Trumpet, but the skinny (and to some, rather anemic) sound of a church organ trumpet. It's beside the point to argue what one likes or dislikes about this type of voicing: The point is, the re-creation was excellent, sounding just like that particular small-scale reed. Some interesting sounds are possible just by using the chiff on some theatre organ voices and leaving the trems off. Doing this with one of the Tibias yielded a perfectly good Gedeckt. E. Power Biggs would have loved it.

I left the campus that day with a great deal of respect for this newest generation of electronic organs. Both instruments I heard were, overall, quite good at imitating the essence of both theatre and straight organ sound. On a scale of 10, they averaged a solid 8 or 9. In a few instances, the realism was almost startling. Electronics are not in a position to replace pipes, as the illusion still falters in places, but if the weak areas are avoided and the strongest utilized to their fullest, one can experience the sensation of a more than listenable middle-sized theatre organ. As we rolled out of the Visalia city limits and hit the open road, I started daydreaming about the possibilities of a true money-is-no-object electronic auditorium installation using the technology to which I had just been exposed. I imagined an auditorium of at least 3000 seats with a high ceiling, widely separated chambers and live acoustics; a large four-manual console with a stop complement something like, say, a Wurlitzer Fox Special. Into the chambers, carefully placed, go the most accurate loudspeakers available, at least one per rank, driven by amplifiers with enormous power reserves. The voicing on the instrument has been gone over rank-by-rank, note-by-note, with a fine-toothed comb by several respected "ears." And of course, when the premiere concert is played, the ornate French-style console (an integral part of the illusion) is spotlit as it rises from the pit on a lift. With the right person at the console, such an instrument could make for an exciting experience. But even the stock models being turned out now, as I can attest, are very capable music makers. The best efforts of electronic organ makers of the 1930's and '40s tonally resemble the current state of the art about as much as a tricycle resembles a Rolls Royce. □

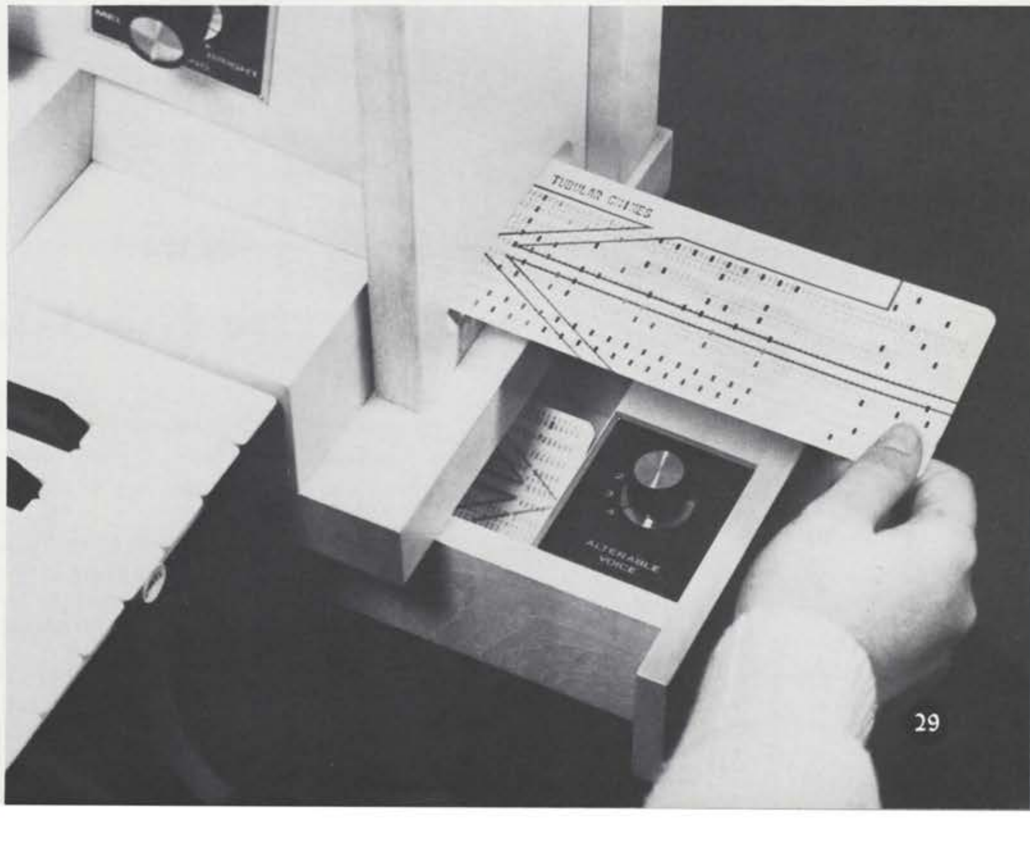
MUSICAL EXPLANATION OF THE ALLEN DIGITAL COMPUTER ORGAN

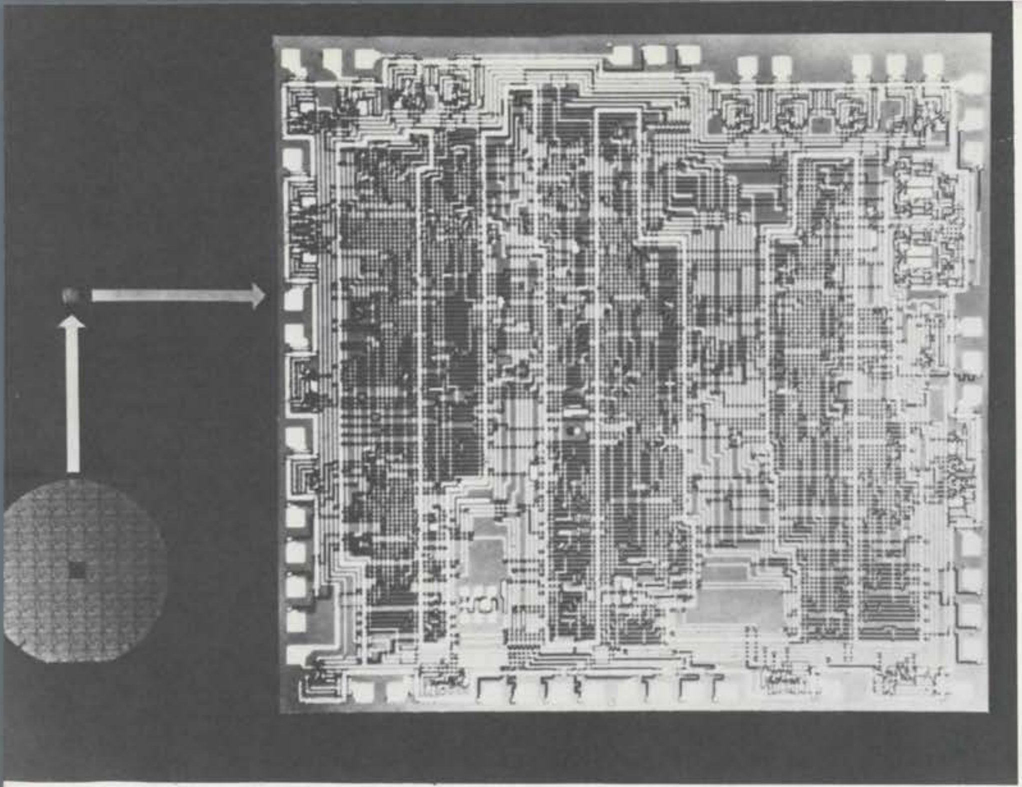
furnished by the
Allen Organ Company

Those already familiar with general organ technology will need to shift gears when probing the workings of the Digital Computer Organ, as built by the Allen Organ Company. The best mental approach to this instrument to avoid the confusion is that of thinking of the Allen as a "third kind of organ."

The first step of explanation should be that of "why the computer organ?" The answer is very direct — sound. Nothing else, short of pipes, can create authentic pipe sound. Let's examine what it is that we are hearing when we listen to an organ. In a pipe organ, we are hearing the sound waves created by organ pipes. In an electronic organ, we are hearing the sound waves created by electronic circuits — the character of the sound is inherent in the circuit. In the Allen Digital Computer Organ, we also hear the sound wave of pipes, but without the pipes having to be present. The "pipes" are stored at the Allen Organ factory, not in the individual organs. Sound interesting? Here's how we do it.

Around 1970 at the beginning of the Computer Organ program, Allen began collecting fine organ pipes for the purpose of sampling. The sampling process involves picking up the sound of the pipe with a fine and accurate microphone, then sending the resulting signal to a laboratory device called a Spectrum Analyzer. The analyzer breaks the pipe sound down into its harmonic components, giving





specific values to each harmonic. Now, this analysis process is nothing particularly new. Other organ companies have done it years ago. The real departure occurs when one attempts to duplicate the sound charted by the Spectrum Analyzer. Up to the point where the figures come out of the analyzer, all is scientifically accurate. When one attempts to build an electronic organ, then, electronic circuits must be designed to imitate those figures. There is no direct connection between the analyzer figures and the electronic circuits designed to imitate them. It is all guesswork. Allen did most of the pioneering in guesswork from 1939 up to the late '60s. In fact, the reputation of the company, you might say, was built on this superior guesswork until 1971 with the advent of the Computer Organ.

So, what did the computer do for the sound? How did it make a direct connection between the results obtained from the analyzer and that which we hear in the Computer Organ? Simple. It eliminates the guesswork. The figures from the Spectrum Analyzer are fed directly into a formula which generates a second set of figures. It is this second set of figures which is fed directly into the Computer Organ to recreate the original sound. The Computer Organ can be accurately considered to be a direct descendant of organ pipes. The key to the difference between electronic organs and computer organs is that the electronic guesses at an imitation, while the computer duplicates.

Information describing fine Diapasons and Principals has been compiled at the Allen factory, and many of these sounds are available in different models of organs. These sounds have become the foundation or building blocks of the Allen Organ. As these sounds are stored in the computer as merely numbers, great flexibility is afforded in the building of custom organs. It's a matter of changing the numbers — computer software. In fact, one of the more innovative features of the Computer Organ is the ability to add to the organ at will and at minimum cost. Each instrument has a minimum of four blank stops which can be added by the organist. Allen maintains a library of sounds in the form of tone cards (a hole-punched card similar to an IBM card) that has grown and evolved into a refined collection of about 300 offerings. Over 100 of them are reeds alone. The tone cards are currently $2.50 each.

Other by-products inherent in the computer system include an exceptionally clear and articulate overall sound, the scaling of speech time (attack/release characteristics), and special transient effects such as chiff and the "bark" in the attack of a reed. Most notable of features is that the intensity and tone color of adjacent notes is always maintained evenly, and the system never requires tuning. Individual note regulation to obtain a smooth scale is eliminated, because the scale is always smooth inherently. Yet, the system can be scaled smoothly to complement any acoustic environment. Audio controls are used to accomplish scaling along with some changes in the computer software over certain ranges of the scale. Once the organ has been installed and adjusted to the building acoustics, no further periodic adjustments are required to maintain that original sound. □