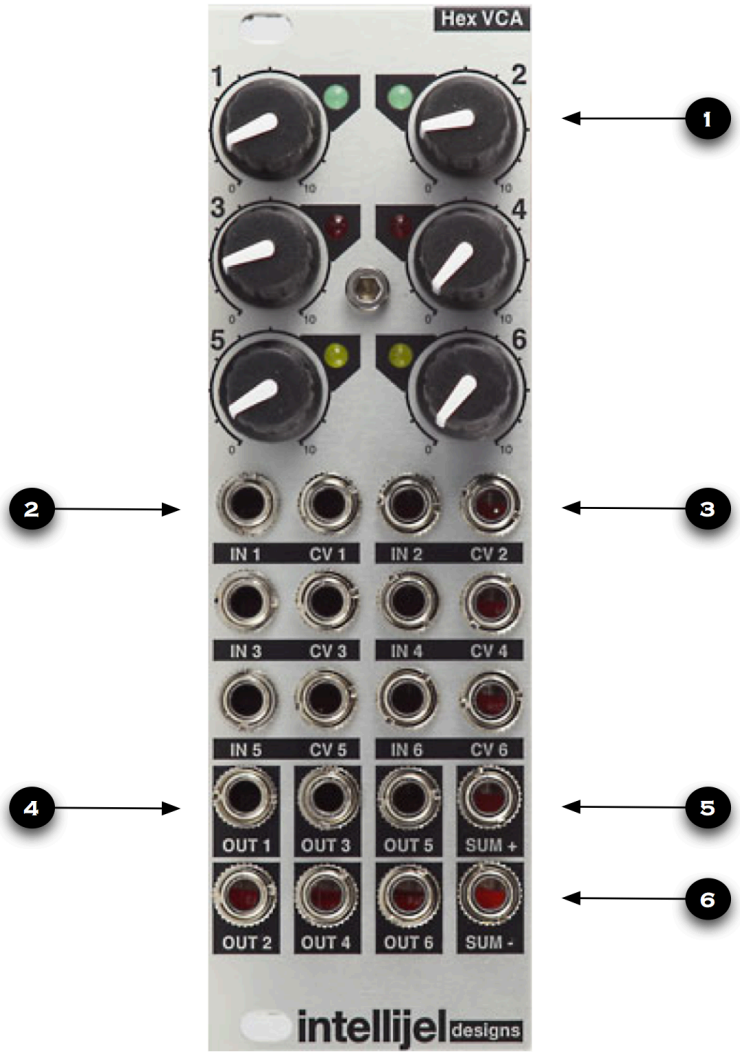
HexVCA Manual v1.0

The HexVCA contains six separate DC coupled logarithmic VCAs that have their outputs normalled to two outputs. The front panel outputs of each VCA is a switching jack which breaks the normal to the mix out when it is patched. This design allows the HexVCA to be used as 6 individual VCAs, a 6 input voltage controlled mixer or any combination e.g. 2 patched VCAs and a four input VC mixer.

At the rear of the HexVCA You will find a six pin header that carries the outputs of the six VCAs. This can be used to normal the outputs of the HexVCA to the Intellijel Mutagen mixer.



Front Panel

1 - VCA Offset
CV offset, also referred to as bias knob. CV indicator LED.

2 - IN 1-6
The signal input of the VCAs.

3 - CV 1-6
The control inputs of the VCAs.

4 - Out 1-6
The output of the individual VCAs.

5 - SUM+
The output of the VCAs mixed together.

6 - SUM-
This is the same as SUM+ except it has inverted phase.

Front Panel Controls in Depth

1 - VCA offset/bias knob and CV indicator LED.
The knob offsets the level of the VCA by injecting 0-5v in to the CV input. This opens the VCA and acts as an initial level control. For traditional VCA operation this knob should be left at 0 (fully counter clock wise).

2 - IN 1-6
The signal input of the VCAs. Patch audio or CV signals here to be controlled by the VCAs. In a traditional VCA patch you would patch the output of your filter here.

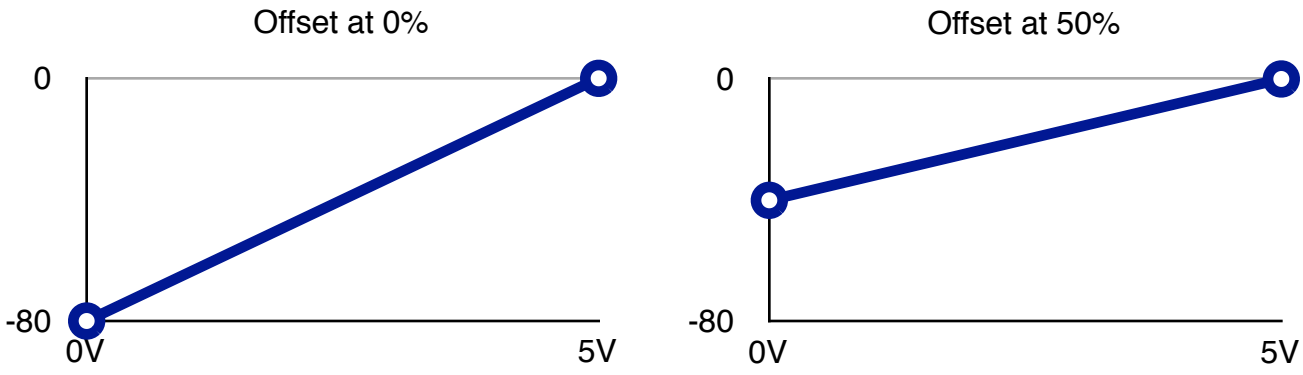
3 - CV 1-6
The control inputs of the VCAs. Control voltage or audio rate signals patched here will control the level of the VCA. In traditional VCA use you would patch the output of a envelope generator here.

4 - Out 1-6
The output of the individual VCAs. Patching into these outputs will remove its VCA from the SUM out.

5 - SUM+
The output of the VCAs mixed together. All of the VCAs are mixed together and output here. If using the HexVCA as a mixer this is your output. Patching into the VCA individual outputs will remove VCAs from this mix.

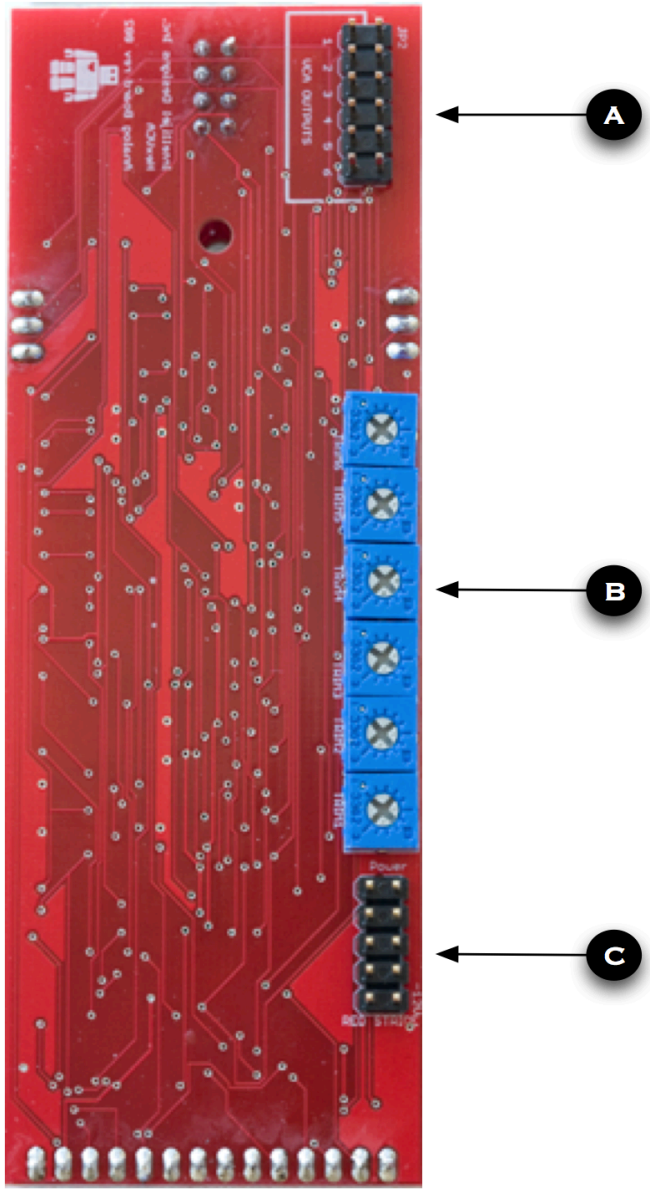
6 - SUM-
This is the same as SUM+ except it has inverted phase. This is useful when constructing feed back patches. Since the signal is inverted from SUM+ mixing it with SUM- will result in no signal as the two waves will cancel each other out.

VCA Offset Explained



The above charts illustrates the effect the Offset knobs have on incoming CV. As offset is increased the point at which 0 CV = -XdB is shifted upwards.

Rear Panel



A - VCA output expander
This is a twelve pin header for connecting to the Mutagen. This is the output of the six individual VCAs

B - CV input trims.
These trimmers are attenuators for the CV inputs. The reduce the CV level before it reaches the VCA. Because CV levels vary widely in modular synthesizers these may need to be adjusted to get optimum performance from your HexVCA.

Turning the trimmer counter clock wise will reduce the CV level.

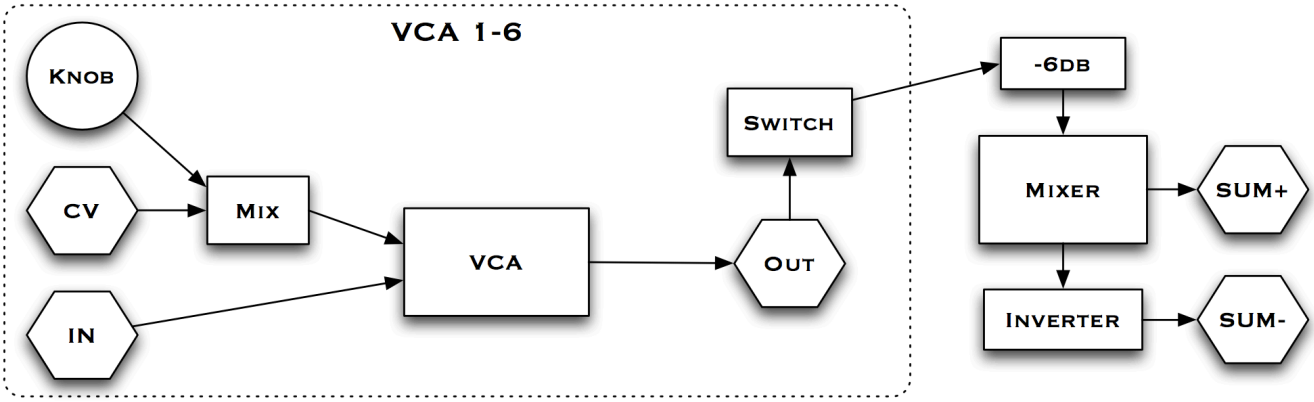
The HexVCA is designed to give 80db of dynamic range for a 0-5v control signal. Before leaving Intellijel these trims are adjusted so that 5v in equals unity gain on the VCA. If your CV input exceeds 5v there is a small amount of gain. Depending on the signal coming into the HexVCA IN this may distort the VCA.

C - Power connector.
Ten pin power connector which conforms to the Eurorack standard.
The lowest pin is -12V and should line up with the red pin on your power ribbon.

It is very important that the power connector is not connected in reverse!
Although no damage will be done to the HexVCA other modules may be damaged by reversing this connector.

Block diagram 1 - VCA Detail

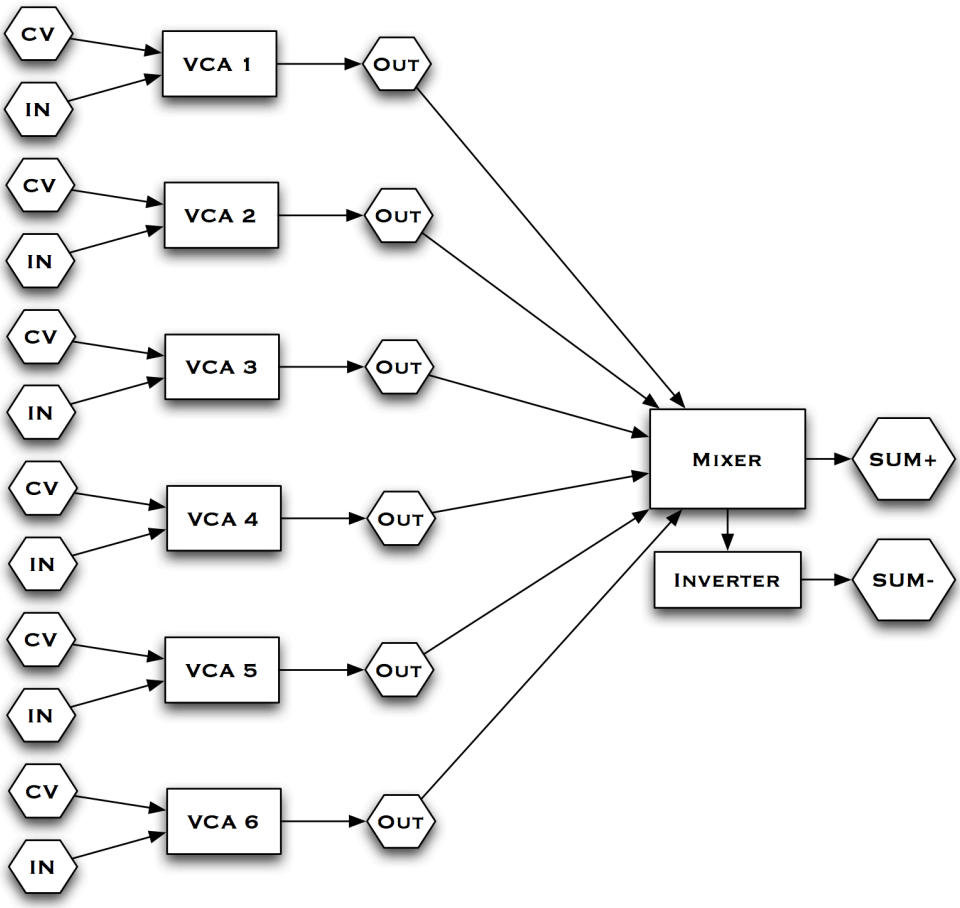
In the below diagram the internal signal flow of the HexVCA is shown. This diagram is simplified to save space. Only one of the 6 VCAs is detailed.



Block diagram 2 - Overview

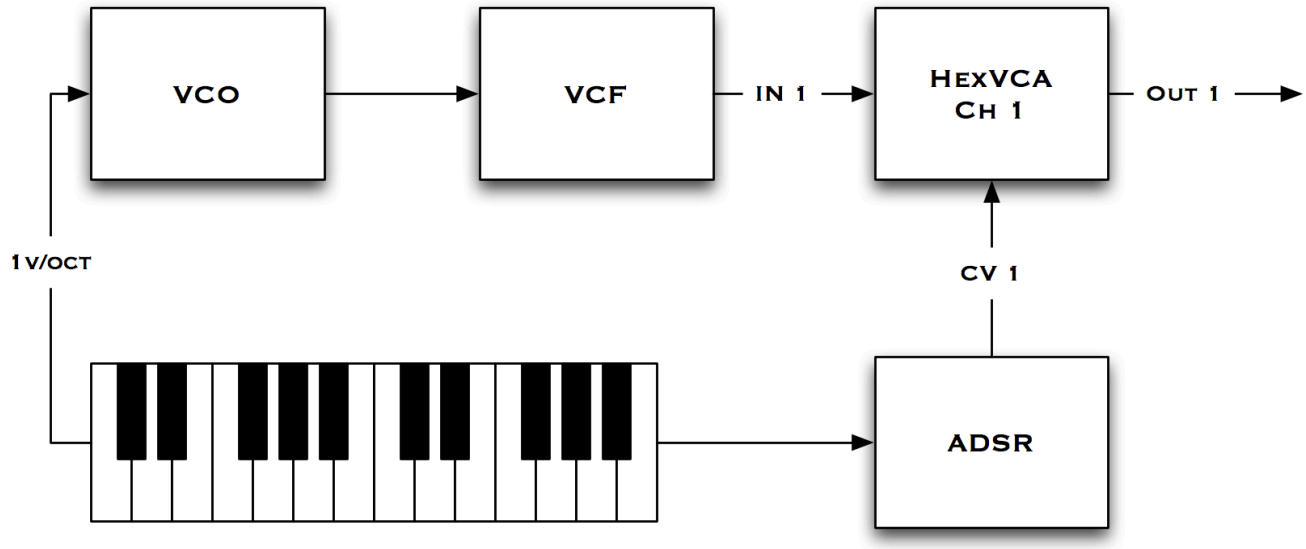
The diagram to the right shows the signal flow of the entire module.

Keep in mind all of the Out jacks (shown as a hexagon) are switching jacks that break the connection to the mixer when a 3.5mm plug is inserted.



Patch Examples

Example 1 - Traditional synthesizer voice

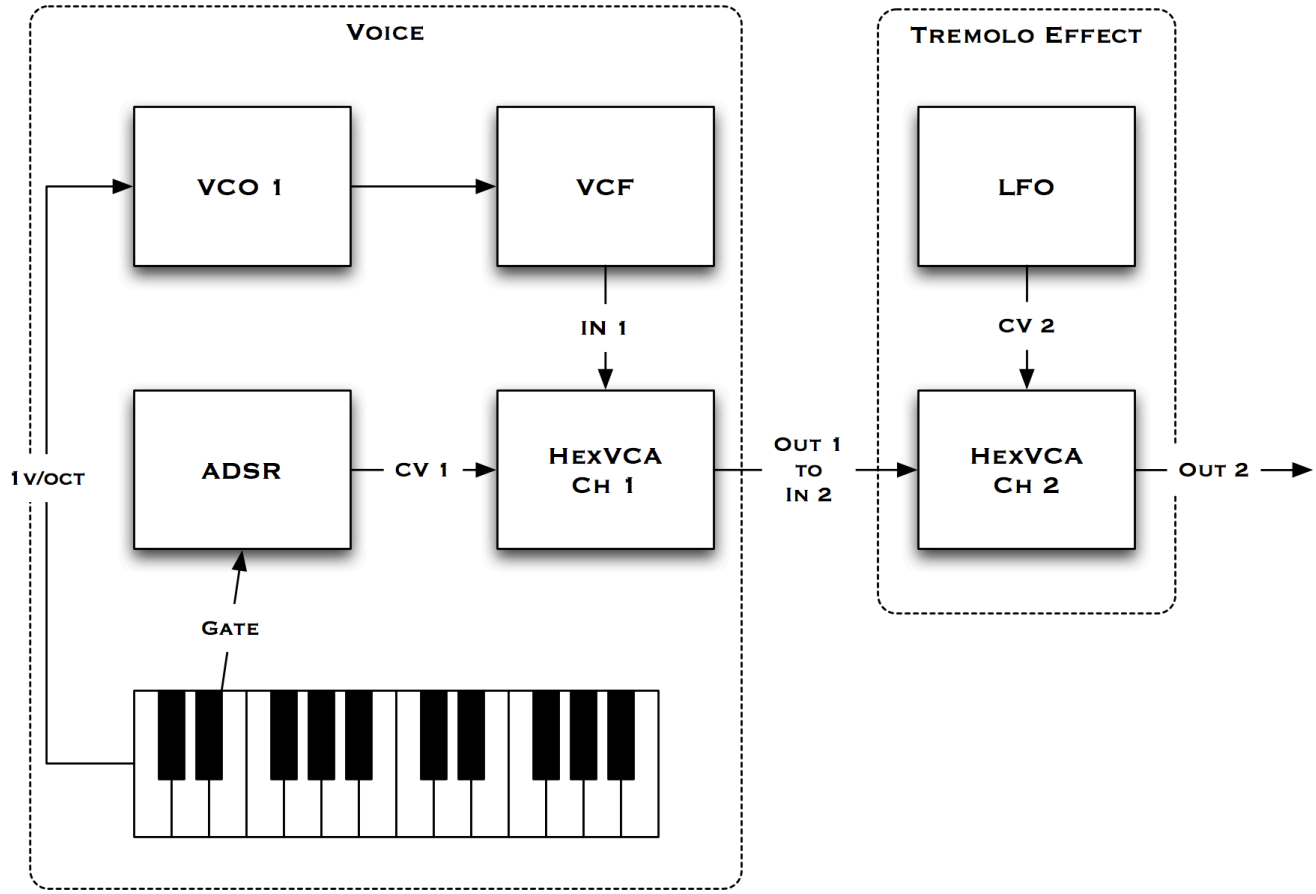


In this example VCA 1 in the HexVCA is used to control the final level of a traditional synthesizer voice. The output of the VCO goes into the VCF, the out put of the VCF goes into the IN 1 of the HexVCA. Knob 1 of the HexVCA should be fully counter clock wise. The gate out of the keyboard goes into the gate in of a ADSR. The output of the ADSR goes to the CV 1 input of the HexVCA. Out 1 of the HexVCA goes to your mixer, audio interface or monitoring system.

If the keyboard is not played no sound will pass and the patch will be silent. If a key is played on the keyboard the ADSR will rise in voltage causing a corresponding rise in volume from the HexVCA. Once the key is released on the keyboard the ADSR voltage will fall to zero and the HexVCA will fade to silence.

Patch Examples

Example 2 - Tremolo effect



This patch demonstrates the common effect known as tremolo. A slow LFO modulates a VCA creating a steady pulsing volume. This effect is sometimes found in old guitar amps and combo organs.

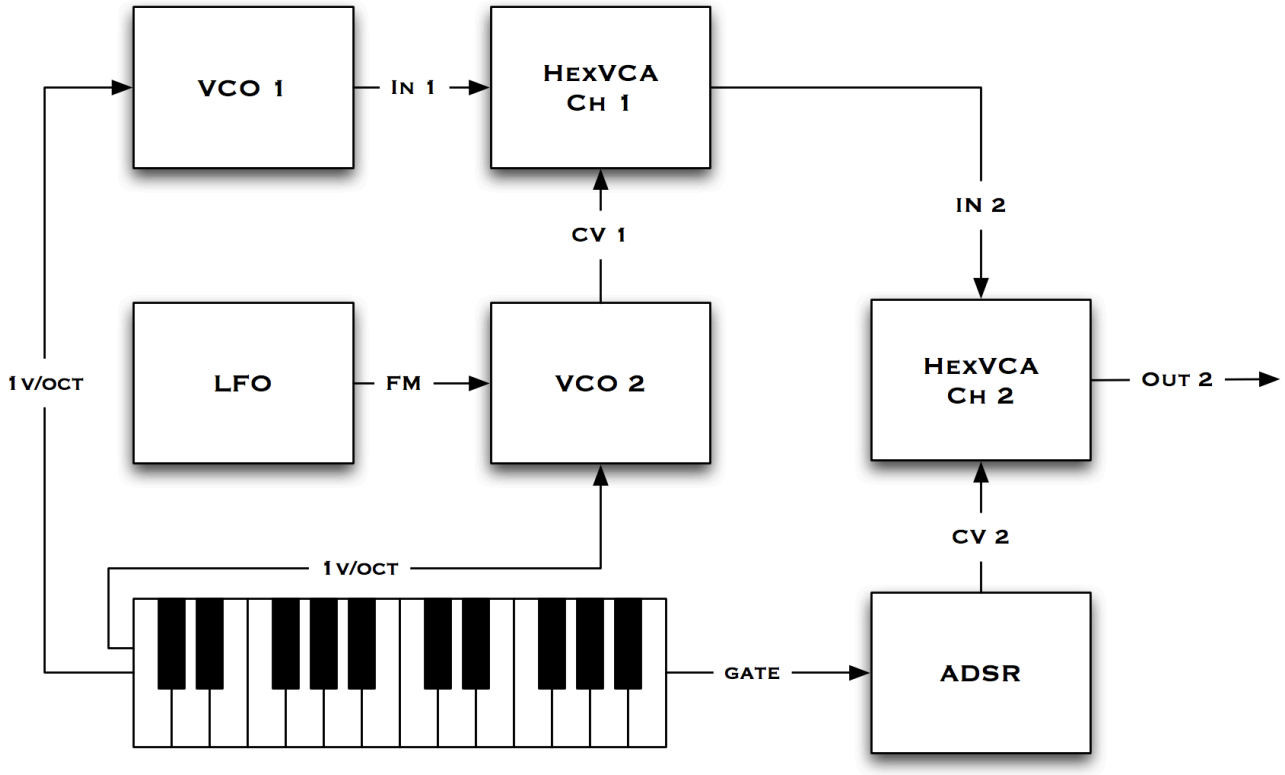
In the Voice section on the left we have the traditional voice patch as seen in example 1.
In the Effect section on the right of the diagram is the Tremolo effect patch.

NOTE: *Make sure you turn the Offset knob of HexVCA ch2 to 12 o clock. This opens the VCA half way which is necessary when using bipolar modulation.*

Use a sine wave for the LFO shape and a slow speed to for the traditional Tremolo sound. Using higher speeds for the LFO and different waves will create harsher and more modern sounds. You can substitute the LFO with a Envelope triggered in time to the music to create rhythmic gating. In this case the Offset knob will control how much the VCA stays open, adjust to taste.

Patch Examples

Example 3 - Audio rate modulation / AM synthesis



This patch can produce a wide variety of metallic, sharp and pitched noise sounds.

NOTE: Make sure you turn the Offset knob of HexVCA ch1 to 12 o clock. This opens the VCA half way which is necessary when using bipolar modulation such as a VCO or LFO.

The HexVCA creates sidebands by modulating the volume of a VCO 1 with VCO 2. These sidebands can be harmonically related to VCO 1 if VCO 2 also tracks the keyboard and is set to a even frequency ratio such as 4:1. If the frequency between the VCOs is not even enharmonic sidebands are created. This is similar to ring modulation except that the original signal (VCO 1) is still present. By modulating the frequency of VCO 2 with a LFO we get moving sidebands that alters the timbre.

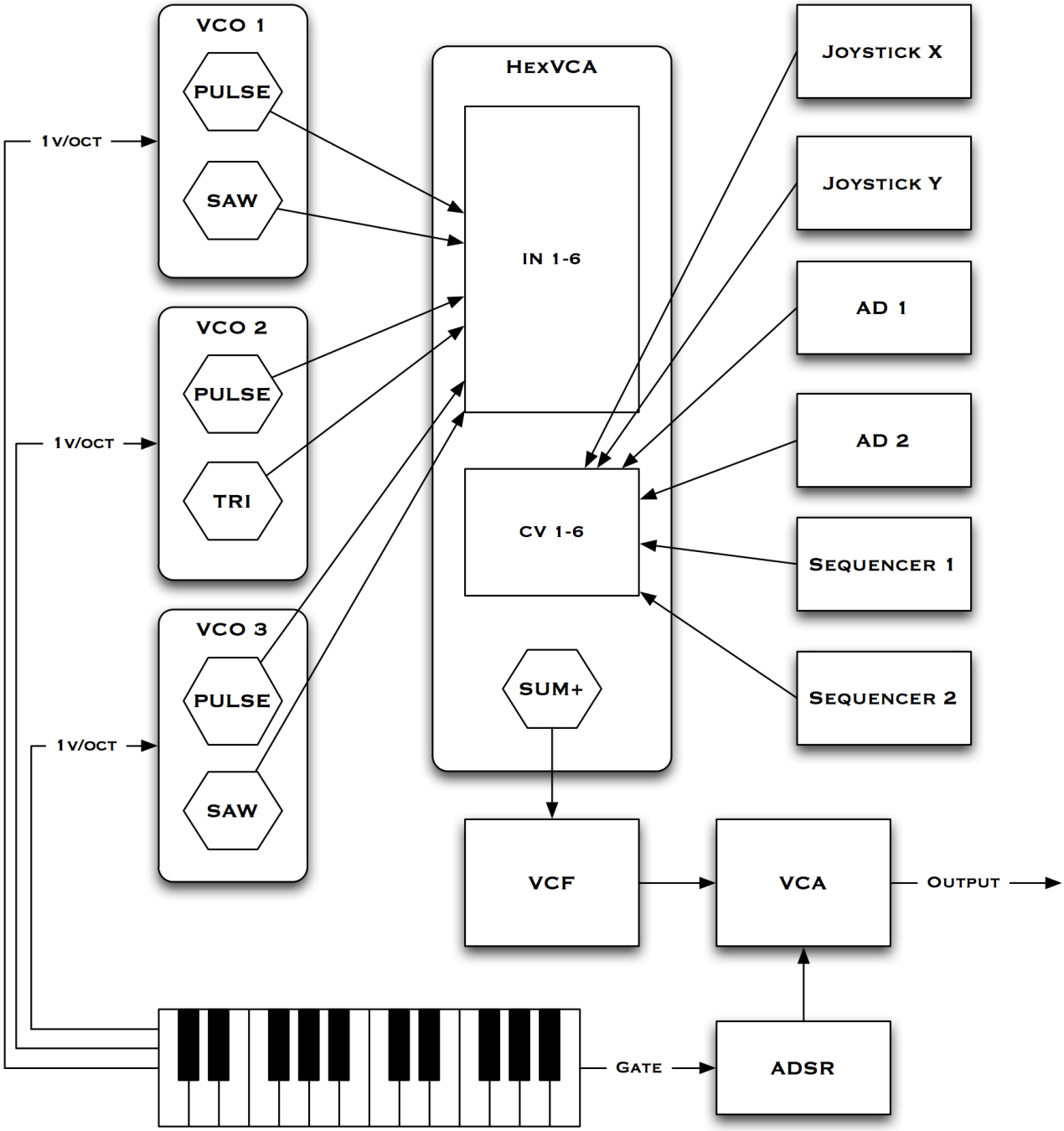
Experiment with different waves for the two VCOs and various frequencies between VCO 1 and 2. By altering the tracking of VCO 2 with an attenuator enharmonic and noise like sounds are possible.

Try replacing VCO 1 with external audio such as drum patterns or polyphonic melodies.

Patch Examples

Example 4 - Voltage Controlled Mixer

In this patch the HexVCA is used as a voltage controlled Mixer. Use the VCA Offset knobs on the HexVCA to set the initial level of the various inputs. The CV inputs will be added to the initial level set by the offset knobs. Positive CV will make the signal louder while negative CV will make the signal quieter. Try tuning the VCOs to different octaves and using clock dividers to trigger the ADs.



Video Manual

http://vimeo.com/20822864

Follow the above link for a walk through of the HexVCA functions.

Support

Web: http://intellijel.com/
email: danjel@intellijel.com

Technical Specifications

Width:	8 HP
Depth:	35mm
Current Draw:	80ma
Dynamic Range:	-80dB to 0dB with 0-5v control signal
Expected input:	5v peak to peak
VCA component:	THATcorp 2162

Credits

HexVCA design: Danjel van Tjin

Manual written by: Haven Siguenza, Danjel van Tjin

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