

AUTOMATION



I automate whatever can be automated to be freer to focus on those aspects of music that can't be automated. The challenge is to figure out which is which.

Laurie Spiegel



Barrel Organ

Player Piano





Conlon Nancarrow

temporal dissonance

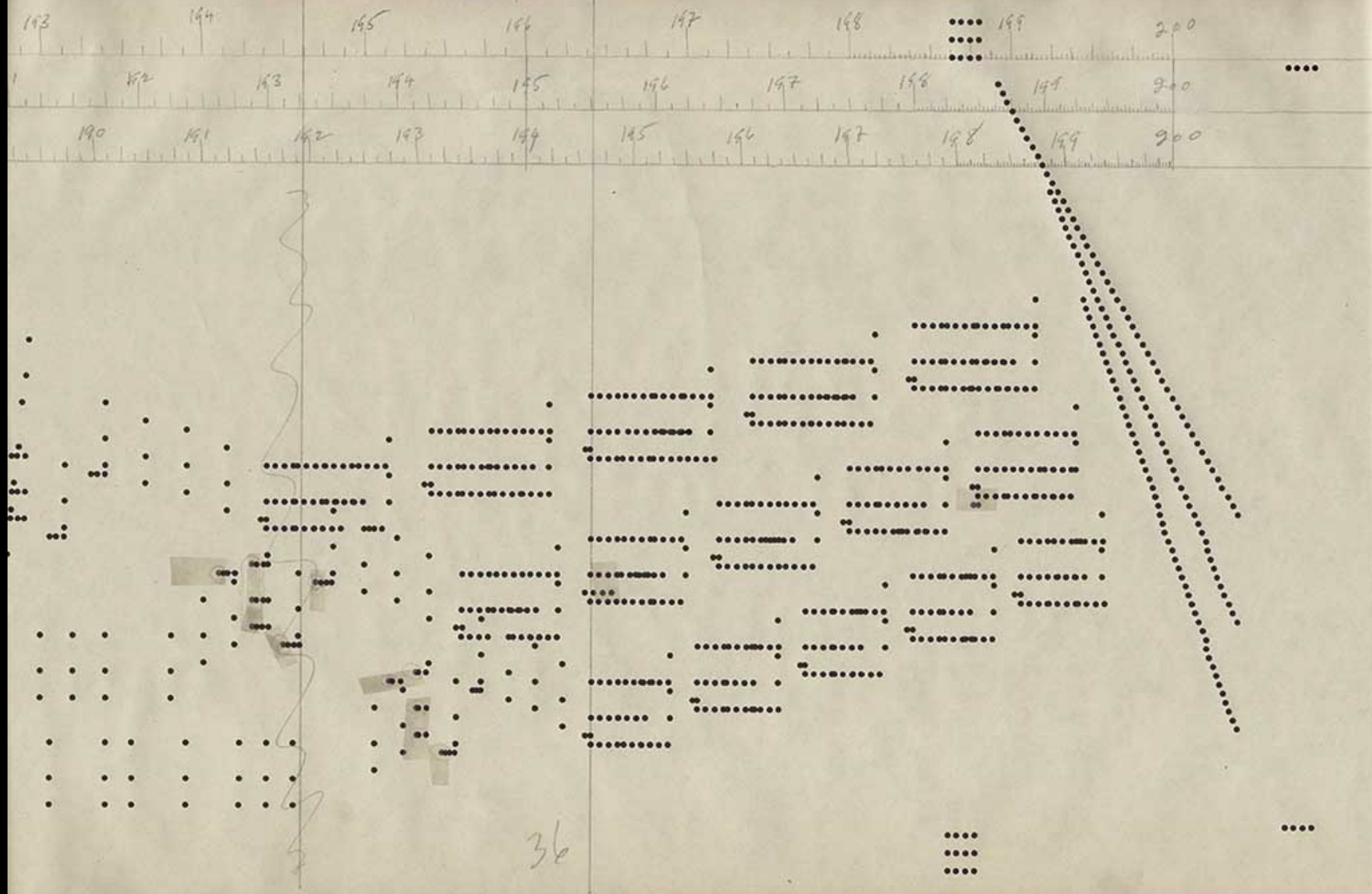
Often used poly-tempi and poly-meter

Complex temporal canons

Precise ratio-based acceleration and deceleration

listen to Study 21





TAPE LOOPS VS. SEQUENCERS

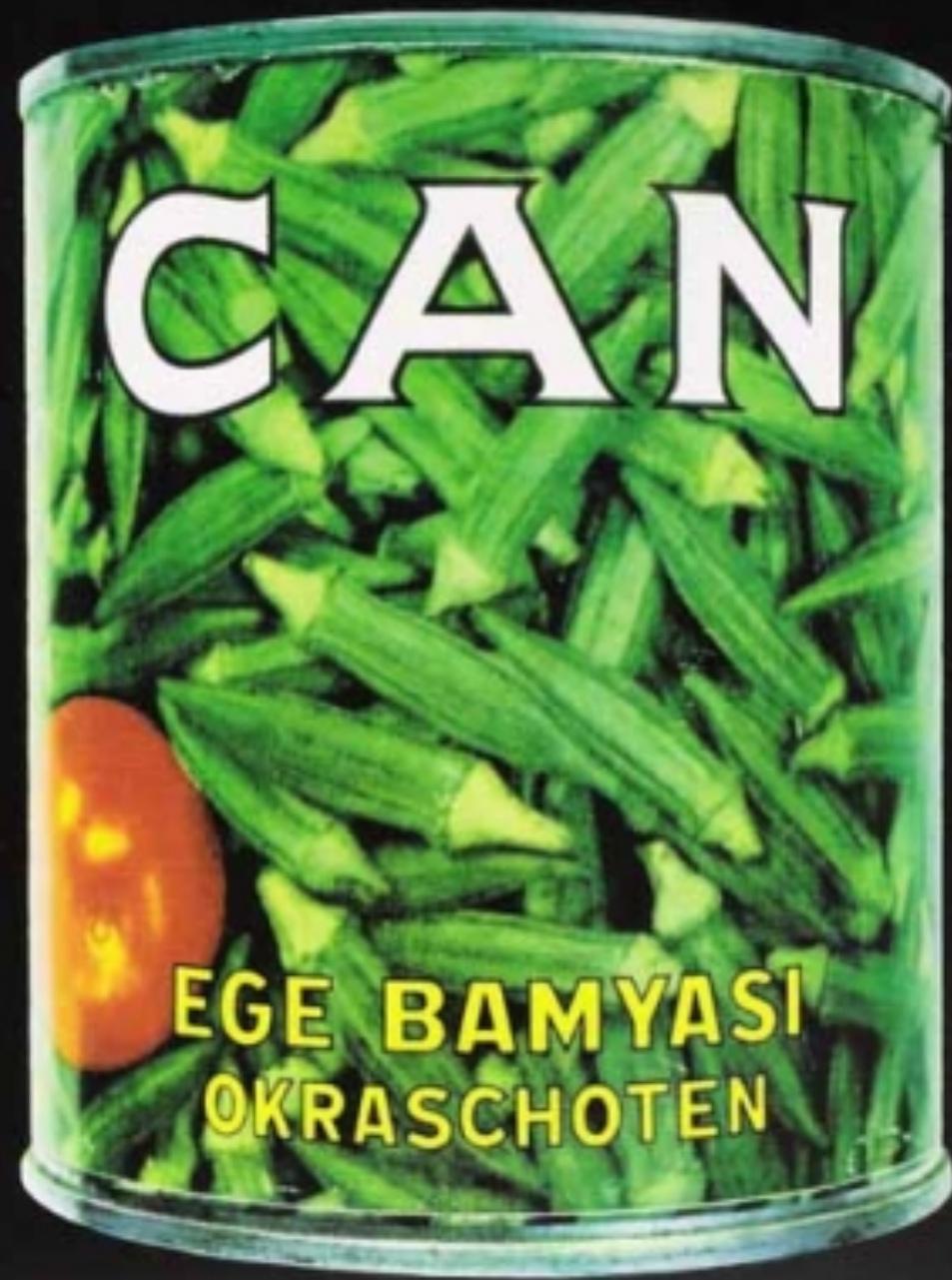
THE GERMAN SCENE

Stockhausen a major influence

Notable Groups

- Can
- Faust
- Neu!
- Tangerine Dream
- Kraftwerk





CHARACTERISTICS OF THE GERMAN SCENE

- Rock band instrumentation with electronics
- Tape Manipulation
- Extended Improvisations
- Mechanical Beats
- Ambient Textures

Can - Ege Bamyasi

collective spontaneous composition

listen: Spoon

phaedra

By tangerine dream

Tangerine Dream



Sequencing



BPM
115.0

FINE
ADJUST



STEPS
32



SYNTH

SEQ

VEL

MIDI



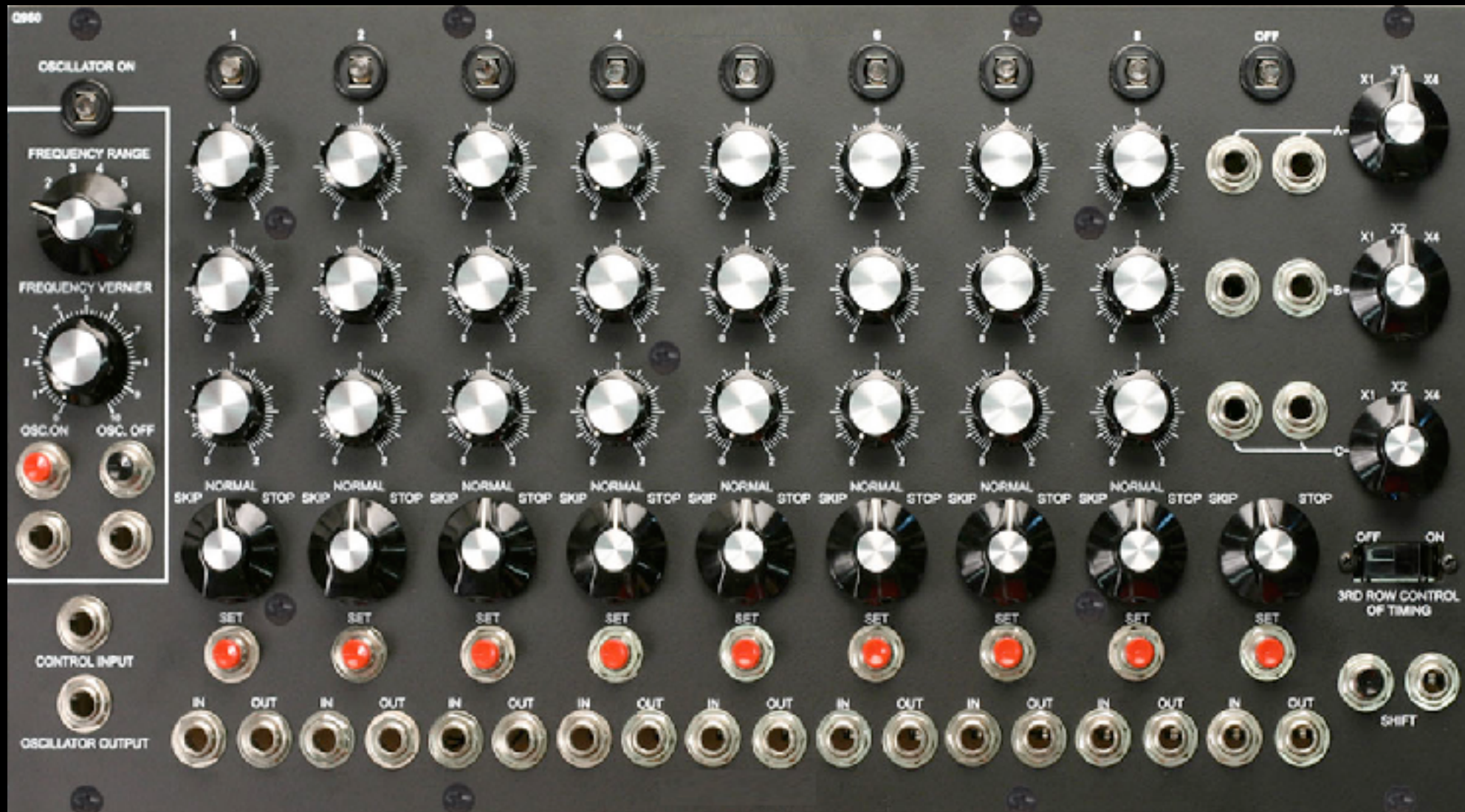
SONG

Area 25

Moog 960 Sequential Controller (1968)

Three rows of eight potentiometers, each sends out a voltage.

A control voltage “clock” controls the speed. Bottom row positions for “play,” “skip,” or “loop.”



Examples

Three rows could play three note chords if all are sent to **VCOs, Voltage-Controlled Oscillators**.

One row could control the pitch of a melodic sequence, while the second controlled filter cutoffs, while a third controls a **VCA, Voltage-Controlled Amplifier**.

Moog 960 Sequential Controller





Kraftwerk





Philosophy

"Industrial folk music"

Technology as art, as it is, not resembling nature.

Cyborgs (biological and artificial), Posthuman

humans fused with machines

"Machines ARE funky"



Autobahn (1974)

the first fully synthesized pop song.

mostly mechanized speech, one of the first uses of the **Vocoder**

homemade electronic percussion pads, as well as Moog bass and phasing on the synthesizers for a swirling effect.

Kraftwerk's first custom-made vocoder



Vocoder

“voice” + “encoder”

Developed in 1928 at Bell Labs as a way to encrypt voice communication.

Kraftwerk's first custom-made vocoder



Sound is passed through a multi-band filter, with each band then going to an envelope follower, which controls then filters a different sound. The result takes the spectral envelope of one sound, and maps it onto another.



The Man-Machine (1978)

The Robots, the single from Kraftwerk's 1978 album *The Man-Machine* advanced the band's philosophy about the role of technology in culture:

to become fused with the machinery, one with technology

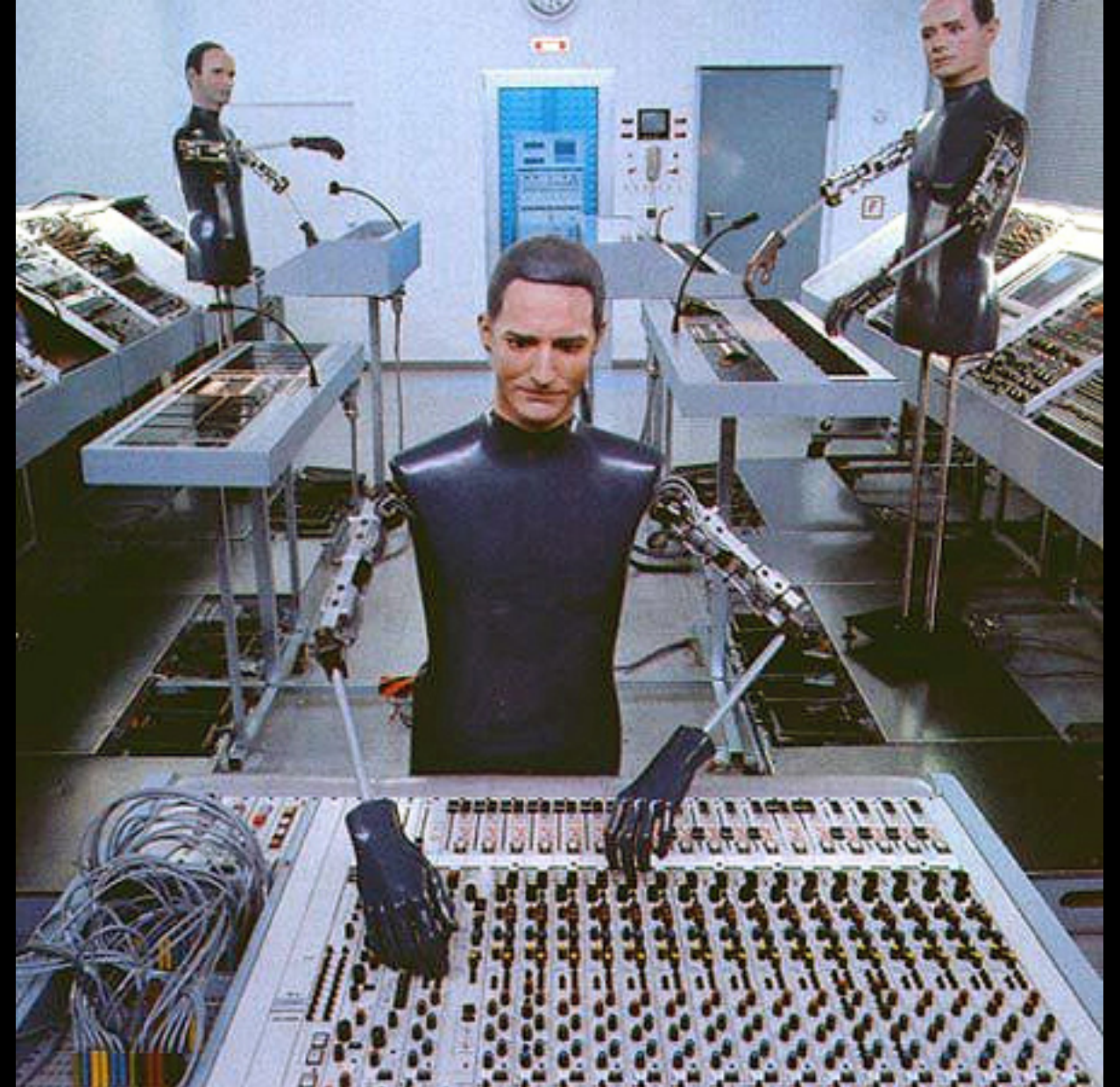
referred to themselves not as musicians, but as "sound chemists"

stated that the instrument they collectively played was "the studio"

watch: The Robots



Kraftwerk would push their concept of transformation into robots by actually replacing themselves with robots during concerts.









Kraftwerk's Influence

Kraftwerk had wide-ranging influence. In Europe, they helped spawn synth-pop and industrial music. In the US, their sound was incorporated into dance music: electro, hip-hop, and techno.



Planet Rock (1982)

Afrika Bambaataa & the Soulsonic Force

Planet Rock fused hip-hop with Kraftwerk (electro)

In addition to being the first hip-hop song to use a drum machine, “Planet Rock” was an early example of the prominent use of sampling - the song borrowed elements from two Kraftwerk songs: the main theme from “Trans-Europe Express” was sampled directly and the beat from “Numbers” (from Kraftwerk’s 1981 *Computer World*) was imitated.

Excerpt from “Numbers”



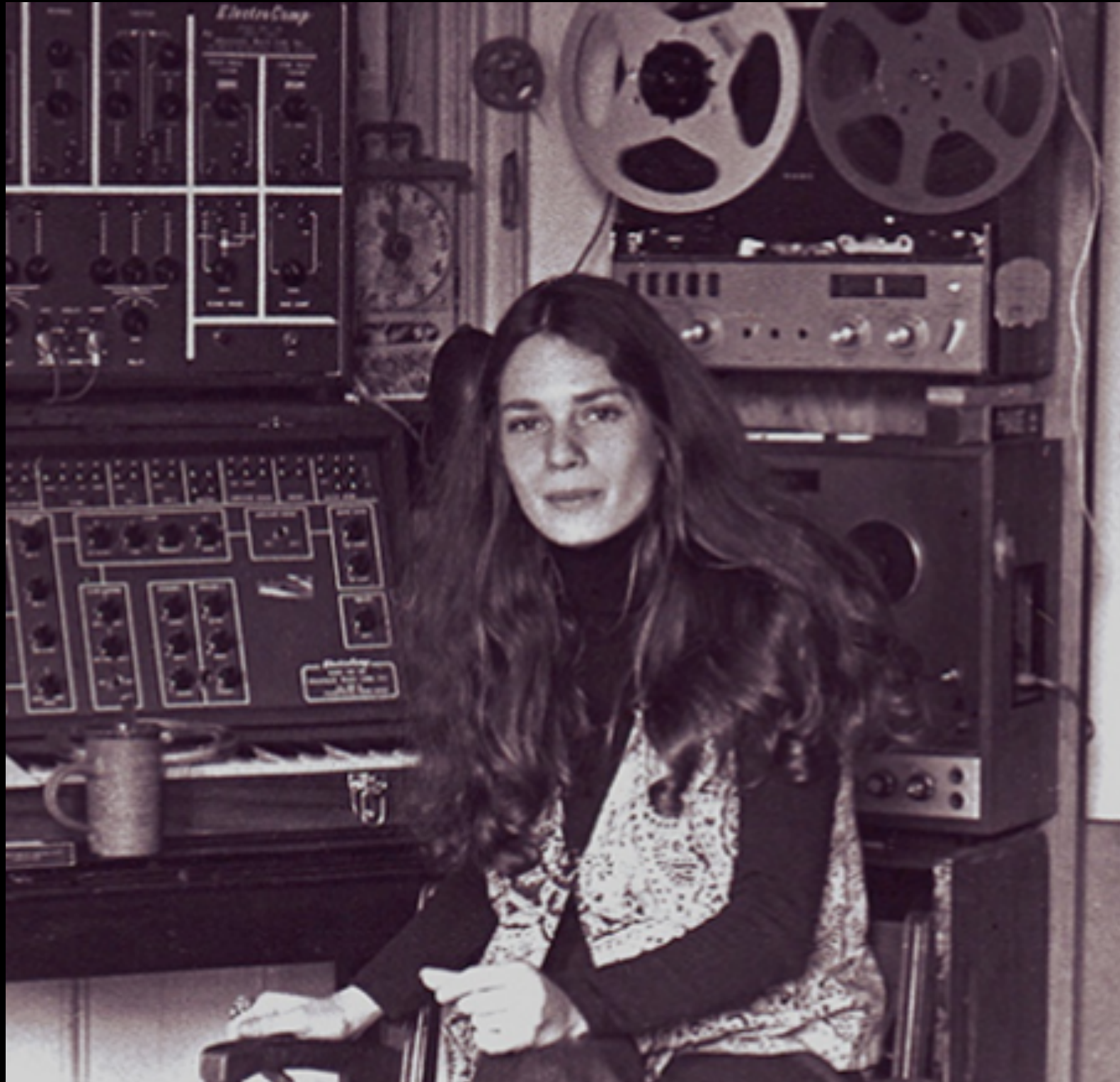
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Excerpt from “Planet Rock”



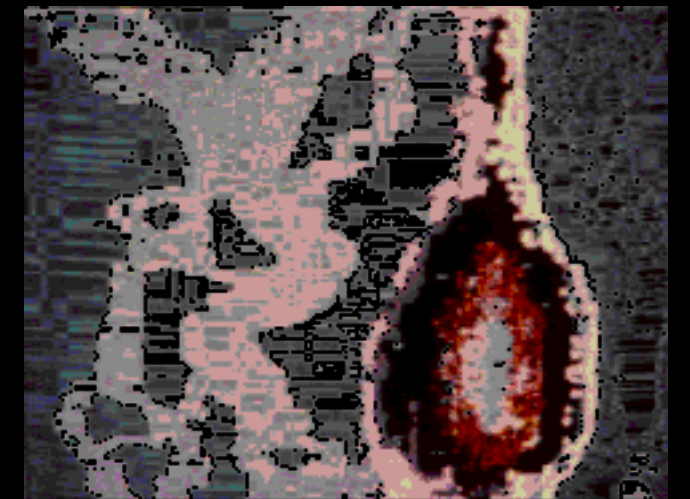
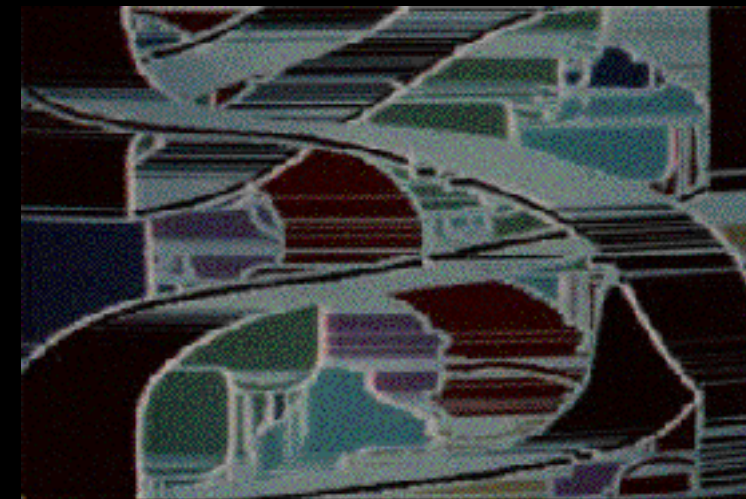
LAURIE SPIEGEL

worked with Max Mathews at Bell Labs

pioneered hybrid digital/analog composition methods

built *Music Mouse - An Intelligent Instrument* (1986)

experimented with early computer animation



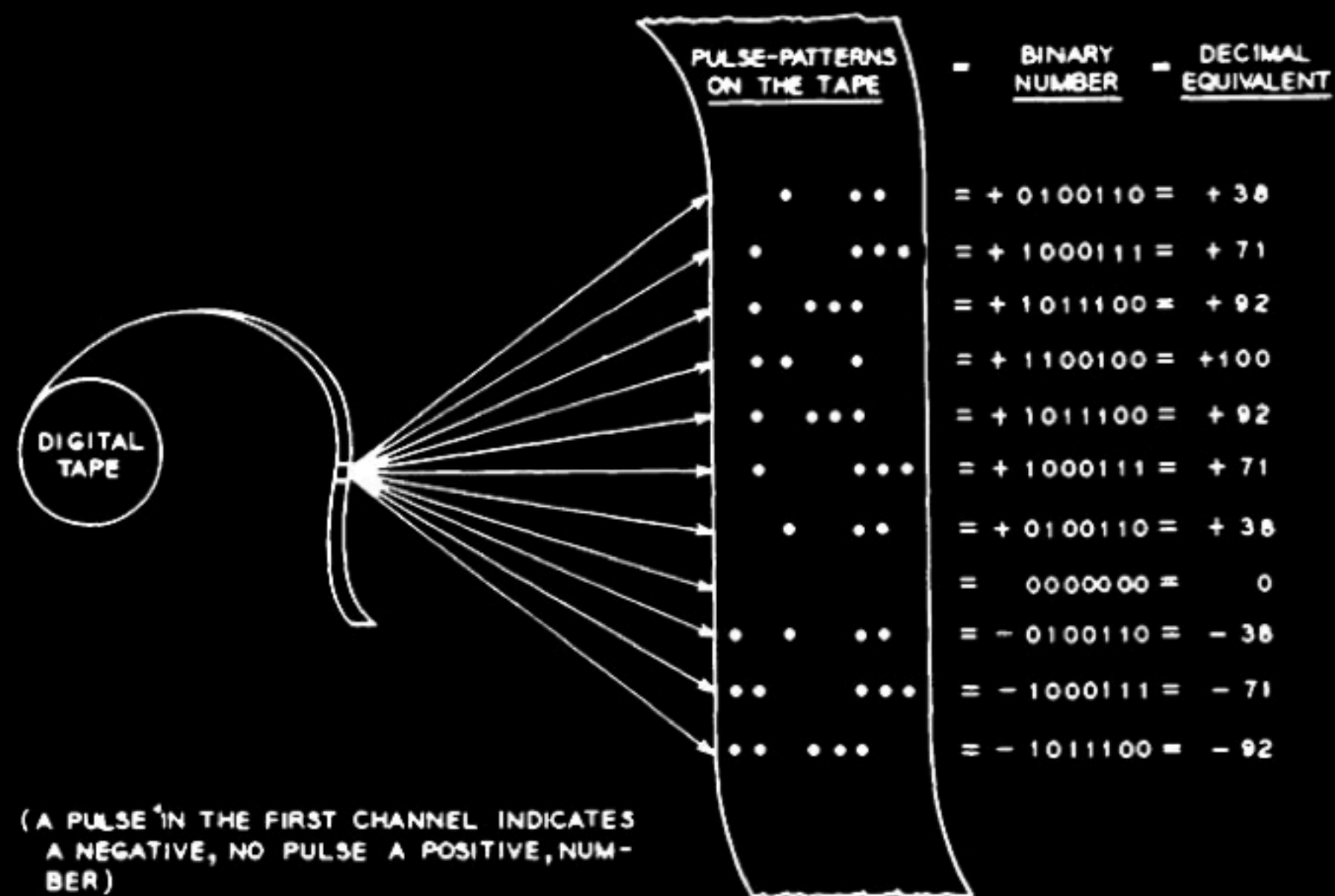


FIGURE 3
REPRESENTATION OF SAMPLE NUMBERS ON DIGITAL TAPE

**Laurie
Spiegel**

The

Expanding

Universe

LS: How would you describe your music?
LS: I wouldn't. People often ask me to do that, and it seems impossible. Music isn't verbal or conceptual. I try to get as close as I can to certain qualities, and I've found these in a variety of styles. I have also found they don't require any known styles.

LS: Well, if you won't describe your music, what's it for?
LS: This music is for listening, though I sometimes write music which is for the enjoyment of playing, instead, usually for piano or guitar.

LS: When I asked that, I meant what instrument is it for?
LS: It's composed specially for record players, and I made it on a computer.

LS: Then you've answered my first question, after all. It's electronic music.
LS: That's true, but that isn't a description of the music, so I still haven't answered your question. Electronics aren't a style or a kind of music any more than a piano is. They're a way of making sounds.

LS: You're being pretty evasive about what your music is like. Will it help to ask in what school of composition were you educated?

LS: A lot of people helped me learn. John Duarte, with whom I studied classic guitar in London, was the first person to encourage my composing and teach me some theory and counterpoint. When I told him I'd been

writing music down a bit, he said, in that case, I was a composer, and if I wanted to become proficient at composing, I should practice by writing a piece every day, whatever I liked, no matter how short or simple. Just like practicing the guitar. I did my best to comply. Writing every day turned out to be good training for professional composing, as composers have to be able to create music fast, for deadlines. Composing is active, not passive. You can't wait for inspiration. Later, at Juilliard, I was shocked at how students were allowed to work on a single piece all year, while I was paying my tuition by composing an educational filmstrip soundtrack every month.

LS: Who else did you study with?
LS: Aside from my main and most important teacher, Jacob Druckman, who also took me as his assistant and to whom I owe a lot, those who taught me the most include Michael Czajkowski who taught me to use the Buchla synthesizer in what was left of Mort Subotnick's studio at NYU, and Vincent Persichetti, and Hall Overton who each took time to sandwich into their busy schedules a free 5 minute lesson here and there. Max Mathews enabled me to have access to computers and to learn to use them for music. From Emmanuel Ghent I learned some very important ideas about the use of computers in composition. After I'd been classicized (I didn't start out

THE EXPANDING UNIVERSE

LAURIE SPIEGEL

Written between 1973-1978

Composed using the Groove system developed by Max Mathews

G.R.O.O.V.E

Generating Realtime Operations On Voltage-controlled Equipment

"I automate whatever can be automated to be freer to focus on those aspects of music that can't be automated. The challenge is to figure out which is which." L.S.