



# electro-harmonix CLOCKWORKS Rhythm Generator Synthesizer Instruction Manual

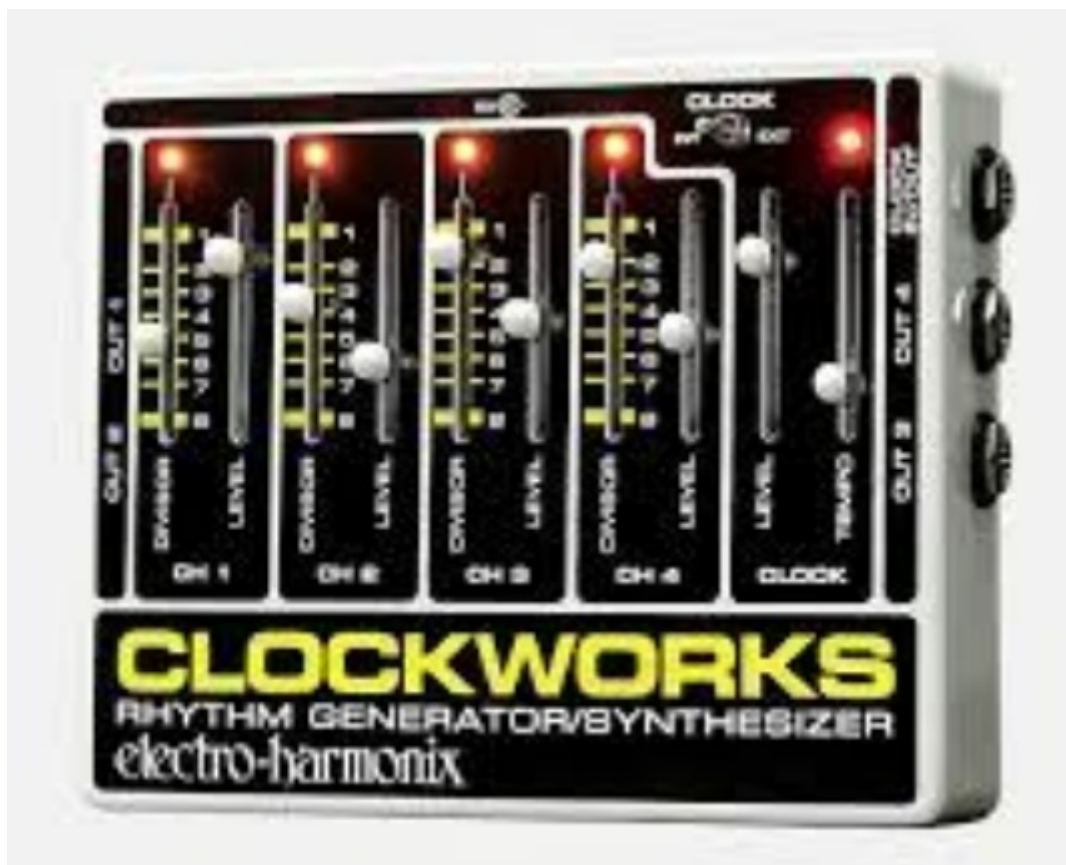
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electro-harmonix CLOCKWORKS Rhythm Generator Synthesizer



## Rhythm Generator / Synthesizer

Congratulations on your purchase of the Electro-Harmonix CLOCKWORKS! The CLOCKWORKS is perfect as a master clock for sequencers and drum machines as well as for triggering electronic percussion, classic EHX drum synths such as the Crash Pad or any other electronic device that can be triggered by pulses. Best of all, it is a faithful reissue of the much sought-after classic first released by Electro-Harmonix in 1980. CLOCKWORKS does not create sound on its own but instead generates pulses to trigger other devices. The pulse trigger can set the tempo for a drum machine or sequencer such as an EHX 8 Step. CLOCKWORKS' pulses might directly play a device by triggering a sound or note in the external device. The great thing about the CLOCKWORKS is you have four separate clock channels so you can connect four devices which will all play rhythmically with each other. The CLOCKWORKS may look complicated but what it does is actually pretty simple: it takes a master clock and divides down its frequency by a whole number between 1 and 8, outputting a pulse at the new frequency created by the divider. There are 4 clock dividers or channels, each driven from the same master clock, so creating polyrhythms is fun and easy! Each channel has its own clock divider control, output level control, and output jack. The master clock can be generated internally by the CLOCKWORKS or may come from an outside source. Although the CLOCKWORKS looks very much like a digital product, it is actually fully analog, not that there is anything wrong with digital products.

**WARNING:** Your CLOCKWORKS comes equipped with an Electro-Harmonix 18VDC-500mA power supply. The CLOCKWORKS requires up to 300mA at 18VDC with a center POSITIVE plug. The CLOCKWORKS does not take batteries. Using the wrong adapter/power supply may damage your unit and void the warranty.

## CONTROLS, INDICATORS & I/O

The following descriptions detail all of the sliders, switches, LEDs (lights), and I/O jacks on the CLOCKWORKS:

### CH 1-4 DIVISOR Sliders & LEDs

Each channel has its own independent DIVISOR slider control. Set a given channel's clock divider by moving the center of its DIVISOR slider to the number you wish to divide by. For example, if you want Channel 2 to divide the master clock by 3, set the CH 2 DIVISOR to 3, centering the slider on the mark for 3.

Above each DIVISOR slider is an LED. The LED blinks each time the channel sends out its clock pulse.

### CH 1-4 LEVEL Sliders

Each channel has its own independent output LEVEL control. The LEVEL slider sets a given channel's output pulse amplitude or level. The maximum output pulse level is 10Vpp. The pulse waveform ranges from 0V to +10V, it does not go below 0V. As you bring the LEVEL sliders down, the amplitude decreases to 0V.

#### **HOW TO SET THE LEVEL CONTROL:**

Start with the LEVEL control at its bottom position. Move the LEVEL control upwards while listening to or watching the slave device to which the channel is connected. At lower LEVEL settings the slave device might not be triggered at all or by only every other pulse from the Clockworks. Push the LEVEL control up until each pulse from the Clockworks triggers the slave. Once you reach this position, push LEVEL up a little bit more and then stop.

The LEVEL control is now set.

#### **OUT 1 – OUT 4 Output Jacks**

Each clock divider channel has its own independent output jack. CH 1 connects to OUT 1, CH 2 to OUT 2, etc. The level of the pulse at each output jack is controlled by its channel's LEVEL slider. These jacks are mono/TS 1/4" jacks; insert any standard patch or instrument cable into the jacks.

#### **CLOCK TEMPO Slider**

The TEMPO slider located in the CLOCK section of the Clockworks adjusts the master tempo or speed of the internal clock generator. When the CLOCK toggle switch is set to INT (for internal), the TEMPO slider sets the tempo that all four clock channels follow. TEMPO slider range: in BPM: 50BPM – 2,400BPM; in Hz: 0.85Hz – 40Hz.

#### **CLOCK LEVEL Slider**

The LEVEL slider located in the CLOCK section of the Clockworks adjusts the output level of the internal master clock sent to the CLOCK IN/OUT jack. The maximum output pulse is 14Vpp. The pulse waveform ranges from 0V to +14V, it does not go below 0V. As you bring the LEVEL slider down, the amplitude decreases to 0V. See the section on the previous page entitled HOW TO SET THE LEVEL CONTROL for help setting the CLOCK LEVEL control.

#### **CLOCK INT/EXT Switch**

The CLOCK switch determines the source for the master clock sent to the four individual channels. When set to INT, the master clock is generated internally by the Clockworks (and set by the TEMPO slider). The internal clock is also sent out the CLOCK IN/OUT jack when set to INT.

When the CLOCK switch is set to EXT (for external), the internal clock is shut off and the Clockworks connects the external clock present at the CLOCK IN/OUT jack to the four clock divider channels. If no clock is connected to the CLOCK IN/OUT jack, the Clockworks TEMPO LED does not blink, it remains in a static state. When set to EXT, the CLOCK LEVEL slider is inactive. The CLOCK TEMPO slider adjusts the amplitude of the external clock. We recommend you set TEMPO anywhere between its maximum and middle slider positions when using external clock. The acceptable input amplitude range for the external clock signal is 4Vpp to 15Vpp for a clock that swings positive only or +/-2 Vpp to +/-7.5 Vpp for a bi-polar clock. The maximum acceptable external clock frequency that yields full pulse amplitude out of all four channels is 65 Hz. The output pulses drop in amplitude as the clock frequency rises above 65 Hz.

#### **CLOCK LED**

The LED above the TEMPO slider blinks at the same rate as the master clock signal whether the clock is generated internally or externally.

#### **CLOCK IN/OUT Jack**

When set to INT mode, the CLOCK IN/OUT jack is an output, the internally generated clock pulses will be output from this jack. When set to EXT mode, CLOCK IN/OUT is an input, connect your externally generated clock to this jack.

#### **18V Power Jack**

Insert the output plug from the supplied 18VDC/500mA AC Adapter that came with your Clockworks into the 18V power jack located at the front of your Clockworks. The Clockworks' power jack is center positive, requiring 18VDC with a minimum current rating of 300mA. The Clockworks can be powered from a voltage as low as 15VDC but the maximum output pulse amplitude will decrease and the maximum divisor, at the slider's lowest position, may increase to 9 or 10. We do not recommend powering the Clockworks with voltages below 15VDC which may yield unpredictable results.

## **WARRANTY INFORMATION**

Please register online at <http://www.ehx.com/product-registration> or complete and return the enclosed warranty card within 10 days of purchase. Electro-Harmonix will repair or replace, at its discretion, a product that fails to operate due to defects in materials or workmanship for a period of one year from the date of purchase. This applies only to original purchasers who have bought their product from an authorized Electro-Harmonix

retailer. Repaired or replaced units will then be warranted for the unexpired portion of the original warranty term. If you should need to return your unit for service within the warranty period, please contact the appropriate office listed below. Customers outside the regions listed below, please contact EHX Customer Service for information on warranty repairs at [info@ehx.com](mailto:info@ehx.com) or +1-718-937-8300. USA and Canadian customers: please obtain a Return Authorization Number (RA#) from EHX Customer Service before returning your product. Include with your returned unit: a written description of the problem as well as your name, address, telephone number, e-mail address, and RA#; and a copy of your receipt clearly showing the purchase date.

## **The United States & Canada**

- EHX CUSTOMER SERVICE
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This warranty gives a purchaser specific legal rights. A purchaser may have even greater rights depending upon the laws of the jurisdiction within which the product was purchased. To hear demos on all EHX pedals visit us on the web at [www.ehx.com](http://www.ehx.com)  
Email us at [info@ehx.com](mailto:info@ehx.com)


## **FCC COMPLIANCE**

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

## Documents / Resources



Time signature is one eighth of the beat (minimum 1/32/128/256). The CLOCKWORKS is controlled as a master clock for measures and drum changes, as well as for trigger pattern generation. When the drum is set to "beat" the clock will be in a 4/4 time signature. When the drum is set to "pattern" the clock will be in a 4/4 time signature of the first eighth of the pattern. When the drum is set to "pattern" the clock will be in a 4/4 time signature of the first eighth of the pattern.

CLOCKWORKS does not create sound as it is not a virtual synthesizer. It is a trigger unit that sends a signal to a virtual synthesizer. The signal is a square wave that is sent to the virtual synthesizer. The signal is a square wave that is sent to the virtual synthesizer. The signal is a square wave that is sent to the virtual synthesizer.

When the drum is set to "beat" the clock will be in a 4/4 time signature. When the drum is set to "pattern" the clock will be in a 4/4 time signature of the first eighth of the pattern. When the drum is set to "pattern" the clock will be in a 4/4 time signature of the first eighth of the pattern.

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## References

- **E Electro-Harmonix**

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