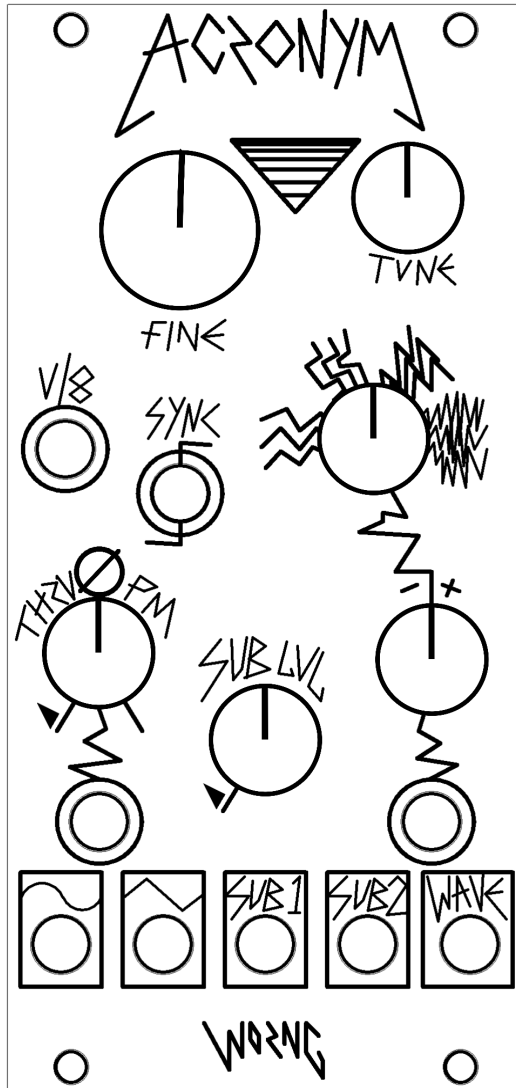


# WORNG Electronics ACRONYM manual

v1.00 January 2023



Thank you for purchasing a WORNG Electronics ACRONYM! At WORNG Electronics we design modules to be the highest quality, with functional well-designed ergonomics as well as distinctive aesthetics and solidly engineered electronics. The ACRONYM is our first module that makes sound of its own, and in typical WORNG Electronics fashion we've pushed it a little further than the run of the mill designs you might already be familiar with. We hope you love exploring new timbres with your ACRONYM!

## Connecting your ACRONYM:

ACRONYM requires 12hp of space in your Eurorack system, and a depth of at least 40mm. Connect the included power cable to the back of the module and to your power busboard. The connection on the module is shrouded and can only go one way, but is also marked with a line to let you know which way the red stripe should be facing. The module is also electrically protected against damage from reverse power connection,

but you should still always be careful connecting power. ACRONYM consumes 95mA of +12V and 72mA of -12V.

## ABOUT ACRONYM:

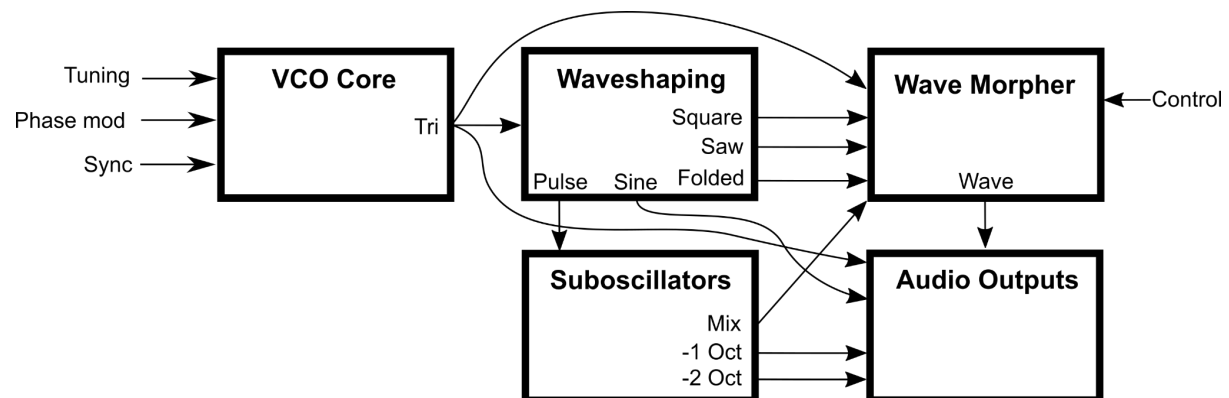
ACRONYM stands for

### **Analogue CoRe Oscillator New tYpe: Morphing.**

It combines a solid-tracking triangle core analogue VCO with some unique waveshaping circuits, and packages it all with a user-friendly interface that allows precise control by hand or with CV.

The key parts of ACRONYM are:

- Triangle core VCO
- Waveshaping circuits
- Two-octave sub-oscillator
- Five-way voltage-controlled waveform morpher
- Audio outputs



## VCO CORE:

The triangle VCO core features linear through-zero phase modulation for clean and tuneful FM tones, and is the basis of all outputs from the module. The core accurately tracks 8+ octaves, even while being modulated, and includes hard sync. The Sync input detects a rising edge and resets the core to its negative peak. The volt per octave input is marked V/8 and is accurately calibrated in the factory.

Some may wonder why the Fine Tune control is large and the Coarse is smaller, as these are often the other way round on modules from other companies. This design choice was made as a larger control makes it easier to make a finer adjustment, as it has a larger circumference than a smaller control. This allows the Coarse tune to quickly get you in the general range of where you want your frequency to be, and then use the Fine tune for accurate final control. This is particularly effective for Phase Modulation, where accurate frequency ratios between the VCO and modulation source are important.

## **WAVESHAPING:**

Waveshaping creates additional Sine and Sawtooth waves from the Triangle core, and a Pulse to drive the sub-oscillator circuit. The Sine is then fed through an additional Wavefolder circuit to create rich and complex harmonic overtones. Note that the Wave Morph CV is used to subtly modulate the Bias of the Wavefolder circuit to create interesting shifting fold behaviour as the folded wave is blended into the Saw.

## **SUBOSCILLATORS:**

The sub-oscillators are specifically shaped to create a hybrid square/saw shape which has a more characterful chewy sound than a typical perfect square shape. This also allows them to be used as modulation sources which give a wider range of voltage rather than just the on/off of a square wave. The triangular frequency indicator on the panel is not driven directly by the core, but by the -2 oct suboscillator. This makes it easier to detect frequency changes, as well as the distinctive behaviour of the suboscillators while the core is being phase modulated.

Because the suboscillators run from a comparator which is triggered by a level detector in the VCO core, when the core is being phase modulated through zero it may cross this threshold multiple times as the core rapidly reverses direction, leading to periodic higher frequency outputs from the suboscillators. This more complex phase modulation doesn't exactly follow the core which is what makes it interesting, but can seem chaotic at times. You'll find that using a

modulation source which is tuned to a multiple of the core frequency will tame this behaviour somewhat if needed, and using sync between two even moreso.

## **WAVEFORM MORPHER:**

This output morphs between the Triangle, Square, Saw and Folded Sine waves with the Wave control or Wave CV input. Additionally, a combination of the -1 octave and -2 octave sub oscillator waves can be mixed into the Wave output with the Sub Lvl control. This allows you to get a complex mixture of waveforms as the basis of your synth voice without the use of external mixers, as well as use voltage controlled morphing to generate more complex waveforms.

The Morph CV input is designed to accept a voltage from -5V to +5V and is attenuverting so it can be swept fully with a typical Eurorack audio signal. Of course this means if you have a stronger signal, for example a +10V envelope, turning the input attenuvertor to 50% will give the full range of modulation. Because it's a 100% analogue circuit the input can be pushed outside those bounds and instead of clipping at the edges it will continue giving interesting outputs as it's pushed.

## **AUDIO OUTPUTS:**

The Triangle and Sine waves, as well as the one and two octave Sub-oscillator outputs, are available as outputs on the bottom of the module. The final output is the Waveform morpher output, marked Wave on the panel.

The design choice was made to provide the simpler, less harmonically rich waveforms on their own outputs both so they could be used as modulation sources and as a clean output to create more complex waves via phase modulation. The more complex and harmonically rich waveforms are available via the Morpher on the Wave output.

## **PATCH IDEAS:**

### **Creating complex timbres using Through-Zero Phase Modulation**

Acronym uses a very stable and accurate VCO core which is able to be phase modulated through-zero, allowing for the creation of rich complex timbres that stay tuneful even with extreme modulation. The difference between Through Zero FM and Through Zero PM is that PM remains in tune even if the modulating signal has a DC offset, allowing the use of more complex modulation sources for a wider range of timbres while still remaining in tune.

A classic example of Phase Modulation involves monitoring the Sine output and patching a Sine wave from another VCO to the Thru 0 PM input and turning up the PM amount. As the amount is increased you will hear the creation of harmonic sidebands, eventually reaching a point where the frequency crosses 0Hz and reverses direction. Try running the Modulator signal through a VCA before the Thru 0 PM input and modulating that with an Envelope Generator for some dynamic complex timbre generation.

Because the frequencies created by phase modulation are multiples of the original waveform which is being modulated, simple waves such as Sines give more controllable results. However, because all the waves are available on ACRONYM while being Phase Modulated simultaneously you can generate some extreme harmonics by taking the output of the Wave Morpher while PMing the core. These rich harmonics will give your filters plenty to chew on, and sweeping a resonant filter through these waves will pull out lots of interesting harmonics.

### **Creating complex timbres by modulating the Wave control**

You may have noticed that the waveforms are arranged on the wave morpher in order of increasing harmonics (Triangle - few harmonics, Square - odd harmonics, Saw - all harmonics, Folded Sine - additional

inharmonics). This means you can modulate the Wave Morpher in a wave that mimics, but doesn't replicate, modulating a low pass filter with a harmonically rich signal passing through it. Try turning the Wave Morph fully counter-clockwise and patching an Envelope Generator to the Wave Morph CV input and modulating positively. The peak of the Envelope will Morph upwards to more harmonically rich timbres and then damp the harmonics down as it decays.

## **Self-patching to create unique timbres**

One of our favourite patches with ACRONYM is patching the Sub2 output to the Wave Morph CV input. Because the Wave Morpher is fully analogue and responds up to and beyond audio rates, when Sub2 is used to modulate the Wave the result is a waveform that repeats every cycle of Sub2 but contains a morphing, stitched together wave made of parts of all the other waveforms. This creates timbres you might otherwise only find from digital wavetable oscillators or with complex patches requiring several VCOs and VCAs and other utility modules.

Start with both the Wave and Wave Morph CV controls in their centre positions, and slowly turn the Wave Morph CV control clockwise to bring in the modulation. You can experiment with different amounts of Sub2 to the Wave Morph CV and different positions of the Wave Morph control to position the constituent waves differently in the overall waveform, also consider using a VCA between Sub2 Out and Wave Morph CV In to dynamically control the waveform.

## **Patching ACRONYM in stereo**

At WORNG Electronics we've developed a bit of a reputation for groundbreaking stereo modules, so you might be wondering why ACRONYM doesn't have stereo outputs. This is because ACRONYM is designed as part of a total modular system, where you can patch your own stereo instead of just being given a pair of outputs and leaving it at that. Pairing your ACRONYM with an LRMSMSLR or MidSide+ opens

up many possibilities, particularly when using ACRONYMs multiple outputs as modulation sources as well as audio.

A basic starting point is patching the Triangle out to the Left input of MS+ and the Wave output set to one of the waveforms with more harmonics to the Right input. Set the Width control to 12 o'clock (mono) and then use the Sub2 output of ACRONYM to modulate the Width CV of MS+. This gives you a stereo waveform with alternating high and low amounts of harmonics on the left and right outputs, which switch over and morph smoothly and consistently, giving a good wide stereo image with good phase coherence.

From this starting point experiment with different combinations of waves and modulation. You can take advantage of phase cancellation from waves with similar harmonics between the mid and side to move frequencies from side to side. As a general rule, keeping low harmonics to the Mid and upper harmonics on the Side will give you usable stereo waveforms, but as always there are no rules and if it sounds good it is good. It's worth remembering also that the phase relationships between different frequencies will change when you run them through a stereo filter, so a filter with the ability to offset the cutoff controls like Parallax will be very useful in stereo patching.

## **RECALIBRATING YOUR ACRONYM:**

Your ACRONYM was calibrated at the factory using a highly accurate voltage source and frequency counter, but you may find that you want to recalibrate it to track more accurately using a particular CV source, or if you find it drifts over time. The three calibration controls are found underneath the Fine Tune control knob, removing it reveals three trimmers marked B, S, and H.

B stands for Bias, this control will make a static adjustment to the base frequency of the VCO core. ACRONYM is calibrated in the factory for 220Hz with both tuning controls in a 12 o'clock position which gives a good usable range with the knobs and CV control, but if you'd prefer a different base frequency range Bias will adjust that.

S stands for Scale, which adjusts the Volt/Octave response from the  $V/8$  CV input. This allows accurate tuning across octaves and adjusting this will allow you to change the tuning to suit other non 1V/oct devices. We don't recommend changing the factory calibration unless you know what you're doing.

H stands for High frequency trim, which is to prevent the core from tending to go flat at high frequencies due to transistor physics. It's highly unlikely that you will ever have a need to change this from the factory calibration.