SOUND MONEY

Bleeps, coos, grunts, pings, twangs—Suzanne Ciani synthesizes them all in the lucrative commercials that bear her unique signature

STEPHEN KINDEL

In her insulated laboratory, high above Manhattan's noisy streets, Suzanne Ciani works in the dark, synthesizing yet another sound. Digital waveforms march in jagged blue ranks across an oscilloscope screen. The red pinhead-size dots of excited LED's wink on and off. Wave envelopes and statistical tables appear and disappear on a CRT, leaving trails of fluorescent green. Her long fingers tripping across a computer keyboard, Ciani keeps reshaping the wave, constantly fiddling until the images satisfy the equations.

At last, all harmonics in order, she throws the final switch. From the innards of a New England Digital Synclavier II emerges an unmistakable sound—the fizz of cola about to be poured from a can. To Ciani, it is also the effervescent sound of money.

In her early thirties, Suzanne Ciani is the star of a tiny world of electronic wizards who combine music, engineering and imagination in creating high-priced sounds for television commercials. In effect, it's the art of taking existing sounds apart, isolating their components, mixing in others and then building new sounds that improve on the original. The new sounds grab attention, precisely the need of big advertisers seeking an extra edge for their products—a unique twang, coo, sigh or cheer that confers instant identity despite the cacophony and clutter of TV advertising.

Suzanne Ciani, working with partial timbres with volume and harmonic envelopes, synthesizes unique sounds for commercials on her $60,000 Synclavier II. "It lets you create sounds that can range from the unimaginable to the startlingly real," she says.

From the midtown studios of her production company, Ciani/Musica, Inc., or from her Park Avenue penthouse-atelier, Suzanne Ciani turns out a dazzling array of sounds marked by a special exuberance that has become her signature. It's not hard to identify a Ciani commercial. In her Atari commercial, for example, the big excitement comes from the sounds underlying the pulsating music—ghostly fadeaway booms, bright bursts of bleep as another space invader bites the interstellar dust. The sounds make the word "Atari" pretty unforgettable. The company turned to Ciani because, she says, "Atari's own game chips don't project as well into a commercial as the sounds I can make."

Ciani's recent sound feats include a talking dishwasher for General Electric Company, a chip "voice" for a new generation of Texas Instruments voice-synthesizer circuitry, the laser-cannon zings in Meco's disco version of the *Star Wars* theme and the sounds for a new line of electronic pinball machines from Bally Manufacturing Company. Ciani approached her Bally assignment as an exercise not only in designing sounds but in composing music as well. "I took the sounds I designed for the chip—the pinging and the chime sounds that the ball makes when it registers a score on a conventional machine—and integrated them into a musical composition. When the ball is in play, the machine generates musical patterns." The music clearly gives Bally pinball machines a special appeal. Unlike other composers, who are totally bound by formal musical notation and traditional instruments, Ciani works her virtuoso performances on the speech-synthesis chip, which came into existence only about five years ago and can be programmed to bring forth almost any sound the mind can conceive. "Going to chip level," as Ciani describes it, "is the most exciting, timely thing I can do."

Going to chip level achieves a remarkable compression of information in a minuscule space, but Ciani's key problems remain—how to compose sounds and music. Using a microprocessor to generate a sound is fairly simple, especially with the latest chips. But using a computer to compose music is quite difficult (*see box*). Moreover, each of Ciani's compositions requires sounds designed for a specific use. With the "pop and pour" of Coca-Cola bubbles, the sound had to work within a variety of musical styles, in different keys and with and without the visual cue of someone opening the can, so that it could be used with equal facility on television and radio. "In addition," she says, "it had to read fast and it had to be better than real."

To get a sound that is better than real, Ciani works most often with her Synclavier II, a

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PHOTOGRAPHS BY JOHN MARMARAS/WOODFIN CAMP


4 Partial timbres
Volume envelope
Harmonic envelope
Tuning: 440.0
Ratio: 4.000
Decay: .000
Portamento:
Vibrato:
Sin 6.00 .07 530
Tuning: 440.2
Ratio: 4.000
Decay: .000
Portamento:
Vibrato:
Sin 5.74 .13 199
Tuning: 439.8
Ratio: 4.000
Decay: .000
Portamento:
Vibrato:
Tri 6.16 .09 315
Tuning: 440.0
Ratio: 4.000
Decay: .000
Portamento:
Vibrato:
Sin 4.16 .11 233
0
500
1000
0
10000

$60,000 piece of hardware and software that represents a major breakthrough in sound production. Unlike the earlier analog Moog synthesizer, which is familiar to rock-music fans, or the second-generation analog-digital combination the Buchla synthesizer represents, the Synclavier has moved beyond to a completely digital system that builds sound additively. "You can do wonderful, wonderful things with the Synclavier," she says. "You can add up to 32 sine waves, so it's strong in timbre design, which allows you to make very clear distinctions among instrument colors. That, plus a frequency-modulation program and a system for combining up to four partial timbres with volume and harmonic envelopes, lets you create sounds that can range from the unimaginable to the startlingly real. I get a string sound that has the articulation of the bow and is absolutely real. In fact, when you think about what this technology can do, real is almost boring."

In her tightly packed sound laboratory, which doubles as a living room, Ciani plays with equipment and jots down desired improvements. To stay at the leading edge of the technology she buys new equipment about every six months.

Ciani is extending sound technology in dynamic and often undreamed-of ways.

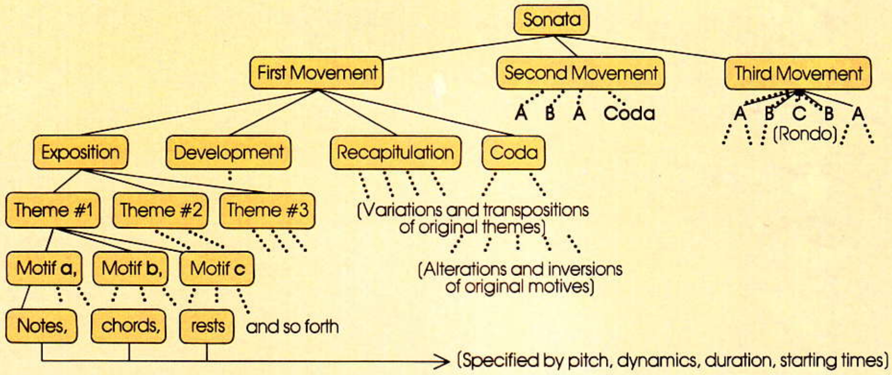
When Ciani receives a new piece of equipment—a harmonizer, a vocoder, a time modulator, digital delays—she plays around with it and then begins jotting notes on desired improvements. If Mark Clayton, her firm's software specialist, can't fulfill her "wish lists," a quick call to the manufacturer usually brings an engineer running. It's fun to work with Ciani: she is extending sound technology in dynamic and often undreamed-of ways. For Ciani, the synergy that results has a price, albeit a welcome one. She has to keep learning more, buying more and selling more. To stay at the leading edge of sound technology she turns over her equipment about once every six months, and she must constantly tackle new business to sustain her gains.

In her view, big companies pay a higher price: arrested development caused by their need to amortize vast R&D expenditures. Slow to shift to new circuit designs, she says, they are soon undercut by small, new companies. "Atari, for example, developed their own sound chip and now they're stuck with it. They have to use it for their next generation of games; they can't afford not to. That opens the door for competition."

Holding on to sound equipment too long also retards the progress of computer-assisted musical composition, Ciani says. She points to conductor Pierre Boulez's Institute for Research and Coordination Acoustics/Music in Paris. "They invest in one kind of hardware, and when they have to stick with it because of budgetary restrictions, they commit themselves to the hardware and develop software only within that realm. That drives the music in certain directions in which it might not go if it were under the pressures of commercial turnover."

Despite her success as a sound entrepreneur, with a client roster of Fortune 500 companies, Ciani sees herself as a serious musician, just as she has ever since she began studying music as a child in her native Boston. She first encountered electronic sound while majoring in composition at Wellesley College. "I saw something at MIT that one might call a very primitive version of a synthesizer. This crazy person over there was using his physics funds to design sounds and had built a machine to do it." As a graduate student at the University of California at Berkeley she discovered Mills College's Tape Music Center and began to take electronic composition seri-

Electronic Etudes: The Art of Computing Music



The first problem in synthesizing music—generating a sound—has been solved since the invention of the telephone. In fact, any device that can transform electrical energy into mechanical energy or vice versa is capable of producing a sound, which is nothing more than the mechanical vibrations of air. Such energy-converting devices, called transducers, can be attached to a microprocessor that regulates voltage, so that fluctuations in voltage are represented as sounds. The next step—accurate tones—is a matter of writing the appropriate software. Beyond that, however, music synthesis gets more difficult.

Probably the best approach to computer-generated music is to treat composition in a hierarchical manner, since virtually all sophisticated programs are themselves hierarchical in nature. That is, a set of instructions is designed to call up one subprogram that calls up other subprograms in a sequence that must be properly executed before the composition returns to the main program sequence. Music generally exhibits a hierarchical structure. Thus in developing algorithms that shape number patterns into a structure of musical composition, you quickly discover the advantages of hierarchical analysis.

In a sonata, for example, the entire composition is a hierarchy of subunits, or branches, and the subunits of one branch are usually found in identical or varied forms in other branches. As a result the themes contained in the exposition are also heard in the development, recapitulation and coda but in different keys, orders and tonalities. Mozart employed this hierarchical structure in the late 18th century when he developed a gamelike system for composing sonatas using only a set of cards, on each of which was a musical phrase, and a pair of dice. As a would-be composer threw the dice, he referred to a set of tables that told him which card to pull. When the sequence of dice-throwing was completed, he could sit down at the piano and play a sonata that obeyed all the rules defining sonatas. Mozart's "melody dicer," as the diversion was called, enjoyed a brief rage among the German and Austrian bourgeoisie, who regarded the ability to make music as a mark of cultural attainment.

In computing music, so to speak, the building of a composition resembles the accumulation of a data base. Each musical event must be associated with a description of its parameters down to the note level, where the description of a particular sound requires such details as pitch, loudness, duration and timbre. Each note's specifications must be stored in numeric form within the computer's memory and compiled according to the routine describing the rules of composition of the particular musical form. At the point when all note events have been assembled in their proper sequence, according to the rules, music has been written. For the electronic composer, the final touch to the piece is to translate each of those notes into the voltage that makes a machine produce the corresponding sound. —S. K.

The hierarchical system of subprograms that generates computer music resembles Mozart's "melody dicer," which was used to compose sonatas.

ously. Soon she was studying digital theory with Bell Laboratories' Max Mathews, who was then working at Stanford University's Artificial Intelligence Laboratory in Palo Alto. Next, she worked for Donald Buchla, whose sophisticated synthesizers greatly extended the range and capabilities of electronic composition.

Right now, Ciani is finishing tracks for a record of original compositions—"different from what people expect of electronic music, much more sensual." The work reminds her that technology has not changed certain things for creative people. "Picasso made sculpture out of bicycle seats, and whatever was put in his hands became art. But simply putting more equipment into the hands of more people won't make more artists." It might, though, stimulate individual creativity. And that appeals to her: "I'd like to see technology be a thing of fantasy and expression. That, I think, is its ultimate strength." □