SCHLAPPI ENGINEERING

BTFLD (Bit Fold) is a distortion, wavefolder, and four bit asynchronous analog to digital converter. The folding output at audio rate provides a hard sync like timbre in a unique sawtooth wavefolder circuit. The stepped output is a type of bit crushed effect and the square wave outputs provide different frequency multiplications or distortions. Rhythms can also be generated from envelopes or LFOs.

GAIN

Controls the gain of the incoming signal before the ADC/wavefolder sections. Up to 2x gain is provided.

If this is fully down (without CV) there will be no output from the module.

CV

Controls the attenuation of incoming CV, adds to GAIN.

The Saw output is normalised here for feedback distortion if no input is detected.

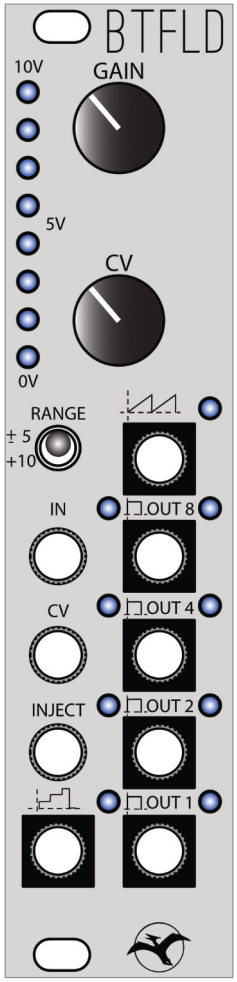
RANGE

Selects the input and output voltage range. +-5V is intended for audio processing and +10V is intended for CV processing, but either can be useful.

INJECT

Adds to the signal input -after- the VCA. This enables phase modulation if either the IN or INJECT inputs are at audio rate.

Using attenuation or a VCA in before this input is highly recommended.



SAW OUTPUT

A wavefolding type effect that will create a mix of sawtooth waves and whatever the input signal is. It can sound similar to a hard sync effect depending on the input signal.

SQUARE OUTPUTS

The combined OUT8, OUT4, OUT2, and OUT1 form a binary word. They can be used as clock dividers or to create rhythms. All gate outputs are 0 or 10V logic signals if the range switch is in +10V position or +5,-5 square waves in the +-5 position.

STEPPED OUTPUT

Stepped voltage made by adding the 4 square outputs together with binary weights.

This output is a 0-10V unipolar stepped analog signal with 16 different values (including zero).

The top bit (OUT8) will provide about 5.3V, the next about 2.64, then 1.32, and the bottom about 0.66V

BINARY CONVERSION

Binary is a number representation which only uses ones and zeros, and each position corresponds to a power of two. With a four bit word we have 1, 2, 4, and 8, which together can add up to 15.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

These seperate bits are output as square waves, which can act as multiples of the original frequency or rhythmically related gate outputs depending on the input.

A 4 bit binary word is called a Nibble and interfaces nicely with our other binary (or other logic) modules.

PRO TIP:

Mix the stepped output with the other outputs! This is a good way to add bass (or the fundamental) back into the wavefolded signal while also maintaining some volume dynamics.

PRO TIP:

Watch the LEDS! If you pass the ends in any direction the waveform may start to clip, which can be be an interesting effect in it's own right but may not be what you were intending.

PATCHES TO START WITH

Sawtooth Wavefolder

- Set RANGE to +-5V
- Start with both knobs fully counter clockwise
- Patch an audio rate sine or triangle wave into the input
- Listen to the Saw output
- Turn the GAIN knob up and listen to the result
- There will be no output if both knobs are down
- Turn the GAIN knob down
- insert an slow envelope or LFO into the CV input and turn up the CV knob
- Try a mix of both knobs
- Try other input waveforms, square wave will not do anything but saw, sine, triangle will

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Square Wavefolder

- Follow above instructions but listen to OUT1
- This should be similar to Saw out but with a different timbre
- Try the other square wave outputs (OUT2, OUT4, OUT8)

Drone Beast

- Start with either of the above patches
- Patch a second oscillator into the CV input
- Tune the second oscillator (at audio rate) close to the first or to a multiple of the first

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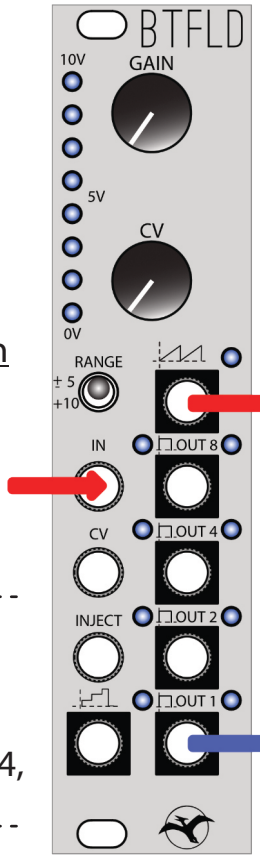

Rhythm Generator

- Set RANGE to +10V
- Start with both knobs fully counter clockwise
- Patch an envelope into the IN
- Patch OUT1 into a trigger or gate input for a percussive sound
- Turn the GAIN knob up and listen to the result
- There will be no output if both knobs are down
- Change the shape of the input envelope
- A ramp up at the same rate as the clock can be used to generate multiples of the clock frequency
- Adding control voltage can lead to some very strange rhythms

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Phase Modulation

- Start with one of the audio rate patches.
- Patch an LFO through a VCA or attenuator into the INJECT input
- Keep the level of this second signal very low
- Try it with a harmonically related audio signal

BLOCK DIAGRAM

The BTFLD can be thought of as several sections combined:
An input section with a VCA and offsets.
An ADC section where the signal is comparated against 16 voltage levels and converted into a 4 bit binary signal.
An output section with a waveshaper for the saw output and a DAC for the stepped voltage output.