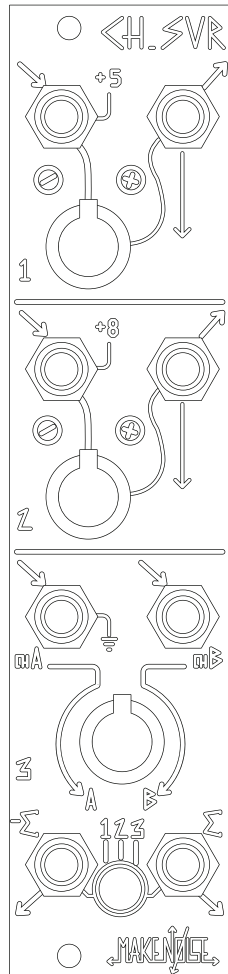


<H.SVR



MAKE NOISE

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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 faceplates, 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 and Walker Farrell
Illustration and layout by Lewis Dahm

INSTALLATION

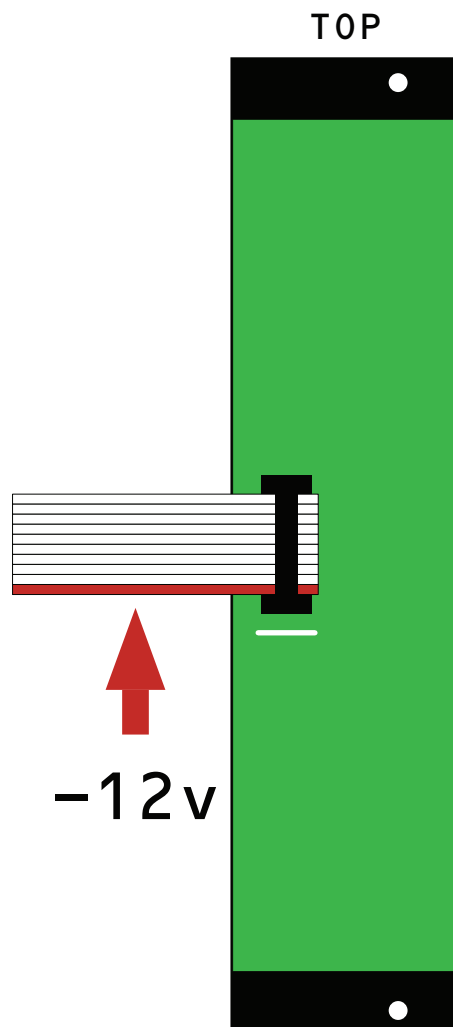
Electrocution hazard!

Always turn the Eurorack case off and unplug the power cord before plugging or unplugging any Eurorack bus board connection cable. Do not touch any electrical terminals when attaching any Eurorack bus board cable.

The Make Noise ChSvr is an electronic music module requiring 20mA of +12VDC and 10mA of -12VDC regulated voltage 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 6HP in your Eurorack synthesizer case, confirm proper installation of 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 manufacturer's specification for location of the negative supply.



INTRODUCTION

Did you know that MATHS started its life as a patch buddy for the Quad Multimode Gate? In the manual for MATHS (2009), Tony wrote:

Ever since completing the QMMG design, I have felt that it needed a good buddy. A patch pal! Say hello to QMMG's best friend, MATHS.

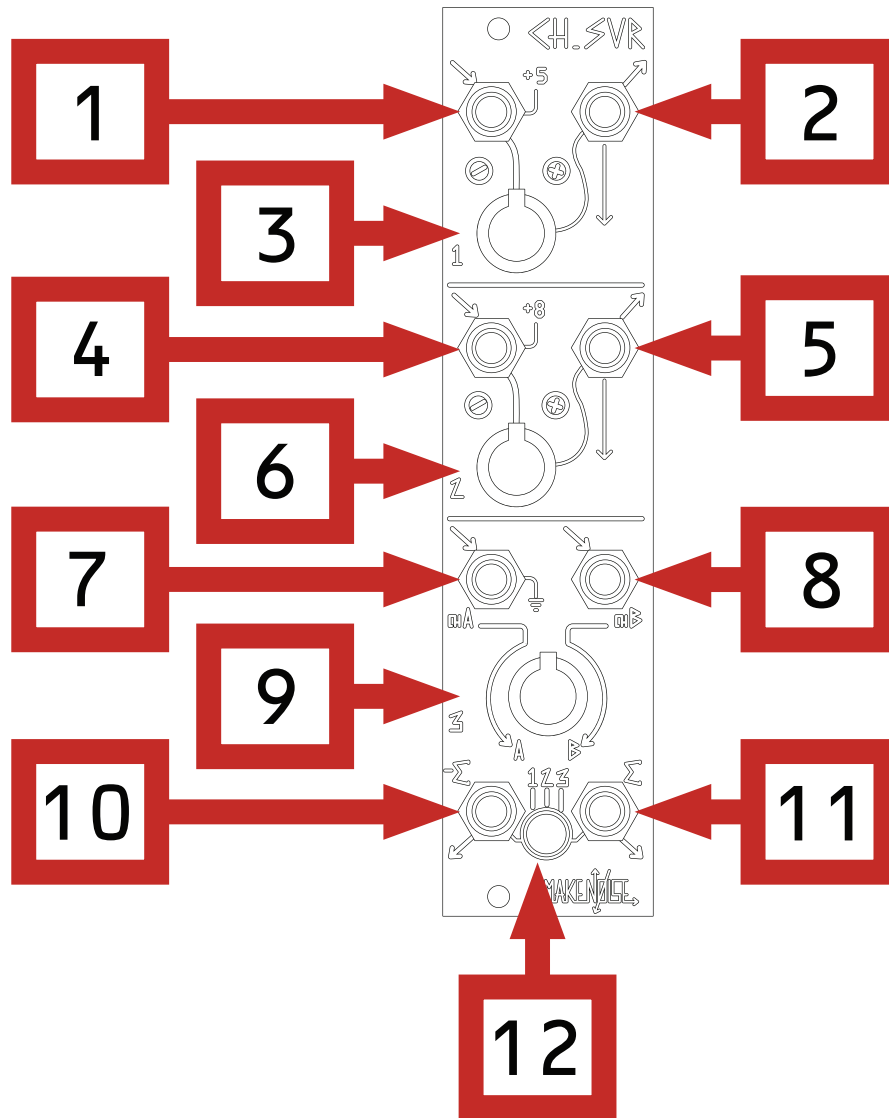
MATHS builds on the tradition set into motion in the 1960's by Don Buchla when he adapted the circuits found within analog computers common to engineering labs, for musical purposes. Buchla's "Algebraic Processor, Model 257" changed the way music synthesizers utilized control voltages. MATHS, a mash-up of the Buchla 281, Buchla 257 & Serge DUSG, continues this great tradition of sculpting the control signals we use to sculpt our sound signals.

MATHS has delighted, confounded and inspired for over fifteen years now! It's been the subject of countless memes, explanation videos, forum posts, and may have been discussed and puzzled over more than any other Eurorack module? It's tough to say.

One thing that we love about MATHS is its flexible four channel design. Each channel works fluidly with the others to make possible a so-far-unknown number of patches. The channels can be used independently, together, or some combination thereof. If you want to control the modulation depth on Channel 1's RISE time, for example, you can do it! Channel 2 and 3 offer attenuverters for this purpose (or any other purpose of your choice). Of course, with this flexibility also comes responsibility and, for some of us, even minor anxiety! Since that attenuverter is not specifically tied to the Channel 1 Rise input, you might wonder: could I be better utilizing that attenuverter somewhere else in my patch? Am I... (gasp) WASTING a channel of my MATHS?!!!!?

And so, the time has come for MATHS to get a good buddy of its own. A condensation of the sum/offset/attenuversion aspects of MATHS, continuing the great tradition of sculpting the control signals we use to sculpt our sound signals. A patch pal! Say hello to MATHS' best friend, Channel Saver.

PANEL CONTROLS



1. **Channel 1 Input:** Normalled to +5VDC. Patch signal to be attenuverted by Channel 1 here.
2. **Channel 1 Output:** Outputs attenuverted version of the signal at the Channel 1 Input. When patched, removes Channel 1 from Sum and Inverted Sum.
3. **Channel 1 Attenuverter:** Used to scale, amplify and/or invert the signal at the Channel 1 input.
4. **Channel 2 Input:** Normalled to +8VDC. Patch signal to be attenuverted by Channel 2 here.
5. **Channel 2 Output:** Outputs attenuverted version of the signal at the Channel 2 Input. When patched, removes Channel 2 from Sum and Inverted Sum.
6. **Channel 2 Attenuverter:** Used to scale, amplify and/or invert the signal at the Channel 2 input.
7. **Channel 3 A Input:** Normalled to ground (0VDC). Patch signal to be cross-faded here.
8. **Channel 3 B Input:** Patch signal to be cross-faded here.
9. **Channel 3 Crossfader:** Use to cross-fade between the A and B Inputs of Channel 3. When A Input is unpatched, works as a simple attenuator.
10. **Inverted SUM Output:** Contains inverted Sum of all three channels (Channels 1 and/or 2 can be removed by patching to their respective output jacks).
11. **SUM Output:** Contains Sum of all three channels (Channels 1 and/or 2 can be removed by patching to their respective output jacks).
12. **SUM LED:** Indicates strength and polarity of SUM output.

GETTING TO KNOW CH.SVR

Like its pal the MATHS, Ch.Svr is laid out top to bottom, with several channels in the upper portion of the module feeding SUM and INVerted Sum outputs at the bottom. However, instead of the individual channels being arranged left to right, Ch.Svr's channels are arranged vertically.

Channels 1 and 2 are near-identical, each being able to scale, amplify, attenuate and invert an incoming signal. With no external signal applied, these channels will generate DC offsets ($\pm 5\text{VDC}$ on Ch1, $\pm 8\text{VDC}$ on Ch2).

Channel 3 is a two-input crossfader with individual inputs for signals A and B. Input A is normalled to ground (0V) so that you can patch only input B to use Ch.3 as a simple non-inverting attenuator.

All 3 channels are normalled to a SUM and INVerted Sum bus via their respective OUTputs, so that addition, subtraction, and inversion may be achieved. Channels 1 and 2 also have individual output jacks: inserting a plug to these sockets will remove the associated signal from the bus. In this way, each of the three Channels can be used independently, or as part of a Sum or Inverted Sum.

TIPS & TRICKS

- Anywhere you need more subtle modulation, Ch. Svr is there for you... now all your eurorack slivers may have subtle and intentional modulation they deserve.
- Use Ch. Svr before your Quantizer to cross fade between different sequences, combine patterns, turn a melody upside down (pattern inversion), transpose a sequence and use any combination of these techniques together to create new musical pattern variations.
- Create new LFO shapes by combining two or more LFOs, adding and subtracting them using the Ch. 1 and 2 attenuverters.

PATCH IDEAS

VOLTAGE MIRROR

Patch signal to be mirrored to Ch3 signal input. Set Ch2 to fully negative, Ch3 to fully positive. Take Sum output. Patch dummy cable to Ch1 output. Adjust Ch2 offset to taste, or use Ch1 for the offset instead if the signal is smaller.

OFFSET AND ATTENUATION

Same patch as voltage mirror, but use Ch2 panel control to set the offset level, and attenuate to taste with Ch3 panel control. Patch Sum out to a CV input that lacks a panel control and attenuator.

SIGNAL AMPLIFIER

Patch signal to be amplified to Ch1 or Ch2 input, turn panel control CW. If more amplification is needed, mult the input to one or both of the other channels and take the Sum.

INVERSION

Patch signal to be inverted to Ch1 or Ch2 input, turn panel control CCW. Set level to taste from full CCW to ~9:00.

FILTER MODULATION MATRIX

Patch Sequencer or Keyboard output, filter envelope, and other modulator of your choice (LFO, Random voltage source etc.) to the three inputs of ChSvr. Patch Sum to Filter Frequency input, setting modulation depths per source to taste using the ChSvr's controls.

WAVEFORM MIXER

Patch Sequencer or Keyboard output, filter envelope, and other modulator of your choice (LFO, Random voltage source etc.) to the three inputs of ChSvr. Patch Sum to Filter Frequency input, setting modulation depths per source to taste using the ChSvr's controls.

MODULATION TRANSIT AUTHORITY

Patch DPO Sine A to Ch1, and two other modulation sources or waveforms to Ch2 and Ch3. Patch resulting Sum to Mod Bus Ext Src input to modulate the DPO's Final output with a more complex signal.

