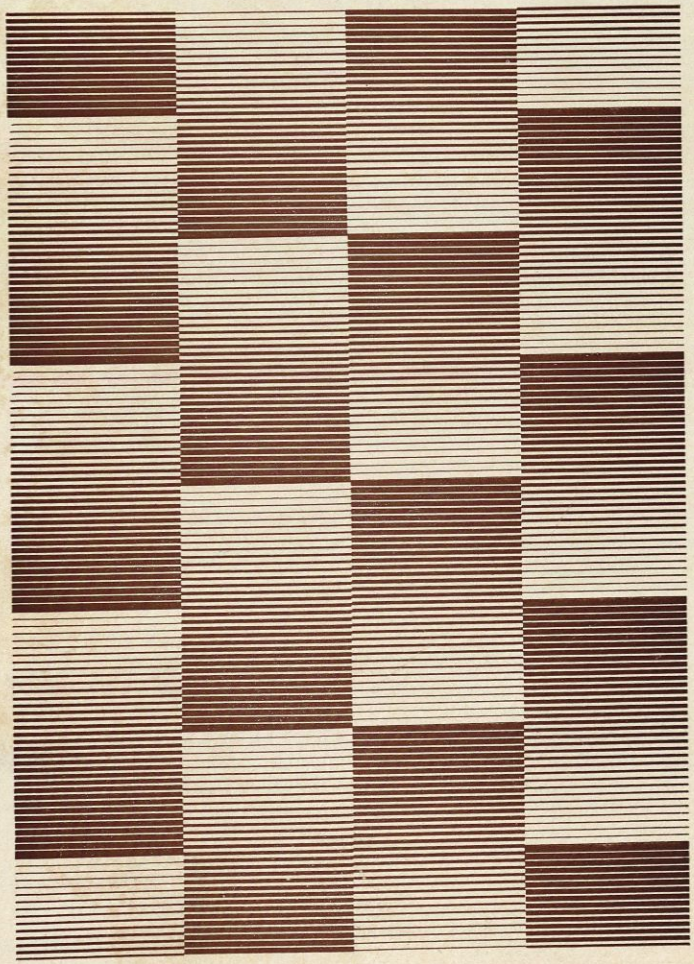
SYNAPSE



SYNAPSE

AN ELECTRONIC MUSIC MAGAZINE . . .

This Issue
Complimentary

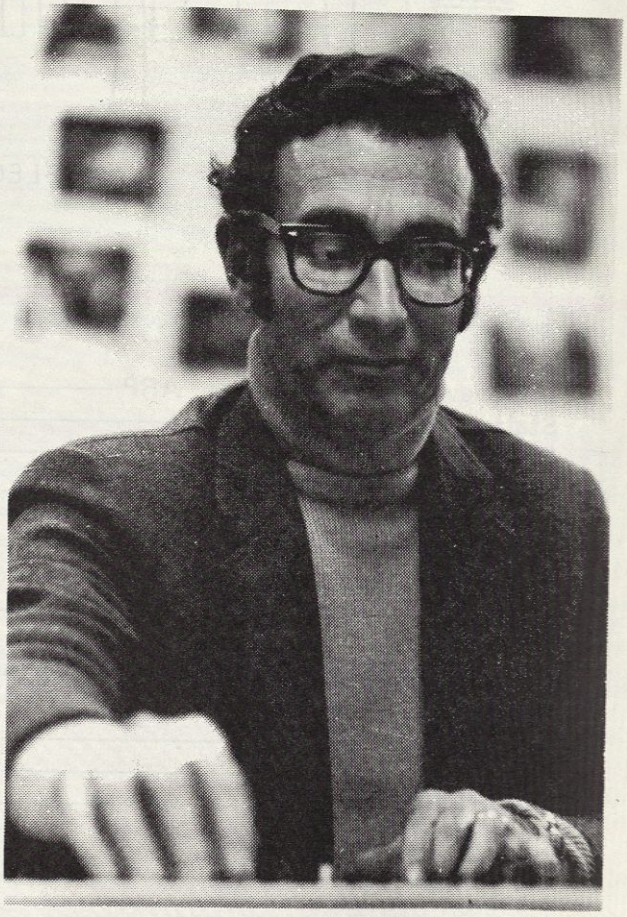
FIRST ISSUE *MARCH '76* *VOLUME I* *NO. I* *$1.25*

ARP

A SYNAPSE EXCLUSIVE!

AN INTERVIEW WITH . . .

FOUNDER OF ARP INSTRUMENTS



Alan R. Pearlman

Q. Are you still involved at ARP?

A. YES! I am President and Chairman of the Board, working with the people doing the research and development on our new products, and planning other special projects.

Q. Are you a composer?

A. If you want to get a little bit of my musical background, I just happen to be one of the 20-40% of the amateur musicians in the U.S. who are always frustrated because music can be a very difficult thing. I wanted to make some equipment that would make music less difficult for amateurs as well as professionals. This is the reason I am in the business. I am primarily an engineering entrepreneur. (I guess that you would call it that.) Being in electronics for about 27 years, my interest in music is simply an amateur one. I had been manufacturing electronic equipment for a number of years before getting into this business.

Q. What were you manufacturing before?

A. In the 1960's I was the principle of a business that manufactured op amps. These encapsulated modules were, at the time, state-of-the art. Since then, that sort of thing isn't very important commercially. The integrated circuits have replaced them. In the mid to late '60's, I foresaw this and decided to get out that business. Music was a field that always intrigued me. I felt the electronic instruments that had been built were only a partial answer to the needs of the musician. I felt a company with the right amount of technical and musical know-how and the right kind of people could add something to the field that didn't exist before. The idea I had when starting the business was to build up a team of people who had interests in the major areas of technology applicable to electronic music.

Q. What was MOOG doing when you started?

A. He was very into it . . . in fact he was always very much into it! He is a very capable, brilliant designer, but was mostly making equipment for composers. At the time I had no idea that he was going to make equipment for performers and I thought that this was a need that certainly should be met. WE (ARP) went into the business with the idea of concentrating on performance. The only reason we started out with a large studio system was that there was an existing market for them. There were a number of large synthesizers, Moog, Buchla and a few in Europe that were of studio design for use by composers, experimenters, and teachers. That was a ready market so we started there planning to go into performance instruments in our next generation and beyond. In general, we have done this. As far as the interior electronics, there is nothing particularly difficult about the concepts that are embodying our synthesizers over the things that have been happening back in the '60's. There were voltage controlled oscillators, voltage controlled filters, keyboards with memory and sequencers too.

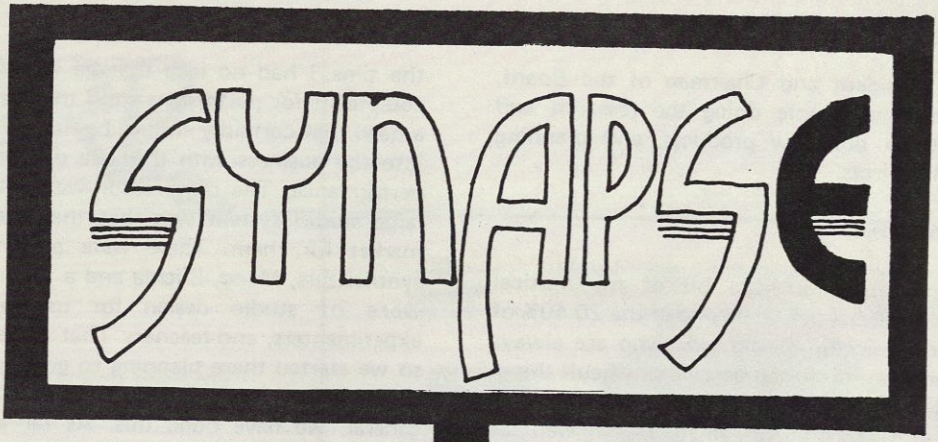
Q. When did you say this was?

A. Back in the 1960's, as a matter of fact, even before then I suspect, there were a lot of things done to process the sounds. Almost all of the techniques used today to process waves existed back in the '60's and even the '50's. Voltage control was pushed heavily by Moog and Buchla. There was another gentleman by the name of Ketchoff who was working in Rome. In the '60's, he came out with the SYNKET which was supposed to be a performance synthesizer. I never saw many of them commercially in the U.S., so I don't know what happened to them. Not many works for the instrument are around.

Q. That's the past . . . now what?

A. The future for ARP is that we are trying to make instruments continually reliable, easier to use and consistent with the musician's budget. We are not trying to make instruments for the wealthy but for the average musician who can afford to buy pianos, guitars, organs and amps.

Continued on page 24



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SYNAPSE IS PUBLISHED MONTHLY BY CONTEMPO PUBLISHING, P.O. BOX 359, NORTH HOLLYWOOD, CALIFORNIA 91603. YEARLY SUBSCRIPTION: $12.00 U.S. / $14.00 FOREIGN. WE CANNOT BE RESPONSIBLE FOR UNSOLICITED MANUSCRIPTS, PHOTOS, OR SCORES. ALL CONTRIBUTIONS AND ADS SHOULD BE ADDRESSED TO CONTEMPO PUBLISHING, 13273 VENTURA BLVD., SUITE 104, STUDIO CITY, CALIFORNIA 91604, (213) 784-8271. PLEASE INCLUDE A SELF ADDRESSED, STAMPED ENVELOPE WITH ALL UNSOLICITED MS. PRINTED IN THE U.S.A.

EDITOR'S NOTE

Welcome to *Synapse.*

> *Synapse:* "/Sin-aps/n., (to come together, to fasten.) The point at which a nervous impulse passes from one neuron to another." an electric spark."
>
> Webster's Dictionary

Presently there are no other magazines solely devoted to electronic *music.* There are any amount of books and magazines available containing only specs and schematics which enables the reader to build mountainous heaps of equipment, but what then?

Synapse indeed means to come together. We offer a complete picture of the art. Our column "Live Electronic Music" is a listing of performances, tape recitals, festivals, and contests throught the U.S. We expect this to be *the* place to inform you on up-coming events. We too will have projects the reader can build, complete with schematics and occasionally printed circuit layouts. Future projects will include devices for variable voltage control of your tape recorders' speed, converting a three head tape deck to do sound-on-sound in *sync.* and some pretty outrageous custom modules.

We'll show you how to do film scores, analyze the perception of sound, get a live show together complete with visual effects, control synthesizers with brain waves, and loads more.

We believe interviews are very important because they patch you into the thoughts of some of the art's most accomplished people. You'll be seeing interviews with composer Morton Subotnick, and Tom Oberheim of Oberheim electronics in our next issues.

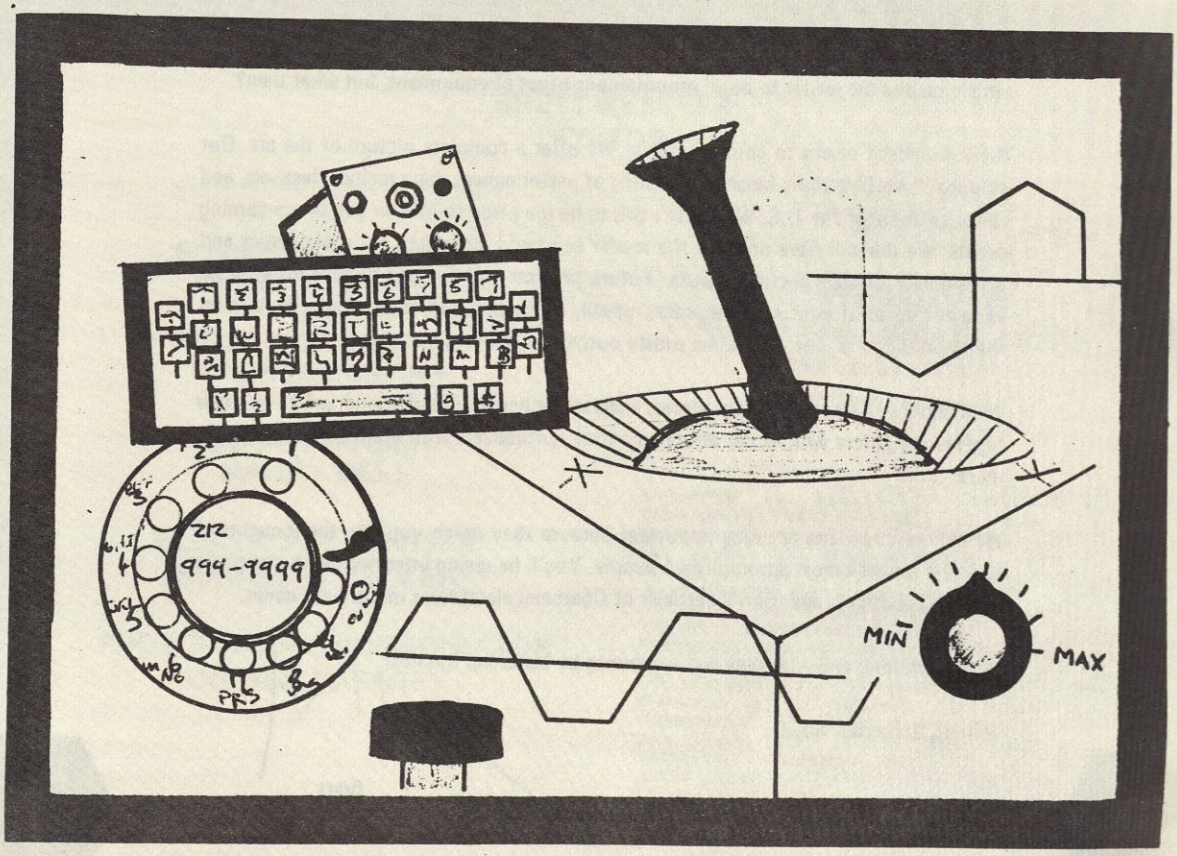
We are monthly and – as they say – growing by leaps and bounds.

Join us, Subscribe Now!

Brett

DEVICES FOR THE CONTROL OF SYNTHESIZERS

BY
NYLE STEINER



AUTHOR PLAYING ELECTRONIC VALVE INSTRUMENT

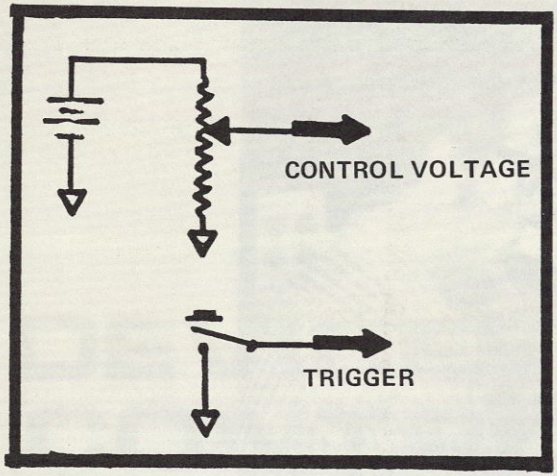
Electronic music synthesizers have a unique quality apart from other musical instruments in that their pitch as well as other things can be controlled by voltages. This means that a means of playing it can be by any device capable of producing voltage changes. Most synthesizers use a standard "black and white" keyboard simply because it is a very popular device for controlling pitch. Each key produces a certain output voltage which in turn controls the pitch of a VCO.

A synthesizer requires basically two things from the player. 1. Triggers for articulation and 2. Control voltages to control pitch and or other things. With a standard acoustical instrument, pitch is controlled by mechanical means; the player must vary its mechanical parameters using its own mechanical means such as pressing piano keys, covering holes, pressing valves, etc. The synthesizer, however, being controlled by voltages, does not care how the voltages are varied. The player can vary the voltages any way that he chooses whether it be by turning a pot, playing a keyboard, pushing a joy stick, punching a computer, etc. etc.

Probably the most simply way to control a synthesizer might be with the use of a potentiometer to vary the voltage and a pushbutton to provide triggers. See fig. 1.

The most standard control device consists of a standard set of black and white keys connected to a string of resistors such that each key taps off one semitone worth of voltage drop across the resistors to control the pitch of a VCO. A trigger is also produced whenever a key is pressed. See Fig. 2.

Keyboards have thus far taken several forms. Another form is by using electrically touch sensitive conductors for keys as has been done by Buchla. These pads are usually made touch sensitive by using a balanced high frequency AC voltage or by using the electrical conductance of the fingers. When the pads are touched, they each turn on a latching circuit to hold the pitch.



SIMPLE MEANS FOR PLAYING A SYNTHESIZER

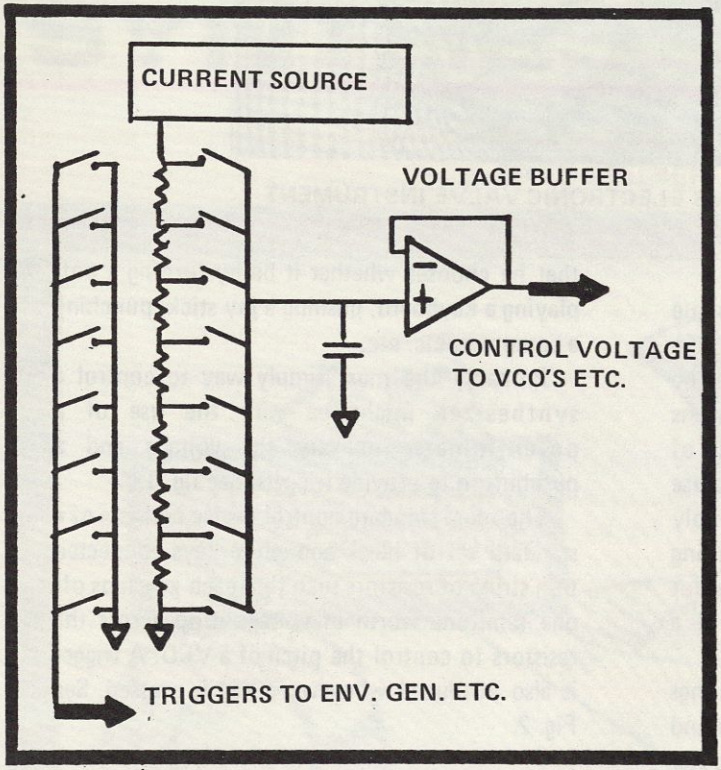


FIG. 2 BASIC SYNTHESIZER KEYBOARD

Each latch usually has a potentiometer to set its pitch. See Fig. 3.

Another form of touch controlled keyboard is made by Putney in which the keys are electrical conductors under a layer of paint. The keyboard is merely painted over the conductors. This keyboard can be played on real time while simultaneously programming a memory for later playback as a sequencer.

Moog makes another form of control device called a Ribbon Controller. It works much like a potentiometer but takes the form of a ribbon which changes output voltage depending on where the finger is rubbed along the ribbon and provides a trigger whenever a metallic strip, running parallel to the ribbon, is touched.

Another control device made by Moog takes the form of a drum and is usually played by

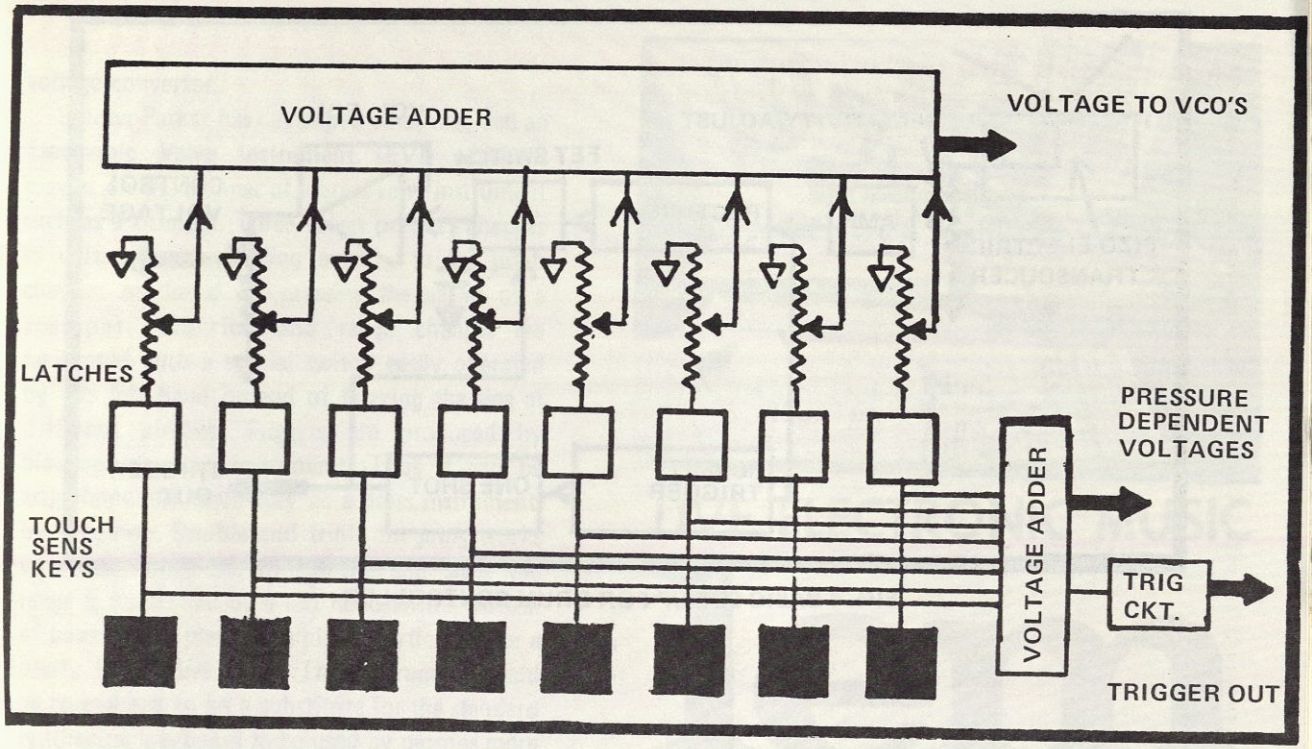


FIG. 3 TYPICAL BUCHLA TOUCH KEYBOARD

striking. An output voltage changes depending upon how hard the drum is struck and triggers are provided whenever the drum is struck. The voltage is made to stay constant after each strike through the use of a sample and hold circuit. See Fig. 4.

The Joy Stick is of course a well known way of controlling voltages to a synthesizer. Although a Joy Stick does not usually produce triggers, it does give the player the ability to control two or more voltages simultaneously by moving only one control. A Joy Stick is simply a lever connected to two or more potentiometers such that a sideways motion turns one pot and a foreward and backward motion turns the other pot. Additional control can be had by turning another pot with a twisting motion of the stick and another still by sliding the stick in and out.

Many instrumentalists from guitar players to horn players can play a synthesizer by playing their instruments through a Pitch to Voltage Convertor such as the one built by 360 Systems. This usually produces two output voltages; one corresponds to the pitch being played (This type of device, it must be remembered, will only act on a single note at a time. Chords cannot be played into it.) and the other is proportional to the loudness of the instrument Another output also provides triggers.

With a device of this type, it is sometimes difficult to get it to operate from the signals of certain instruments and pitch ranges and it takes it time to convert the pitches from the instrument into voltages.

Another approach to playing a synthesizer is to produce an electronic controller that works the same way as a synthesizer keyboard, i.e. switching of resistors, only take the form of a brass instrument, clarinet or what have you. This alleviates the disadvantages of using a pitch to

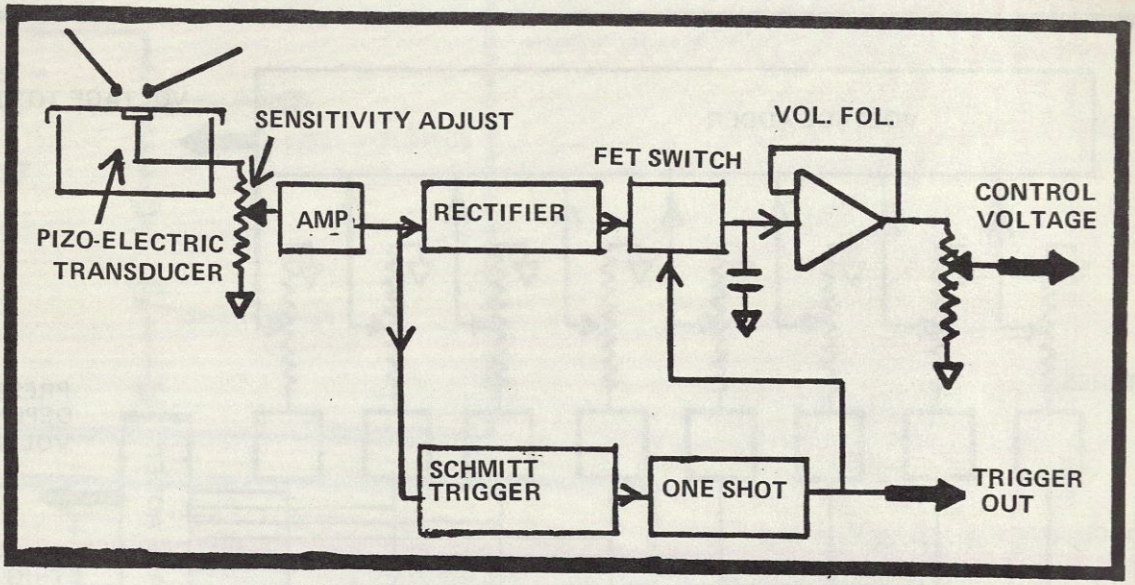
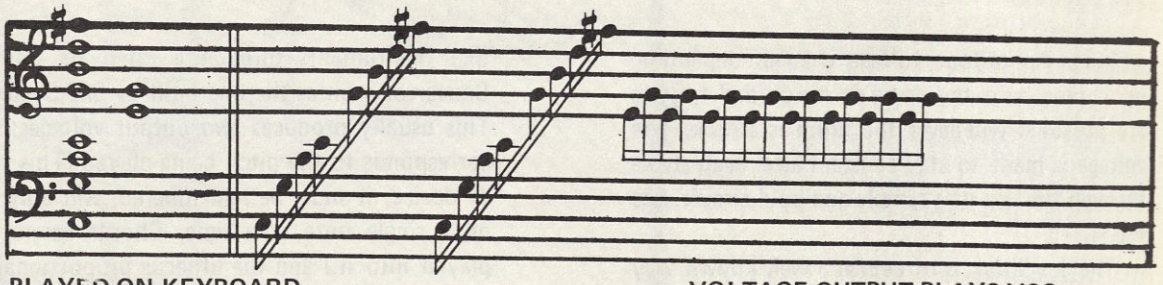


FIG. 4 BASIC SET-UP FOR DRUM CONTROLLER



PLAYED ON KEYBOARD

VOLTAGE OUTPUT PLAYS VCO

BASIC OPERATION OF MULTIPHONIC KEYBOARD AS BUILT BY STEINER-PARKER

voltage convertor.

Steiner-Parker has developed what they call an Electronic Valve Instrument (EVI) which is played on the manner of a brass valve instrument such as a trumpet. Three valves produce changes in voltage corresponding exactly to the pitch changes produced by pressing the valves of a trumpet. Slurring and range changes are facilitated with a special switch easily operated by the left hand instead of buzzing the lips at different pitches. Triggers are produced by blowing into the instrument. Thus it can be articulated the same way as a brass instrument; by tonguing. Double and triple tonguing works very well with this instrument and since the range is controlled by a left hand switch instead of buzzing the player can play effortlessly over a nearly five octave range. This instrument could be considered to be a substitute for the standard synthesizer keyboard to be used by persons more familiar with a brass instrument than with a standard set of keys.

Computone Inc. makes another instrument called a Lyricon which seems to be a voltage control device which plays in the manner of w woodwind instrument such as a clarinet.

A synthesizer, being a voltage controlled device tends to be a "One note at a time device" when using a standard keyboard. We are all used to having a keyboard play Polyphonic (as many notes as is pressed) like organs do. Most synthesizers, however, will play only one note or two notes at a time. This is because each key represents a voltage change controlling one or more tracking VCO's instead of each key representing a separate tone generator as is the case with organs. Some very complex synthesizer keyboards can play polyphonic by putting out several control voltages simultaneously driving

Question:
Why Doesn't Ma Bell Change The Dial-Tone To "A" 440 So That Musicians Can Tune To The Telephone?

several VCO's. There are many problems associated with producing triggers and envelopes for each voice and polyphonic synthesizers are presently prohibitively expensive. Besides, the utilization of a polyphonic synthesizer by many performers is to no greater extent than what can be produced with many organs. Both polyphonic and monotonic synthesizers have their own bag but are in many cases two different animals.

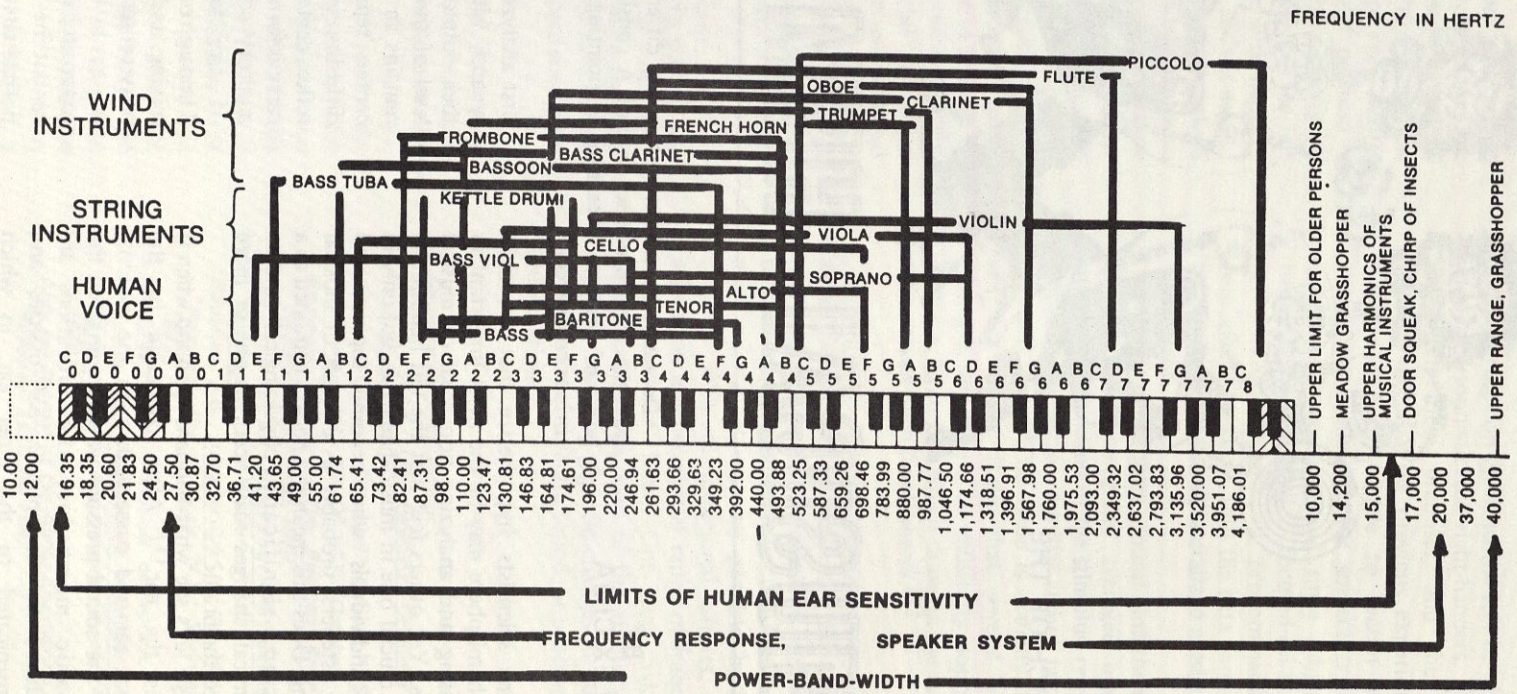
Using even a single VCO such as might be found in a small synthesizer, it is possible to produce any harmonic sonority by using some kind of sequential controller to play arpeggios of the desired harmony. Very complex chord structures can be played in this manner without the limitation of only having, for example, four VCO's and a four voice polyphonic keyboard. Sequencers though have the disadvantages of having to be reprogrammed for each set of notes.

A new type of special keyboard has been developed by Steiner-Parker which they call a Multiphonic Keyboard (not to be confused with polyphonic). When played single note at a time, it behaves like any standard one voice synthesizer keyboard but when many keys are pressed simultaneously the keyboard plays a sequential pattern consisting of the notes pressed. The sequential pattern changes as the pressed notes are changed. Thus this keyboard can be played as though it were a full polyphonic keyboard but instead of hearing many voices playing in harmony, one voice plays arpeggios of the harmonies played. See Fig. 5. The sequential rate is adjustable.

The author of this article has used on many occasions, a blow tube trigger generator to articulate the synthesizer while leaving both hands free to play knobs and a tiny three octave keyboard made by cutting a pattern of keys in a piece of printed circuit board.

Suffice it to say that there are countless ways of playing a synthesizer. All we need to do is use our imagination along with anything that can produce a voltage change. It would be impossible to cover all of the possibilities. I have written this whole article without even getting into the computer which through the use of a Digital to Analog Convertor, can convert its numbers into control voltages or even audio signals themselves.

HERTZ!



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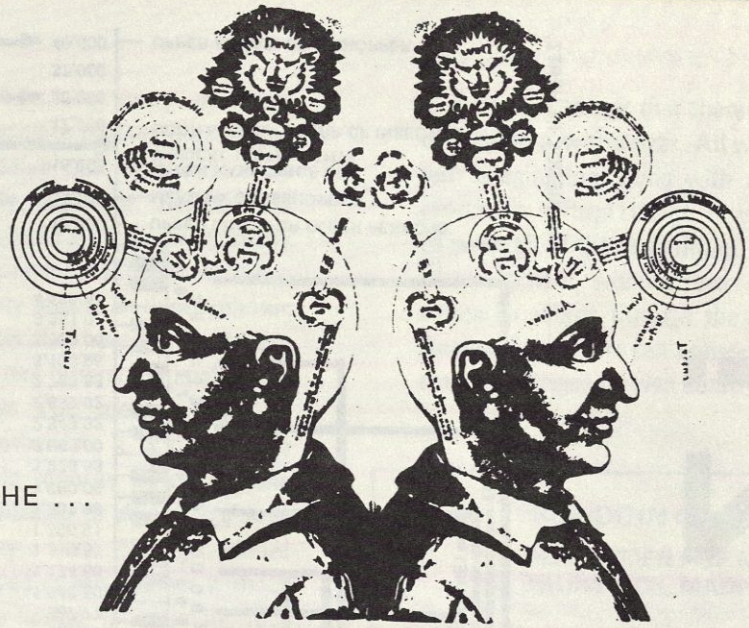

IN SEARCH OF THE . . .

MUSICAL HEMISPHERE

BY
ALEX CIMA

Do musicians and nonmusicians differ in the way the brain processes sound? A considerable body of research literature is pointing out a curious controversy.

Some scientists hypothesize that the right brain hemisphere may be the most important in processing and analyzing nonverbal or musical sounds. Yet others feel that the left hemisphere is the crucial one in musical analysis, but only in those individuals who become sophisticated music listeners, probably as a result of musical training. Does this mean if a person is trained as a musician, significant physiological and/or anatomical changes may occur in one or more areas of the brain?

First, let's see what happens to sound when it reaches the ear.(1) After collection by the external ear and passage through the external canal, the sound pressure waves impinge on the tympanic membrane, the vibrations are transduced by the middle ear ossicles and communicated to the inner ear, in which resonant peaks and periodicity information are first analyzed by the cochlea's hair cells. These synapse with bipolar cells, which in turn send their output to centers in the medulla, about the level of the skull's base. So far the information remains in the side which collected it. These centers represent the beginning of information diffusion and divergence (to the cerebellum, reflex centers, and other areas), ascending fibers carry information which will eventually reach the auditory cortex, the inner and superior portions of the temporal lobe in each hemisphere. Throughout its ascent, substantial sharing, mixing, and analysis is undertaken by the various relay centers. Each ear is ultimately represented in each hemisphere, with the contralateral (opposite) ear predominating. Thus, sound input cannot be restricted to one hemisphere under normal circumstances.

If you are right-handed there is a strong probability that your speech centers (that is, the brain cells which exercise hegemony over verbal expression as a cognitive function), will be located in the left hemisphere, while corresponding areas on the right perform a considerably diminished role in this capacity.(2)

If speech is processed primarily by the left hemisphere in right-handed people, what happens to other kinds of auditory inputs such as music?

The controversy centers around the work of Diane Kimura and Brenda Milner,(3) who postulated that the minor right hemisphere processes musical sound as well as other non-speech sounds, in other words, the hemispheres seems to be differentiated along a verbal-nonverbal dimension, with music analysis falling on the right. Milner localizes musical hearing on the right temporal lobe as a result of her tests on patients who underwent a right temporal lobectomy (partial or total removal of the lobe) and exhibited depressed scores on tonal pattern perception, while a similar surgical procedure on left lobectomy patients failed to elicit the same results. Kimura's findings relate to a special test in which information is split between the two ears (dichotic listening), she demonstrated that subjects make fewer mistakes in recognition of tunes presented to the left ear (functionally predominating in the right hemisphere), and fewer mistakes in recognition of verbal material including numbers when presented to the right ear (predominantly represented in the left hemisphere).

Others feel differently. Thomas Bever and Robert Chiarello(4) propose that "Musically experienced listeners recognize simple melodies better in the right ear than the left, while the reverse is true for naive listeners . . .", since the left hemisphere is assumed specialized for analytical organization, and since experimental and clinical and clinical research supports the notion that ". . . the left hemisphere is specialized for propositional, analytic, and serial processing of incoming information, while the right hemisphere is more adapted for the perception of oppositional, holistic, and synthetic relations", then, if one considers that musically experienced listeners learn to perceive a melody " . . . as an articulated set of relations among components, rather than as a whole", a good case could be made for a primary role in music perception given to the left hemisphere in musically sophisticated right-handers. Their data supported these premises, and they further pointed out that in previous experiments, no attempts were made to recruit musically sophisticated subjects (or subject training not taken into account), and since subjects were naive listeners, they ". . . focused on the overall melodic contour", a predominantly right hemisphere function, thus the data contaminated by false positive scores lateralized music function to the right.

Other researchers found interhemispheric asymmetry in computer averaged brain wave studies as a function of the stimulus' relevance or familiarity (relevant, familiar stimuli lateralize to the left).(5) (6) The issue is actually far from settled, it is likely that several analytical strategies are open to musically sophisticated listeners, strategies which draw on the functional resources of both hemispheres.(7)

Electronic music composers are certainly aware of their dependence on technology and research. It is perfectly logical to expect that as our knowledge of brain function becomes more sophisticated, it may be possible to integrate findings with compositional efforts, perhaps enhancing the perceptual range of frequency or sound pressure level. One may ask: could improved manipulations of the auditory system lead to surprising gigantic changes in our ability to perceive or generate sound, or process musical information?

References

1) *Good background reading:*

Dallos, Peter. The Auditory Periphery. N.Y.: Academic, 1973.

Dutsch, Diana. "Musical illusions." Scientific American, 233: 92-104, 1975 (October)

Gazzaniga, Michael. The Bisected Brain. N.Y.: Appleton, pgs. 89-90, 1970.

Gulick, W.L. Hearing: Physiology and Psychophysics. N.Y.: Oxford, 1971.

Roederer, J.G. Introduction to the Physics and Psychophysics of Music. N.Y.: Springer-Verlag, 1973.

Ward, W. Dixon. "Musical perception." In J.V. Tobias (Ed.) Foundations of Modern Auditory Theory. Vol. 1. N.Y.: Academic, pgs. 407-447, 1970.

Also, see Journal of the Audio Engineering Society, November 1975, pg. 754.

Continued next page

2) Geschwind, N., and Levitsky, W. "Human brain: Left-right asymmetries in temporal speech region." Science, 161:186-187, 1968.
Approximately 96% of right-handed individuals are left speech dominant, while in left-handed populations, dominance does not exhibit such a marked lateralization, therefore remaining unpredictable.
3) Kimura, D. "Cerebral dominance and the perception of verbal stimuli." Canadian Journal of Psychology, 15:166-171, 1961.
Ibid. "Left-right differences in the perception of melodies." Quarterly Journal of Experimental Psychology, 16:355-358, 1964.
Ibid. "Functional asymmetry of the brain in dichotic listening." Cortex, 3: 163-178, 1967.
Milner, B. "Laterality effects in audition." In V. Mountcastle (Ed.) Interhemispheric Relations and Cerebral Dominance. Baltimore: Johns Hopkins, 1962, pgs. 177-195.
4) Bever, T.G., and Chiarello, R.J. "Cerebral dominance in musicians and nonmusicians." Science 185: 537-539, 1974.
5) Matsumiya, Y., Tagliasco, V., Lombroso, C.T., and Goodglass, H. "Auditory evoked response: Meaningfulness of stimuli and interhemispheric asymmetry." Science, 175: 790-792, 1972.
6) Nachshon, J., and Carmon, A. "Stimulus familiarity and ear superiority in dichotic listening." Journal of the Acoustical Society of America, 57: 223-227, 1975.
7) Gordon, Harold. "Hemispheric asymmetry and musical performance." Science, 189: 68-69, 1975.

PERFORMANCES

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FESTIVAL

Contact Elliott Schwartz, Bowdoin College, Brunswick, Maine 04011 (See page 17 for details)

GRAPHIC EQUALIZERS

FOR FIXED FORMANT FILTERING . . .

BY
ROB LEWIS

The fixed formant filter is one of the basic "building blocks" the electronic musician can use in setting up a patch, whether he is trying to imitate traditional instruments or create new sounds. These devices are offered as standard equipment in some synthesizers, and as accessories that can be patched into an existing setup.

The purpose of a fixed formant filter can be deduced from its name. First of all, it is a *filter* in the traditional sense – its basic effect consists of emphasizing some sound frequencies and/or deemphasizing others. It should not distort pure tones in any way, or generate harmonics that aren't present in the input signal, though it may change the balance of existing harmonics.

Secondly, it is a *formant* filter. "Formant" is a linguistic term referring to certain bands of frequencies that are emphasized by the resonances of the vocal tract, which acts as an acoustical filter and enables humans to form articulated speech. By extension, "formant" can refer to the individual timbre-shaping characteristics of real or synthesized instruments.

Lastly, these filters are *fixed* – their characteristics must be set with manual controls and can't be altered by the keyboard or other control voltages. This is at once their chief advantage and their chief limitation. It's a limitation because most really advanced effects require filters that can be voltage controlled. It's an advantage because a fixed filter can be made much more versatile than a voltage controlled filter of comparable cost.

Thus, the primary purpose of a fixed filter is to provide a basic tone color, or "voicing", which is then modified by VCF's and all the other tools of the trade.

An examination of manufacturers' literature on fixed formant filters reveals that they are equipped with a signal input, a bank of from four to fourteen controls, each used to vary the response to a preassigned band of frequencies, and a signal output. (Some models also provide a separate output for each frequency band). Not quite coincidentally, there is a device used by sound engineers and hi-fi sophisticates called a Graphic Equalizer that has virtually identical capabilities. In fact, the main functional difference between a fixed formant filter bank and a graphic equalizer is that the former is used to *create* sound colorations in a synthesizer, while the latter is used mainly to *remove* built-in colorations in imperfect speaker systems, recordings, etc. The other important difference is that a graphic equalizer will often give you two channels of filtering for perhaps half the price that a synthesizer manufacturer will charge you for one channel!

This isn't to say that any old graphic equalizer will do everything that the most exotic Moog or Buchla fixed filter bank will do – it won't. But for the musician on a budget, it will give very useful performance for a lot less green.

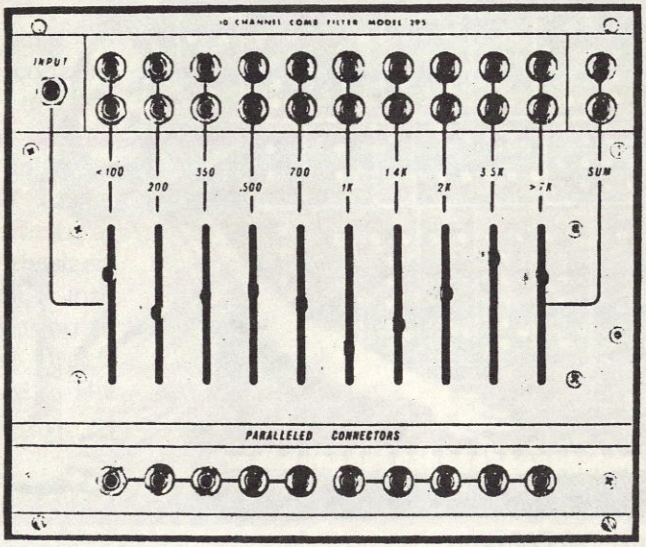
Choosing an Equalizer

Since saving money is the main reason you should be considering a graphic equalizer, we will

consider only those units intended mainly for home hi-fi and forego discussion of the much more expensive pro versions.

Most home equalizers have frequency bands an octave or more wide. Octave bands are narrow enough to be very useful, but not quite as capable as the *half*-octave bands offered by some fixed filter bands. Octave equalizers are made by Soundcraftsmen, SAE, MXR, and others. SAE also makes a half-octave graphic equalizer which offers an unusually wide ±16 dB adjustment range on each band; however at $550, it's quite a bit more expensive than octave units (most of which give ±10 or 12 dB of control). Cerwin-Vega offers a $470 hybrid unit with half-octave bands below 250 Hz and octave bands above, something you'll appreciate if you're especially fussy about your bass sound. It, like several others, can be mounted in a standard 19" wide equipment cabinet to make a roadworthy package.

If you buy a stereo equalizer, be sure it has separate controls for each channel – a few units tie both channels to a common control and effectively rob you of half their flexibility. For extreme effects, you can connect the two channels of a stereo equalizer in series, and double the control range. Keep input signal levels low when boosting heavily, however, or you run the risk of overloading the circuits and generating distortion. There may also be objectionable noise buildup with the channels in series, so check this in the store if you anticipate using the equalizer this way.



BUCHLA FILTER BANK

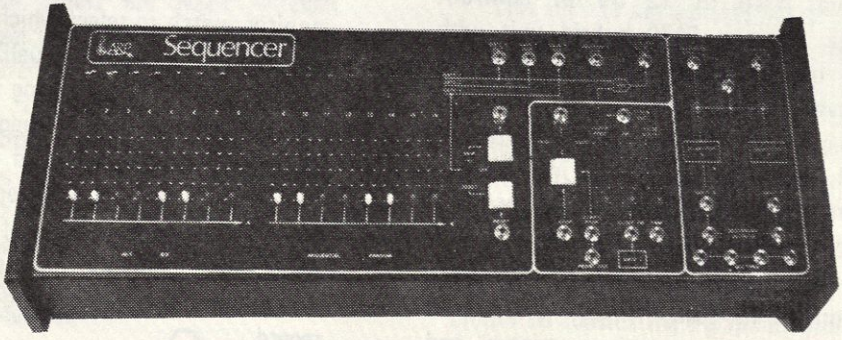
Most home equalizers have a tape monitor feature that you can use as an input selector. By patching one oscillator into the normal input and another into the tape input, you can use the tape monitor switch to select which one you want to process with the graphic equalizer.

Keep in mind when using the equalizer that, wwhile many are very ruggedly constructed, most are basically intended for use in a hi-fi system and aren't designed to survive the constant banging around that touring musicians subject their equipment to. A solid, well-designed case and a little care can do wonders in this regard.

NEW NEW NEW NEW

OZNIE

The Oznie from Process Electronics Corporation looks like a new standard. 3 VC filters, fixed filterbank, 4 VCO's, 4 envelope generators, 5 mixers, and a 5 octave keyboard, in addition to the regular stuff (NA, RM, Mults, Inv. etc.) $3,250.00 Oznie, Box 7, Centerville, Pa. 16404



ARP SEQUENCER

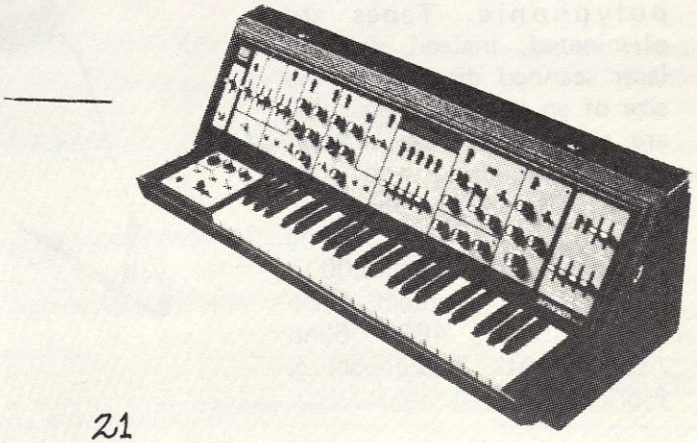
Beginning April 1st, ARP will offer a 16 note portable sequencer. Its features include: individual note routing to five different gate outputs, random sequences, VC pulse width on the internal clock (for leggato or stacatto effects), VC Clock rate, and foot-pedal control jacks. In addition the ARP contains two "quantizer" circuits which convert all pot tunings to an even chromatic half-tone making tuning much easier. According to Bob Hoffman at ARP "Feeding a synthesizers sample and hold voltages into the quantizers gives you a Bach-like score that's super-fast and a gas!" The sequencer will retail at $795.00.

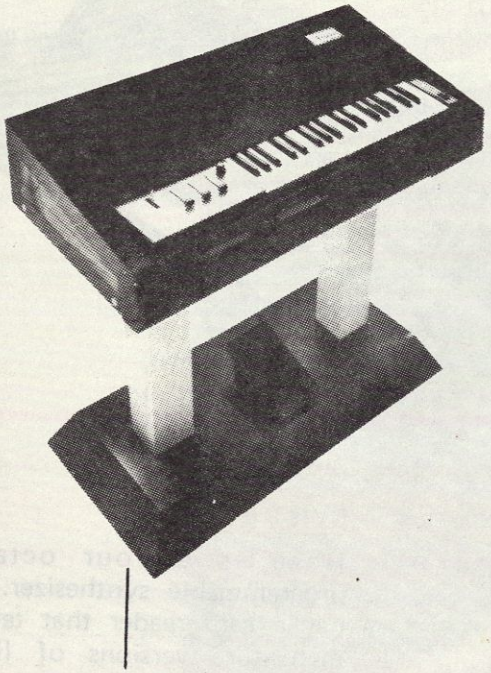
SYN-KEY

Here is a four octave programmable synthesizer. Is has a card reader that takes miniature versions of IBM cards. They are plastic and you can carry 'em around in your wallet. Retail: $1995.00. For more information: SPG 117 W. Hintz Road, Wheeling, Illinois 60090.

ROLAND GOES SOLID

Roland Synthesizers are beefing up their line with some really nice equipment. The first of which is the SH-5. For a $1395.00 Retail one gets 2 VC Oscillators, two low frequency Oscillators with keyboard delay and flashing speed indicator lamps, two interesting filter circuits, 4 octaves of ivories and more. They are available through Beckmen Musical Instruments Inc. 2925 S. Vail Ave., L.A., CAL. 90040. They will have a semi-modular system pretty soon, (Look for it in **Synapse.**)



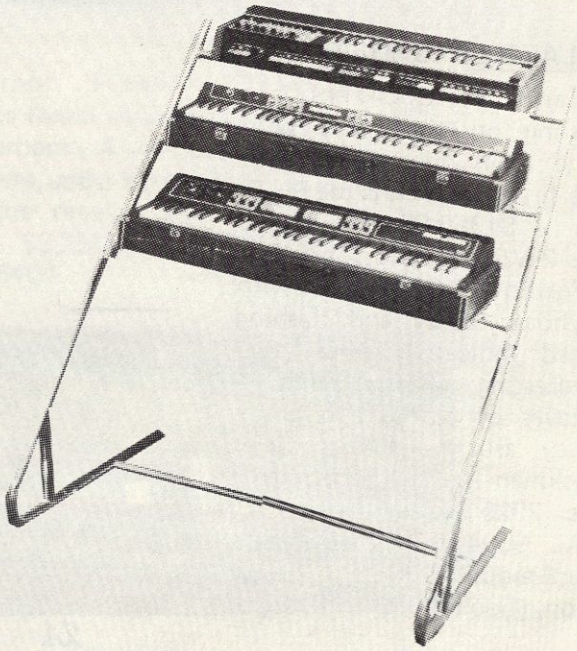


SYN-CORDION "CAT"

A full portable synthesizer for under $400.00? 2 VCO's, a LFO, a Ring modulator, ADSR, VCF, three octave keyboard, and Sample and hold? This could be just the thing for the beginning synthesist, perhaps (at this great price), you rock keyboard men will want to stock up on two or three for your battery of machines! Check this out . . . Syncordion Corp. 32-73 Steinway St., L.I.C., N.Y. 11103.

ORCHESTRON

In the middle of a recent U.S. tour Patrick Moraz of the group YES abandoned his profusion of single and double mellotrons for one instrument: The Orchestron. (It is now situated in his nest of other keyboards.) It's fully polyphonic. Tapes are eliminated, instead, it uses laser scanned discs about the size of an lp. Voices available are cello, choir, sax, French horn, Hammond and pipe organs. It sounds like pure heaven. Prices range according to model – from $1995.00 to $10,000.00. Contact Vaco Synthesizers, 4651 62nd Avenue North, St. Petersburg, Florida 33565.

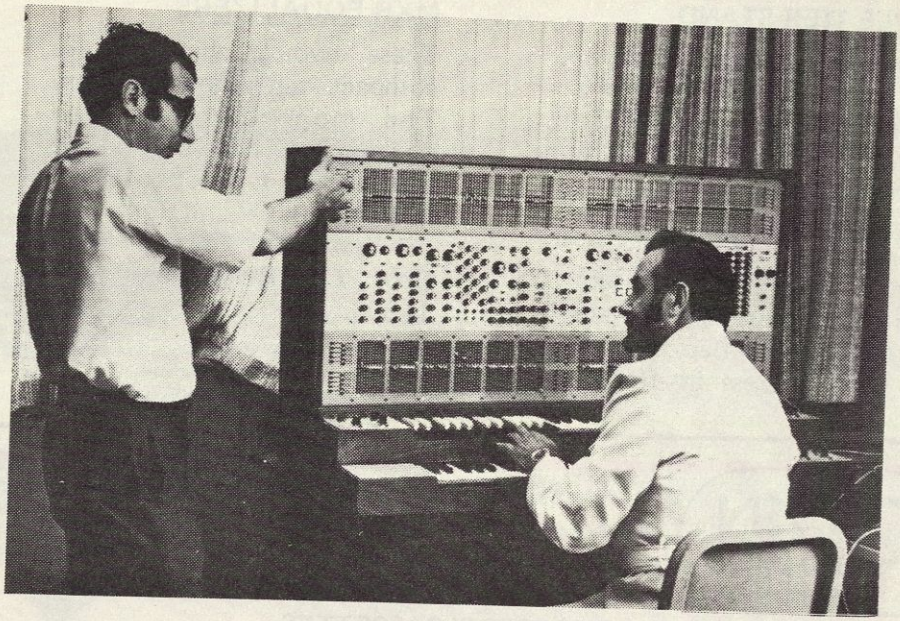


TRIPLE TIER STAND

"There isn't a keyboard player alive who hadn't wished for a stand to place multiple keyboards on in performance." Here from Boss (Via Beckman) is a chrome-plated steel stand that holds three machines right where you want 'em. Retail: $149.50. Write Beckman at the same address as Roland

MXR EQUALIZERS

These two graphic eq's are compact, ten-band, and clean. The mono unit, designed primarily for the stage musician, retails at $139.95 and the stereo unit for home use goes at $199.95. MXR Box 722/Rochester N.Y. 14603.



Q. Is the price reduction going to be achieved by producing a full synthesizer on one chip?

A. It is kind of hard to say at this time. There is an awful lot going on in the semi-conductor industry. It is certainly an intriguing idea. You have to realize that instruments are more than the IC's that go into them. They have a lot of what I call "overhead hardware" like pots, switches, power supplies, cases and so on. Costs can be brought down in all of these areas. Part of the problem was not to strain oneself with too heavy a dedication to any one technology making evolution difficult, because I think that there is more to come.

Q. Where do you think electronic music will be in twenty years?

A. I think that if things go the way we see them going, EM will be an amateur medium as well as a professional one. By that I mean that synthesizers in some form will be found in most homes just like pianos and other instruments. People will be giving EM lessons the way they are giving guitar lessons now. Kids wanting to study synthesizer will be able to get private lessons at any number of places.

Q. Do you feel that the mystery or mystique of EM will be removed?

A. YES! I don't think there should be any mystery or mystique. Most people aren't frightened, they assume that they will be able to learn and they do. Last week I was at a college helping to conduct a three day inter-session course in EM with some of the undergraduates. It was gratifying and interesting to see how the freshmen were able to take to these concepts by making music right away using the equipment which I brought with me. Each student felt that there was something for him – something he could do in expanding his capabilities more than could have been done with the instruments he took lessons on as a kid.

Q. Do you find that synthesizers eliminate the need for a composer to spend years of working on playing technique as opposed to composing?

A. Is dexterity necessary in music? It is required for certain instruments. Playing the piano is really difficult because it has a limited amount of sustainability and a limited range of tone colors. In

playing the piano you have to overcome the fact that sounds die away quickly. Only by playing successions of notes will sounds blend and overlap. This means that you have to develop a certain amount of speed and use harmonies for tone coloration. Solo pianists must do the most with harmony, dynamics, rapid playing of arpeggios, and things like that to keep the music moving along.

Q. **Will our present equipment soon be out-moded?**

A. I don't think so. It doesn't work that way. Music tends to have a fairly long cycle of product life and acceptance. We have seen all types of instruments evolve and as they do, there are techniques discovered for playing them and exploiting their characteristic results. The musical uses which are discovered by the most advanced composers and performers start filtering down to the less advanced by teaching and composing. The VC concept is very useful. There are things that are easy to do with it that are difficult with digital concepts and vice-versa. There is an increasing use of digital technology in EM besides the technology which is being used in electronic organs. They are already highly digital. We will see more of this in synthesizers as time goes on. I doubt that the concept of VC will die shortly. I don't think it will die in four, five, or even ten years because I see more and more things that can be done with it.

Q. **How did ARP start out as a company?**

A. Fairly normally. I tried to put a company together by performing some experiments in a basement laboratory and getting some assistants together who were interested. We then started digging into our pockets. Soon we were in a small plant and then we moved into a larger facility and became a public company in 1973. We are not as large a company as people seem to think. We are about 100 people and

consider ourselves to be a small business.

Q. What year did you start ARP?

A. Development started in the summer of 1969, production started on the large 2500 modular system in 1970.

Q. What came next?

A. After that we introduced the 2600 in two stages. The first was of all metal construction and then the present – synthesizer in a suitcase. Then we came out with our early soloist which looked something like what Japanese organ companies are making today (He chuckles . . .) We came out with the Odyssey next, and then redesigned the Soloist, adding more voices and going more digital. It is highly digital. There are 2,000 bits of digital memory in this thing to help identify the paramenters in the voices. There is also analogue circuitry for some of the controls.

Q. People criticize EM as being simple, boring and non-human . . .

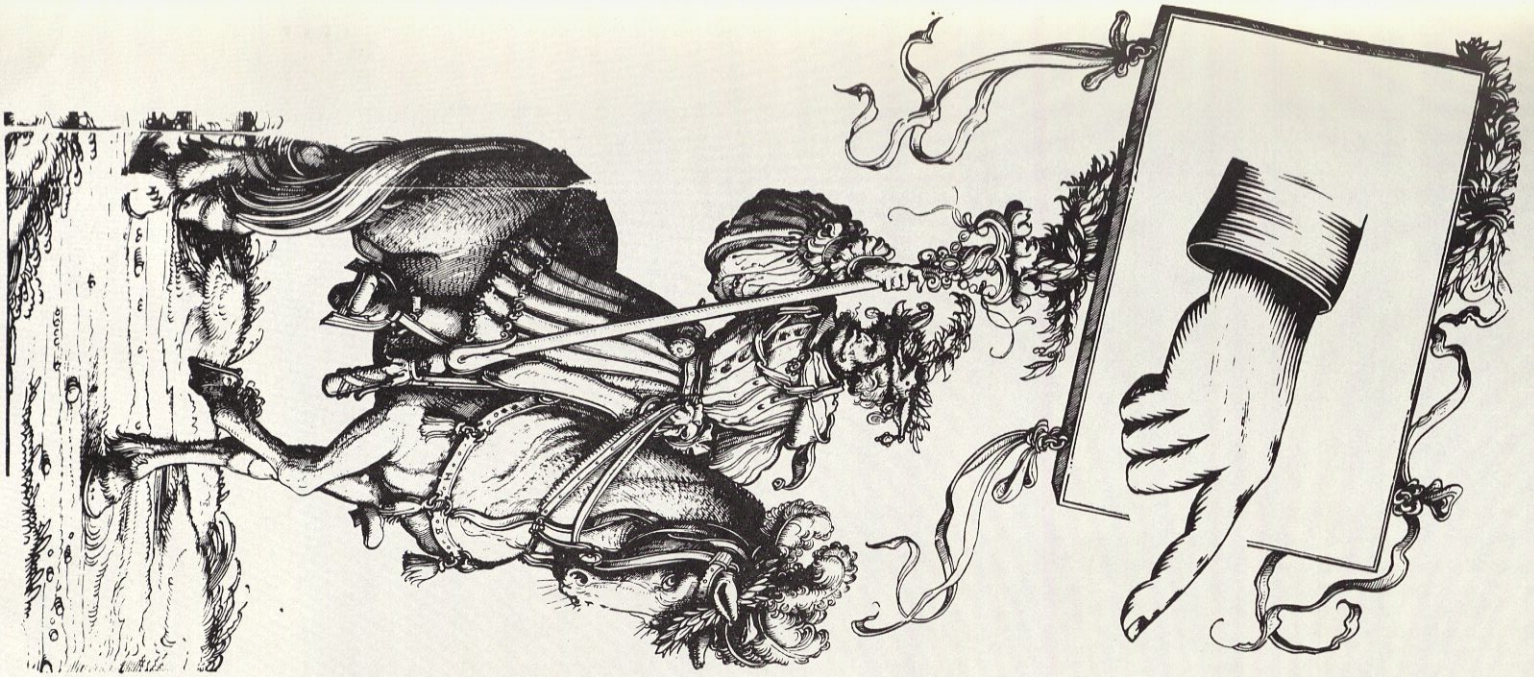
A. Whenever a new instrument was introduced in the past, there were always people who objected to it because it was unfamiliar and they felt it inferior. When the piano came out, the harpsichordists said it was inferior because it didn't sound like a harpsichord and it didn't play like one.

Q. Do you feel it is your responsibility to make the equipment sound more pleasing or are you going to wait for the public to change?

A. I think we are going to have to wait for the public, the composers, and the performers to come around. Right now it is a new type of instrument and they must learn to use it for musical purposes. Their first efforts with synthesizers are usually imitative of traditional instruments and existing electronic sounds like Wa Wa and ring modulator effects. The most creative work has yet to be done.

Q. Do you think that will be done in the vein of the avant-garde, more so than Jazz or Rock?

A. I suspect that a new form of popular music will be emerging that will be different. Each form of popular music has its own something. Brass was popular with the Jazz in the Dixieland and Swing era. With Rock and Roll's electrically amplified sounds, everyone was trying to get the biggest amplifier available to make the loudest possible sound. Everything was amplified. This became saturated and the rock musicians started looking for other ways to modify the output of their devices. They started using synthesizers in groups and now they are being more creative with these sounds. I feel that the serious music that is going to emerge will be better off coming from the popular sound as most serious music has. I think what you call avant-garde and what I call avant-garde are probably kind of interesting but highly derivative forms of music. The ones derived from early avant-garde music that didn't have electronics were trying to do 12 tone serial music and other forms with electronics are probably not going to make a stir in the music world. We don't really see that much happening in the musical world in the highly derivative avant-garde forms. "Switched On" music is a novelty also.. We have to be patient and wait for the popular forms to develop to the point where these forms then lead to larger compositions that we call serious music. It has happened in the past. Composers like Gershwin came from folk music and I think that same thing is going to happen again. The integration of folk music with EM will lead to something a bit more palatable, enjoyable, and human in serious EM composition. ⬡



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