four, allowing individual tutoring on repertoire, manual and foot exercises, finger substitution, chordal structures and inversions. Worksheets, vocabulary puzzles, quizzes and visits to other consoles in the town are included. Several guest organists have been invited to visit the class, with a question and answer period after each appearance.

All that is required for enrollment is a minimum of one year of keyboard training, whether it be organ, piano or accordion. There are music teachers, housewives, nurses, dentists and a mortician in the class, as well as a man and wife team whose goal is to play organ and piano duets in their retirement. What a thrill to be able to teach and inspire all these different levels of talent and ability. They are of different ages and at different stages of achievement — all motivated to improve and learn. They proved that when the entire first class signed up for the second semester. A 100% follow-through is pretty hard to beat!

It is a joy to see the smiling faces every day. Wait till they find out we will be learning the 11th and 13th chords! The second semester will include more basics, as well as an introduction to "Chicago Style," open harmony, glissandos, transposition and modulation, and improvisation.

Those who have a flair for theatre organ music and wish to have concert experience before an audience are given an opportunity to play a three-manual custom Allen organ for a half hour before the Adult Education Travel Forum lecture and film series.

When the first year is completed, it will be time to compile the textbook for the class. At the moment it is all in my head. □

# STATE OF THE ART IN "PIPELESS" ORGANS: AN IMPRESSIVE INSTALLATION IN VISALIA, CALIFORNIA

by Ron Musselman

Ever since the introduction of the Hammond organ in the 1930's, organ enthusiasts have tended to use the pipe organ as a yardstick in judging the merits of electronic organs. While absolutely realistic pipe sound has not been achieved to this day, some instruments, the original Hammond included, were never really intended to go head-to-head with the pipe organ in a battle for tonal equality.

Of course many makers of electronic organs have tried over the years to duplicate the sound of pipes, with varying degrees of success. The vast majority of instruments designed for home use have been built down to a price to place them within the reach of almost anyone. An organ in this classification is usually a loose approximation of a theatre organ. As an impressionistic attempt to simulate the sound of a pipe organ, they satisfy the needs of thousands of amateur organists without entailing an impossible expense. It is this affordability, along with modest space requirements and minimal maintenance that make the electronic organ such an attractive proposition for home use as well as for some public installations. These instruments normally generate a handful of voices from a single set of oscillators, the various voices being produced by modifier circuitry. A typical organ of this type often supplies a good flute and Tibia sound, a decent string and Diapason, with the other voices, particularly the more pungent reeds, sounding noticeably synthetic to even the most casual listener. And the ensemble sound is not what would be expected when the voices are combined. But this is not to criticize the average electronic. All of these perceived shortcomings are simply a function of price. And when one considers all that goes into the making of an organ selling for four or five thousand dollars, it is clear that the best instruments in this price range are ingenious and effective pieces of engineering.

While most electronic organs are built on the basis of compromise with the general consumer market in mind, a few firms have turned out organs designed to be a challenge to the real thing. Naturally, an electronic instrument *that* ambitious is going to be more complex, with requirements such as a set of oscillators for each individual voice for improved accuracy of each rank by itself, as well as a convincing ensemble sound that retains the integrity of each pipe, rather than dissolving into homogenized sonic mush. And each oscillator of the Posthorn, for example, is going to be comprised of more components in order to provide more of the harmonics and partials that are present in an actual Posthorn. A no-holds-barred electronic that strives for as much realism as possible is not inexpensive to build: The pursuit of perfection has never been cheap. But there have been enough customers in the market for premium electronics to make their manufacture feasible. In the case of the church, many congregations with

The College of the Sequoias Theatre.

a considerable amount of money to spend on a new organ found that for a given price, a greater number of voices were obtainable from a top electronic than a pipe organ. Other considerations echo those of individual purchasers; the mitigation of space requirements and most maintenance.

One of the leaders in the field of high-tech "pipeless" organs is the Allen Organ Company, which gained attention 44 years ago with the introduction of the first organ utilizing all-electronic oscillators. The Allen organs I've heard the past few years, live and recorded, have sounded basically very good, with some stops and certain combinations sounding, as one individual put it, "like a recording of a pipe organ." One of their latest major installations (representing an investment of over $50,000) is in the College of the Sequoias Theatre in Visalia, California. Located in the San Joaquin Valley between San Francisco and Los Angeles, this community has more than one other sizeable electronic installation, but the new COS organ is in a league by itself. Gaylord Carter and Tom Hazleton have each played it for college events and both were pleased with its sound.

My first look at this instrument was arranged by calling the college's Director of Organ Studies, Pete Sweeney, who is very enthusiastic about the organ. I had planned a trip that would take me through Visalia, so I set up a meeting with him to have a look at it on my way through. After being asked to look around and select what he felt was the best sounding electronic on the market for the college's new theatre, Sweeney chose the three-manual Allen 965. The former owner of a middle-sized Robert-Morton (whose chambers were sacrificed to bedrooms to accommodate a growing family), he turned to electronics as a substitute. He is the first to admit that although electronic organs are now very accurate in imitating the sound of pipes, the Morton (and any theatre pipe organ he might have installed in the house) cannot be completely duplicated electronically with absolute accuracy. "However," he says, "aside from needing to free up space, I found myself spending a lot of time tuning, patching, regulating and fixing occasional ciphers. When you come home after work and find a new problem, it's easy to say, 'Oh well, I'll fix it tomorrow.' Now all I have to do when I want to practice in the evening is hit the switch, set up registration and start playing. It's very close to the sound I had with pipes. Not an exact replacement, but a very good substitute."

The price of an instrument like the 965 at the college was a little out of reach, so he settled for a scaled-down two-manual version for his home studio. On my way down, Pete had me swing by his house first before we went over to the campus. After a get-acquainted chat, he showed me his studio, a room measuring about 15' x 22'. In the middle of one wall was the two-manual horseshoe console. As he slipped onto the bench and began playing, one thing that impressed me was the effect produced by the four separate speaker systems placed in each corner and enhanced by a factory-built digital delay system. Without the delay, the voicing of the organ sounded good, but as you would expect, the room was dead. Switched in, the walls almost seemed to drop away and the illusion of being in a much larger room did a lot to make the sound of the organ much more effective. I was pleasantly surprised to hear a very good Tibia Clausa, clearly-etched strings that were most realistic, and the best imitation of a Posthorn I've heard yet. Although I was interested mainly in the quality of the pipe voices, I was intrigued with and amused by the synthesized Chrysoglott that featured detailed action noise! While it was not a 100% faithful simulation of pipe organ sound, it's definitely good enough that a person can stop picking out differences and enjoy what it does. After this short sample, I could understand how this dyed-in-the-wool pipe organ man could find happiness with an imitation.

We drove to the Visalia college campus and pulled into the parking lot of the theatre, a crisply-attractive modern round-shaped building, vaguely reminiscent of Hollywood's Carthay Circle Theatre minus the tower, with a massive stage house. The entrance corridors were simply-appointed, but richly-colored surfaces lent an air of understated luxury. We entered the auditorium just above stage level and there she was on the center of the stage elevator; a three-manual, double rail, wood finish, scroll console that at first glance

The Allen 965 at the College of the Sequoias.

looked like a Wurlitzer 260. Stretching upward at a steep angle from this imposing sight on the stage was an auditorium of about 400 comfortable theatre seats arranged in curving rows. With the steeply inclined floor, one got the feeling of being seated in a movie house balcony. The audience had a nice overview of the stage, yet the loftiness was not excessive. And while the house had an air of snug intimacy about it, the steep rows gave a certain sense of bigness to the space. It was one of the few modern auditoriums I have really enjoyed being in, and it complemented the console well.

Pete's studio organ had proved to be a flexible instrument, so I was anxious to hear what this big brother to it would do. If it sounded anything like its console looked, it was bound to be a winner. A quick look around the stop rails while Pete and his assistant were getting everything hooked up revealed a number of familiar names: Posthorn, Kinura, Krumet, Vox Humana, Viol d'Orchestre, Solo String, Saxophone, and so on. I took a seat in the auditorium as Pete walked back out on stage and took his place at the console. As he launched into "Lover" and used several combinations in rapid succession, it was apparent just how far electronics had come in the last decade. A medley of old standards followed and I heard many sounds in the next 20 minutes that were very much like those of a typical 15-rank theatre organ. Pete remarked later that the synthesized "space" of this installation could have been a little more pronounced, and would have been, had they anticipated the relative

deadness of the room. But I found the ambience of this large room added a fair amount of augmentation even without help. The various combinations meshed well, yet the properties of individual ranks were intact. The Posthorn has been the downfall of almost all electronics which have attempted that voice, but the best of more than one variant on this instrument had a nice authoritative "bark" when chorded as an accent, but had a way of almost disappearing in full ensemble. In addition to a large room, the COS organ benefits from a beefy amplification system totaling 1400 watts and feeding 28 separate loudspeaker enclosures. I would bet this organ would sound good with just one hefty amplifier and sizeable high quality speaker system, but the 28 units go a long way in dispersing the sounds and keeping intermodulation distortion down by limiting the number of simultaneous notes issued by any one driver.

After hearing how the organ sounded using combinations in normal playing, I was curious to hear how the individual voices would sound by themselves. So we listened to several "ranks," one note at a time and in chords. First was the largest scale Tibia, which sounded somewhat like a Wurlitzer specimen and even had a hint of breathiness to it. Up at the top where real Tibias break into metal pipes, the Allen Tibia even duplicated the brightness of that octave; a small thing that would not be noticed by some, but it's an item typical of the attention to detail found throughout this organ. Oddly enough, the only place a Tuba appears on this organ is in the Pedal. This 32-note stop, starting at 16', is a very good imitation, with just the right amount of smooth "throb" in the bottom octave and an upper-end sound with a strong resemblance to the brassy Morton Tubas. There was a curious harmonic on this stop that stood apart from the fundamental and other tonal makeup in the lower half of its compass. Giving that portion a slightly artificial quality, the sound was one of very few "seams" showing anywhere. In the top half, this extra "bite" sounded just like the singing buzziness heard in some real Tuba pipes needing a little attention, and in that sense, the sound was extra realism. Perhaps Allen deliberately added it for that reason. Whatever the case, it's the best electronic Tuba I've heard. As to its absence from the manuals, this could probably be remedied by the extensive list of extra stops available with the stop cards that add stops playable through special tabs. The Krumet was true to the name on the stop tab, but there was a strong fundamental that almost sounded like another stop playing in unison. The only out and out electronic-sounding stop was something on the Great simply tagged "Horn." I'm not sure why this color was included (or what it is supposed to sound like, if anything), but parts of it combine the qualities of Diapason, horn and string to produce a timbre I recall hearing on some of the better sounding electronics a few years back. Sounded pleasant without trems.

Two different Oboes, both good, were heard from the Great and Solo manuals (incidentally, the different pitches on each manual are independent of each other, and each manual is independent, giving this model the equivalent of 66 ranks). The Oboe drawn on the Great had an Oboe Horn quality to it, and was a broader sound than that on the Solo, which is a close approximation of an orchestral Oboe. The English Horn (not a Posthorn) gave out a pretty sound that would be right at home as a solo stop on a church organ. The Saxophone is another effort that hits the mark, sounding like a cross between a Kimball Sax and the Brass Sax of a Wurlitzer. The Vd'O, while sounding stringy in its upper register, wasn't what you would expect to hear. But the cards provided a string and Celeste similar to a Violin and Celeste (keen) that proved to be both strikingly beautiful and credible. One of the best sounds on the instrument.

The Accompaniment's Diapason is quite useful, being between the dull Phonon Diapason and the brighter variety found on some theatre organs. A Diapason chorus from the stop cards exhibited one of the straight organ qualities available from the 965. An amazingly real Trumpet was also demonstrated. Not a Style D or Brass

## STOP LIST

**PEDAL**

Diaphone . . . . . 32
Bourdon . . . . . 32
Tuba . . . . . 16
Diaphone . . . . . 16
Tibia Clausa . . . . . 16
Violone . . . . . 16
Bourdon . . . . . 16
Tuba Horn . . . . . 8
Open Diapason . . . . . 8
Tibia Clausa . . . . . 8
Tibia . . . . . 8
Clarinet . . . . . 8
String . . . . . 8
Flute . . . . . 8
Octave . . . . . 4
Alterable 1
Alterable 2
Accomp. to Pedal
Great to Pedal
Solo to Pedal
Percussion . . . . . 8
Sustain
Bass Drum
Cymbal

**ACCOMPANIMENT**

English Post Horn . . . . 8
Trumpet . . . . . 8
Open Diapason . . . . . 8
Tibia . . . . . 8
Clarinet . . . . . 8
Oboe . . . . . 8
Viole d'Orch. . . . . 8
Viole Celeste . . . . . 8
Oboe Horn . . . . . 8
Cello . . . . . 8
Vox Humana . . . . . 8
Piccolo . . . . . 4
Viole d'Orch. . . . . 4
Viole Celeste . . . . . 4
Flute . . . . . 4
Piccolo . . . . . 2
Chrysoglott
Alterable 3
Alterable 4
Alterable 5
Alterable 6
Solo to Accomp. . . . . 8
Percussion A
Percussion B
Delay Off
Snare Drum
Snare Drum Roll
Tom Tom
Wood Block
Sand Block
Claves
Castanets

**GREAT**

English Post Horn . . . 16
Trumpet . . . . . 16
Tibia Clausa . . . . . 16
Oboe . . . . . 16
Violone . . . . . 16
Krumet . . . . . 16
Vox Humana . . . . . 16
Horn . . . . . 8
Open Diapason . . . . . 8
Tibia Clausa . . . . . 8
Clarinet . . . . . 8
Viole d'Orch. . . . . 8
Viole Celeste . . . . . 8
Concert Flute . . . . . 8
Cello . . . . . 8
Tibia Quint. . . . . 5-1/3
Tibia Clausa . . . . . 4
Viole . . . . . 4
Flute . . . . . 4
Twelfth . . . . . 2-2/3
Piccolo A . . . . . 2
Piccolo B . . . . . 2
Alterable 7
Alterable 8
Alterable 9
Alterable 10
Percussion A
Percussion B
Chiff
Delay Off
Solo to Great . . . . . 8
Solo to Great . . . . . 4

**SOLO**

Trumpet . . . . . 8
Tibia Clausa . . . . . 8
Oboe . . . . . 8
Kinura . . . . . 8
English Horn . . . . . 8
Saxophone . . . . . 8
Solo String . . . . . 8
Clarion . . . . . 4
Piccolo . . . . . 4
Solo String . . . . . 4
Twelfth . . . . . 2-2/3
Piccolo . . . . . 2
Larigot . . . . . 1-1/3
Fife . . . . . 1
Chiff
Delay Off
Alterable 11
Alterable 12
Sub Octaver
Sustain
Piano Mode
Solo Vibrato
Delay Vibrato

**GENERALS**

Chiff Gt/Acc A
Chiff Gt/Acc B
Chiff Solo
Chorus
Reverb
Memory B

**TREMULANTS**

Solo Tibia/Sax
Gt/Acc Tibia/Vox
Solo Main
Gt/Acc Main 1
Gt/Acc Main 2
Brass

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