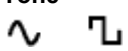# TRIWAVE PICOGENERATOR

Introduction

The Triwave is a **dual tone generator** with *three* **LFO**'s and potential for many options and modifications (mods). Primarily an instrument in either mono or stereo (optional) configurations, the Triwave can also accept various audio, trigger, and control inputs.

In this guide, **CW** stands for clockwise (knob turned all the way to the right or "up"), and **CCW** stands for counter-clockwise (knob turned all the way to the left or "down").

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Tone Generators

The two tone generators are named **Linnet** and **Gale**.

Each has the following controls:

Pitch	Controls the *Center Frequency*, which ranges approximately from 20Hz to over 20kHz (full range of human hearing).
Tone	Selects either a *Square Wave* (harsh) or *Triangle Wave* (soft). At low frequencies the *Triangle Wave* may resemble a *Sine Wave*.
Range	*(optional)* Toggles between the *Full Range* and *High Range* of the *Center Frequency*. When set to the *High Range* the **Pitch** knob will go from a middle pitch (with respect to the *Full Range*) to extremely high pitches.
Cross Mod	Each channel gets a **Cross** knob, which controls how much of the other channel's audio is passed through to modulate the channel's knob you're adjusting. To best hear its effect try the following: turn down all the **Depth** knobs, turn up one channel's **Cross** knob and **Pitch** knob to a medium-high pitch (Ex. **Gale**), and then sweep the **Pitch** knob on the opposite channel (Ex. **Linnet**).

LFO's

Each of the three **LFO**'s can independently modulate the pitch of each of the two tone generators. The flashing LED lights indicate the rate of each LFO.

Each **LFO** has the following controls:

Speed	Sets the rate at which the **LFO** rises and falls. The range is approxiamately from 0.1Hz to 125Hz (or from 10 cylces/second to a low audio pitch).
Depth	These six knobs allow you to control the **LFO**'s effect level. They are split into to two groups of three—one for **Linnet** and one for **Gale** giving you six combinations of modulation.
Wave	*(optional)* Chooses the **LFO**'s waveshape. At **CCW**, the **LFO** produces a *Square Wave* (sharp chopping). At **CW**, it produces a *Triangle Wave* (smooth fading). In between these two extremes it produces various *Square/Triangle* hybrid waveshapes.
Symmetry	*(optional)* Adjusts the **LFO** waveshape *Symmetry* (duty cycle). In conjunction with the **Wave** control **Symmetry** can produce alternate waveshapes. With **Wave** set to *Triangle Wave* and **Symmetry** at **CCW** the **LFO** produces a *Ramp-Up Sawtooth Wave*; set to center is the normal *Triangle Wave;* and at **CW** a *Ramp-Down Sawtooth Wave*. With **Wave** set to *Square Wave* and **Symmetry** at **CCW** the **LFO** produces a *Blip-Down Wave*; set to center is the normal *Square Wave*; and at **CW** a *Blip-Up Wave*.

Output

Volume	Sets the overall output level.
Mix	Blends **Linnet** and **Gale** output signal mix. At **CCW** only **Gale** is heard, while at **CW** only **Linnet** is heard. With the **Mix** knob at center position both channels are heard equally.
Pan & Volume	*(stereo triwave only)* These four controls replace **Volume** and **Mix**. Each channel now has its own **Volume** and **Pan** controls. The **Pan** knob allows each channel to be hard-panned to the left or right output jack—or set anywhere in the stereo field—while the separate **Volume** knobs allow for independent control over the **Linnet** and **Gale** output levels.

Inputs and Control Jacks

Ring Mod   *Ring Modulation* is produced by combining two frequencies (often an input signal and an internal oscillator) to generate their sum and difference frequencies. In the triwave, the input jack signal is boosted or cut by a **Sensitivity** control knob and then fed into both **Linnet** and **Gale** for complex *Ring Modulation* effects. To best hear this effect insert an input signal (Ex. guitar, keyboard, iPod, etc.) into the input jack. Turn down all the **Depth** and **Cross** knobs (fully **CCW**) and adjust the **Sensitivity** knob to fully **CW**.

Aux Volume   Allows an incoming signal at the input jack to be smoothly blended over the Triwave's tone generators, passing to the output unaffected.

Exp. Jacks   These inputs either control **LFO** speed or **Linnet** and **Gale** pitch with an *Expression* or *Volume* pedal. Each jack controls one parameter only. The respective knob will set the low end of the control range when something is plugged into the jack. For full expression pedal range, turn the knob to **CCW**.
<u>Note</u>: It's recommended to use an *Expression* or *Volume* pedal with a 500k pot. *Expression* pedals with a 100k pot will work for pitch control, but will limit the LFO speed range to the medium and fast speeds.
<u>Hint:</u> Any variable resistance can be used: photocells, external potentiometers, fingers squeezing two wires, etc.
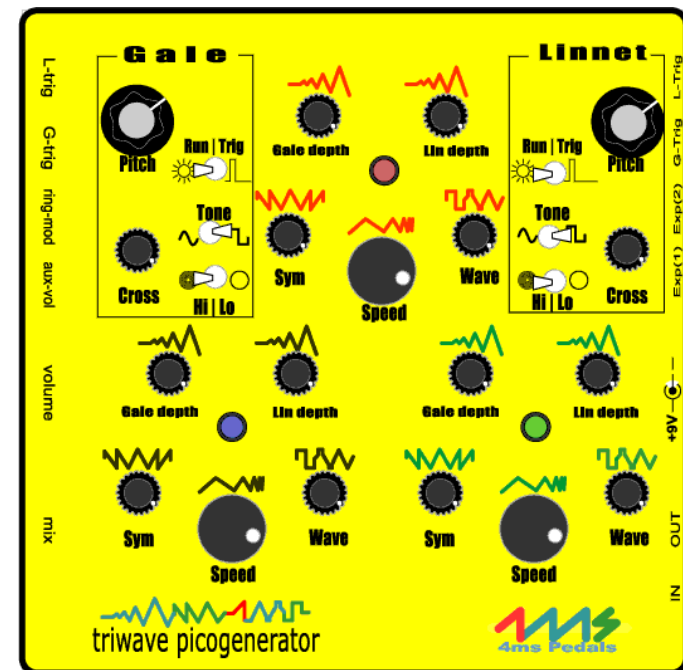
Triggers

Each channel (**Linnet**/**Gale**) has a *Drum Trigger.* In most Triwaves, each channel has its own trigger jack. Optionally, the Triwave may be built so that the trigger signals can be taken from the **Ring Mod/Aux Vol** input jack.

Trigger On/Off   With the trigger on, the channel will be silent unless there's a signal at the trigger jack. As long as a signal persists, the channel will continue to be "on", thus making a sound. Anything can be a trigger: plucking a guitar string, tapping a keyboard key, a drum pad, a drum machine, or a CV output from a synth—even touching a bare cable with your finger.

Trigger Sens.   This sets the trigger threshold. With a low threshold (**CW**), the tiniest signal will cause the channel to make sound. With a high threshold (**CCW**), only a loud signal will trigger the channel. Interesting effects can be obtained by sweeping this control while inputting a steady rhythm.

TRIWAVE PICOGENERATOR

User Guide

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