PIXELWAVE

3 OSCILLATOR
PHASE DISTORTION GUITAR SYNTH
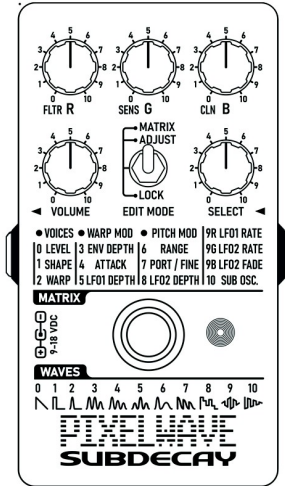
USER GUIDE
VERSION 1.00A

Oscillator Waveforms:

	Name	Wave Modulation				Name			
0	Saw	Sine	Saw		5	Tri Res	Sine	Tri Spectra
1	PWM	Square	Pulse		6	Hard Res	Sine	Spectra distortion
2	Pulse	Sine	Pulse		7	Sync	Sine	Saw Sync Freq.
3	Sqr Res	Sine	Sqr Spectra		8	Noise		Filtered Noise Resonance
4	Saw Res	Sine	Saw Spectra		9	Ring 1		PWM Ring Modulation
					10	Ring 2		Saw Ring Modulation

All waveforms can be modulated manually, by envelope or by LFO.
Waveforms 0, 1 & 2 use pure phase distortion.
Waveforms 3 – 7 use a windowed sync function.
Waveform 8 emulates filtered noise with increasing resonance.
Waveforms 9 & 10 are similar to the Saw and PWM waves, but ring modulate with the previous oscillator. Oscillator order is SUB>REG>GREEN>BLUE. Ring modulation can be stacked over all four oscillators with the final output being the Blue oscillator.

Factory Reset and startup options:
With edit mode set to ADJUST set the select knob to 10 and hold the bypass switch for two seconds. Upon release the LED will pulse red 4 times. Then it will flash. The set the select knob to the following settings for the following options. Settings effective the next time the pedal is powered on.

1 Green flash 2x: Restore factory presets for guitar.
2 Green flash 3x: Restore Guitar tracking. (does not change user presets)
3 Green flash 4x: User Tracking range. Set the B knob for tracking range.
4 Blue flash 2x: Restore factory presets for bass.
5 Blue flash 3x: Restore Bass tracking. (does not change user presets)
6 Blue flash 4x: User Tracking range. Set the B knob for tracking range.
(All other select knob settings are reserved for diagnosis and trouble shooting.)

Warranty:

The Subdecay Pixel Wave is a digital guitar synthesizer based on phase distortion synthesis originally used in the 80s by Casio Cosmo synthesizers. This synth engine was meant to compete with the iconic DX7 FM synth. The sounds lay somewhere between the cold DX digital and earlier analog synthesizers. The Cosmo synths were also easier to program than their FM counterparts. While mostly forgotten for years outside a small cult following, phase distortion synthesis has had a renaissance over the last decade.

How it works:
The Pixel Wave is a monophonic guitar synth with 37 programmable parameters and 11 user presets. Parameters control 3 Oscillators, 1 sub oscillator, modulation, LFOs, routing, pitch offset and more. The edit mode switch and select knob control the interaction of R G & B knobs.

Controls:
Edit mode switch: Changes function of controls including the bypass switch.
Lock: Locks access to RGB controls to avoid drastic changes in sound if the knob positions are accidentally changed.
Switch– press to bypass or engage the effect.
Select– Changes between 11 user presets.
RGB knobs– No effect in this mode.
LED– Blue & green on when the effect is engaged.

Adjust:
Switch– press to bypass or engage the effect.
Select– No effect in this mode.
R- Filter– A low pass filter tone control.
G- Sense– Signal input level to the effect. This will alter note sustain and change how far the envelopes will open.
B- Clean– Clean signal level.

Matrix: Used for deep editing options.
Switch– Press to solo oscillators. The LED will cycle colors to indicate which oscillator is active. To save settings hold the switch for two seconds.
Changing modes– Changing to adjust mode from matrix mode will retain all settings, but switching to lock mode will revert back to user presets.
The RGB knobs mostly line up with the PixelWave's three oscillators and serve the same function for each oscillator, but there are some exceptions. (exceptions shown in bold in the table below)

SEL	Red Oscillator 1	Green Oscillator 2	Blue Oscillator 3
0	Level	Level	Level
1	Shape	Shape	Shape
2	Warp	Warp	Warp
3	Warp envelope	Warp envelope	Warp envelope
4	Warp envelope attack	Warp envelope attack	Warp envelope attack
5	Warp LFO level (LF01)	Warp LFO level (LF01)	Warp LFO level (LF01)
6	**Range– octave up or down**	**Range– Half step increment detune**	**Range– Half step increment detune**
7	**Portamento**	**Fine tune by +/- half step**	**Fine tune by +/- half step**
8	Pitch LFO level (LF02)	Pitch LFO level (LF02)	Pitch LFO level (LF02)
9	LF01 Rate	LF02 Rate	LF02 Fade
10	Sub oscillator level	Sub oscillator shape	Sub oscillator warp

1 Shape: Selects oscillator waveform. (See opposite page for waveforms)
2 Warp: Manually warp the waveform (phase distortion)
3 Envelope Depth: Pick attack modulates waveform warp. Turn left for reverse modulation. Turn right for forward modulation. Center for no envelope modulation.
4 Attack: Turn left for a slower envelope attack.
5 LFO1 Depth: warp modulation level via LFO1.
6 Range: The R knob offsets all oscillators by one octave up or down. The G & B knobs offset their oscillators up to two octaves in half step increments.
7 Port/Fine: The R knob controls the rise time of all oscillators' pitch. The G & B knobs fine tune their oscillators.
8 LFO2 Depth: Oscillator pitch modulation via LFO2.
9R LFO1 Rate: LFO speed routed to Warp Modulation.
9G LFO2 Rate: LFO speed routed to Pitch Modulation.
9B LFO2 Fade: Controls fade in of Pitch modulation. Turn to the right for vibrato delay.
10 Sub Oscillator: R- Level. G- Shape (Saw, Pulse, Hard Res, or Sync.) B- Manually warp the waveform.

Where and how to use:
The Pixel Wave is a monophonic effect. This can require some adjustments in playing style. Making sure to play only one string at a time will improve tracking. Using palm muting techniques to keep other strings quiet helps as well. Using the neck pickup of your guitar will also help. Using other effects in front of it will usually result in poor tracking.