LxD

12dB

CV

STRIKE

6dB

CV

STRIKE

MAKE NOISE

MAKE NOISE

v 2.4

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LxD

Limited WARRANTY:

Make Noise warrants this product to be free of defects in materials or construction for a period of one year from the date of purchase (proof of purchase/invoice required).

Malfunction resulting from wrong power supply voltages, backwards or reversed eurorack bus board cable connection, abuse of the product, removing knobs, changing face plates, or any other causes determined by Make Noise to be the fault of the user are not covered by this warranty, and normal service rates will apply.

During the warranty period, any defective products will be repaired or replaced, at the option of Make Noise, on a return-to-Make Noise basis with the customer paying the transit cost to Make Noise.

Make Noise implies and accepts no responsibility for harm to person or apparatus caused through operation of this product.

Please contact technical@makenoisemusic.com with any questions, Return To Manufacturer Authorization, or any needs & comments.

http://www.makenoisemusic.com

About This Manual:
Written by Tony Rolando
Edited by Walker Farrell
llustrated by W.Lee Coleman

Electrocution hazard!

Always turn the Eurorack case off and unplug the power cord before plugging or un-plugging any Eurorack bus board connection cable.

Do not touch any electrical terminals when attaching any Eurorack bus board cable.

The Make Noise LxD is an electronic music module requiring 25 mA of +12VDC and 25 mA of -12VDC regulated voltages and a properly formatted distribution receptacle to operate. It must be properly installed into a Eurorack format modular synthesizer system case.

Go to http://www.makenoisemusic.com/ for examples of Eurorack Systems and Cases.

To install, find 4HP in your Eurorack synthesizer case, confirm proper installation of included eurorack bus board connector cable on backside of module (see picture below), plug the bus board connector cable into the Eurorack style bus board, minding the polarity so that the RED stripe on the cable is oriented to the NEGATIVE 12 Volt line on both the module and the bus board. On the Make Noise 6U or 3U Busboard, the negative 12 Volt line is indicated by the white stripe.
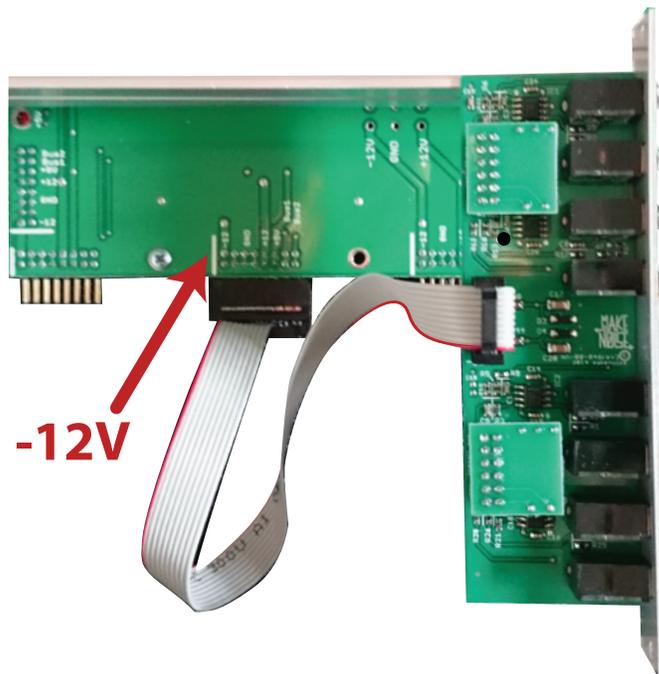
Please refer to your case manufacturers' specifications for location of the negative supply.

OVERVIEW

The LxD is a dual-response, two channel, direct-coupled, Low Pass Gate, which utilizes two vactrols in order to provide simultaneous control over the Amplitude and Frequency content of an Input Signal. It is, in essence, a VCFA (Voltage Controlled Filter Amplifier). Unlike the OPTOMIX and some other dual-Low Pass Gates, the LxD offers two different Filter responses.

The top channel, CH. 1, offers a 12db/Octave response that is mildly-resonant, while the bottom channel, CH.2, offers a 6db/Octave that is non-resonant. The Output of CH.1 is normalled to the Input of CH.2. Utilizing this normalization puts the two channels in series, which is similar to the classic VCF into VCA arrangement made popular by many monosynths of the 1970's.

Folks have often described the sound of a Low Pass Gate as "ringing." While the LxD circuits are not actually ringing, that term does describe many of the sounds possible when using a LPG, such as the LxD, in order to process complex, harmonically-rich signals, generated through Frequency Modulation or Ring Modulation.

PERSPECTIVE

The LxD, being a vactrol-based circuit, will never have the speed or tight tolerances found in many other VCA and VCF circuits. **I would recommend that musicians desiring closely-matched gain across multiple channels of VCAs look elsewhere!** If you seek to program extremely-short sounds, clicks, pops, or ticks, the LxD is not the best choice.

What the LxD does offer is extremely low-noise and low-distortion in a smooth, natural-sounding circuit!
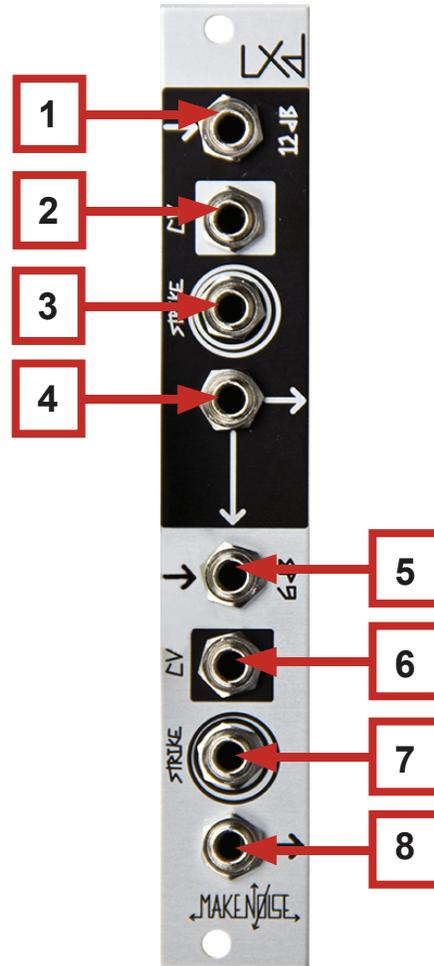
LxD Panel Controls:

1. Signal Input CH. 1: Direct coupled signal input for the 12db/Octave LPG circuit, capable of accepting audio or control signals. Range of up to 15Vpp.

2. Control Signal Input CH. 1: Direct-coupled, highly sensitive, CV input for the corresponding channel's vactrol gate. Range 0V-8V.

3. STRIKE Input CH. 1: Gate Input for striking, pinging or plucking the vactrol gate. Expects 8V to 10V Gate or Clock signal.

4. Signal Output CH. 1: Direct-coupled output of the signal applied to the input, as processed by the 12db/Octave low pass gate circuit. 10Vpp (depending upon settings and source material). Normalled to Signal Input CH. 2.

5. Signal Input CH. 2: Direct-coupled signal input for the 6db/Octave LPG circuit, capable of accepting audio or control signals. Range of up to 15Vpp.

6. Control Signal Input CH. 2: Direct-coupled, highly-sensitive, CV input for the corresponding channel's vactrol gate. Range 0V-8V.

7. STRIKE Input CH. 2: Gate input for striking, pinging or plucking the vactrol gate. Expects 8V to 10V Gate or Clock signal.

8. Signal Output CH. 2: Direct coupled output of the signal applied to the input, as processed by the 6db/Octave Low Pass Gate circuit. 10Vpp (depending upon settings and source material).

It's a VCA, It's a VCF...

The Low Pass Gate operates simultaneously in the amplitude and frequency domains. As the Control Signal becomes more positive, the Amplitude of the Processed Signal increases: the low frequencies being more quickly amplified than high frequencies. As the Control Signal becomes less positive, the Amplitudedecreases, with the high frequencies being attenuated much sooner than the low frequencies.

The net effect is that in fast, transient modulation of the Processed Signal's Amplitude, the low frequencies are more pronounced, lurking in the spectrum, while the high frequencies are eagerly diminished. A fast/short envelope (Control Signal) of around +8V will provide a beautiful example of the LxD's ability to produce acoustic-like Attack and Decay transients. The processed signal will seem to ring-- not unlike a struck drum, piano string or xylophone bar.

Two Unique Channels:
CH. 1:

As a VCF, CH.1, is a mildly-resonant, Low Pass Filter Circuit, accentuating frequencies at and around the cutoff frequency, which is determined by the Control Voltage level at the CH. 1 Control Input. As a VCA, CH. 1 has a faster Attack and Decay response than CH. 2; however, it is still slower than the typical synthesizer VCF or VCA. Like CH. 2, it has a smooth, natural-sounding response to modulation.

CH. 2:

As a VCF, CH.2 is a very mild, non-resonant, Low Pass Filter Circuit, acting to gently reveal (or hide0 the sharper edges of a sound. This characteristic also adds to the "ringing" effect. As the amplitude of the sound decays, there is a simultaneous loss in high frequency content that is similar to the natural loss of energy in idio and membranophonic instruments. As a VCA, LxD CH. 2 has a moderate Attack response and slow Decay response, meaning that it turns off quickly, but takes a while to shut off, yielding a smooth, natural-sounding Decay to almost any sound processed dynamically.

TYPICAL USES:

Low Pass Gates such as the LxD are typically used to process audio signals. The LxD excels at processing harmonically-rich sounds. Patch your audio signal (e.g. STO Variable Shape Output; DPO Square Output) to the Signal Input of CH.1. Next, patch a Control Voltage, such as an Envelope or LFO (e.g. CH. 1 or 4 MATHS; FUNCTION Non-Inverting Output with Cycle engaged), to the Control Input of CH. 1. Then, patch the CH. 1 Signal Output to your monitoring system and listen to the results. Experiment with changing the Timbre of the Audio Signal you are processing (e.g. adjust the STO's Variable Shape Control; patch DPO SAW or Final Output instead of Square and adjust Frequency) and the rate of the Control Signal patched to the Control Signal Input. Now, patch a Clock signal (e.g. Wogglebug Clock Output; MATHS/FUNCTION EOR or EOC Output) to the LxD CH. 1 Strike Input. Observe the sound. Remove the signal patched to LxD CH. 1 Control Signal Input. Observe the sound. Setup this same patch, but instead use CH.2. Note the differences in the result.

Now, try patching a Square Wave from your VCO (e.g. STO SUB Output; DPO Square Output) to LxD CH. 1 Signal Input. Patch an LFO (e.g. CH. 1 or 4 of MATHS; Non-Inverting Output from FUNCTION with Cycle engaged) to LxD CH. 1 Control Input. Patch a faster Square LFO or CLOCK signal (e.g. Wogglebug Clock Output; MATHS or FUNCTION EOR or EOC OUTput) to LxD CH.2 Strike Input. Patch LxD CH. 2 Signal Output to your monitoring system. Listen to the results of the classic VCF into VCA signal path: performed here utilizing Low Pass Gates.

TIPS AND TRICKS:

If utilizing the LxD in a sequencing patch, the Strike Input may act as an Accent parameter. Patch an attenuated Envelope signal (e.g. from MATHS Channel 1 Signal Output with the Attenuvertor set to about 2 o' clock) to the Control Input. Apply an Accent Gate/signal to the Strike Input. Steps where the Accent Gate is Triggered are loud. Set up a Dynamic FM patch using one of the LxD's CH. Outputs to control the FM Index on the DPO. Rather than applying an Envelope to CV the Control Input, just apply a Gate to the LxD's Strike Input. This is a great technique to add a burst of modulation and works with any signal source (e.g. LFO, Random Voltage, Noise, etc) patched to the LxD's CH. Signal Inputs.

Use LxD to process Control Voltages:

Anywhere you desire a variable Modulation Index, patch the Modulation Source to be processed to either of the LxD's Signal Inputs and patch the Control Signal that will determine the Modulation Index to the LxD's appropriate Control Signal Input. Finally, patch the LxD Signal Output from the corresponding channel to your Modulation Destination.

Patch Examples:
The New Bongo
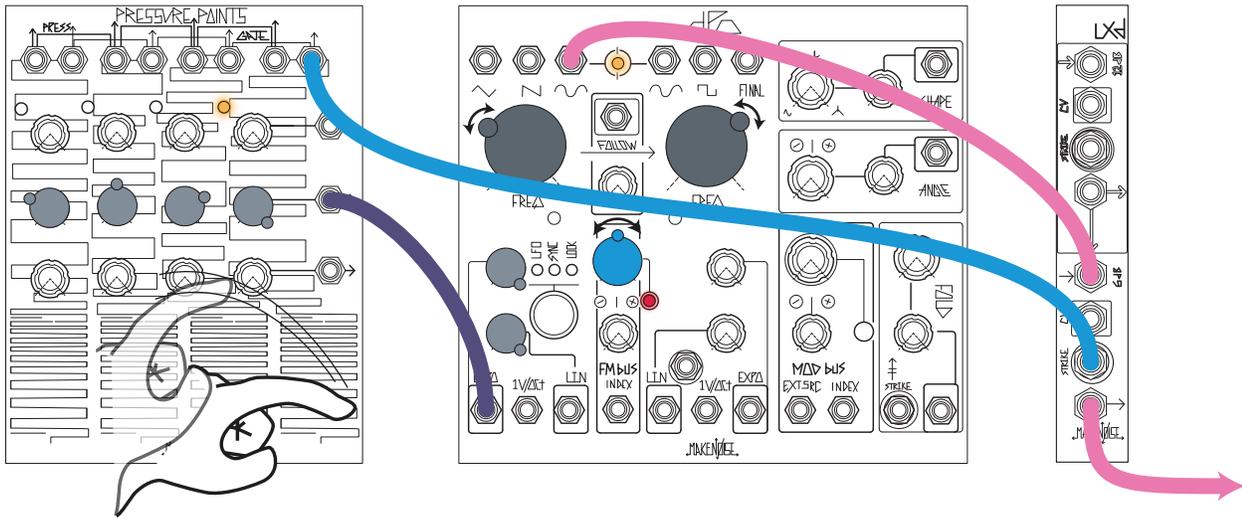
FM Pings:
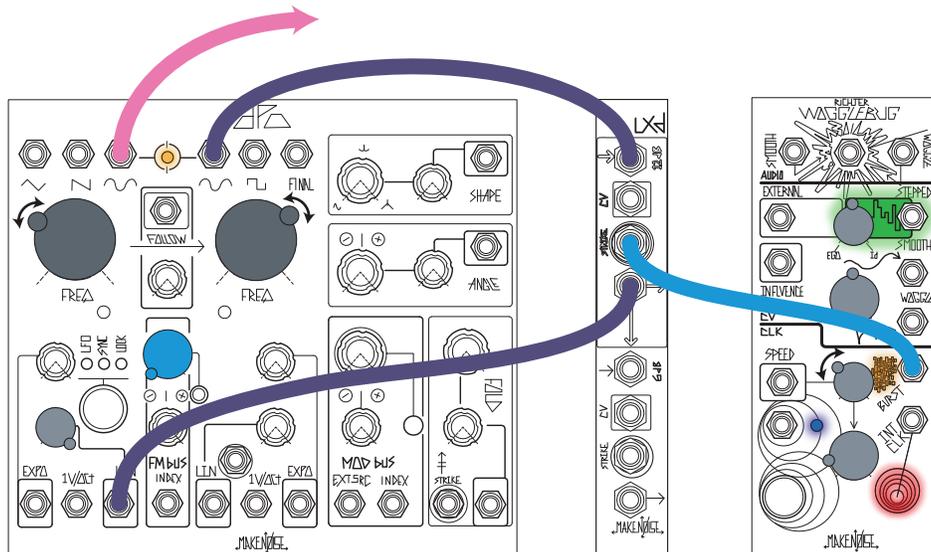
Variation:
In order to dynamically control the FM Pings, first set up the patch as described above. Remove the cable from the LxD CH. 1 Output and apply a slow Envelope from MATHS or FUNCTION (or any positively-moving Control Voltage) to LxD's CH. 2 Control Input. Finally, patch the LxD's CH. 2 Output to the STO's FM Input (instead of the CH. 1 Output used before). This will further shape the Amplitude of the the FM Source as it as being applied to the STO's Linear FM Input.

Patch Examples:
Monosynth Lead