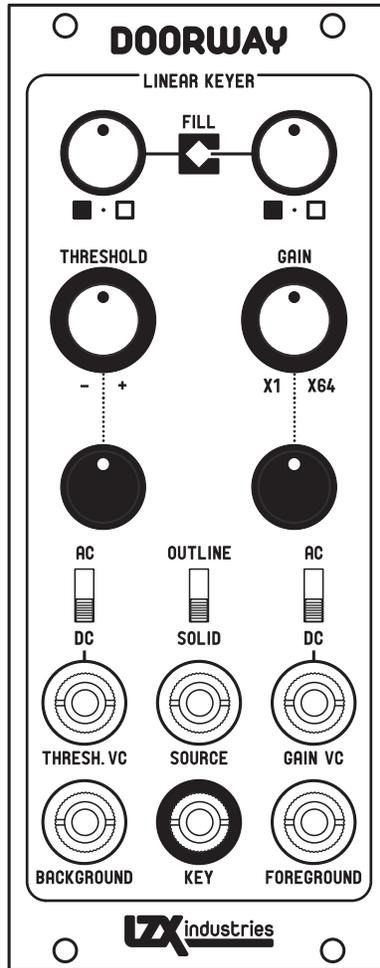


# DOORWAY

## OWNER'S MANUAL



# OVER, UNDER & THRU

Key generators are the bread and butter of creativity in video and imaging systems. From the alpha channel compositing and matte control of modern software packages back to the primitive wipe generators of broadcast consoles, keys are the thing. Doorway is very exciting for me because it is tuned specifically for fully controllable shape and line generation, and complex combinatorial joining of multiple keys together. Through multiple Doorways, a complex 2D figure can be generated and composited together from simple horizontal and vertical ramp generators.

My focus going into designing the Expedition series modules has been to embrace what makes analog video processing unique and irreplaceable: continuous, linear functions. It only makes sense that the series' signature key generator module should be a soft keyer. Doorway's key is generated through high gain amplification of the input signal around a threshold point. Unlike a hard key generator, there is no comparator, digital logic, or on/off state in the binary sense. The edge of the key itself, and its softness/width, are composed of the input signal itself with its contrast blown way out of proportion to the typical brightness scale.

Likewise, rather than an inversion/negative key function or output, this positive and negative spaces of the key can be set to any grayscale value, or external sources can be inserted. This allows the joining of multiple keys together in various alpha compositing modes: over, under, in, XOR, etc.

I'm excited to see what you find on the other side of this Doorway.

Lars Larsen  
November, 2016

DOORWAY  
OWNER'S MANUAL

Written by Lars Larsen

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LZX Industries  
814 SE 14th Ave.  
Portland, OR 97214  
USA



[www.lzxindustries.net](http://www.lzxindustries.net)  
[lzx@lzxindustries.net](mailto:lzx@lzxindustries.net)  
Creative tools for video synthesis  
and analog image processing.

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# FEATURES

Doorway is a linear video key generator and compositor, also known as a soft keyer. A typical video key is generated using a comparator circuit, where the output is a binary state: on or off. Doorway instead achieves key generation via high gain amplification and clipping of the input source. The edge of the resulting key is therefore composed of a variable percentage of the input signal, centered around the threshold point.

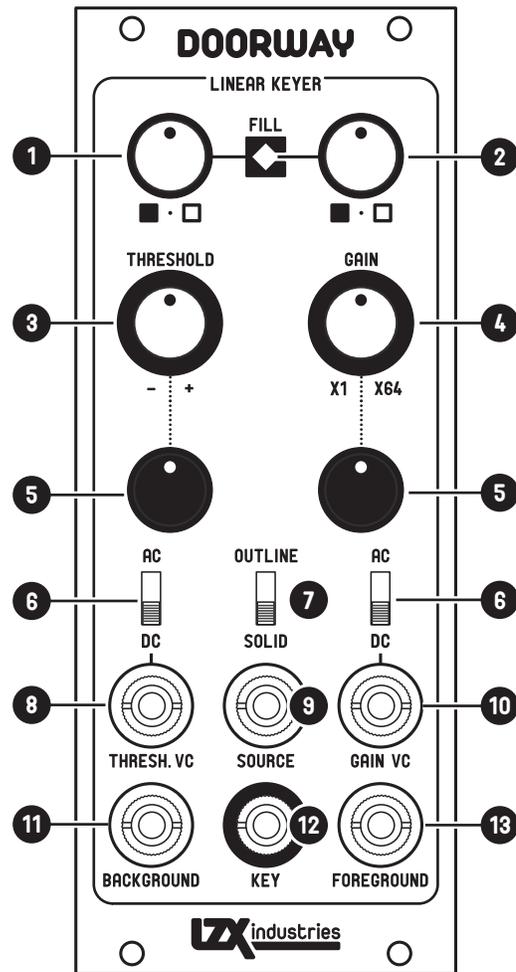
- ▶ Voltage controlled threshold across the full input range. Video rate modulation paths allow displacement of the threshold by another shape or image source.
- ▶ Voltage controlled gain amplifies input signal up to a gain of X64, enabling a continuous sweep from fully soft to fully hard edge.
- ▶ Foreground and background level controls and signal inputs allow the negative and positive space of the resulting key to be set to any grayscale level, or be filled with external signals. This aids the compositing of multiple shapes and patterns.
- ▶ Outline mode switches a full wave rectifier into the signal path. In this mode, gain controls the width of the outline rather than the softness of the key's edge.
- ▶ AC/DC input coupling switches and inverting level attenuators on voltage control inputs.

# SPECIFICATIONS

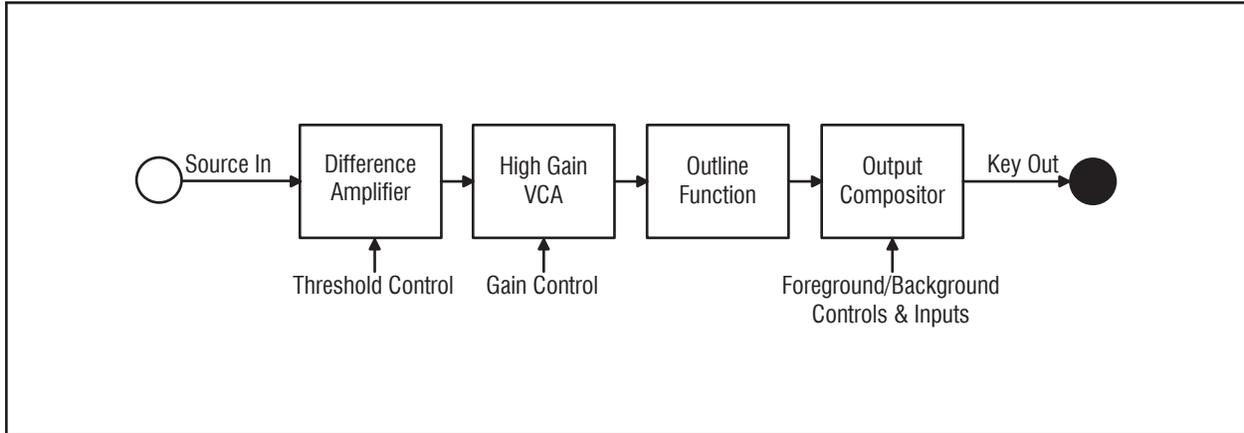
Format	EuroRack Synthesizer Module
EuroRack Width	10HP
Mounting Depth	1.25 inches (31.75 mm)
Frontpanel Dimensions	1.9882 inches (50.5 mm) * 5.059 inches (128.5 mm)
+12V Power Consumption	80mA
-12V Power Consumption	80mA
Series Output Resistance	499 ohms
Input Termination Resistance	100K ohms
Voltage Levels (Expected)	0-1V DC
Voltage Levels (Absolute Maximum)	+/-12V DC

# USER CONTROLS & CONNECTIONS

- 1** Background offset control. This control sets a grayscale level to be applied to the negative space of the output key. Fully counter-clockwise, the level is set to 0V (black.) Fully clockwise, the level is set to 1V (white.)
- 2** Foreground offset control. Functions as (1) but for the positive space of the output key.
- 3** Threshold offset control. This control sets the center of the grayscale level at which the input source is amplified into the output key. Fully counter-clockwise, the threshold value is -0.1V. Fully clockwise, the threshold value is 1.1V.
- 4** Gain offset control. This controls the gain of the input source around its threshold value, effectively setting the width or softness of the output key's edges. Fully counter-clockwise, the gain is 1X (fully soft edge). Fully clockwise, the gain is 64X (very hard edge.)
- 5** Inverting level controls. These controls set the depth of external voltage control modulation applied to the associated parameter. In their center positions, the output is 0. Adjusted clockwise from center, the signal is added to the associated parameter. Adjusted counter-clockwise, the signal is subtracted.
- 6** Voltage control AC/DC coupling switches. In AC mode, slow moving voltages are removed from the input signal and only high frequency content remains.
- 7** Outline/Solid mode switch. When in its downward position, the key generator functions normally. When in its upward position, key values above white will be inverted. This creates a window around the threshold voltage, allowing just the outline of the key to pass through.
- 8** Threshold external voltage control input. 0-1V DC full scale. The depth of modulation is set by the associated inverting level control (4).
- 9** Primary source signal input for frequency multiplier. 0-1V DC expected.
- 10** Gain external voltage control input 0-1V DC full scale. The depth of modulation is set by the associated inverting level control (4).
- 11** Background external input. The signal input into this jack will add to the brightness set by the background offset gain control (1). This allows an external key, pattern, or other source, to be inserted into the negative space of the output key. 0-1V DC expected.
- 12** Key output. 0-1V DC level.
- 13** Foreground external input. Functions as (11) but for the positive space of the output key. 0-1V DC expected.



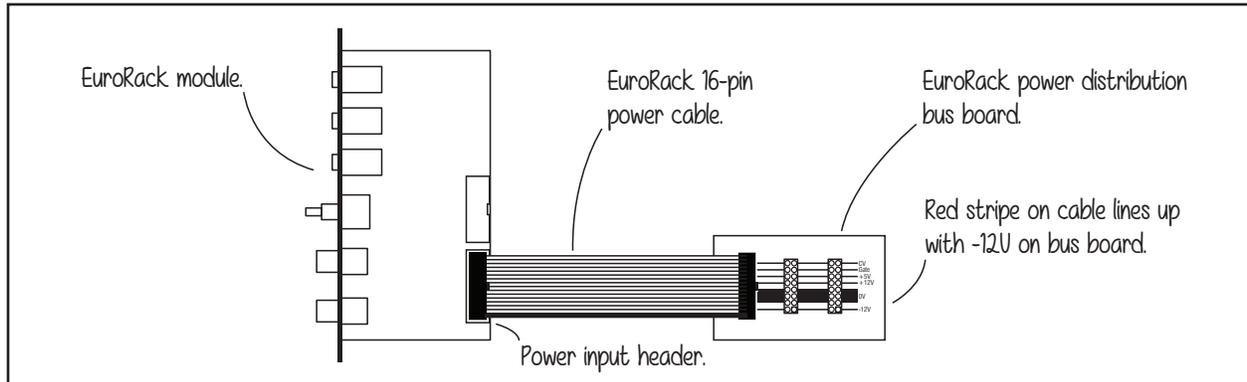
# BLOCK DIAGRAM



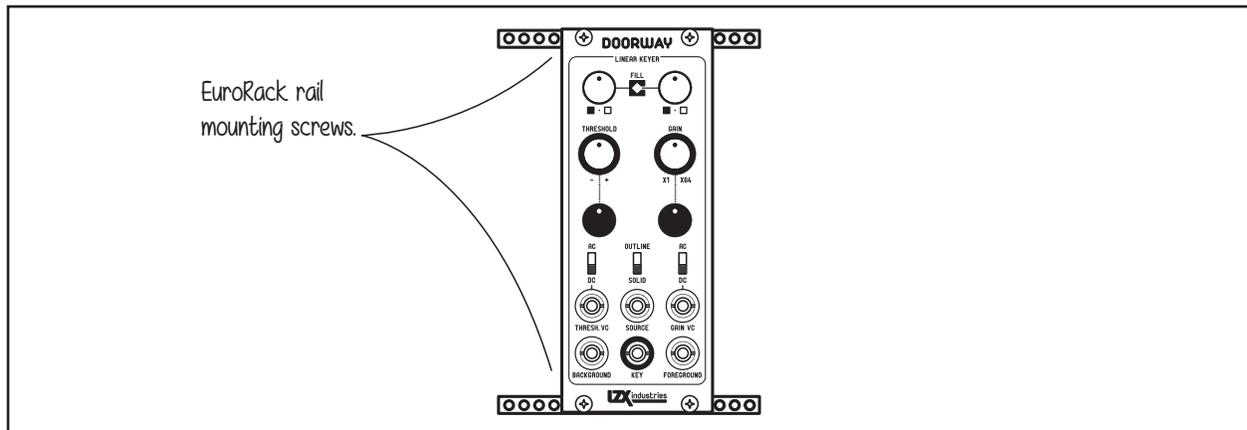
# INSTALLATION

Power down your EuroRack case and disconnect it from AC power outlet while installing new modules.

Remove the module from its packaging and connect the 16-pin power cable to the keyed power entry header on the rear of the module as shown. Connect the other end of the power cable to an empty connector on your EuroRack power distribution busboard. Ensure pin 1 (-12V, with the red stripe) is oriented as indicated on your power distribution busboard.



After connecting the power cable, mount the module frontpanel flush to your enclosure's EuroRack mounting rails and secure the module with the mounting screws provided by your enclosure's manufacturer.





# MANUFACTURER'S WARRANTY

Fully assembled versions of this product are covered by our manufacturer warranty for one year following the date of manufacture. This warranty covers any defect in the manufacturing of this product, such as assembly errors or faulty components. This warranty does not cover any damage or malfunction caused by incorrect use – such as, but not limited to, power cables connected backwards, excessive voltage levels, or exposure to extreme temperature or moisture levels. The warranty covers replacement or repair, as decided by the manufacturer. Please contact customer service via our website at [www.lzxindustries.net](http://www.lzxindustries.net) for instructions on returning the product. The cost of returning a product for repair or replacement is paid for by the customer.

DIY kits and bare printed circuit boards are not covered under any warranty and come with no guarantee of assembly troubleshooting or customer support. However, we are nice and will help you when possible. Please contact us if you have questions about or problems with your build.