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The Musician and The Electronic Medium: Part Eight

COMPUTER MUSIC SYSTEMS

Most people are not fully aware of the prominent role that computers play in our lives. Of course, we have become accustomed to seeing them in various forms in stores, airports, businesses, schools and just about any place else. Yet most people have never confronted a computer, and most have only a superficial notion of what computers do and how they do it. When people finally realize what has been happening over the past few years and what is happening at the present time, they will want to become more informed about the variety of ways that computers affect their lives. The purpose of this article is to present an overview of the effects of the

computer with particular emphasis on its application to music.

Mechanical computers have been around for quite some time, but

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electronic computers surfaced in the late '40s when vacuum tubes were used to control the flow of electrons. These computers were cumbersome, expensive and slow by today's standards. They were primarily developed for military purposes and subsequently found their way into government, industry and business. By the '60s computers were using transistors instead of vacuum tubes, and, as a result, smaller, faster and less expensive desk top models were selling for \$20,000 and up. These computers found larger markets and wider applications — especially at the university level. In the '70s transistors were superseded by tiny integrated circuits, and again computers became faster, more compact and less expensive. During the last few years, we have seen many developments which clearly indicate that the computer is still evolving and that it is definitely here to stay. Some of the indications are listed below.

1. Consumer Product Status

Rapid advances in microprocessor technology and visions of worldwide markets have attracted many manufacturers into the computer field. With greater competition, the prices of computers are dropping constantly. Personal computers, with limited capabilities, can start as low as \$100. Other personal computers under \$5,000 can offer a wide variety of applications that

include everything from business and educational activities to games. To put it simply, computers no longer belong exclusively to the world of government, business and science; they are now considered consumer products.

2. Availability and Sales

As further evidence of their new status, computers are sold everywhere. Computer stores have suddenly sprung up where none previously existed. These stores reassure the wary buyer that the machines will stand up and that service is readily available. In addition to computer stores, the consumer can purchase computers at discount houses, department stores and audio shops. In spite of the recession, computer sales are up.

3. High Visibility

Older computers were hidden from the public's eye simply because they were huge and inaccessible. They were frequently depicted as a threat to the labor movement and to mankind. As a result, computers came of age in spite of a somewhat hostile environment. Today, however, conditions are different; computers are seen everywhere. The media has also helped to bring about dramatic changes in the way that the public

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regards the computer. Daily advertisements in newspapers, periodicals, radio and TV portray the computer as man's indispensable tool — an instrument that will help him with his work, his health, his education and his leisure. In addition to the advertisements, the media is presenting articles and TV specials on the wonderful achievements and potential of the computer. This high visibility has done a great deal in making the computer more widely accepted and more desirable.

4. Computers in Education

I'm sure that you do not have to be reminded that the educational system is probably the most powerful and most influential institution in our country. When the computer penetrates the educational system it will not only revolutionize teaching methodology and the educational process, it will also make computers as common as television or calculators. Computer literacy will be considered as necessary as reading and writing. In its 1980 report, the Rockefeller Foundation's Commission on the Humanities stated that "Computer literacy must now be considered among the goals of a liberal education by all colleges and universities..." That statement was made two years ago and the penetration has not as yet taken place. Why not? The problem, as I see it, is twofold. First, manufacturers are ready with their hardware, but not being educators, they have neglected software programs for most subject areas. Secondly, the vast majority of teachers have not had training in computer assisted instruction; therefore they can not write their own programs or use the computer as a teaching tool.

This apparent stalemate will not last long. The students are ready; the manufacturers are ready; nothing will keep them apart. If necessary, the manufacturers will create software programs as well as the hardware, and that's just what is happening at the present time. A few synthesizer manufacturers are using Apple II computers to control their digital synthesizers, and they are creating software programs aimed directly at the educational market. These products have generated a great deal of interest in the educational community, and things are already beginning to happen. For example, I regularly participate in state, regional, and

national conferences as an electronic music clinician. So far this year, I have been asked to appear at three state conferences and at the Regional Conference of the Music Educators National Conference. For the first time, I was asked to present sessions on computer application to the music curriculum at all four conferences. I think this is unusual, and it seems to be happening at other conferences too.

In any event, I want to give you some idea of what kinds of hardware/software packages manufacturers are putting together for our schools. I think that you will be able to anticipate the direction that music education is taking, and perhaps you will also be able to look down the road and see what effect these changes will have on the entire music scene in the next decade.

The Syntauri Corporation (3506 Waverley, Palo Alto, California 94306) was founded in 1980, with the express purpose of designing, developing and manufacturing synthesizer systems, using micro-computer technologies. Its efforts have produced the alphaSyntauri — a low-cost, all digital instrument which interfaces with the Apple II computer. (See Figure 1.)

This eight-voice polyphonic synthesizer utilizes a five-octave or four-octave velocity-sensitive keyboard and is software based. This means that the instrument can be upgraded whenever new software becomes available. (Software can include manuals, computer programs, floppy disks, diskettes, and tapes.)

The alphaSyntauri has two features that have special appeal for music educators. The first is the low cost for the basic system and for components, accessories, and software. The various systems list for \$1,225 to \$1,995 (excluding the cost of the Apple II computer). The other attractive feature is the software — especially Music Master, a series of programs designed to provide effective, comprehensive, low-cost training in basic musicianship. These programs were written by Dr. Wolfgang Kuhn of Stanford University and Dr. Paul Lorton of the University of San Francisco. Music Master is available in sequential modules that teach basic theory and ear training. Music fundamentals can be mastered using interactive drill and practice exercises. The beginning module introduces major, natural minor, harmonic minor, and melodic minor

scales. It also includes exercises in recognizing scales by sound alone, playing scales from notation, and playing scales from memory. Exercises for intervals consist of recognizing simple and diatonic intervals by sound, and identifying intervals by playing them at the keyboard. Exercises for triads include playing triads at the keyboard, identifying triads from notation, and recognizing major, minor, augmented and diminished triads by sound. The intermediate and advanced modules in the series cover rhythmic dictation, harmonic progression, chords, melodic dictation, counterpoint, and modulation. In this program students receive instant feedback on each problem, and, at the end of each session, they are given an overall score for the number of correct responses out of the number of first tries. Teacher manuals and student manuals are also included in the package.

In addition to the Music Master program, the techniques of sound synthesis can be self-taught using the tutorial manual which comes with every alphaSyntauri instrument. Musicians and students will also be interested in Draw Waves, a program which enables the musician to create new sounds by drawing graphical presentations of complex sounds on the video screen. The Apple II transforms the picture into sounds which can be stored digitally and recalled at a later time. Any waveform can be analyzed by harmonic number and amplitude using the Syntauri Analyzer. Once analyzed, sounds can be modified by adding or subtracting harmonics. In combination with the Analyzer, which is standard on all alphaSyntauri synthesizers, the Draw Waves program is a powerful tool for experienced synthesists and also for students who are learning synthesis techniques.

The Metatrak program provides eight-voice polyphony, up to 2,000 note sequencing (single track recording), and quick keyboard transposition. Recording is done live at the keyboard; all dynamic and rhythmic variations are digitally recorded and can be played back at almost any speed. An unlimited number of sounds can be stored on diskettes for fast retrieval. With Syntauri's Meta-Expander, it is possible to record and store up to 20,000 notes — enough for a piece of 30 to 60 minutes duration.

In the near future Syntauri will release a new program called Composer's Assistant. This software package will digitally convert any piece of music played on the alphaSyntauri into a high resolution graphic musical notation. In other words, it will print what is played — up to eight notes simultaneously in score format. What a boon for the composer and arranger!

Soundchaser (Passport Designs, Inc., 785 Main Street, Half Moon Bay, California 94019) is another synthesizer manufacturer that has also designed an eight-voice polyphonic synthesizer to be controlled by the Apple II computer. (See Figure 2.)

The Soundchaser features a software program called the Music Tutor which was written by Dr. Charles Body of the University of Minnesota. The program contains

four training units — intervals, matching and tuning, chords, and melodic games to develop aural skills and to introduce general music concepts. The program uses a variety of drills which students can follow at their own pace. A set of displays on the video screen provides instruction, encouragement, feedback, scores, and drill parameters. Professional musicians can use the same programs to sharpen and improve skills. Music Tutor guides students through the most repetitious and tedious drills, freeing the teacher for more personalized interaction with the class.

Note Writer is another program that transforms Soundchaser into a real-time monophonic music transcriber. It can write a melody, harmony or bass line in any key, meter or tempo. The line that you

play on the keyboard appears simultaneously on the screen in standard music notation. Editing features let you move themes around, correct mistakes, add notes and rests, change meter and key signature, and transpose.

Although the Soundchaser and the alphaSyntauri are similar in some respects, there are differences which should be evaluated if you are interested. Incidentally, both of these systems can be used by private music teachers; they do not have to be used in music classrooms.



Figure 1

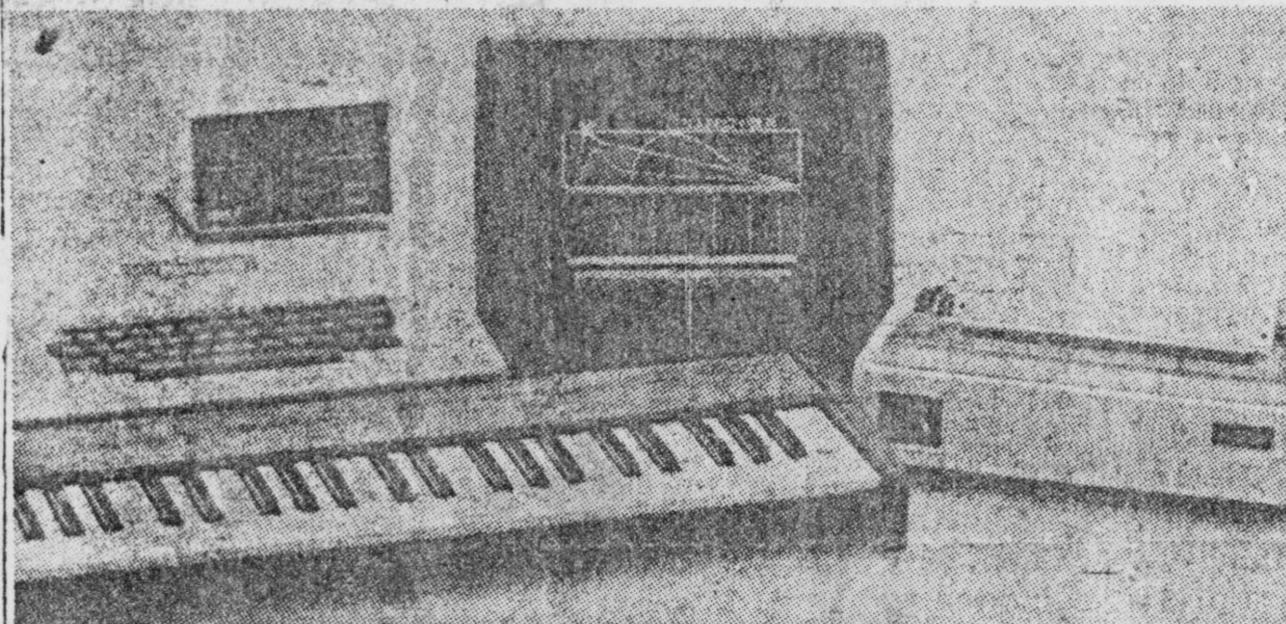


Figure 2