Liz Philips In New York City
Sound Articulates Space

. . . perhaps the most important aspect of her work: that space is not only expressed as sound, it is, in fact, *made of sound.*

by RANDY COHEN

Nineteenth century composers wrote works to be played in laboratory conditions. The concert hall functioned as a carefully controlled setting to shield the audience from all sounds other than the composition itself. In much the same way, nineteenth century scientists studied individual phenomena in isolation from the environments such phenomena regularly occured in. More recently, particularly since the influence of John Cage, composers have taken their work outside of these neutral spaces and allowed it to exist in a larger acoustic context. Likewise, contemporary scientists examine phenomena as they interact with their surroundings.

The works of Elizabeth Phillips not only co-exist comfortably with their surroundings, but, in a large measure, they are *created* by that interaction. Ms. Phillips creates spaces articulated by changing sounds responding to the presence of people within those spaces. They are three-dimensional spaces, approximately the size of a six-foot cube, created by radio frequency capacitance fields, somewhat analogous to giant theremin antennas. The activity of people within the field modifies electronic sounds made by a synthesizer. These are spaces to be explored with the ears more than with the eyes. They are sensative to variations in people: their volume, surface area, conductivity, weight, distance from the ground, shape (especially sharp edges). Most of these parameters are time determinate.

She says of her work:

"In my sound installations, the presence and movement and/or the absence and stillness of the audience in areas of the room determine the combinations of tones of the sound-space. The audience finds — at the same time — that those sounds function to reveal changing three-dimensional forms which vary in depth and time."

PHOTOGRAPHS BY MARY LUCIER

An interactive R.F. capacitance system, Nam June Paik participating, the Kitchen, N.Y.C.

As you move through the space you discover its properties, perceive its edges, notice certain sensative areas, and you learn all of this in the form of changing sounds. You are immersed in an acoustic space, in a system that is responsive to your actions.

Ms. Phillips designs her works for a variety of settings. She has composed pieces for dancers, for outdoor public gatherings, and for galleries. She installed "Broken/Unbroken Terracotta" at the Lions Gallery of the Senses in Hartford, Connecticut, in September of 1975. The composer, Earl Howard, a sometime collaborator with Ms. Phillips, described the work:

"Here is a fluid composed of sounds, whose shape is determined by its container. I will say only that a container is anything which actively holds sound. When there is stillness in the room one may notice that there are eddies, currents, some internal motions, which seem to flow independently. If one should move to interrupt a particular movement of sound he will find himself in a position of partial or total control over the substance of his space (this sound fluid)."

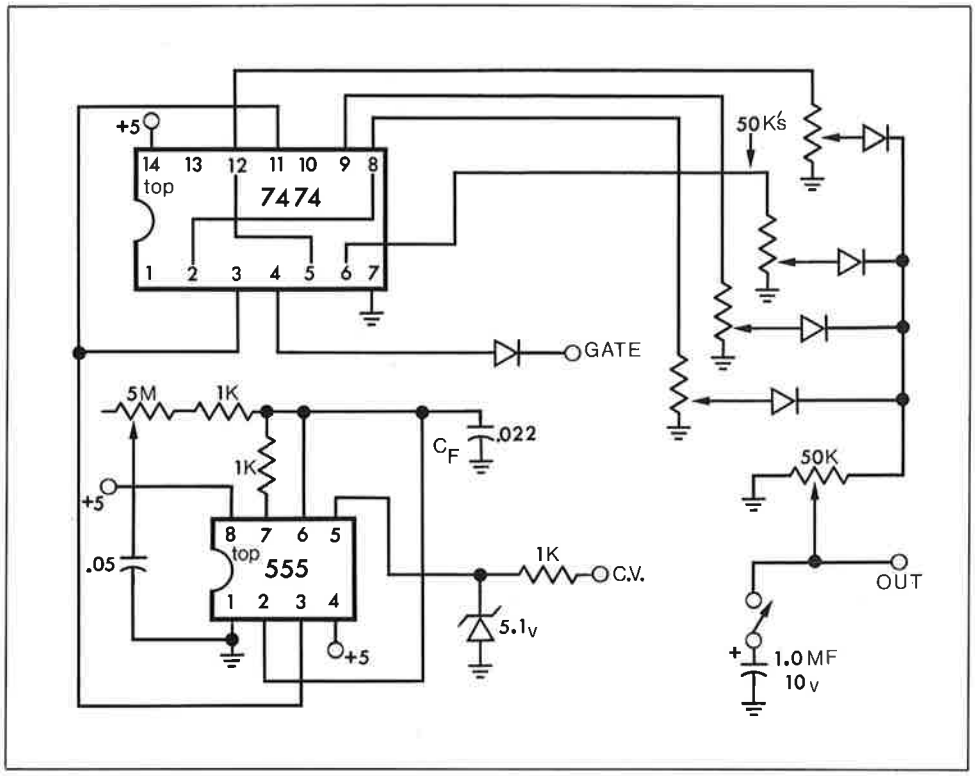
Her pieces function as coherent musical entities, but Ms. Phillips cautions that: "It would be ridiculous to tape it, listen, and analyze my work as music. You would only be dealing with half of the piece." The other half, the spatial aspects, are discovered by physically exploring the space. However, her work can not be regarded simply as sculpture, as painter Cora Cohen indicates: "It isn't music or sculpture. You could treat it like music, and just listen, but . . . ."

Her work is to be approached by involving yourself directly and actively with the space, by moving through it and experiencing its dimensions, its changes of sound and shape, and the underlying systems that determine these interactions. As you do this, you find that the sounds articulate the space, but not as a secondary characteristic, rather, in many ways, the sounds *are* the space, or, as Cora Cohen described it: "The sounds and the space, in a big way, are meshed."

Ms. Phillips created a space that was

Walking Ring Sequencer

by JOHN BLACET

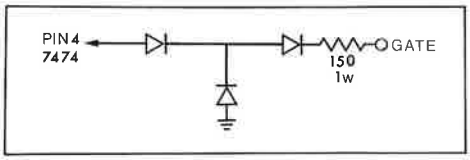


Walking ring sequencer schematic.

This simple circuit is quite useful for generating a number of functions. It can be used for trilling, vibrato, or higher frequency FM. It will also provide voltages for note sequences, gating, controlling filters, VCA's, or any other V.C. module.

A 555 timer is used as a simple V.C. clock, with the 5 meg. pot. determining sequence speed along with the voltage at the C.V. input. This input will vary the speed with a positive voltage applied. This function is non-linear, has a 3:1 range, and increases speed as the voltage decreases. With the component values shown (5 meg. and .022), the range is 2 Hz to 7K Hz. Larger values of C_F will result in slower rates, and smaller values, faster ones.

A 7474 flip-flop is wired as a walking ring counter. The outputs overlap, so the final output is apparent as four steps and moving one of the four level controls moves the whole sequence. The primary disadvantage here is that individual notes are difficult to tune accurately, so that sequence should be run fairly fast in order to minimize note inaccuracies when controlling a VCO.



Optional gate protection circuit for negative voltages

The sequencer can be turned off at the gate input with a ground. No connection or a positive voltage here will allow the circuit to operate. This input is protected from normal synthesizer positive voltages; but negative voltages should not be applied here, unless you use the optional gate protection circuit.

The 50K pot. on the output controls the level from 0 to 3.5 volts. The 1.0 MF capacitor and switch are used to provide a slide function.

The circuit can be assembled using a P.C. board, or as shown in the photo, a perf. board and wiring pencil or wire wrap. This is simpler and more compact especially if you are only building one. A discussion of these wiring techniques is provided in the April, 1976 *Popular Electronics.* This magazine is also a good place to look to for parts.

I used some unusual miniature 50K pots, for compactness. These are quite usable without knobs, but regular pots can be used for better control. The miniature pots are available from Poly-Paks Inc.

Note the power supply is 5 volts and must be regulated. Higher voltages may destroy the 7474 I.C. If 5 volts is not available use a LM309K, LM340T, or LM340K, 5 volt voltage regulator.

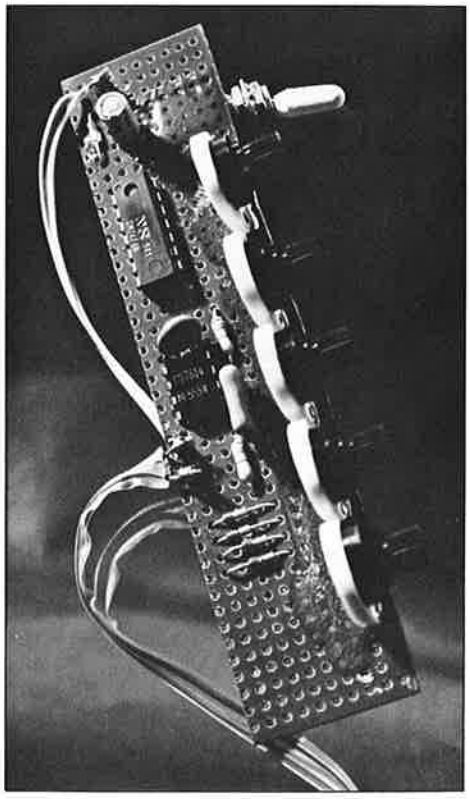
Finally, if you have any ideas for unusual modules that you would like to see plans for in *Synapse*, or would be interested in a parts kit for this project, write to me in care of *Synapse*, P.O. Box 359, N. Hollywood, Cal. 91603.

PARTS LIST:

1 7474 Flip-Flop
1 555 Timer
5 General Purpose Diodes
1 5.1V Zener Diode
1 .05 Ceramic Disc
1 .022 Mylar
1 1.0 MF 10V Electrolytic
3 1K Resistors ¼ Watt
5 50K Potentiometers Linear
1 5 Meg. Potentiometers Linear
1 SPST Switch
3 Jacks

OPTIONAL CIRCUIT

3 General Purpose Diodes
1 150 1 Watt Resistor



One possible way to construct the sequencer. Some parts, including the 5 meg. pot, are not shown.

The motion of the people eating dinner, as they raised a glass, or moved a knife, was sensed by the field, and resulted in a change in the pitches of several oscillators.

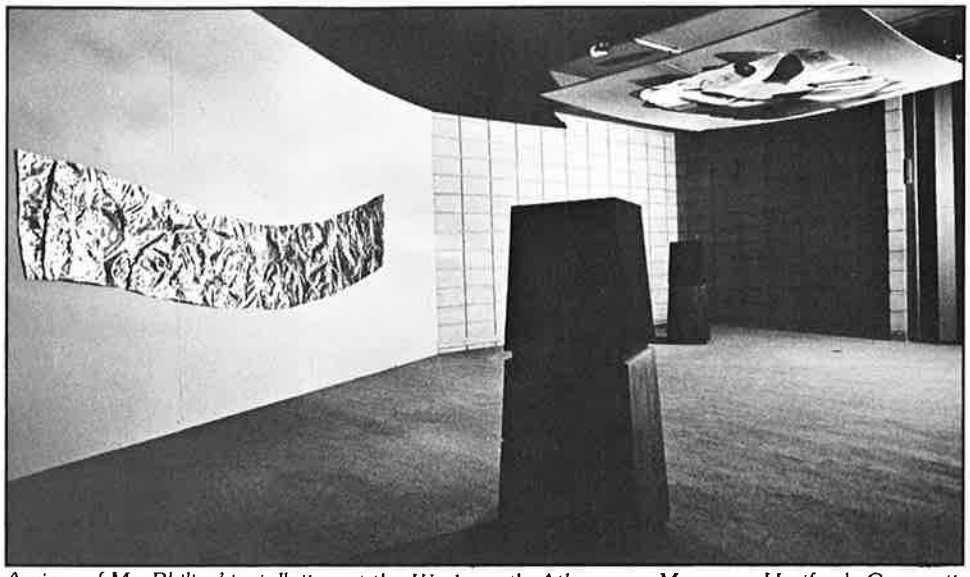
tune very high frequencies to a narrow range of sensitivity."

It is only by making her fields unshielded that she is able to create spaces responsive to their surroundings. She is concerned with: "A system open to the environment. Extract a changing structure, as a sculptor extracts a shape from a stone, but structures that can change as radically as the environment changes."

She is also concerned that her works exist on the human scale, that they: "Don't become monumental — that you can understand small distances and proportions."

When Liz began working with responsive spaces, she explored three basic technologies: light, radar, and RF capacitance fields. The light works relied primarily on lasers, both as a sensing device, and to display changing shapes and colors. She rejected this approach, believing that the lights imposed themselves too strongly on the space, making the shapes too overt, too apparent. The radar sensed motion by measuring the doppler shift in micro-waves reflected from objects. It was an excellent system to cover very large areas, and very broad motion. However, it could not distinguish between a person and a thing, as could the capacitance fields, nor could it operate with enough sensitivity to reflect small gestures, and so this system was also rejected. It was in the applications of the RF capacitance fields that she has found her greatest successes.

There has been a progression in the sophistication of her musical materials. Her early works used only a few tuned oscillators that varied in pitch, while recent works use a complex synthesizer of her own design and construction. One such early piece was the "Electronic Banquet," performed at the New York Avant Garde Festival in 1971. People were invited to attend a formal dinner. The antenna of a capacitance field ran along the dinner table, under the table cloth. The motion of the people eating dinner, as they raised a glass, or moved a knife, was sensed by the field, and resulted in a change in the pitches of several oscillators. Her first opportunity to use complex synthesizers came the following year. Joel Chadabe, the director of the electronic music studios at the State University of New York at Albany, invited Ms. Phillips to work at his facility. She now builds most of her own sound equipment, as well as the capacitance fields.



A view of Ms. Philips' installation at the Wadsworth Atheneum Museum, Hartford, Connecticut, November 1975.

Her work is, perhaps, best experienced in galleries, where, she says: "You can see it if you move inside and explore it or if you sit outside and watch others move. Since the sounds are produced by the sum of the movements of many people, it is sometimes easier to tell from the outside. John Baldassari (the conceptual artist) came and wouldn't go inside the field, he sat for several hours. I think he understood the space . . . or he was taking a nap."

She is currently working on a large piece to be installed for the entire month of April, outdoors, at the City University of New York Graduate Center on 42nd Street between 5th and 6th Avenues. This piece, "City Flow," uses time intervals determined by traffic light patterns throughout the city of new York. It will include an interactive space created by two overlapping RF capacitance fields to define near space, and a doppler shift radar unit to create the far space. The fields will be sensitive to people moving within them, and the sounds will be further modified by the information flow of the traffic lights.

"The Traffic Bureau is now using sonic scanners to sense car speed and density on main streets. These details travel as pulses on phone lines to high-speed computers where the information is automatically accumulated, sorted and resolved. The resulting decisions are fed back, separately, to each individual traffic light within the system. Through this particle/global approach, traffic, in essence, controls its own rate of speed, as the lights are constantly adapting to the changing environment. The city, thus, can act as a living organism whose fundamental structure is a composition of physical modulations and dynamic transformation. Each musical composition will directly employ clusters and intervals of this city traffic information, and directly transform them into fundamental pitches, overtones, harmonic content, loudness, durations and rhythms. There will be constant flow/change; green lights are travelling up and down the avenue — somebody is always moving — there is always change."

Liz is presently working on the problem of the specific sound material to be used, under a grant from the National Endowment for the Arts. The material will include concrete sounds in the area, particularly the sounds of traffic, and also electronic sounds and the saxophone playing of Earl Howard. All of the sounds will be subject to modifications triggered by activity within the fields, and the information flow from the traffic lights. In addition, the electronic sounds will be automated to respond to the concrete sounds, playing against the saxophone and the ambient noise. Despite the grand scale of this work, Liz Phillips hopes that it will not be a loud piece:

"I'm not going to fight the traffic. I have to live here. It will be as quiet as it can be . . . I hope, real quiet."

"It would be ridiculous to tape it, listen, and analyze my work as music. You would only be dealing with half of the piece."

influenced in many ways by the Breugles painting of the wheat gatherers. She was interested in the proportions, edge placement, and scale of the painting. While this was a legitimate source of compositional material, it seemed unlikely that anyone in the audience would perceive the origins of her piece in the Breugles work. The systems that are employed to generate patterns are often inaccessible to a person exposed only to the final work. The inductive reasoning required to abstract such a system is quite difficult. However, after exploring this work of Ms. Phillips, Cora Cohen approached her and suggested that Liz should see the Breugles painting of wheat gatherers.

Cora acknowledged perceiving the similarities of proportion in both works, but felt that the relationship between the two was more intimate, one of tone, of atmosphere, and of texture. She noted the textural equivalent of the "fluffiness of the wheat" in the Breugles to the internal structures of the sounds in the Phillips work. In the painting, Ms. Cohen commented, "It is difficult to tell where the air is ending and the solidness of the ground is beginning." Likewise, in the Phillips work, Ms. Cohen found a similar ambiguity of edges between the sounds and the physical boundaries of the space, a merging of the acoustic and the physical: tactile sounds. She added: "What I love about her work has to do with how close you can get with sound and space.

They despise it. Engineers like to make systems closed. I am taking closed systems and making them unstable. What I'm doing is a very hard thing for them: making my fields unshielded.

There is a point where they almost meet." This is a central issue in the work of Elizabeth Phillips, perhaps the most important aspect of her work: that space is not only expressed as sound, it is, in fact, *made of sound.*

Liz Phillips built her first responsive space when she was still in high school, in Englewood, New Jersey. She composed a piece using electric timers, lights, and pressure sensitive floor switches to turn on taped sounds. She has gone on to become a self-sufficient artist-technician, designing and building most of her own equipment. She learned her electronics at what was primarily a defense lab, as an artist in residence at the Riverside Research Laboratories. She has often worked in advanced technological settings, including a stint at the Center for Advanced Visual Research at the Massachusetts Institute of Technology.

The capacitance fields she now uses are of her own design, and are larger than any comparable fields in existance. However, the engineers she learned from were not always sympathetic to the problem of designing larger interactive fields.

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