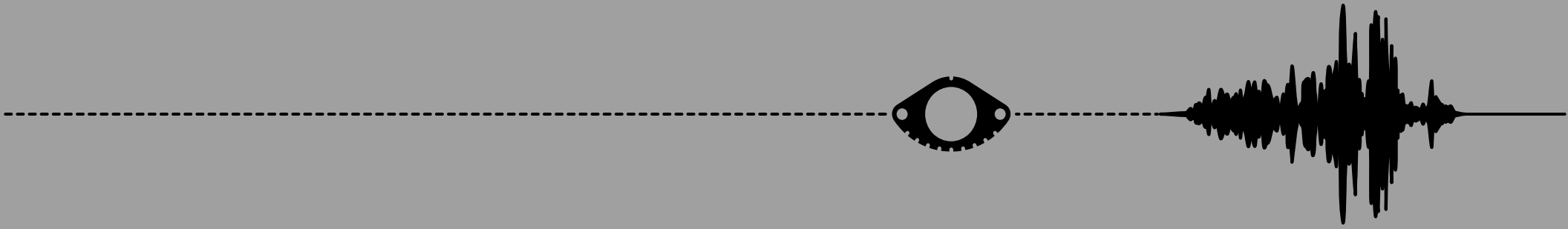
therevox

ET-4.3
user manual



Therevox builds custom musical instruments in Tecumseh Ontario Canada.

The ET-4.3 was designed and constructed by Mike Beauchamp and Melissa Damphouse with heaps of support from family, friends and our customers.

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Made in Canada

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user manual

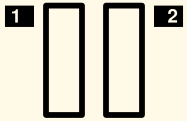
contents

playing

The ET-4.3 is a continuous pitch analog instrument. Sounds are produced by two oscillators, each producing six different waveforms. A low-pass filter and spring reverb allow for further sonic goodness.

The pitch of the instrument is controlled by the ring and the amplitude of each oscillator is controlled by the pressure sensitive intensity keys.

The Keys



By varying the pressure on each of the intensity keys, you create amplitude envelopes for each of the oscillators.

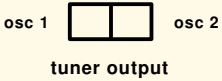
Use these separately to switch between different voices, or mix the oscillators together creating unique sounds.

The Ring

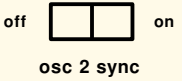
The ring controls the pitch of the oscillators. The reference keyboard allows you to point to notes and everything in between.

The ring can be adjusted to fit comfortably between the first and second knuckle by moving the rubber retainer to a different notch.

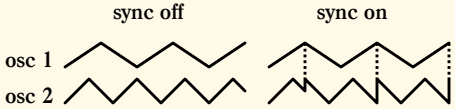
switches

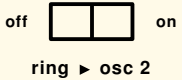


A tuner can be connected to silently verify and modify tuning of either oscillator at any time. The tuner output switch selects which oscillator to tune.



Synching oscillator 2 will force the waveform to reset at the same pitch as oscillator 1.





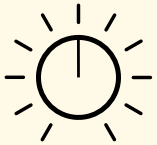
The pitch of oscillator 2 can follow the ring or be disconnected from it using the ring › osc 2 switch. Disabling this allows oscillator 2 to be set to a consistent pitch.

oscillators

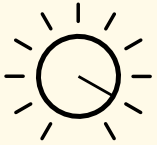
Ring offset is the master tuning control for both oscillators and the external ring CV.

Oscillator 2 can be tuned independently using the osc 2 offset control. This control can also be used to detune or offset the pitch of oscillator 2 to any harmonic interval of oscillator 1.

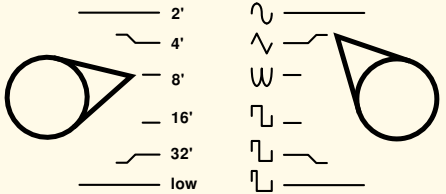
For each oscillator there are six octave positions and six waveform options.



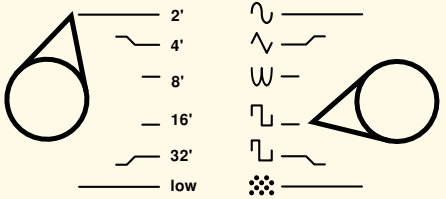
ring offset



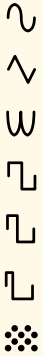
osc 2 offset



osc 1



osc 2



Sine Wave

Triangle Wave

Rectified Sine

Square Wave

30% Pulse

10% Pulse

White Noise

filter and reverb

The filter cutoff alters the timbre of the oscillators. Turning the knob clockwise on this low-pass filter allows increasingly higher frequencies to be heard. This can also be controlled with an expression pedal or external control voltage plugged into the exp jack.

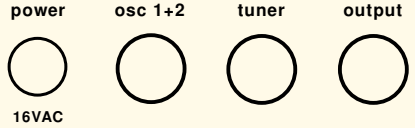
The filter resonance controls the amount of emphasis at the filter cutoff frequency.

Reverberation is generated by sending the sound through a series of springs inside the ET-4.3. The dry+reverb mix knob controls the blend between the original and reverberated sound.

The amplitude of the output signal is controlled by the output volume knob.

effects loop and phones

power and outputs



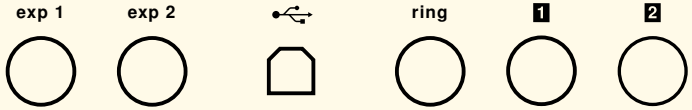
The ET-4.3 is powered by a 16VAC 1000mA adapter.

Osc 1+2 is a stereo TRS output with each oscillator on a separate channel. These signals are taken before the filter and reverb.

An instrument tuner can be plugged directly into the front panel.

The output is a line-level signal, appropriate for most recording equipment, amplifiers and effects. Lower the output volume if you experience unwanted distortion.

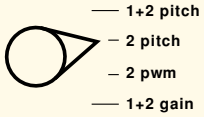
exp and cv jacks



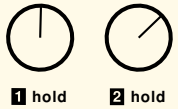
The ET-4.3 has two expression pedal inputs. Exp 1 can be assigned to different parameters using the Exp 1 Function switch. Exp 2 can be used to control the filter cutoff frequency. Use a 1/4" TRS plug with an appropriate pedal. The exp input can also accept an external CV within 0 and +10V.

To interface with external synthesizer gear, control voltage outputs are available on the side panel. A 1V/oct CV for the ring is available, as well as control voltage outputs for each intensity key.

exp 1 and holds



exp 1 function



Exp 1 is an expression pedal or CV input that can be assigned to 4 different parameters.

1+2 pitch : controls pitch of both oscillators. Can be used with external keyboard with 1V/oct CV output.
2 pitch : controls pitch of oscillator 2. An expression pedal w/ attenuation can be used to bend osc 2 to a set interval.
2 pwm : changes the width of the pulse wave of oscillator 2. Best used when set to 30% pulse.
1+2 gain : controls the volume of both oscillators. Use a pedal instead of the intensity keys or modulate with CV source.
The hold knobs control the volume of each oscillator and can be used to "hold" the position of each intensity key.

A 1/4" mono cord can be used on the side panel to create custom patches. Here are some examples:

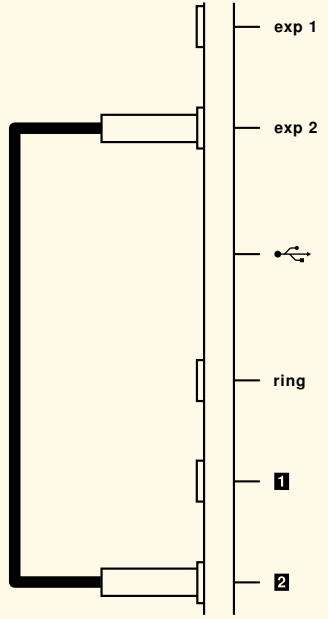
ring -› exp 2 : filter cutoff frequency will change with ring position.

[2] -› exp 2 : control the filter cutoff with intensity key 2. Optionally mute oscillator 2 by turning sync on and setting this oscillator to the lowest octave.

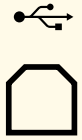
Tune Out -› exp 2 : use osc 2 as an LFO by setting it to "Low" and disabling ring › osc 2.

[2] -› exp 1 @ 2 pwm : osc 2 pulse width changes with amplitude.

The filter cutoff knob changes the range when using the exp input.



midi over usb output



A Type-B USB jack on the side panel is used to send MIDI commands to a USB host such as a laptop or computer.

With the ET-4.3 already powered on, plug the USB cable between the host and instrument. When the instrument recognizes a connection it will wait 10 seconds for you to select a mode of operation. There are 4 modes of operation that can be selected by having held down different intensity keys at the conclusion of the 10 second wait time. To switch to a different mode unplug the USB cable, plug it back in and then hold down the appropriate intensity key(s).
The position of the ring is sent as a 14-bit pitch bend covering +/- 24 or 12 semitones depending on the operating mode selected. The ring offset knob can still be used to tune the position of the ring.

	Mode 0 	Mode 1 	Mode 2 	Mode 3 
Ring :	+/- 24 semitone CH: 1	+/- 24 semitone CH: 1, 2	+/- 12 semitone CH: 1	+/- 12 semitone CH: 1, 2
Intensity key 1 :	Note On/Off, CC 20 CH: 1	Note On/Off, CC 20 CH: 1	Note On/Off, CC 20 CH: 1	Note On/Off, CC 20 CH: 1
Intensity key 2 :	CC 21 CH: 1	Note On/Off, CC 21 CH: 2	CC 21 CH: 1	Note On/Off, CC 21 CH: 2
Osc 2 offset :	CC 22 CH: 1	CC 22 CH: 2	CC 22 CH: 1	CC 22 CH: 2
Osc 1 oct :	Note oct CH: 1	Note oct CH: 1	Note oct CH: 1	Note oct CH: 1
Osc 2 oct :	CC 23 CH: 1	Note oct CH: 2	CC 23 CH: 1	Note oct CH: 2
Exp 1 :	CC 4 CH: 1	CC 4 CH: 1, 2	CC 4 CH: 1	CC 4 CH: 1, 2

care

This instrument is handcrafted out of North American black walnut and is protected with a hand rubbed tung oil finish.

Panels and wood can be cleaned with a slightly damp rag.

Because of the internal spring reverb, take care when handling and moving.
Avoid water and extreme temperatures. In case of emergency, do not use instrument as a flotation device.
Your instrument has been calibrated and tested by Therevox. Please contact us if you have any questions or comments.

technical info

16V AC 1000mA. (Not DC!)
2.1mm barrel type.

0 to +6V @ 1V per octave.
‹100 ohm.

-0.15V to +10V.
1000 ohm.

3V p-p.
5000 ohm.

1/4” TRS. Tip - CV, Ring - Reference, Sleeve - Ground.

MIDI Output:

protocol:	MIDI over USB
processor:	32-bit ARM Cortex-M4 MK20DX128 @ 48 MHz
sampling:	16-bit ADC
board:	Teensy 3.0
programming:	Arduino capatible. Teensyduino w/ halfkay bootloader