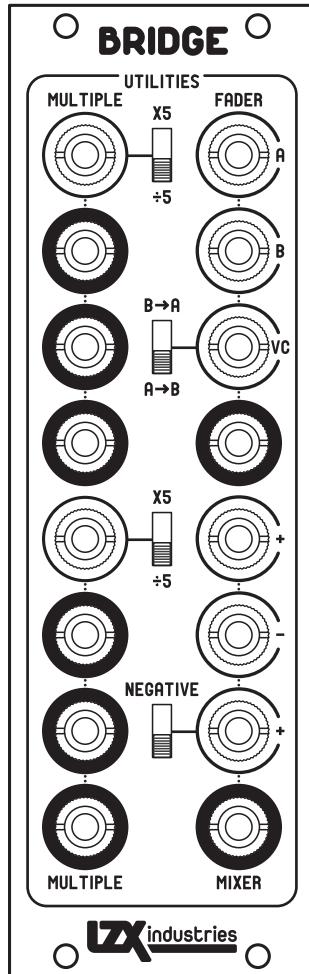# BRIDGE
OWNER'S MANUAL

BRIDGES BETWEEN WORLDS

Bridge at first glance is a modest selection of utility functions, but like the mundane contents of an adventurer's backpack, the journey can't progress as far without it. Our goal with this module was to provide a module that was small, low cost, and provided the kind of functions that one can never have too many of. Each functional block here multiplies the potential of every other module in your system by allowing quick access to amplitude modulation, switching, signal mixing, amplification, buffering, and attenuation.

Lars Larsen
December, 2016

BRIDGE
OWNER'S MANUAL

Written by Lars Larsen

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LZX-BR-OM-V1.0

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FEATURES

Bridge is a multi-function utility module for video synthesizers. It is designed with the simple goal of packing a variety of always useful utility functions into a compact, low cost package.
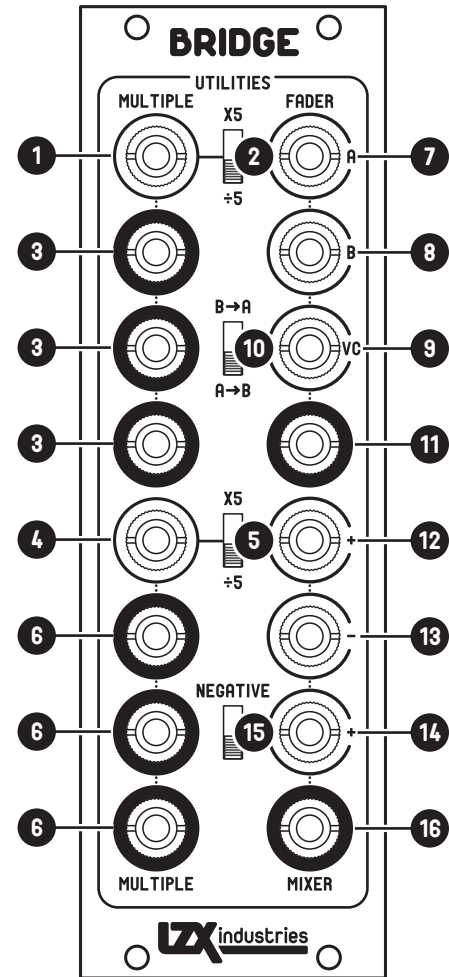
► Dual buffered multiples with three outputs and voltage scaling. In amplify setting, input signals are amplified by a factor of five. In attenuate setting, input signals are attenuated by a factor of five. These scalers allow quick translation between standard EuroRack audio world 5V signal levels and LZX video module 1V signal levels.

► Single wideband voltage controlled crossfader/multiplier with CV inversion switch. It can be patched as a single VCA, a crossfader/switcher between two inputs, or when combined with the mixer section a 4-quadrant multiplier.

► Single three input signal mixer. Two adding inputs and one subtracting input. One adding input can alternately perform a mirrored inversion (1V - input signal.)

SPECIFICATIONS

Format	EuroRack Synthesizer Module
EuroRack Width	8HP
Mounting Depth	1.25 inches (31.75 mm)
Frontpanel Dimensions	1.5882 inches (40.34 mm) * 5.059 inches (128.5 mm)
+12V Power Consumption	30mA
-12V Power Consumption	30mA
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   Buffered Multiple/Scaler #1 input. 0-1V DC expected in buffered multiple or X5 (LZX to Euro) gain mode. 0-5V DC or +/-5V DC expected in /5 (Euro to LZX) attenuation mode.

2   Buffered Multiple/Scaler #1 gain selection switch. In the upper position, the input voltage is amplified X5 to perform LZX (0-1V DC) to EuroRack Audio (0-5V DC) level translation. In the center position, the input signal is buffered at unity gain. In the lower position, the input voltage is divided by 5 to perform EuroRack Audio (0-5V DC) to LZX (0-1V DC) level translation.

3   Buffered Multiple/Scaler #1 output jacks. Each output is individually buffered.

4   Buffered Multiple/Scaler #2 input. Functions as (1).

5   Buffered Multiple/Scaler #2 gain selection switch. Functions as (2).

6   Buffered Multiple/Scaler #2 output jacks. Functions as (3)

7   Fader Channel A input. 0-1V DC expected.

8   Fader Channel B input. 0-1V DC expected.

9   Fader Voltage Control input. 0-1V DC expected.

10 Fader direction selection switch. In downward position, a voltage control signal (9) rising from 0V to 1V will cause the output (11) to crossfade from channel A to channel B. In the upward position, a rising control voltage will crossfade from channel B to channel A.

11 Fader output. 0-1V typical.

12 Mixer non-inverting input. 0-1V DC expected. Signal patched here will be added to other mixer inputs (13), (14).

13 Mixer inverting input. 0-1V DC expected. Signal patched here will be subtracted from other mixer inputs (12), (14).

14 Mixer multi-function input. 0-1V DC expected. How this signal interacts with the mix is determined by the position of the multi-function input mode switch (15).

15 Mixer multi-function input mode switch. In its downward position, the multi-function input (14) adds to the mix in the same manner as the non-inverting input (12). In its upward position, Negative, the signal is subtracted from a 1V bias and then added to the mix.

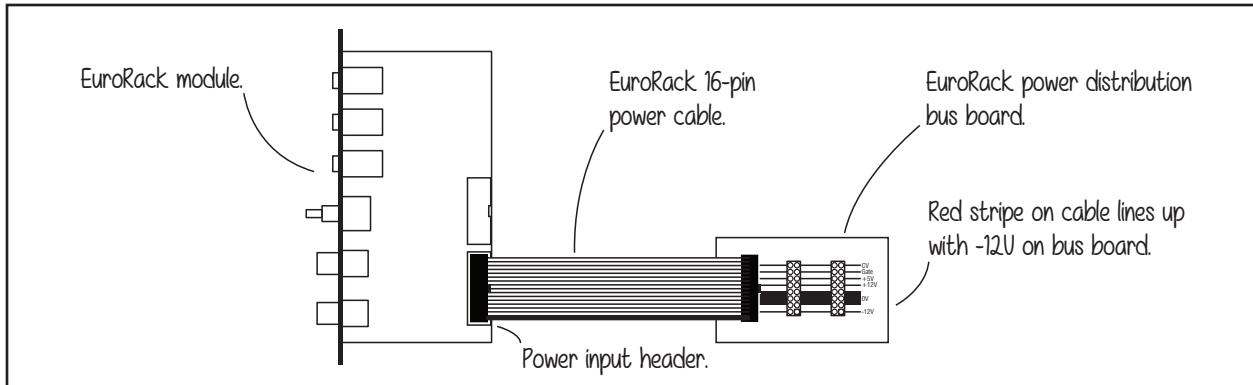**16** Mixer output. 0-1V typical.

BLOCK DIAGRAM

Channel A
Channel B
Cross
Fader
Out

Voltage Control

+ In
- In
+ | 1- In
3 Input
Mixer
Out

Input
Scaler
& Buffers
Out
Out
Out

Input
Scaler
& Buffers
Out
Out
Out
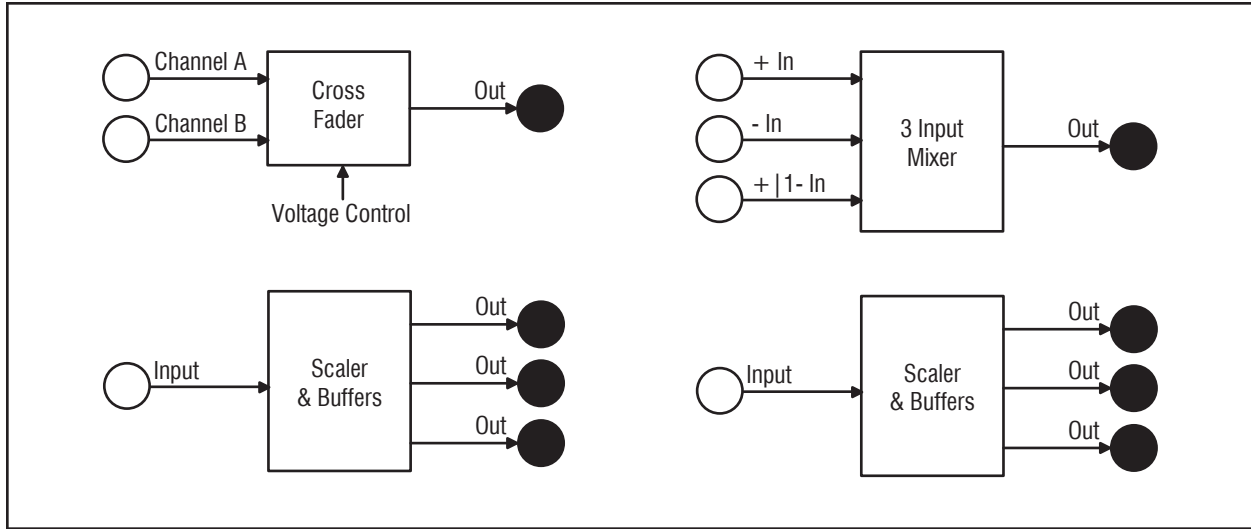
INSTALLATION

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.

EuroRack module.

EuroRack 16-pin power cable.

EuroRack power distribution bus board.

Red stripe on cable lines up with -12V on bus board.

Power input header.

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.


EuroRack rail mounting screws.
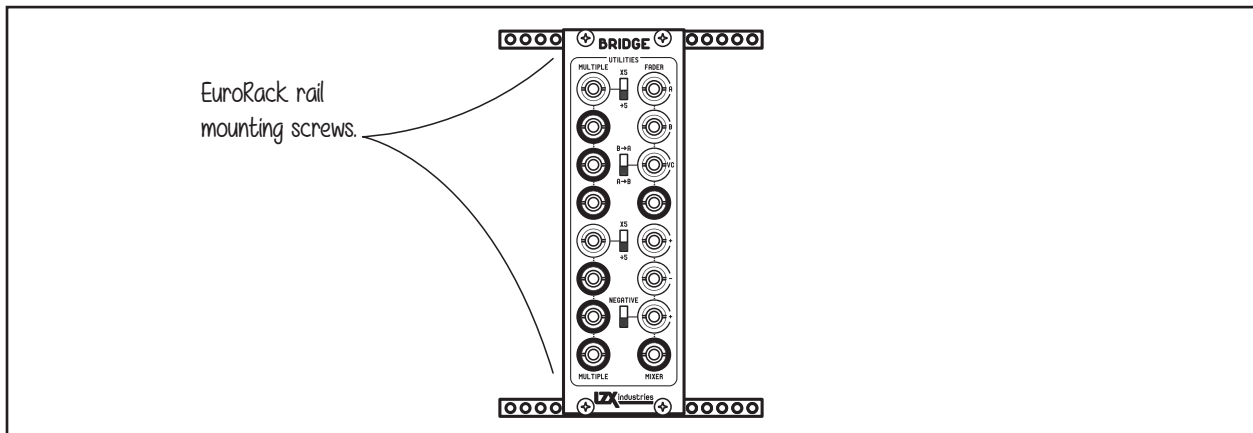
EXAMPLE PATCHES

EURORACK AUDIO TO LZX LEVEL TRANSLATION

One of Bridge's primary use cases is voltage level translation between EuroRack audio modules and LZX video synthesis modules. LZX modules are tolerant of voltages from audio modules, but the expected voltage range (0 to 1V) is smaller than what is typical from audio modules (0 to 5V or +/-5V.) This means an audio module plugged straight into an LZX module will clip. Sometimes this is desirable. When it's not, Bridge has a preset attenuator for level translation as illustrated below.
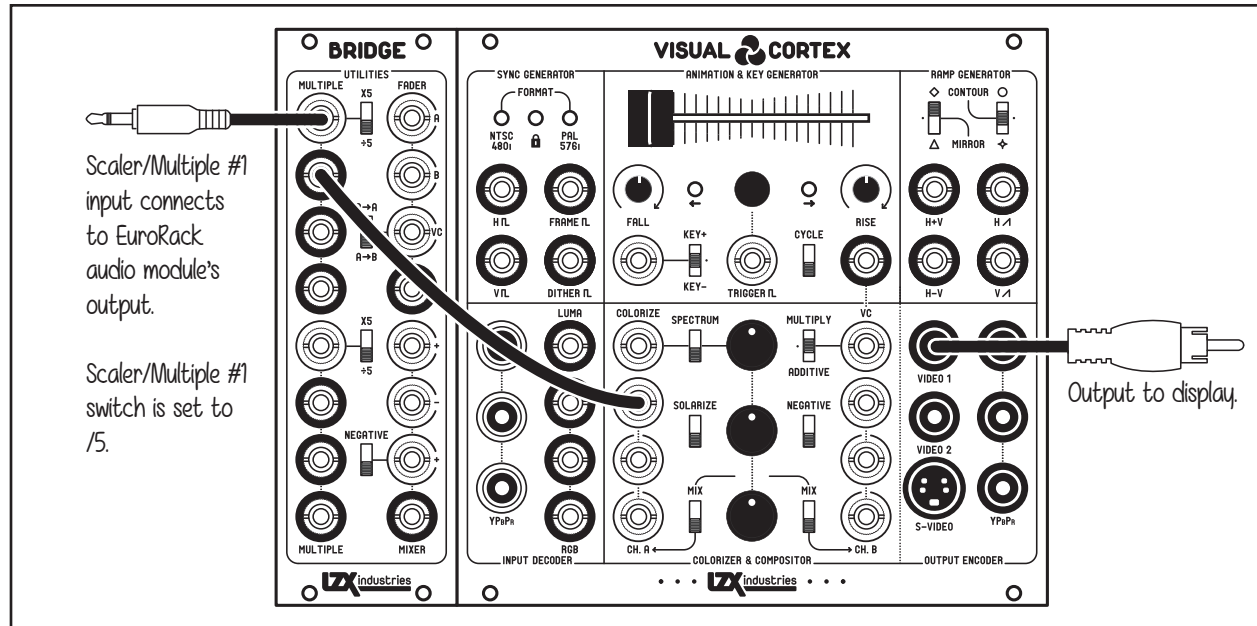
Further exercises and experiments to explore:

▶ Try using the scaler/multiples to amplify a video rate signal, process it with audio modules, and then send it back to video output. This works especially well if you set the Visual Cortex compositor up so that the processed signal is on the A channel and the original signal is on the B channel. You can now do a wet/dry mix between the two versions of the signal.

▶ Try patching ramps and video sources into the fader and mixer sections and experiment with how the various combinations work. Try audio rate and low frequency sources into these processes as well.

▶ Use the multiples in unity gain mode to send a single output to multiple destinations at the same time. Parallel processing is incredibly powerful in a video system.

▶ After setting up a patch you like between other modules, use Bridge's utility functions to insert more modulation into signals in the patch to add further nuance and visual complexity.

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 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.