BUCHLA'S FIRST MODULAR SYSTEM

Still Going Strong After 37 Years
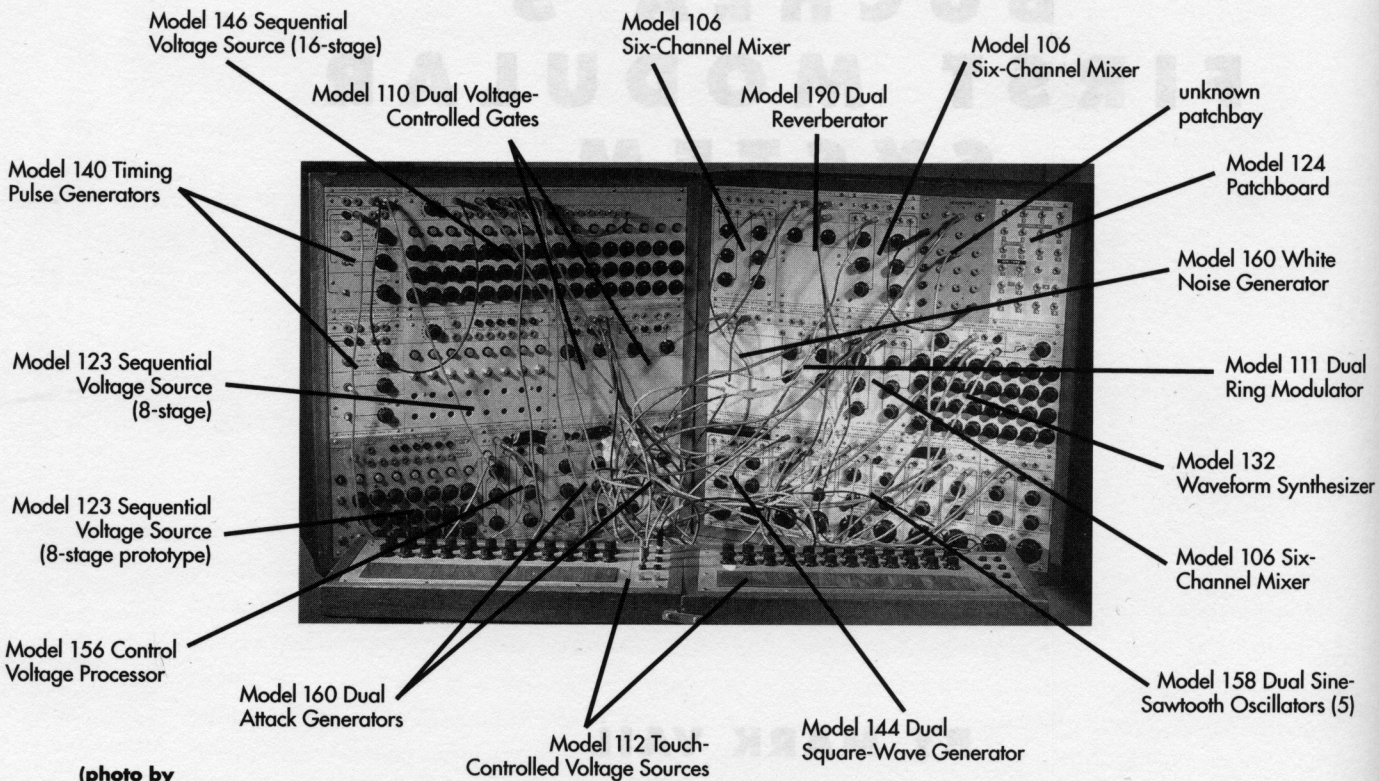
BY MARK VAIL

Sometimes we take our MIDI-laden music systems for granted. Turn on a few switches, push a button or two, and instant nirvana. It's all so easy. It hasn't always been so. Let's jump in the time machine and travel back to the 1960s. Electronic music was produced differently then. The most familiar method of creating new sounds was *musique concrète*, in which acoustic sounds and bleeps and bloops output by electronic test equipment were recorded on 1/4" magnetic tape, which was meticulously cut into short strips and spliced back together to make music. Creating a few minutes of taped music could take weeks or months. Thankfully, several groups of forward-looking electronic pioneers began to work on instruments that could simplify the music-making process; otherwise, we might all still be holed up in tape studios with razor blades, splicing blocks, Scotch tape, and thousands of strips of magnetic tape strewn about the floor, wound around 7" plastic spools, and pinned to the walls.

Some of the earliest efforts to replace *musique concrète* techniques took place at the San Francisco Tape Music Center, founded by Morton Subotnick and Ramon Sender in the early '60s. "Ramon and I were trying to move away from cutting and splicing to get something that was more like an analog computer," Subotnick explains. "From around 1959 or 1960, we had the idea of a kind of open-ended palette or black box for composing. Instead of having to go to a big studio, composers could have this inexpensive instrument in their own home and be able to compose. We had approached a number of different people, but Don Buchla appeared to be the most interesting of everybody. So we commissioned him to make a system for the Tape Center. I think we got a grant of $500 from the Rockefeller Foundation to build it, which is sort of ridiculous, but that's what we got. Buchla's first synthesizer was the beginning of an answer to the vision we'd had. It allowed me to really do what I believed I wanted to do—and much more—although it took a different shape than I thought it was going to."

What was Buchla's perspective? "I was doing *musique concrète* using tape recorders at the time," he recalls. "I went over to some of the concerts at 321 Divisidero, the old San Francisco Tape Music Center, and noticed that they had more tape

Model 146 Sequential Voltage Source (16-stage)

Model 110 Dual Voltage-Controlled Gates

Model 106 Six-Channel Mixer

Model 190 Dual Reverberator

Model 106 Six-Channel Mixer

unknown patchbay

Model 140 Timing Pulse Generators

Model 124 Patchboard

Model 160 White Noise Generator

Model 123 Sequential Voltage Source (8-stage)

Model 111 Dual Ring Modulator

Model 132 Waveform Synthesizer

Model 123 Sequential Voltage Source (8-stage prototype)

Model 106 Six-Channel Mixer

Model 156 Control Voltage Processor

Model 160 Dual Attack Generators

Model 112 Touch-Controlled Voltage Sources

Model 144 Dual Square-Wave Generator

Model 158 Dual Sine-Sawtooth Oscillators (5)

(photo by Bill Reitzel)

recorders than I did, seeing as I had only one monophonic Wollensak and they had this wonderful three-track Ampex. They were making music with war-surplus electronics and Hewlett-Packard oscillators, things like that. I asked, 'Why don't we make intentional musical instruments?' Nobody had thought of that, at least in that area of studios that were classically fitted out with surplus electronics. I suggested that we design a voltage-controlled musical instrument, and they supported it."

The result is the instrument you see pictured above, Buchla's first modular synthesizer. If you were able to focus closely on the individual modules, you could see "San Francisco Tape Music Center Inc" stenciled on most of them. "We just called it 'the Buchla,'" says Subotnick. "Don named it the 'San Francisco Tape Music Center' because he thought we were going to go into business with him, but we didn't want to do that. So he later changed his company's name to 'Buchla and Associates.'"

Buchla started designing the synthesizer in early '63, drawing on his knowledge of physics and electronics and his experience in building acoustic and electro-acoustic instruments of welded steel and

other materials. "I took a very scientific attitude about sound," he says. "The reason we called it a 'synthesizer' was because we started with the elements of sound. I know that synthesis means something else now: It's come to mean imitation. But at that time, the correct interpretation was the building of sounds from basic elements, like pitch, timbre, amplitude, and a few other things. We used envelope generators from the very beginning, and of course oscillators, filters, and voltage-controlled amplifiers. I called them 'gates,' but they're correctly known as voltage-controlled amplifiers."

Perhaps you're wondering where the keyboard is. Actually, there are two of them right there in the picture. But they aren't in the black-and-white form you might have expected. "The input devices were an important aspect to that system," Buchla explains. "They were all capacitance-sensitive touch-plates, or resistance-sensitive in some cases, organized in various sorts of arrays."

Subotnick explains the touch-plates further: "They were pressure-sensitive. One had 12 keys and you could tune it straight across the board. You could get a chromatic scale if you chose to. It had
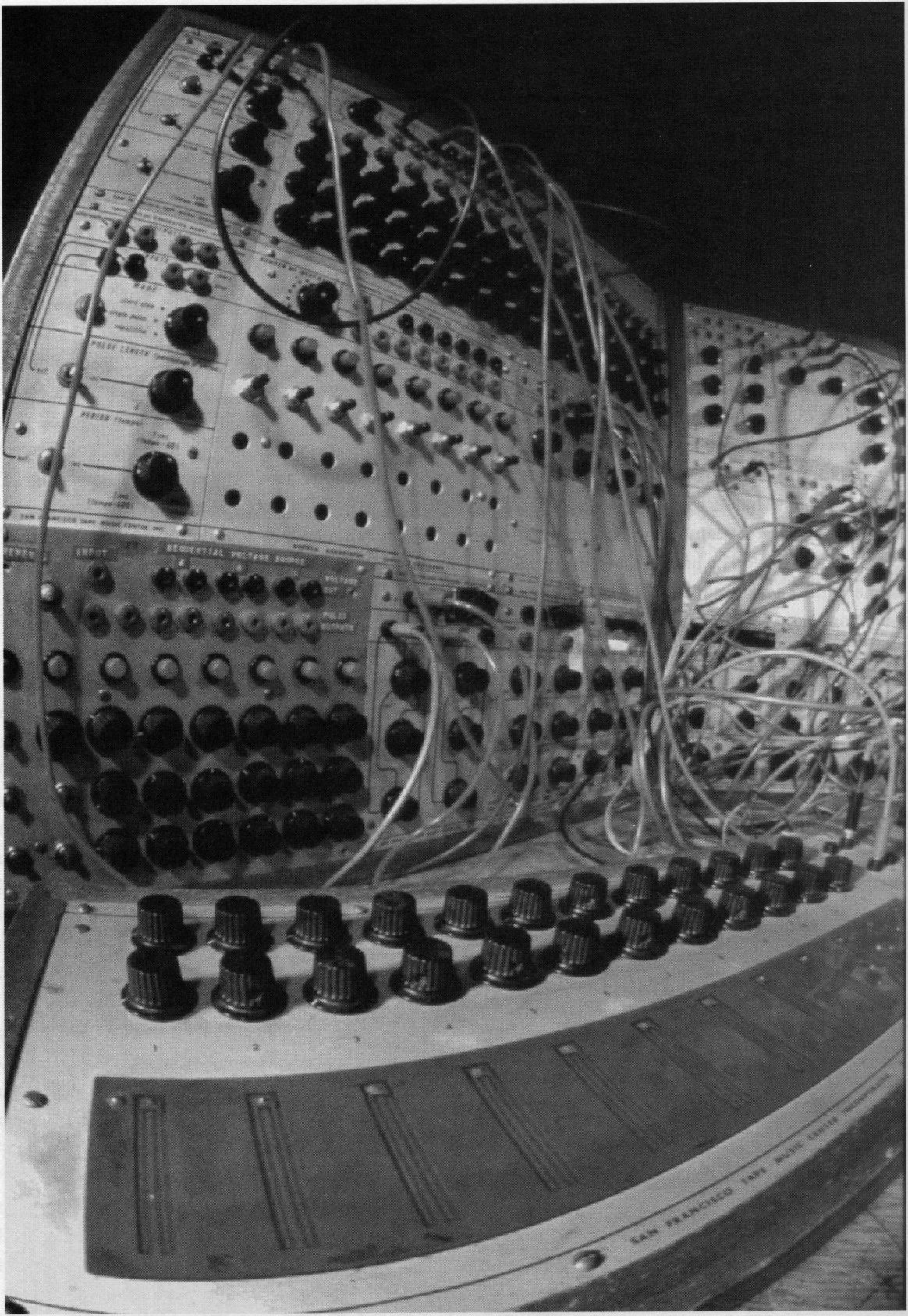
almost the same time as Buchla. "I think people feel more comfortable with the Moog," Subotnick suggests, "which is more like a traditional instrument. Moog's envelope generators controlled voltage-controlled amplifiers. The envelope generator in the Buchla wasn't intended to govern the loudness of the sound. It was a generic envelope that could be used for any number of things. For instance, I could use an envelope generator to control the pitch of an oscillator. I could route a single voltage from the sequencer for a stable tone, then use an envelope generator with a very fast attack and decay to create a transient at the beginning of the sound. It was much like dealing with an FM synthesizer today. All the envelopes that you have with an FM sound were equivalent to analog envelopes and they are applied in exactly the same way, except that you could apply them to anything, because they were wires. You could apply it to the filter, you could make an accelerando and ritard by applying it to the pulse generator that drove the sequencer."

In the summer of 1966, the San Francisco Tape Music Center was moved to Mills College in Oakland, California, where it was renamed the Center for Contemporary Music, or CCM for short. Meanwhile, Subotnick had moved to New York, taking along another synthesizer, very similar to the first, that Buchla built for him. Subotnick used this system to record two of his early albums, *Silver Apples of the Moon* and *The Wild Bull*. (Both of these are currently out of print, but Subotnick is in negotiations to get them and historical recordings made at the San Francisco Tape Music Center rereleased on CD.)

Buchla's first synthesizer has been in residence at Mills for more than a quarter of a century. For much of that period, it sat unused in a closet while students made use of newer technologies. Early in 1992, though, a CCM student pulled it out of the mothballs to see if it still ticked. "When I first fired it up, it made the most incredible sound," Christopher Koenigsberg tells us. "Just plugging in one oscillator and not even touching it produced this enormous range of variations, as if someone was triggering it with the sequencer. I guess it was heating up and cooling off, but it was wailing and making awesome music! It was like waking up dinosaurs."

Not much else worked on the instrument at that point, but things improved after a visit from Bill Maginnis, CCM's first technical director. Maginnis got the Buchla up and running again, and soon thereafter, Koenigsberg decided to use it—along with some '90s-vintage gear—to record music for his upcoming concert. "I modified some patches that somebody had already set up and basically improvised for a while, recording it onto DAT. I did a little bit of editing on a Macintosh with Digidesign's Sound Tools to filter out some 60-cycle hum and cut out a couple of dead spots. It came out pretty well, I think."

Koenigsberg sums up working with the old Buchla as opposed to today's digital synths: "This is more like taking a lump of clay and kneading it with your fingers on the knobs and touch-plates. You can interact with the sound in complex ways. The problem with most equipment nowadays is there's a lot of bandwidth coming out, they can make a lot of different sounds, and the signal-to-noise ratio is really great. But there are a lot of parameters to change using these awful little LCDs. You don't get the sense that you're getting any bandwidth from the performer—the bandwidth of a human making expressive motions."