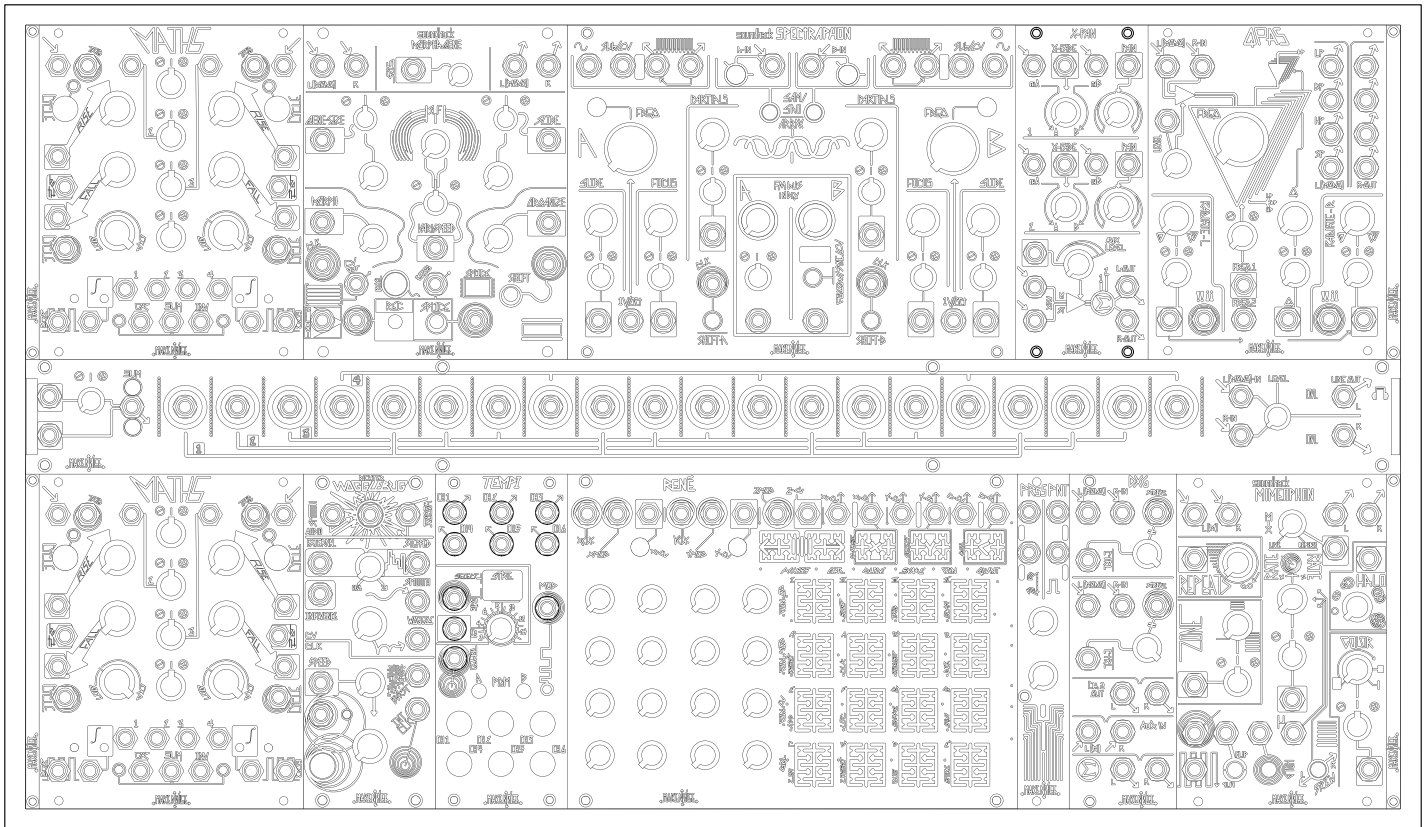


Resynthesizer



← MAKE NOISE →

TABLE OF CONTENTS

- FCC
- LIMITED WARRANTY
- INTRODUCTION
- WHAT IS THE RESYNTHESIZER?
- THE MODULES OF THE RESYNTHESIZER
 - MATHS
 - MORPHAGENE & SPECTRAPHON
 - X-PAN
 - QPAS
 - CV BUS
 - WOGGLEBUG
 - TEMPI
 - RENÉ
 - PRSS PNT
 - DXG
 - MIMEOPHON
- PATCH CORNER





This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes / modifications not approved by the Make Noise Co. could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

makenoisemusic.com
Make Noise Co., 414 Haywood Road, Asheville, NC 28806



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 Walker Farrell

Illustration and layout by Lewis Dahm

DSP and Firmware design for Soundhack modules by Tom Erbe



INTRODUCTION

The ReSynthesizer can trace its origins to Spring 2023, with Walker and Rodent putting together a collection of modules to announce and demonstrate the Soundhack Spectraphon at Superbooth '23. We knew that these modules would need to complement Spectraphon in a way that would show its true capabilities. As such, this specialized layout comprised a single-system overview of the last 8 years of Make Noise module designs.

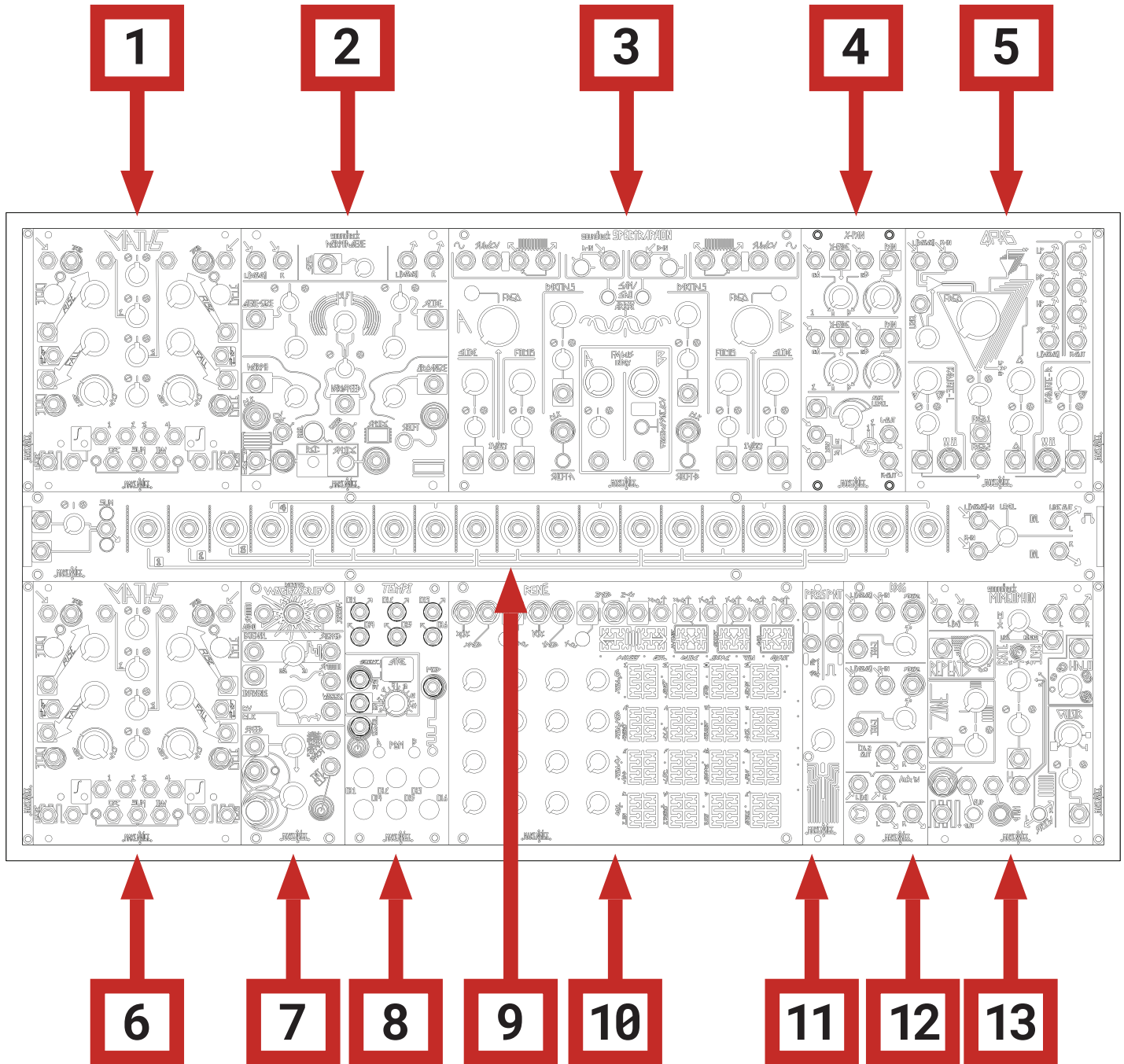
After Superbooth Walker and Peter continued to use a similar system configuration in videos for our Youtube and Instagram Channels, prompting some folks to speculate if it was to be our new 7U system. At that time we had no plans for a new system; in fact, this layout had been intended as temporary all along, but we found that it made a useful layout in almost all cases and so we continued using it in videos anyway. (The layout even gained the popular unofficial moniker “System X” thanks to the speculative work of Cinematic Laboratory and others.) Choices like the unusual placement of the Morphagene, adjacent to Spectraphon, which we initially assumed would be mainly for a very specific use-case, quickly became second nature to patch. The Spectraphon and Morphagene work together to ReSynthesize raw materials into lush soundscapes, microsound manipulations, or wherever the path leads.

In early 2024, we announced DXG for the easy mixdown of mono or stereo signals, and PrssPnt to add physical touch interaction. With these pieces in place, the ReSynthesizer is born. Pairing the Spectraphon with the Morphagene, and the core Make Noise CV generation suite, the ReSynthesizer is an open design blackboard ready for experimentation and discovery.

We've put this collection through its paces and have found it to hold up to any test we throw at it— we can't wait to hear what sounds you find with it!



MODULES



1. MATHS
2. MORPHAGENE
3. SPECTRAPHON
4. X-PAN
5. QPAS
6. MATHS
7. WOGGLEBUG

8. TEMPI
9. CV BUS
10. RENE
11. PRESS PNT
12. DXG
13. MIMEOPHON



WHAT IS THE RESYNTHESIZER?

The Make Noise ReSynthesizer is a modern modular musical instrument that brings together a number of independent modules to create new sounds from those that already exist.

To best understand what the ReSynthesizer is, let's start by synthesizing the elements of the word itself:

Re- (prefix):

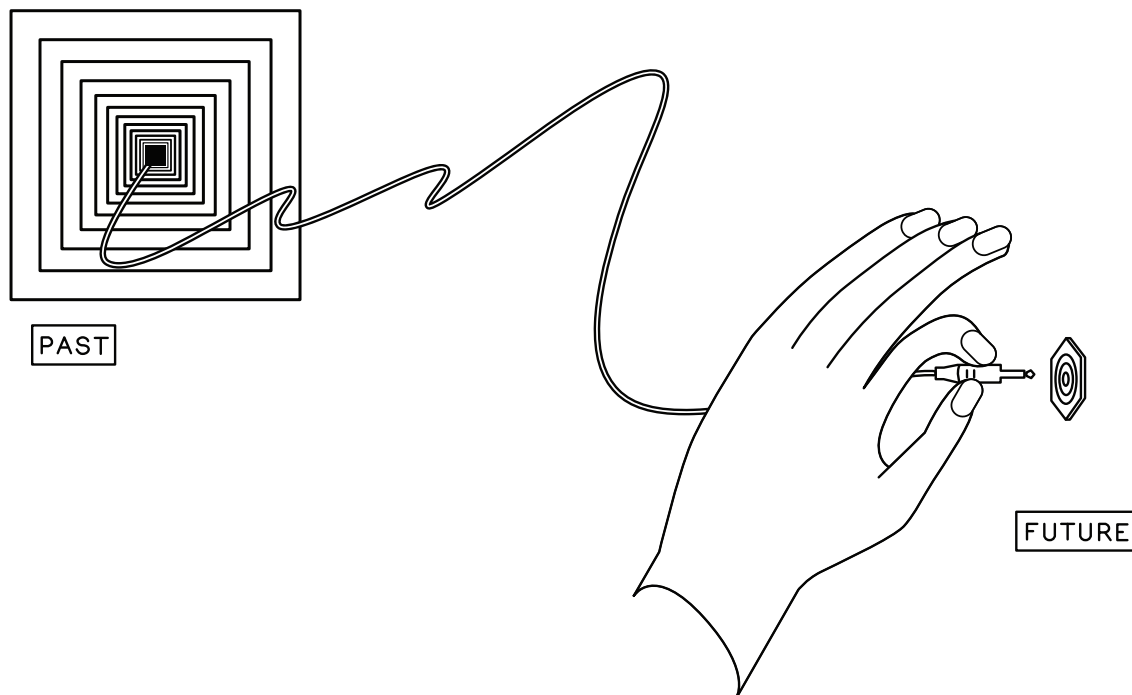
1. Again, anew (renew, recommit, reheat)
2. A completion or intensification of the base (reletter, relead, rebronze)
3. Back, backward (reject, reply, resist)

Synthesis/Synthesize:

1. The formation of something complex or coherent by combining simpler things
2. A deduction from the general to the particular
3. The reunion of parts that have been divided

So, with "Re" meaning both "anew" and "backward," as well as "intensify" or "complete," and "synthesis" meaning "formation," "combination," and "reunion," we can see that the ReSynthesizer is about the meeting and combination of new and old to create something specific and intense.

This resynthesis of new and old takes several forms: the building on the foundations of electronic musical history to look toward the future; the inclusion of a wide variety of module designs from throughout the history of Make Noise, from the 2000s' MATHS and Wogglebug to the 2020s' DXG and Spectraphon; the creation of new sounds from already existing sonic materials; and perhaps most importantly of all the meeting and relationship between the musician and the instrument.



ReSynthesizing Electronic Music History

Each individual module in the ReSynthesizer has its own manual (highly recommended supplemental reading to this one!). In those manuals, as well as the webpages and the Make Noise YouTube and Instagram channels, you will find reference to a great number of devices and techniques from throughout the history of electronic music, including but not limited to:

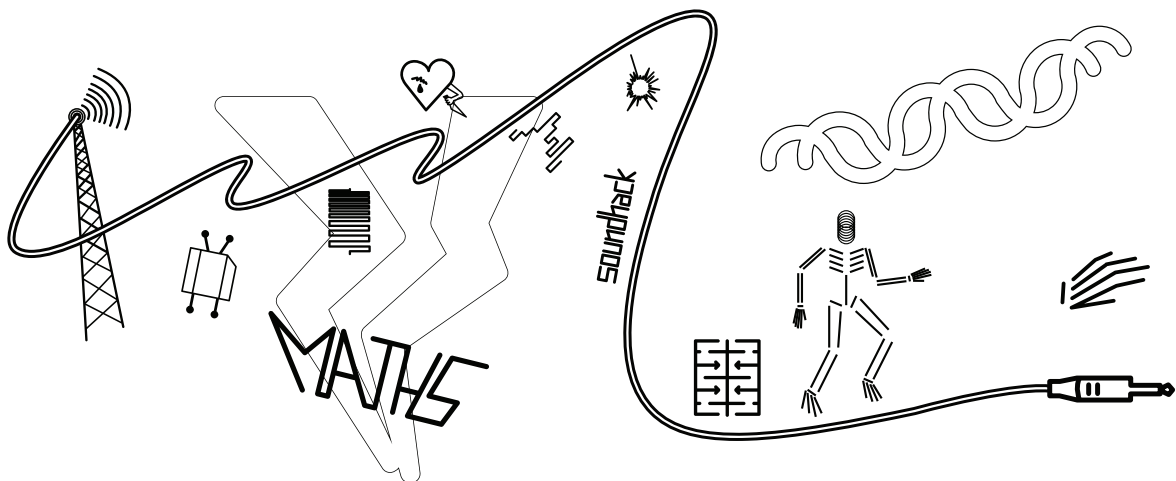
- Buchla 257, 259, 266, 281, 292, 296, and MARF
- Serge DUSG and TKB
- Roland Space Echo
- Deltalab Effectron
- Minimoog Voyager
- Tape Music/Musique Concrète
- Microsound, Granular Synthesis
- Karplus Strong Synthesis

The ReSynthesizer does not contain direct copies of any of these classic instruments or techniques; rather, it pays respect to their innovations and legacy, while recombining the concepts in new ways and adding new functions and techniques of its own.

ReSynthesizing Make Noise History

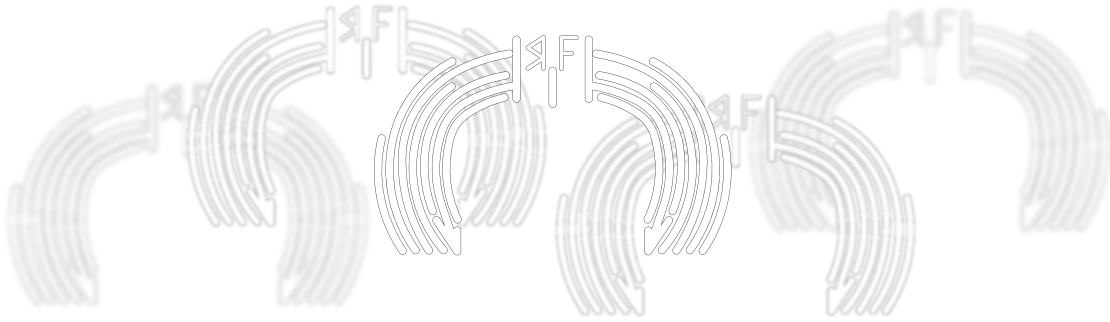
Make Noise has been making noise and synthesizers since 2008, and we can find every era of Tony Rolando's module design here in the ReSynthesizer. Additionally we can find in this system all of Make Noise's current collaborations with Tom Erbe of soundhack.

The MATHS and Wogglebug were first released as Make Noise modules in the late 2000s, both receiving minor revisions in the mid-2010s. The first version of René was released in 2009 and then updated and greatly expanded in 2018. TEMPI was released in 2016 and especially designed to communicate with the complexities of René. The soundhack Morphagene from 2017 is something of a spiritual successor to the 2011 Phonogene, but with greatly expanded capabilities in sonics, stereo sound, patch programmability, and memory. X-PAN, QPAS, and the soundhack Mimeophon all date to 2019 with a particular emphasis on the connection between mono and stereo signal paths within the modular system. The soundhack Spectraphon was released in 2023 and represents a leap forward in the power of digital signal processing in the modular context. The ReSynthesizer is housed in the 4 Zone CV Bus Case, a massively powerful 2023 update to the CV Bus case that had existed in various iterations since 2014. Finally, DXG and PrssPnt from 2024 round out the mixing, note creation, and hand-playing capabilities of the ReSynthesizer.



ReSynthesizing existing sounds

Most synthesizers have some circuits for sound generation (oscillators etc.), and others for sound manipulation (filters, effects etc.). Unlike most oscillators, the core sound generation modules of the ReSynthesizer (Morphagene and Spectraphon) are both specially equipped to create sounds from other sounds. They can be fed into each other, fed by other modules in the system, or take sounds from completely outside and utilize them as the basis of new sonic material. They can additionally generate sound without direct input when needed, either from memory (Morphagene) or using several oscillation modes (Spectraphon). Of course, the ReSynthesizer's sound manipulation modules such as QPAS and Mimeophon can also be used to generate sound without input, so the ReSynthesizer is as flexible and symbiotic as the synthesist patching it.

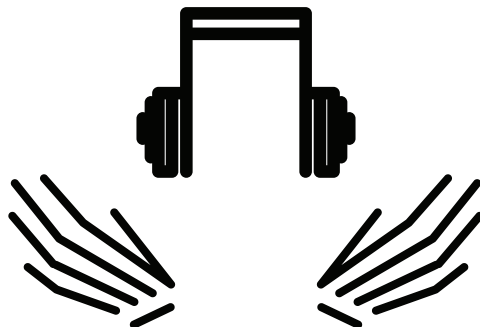


ReSynthesizing the musician/instrument relationship

A musician and their instrument are always in some sense an entangled combination that comprises a single constantly changing entity. The musician controls the instrument to some degree, while also reacting to the instrument's behavior. Together, an equilibrium is constantly approached and utilized for musical purpose. Perhaps even more than with traditional musical instruments, a modular synthesizer like the ReSynthesizer blurs the lines between listening and playing, composing and improvising, music and noise, sound and silence.

At Make Noise, we see our instruments as a collaboration with musicians who create once in a lifetime performances that push boundaries and play the notes between the notes to discover the unfound sounds. We want our instruments to be an experience, one that will require us to change our trajectories and thereby impact the way we understand and imagine sound.

Also, we think what we do is fun and we hope you like it, too.



THE MODULES OF THE RESYNTHESIZER

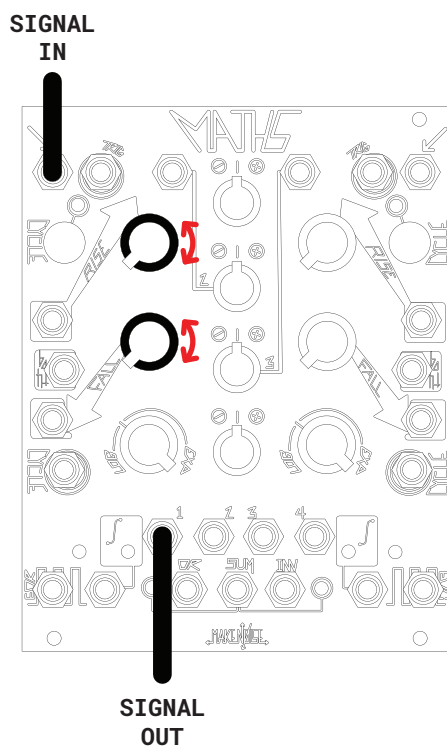
MATHS

MATHS might be thought of as the central modulation hub of the ReSynthesizer. If we think of modules as individual parts that can either generate, process, or mix and route signals, MATHS is a special case that does all three!

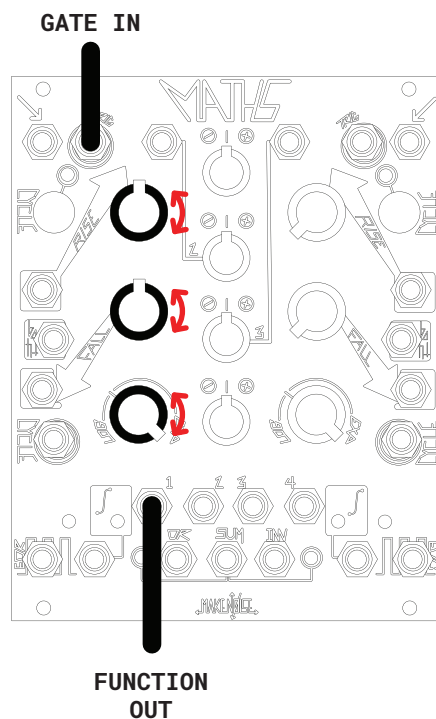
[MANUAL](#)[YOUTUBE PLAYLIST](#)

Basic patches:

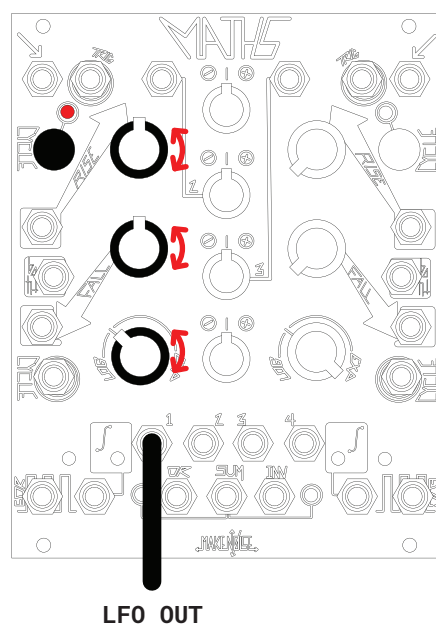
Slow down a signal's rate of change by patching to the Channel 1 or 4 input and using the Rise and Fall controls to set how fast it is allowed to move. This is commonly used to generate slew/portamento.



Generate a simple function/envelope by patching a gate signal to the Channel 1 or 4 Signal or Trigger input. The function's shape and length will be determined by the Rise, Fall, and Response controls.



Generate a low frequency oscillator by turning on Cycle on Channel 1 or 4. The LFO's shape and length will be determined by the Rise, Fall, and Response controls.



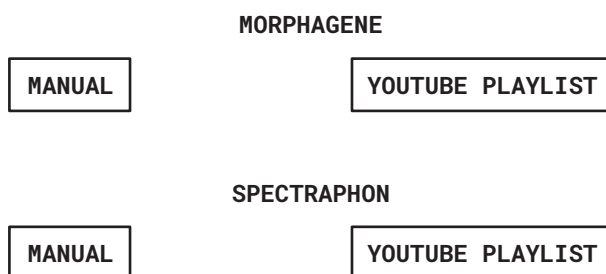
There are many, many ways to use MATHS. See the MATHS manual for full details!



Morphagene and Spectraphon

The Morphagene and Spectraphon are the primary sound sources for the ReSynthesizer. However, unlike the core voltage controlled oscillators of most synthesizers, these modules are specifically geared toward chewing sound up and spitting it out, creating new sounds from those that already exist.

The Morphagene operates on sound in the amplitude and time domain, and the Spectraphon in the frequency domain. A less technical way to think about it is that the Morphagene records and replays the sound literally, as a copy of the original sound that can then be manipulated by repeating, speeding up, slowing down, reversing, adding space between sounds, chopping into smaller pieces and reorganizing it in time, and more. On the other hand, the Spectraphon reinterprets the sound figuratively, using “Spectral Amplitude Modulation” (SAM) to oscillate at various frequencies based on its harmonic content. The resulting set of frequencies can be written into an Array to be the basis of the oscillator output in Spectral Array Oscillation (SAO). The Spectraphon can also generate its own sound via the SpectraNoise modes, Noise and Chaos.



Basic resynthesis patch:

Patch a sound of your choice to Morphagene and record it. Mult the Morphagene’s outputs to both Spectraphon inputs (in SAM), and the Aux input of the X-PAN. Patch Spectraphon’s Even/Odd outs to the X-PAN channel inputs and manipulate all controls to taste.



X-PAN

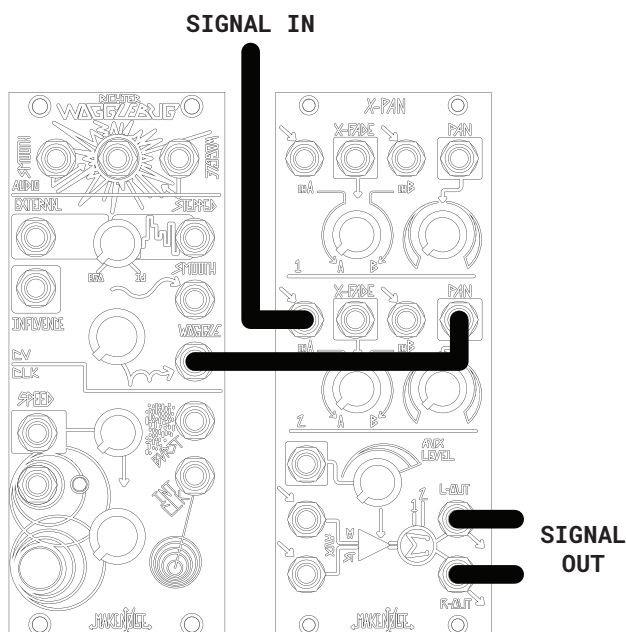
X-PAN is a mixer primarily designed for crossfading between sounds and moving them around in the stereo field. It is great for blending multiple outputs of Spectraphon, voltage controlled panning or crossfading, and chaining to or from the DXG for larger mixes via the Aux inputs. It can also be useful for generating stereo signals from one or more mono signals, for further stereo processing in QPAS, DXG, or Mimeophon.

[MANUAL](#)

[YOUTUBE PLAYLIST](#)

Basic uses:

Patch a sine wave from Spectraphon (or any other audio output) to a channel input, use Wobblebug to pan it left and right randomly



Patch the Even and Odd outputs of a Spectraphon Side to the A and B inputs of an X-PAN channel, use a cycling MATHS to crossfade between Even and Odd dynamically



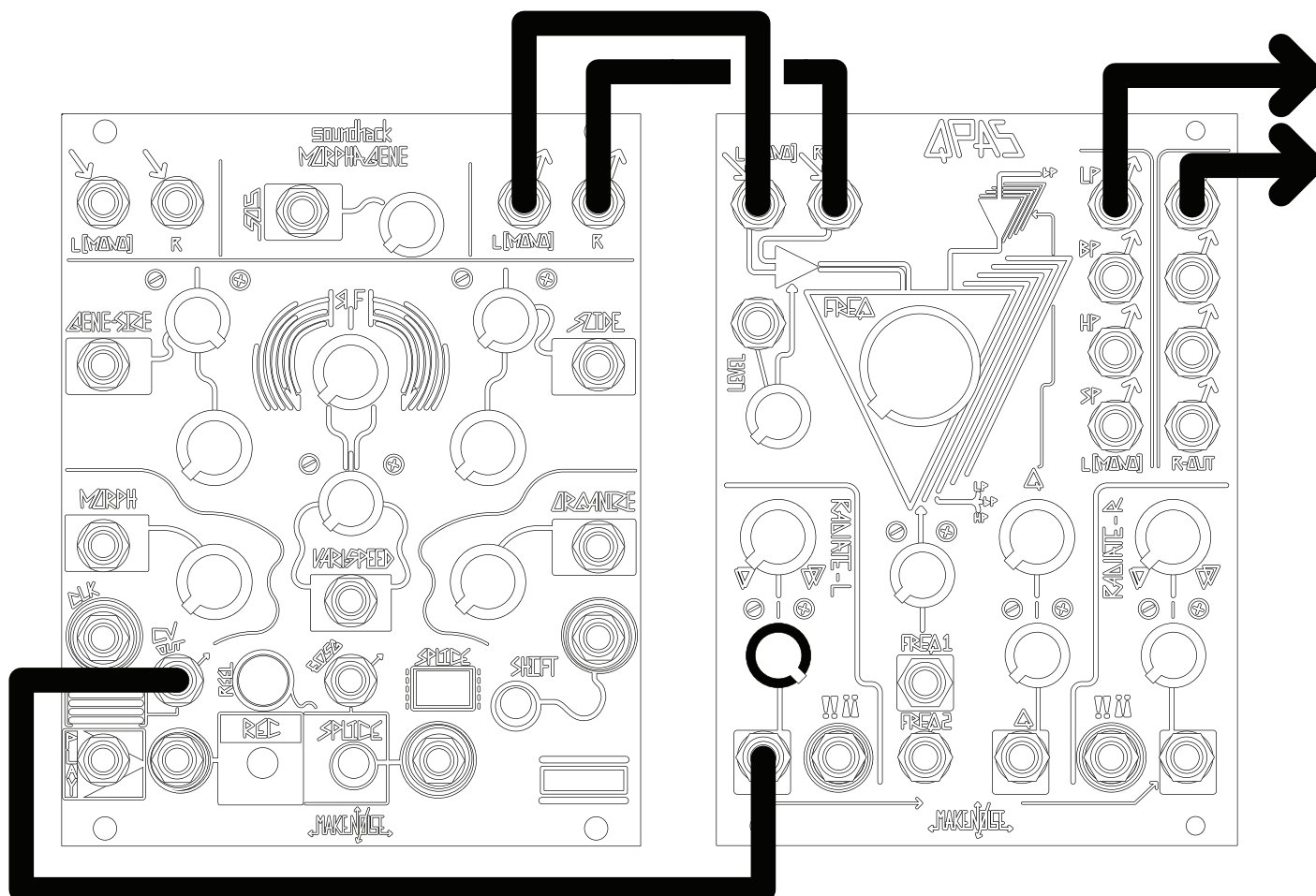
QPAS

The Quad Peak Animation System is a stereo filter with four filter cores, two per side. Via a special parameter called Radiate, it creates a unique voltage controlled stereo animation. It has four filter types, each with dedicated stereo outputs including a special new type called Smile Pass. Unlike many filters the QPAS also features a VCA on the input for ease of note creation. It is also a useful utility for converting mono signals to stereo and vice versa.

[MANUAL](#)
[YOUTUBE PLAYLIST](#)

Basic use:

Patch Morphagene outputs to QPAS inputs. Monitor any pair of outputs. Set Frequency to taste. Use Morphagene CV output to Radiate QPAS' peaks.



CV Bus

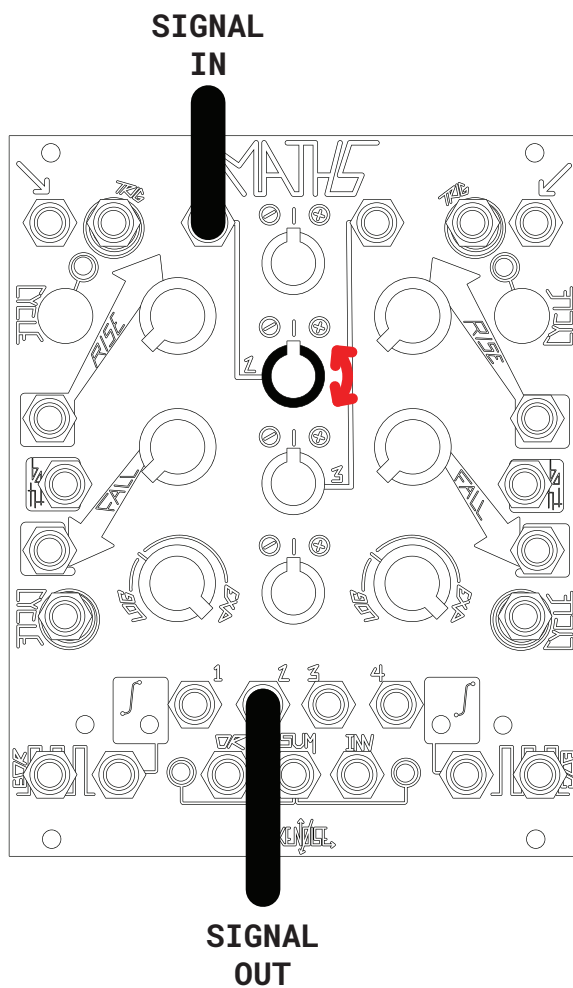
The CV Bus provides a number of useful utilities for overall system integration. The Voltage Math section is a simplified version of the middle channels of the MATHS module, allowing quick access to universally useful functions like attenuation, signal mixing, and level shifting. The Multiple is a horizontally arranged set of jacks for signal distribution, allowing one signal to be sent to several places through the system with color coded signal indication. The output section allows the ReSynthesizer's output signal to be sent into the world with a line level output and volume control.

MATHS

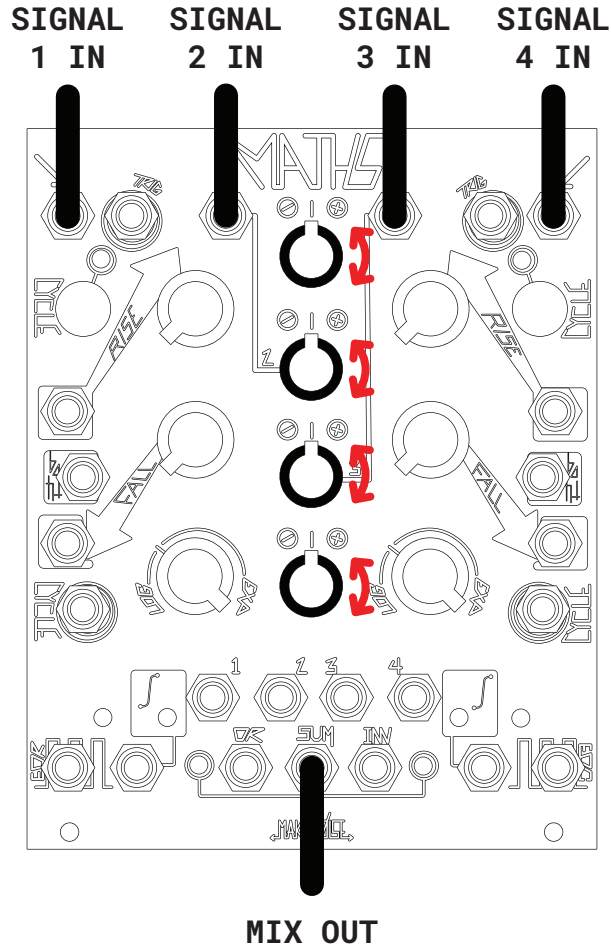
Oops, we already covered MATHS... oh wait, there's another one! Yes, MATHS is such a useful module that the ReSynthesizer contains two of them. Patch them alone or together for maximum modulation!!

More basic uses for MATHS:

Attenuate or invert a signal by patching it to channel 2 or 3 and using the channel's attenuverter to set its level and polarity.



Mix 2-4 signals by patching them to the channels' inputs, adjusting the attenuverters to set their individual levels, and find the mix at the SUM output (note that in this case Channels 1 and 4 will additionally slew the signals as detailed above).



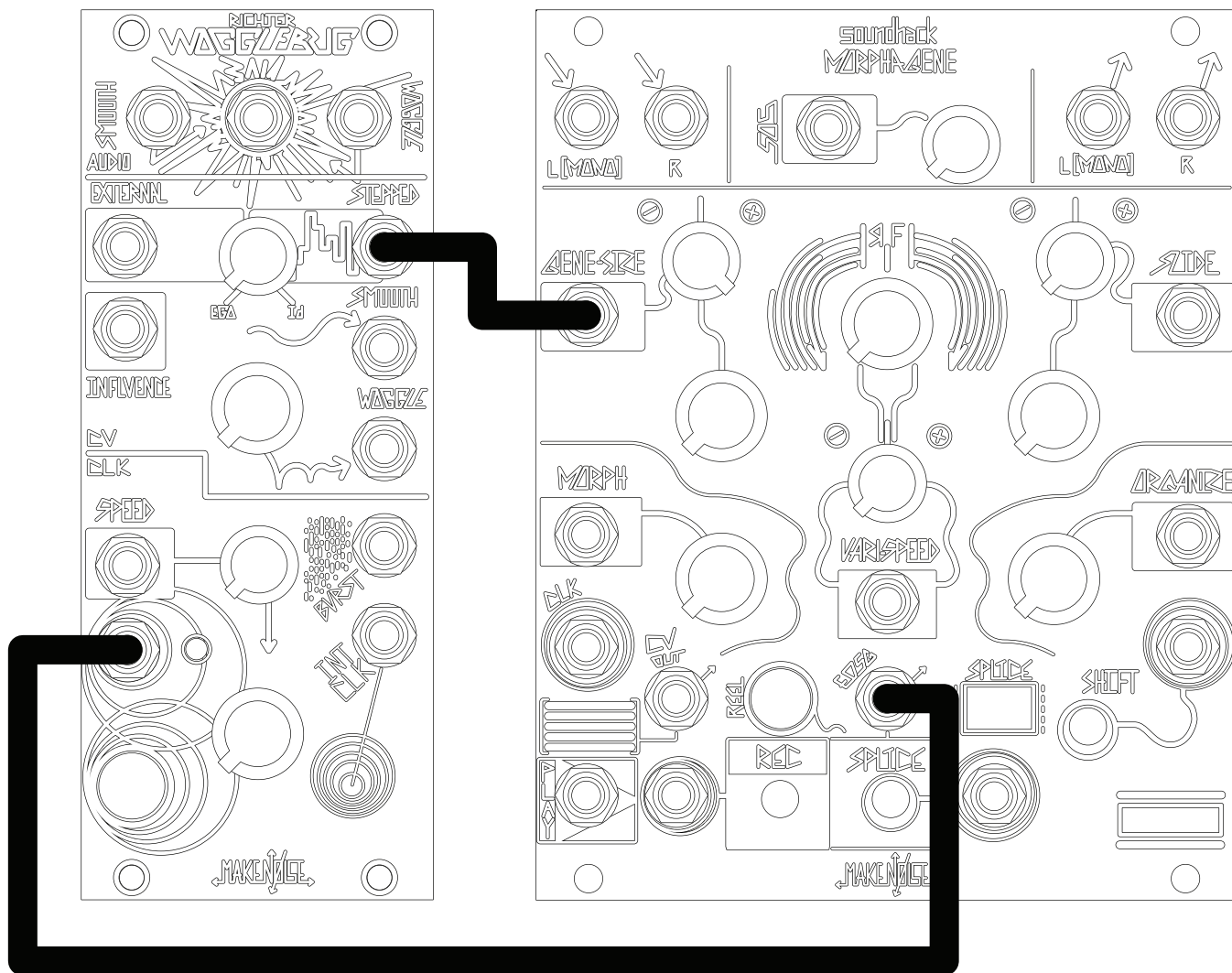
Wobblebug

Wobblebug is the ReSynthesizer's Id Monster. Based on a classic circuit by Grant Richter of Wiard Synthesizers, the Wobblebug creates several types of random voltage and can be used to do everything from add a little bit of unpredictable motion to a patch, to being used as the hub of self-playing music systems. The Ego and Influence inputs allow it to be guided by other signals within the system, creating the potential for various symbiotic relationships and feedback networks.

[MANUAL](#)
[YOUTUBE PLAYLIST](#)

Basic patch:

Patch Morphagene EOSG to Wobblebug Clock input, and Stepped Random CV Output to Morphagene Gene size. This will create a new random Gene Size with each new Gene.



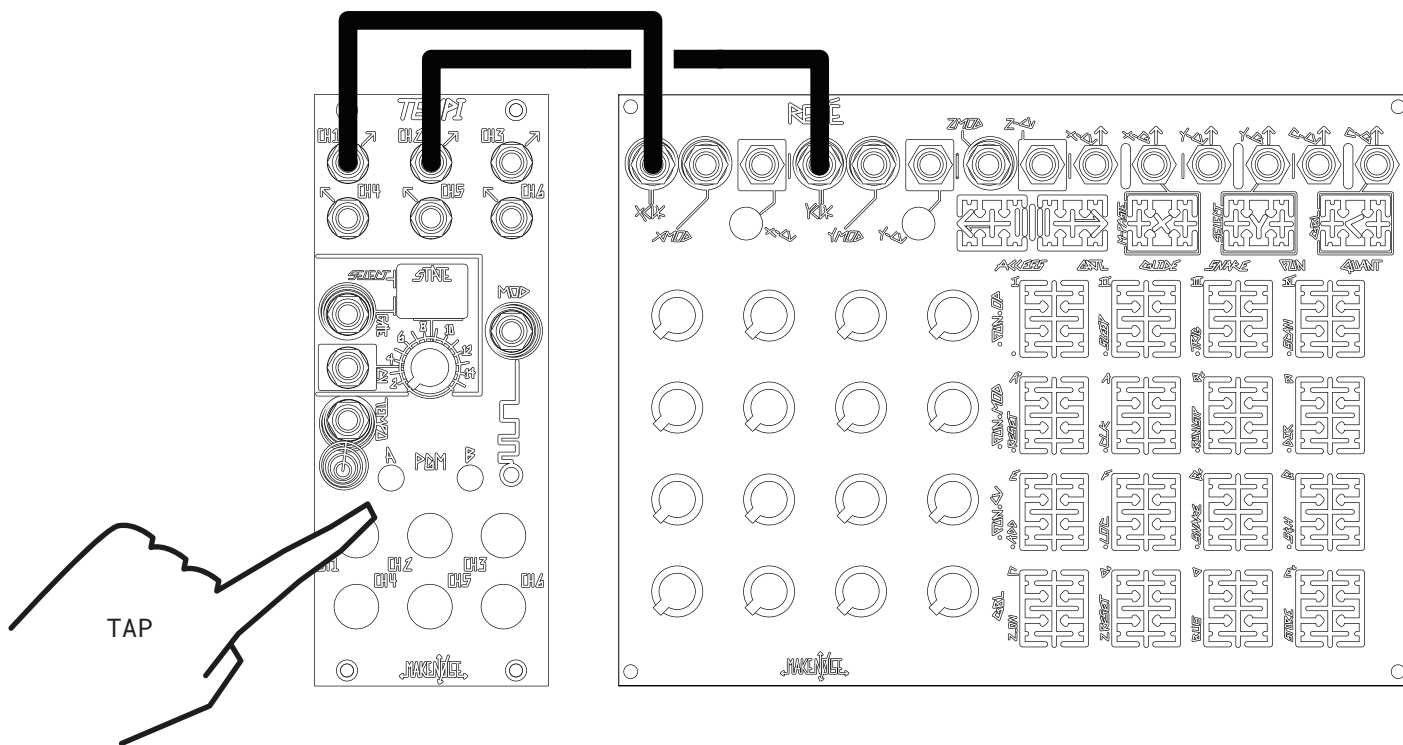
TEMPI

TEMPI is a polyphonic time shifting module. The six channels generate six related clocks that can be human-programmed by simply tapping the associated button at your choice of tempo. The channels can additionally be Muted, Shifted, made to start and stop via gate stream, and more, making it a playable, patch programmable clock divider and multiplier. TEMPI is useful for clocking the channels of René, automating the Record or Play functions of Morphagene, triggering MATHS functions, creating notes by Striking DXG channels, and much more! TEMPI can also store collections of clock rates called States, which can be dynamically selected alongside the States of René without the need for patching, thanks to the Select Bus.

[MANUAL](#)
[YOUTUBE PLAYLIST](#)

Basic patch:

Patch Channels 1 and 2 to René X and Y Clock inputs. Tap channel Buttons to set clock rates (a.k.a. tempi).



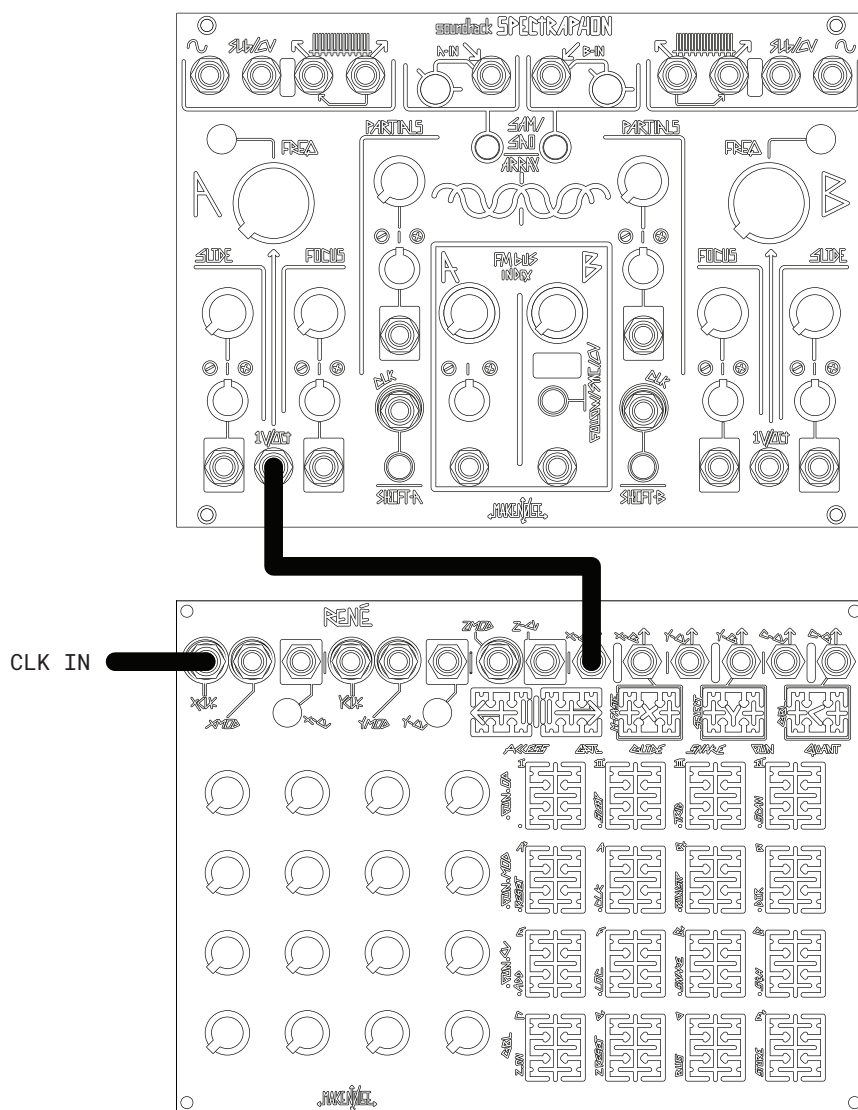
RENÉ

René is a three dimensional, three channel Cartesian sequencer. Unlike the archetypical step sequencer of yore, René arranges its steps or locations in a 2 dimensional grid of horizontal and vertical coordinates, and can traverse through them in many possible paths. Three related channels of grid locations are traversed at once by two clocks (X and Y), creating three sets of control voltage and gate outputs, which can be used to sequence notes or modulation on Spectraphon, Morphagene, or pretty much any other module in the ReSynthesizer. The total programming for all three channels can be saved into States, which can then be dynamically selected via Z Clock and Z-CV to add a third dimension to the sequencing. René can also control the TEMPI via the Select Bus for State selection, along with editing powers such as Store, Revert, Multi-Paste, and MESH Programming (see the manual for full details!).

[MANUAL](#)
[YOUTUBE PLAYLIST](#)

Basic patch:

Clock X-Clk with a clock source of your choice. Patch X-CV to Spectraphon 1v/oct input



PrssPnt

PrssPnt creates a special node for human touch in the ReSynthesizer. Touching the printed copper wire at the bottom of the module generates four simultaneous signals for immediate gestural control of as many parameters as you can handle within a patch.

[MANUAL](#)[YOUTUBE PLAYLIST](#)

DXG

The Dual Stereo Gate is a stereo mixer with two low pass gates on its channel inputs for dynamics control and note creation. It can be used to mix multiple mono stereo signals together to a stereo output, as well as add rhythmic variation. The Strike inputs make it easy to create plucking or pinging sounds from any signal. It can also be chained to or from the X-PAN for larger mixes via the Aux inputs.

[MANUAL](#)[YOUTUBE PLAYLIST](#)

Mimeophon

The Mimeophon is a stereo, multi-zone color audio repeater. It's a modern take on various historical sound copying, repeating, and echo devices. It can operate on several different time scales via the Zone control, timbrally sculpt and spatialize repeats, and even generate sound or oscillate directly at audio rate in the shortest Zone. It will often be the final stage of the ReSynthesizer's signal flow, but by no means has to be! The ReSynthesizer lets you rearrange your patch flow just as flexibly as it rearranges sounds!

[MANUAL](#)[YOUTUBE PLAYLIST](#)

PATCH IDEAS

Basic Stereo Resynthesis Patch

This patch is a good starting point for resynthesizing the Morphagene's outputs in stereo while also hearing the original version mixed in with the resynthesis.

Put both sides of **Spectraphon** in SAM

Morphagene L Output -> **CV Bus** Ch1
Morphagene R Output -> **CV Bus** Ch2
CV Bus Ch1 -> **Spectraphon** A Input
CV Bus Ch1 -> **DXG** Ch1 L Input
CV Bus Ch2 -> **Spectraphon** B Input
CV Bus Ch2 -> **DXG** Ch1 R Input
Spectraphon A Odd -> **X-PAN** ChA L Input
Spectraphon B Odd -> **X-PAN** ChB R Input
Spectraphon A Even -> **X-PAN** ChB R Input
Spectraphon B Even -> **X-PAN** ChB L Input
X-PAN Outputs -> **DXG** Ch2 Inputs
DXG Outputs -> Monitor

Set **X-PAN** X-Fade controls to about 10:00
Set **X-PAN** ChA Pan to 10:00
Set **X-PAN** ChB Pan to 2:00

Adjust **Spectraphon** Input levels to taste
Adjust **DXG** levels to taste for mix between **Morphagene** output and resynthesized version

*Optional: Filter one or both with **QPAS**, add echoes to one or both with **Mimeophon**.*

