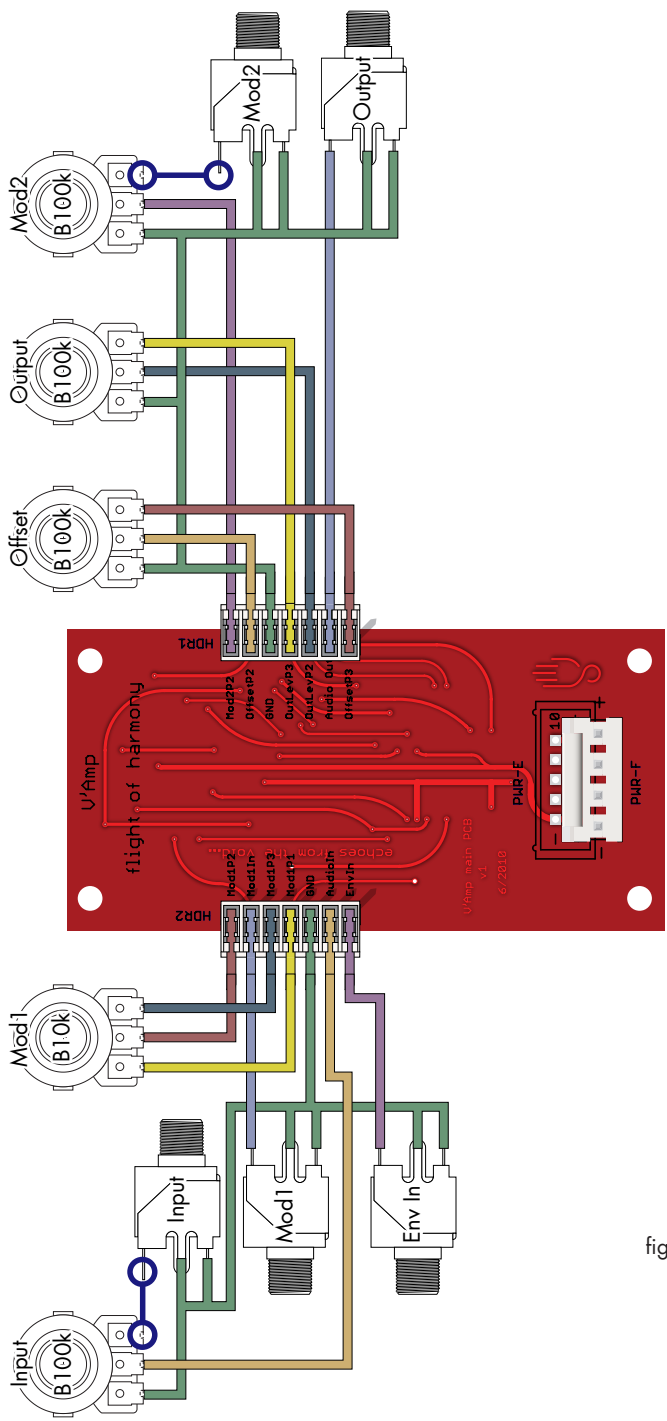
Output

Output: The output jack.

fig.3

HDR2, top to bottom:

Mod1P2	Mod1 potentiometer wiper
Mod1In	Mod1 Jack signal
Mod1P3	Mod1 potentiometer terminal 3 (fully CW)
Mod1P1	Mod1 potentiometer terminal 1 (fully CCW)
GND	Common ground
AudioIn	Audio input jack signal
EnvIn	Envelope input jack signal

HDR1, top to bottom:

Mod2P2	Mod2 potentiometer wiper
OffsetP2	Offset potentiometer wiper
GND	Common ground
OutLevP3	Output potentiometer terminal 3 (fully CW)
OutLevP2	Output potentiometer wiper
Audio Out	To output jack
OffsetP3	Offset potentiometer terminal 3 (fully CW)

Mechanical template

V'Amp

Mod 1

Mod 2

Offset

Input

Output

Env in

Mod1

Mod2

Audio in

$f_{(h)}$

Output
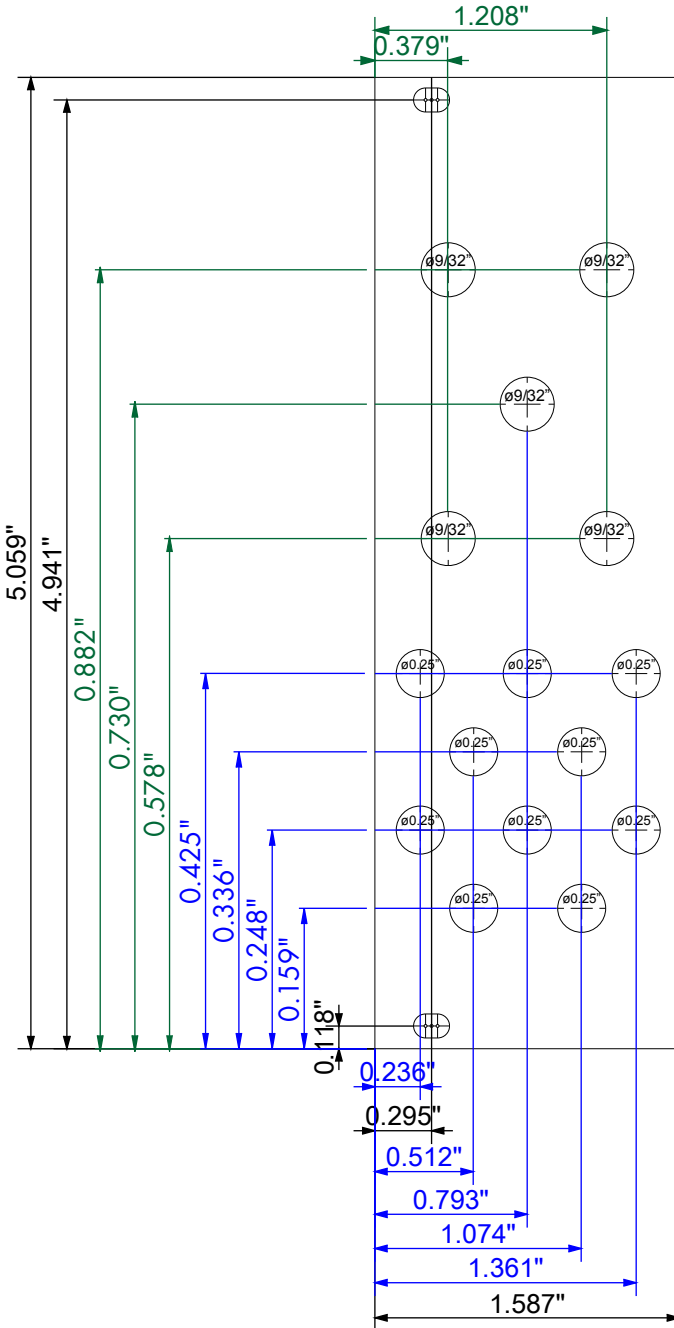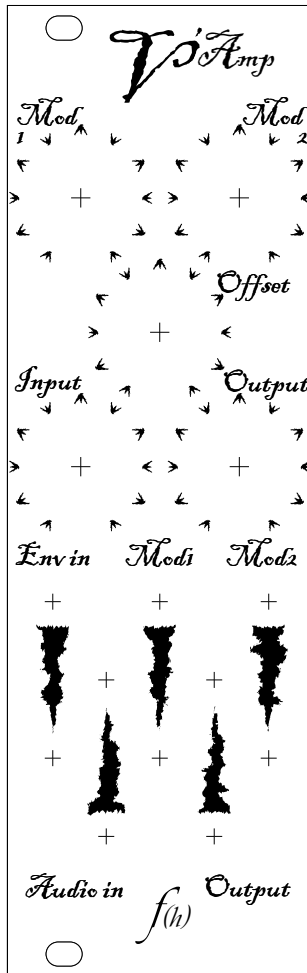
Stuff

There is a lot of discussion about the V'Amp on the Muffwiggler forums, come check it out! People have posted some excellent demos on there. I haunt the forums as well, and new things are posted there long before they hit the f(h) website.

http://www.muffwiggler.com/forum/index.php

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

Send samples to: samples@flightofharmony.com

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

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http://www.flightofharmony.com

Revised Aug, 2010. (first printing)

no love for you

f(h)