Zero Z-1, Dual Zero Difference

The Z-1 is a is a two channel zero difference trrigger the can be CV controlled.

This is the evaluating click less switching control circuit used in the D-2, 4-Band Distortion module but with all the ins and outs accessible.

It works with both control signals and audio rate. It is completely DC coupled.

It can be used to detect zero crossings of signals and the direction of the zero crossing, to detect zero difference between between two signals, to add jitter to signals and many other things. It is mainly ment to be used in combination with other modules such as the Switch module but can also be used on its own.

Have a look at the use case examples below to get an idea of how to use it. Just describing the function can get a bit abstract.

Controls

A+

A is one of the inputs to a comparator (B is the other). A is compared to B. If the voltage on A is higher than B then Out will go high if D is high and low if D is low. D is controlling what Out will be after A has become higher than B.
A is normalled to 0V if nothing is connected.

If nothing is connected to D then Out will change from low to high or high to low depending on what it was before when A gets equal to B.

B-

B is the other input to the comparator.

D

D is the CV control input. In-put signal high is about 1V in.
D is controlling what Out will be after A has become higher than B.
If nothing is connected to D the output is just controlled by A and B.

Out

Out is a logic output where high is +5V and low is 0V.
It is meant as a logic or control signal but can of cause be used for audio.
The LED next to the Out shows the status of the output signal.

So in short you can compare two signals on A and B and when they are equal Out will switch.
Or you can compare signals on A and B but Out will only switch to what you tell it to switch to by the signal in on D.
This sounds simple but can give you access to functions that are hard to achive in other ways.

Device specs

Module size:	2 hp wide, 29 mm deep with power connector.
Input impedance:	100 kohm
Out impedance:	1 kohm
Power requirements:	+12V. Max power consumption 10 mA -12V. Max power consumption 3 mA Connect the power cable with the red stripe towards the marking -12V on the board. The unit is protected for reverse power.

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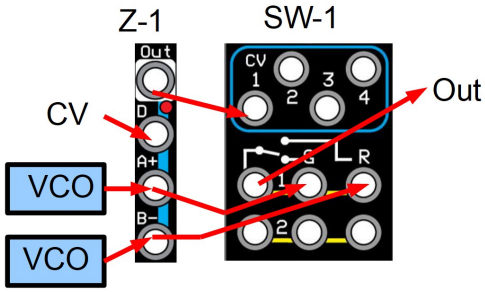
Use case examples

A few examples, just to get your imagination going.

Clickless switching

A way to switch audio or CV without any glitches in combination with the SW-1 Switch module.



You tell it to switch with the signal in on D.
A and B listens to the two signals you are going to switch between. It then waits till they are on the exact same voltage and a switch is made. This way you get no click in the switching.
Try and connect an un-synced VCO to D for controlling when it shall switch. Could give an almost broken but not harsh sound.

If D isn't connected it will switch every time the two signals are equal.

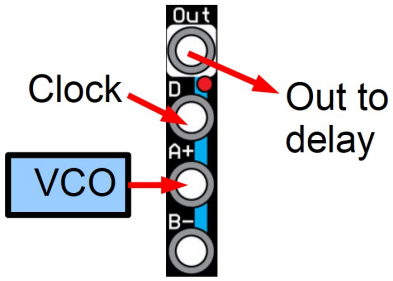
If you want to introduce a subharmonic to this, switch on the Latch function in the Switch and switchng will be done every second time instead.

Switched rectification

Very similar to the clickless switching example above but only one signal in to B. A can be left unconnected and in that way connected to 0V. D can be unconnected.
Every time the signal in passes 0V the Zero will toggle the Out signal. This way you only get half periods of the signal in.
It can also be controlled with D if you want like in the previous example.

Jitter generation

Jitter is when the rising and falling edges of a signal vary around the time where they are supposed to be. This is normally a bad thing and you would like to get rid of it. But it could actually be very interesting in creating sounds.



One example is to connect it on the clock input of a delay to get slight frequency shifting on the output.
Connet the clock signal for the delay to D and Out to the clock input of the delay.
Connect an un-synced VCO or LFO to A and vary the frequency till you ger something you like.

An other example can be to connect it on the sync signal between two VCOs.
Connect VCO-1 to D and Out to the sync input of VCO-2.
Connect a third not synced VCO-3 to A. The frequency of VCO-3 will control the ammount of jitter. High frequency in on A will give low jitter, a lower frequency will increase the jitter. If the frequency of VCO-3 is lower than VCO-1 it will loose sync on some periods. Can be really interesting to play with.

Keyboard split

Set a voltage in on A that represent the keyboard split voltage. Connect the pitch CV to B.
When the pitch voltage is higher than A you will get +5V on Out and can let that control something.
If you modulate the voltage on A the keyboard split point will move.

Please check www.dpw.se for updates of the manual and demo videos.