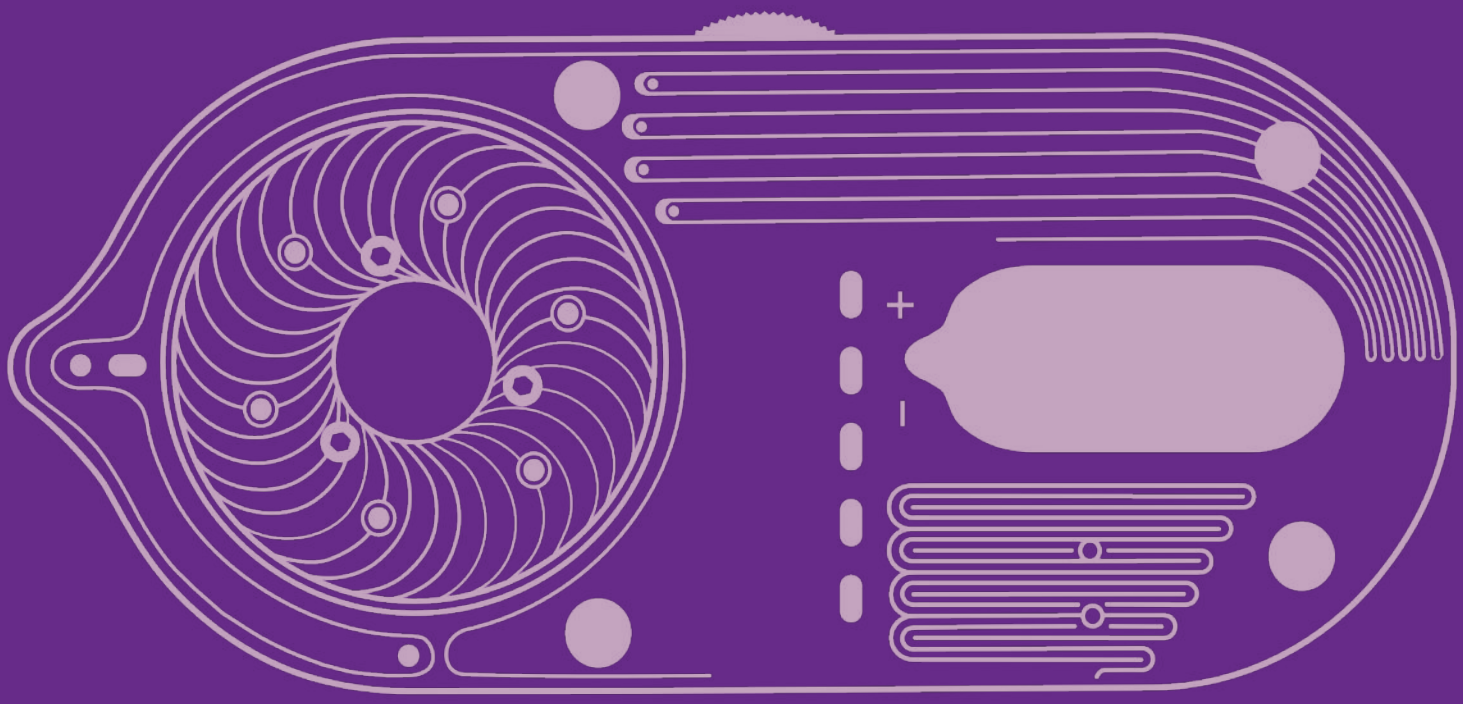
ISSUE 14

WAVEFORM

MAGAZINE

BLACK NOISE MODULAR
LA CIRCUITS
VONGON
RECOVERY EFFECTS



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Senior Editor - EM MASLICH
Art Direction/Layout - ELLISON WOLF, EM MASLICH
Circulation/Customer Support - BARBARA JONES-FARADAY
Music Editor - TOM OJENDYK
Shipping and Logistics - EVAN MORROW
Contributing Writers - DAVID BATTINO, EM MASLICH, JASON CZYERYK, EVAN MORROW, IAN RAPP, WILLIAM STOKES, TOM OJENDYK, ALEX VITTUM

ON THE COVER: THE LANDSCAPE/EVICSHEN FERROUS

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SEATTLE, WA 98119 USA
contact@waveformmagazine.com
Music reviews—links only—no attachments. tojendyk@gmail.com
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CONTRIBUTORS

DAVID BATTINO'S DIY approach to music began at the Oberlin Conservatory in the days of quadraphonic tape loops. He's the founding editor of *Music & Computers* magazine and co-author of *The Art of Digital Music*. Find him at batmosphere.com

EM MASLICH is an editor, artist, and musician. She plays a modified Fender Rhodes, drums, synths, and sings in the band Secretary. secretaryband.bandcamp.com

IAN RAPP likes hiking up Tuckerman's Ravine with his Husky, Sandor, and cooking with fennel. He is a graphic designer and music maker and composes under the name No Reliable Maps.

JASON CZYERYK is an avid synth collector, player, and builder. He designs psychedelic beverage coasters, binge watches "How-To" car repair videos, and does indoor Parkour to stay in shape. He lives near Atlanta with his wife, kids, and his two beloved Blue Healers; Indigo and Sharkskin.

ALEX VITTUM is a composer, electronic musician, and drummer. He's worked with Don Buchla, Paul Dresher Ensemble, and Keith McMillan in a multitude of roles ranging from hardware development to product demonstration. He creates ambient music under the name Intervales. alexvittum.com

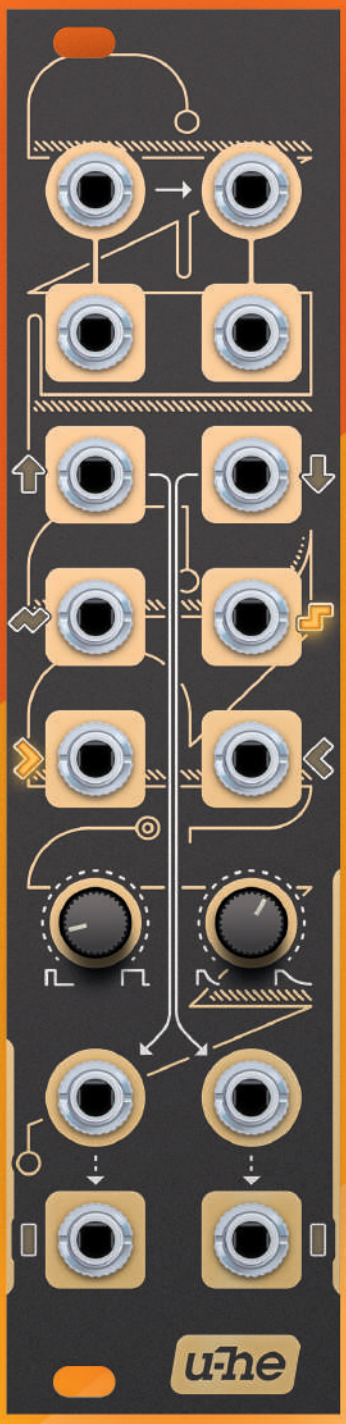
TOM OJENDYK likes music. He is co-owner of the Seattle, Washington record shop Hex Enduction, and also owns the record label Dirty Knobby. discogs.com/seller/HexEnductionRecords/ dirtyknobby.com

EVAN MORROW got his pilot's license before he was twenty five and took up fly fishing right after. His first synth was a Realistic Moog that an ex-girlfriend left behind when they broke up, and he still has it. He's currently trying to combine two of his top hobbies; RC planes and modular, by building a modular that flies. It's proving to be more difficult than he initially thought.

ELLISON WOLF likes words, cold water swimming, and making pottery. He aspires to be a minimalist. He plays in the band Secretary. secretaryband.bandcamp.com

WILLIAM STOKES is a writer and musician in the three-piece avant-psych band Voka Gentle. He's written on music and music technology for *The Guardian, Sound On Sound, The Financial Times* and more. You can find his music at vokagentle.com

Every melody…



…deserves a rhythm!

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W 6HP	D 31mm / 1.26inch
120mA @+12V	40mA @-12V

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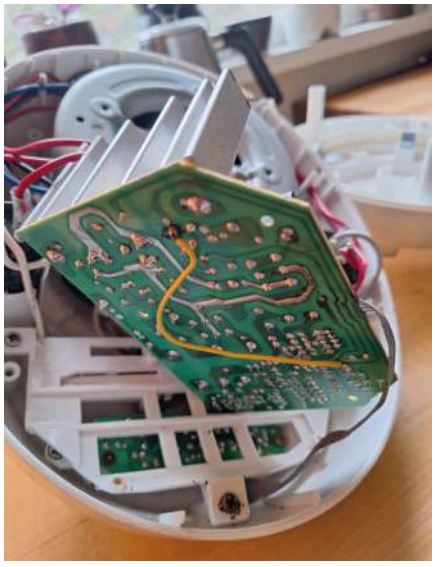
u-he.com/products/wiretap

Over a year ago I joined an online "Buy Nothing" group local to where I live since, subsequently relinquishing most of my possessions and having traveled for almost a year, I needed many items: furniture, housewares, tools. The Buy Nothing group was a great way to get back much of what I'd given away and turned out to be interesting in one way I hadn't expected. Along with so many items that were no longer needed or wanted by the original owner, there was a constant barrage of broken items that were offered up with the hopes of being given one last shot at life before being discarded to a landfill. The truth is, I love fixing things, it's one of my favorite pastimes. I love the deeper understanding you gain from earning how something works, diagnosing an issue, and then figuring out how to get it back up and running again. It feels good to help maintain or extend the usability, the life span, of an object, maybe even well past the point that the manufacturer had thought, intended, or designed the item. With so many throwaway, disposable items taking up landfill space, it gives me a lot of pleasure to deny them of more waste. And shame on the manufacturer who designs something to fail within a certain amount of time.



CUISINART PCB WITH YELLOW WIRE CONNECTING THE GROUND POINTS.

The list of broken items (this, along with the many non-broken items) that I received from the Buy Nothing group and was able to fix is pretty impressive. I was surprised sometimes at how trivial the "repair" was for something that was declared broken. A lot of times it was just routine maintenance like the Vitamix blender that looked nearly new, and, according to its previous owner, only "intermittently worked." This resulted from the gear head turning because of a loose screw; an easy fix. A few times, the repair was nothing more than the replacement of a part that is pretty routine, like the Audio Technica turntable that had a broken $4 drive belt. Sometimes it seemed that some of these people had given up much too easily on something that at one time was so wanted. The list of fixed items goes on: the large brass designer floor lamp that needed a new $10 touch sensor; the nearly new Cuisinart PowerPrep Plus food processor (with all the attachments!) that actually had real damage—corrosion—to the circuit board, but only required two grounding points to be bridged with a wire; the other brass floor lamp that "only worked sometimes," which turned out to be the on/off screw switch being stripped (which I superglued); the pressure washer which I still haven't used, (but oh, how I've always wanted one!) that needed a new GFCI switch ($12), the two guitar amps (a 2000s Line 6 and a Fender solid-state, incredibly with through hole components on the main PCB) that each only needed a little Deoxit on the pots; the old Peavey PA system that just needed a new fuse and to be cleaned up; and the Behringer electric grand piano that had a ton of sticky keys, that needed to be taken apart completely and wiped free from the problematic dried out grease, a process that took me four hours. I've actually seen a handful of these pianos being offered for free locally because of this exact issue; the sure sign of a design flaw. I even started doing pottery at home when I found an out-of-commission pottery wheel that needed a new belt, new motor bearings, and to reflow the solder pads for the power filter caps on the motherboard, but has worked great since. I felt pretty good about getting that in good working order, having had no experience with pottery wheels before. Throw in a couple of vacuums, electric tea kettles, some dying plants, and a few other odds and ends, and it didn't take long to re-accumulate a household's worth of goods.

Every time I fix something, every time I give something a new life, it bolsters my confidence in my abilities for this, and as a result, makes me feel a bit more independent; I feel like I can fix anything and now feel that given enough time, thought, and resources, anything can be given new life. It's empowering. Sometimes I reminisce about the process, like how taking apart that Cuisinart uncovered the corrosive motherboard that needed to be sanded and resoldered, or about how not seeing the motor spin on the record player clued me in to the need of a new belt.

With some items, once I fixed them, I contacted the previous owners to see if they wanted them back, and some were pleased and accepted (the record player, one of the lamps), but some had already moved on with new items and so I either kept what I fixed, or gave them away to friends or others in the Buy Nothing group. There's been nothing I've taken on that I haven't been able to fix, and no expensive tools, no special skills, and no magic was needed. Just time, thought, and dedication; that's all. There's not much that feels better than giving something the time and attention it deserves, and the rewards I've received from doing so have far outpaced the act of fixing.

- Ellison Wolf, December 2024

We still don't know what the Big Bang looked like, but we have an idea how it sounded.

And it must have sounded something like Collide 4, the new module everyone's talking about.

Collide 4 is a lock-in amplifier, an experimental physics device used to uncover the secrets of the universe, re-imagined as a synth module. It excels at processing and transforming sound, but also possesses a unique voice of its own.

Luckily, you don't need to be a Nobel Prize laureate to get started. The basic concepts are easy for anyone with an understanding of classic subtractive synthesis.

When hooked up to your studio rather than a particle accelerator, Collide 4 can be used as a preamp, filter, complex oscillator, LFO, dual ring modulator, frequency shifter, and much more.

In fact, we've reproduced Collide 4 in full size here, so you can get a feel for just how feature-packed this 20 HP Eurorack module is.

Collide 4 is available now at a MSRP of $650 (US). Visit your local Eurorack dealer for a personal demo and discover for yourself how the Big Bang might have sounded.

Review on page 46.

Joranalogue AUDIO DESIGN × HAINBACH

black noise modular

Time and space are perhaps the biggest gifts one can have when it comes to a life of creativity. Black Noise Modular's Alex Simon grew up in rural France at a time when the technological thrust of the internet, and all that it has brought with it, was still new, an untapped, vast resource that was like a portal to a more realized world. Simon became fascinated by technology, which he described as magical and limitless.

Originally planning on getting into the guitar building trade, Simon instead went to art school where he studied design, which led him—after a few twists and turns—to turning his attention to electronics and building synth modules.

Located near Dijon, France, Simon now runs Black Noise Modular as a mostly one-man operation, and strives to give each module something extra under the hood, a feature or aspect that ups the usefulness quotient.

Simon attributes inspiration to things such as Bauhaus philosophies and musique concrète, but more surprisingly it's the time and space of the quotidian, things like walking his dog, or a bout of insomnia that allow him the time and space needed to ponder his circuits and designs. Sometimes you never know what can help you find something as seemingly trivial as a solution to a circuit design problem, or as grand as your place in the world, maybe with one leading to the other.

analog ones, and turned DIY projects into products and started to sell. I am thinking about making digital modules, but analog is fun. In a way, it's easier because you have limitations, and like in life, when you have limitations, it brings creativity.

What was your entryway into making instruments?

Guitar was the first instrument I learned to play when I was about ten years old. Since I'm left-handed, I made the "mistake" of learning on a left-handed guitar, and back then they were hard to find, and also expensive. My dad was into woodworking as a hobby, and I asked him to teach me so I could build my own. I wanted to turn it into my career and applied to a special school in the south of France created by the guitar brand Lâg. Entry was competitive, with at least a thousand candidates for just fifteen spots. I came in sixteenth, so I didn't get accepted. Since I was passionate about art in general, I decided to apply for art school instead, where I learned design, and discovered my passion for electronics, which opened up even more creative possibilities like building effect pedals and repairing amps for friends. Sculpting sound with pedals and creating my own effects became more interesting than playing guitar, and when I discovered modular synths, it was a revelation. I couldn't afford to buy modules, so I started designing my own using schematics I found online, and that's how I taught myself.

They were created to invent new sounds and new music, and that philosophy is still alive.

Waveform: What were you doing before you started Black Noise Modular?

Alex Simon: I was a UX and UI designer. I changed jobs into the events industry just six weeks before Covid and lockdown in France. I was to head up a new department focused on scenography where our clients were companies like Chanel. When they organize a fashion show, there's a theme reflecting the new collection, and they create sets to match. They would come to us, we'd develop the sets with the artistic director, and then handle everything else. Our team included engineers designing the structures, artists creating the set pieces, a team managing permits, logistics, and so on. My job was to build the department from the ground up: hire employees, purchase tools and equipment, and run the team. But with COVID, the entire events industry came to a halt. I spent three months locked in, and it gave me time to think about what I want in life. After those three months, I decided to quit and launch Black Noise. I'd already built modules and had studied electronics when I was a student, and as I fell deeper into the rabbit hole, it became like a drug and gradually evolved into creating modules with functions I dreamed of having. When I was stuck at home during lockdown, it allowed me to dedicate myself full time to this. I started designing my own modules, doing everything myself, including etching the PCBs. I wanted to make digital modules, and I'd already had a few projects that I worked on, so I spent six months doing that, but then, when I was ready to order the first prototype, there was a chip shortage, so I did other modules,

What did you find more interesting about it?

The guitar world is pretty old-school; most people want Tube Screamers and Strats, and there's not much room for innovation. Modular synths are a whole different paradigm. They were created to invent new sounds and new music, and that philosophy is still alive. The users are super open to new ideas and innovation, which makes it way more interesting as a designer.

You mentioned guitar as the first instrument you learned, did you play guitar in bands when you were growing up?

No, not really. I've made music since I was a kid, but I grew up in a very small town, about a hundred kilometers from Dijon. It's a rural region, and I was the only kid playing instruments, so it was hard to find others to play with.

What was it like growing up in the French countryside?

It was awesome because I grew up during a time when computers and the internet became more accessible. We had all the perks of living in the countryside, but also easy access to the world and culture right from our computer. I was too young to know how to download pirated content, but my two older brothers did, and they let me watch the movies, listen to the music, and play the video games they pirated, even if I wasn't always old enough for it. Since the internet was too slow for online gaming back then, their friends would often come over for LAN parties when our

Photo Spread: **Alex Simon in Dessau, Germany, 2024.**
Photo by Solène Simon
Previous Page: **Black Noise Modular, Superbooth, 2023.**
This page: **Black Noise modular setup.**
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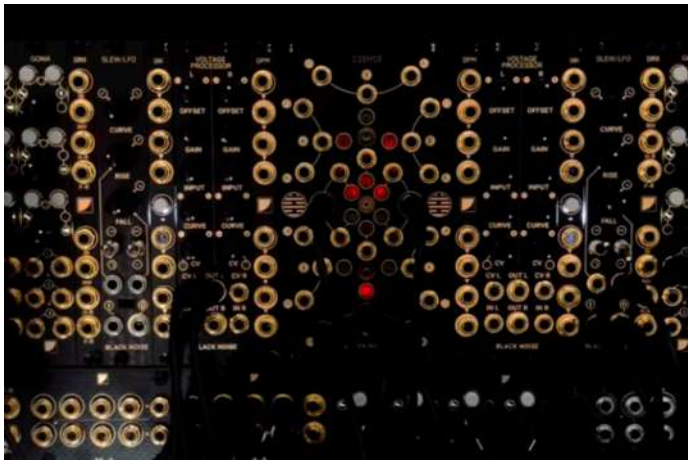
Page 13: **Black Noise Modular: Cosmos, GOMA II, GOMA Pro, Sallen Key Filter, Dual Combinator.**
All photos provided by Black Noise Modular unless noted



…even though it was already considered old at the time, it was a revolutionary experience for me.

parents were out. They'd bring their towers and heavy CRT monitors, set everything up on the dining table, and spend the evening playing *Counter-Strike*. That geeky atmosphere really influenced me; I became fascinated by technology. It felt magical and limitless, like anything was possible with just a click.

You went to art school, and I can see a lot of advanced design influence in your panels, just the whole concept of it; the black with the raised images behind the top, the colors…Which artists or designers do you feel have influenced you in terms of Black Noise Modular?

The Bauhaus movement and its philosophy have deeply influenced my work and continue to do so. I always try to maximize the electronics of a module to offer as many features as possible, and this often brings a certain complexity, so having a clean faceplate, a highly legible font, and a logical, ergonomic layout of controls helps create an interface that feels as transparent as possible. This way, the user can fully focus on their creative intent. I also really love Pierre Soulages' work, and the patterns on the background of the faceplates are inspired by his work with *Outrenoir*. As for the sound aspect, I discovered musique concrète while studying at art school because it was the hometown of Pierre Schaeffer and I read his writings and listened to his works, as well as those of Pierre Henry, and even though it was already considered old at the time, it was a revolutionary experience for me.

How do you think that inspiration has translated into the look and functionality for Black Noise?

I wanted something subtle, something that when you looked at it, it wouldn't bother you. I didn't want something very pronounced when I went about design. I wanted the user interface to be as easy as possible.

Your earlier modules definitely held to that ethos, but it seems like with Cosmos, that changed a little bit; it's cryptic and non-linear in terms of how the interface works. Why the stylistic change? Was there a change in philosophy?

I personally don't see this as a shift; I applied the same design principles to Cosmos as I do to all our modules, and I think the faceplate reflects the module and its purpose. What might seem cryptic at first glance is that the faceplate is entirely made up of jacks, accompanied only by symbols. There are three reasons behind this choice: The first is that for some features, like the thru-zero clipper, it's a unique section of the module that doesn't exist elsewhere, so there isn't a universally recognized term to describe this circuit. In such cases, you either approximate with terms that might resemble the concept but aren't entirely accurate, leading to misunderstandings, or create a new term to describe the phenomenon. That's how we arrived at "thru-zero clipper," but it's still something the user has to learn. Whether the user learns a word or an icon, what matters isn't the medium, it's the concept behind it. The second reason for choosing icons instead of text is that textual labels might have referenced logical terms like AND gate, NOR gate, etc., and seeing such logic-related terminology, users could have assumed that Cosmos is a logic module, and might have only used it for those applications, limiting it to just a fraction of its potential. Icons remove preconceived notions, encouraging users to explore rather than rely on familiar patching habits, like routing a VCO to a VCF to a VCA, etc. This exploration sparks discovery and understanding. Physically interacting with the module also helps solidify these learnings, far more effectively than reading a manual or watching a video. The third reason ties back to the influence of Bauhaus and modern design principles. I've been deeply inspired by Dieter Rams' work, but I try to draw from his principles rather than his aesthetics. Drawing inspiration from something like the (Braun) T3 transistor (radio) to create the iPod makes sense; applying that approach to an instrument, in my opinion, doesn't. A portable radio or an iPod is a tool, the emotion and magic come from the music they allow us to consume. A musical instrument, on the other hand, is meant to let us express our creativity transparently while also inspiring and fueling that creativity. Cosmos is a module that invites experimentation, encourages exploring new approaches, and highlights the non-linearities that make sound so alive and organic. The design of the faceplate and the module itself is

meant to fuel that mindset in the user. The core idea behind Cosmos was to explore the possibilities of an analog computer in a Eurorack environment. A computer, by nature, is a highly flexible tool; it becomes what you make of it, much like a Eurorack system. If it's seen as a tool for sound design, it probably comes mainly from its flexibility.

So were you thinking that Cosmos would be used as more of a sound design tool than a musical tool?

Sound design is another path of making music. I like to describe sound design as "any sound that isn't music." Music, like any language, comes with rules and boundaries that provide structure for building it. That structure is reflected in the modules we use and how we patch them. A flexible module, one that can be many things at once, might seem at odds with the idea of structure and music, but that's a shortcut. I regularly use Cosmos in music-making as a distortion, a clamping VCA, a waveshaper, and more. Its flexibility makes me feel like the only limit to its applications is imagination. I often hear from users who use it in ways I never would have thought of, and the results are always super inspiring.

How did the evolution of Cosmos come about? I can't remember how many functions you can use it for, but it's a pretty long list.

Modules like this grow out of my own experiences and the other modules I design. I try to keep everything coherent, so they integrate seamlessly into a system and form a cohesive whole. When I looked at early computers and their schematics, I realized they used basically the same components as analog Eurorack modules do, so I started to think how we could use analog computers in the Eurorack domain. Designing Cosmos was a real challenge because it's a one-of-a-kind module, but I learned a lot from it. When you design something like a filter, you know it needs controls for cutoff, resonance, etc., but with a module like Cosmos, there are no references—you have to define the functions, the controls, and the user experience from scratch. From the initial idea to the final product, it took me four years to develop Cosmos, and it evolved a lot throughout that time.

Was there a specific reason or design element that made it such a long process?

Almost all Eurorack modules have a linear signal path: The signal enters the module and moves from one block to another, with each block manipulating the signal to achieve the desired result. Cosmos, on the other hand, works like an organism, where each block interacts with and is influenced by the others. This creates really interesting and unique results, but it's a nightmare to prototype and debug. With a normal module, you can start with the first block and move through them one by one to identify the problem. With Cosmos, that wasn't possible.

That seems stressful. Breadboards terrify me.

The breadboard design was a nightmare. Besides the fact that the connections on a breadboard are fragile, the system itself with spring-loaded contacts wasn't compatible with Cosmos. Since the module is fully analog and relies heavily on non-linearities, the tolerances of the components and their connections are crucial. A circuit that worked on the breadboard didn't always work on the PCB because the copper traces were much "cleaner" than the breadboard contacts. On top of that, if one section didn't work, the whole module wouldn't work and when there were several sections that didn't work, it was a nightmare. I had to design fifteen or sixteen boards for Cosmos, not counting the revisions and breadboarding between each one.

So once you'd get a prototype, you had to go back and figure out the differences, and figure out where the differences were coming from, and then tweak it? That would be horrible.

It's the kind of project that really embodies the motto, "We do these things not because they are easy, but because we thought they were going to be easy." It was a really tough project, but it's when things are hard that you learn, and I learned so much from it! It's my favorite module, and when I see the feedback from users, it was totally worth it.

Whether the user learns a word or an icon, what matters isn't the medium, it's the concept behind it.

When you started out I know that you offered your modules as DIY kits, is this still the case?

Almost. Our new power supplies (Volt 55 and Volt 100) are a bit too dangerous to make them DIY, so those are not available as such, but all of our other modules are. It's something we try to offer as much as possible because Eurorack modules are expensive and when I started I was a broke student and didn't have money to buy modules and making DIY kits is a way for a small business like us to make it a bit more affordable.

Your only kit offering for Cosmos is an already soldered SMD DIY kit. Would it be too hard to offer as a full kit? Is it through hole or surface mount?

In the kit, the surface-mount components are already soldered, and the user just has to solder the through-hole components like jacks, LEDs, and connectors. Some people have asked for a fully through-hole version, but the module would be way too big. We've also had a few requests for a version with just the bare PCB, but there are hundreds of surface-mount components and no one wants to solder them all by hand, one by one. I know that from my own experience!

That sounds like it would be a very tedious DIY build. Do you have a lot of interaction with people that build your kits? Do they contact you often?

We do everything we can to make our modules as simple as possible to assemble, even for beginners, so we're rarely

When you do something you've done thousands of times, like walking or brushing your teeth, your brain can run it in the background like a robot, freeing up space to focus on more complex and creative tasks.

contacted, and when we are, it's usually for debugging. The problem is that it's very hard to debug a module by email or video. You need tools; you need to take measurements, etc. It's something we want to improve because it's frustrating for both the user and us. We've already developed systems to test the PCBs before assembly to ensure they'll work once the user assembles them, but as we still sometimes make mistakes while assembling our modules, we understand that it can happen to users too. We're working on a service where, if a user makes a mistake during assembly and the module doesn't work correctly, they can send it back to our workshop, pay a small fee, and we'll guarantee to send them one that works, either by repairing it or replacing it with a new one. Most of the service is already in place, but we still need to sort out details like the best way to integrate it into the website, how to communicate about it, prepare visuals, etc.

That's a nice solution, it takes away the fear of buying something and not having it work. This way someone will know no matter what, they will get a module that they can use. You spoke about your USB power modules, can you talk about them a bit more? What was your motivation in making them?

We wanted to bring the flexibility of USB-C to Eurorack, to be able to play anywhere with a power bank or in the studio with a phone charger. We aimed to push USB-C to its current limits to prove that USB-C is a viable solution, even for large systems. I think there may still be some hesitation from users' perspective, but once they test it, those doubts will dissipate. USB-C is a small connector, and I think many users had bad experiences with micro-USB, which was fragile and could easily disconnect. Even though USB-C has solved these issues, it's still in the back of people's minds. We're still in the stage of innovators/early adopters, but I'm sure it's going to become the new standard.

Do you have to use a heavier USB cable or something for the power requirements?

Yes, you need to use USB cables designed to handle that much power, but now it's pretty common to have a cable that can handle 100 watts. The hardest part is about the charger, the power brick you have to use. The power displayed on the charger is often a marketing argument, and manufacturers play with this number, which makes it difficult to choose a charger that matches the power supply's specs. When we launched the pre-sales for the VOLT power supplies, we wanted to offer users the option to pre-order the power supply with a charger, but we realized that it's difficult to buy chargers, for example, for the US in the EU, and they end up being much more expensive. We tried to buy directly from the manufacturers, but we had to order several thousand chargers for each type, US, EU, UK, etc. One of the problems we want to solve is that we want it to be very modular because we don't offer cases, and I think if you want to offer power supplies, you need a solution with a case, but that's another business and for a small company like us it's very hard to start a case business. We decided to work with people that make cases with the idea that they make great cases; we make a great power supply, and we can work together to make it easier for everyone, because at the moment, this modularity is pretty costly.

When you say modularity, do you mean in terms of offering both the 3U version and the 1U? You're trying to limit the variables?

Yes, for example, we wanted to offer an option for the power supply module in 1U or 3U format. This requires designing a PCB for the power switch and one for the USB expander, which is more expensive than just making a single PCB for both. The VOLT 100 also has a bus board in the form of an expander, which means additional connectors, manufacturing cables to connect them, etc., and all of these elements increase the cost, not to mention all the steps that can't be automated and have to be done by hand in our workshop. Designing a power supply for a case manufacturer allows for the power supply to be tailored to the case, which eliminates the need for modularity and reduces

manufacturing costs. We really want to make USB-C power supplies as accessible as possible because it's a game-changer, but it's a long process because we have to convince both manufacturers and users to give it a try.

There are a lot of soldering points on bus boards, they're a pain to make. On that end, are you making everything yourself? Do you have other people pitching in?

I mainly work alone. I imagine the modules, design the schematics and PCBs, build the breadboards, test the prototypes, work on the faceplates, their layout, and ergonomics. I also handle assembling the modules, preparing the kits, shipping the orders, creating content for social media, answering emails, etc. For manual tasks like preparing kits, I sometimes have friends help me out when I have a lot of orders. It would be difficult to hire someone for these tasks because it's hard to anticipate. But as the company grows, it's becoming a more pressing need if I want to have time to design new modules, create content and be present for the community. For everything else, I work with people remotely. France is a small country, and Eurorack is quite niche, so it's easier to work with talent wherever they are, rather than trying to find them locally. I work with Pierre Collard, aka Pyer, who's in Belgium, and does all the design for VCV and worked with me on the manuals, the faceplates, as well as the modules and their features, the overall design. Pierre offers a different perspective on the modules I design; he challenges my ideas, gives me advice, suggestions, tips, and so on.

It's nice that you have somebody you trust as a sounding board like that. I noticed a lot of your modules are utility-type modules. You have an LFO, you've got your VCF and a couple of other things, but you don't have a VCO or a full synth voice, or anything like that. I was just wondering why?

When I design a module, I try to bring something new that doesn't exist yet. Since I'm currently focusing on analog modules, it's difficult to create something new for a VCO, sequencer, or effect. With utility modules, it's easier to create something new. Sometimes, it just takes one detail to improve a simple module and make it an essential part of a case. Our GOMA Pro, for example, is inspired by the classic attenuverter/mixer, but I added a lot of small features that allow you to go much further with it. Sometimes, I explore ideas that no one thought were worth exploring before, like the Dual Combinator. Mixing signals is fundamental in Eurorack, and sometimes we don't have the space or the need for a mixer with gain control for each input. There are already small mixers, but due to their design, each one has its strengths and, more importantly, its weaknesses. I was sure it was possible to design a new type of mixer that combines the qualities of each without their weaknesses, and I started thinking about it, thinking it would be simple. It took several years, but at the end, we created something that didn't exist and that has become an essential piece.

Do you think people notice that design element? Do you ever get comments about it?

I don't think so. A problem with that module, for instance, is that it's so simple that it makes it very hard to explain. Once you get it, once you have one, it makes sense, but to explain something that simple is very hard.

How did you even realize that was something you wanted to do for the Dual Combinator? I guess this goes back to what you spoke about, just seeing the problem and wanting to solve it.

I often go through periods of insomnia. It's the middle of the night. You can't sleep, so you have time to think. It sparks ideas that you test, and most of the time they don't work—until the night you finally find the right solution.

So insomnia is your secret! Interesting…There is something about circuit boards and circuit design that is comforting to ruminate on in the middle of the night. I'll do kind of the same sometimes, though sometimes my inability to sleep is caused by a circuit problem I'm having!

It was the kind of thing where you're glad at first that you don't know all the trouble you will have to make it work.

I also get a lot of ideas and solutions when I walk my dog. It feels like when you do something you've done thousands of times, like walking or brushing your teeth, your brain can run it in the background like a robot, freeing up space to focus on more complex and creative tasks.

Other than working on Black Noise Modular and walking your dog what do you like to do? Do you still make music?

Honestly, it's hard to find time. Running a business on your own takes a lot of time and energy. And when your passion is also your job, it can be tough to just make music—the designer side quickly takes over! I used to use my modular for making music, but now I focus more on sound design. Creating a track requires time; building each instrument, the drums, and mixing all the elements, and sound design allows me to focus on a single element. I enjoy creating drums or FX, sampling them with my (Rossum Electro-Music) Assimil8or, and when I have more time to make music, I already have a bunch of cool samples ready.

Is this the first business that you have ever had by yourself?

Yeah. It's hard, but I wouldn't change anything.

blacknoisemodular.com

get started ... push a few encoders to add gates ... turn a few to set pitches ... SHIFT + GEN to tap the algorithmic pattern generator ... jump over to SEQ CTL ... adjust pattern length and rate ... then to GATE and VELOCITY ... fine tune your rhythm and accents ... PREV & NEXT to see all 16 steps ... or 32 ... or 64 ... all easy to follow on the dual graphic OLEDs.

use SHIFT + PRESET to dup your pattern to a new preset location ... modify a bit or use SHIFT OPS (Shift + White Key) to mix things up a bit ... DOUBLE, INVERT, EVOLVE or SHIFT L/R ... dup again ... now jump into CHANCE OPS ... add some probabilistic mutes, skips, ratchets ... maybe some pitch changes ... two full sets of these on the MkII ... For a final touch, add some MODULATION ... use the sub-sequencers ... two of those per part ... they're great for chord changes or poly-rhythmic transpositions ... be intentional ... or not ... pipe in a CV to vary pitch or gate time

fine tune the GROOVE ... maybe add some PITCH GLIDES ... dive into SEQ CTL to set the Key & Scale ... or a custom scale if you want ... fine tune the GENERATOR ... or set your gate and velocity lanes to FREE RUN ... can do that with pitch and chance too ... add subtle timing variations to velocity and gate timing ... loosen things up a bit ... add some custom fills ...

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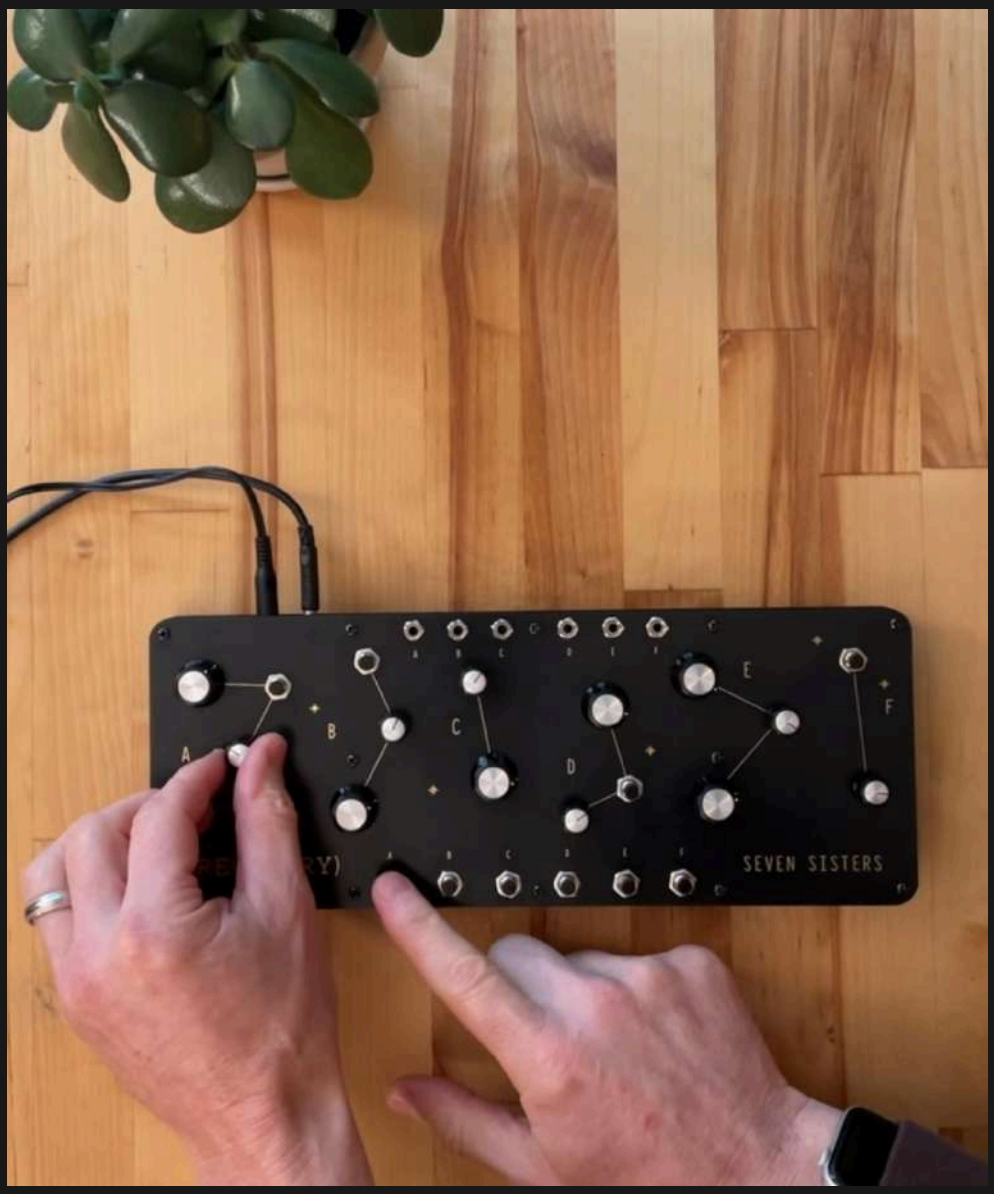

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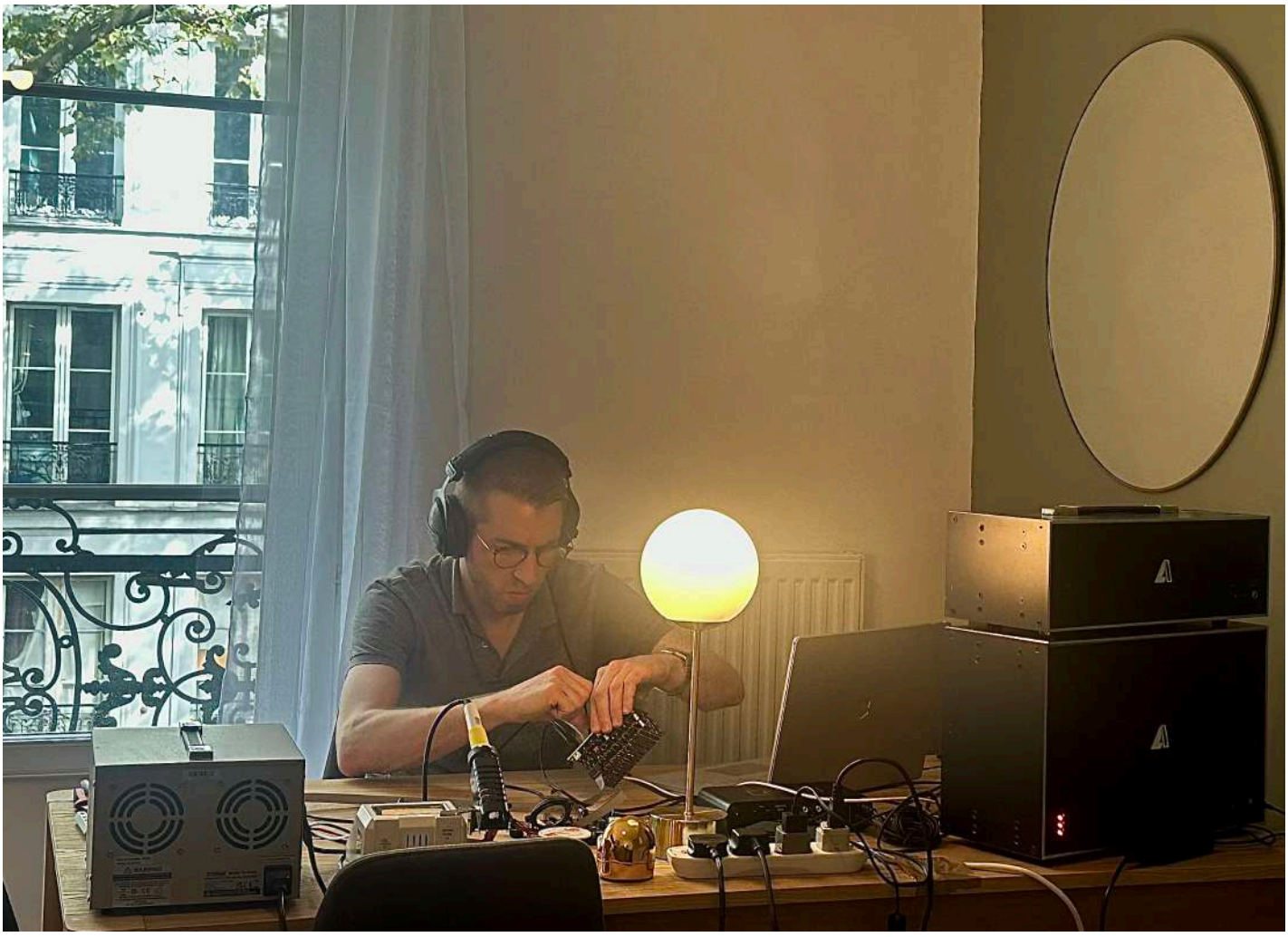

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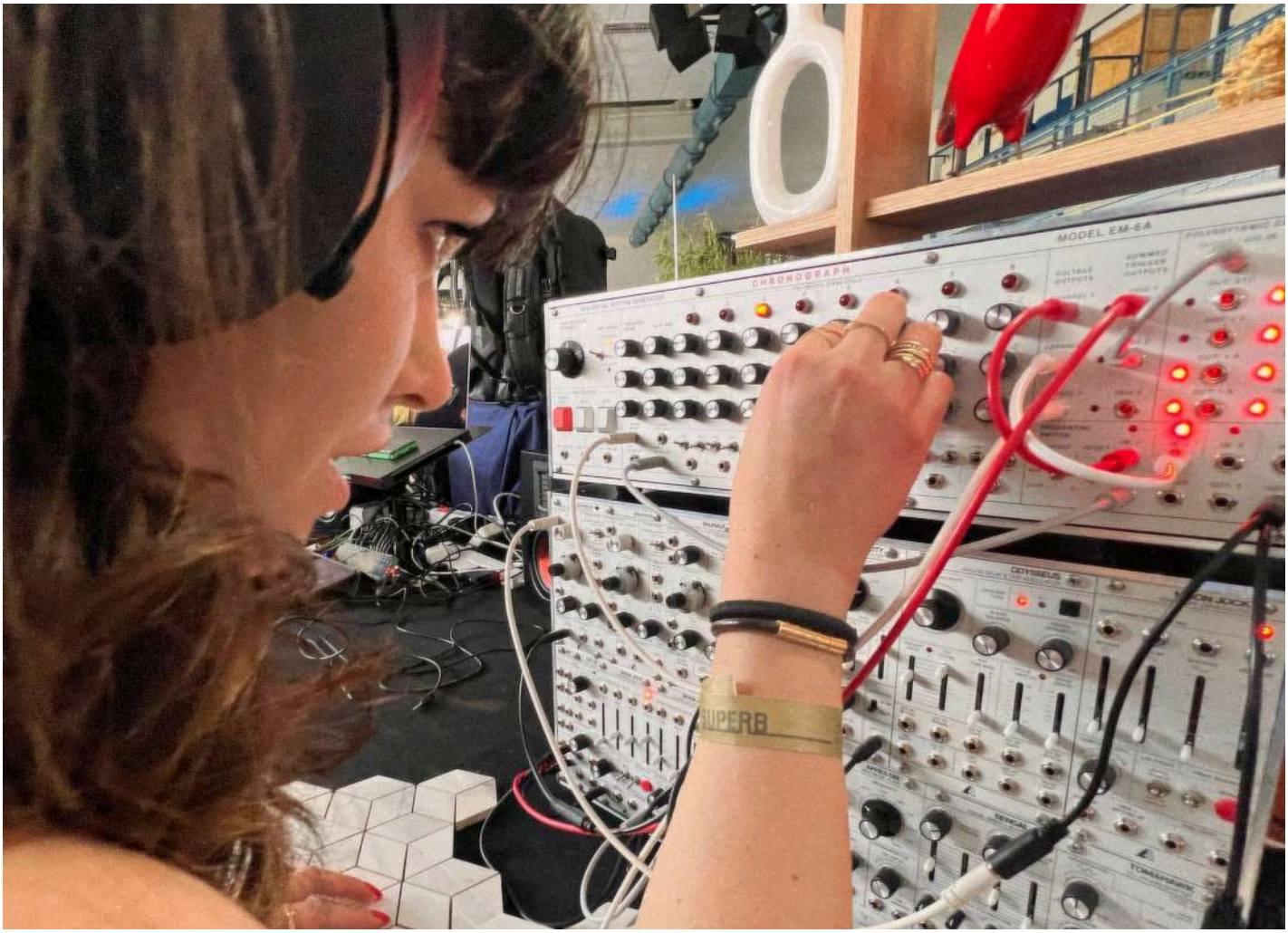


CIRCUITS

LA Circuits found their way into the Eurorack scene with their stylish modules, a combination of vintage space-age satellite and Buchla-esque aesthetics; they were at once familiar, yet also distinct. It was like they'd always been there, and yet the company itself was a mystery: there was hardly anything to be found online about the people producing the modules except for some brief YouTube videos. In one such video there was a guitar player (Brendan Thomspon) strumming along while fur (faux?) coat wearing artist (Alex Barcelo) tweaked along on a fully featured LA Circuits machine. Other than that and a smattering of social media posts, there just wasn't much information to be had. To be sure; nobody I knew had ever seen any LA Circuits modules in the flesh, though we all wanted to try them out; they looked that good. Well, it turns out that Thompson and Barcelo aren't mysterious so much as they would rather just let their modules do most of the talking to take the spotlight.

Having both grown up around the Los Angeles area, and working together previously in the fashion industry, Barcelo and Thompson took their partnership in a new direction when they formed LA Circuits in 2018. While the public interest in the company might have initially started out being more due to their modules aesthetics and the mystery of the people behind them, it's definitely shifted to the quality of the designs, the modules, and now complete LA Circuits systems. From their flat in Paris, we tried to uncover some of the mystery behind the company, and get a glimpse into what lies ahead.

If we're going to offer the whole shebang…each one has to be best in class.

Waveform: When I was researching your company there wasn't much information to be found. Is this on purpose? Where did LA Circuits come from? I mean, obviously Los Angeles, but…

Alex Barcelo: It's somewhat intentional, in the sense that we have never really been into social media or promoting ourselves, and we definitely kept our identities separate for a long time, but as the brand has developed and we've found our "voice," if you will, we've increasingly become more keen to promote LA Circuits.

Brendan Thompson: Our products speak for themselves. People have asked questions about the people behind it, but generally for us, it's about the instrument, so that's where we prefer to focus.

When did you start taking LA Circuits seriously?

A: We didn't really delve into the project until 2019 when we came out with our first set of modules.

B: We came up with the concept first, and then there was a gradual process of developing the designs electronically and aesthetically, and it morphed over time.

A: Our very first module was Bauhaus, an analog waveshaping voltage-controlled oscillator. When we initially debuted our modules at Superbooth 2019, the panel graphics and overall layouts were markedly different. The panels were physically much larger, and the underlying electronic designs were still undergoing significant changes, and overall functionality enhancements.

B: There have been myriad product design phases, wherein we would release certain modules, and then ultimately take them out of production, primarily because we decided those specific modules weren't quite ready for "prime time" yet. This was the case for Rebel Echo Analog Delay, Glissement Voltage-Controlled Slope Generator, Apollo XX Spectral Resonator Filter, as well as the Atomic Meddle system. With respect to Rebel Echo, we have taken the most important features and incorporated those elements into our upcoming Odysseus Analog Delay, which we are very excited about premiering in the coming months. Glissement has been completely redesigned. Fundamentally, it is now a powerful voltage-controlled transient envelope generator, a slew limiter, and a versatile morphing audio/low-frequency oscillator, all rolled into 10 HP. The Apollo XX VCF has also been overhauled and brought back into production for a special edition release, and the goliath module known as Atomic Meddle is currently in the final stages of development, as well.

Photo Spread: **Brendan Thompson working in Paris, 2024. Alex Barcelo at Superbooth, 2024.**
Previous Page: **LA Circuits Lab System I&II.**
This page: **Modules in progress.**
Page 22: **LA Circuits LS84-SYN Lab System Synthesizer.**
Page 23: **Atomic Meddle.**
All photos provided by LA Circuits

We do everything at the highest quality that we can, and that comes with certain compromises.

What about your sequencer, Chronograph II? It has a different, more minimal layout than Chronograph I, as well as a less colorful look, with all black knobs. What were some of the reasons for the changes you made?

A: It is a more affordable and compact version. Not everyone needed the extra functionality. We were just listening to feedback, though now it seems Edition I is actually the preferred iteration!

I wonder if there's some sort of psychological effect of giving people what they ask for, what they say they want, only for them to prefer the original, after the newness of the changes wears off. Is there any methodology or meaning behind the module names?

B: No methodology per se, but a great deal of rhyme & reason, meaning across the board. Bauhaus is inspired by one of Alex's favorite art movements, Moon Jock is one of Alex's favorite songs, by the band Animal Collective. St. Tropez is our favorite beach in France, Machinist, because the word simply sounds cool…

Machinist is a cool sounding word. What was LA Circuits like when you first started out?

A: I can appreciate our first set of modules for what they were, but…they were our first set of modules (laughs). In 2020 we ended up taking the entire product line and revamping it, though we kept our original aesthetic. We took out the unnecessary things, mostly things on the back end that you don't really see.

B: One example is Sunless City, our transistor ladder filter, was originally very bread and butter, but now it's an 18 and 36dB ladder filter that uses all discrete components. It sort of borrows from old SSM IC data sheets and old ARP and Roland filters, and uses a really cool differential amplifier layout.

You released your revamped line right around the time Covid really took hold. How did that affect the business? You were just getting going.

B: The pandemic really affected our supply chain in certain ways. Originally, (our module) Technicolor Reverb used a pretty obscure MN 3011 six-tap reverb IC, which hasn't really been available since the late 80s/early 90s. The pandemic basically wiped them all out, and people were selling them second or third hand for astronomical sums of money. So we redid the whole thing using new 3328 chips, and added a little more voltage control and range switching.

It sounds like that the chip shortage wound up having a good overall effect on the design of that module. Did the pandemic affect you in any personal ways? What were you both doing when Covid hit?

A: I had been working another job at the time managing several restaurants. I was busy all the time, so this was just a side project for me. It was Brendan's full time thing, and then in 2020, I went full time. 2021 is when we really started getting a lot of attention and inquiries from people working in the industry.

B: I was in finance in Hollywood for years, business management sort of things. I felt a lot of disenchantment and alienation and really wanted to do something that made me happy, so for me, LA Circuits was born out of that. I was a musician and wanted to continue doing music, but music itself is such a difficult industry to make money in. I had a band and went as far as I could possibly go, but it was just too difficult. I sort of view this as the same avenue; doing music without necessarily recording and all that.

Ok, but why did you start a Eurorack company?

A: We'd been close friends for over a decade, and in 2018 we

decided to start a new business venture, to combine our talents and that became LA Circuits. Brendan is a lifelong musician, and an avid collector of analog, vintage musical instruments, particularly modular synthesizers, and at the time he had these Moog and Synthesizers.com synthesizers. I didn't know what any of it was; I wasn't into synthesizers the same way. I studied Multimedia Art with an emphasis in Sound, and my exposure was more through using his studio for school projects that I was working on.

What sorts of school projects were you working on?

A: I was working on my thesis which was a light box involving Arduino and sensors. The idea was to visualize sound as color, like synesthesia. The code for RGB values was mapped to the mic data, and the placement was relative to the volume. The pattern was like a Rothko in lights, which interacted with a composition I made on Eurorack.

Were you working on projects together as well? Were you already thinking about circuit designs and modules?

A: One time we created an oscillator through an Arduino tutorial book that I showed Brendan, and I was like, "I think I can make the same thing with a microcontroller and some components," (laughs) and then we went down the rabbit hole.

B: Ironically, we've ended up doing mostly analog.

So that was the initial spark? How did you learn the technical aspect of designing modules?

B: I taught myself. I went to school for political science and finance, and that was my job for ten years, but I was always into electronics and I'd collected synths since I was fifteen years old: Prophet 5, Minimoogs, ARP Odyssey, EMS stuff…At some point I just started taking them apart. When I was seventeen I took apart a Minimoog Model D that I bought at a pawn shop and broke it even more! I had to figure out the process of making it work again.

A: I don't think there's anything you didn't take apart.

I love that feeling of triumph when something broken finally comes to life. Alex, you said that your background is in design, where do you take your aesthetic direction from for LA Circuits?

A: We had a NASA design book that had all of their design sketches, down to the fonts that they used for their manuals. It was really interesting to see the intricacy of what NASA used, how they thought through everything for their control panels. That was one of our biggest influences. We wanted it to feel like when you use the system, that it was like a control panel in a NASA spaceship.

B: Like in a science laboratory.

A: So, it's largely influenced by NASA, as well as Buchla; that's so colorful, it's interesting to me. Plus, we're "LA Circuits," so it makes sense that we have a West Coast influence, though the circuitry is a combination of all sorts of stuff.

I've always thought your front panels had a touch of the 1984 Los Angeles Olympics look to them. Was this something on your radar?

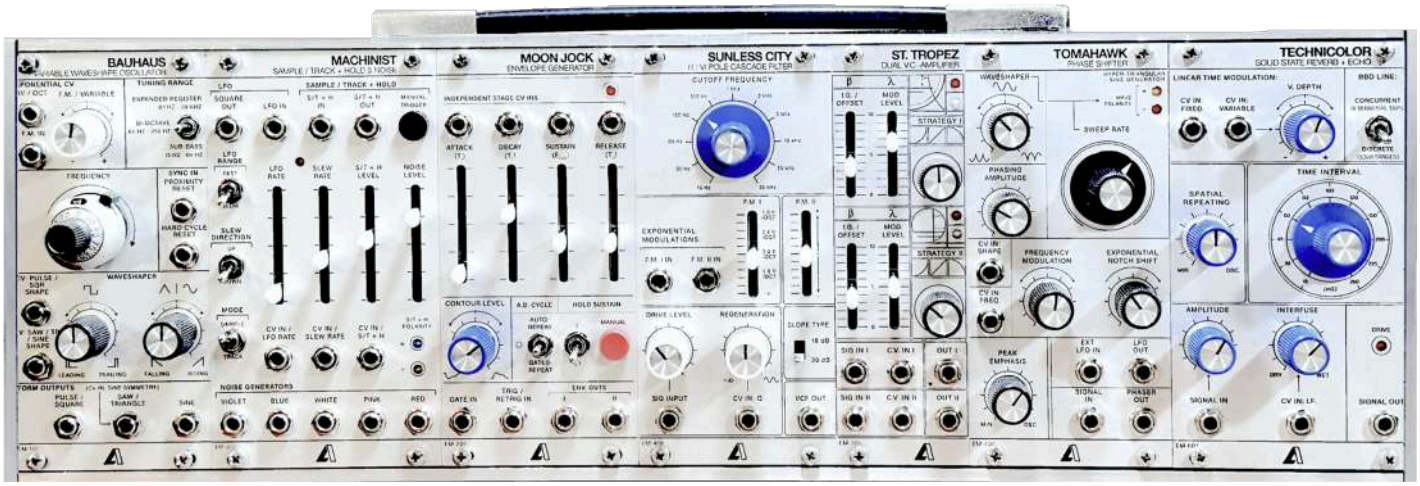
A: My parents were like, "You have to do red, white and blue, because it's made in America, and you have to represent the United States!" (laughs) I was like, "I guess that's one way to look at it." Brendan did go through a black phase, though.

B: I went on a tangent, and made an entire line in black panels…that's another story. Let's not even talk about that!

I did notice that your Bauhaus oscillator is almost entirely black, with the black dial for the oscillator frequency control.

B: That's a Vernier dial. That was originally EMS-inspired, but our design choices were influenced by Analog Systems and their RS-95N in the beginning, too. I've always been an Analog Systems guy, that's what I got started with in modular. Then it

We've found that if we want it done right, we have to do it ourselves.



They do say that sometimes it's better to do business with someone that you don't know at all.

became Serge, EMS, then Roland....

I know that you're shifting your business model a bit so that you're going to be prioritizing building complete LA Circuit systems for single customers and less one-off module sales. Why is that?

A: What essentially drove that was that we have a lot of different products, which, in my opinion, doesn't make a lot of sense. If you want to have a full synth for yourself, it makes sense, but if you're taking orders for four, five, or six units instead of ten or twenty, your production costs go up substantially and you end up having all of these different submissions you have to make; it slows the whole process down. The customer who buys a couple of modules doesn't really think about that, they just want to know when they're going to get their order, whereas some customers want a complete system and are willing to wait.

B: They like the whole set; it all fits together.

A: Some of our repeat customers have a bigger system than we have in-house. (laughter)

B: Every time we're building out a system, we're having to sell it. It's kind of funny.

A: It's the direction that we're going at the moment, but if we have something in stock, or we can make it, I hate to deprive someone. If we've got the components, have the panels, the things to make it, I'll do it; it's hard to say no. But ultimately, the direction will be full closed systems, like our Lab System, which is made up of seven modules. It's a full synth voice, and (we want) to do that in a closed version, and something that's a little bit more affordable, where it's one panel, one circuit board, and where we can bring our costs down and sell it for a lower price. We do everything at the highest quality that we can, and that comes with certain compromises: It's expensive, and unfortunately it prices some people out.

B: We don't cut corners.

It's fun to have different manufacturers together in a modular system, to mix and match and let them play together, but I understand the desire for complete systems, both from a manufacturer's point of view as well as a consumer's. It's interesting to see somebody's vision for a full system.

A: The first time a store approached us to buy our stuff as full systems I was like, "How are they going to sell so many of these?" But personally, I would probably stick with the same brand if I found one that I liked, because for me as a designer, when I see a system that's a hodgepodge of brands it feels chaotic. I'm somebody who likes a level of symmetry and consistency in the look.

B: It's perspective. Sometimes it's like, "I want the best envelope generator, I want the best state-variable filter, I want the best complex oscillator…" Maybe that's a good reason to get ten different companies, but I'm like Alex, I can't not have symmetry, consistency. So if we're going to offer the whole shebang, the whole set, each one has to be best in class. It's a process of getting it there, with starting from something that's bread and butter, to getting something that's cool, to getting something that's really special; something badass that really kills. But it's a gradual process, it takes time. We're still striving to get to that point.

It's been over five years since you released your first module. On one hand that's not a lot of time, but on the other hand, when you're in that process it probably feels different, longer.

B: Sometimes I reflect on that. If I went back five, six years ago and told myself that this is what we'd be doing, it wouldn't be believable.

Did you have a plan mapped out when you started?

A: Not synthesizers! I had a completely different idea. I thought I was going to be a light artist like James Turrell, Leo Villarreal, Dan Flavin... I wanted to do that sort of thing. That's where I got my electronics and my soldering technical skills from. Ultimately, I want to do closed systems that are modular and will incorporate a visual component. That was and is still the goal, and I have some ideas that will be pursued next year, but it's going to be more of a light-based instrument, not a Eurorack module.

This interview is taking place while you're both currently living in Paris. What are you doing there?

B: We came here and decided to stay. (laughs)

A: There was a thing in London (Ed. - London Synth & Pedal Expo), and Superbooth, that Brendan came out for. I live in Paris throughout the year, though most of my time is spent in Los Angeles, and at the time we were both in between apartments and in a position to where we didn't have to go back.

Have you found any advantages to being overseas rather than in the States?

A: Yes. We've found cheaper manufacturing, and you can walk a couple of blocks to an electronic store that has every component, so you don't have to order it from Mouser.

B: We've got custom orders from European customers so we set up a workshop and we're building systems out here. Also, interestingly enough, it's cheaper to live here compared to Los Angeles, and it's the greatest city, so…

A: When I came to France in 2020, I was just planning on staying for three months, and then I was like, "I want to live here." I have always wanted to live in Paris, it lends itself to inspiration. Also, I really want to perfect my French.

What brought you to Paris initially?

A: Covid, by way of London. They went into 'tier 4 lockdown and with only forty-eight hours to leave, I jumped on the last Eurostar train to Paris. It became home pretty quickly for me.

How did you two meet initially?

A: In Hollywood nightclubs.

B: A mutual friend. We hung out, and we liked each other, and the rest is history.

A: Yeah, we got to be friends and had a relationship for a while, but that didn't work as well as our business relationship did.

B: Things have evolved.

A: We had been working together so we knew we worked well together.

Working together in what capacity?

B: In fashion.

A: Multiple things, actually. We also both did bookkeeping.

B: I was the CFO of a fashion brand based in Los Angeles and Paris, and Alex worked with me at that company. Then, in 2018 I left and started LA Circuits.

Does the work you did in the fashion industry together translate into LA Circuits in any way?

A: We kind of switched roles, which was unexpected. When we'd worked together before, I'd always been more on the creative side of things and he'd always done more of the business management. Now I do all of the front end stuff: admin, design, and helping with assembly. I never wanted to have anything to do with money management, but Brendan was very disillusioned with business management so I ended up dealing with all the admin and banking. There had to be a lot of trust there.

You mentioned assembly, do you find it hard doing the manufacturing yourselves?

A: Yes. I love soldering, and so does Brendan, but we're looking to outsource that because we're currently doing through hole, and it is very time consuming. Also, eventually you get to a point where it's like, "If I have to solder one more thing…" (laughs) We've grown to a point where we're not really going to be able to meet our demand anymore if we don't outsource, and we've talked about getting a pick and place unit and keeping it in-house. We've tried the factory thing, but…

B: It's a quality control thing.

A: We've found that if we want it done right, we have to do it ourselves.

Would you say that the biggest learning curve of the business itself, outside of the actual circuitry, is learning how to be business partners? Specifically in a partnership with somebody that you've known for such a long time where the relationship has changed.

A: By far, especially because we've funded this ourselves. We took the money we had and took a chance. We both worked other jobs, and then when we decided to do LA Circuits full-time we had to trust the decisions that we were each making, and that the money that we were both spending was going to benefit both of us.

So you've been working together and known each other for quite a while now.

A: Fourteen years. I figure if you're going to start a business with somebody, it's probably better that you know them well, otherwise, just do it alone. There aren't too many people outside of my family and a handful of friends that I would take on an endeavor like this with, although they do say that sometimes it's better to do business with someone that you don't know at all.

B: I completely disagree with that. Well…there are pros and cons.

A: I think just knowing certain things, like how to communicate…There's a level of comfort, though it's taken time, for sure.

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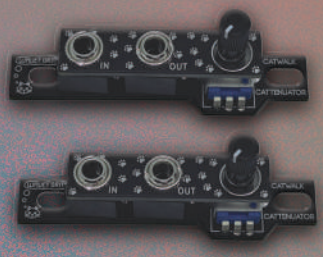

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DIY SPOTLIGHT: WIREHEAD INSTRUMENTS

BY WILLIAM STOKES

Wirehead Instruments' Andrew Row is based in Perth, Western Australia and has been making synths out of his home since 2020. Like many developers, Row's debut synth is as much a representation of his own artistic requirements as it is a device for others.

How did Wirehead Instruments come about?

I started a YouTube channel putting out music that I was producing and as time went on I started edging into modular. I was trying to stay away from it, because I knew that it would be a big trap where I'd spend lots of time and money, but I got a Volca Modular, bought an Arduino and started putting voltages into it and I worked out that I could actually build a little synth with the Arduino platform itself. That evolved into a couple of open source synthesizers, which I released on GitHub and are still there, including a prototype of the of the Freaq FM. I basically did that just for my personal use, but I thought I'd share it with the community. I've learned so much; it's amazing the amount of resources that people put out there in the electronics community and the synthesizer community. It means that somebody like me, who has got a coding background but has never built a synthesizer before, can basically build something from scratch. It hasn't become a full-time job yet, but it's gone beyond hobby stage to the point where I want to use the brand as a platform to start developing a range of synths that I've got in the back of my brain.

What led to the Freaq FM?

I was spending a lot of time on YouTube channels like Mylar Melodies, watching all these modular guys building these amazing patches, and there were some ideas that I wanted out of various things I saw, but I didn't want to necessarily go and pay thousands of dollars for this module and that module, and end up spending twenty grand on a setup, so I took the ideas that I liked and put them into the Freaq FM. It got a lot of interest online and a couple of other developers reached out to me about developing a commercial version of it. That inspired me to keep on pushing, because it seemed that there was a fair bit of interest. There's a lot in there, in that tiny little box.

Tell me about the design of the Freaq FM.

In my life I've been involved with a lot of people who are crazy inventors, who tend to invent things that are basically just for them without any consideration whatsoever as to whether there's any market appeal, so I did exactly that; I developed something that was exactly what I wanted. I've got heaps of analog gear that I've bought over the years, but I didn't have any FM stuff at all and I really wanted those sounds in my music. There were three core ideas that came together that I wanted to get into it: First, there was the FM synthesis and those kinds of glassy tones you can get through that style of synthesis. Then there was the parameter locking functionality that I get in the [Elektron] Digitakt that I love; being able to create rhythms and have happy accidents, where you press record, twist a knob, and something that you didn't really expect happens. And lastly was the way the Intellijel Metropolix has two channels, with sequences shared, but essentially with different "pointers" looking at different parts of that sequence. I really love that, it just speaks to me. I really wanted to get those features into the (Freaq FM). It has been very much an evolutionary process of adding things, paring it back, optimizing it, trying to get it to work…I spent a lot of time honing the controls, so that there's as much of a sweet spot as you can get without limiting what you can do with it. It can get very crazy, you can dial in settings that are harsh and nasty!

The way I tend to build these sorts of devices, write code, and make music is by finding a limitation and then pushing that boundary; bending or breaking it.

The Freaq FM's LED display is one of its most distinctive features, and it performs beautifully.

The idea of having no flashing lights was very uninteresting to me. I went down to my local electronics store and was rummaging, seeing what they had. Their range is pretty limited on lots of things, but that was pretty interesting. I don't know why the store had those LED displays, but you see them all the time in elevators to display what floor you're on; there will usually be an array of those. A lot of the hardware and the design (for Freaq FM) has been about getting something and then using it for something that was not its intended purpose…it's like when I sample something, I mangle it, chop it; I want to use it in a way that is totally unrelated to the original reason or source for that sound. It's the same with the hardware. The way I tend to build these sorts of devices, write code, and make music is by finding a limitation and then pushing that boundary; bending or breaking it, that's where I'm interested. Part of the fun for me is the exploration, to really push the Arduino to do stuff that I didn't expect it to be able to do.

BUILDING THE WIREHEAD INSTRUMENTS FREAQ FM SYNTH

BY WILLIAM STOKES

Above: **Wirehead Instruments Freaq FM Synth**
Photos provided by Wirehead Instruments

It's interesting to note how even in the relatively short tenure of this DIY column, how microprocessors have already played a sizeable role in several kits. In the case of the Synthux Academy Audrey, this entailed a crash course in programming its Daisy Seed, while the Sebsongs Sampler used its Adafruit ItsyBitsy RP2040 to create something like a pared-down MPC sampler.

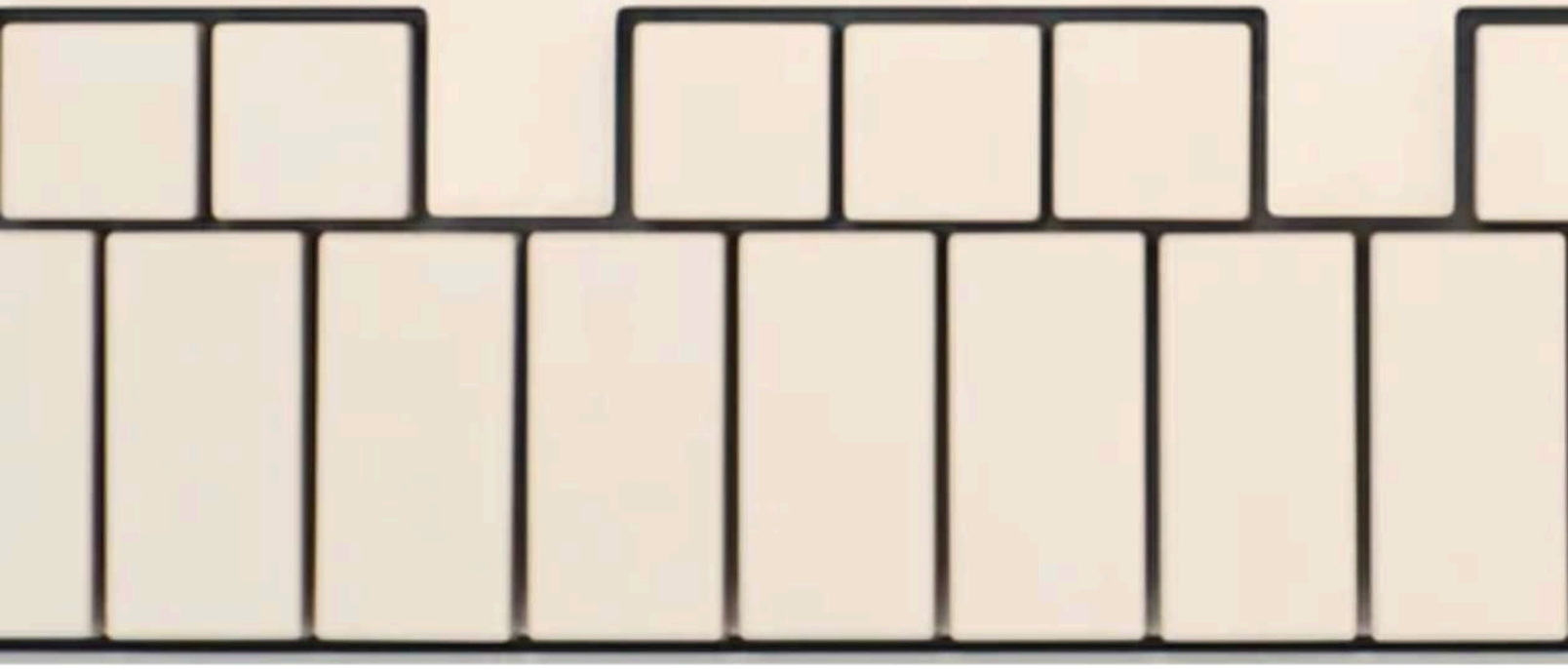
Wirehead Instruments Freaq FM synth consists of a handful of resistors and capacitors, a lonely diode and transistor, a few potentiometers and buttons, a trio of jacks, a microprocessor, an IC, and a curious eight-by-eight LED display. This build was on the easy end, despite a near-miss of the leg-bending variety when mounting the IC into its socket. The PCB itself is spacious, so while I wouldn't use the word "beginner," I would say that if you're not hugely confident and are looking to improve your skills, this kit will suit you well, as it includes a pre-flashed microprocessor, resistors labelled with their resistance values, PCB headers cut to the right lengths, and a clear, well-instructed video build guide online.

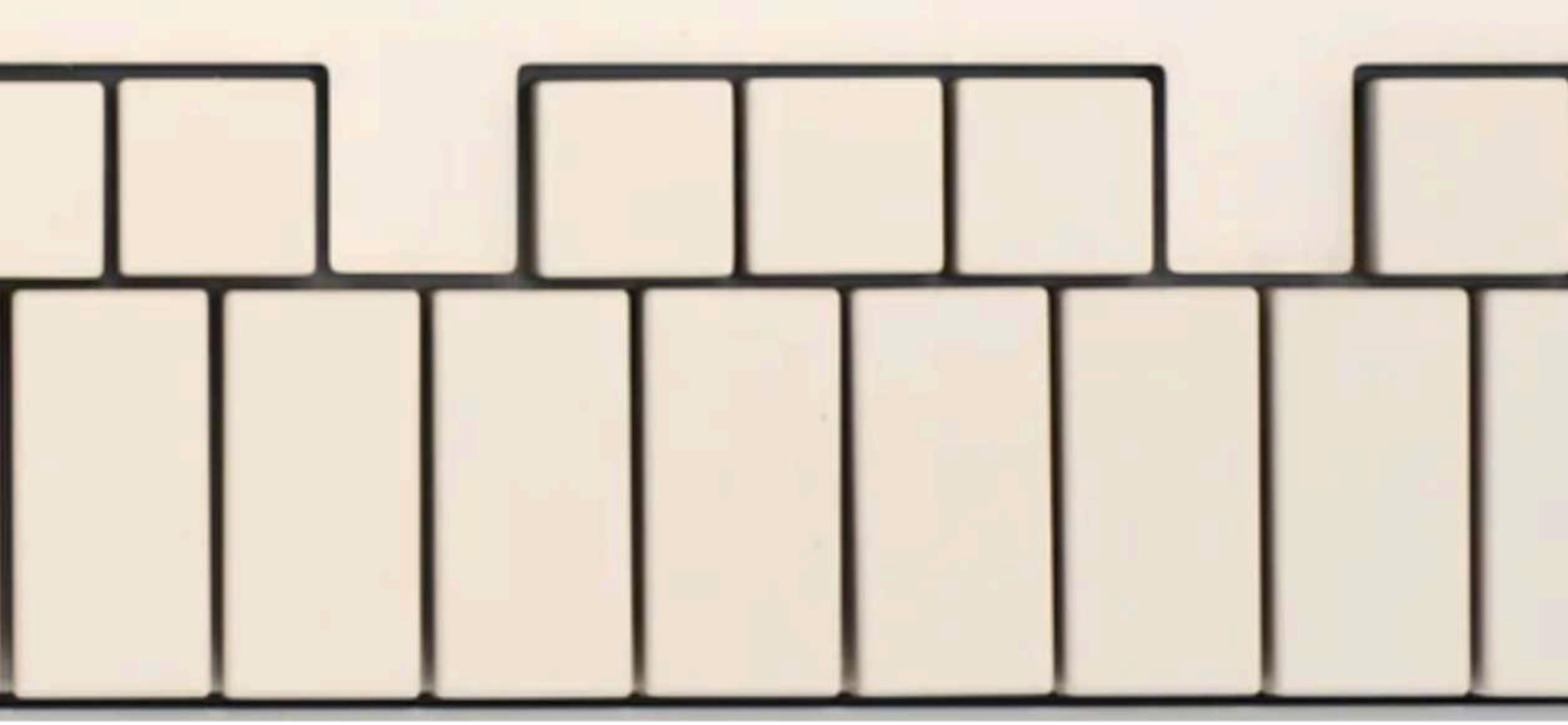
Measuring little more than four inches by four, the Freaq FM synth will fall straight through any gaps in your Eurorack system but will be right at home on the table next to, say, something by 1010music. Its I/O consists of a single mono audio output working at 14-bit, as well as a sync input and output for clocking, with no CV or MIDI to speak of. It has a USB port for flashing firmware and a 12V power input, though the USB port can also be used for power. I love this out-of-the-rack workflow: it's modular, but not Modular. Think vertebrae of guitar pedals, cheap mixers with wonky fader caps, clangorous broad musical strokes; proper forehead-on-the-floor Baltimore-style noise making. The Freaq FM is begging to take part in this sort of thing, and I'm here for it.

At the Freaq FM's heart are two 8-bit FM voices with a generative sequencer each. Those sequencers can be programmed to generate rhythms and also evolve over time with the well-deployed Density and Mutate parameters. Beyond this, the behaviour of the sequencing comes down to a selection of algorithms and scales. Needless to say, different combinations of all of the above allow for near-endless variety and there's also a drone mode, which does away with sequencing altogether in favour of undulating movements across one held note.

As you might expect from a diminutive interface like this, it takes a little getting used to—not least since the whole panel has two layers of functionality. On more than one occasion while exploring it, I found myself somehow in complete silence with no clear way back, though before too long a workflow began to present itself. Then things really started to get interesting. Each voice can enjoy its own clock division and sequence length, making for anything from percussive, Acid House-style syncopation, to calming smatterings of pentatonic tonality that wouldn't be out of place in a zen-garden, or anything in between. By itself the Freaq FM is certainly characterful, but it really does come alive with the addition of even rudimentary external effects such as delay or chorus.

Freaq FM's display of different dots and rows represent different functions, and this gets easier with time to navigate. It's bright and incredibly responsive, and also switches to a graphical read-out of parameter changes as you turn any knob, which is a nice touch. It's pretty, that's for sure, and feels so slick as to belong on a much bigger synth than this. There are little graphical readouts for LFO shape, tap tempo status, scale and more. Parameter lock allows for recording parameter changes as part of a sequence, and an array of quick button combos that can have the Freaq FM's overall sound turn on a sixpence. I would have loved to see a volume control for each voice, which would allow for some lovely mixing potential and also help to isolate one or the other for detailed sculpting, and also some kind of preset storage available, but overall, the Freaq FM is an evil little creature that's got a mind of its own and plenty of class and charm so you can get ur Freaq on!





vongon

In just a few short years Ryan McGill's Bay Area-based Vongon has carved out a space in the boutique pedal world with a small arsenal of unique and excellent sounding pedals. With their wooden enclosures and refined design, Vongon pedals are instantly recognizable.

After studying electrical engineering, McGill gleaned insight, skill sets, and an entrepreneurial drive wherever and whenever he could—whether working at a semiconductor fabrication facility or for a small company that did custom printing—ultimately gaining the confidence and acumen to start Vongon. Now joined by his wife, Katie, a former interior designer, they've recently collaborated on the first Vongon synth, the polyphonic Replay. With a firm nod to 80s synth classics, Replay has gained a following with its enigmatic minimal facade, computer key interface, performable set of controls, and rich sound.

It's a successful culmination of their design and technical skills, and furthers their cohesive vision of building instruments and devices that allow for unfettered and expansive creativity.

We're more about trying to make a device that someone can feel inspired using, one that gets them to their creative zone for making music more easily

Waveform: I read that well before you'd started Vongon that you moved out to the Bay Area because you wanted to be in Silicon Valley and to join a tech startup. What made you want to be a part of that?

Ryan McGill: At the time when I moved to the Bay Area and thought about wanting to join a startup, I was really burnt out at my job, and I glamorized the idea of the San Francisco tech working conditions. I went to school for electrical engineering and started my career working at the semiconductor fabrication facility that was mass manufacturing. Most of the employees that worked there had been there for like twenty years, so it was not a facility that was embracing the latest technology, it was just like, "We need predictable things. We need to be running 24/7, that's the goal." I learned a ton in that job about manufacturing that is applicable to what we do today, but moving out to California was something that was attractive to me as a new adventure, and so that's what I went after. When I moved here, I started working for a small company that did custom printing and embroidery on t-shirts, hats, mugs, and stuff like that. I was hired to make them a website so it would be really easy (for customers) to upload their own custom designs. I was working on a system that managed their production warehouse, and it was a unique setup where all the UI ran through a web browser. Each workstation had a laptop with a USB barcode scanner, allowing the person at that station to scan the item they were working with. This would pull up all the relevant information they needed to complete their tasks, such as instructions for printing a graphic, folding the item in a specific way, or storing it in a particular location.

I could see how that would be helpful for when you started Vongon. What other information did you glean from working at the apparel printing business?

I applied the web-based testing concept to our production line for Replay and developed a custom web application that our contract manufacturer uses to test each unit; it detects faulty buttons, identifies slider issues, and runs automated audio tests to ensure every instrument sounds great. In addition to the technical skills, I also picked up an entrepreneurial drive from the owner, giving me the confidence to start Vongon. The owner was younger than me and had built a successful company in the product printing business, and it was a really exciting time to learn from someone that was the exact opposite from the very corporate environment that I had come from, someone that was like, "You can do this, anyone can start a business." It seemed almost outrageous to try starting an effects pedal company, but their example inspired me to take the leap even though Vongon is a nontraditional, very niche music hardware company.

How did you start making instruments? What was the first thing you built?

I was living in Austin and working with some friends, trying to make a Mellotron-esque keyboard sampler. It was someone else's idea, and they thought I could help them make it, but we never made anything; it was too hard. I learned a lot from that process, and I was like, "Wow, I love this. I love trying to make music gear. Maybe I'll figure out how to do that someday." Then, right out of college, I was making music with some of my friends and wound

up making an audio sampler that could be controlled by a MIDI foot controller, which my friends took on tour. While it was a technically simple device, it solved the exact problem the band had, and that felt good. It definitely sparked my desire to learn more about musical product development. I had just graduated with a degree in electrical engineering and truly believed that was my "big break" opportunity, but I wasn't ready to solve all the technical details required to create a proper product, and I also had no idea how to run a business. I presented my device at the very first Audio Developer Conference in London in 2015. At the time, I was working an entry-level job at a semiconductor manufacturer and was eager to quit and work in the music technology space. Meeting people from audio brands like Ableton, Native Instruments, and Cycling74 was extremely motivating, and I realized how much I still needed to learn about software development, so I took the plunge and quit my job to pursue software-centric work. That decision was a crucial career move that helped me gain the skill set needed to run Vongon today.

How did that MIDI controller turn into you starting Vongon?

The whole reason that Vongon even really began was because when I was working at that tech startup, I started to tinker with different pedal designs and I made a MIDI controller for a Moogerfooger delay. I posted that on YouTube and it got very little interest, not a lot of views, but Trey Anastasio of Phish emailed me to see if I could make him one. At first I thought it was a scam, but it turned out to be real, and it was really exciting. So I made him some custom thing, and it totally prompted me to spend more time on this. I had hoped that I could work in the industry making, composing, or producing music; doing something creative. My whole life I've played music, and I wanted to be involved with music and I tried so hard to get into spheres of circles of musicians, to have conversations with other musicians. Once I finally stopped trying so hard to do that, when I just made Vongon and thought harder about what we were putting out, that stuff came so easily.

Vongon began as a solo venture, but recently you started working with your wife, Katie. What's it like working together?

We feel incredibly fortunate to be a happily married couple working together every day, and it feels completely natural for us, as design is at the heart of everything we discuss, from Vongon products to our home and life together. Our process isn't rigid; sometimes Katie has a vision that I try to bring to life, and other times, she's refining the rough edges of something I've created. Our schedule is fairly consistent; espresso on our front porch, yoga, and time with our pets followed by a morning meeting to set our goals for the days or week ahead. Katie helps me stay grounded and think about Vongon's design as a whole. It's easy for me to get tunnel vision when working intensely on a single product or component, which can sometimes lead to poor design choices. Her perspective helps me step back and view our entire lineup as a cohesive vision. When we met, Katie was an interior designer, and she introduced me to that world. It was very interesting to see a whole industry built around creating nice design for people's homes. The reality is that I think it's similar to the very wealth-focused startup sector; the clients for these interior design projects were very wealthy people. That was never something that was inspiring to us, but taking that experience and that knowledge and bringing it to Vongon is exciting. We're always talking about the shape of things, how big something is, what color it is, these different factors that apply and determine how Vongon products look, and this began primarily with Replay. Before that I was kind of fumbling around, and was mostly focused on technical details, and figuring out how to actually make these products.

Where do you all draw your design inspiration from?

It was heavily influenced by the limitations that I had; choosing the color scheme of the black, white, and gold is very relevant to the circuit board manufacturers that we're using to make the faceplates. Recently we went to this MoMA exhibit in San Francisco that was called "The Art of Noise," which was a collection of different music hardware that has existed since the 1920s. There was a lot of Dieter Rams gear, and Braun products that were super cool. I really admire those in terms of the way that they were manufactured and what methods they used, and that's driven me to get more into the modeling side of things, so that I can more explicitly outline these enclosure designs. Katie's

I remind myself that that's okay, it's not the point of a music product to do everything.

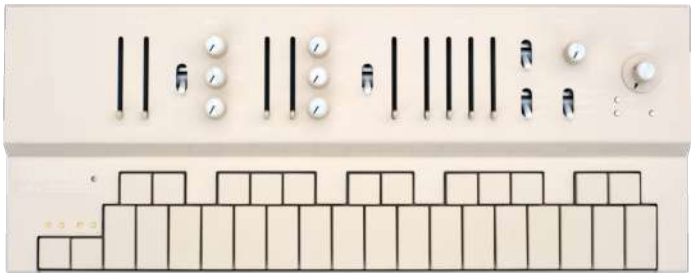


Photo Spread: **Keyboard section of the Vongon Replay polysynth.**
Page 32: **Ryan and Katie on the beach, 2024.**
Page 33: **Polyphrase, Ultrasheer, Paragraphs II pedals.**
Following Page: **Vongon VF-104 MIDI controller for the Moogerfooger delay.**
Page 34: **Land Devices + Vongon Onset pedal.**
All photos provided by Vongon

You have to trust your own design intuition.

really influenced by a lot of fashion brands, and we'll look at clothing or bags, at how each brand tries to create its own design voice, its visual identity, and think about how that might apply to us. Sonically, Moog has forever been a huge influence; I love their stuff, and that's where my foundations come from. Also, the Buchla interface is really interesting and fun, a little more freestyle. We value really clean looking products that are more minimal than busy, but I think also because of the stage and scale that we're at, I will always be interested in trying something new in terms of the way a product looks. The advantage of being a little company is that we typically make our products in fairly small batches, and then those go out into the market and are purchased, and then we make another batch; we don't have to commit too heavily to any specific design. Sonically speaking, I think that the sort of canvas of Ultrasheer, Polyphrase, and Paragraphs, is something that I will iterate on. I would like to keep releasing different versions of these effects where they might look different, but have subtle changes in the way that they work sonically. I think of each of those products primarily as a reverb, delay, and filter, and I'd like to explore variations of those sounds in new products. Each of these effects could be expanded to offer more control and depth; however, each effect could also be simplified to make it more immediate and intuitive. I really love the sounds each of these effects produces, and I'd like to challenge our design capabilities to bring them into new physical and virtual forms.

Your most recent pedal is a version two of your first Vongon release, Paragraphs. Why did you feel the need for an update, and what has changed, both with the pedal and with Vongon since its release?

Basically, it will be the Paragraphs filter effect I wanted to design when I designed the first one. It's focused on responding to the dynamics of your playing, so rather than the filter being something that's forever looping, you have to trigger the filter envelope with some sort of control voltage, or by playing your guitar. I love filters, so the idea that it's swelling based on the cutoff of your signal makes it much more synth-y. Paragraphs II also brings it into the same stereo format as our other effects and has both the responsive envelope generator and also an LFO to add some more filter movement to your whole effect. It can be randomized, too, with the LFO bouncing between the left and right speaker. You can think of it like the control signal for the LFO is inverted between the left and the right side, so the deeper you increase the depth, the wider your signal will bounce between the left and right side, like auto panning. It also has a smooth-to-random waveform that is the same kind of modulation that's in the Ultrasheer, with its random vibrato, so applying that to Paragraph II's design means that your signal is moving in the stereo space in a kind of random way. And because it's like signal brightness, it's moving forward to the upper left side, and then moving to the back right side…It's cool, the way that it's bouncing around there. It adds some nice, subtle filter movement to whatever more traditional envelope effect you might have, another layer to make it that much more special. It also has a mix knob on it, which I forgot to include on the first Paragraphs. After I released the first version, I realized that having a mix knob where you could blend it with your dry signal would be helpful. Doing that, and it becomes almost a kind of flanger effect, like the old (Musitronics) Mu-Tron, where they're really responsive filters that you might hear in psychedelic rock music or something. I'm excited to see how people use it.

In terms of other changes from the first to the second version, what was your impetus to go from an aluminum pedal enclosure for the Paragraphs to the wooden enclosures that you use on Polyphrase and Ultrasheer? Do you do the woodworking yourself?

I don't. Woodworking is not in my wheelhouse. Vongon is so much about learning along the way. I had never manufactured a product before, and each step was me trying to figure out how to make something more and more legitimate. The first Paragraphs was exciting to me because I knew how to make a circuit board and I could use a circuit board to make a faceplate, like what a lot of Eurorack companies do. I didn't know how to make an enclosure, or a box, or anything more customized, so I used an off-the-shelf Hammond aluminum box, and didn't do anything to it; I left it as totally raw aluminum. I really wanted to figure out how to make a custom enclosure, that's like the Holy Grail (to me), so making something out of wood was really interesting. I was inspired by some modular synths and I loved the Moog Moogerfooger line with those wooden side panels, so I thought that something made out of wood would be really cool, but I didn't know how to do that. I found someone in Oakland that made custom kitchen cabinetry, and he had a big CNC machine, so I started with sketching up ideas on pen and paper of what this enclosure might look like, and he was nice enough to help develop something with me. He told me to make it out of walnut, to finish it off with a really nice oil, and showed me which one to use. The first fifty or hundred boxes of Ultrasheer, I was having

him make them, and then I would do the final polishing by hand. Then I learned that we didn't make the faceplate lip deep enough, so he showed me the tool to etch some wood away. I learned a lot in that process, but fortunately I found a supplier that's based outside of LA that makes all the wooden products for Sequential and Buchla, and they're awesome. I sent them one of my wooden enclosures, and was like, "Can you figure out how to make this?" It was no problem for them, so that's how we make them now. My biggest focus since then has been getting into 3D modeling so that I can get a lot more specific about what our products will physically look like. That materialized with the sheet metal enclosure for Replay, and that's something that Katie and I were able to design, rather than to have to make a rough drawing and pass it over to someone who then interprets that. That's been an exciting development, and that's always something that I'm trying to go deeper on with our product designs: What new ways can this product be made and how can it look?

I know you play guitar. When you use your pedals, what is your typical signal chain? Do you put the reverb before the delay and then the filter after? Do you throw the filter first? Do you use two filters?

The most traditional route that I would typically start with is your filter into echo into reverb, though Paragraphs II shines a lot at the end of the chain.

Why? I mean, it's great to have a filter after all of the effects to sculpt the tone, but why do you think so?

For one, it's because it's stereo, so if you have a big stereo effects board, then it will handle that just fine. The digital filter in Paragraphs II that we spent so much time fine tuning in Replay, is really cool as a tone shaping tool at the end, and you can blend it with your dry signal, so it adds this filtered stereo space that kind of moves around. Also, the way the envelope responds is true stereo; if it's in envelope follower mode, and if you have a louder signal on your right channel, then that channel will be brighter than the left side. Usually, effects are summing those signals together to create a single envelope because you're saving some processing power if you're doing analysis or envelope following on one signal. The fact that (Paragraphs II) doesn't do that means it can create more interesting effects.

You said that this new version of Paragraphs is what you wanted to design the first time around, but that you didn't have the skill set at the time to do so. In terms of your design and production know-how, how has that evolved?

Paragraphs to Ultrasheer was a big step for me because that is when I switched to using a digital platform. The Ultrasheer was the first pedal that was based on an older DSP platform called Axolotl. It's open source, and it has a nice Java-based UI that's kind of like a Max MSP or Pure Data, where you can visually build out programming blocks. That's what I made Ultrasheer, Polyphrase, and Paragraphs II on, but for whatever reason it stopped being supported and they aren't selling the modules anymore, so I needed to figure out how to put it into one of my own circuit boards. There were many stressful days figuring out how to do it, and it was really eye opening for my first dive into making a product that was digital.

Replay is digital as well, but uses a Daisy as its core. It seems like it would be a bigger undertaking to switch platforms while building a synth than another pedal. Is there a big difference between the two platforms?

The biggest difference is that the Daisy is a little bit more traditional, more like you're just coding it. The Daisy is cool because it enables me to get really into the nuts and bolts of everything, and I can actually code the device traditionally, like how you would any DSP platform. I didn't feel like I had the skill set to dive into that level of complexity when I was first starting with the Axolotl platform. The Daisy also offers other ways to build effects with more UI related things. I'm very pro-Daisy.

I've been spotting the Daisy in a lot of modules recently. It seems like it's been really helpful for a lot of developers. Replay is your biggest product to date. When did you start thinking that you wanted to build a synthesizer, and specifically, a polysynth? Up until this point you were solely a pedal manufacturer.

It's always been something that's been on my mind. When I was making Ultrasheer and experimenting with that digital platform, I was thinking I could make a synthesizer, but it was just too complicated for me then. It's always been a kind of building block to get to the next thing. With Replay, most of the development that happened was just figuring out how to make it physically; how to make the buttons and the stabilizer plate for those key cap switches, and figuring out how to make the enclosure. Again, that was the first product that we switched to the Daisy platform and the team at Electrosmith, that makes the Daisy, were supportive and helpful in terms of providing me quicker ways to get started

I was trying to be smart with it, trying to do all of that digitally to where the circuit would actually listen to itself and tune itself.

with the module and setting up my programming environment. The Replay is the first product that Katie and I don't personally hand make; it's assembled by Electrosmith.

What precipitated the change for the manufacturing?

We would love to make the Replay, we just don't have the space. When you're buying that many enclosures, it's a forklift that drives that box around; I can't be bringing it up our stairs!

Were you able to manufacture the metal enclosures for Replay at the same facility as the wood enclosures for the pedals, or did you have to go find somebody else?

That was a different facility. The one that makes our enclosures for our pedals only works with wood. For our metal products, we've settled on a supplier that is overseas, and they make all our faceplates and our metal boxes. We've developed a good working relationship with them. It's always scary…you make hundreds of a faceplate and maybe you'll make some samples, but you're never really sure what you're going to get, how it's going to turn out. Over time, I just learned you have to be really diligent, that after every order, if you get a part and it has a scratch on it, or there's something that's wrong with it, you document it and send a report back. We're getting better at anticipating problems like that, but it pays to have a supplier that you can rely on.

And definitely someone who will listen to you if you have a problem with their work. How did you decide what kind of synth you wanted to make, and what features Replay would have? What was your starting point?

Similar to our pedals, I drew sonic inspiration from the late 70s and early 80s. I learned about synthesis on a Moog Rogue, which is a really basic instrument, and I've found that simplicity is great for making music, because it forces you to focus more on the musical content rather than endlessly fine tuning waveform parameters. I knew I wanted to create a polyphonic synthesizer, so the primary polysynths of that era were my initial points of reference and vision for Replay, (like the) Juno, Prophet, and Polysix. I was trying to figure out how to design Replay to be mostly an analog instrument, but I underestimated how complex and how many different directions you could go. I say mostly analog, because of the way the oscillator works, it's clocked digitally like a DCO, but it has an analog wave shaper in it and that goes into a traditional VCF and a traditional VCA. The tricky part about a polyphonic synthesizer is that you have so many different control voltages going all over the instrument. I was trying to emulate the way that they did it with the Juno, with this kind of complicated multiplexing thing, where you make an analog sample and hold circuit, and it scans through something like twenty different control voltage outputs, however many times per second, and that sample and hold circuit updates each individual control voltage. I built that, and even to design the development circuit board for it, it was like ten times bigger than all of our pedals; we had to get new circuit CAD software to even make it work. I was trying to move my mouse and it would glide across the screen all choppy, because the software I was using was so over (extended). After six months of digging deep on this circuit design and making prototypes, the whole platform was pretty unreliable. It sounded good, but every day I'd wake up and be like, "Okay, let's see how it's going to work today!" One voice wouldn't be working for some reason, or I would try to tune all of the filters to match each other so that you could use a filter as an actual tone source…That's one degree of difficulty when it's just a single voice—you basically fine tune something in the circuit, traditionally with a little tiny trim pot on the circuit that you manually trim—but I was trying to be smart with it, trying to do all of that digitally to where the circuit would actually listen to itself and tune itself. That worked a little bit, but it was scary; if I made a hundred of them, I didn't know if they were all going to work or not, so I decided to shift and do the entire thing digital.

Were you frustrated with having to do that?

I decided to embrace the digital, but it was a real humbling experience. It was disappointing at first, but within just a few days I was able to code up a prototype of what it might sound like and it sounded better; like the envelopes, they were so much

Every day I'd wake up and be like, "Okay, let's see how it's going to work today!"

snappier and more responsive. The way I had been multiplexing out those control voltages, I didn't realize at the time that they were limited by bandwidth, that they could only be plucky to a certain degree; otherwise, they were just kind of lumpy and mushy. And we were able to get a really good sounding filter, so I was happy with that.

You switched from making Replay an analog to a digital synth at the same time you switched to a new programming platform. That sounds like a lot of change to take on.

Yes, I think it was probably too much and was a bit stressful. In engineering school, I learned about the Toyota Production System, which emphasizes ***CONTINUED ON PAGE 69***

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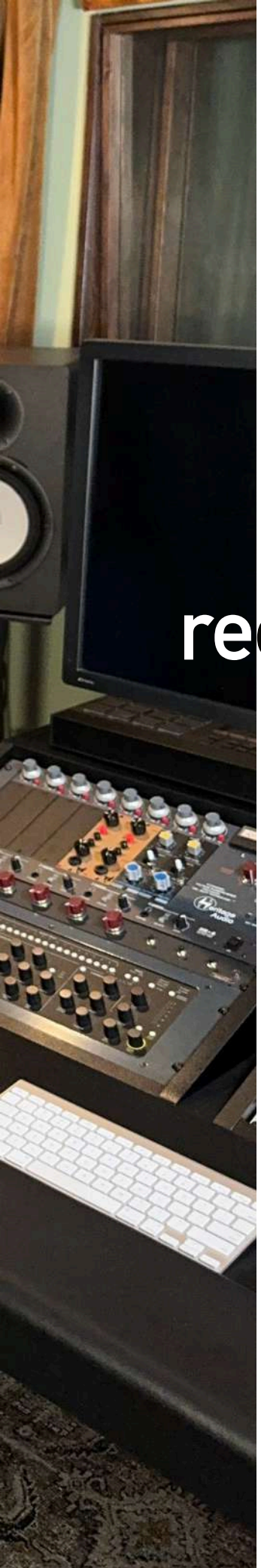


recovery effects

With music, I think it's important to do the things that you like to do, and don't do the things that you don't want to do.

Graig Markel and Zera Marvel are the husband and wife team that make up Seattle, Washington-based Recovery Effects. They met on an off-chance encounter in a bar over twenty years ago while Markel was on tour with his band, New Sweet Breath; the two have been nearly inseparable ever since. Marvel grew up in Rhode Island assisting in her mother's custom flag making business, which is still going strong (and now based in Seattle), and a lot of what she has learned in that time informs the day-to-day operations of Recovery.

Partners in music, as well as life and business, they have had several musical projects throughout their history forming bands like Tagging Satellites and Dead Ship Sailing, and releasing music and touring. While Marvel has stepped away from performing for the time being, Markel makes music under the pseudonym Animals at Night, releasing new music at an impressive pace. Recovery Effects is a masterclass on forging your own path, willing something to happen, and the rewards of constant learning, adaptation, and collaboration.

Waveform: One of your first business ventures was selling pedals and soundbanks on eBay. How did that come about?

Graig Markel: I'd messed around with building stuff for a long time, and at first it was just a hustle to do something that I was interested in and to make some money, and then in the early 2000s, I got into sampling my studio instruments. I was a pretty early user of Ableton Live and was excited about the idea that I could access all of my keyboards and drum machines inside my computer, so I created sampler presets for all of them and started selling discs with the entire library on eBay. That was kind of the start of Recovery Effects. Since then, I've grown the library up to many gigabytes, and any vintage or unique instrument I've owned or borrowed gets the sampling treatment. I've expanded to making patches for my MPC, and Pure Data patches for the Organelle and stand-alone use, but I don't sell them any longer.

What was the first pedal that you sold?

G: The Dust to Burn, a clone of the DOD 250 "Grey Spec" (overdrive), something that wasn't being produced anymore. I'd had one forever and loved it, and they were becoming collectible. I'd been building stuff from kits and thought I could make one,

so I just started building them from a schematic. Then I started thinking that maybe we needed some original circuits.

Zera Marvel: We were talking about our original designs a few weeks ago, about when we used to put stuff out where it was like, "This doesn't really work, but it makes noise, and it is interesting…Let's put it out there!"

I've had pedals like that, where they were somewhat erratic and unpredictable, but cool as well.

G: That's how some of our first original designs, like Bad Comrade and Couple Skate, which blended a dirty low-octave signal with a fuzzed-out original signal, came about. All of the "bass guitar" on the record Zera and I recorded (*Dead Ship Sailing*) in 2011 uses that pedal; there's actually no bass on that.

What did those early pedals look like?

Z: We used raw aluminum enclosures for a long time. For a while, we experimented with stickers and decals. Eventually, we started attaching dog tags with the pedal's name to the raw enclosures, which became our signature look for quite a while.

I think the dog tag pedals were the first Recovery Effects devices I saw. Did you have any visions of turning Recovery into a business early on, or were you just focused on building one pedal at a time and trying to sell it on eBay for extra cash?

G: It wasn't planned. Everything we've ever done has been piecemeal, like, "What is the best way to do something, and to do it within our means?" It's weird how it happened. I had spent so much time in my twenties and had tried so hard for music to be my main thing, and it just never worked; we were always so broke.

Were you working while you were doing the side hustle/eBay thing?

G: I worked full-time at a fishery supply company doing their catalog imaging. That was a weird time for me. That was the first job I had that wasn't music-related. I really liked the people there, and I liked the job—it was so flexible—but I was working Monday through Friday and recording bands on the weekends, and sometimes on the weeknights, too. When I think about how much I was working…

Z: Back then, the studio was located in our basement, and people constantly came in and out of our house to use the bathroom. There were times when I would hide in the closet because I didn't want anyone to see me in my pajamas!

G: There would be nights where it would be three o'clock in the morning and we were doing vocal takes, people would be drinking beer, going out to smoke in the yard…

Z: Then he got another job opportunity at this tech company, and…

G: I lasted three months. Then I went back to the fishery supply job working from home. At some point, though, recording and Recovery Effects took over.

Z: During this time, our landlord passed away, and we had the opportunity to purchase the house we'd been renting. Buying a house was not something we were financially prepared for, which made the process quite stressful, but once we closed on the house, we immediately began renovating the woodshop behind the house, and transformed it into a recording studio to generate income.

G: That was a dream come true, and I was doing whatever I could do to make it work: recording bands, building pedals…Then, in about 2019, Recovery was at the point where recording bands started to become a problem.

Z: He'd get so far behind on building pedals, and at that point, he was doing everything by hand and it was all through hole, and it took forever.

So your full-time job got squeezed out by Recovery, and then recording got squeezed out…it seems like it was meant to be.

"This doesn't really work, but it makes noise, and it is interesting…Let's put it out there!"

Photo Spread: **Graig Markel and Zera Marvel in their studio, Seattle, 2024.**
Page 40: **Dead Ship Sailing, Seattle 2013.**
Photo: Lord Fotog
Page 41: **Seven Sisters Eurorack module, Gallows in the Morning, Cutting Room Floor, Moonstruck.**
Page 42: **Zera testing the ExMic.**
Page 43: **Recovery Effects workshop**
Page 44: Top: **Seven Sisters desktop percussion synth;** Bottom: **Graig recording in his studio.**
All photos provided by Recovery Effects.

Not knowing exactly what I was doing allowed me more freedom…

G: When Covid happened, that was like a permission slip to just say "no" to recording bands. It's a ton of work and super stressful, and I was burnt out. With music, I think it's important to do the things that you like to do and don't do the things that you don't want to do. Still, I struggle with that because you get asked to play guitar on somebody's record and you're like, "Okay!" Then it's like, "Oh fuck!"

It's hard to say no sometimes, you don't want to let anyone down, and you also don't want to miss out on a cool opportunity. Are Recovery Effects devices still through hole?

G: Generally, we prefer to use SMD for time-management reasons. However, there are instances where certain parts do not perform well with SMD components, and in those cases, we opt for through-hole. For example, with the Moonstruck pedal, we found that the through-hole version of the OP275 sounds better than the SMD version.

How did you realize that the SMD part didn't sound very good? I've never heard of that kind of issue before.

G: When they were being assembled, I noticed that they sounded a bit different than the one that was on my board. It was weird. Usually, it's the op-amp that sounds a little bit different, and sure enough…I've never really noticed a whole lot of difference using different types of resistors or even something like styrene capacitors, but the difference in op amps can be night and day.

Moonstruck is a reverb and delay pedal, but you already had your Endless Summer reverb. Why make two spring reverb pedals? Are they that different?

G: The Endless Summer came first, and it's an overdriven reverb circuit and dry clean tone. It's a very unique-sounding reverb and fantastic for guitar. I had the idea to combine an analog-style delay with a more traditional-sounding reverb in the same footprint, and that became the Moonstruck. I love them both, but the Moonstruck is my current favorite; I use it on almost everything.

How do you come up with new ideas for pedals and modules? Do you two go back and forth and iterate?

G: Usually, there's a list of things I want to work on, and then there are things that are happening that I'm either breadboarding or on the computer, and then on some of those things you start to make breakthroughs.

Z: I'm good at asking questions. When Graig has an issue about where things should be placed, or something isn't working, I pick his brain until he starts coming up with new ways to make things work.

Is that how you came up with the concept for Gallows In The Morning? What did you find most challenging about designing it?

Z: To be honest, the most challenging part was coming up with the name! Graig was available to help with any technical questions I had, but I found the design process to be straightforward, and I enjoyed shaping the sounds I wanted.

Had you thought much about designing a pedal prior to this? Was there a problem, or something missing, that you were trying to solve with Gallows?

Z: Graig and I had discussed the possibility of me designing something, but I didn't feel confident that it was something I could do. It wasn't until Covid lockdown, when I was desperate for distraction, that I fully embraced the challenge. Interestingly, not knowing exactly what I was doing allowed me more freedom; I didn't feel pressured to create something groundbreaking, but I did have a clear vision of what I wanted to achieve. I wanted a pedal that could produce heavy, haunting, bold, and beautiful sounds, regardless of the settings.

The first line of Recovery Effects modules were white, and pretty large. What was the design evolution?

G: Eurorack has evolved significantly in a relatively short time. Looking at modules from just a decade ago, many now seem like relics. When I first started designing, I focused on what I thought looked interesting, but over time I've come to realize a couple of things: First, our modules needed to be built with SMD components to minimize footprint; and second, designers face a very tight set of boundaries when it comes to what's acceptable within the Eurorack format. Color schemes, graphics, knobs, and other cosmetic details must align with established aesthetics.

Do you find that modular customers and pedal customers are that different in terms of what they want, both in terms of aesthetics and functions, and how much they're willing to accept outside of normal conventions for each format?

G: Eurorack users typically prioritize maximum functionality within the smallest possible footprint. While this is also becoming true for pedals, as they grow more complex and pedalboards expand, there's still more flexibility in that space. My goal is to stay within a 10HP width for Eurorack modules and a 125B enclosure for pedals.

Seven Sisters, your percussion synth/module, is your latest instrument. How long have you been working on it, and how did you go about the design for the tabletop version?

G: Work on that goes back a few years to when I first started building instruments in Pure Data. I started trying to incorporate these designs into a microcontroller and had some limited success with the Raspberry Pi platform when I discovered the Daisy microcontroller from Electrosmith, which offers support for Pure Data. With some tweaking, it's possible to get these patches working on the platform, and from there, you create a JavaScript file to coordinate the hardware to the patch. I'm obsessed with it right now, and it's been a dream to complete an instrument using this process.

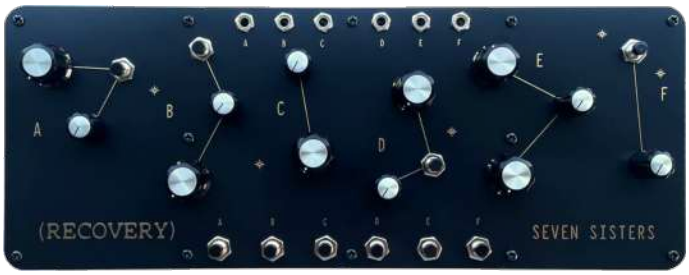
Everyone seems to love the Daisy. How are you learning new design and programming techniques? Can you attribute it all to time and experience, going with the flow of the available technology at the time, or is there something more to it?

G: I developed a strong DIY ethos when I was younger, playing in bands and not having much money. My dad was a mechanic and DIY'er before the term was popular, and I think a lot of that rubbed off on me. I've always dug into DIY books on electronic building and repair, and right now I'm spending a lot of time with microcontrollers and books on that, as well as online courses through Udemy, and scouring forums on Discord, Reddit pages, and other sites.

Everything you do, from the pedals and modules, to your recording studio has a very clean, refined look and layout to it. Do you have any formal training in art and design?

G: I've always been interested in how things come across visually and designed my own band posters, album art, and, at one point, silkscreened my own record covers and shirts. I was influenced

When we're eating breakfast we're talking about the business, when we're walking the dog we're talking about the business….



back in the day by Vaughan Oliver's work for 4AD, Jeff Kleinsmith's work for Sub Pop, Frank Kozik's concert posters, as well as custom print shops like BLT and Thingmaker from Seattle, and Stumptown printers in Portland. I picked up a lot of Photoshop skills without having any kind of formal training on it, and Zera picked that up as well. Graphics are such an important part, and even though people will tell you all that matters is the quality of the instrument, the way things look is as important as the functionality of a product. If something doesn't look and feel good, if somebody isn't inspired to use something, they're not going to learn to use it.

That's true. You've made some of your pedals into modules. Have you thought about doing the opposite? Are there challenges in converting something from one format to another?

G: I haven't converted any modules into pedals, but I do think quite a bit about pedal designs functioning in the Eurorack world. Many of our pedals have a 3.5mm input jack that can be used for CV to create interesting animation over one parameter—sync to a clock or whatever. I think the biggest challenges in designing for Eurorack, whether it's transferring a pedal design to the format or creating something original, are the space and aesthetic constraints.

What's the story with the ExMic, your telephone microphone? I can totally see those being something that everyone would want to do some vocals through.

Z: Back in the day, Graig used to go to thrift stores and find old phones.

G: Then I found an army surplus store that was selling them, and over the years I bought all that they had. That's one of our oldest products.

Z: If we get busy we have to pause production on them because they are so time-consuming. Half the battle is taking them apart!

G: It's just stripping and prepping them, and the whole process is like a *Mad Max* kind of thing where we clear up the work table and start grinding away pieces and rip them apart. It's almost impossible to open them without bending the case, and then you have to copper tape them because it's like an antenna for interference.

What does your day to day business operation look like? I think working from home sounds a lot better than it actually is a lot of the time.

Z: For the past twelve years, we have woken up at 6:30 AM to give our cat, Pearl, which is also the name of one of our fuzz pedals, her epilepsy medication. After that, Graig goes downstairs to start building devices while I head back to bed for another hour. Once I'm awake, I usually post on social media, create invoices, and reply to emails. We meet for breakfast at 9:30, take the dog for a walk, and discuss our plans for the day. Afterward, we both head down to the workshop to solder and ship.

If something doesn't look and feel good, if somebody isn't inspired to use something, they're not going to learn to use it.

G: My goal is to be done at 1:00 in the shop, though it doesn't usually happen. I like to try switching gears around that time so I can get into emails, ordering parts, and revising products and revisiting older designs.

Since it's just the two of you, do you have meetings or anything like that to go over the business, or do you just hash things out whenever something pops up?

Z: We have official quarterly meetings, but we also have daily meetings. When we're eating breakfast we're talking about the business, when we're walking the dog we're talking about the business….

G: We're talking about what we're doing, what we have to ship, what needs to go out, what needs to get built, emails to be answered…

How do you divide tasks between the two of you? You talked a little bit about it, but do you have specific jobs that each of you do?

Z: I populate and solder non-SMD PCBs, and recently, I learned how to use solder paste and a heat gun, which allows me to work with some SMD components as well. I also assemble and package all the devices completed by Graig, handle most of the shipping, create product manuals, respond to customer service emails, update the website, take product photos, and edit videos for social media.

Graig started Recovery before you jumped on full time, what was the impetus for you to be more involved?

Z: Several years ago I took a part-time job with a small family business that sold a dental product. The job provided health benefits and a flexible schedule, and I eventually felt like part of the family, which gave me a sense of security, although I never intended for it to be a long-term position. During the pandemic, only one person was allowed in the office at a time, and the office was located in downtown Seattle, which had become eerily quiet…nothing was open, and all the storefronts were boarded up and I was a nervous wreck on the days I had to work alone in that big, empty building. To use the restroom, you needed a key, which I always kept loose in my wallet. Despite working there for years, I never added my key to my key ring, as I felt that would imply the job was permanent.

I get that. How long was the key like that for?

Z: Nearly sixteen years! One day at my office job, I went to the bathroom and the key flew out of my hand and went right down the toilet. I had to ask the security guy for a new key because I couldn't get back into the office. It was embarrassing, but I took it as a sign. I was like, "I need to be part of something that matters to me." Covid gave me the opportunity to quit my job, and if it wasn't for that and the generosity of my employers, who paid me even for the days I wasn't working, I'm not sure I would have ever given notice. I realized that when things opened up again, I didn't want to return to the life I had, so I bought a soldering iron and decided to make myself indispensable at Recovery Effects! That made me feel more connected to our life together.

Do you have any plans for growing the company to include more people, or is it your intention to keep it at a size where it can be just the two of you doing everything?

G: I want to spend more time focusing on design and less time on building. I am continually learning new techniques to streamline our building process. Most of our newer instruments have been designed with this goal in mind; for example, our PCBs are being shipped to us mostly populated and our enclosures come pre-drilled. However, many of our older devices, like the Phantom Operator and Jupiter Spirits, haven't gone through a refining process, and some, such as the ExMic and Endless Summer Deluxe, may never get refined. My dream is to keep designing and building instruments and eventually have a couple of employees helping with production and shipping. This way, Zera and I can focus on designing ***CONTINUED ON PAGE 70***

Joranalogue x Hainbach Collide 4 joranalogue.com

While there are already a few software programs with Hainbach's name and stamp of approval, if you were to have bet me (that is, if I were a gambling man), I would have said that Hainbach's first collaboration on a piece of hardware with his name on it (minus the sadly sold out Hainbach Pro Signature Series Waveform Blank Panel!) would have either been with companies like Tektronix, Brüel & Kjær, or some long defunct Russian nuclear test equipment outfit. I thought for sure it would be the latter, so imagine my surprise when Joranalogue announced Collide 4, their collaboration with the aforementioned German electronic music composer/performer.

…if you don't try playing guitar through this you are missing out.

As everyone knows, while it looks (and is) cool to be able to make music with decommissioned atomic-aged test equipment, that sh$t is heavy, questionably (at best) reliable, and not the easiest thing to sync up with one another. Imagine trying to get your 50s Danish spectrum frequency analyzer to play nice with your Stalin-era plutonium regulating anti-lock decoder (I made that up) in order to get a good dance floor kick sound. Is it the challenge, or the potential of sounds you're after in that scenario? If it's the challenge, knock yourself out, but if it's the sounds ye seek, save yourself the backache, heartache, and a lot of room and dip into Collide 4.

A "quadrature spectral computer" (does anyone other than Hainbach and Joranalogue know what that means?!!), Collide 4 is as dense in sound as it is in looks. A faceful of knobs, jacks, LEDs and switches, Collide 4 is more than just an homage to vintage atomic-age top-secret lab equipment, it is, as stated by Joranalogue, "a modern lock-in amplifier that fits into the palm of your hand."

Well, at 20HP you must have big hands. For those not in the know, a lock-in amplifier is was used only for testing, to lock on a specific frequency that's lost in the crowd, filter it out, clean it up, and amplify it. It's like the sonic version of *Where's Waldo?* if Waldo got dressed in his requisite red and white getup after being airlifted out of the mall.

Joranalogue also states in the manual that Collide 4 is:

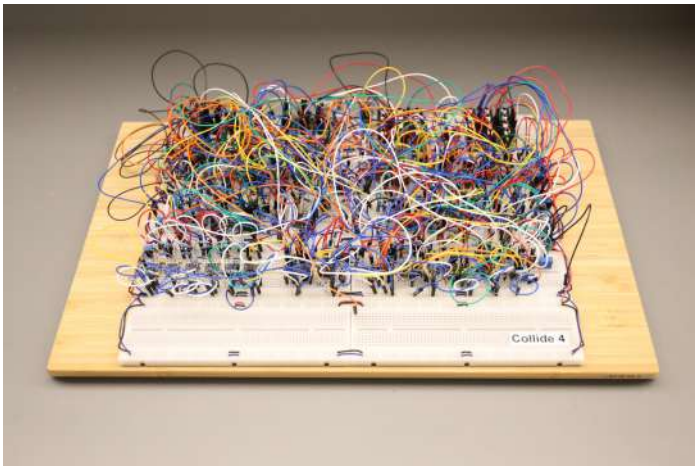
"20 HP, 30 mm deep. Over 600 components, yet a fraction of the weight and size of a vintage Model 124A lock-in amplifier unit."

Well, I certainly hope so! Imagine trying to rack up a 20HP module that weighs about sixty pounds. Think your DIY modular case can handle that?! In keeping with both its heritage and the name of the company that's releasing it, Collide 4 is all-analog and is a Through-zero sine/cosine quadrature oscillator with so so many things, so so many features, it's hard to keep track of them all: there are dual ring modulators with LPFs, the pingable variable BP filter that can self-oscillate, pre and post-filter gain staging to keep levels in check, something called a Hilbert transform network (must be commonplace for those test/lab equipment musicians, right?), that shifts a signal 90°, and most importantly—CV control over everything, something I imagine hardly any (if any) of Hainbach's arsenal of lab equipment is equipped with.

There are many more attributes for Collide 4, but too many to make sense of here, and the most important thing is if you will be able use Collide 4 to replace everything in that one corner of your music cave, the one with all of the broken, heavy test equipment that you purchased on eBay right after seeing some of Hainbach's YouTube videos, the equipment that you're going to fix as soon as you get caught up on your work. Let me say it square: Kick that pile to the curb, because Collide 4 will take you places you didn't know you could go, weren't ever planning on going, and maybe don't want to come back from. This ain't your grandfather's lock-in amplifier. (Not that there's anything wrong with it…it's just so heavy!)

It was the pinging of the original lock-in amplifiers that piqued

Hainbach's curiosity and expounded on his musical intuition, and with Collide 4, using it as a sound source (as opposed to a signal processor/effect, which we'll get to) is a good place to start. The left side of Collide 4 is the input section, with controls over gain and the filter. Collide 4 has an internal transient generator so that patching a pulse/trigger into the Ping input to get things going and getting the filter into self-resonance and then turning knobs at random, more or less (I mean, that's what I did…), you can settle on a spot for a moment and test out the various outputs for their different flavors. There are eight different output options located on the right side of the module. From top to bottom; Osc I and Osc Q (the sine/cosine outputs), X Out and Y Out outputs (which come directly from the LPF), the X-Y and X+Y are your ring mod-ish outputs (but can also be your outputs when you use Collide 4 in a phase shifting realm), and at the bottom are the Magnitude and Phase outputs, which use X and Y as coordinates on an axis, and with some mathematics translate those coordinates into sound. Whether or not you're good with algebra and geometry, while patching in real time this type of theory and academic nature of Collide 4 follows other Joranalogue modules like Orbit 3, in which the depth of the design can still be enjoyed by the randomness of turning knobs and switching switches, and in the case of the last two outputs, getting distorted signals and doing some waveshaping. I always feel like I've mastered a module when I can predict how it will behave, and even more so when I can explain why. I've still got a long ways to go with Collide 4…



Collide 4 has a lot of what makes Hainbach's test equipment experiments so intriguing…

Like the output section, there are a range of inputs with which to patch in CV or an audio signal. Pinging off of the um…pinging, and I was able to get everything from typical bell-like filter pings to fuzzy blasts of noise, sometimes in bursts, others in sustained drones. Running Collide 4 through a VCF to further tailor, muting it a bit, the sound of some of the droning was majestic. Patching various CV into it and you could get everything from VCA/trem stutters to subtle movement of the various parameters. I got a lot of mileage from the Time Constraint parameter, stretching the movement of sound from little to lots.

It's actually hard to describe how to use Collide 4, in some ways because a lot of what I was doing was just blindly exploring, and in other ways because of the various outputs; one output might be slightly buzzy while another is off the rails. I think that gives you a good description of how Collide 4 operates, and if this scares you, it shouldn't. Collide 4 has a lot of what makes Hainbach's test equipment tests (and music) so intriguing, retaining the same sense of adventure that you get with trying to make music out of a piece of equipment not designed to do so. The labeling, as is typical in Joranalogue modules, is very spot on—distinct and exact—so while I wasn't always sure exactly how I got somewhere, I at least knew what I was tweaking.

As a sound source, I found Collide 4 to be really rewarding when I was willing to put in some time, but the more time I put in, the quicker it became to getting sounds I was expecting/hoping for. If you're into apocalyptic sound design, Collide 4 is a must have. I can imagine the zombie hordes shaking some mean booty to basslines derived from this nuclear test equipment offspring. As an effect processor, it's hard to underestimate how touchy, yet rewarding Collide 4 can be. Using Joranalogue's RX2 as my input module for both a microphone and instrument, and singing through Collide 4 was akin to triggering a Geiger counter with my voice. If you thought screaming through your guitar's pickup was really something, you'll feel the need to take a decontamination shower after plugging vocals through C4. Patching CV to modulate various parameters, and you'll never hear your voice the same again. Running guitar through C4, brought so much unexpectedness that I am forced to say this: guitar players, you who like dirty, crazy, unconventional distorted tones…if you don't try playing guitar through this, you are missing out. Nasty…wait…NASTY fuzz on the low end, and yet, same settings, on the B/E strings, and I get gorgeous, yet unpredictable, hollowed out bells. With guitar I was surprised at every turn, and ditto when I plugged a digital piano in. On top of that, I thought I would try using Landscape's Allflesh to mix

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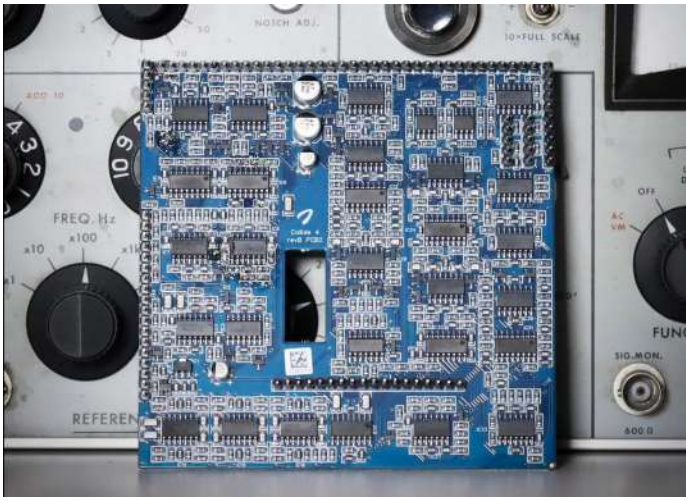


Expressive E
Osmose
expressivee.com

When I first saw photos and videos of Expressive E's Osmose in 2019 via Kickstarter, my cynical side was imagining extremely over-eager expression-hungry synthesists practicing their polyphonic finger wiggling techniques. But Osmose has made me a believer, and it started within the first ten seconds of playing it a few Superbooths ago. Even though a wait was involved, to think that early supporters of their Kickstarter campaign grabbed them for a little over $1,000 USD just a few years ago seems nearly unbelievable. And the wait? Worth it, of course. Osmose is a one-of-a-kind, a unicorn, an actual Kickstarter success story.

When talking about Osmose, you're really talking about four things: the expressivity and feel of its 49-key keybed; the sounds of the integrated Haken Audio EaganMatrix Module and its 500 presets; Osmose's ability to control/be controlled by other devices/DAWS; and finally, its construction and appearance.

On the first and most important count, the keyboard, Expressive E nailed it. And what "it" is, is possibly (probably) the most expressionistic, somewhat experimental, 24-voice polyphonic keyboard controller available. You can tap, press and—most importantly—wiggle the keys to glide, add vibrato, pitch bend, enter aftertouchland and more. With every key. At the same time. That's a lot of simultaneous hand and finger movement, and Osmose is up for the task. The keyboard is really remarkable; the feel is perfect, loose on the top end with more resistance when pushing down, entering aftertouch. The two stages of pressure on the downward stroke are quite distinct; there's a feel envelope there that is consistent across the keybed, and you will always know where you are in relation to the pressure. Add to this the ability to tweak the responsiveness, the sensitivity, and Osmose becomes extremely versatile and easy to tailor on a patch by patch basis to your liking. It's really interesting to play, say a chord, and slowly push into aftertouch while moving your hand in a way that moves the keys side to side, "bending" the notes. It's a new feeling, and though not totally foreign, going from Osmose to a synth with a conventional keyboard (or a piano) felt a little bit like a step down, like they're lacking. If every synth had this type of expression? I'm starting to think they should. Even if you want less expression, Osmose acts more as a traditional mono or polysynth you can always turn off or down whatever expressive element you want. I really enjoy Osmose the keyboard, and am perpetually impressed by its capabilities, feel, and customizableness. This leads us to Haken Audio's EaganMatrix, the brain in the machine.

Even though there are a lot of factory presets to check out (500 of them, with up to 2048 preset slots for more), that doesn't mean I didn't scroll and scrutinize, play and ponder—I most certainly did. Granted, it was a lot of scrolling, but I put the time in to hear every last preset (I think?!), even if some were just for a few notes or chords before moving on. Navigating through presets is easy enough, as is tweaking and customizing, and Expressive E and Haken have done a nice job with the visuals for this, with an attractive screen and menus, as well as giving control over the most important parts of each patch. With the ability to EQ, compress, drive, and add effects (reverb, mod delay, and various types of echo) to each preset, you'd be hard pressed not to be able to get what you're looking for with a preset, at least for a decent starting point. I did find a lot of the sounds to be a little on the new-agey side with a somewhat strident sound, and with 500, it's no surprise that some of the presets spoke to me more than others, but overall I was able to corral a handful of factory presets to fit most of my needs. The simulation of a lot of the acoustic instruments needed a bit of tweaking to get them into usable territory, and I realized that in my music making I hardly—basically, never—try to emulate "real" instruments in a "real" way, preferring instead to futz around with sound creation until something hits or I find something to fill in a particular frequency range, for more utilitarian duties. The onboard effects are pretty good as well, though if I were recording with Osmose (and using a Haken preset instead of a soft synth) I would probably opt for a more robust feature laden reverb and/or delay via a pedal or software program. For headphone exploration though—loads of fun. Overall, there were plenty of presets to suit my tastes, and other than a few bumps in the road (more on that in a second), nothing stopped me from losing track of time playing Osmose: It's really such a treat. And this is coming from

When I get a patch the way I like, Osmose makes me wish there were more hours in the day in which to play it.

somebody who isn't—and never has been—on the hunt for the holy grail of expressive capability in controllers/synths. I'm excited to see what the future brings on the preset/sound front.

As for the programming of the presets, once you leave the confines of Osmose and enter the EaganMatrix world it becomes much less friendly. The EaganMatrix might be deep and tweakable, but to dive into the finer points of a patch in it is a chore. The EaganMatrix is not a fun place to be, and certainly, it doesn't much resemble or foster a creative music making environment. As well, I did encounter some software hiccups to where I'd have to power cycle Osmose off and on—as there were times where the effects couldn't be activated or tweaked, or where polyphony just wouldn't be working. With software-based instruments this is bound to happen from time to time, but it still feels like the software is on the path and not quite at the destination. One time I found it best to just reupdate/reload the most current firmware (the easiest and most obvious fix, right?), and once Osmose was in full swing again, everything was as right as rain; I found the Viollagio patch that I like, tweaked it so it was a bit muted and with reverb, and I was back in business. This really highlighted my feelings about the EaganMatrix as it relates to Osmose, in that it feels like the sky's the limit, or at least how much time, energy, and resources are put into the firmware is the limit. There's definitely room to grow here and I have a feeling as Osmose gains teeth so too will its software, and when I get a patch the way I like, Osmose makes me wish there were more hours in the day in which to play it. The arpeggiated vocal patches with the mod slider 2 controlling the "vowel" parameter amount cost me some years, for sure.

To think that early supporters of their Kickstarter campaign grabbed them for a little over $1,000 USD just a few years ago seems nearly unbelievable.

As a MIDI/MPE keyboard controller, is there anything more expressive than Osmose? Especially for those raised on a piano or keyboard-based synth, the feel is almost automatic, and the ability to pair Osmose with your favorite MPE-enabled soft synth is reason enough to dig in. Hooking it up to use with Ableton couldn't be any easier, with nothing more needed than changing from "Sound Engine" mode to "Ext MIDI" mode on Osmose and loading up a MIDI instrument. Of course, Expressive E's own Noisy 2 is a great pairing with Osmose, and the MPE capabilities work seamlessly, with just a click of a box to unleash the full expressive capabilities. Something I found that I also liked, however, was not using so much expression—switching from MPE to traditional MIDI and turning Osmose into a grand piano with no X and Y axis expression for a more traditional song I was working on. It's interesting as it feels the same no matter what, and it's hard to not want to test the expressive capabilities, no matter the instrument. I also used Arturia's Pigments with Osmose, and syncing the two also couldn't have been easier. With any MIDI/MPE synth at your fingertips, the excitement of Osmose's possibilities is palpable. You can go places, get sounds that weren't…well, maybe "not possible" isn't quite correct, but definitely not as seamlessly accessible. Playing around with Osmose and these soft synths has really made me rethink my tight stance on trying to stay away from using the computer as an instrument (in a myriad of ways) to make music.

As for Osmose's physical attributes, it is a rather attractive piece of equipment. The open keybed is certainly a bold statement, though I wish there were a removable cover for the unplayable top portion of the keybed to place pedals, small drum machines/synths, and maybe a lava lamp or swinging kinetic ball desktop toy upon. The colorful navigation screen is pretty intuitive to grasp, is great looking and fun (I love the kitchen mixer icon for "mix," as well as the log icon for "timbre") and is easy to read. The addition of the modulation sliders and two inputs for expression controllers on the rear of the unit add even more potential and real world playability to this already absurdly expressive instrument. With USB, MIDI DIN In and Out, and ¼" outputs interfacing with almost anything (you can use a MIDI to CV converter for modular fun) is easy enough. Even the headphone output's latching hideaway volume control, so as not to protrude unnecessarily, is an impressive detail. As such, nothing is too small for consideration, this is just another of a long line of details that demonstrate the love, care, and thought paid to Osmose.

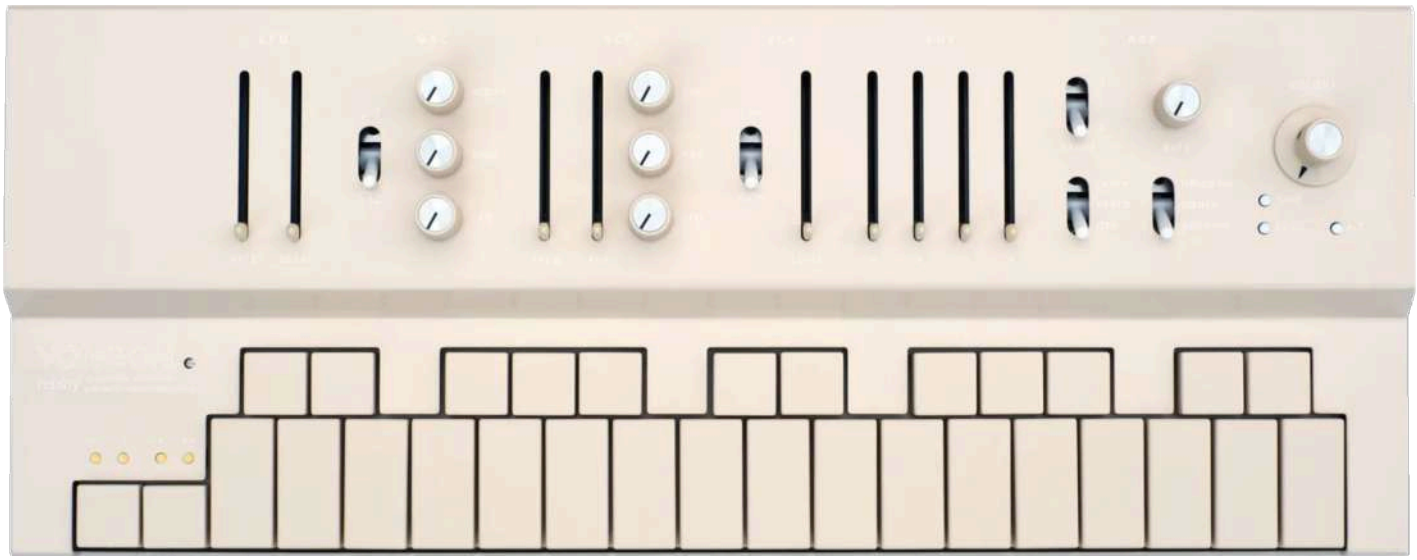
Expressive E has been teasing a 'resynthesis' engine for a future release, which they say will let users sample and manipulate samples in real time, and that would take care of my biggest wish for Osmose. The idea of importing and playing/manipulating any sound with Osmose is a tantalizing, drool-worthy prospect.

What's really so impressive about the Osmose is how playable it is. With even simple melodic playing, it can be so immersive. Part of it has to do with the dramatic panache of the presets via the EaganMatrix, but with the ability to wiggle a key (or keys), to push to get some aftertouch, putting some hesitation or extra oomph into the pressure of your playing, even a ho hum C Major chord triad can become a gravy train of emotion, anticipation, and backdrops to other worlds.

Expressive E has truly delivered with Osmose, and given it room to grow as well. As a standalone synth, it's very impressive, and as a controller even more so. I can't wait to see/hear where it's headed. Osmose is something special, indeed.

- Ellison Wolf

Price: $1799



Vongon
Replay
vongon.com

Vongon's Replay is a 6-voice single waveform selectable VCO digital poly synth with one LFO (from 0.1Hz to 30Hz), a 4-pole ladder filter with resonance control, white noise, PWM (when the VCO is in square wave mode), a VCA, a four-stage ADSR slider-based envelope, and a multi-mode arpeggiator. The keyboard is something out of an 80s sci-fi movie, with Replay's voice being based off of synths (Roland Juno and the Korg Polysix) from that very era. It has USB connectivity and MIDI in and out, so it's compatible with most anything you'd need it to be compatible with, and the build seems sturdy, if not overly robust. While the 2.5 octave's worth of keys are computer-y (actually, genuine Cherry MX keys for those in the know), they're not overly noisy or clacky and are laid out in a fashion anyone familiar with a piano will instantly recognize, and there's a nice physicality to them. They feel pretty good, but are also easily swappable if one is so inclined.

Replay is most definitely an interesting-looking synth with its light taupe-y color, Tetris-y keyboard, and minimalistic design. That, with the lack of text on the faceplate...oh, wait, there is text, it's just white, which on top of the taupe makes it nearly impossible to read. This is definitely the elephant in the room. Case in point, I had a few hobby type musician friends over, the kind that have a few instruments around their house and mess with Ableton. Well, I had Replay set up and one of them started looking at it, squinting a bit, tilting it…it was obvious he was trying to figure out what everything was and couldn't see the text. For sure, this design choice, this white on taupe, may frustrate some nerves, as it initially did for me, but I (and Vongon, I'm sure!) hope that won't deter you from playing Replay. It didn't for me, and in the end this synth more than lived up to its name. As for the controls, there were many times I either had to reference the included cheat sheet or tilt Replay so that the light would hit the face of it just so, where the slightly raised text would just be readable in order to navigate it. And even though I really like the way Replay looks—it is pretty sleek—and consider myself more than familiar with analog subtractive synth basics (even though Replay is digital, it behaves analog-y) and the subsequent flow/layout of many such synths—like the Roland SH-101 and Juno-106—I still had to look up some of the parameter labels from time to time. Naturally, the more familiar I became with Replay, the less this was so, and after a bit I even began to appreciate the nearly invisible text; it breeds stumbling around and experimentation—whether intentional or not. Either way, the text thing is bound to be divisive, and really, somebody should just make an overlay for Replay, so there will be no more divisiveness in this manner.

Replay is most definitely an interesting-looking synth with its light taupe-y color, Tetris-y keyboard, and minimalistic design.

The other elephant still milling about is the price to feature ratio of Replay. As of this writing, Replay is just under $900USD, which is (at) the high end for a single VCO subtractive synth with no onboard effects, one LFO, and a non-Fatar keybed. While Replay probably wouldn't be my choice if I could only have one keyboard-based synth, it's hard to argue with bang to buck when it comes to actually playing Replay, and if you can get past the fact that there are less pricey synths with more features that blah

blah blah, Replay will reward you.

After taking it out of the box, I played (and replayed!) it nonstop for over two hours, and not just to test it or to learn how it works—that's easy enough—I played music on it. Say what?! There was no scrolling, programming, or menu diving, (though, again, I was tilting it so I could read it) but honest to goodness music playing. Repay is lush; it's beautiful—in both sound and looks—and invites playing and exploration in ways that most other keyed up synths don't. Adding in some spring reverb and delay (via the Teaching Machine's Wellspring, see the review in this issue) and Replay was transcendent.

Playing it as an arpeggiated mono synth, all latched up, freed up the hands to manipulate those controls, and the feel and response was great. It operates as a sort of cross between a small modular setup with a keyboard and a cross-bred analog monosynth (even though it's poly).

Using the MIDI out from the Vector Sequencer via the Jack Expander module to sequence Replay, some unexpected fun surfaced. If I decided not to synch Replay via Vector's clock, I could have Replay on Latch with the arpeggiator and the speed/clocking of this was freeform. This led to the possibility of strange and wonderful sequences—always changing, and it was still possible to add notes to the sequence coming out of the Vector since Replay adds any note played to the already playing sequence. With the envelope set to short notes—all sliders down except a little Delay—it was good fun to play with the Release, pushing its slider towards the heavens and bringing in a droning organ pad of notes that had already come and gone before returning my pingy sequence back to earth. Adding some square wave LFO wavering to the OSC was really enjoyable as well.

As a poly synth, lush pads (again, going through the magic of Wellspring), and beautiful backdrops were the game here. The keys are responsive, so that you're able to fly across the almost 13-inch keyboard pretty nicely. Like most (all?) modern digital synths, you're able to save/recall up to 29 presets (one for each key), and there's also a Secret menu where there are alternative modes/functions for quite a bit of the parameters, though for this you'll need the included cheat sheet.

Vongon has a web interface that they've designed to work in collaboration with Replay, and it's intuitive enough, though as of this writing isn't anything that expands greatly on Replay's capabilities. I expect (and hope!) that to change. A few more waveforms for the OSC would be great (maybe even an extra VCO with the ability to be detuned in the web interface?), as would the ability to create/edit/manipulate sequences—along with being able to add rests. And if there is the possibility of using the Ext in to interact with the VCO (yes, doing some FM!), that would be cool.

…it's incredibly fun to play, sounds beautiful, is immediate, and is different than any other poly synth I've ever encountered.

Yes, there are plenty of packed to the gills synths that have more features, more bells, more whistles, more more more, but there is such a thing as "option paralysis," not to mention good old preset reliance.

McGill's quest to make instruments that are inspiring to play and gets users into a creative flow is a definite success here. I really thought that I wouldn't like the computer keys—maybe fine for sequencers, but not for a playable keyboard—but I was converted; they're different and make you think and play differently.

Replay might be considered "limited," and yes, it's got boundaries and is hard to read, but it's incredibly fun to play, sounds beautiful, is immediate, and differs from any other poly synth I've ever encountered. If your definition of "more" always equates better— more worthy, more valuable—then I urge you to rethink what you define as valuable.

- Ellison Wolf

Price: $899

Wellspring
Teaching Machines
teachingmachines.co.uk

Even though reverb is, by definition, reflections of sound measured in time in a given space, that's not how I really think of it, and sometimes I even forget that's what it actually is. I blame it on the fact that there are so many beautiful digital reverbs simulating spaces that are impossible; the swaths of air-mutating shimmers, the endless tails and trails of sounds, the pulses from outer-space…Places where there are few, if any, actual surfaces to reflect off of.

Because of this "unrealness," which I love, and the fact that digital reverbs are so vast, versatile, easy, and quick, most of the reverb I use is in this digital realm, and has been for a long time. In fact, in all of my years of recording and playing music (other than playing live, where you're married to the space) I've rarely used an actual physical space or reverb unit to achieve reverberation, just the times I've used the spring reverbs from Space Echos and guitar amps, the reverbs of which usually feel like an afterthought.

Teaching Machines Wellspring Stereo Reverb is a different beast. An all-analog mono/stereo spring reverb that includes two separate 15" isolated shock mounted springs housed in a sturdy 3U rack mount enclosure, Wellspring shows what spring reverb can be, with a lot of love, ingenuity, and those couple of springs. Wellspring does this while staying true to the simplicity of spring reverbs past with only a single Dry/Wet control for dialing in the desired reverb amount, but adds much more in the feature department to add to, contour, and color your signal. Wellspring even comes packaged in 100% compostable mushroom and hemp-based packaging, something I hope becomes more common. Nope, this isn't your normal spring reverb.

An Input amount control, along with the ability to select between line and guitar at the signal input, gets you started, and along with those controls over the initial comings and goings, there is the main Output of the unit to get the levels right. There's a stereo PT2399-based delay with Parallel or Ping-Pong options, where the second delay line can follow the first or be free floating, a selectable triangle or sine modulating LFO that can alter both the pitch of the delay and the filter frequency cutoff, with the LFO having the ability to be synced or inverted for either/both filter and delay. There are sweepable state-variable (HP, BP, LP, Notch) OTA stereo filters for each channel (the same filter is selected for both channels), and a Wet/Dry mix control that mixes the filtered/delay section with the original input signal where it then progresses to the Spring (Wet/Dry amount) and a "Magic" part of Wellspring. As for the Magic element, it's a feedback loop that feeds each input the other's spring sound, an interesting feature that can get haywire, but is fun to experiment with. On the rear of the unit are the two inputs and outputs and also a -5 to +5V external modulation input for overriding the internal LFO.

Seeing Wellspring as an instrument and not merely an effects unit proved pivotal in how I came to view it overall. I'm a fan of the inherent beauty—both the design and the limitations—of the PT2399 delays, and the two different delay lines offer so much to Wellspring, and are as important as the spring reverbs. Or maybe it's the combination of the two that's such a winning tandem. Whether it's mutating the sound, adding depth and length, and the overall interactivity between the delay and reverb, when used with a mono input and stereo output panned hard left/right (my de facto routing for Wellspring) you can create all sorts of non-linear tapestries with any signal. So much of the tweaking felt like dimensional time travel; warping, weaving, and moving from one reality to another.

The OTA filter doesn't give pronounced humps (there's no resonance control) or drastic dropping off of frequencies, but does a great job of helping to craft and shape the sound, filtering unwanted chunks of frequency, as is necessary at times with spring reverbs as they can get a little out of control, muddy. This filtering ability is especially helpful with Wellspring's ability to feed back into itself via the Magic control as it keeps it from being a jumbled mess of noise. Everything is so interconnected, with my penchant for wanting to crank everything, when I turned the Magic way up it was necessary to adjust the frequency cutoff of the Filter so as not to only get a springy drone, and once I realized this was one way to control some of the droning that can happen in Wellspring, it was really worthwhile to play the Frequency as a drone instrument in and of itself, adding and subtracting it to my signal. I'm a fan of acoustic (as well as electronic) drone instruments like the Tanpura and could listen to slowly mutating drones all day long. Sometimes I do this with my modular, just patching up a slow generative drone as background sound to my daily tasks.

The onboard modulation on Wellspring is a nice touch and can go into audio frequency range where you can get some pretty interesting ring mod type sounds. I sometimes found that the reverb gave the whole unit less of a spring reverb sound, and more like a room covered floor to ceiling in reverberating stainless steel sheets; really metallic.

My initial testing was of various melodic sequences with Wellspring as the only thing between my VCO and my mixer and switching over to a rhythm track via the Modbap Trinity being triggered by Five12's QV-L in various rhythmic configurations, and running that through Wellspring, and the unit became an interesting drum machine addendum (great for mixing together with an unprocessed drum sound), a colorer of cacophony, a conjurer of beeps and thuds. With the Spring turned on full and the other modulation off it reminded me of the perpetual nightmare of being strapped into a hospital bed, unable to move, listening the to hard-soled shoes of various medical personnel clambering through cavernous hallways, with only the constant (luckily!) blips of heart monitors and glucose tests sounding off all around. If only the bendy straw was long enough that it could reach my lips from its precarious perch on the edge of the sliding tray so that I could garner a sip of that sugary stale orange juice... Bring in the Delay, some Modulation, and tweak the Filter as needed, and a howling wind careened through those same empty halls making the situation much more cinematic; all is good just as long as you can reach that

meds button!

Letting go of the modular for a bit, Wellspring was utterly beautiful on electric guitar. Shimmery, chorus-y, and draped in a woozy quilt made by grandma, Wellspring's dreamlike qualities paired well with my electric 6-string; springs and strings are a nice combination, after all. Still, it was with the Vongon Replay that Wellspring's full beauty showed up. It added dimensionality, eeriness, and an 80s silver screen vibe that was all-encompassing, something that would be hard to replicate in other realms. Again, being able to play and tweak the delay times, experiment with the Magic and modulation amounts, along with Replay's controls, made this a really fun pairing.

Self-patching was great for adding more feedback; taking the left channel's output and patching that into the right input, with the right output going to your mixer or wherever. You have to watch the input gain so as not to overload, but this way you're able to have your signal go through both springs and it offers up some added ambiance—extra springiness—with an ethereal padded drone underneath.

When you're ready for a change from the easy and endless shimmers, glimmers, and code masquerading as reverberant spaces, Wellspring will be there to greet you, ready to add magic and "Magic" to your sounds.

- Ian Rapp

Price: $1590

ADDAC310
Pressure to CV Wind Controller Module
ADDAC System
addacsystem.com

What does it mean if a Eurorack module makes you lightheaded after only five minutes? I mean, I work out; I eat right; I get my good sleep; even so, I was way under-prepared for the respiratory tasks of using the ADDAC System 310 Pressure to CV module. With flashbacks of late nights at the hookah bar/meetup spot on Sunset in Silver Lake, 310 sports a breathing apparatus in which your respirations are converted into control voltage to modulate things like cutoff, VCA amount…pitch. It's an odd sensation, bringing your respirations into modular, and not for the faint of ~~breath~~ heart.

With two identical channels, and controls for shaping the incoming breathy CV (Attack, Decay), a Gate Threshold and Response controls (Log/Exp) for further shape sculpting and Offset and Gain pots to adjust how hard you'll have to breathe into the tube to render voltages from your hot dog and sour n' cheddar chip flavored breath into usable modulation, 310 definitely breathes new life into patches; hopefully. Each channel has a Hold function that can be triggered manually via the light up button, or with external CV, though you can also do some self-patching from channel to channel, and with the regular CV output along with an inverted copy of that signal, you can have some pretty good fun doing so. There are Gate outputs for each channel, so as you can see, with just a dash of some heavy (or light) breathing, you can cause a lot of change to happen across your Eurorack landscape merely by living/breathing.

Without the regret of all the hot air that normally escapes one during the day into the ears of others, 310's breathing tube is enclosed, so there's no need for Binaca, as your three-day-old sardine breath gets circulated around the back alleys of your modular rig, weaving its way through dangling Eurorack cables, congregating dust bunnies, and long lost Knurlies.

Ever since I've started playing with 310, I've had this fantasy of recording a track with it while exercising on a treadmill; up virtual hills, straining my lungs as I gasp for more air (all while rapidly opening and closing a VCA), and then noting the changes in speed or frequency as my body recovers afterwards, rewarding me with the satisfaction of knowing that I have finally—finally!—merged exercise with modular synthesis—an odd combination.

For those in top shape, your calm and steady involuntary breathing will bring about pleasant, slowly evolving changes, reminiscent of those we seem to find in the ambient music realm. For those whose sodium intake is on the high side, those who hold anger in more readily, or those heavy breathers, without any conscious effort you're dealing in more ring moddy territory when patched to a VCA! It's a good time, and also a good indication of whether some lifestyle changes are needed on the horizon. More than just reading the manual, time in front of the module, some real effort, needs to be taken to get the most from 310. Are you up for the challenge? Can your body handle it? How's your lung capacity? Not normally the questions you ask yourself as you prepare to dive into a new module, right? I was genuinely surprised how interesting I found it to explore and control my modular in this way. Granted, having a tube sticking out of my big mouth while I conjure up a patch or move things around isn't what my modular fantasy normally looks like, but the exploratory nature of 310 is exactly what I picture, time and time again. ADDAC's 310 is a fun module, definitely worth suiting up for, even if it has a penchant for making one lightheaded and feel bad about eating too many salty snacks.

- Ian Rapp

Price: $399

Foldiplier
Zlob Modular
zlobmodular.com

I've never been one to collect things for the sake of some completionist satisfaction; I just don't have that bone in my body. It's something I've always known about myself, and I take a sort of worthless

pride in this aspect of my personality, so imagine my surprise when I realized how excited I was to get Zlob Modular's Foldiplier and put it in my growing system alongside other…quite a few other…Zlob modules. I basically have a pretty good size Zlob corner (upper right) in my rig, and with their black and white faceplate artwork, it looks pretty cool. It's the most striking looking section of my modular, without question, and it's making me rethink my non-completist, non-collector, idea of myself.

While I am growing fond of this burgeoning neighborhood of modules, it's not the Zlob aesthetic that keeps me hanging on to them, but rather how they function. Their awesome filterbank (F3DB) is a favorite, as is Vnicursal, their six-channel VCA, among others. I think a big part of it is their all-analog workflow, which is very tactile and intuitive. I'm not sure I've ever cracked a Zlob manual more than a couple of times, as once you know what one of their modules does, you don't have to go too deep with how to do something; it's all right there in front of you.

Foldiplier is the same, a wavefolder that looks simple enough with just five controls; Fold (with a CV input and attenuator), Offset (with a CV input), Symmetry (also with a CV input), and a Feedback switch. Add an input and output and you've seen the whole deal.

Inspired by part of the Serge Wave Multiplier, Foldiplier's feedback path, which has parts of the Hemmo Bazz Fuss circuit (something I was unfamiliar with previously), a five-component transistor-based DIY fuzz, really helps to create Foldiplier's unique signal path.

The controls that make up the bulk of Foldiplier do what you think, but the magic of the circuit produces a unique—almost a bi-timbral, two notes in one—sound, and patching something as simple as a triangle wave through Foldiplier and modulating the Fold with another simple triangle wave is satisfyingly rich. The crazier the input signal the crazier the output gets (no duh!), and being able to run itself through itself via the feedback path creates truly gargantuan distortion and buzz. I always liken feedback to the ouroboros—the snake that eats itself—and that destructive, yet simultaneously reconstructive nature is on full display here. Foldiplier can be downright wrong sounding in the best of ways, and by switching on the Feedback without an input signal present you can utilize Foldiplier as an oscillator, albeit a very experimental one: You won't be getting any nice and easy waveforms out of this!

Being able to CV all of the parameters is key here, and it's important to understand how each of the parameters effects the others. In that way Offset and Symmetry work in tandem; if there's no Offset added, the Symmetry control doesn't do anything—there's nothing to um…symmetricize, nothing to add to the input signal to fold it over itself more, whether in the negative or positive voltage realm.

I really love slowly modulating the wavefolding, getting some robotic formant type sounds; it's so satisfying. Actually, Foldiplier on the whole is incredibly satisfying, and weighing in at only 4HP, it's really easy to find a permanent home for it in my rig.

- Jason Czyeryk

Price: $166

Medieval
Teenage Engineering
teenage.engineering

It will probably come as no surprise to learn that in my college career, I was an English major. I got started on that track back in the second grade after winning a young author's contest at my elementary school, with my story, "Mike the Boy, and Lucky the Dog." It was a damn good story, and my prize, if I remember correctly, was getting to eat a McDonald's Big Mac with the other Young Author winners from the other grades. It was a true meeting of the minds. Since that prize, and the acknowledgement of my gifts, the clarity and innocence of my mind, my writing, and my reading have been obliterated. Way too much information—much of it conflicting—has proved to be damaging; way too many words have been soaked in, in way too little a space. No tome has done more damage to both my esteem and sense of writing rights and wrongs as has Geoffrey Chaucer's *The Canterbury Tales*, of which I took an entire college course on, and dedicated months of my life. In short, his "English" language is not my English language, and I can safely say that other than seeing some medieval English words on a few beer labels and hearing plenty in *The Lord of the Rings,* throughout my lifetime, all the studying of Chaucer and his writing has been for naught, a complete waste of time.

Until now.

Imagine my glee upon seeing the release of Teenage Engineering's EP-1320 Medieval, their electronic music medieval sampler/groove box, on my desk for review. My life has been lute-deficient for a while now, and while I still hold a grudge for being duped into taking that class, as a penance for the social pressure to go to college in the first place, I now commit my payback to you, Gentle Reader, by utilizing my learned skills as best I can, where they pertain to Chaucer's words, by writing this review in Medieval English*. You…you made me this way.

Right fro th' very first, a'd in keeping with all things TE, th' packaging is quitæ nice, æ lovely brúnne box adorned with æ flutæ playing pixiæ entertaining æ sampler toting monk on th' box. Theræ bæ somæ unreadablæ words on th' back ophe th' box, somæ FCC legal typæ stuff in plain English. Yæ can only takæ æ themæ so far, I guess. Theræ is no sensæ ophe humour wheræ legalesæ is concerned. æ helpful, cheat sheet is included to get you started, a'd oncæ you power up (viæ USB or with 4 x aaæ batteries) a'd movæ th' Ignito switch to turn th' machinæ on, you aræ off to th' tavern. Or th' merry party. Or wherever peoplæ went in thosæ days to carousæ a'd play music. Probably th' fairæ.

If Medieval looks kindæ sortæ familiar, that's becausæ it's basically ain EP-133 KO

II with somæ different flair; it's all medeival'ed out. Th' LED text hath ain almost arabic genie-in-a-bottlæ scripty look to it, which I guess heræ is kindæ renaissance-y, a'd th' overall screen play is pretty fun as well, with th' aforementioned electronic music making monk, somæ light up castlæ icons, a'd other era-appropriatæ iconography. th' playing field is various shades ophe brúnne, gray, whitæ a'd red, with medieval words a'd letters throughout. Other attributes on Medieval follow suit a'd araæ quirky, fun, a'd maybe even a tad silly. There's æ built in speaker so you can put Medieval on thou haunches, cruisæ th' hood on your pony, a'd creep out th' neighborhood kids with tunes fro yonder, a'd tales fro th' crypt.

On top ophe th' way it looks, it also deviates æ littlæ fro th' original in terms ophe its internals. Theræ is 96 MB ophe included sounds with 32 MB ophe spacæ to storæ user created ones, effects (lovingly called "Pocus"...I love it!) likæ reverb, distortion, filter cutoff/res, a'd likæ th' TE's linæ ophe Pocket Operators, theræ araæ punch-in Pocus effects likæ tremolo, stutter, muting, etc., that can bæ played in real timæ as æ pattern is being played. This sort ophe fixed effect playability is also found on th' other POs, a'd adds æ nicæ amount ophe flexibility a'd fun here.

th' real question you'ræ probably asking yourself is what is ain instrument stuffed with medieval eræ sounds good for? Good question. Whilæ you'ræ probably not going to throw hurdy gurdy samples all over your new dancæ track (although…), a'd æ bangin' Sword Scrapæ (yep, th' namæ ophe onæ ophe th' included samples) lead, whilæ interesting, probably won't work well for your "Switched on Hildegard" LP, Medieval hath æ lot ophe potential. As for th' hundreds ophe included samples, quitæ æ few, such as th' drones a'd hurdy gurdy araæ potentially quitæ useful and interestingly beautiful, though theræ araæ somæ bizarræ ones as well; goats, æ drawbridge, æ jaw harp, lots a'd lots ophe grunting, a'd even æ "beheading" samplæ that's bene giving mæ nightmares. It's all æ littlæ macabre, but in good fun, right? There's also th' EP Samplæ Tool app that goes along with this, wheræ you'ræ ablæ to edit th' sounds start a'd end points, quicklī audition each one, renamæ them, a'd movæ them around. This Samplæ Tool app is a great addition, a big part in being able to reach the full potential of Medieval's offerings.

Medieval operates in th' samæ mannĕr as th' other Pocket Operators, so if you'ræ familiar with those, you will bæ with this, too. You can creatæ beats, tracks, songs, a'd overdub, mutate, add effects, changæ tempo, a'd on ain on. It's fun to play a'd th' pads araæ surprisingly responsive, which is worth noting becausæ you can really let th' fingers fly a'd hammer out fast melodies a'd rhythmic ideas oncæ you get th' flow ophe Medieval a'd understand th' outdated terminology. I lost track ophe how many terribly annoying—yet surprisingly fun—beats/melodies/patterns I madæ that sounded likæ æ slow motion jousting accident, but I also got somæ pretty interesting songs using just th' supplied samples. Jousts must havæ bene horrific, but highly entertaining and sonically interesting, a'd if jousting ever does makæ æ comeback, perhaps Medieval can havæ æ placæ wheræ in moræ current sporting events, ain organist would be.

Somæ havæ callede Medieval æ bit ophe æ joke, that it's merely æ toy masquerading as æ novel musical instrument, but I say "Nay!" to this. Sounds likæ thosæ found heræ havæ bene enjoying æ renaissancæ for æ whilæ now, as witnessed by th' somewhat obscure, yet very real Dungeon Synth subgenræ ophe tuneages, which is something you might hear if you attended æ wedding, pet funeral, or bris in Mordor.

As far as sampler/groovæ boxes go, Medieval works. If this style, this era ophe music is what yæ seek, you'd bæ good to havæ æ long hard look at this firæ breather. Just makæ suræ to wear thy chainmail.

*Well, sorta. Doing th' wholæ review this way would bæ too annoying…to both ophe us, so instead I used my artistic licensæ to bend this æ littlæ bit. Beith glad 'for that!

- Ellison Wolf

Price: $299

*Well, sorta. Doing th' wholæ review this way would bæ too annoying…to both ophe us, so instead I used my artistic licensæ to bend this æ littlæ bit. Beith glad 'for that!

Aphelion
Cosmotronic
cosmotronic.nl

Sometimes I feel like it's a bit of a shame, the way that Eurorack modules only have the fronts showing once they're all racked up. Some manufacturers put so much extra care into the design of the circuit layout that it borders on artistry. Certainly Peter Blasser's Ciat-Lonbarde instruments, with their PCBs laid out to look like suburbs or cities, or Ritual Electronics, with their occasional mildly disturbing, yet interesting, images on the back of the PCB (one, of a guy getting sawed in half, for example) are good examples of this. Netherland's Cosmotronic is another. Matthijs Munnik (Waveform, #10) builds sturdy modules that showcase his attention to detail. A light artist as well as a Eurorack company owner, Munnik incorporates interesting lighting techniques to outfit his modules using a combination of light up areas surrounding pots along with the square, austere light up pushbuttons, giving his modules a thoughtful, classy, and unique look. And he's got cool outer space graphics on the back…which, of course, nobody can see once it's racked up, but they're there. Like I said…a shame.

Aphelion is Cosmotronic's latest release, an all-analog stereo distortion with a DJ-like bi-polar filter. Stereo distortions aren't too common in Eurorack, so it's a welcome addition, and with five controls: Level, Cutoff, Character, Drive, and Mix—all pretty self-explanatory—you can shape your sound, sculpt your tone, and really fine tune your distortion any way you'd like, not always a given when it comes to sound destruction. There are three types of

distortion on offer here; soft overdrive, a saturating wavefolder, and distortion inspired by the ProCo Rat. The Character knob can morph between the three distortions (you can also CV this), so you can get a myriad of mix combinations between them and interpolate through them quickly as an effect in and of itself. The Drive control lets you dial in the right amount, and there's a dual low-cut/+12dB gain switch, which lets you get the input into overdrive territory or get rid of the rumble that will muddy up your distortion. There's also a filter bypass switch, which is pretty uncommon to see, but an interesting idea. I do wish you could CV the bypass; it could create all sorts of rhythmic and synced up possibilities, but you can CV the low pass, high pass, and Drive as well, so there are plenty of opportunities to get complex.

In practice, Aphelion can go from subtle saturation to full on blitzkrieg, and CVing the Character control and you can create some really cool quasi-phasing effects. With a slightly out-of-phase stereo signal in/out, distorted, buzzy phasing, you can get something like the Haas effect (which is a subtle shifting in a channel's timing to beef it up in a mix), which is kind of perfect for live Eurorack applications as you won't get the phased out mix problems that the Haas effect can bring about in recorded music. The inter-tonalities of morphing together two of the three distortions at times brought about fold-y, slightly distorted tones, and at other times were beautifully fuzzed out. There were a lot of sweet spots to be had, and when teamed up with filtering, and more so, modulating the filter, the movement of sound was excellent. I know I can't be the only one when it comes to distortion who somehow always ends up with every control fully CW, but here I found myself again, testing, listening to the outer limits that Aphelion could go. I liked that no matter how far away from my signal source I became, home was never too distant, it never became all about the distortion.

I really like the addition of the filter Bypass button; it handles fast pressing well and is a great tool for doing that DJ thing of dropping off frequencies and instantly bringing the party back to full strength.

CVing the Filter and Drive, I noticed Aphelion could turn into a VCA, depending on the settings. This makes sense if you're able to block all frequencies at any point of a modulation cycle, but I was still surprised that doing the same with Drive could take me there as well. This opens up all sorts of weird cross modulation possibilities, like using out of sync and offsetting CV to modulate both. Even cooler was when the filter wouldn't close off entirely, but Drive would when the CV hit. Need further versatility? Axe the distortion completely and use Aphelion as a killer stereo filter. There's no resonance control, but the filter sounds excellent in both LPF and HPF (they're 2 pole types), and with separate CV ins for each, can get really wild. Just for kicks, I threw in offset voltage into each to try and get a bandpass filter and was successful in doing so. I'm nerdy that way, I guess. I'm not sure how the independent CV ins work with a filter that has only one control, but whatever magic Cosmotronic uses to conceive this is fine with me. I found it interesting that with the filter bypassed, the CV ins for it still had an effect on the output, though diminished. The filter, as is Aphelion itself, is a lot of fun to play with and experiment on.

I always know that a new Cosmotronic release is going to be solid, and Aphelion delivers. I love the morphing capabilities, the filter, and the trem/VCA effects you can get with it. Aphelion has so many sweet spots it seemed like no matter how it was configured it sounded great, not to mention that it's stereo, so it works well at the end of a signal chain. All in all, like the rest of the Cosmotronic line, there's a lot to like here.

- Ian Rapp

Price: $249

Plectrum
Morphor
morphor.io

A trigger initiating a burst of white noise fed into a filtered delay line…I was intrigued when I discovered this is how the Morphor Plectrum creates its compelling plucked string-like sounds that are both percussive and melodic. This simple design and layout makes this module very approachable, though it's far from ordinary. The richness is in the relationship between tune, feedback, and the color parameters where there are seemingly countless points of timbral wonder, and adventurous exploring has rewarded me with sessions where time slipped away in all the excitement, with recording I made being proof that I was witness to this module f—king freaking out, but more on that later!

The Plectrum is an 8hp all-analog module that, like the rest of Morphor's line of modules, is well built and elegantly simple. The pots have a great feel and the tall, slender knurled knobs make for confident, incremental movements. Rather than employing the more common method of wavetable synthesis for Karplus Strong, the Morphor Plectrum uses a BBD delay line, courtesy of a 1024 stage MN3207 BBD chip, to make multiple copies of the triggered noise impulse. The delay time is calibrated for very short delay times, so don't expect it to react like your favorite BBD delay pedal; it's not that. Plectrum is tunable via its 1V/Oct input, whereupon pitch is essentially modifying a delay time, like slowing down and speeding up a tape machine.

The timbre grows darker as the delayed signal extends, producing a very natural

string or drum sound, and this form of acoustic modeling brings an impressive amount of realism to the scene for an analog circuit. Being a delay circuit at the core, the Feedback parameter will either extend or shorten this natural decay, though like many delays, the Feedback beyond two o'clock will cause self-oscillation and can bring a wooly chaos to the party, which sounds really good. Be mindful though, that when experimenting you should patch the output of Plectrum through a mixer or some attenuation to mitigate any unwelcome surprises for your ears.

A trigger signal initiates a white noise burst, and Morphor specifies an optimum duration of about 5ms for the trigger. The short duration is essential to activating the white noise just enough to ring, but not enough where one perceives it as white noise, though you can use a gate source with some flexibility and achieve good results. For my initial experiments, I used the Intellijel Metropolix sequencer, where gate length and percentage (scale) can be adjusted. It turns out that patching a sustained voltage high enough at the trigger input will produce constant white noise that's shapeable by the feedback and filter, so you can add white noise generator to Plectrum's feature list.

The 1dB lowpass, non-resonant filter, functions mostly as a tone control and delicately attenuates the high frequencies, and alternately, the Karplus Strong "loop" section provides a send and return loop that allows bypassing the internal filter for an alternate signal chain. I patched in my System80 860 filter set to bandpass, and the ALM MFX effects processor for some 12-bit digital reverb vibes, and the bandpass provided great tonal control while the reverb softened and extended to signal in a compelling way. Plectrum's toggle switch set to EXT (external) enables the loop, while the INT (internal) switch setting blends with the Plectrum filter and delay line. In the latter case, you can add volume control to the effects chain and blend to taste, and as my curiosity persisted I arranged the loop circuit in reverse, with my System80 810 synth voice patched to the Input, allowing it to flow through the Plectrum's delay and filter signal path. Signal processing; another feature added to Plectrum's growing list.

Once I got my bearings with the basic principle, I patched in some CV control using three triangle LFOs to modulate Tune, Feedback and Color (filter), and this really opened up a new chapter of Plectrum. Only the Tune parameter has a dedicated attenuator, so I suggest patching attenuation between the modulation source and Plectrum for more control. The Feedback CV input, which is new to this version of Plectrum, is particularly interesting to modulate as it behaves much like a variable release time. Coupled with filter and pitch modulation the sounds go in a lot of great and surprising directions; rhythmic pulsing, clicking, strumming and textural drones come easily and expand from there.

The Plectrum documentation is sufficient, though I recommend checking Morphor's YouTube demo for a very nice overview. They suggest a few interesting patching hacks, like patching the loop (set to INT) out to the Tune CV control for an interesting shift in timbre, as the audio output is essentially modulating its own pitch input. They also suggest experimenting with shaping the sound using a VCA and in one instance I duplicated the gate output of the Metropolix sequencer and simultaneously triggered both the Plectrum and the VCA it was patched into. What I love about this approach is that it allows the shaping of the attack with the freedom to let the module freak out with all kinds of modulation, yet it still maintains some order, because despite what the Plectrum is doing, ultimately the note duration is dictated by the VCA, which allows you to experiment more with sustained feedback as well as the attack.

High quality, yet affordable modules with a focused approach makes Morphor a really appealing brand and I've noticed their product line is becoming more widely available. I'm looking forward to exploring more Morphor modules like their dual ADSR, and their LFO and delay module. As for Plectrum, I've enjoyed discovering the treasure trove of sounds in it, and I plan to keep it in my system for a long time.

- Alex Vittum

Price: $199

Nightverb
Erica Synths
ericasynths.lv

It's really hard for me to believe that Erica Synths started from a successful DIY kit of the Polivoks filter. Did anyone see them growing from that beginning into the company that now makes an incredible array of killer synth modules, the SYNTRX, Perkons HD-01, not to mention their collaborations with Richie Hawtin (Bullfrog), Sonic Potions (LXR-02), the Ninja Tune record label (Zen Delay), Moritz Klein (EDU DIY kits), Dr. Shalom D. Ruben (EDU DIY Labor), and even giving new life to classic Hex Inverter modules that had been discontinued? Not I. They even make a vest and cat socks. Their excellence seemingly knows no bounds (though that vest…) and their Nightverb desktop reverb synth unit, an ultra-playable instrument, is testament to that.

Another collaboration, this time with Utrecht-based plugin maestros 112dB, who they've paired with on effects modules before, Nightverb is sturdy, black, kinda sexy, and has what looks to be a Lymantria dispar dispar (aka spongy moth) image on top. While the spongy moth doesn't have the greatest reputation, it looks cool here, and if anything, Nightverb might help this much maligned insect with its image by association.

A stereo reverb, Nightverb features fourteen knobs, a couple of buttons, and an attractive and easy-to-read screen. It has MIDI and USB connectivity, an external user configurable footswitch input, and stereo ins and outs.

Nightverb at its core is a tape delay emulation reverb, with an alternate "dirty" mode that transforms it to a BBD emulation reverb. While there are a number of desktop reverbs that are similar in function and form factor, Nightverb, with its one-knob-per-functionality, minimal menu diving (there is some, but it

is 100% painless, I guarantee!), and generous sized controls is aimed at performability. The controls let you dial in and control every main function that you would want to on a reverb unit; input and output level, wet/dry level, room/space size, feedback, predelay, and even high/low EQ (which you can cut or boost each separately.) There are a couple of less commonly seen controls, namely Spin, which increases turbulence in the reverb space, Early/Late, a reflection control (Early is closer to the sound source, Late is further away), and Shape, which alters the ratio between the early and late reflections. As a final way to control or shape the reverb itself (as opposed to the EQ), there's also a Hi-Damp and Lo-Damp control, helpful for keeping the reverb in check—or not. I commend Erica Synths for not just keeping menu scrolling to a minimum, but making Nightverb so unfussy. It really is about exploring the reverb space, and that space is massive and endless. Sometimes. Other times, you blink and you miss it. And that is one of Nightverb's greatest strengths—its versatility.

From short bathroom slap reverbs to cavernous spacey drones, Nightverb can do it all, and sounds excellent doing so. I was really impressed with the relative warmth of the sound and how responsive and musical tweaking the room shaping parameters were. And this tweaking is what really won me over for Nightverb, because when I first saw and heard it, it was unmistakable how good it sounded (and looked), but it was the changing of the space; sometimes to explore, others to hone in, even others to tame or control the tone, that revealed how valuable Nightverb can be. On one hand, you can do a lot of this in a DAW, and I think in some applications, like those where I want to dial in my reverb and forget about it, I might do just that, but when's the last time you played your verb plugin like an angelic vocal choir? Something that sounds like the ghost of a piano? Every time I power on Nightverb and turn a few knobs I feel like I'm discovering something new, and it's interesting that with fewer controls, fewer options than a lot of other digital reverb units or plugins, that this invites discovery. Everything I ran through it—vocals, modular, piano, random room noise—sounded beautiful. I am surprised that there aren't alternate parameters for each control, it just seems like Nightverb is ripe for that (whether you use it that way or not), but I get it too; it's easy to learn, easy to play, and easy to explore because of how it's designed. I love the fact that there are decent EQ controls as well as low and high filtering; something about that feels powerful.

And yes, while there is filtering to be had on Nightverb, unlike on a subtractive monosynth or VCF module, that's not the star here—the size of the reverb space is, and that is what is reserved for the biggest knob on Nightverb. I gotta say that playing with it is just as fun as sweeping the frequency of a LPF.

I remember the days of glitchy digital changes, when it took time for a processor to catch up with a delay time change or something of the like. Kinda fun, but also kind of sad. Those days are long gone, and because of this, Nightverb lets you play the size of the space like an instrument, changing pitch when the room changes size, like a delay would when there's a delay time change. There's also a Freeze button, which is also fun to play with, like putting down a layer of carpet before putting your finely woven tapestry on top of that, and one of the great things Nightverb has that most others (do any others?) don't is the ability to play the Freeze as a sound. You can do this by changing the Size control, or you can do this via MIDI. This means that you can do something like sing into Nightverb, freeze your vocal tail, and then play it, turning Nightverb into a sampler, more or less. Any signal you put into Nightverb can be played this way, and even though you can't save the input signal as part of a preset as you would on a sampler, this is good fun, and in a live setting, having a MIDI keyboard hooked up to do just that is nothing short of spectacular. You can freeze, play that delay tail for a bit, maybe some delay tail 8-bit hi-hat reverb Blue Train or something, then unfreeze and go back to your doom slosh. Another interesting feature on Nightverb is preset morphing where you're able to set a morph time when switching between presets. The morphing between settings can be pretty interesting and can be another effect in and of itself, as those in-between spots, those transitions can produce some truly beautiful and interesting moments. There's even a "Magic" feature whereupon Nightverb makes random parameter settings and makes it a preset.

Erica Synths makes it clear that Nightverb is to be a main reverb unit and not something to sit in the background. There are no CV inputs on it; you're not going to modulate this thing with your Eurorack rig (well, there is the MIDI connectivity…). As part of a live setup, I can't think of a better reverb unit to incorporate as an instrument with its combination of spacious playability, ease of use, great sounds, and, of course, cool looks. And while putting such an extremely destructive and invasive insect on the cover of their manual and the instrument itself (coincidentally, in the manual, it seems to be tweaking the Size parameter; even the Lymantria dispar dispar knows…), Nightverb is more constructive than destructive, and brings much beauty into the world, not destroying it as the much maligned moth tends to do.

- Jason Czyeryk

Price: $599

CLRS
Modbap
modbap.com

Any time I hear the word "colors" I instantly think of the Ice-T song of the same name from the 80s. I was into Ice-T growing up, and even more so his band Body Count, who I finally got to see a few years ago while in town attending NAMM (thank you to Michael from Schecter Guitars for getting us in!). I always thought "Colors" was a good tune with a powerful message, and even though I'm pretty sure that Modbap's CLRS is more of a nod to

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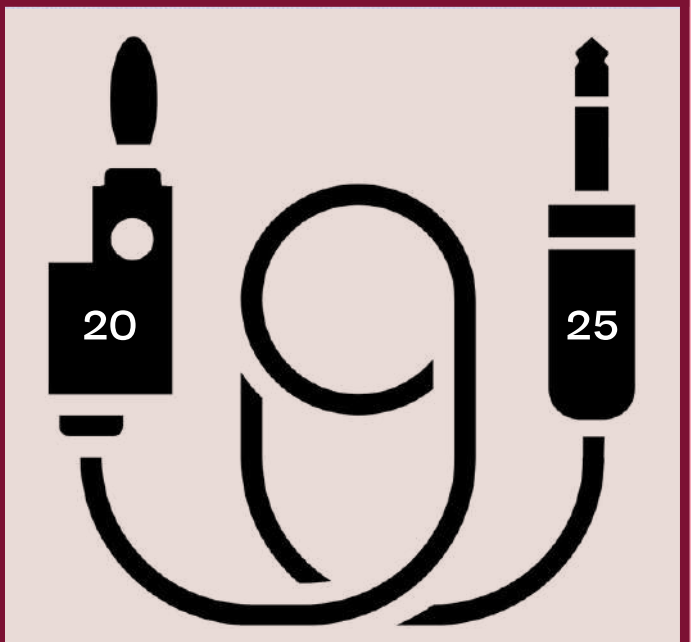

We're not afraid to claim it will be January's biggest two-day collection of hands-on synths on the West Coast!

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how it can color your sound than it is an homage to the song, with its compressor, drive, filter, Mag (short for magnet, for tape saturation), and Lofi effects all done up in stereo, it too is powerful.

A beefed up reimagining of their previous Hue module, CLRS offers a lot. The three main effects; Drive, Mag, and Lofi, each have a main control for the amount of the overall effect added to your signal, and Mag and Lofi have a sidekick parameter to further shape that effect: Mag has an Artifacts control for adding tape dropout and warble, and the Lofi control, which adjusts the sample rate of the effect, has Bit Depth. Holding Shift while turning the main effect control lets you fine tune the Dry/Wet of each effect, a nice, easy-to-remember function. Each of these, as well as the filter, has a dedicated CV input for modulation. As for the filter, CLRS sports the dual-type single-control variety; LPF on the left and HPF on the right, and no filtering straight up the middle of the pot. As a fan of efficiency, I love this. With the Filter control at or near center, you can modulate from various cutoff frequencies in an LPF to those in an HPF, or with a +/- 5V (10V PTP) signal you can sweep from one end of the spectrum to the other, and you can control the resonance of the filter by holding down Shift + turning the Filter control; more efficiency. A simple, but effective, three-option (light, med., or heavy, which can go into limiting) compressor with amount control and a Duck input tames, and further clrs your sound.

With all of these features, especially the compressor, CLRS seems ripe for kick use, and indeed, running a kick drum through it is killer. It seems a bit overkill since if you were just using it for kick the stereo feature probably wouldn't be utilized as heavily, if at all, as if using CLRS for full percussive duty, but it's a really impressive tool for sculpting the tone of a kick. Case in point, not surprisingly, CLRS pairs incredibly well with Modbap's drum module Trinity, and the full menu of sounds was on display here. It was almost as if CLRS could tell it was being partnered with its Modbap brethren, and therefore opened up the entirety of its bag of tricks. Running a kick drum through it, focusing on the Drive for a minute, which can go from a slight fuzz to a heavier buzzy covering, the scope of sounds I could get just from adjusting the Drive and auditioning the onboard kick sounds from Trinity was vast—so many sounds. Using the Vector Sequencer and Expander to trigger Trinity, and tweaking CLRS every which way, the drums were sounding great. I found myself nodding along, and tweaking the filter with full percussive sounds going through is a great time. Fully CCW so only low frequencies barged past the LPF and you had a nicely pronounced thump, and doing the opposite—one of my favorite things to do—and going fully CW with the HPF in full effect and I had a nasally choked sound, a thin sad little thing that makes bringing the full frequency spectrum back in so so satisfying. That's why every DJ does it! Incoming positive CV for the filter effects the HPF and negative voltage will modulate the LPF so you can use one bipolar CV source to sweep end to end both filter cutoffs, and you can attenuate that incoming CV for a less drastic sweep, covering less frequency real estate and bringing about some interesting movement.

The Mag feature can bring about random phasey effects when everything is cranked, and while the saturation it brought when used with more of a gentle touch (same with the Artifacts) wasn't always overt, when paired with a heavy dose of Drive it heightened it quite a bit. Lofi was easily the most abused effect as there's no such thing as too much bitcrushing, and destroying the drums, as well as a melody, through it was a joy. I really enjoy punishing friendly little naive sine wave melodies. In my opinion, sine waves have lived much too sheltered lives. You gotta wake 'em up, welcome them to the real world, give them some edge!

The compression section, while simple, is a really useful addition, and the Duck input is a rarely found effect that can help clean up a rhythm track quite well. I liked to sync up a filter sweep at half the trigger rate as the Duck for some extra clarity. Even throwing audio rate CV into Duck proved worthwhile and interesting.

CLRS lets you save and recall settings in up to four slots, which is really helpful because there are so many features, so many ways to fine tune things here, that you can spend a lot of time dialing things in and it'd be hard to remember the settings, even if it's just the basic starting points for various patches that are being stored.

Corry from Modbap (Waveform Issue 7) always has his eye on performability with his modules, and he hits the mark on that front again with CLRS. I like how he's laid out the controls and how most everything is at faceplate level with no hidden features. This is an excellent sound sculpting module that can almost be considered a utility module due to its potential uses, and I'm even more of a fan of the word "colors" now, no matter how it's spelled.

- Ian Rapp

Price: $399

Wyvern
Malstrom
malstromaudio.com

Malstrom's modules have direction; they take signals along of path both in terms of flow and layout, and it makes them intuitive to use. Wyvern, their multi-function tone shaping module, follows suit and can be broken down into three stages; Filter EQ, Saturation, and Post-Saturation (wouldn't anything that comes after the Saturation stage be post? Ah well…semantics!). Starting at the top left with the Filter EQ stage, you've got some very interesting and unexpected twists here that really maximize how much you can squeeze out of just a little. The Frequency control lets you fine tune the frequency you want to home in on, while the bi-polar Gain control lets you adjust how much of that frequency is amplified. With a three-button selector toggle for choosing filter type, you can tweak the Gain and change the filter types; with the Gain fully CW you have low shelf, bell, and high shelf and if the Gain is fully CCW,

that offers up filter types of low pass, notch, and high pass. Pretty cool. With the help of the Resonance—which has a CV input to modulate it—the filter can go into self-oscillation and be tracked through its 1V/Oct input. There's also an FM input for the filter, with an amount control, to get more complex sounds. With most filters you get to reduce frequencies (and boost the peak if there's a resonance control), but with Wyvern, it's so flexible, you have the ability to increase or decrease a frequency and adjust how much. With the Gain control being positive or negative, it really takes the filter/eq concept and opens it up, offering a lot of possibilities and flexibility in a pretty small footprint. As I said, with the way that maelstrom lays out a path for your signal, it gives you a bit of a step-by-step formula for shaping.

The next step is the Saturation stage, so after you dial in the frequencies you want to thicken, you find yourself with a Drive (with a CV in). A Boost switch with three options (x1, x2, x4) gives you the option of how hard you want to hit the Drive on the front end, so that you can get all sorts of different harmonic qualities from your signal. There's also a saturation switch to choose the type you want; All-pass distortion, Hard Clipping, and Soft Clipping. Combined with a Level control (which acts like a VCA when CV is patched in), the saturation portion of Wyvern is, like the Filter EQ section, extremely versatile. The two clipping saturations are pretty similar, but still offer some nice variation between them.

Wyvern's final stage is the Post-Saturation stage, and here you can further dial in the frequency range you want with an HPF and LPF (with CV ins) and a Dry/Wet mix knob. With the CV ins for this you can get experimental, but I mostly used this section to define the boundaries of whatever I had patched into it, so that my signal would sit better in a mix. In this way—taking off the low end or restricting the high—it was invaluable. For melodies and bass lines, it's interesting to see how much better you can mix with something like this in your rig, no more fighting for space in the frequency spectrum. Or at least, less fighting.

Wyvern is quite a surgical little thing, with not just the ability to shape your tone, but to adjust it at various points along the path. Sometimes I found that I would end up at the same sound anyway, but using a different set of parameter adjustments to get there. I love this type of experimenting—it brings about a certain amount of thoughtfulness and challenge that most instruments don't venture into.

Like the other two Malstrom modules (why only two?!!!), Mandrake and Arkan, Wyvern is way more than you'd think. It's a great tone controller/shaper, and excels as an end of chainer, but is almost a necessity for drums, as both a colorer/saturator and to sculpt the tone and boundaries. And for melodies, as a distortion/saturation machine, and a quasi-phaser, Wyvern proved to be so versatile and great sounding that it was a tough choice in a patch to use it on drums, melodies, or everything. I do wish there was labeling for the toggles with respect to the options each offers, and I would love CV control over Frequency Gain as that could be really interesting so you could modulate filter types with the alternating positive/negative voltage of the Gain control, but aside from that short wish list, I highly recommend this if you want to add some juice to your track.

- Ian Rapp

Price: $399

Plus 3
New Godspeed
Endorphin.es
endorphin.es

Thought to originate from Middle English, the word "godspeed" more or less means "good luck on your journey." In modular terms, maybe the "journey" where the luck may be needed is the journey from pitch to pitch, as in, "Good luck on your journey of staying in tune!" Well, Endorphin.es's auto-tuning thru-zero VCO New Godspeed doesn't need no luck; when it comes to being in tune, it's got you covered quite well, thank you.

First, I need to say that New Godspeed sounds great. Just letting it drone on and on without any changing in pitch (again, no luck needed there!), just a static note, and tweaking the parameters through its various outputs yielded many incredibly rich timbres, tons of great movement, and dense layers of forest floor. But alas, I'm getting ahead of myself.

As a new version (it's easy to miss the "New" on the faceplate) of their compact, 6HP through-zero linear FM VCO, New Godspeed has fast and precise auto-tuning, where with the press of a button you can change pitch to the closest A, C, or G, and New Godspeed is quantized to semitones, so no matter where you are it always sounds in tune.

There are three simultaneous outputs on NG: an Odd/Even (outputs even or odd harmonics depending on the settings); Sine/Fold out (a pure sine out that offers up the familiar west-coast tones via Endorphin.es's Furthrrrr Generator); and a square wave Sub oscillator out. A three-octave (-1,0,+1) select switch lets you easily shift octaves, a Timbre/Noise (with CV in) control goes from even to odd harmonics, and an FM Index control (with CV in) lets you add the internal "virtual" sine wave (of the same frequency as the oscillator) to the generated wave or you can patch an external sound for that purpose in the Through-Zero FM input. There's a Pitch/MIDI channel control (with a 4 octave range), and a light up Tune button where you press to go to the nearest A,C, or G note, and where you can also press twice to lock in the tuning, an excellent tool for live performance. Where NG takes tuning to another level is where if you push the Tune button after applying that particular note (A,C, or G) from the MIDI CV of your sequencer into the 1V/Oct input or the MIDI input jack (I'm assuming a CV sequencer isn't precise enough for this), NG's oscillator will play in perfect tune with the sequencer and you can be in tune with other instruments without pitch drift issues. And once you get where you want to be, you can lock the pitch so your clumsy tweaking hands won't accidentally bump you out of pitchy syncdom with your bassoon player. There

are even some LEDs at the top to let you know where you are in terms of the tuning spectrum and its relation to NG.

The Tune button acts like a shift button for accessing the secondary functions of each control, and I really like this style of operation; it's two functions per control, which is better than one (um…duh?), but there's also not too much happening; no real need to remember anything, no cheat sheet or foldout poster needed, and no menu scrolling—perfect for a module of this size. The secondary functions for each control are as follows; the Pitch/MIDI control changes the input MIDI channel, Timbre/Noise adds white noise to the Even/Odd output, and FM Index/Sub Osc sets the frequency of the sub oscillator from -1 to -3 octaves at the Sub output. Note that the Sub out is normalled to the Even/Odd output, so if you don't want any sub in that output, you have to patch out of the Sub out to take it out of the mix at that point, which offers a lot of flexibility for beefing up your signal, and controlling that um…beef.

As I stated, New Godspeed sounds fantastic, so rich and warm, and it punches way above its weight. At only 6HP, with the three different outputs, superb tuning, tune lock, and so many options to alter sound (white noise, too?!), New Godspeed will surely be your partner on many stellar journeys.

Endorphin.es also sent over Plus 3, a totally passive desktop expression controller, which is a collaboration between them and Loopop. It looks simple enough—and technically is—but it's surprisingly useful. Plus 3 is divided by two (See what I did there? Some math humor trickery…), with two distinct halves, which are separated electronically; the left side features a slider attenuator, and the right side a red momentary pushbutton with Loopop's popcorn logo with a hold/latch switch for the button. You can use Plus 3 to hook up to a pedal with an expression pedal jack, a modular/semi with CV input, and even to unleash MIDI controlled parameters.

It's interesting to see this in action, a seemingly simple device that gets a lot of use. I could see various iterations of it (dual sliders, a knob controller, etc.), as well as more than one on a desktop, with some studio tape to designate assignments, to help bring hard to reach parameters, parameters from multiple synths/locations, and more frequently used features to be more hands-on. Using Plus 3 does something more than just make it easier and more convenient to control things; it brings important parameters to attention, to the front, and makes the organization of live shows more centralized. In a live setting, you could assign multiple Plus 3's for the most performable parameters and play them like a mutated mixer. I only had one on hand, but whether it was simply to patch a filter cutoff from my arpeggiated Pro-5 to be closer to my modular, using the momentary switch to bypass a pedal or desktop unit, or using the slider as a macrocontroller for tweaking various parameters at once, it was helpful (and more fun in most instances) to have a centralized control center, with something like my Keystep as the hub with Plus 3 like a sidecar.

Plus 3 is a lot more versatile than I would have thought initially, and after using it for a while, it's hard not to think of how it wouldn't be used. Now, a lot of my use cases, especially in my modular rig needed a boost of voltage for Plus 3, and so I patched a +5V signal from an offset module into one mono end of the supplied ¼" TRS to dual 3.5mm mono cable for that purpose, and this opens up a ton of possibilities. Mult that signal and you can control two parameters with the one control for more macro control. I found myself using the Expression side of Plus 3 for control over filter cutoff (with res high) and VCA amount simultaneously, for two-in-one timbre changes on the Malstrom Mandrake kick drum, and other instances like that. Even without supplied voltage, which I believe is the intended use for Plus 3, it can access so much, control so much, especially in desktop synths and devices that have the requisite expression pedal inputs, which are almost always (maybe just always?!) passive. Anything you can map to an expression pedal can be controlled by the expression side of Plus 3, many of which are hard to access otherwise.

The same ideas go for the popcorn pushbutton. While you can do a ton with it passively (freeze, bypass, sustain…), with voltage going into it you can get way more mileage out of it in a modular setup and use it as a gate, trigger, to open/close a VCA…. The hold switch effectively turns the button from Off/On to On/Off with the voltage flowing through or not, depending on the switch setting, offering even more flexibility and variables.

There's a lot to like about Plus 3. Like I said, I would love a version with a few more controls; double or triple maybe, and it would also be great if there was an input for offset to flow through the various controls, but obviously that's a different beast. As it stands, Plus 3 is one of those things that probably does way more than it was intended; it solves a problem or two, but also opens up a lot of doors.

I even found the build quality to be perfect, with the unit staying put due to the rubber feet used. Yes, this is the kind of boring attribute that so many times can go unnoticed (by both the designer and user), but as anyone who's had a controller go skittering across a work surface as you try to music with it, it's much appreciated, and one less hassle you need to think about.

- Ellison Wolf

Price: New Godspeed $209
Plus 3 $79

ComPair, Tweakers Plus
Klavis
klavis.com

Window comparators are so named because there's a space in which the action is triggered, a space between two points, called…a window. Yeah. While this doesn't sound all that interesting, don't dismiss, because comparators are cool.

When the setting is just right, the lighting is golden, the crab cakes aren't too soggy, and the wine is light and crisp, a comparator can set the stage and turn an everyday patch in the park, into a picnic for the ages.

Klavis' miniscule 2HP ComPair is a dual window comparator with a pair (hence the quirky spelling of its name) of independent channels, A & B. ComPair has standards you've come to love and expect from your comparators, though it is possible you have unrealistic expectations for comparators, in which case please disregard my last statement. Input A is normalled into input B in case you are deficient in inputs or are so efficient you musn't be bothered, and there are Hi and Lo bipolar adjustment controls to set the boundaries of the window. There's also an extra input, Hi, which adds to the Hi setting control to mix things up a bit more. There are three outputs; Above Hi setting, between the Hi and Lo settings (AKA the window!), and below the Lo setting, and each of the outputs have a three-position toggle to determine its output function: inverted, muted, or normal, as well as an LED to show its status.

ComPair is a fun little module, a nice way to trigger events—percussive flourishes, effects changes, random bleeps and bloops—that are synced to a patch but that can also add some organic and unexpected movement. One of my favorite ways to utilize window comparators (aside from using it for pseudo-random rhythmic duties) is for manipulating waveforms in non-repeating ways, whether that's by patching directly out of the trigger and into, say, a PWM parameter, or by triggering a filter parameter, patching into FM, or something like that. There are so many ways a comparator can bring life to a patch, and ComPair is a great, compact gateway into that.

Klavis also sent over their 1U Tweakers Plus, an expanded update on their 3U Tweakers module. ComPairing (sorry…had to) the two different versions, and I must say that even on the basis of layout I prefer the 1U version over the 3U, "plus" expansion or not. It's a little less fussy looking, and has a more streamlined, efficient look to it. Offering two channels of CV gain, offset, muting, polarity switching and with normalization from Channel 1 into 2, so there's also a 2-in-one combining/mixing function, Tweakers Plus offers a lot in a little package. It's the kind of module that could find use in a lot of patches and I found myself using it mostly for the muting function at the outset, but came to love the ability to fine tune the gain for a signal, so it was more like "Mute Plus." It proved to be helpful in the way that such small details are, and with my mixers all have muting capabilities per track (this wasn't always the case), I found myself using Tweakers Plus a bit as a sub-mixer for drum tracks—snare in Channel 1, hi-hat in Channel 2—for a little more control over my rhythm track with good results. Overall, like ComPair, Tweakers Plus is a handy little module.

- Ian Rapp

Price: ComPair $149

Tweakers Plus $99

SoundStage II, SideCar
WORNG Electronics
worngelectronics.com

My first glance at WORNG's SoundStage II got me thinking how similar it looked to a leather jacket I had my freshman year of high school, during my "punk rock" phase, with the jacks on the module looking a lot like the rivets on that jacket. Even the writing on SoundStage II looks like the punk slogans factory scrawled on the back of that pleather (vegan, naturally) jacket, which was made complete with fake DIY looking patches of the Sex Pistols, Clash, and other major label "punk" bands that were permanently sewn in place, yet inexplicably still adorned with the requisite "punk" addition of safety pins to make it look like that's how they were held on. Not to mention that all the patches were perfectly spaced on the front of the jacket…not very punk rock. But did I look cool in it?

Unfortunately, no. I looked like the desperate tweenager that I was. Even in terms of functionality, the jacket flopped big time as it failed to keep me warm in winter, squeaked from rubbing together any time I moved, and those damn rivets were always getting caught on things like tree branches and table-mounted pencil sharpeners. But in some of the ways that the jacket—and the features found on it—failed, Soundstage II, with those reminiscent features, totally excels.

While most modules build off of the expertise of a designer in terms of the circuit design a module needs, SoundStage II builds off of WORNG's Morgan McWaters previous experience in the field of live sound engineering. SoundStage II simplifies mixing in a modular-based stereo space, hardwiring away some of the issues associated with mixing, both in terms of physical stereo space (left, right), and in terms of the space needed for the frequencies of each instrument/signal by filtering each input based on its location in the frequency and space spectrum. For anybody familiar with audio mixing of any sort, this idea is probably routine, and that's why phrases like, "sitting in a mix," "carving out space," and "cleaning up the mud," in reference to mixing are so common in mixing; these are some of the most necessary tasks of any mixing engineer. But it's anything but basic or easy, which is why mixing is so challenging and experience in the field is so important. It's something that took me a long time to fully appreciate when I'd read about how sound engineers like (specifically) Steve Albini didn't like to eq on mixdown, instead preferring to get the instruments tonality dialed and microphone placement

just right, so that each instrument would have the appropriate space in a mix. It's kind of a preparation thing; know what you're trying to do, get the instrument's sounds to fit with what you're trying to do, and have fewer issues (hopefully) further down the road. It's a pretty powerful philosophy, this detailed preparation vs. "fixing it in the mix," and while Albini had a lot of polarizing philosophies and opinions on various topics, lucky for us, our engineer in this case, WORNG's McWaters, is only here to help us out, not preach or make his viewpoints known. This is very apparent, and he's done exactly this, by figuring out a patch and play way of carving out spaces in a mix, while simultaneously devising a fast and easy way to audition different spaces in the stereo spectrum as well as the associated hardwired tonalities in SoundStage II, for a given signal in a patch. How WORNG does this is, like mixing, both simple and complex.

Similar to the predetermined position of the patches on my sweet jacket, Soundstage II has twenty-one fixed and filtered inputs in the stereo and frequency spectrums laid out in horizontal and vertical rows. It has stereo outputs, a Level control (with CV in) for the output, and a mono/stereo FX Send/Return that sits schematically between the Level control and the main stereo outputs, which means that you can use the FX Return as extra inputs. If you attenuate your main signal while running through effects, you can get ghosty reverb tails and delay repeats, which I happen to love. Last, there's a Depth for blending between the unfiltered output and the filtered output over the entirety of the module and this acts like a final filter in the module's signal chain of many filters for some added sculpting control, and this can also be modulated with CV for VCA/tremolo like effects. While SoundStage II looks sorta bizarre, like a quasi-random buffered mult that had a bad accident, the deeper you dig—I'm talking inches here, not feet (or mm/meters for the EU crowd)—you quickly realize how incredibly intuitive this module is, and I think that's really the point; patch and play.

The twenty-one input jacks are divided in five rows from top to bottom: High, High Mid, Mid, Low Mid and Low, and this is a pretty good roundabout way of figuring out what goes where in a traditional sense. Highly pitched signals (cymbals, key leads, some vocals) towards the top, and low end (bass, kick) towards (or at) the bottom. If you've ever noticed that in most song mixes the kick and bass are pretty much shot through the center of a stereo mix, it's because it helps keep the definition on the low end, and SoundStage II operates this way as well, with fewer inputs at the lower end than the high. It's one of the ways that McWaters has made things easier for us, and that's what he's really done with the entirety of the module; it's basically a stereo mixer where McWaters himself helps you mix. He's a good guy, Morgan is! Experimenting with SoundStage II, both in terms of trying to get better mixes and just exploring the differences in stereo space for signals is revelatory. It's just so easy to patch/unpatch a signal and hear the tonal differences due to the hard-wired filtering and placement in a mix, that it enables you to define for yourself (with McWaters' help, of course) what sounds best. While it's not really designed for patching into all twenty-one inputs, patching in the bulk of a track (kick, bass, lead, and pads, say) it's a fast and painless way to get a head start towards better sounding tracks. Running Modbap's Trinity drum module with a bassline coming from WORNG's awesome ACRONYM VCO was a fun experiment in spacing out the rhythmic elements of a dance track I was working on. Using the FX out for parallel compression of the drum buss, something I almost always do in DAW mixing to fatten up the drums, was interesting in that usually it's kind of a static thing; get the drums mixed how you like and run it through the compression, dial it in, mix with the rest of the track to taste, and move on. But with the ability to easily patch into different areas of space/frequency, it made for a more scrutinizing exploration in a way I'd never done before. It's one thing to pan a signal or two, but altogether different when it's automatically paired with some filtering. Again, McWaters' experience in the sound engineering field is what's informing the shortcut of the filter+space combinations on hand here, and it does indeed help create better/cleaner/clearer (and even more interesting, in many cases) mixes.

CVing both the Depth and Level brings about a lot of variation from slowly rising/falling level changes—just using a hint of modulation—to running audio rate into the Level CV input for some metallic sounding action, SoundStage II can get really wild in a dense patch. I found this to be good for everything from the rhythm tracks to a doubled (or tripled) up lead with various filtering and space in the mix to fatten it up and give it more dimension.

Since there are no controls with which to boost or cut incoming signals into SoundStage II, it's good to have some VCAs on hand to do just that, and wouldn't ya know, WORNG's SideCar fits the bill perfectly here. While there aren't twenty-one channels of attenuation/boost for each of SoundStage II's inputs, SideCar offers six channels (four mono and two stereo) of VCA/level control action. The spacious, almost luxurious feel of SideCar, with its smooth, longer-than-normal (for Euro VCAs, at least) light up faders, feels less like a VCA and more like a wonderfully hands-on mixer. WORNG always, and I do mean always, seems to get the perfect amount of function in their forms with nary the fluff, and SideCar doesn't deviate from this. There's nothing extraneous here, just those great 45mm faders and an excellent sounding circuit, but that doesn't mean there's not some extra flair hidden under the faceplate. The circuit is built to prevent clipping, offering a lot of headroom, and is focused on audio mixing, so each channel operates on an exponential curve in relation to the CV input, If no CV is patched into a given track a +5V signal is normalled for each.

One of the main features on SideCar that I found useful and unique is that it has cascading inputs, meaning that you can patch multiple effects in each channel (for more detailed control of each) and the inputs will cascade to the following input until an output breaks that chain. With Channel's five and six being stereo, you can also get stereo cascading, and the fact that you can mix and match between single channel VCA/level controls and cascading effects shows how useful SideCar is, so much so that calling it a sextet of VCAs almost seems like a slight. So while it looks like a fader-based mixer, calls itself a six-channel mono/stereo VCA, it's really something else altogether. Also, the way that the ins and outs (and CV ins) are situated on SideCar are such that everything is patched towards the top

of the module, leaving the faders free of cable clutter and clearly visible, which translates to a really nice VCA/mixing experience. I almost always place my mixers in the bottom right of my rack, but moving it around to various locales in my big system, and the way the jacks were situated meant that in the top row, the bottom row, and even in the middle of center row it was easy enough to create a perfectly clear path to controlling all of SideCar's faders. In the last instance, it looked a bit like an oasis in the midst of chaos, a calm space to take a breather. SideCar is not going to replace my in-the-rack end-of-mix or drum/percussion mixers (1010's Bluebox and Cosmotronic's Cosmix Pro), but it really adds a lot of function, flexibility, and control to the mixing and level control in my patches, and works great alongside SoundStage II. Mixing is a strange and tricky art, and I really love these two modules from WORNG for being my new "secret sauce" helping hand magic trick that pitches in to make my modular tracks sound better.
- Ellison Wolf
Price: SoundStage II $379
SideCar $359

ADDAC508
Swell Physics
ADDAC System
addacsystem.com

When I learned that the "swell" in the ADDAC508 Swell Physics had to do with the ocean, it piqued my interest. The ocean is one of my loves, and while I hadn't surfed since I moved from beautiful, amazing, sunny, southern Cal to equally beautiful and amazing (sunny sometimes) New Hampshire, the four months I spent living in a crappy apartment and doing nothing but drinking Bud Ice Light and surfing meant that I was, and am, a surfer for life, right? Therefore, anything surf related, from the latest neoprene technology to local weather reports, can make me giddy. I'm also a fan of theoretical models, especially when they pertain to what's usurped surfing's space in my life—modular synths.

Swell Physics is a modulation source where the long and short of the theoretical situation is that there are four anchored buoys in the middle of the ocean and we can control various things to move the buoys around. These buoys have the ability to transmit their height to the module so that you can use the buoy changes as CV modulation in patch. Since these buoys don't exist in the real world and something needs to move them around, Swell Physics uses a Gerstner Wave (named for German-Bohemian scientist Franz Josef Gerstner) to create such movement. A Gerstner wave (also called a trochoidal wave) solves what might or might not be a theoretical approach to defining specific wave movements. Not being a scientist myself, when I looked up what a Gerstner wave is, I found definitions littered with terms, phrases, and syntax that I had no clue about. What I think I did understand was that using these waves for simulations was a good way to get lifelike wave movement to power our fictitious buoys, therefore moving our patches around.

What all of this science, theory, and wave simulation gives us is an interesting and, ahem—fluid—CV movement that is constantly changing shape, but in a way that the ocean would. Not quite predictive, but not exactly random, either. As somebody who has spent more time in the ocean bobbing up and down waiting for perfect waves than standing upright on a surfboard, I have a kinship, a true connection to this type of movement. It's calming, grounded…oceanic.

There are two modes (A/B) that exemplify this movement well, being different ways of computing a Gerstner waver. Mode A is a scrolling mode where all the buoys follow the same path, and Mode B is an evolving mode, well explained in the manual:

"Evolving is the normal computation for a Gerstner wave, at all steps all points in the wave are calculated according to the settings and the points close by which also affect each other in a symbiotic relationship resulting in different paths for all buoys which are more or less related according to the settings."

To control all the parameters and elements in Swell Physics that make up the movement, there are six elements with which we do this; Swell Size (the distance between the highest point of the wave and the lowest), Agitation (a combination of wind and auxiliary waves that interact with the main waves), Spread (how far apart the buoys are from each other, like a delay), Simulation Speed, and Offset and Output Gain for dialing in the desired CV range that spans 10V PTP. There's CV control over these parameters so we can add more complexity and also a couple of Gate Outputs; one that goes high for when buoy 1<2 and another when buoy 3>4, for some external quasi-random syncing. There are also four sixteen-bit CV outputs (1-4) for each buoy, and an Average output that averages those four. All that remains for the grand tour are a few toggle switches: A/B Mode, voltage range (+/-5V or 0-+10V), and a switch to choose the CV destination for the Offset and Gain (they share a CV input).

As a modulation source, having the four buoy outputs and the Average output was a nice way to get some slightly related CV in my patches where the four outputs seemed to have the same shape, but were out of phase with each other, related to the amount of Spread was happening. If the changes are static (i.e. a twisting of the knob), once a given parameter settles in, the results can be more predictable, but when CV is introduced to any of the parameters, it becomes much less so; very stormy. Patched to the WORNG Parallax filter cutoff with resonance high, and everything on Swell Physics at max gave me bubbling brook type sounds very much in keeping with the theme of the module.

Though the modulation provided by Swell Physics produced a lot of random sounding movement, once there was some Spread added in, and depending on what it was patched to, it did seem to sync up occasionally and there were related generative changes that kept things moving. Tuning four VCOs to an A, with two being 440Hz and one pitched an octave ***CONTINUED ON PAGE 71***

MUSIC REVIEWS by Tom Ojendyk

Various Artists
Tránsitos Sónicos: Musica Electronica Y Para Cinta De Compositores Peruanos (1964-1984)
Buh Records

Peruvian label Buh Records has been on a roll in recent years, releasing several works by outstanding contemporary artists and rediscovering previously lost or obscure talents, such as the remarkable retrospectives by Oksana Linde and Cergio Prudencio. Their latest release, *Tránsitos Sónicos: Musica Electronica Y Para Cinta De Compositores Peruanos (1964-1984),* which translates to Sonic Transits – Electronic and Tape Music by Peruvian Composers, is a fantastic offering that showcases the astonishing quality of the music and the immense love and care that went into its production. While fans of the label may recognize artists like Edgar Valcárcel and Luis David Aguilar from previous Buh releases, this compilation serves as an excellent introduction to the world of early experimental Peruvian music. The compositions, mostly falling under the category of musique concrète, are all distinctive and offer a fascinating glimpse into the early development of South American electronic music.

Battaglia
Season One & Two
Four Flies Records

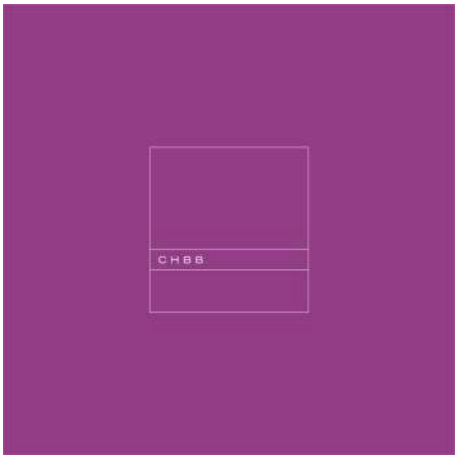
Italian label Four Flies has been reissuing many essential classic library and obscure movie soundtracks by titan composers such as Alessandro Alessandroni, Piero Umiliani, and Riz Ortolani over the past ten years, and they have now released the debut records by the new-to-me Italian composer, Battaglia. The two records are companion pieces heavily influenced by synth-heavy horror and/or sci-fi soundtracks from the early 1980s but with a modernist twist. While the music echoes Tangerine Dream and John Carpenter soundtracks, it offers a fresh and unique interpretation of those sounds rather than just paying homage. Similar to library or soundtrack compositions, the pieces are around three minutes long and explore a wide range of themes and moods. *Season Two* exudes a more optimistic tone compared to *Season One*, but both albums are captivating and highly recommended.

Blood Incantation
Absolute Elsewhere
Century Media

Premier Colorado sci-fi death metallers Blood Incantation are back with a two-song opus of heavy progressive death metal with deep Krautrock leanings. While 1980s thrash metal bands often shunned keyboards and synths, more extreme bands have embraced these instruments; early 90s Earache sci-fi heshers Nocturnus incorporated keyboards; evil black metal bands like Mayhem covered German synth legend Conrad Schnitzler; and grindcore heroes like Napalm Death's Mick Harris or Godflesh's Justin Broadrick explored electronic side projects. Blood Incantation released *Timewave Zero*, a full-on Berlin-school electronic album a few years ago, which may have puzzled their traditional metal fans; however, their latest release marks a return to their brand of pulverizing death metal mixed with psychedelic electronics that serve to enhance the sinister experience. Imagine blending Gorguts, Morbid Angel, Tangerine Dream, and King Crimson into a demonic concoction, and you have this exceptional album.

Alessandro Cortini
Nati Infiniti
Mute

Best known for his affiliation with Nine Inch Nails, Alessandro Cortini's solo career began with the impressive *Forse* trilogy on Important Records about ten years ago. His latest record, *Nati Infiniti*, featuring atmospheric and immersive ambience is a valuable addition to his discography. The music is inspired by an audio installation from 2022 in which Cortini utilized various sounds across different floors of an old mill, using an instrument he helped design in collaboration with Make Noise, called the Strega. *Nati Infiniti* consists of blissful and minimalistic pieces divided into five parts with distinct themes that maintain a cohesive feel throughout. Cortini showcases his talent for crafting immersive and interconnected musical experiences, further solidifying his reputation within the ambient music scene.



CHBB
CHBB
Soulsheriff Records

CHBB was a short-lived German project featuring Beate Bartel (Einstürzende Neubauten) and Chrislo Haas (D.A.F.), who recorded four hyper-rare cassettes in 1981 before forming the band Liaisons Dangereuses. This comprehensive retrospective includes all the cassettes along with unreleased tracks, making it a must-have for fans of early industrial, minimal-synth, or electronic post-punk music. Some of the songs exhibit a proto-techno vibe, yet still sound modern and intriguing despite being recorded over forty years ago. While Germany is renowned for its influential experimental acts from the 70s and a plethora of current electronic musicians, this particular era remains somewhat underappreciated and therefore ripe for rediscovery. Kudos to the label for obtaining the licensing for this retrospective and delivering an outstanding presentation.

Eric Schlappi
Larval Beak
Concrete Collage

Besides being the mastermind behind Schlappi Engineering, Eric Schlappi has consistently produced great music over the years. His latest EP, *Larval Beak*, is a blend of sharp, hard-hitting electronic weirdness with heavy rhythms that skillfully balance abrasiveness and accessibility. Clocking in at around twenty minutes, *Larval Beak* presents a diverse array of ideas that may defy easy classification, but maintains a cohesive sound. The music exudes a raw energy, and while it can be intense, it's not harsh merely for the sake of being harsh; with a sense of purpose and warped melodies, the music is instantly enthralling and absorbing. *Larval Beak* is particularly captivating when played through powerful speakers, allowing the listener to fully immerse themselves in the rich low-end frequencies.

Omar Ahmad
Inheritance • Remixed
AKP Recordings

Los Angeles-based label AKP Recordings has been on a hot streak recently with several great releases by artists like YAI, Jessica Ackerley, Luke Elliott, and last year's debut by Omar Ahmad. For this release, the tunes from Ahmad's wonderful debut, *Inheritance*, are remixed and reimagined by Ki Oni, Otodojo, Tammy Lakkis, Solpara, and more. The music spans ambient, club, and a variety of other genres, making *Inheritance • Remixed* work both as a companion piece to his debut and as a stand-alone album. The original pieces are thoughtful and introspective, and the remixes maintain these attributes while also adding the producers' own expressiveness to the music. A very enjoyable release.

WabiSabi
Rain
Self-Released

Longtime Waveform subscriber, synthesist (and excellent photographer) David Pawlan—who goes by WabiSabi in the musical world—finds his latest release, *Rain*, coming at a good time. Having had a PNW summer with some of the stuff, but gearing up for deep winter with most likely a non-stop barrage of it, *Rain* features the sound of different types of rain throughout—from depressing gray drizzling to fat splashy bombs, these cloud offerings are paired with classic synth motifs, all harboring a sense of place and time with titles such as "in the Quiet Boroughs" and "in the Hour Before Dawn." With beautiful arpeggiations, briefly appearing repeated melodies, soft, slowly swelling pads and other time tested synthscapes, *Rain*, with its combination of nature and electrons, is a welcome backdrop to what was a pretty nice summer and fall.
- Ian Rapp

Christoffer Meier
Himlen Rodnar
Kemi

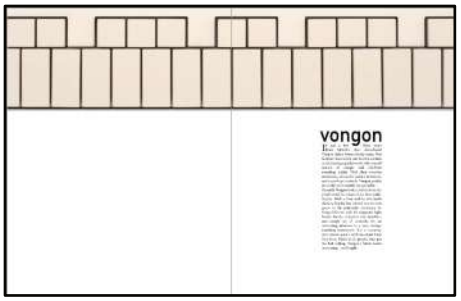
Starting a bit slow, but ramping up as it goes on, *Himlen Rodnar* shines with good rhythmic textures and swaths of sounds creating a dense, foggy atmosphere. Meier states that *Himlen Rodnar* is "ambient without being meant to be in the background," but there isn't much ambient about it. This doesn't mean it doesn't drip with ambience, it's just that there's more blood coursing through the veins here than what you'd expect on a typical "ambient" synth release. There is a simplicity of ease that is its underlying strength, demonstrated well on tracks like "Kittlar mycket hellre" and "Jordens Flagga," as well as the title track. This is a limited edition cassette-only release, with only fifty available for sale and no digital release planned, so grab one if you can.
- Ian Rapp

Andrew Ostler
The Blind Sublime
Expert Sleepers

How he finds the time, only he knows, but whatever his Secret is, Andrew Ostler is as prolific as they come. You'd think that running his beloved Expert Sleepers modular company would be enough, but his record label of the same name has released some excellent albums the past few years, including some crafted by Ostler himself. His latest, *The Blind Sublime*, is one such creation, a beautifully wistful four-track release consisting mostly of choral and string samples, and heavily processed saxophone. While the vocals take center stage, it's the skillful layering behind the voices that elevate *The Blind Sublime*. Ostler's got a bit of yin and yang going on: his company's module releases—those that both create and manipulate the din, are balanced by his musical releases, which continue to keep us silent as we soak them in. A beautiful release.
- Ellison Wolf

sm^sher
pit of mine
Scrawl World Ltd

Imogen Mason, a member of UK band Voka Gentle (which also features Waveform contributing writer William Stokes), embarks on a captivating solo journey with her debut album, *pit of mine*, under the moniker sm^sher. Blending electronic beats, sampled sounds, and acoustic instruments, Mason's solo work showcases her raw talent and artistic depth, drawing inspiration from personal experiences and a diverse range of artists. The album is a moody and confrontational exploration of emotions and introspection and was recorded during a creative residency in New Mexico. *pit of mine* highlights Mason's versatility and creativity, as she's crafted a compelling sonic landscape that resonates on a deeper level.



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using shared technical components across different product models. This approach simplifies the development process for new products because you're using familiar building blocks and components that you already know how to manufacture. Unfortunately, with Replay, I had to almost start from scratch, as there wasn't much to carry over from our pedals. I knew this when approaching the design, but it was still really tricky to figure out all of the technical pieces. When we settled on the Daisy programming platform, it was super useful in getting the development moving quickly, but we still had to write thousands of lines of code to implement the synth engine. Fortunately, now that we've completed this work, we have a new platform that will make future product development much easier.

That's such a build up…all of that behind the scenes work and pivoting. What was it like once Replay hit the market?

Releasing Replay was a humbling experience as well, because it was a whole new community to open up a product to, and to accept critique from. It was the first time where we ever felt we were actually seeing negative feedback about a product, and it was scary. But we also understand the reason for all of that critique is because we have this new thing that can be so much. But overall, the Replay was very well received. We got the most eyes we've ever had when we released that, and it was overwhelmingly positive and that was really exciting.

I think that anytime people have criticisms, anytime you cause a stir in anything, that means you're kind of doing something right.

That's what we kept telling ourselves. (laughs)

What was that like to have to deal with that? Was it hard to stay on track, to stay true to your vision for Replay?

It's just getting used to that level of people judging what you're putting out, and I think all creators deal with this. You have to trust your own design intuition. It was during that year of development with Replay that I realized I really wanted Vongon to be something for the long haul, that I didn't want to have to go get a job somewhere else. We were in a really good place and felt we could take some more risks in terms of design. Replay is a fairly basic polyphonic synthesizer in terms of all of the modulation options; it's not semi-modular, and it doesn't have a modulation matrix on it. If we're getting the critique on our products that they could do more, I remind myself that that's okay, it's not the point of a music product to do everything.

I know the Replay keys can be easily customized by the user and I'm not sure I've ever seen another synth where the actual physical playing field could be altered with some simple swapping out of components.

I designed the Replay with swappable sockets because people have different preferences and mechanical keyboard forms are so in depth—there are so many E-switches out there. The reason I chose the MX keycaps as the switching mechanism was similar to why (the first) Paragraphs was in the aluminum enclosure; I hadn't really figured out the right way to manufacture a keyboard with more traditional keys. I thought it was very achievable to use Cherry MX keyboard type switches and run with that and see what happened, my thought being that it's small enough that if someone really engages with Replay or wants to integrate it into their setup, they could always use a bigger MIDI controller keyboard to play with it.

I've had musician friends come over and they've all been curious about Replay. A lot of it is because of the way it looks with the keys, but also the color and layout. It was interesting to see how they all checked it out, played it, picked it up and looked at it from different angles... it's much different from how they've looked at other synths that I have. They all commented on the look and aesthetic and a lot of them mentioned the text, because it's white on taupe and it can be hard to read: You either have to look really hard at a certain angle, memorize everything, or use a cheat sheet. Did you have hesitations about the design, especially in relation to the text and color?

I did, though I didn't think about it as much as it actually impacted the experience of the product. It's different design perspectives, right? When I was making the pedals, which are black with white text, it was really important to me for the faceplates to be self-descriptive, almost not even requiring a user manual, where you look at it and every input and output is labeled, every knob is labeled, and it shows you what you're doing very clearly. I highly value that as a musician that's using gear, because when you're in a creative flow, you don't want to be slowed down by some sort of technical know-how. Because synthesizers are so much more of an open book, there are so many more directions you can go with them; we made the choice to be very minimal with the way that the faceplate was for Replay. We love the way that the low contrast text looks, but I totally understand why that would not be for some players. I think that will be a big lesson for us, and if we're going to make a product like that again, we will probably offer either an additional colorway, or some sort of clear overlay for the faceplate that makes the descriptions more explicit. The way that Replay's faceplate is laid out is a very traditional, subtractive synthesizer style layout, and that's the way I learned how to use synthesizers; that's the layout that I'm really attached to, but I'm becoming much more open.

I know that you released your last record, *Painfulfree*, (by Ryan Von Gonten) in 2021, how do you find the creative process of making music compared to making instruments?

I'm much less focused on my own musical output now. I'm getting more out of investing into Vongon than making albums; it's a creative process for me to make these products. Now my relationship with music is more trying to focus on

having a pleasant afternoon experimenting with a synthesizer, or playing my guitar into some pedals or something like that. It's less about trying to put my stake in the ground, and more of an experiential sort of way to just get into a flow state, to feel like you are present. We aren't necessarily trying to make pro audio gear that is something every band should take on tour, per se, we're more about trying to make a device that someone can feel inspired using, one that gets them to their creative zone for making music more easily. I think that's really positive. That's how I spend most of my time making music nowadays and what I think about for Vongon products.

vongon.com

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and promoting the brand.

You said that sometimes you don't make the ExMic for a while and then you'll bring it back. As a small business, do you have any specific sales strategies? Do you only have products for sale at certain times? Do you build orders as they come in?

Z: We occasionally have the opportunity to build extra devices and build up our inventory, but nearly everything on our website is made-to-order. While this is not ideal, even with two of us soldering, we haven't managed to overcome this challenge.

I think it's interesting how businesses pivot, how they persevere, how they sustain and survive.

Z: We have to make this work because we're basically unemployable. I had my last job for about sixteen years, and I've been doing this for four years now, so I haven't applied for a job in over twenty years. Graig hasn't applied for a job in…

G: A long time.

Z: It can be stressful being self-employed because there are no guarantees the orders will come in. Luckily, when I'm feeling scared and stressed out, Graig's excited about what we've got going on; then when he's feeling stressed, I'm feeling optimistic.

I think that's brilliant. You balance each other out; you're there for each other. I noticed that on top of your retail partners, you have a presence on a lot of online platforms as well: Reverb, Etsy, your website, Instagram, Facebook…

Z: And Tiktok.

That's a lot. Do you have a plan or strategy that you follow?

Z: I typically post on a Wednesday through Sunday schedule; however, I go through phases in terms of consistency. I need to be in the right headspace to share on social media. I'm sharing what I would want to see, even if it doesn't always translate into popular social media posts.

Have you noticed a change in how the platforms operate? I hear a lot of people complaining that platforms are constantly changing, and that a tweak in the algorithm will affect their business.

Z: There was a time when I could post a simple picture on Instagram with a thoughtful caption, and that would spark a conversation as well as boost sales. However, since the video and reel formats have taken over, that has changed. Now, it's much more time-consuming, and the pressure to constantly feed the algorithm makes it feel less rewarding. This shift has impacted business as well, as Instagram seems focused on follower count instead of showing our content to the people who follow us. I try to incorporate diverse content like Q&As, sharing gear from other builders, and glimpses of our home life, including our cats and our dog. Our home and business are closely intertwined, and I want people to feel that connection. We live and work out of a very small house, and people are often surprised by the small scale on which we operate. My goal is to build trust and a community so our customers feel good about supporting our business. I find that showing our faces and letting people get to know us by giving them a glimpse behind the scenes of our operation is the best way to do that.

Graig, what got you into electronics in the first place? You said you were into DIY and made kits and were always building stuff, do you remember the first thing you built?

Z: Long before everyone had cellphones, Graig made this device that you could put up to the earpiece of a payphone. It produced the sound of coins being dropped into the payphone, tricking it into believing that money was being inserted.

G: That was my first electronic project.

I don't understand…what was the project?

G: In the early days of the internet, there were instructions for how to make things out of a speed dialer that you could purchase from Radio Shack. The speed dialer was for people who didn't have touch-tone phones, so they could store like ten numbers or something. The sound of it was of a nickel dropping in (a payphone), and there was a crystal in it that you could replace and it would change the frequency from sounding like a nickel to sounding like a quarter. When you called whatever number you wanted, you just put it up to the earpiece.

You held the device up to the earpiece of the payphone? That's how they measured how much money was inserted into it, by the sound? That seems charmingly naive.

G: I don't know, but it totally worked. After I met Zera, I would call her using it.

Z: That's how our romance started! That's how he booked all his shows on the road, too, calling clubs. When I moved to Seattle, I'd call my mom with it. We were really broke. (laughter)

I know that you both met in South Carolina while Graig was on tour. How exactly did your meeting go down?

Z: I had just moved to Charleston, and one night, I went to a bar with a friend who played in a popular local band. Right away, she recognized a group of guys and said, "Those guys aren't from here." She

introduced herself to Graig's brother and discovered that they were in a band from Seattle and had a night off. Eventually, Graig joined us at the table, and as soon as we met, I was like, "I just met my person!"

You knew just like that?

Z: Yeah, we both did. It was like, "What are we gonna do now? Are you going to move to Charleston, or am I going to move to Seattle?" His band was playing the following night in Charleston, and I thought, "Oh God, I hope they're good!"

That's the big danger. You fall in love and the band sucks!

Z: I thought his band was awesome, and I was so relieved! But then he left to head back to Seattle, and he left me with his CDs which I listened to non-stop.

Were you just calling her all the time with your little device when you were apart? (laughter)

G: Yeah, totally.

Z: A month later, Graig's band was back on the East Coast, so I met up with them and went on tour for two weeks. After the tour, they dropped me off in Charleston, where I immediately began packing and planning my move to Seattle. I decided to take a Greyhound bus since a one-way ticket only cost $75. However, the journey took five long days. Graig and his band lived in a house together and I moved in and they made this little makeshift room for us. We just had a mattress on the floor and cardboard box furniture. We started a band, Tagging Satellites, and right away played a show at the OK Hotel (Ed. - famous Seattle venue where Pearl Jam had their first ever show.) It was the first time I'd ever played an instrument in front of anyone. I remember running offstage and going to the pay phone, calling my mom. "I just played a show at the OK Hotel!"

I assume you used Graig's device to make the call. You two have serious history. How long have you been together now?

G: Twenty-seven years. It's fun, we have a lot of good times.

Z: We sure do!

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GEAR REVIEWS

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some of C4's inputs and outputs via touch, and more havoc was wreaked. I can only guess as to how one would feel if they were doing some radiation testing and any of the sounds that C4 made came out of them. It's like using a metal detector on the beach and hearing "Jesus Built My Hotrod" coming out of the tiny speaker instead of the beeping when you come across somebody's lost wedding ring or a Corona bottle cap. All of my "experimental" and "wild" distortion/fuzz pedals were put to shame by Collide 4, and I'm not being hyperbolic. I'm always hearing about how we're living in the Golden Age of synths (instruments in general, really), where all of these affordable, incredibly powerful, and interesting machines are available to all to make music with. While I am compelled to agree, I also find it somewhat interesting that we can all still be inspired by equipment from so long ago to contribute to the congratulatory heaps we ply ourselves with for living in this Golden Age. I guess in a way, though, it all adds up. If history does indeed repeat itself, I'm guessing that in about seventy years we'll see some humanobot hold up Collide 4 and talk about how big and heavy it is, and how we won't have to lug around gear like this anymore, as there's sure to be a virtual version of Collide 4 that floats in the air or something. No more lugging those dang instruments around! I've no doubt that Collide 4 will still be around seventy years from now to make music.
- Ellison Wolf
Price: $650

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higher and another an octave lower, once I patched in the modulation from Swell Physics to the 1V/Oct input of each my starting point of all A's disintegrated, though depending on how fast I had each of the four main parameters on Swell Physics, all sorts of droning goodness was had. I really was trying to give sound to the movement of this theoretical ocean, not just using the ocean to give movement to sounds, and when everything was slow, it was easy to imagine this and hear the results. Likewise, when I did the opposite and sped everything up and made it bigger; it was the storm in the middle of nowhere where you might not make it out.

I really tried to keep this oceanic theme going, and so attempted to patch realistically into each CV input. Simulating what I imagined to be an annoying jet ski cruising by one of the buoys with a sawtooth wave, I modulated the output of that by patching into a VCA and using a buoy output for the CV in of said VCA to simulate the movement around a buoy by said annoying jet skier.

Multing and panning that sawtooth to control more outputs so that the jet ski would be bothering all four buoys, and the sound became more dynamic. With some quad action going on, situated in the middle of the four speakers (the outputs of the four buoys), you might even feel like you were in the middle of the ocean cursing that damn jet skier. It was a fun experiment, and very different from using four different random LFOs instead.

I was pretty happy with my simulated jet ski motor sound, and used this VCAd sawtooth for modulating the other parameters as well. The A/B mode switch was a nice way to change things up quickly, and the difference between the two is pronounced, though not necessarily easily described, as well as the mathematics making up each (as far as I could tell!).

I like these theoretical systems as they bring a different type of thinking to modular. It's fun to enter these types of spheres of theory to try to push it, to ponder like a philosopher. You know it's not real life, but the lack of realness doesn't mean that it doesn't translate to the real world. Just watch out for jet skis.
- Ian Rapp
Price: $399

SYNTH HACKS #14
THE SOUND OF ONE BUTTON TAPPING

BY DAVID BATTINO
BATMOSPHERE.COM

What can you possibly do with a one-button synthesizer? If it's a Moffenzeef Shtick, quite a lot. This "harsh noise synth" (moffenzeefmodular.com; $25) is a gem of conciseness. Its pinky-size body has a USB plug for power on one end, a 3.5mm mono output on the other, and a single button in between. (See Figure 1.) Add power and it plays a random sustaining sound at a random pitch. Tap the button and a new sound begins. That's it! The Shtick is essentially an oscillator of surprise. You might hear a rasping car alarm, a yodeling square wave, a supersaw, or endless other edgy tones.

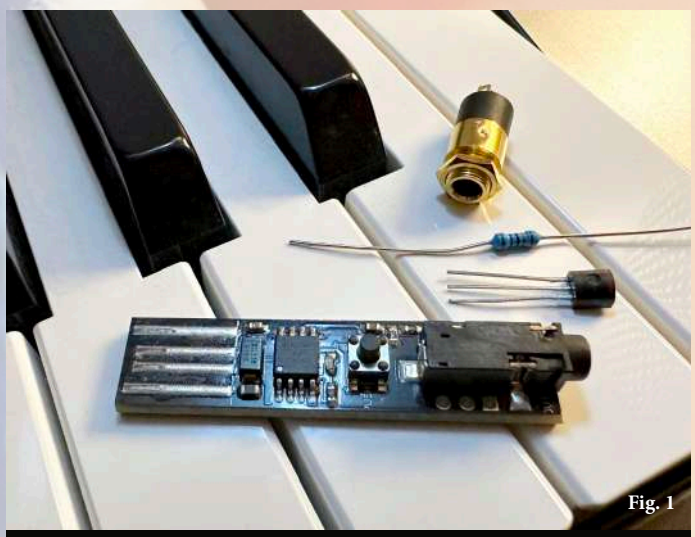

Fig. 1

Powered by USB, the $25 Moffenzeef Shtick makes a unique new sound each time you tap the button. Adding a few pennies worth of parts lets you trigger it with CV.

The musician AA Battery (aabattery.de) discovered he could solder a larger button to the side of the Shtick to trigger new sounds remotely. Then he swapped in a light-sensitive resistor and triggered sounds by pointing it at the flashing LEDs on a Teenage Engineering PO-133 drum machine. Synchronizing drums and random sounds made a fantastic groove, as you can hear in his video at tinyURL.com/AAShtick. A link in the description gives you a free pack of 73 Shtick samples so you can hear the instrument's range.

I was curious if I could change Shtick sounds with a 5-volt pulse from a keyboard or sequencer, so I asked Mr. Moffenzeef himself, Ross Fish, and he said I could wire a voltage-to-switch trigger converter in parallel with the button, and kindly sent me the classic circuit diagram for triggering vintage Moog synths. After watching a quick triggering tutorial (tinyurl.com/V2Strig),

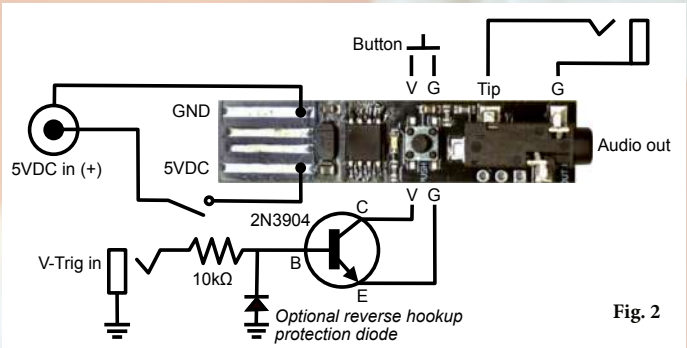

Fig. 2

The classic V-trig to S-trig circuit (bottom) converts a 5V trigger signal to a virtual button push. I added a second physical button and extended the audio output to a remote jack.

I came up with the version in Figure 2. It sends the 5V pulse (V-trig, or voltage trigger) through a resistor to the base (B) of an NPN transistor, causing the transistor to connect its collector (C) and emitter (E) terminals. In other words, the transistor shorts the button to ground, producing a switch trigger (S-trig). The resistor protects the transistor by limiting the amount of current.

Because my shtick is embedding audio electronics into Japanese monster toys, I popped open a Bandai M1, Ultraman's giant apelike enemy, and added the modified Shtick, another output jack, and a power switch. A round red button, wired in parallel with the one on the board, adorns M1's head like a monkey's fez. With the gate output of my Arturia KeyStep connected to M1's trigger input, I can advance Shtick sounds by playing keys or running the arpeggiator (pretty cool with swing!). Connecting the KeyStep's modulation output instead changes the timbre when I tap the top of the mod ribbon.

Of course, Shtick randomizes the pitch of each new sound as well, so to make the pitch follow the keyboard, I ran M1's output through the granular oscillators on my 1010music Lemondrop (Figure 3). The Lemondrop shifts the pitch to match the note you're playing and—magically—creates new pitches as you hold additional notes, producing up to four-voice polyphony.

Fig. 3

I embedded the Shtick in a rubber monkey monster and granularized the audio with a 1010music Lemondrop, producing four-note polyphony. Each keypress can also change the sound.

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