Gilbert

Quick Specs:

Size: 8hp Wide, 1.625 inches deep (including power header)

Power Draw (max): +12V: 27mA, -12V: 27mA

DC coupled quadrature CV and audio processor

Perfect utility for quadrature panning, four way crossfading, & four way signal routing

Functions as a wavefolder/frequency multiplier when processing audio

Global linear VCA controls all outputs simultaneously

Limited release, handmade in NYC

Installation:

To install **Gilbert**, allocate 8hp of space in your Eurorack case. Before placing **Gilbert** in your rack, install the ribbon cable on the module and then on the bus board inside of your case. There is a red line on the ribbon cable. Ensure that it aligns with the **-12V** or **RED STRIPE** indicator on both the module and the busboard inside of your rack. Failure to do so can result in permanent damage to **Gilbert**, your power supply, and/or other modules in your case. After double checking the ribbon cable, place the module in your case and secure it with the screws of your choosing.

What does it do? :

Gilbert is a quadrature voltage processor. It is DC coupled, capable of processing both CV and audio. Through creative patching it can achieve a number of things including, but not limited to, wavefolding, frequency multiplication, multi-channel crossfading, and multi-channel signal routing. On paper Gilbert may seem esoteric, however in practice it is incredibly intuitive and easy to use.

There is one main input and four main outputs. As shown by ***fig 1.1***, as the input voltage increases from -5V to +5V, four unipolar sinusoidal waveforms rise and fall sequentially at the four main outputs with a 90 degree phase difference. This allows a single CV source to generate four new control voltages that are tailored for quadraphonic panning, multi-channel crossfading, and multi-channel routing. Alternatively, these four new control voltages can sequentially modulate four different parameters in your modular system, creating a lot of dynamic and complex movement that all stems from a single CV source. The status of the sine wave at each output is indicated by the brightness of each jack's neighboring LED.

The four main outputs are internally processed through a bipolar mixer, the output of which is provided at the **fold output**. By mixing these four new signals together, Gilbert acts as a frequency multiplier. When a triangle wave is applied to the input, a bipolar sine wave is created that has a frequency three times that of the input waveform ***(fig 2.1)***. When a saw wave is applied to the input, a bipolar sine wave is created that has a frequency one and a half times

that of the input waveform. By modulating the amplitude of the input waveform, **Gilbert** functions as a wavefolder, creating interesting new waveshapes for modulation or adding harmonics to audio signals.

The **level** control and associated CV input determines the level of all of **Gilbert's** outputs simultaneously. The input CV sums with the knob position. The total expected range of this sum is 0 - 10V. The level control is great for adding another layer of complexity to the newly created modulation or acting as a VCA for the newly created audio waveform.

How to patch it? :

Keeping it simple: Patch a triangle or sawtooth LFO to the input. Assuming that the LFO has a range of +/- 5V, position the input attenuator fully clockwise and the manual control at 12 o'clock. As the LFO cycles, watch the LEDs gradually fade in and out. The LED's varying brightness indicates the rising and falling of the sine wave at each output. If the LEDs are not lit, ensure that the level panel control is fully clockwise. Patch the four outputs so that they are modulating four different parameters within your modular system. Listen to these parameters vary as your initial LFO cycles. The level control and associated CV input allows the level of all of the module's outputs to be adjusted simultaneously.

A little more complex: By attenuating the input signal, the user is able to limit how many of Gilbert's outputs are active. As the input signal is attenuated, the output signals rise and fall more gradually with a larger phase difference.

Turn the input attenuator counter clockwise until only two LEDs are alternating back and forth. Adjust the manual control to determine which two LEDs are alternating. The manual control adjusts the value of an internal DC offset that mixes in with the input signal, post attenuation. By varying the range of the input signal and the position of the manual control, the user can dynamically control the complexity of the newly generated modulation.

A specific example: By using the four main outputs to modulate the level of four VCAs, the user is able to crossfade between four different audio sources. By varying Gilbert's input attenuator and manual control, the user can dynamically transition from four way crossfading to two way crossfading and also dynamically vary which two channels are being crossfaded.

Further patching:

Find an audio rate triangle or sawtooth waveform in your modular system. Apply this waveform to Gilbert's input. Assuming this waveform has a range of +/- 5V, position the manual control at noon, while also positioning the input attenuator fully clockwise. Apply Gilbert's fold output to the final output of your modular system, while ensuring the level control is positioned fully clockwise.

While listening to the output, slowly turn the input attenuator to its counterclockwise position. You should hear the timbre of the output waveform gradually become less complex and then fade into silence. Now, adjust the input attenuator until only two LEDs are lit. Adjust the manual control clockwise and then counterclockwise while listening to how this affects the timbre of the output. While using Gilbert as an audio processor, the input attenuator functions similarly to a "timbre" or "fold" control that is found on dedicated wave folders, while the manual control functions similarly to a "bias", "symmetry", or "offset" control.

Gaining voltage control over these two parameters is easy. Remove your initial waveform from Gilbert's input and instead apply it to the input of a low pass gate or VCA. Apply the LPG's/VCA's associated output to the input of a DC coupled mixer. Apply the mixer's output to Gilbert's input, while positioning Gilbert's input attenuator fully clockwise and the manual control to noon. Next, find two separate CV sources in your modular system. Apply the first source to the CV input on the LPG/VCA and the second to another input on your mixer. The CV

being applied to the LPG/VCA will provide voltage control over the “fold amount” or “timbre”, while the CV being applied to the second input on the mixer will provide voltage control over the “symmetry” or “bias” amount. Gilbert's input attenuator will determine the maximum amount of wavefolding, while the manual control will determine the initial bias point/symmetry value.

Gilbert’s level control can act as the final VCA for this patch by positioning the panel control fully counterclockwise and then applying an envelope to the associated CV input. Alternatively The level control can be left fully clockwise and GIlbert’s fold output can be applied to a LPG to achieve a traditional west coast sound.

Explaining the Graphs:

The graphs below provide a visual explanation as to how the different outputs respond to varying input levels. Take note on how the waveshape and amplitude of the various outputs changes depending on the amplitude of the input waveform. Figures 1.1 - 1.4 show how the four main outputs vary as the input signal is attenuated, while the manual control is positioned at noon. Figures 2.1 - 2.4 show how the fold output varies as the input signal is attenuated while the manual control is left in its noon position.

Fig. 1.1

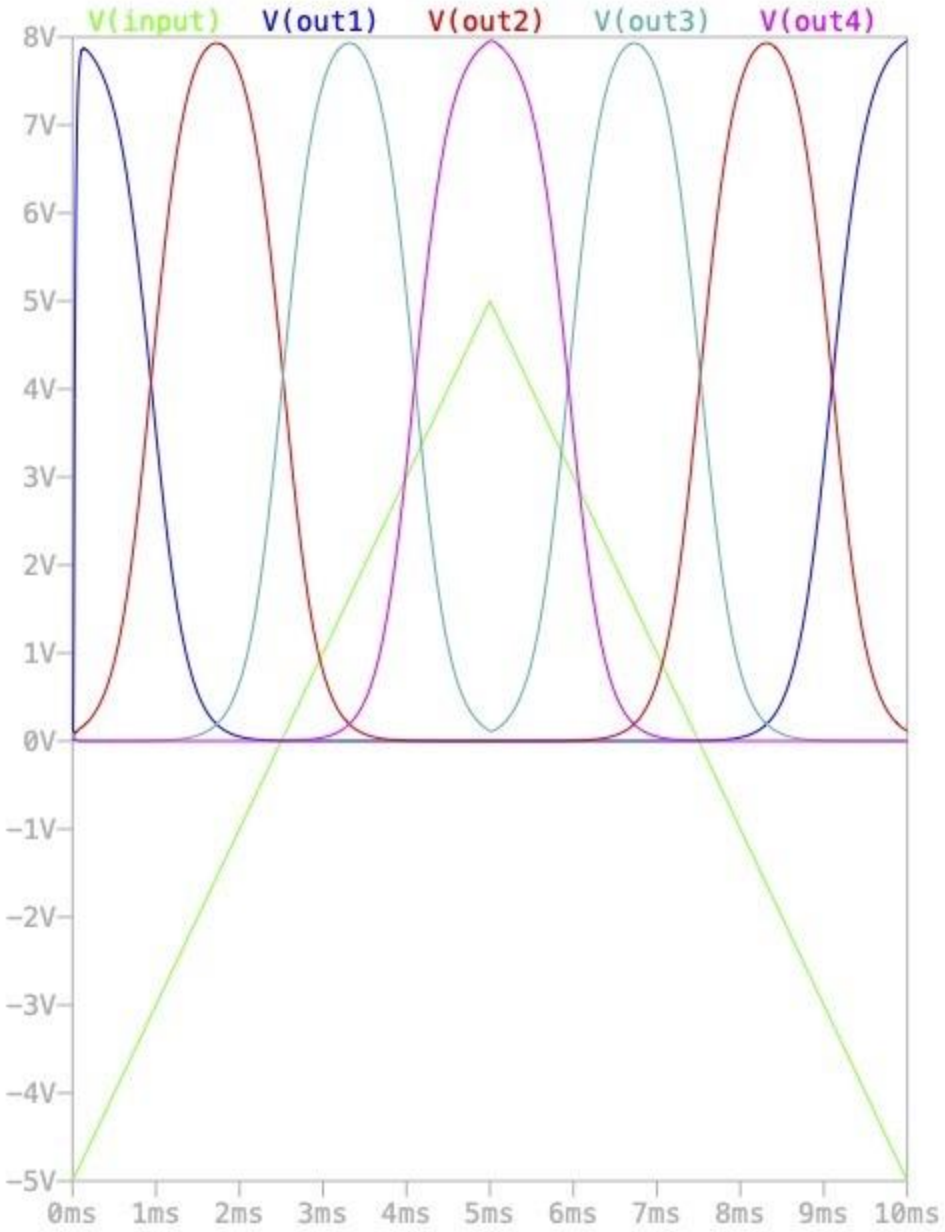

V(input)
V(out1)
V(out2)
V(out3)
V(out4)
8V
7V
6V
5V
4V
3V
2V
1V
0V
−1V
−2V
−3V
−4V
−5V
0ms
1ms
2ms
3ms
4ms
5ms
6ms
7ms
8ms
9ms
10ms

Fig. 1.2

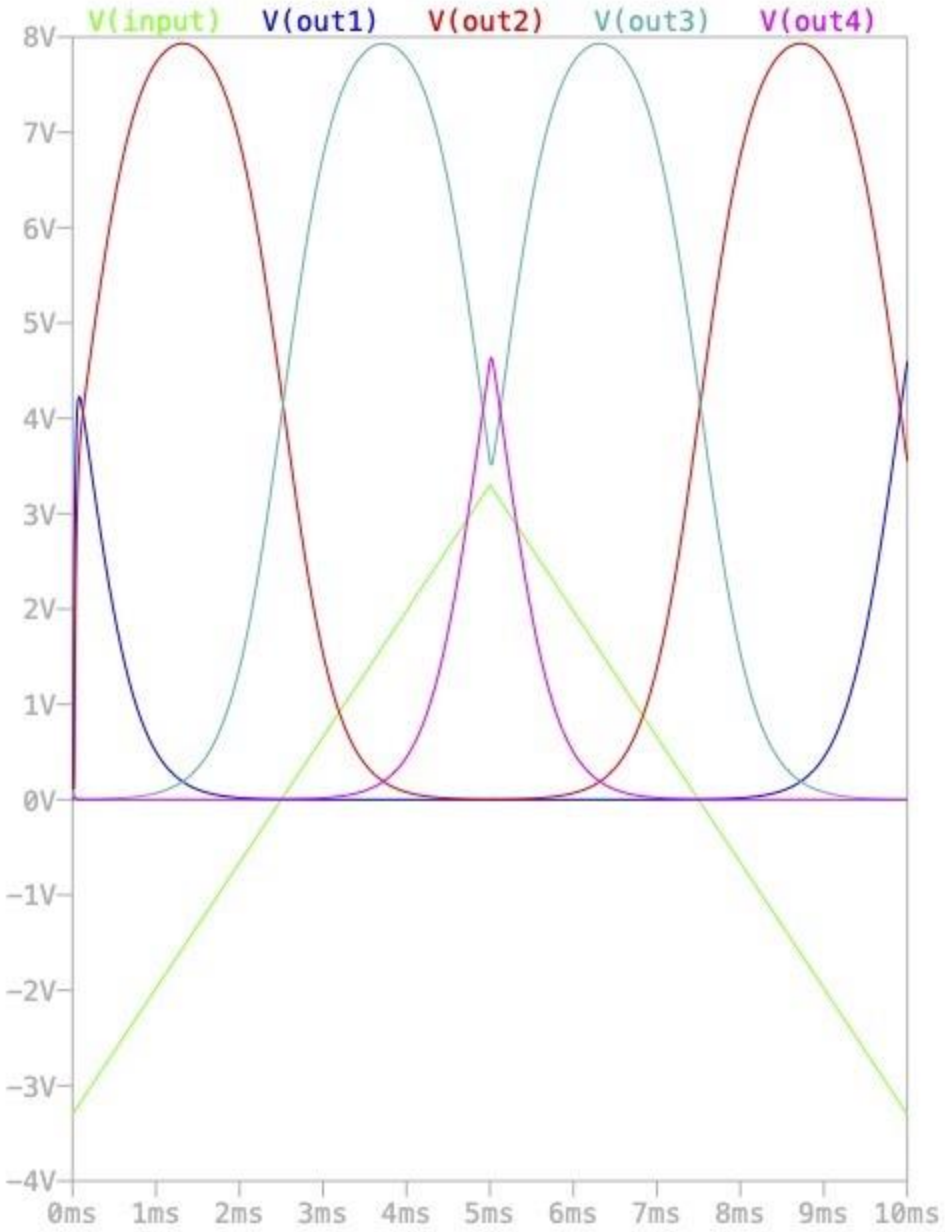

V(input)
V(out1)
V(out2)
V(out3)
V(out4)
8V
7V
6V
5V
4V
3V
2V
1V
0V
−1V
−2V
−3V
−4V
0ms
1ms
2ms
3ms
4ms
5ms
6ms
7ms
8ms
9ms
10ms

Fig 1.3

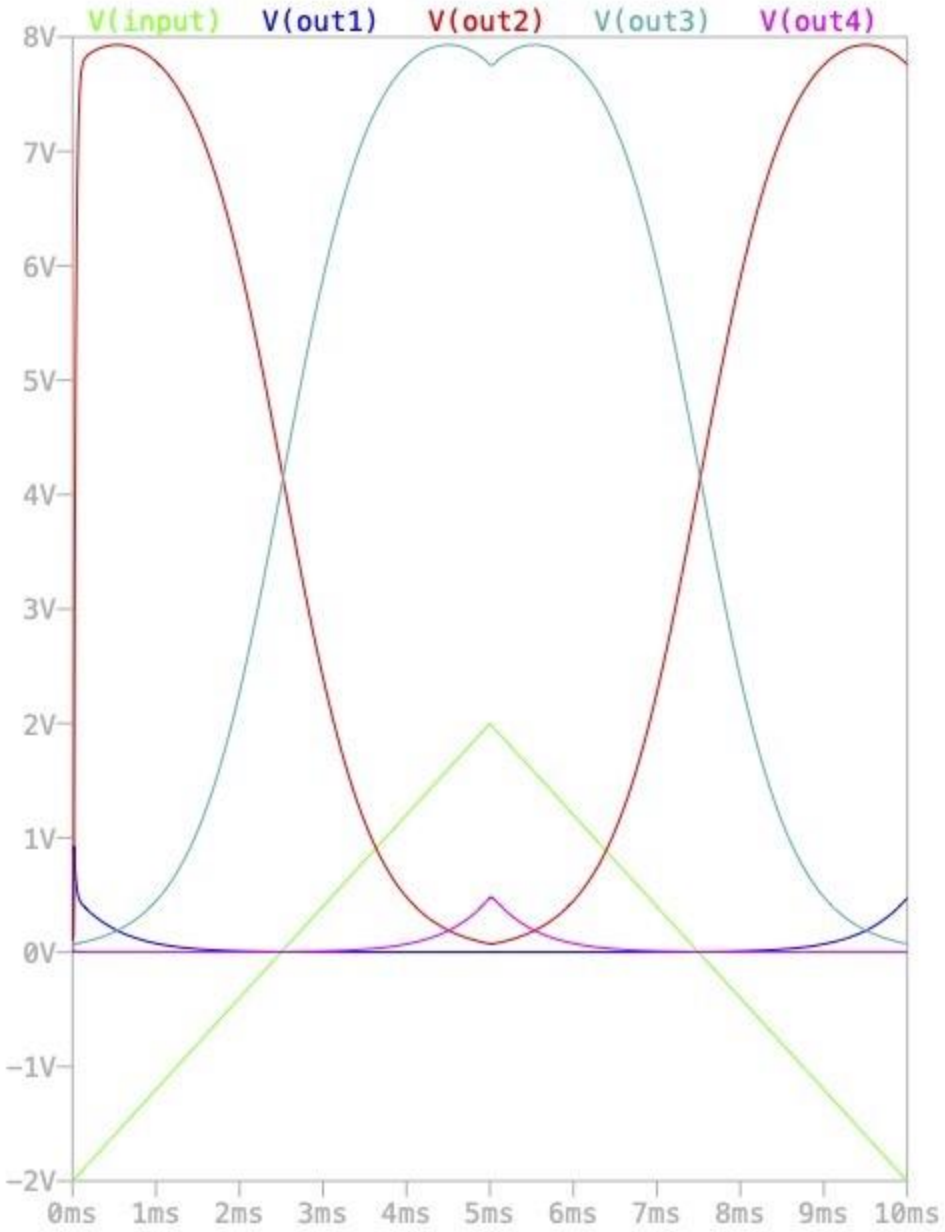

V(input)
V(out1)
V(out2)
V(out3)
V(out4)
8V
7V
6V
5V
4V
3V
2V
1V
0V
−1V
−2V
0ms
1ms
2ms
3ms
4ms
5ms
6ms
7ms
8ms
9ms
10ms

Fig 1.4

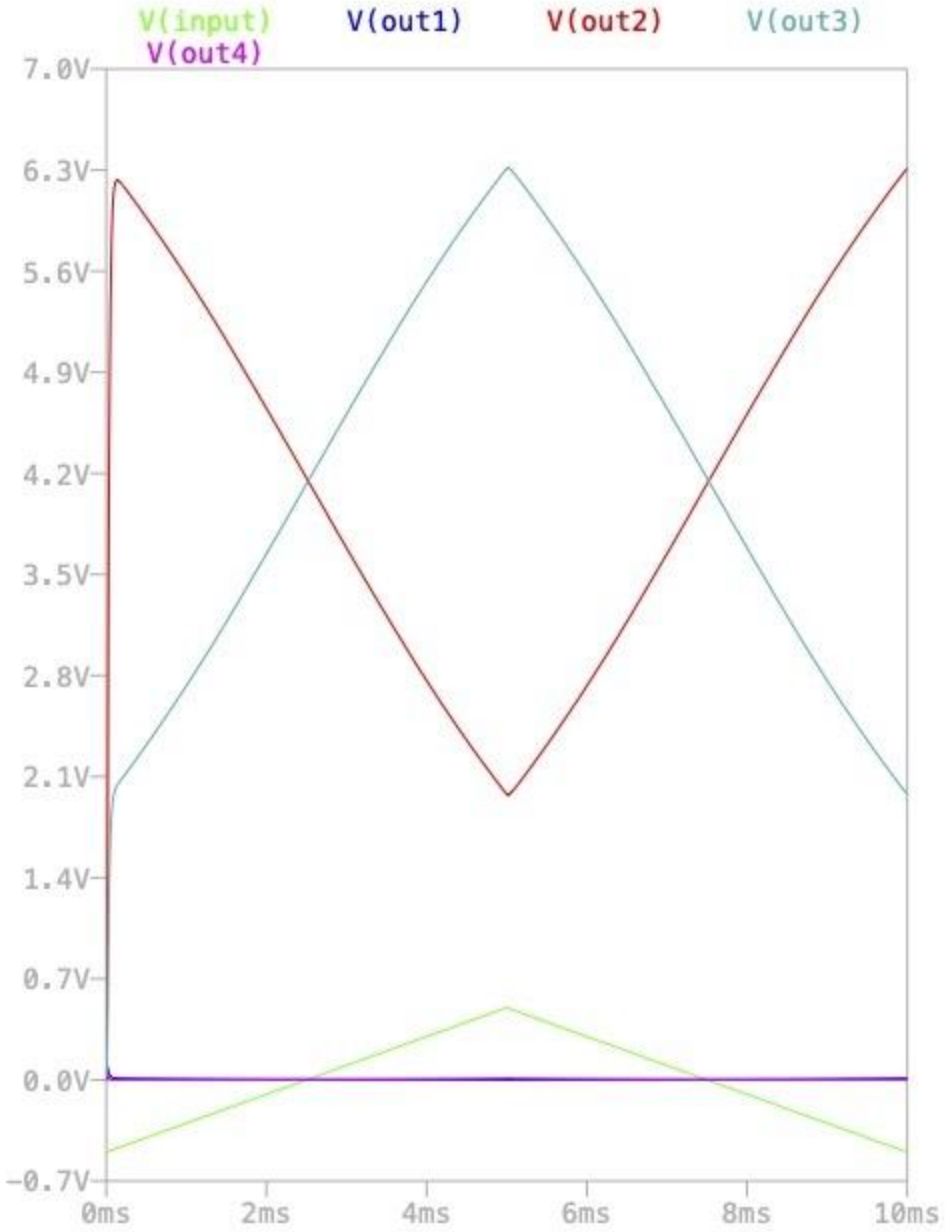

V(input)
V(out1)
V(out2)
V(out3)
V(out4)
7.0V
6.3V
5.6V
4.9V
4.2V
3.5V
2.8V
2.1V
1.4V
0.7V
0.0V
-0.7V
0ms
2ms
4ms
6ms
8ms
10ms

Fig 2.1

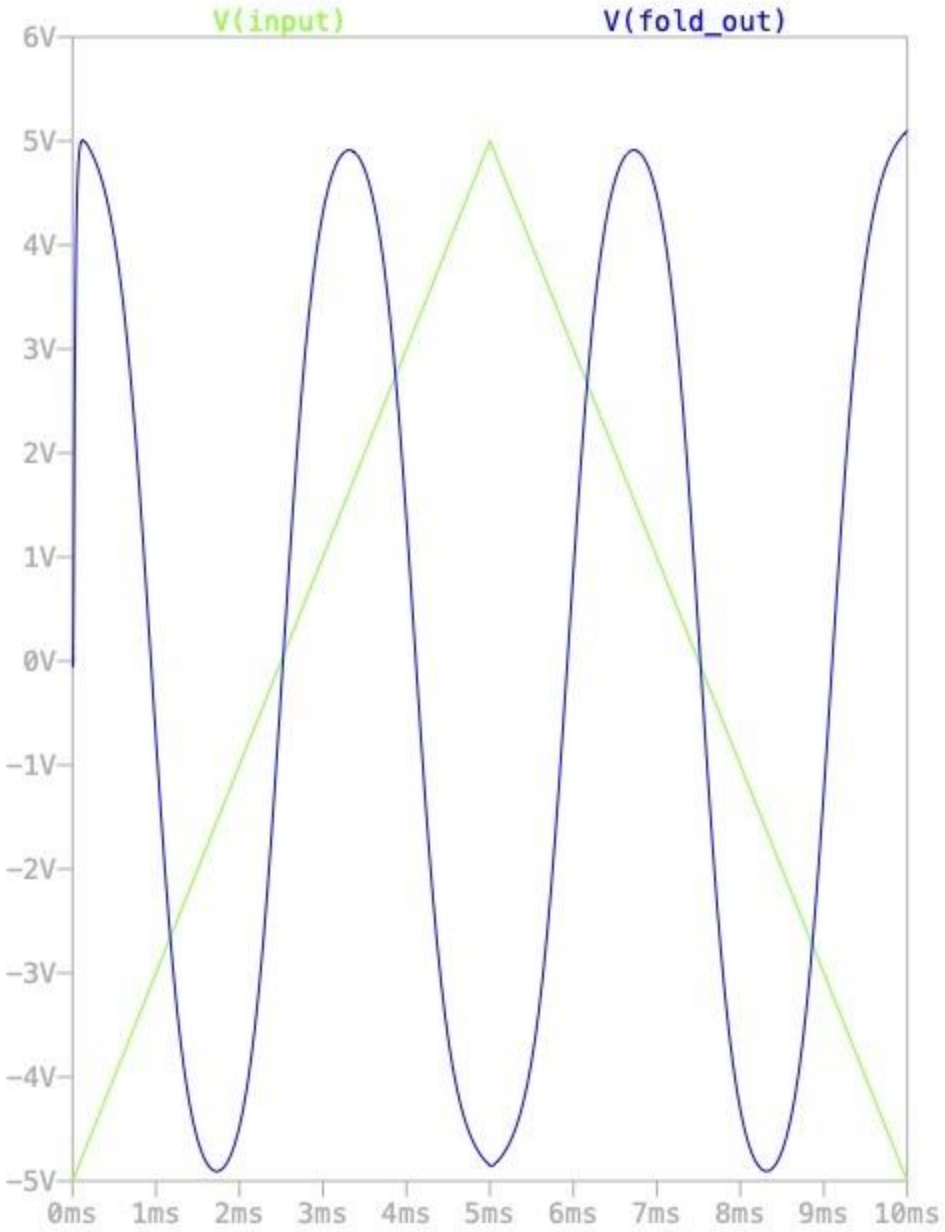

V(input)
V(fold_out)
6V
5V
4V
3V
2V
1V
0V
−1V
−2V
−3V
−4V
−5V
0ms
1ms
2ms
3ms
4ms
5ms
6ms
7ms
8ms
9ms
10ms

Fig. 2.2

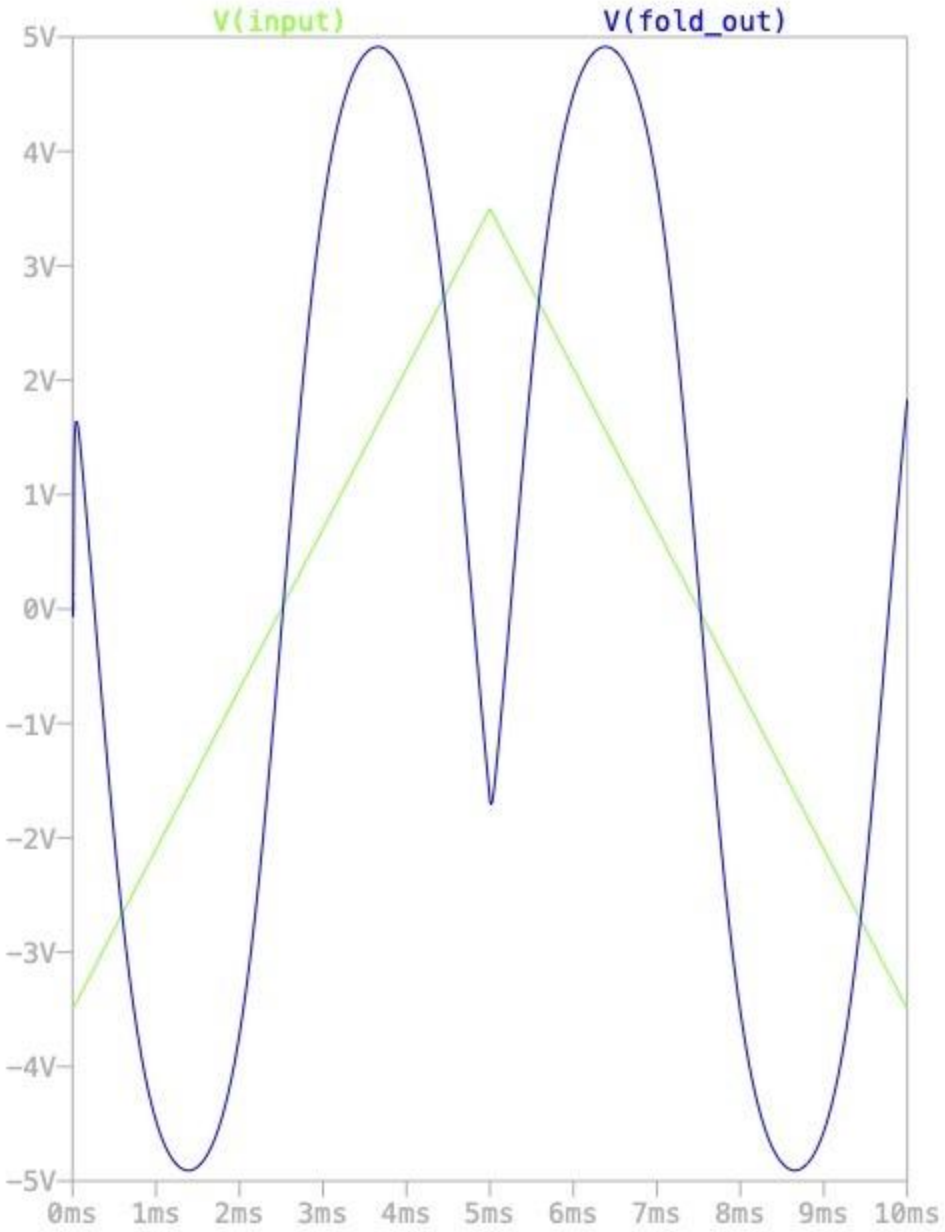

V(input)
V(fold_out)
5V
4V
3V
2V
1V
0V
−1V
−2V
−3V
−4V
−5V
0ms
1ms
2ms
3ms
4ms
5ms
6ms
7ms
8ms
9ms
10ms

Fig. 2.3

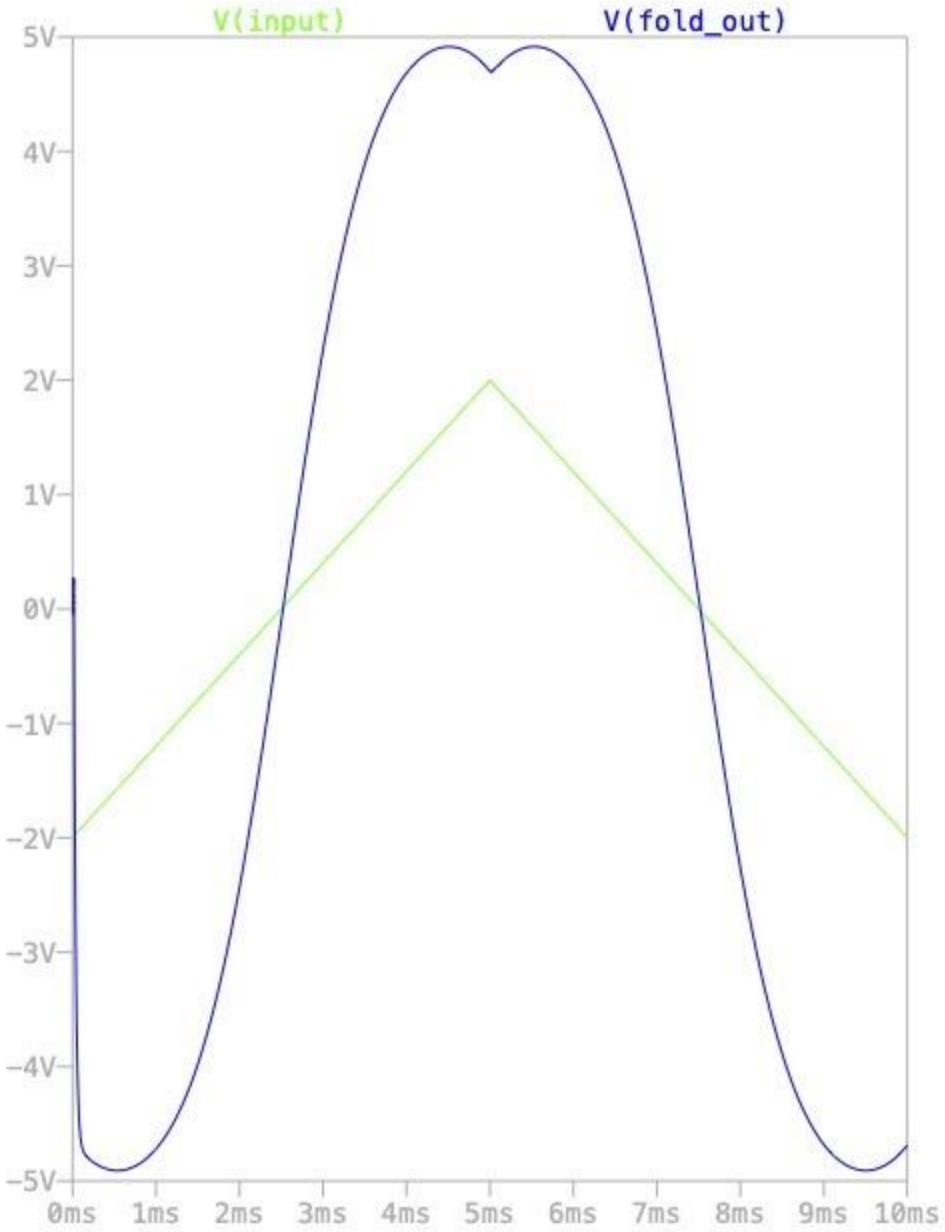
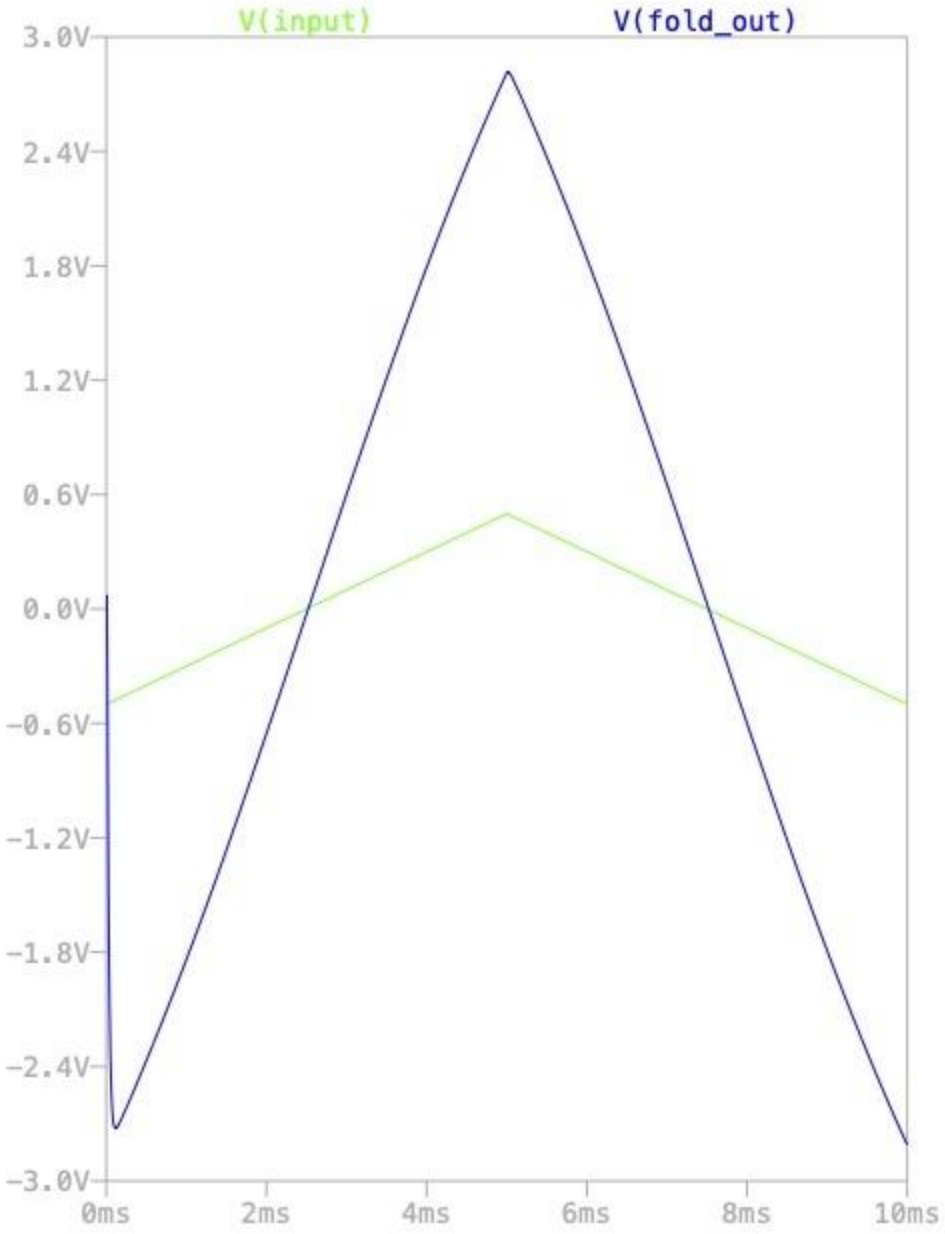

V(input)
V(fold_out)
5V
4V
3V
2V
1V
0V
-1V
-2V
-3V
-4V
-5V
0ms
1ms
2ms
3ms
4ms
5ms
6ms
7ms
8ms
9ms
10ms

Fig. 2.4


V(input)
V(fold_out)
3.0V
2.4V
1.8V
1.2V
0.6V
0.0V
-0.6V
-1.2V
-1.8V
-2.4V
-3.0V
0ms
2ms
4ms
6ms
8ms
10ms

Input

Signal to be processed by Gilbert

DC Coupled, expected range: +/- 5V

Manual

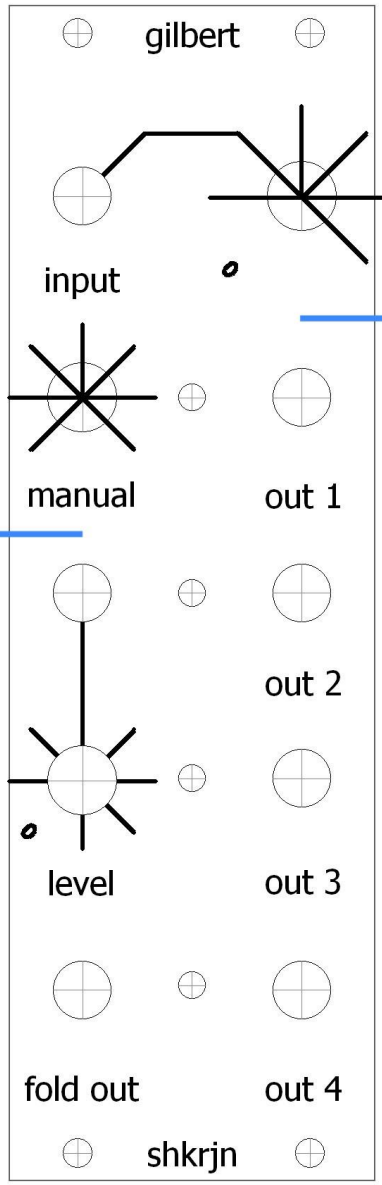
This internal DC offset mixes with the input signal post attenuation. Along with the input attenuator, the manual control allows Gilbert to accommodate unipolar signals at the input and determines the status of the various outputs

Level

Level acts as a global VCA and controls the level of all of Gilbert's outputs simultaneously. The CV input sums with the panel control and the total expected range of this sum is 0 - 10V.

Fold Out

The four main outputs are internally processed through a bipolar mixer, the output of which is provided at the fold output. This allows Gilbert to function as a wavefolder/frequency multiplier. This output waveform is bipolar with a range of +/- 5V when the level control is fully clockwise.



This accompanying input attenuator adjusts the level of the input signal, which determines how many of Gilbert's outputs are active

Main Outputs

As the input voltage increases from -5V to +5V, four unipolar sine waves rise and fall sequentially at the four main outputs with a 90 degree phase difference.

The voltage range of these outputs is determined by the level control. The maximum range is 0 - 8V