EarthQuaker Devices EQD Wave Transformer Eurorack Transfiguration Oscillator Instruction Manual

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Hey, what's up? Congratulations on your purchase of The Wave Transformer Transfiguration Oscillator. The Wave Transformer is a voltage-controlled oscillator with vintage voicing and over 8 octaves of precise pitch tracking. It has 7 simultaneous wave outputs, including a special Complex output.

The Transform control transmutes from a basic waveform through many strange iterations into a complex, twisted mass of audio mutations at the Complex output. You can produce countless variations on these permutations by combining this new circuit with Hard Sync, Soft Sync, Linear FM and Exponential FM. Additionally, you can mute the source waveform to use the circuit as a harmonic/ VCA gate. If that wasn't enough, it has a Shape Insert that allows you to transform external oscillations and modular-level audio sources.

Special thanks to Angela Kolenc, Jamie Stillman, Julie Robbins, Luke Zollinger, Karl Vorndran and Jon Sonnenberg. Without your support, none of this would be possible. –Joshua Kolenc, Designer de modules e autor do manual

NOTICES

ELECTRICAL DANGER! IMPROPER INSTALLATION OR HANDLING MAY RESULT IN ELECTROCUTION OR DAMAGE TO YOUR MODULE, EURORACK ENCLOSURE OR OTHER MODULES. ALWAYS SWITCH OFF AND DISCONNECT THE EURORACK ENCLOSURE OR POWER SUPPLY BEFORE INSTALLING A MODULE. MAKE SURE TO COVER ALL EMPTY RACK SPACES WITH
BLANK PANELS.

HIGH SIGNAL LEVELS! THIS DEVICE HAS THE CAPABILITY OF PRODUCING MODULAR SIGNAL LEVELS ABOVE +/-10 VOLTS. USE CAUTION WHEN OPERATING THIS EQUIPMENT AS HIGH SIGNAL LEVELS MAY DAMAGE YOUR AUDIO EQUIPMENT OR YOUR HEARING!

EARTHQUAKER DEVICES DOES NOT IMPLY OR ASSUME ANY RESPONSIBILITY FOR DAMAGE TO ANY PERSON OR DAMAGE TO ANY DEVICE OR OBJECT AS A RESULT OF THE USE OF THIS MODULE.

CE

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES.

OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

CHANGES/MODIFICATIONS NOT APPROVED BY EARTHQUAKER DEVICES LLC COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A DIGITAL DEVICE PURSUANT TO PART 15 OF THE FCC RULES. THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS.

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TECHNICAL SPECIFICATIONS

- Horizontal dimension: 20HP
- Maximum depth: 25.4 mm / 1 inch
- Power consumption: 90 mA max. +12V rail /90 mA max. -12V rail
- Standard 10-pin Eurorack power connector with marking to note negative pins
- Skiff compatible – less than 1 inch (25.4 mm) remains behind panel with power connector installed

WE RECOMMEND USING A HIGH QUALITY, LOW NOISE POWER SUPPLY.

INSTALLATION

1. Shut down and disconnect the Eurorack case or power supply and allocate 20HP of empty space in the system.
2. Connect the 10-pin end of the included ribbon cable to the power pin on the back of the module so that the red stripe on the cable faces the words “Red Stripe” printed on the circuit board. Connect the 16-pin end of the ribbon cable to the bus board of your Eurorack enclosure according to the enclosure or bus manufacturer’s specifications. Position the cable correctly, otherwise it may cause damage to your module or system.
3. Secure the module to the rails with chassis-compatible mounting screws and cover any remaining open space with blank panels.

PANEL CONTROLS

SUB SOURCE

Selects the internal oscillator or signal routed to the Shape Insert jack for use in sub-octave generation. This control affects the Complex, Sub Pulse and Sub Square outputs. Leave it at “Int” unless you are tracking an external source.

SUB OCTAVE

Selects between 1 octave lower, 2 octaves lower or mute the sub-octaves. This control affects the Complex and Sub Square outputs. The Sub Pulse output is not affected by this control as it is fixed at 1 octave lower.

COMPLEX

SOURCE Selects between muting and unmuting the source wave for the Complex output

Leaving the source wave on allows you to hear the waveform transform from the original wave through multiple iterations until maximum harmonic complexity is reached.

Muting the source waveform means that the Complex output will be silent if the Transform panel control is fully counterclockwise and no CV is present at the Transform CV input.

This allows the Transform circuit to act as a harmonic/VCA gate. It will go from silence to increasing volume and harmonic complexity as the panel control or CV input increases.

TUNE

Wide control of oscillator tuning, covering approximately 7 octaves.

FINE TUNE

Fine control of the oscillator tuning, covering just over an octave.

ÿTUNE (MICRO TUNE)

Ultra-fine oscillator control, covering approximately 25 cents.

PULSE WIDTH

Varies the Pulse dimension of the Rectangle output between 0% and 100%. At 0% or 100% Pulse Width, the Rectangle output is silent.

TRANSFORM

Transforms the Complex output of a triangle wave through multiple iterations into a strange, harmonically complex waveform using an asymmetrical multi-differential audio transmutation circuit.

It can range from a simple waveform to a silhouette of your cat watching you react to a “gift” he left for you on the counter. It is serious.

APPETIZER

HARD SYNC

Accepts +/-5 volts. Uses the input signal to reset the oscillator phase. This input works best with pulses. You can use positive pulses, negative pulses or bipolar pulses. The positive pulses and the negative pulse will reset the oscillator to different points in its phase. Using bipolar pulses will alternate between resetting the oscillator to the two different phases. The input pulses will force the oscillation period to be tuned to integral multiples of the input signal.

SOFT SYNC

Accepts +/-5 volts. Pulses at this input cause the upper peak of the triangle wave to prematurely change direction, causing the period of oscillation to be a multiple of the pulse amplitude of the input signal.

ACCEPTS TRADITIONAL VOLT/OCTAVE CV TO CONTROL TUNING. IT CAN ALSO ACCEPT UP TO -10 VOLTS TO SLOW DOWN TO 0.12 HZ FOR LFO OPERATION. OVER 8 OCTAVES OF ACCURATE PITCH TRACKING STARTING AT A-1 (13.75 HZ).

V/OCTAVE

Accepts traditional volt/octave CV to control pitch. Over 8 octaves of precise pitch tracking starting at A-1 (13.75 Hz).

SHAPE INSERT

Accepts +/-5 volts. Allows the insertion of another waveform or modular level signal to be muted by the Transform circuit.
The new waveform will change the results heard at the Complex output. The sub-octave circuit can track the input signal if you set the Sub Source switch to «Ext». Otherwise, the Complex output will have a mixture of harmonics derived from the external audio and sub-octaves derived from the internal oscillator. Many

strange and interesting results can be achieved with creative combinations and cross-modulations with external sources.

THE ORIGINAL WAVEFORM INSERTED INTO THIS INPUT WILL ONLY BE HEARD IF COMPLEX SOURCE IS SET TO ON AND THE TRANSFORM CONTROL IS FULLY COUNTERCLOCKWISE WITHOUT ANY CV PRESENT ON THE TRANSFORM CV INPUT.

LIN FM

Accepts +/-5 volt audio signals. It allows linear frequency modulation, where an increase or decrease in the control voltage respectively increases or decreases the tuning of the oscillator with a linear relationship to the input voltage.

The input is AC coupled to block DC signals in order to reduce any pitch compensation when using frequency modulation.

This input is accompanied by an attenuator located above the input jack.
The input signal is fully attenuated when the control is counterclockwise and passes through unaffected when the control is fully clockwise.

EXPO FM

Accepts +/-10 volts. It allows linear frequency modulation, where an increase or decrease in the control voltage respectively increases or decreases the tuning of the oscillator with an exponential relationship with the input voltage. This means that with each volt increase in the input, the audio frequency will double.

The input is DC coupled to allow the use of voltage offsets, audio rate signals and everything else.

This input is accompanied by an attenuator located above the input jack. The input signal is fully attenuated when the control is counterclockwise and passes through unaffected when the control is fully clockwise.

PULSE WIDTH CV INPUT

accepts +/-5 volts. Allows control of the pulse amplitude of the Rectangle output of the duty cycle from 0 to 100%. Pulse Width can be modulated with DC control voltages and audio signals

Note: Settings of 0% or 100% will result in silence on the Pulse Width output.

This CV input is added to the Pulse Width panel control. Use the panel control to set the default pulse dimension from which to modulate.

This input is accompanied by an inverting attenuator located above the input jack. When the associated control is fully clockwise, the CV passes unchanged to be mixed with the panel control. When the control is in the noon position, the CV is fully attenuated. When the control is fully counterclockwise, the CV is inverted before mixing with the panel control to result in subtraction.

THE WRIST SIZE CAN BE MODULATED TO CREATE SILENCE WHEN YOU DON'T WANT TO HEAR A NOTE, DISPOSING THE NEED FOR A VCA IN SOME CASES.

TRANSFORM CV INPUT

Accepts -0-5 volts. Allows control of the Transform circuit. This CV input is added to the Transform panel control. Use the panel control to set the default transformation to modulate from.

This input is accompanied by an inverting attenuator located above the input jack. When the associated control is fully clockwise, the CV passes unchanged to be mixed with the panel control. When the control is in the noon position, the CV is fully attenuated. When the control is fully counterclockwise, the CV is inverted before mixing with the panel control to result in subtraction.

Transform can be modulated with DC control voltages and audio signals.

SWITCHING THE COMPLEX SOURCE PANEL CONTROL TO «MUTE» WILL ALLOW THE TRANSFORM CIRCUIT TO ACT AS A HARMONIC GATE/VCA, WHERE VOLUME AND HARMONIC COMPLEXITY WILL INCREASE AS THE CV INCREASES AT THIS INPUT. THE EFFECTS WILL BE RELATIVE TO CONFIGURATION OF THE CONTROL PANEL, WITH THE SIGNAL MUTED WHEN THE CONTROL PANEL IS FULLY COUNTERCLOCKWISE AND THERE IS NO VOLTAGE PRESENT AT THE CV INPUT.

ÿTUNE CV INPUT

Accepts +/-10 volts. This is an exponential CV input that allows precise modulation of the oscillator pitch. An increase in voltage of 10 volts will raise the pitch by about 7 semitones. This input can be used for sequencing precise pitch bends, adding pitch jitter with a random voltage source, or sequencing small pitch changes for drone or microtonal music.

This CV input is added to the Tune and Fine Tune panel control. Use the panel controls to set the default pitch from which to modulate.

This input is accompanied by an inverting attenuator located above the input jack. When the associated control is fully clockwise, the CV passes unchanged to be mixed with the panel control. When the control is in the noon position, the CV is fully attenuated. When the control is fully counterclockwise, the CV is inverted before mixing with the panel control to result in subtraction.µTune can be modulated with DC control voltages and audio signals.

OUTPUTS

SINE

+/-5 volts. The most basic waveform has a smooth, clean sound and is made up of just the fundamental frequency.

TRIANGLE

+/-5 volts. Slightly spikier than the sine wave, the triangle wave has more vibration and contains a combination of the fundamental frequency and odd-order harmonic frequencies that fade quickly.

SAW

+/-5 volts. This is a negative ramp (downhill) saw. It has an even more vibrant sound than the triangular one and contains a mixture of the fundamental frequency and harmonic frequencies of even and odd order.

COMPLEX

Up to +/-10 volts. This strange and innovative output varies between a simple waveform (triangle, unless you route a signal to the Shape Insert jack) and a complex transformation of the harmonic structure of the original waveform. It contains a unique blend of fundamental frequency, odd-order harmonics, even-order harmonics, and subharmonics. The Sub Octave panel control will determine whether the subharmonics are derived from one octave lower, two octaves lower, or are muted.

The proportions of harmonic/subharmonic content and structure will mutate as the Transform control or associated CV is changed. Unlike the other outputs, this output also varies in amplitude in linear relation to the panel control and/or input CV.

Routing other wave outputs or external signals into the Shape Insert jack will change what is present at this output.

Use the Complex Source panel control to mute the source wave will cause the Complex output to be silent if the Transform panel control is fully counterclockwise and no CV is present at the Transform CV input. This allows the Transform circuit to act as a harmonic/VCA gate. It will go from quiet to increasing harmonic complexity as panel control or CV input increases.

RECTANGLE

+/-5 volts. The pulse size of this waveform depends on the Pulse Width panel control and its associated CV input. When there is no CV present and the panel control is set to noon, a 50% duty cycle (square) waveform is obtained.

In this configuration, it has a rich, vibrant sound that is composed of the fundamental frequency and odd-order harmonics that roll off more slowly than with the triangle wave. Varying Pulse Width changes the harmonic content of this output, reducing odd-order harmonics and, in some configurations, increasing even-order harmonics.

Modulating the Pulse Width CV input can produce many interesting harmonic movements and variations.

SUB PULSE

+/-5 volts. 25% duty cycle sub-octave signal 1 octave below the source signal. The source signal selected by the Sub Source switch. When set to Int, the sub-octave is derived from the internal oscillator.

When set to Ext, the sub-octave is derived from the signal that was routed to the Shape Insert jack.

This output is fixed at 1 octave down and does not respond to changes in the Sub Octave panel control.

WE PURPOSELY USE AN “UNPROCESSED” VERSION OF THIS OUTPUT, INSTEAD OF ONE THAT HAS BEEN REFURBISHED USING A COMPARATOR CIRCUIT. IT HAS A RAWER AND AGGRESSIVE SOUND.

SUB SQUARE

+/-5 volts. A sub-octave square wave 2 or 2 octaves below the source signal, depending on the Sub Octave setting.
The source signal selected by the Sub Source switch. When set to Int, the sub-octave is derived from the internal oscillator. When set to Ext, the sub-octave is derived from the signal that was routed to the Shape Insert jack.

JUST AS ON SUB PULSE, WE PURPOSELY USED AN “UNPROCESSED” VERSION OF THIS OUTPUT, INSTEAD OF ONE THAT HAS BEEN REFURBISHED USING A COMPARATOR CIRCUIT. IT HAS A RAWER AND AGGRESSIVE SOUND.

GUARANTEE

We will repair any of our devices for as long as the company exists. There is never a charge unless the circuit board needs to be replaced due to user-caused damage such as an unsuccessful non-factory repair, incorrect power supply, reverse voltage, modification, water damage, etc. Access www.earthquakerdevices.com/support to ask questions or initiate a warranty claim.

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References

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- Support — EarthQuaker Devices
- User Manual

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