Buchempfehlung: PATCH & TWEAK with MOOG (Kim Bjørn)

Wieder ein schönes Stück Synthesizer-Geschichte, diesmal mit einem Vorwort von Hans Zimmer. „PATCH & TWEAK with MOOG“ ist eine bemerkenswerte Zusammenfassung der historischen wie auch modernen Moog-Instrumente. Dabei kommen – wie üblich – auch aktuelle Komponisten und Live-Acts zu Wort, die über „ihren“ Einsatz von Moog Synthesizern berichten. Praktische Patch-Beispiele rund um Grandmother, Matriarch und viele andere Moog-Patch-Synthesizer runden das Buch gelungen ab.

Zugegeben, das Schwester-Exemplar „PATCH & TWEAK with KORG“ erscheint um einen Tick informativer. Das ist aber dem glücklichen Umstand geschuldet, dass bei Korg *auch* die Geschichte und Instrumente der Firma ARP behandelt werden, was den Informationshorizont nochmals deutlich erweitert. Und Moog ist eben (nur) Moog.

Modulation sources
The modulation section holds an LFO with four syncable waveforms and an S/H output. Three knobs control how much of the modulation is being sent when the Mod wheel is turned up.

Sound sources and Mixer
Two oscillators with four waveforms and individual outputs. Hard sync and separate PWM input on the first oscillator and linear FM input on the second. The mixer allows external signals to replace any of the three normalled inputs, one of them being noise.

Filter section
24 dB/oct low-pass filter with separate envelope and resonance controls. A 3-way switch adjusts the amount of keyboard tracking (p. 57).

EG section
Classic 4-stage envelope with Attack, Decay, Sustain and Release controls. A nice feature is the negative envelope output, and the ability to split the envelope into two via the VCA MODE control.

- Spring reverb
- 256-step sequencer with 3 memory slots
- Arpeggiator
- 32-note keyboard
- Patch points: 21 inputs, 20 outputs and a parallel wired 4-pin Mult
- MIDI, USB, external audio input

Output section
The final amplifier section lets you use one of three VCA modes with ENV using the Envelope in ADSR mode. The KB RLS mode is based on the original KB Gate function from the Moog Voyager (p. 176), which output a separate gate signal when a key was pressed. On the Grandmother, it's improved to split the Envelope generator into two envelopes: one controlling the amplifier with instant attack and adjustable release, the other controlling the filter (p. 75).

Spring reverb
The Grandmother contains a 6" long analog spring reverb tank, which provides a vintage reverb feel. The

Doch natürlich reicht das auch völlig aus, denn das behandelte (und abgebildete) Arsenal an Moog-Instrumenten ist riesig. Die exzellenten Fotos stammen unter anderem von Vintage Works, Perfect Circuit, Techno Empire und – klarer weise – zu einem guten Teil aus der PR-Abteilung von Moog Music selbst.

Modulation sources
Features an additional noise output and additional stepped triangle and smooth random waveforms. The PITCH MOD ASSIGN controls which oscillators' pitches are affected by the Mod wheel.

Sound sources + Mixer
Four oscillators with Pitch, PWM, and Linear FM inputs and individual outputs. They can be hard synced to each other in various configurations. The mixer features external inputs, and like the Grandmother, overdrives the sound when set past 3 o'clock.

Filter section
The stereo filter is essentially two low-pass filters which can be switched to a configuration of high-pass and low-pass in either serial or parallel (p. 56-57).

Envelopes
Two ADSR envelopes with trigger output for their end stages (p. 77). The amplitude envelope is normalled to the VCAs.

- 1 stereo delay (effectively 2)
- 256-step sequencer with 12 memory locations
- Arpeggiator
- 49-note keyboard with velocity and aftertouch sensing
- 90 patch points and 2 mults
- MIDI, USB, external audio input

Buchempfehlung: PATCH & TWEAK with MOOG (Kim Bjørn)

„PATCH & TWEAK with MOOG“ ist ein Muss für jeden Synthesizer-Enthusiasten, der analoge Synthesizer (alte wie auch neue) wertschätzt, und der zudem profunden geschichtlichen wie auch künstlerischen Hintergrundinformationen nicht abgeneigt ist.

THE MAGIC IS IN THE PROCESS

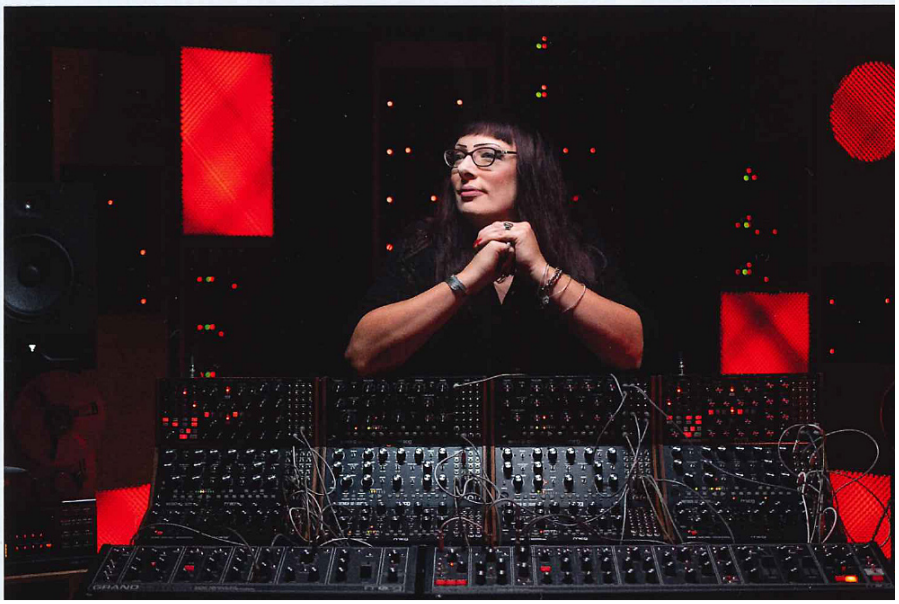
Interview with Lisa Bella Donna, musician, modular synthesist, and clin

Lisa Bella Donna's musical journey began early, growing up surrounded by music.

"My parents were avid music listeners in the 1970s. I never had the luxury of formal training, so listening to and studying records and radio in a diverse range of music was my first passion. My local library had a really amazing music department. I basically lived there all through my youth, reading about and listening to a wide spectrum of music.

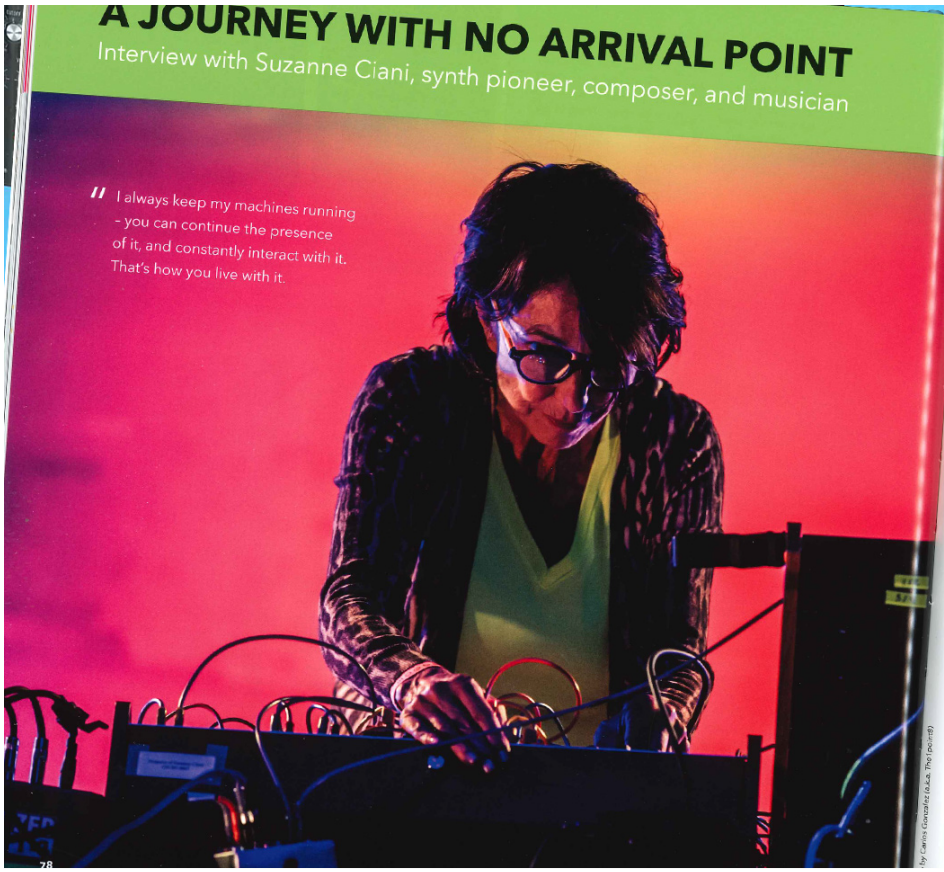
"I was inspired by multi-instrumentalists like Bob Mayo, Ken Hensley, Joe Zawinul, and Gary Wright – my parents moved a lot when I was young, so it was difficult having a main instrument to develop on. I sort of grabbed whatever I could, when I could.

"When I was an early teen, a Vietnam veteran in our neighborhood heard my band practicing, and told us we needed an organ – that he'd give his to us if we came and got it. Two kids with a rolling cart pushed, shoved, and carried this mammoth thing from his house to my basement in the summer



A JOURNEY WITH NO ARRIVAL POINT

Interview with Suzanne Ciani, synth pioneer, composer, and musician



"I always keep my machines running - you can continue the presence of it, and constantly interact with it. That's how you live with it.

Susanne Ciani is a five-time Grammy-nominated composer, recording artist, and pioneer in the field of electronic music. She has released more than 25 albums and was the first woman hired to score a major Hollywood film. In 1995, she established her own record label, Seventh Wa featured in countless commer and feature films. In recent ye modular synthesis after decad composing and performing at

Though Suzanne Ciani is widely known for her advocacy and lifelong relationship with the Buchla modular synthesizer, her acquaintance with electronic instruments started with a Moog.

"The Moog was one of the first instruments that I played, actually. I was in graduate school at UC Berkeley from 1968 to 1970, and I went to the San Francisco Tape Music Center at Mills College. There was a Moog 15 there, and the fellow that ran the studio gave it to me for a whole summer. The school was closing down, but I got a grant and took this Moog back to Berkeley where I lived and just went crazy. I always keep my machines running – you can continue the presence of it, and constantly interact with it. That's how you live with it. So I had this Moog, and remember to this day the wonderment of making the sounds of sunrise and sunset – I did love that machine early on."

Krause, Beaver, and another Bob

At the end of her graduate studies in the summer of 1970, Suzanne had to give the Moog 15 back. However, in the meantime, the music department at UC Berkeley had gotten a Moog synthesizer.

"I said, 'Fantastic – let me at it!' but the Music Department didn't know what it was and felt they had to protect it, so I wasn't allowed to because I didn't have any 'credentials.' They said, 'Well, you have to go take a course.' So I went to Sunset Studio and took a course with Bernie Krause and Paul Beaver. Bob De Souza was the engineer there, and he later taught me everything about engineering. That was a wonderful thing."

In recording situations with the analog synthesizer, Suzanne didn't always find the workflow practical.

"The Moog 15 was at one side of the studio, and the tape recorder at the other side, a few steps away. So you'd set something up on the Moog, then go up and press the Record button on the tape recorder, and the Moog would go out of tune. So you would stop the tape recorder, go back and retune the Moog, go back to hit Record, and

The battle, the keys, and the

Suzanne soon found work with had started his instrument comp

"I was very anti-Moog for ma wanted people to see other pos over those years that dichotomy

"In the early days we were ve called West Coast/East Coast thi on we started to communicate m Internet and visibility. I think that for the meltdown of that severe d think that at the very source of Mo it was the same. Bob Moog, who already had an alternative conscio started, his instrument was not a k ment and he was deeply into the a of electronic interfaces. I'm sure he the keyboard – the definition of his that's the route it took."

However, as Suzanne recalls, an it became a success, as the synthes opted by rock'n'roll players and jaz

"I was working in the trenches o industry in New York City, going fro dio as a session player. I remember catching on like wildfire – everybody sound, it has the most cut-through a But still I never wanted to have one. and tried to focus purely on Buchla.

"I went to New York City in 1974 a ly after that I went out to the Moog fa it was nearby. Bob showed me the M being used by Keith Emerson. It was t big thing and he said 'Look at this, it's mechanism for saving sounds!' There big plug-in boards that allowed Keith sounds. That's when I realized that Keit to interact with it, he just wanted the so Moog. For me that was so disappointin my whole life was interacting with the and being part of it – an organic extens

LEADING THE CURRENT TO NEW PATHS

Interview with Coralie Ehinger (a.k.a. Therminal C), theremin artist

Coralie Ehinger (Therminal C) lives and works in Lausanne, Switzerland, and is the Swiss ambassador of the theremin. In 2007 she created the first French-language online platform dedicated to the theremin (etheremin.com), and co-wrote *An Introduction to the Theremin*. In 2009 she founded the theremin and synth festival NODE. Coralie holds a degree in Special Education, and has worked to develop the didactic and recreational aspects of the theremin via courses and conferences offered in schools. She has col... in the proje... creates, co... well as perf... er and the ...

Coralie Ehinger started playing the theremin in 2006, but it took ten years before she started connecting her theremin with synthesizers.

"It all happened thanks to my brother, who's a musician and sound engineer – and passionate about synthesizers. He built a clone of a Buchla Music Easel and encouraged me to try it. I brought my theremin over to his place, we connected them via CV – and *bam!* I was struck with amazement, and immediately started to get ideas about what I could do. To all my suggestions and ideas, he replied, 'Yes, of course you could do it'. Pandora's box was opened, there was no way back."

Coralie took the Buchla home, and a new adventure began.

"I had the feeling of finally finding my own path, finding what I wanted to do in music with my theremin – which was playing it in a traditional way, and at the same time using it as a controller to create a musical accompaniment. Cosmic music where both melody and accompaniment would be played live, at the same time, b... na of the theremin...

After experime... ing the basics of s... module and enter...

Leading the curr...

Coralie sees mod... vity, and like a so...

"My creativity ... for new modules ... me explore new ... a never-ending ...

"Once I get ... the sounds and ... bumps, get lost ... thing, I hold on ...

"Of course, ... sounds and id... trying some th... the beauty of ...

Photo by Lionel Pallarès

TAMING THE MODULAR WILD CARD

Interview with Hannes Bieger, producer, mixing engineer, and musician

Hannes Bieger is one of Europe's most in-demand mixing engineers, with clients including some of the biggest names in contemporary house and techno. In 2017 he stepped back into the foreground with his debut EP on Poker Flat, inspired by the purchase of a ... vigo... relea... cludi... And ...

Hannes Bieger was a Moog lover from the beginning, and he always knew what he wanted in his rig.

"My first synth was a Moog Rogue, which I bought in 1997. I really wanted a Minimoog, but I couldn't afford it. Then I got a Juno and a Nord Lead and other stuff, and finally I was able to acquire a Minimoog in 2004. It's an original, but completely refurbished and with an added internal MIDI interface. After all these years, it's my desert island synth. I know it inside out, all the tricks it can do, and I think it's not 'just' a Minimoog, it's a milestone of instrument-making. It's still the perfect combination of features; you're not really missing anything, and it's complex enough to do nice things, and easy enough not to require patch sheets."

Early influences

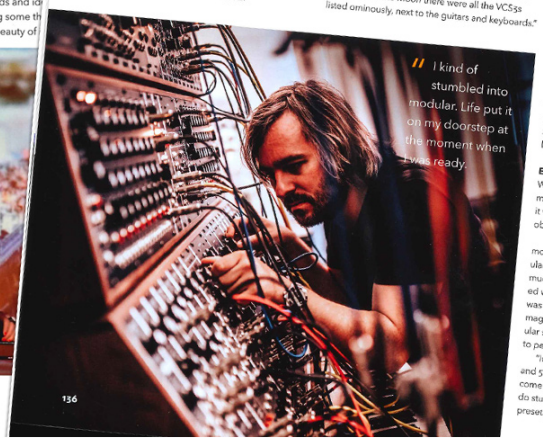
Exposed to synthesizers at a very early age, Hannes has poured his earnings into collecting a mouthwatering selection of synths over the years.

"When I was six, I was sitting at home next to the stereo with headphones on, getting lost in the sonic world. My father's record collection included the Beatles, which featured the vari-pitch things they did to the drums as early as *Revolver*, and of course the modular that appears on *Abbey Road*. Then there was Pink Floyd – what they did with recorded voices and sound effects was early 'sampling'. Rick Wright's organ playing was already very synth-like, and on *Dark Side Of The Moon* there were all the VCSs listed ominously, next to the guitars and keyboards."

"I would say that a lot of the later Beatles and all the Pink Floyd classics are electronic music, because they really played the studio as an instrument, using tape loops and synthesizers – and that was the first time I was exposed to them.

"Being a kid in the early 1980s, there was a lot of synth music on the radio that I never connected with at the time, but I've been loving things like the magnificent Minimoog solo stuff on 'Shine On You Crazy Diamond,' even before I knew it was a Moog synthesizer. I connected with that sound long before I knew what it was.

"In the 1990s, my interest shifted away from the rock bands, toward more funk and acid jazz and then later trip hop, deep house, and that sort of stuff. If there's one watershed moment for me, it was at some point in late 1995 or early 1996 when I first listened to Portishead. It resonated with me immediately, and I knew that all my playing in bands and noodling with guitar solos was all over for me. The 1990s were also when I started producing, and *Moon Safari* by Air was a very important album for me, one which I just recently rediscovered and fell in love with again."



> "I kind of stumbled into modular. Life put it on my doorstep at the moment when I was ready."

Easing into modular

While Hannes does a lot of work with his Moog modular synthesizer and other modular gear today, it was a long time coming, and was by no means an obvious goal for his artistic path.

"For most of my musical life I didn't connect with modular synthesizers. I knew somehow that modular synthesizers existed, but it never really meant much to me. In the early 2000s, when Doepfer started with what would become the Eurorack format, I was starting to write stuff for the German *Keyboards* magazine and so was in the scene, but to me, modular synths were always this nerdy stuff, interesting to people who had never really made actual music.

"In the last band I played in, I played 50% guitar and 50% Minimoog. After the shows, people would come to me and would say 'I didn't know you could do stuff like that with a keyboard!' I didn't have any presets, so I would hit chords on the guitar and use the wah pedal while taking a few seconds to change the sound on the synth. I had to practice routines of switching sounds and stuff like that. This wouldn't have been possible with modular synths, so I didn't enjoy the thought of working with them. It's probably because I'm a guitarist at heart – I was always used to having a solid piece of wood and metal in my hands when making music."

When he started mixing a couple of years later, Hannes didn't exactly enjoy having to mix elements with modular synth.

"These sounds were oftentimes way too complex for the arrangement – all the modulations, four modular basslines in parallel when one of them was too busy already, and so on. It always felt like a swarm of bees in a tin can – rather difficult from an engineering point of view, and I never really enjoyed it.

"I kind of stumbled into modular. Life put it on my doorstep at the moment when I was ready. In late 2015, I was starting to put my live set back together and I was considering a Sub 37. I could have walked over to the biggest musical instrument shop in Berlin, which is dangerously close to my studio, and just bought it – but I decided to check the availability on the store's website, and went from there to the Moog website to find out what a 'Sub 37 Tribute Edition' was – and boom! There were the modulars."

Keeping th...

Forming a s... means Hann... place outsid... interest, tho...

"I was ne... to have a cou... I always sold ... In terms of pe... with software ... drums, toms a...

"On the oth... things in my m... sounds, and o... them by sendin... really liked the ... fest. The modula... can also use all ...

"With the DF... couple of hundre... I got out of it.' I d... important piece ... percussion on the... using it on almost... done basslines an...

SYNTHESIZERS IN THE GAME

Interview with Sarah Schachner, composer, producer, and multi-instrumentalist

"Synthesis can seem intimidating at first, but my advice is to just dive in and try it for yourself. Most of what I've learned is through trial and error, not from reading manuals or being an expert by any means."

Sarah Schachner grew up with a sound engineer dad who had worked with many great musicians of the 1970s.

"I had seen and heard the giant Moog modulars as a kid and was intrigued. After hearing the music of Stevie Wonder, Herbie Hancock, and the great Hammond organ players of the 1960s, I became obsessed with vintage keyboards in my youth, which naturally led me to the world of analog synths. As soon as I could afford it I bought my first mono synth – the Moog Voyager. I was beginning a career in scoring for visual media at the time, and wanted to incorporate these amazing instruments into my workflow."

Depth and emotion

As a piano and string player, Sarah likes to have a performative aspect to her music.

"I track as much as I can straight to audio as a performance. The Voyager fills in an incredible low end that is great for the cinematic music I do for film/TV and video games. I could easily pull up a Moog setting on a software synth plug-in, but the real thing has more depth and emotion."

> "Most of what I've learned is through trial and error, not from reading manuals or being an expert by any means."

photos courtesy of Moog Music

and viola, while playing ...

"Most importantly, these analog instruments blend so well with organic sounds. I'm often multitracking myself on strings, and the combination of the analog low end with organic close-miked textures has become a staple for me.

"The Matriarch, on the other hand, is fantastic for exploration. While the Voyager is more of a functional workhorse synth with lots of low-end power, the Matriarch is a sonic playground when I want to surprise myself and have fun. The independent oscillator layout always yields unexpected results that never fail to spark inspiration, and the stereo delay feels like getting wrapped in a warm blanket."

Blurring and blending the lines

Sarah was drawn to the DFAM because of how it blurred the lines between drum machine and synth.

"I first played with it at the Moog 'House of Electronicus' pop-up a few years back and was surprised with how immediately gratifying it was. While you can achieve standard sounds with it, its hybrid nature is what makes it special and fun!"

Along with various orchestral string, folk and ethnic bowed instruments she's been collecting, Sarah also amassed a modest collection of analog synths.

"The synths that currently get the most use on my music are the Moog Voyager, Matriarch, DFAM, Roland Jupiter-6, Korg ARP Odyssey, and a custom Eurorack modular setup. Lately, I've been interested in unique standalone synths that have a meditative experiential quality to them. The SOMA Lyra-8 and the Matriarch both feel a bit therapeutic to play.

"All my synths bus together into one digital mixer, which keeps things simple. I take the output of that mixer and put it through a handful of different distortion/reverb effects that can be bypassed as needed. The other side of my studio is mostly filled with acoustic string instruments, which I record through my Manley FORCE tube preamp. In addition to mixing acoustic sounds with synth, I'm interested in blending ancient instruments with modern technology and blurring the lines between old and new. It definitely helps that Moog gear always sounds very warm and alive."

Room for exper...

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"It's fun ... you wouldr... standalone ... control or ... assignabl... proach to ... artificial i... going to ...

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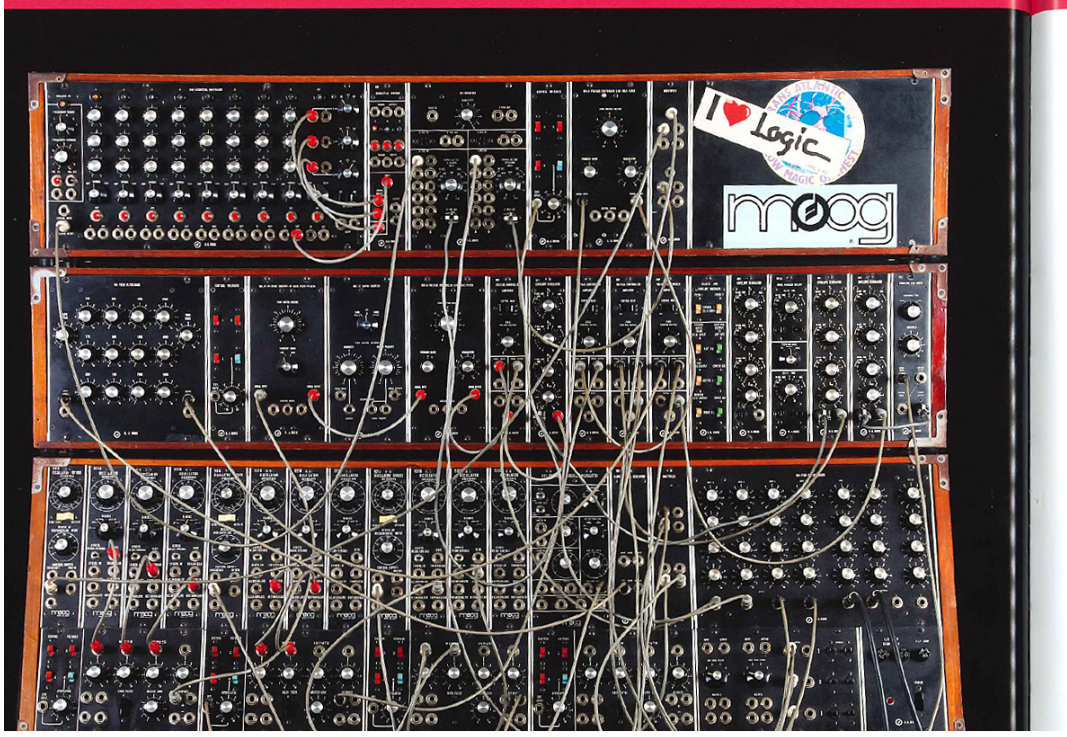
THE BLUEPRINT OF A SOUND

Interview with Hideki Matsutake of Logic System, electronic music pioneer

Hideki Matsutake is a Japanese producer, arranger, and synthesizer programmer. He is known for his pioneering work in electronic music and particularly music programming, as the assistant of Isao Tomita during the early 1970s and as the 'fourth member' of th to 19 activ Hosc brea



The first time Hideki Matsutake came across a synthesizer was in the American Pavilion at the first world exposition held in Japan, the Osaka Expo of 1970. The theme was 'Progress and Harmony for Mankind' and the 18-year-old Hideki was among the 64 million visitors.

"I came across a particular sound, but didn't realise at the time it was from something called a synthesizer. I visited an instrument store and found out what it was. I finally got the term 'synthesizer', and also got the idea of using that instrument as a professional to earn a living. At that time I was really digging the Wendy Carlos album *Switched-On Bach*, and realized it was a Moog synthesizer."

Tomita and the Moog III

The following year, Hideki had the opportunity to work for the legendary composer Isao Tomita, who influenced generations of electronic musicians in Japan.

"At that time there wasn't a Moog at the office, but six months later Mr. Tomita purchased the Moog IIIp. So at an early stage of my career, I had the pleasure of touching and operating one of the first few Moog systems in Japan at the time.

"At the time the Moog IIIp was installed, Mr. Tomita never taught me how to make sound, or how to actually use the synthesizer. His policy was that otherwise I wouldn't have the opportunity to make my own sounds and find my own tone. That policy still exists in my heart."

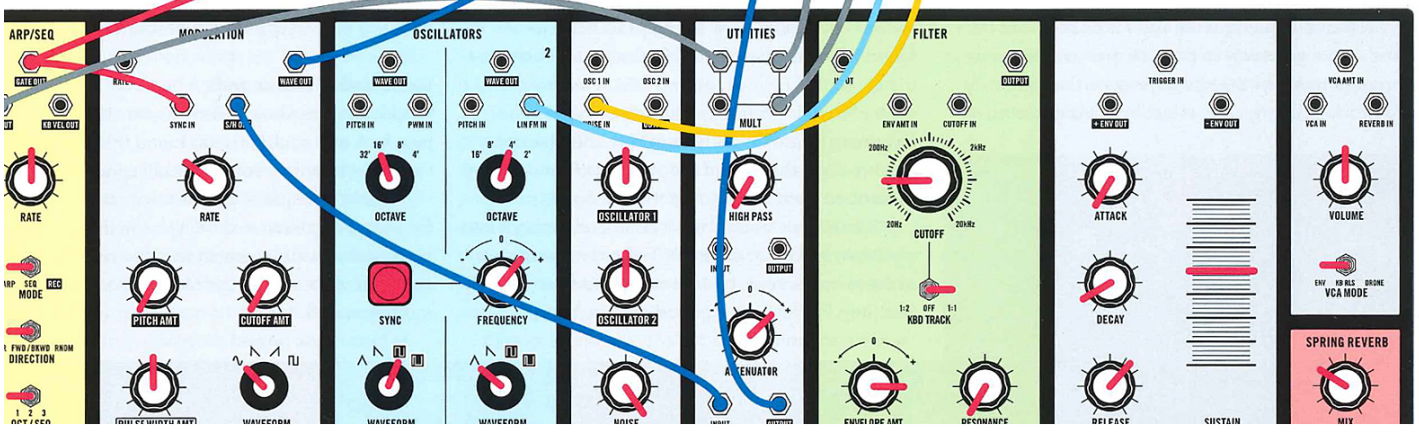
For Hideki, the 1970s was a time of practice, trial and error. However, Tomita had started production of his second album (later 4-times Grammy nominated) *Snowflakes Are Dancing*, based on music by Claude Debussy, and needed to focus on that.

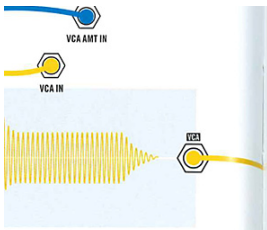
"In 1972 I left the office and started a new place Yell Late with Japa one of M " Saka ly in of th H an 8 the 1981 a ve K Rola the back Acce que in m com tech " anal was rien and The "I ha but way me a bl a to

Steely timbre

This patch is all about the subtle nuances – which may not be so subtle after all. Together, the four oscillators create layers of sound which can be turned up or down individually during performance. Make sure the Mod wheel is up on the Grandmother, and that the DFAM sequencer is stopped.

An optional rhythmic twist when using the Arpeggiator is to patch the TRIGGER output of the DFAM to its own ADV/CLOCK input and start its sequencer. Turn down some of the VELOCITY knobs to occasionally omit notes.





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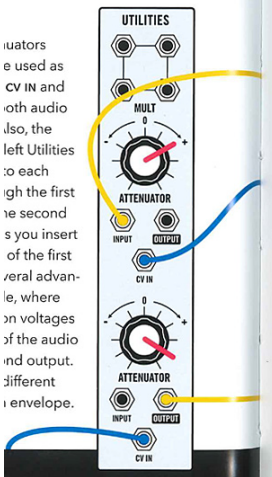

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EG BASICS

The *envelope* commonly shapes notes by opening and closing the VCA depending on its timing and level settings. Initially there are four stages in a common envelope shape.

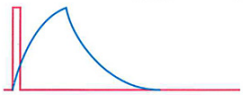
The envelope shapes on the Moog semi-modulars are *exponential*: they are curved (see above) and sound more natural than a linear shape.

ADSR
This four-stage envelope, found on the Grandmother – and two of them on the Matriarch – has three timed stages and one level setting:
Attack: the time it takes for a note to go from zero to maximum level.
Decay: how fast the level falls from the end of the Attack stage to its sustain level.
Sustain: the level at which the note sustains while being held (when the gate is open/high).
Release: how fast the level falls to zero again when the note is released (when the gate is off again).

ASD (ASR)
This type of envelope, which is found on the Mother-32 and Subharmonicon, does not have an intermediary timing stage.

On the Mother-32, this means that after the attack stage, the note will decay immediately – like the AD envelope. If Sustain is switched on, the note will sustain at full level until being released, then decay to zero.

Pressing the Trigger button of the Subharmonicon simply triggers the AD envelope, while holding it down sustains it – see below.



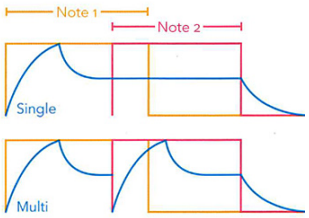
AD
The simple Attack-Decay envelope ignores how long a note is held. It simply starts when recieving a trigger or gate, and then does its own thing.

This type of envelope is commonly used for percussion sounds, which is why the DFAM has no less than three of these. While the DFAM has a fixed Attack time of 1 ms, a switch makes it possible to change the attack of the VCA envelope to a slightly slower setting of 100 ms.

On the Subharmonicon, the Attack and Decay times can each be up to ten seconds long.

DFAM percussion specialty
The Attack and Decay on the DFAM EGs start more linearly, and also have a little spike at the top of the attack. According to Lead Engineer Steve Dunnington, this gives them a particular sound, more suitable for percussive synthesis. See also p. 76.

Single vs. Multi triggering
In *single triggering*, the envelope of the first note played will not restart when other notes are played legato. *Multi triggering* restarts the envelope with every new key press, even if they overlap. This behavior is selected with the Matriarch's **MULTI TRIG** button or via Global Settings on the Grandmother.



Grandmother AD + ASD
The ADSR Envelope on the Grandmother can be split into two

Subharmonicon EG behavior
On the Subharmonicon, the Attack stage has to finish before accepting

Mylar Melodies (…) live synth performer from the North of England. He's best known for his modular synth YouTube videos, and for producing the "Why We Bleep" podcast.

and can be found online and at … demonstrating Moog synthesizers and more

Top patch: Harmonic DFAM
"Get more easily-tuned droney jams on DFAM. Tune **VCO 1** until you achieve a harmonious sound. Raise the **PITCH** knobs gradually, to more easily make riffs, and return to the starting point again. Try varying **VELOCITY**, and switch **HARD SYNC** on."

Bottom patch: Well random, FAM
"The magic trick, courtesy of wizardly Steve Dunnington, is the **VCO 2** to **VELOCITY** creating semi-random triggers. Perform subtle **VCO 2** adjustment to vary randomness, and try the Square wave for more regular triggers. Adjust **VCO 1 EG AMOUNT** as a performance effect (invert and squiggle).

Synth pairing tips

"I think effects are an essential pairing – … ically some nice delay and reverb. With … gear, I've used Eventides the most. It's t… that Moog put Eventide effects inside t… phonic spaceship, the Moog One. Dua… is a favorite algorithm on the Eventide … because you can set up this lovely call… response between what you play and … you hear back. Using pre-delay, with … reverbs for left and right, creates a hu… effect which is pleasing if you're playi… monosynth with a mono output. The… MIDI-synced, or you just tap the tem… it all be a touch loose. No shame in …

"I get asked a lot what first Eurorack … people should buy to pair with sem… like the Mother-32, DFAM, Make N… and so on. There's no one-size-fits-… but if it was me, I would want my fi… to represent the following schools …

INVENTING A MUSIC INDUSTRY

How Bob Moog changed music history forever

BY ALEX MAIOLO

On a typical night in America in 1973, families gathered around the television to watch the popular game show *To Tell The Truth*. On one particular evening's program, three men all claimed to be Dr. Robert Moog, inventor of the synthesizer bearing the same name. The panel peppered them with surprisingly well-thought-out questions, designed to trap the impostors. Unanimously, and without consulting each other as a jury, they chose the man in seat number two, who clearly knew his stuff and had answered all of the questions satisfactorily.

As it turned out, Bob Moog was actually the man in seat number three.

Even though there were errors, the other contestants' answers were surprisingly convincing. Watching the video, it's pretty clear that the panel's second choice likely wouldn't have been Moog either. He was the most humble and, as a side note, the only one not sporting a fashionable mustache. The General Manager of a corporation and a Manhattan-based attorney had out-Mooged the man himself. Upon the show's conclusion, the real Dr. Robert Moog gave a demonstration of the Minimoog, leaning heavily on the eternal crowd pleasers that are filter sweeps and white noise.

The most famous unrecognizable man

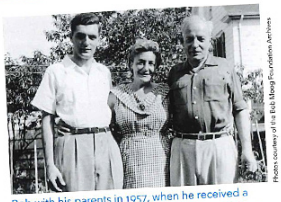
By the time of the show's airing, even people who essentially had no idea how one worked might drop the term "the Moog," a buzzword synonymous with "synthesizer." That same year, the Schaefer Beer company released a television commercial featuring composer Edd Kalehoff. Decked out in his best *Playboy* Magazine reader leisurewear, he dynamically played a futuristic version of the company's jingle. He patched the panel and tweaked the knobs of his modular synthesizer, simultaneously violating the universal rule of keeping beer away from electronics. The overlaid text made it clear he was playing "the MOOG" in all caps. In the wake of hit records by Wendy Carlos and Gershon Kingsley, the synthesizer was the Now Sound, and everyone wanted a piece of it. The look we associate with this era – a fisheye view of a battery of wires, draped over fluted taper skirt knobs – is a secret handshake that plenty of electronic artists still make part of their brand.

Bob Moog may not have intended to invent soundlab geek festishism along the way, but he most certainly did. He regularly appeared in ads for his products, but remained mostly anonymous during the company's first heyday – even though he had almost single-handedly changed musical history more than anyone else in the past decade, with the possible exception of the somewhat more recognizable Beatles.

Not everyone gets to live through a major paradigm shift, and only a handful of people in history have created one. Furthermore, these tend to arrive unexpectedly: while we were waiting in expectation of a future that included rocket cars and food pills, the internet snuck up on us and completely changed civilization in a matter of years.

For most people, electronic music just sort of... appeared... one day in the mid-1960s. Most folks didn't have the music of Karlheinz Stockhausen, Halim El-Dabh, and Else Marie Pade side-by-side with their Sinatra albums. They were blissfully unaware of the Telharmonium and Ondes Martenot, they didn't give much thought to how the sounds coming from the BBC Radiophonic Workshop were made, and they might only recognize the theremin as "the thing that makes UFO sounds" in B-movies.

At 15 years old, Bob plays his first theremin at the Bronx High School of Science.



Photos courtesy of the Bob Moog Foundation Archives

Bob with his parents in 1957, when he received a Bachelor's Degree in physics from Queens College and a Bachelor's degree in electrical engineering from Columbia University.

Popular science

Appropriately, that's where Moog's story begins. In 1949, at 15 years old, he built a theremin using plans from a magazine. People close to him weren't surprised. Though his mother was intent on him becoming a concert pianist, he gravitated towards the workshop of his father, who was an electrical engineer with ConEd. By 19, young Bob had published an article on the theremin in *Radio and Television News*, and started RAMCO, soon to be renamed R.A. Moog Co., selling theremins – both assembled and as kits – from his parents' basement.

The famous composer and inventor Raymond Scott contacted Bob to obtain a theremin subassembly for an instrument he was designing called the Clavivox. In what would prove to be a life-changing experience, Bob and his father were invited to the famously secretive inventor's home workshop. It was nothing short of a sound designer's wonderland – full of circuitry, vacuum tubes, temporarily abandoned ideas, and various works in progress. On a subsequent trip they were shown what can only be described as a proto-sequencer: an entire wall of stepping relays, based on telephone switching technology, that would turn sounds on and off. Anyone who has devoted their life to composing on modular has heard the "telephone operator" jokes, but the two are intrinsically linked.

New York City on May 23, 1934. [illegible] and Shirley Moog. While he earned a Ph.D. in Engineering Physics from Cornell University in 1965, at the end of his life he actually held four doctorates [illegible] honors included a lifetime-achievement, Grammy Trustees award, a Technical Grammy, and induction into the National Inventors Hall of Fame.

Moog married his college sweetheart, Shirleigh, née Shirley May Leigh, in 1958. As with most cottage industries, she found herself contributing to the company in various ways, from bookkeeping and assembling theremins on the kitchen table to entertaining legions of guests over the course of their marriage, while simultaneously raising their children.

By 1961 Moog had sold over 1000 theremins, which brought him into the orbit of composer Herb Deutsch, who had read the *Radio and Television News* article and purchased an R.A. Moog kit. In 1963 Deutsch was at a statewide gathering of school band and orchestra students, perusing instruments on display from various manufacturers. He walked into a tiny room full of nothing but tubas and there- mins, where he met Bob Moog, standing amongst the latter. Soon the two were discussing musique concrète, and what "electronic music" even meant. They were terms Moog was largely unfamiliar with, even though he was unknowingly contributing to their historic arc.

The circuitry of the mind

As luck would have it, Deutsch was performing an electronic music show two months later, and Moog went. After the show, the two picked up their previous conversation and started to discuss in earnest what an ideal electronic musical instrument should be. Before long, they were working together to design one, and talking about components. It was decided that an oscillator would have to be at the heart of it. Deutsch had to explain to Moog the concept of the envelope, illustrating how attack and decay are the hallmark of any instrument's sound, from trumpet to piano. Moog sent him to the hardware store to fetch a doorbell button and, by the time he returned, Moog had sketched out a simple envelope generator that could be triggered by the 35-cent button.

In 1964 the two friends took a road trip to the Toronto Electronic Music Studio to meet Myron Schaeffer and Gustav Clamaga. It was an important trip for many reasons. First, Moog had never seen a studio dedicated entirely to electronic music. Second, it gave him a sense that there were othe people in the world with a similar outlook and in terests. Third, and most importantly to the tech f among us, Clamaga explained that a filter had t a part of the system. It would ultimately become Moog's best-known feature.

Years later, Moog emphasized, "Neither of u had any idea where this was leading."

Electronic debutante

With the help of Myron Schaeffer and Jacquelin Harvey of the Audio Engineering Society, the first Moog modular was debuted at the 1964 A Convention. It was not the first synthesizer, hov About a decade earlier, Herbert Belar and Har Olson at RCA had beaten him to the punch – i ally, with their Hollerith-card based instrument problem was, it took up an entire room and la any interactive quality. Additionally, an uninte space race had been happening in 1963, as D Buchla was designing his own system for Mo Subotnick and Ramon Sender.

It was probably the inclusion of a convent keyboard in the design that left history remer ing Moog kindest of all. This was the first cor cially available synthesizer, bringing synthes university labs and into studios, in the hands who fit the more common description of "m

Bob Moog and Herb Deutsch.

1969

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II, and III

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ficant working rela-
working with Herb
modular synthe-

The first 900 Series modules

901 Voltage-Controlled Oscillator
901 A Oscillator Controller
901 B Oscillator
901 C Output Stage
901 D Variable-Waveform Output Stage
902 Voltage-Controlled Amplifier
902 A Band Pass Filter Adaptor
903 White Sound Source
903 A Random Signal Generator
904 Voltage-Controlled Filter
904 A Voltage-Controlled Low-pass Filter
904 B High-pass Filter
904 C Filter Coupler
905 Reverberation Unit
906 Impulse Generator
907 Fixed Filter Bank
910 Power Supply
911 Envelope Generator
911 A Dual Trigger Delay
912 Envelope Follower
913 Triggered Envelope Generator
914 Extended Range Fixed Filter Bank
920 Power Supply
950 Keyboard Controller
950 B Scale Programmer
951 Keyboard Controller
955 Linear Controller
956 Ribbon Controller
958 Foot Pedal Controller
959 X-Y Controller
960 Sequential Controller
961 Interface
962 Sequential Switch
982 2-Channel Mixer
984 4-Channel Mixer

Synthesizer I was intended for independent composers, educational facilities, and as a "starter" for pro studios. Its modules included: two each 901B, 902, 911, and one each 901, 901A, 903A, 904A, 905, 907, 910, 950, 956, and 991.

Synthesizer II was aimed at advanced electronic music programs or for larger studios, and added four 901B and one each of the 901A, 904B, 904C, and 984 to the Synthesizer I's complement.

Synthesizer III was intended for commercial studios and augmented the II complement with four additional 901B and one more 901A, 902, 911, 911A, and 912, while replacing the 907 with a 914 and the 991 with a 992 and 993.

Sequencer Complement A was a sequencer setup with one each of the 960, 961, 962, sold in a separate "c" or "p" cabinet. ***Sequencer Complement B*** (shown below) was a dual-sequencer package that featured an extra 960 and 962.

Above: Synthesizer IIIc with Sequencer Complement B on top. Below is the IIIp version of the same configuration.

and IIIp courtesy of Moog Music


Model A


Model B


Model C


Model D

Photos of Minimoog Model D by Vintagesynths - Photos of Model A-C: EMEAPP (Electronic Music Education and Preservation Project)

the now-classic Moog low-pass VCF, a transistor ladder circuit with a wonderfully rich timbre. Dual ADSR envelopes for filter cutoff and loudness fed the switchable main output and headphone output, with an A-440 tuning reference thrown in for good measure. This synth architecture is now so common that most electronic musicians know it by heart.

Bob and the Moog staff believed they would sell perhaps 100 units, but the Minimoog Model D proved to be an instant hit. Over 12,000 Minis were sold, virtually unchanged in design, until its discontinuation in 1981. However, its success came too late to save R. A. Moog – Bob was forced to sell the company that bore his name.

Sonic Six

Recognizing the market for a small, affordable synthesizer well-suited to the needs of educators, Moog developed the Sonic V in 1971. This was a cleanly laid-out design with an easy-to-follow signal flow diagram, paired with a four-octave keyboard and simple left-hand controls. The Sonic V was quickly superseded by 1972's Sonic Six, which refined the original design into a unique, portable synthesizer for educators and performers alike.

The Sonic Six was designed in a two-part polyester laminate chassis that folded together into its own molded case for easy portability. It used switches rather than patch cables to connect or disconnect elements of the sound structure, which included two oscillators, a ring modulator, noise source, resonant filter, output mixer, and 'articulator' (VCA and envelope). Left-hand controls included pitch, glide rate, and master volume.

In addition to two signal outp and an audio input, the Sonic a built-in amplifier and speake use, making it highly suitable Moog provided literature for synthesis with the Sonic Six, a courses offered at local dealer

Synthesizer 10 and 12

The Synthesizer 10 and Synthesizer 12 were designed to be the most portable and affordable Moog modulars to date. The Synthesizer 10, the last modular from R. A. Moog Co., featured two each of the 901B and 911 and one each of the 901, 901A, 902, 903A, 904A, 907, 910, and 951, with a comprehensive Console panel underneath.

The Synthesizer 12 was released by the newly-formed Moog muSonics (later Moog Music Inc.), still with Bob at the design helm. Superseding the 10, it replaced the 10's oscillators with the new 921/921A/921B modules, and introduced the 952 duophonic keyboard.

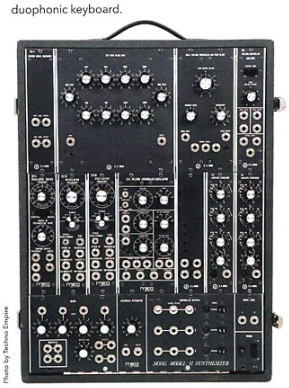


Photo by Techno Empire

Satellite

The Satellite was Moog's first venture into the realm of extremely simple and portable monophonic synthesizers designed to be mounted atop electric organs or pianos. Key to this design was a completely re-thought user interface, familiar to the organist and designed for one-handed use while playing. The Satellite was equipped with

20 tabs that were quickly accessible by the player's thumb. These controlled performance effects like octave transposition or glide on/off, and allowed

instant acce bres from *H* Seven left-H trolled filter and volume

16 Channel Vocoder

After Bob Moog left Moog M position was filled by Germa who was responsible for sor electronic music keyboards Melochord. The Moog 16 C based on Bode's own 7702 frequency bands from 50 H had its own optional contr exposed on a large front-p

1980

Liberation

Liberation (without a "the" in front, according to Moog developer Rock Wehrmann) was one of the earliest commercially-available 'keytars' – keyboards designed to be played while worn like a guitar. Its architecture included two VCOs with oscillator sync and a pink noise source, sample and hold, a ring modulator for amplitude modulation of VCO 1 vs. VCO 2, and a divide-down square wave Poly section that could be tuned apart from the VCOs. This gave Liberation the ability to play chords under the synthesizer lead. All sounds were run through a low-pass VCF and VCA with independent ADSR envelopes.

Many of these features could be controlled in real time with the Force (pressure) sensor under the keybed, as well as a left-hand 'neck' with controls for Force sensor routing and amount, Glide switch, pitch bend ribbon, and wheels for modulation, filter (spring-loaded to return to zero), and volume. A 40-foot cable connected it to a rackmount power supply and audio output.


Photo by Techno Empire

Concertmate MG-1

The Concertmate MG-1 was an affordable synth built by Moog under the Realistic brand and sold by the Tandy/Radio Shack retail chain. Designed by Tandy engineer Paul Schreiber with input from Moog's Dave Luce, the MG-1 had none of Liberation's performance controls, but its sound engine was nearly identical – compare their front panel features and see for yourself.


Photo by Vintage Works

Opus 3

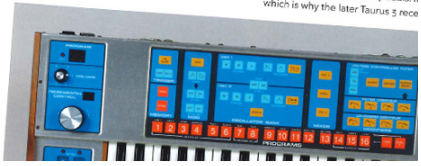
The Opus 3 was so named because it produced three paraphonic sounds – Strings, Organ, and Brass. The Organ sound was a square wave with an adjustable mix of five footages (harmonic ratios), while the String and Brass sounds were


Photo by Perfect Circuit

Taurus II – and Taurus III protot

Moog attempted to update the s synthesizer with the Taurus II (left on a mic stand above a 17-note p easier to program than the first Ta foot-operated expression controls a repackaged Rogue with a lower Taurus' sonic punch.

The Taurus III also had a keybo on a mic stand above the pedals. H which is why the later Taurus 3 rece

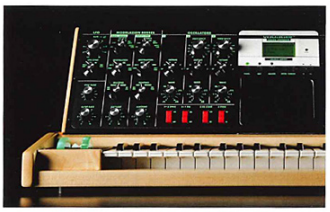


linimoog Voyager

inimoog Voyager Old School Edition

Minimoog Voyager RME (Rack Mount Edition, 2005)

inimoog Voyager Electric Blue Edition



Minimoog Voyager Select Series Edition (Green)

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Little Phatty

The Little Phatty (2006), the last Moog synthesizer in whose design Bob Moog had a hand before his passing in 2005, was as simple and elegant as the Voyager was feature-rich. Its aerodynamically-swept chassis, created by renowned design engineer Axel Hartmann, held a monophonic synthesizer with two VCOs with continuously variable waveforms, a ladder low-pass VCF, a 6-waveform LFO, and two ADSR envelopes. All connections were on the left side panel rather than the rear, and the user interface made clever use of four large editing encoders, one each per section of the architecture - Modulation, Oscillators, Filter, and Envelope Generators - with specific parameters quickly assignable from backlit buttons under each one.

In addition to the original Stage edition with its aluminum side panels, a 1200-unit Little Phatty Tribute Edition with wood side panels was released at the time of the product's launch.

The current Stage II Edition adds MIDI Clock Sync and MIDI over USB, tap tempo, and an arpeggiator.

esy of Moog Music

Moog Guitars

The Moog Guitars fron
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and brought a unique
pabilities of the conve
guitar. Using a combin
pickups with built-in tr
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GREATSYNTHESIZERS.com

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Subsequent 37

The Subsequent 37 (2017) is still available as of this writing, and includes a variety of improvements upon the original Sub 37: a more playable keyboard, improved mixer headroom, tweaked gain staging in the filter, and a more powerful Multidrive circuit.

In another nod to the storied history of Moog, the Synthesizer IIIc and IIIp were reissued in two limited-edition releases one year apart (2018 and 2019). These reissues feature faithful reproductions of all of the original 'instruments' (modules) and console panels from the original III layouts, with the Sequencer Complement B as an optional add-on. The reissued Synthesizer IIIp is still available for sale as of the writing of this book.

Model 15 and Minimoog Model D for iOS

Designed to be as faithful to the original hardware in appearance, sound, and operation as possible, Moog's latest iOS apps offer users a chance to taste the magic of classic Moog hardware in an accessible multitouch format.

The Model 15 app (2015) comes complete with user-draggable patch cords, a full complement of modules, and access to a traditional keyboard, ribbon controller, and/or Animoog-style slide-sensitive pad keyboard. Features not found on the original include an arpeggiator with tempo sync, tap tempo, and audio looper/recorder with overdub.

The Minimoog Model D app (2018) provides the features and layout of the reissued Model D, complete with extra LFO, as well as an arpeggiator, looper/recorder, and modulation and delay effects with tempo sync.

These apps, as well as Filtatron and Animoog, are still available today.

Photos on this spread courtesy of Moog Music

Moog One

The Moog One, released in 2018, is Moog's first true polyphonic synthesizer since the release of the Memorymoog some 35 years earlier. Available with either 8 or 16 voices of polyphony, it features advances in synthesizer design never before seen in a Moog synthesizer, all presented in a large hands-on front panel with a color LCD screen at the Center Console for deeper function control.

Each voice starts with a blend of three new Triangle Core analog oscillators, so named for their ability to blend and skew triangle/sawtooth and pulse waves for unique waveforms, further enhanced by hard sync, ring modulation, FM, and a dual-color noise generator with its own envelope. All of these, plus an external audio source, can be routed and controlled independently in the Moog One's mixer, routed to either or both of the available filters – a Moog ladder and a pair of state-variable filters.

With four LFOs and three envelopes per voice, an extensive modulation matrix, and the ability to morph modulations through modifiers called Transforms, the Moog One offers unprecedented timbral control within its sonic architecture as well as from a host of physical control sources – a 61-note velocity and pressure-sensitive keyboard, pitch and m wheels, and a programmable XY pad.

The Moog One is tritimbral, capable of sp and layering three different complete sound grams called Synths with one-touch recall of one of them for front-panel editing. With dua inputs, CV input and output routings, a built-i sequencer and arpeggiator for each of the th Synths, and a comprehensive set of per-Synth global effects created by Eventide, the Moog intended to be the most powerful analog syn er ever made.

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Prädikat: Sehr empfehlenswert.

PATCH & TWEAK with MOOG

… is a practical guided tour and learning resource for Moog’s five semi-modular instruments the Mother-32, DFAM, Subharmonicon, Grandmother, and Matriarch. Clear tutorials and inspiring example patches cover each of these Moog instruments in detail – then combine them with one another and with third-party synthesizer modules to expand their power.

The book also celebrates the storied history of Moog Music and its founder, Dr. Robert A. “Bob” Moog. It features 30 interviews with artists and past and current Moog designers, and is rounded out with a biography of Bob Moog, a look at Moog Music today, and a comprehensive Moog product timeline. Between its inspiring stories and tempting musical recipes, PATCH & TWEAK with Moog is a must-have for new and experienced synthesists and other Moog fans.

Link: https://bjooks.com/products/patch-tweak-with-moog