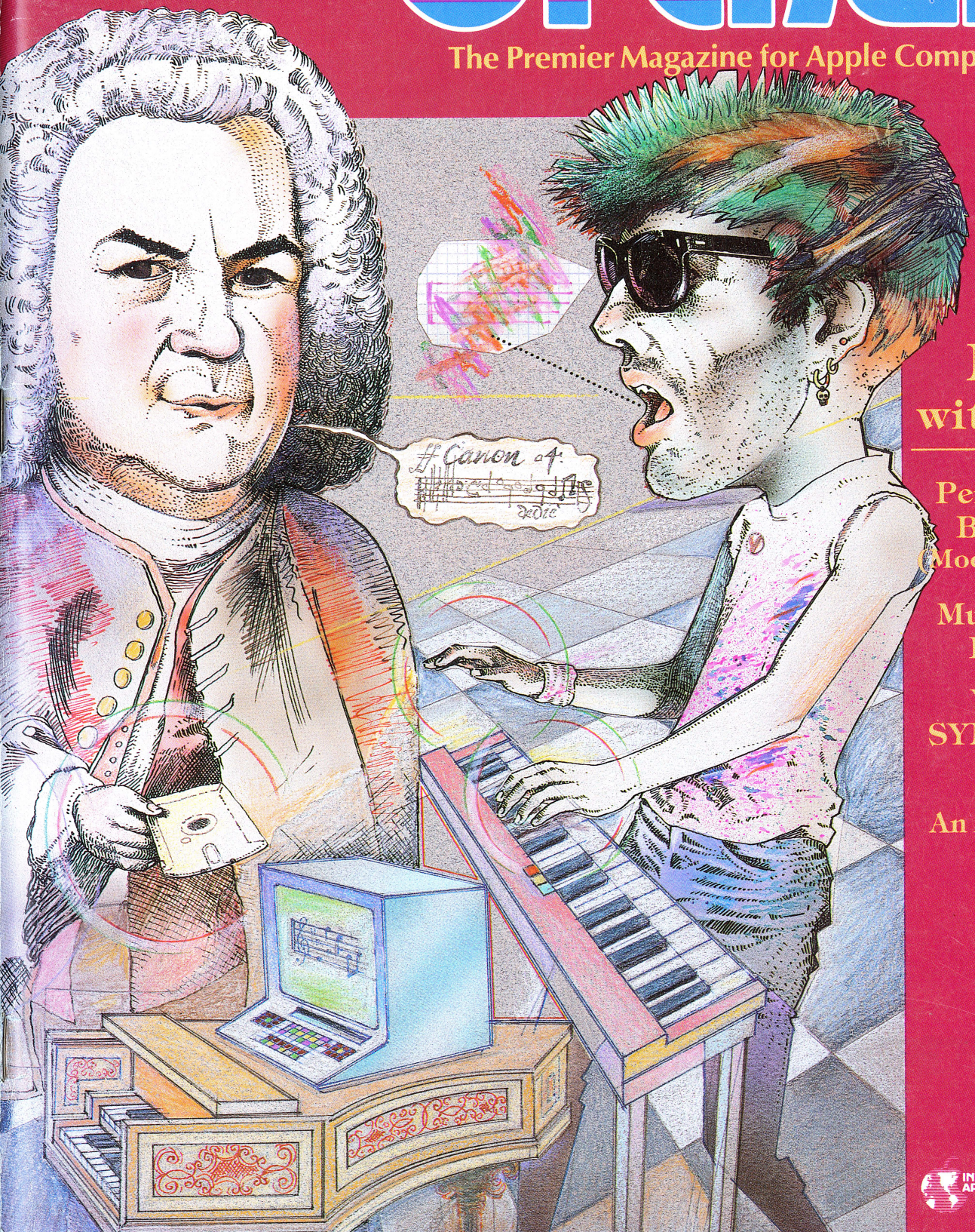
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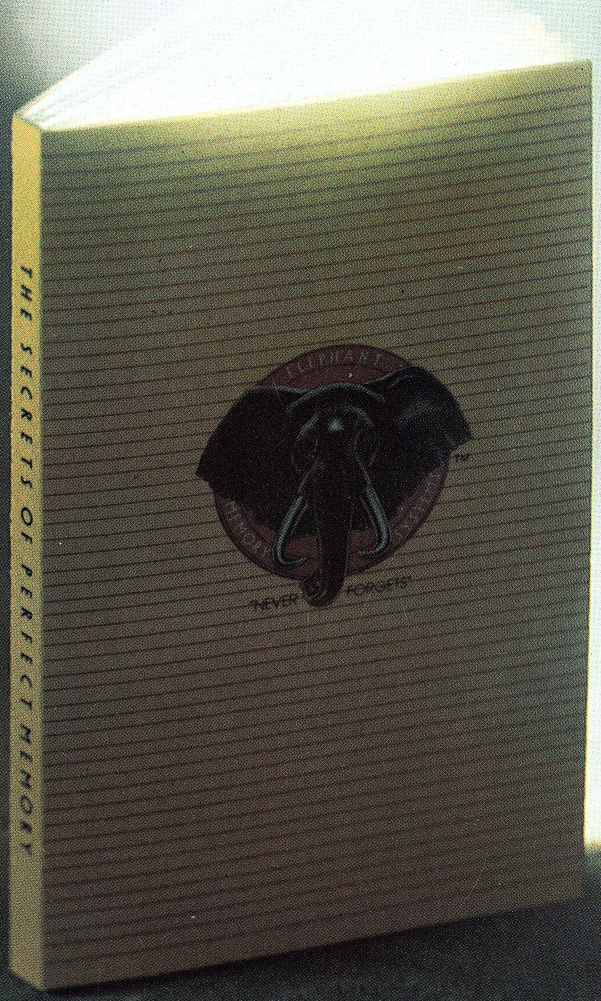
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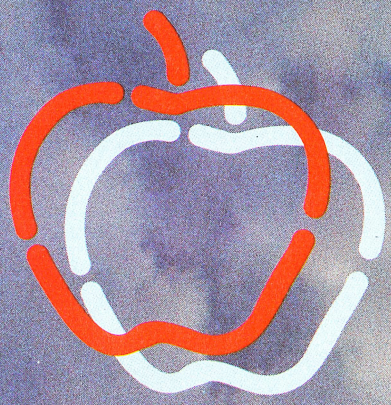
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Apple Orchard

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Textfile

The use of an Apple computer to generate music—*real* music—,is perhaps the most spectacular application yet devised for our favorite machines. At every show, at every group get-together, it is the music demonstrations that attract the largest crowds. Every musician and music teacher has at least wondered about these things; can they help to teach music? Are they real?

To try to answer this, we're taking advantage of our monthly frequency to attempt our first issue mostly devoted to one subject: "computer music" or digital synthesizers. Our goal is to show you what's available, what works, and then to encourage you to go as far into this activity as your time, talent, and inclination leads you.

Ask about music synthesizers and the name that you are likely to hear first is Moog (rhymes with "mow", not "moo"). Bob Moog is the man behind the machine, and he starts our journey with a thorough background on the development of electronic music

Review and analysis of the hardware and software that lets an Apple make music turned out to be an awesome task, particularly since we wanted to approach it from a musical point of view as much as the computer/technical. Julie White, Tom Darter, and Peter Nye each tackled segments of the job, with results herein.

Meanwhile, Dirk van Nouhuys, Dennis Briskin, and Tony Dirksen focused on the human and user aspects. So, you'll read about individual users, amateur and professional; about new directions in music education, and about buying your own system.

Lenore Wolgelenter also appears. And in addition to mentioning her article on professional musicians who have become Apple-ized, we must point out that Lenore also served as the editorial co-ordinator for this special issue effort. We're excited about the results.

Richard Loggins returns with a non-musical article, Part 2 of our WPL series. Rich begins construction of an address book, while showing you another facet of Applewriter's companion. Then, Pat Caffrey looks at Portfolio, a stock market game.

Question: are there other topics that you feel are deserving of this kind of special-issue focus? Or should the approach be different? Let us know what you think; **Apple Orchard** really belongs to you.

Please join with us in a moment of sadness. Our Managing Editor, Donna Caldwell, is leaving the **Apple Orchard** family to pursue a slightly different but equally challenging career direction. In eighteen months, Donna moved from young and excited Editorial Assistant to less young but no less excited Managing Editor. Her efforts have been instrumental in **Apple Orchard's** growth; it could have happened without her, but it wouldn't have been as pleasant a journey for the rest of us. We hope you'll all join us in wishing her well.

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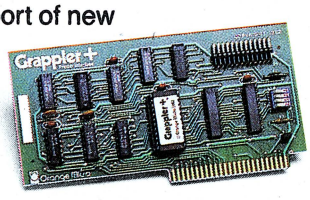
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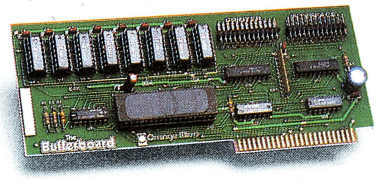
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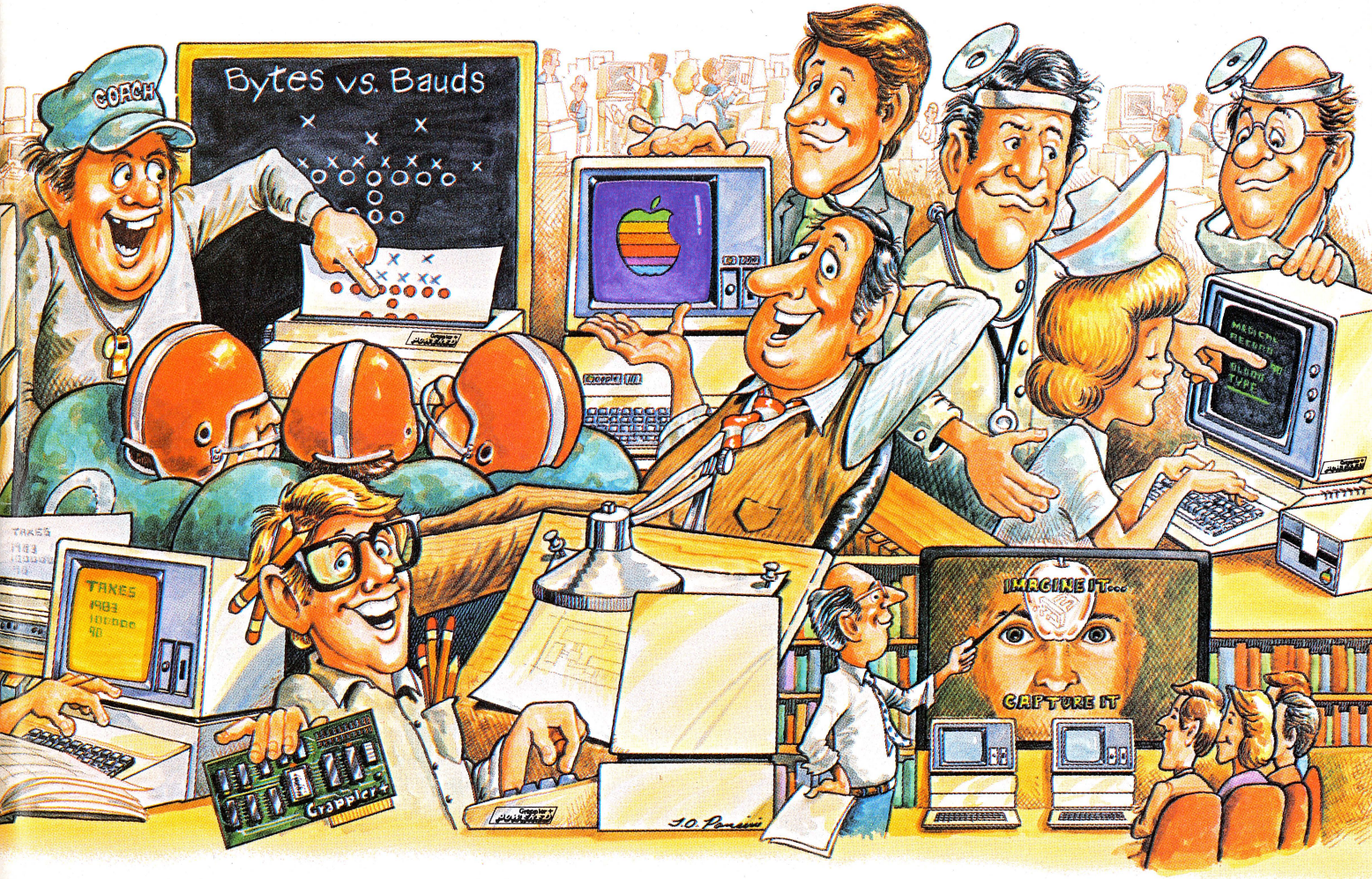
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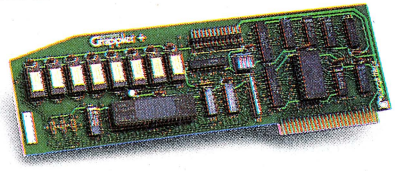
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Circle HelpCard No. 42

From Dynamos to Dynamic RAM's: 75 Years of Electronic Music

by Bob A. Moog

In Botticelli's famous painting "The Birth of Venus", the beauty queen of antiquity appears fully developed on her first day. The painting depicts her as a mature woman, riding in from the sea on a giant half-shell, and being met by a small reception committee on shore.

So it also often seems with electronic music, which surfaced in the late sixties as a seemingly mature popular artistic medium, riding into view on the success of Switched-on Bach (one of the largest-selling classical albums of all time), and being propelled by rock and roll and the electronic media. However, real artistic media, like real people, develop and grow to maturity, a process which inevitably takes time and nurturing. According to legend, Venus spent her younger days in the sea before she made the terrestial scene. Similarly, the growth of the medium of electronic music took place over three quarters of a century, during which time it developed from an awkward 'child' to the potent musical resource that we know today.

The Telharmonium

Electronic music started at the beginning of this century, when inventor Thaddeus Cahill designed and built an electric music system that still seems remarkable for its originality of concept and sheer size of the final product. Cahill knew that an alternating electrical voltage, when applied to a loudspeaker, would produce a musical tone. The more rapid the alternation, the higher is the tone's pitch. Cahill designed a series of electrical generators, each running at a different speed, to produce a complete range of musical notes. He then added large mixing transformers to combine the tones, several piano-like keyboards to enable musicians to control the tones, and a large bank of switches to activate and route the tones. He called his development the Telharmonium, a name that suggests sending music over distances.

The Telharmonium was no hand-held or table-top instrument. Each generator was capable of producing up to fifteen kilowatts of power. The mixing transformers weighed upwards of a ton each. The Telharmonium was built in the early 1900's, in Holyoke, Massachusetts, then transported to New York City on a whole train of flat cars. It was installed in midtown Manhattan in a building that Cahill named (what else?) Telharmonic Hall.

For Cahill, the Telharmonium was more than the outgrowth of casual tinkering. It was a business venture: The New York Electric Music Company. Cahill's marketing plan included not only public concerts, but also a network of subscribers who were connected via telephone lines, and who would receive Telharmonic music in their homes and businesses. The Company's staff included several trained musicians who performed concerts at scheduled times throughout the day. Initial press reviews were generally favorable; musicians throughout the world discussed Cahill's developments with wonder and enthusiasm.

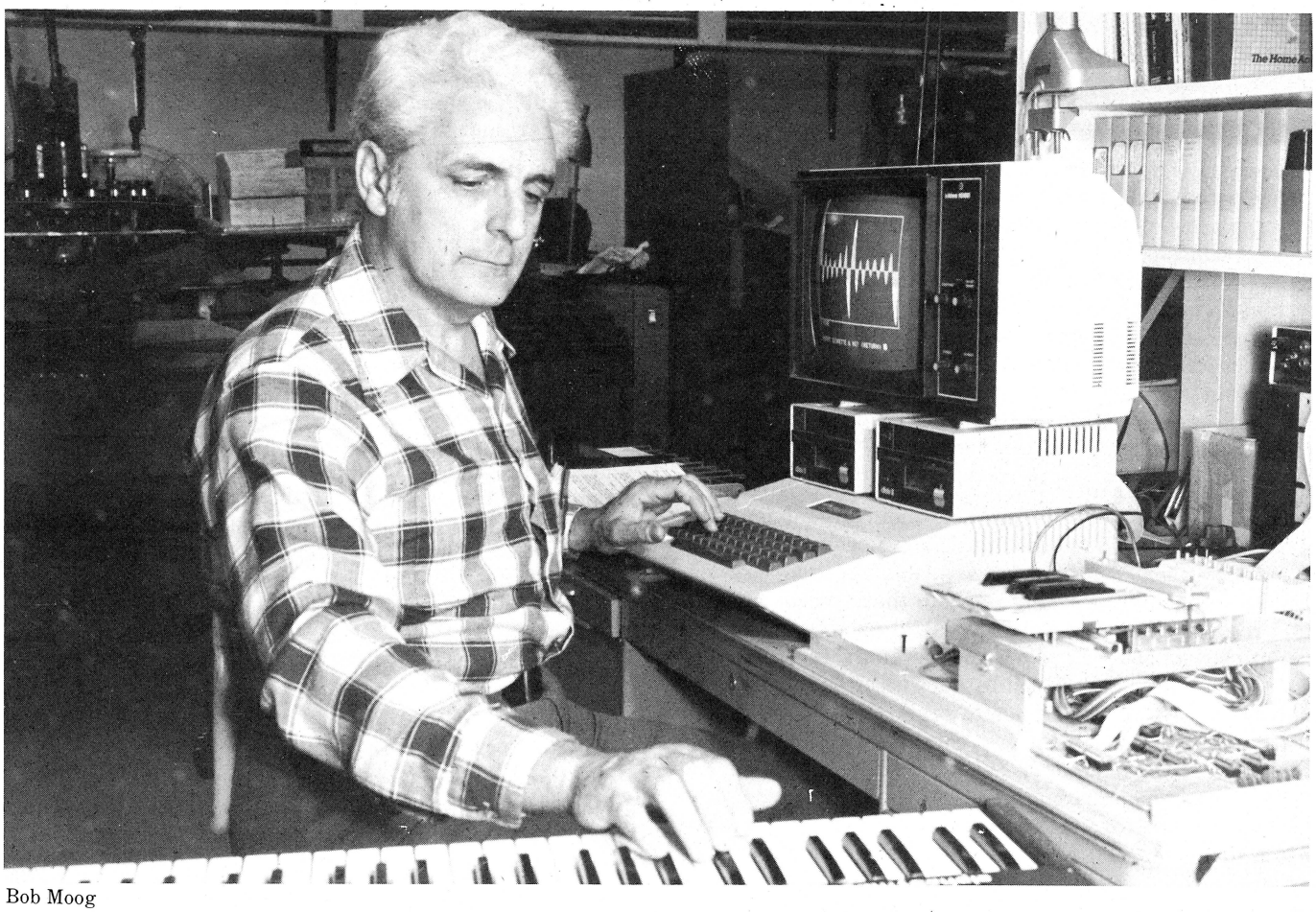
After several years of operating, however, the Telharmonium failed to live up to its early promise. Although it was a technical *tour de force* that enabled musicians to control tone color through sophisticaed synthesis and touch sensitive keyboards, the Telharmonium produced tones that eventually proved tiresome to listen to. Besides that, the radio was enjoying an increasing popularity. As the First World War drew to a close, the New York Electric Music Company "took the count" and went out of business, leaving a technocultural legacy that included additive synthesis (later employed in the Hammond organ with enormous commercial success), touch-sensitive keyboards (which are considered "hip" to this very day), and the concept of a music-by-subscriber-network that we generally refer to by the trade name Muzak.

Early Electronic Instruments

The vacuum tube was invented by Lee DeForest in 1907. Within two decades, when most people were just becoming acquainted with radio, technicians and experimenters were deeply immersed in finding musical applications for the new technology.

Programmable Electronic Musical Instruments

The idea of programmable musical instruments is nothing new. Music boxes have been made for hundreds of years, and reached a startling level of sophistication toward the end of the nineteenth century. Player pianos and nickelodeons were commonplace at the beginning of this century. So it was natural for the early electronic musical instrument developers to combine electronic sound generation with programmed control, to form what we would call today a "programmable synthesizer". The first instrument of this type that I know of is the Coupleux-Givelet Synthesizer, a four-voice instrument whose 'controls' were manipulated pneumatically with the sort of technology that was developed by the player-piano industry.



Bob Moog

Conceptually however, the Coupleux-Givelet instrument went far beyond the player piano: the paper roll that programmed the instrument not only turned notes on and off, but also varied pitch, loudness, tone color, vibrato, and other properties of the sounds themselves. The technology employed by Coupleux and Givelet was crude by today's standards: pneumatic bellows moving the iron cores of electrical coils to vary tone color, tracker bars to start and stop notes, and so forth. But the concept of providing musicians with ways of shaping the individual properties of sounds, of enabling musicians to build up sound from component parts, is what has made electronic and computer music so attractive to musicians.

One of the earliest electronic instruments was the Pianorad, invented by Hugo Gernsback, a man whom many regard as a Founding Father of science fiction in this country. Gernsback's invention consisted of a bank of vacuum-tube oscillators (electronic alternating voltage generators) covering several octaves of the musical pitch range. Each oscillator was connected to its own loudspeaker driver, and was activated by one key of a conventional organ-like keyboard. (If you are familiar with the technical bases of audio electronics, you will recognize that Gernsback's scheme of having a separate loudspeaker driver for each note was a foolproof way of avoiding intermodulation distortion,– pretty hip for the 1920's!) Throughout the 1920's, the Pianorad was regularly played live over radio in New York City, by itself and in ensemble with other musicians.

The Theremin was perhaps the most novel and original of all the early electronic musical instruments, in that its means of control, as well as its means of sound production, was completely new. Whereas instruments like the Telharmonium and the Pianorad used conventional piano-like keyboards for musical control, the Theremin was controlled by the movements of the player's hand in the space surrounding the instrument. Thus, the Theremin offered musicians not merely a new set of tone colors, but a new way of controlling and shaping those colors. In the hands of a skilled musician, the Theremin produces warm, vibrant tones that suggest a cello or a human voice, but with a much wider pitch range. The Theremin was brought to this country in 1927 by its inventor, Leon Theremin. It was manufactured by the Radio Corporation of America for a brief period of time during the early thirties. Several musicians made careers of giving Theremin concerts. The greatest of these is Clara Rockmore, who played over 150 concerts with major symphony orchestras and with her pianist sister Nadia Reisenberg before retiring.

Other new electronic instruments challenged, but never matched, the Theremin's originality. The Ondes Martenot, like the Theremin, was a solo instrument. That is, it produced one note at a time, like a clarinet or trumpet. However, the Ondes Martenot's control mechanism was a keyboard that worked in combination with a sliding flexible band. It enabled a musician to either play discrete notes or slide from note to note, much as a violinist is able to do. Another important instrument is the Trautonium, a German invention that utilized a long contact ribbon as its main control means. Leon Theremin himself experimented with a variety of new instruments, including a dance platform that doubled as a musical instrument. Many of these new instruments achieved small-scale production: Trautoniums were made by Telefunken,

and Ondes Martenots were built in the inventor's own factory.

Electronic Music at the Halfway Point

The work of Coupleux and Givelet was the first of a series of experimental programmable synthesizers. Throughout the 1930s, a growing body of electronic musical instrument designers came up with an amazing variety of new instruments for musicians to explore. Some (like Theremin's instruments) were designed to be played live. Others were intended to be programmed. Composers such as Percy Grainger, Henry Cowell, and Edgar Varese worked with these developments, struggling with early electrical disc recording to realize and record the sort of music that their minds were creating for them.

World War II diverted the talents of electronic engineers from musical instrument design to more urgent matters. After the war ended in 1945, musicians discovered that yet another electronic resource was available: the tape recorder. Unlike any sound recording medium that preceded it, the tape recorder offered musicians the ability to physically manipulate stored sounds,- to cut sounds apart, reverse them, shape them, and splice them together with any degree of complexity they chose. Experimental studios sprang up in Germany, France, and Italy; in New York, Toronto, and Urbana, Illinois. Working in laboratory-studios with electronic technicians, experimental composers set about making complete pieces of music with electronic sound-producing and modifying instruments and tape recorders. Their music was as experimental as their way of working: new timbres, sound structures that were far more intricate than those that could be produced by traditional performers, and sounds that started out as everyday noises, but were structured electronically to become music. These experimental composers developed ways of organizing and working with electronic equipment that became known collectively as "Classical Electronic Music Studio Techniques". They worked through the 1950s and early '60s, conveying their new-found knowledge to music students and to other experimentally inclined composers.

Emergence of the Modern-day Electronic Music Synthesizer

In the mid-sixties, several developments came together, the result of which was the appearance of keyboard synthesizers which are now so popular. These developments were the availability of high quality transistors at reasonable cost, the use of multitrack recorders in pop and rock music, the increasing popularity of rock music itself, and the increasing activity of experimental musicians.
perform a single function, but all of which were designed to be easily interconnectable, like a component stereo system.

The Classical Electronic Music Studio Technique centered on the use of a wide variety of electronic sound producing and modifying instruments which the musician connected together (patched) to perform the function that he wanted. Electronic musicians soon learned to describe a particular sound event in terms of the types of instruments that he used to produce the sound, and the pattern in which the instruments were interconnected. This led to the concept of a modular system—a group of devices, each of which was designed to

When I became interested in electronic music instrumentation some twenty years ago, I knew of the modular concept. (My engineering laboratory instructor was also the technical director of the Columbia-Princeton Electronic Music Center!) I also knew that transistor circuits could be used to build a modular system that was much more compact, stable, wide range—and cheaper—than a similar system made with vacuum tubes. I had always been interested in electronic musical instruments, and in fact had made a good part-time living building Theremins on a custom basis while I worked my way through graduate school. When I met Herb Deutsch, an experimental composer who at that time was an instructor in the Hofstra University music department, he asked me if I was interested in building some electronic music equipment for him. I naturally said "Yes"!

Herb and I worked together for several weeks in the spring and summer of 1964. Herb described the sorts of sounds that he wanted to work with, and I built some modules to meet his requirements. As we worked, I building circuits and he using the circuits and his tape recorder to compose music, the importance of the modular concept became evident. We talked about many kinds of modules and tried a variety of ideas, some of which we developed while others we discarded. We considered various sorts of control devices, and settled on a keyboard and a long, slender touch-sensitive "ribbon controller".

By the end of summer, Herb and I had pinned down the components of our first modular system. In doing so, we articulated a complete instrument concept, a concept which has formed the basis of the synthesizer industry which is now worldwide in scope and the fastest-growing segment of the musical instrument industry. I gave our modest collection of handmade modules its first public showing at the 1964 Audio Engineering Society convention in New York City. Our first customer was Alwin Nikolais, a choreographer who composes his own sound scores. Second was Eric Siday, a commercial composer, and third was Vladimir Ussachevsky, the director of the Columbia-Princeton Electronic Music Center. The world of pop and rock music had nothing to do with us; not yet!

At the same time that we were getting ready to make electronic equipment for a living, musician-inventor Don Buchla was collaborating with composer Morton Subotnick. The result of their collaboration was also a modular electronic system, similar in many ways to what Deutsch and I had come up with. And in Rome, television engineer Paul Ketoff had already built several small modular, keyboard controlled instruments. In retrospect it seems that in the mid sixties, the transistorized modular electronic music system was an idea whose time had come.

As the sixties unfolded, our equipment became popular with experimental composers and with the loose network of musicians who produced radio and TV commercials. One of these was Walter Carlos, a New York recording engineer who had been a student of Ussachevsky. Carlos built a small but elegant electronic music studio in the living room of his apartment. After a few experiments, he and a couple of his colleagues began a project to use the modular synthesizer which we had built for him to realize the music of J. S. Bach. They finished their project in 1968. The resulting record, *Switched-on Bach*, was an instant success, and catapulted the entire electronic music medium into public view.

The beginning of the popularization of synthesizers and electronic music in the latter part of the '60's, coincided with the emergence of rock and roll as a dominating cultural force. As a musical medium, rock and roll could not exist without electronics. The whole electronic music medium was adopted, slowly at first and then more completely, by rock musicians. The big turning point came in the early seventies, when a new generation of synthesizers that could be played in live performance without having to be patched was placed on the market. These included the Minimoog (which is still popular among electronic keyboard players) and the early Arp instruments. The early '70's were marked by the acceptance of the keyboard synthesizer as a legitimate and important addition to the electronic keyboard performer's arsenal.

The Importance of Digital Technology

Until fairly recently, most synthesizers were analog instruments. "Analog" is the technical term that means that the instrument's circuitry produces continuously-varying voltages that correspond, say, to the sound waveform. In contrast, "digital" circuits produce numbers that must be converted into voltages before they can have anything to do with sound. Digital circuits are inherently accurate. Their contents can be easily moved around, processed, and stored with no loss of accuracy. (*A non-musical way of explaining analog vs. digital is this: if your watch has moving hands on it, it's analog. If it displays numbers, it's digital.—PCW.*)

The development of the microprocessor played the same role in the utilization of digital circuitry in synthesizers as the proliferation of the transistor played in the utilization of analog circuitry. Only a couple of years after the first microprocessors were put on the market, they were being utilized to replace patch cords and manually operated control knobs on synthesizers. With microprocessor programming of a keyboard instrument, it is possible to set up a tone color, then store all of the numbers defining that tone color in a digital memory. The tone color can be called up in performance virtually instantly, a huge increase in convenience for the performing musician over having to adjust the knobs of an all-analog instrument.

Many of the currently-available electronic keyboard instruments are microprocessor-controlled, and are equipped with MIDI (Musical Instrument Digital Interface) which allows instruments to "talk" to one another, or to a MIDI-equipped computer. In a sense, we are returning to the modular concept. Now however, the "modules" are complete instruments, the "patch cords" are MIDI cables, and the signals that flow among the modules are not sound waves or control signals, but are complete sets of commands. With the right software it is now possible, even convenient, to organize several MIDI-equipped instruments into a computer-controlled ensemble, thereby greatly reducing the need for multitrack recorders in electronic music!

Digital Sound Synthesis

Digital programming of an analog synthesizer requires the execution of up to a few thousand instructions per second, and can therefore be easily handled by a microprocessor. For a synthesizer to generate an actual sound waveform by digital means, on the other hand, requires the execution of hundreds of thousands or millions of instructions per second. Personal computers are able to program and control synthesizers, but they do not go fast enough to generate musical quality waveforms digitally. Some computer-based music systems, like the alphaSyntauri, use peripherals that are specially designed to produce musical sounds. Others rely on large computers that are capable of musical sound throughput in real time.

If you are more interested in composing than in live performance, you can use an Apple II-size computer to produce music of considerable complexity. You would write a program to produce the data for the sound waveform, and then dump that data into a mass storage medium such as a hard disk. When enough data to make a piece of music is accumulated, you would invoke another program to feed that data rapidly to a digital-to-analog converter, thereby producing the desired sound waveform. Experimental composers have worked this way for a long time. There are computer music laboratories at Bell Laboratories, MIT, Stanford, and many other institutions that have served experimental composers for the past two decades. Today it is possible to do the same thing on your kitchen table, with the right software and peripherals.

What's in the Future

Personal computers will become increasingly important to musicians. A MIDI-equipped computer can perform the function of personal recording studio (recording and processing MIDI commands as the musician generates them by playing a keyboard or similar control device), music learning center, or a composing center. Digitally programmable synthesizers may come to be regarded as specialized computer peripherals, spitting out complex sound waveforms just as my printer spits out golden prose at 160 characters per second. If you like to play music for fun, you may, some time in the future, buy a finely crafted MIDI-equipped keyboard. You may then take it to your friend's house on Saturday night where you will plug into his MIDI-equipped computer and synthesizer and play, either by yourself or with him. If you enjoy playing music with your friend but the snow is too deep for you to go to his house, you may elect to hook your computer to his over a phone line, and both of you can play while hearing each other's performance, just as if you were in the same room.

If you're a professional composer, you will probably have thrown out your pen and your music paper long ago. You will compose right at your computer, using a user-friendly "*note-processing*" program. When you have enough to listen to, you'll command your computer to "play it out" through the synthesizer peripheral that's connected between your computer and your sound system.

If your dream is to play with your local rock band, everything you've learned on your home computer music system will carry over as you head for the bright lights and the screaming crowd. Your band will have its own computer and programmable synthesizer, just as today's bands all have their own PA systems. You'll plug your glitter-coated handheld keyboard into the MIDI input on the computer, call up the selection of tone colors you use for the performance, and wail away. Your record company will store the MIDI signals on their hard disk, for later release as a MIDI-encoded 'live album".

Far fetched, you say? Don't kid yourself!

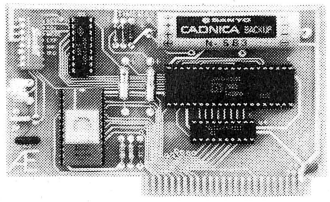
Bob Moog started the synthesizer explosion with the first Moog Synthesizer and is presently doing reasearch, lecturing and writing.

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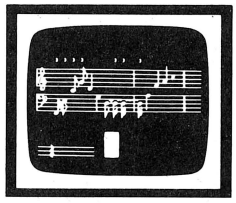
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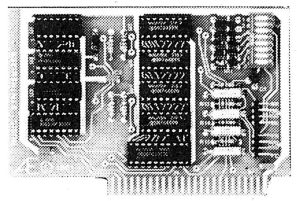
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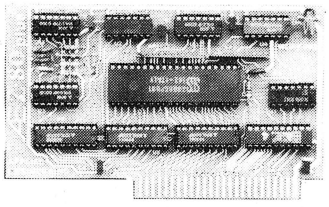




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SUP'RTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	NO	YES	NO	YES	YES	NO	YES

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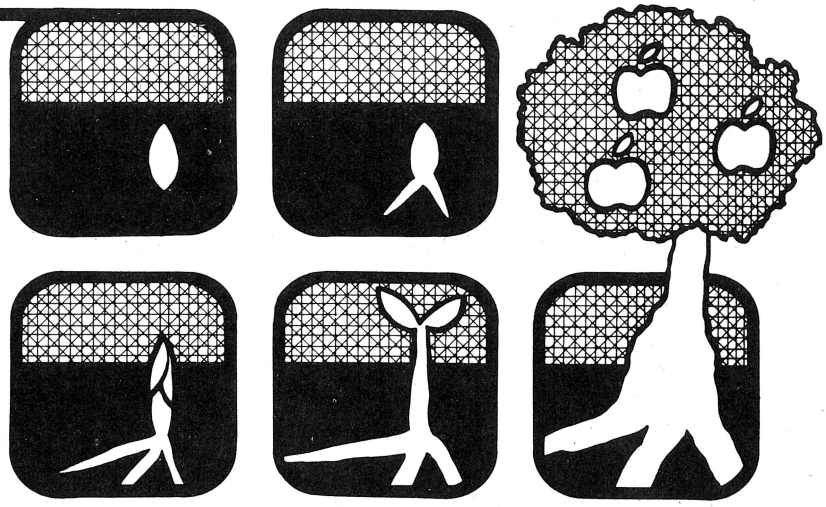
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The Connections

Electronic music synthesis on an Apple? Voice recognition? Controller boxes for electric motors, lights, and other switches? Sensors for light, temperature, voltage, current, and sound levels? On an Apple? Yup. You name it, and it most likely can be, and has been, connected to an Apple computer. Or somebody's working on it.

The array of peripheral boards that can be plugged into the Apple II's eight expansion slots is astounding, as our product listings, reviews, and advertisements have shown over the months. It's a major reason why "more people are doing more things . . .", and, more importantly, *getting more things done.*

Accomplishment is the key, although the hobbyists view use of the machine as an end in itself. Most of us want to use the personal computer to help us with a personally-defined range of tasks. *Our* tasks, both work and play. And not only are no two people's lists of tasks the same, the aggregate of those lists is so incredibly diverse that it seems no machine can satisfy them all.

Well, it can't. Not by itself, anyway. The personal computer without expansion capability does only part of the job. Hence, the home "game machines" that stall at a load much greater than a checkbook, or the rigidly-designed business computers that have no way other than an RS-232 serial port to communicate with the world outside their motherboard wombs.

Even Baby Blue has only five slots, two of which are to be used if you want a monitor and disk drives. No wonder the magazines for that machine are much larger; there are so many more things that need correcting, and there's a considerable business in multiple-function boards to conserve those precious slots.

Through it all, the Apples have been unique; the company encouraged a bunch of creative minds, on and off its payroll, to go and develop—to allow Apple computers to handle more items on that aggregate list. To go beyond Games and Bookkeeping, to process control, scientific analysis . . . and, as we show in this issue, to music. Not just beeps, buzzes, tones and squawks, but *music.*

That's the real beauty of our favorite machine; when it's not a word processor, it can be a musical instrument or a burglar alarm; sometimes more than one thing at a time. All because of the ability to plug in a variety of uses, each encapsulated in silicon, copper (or gold), and various resins.

There is always a temptation to lower production costs by using fewer connectors; the penalty is fewer access points for external items. These are usually justified by pompous pronouncements about market research, which boil down to "We know what's best for you".

Maybe so. But a computer that doesn't have that extensibility, even an Apple, is at a severe disadvantage; it will likely disappoint those who make the sales projections. Our intelligence on the "Peanut", or PC Junior, indicates that one large firm thinks very highly of connecting points; see for yourself.

It shouldn't be a surprise; every salesman knows that to be successful, "ya gotta have the connections."



Music & Sound For the Apple

by Julie White

Up until recently, systems for digitally processing and synthesizing sound have been available only in super-megabuck, megapower "installations" for professional musicians, recording engineers, and programmers. Unless he wanted to build his own from scratch, the average home-computerist was left out. However, in the last four or five years, a number of systems have been developed to bring digital-sound synthesis and processing into the home.

Each of these Apple-compatible systems has approached the concept of digital sound in its own way. Three are synthesizer systems, ranging from a simple but effective music-writing program with a limited variety of sounds, to a 16-voice composing system that allows for extensive sound manipulation and modification. The last is a kind of digital "tape recorder"; it lets you do neat things with real sounds.

Each system has its advantages and its shortcomings—and no one does everything you might want such a system to do—but as a group, they indicate that progress may be headed in the right direction. It's worth keeping in mind that while digital technology allows sounds to be manipulated very precisely, it also means the loss of the fluidity of control that makes analog systems so pleasant to use. It would be a mistake to assume that any of these systems will turn a beginner into a professional musician, or take the place of serious instrumental study. What these systems do offer, however, are various ways for the amateur or even non-musician to play around with sound, and, with a bit of work, actually to create music.

ALF MC1
1315 Nelson
Denver, CO 80213
(303) 234-0871

The ALF MC1 Music Card ($195) is a nine-voice music writing and playback system, designed to be compatible with any Apple II with 32k or more memory. The package consists of a system disk (actually, you get two: one in Integer BASIC, the other in Applesoft) an owner's manual, and a hardware board. In addition, you will need a stereo amplifier, speakers, and two game paddles. The program allows you to enter music on a musical staff display, play it back, and build up "albums" of songs. The package is intended to be a general-purpose tool for the hobbyist or the professional musician, with or without computer experience, and although it is helpful to be able to read music, it is not absolutely necessary.

Installing the board is very simple — it plugs into a slot in the Apple, and a connecting stereo audio cable plugs into your amplifier. The main music-writing program is called "Entry". A graphic representation of treble and bass staves appears, on which you enter up to nine lines or "parts," one at a time. Music can be transcribed over a range of four and a half octaves, extending from C, two octaves below middle C, to F two and a half octaves above. Key and time signatures are entered first, via the Apple keyboard. Any time signature can be used, and key signatures can contain up to six flats or sharps.

Eight asterisks are displayed to the right of these signatures; as you pass the cursor over each, information is displayed on the command line at the bottom of the screen, concerning a "quarter" function that allows for tempo changes at any point in any part by determining the real-time value of a quarter note; a "gap" function that determines how much time there will be between each note's decay and the attack of the next note; and a transpose function that ostensibly lets you transpose a part up or down five and a half octaves, and thereby extend beyond the range of the staff.

Practically speaking, you can transpose about three octaves above the highest written note before the computer rolls the pitches over into the low register, and about an octave below the lowest note before that rolls under into the high register. Other asterisk functions have to do with the volume and what are called the the "envelope" settings: the attack, decay, sustain, and release of each note.

Pitches are chosen by moving a cursor up and down the staff with paddle one, and are entered when the paddle's button is pressed. When the note is entered, the pitch sounds. Note durations (which extend to 64th notes and even include triplets), accidentals, and ties can be selected from a line display below the staff, using paddle zero. Another paddle-zero

function allows you to move to any note in a part to insert, delete, or hear it. This last is turned on by a "speaker" function.

Another line at the bottom of the screen keeps tabs on what line and measure you're in, and how many notes are left available in memory (total capacity is about 5900 notes). A third line displays keyboard commands as you enter them, and also lists the name and octave placement of whatever note the cursor is sitting on. Although you can enter nine musical lines altogether, only one line can be worked on—or seen—at a time. After you enter each line, you can listen to what you've done. Since all lines play back together, you can listen to individual lines only by turning every other line's volume setting to zero, or by using the aforementioned "speaker" feature.

Other features you can use include a "fuzz" function, which adds pseudo-white noise to the sound of a line. With this and some adjusting of the envelope settings, you can produce some percussive sounds. A speed command will change the tempo of the entire piece, and a length function allows for unusual divisions of the quarter note, which can be divided into as many time periods as there are in the "quarter" setting. On the staff, these odd notes appear as Xs on stems, rather than as noteheads. This is very useful in entering pieces like Chopin mazurkas, which contain endless strings of 13 or 17 notes to a beat. Another feature is the ability to create subroutines, useful for having sections repeat without having to re-enter them on the staff, or for creating rounds, endless loops, and such.

Once you have finished entering and editing a piece, the Play program will play it back for you. Another program, called Disco, lets you string pieces together into an "album". These albums do not allow for uniterrupted play, as might be expected; you have to set the speed with a game-paddle and push the button before each song on an album will start. Apparently this was put in to allow you to announce each song before it starts. The manual has instructions for writing music without using the Entry program, in a chapter entitled Perform, and there's also a chapter that provides instructions for accessing the synthesizer directly, which, among other things, allows you to create different divisions of the octave.

The playback sound is very clean and precise, with good pitch accuracy, going off only in the very highest and lowest registers. Rhythmic accuracy is excellent within and between parts. Adjusting the envelope settings can be fun. Important to note, however, is that the only waveform available (besides the fuzz) is a square wave. As a result, everything you play on the MC1 sounds a lot like a reedy organ, although, with a little work, some interesting "dying squeezebox" accordian sounds can be created.

The software, although flexible, is comparatively slow. It takes a frustratingly long time to get back and forth between playing and editing lines, and entering notes via the paddles is cumbersome. Using the measure lines is a bit strange, in that they are designed to appear as soon as you have entered the correct rhythmic values for a measure. When you delete a note from a measure (a common procedure), the program automatically sucks up notes from subsequent measures, creating all kinds of weird ties and note values to make up for the lost beat. Not having the full range of key signatures available is slightly annoying. The transposition function is difficult to deal with; after you order a transposition, you have to go into Play to hear it (and lower the volume settings on all the other voices if you want to *really* hear it). It's easy to lose sense of what things sound like in all that going back and forth.

While the above features are merely bothersome, there are more serious problems with the MC1. The manual provides no summaries within chapters, in some cases leaving you to guess what a chapter is for. The poor organization makes it difficult to find information on technical details, or to obtain any kind of overview. Information appears in bizarre places; for instance, you learn how to use triplets not during the explanation of note durations, but in the section on subroutines. Spending all that time looking for information in the manual (and not to mention waiting for the program to load and reload) can make entering music a tedious, even exasperating process. The prose tends to be convoluted and cluttered with unnecessary comments. Considering the program is meant for use by the novice (both computer and musical), a more understandable manual would seem a necessity.

It would also help to offset the fact that by today's standards, the software is not especially user-friendly. It is not clear how to move from one menu to another, and it is frighteningly easy to crash the system, or destroy data by accident. I destroyed the songs in the catalog while I was (I thought correctly) following instructions on how to create an album for the Disco program.

Overall, the package does what it claims, and if you are interested in transcribing music and having it played back for you, this system does that quite adequately. When it was first developed in 1977, the MC1 was the first such system of its kind, and with all credit given to it as such, it is starting to look more crude and less user-friendly as more sophisticated and flexible systems are being developed and marketed. Considering its limited sound resources and user-unfriendliness, the system is a bit pricey at $195. Extra albums of music are available so that you can hear what others have done on the system. Other software, including programming aids and lots of educational software are available.

Applied Engineering

P. O. Box 470301
Dallas, TX 73249
(214) 492-2027

Applied Engineering makes the Super Music Synthesizer ($159), a 16-voice synthesizer system similiar to the ALF, and compatible with an Apple II with 48k memory. The system comes with a double-sided disk, a hardware board, and a stereo audio cable. You provide a stereo amp and speakers. On the board there are three tone-generating oscillators and one noise oscillator, each with dividers giving it four separate outputs.

The first problem with the system was encountered while installing and booting it up. I found that the manual provides contradictory instructions on which slots the board can plug into; on one page, it lists 0 through 7, while on the next it lists 1 through 7. The default setting is 3. I tried to tell the software I wanted the board in slot 0, but could not do so because the master disk is permanently write-protected. After I went to a copy (a procedure not detailed until much later in the manual), I tried again. This time the software accepted the instruction, but upon any subsequent instructions, the system crashed. I decided to stick with slot 3.

There are several programs available. In Play, you can listen to the 30 or so songs provided on disk, either in random order or individually. A catalog is provided, and the speed of the songs can be adjusted by twiddling game paddle zero and pressing the button. You can also stop the song at any point by hitting Control/Reset. All of the musical tones on the disk tend to sound the same timbre-wise, although there are some interesting effects to be found on "Alien Chopper Death," "March of the Womp Rats," and "Amoeba Jig." Another program allows you to create custom "albums" of your own songs.

In order to use the Compose program, first you have to copy the system disk and, using FID, wipe out all the songs already on disk. If you don't do this (and at first I didn't), the program will not save any part of a song, and will crash if you get persistent about it. This tidbit of extremely necessary information is tucked away in an unobtrusive spot in the manual. Once you manage to get into it, the program lets you enter 12 lines of notes. In addition, four lines of "percussion" (noise) are available to add to other lines. About 8800 notes are available in memory.

As with the ALF MC1, pitches are chosen with a cursor that travels up and down the staff, controlled by game paddle one. A Hi-Res graphic display presents a grand staff (treble and bass clef).At the end of the paddle's travel is a "rest" (hence the manual calls it the "pitch/rest" paddle), and a note or rest placed into the file by pressing the button on the paddle, which simultaneously sounds the pitch. Paddle zero is the "commands" paddle. As you turn the knob on the paddle, the various functions appear one by one in a inverse-video box on the screen; you select the one in the box by pushing the paddle button. Since they appear only one at a time, you must constantly search for the proper function. Unfortunately, my game paddles are somewhat jittery, which made the process rather annoying.

The keyboard is used to enter all other commands. Only the first three letters of each command are necessary, and a list of commands is easily accessed by pressing "?". They include key signatures, time signatures, envelope settings, quarter-value, speed, and transposition functions. The last will transpose up or down five or so octaves, and has the same limitations as the ALF transpose function. Other commands include volume, speaker location (the system can perform in quadrophonic -- four-channel stereo -- by setting a bank of DIP switches on the board prior to installation), percussion, and subroutines.

Once again, even with the extra voices and the percussion, the timbres, which seem to be pulse waves, are limited. There is a section in the manual for extending the system's capabilities by programming it in BASIC or machine language, but apparently you can not change the waveforms even in these modes. You can play songs written for the ALF synthesizer on this system although, obviously, the nine-voice ALF song files don't take full advantage of the Applied hardware's 12 voices-plus.

The manual is not as clear and well-organized as it could be; information is difficult to find, owing to the lack of a table of contents or an index. Few parts of the program are explained as thoroughly as they could be, and a few are not explained even adequately. An attempt has been made to make the software user-friendly, with organized menus and instruction displays, but it is nevertheless far too easy to crash. There is no error-message table in the manual, which is annoying considering how many errors it is possible to make. Other problems include the tuning, which is not accurate, and the relatively slow pace at which the system loads, saves, and accesses files.

Mountain Computer Music System

300 El Pueblo
Scotts Valley, CA 95066
(408) 438-6650

The Mountain Computer Music System ($395) is a digital music synthesizer for the 48k Apple II computer. The package comes with two double-sided floppy disks, an operating manual, a six-foot stereo audio cable, a light pen, and two hardware boards, which plug into two consecutive slots in the Apple. The system is intended for use by both the professional and amateur musician, with or without computer experience and, with perseverance, can be enjoyed by just about anyone.

One disk contains the Music Player, Editor, and Merger on one side, and song files on the back. The other has the Instrument Definer and Player, with instrument files on the back. Thanks to clear instructions in the manual, installation and boot-up are easy.

The Music Editor, once loaded, allows you to enter pieces of music and then edit them. Up to sixteen lines can be transcribed, one at a time. Notes are entered with a cursor that roams up and down on a Hi-Res graphic display of a musical staff, either single or piano-style double. The lower part of the screen displays a Main Commands Menu, from which you choose rhythmic values for notes and rests (with resolution up to 32nd notes, but no triplets), accidentals, measure lines, and either a single-note or chord "mode". Other functions let you move the staff cursor to any point in a line, or even scroll up or down to look at other parts, although you can only *work* on one line at a time.

Three submenus are accessible from the Main Command Menu, including a signature commands menu, which offers a variety of time signatures (odd ones not listed can be entered via the keyboard), clefs (treble, bass, alto, tenor, or combination treble and bass), and key signatures (up to seven flats or sharps). A note-modifier menu lets you insert accents and other musical markings (including sforzandos and staccato dots) on a single note or a group. A sound-control menu presents a selection of dynamics (ranging from *ppp* to *fff*), speaker assignments, and eight standard Italian tempo markings. If you don't like any of the tempos given, metronome markings can be entered via the keyboard.

A status line at the bottom of the screen displays information on which part you are working in, the measure number, octave, mode, and note duration, as well as various parameters that are referenced by asterisks under the staff. These last include speaker location, instrument assignment, and tempo. The screen can display only four octaves at a time, although the system's range is actually eight octaves, so a number below the staff lets you know what octave you're in.

There are several ways to enter information on the Music Editor, allowing for quite a bit of flexibilty. Any command can be entered from the keyboard, except for moving from one menu to another. The light pen can select items from the various menus, although it cannot position a note. With the game paddles, you can position and plug in notes, and also

select items from the menus. Any combination of these can be used, and as certain functions are more suited to one or another, you can use each for whichever functions are most comfortable and efficient for you. (For me, the keyboard turned out to be the quickest, but it is pleasant to have the other options.)

Once you have finished a composition, you can save it, and then print it out in music notation on a Silentype printer. You can print any part or measure of a piece, in either normal or double size. The music is printed vertically on the paper in one long strip, one line at a time. If you want to assemble a multi-line "score", get out your scissors and glue.

The Music Player lets you choose "instruments" for the pieces you've entered, and then plays them for you. Pieces are stored either as "composition" or "play" files. Composition files are the songs you have created by using the Music Editor. When you assign each of the parts of an instrument from the instrument file, and save the lot, you have created a "play" file. The instrument assignments can easily be changed as many times as you like, and you can also re-assign speaker locations for each part.

The Music Merger is a very useful program that lets you combine two composition files into one larger file. This allows for playback of pieces that are too big for the Music Editor (which, because it is manipulating so much information, has a limited capacity) to handle in one chunk. Although you can only combine two files at a stroke, you can merge the merged files. At some point, you will reach the maximum allowable size, which is not easily determined until you get to it.

The really fascinating part of this system is the Instrument Definer, which allows you to create or modify instrumental sounds, using up to eight pairs of oscillators. As you enter each modification, a scale (or melody of your choosing) plays through your speakers, so you can hear each change. This makes the program useable by anyone, even if you don't understand precisely what its doing with oscillators and waveforms. Features include the ability to create individual waveforms for each oscillator by a method called "additive synthesis": you call up the first 24 harmonics of the wave and assign them all relative volumes. If you like, the system will then plot the resultant waveform for you on a graph display.

For each pair of oscillators, you can adjust the envelope settings (it lets you specify 15 points in the envelope curve), make dynamic pitch changes, and balance the volume with the other oscillator pairs. Also,attack and decay times can be globally adjusted for the entire instrument sound. Once an instrument is created, you can save it and call it up at any point. Since there are 16 oscillators in the hardware, quite a range of sounds can be created -- from traditional instrument sounds to weird or "electronic" sounds. In addition, the manual provides two Applesoft programs for creating your own waveforms, and encourages you to write your own programs.

The manual deserves special mention. Information is presented in a logical, understandable fashion, with numerous graphic displays to confirm what is appearing on the screen. Summaries and overviews are provided at useful junctures, and the workings of each program are explained carefully and thoroughly. The Music Editor has three chapters devoted to it: a tutorial that walks you through it, a guide that serves as a concise overview, and a reference that contains detailed information on every function. The Music Merger and Player get one chapter each, and the chapter on the Instrument Definer contains both a tutorial and a reference.

The final chapter is huge, and explains general theory behind musical sound and synthesis, the additive synthesis process, and the rest of the hardware and software that make up the system. It is comprehensive and well-written, providing a detailed explanation of all the basics, and is very useful to read simply as a grounding in the mysteries of digital sound synthesis. The exhaustive appendices contain a glossary of musical terms, lists of keyboard commands for the Music Editor and error messages, a page on storing and filing, a bibliography, lists of system specifications and frequencies of musical notes, and an index.

Now for the drawbacks. The dozen or so preset instruments are out of tune (if you're willing to do some machine-language work it might be possible to do something about this), although those created with the Instrument Definer sound better. The other problem is that the system is *very* slow. Going back and forth between main menu items, and accessing and loading the necessary files takes lots of time, and life can pass you by in the interim. Of course, a larger micro would be of help, particularly since the system is so extensive and flexible. Since it takes so much time accessing, exiting, saving, etc., be prepared to entertain yourself while waiting for things to get done.

The good things about the system, however, far outweigh its disadvantages. One of these is its user-friendliness: the software is most obliging in providing convenient, obvious exits from one menu or submenu to the others, and it refuses to allow you to screw things up; it will not accept commands that are outside its limits or that are inappropriate. Error messages are clear and non-threatening. It is not so complete as to be usable without the manual, but since the manual is so friendly itself, you don't mind. Another positive aspect is that the system is expandable — other software written for it, including the alphaSyntauri and Soundchaser systems, allow for the Mountain hardware to be played in real time using a keyboard.

Overall, the Mountain system offers a tremendous amount of flexibility, and it will certainly keep the hobbyist happy, and busy, for a long time. This, combined with its value as a composer's tool, its capabilities for modifying sound, and its expansion possibilities, make it an extremely attractive investment for anyone interested in the possiblities of digital sound synthesis.

Decillionix DX-1
Sunnyvale, CA 94086
(408) 732-7758

The Decillionix DX-1 ($239) is a digital sound-effects program, intended for use by anyone with a hankering to play around with real sound. The system comes with a circuit board, an owner's manual, and a floppy diskette. You supply an Apple II with 48k of memory and Applesoft Basic, at least one disk drive with DOS 3.3, plus a microphone and a speaker or stereo system.

The microphone is connected to a miniature phone jack on the board (an adapter is supplied for quarter-inch phone plugs). You can also use a high-level signal, such as a synthesizer or tape recorder, for input, and a switch on the board

provides the proper sensitivity. The input level can be further adjusted with an onboard potentiometer, and a filter switch helps to minimize high-frequency distortion.

Essentially, the hardware consists of one analog-to-digital converter and two digital-to-analog converters. These respectively convert input signals into digital data and then back into sound. And that's it; all other functions are controlled by the software.

The software comes with 22 preset sounds, stored in three "Soundbases". A soundbase is a collection of sounds stored in the computer memory, and when you boot the disk, the program automatically loads Soundbase 1 for you. In this soundbase are eight digitally-recorded drum sounds of excellent quality. Soundbase 2 contains eight miscellaneous sounds, including burps, finger snaps, and "boings"; while Soundbase 3 contains electronic sounds, described in the manual (rather accurately) as zap, sting, warble, spindown, spring, and wow.

The software basically accomplishes two things: it lets you record and play back sound, and it lets you sequence the sounds in various ways. Ninety-six pages of Apple memory are available to load a soundbase. The software allows you to choose a "mode" for dividing up that memory into from one to eight sections. The length of the sounds you want to record will partially determine which mode you choose; longer sounds need larger areas of memory. After you have selected a mode, each section of memory is assigned a pair of keys. When you press "R", pressing the left-hand key of the pair turns on the record function. The right-hand key can be used to hear what you've recorded. Pressing "R" again turns both keys into playback.

The sound volume that will trigger the computer to record is adjustable, which is useful in eliminating low-level noise that otherwise might get recorded. When the memory is full, the computer stops recording, and beeps at you through the Apple speaker. Before you start you can adjust the "record rate," which changes the sampling rate of the system. For the same amount of memory, a slow sampling rate allows for the recording of long sounds, while a faster rate means that sounds must be shorter, but are recorded with better fidelity. A "freerun" function allows you to monitor the sound as it passes through the circuitry without actually recording it. The play rate is also adjustable, which changes the pitch, as is the volume. You can also play the sounds backwards.

When you have completely loaded the memory, you have created your very own soundbase. You can then save it on another disk, onto which you have previously copied the program. Each disk has room for three.

Then there is the Autosequencer, which lets you sequence sounds and adjust the playback parameters of pitch, volume, and direction. You can enter information for up to 32 sound "events" in four groups of eight. A fifth group lets you sequence the other four. For each of the sounds in each group, you plug in numeric values for the address in memory of the sound you want, how much of the sound you want (you can choose all or part of it, starting at the beginning or anywhere else), and the duration, pitch, volume, and direction. A table in the back of the manual provides the address locations for each sound in each mode. Sequences you have created can be saved on disk, and reloaded to be used with any soundbase.

Also available are various preset sound patterns. One menu selection calls up eight routines which sequence and process sound in various ways. For instance, "cycle sounds" takes each sound in the soundbase, and repeats it five times, increasing its pitch each time. "Random" (fast or slow) chooses sounds at random and assigns them random pitches. Then there is a selection of preset musical rhythms, like Samba, Shuffle, or Country. Again, you can assign different values for pitch, tempo, and volume, or listen to the sounds backwards. These patterns were designed for the "drum-set" soundbase that comes with the package, but they are just as effective with burps, whistles, and boings.

The DX-1 is a charm to use. The manual is clear and concise, offering both detailed explanations and thoughtful overviews, along with lots of charts to go along with what you are seeing on the screen display. It is pretty difficult to screw things up, and in spots where you might be able to crash the system, information is provided on how, why, and what you can do about it. In fact, it actually invites you do *try out* some system crashes, to take the fear out of it. The software is very user-friendly, with clearly organized menus and submenus, and entering information and loading and saving programs is quick and easy.

Its main limitation is that the sound quality of all but short sounds is not very good; aliasing effects tend to creep in when you record long sounds. Recording sound information gobbles up huge numbers of bytes, and so lots of high-fidelity storage is just not possible within the memory of an Apple. Also, because the system records samples that are only eight bits in length, the resulting signal-to-noise ratio is 48 dB, about equivalent to a cheap cassette recorder. Another problem is that the microphone input is unbalanced—again, like a cheap cassette recorder. This allows annoying amounts of electrical noise (like the Apple's clock) to get into recordings.

These drawbacks aside, the DX-1 is great fun for anyone, professional or otherwise, interested in playing with digital sound processing at home. For $79, the company will sell you four more disks (12 soundbases) of interesting, well-recorded sounds.

A fascinating, although minimally documented, program available from Decillionix is called "Echo" (one disk and a paddle-like "feedback" control, $149). This program takes sound from the DX-1's input and loops it back to you, while allowing you to process it along the way. There are 49 different routines built into the software, selectable from the keyboard, ranging from straight repeat to complex triple-loop pitch-changing space echoes. The manual tells you briefly which keys do what, but after that pretty much leaves you on your own to explore. Parameters within the routines can be adjusted by the feedback control and a joystick or pair of game paddles.

A quick-reference chart provides a concise summary of possibilities, but it helps a lot if you are at least acquainted with the basics of digital sound processing. But even without such knowledge, if you are willing to explore and use your ears, you can have quite a good time with this, although the same limitations on sound quality mentioned above apply.

Julie White is a musician and journalist in the Boston area who is just beginning to explore the wonderful world of micros.

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"I Wish I Had More Time . . ."

for Home Music Synthesizers

by Dennis Briskin

They love it and they wish they had more time to play with it. That's the common theme running through the talk of a diverse sample of home users of the Apple-driven music synthesizers made by Syntauri Corportation (alphaSyntauri) and Passport Designs (Soundchaser).

I recently talked with six amateur musicians and a retired professional about their reactions to digital synthesized music. The group ranged from a podiatrist in Tucson, Arizona, to a computer profesional in Chicago to a college maintenance man in the San Fernando Valley of Southern California. I also interviewed a former globe-trotting symphony conductor in Westport, Connecticut, a piano teacher in Odessa, Texas, an educational sales specialist in Cincinnati, Ohio, and a technical editor in Peterborough, New Hampshire.

Nancy Norman, 31, is a computer professional, working for a railroad in Chicago. She has played the piano since age 7. She chose an alphaSyntauri, she says, "because of my computer background. The notion of combining music and my computer interest fascinated me."

After using it only 3-4 hours per week for 18 months she says, "It's working out real well. The more time I spend on it the more time I *want* to spend on it." Nancy praises the alphaSyntauri for helping her discover new musical abilities.

"I started out just playing songs and recording them. Then I did some orchestration, deciding which instruments sounded best with what kind of song. Now I have evolved to my own compositions, something I never knew I was able to do.

"The synthesizer helped me to discover that. I never went to music school and I never knew anything about orchestration or arranging songs or composing. By just playing around with it I was able to discover some abilities. It's been a real pleasant surprise."

Nancy also credits the synthesizer with helping her improve her keyboard skills. "I have been motivated to spend more time on my music," she says. "Before I got the synthesizer I would have labeled myself a 'has been' piano player because I stopped taking lessons 8 years ago. I lost a lot of technique. Any time I sat down at a piano it was very frustrating.

"The computer really picks up a lot of the slack. It makes music making more of a creative skill that doesn't need the manual ability of your fingers. For example, on the alphaSyntauri I can play something relatively slow and as long as I play it timed accurately I can have the computer speed it up to the tempo I want. It can play something much faster than my fingers are capable of doing."

What kind of music does she play? "That's a real hard question," she says. "The stuff I am composing might be labeled 'Romantic Synthesizer.' It's sort of easy listening stuff. It seems to fit a wide variety of musical tastes. It could also be called adult contemporary."

Although she has done well with the synthesizer, she says it should be easier for non-musicians to use.

"You have to have a keyboard background to use it effectively. Someone without a keyboard background could use it only if they have a lot of time and are very patient and read up a lot. Or if they have someone guiding them through it. It could be improved if it had software written for non-musical types.

"I really do wish I were able to spend more time with it," she says.

Kay Mains, 34, is a homemaker and piano teacher in Odessa, Texas. She uses both the alphaSyntauri and a regular piano to teach a range of musical skills to children.

"My kids write songs from their first lesson," she says. "They are very primitive songs, but I have a little five-year-old who is beginning to be creative with it. They pick out what instrument they want to work with and they begin writing their songs. We record it on the computer and play it back on different instruments. They can hear what their song sounds like on strings or an organ or a trumpet. And they get to watch the notes on the screen, too. So they hear it and they see it.

"I have always felt there is more to music than reading notes off a sheet of paper," she says, explaining why she uses a synthesizer for music instruction. "To be a complete musician you have to be able to do a certain amount of playing by ear, as well as composition, to be creative on the instrument. You really can't do that well on a piano. To be able to do on the piano what I do on the alphaSyntauri would take probably twice as long. I don't have much time with my kids."

Kay also uses the Syntauri to help her students learn about chord changes. "With the alphaSyntauri I program in melodies and then the students start hearing these chord changes come up, listen to the melody, and start anticipating the chord changes. All they have to concentrate on is the chords. That has been phenomenal in giving them the feel for the chords."

In contrast to her current enthusiasm, Kay was computer resistant until she saw a demonstration of the alphaSyntauri in a computer store in Midland, Texas.

"My husband was wanting an Apple but I didn't think a computer would be necessary to have around the house. Then I saw a demonstration and I said, 'That's what I want. I want to get it and learn how to use it for my own enjoyment. I want to teach kids, too.' "

In the year since she bought it, she has particularly enjoyed using the synthesizer for arranging.

"I like to sit there, get a piece of music, and start working with the instruments and combining them and get my own arrangement of it as I want to hear it. That's what I really enjoy about it. I could never play strings and trumpets and bells, but on the alphaSyntauri I can. I've always thought the marimba was one of the most beautiful instruments. On this I can have a marimba. I just enjoy having that creativity."

Like Nancy Norman, he uses the tempo control feature to record a song slowly and play it back at normal speed.

"I can play things that are beyond my technical capabilities. I can key in note by note in half the time. I've been playing a lot of Baroque stuff, like some of the Bach fugues. If I can't handle three or four parts, I can key in a couple of the parts and try to keep up just playing one part. So I make music with myself."

Although he averages less than an hour per night, he wants to spend a couple of hours per session. "It's easy to get wrapped up in it. I've only had it two months," he says, "so I really haven't explored everything I can do with it yet."

He also describes his Soundchaser as well documented and easy to use. Dr. Nyberg's musical training as a child consisted of six years of piano lessons beginning at age 8.

"I try to play the keyboard repertoire, Bach and Beethoven, things that I couldn't play when I quit taking piano lessons 30 years ago."

His enjoyment aside, he says the synthesizer has little effect on his creativity. "I haven't had it long enough to do all it can do. When I get some time I want to play around with it. All those possibilities are built into the thing. I've always liked harpsichord music and I could never afford one. And I don't have the time to build one. It's let me have a variety of keyboard instruments that I couldn't have otherwise. It's just a question of getting around to playing with the thing."

Robert Nyberg, 34, is a podiatrist in Tucson, Arizona. He bought a synthesizer for an unusual reason: the weather.

"The problem with keyboards in the Southwest is you get such a range of humidities and temperatures that I felt I would be tuning a piano once a month. Plus, when I heard what the Soundchaser could do I was really impressed. It lets me own a harpsichord as well as a piano, as well as fooling around with other sounds."

While Bob likes the synthesizer's broad range of sounds, it does have its limits. "Nothing is as good as an instrument," he says. "It's not an instrument. If you want a piano, buy a Steinway. But for what I do, I'm satisfied.

Ray Biernat, 36, lives in North Hollywood, California, and does maintenance work for a college. He likes his Soundchaser primarily for its ability to manipulate sounds.

"I can mix some avant garde sounds or sound effects and create a whole new effect," he says. "I enjoy that. It's not something that's hard to do, either. With just the press of a button you can change the whole thing around."

Unlike the others, he did not study piano as a child, but derived his musical knowledge through the guitar. "Whatever I learned on guitar, I just applied it to the keyboard. I guess I have some natural ability as a musician," he says.

His musical taste runs to popular and jazz. "There's a good and bad in everything. I like a little of everyone. All different types."

"That's one of the reasons I wanted to get the Soundchaser. You can write music on there. It can be edited and transcribed. It can be saved, recreated, put on multiple track recordings. These kinds of features all grabbed me."

Having bought the equipment only two months ago, he says he has played it only periodically and is still learning to use all the different features. He thinks the synthesizer is "defintely" helping him become a better musician and enhancing his creativity.

"You can play things on it that you couldn't play if you don't have the chops. You can change the tempo. You can change the instrumentation, like if you're doing multitrack recording. Every time you play you're layering the sound. What if you don't like the way the total arrangement sounds? Maybe you think the lead line should be played by an organ sound. With Soundchaser you change the instrumentation. Every instrument can play the different parts of the melody or the different parts of the harmony. I find that very interesting."

"I like all this technology and the things it allows a person to do."

William Strickland, 69, is a retired orchestra conductor living in Westport, Connecticut.

"After 44 orchestras in 26 different countries I decided to quit," he says. He describes himself as a wandering missionary for contemporary American music.

"One day I woke up and decided to quit it all. I spent 21 years in hotels and on trains and planes and boats. Now I've bought a house in Westport, and nothing can get me out of it."

Of his Passport system, which he has had only 2 months, he says, "This new Turbotrack system is unlike anything else I have ever seen. It's absolutely remarkable. The quality of the sound is the finest I've heard."

He is tight-lipped about his use of the synthesizer. "I'm trying to recreate some (classical) pieces of music that I think need electric sounds to back them up. I'd rather not tell you what they are because that's a competitive field."

As to what he likes best about digital synthesis, he says, "That's a hard question because digital does one thing and analog does another. They both are valuable. Digital is tremendous because of its complete accuracy. The analog isn't quite that good because is has oscillators.

"Digital is a pair of steps going up and analog is a ramp. The digital is very precise and very exacting. The analog can drift all over the place. That was one of the disadvantages of it."

He also composes on his synthesizer. He has worked with synthesizers for the past ten years. "I started with a mini-Moog and moved up the scale. It's developed so fast."

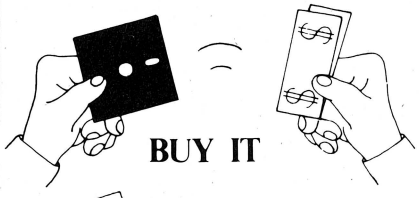
Of digital synthesizers he says flatly, "They have absolutely infinite possibilities."

Deac Manross, 33, is an educational sales specialist with Apple Computer, Inc. in Cincinnati, Ohio.

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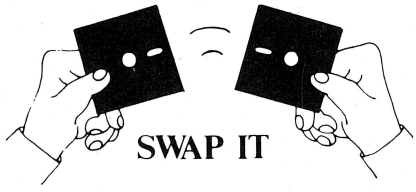
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He bought a synthesizer because he already has a piano. We're somewhat of a musical family. I've always been interested in music. My mother was a music teacher. I play guitar. The kids take piano lessons."

"The first time I heard of the alphaSyntauri was back in '79 at the National Computer Conference in New York City. It blew me away and I said to myself, 'Some day I'm going to have one of those', because of the features and the capability.

"Unfortunately, as fast-paced and busy as my job is I don't have the time to spend with it. I end up using it more for business than for personal pleasure.

"It's a real show stopper. When I do an educational presentation I usually take it along with me. It's one of the more humanizing uses of personal computers."

When he first got his alphaSyntauri he spent a lot of time on it. Over the last 9 months he estimates he's used it for himself 15-20 hours.

"It's not for not wanting to," he says. "I still have all these grand schemes and designs. One of the reasons I got it is I have always been taken by the idea of doing multi-tracking and then putting compositions together. I love the idea of being able to be a one-man symphony. Deep inside I think when I have some time I'll sit down and do that."

Organ or synthesizer? Which does he prefer? "Different things for different times," he says. "I like them both. I would take the alphaSyntauri over any organ on the market."

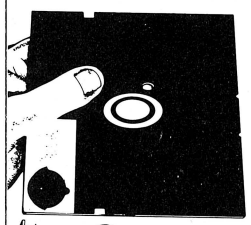
How about a piano versus the alphaSyntauri? "I like the piano an awful lot," he laughs. "It's a different kind of sound and a different kind of thing you can do on it."

While he praises the alphaSyntauri, Manross says it's difficult for the first-time user. "I think they are overwhelmed," he says. "The manual, good as it is, is still geared toward the person who has been through years of college and has a basic intellectual curiosity, as opposed to the person who just wants to turn it on and have it play something. They need to bridge that gap between what the alphaSyntauri is today and what that first-time person is using."

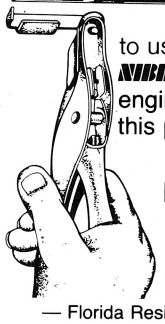
Manross would also like to see other improvements. "The touch of the key-

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board. It would be nice to get the expressivity you have on a regular commercial organ. Or an easier volume control. It seems like everything is played at the same volume level. It's kind of one-dimensional."

"But beyond that I'm thrilled to death with it. I just wish I had more time."

Gregg Williams, 29, is a senior technical editor at *Byte* Magazine in Peterborough, New Hampshire.

He bought his alphaSyntauri 18 months ago on special at an Applefest. "I always wanted one, but when I saw that discount of one-third off staring me in the face I just stopped dead in my tracks. I couldn't take my eyes off it. But I waited until the end of the day. I did all the work I had to do for the magazine and then I came back and wrote out a check for over $1,000 without blinking any eye. And I've never regretted it."

Like William Strickland, Gregg praises the digital synthesizer for its accuracy. "Anything that is digital has information that can be stored on a disk," he says. "Digital makes a recording more repeatable."

He also likes the alphaSyntauri's variety. "I decided this would give me a far more versatile instrument than a piano. This can be an organ, a piano, a flute, plus some weird sound you never heard of."

He also went for the portability. "I live in an apartment. A piano would have been a major investment and a major task to move around. I can pick up the alphaSyntauri keyboard with one hand and tuck it under my arm."

"I want to build keyboard skills," he adds. "I'd like to be able to sit down and play a simple melody with my right hand and the correct chords with my left hand. That's my minimum goal. I'd like more than that. I'd certainly like to play jazz, especially boogie-woogie piano. That's my secret desire."

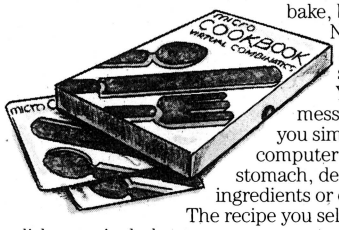
He adds that a synthesizer won't help him learn keyboard skills better than a piano. "When I am teaching myself basic skills, I'll just configure the synthesizer to be an ordinary keyboard."

He finds an important difference in the keyboard feel between the alphaSyntauri and an ordinary piano. "A piano has what you would call 'force sensing.' The harder you hit a key the louder it sounds. The alphaSyntauri tries to duplicate that with what's called 'velocity sensing.' The faster you hit a key the louder it sounds. But they are not identical, so you lose something."

"There is a difference between playing the piano and playing the synthesizer. If you are getting into the fine points of a piece and playing for expressiveness, it's possible on a piano to play a number of notes very quickly and very lightly. On the synthesizer you can't because if you play them quickly that also makes them loud." Still, he would not change his synthesizer. "I am more than satisfied with it as it is. I could spend years just playing around with the sounds (although) I'm more interested in playing something than playing *with* it. Gregg is the only user, but he loves to show it off. "When I have a party I demonstrate it to people. I'm always delighted to have a chance to show the alphaSyntauri to people who know how to play the piano. They play me a little something and I save it as a recording. It's really nice to take someone with real talent and sit him down at the alphaSyntauri and say, 'Look, you can do *this*.' " The time he spends with his synthesizer fits the pattern of the others I talked with. "Alas, not as much as I would like," he says. "It sometimes goes without use for weeks on end, which is a shame because I really like it. I just don't have time for it."

Dennis Briskin is a freelance writer in Palo Alto, California. He has a Master of Arts degree in Journalism from the University of Missouri and has written for numerous computer magazines.

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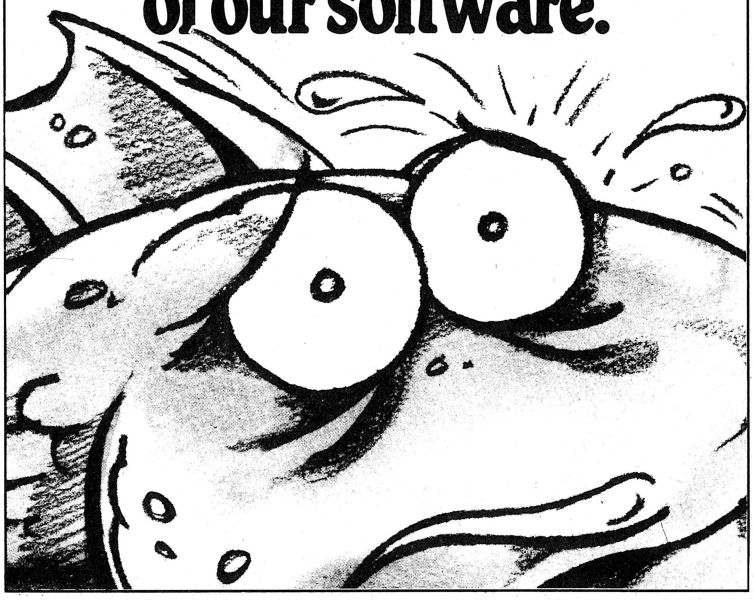
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Seven Steps to Buying Your Music System

by Tony Dirkson

Two types of people buy computer-based synthesizers: computerphiles looking for the ultimate peripheral, and musicians looking for the ultimate sound. Let's start with a few words of reassurance for each.

First, for musicians. Buying a computer-based synthesizer is a lot easier than you may have ever imagined. Choosing the right system isn't much different than deciding between a Steinway and a Baldwin, or between a Martin and a Guild. And you don't have to go to a pin-striped computer store to test out music systems, since more and more *music* stores are featuring Apple-based keyboards in their synthesizer rooms.

Next, a few comforting words for computerphiles. Today's synthesizers are all pretty solid products, so you can't really go wrong, even if you don't yet know a lot about music. Each system offers its own price and performance features, giving you some basis for making an intelligent decision.

No matter which language you speak, computerese or musicianese, you can select your system among like souls who can show, sell, and support your synthesizer.

If you've read this far, you're probably interested. What to do next? Well, I've got your next three months all mapped out . . .

STEP 1. Explore what's available. Guess what? You've already started. This issue of **Apple Orchard** has been designed to answer most of your questions about Apple-based music synthesizers.

But you may want to explore a little farther before visiting any stores. You have several options: write to manufacturers for product information; check out old copies of *Keyboard* magazine for views and reviews of different systems; find out from the grapevine what other musicians are using, and what they like and dislike about their systems.

STEP 2. Find a dealer. A few phone calls to local computer dealers or music shops should suffice. Or you can contact a manufacturer to find outlets in your area.

Two years ago, finding a dealer might have represented a mighty task. But computer-based synthesizers have found their way into many new stores recently. Music stores, in particular, have discovered that these systems can offer real value for their customers. As Alan Levin, manager of Chuck Levin's Music Center in Wheaton, Maryland, notes: "Some musicians and dealers are still scared to death of these things. When I took them on, everybody looked at me pretty funny. But then one of the guys took one home over the weekend. When he brought it back, he admitted that he didn't yet know everything about it. But he said it was pretty easy to learn."

Levin's store (one of the biggest in the country) features a separate keyboard room with 50 working synthesizers. The computer-based systems are a relatively recent addition. Levin compares them favorably to the other synthesizers he sells: "With standard systems, you just push a button that says FLUTE and you get a flute sound. The computer synthesizers aren't quite that easy, but you don't need any special knowledge about computers to use them. Basically, you're getting $10,000 worth of keyboard for $2,000."

Computer dealers, too, often sell one or two brands of synthesizers. They're real "attention getters," according to Tom Kappel of Kappel's Computer Store in Belleville, Illinois. And a lot of people, even those who don't know much about music, are willing to try them out. Which leads us to . . . .

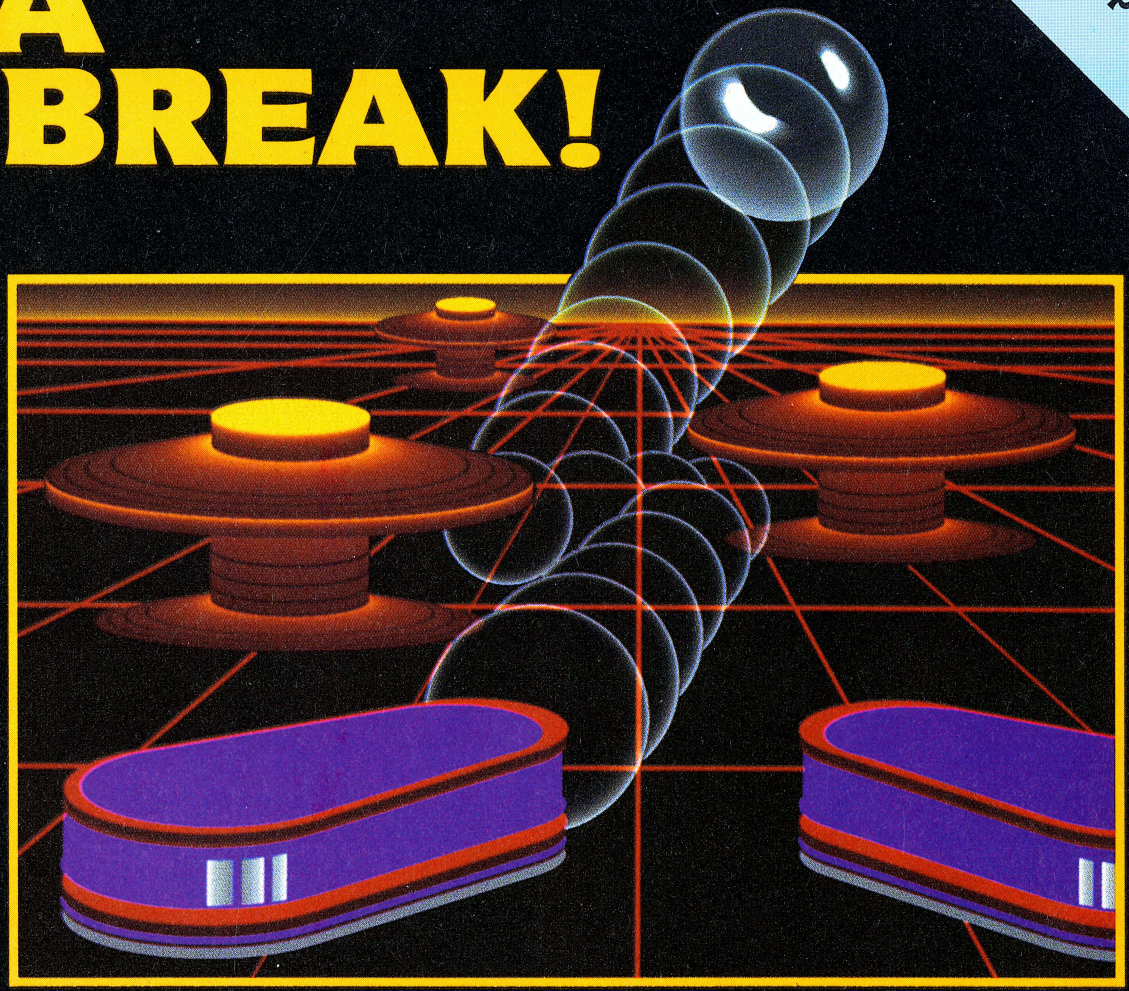
STEP 3. Try out a system. A single note is worth a thousand syllables. In most stores, you can simply walk in and, without any special help, press a note on the keyboard. Then you can tinker with the program until you get the sound you want.

Playing that first note makes all the difference. Bob Truman, co-owner of Nadine's in Hollywood, observes that people get hooked instantly when they hear the sound of a trombone or a flute emanating from a synthesizer. "A couple of years ago," he notes, "people wouldn't even touch the keyboards. But we're not seeing that any more. Now they come in, ask 'what's this thing here' and start playing with it.

"What's exciting about these systems," Truman continues, "is that you can use them right away. You just plug one in and start playing—and you're making music."

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If you're afraid of sounding less than expert, don't worry. Most systems run in-store demo programs that can give you some feel for their capabilities. And at some stores, such as San Francisco's Bananas at Large, you can shield your potentially less-than-golden tones by donning a headset.

STEP 4. Consider the alternatives. "My mama told me . . . ya better shop around." If you're like many people, you probably want to compare the sound of different systems before deciding which one is right for you. Stores that offer multiple systems make this possible. Many have trained computer musicians on staff to help you identify some of the differences you're hearing. At Computers and Music of Daly City, California, for instance, the entire staff has been trained for all their computer-based synthesizers. Computer shops, such as Kaplan's, may have specialists available by appointment to answer your more detailed questions.

Sound, alone, may not be the only standard on which you make a judgment. You may decide that one system produces the best sound, while another would be better for performance, while still another would be good for you because it requires no specialized keyboard skills.

"Considering alternatives" doesn't mean you have to try out every system. What it does mean is that you should use guides such as this magazine—as well as the advice of a dealer—to determine which synthesizer is really best for you.

STEP 5. Think about yourself. And about your total computer needs. If you don't already own a computer system, you may want to do some serious thinking about all the ways you could use one beyond just music.

"A lot of recording studios want computers in order to handle their bookkeeping," notes Alan Levin. "The synthesizer is something extra they can get at a reasonable price."

Are you a professional musician? Think about programs that can help you keep track of your schedule or your income. Just a serious amateur? Consider a database program that would allow you to file all your records and tapes.

You can, of course, buy these programs later on. But if you're like most new computer owners, you'll probably want to take advantage of the more general capabilities of your computer right away. It is, after all, one of the main reasons for choosing a computer-based music system over a standard synthesizer.

Many music stores sell computers as well as synthesizers. They're not usually equipped to provide total support for the computer itself. That's coming. But right now, most music store owners agree with J. D. Sharp that they'd prefer to take an advisory role. "We can put a system together for people, but our real speciality is synthesizers." In fact, as Spencer West of Computers and Music notes: "We usually sell just the synthesizer, because people can find ways to get better deals on the computer itself." In some shops, such as Nadine's, the store can help interested customers arrange deals for purchasing the computer.

STEP 6. Decide. Synthesizer dealers aren't different than anyone else. It's to their advantage if you buy as quickly as possible. But they don't really expect it. Spencer West observes that their typical customer can take up to three months to buy: "These are very sophisticated buyers. They know what they want, and they're looking for the best. They're not easily swayed."

A lot of synthesizer 'customers' are really, as Tom Kappel notes, just curiosity seekers. But most dealers don't seem to mind helping people with a more casual interest. "These systems cost almost as much as the computer itself," explains Kappel. "People aren't really going to buy one unless they're pretty serious about music. But our keyboard is hooked into an Apple that can also do lots of other things. It helps draw attention to all the computer can do."

STEP 7. If you've got the money, honey . . . You can take your synthesizer home, or to your studio. Computer-based synthesizers have made computerized music more affordable than ever before. "A lot of people who never had musical aspirations are getting into these systems," notes Bob Truman.

It's taken you a short seven steps to get here, but it might just open up a new world of musical opportunities for you. Or it may allow you to take your existing musical skills into a new dimension.

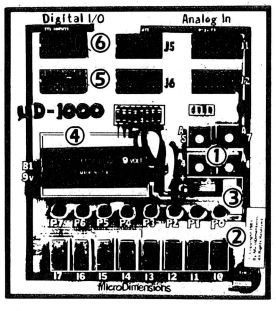
Most dealers, both music and computer shops, realize that you're not likely to make any snap decisions. And they want to help you make the best decision, because they want you to spread the good word about them, so that they'll profit in the growing computer-based synthesizer market—a market that most of them think is just about ready to really take off.

Tony Dirksen is a man of many talents at Apple Computer in the Marketing Communication division.

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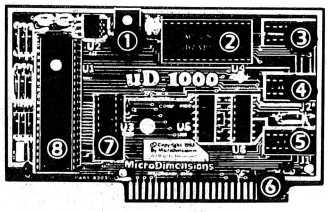
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The alphaSyntauri (from Syntauri Corp) and The Soundchaser (from Passport Designs)

Review by Tom Darter

Synthesizers have been around for about twenty years now. Not a long time in absolute terms, but certainly time enough (given the short half-life of technology these days) to allow them to go through a number of generations. The evolution of synthesizers and computers has followed a roughly parallel course; but, in the last few years, the lines have met, and the cross-fertilization of the two technologies has produced a number of fascinating offspring.

In the beginning, hardware was everything. The first synthesizers were massive collections of discrete circuits called modules, which could be configured in a multitude of ways. In order to produce a sound, the musicians had to connect the modules together physically, using patch cords, in order to create a specific electronic connection to meet a specific musical need. The early synthesizers were general purpose, but they were also very cumbersome. (One example: in 1969 I was involved in a number of concerts as a member of an electronic music group. A typical concert consisted of three pieces, each about 15 minutes long; in between each piece, we needed about 45 minutes to re-configure and re-tune the synthesizers.)

After a while, certain configurations proved to be more musically useful—or at least more used—than others, so manufacturers began building instruments in which these configurations were pre-chosen. A limited number of circuits were chosen, and these were wired together in one set way, leaving only the specific settings of each circuit to the discretion of the musician. There was an obvious loss of flexibility, coupled with an equally obvious gain in efficiency. As a result, synthesizers began to establish a foothold in the arena of live performance, and word got out that there was a new musical instrument in the world.

However, things were still complicated. The chain of circuits was decided, but the settings for each circuit still had to be fixed, and the settings for each circuit depended on the position of a number of knobs. Synthesizers were capable of producing thousands of sounds, but shifting from one sound to another was still a laborious process. To play the synthesizer effectively, one had to know how to "play the knobs."

And now the evolutionary lines meet: enter the microprocessor. As soon as miniaturization had reached a certain stage in the microcomputer industry, manufacturers in the synthesizer industry began to investigate the idea of using microprocessors as control devices for their instruments. Knob settings could be read as numbers, and these numbers could be stored in a memory chip. An entire configuration of knob settings—a patch—could be stored easily and later recalled by the microprocessor, which assumed the role of supervisor, telling the synthesizer's circuits what to do. In

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fact, the memory could retain settings for a large number of patches and recall them almost instantly. Musicians could switch from one sound to another almost immediately in live performance. The true Age of Synthesizers was at hand.

It was only a matter of time before someone tried the opposite approach: that of installing a synthesizer inside of a computer. Once that is done, the entire situation is reversed. The synthesizer becomes the tool of the computer, and the uses of that tool are determined by the operational system loaded into the computer via the nearest disk drive. Software is everything.

In many of these hybrid applications, though, the microprocessors were performing the somewhat limited roles of librarian and traffic cop. They were installed inside the synthesizer, to be sure, but it was still the synthesizer's hardware that determined the basic operational configuration of the instrument.

Well, not *everything*. The sounds of the instrument can only be as good as the device producing the sounds, the synthesizer itself. Software control opens a multitude of doors, but the scenes viewed through those doors are defined—and limited—by the sound-producing hardware.

By now you're probably thinking, "Okay, thanks for the history lesson, but where's the article I thought I was reading? I've got an Apple computer and I'm interested in music. What stuff can I buy, what does it do, and how well does it do it?"

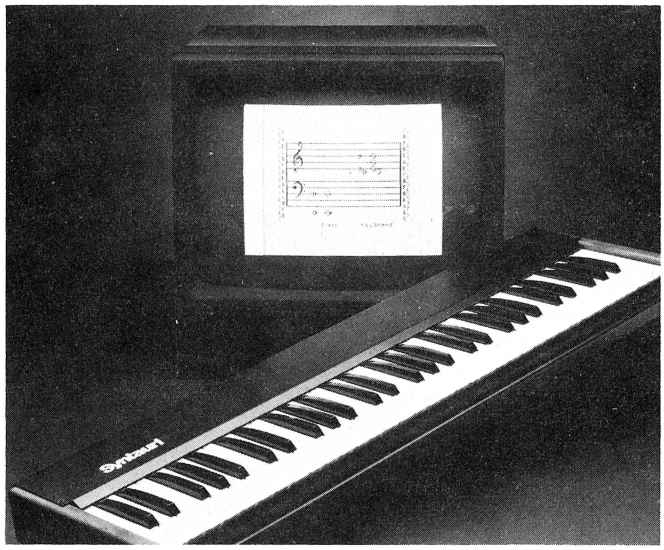
Good questions all. As the title of this article suggests, I have been asked to give you an overview of two computer/synthesizer music systems that operate with the Apple computer. Both companies involved, Passport Designs and Syntauri Corp., have been involved in the development of their respective systems for a number of years, and I have had ample opportunity to familiarize myself with both. One important thing that I have realized is that the similarities between these two systems (on a conceptual level at least) far outweigh the differences. (This is nothing new in the music industry; pianos made by Baldwin are *conceptually* very similar to pianos made by Steinway.) These conceptual similarities are most easily understood within the context of synthesizer design in general; that's the reason for the short history lesson. It's also true that differences between things stand out in bolder relief once the similarities have been recognized.

So, before detailing the aspects of each system that make them unique, let's take a brief look at some of the things they have in common.

Passport and Syntauri

Both Passport and Syntauri fit in neatly at the end of our little history lesson; both companies start with the basic approach of plugging a synthesizer into an Apple computer. More importantly, they both are currently using the same synthesizer circuit board, the Music System from Mountain Computer, so almost all of the hardware is the same.

The Music System itself consists of two circuit boards joined by a short ribbon cable. The boards are designed to top



plug into adjacent slots in the Apple. The audio signal exits the boards via two female RCA jacks, which need to be connected to your sound system. (There is also a light pen connected to the boards. Mountain Computer employs the pen in its operational system for the boards, but neither Passport nor Syntauri use it. The light pen cannot be disconnected, so you have to hang it out the back of your Apple or lay it gently alongside.)

The Music System comes equipped with 16 digital oscillators, which are the basic sound-producing circuit of a synthesizer. Each oscillator is capable of producing one sound at a time. Theoretically, then, it would be possible to produce as many as 16 sounds at a time, with the synthesizer following commands issued from the computer or via a piano-like keyboard linked to the computer. In practice, the oscillators are coupled in groups of two in *most* situations (appearing simultaneously, one each, at the two outputs of the circuit boards), so in *most* cases the Music System is configured to produce up to eight sounds at a time.

Oscillators generate sound by generating waveforms. These operate within an electronic circuit as a regularly alternating current, which is translated by a speaker into vibrations in the air. Analog oscillators use electronic circuitry to produce the wave-like alternating current directly. Digital oscillators create waveforms in a slightly less straightforward way: they store waveshapes as a series of numbers that represent one cycle of the waveform (the numbers themselves being successive point-by-point readouts of the waveshape, as if it were plotted on a graph). Since these numbers are stored as digital information, they have to be converted into analog alternating current before being sent to an amplifier or speaker.

Creating waveshapes digitally offers a lot of flexibility. There are no hardware constraints at all; you can create any waveshape that can be plotted on a two-dimensional graph. The limitation (and for many, the resultant problem with inexpensive digital sound-producing circuitry) comes when these waveshapes are translated into analog electrical impulses. The digital-to-analog converter does its job by sampling the stream of numbers coming from the digital oscillator. When the oscillator is asked to put out a high-frequency sound, the numbers go by more quickly (more cycles per



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second) and the converter can't keep up with it. Sound translation is inexact and the sound quality deteriorates. This phenonenon, called *aliasing*, can produce a lot of distortion at higher frequencies.

So there is the main hardware limitation of both systems. Having said all that, though, I must also add that the designers at Passport and Syntauri have come up with a number of beautiful and intriguing sounds for their respective systems. Certain kinds of sounds can be synthesized quite well using the Mountain Computer boards, and other kinds of sounds are simply impossible. Within the constraints of the Mountain Computer boards, both the Soundchaser and the alphaSyntauri operate very well. (A more detailed review of the hardware, by Julie White, appears elsewhere in this issue.)

Both systems have essentially the same computer hardware requirements. You can use an Apple II with Applesoft firmware card and 48K of RAM; and Apple II Plus with 48K RAM, or an Apple //e. The alphaSyntauri also requires an additional 16K RAM card for the Apple II or II Plus. You'll also need at least one disk drive, a video monitor, Apple game controls, and an audio system. Each system provides you with a piano-like keyboard that hooks up through an interface card plugged into the Apple. The keyboards are somewhat different, and will be discussed in the sections on the separate systems.

Speaking of which, let's get to it. Now that we have explored the similarities, it's time to take a look at the things that make the two systems unique—the software packages that create the operational configurations. This is where we will find the special things that each system has to offer.

Depending on the system configuration you purchase, you can have either a four-octave or a five-octave keyboard, enclosed in a metal housing. The keys themselves are plastic, like those on most organs and synthesizers. The key action is somewhat springy, but is easy to get used to. Syntauri provides two on/off foot pedals, one of which imitates the function of a piano sustain pedal and the other of which imitates a glide effect between keyboard notes.

Charlie Kellner is a major reason why Apple computers have become involved with music. These days, he's a man with a smile on his face—and for good reason. He has managed to have his dreams come true. As a vital part of the creative madness at LucasFilms, Charlie has pulled together his interest in computers, music and graphics.

Interestingly, Charlie gives much of the credit to two dearly loved music teachers. Florence and Mabel Rippel played over 50 instruments, loved opera and spent their money on helping talented children. They recognized Charlie's abilities and provided him with a violin, trumpet, as well as 15 years of piano lessons. His father was a radio-TV repairman. Given this background, it was natural for Charlie to become involved with electronics and music.

While majoring in physics and math at Oregon State during the 1960's Charlie came into contact with electronic

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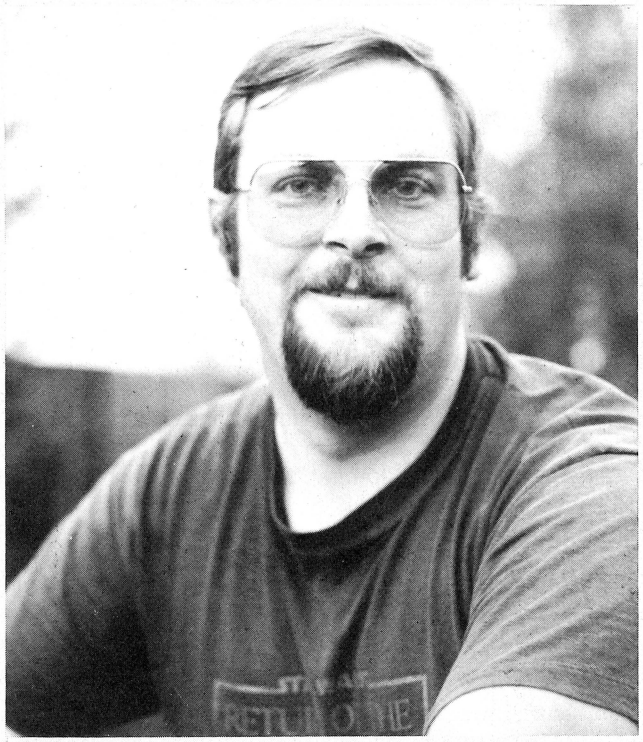


Photo by John Wimberley

Charlie Kellner

music. At one point he had to make a choice between tuition or a Moog synthesizer; he headed towards the nearest parts store to build his own. The biggest obstacle was the keyboard. With luck on his side, he met a group of musicians upgrading their equipment and inherited a 2-octave keyboard.

Unable to find a job after graduation, Charlie delivered pizza and took computer classes at the local junior college. His first programming job was for the County and after several years found himself looking for new challenges. Together with 3 friends he set up a company to produce sound equipment and synthesizers.

At this time, microcomputers were beginning to appear in the marketplace. Charlie decided to take his chances on the (then young) Apple II computer. For a short time, he put aside his musical products and together with his wife focused on writing games. An Apple advertisement for contributions to the company's software library led the way for Charlie to become Apple's 201st employee. His contributions in the area of graphics and education software played a part in Apple's success.

In his spare time and with continued persistence, Charlie kept plugging away at his synthesizer, building a first prototype and writing code. Another piece of good fortune came his way as a company located in Santa Cruz, Ca. was looking for assistance with music boards. He became involved and at the same time found the solution to his problems. Mountain Computer's Music System was the missing link for his alphaSyntauri. By 1979, his handmade black plastic 5-octave keyboard and hand wired cards were ready to plug into the Apple . . . and he played the instrument in Apple's booth at the National Computer Conference. (*He also blew the collected minds of Apple user group members with his classy demos in those days.—PCW*)

Charlie was certain that his synthesizer was a viable product; however, Apple did not want to get into the music business. Mountain Computer was not interested in live performance instruments. That was left to Ellen Lapham and the other people that got Syntauri Corporation off the ground.

Interviewing Charlie Kellner is a series of wonderful conversations without enough time to complete them all. Once we got into the 'architecture' of the instrument, minutes became precious as Charlie had a meeting scheduled. According to Charlie, his approach was to make the instrument easy . . . there are 10 instrument sounds per instrument bank because there are 10 numeric keys on the Apple keyboard; one keystroke to change an instrument sound. The menu is mnemonic, typing one "R" for record, "S" for save, etc. At this point of computer development, we take this type of simplicity for granted. In 1978, human factor considerations were in their infancy.

Charlie's own greatest learning curve came not with the software or hardware, rather with the human ear. His choice was between "attempting to program the computer to perfect mathematical accuracy for a particular sound which does not exist in the real world; or program the sound to what the ear can hear, i.e., real world sounds." His decision was in the direction of the human ear. Charlie is quick to point out that people with extensive musical and computer backgrounds such as Jeff Raskin and Steve Clark (among many) gave of their time to help create new and acoustical type instrument sounds.

Now that the sounds software was written and the music boards were in place, there was a big blank on the screen while the instrument was played. Following an evening watching "Close Encounters of the Third Kind", Charlie turned his interest to graphics. The first completed software package had bars rising and falling with the stroke of a musical key, creating a colorful dancing pattern on the monitor.

Charlie delivered his instrument to Syntauri, continued at Apple for two more years and is no longer directly associated with either company. We have not, however, heard the last of this man's talent. At LucasFilms turning creative ideas into reality is the goal and Charlie Kellner is one individual with lots of ideas.

by Lenore Wolgelenter

The basic operational software for the alphaSyntauri is called *alphaPlus*; it's Syntauri's main interface between the user and the conceptual "knobs" of the Mountain Computer synthesizer. It allows the user to define basic waveshapes and basic envelopes (loudness contours for the sounds produced by the oscillators), and then combine these into a basic synthesizer voice—a preset. These values are of course stored in memory for later recall. Groups of ten presets can be combined into a preset master. The system operates from one preset master at a time, so ten different sounds are available for immediate access at any given time.

Each basic sound involves two oscillators, so up to eight notes can be played simultaneously on the keyboard. In normal operation, all eight notes will play the same preset sound. As you play, the display screen responds with a series of colored bars, representing pitch and octave (the effect is somewhat similar to the giant musical display screen in *Close Encounters of the Third Kind*.

There is a number of program routines that facilitate the creation of waveshapes. The two basic routines, Wave and Quickwave, involve additive synthesis, the creation of a com-

plex wave through combining simpler waves at various harmonic frequencies above a basic tone. An additional utility software disk called *SoundsTrio*, offers three other routines: autoPulse, DrawWaves, and B-3.

The other cornerstone of the alphaSyntauri software is called *Metatrak*. The alphaPlus software allows for the recording of music and sounds played on the keyboard; the effect is the equivalent of turning on a cassette deck while playing the piano. With Metatrak, the synthesizer and computer imitate a multi-track tape recorder. In other words, you can do "overdubs" and can combine a number of preset sounds into one recording. The recording, of course, is digital information stored inside the computer; when recalled, the computer plays back the performance you have entered.

Metatrak allows for up to sixteen separate tracks, with the following limitations: 1) since the synthesizer still has only sixteen oscillators, no more than eight notes can sound at any one time, and 2) only one preset master can be accessed at any given time, so only ten different preset sounds are available for a given "recording".

Tracks are normally laid down one at a time. The process is straightforward and the system is easy to use, but you will find yourself waiting for the disk drive to save and then reload a piece after the addition of each new "track." Errors can be erased and re-recorded, and a final mix allows for the volumes of the separate tracks to be set at different levels. There are also features that simulate "fast forward" and looping, and the playback speed can be changed over a wide range (with, of course, no change in pitch).

The Metatrak software also allows for a split keyboard function in live playing. The keyboard can be divided into as many as eight sections, each of which can access a different preset. In addition, the software allows the user to connect many of the available drum simulator machines.

The most recent software package from Syntauri is called *Simply Music*, a system that helps users learn music by playing songs and practice pieces. The foundation of the system is the Metatrak recording and playback software, but the presentation is completely different. Groups of songs, called albums, are provided on disks. Once a song is loaded in, users have a number of options. They can just listen, or they can mute some parts and just listen to others, or they can change the orchestration, or they can mute one part and play it while the computer plays the rest of the arrangement.

The display screen gets involved too. A chosen track can be displayed on the screen in one of three ways: 1) the standard Syntauri bar display; 2) on a picture of the keyboard, with a black box showing what note is being played; 3) on a piano-like great staff, where the notes appear as whole notes in their proper place. During all of this, the keyboard remains active, and the notes played by the user are displayed as well, so that the user can compare his performance of the part with the prerecorded track.

Syntauri has made arrangements with a number of publishers, and is offering Courseware disks that contain recordings of pieces from method books and songbook collections. In fact, each Courseware package contains one or more disks and a sheet music book.

Other software packages include *Composer's Assistant*, which creates hard copy music notation of pieces performed on the keyboard (you'll need a printer); and *Music Master*, an educational package that focuses on ear training, scales, intervals, and triads.

The alphaSyntauri now comes in three basic packages.

1) **Simply Music-Four Octave**, which includes the Mountain Computer boards, a four-octave keyboard, the Simply Music system disk, a demo disk, a disk with 100 instrument sounds, one Courseware package, and a disk for recording songs. Introductory price is $995.

2) **Simply Music-Five Octave**, as above except that a five-octave keyboard is substituted; $1295.

3) **alphaSyntauri**, the pro package with five-octave keyboard and the following software: *alphaPlus*, *Metatrak*, *SoundsTrio*, *Simply Music* system plus one Courseware disk, Preset Masters disk, and demo disks. $1,495. *Composer's Assistant* is a separate item at $395, as is *Music Master* at $75.

The Soundchaser

The Soundchaser comes with a four-octave keyboard, enclosed in a housing of finished wood. The keys are plastic (as with most organs and synthesizers) and the action has a nice feel, with some resistance to the touch.

The basic operational system is called *FourTrak*. It provides the basic interface between the user and the Mountain Computer synthesizer. It allows the user to create waveshapes and basic sound envelopes, and then combine these into a basic synthesizer preset. The waveshapes and settings for a group of ten presets can be saved in memory as a Master file. The system operates from one Master file at a time, so ten different preset sounds are available for immediate use at any given time.

Since each sound involves two oscillators, up to eight notes can be played simultaneously on the keyboard. In normal operation, all eight notes will play the same preset sound.

The basic program for the creation of waveshapes is called *WaveMaker*. It uses additive synthesis (combination of harmonics) as its basic routine, but any defined waveshape can be used as the wave for each harmonic frequency location. An



additional software disk, called *Tunings and Waveforms*, contains a grouping of popular analog synthesizer waveforms; it also offers other waveshaping routines, and offers routines that change the tuning and intonation of the keyboard.

The basic operational system, *FourTrak*, also includes a software imitation of a four-track tape recorder. Using one track at a time, you can overdub parts, and combine four different presets into one recording. The recording is stored as digital information inside the computer (or on a disk); when recalled, the computer plays back the entire performance you have entered.

As the name implies, the system allows recording of up to four separate tracks using up to four presets from one master. The performance on these tracks is only limited by the fact that the Mountain Computer synthesizer has but 16 oscillators, so no more than eight notes can sound at any one time.

Tracks are normally laid down one at a time. The procedure is easy to understand and use. The Soundchaser designers have licensed a high-speed disk operating system called Diversi-DOS for use in their system, so there is minimal waiting time for disk saves and loads. While reviewing a recorded performance, it is possible to change preset sounds, or even certain programmed parameters of a specific sound. In addition, playback speed can be changed over a wide range (with no change in pitch).

Another software package, *TraksEditor*, provides a means for editing a previously recorded Fourtrak performance. Mistakes such as wrong notes and incorrect rhythms can be cleaned up, and a display screen printout of the information in the performance file lets you see what you have played. In addition, the software allows for precise, one-note-at-a-time entry of music into the FourTrak system. The *TraksPlayer* software disk allows you to collect groups of FourTrak pieces into the equivalent of a long-playing album.

John Borowicz and Dave Kusak have come a long way since living together in a dormitory at the University of Connecticut. Their interests in music and computers did not end with graduation. The first job out of college was for EML (Electronic Music Labs) on the East Coast, designing synthesizers. After several years they took their first big step as entrepreneurs and started a company to design and produce a computer controlled percussion synthesizer called the Synare.

With the success of the Synare, it was time to move on and that they did. John headed towards the University of Minnesota for a Master's Degree in Computer Science. Dave came to the San Francisco Bay area to work with John Lilly at Marine World. Dr. Lilly's projects included developing communication techniques between humans and dolphins; Dave spent his time doing software development for these projects.

Fostered by the growth in microcomputers and their interest in music, these two friends once again combined their talents. Passport Designs was organized as a commercial venture and in 1981 they released their software based four-octave digital synthesizer. Since that time their venture has grown and the Soundchaser instrument is an important part of the digital music world.

by Lenore Wolgelenter

A more advanced multi-track approach can be found in the Soundchaser *TurboTraks* software. In this system, sixteen tracks are available. In addition, the 16 oscillators of the Mountain Computer synthesizer are accessed individually, so the keyboard has the potential to play up to sixteen notes at once. There are also sixteen presets available for access at any one time. Oscillators are assigned to presets via a matrix-like screen display, and a single preset can contain as many as sixteen oscillators. Editing and arranging features are available during review of a recorded performance, and transposition and tempo change features are also supplied. There is a number of facets to this software, but the manual is clear and straightforward, so learning the system is not too difficult. TurboTraks also offers a split keyboard function, with presets being assignable to the upper or lower areas of the keyboard.

A number of educational disks are available for the Soundchaser. *Notes and Keys* teaches ear training and basic keyboard technique. *Intervals* focuses on ear training and notation of intervals, while *Chords* offers a similar approach to basic chord types. *Matching and Tuning* teaches the user how to "tune" specific pitches and chord tones. *Ear Teacher* is a utility program that allows the user to change aspects of the other ear training programs, and also allows for record keeping. *Melodic Games* presents melodic dictation in a number of game formats.

Soundchaser also functions with a *Notewriter* program, which creates hard copy music notation of pieces performed on the keyboard (a printer is needed). A *Notetools* utility program allows Notewriter files to be converted into FourTrak files, so that multi-track recordings can be made of Notewriter pieces.

The Soundchaser system now comes in three basic packages:
1) The Home System, which includes the Mountain Computer boards, the four-octave keyboard, and the following software: FourTrak, Notes & Keys, Melodic Games, and Notewriter. Price is $1,495.
2) The Educator System, which includes the same hardware, but replaces the Melodic Games and Notewriter software with Intervals, Chords, Ear Teacher, and Matching and Tuning. $1,695.
3) The Pro System, which includes the boards and keyboard, FourTrak, FourTrak Editor, TurboTraks, Notewriter, and a drum sync utility for use wioth TurboTraks. Price: $1,795.

Most of the software is also available separately. Also, the keyboard and basic operational system (FourTrak) plus Notewriter, can be purchased without the Mountain Computer boards for $875.

In Closing . . .

Please remember that these overviews are time-bound by the present. Since these two systems operate witn an Apple computer, a new feature or approach is only as far away as the next piece of software or hardware. The future promises to be very exciting!

Tom Darter is Editor of *Keyboard Magazine*. He also works as a composer and performer in the San Francisco Bay Area, and serves as a consultant for a number of synthesizer manufacturers. He has a Doctorate in Music from Cornell University.

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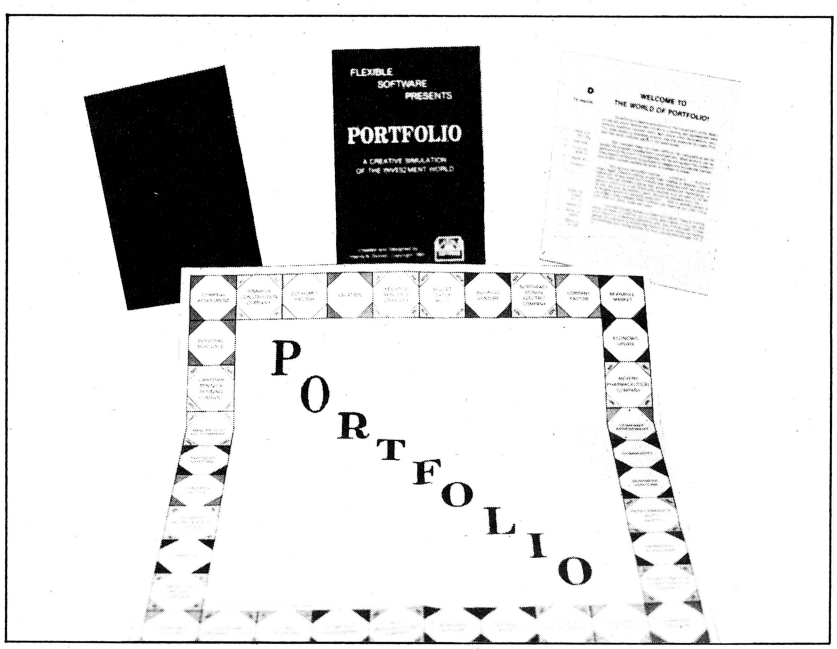
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Music Programs for the Apple

by Peter Nye

In the past few years there has been growing excitement among educators over the possibilities of using computers for music education. Music, perhaps more than any other subject, could benefit greatly from the one-on-one interaction and the infinite patience of which computers are capable.

But good instructional programs are hard to write, as most who have tried have found out. It's relatively easy to write a simple interval identification program. Programs that adapt themselves to the individual level, the way a human tutor can, that cover the really important aspects of music, and at the same time can fit on an Apple, are only just beginning to appear. The excitement that these programs generate among those who use them bodes well for the future of computer-based musical instruction.

Most of the musical software written for the Apples falls into one of two categories. The first is note entry programs, which allow you to enter notes into the computer, sometimes in musical notation, hear the result, and save it on the disk. There are quite a few of these, and I have not attempted to cover them here, for the most part. Some of them are covered in other articles in this issue.

The other class of programs that can be found in abundance are drills (sometimes in the form of timed "games") on the basic elements of music. For the most part, these drills are truly computer-aided instruction, where the computer serves as a drillmaster for concepts that are taught by other means. I have divided these programs into two groups: those aimed primarily at younger childen, and those more suitable for older children or adults.

All of the software described here is commericially available. This excludes a number of programs that have appeared in computer magazines in a line-by-line, ready-to-type-in form. I have also not covered a number of programs that have been developed in university music departments but which are not commercially available. More information about these programs can be found in educational journals and various software directories for the Apple. Of special interest is *Music Programs for the Apple Computer*, available for $7 from Denis Moreen, College of Notre Dame, Belmont, California. There are also some interesting programs for the Passport and Syntauri keyboard-based systems. These are reviewed elsewhere in this issue of **Apple Orchard**.

The naked Apple speaker (the "2-inch woofer")is not known for its musical fidelity. For this reason, many of the programs require music boards which plug into your Apple on one end, and a stereo or headphone amplifier on the other. Following each program description are symbols telling which music board it works with. Some programs work with either a board or the Apple speaker. The symbols are:

S - The apple speaker

M - The MMI Dac Board, $160, Micro Music Inc., 1535 121st Avenue S.E., Bellevue, Washington 98005

A - The ALF Music Card MC16, $245, ALF, 1315F Nelson St., Denver, Colorado 80215

B - Mockingboard, $129, Sweet Micro Systems, 150 Chestnut Street, Providence, Rhode Island 02903

I will start out with the exceptions to the rule; that is, programs that are not drills on previously acquired knowledge. These programs are fairly new, and point the way to an exciting trend in musical software. Especially interesting, and educational in the best sense, are the compositional programs, which allow contact and exploration of music itself, rather than isolating its components, and which are fun for both the inexperienced and the experienced musician.

The Music Construction Set, by William Harvey, is one of the best note entry systems around. By using a joystick, you pick up notes, rests and other musical symbols and deposit them on the staff. You then select the "PLAY" icon (a picture of a piano), and the music plays while it scrolls across the screen (in the Mockingboard version only; in the Apple version, it's all it can do to get the music out through the Apple speaker.) The program allows for two voices (bass and treble), but each voice can have chords. You can copy any measure or group of measures by using the "cut" and "paste" icons. What particularly distinguishes this program from others like it is its manual, which includes an introduction to musical symbols and terms, along with games and experiments to learn about them. $40.00, from Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403. (S,M)

Music Designer II, by David W. Megill, is a composing program that allows you to experiment with different kinds of musical sounds without actually having to specify the exact notes. Notes are chosen by random from within a set of guidelines which you specify. For instance, you may choose to have one slowly-moving low voice and two quickly-moving high voices, all with fast glissandi, gradually getting softer, will all notes chosen from a minor scale. (You can also specify exact notes, if you want.) When you get something you like, you "record" it, and then put sequences of these recordings together to form an entire composition. Furthermore, the composition can be synchronized with an "Art Performance", designed on a rather remarkable drawing program, Art Designer II. The two programs, running on different Apples, send cues to each other to coordinate the performance.

Music Designer II is a complex compositional system, and therefore not appropriate for young children, but it should be interesting for older children and adults, whatever the level of musical experience. $49.95 each, from CAPS Software, 4024 Alto St., Oceanside CA 92056. (A)

Practical Theory, by Sandy Feldstein, is one of the only programs around that actually teaches music theory. It comes with a textbook/workbook, and covers from "What is a staff?" through chords and harmonizations, following the often-ignored teaching principal of giving you a small amount of information, and then giving you exercises until you have mastered it. $199.95 for three volumes, or $79.95 per volume, from Alfred Publishing Company, 15335 Morrison Street, P. O. Box 5964, Sherman Oaks, CA 91413. (S)

The University of Akron Series was not available for review when this was written; however the catalog descriptions look promising. These programs provide step-by-step tutorials as well as drills on basic music reading, including staff reading by name and on the keyboard, major/minor scales, simple intervals, and rhythms. Especially promising is the Mr. Metro Gnome program, which teaches rhythm, displaying the student's attempts compared with the correct rhythm. These programs will be $69 each from Musictronic, P.O. Box 441, 555 Park Drive, Owantonna, Minnesota 55060. (S,A)

Micro Brass Series provides fingering practice for brass players, using a replica of a set of trumpet valves hooked up to the Apple. A note is displayed and played, and the student then pushes the right valves for her instrument. If she gets it wrong, the correct valves to push are displayed on the screen. The student can select the level of difficulty, which is then adjusted according to how well she does. This program includes a timed game, for which best score to date is retained and displayed. There are different versions for trumpet, french horn, baritone, and tuba. $70 for the valve assembly, plus $70 for each version, from MMI (see address, above). (M)

BASIC GUITAR I, by Michael Fink, has everything you need to start learning folk guitar, except the guitar. For each of the seven principal keys, it shows the three principal chords in clear Hi-Res illustrations, along with the tricks for playing the chord. Comes with a chord disk with practice routines, and a song disk, where it plays the melody line and shows you when to strum and when to change chords. $50 from DCS Software, 4826 Bucknell, San Antonio, Texas 78249. Also available from MMI. (S)

Music Games for the Very Young

Early Games Music, by John Paulson, is remarkably easy to use. It has 8 games, which can be selected by a non-reading child, once she knows how to play the games, by using a unique revolving picture menu. The games are of three types: (S)

1. Perform/record/playback: You use the number keys to play the Apple like a piano (within a one-octave range). The note appears on one of a choice of 4 displays: a piano key-board, a bass staff, a treble staff, or a screen of abstract colored shapes. With the first three, when a note is played, its letter name appears on the appropriate key or staff position. With the shape display, a geometric shape of random color and placement appears, creating quite a gratifying picture. The program comes with six pre-recorded songs.
2. A clever no-failure method of learning note names, either on the piano keyboard or the bass or treble staff. It gets harder as you get better, with hints if you get it wrong.
3. A keyboard tutor that teaches songs by the follow-the-leader method: it plays the first note, then you play it; it plays the first two notes, and then you play the first two notes, etc. This is frustrating with the tunes provided, because it takes so long to get to the end, but works well with shorter tunes which you can record yourself. 29.95, from Counterpoint Software, Inc., Suite 140, Shelard Plaza North, Minneapolis, MN 55426.

The Magic Musical Balloon Game, by Sally Monsour and Charles Knox, teaches the concept of melodic direction. A melody is played in several fragments, each of which either goes up, down, or stays at the same level. The child presses U, D, or S. If she gets it right, a hot-air balloon moves in the appropriate direction over the colorful landscape. $25 from MMI (see address above). (M)

Music Readiness: Pitch and Rhythm, by Dinah Embry, is a series of 9 programs to reinforce the concepts of high and low pitch, step and skip, and note lengths, using colorful animated pictures. It reenforces concepts by relating them to parallel concepts, for instance four fish representing a whole note. Comes with teacher/parent guide and additional student exercises. $69.95 from Sterling Swift Publishing Company, 7901 South IH-35, Austin, Texas, 78744. (S)

Ear Challenger, by Chris Alix and Stephen Walker, is another follow-the-leader game, using a sequence of randomly-chosen tones from an 8-note scale (you choose the

length of the sequence). The tones are represented by exceptionally nice flashing color bars on the screen. $39.95, from Electronic Courseware Systems, P. O. Box 2374, Station A, Champaign, IL 61820. (S)

Doremi, by Bruce Benward and David Williams, is a follow-the-leader game, using scale degrees and solfege syllables. You select a sequence length of 1 to 4 notes. Visual and aural rewards. $75 from MMI. (M)

Name That Tune, by Bruce Benward and David Williams, follows the same lines, except the notes chosen form a melody. At certain points you get a chance to guess what the melody is. $75 from MMI. (M)

Find the Key displays the name of a note in big letters; you move a marker using a game paddle until it is over the corresponding key on a big musical keyboard. Gratifying reward for getting it right. $15 from Edutek, 415 Cambridge, #14, Palo Alto, CA 94306. (S)

Musical Staff Drill is similar, except that instead of using the letter name, the note is displayed on a grand staff. $20 from Edutek.

Notes contains 5 games to teach the letter names of notes. It includes some record keeping and tailoring of games by parents or teachers. (S) The games are:

1. Note capture: A note name is shown, and a note wanders up and down the staff. You press any key when it is in the right place. Help is available in the form of a la-beled staff.
2. Note bounce: A note name is shown, and you use a paddle to place the note in the correct position.
3. Note race: Like note bounce, except two players compete against each other.
4. Note Namer: Six notes are placed on the staff. You identify the notes by pressing a number key (1 equals A, etc.). The note sounds when it is correctly identified, and all six are played at the end. A help page appears if you appear to not be doing too well.
5. Note Words: A sentence is shown with the letters of one word replaced by dashes. The user uses the paddle to move the note to the right position of the staff to fill in the missing letters. $19.95, from Merry Bee Communications, 815 Crest Drive - Papillion, Omaha, Nebraska 68046.

Musical Stories is like Note Words, above, except that entire stories are used. You can also use your own stories. $19.95, from Merry Bee Communciations. (S)

Drills and Games for Older Children and Adults

Note Trespassing is a beat-the-clock note recognition game. A series of notes starts emerging from the right hand of the screen. Your job is to make the note disappear by pressing a number key (1 = A, 2 = B, etc.). The correct note sounds as they disappear. If they get to the middle of the screen before you can name them, you lose the round. Includes several levels of difficulty; you choose the speed and the clefs. $25 from Notable Software, P. O. Box 1556, Philadelphia, PA. 19105. (S)

Musical Match-up is a chord-matching game, like the card game of Concentration, where you have a series of cards face down, and you turn over two at a time, trying to remember which cards were turned up before so that you can get a match. In this case, you are matching chords, either by their representation on the staff or their names. There are ten levels of difficulty. $25 from Notable Software. (S)

Basic Ear Training by Tim Gill and Forrest Thiessen, is exceptionally well-designed and easy to use; everything is done with one paddle. (A) It contains five drills:

1. Pitch discrimination — It plays two tones a half step or less apart, and you say whether they are higher, lower, or the same.
2. Interval recognition — It plays a simple interval, which you identify. If you get it wrong, it will (optionally) play the one you have selected, and then the original one. Choice of melodic or harmonic intervals.
3. Chord recognition — It plays a triad, and you identify it as major, minor, augmented, or diminished.
4. Scale recognition — It plays a scale, and you identify the scale type. $49.95 from ALF Products Incorporated, 1315F Nelsoin St., Denver, CO 80215.

MUSIC THEORY, by Linda Borry, contains 16 exercises in music theory. For each exercise, you either choose a level of difficulty or select the assemblage of items you want to be tested on. It makes you decide ahead of time how many problems you want to try, which is somewhat annoying, but in general, it's clear and easy to follow. Comes with a large manual which covers the fundamentals of music theory. It is certainly a good deal for the money. (S) The individual exercises are:

1. It displays a note: you type in its name. Different clefs and key signatures.
2. It gives you a note name: you type in the enharmonic equivalent (for instance, G flat for F sharp).
3. It plays two tones sequentially: you identify them as a whole or half step.
4. It plays a series of 3 to 5 notes, only two of which are a half-step apart: you identify where the half step occurred.
5. It plays simple melodic intervals: you identify them.
6. It displays two notes: you identify them. Different clefs and key signatures.
7. It displays a seequence of 3-5 notes, leaving one out. It then plays the sequence. You give the name of the missing note.
8. It displays a short sequence of notes, and then plays it, but playing one note wrong. You identify the wrong note. It then displays what was really played.
9. It plays a scale: you identify the scale type.
10. It plays a triad, arpeggiated: you idenitfy the type.
11. It plays a seventh chord: you identify the type.
12. It displays a note or rest. You identify the duration by name, (for instance, "D8" for dotted eighth), and the equivalent number of quarter notes.
13. It displays a short passage with a missing note. You type in the duration of the missing note.
14. It displays a rhythmic pattern, and then plays three patterns. You identify which is the right one.
15. It displays a rhythmic pattern. You tap out the rhythmic pattern. It then tells you whether or not you were right. If you weren't, it displays the rhythm you played.
16. You identify Italian musical terms by multiple choice. $44 from MECC, 3490 Lexington Avenue North, St. Paul, MN 55112.

Elements of Music, by John Eddins and Robert Weiss, consists of three programs, which are each a timed drill of 20 tries. You can practice either in drill mode or test mode, which means that your score is saved for later perusal by the teacher. Alternates treble and bass clefs. (S)

1. Pitch name identification: it displays a note on the staff; you type in the letter name.
2. Key signature identification: it displays a key signature on the staff; you type in the name of the major and minor key.
3. Keyboard recogniton drill: it displays a note on the staff; you move a dot until it is over the corresponding key on a piano keyboard. $99.95, or $39.95 each (without record keeping), from Electronic Courseware Systems, P. O. Box 2374, Station A, Champaign, IL 61820.

Interval Drillmaster, by Gerald W. Chastain, consists of two types of drills:

1. You hear a simple melodic interval, and move an arrow until it is pointing at the correct name of the interval.
2. You see a note on the staff, and hear the interval. You indicate the position on the staff of the second note and its interval.

There are 11 levels of difficulty for each exercise. You move on to the next level when you have passed a timed test. You can also see an analysis of your errors. Extensive record keeping. $75, from Conduit, P.O. Box 388, Iowa City, IA 52244. (S,A)

Tuner, by Don Pederson, sharpens your sense of when two notes are "in tune". The program plays two notes that are very close together. You press "L" or "R" to lower or raise the second note until they are in tune. It then displays "Right", "Close", or "Wrong". $35 from Conduit. (S,A)

Music in Theory and Practice, by Bruce Benward, is a comprehensive and well-written music theory textbook for undergraduates who already know how to read and play music. The accompanying diskettes allow students to type in the answers to exercises in the book and to see if their answers were right. In some cases it also plays the right answer. $400 for volume I and 11 diskettes; $275 for Volume II and 6 diskettes, from MMI. (M)

Music Lover's Guide Series, by David Williams, Julie Schulze and Al Blackford, is a series of of aids for learning musical terms. For each program, there are three primary methods of learning: 1) Select-a-term (multiple choice); 2) Spell-a-term (it shows you the word briefly, then you type it in); and 3) Recall-a-term (it shows you the definition, and you type in the term). The programs are: General Music Terms ($70), Standard Instrument Names($50), Foreign Instrument Names($50), Italian Terms ($50), Musical Symbols ($70) and Composers and Their Works($70), all from MMI.

Sir William Wrong-Note, by Timothy Kolosick, displays a four-part chord, and then plays it, with one note wrong. You identify the voice in which the wrong note occurs, and then the note that was actually played. $150 from MMI. Provides record keeyping and different levels of difficulty. (M)

Arnold, by Timothy Kolosick, provides melodic dictation by either scale degrees or solfeggio, using a follow-the-leader technique. This is separated from other such programs by its carefully selected progression of melodies. Includes record keeping. (M)

Sebastian, by Brian Moore, displays and plays a melody. You identify whether the pitch, rhythm, or tempo is wrong, and which note. Very friendly and well-designed. (M)

Harmony Drills: Set 1, by Bruce Benward and Timothy Kolosick, provides practice in aural recognition of diatonic chord progressions. It plays a chord progression, and you give the chord number and inversion of each chord. You can choose from 5 levels of difficulty. $90, from MMI. (M)

The following five programs, all by George Makas, let you set the level of difficulty when you start. They be used as a drill or as a game, where you try to beat the clock. They are all available from MMI.

Pitch Identification Drill Without Accidentals requires you to name notes that appear on the staff. Includes treble, bass, and great clefs, and concert pitch for B-flat, E-flat, F, and A instruments. You select the level of difficulty initially. $50. (M)

Pitch Identfication Drill With Accidentals is similar, but with a difference. $50. (M)

Key Signatures displays a key signature and plays major or minor scale. You name the key. $60. (M)

Mode Drills plays a scale. You identify it as major, minor, or as one of the church modes. $70. (M)

Rhythmic Drills plays a short melody. You type in the note durations. It then displays the melody in musical notation. $75. (M)

Melodious Dictator displays a staff and a musical keyboard. It generates a random sequence of notes, and displays the intial note. You enter the rest of the sequence using the piano keyboard. Adjusts automatically to your level of expertise. $150 from MMI. (M)

Harmonious Dictator, by J. Timothy Kolosick and David Williams, plays a randomly (although intelligently) generated progression, and displays the first chord. You give the chord numbers of the remaining chords. The level of difficulty is adjusted automatically. $150 from MMI. (M)

Rhythmic Dictator, by Phyllis Parr, David Shrader, and David Williams, plays a randomly-generated series of notes and rests of equal value (e.g., quarter notes and quarter rests). You detect the pattern for each measure by selecting from a list of possibilities. The level of difficulty is adjusted automatically. $125 from MMI. (M)

Chord Mania, by David Williams, Julie Shulze, and David Shrader, is a beat-the-clock game, for one or two players. It displays and (optionally) plays a chord. You identify the chord number and inversion. Comes with a number of levels of difficulty. $125 from MMI. (M)

Interval Mania is similar to Chord Mania, except that you are tested on intervals, instead of chords. $150 from MMI. (M)

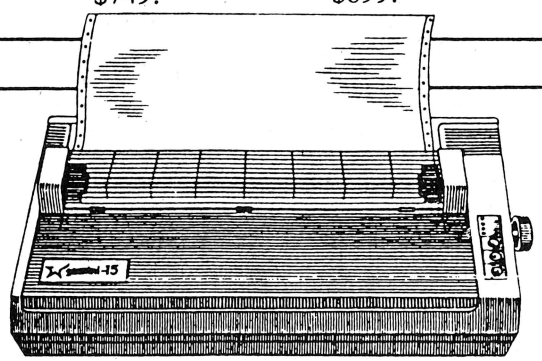
Peter Nye has been involved with computer-based music instruction for the past eight years. He graduated from Stanford with a B.A in Music and an M.S. in Computer Engineering. He now works for Syntauri, developing educational programs for their keyboard-based synthesizer system.

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Apple In Music Education

by Dirk van Nouhuys

In American colleges, high schools, and elementary schools, music systems based on Apple computers are changing how people learn about music (particularly music theory), who learns, and what they learn.

For this exclusive **Apple Orchard** survey of music education, we spoke with a broad range of educators from coast to coast. Installations ranged from isolated teachers using an Apple II Plus without any other equipment, to a large college music department with eight Apple II's, with synthesizer cards and attached keyboards, two Apple ///'s for program development, and a Corvus hard disk for storage. With very few exceptions (note below) these teachers expressed marked enthusiasm for their tools. They saw the computers offering their students better methods of learning many of the conventional elements of music education, ways of learning things that had not been easily available before, saw them drawing in students who would not have studied otherwise, and saw relief for teachers from rote procedure and administrative tasks. A significant finding was that the Apple-based systems are being used mostly to teach *conventional music* rather than "computer music".

A Scattered Picture in the Midst of Change

A scattered picture? Consider: no secondary or private teacher I spoke with had been formally trained in the use of computers in music education. Not one. This movement does not stem from the centers of computer technology, nor from conventionally accepted centers of culture. No private or secondary teacher I talked to worked in New York, Boston, Chicago, San Francisco or Los Angeles, and I encountered only two college programs in those cities. The most sophisticated state or provincial program is in the province of New Brunswick, Canada, and there is an excellent program getting up steam in Montana.

Quite possibly Apples are functioning in secondary education in the cities I mentioned (*and we'd like to hear about them.—PCW*), but my reference network did not lead me to them, because of the nature of this activity. Use of Apples in music education is not a doctrine being disseminated from some center, but is instead a collage of grass roots movements emerging here and there as creative people see the possibilities of the medium. Isolation is a problem of this scattered grass roots movement. People in colleges and secondary schools both mentioned isolation as a problem.

(*People interested in participating in an international Special Interest Group in Music Education are invited—nay, urged—to call Louis Milrad, the IAC's SIG Co-ordinator, at (416) 222-8447.—PCW.*)

Scattering and isolation will rapidly diminish. Several universities are training future music teachers in the use of computers and offering summer seminars to working teachers. The number of publications in the field is increasing, beginning for the academic world in several articles in the Proceedings of the IFIP TC-3 3rd World Conference on Computers in Education in 1981.

High Schools and Elementary Schools

How Students Learn Music

The most widespread effect on how people learn music comes from new tools for ear training. The classic schoolroom method requires teachers to present musical elements to students in a full class for individual student recognition. Elements may include notes, intervals (the difference in pitch between notes), chords, and rhythms. Many readers will remember squirming in their seats while their fellow students had their turns. You may not remember that the teacher was equally bored. Secondary music students vary widely in ability and backgrounds; classroom drills fail to stimulate the able students and fail to provide the less-than-average student with just the practice that will move them ahead. Finally, the teacher spends hours, unseen by the student, keeping paper records.

Many software packages exist to perform the mechanical functions of the teacher. The simplest, most often found in elementary schools, are based on the Apple keyboard and speaker. I heard the veteran Apple Music Theory program mentioned most often by people without special musical equipment. But, as discussed elsewhere in this issue, synthesizers approaching expensive lab equipment and electric organ keyboards that drive public address amplification, hi-fi equipment, or earphones are available at prices running up to about $4000 for a full suite.

Several programs exist to teach sight reading both on systems connected to an electric organ keyboard and on systems with the Apple keyboard alone. Some elementary school teachers prefer these Apple-connected keyboards as easier for young children to deal with. Typically they show a staff on the the screen and ask the student to play the appropriate notes, much like a typing tutor program. Such programs readily progress to tasks like playing all the notes of a triad given a staff and the root of the triad.

Of course, these programs can't teach anyone to play a keyboard instrument with grace. But they can quickly and with relatively little pain bring a student to the point where weakness in sight reading will not handicap her or his performance skills.

As an "ear teacher", the Apple can present notes, intervals, chords, or tempos to the student as sounds, as notes displayed on the staff on a monitor, or by name (*do, re, me,* etc.), and ask the student to identify them, by either keyboard, or, in a few programs by playing a note on an instrument into a microphone. The Apple never loses patience, and it can relieve the boredom of the student by presenting the material in a variety of ways including methods rare or unknown in conventional classrooms. Most of the programs available automatically increase difficulty in response to what the student does as typing tutor programs increase the speed they demand and the complexity of the fingering. The program's commendation lacks the warmth of a human task master, but its condemnation lacks the sting.

Here's an example of what we found in high school ear training programs where a computer does something that older methods seldom allow. The machine sounds two notes, and the student adjusts one, e.g. with the Apple keyboard arrows, until it sounds in tune with the other. This procedure has hand-ear simplicity for the student and does not require any previous knowledge of music. It's just as easy for an Apple driving a synthesizer to sound a chord with one note out of tune so that the student can adjust the discordant note to the correct pitch. The computer will patiently tell the student whether he is right or wrong and generate new chords, the type under program control, to fit the pace and patience of the student. If the teacher needs records, the computer will keep them without bothering student or teacher.

Now for another, more controversial example. Coventional musical notation is widely regarded as an awkward medium, inexact and hard to learn. Programs exist now in a variety of forms that are based on sight reading, but not on notes and staffs. Various other systems of showing the music on the screen have appeared. Teachers give this innovation mixed reviews; some say the student has to learn the staff someday anyway, better not to confuse the issue. Others, often either those who work with young children or those who want to redefine music (discussed below) see in micro-computer-based graphics an escape from conventional notation. (discussion not unlike the AUERTY-Dvorak keyboard)

Consider in any event, the pleasure of a teacher who is giving his or her time to more conceptual parts of music appreciation or discussing problems with students while in another part of the same room with headphones other students are working through ear training at their own pace.

The equipment and programs are available to private teachers, of course, and dealers report some sales. I was not able to talk to enough private teachers to form a clear impression of how widely private teachers are using equipment based on Apples.

Who is Learning Music

Computers are attractive to many elementary school age kids. Some secondary school students are pressing hesitant teachers to use computers in the classroom because the kids themselves are familiar with them, and with their music on popular albums and television commercials. Not just in Cupertino and Boca Raton; a middle school teacher in Bozeman, Montana found that about 20% of his students had a computer at home.

Students will come into the music room because they see a computer there and it is attractive and/or familiar. The Apples attract a certain number to music education that would otherwise not study. Some are attracted by game programs that are available in the area of music. ("Metro Gnome teaches tapping rhythm patterns. He asks you some questions and checks you as you tap various rhythms"). Most of the teachers I talked to felt you could only go a limited way teaching with games, but that the games did serve to lure some kids to studying music who would otherwise pass it by.

In some cases the attraction is more technically musical. One high school music teacher told me that students have been attracted to studying music through seeing a music editor. Writing notes on the screen entranced them. Once they had written them, they could play out the notes they had written and thus came to music education through the computer, as it were, backwards, from learning to write music to playing it.

What Students are Learning

Apple-based systems are also changing what is taught. Secondary schools normally stress performance to the exclusion of theory, appreciation and ear training. How many more times have you heard the band at the football game than you have heard of high school classes dealing with theory of harmony or structure of music? Software that makes teaching these subjects easier and more attractive is turning out secondary students who understand better the music they perform and are better equipped to go on learning.

Teaching composition at this level is unusual, but again, Apple-based systems are greatly facilitating it. In addition to the usefulness of a music editor, systems based on synthesizers offer the beginning composer a better chance to hear correct performance of her or his work. One of the common problems of teaching composition or structure of music at this level is performance. The 8th grader who has composed a tune can't play it very well, and very possibly her or his teacher can't play well either. With an editor-and-synthesizer system, the computer will allow the student to hear a rendition of a newly-composed work. The rendition may not be expressive, but the notes will be played as written.

It appears that composition will become more common in high school. The Canadian province of New Brunswick has a prosperous and thoughtfully planned microcomputer program. A microcomputer center has over 20 machines. Fifteen high and elementary schools have Apple-synthesizer-organ keyboard units and a consultant who travels through the province has another. In this rich environment students are doing more ambitious things, for example writing string quartets—and hearing them.

Relations with the Community

Several teachers have found ingenious ways of using Apple-based systems to reach out to the community. With the several "instrument" packages that come with synthesizers,

an Apple-based system can serve as the orchestra in elementary school choral productions. A middle school teacher reported that when his students had made tunes on the computer he used the Apple's cassette jack to make cassette recordings. "That way music is like art, you can take something home to Mom and Dad".

Problems

The difficulties people spoke of most often at this level were getting money for equipment, isolation, and lack of programs for young children.

We are all familiar with the problem of getting money for equipment; the less obvious but important need for printers struck me. Teachers want to print scores from music editors and records from grading and grade keeping programs.

No elementary or high school teacher I spoke to had been trained for this work in any way, and few had personal contact with other programs. They were interested people who had learned from the the manuals and figured things out. That situation is changing, as discussed in connection with colleges below.

No teacher described any program as very useful much below the 6th grade, but teachers feel that combining sound and graphics offer good possibilities. Consider an ear training program with graphic cues rather than words. A hint to the software entrepreneurs.

Colleges and Universities

How Students Are Learning

The "how" of using Apples in college is much like that in high school, with greater sophistication. In college, systems based on Apples continue to make ear training and related practice disciplines easier, broader, and less repetitive.

Consider the program by Jones and others at SUNY Plattsburgh that uses a mathematical model to interactively correct student assignments in four part harmony. Training courses take advantage of the computer's abilities to make chords hard or impossible to finger on real instruments, to create unusual mixtures of timbers, arbitrary rhythm, etc. The tendency to widen what the student is trained in will be explored further in just a moment.

Some colleges have felt free to take advantage of the self-paced quality of computer-based learning to free up course structure. At the University of Akron, for example, music majors are required to take an ear training course that has certain goals. The course is a three unit semester course with records kept on the Apple system. They study on Apples at their own pace. A student who is very apt and/or puts in many hours may finish in a few weeks, or a slow student may spend whatever number of hours it takes over the whole semester. The student who passes quickly is free to dispose of his or her extra time at will.

Programming marks a difference between music education in universities versus high school. Only one high school teacher I talked to was programming, whereas all the college teachers were doing at least some programming. The University of Akron department has eight Apple IIs equipped with electric organ type keyboards and synthesizers, and two Apple ///s, all connected to a 10-megabyte Corvus disk. They are not using the keyboard maker's software, however; they have written all their own in Pascal.

The reason for this difference seems to be partly the support of university computer science departments, but it is mostly a matter of time. High school teachers feel they have no time. But of course "having time" is partly what the world sees as your job; writing education programs has been seen as part of university research, (*Program or Perish?—PCW*) whereas in high school it is not. Several of the software packages on the market have emerged from universities and several university teachers I spoke to have plans to market new software.

The direct contribution of Apple-based systems to teaching performance skills has been restricted largely to programs that display the staff (or some innovative form of notation) while a student plays the notes on an electric-organ keyboard, where the computer signals if the student makes an error. That's useful only at a very basic level. Some software can measure how long a student holds down a key, and university researchers have developed programs that use that information to correct the students rhythm. A program with resolution to sixteenth notes, for example, offers the student the following feedback: playing back what the student plays; a performance in correct rhythm; graphic display of the rhythm played versus performed.

The physics of music is a specialized area where systems-based computers and synthesizers can change college teaching. The software available with synthesizers can usually make visible as sound spectra the elements that make up pitch, timbre, the attack and decay of notes, etc. In most systems the student can vary these elements at will and hear immediately what they mean to the ear. In colleges where microcomputers are in use, they have become a cornerstone to learning the physics of music. One college has felt free to abolish a course in the physics of music previously required of music majors because of their exposure to Apple-based synthesizers in other courses.

Who is Learning Music

In general, the computer attracts students in college in much the same way as it does in high school. Some students are coming to the music department from the computer department.

Two other groups of students who are being exposed to computers are of interest. One is music majors. Several colleges now require courses in computer music for all music majors, others are planning to. One college is planning next year to require a microcomputer programming class of all music majors. Future secondary music teachers will be trained in this area.

Those music teachers are the second group of students. In my research I found summer training courses based on Apple equipment and aimed at secondary teachers, or at least including them, at Akron, Silver Lake College in Wisconsin, at Montana State, at Portland University, Sonoma State in California, and at NYU in New York City. Others no doubt exist. Enrollment has been above the expectations of the people who offered the courses.

Not all of these teacher/students are musicians. In fact these courses appeal to teachers who are "backing into" music through the computer, like the high school students who began by writing notes on the monitor. These are non-musical secondary school teachers who are called up to teach music and who don't feel comfortable with it. The Apple in this case may offer much needed tools and support. "This is

the first *pleasant* experience I've had with teaching music," commented one person after the summer program at Portland.

What Students are Learning

As for the high school student who for the first time can easily hear what he or she has composed, so, on a college level, systems based on synthesizers open up the field of arranging. The synthesizers offer imitations of instruments and it is possible for a student to take her or his own composition or some well-known tune and play with different arrangements and hear them. Usually eight voices are available. The "instruments" can as easily be a jazz quartet playing *la Folia* as it can be recorder and harpsichord playing *St. Louis Blues*, or perhaps vice versa. Of course, no one would have trouble telling the simulation from the real instruments, but for the purposes of a class in arranging, the capacity to hear a result promptly often outweighs fidelity to instrumental sound.

In addition to arranging, the skills of the recording studio are a part of modern music production. One music teacher commented that no music major should leave school without some practical knowledge of what goes on in a recording studio, mixing, dubbing and so on. Recording studio equipment is beyond the reach of most colleges, but again synthesizer-based systems offer similar tools powerful enough for educational purposes.

The question of imitation of instruments brings us to what may be the greatest long-term effect of microcomputers on teaching music: the redefinition of music itself. Students can create sounds that could not be created with any existing instrument and control timbre, decay and attack, intervals and meter in unforeseen ways.

Actually, composers and performers have been redefining music since at least the middle ages, and the pressure of opportunities that comes from microcomputer based systems can be seen as an extension of pressures associated with music concrete, John Cage, or the large-computer music systems such as those at Stanford University's computer Music department.

The importance for music education is that that Apple-based equipment is bringing the tools of experiment, and particularly of teaching experiment, down to a price that makes them more generally available and is beginning to establish a community of interest.

Ron Pellegrino at Sonoma State is an articulate spokesperson for this position. He says, for instance, that hitherto what we have been teaching as music theory has really only been the history of music theory. With our present equipment not only to control sound, but to readily preserve and portray what we do, we are only now in a position to actually teach music theory. For Mr. Pellegrino and for several other teachers, music theory is a body of theory about certain kinds of structures. If that is so, then maybe we don't have to restrict music to sound, and, for example the graphics, which can be part of a composition on an Apple, are also music.

Advocates of this position all stress that this expanded definition of music will add to rather than replace traditional musical activities and education, as movies did not replace books and television has not replaced movies.

Dissenting Voices

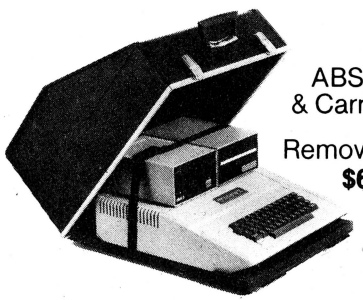
We did hear some dissenting voices. They are of two kinds. One group of people tends to say the programs are not good enough. I have heard complaints about the accuracy of the pitches from given software, the tempi, and of the concept of what it is to teach music that underlies certain programs. These are limitations on the existing software for the most part, and I'm sure we will see great improvements in the next few years as programmers work more closely with practicing music educators or as practicing music educators become programmers.

The second type of objection states that when a student, for example, does ear training with a machine rather than a person, certain important elements of flexibility and identification are lost. In the matter of flexibility they say that, though I call the programs flexible and patient, they are in the end not as resourceful as a human teacher and passing from stage to stage is not as rewarding as the human response of a teacher. On the matter of identification they point out that you learn something very important merely by being with a teacher who is concerned about you and teaching.

On this latter point the advocates of computer-based training say the machine frees up students and teachers to have personal relations in more rewarding moments. Certainly that's true sometimes, and sometimes it surely fails to occur. Because the inescapable fact that emerges is this: music education remains in the control of human beings, of varying resourcefulness. The computer is a tool, but in the final analysis, the quality of music education is determined by people.

Dirk van Nouhuys is a publications consultant and a published author.

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How the Pros Do It

by Lenore Wolgelenter

Artists are a restless group of people. Their need to create puts them on the lookout for ideas and equipment to assist in the expression of these ideas. Music is an art form constantly in search of expressive tools and the musicians interviewed for this article represent the music pioneers of today.

The keyboard has long been a major mode of musical expression. In the Middle Ages, the dulcimer was the earliest form of "keyboard" type instrument, followed by the clavicord and harpsicord. In the early 1700's, the pianoforte became very important as a compositional and performance instrument. During that period, the "keyboard sound" developed into what we today know as the piano.

Various analog electric and electronic organs also contributed to the march of musical development, reflecting the needs and technology of the era. Similarly, the digital synthesizer is the result of available technology and a new breed of musician. The synthesist is a combination of musician, engineer, technician and tinkerer and sees this technology as a way to greater expression. The composer/arranger can use this technology to do his/her work with greater efficiency, leaving time for creativity. The performer is wide open to almost limitless options and challenges.

Let's visit briefly with a selected handful of artists, to see how the Apple computer and its musical adjuncts has affected their professional and personal lives.

Chris Cerf lives and works out of his townhouse in Manhattan, which contains among other things, lifesize Muppet characters and computers. He was the first Apple enthusiast at Henson Productions (*Sesame Street*) and has become a strong advocate for using computers in the creative arts. Chris is one of those people who gets you smiling, whether you talk with him in person or at 6 AM on the phone. He is enthusiastic about all he does, and that includes a long list of accomplishments as writer (*Harvard Lampoon*) editor (Random House) composer, lyricist (Children's Television Workshop). He is a renaissance man with a focus on bringing high quality, humorous entertainment to children (of all ages).

He recently completed an album called *Born to Add*. A major working tool for the production of this record was his Apple (lyrics) and alphaSyntauri (music and orchestration). The album is a parody of rock and roll songs from the 1950's through the 60's in which children can learn about letters and numbers. I can recommend the album for adults who are into rock and roll of that period.

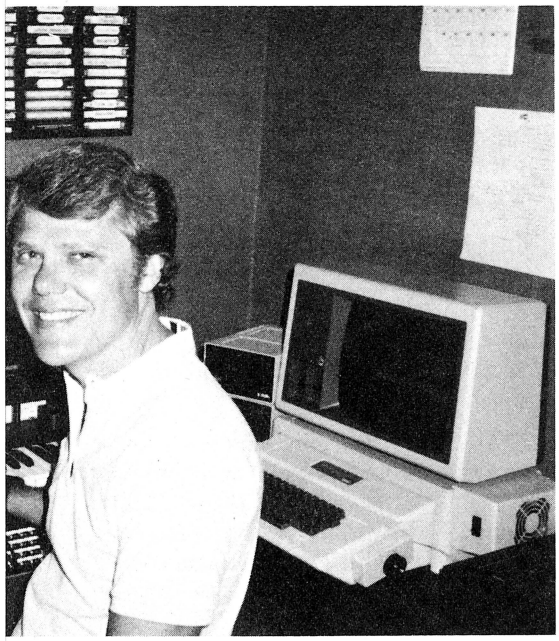
Chris' first introduction to computers came via his wife, an adjunct Professor of Electrical Engineering at Columbia University in New York. Purchase of an Apple computer for word processing was only the beginning. As consultant to the Sesame Place group of theme parks for children, he got involved with the computer as a tool for education. During this time, Charlie Kellner introduced him to the alphaSyntauri. As Chris put it, "I fell in love."

The synthesizer with computer memory opened up a new world. While working on a project, Chris can create the theme and structure of the musical composition. Once he starts collaboration with producers and directors, the alphaSyntauri software lets him quickly change a component of the score or the orchestration. When he worked only with the piano, none of the instant idea changes were possible. While Chris uses more complex synthesizers for final recording, the ability to get most of his



Photo by Jonathan Becker

Chris Cerf



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During college he majored in music education, went on to obtain a Master's Degree in Music and played both piano and trumpet. When it came time to earn a living, he moved to Los Angeles to try his luck in show 'biz' as an arranger, orchestrator and composer.

Working with the new technology has definitely changed long standing work habits, increasing both productivity and creativity. For Dell, the Soundchaser is an affordable, sophisticated way to learn about digital synthesis. Often when working on a composition, he hears a sound that he wants in his head. There is no way to make that sound a reality with a piano or trumpet. Using additive synthesis on a digital synthesizer, he can produce those unique sounds for commercials or specific performances. According to Dell, "producers spend megabucks and want choices" and he can put his energy into being productive with instant feedback and access to compositional changes.

Dell does orchestration and arranging for such people as Kenny Rogers, the Jackson Five and Diahan Carroll (only a few of the prominent performers he has worked with). He can prerecord the music and go do other work while the artist listens to and becomes familiar with the new arrangement. The performer and arranger can easily collaborate on musical changes without spending time rewriting the score.

The Soundchaser is not just part of Dell's professional life. He uses it as a tool to teach his own children about music. He is also studying with composer Lyle Murphy, in what he calls a "natural system of music composition". Once again, the recording capabilities of a digital synthesizer let him create, record and play it back without spending time writing and rewriting. Each line of music can be added to the previous line and the entire composition stored on diskette.

Now that Dell is committed to digital synthesis and computers, his next goal is to get the Soundchaser included in an orchestra. He wants the synthesizer to be as familiar in performance as any acoustic instrument.

* * * * *

Tim Weisberg comes to the world of computer music with an atypical background: a major in cultural anthropology and a Master's degree in Psychology. All this time, he continued studying classical music and playing his flute. In 1969, he decided not to go for a Ph.D. but to pursue the world of rock and roll. Instead of taking the simpler route and switching to a traditional rock and roll instrument, Tim stuck with the flute. In live performance, rather than competing with the electronic insruments on stage, he simply gets the other performers to turn down the volume and he plays his flute. With more than 6 record albums to his credit, he successfully brought an unusual instrument to the pop world.

Always on the lookout for a new challenge, Tim went to the 1981 NAMM show (National Association of Music Merchants which is equivalent to the NCC) and observed that digital and digital/analog hybrids were coming to the forefront of what is new. Putting on his analytical hat, he went in search of answers to his questions about this new technology. The end result was the purchase of an Apple II computer, followed by Roland's Compu-Music system and an immersion into a new world of music cabilities.

Tim's present band goes on stage playing a flute, four or five different syntheiszers, guitar and his Compu-Music System. Working with this technology has given the band what Tom calls a "mental musical stretch" and is a dramatic departure from how they performed in the past. The ability to create new sounds and to compose with instant feedback brings almost limitless musical possibilities. As with other performers, Tim is interested in MIDI and the ability to hook up several keyboards to his Apple. He is also learning how to program both his Apple and Compu-Music system. One end result of this challenge will be that Tim's next record album will include computer music.

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Photo by Jonathan Becker

Chris Cerf



Dell Hake

work done at home, before using studio time, has more than justified the cost of his equipment.

Being a perennial visionary, Chris has a goal of bringing together talented people who work in graphics, education, writing, humor and other art forms. His emphasis is on using the computer technology to develop and distribute educational entertainment.

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Dell Hake was typical of many new computer users. At first he said, "No way, the computer is too complicated, I would need to learn programming, etc." With a degree of curiosity, however, he kept looking out of the corner of his eye. More and more was being published about home computers. In a *Byte* article, published in 1977, Dell first read about computer music synthesizers; he realized sooner or later someone would develop a reasonably priced system. After seeing an ad for Passport Designs' Soundchaser, he got hooked and purchased both the synthesizer and computer for his work as an arranger and composer.

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Tom Chase, a composer, arranger and conductor with an impressive list of credits, is at home in the world of pop-

ular music and entertainment. As with most people in the 'industry', his background includes extensive music training. Tom was a composition major and piano minor at the University of Southern California. Along the way, he also became proficient at playing the guitar.

After meeting Chris Albano of Passport Designs at a Comdex show, Tom decided to take the plunge and go digital. He bought an Apple and Soundchaser, and became a computer convert. Since this was his first computer experience, it required a reorientation to his work and he felt some apprehension. However, a few days with the manual and he was convinced that, "If *I* could get it, anyone can." The cost of what was available prior to the Soundchaser was way beyond his means, and he could not justify the expense. The combined cost of his new equipment has more than paid for itself in a short period of time.

Tom's main focus as an arranger is to get the music orchestrated and back to the artist for rehearsal. With his new digital tools, he could store each artist's song arrangements on diskettes and build an individual library per performer. The time saved allows him to focus on the artist's style without having to rewrite musical scores for instrumental changes.

As he gained experience with the computer, Tom was intent on expanding the applications of his equipment and began with wordprocessing and business software. Along with friend Dell Hake, he is studying with Lyle Murphy and finds the Soundchaser an invaluable tool.

For a professional like Tom, the multitrack recording capability fills an essential need. His hope for the future is to be provided with an extensive sounds library so that he can boot up a great variety of sounds and do his work. He is also looking forward to MIDI as a way to interface other equipment such as a drum machine and other synthesizers. (See article by Bowen and Armbruster.)

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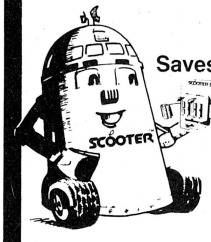
There were two firsts in July at the California Institute of Art in Valencia. The Bella Lewitsky Dance Company premiered a dance composition titled *Sextet*. It was choreographed by Kurt Weinheimer, and the music was composed on an Apple computer and Compu-Music System.

Jeff Rona is a programmer/product developer for Roland Corporation and a composer/musician at night. This was his first composition for dance and the creative process was unusual. Weinheimer choreographed the dance to a metronome and had the piece videotaped. Jeff then worked with the Compu-Music synthesizer and Weinheimer's videotape; six months later the musical score was completed and stored on diskette. In order to create the special sounds he wanted, Jeff hooked up a Roland Jupitor 8 synthesizer to the Apple as the performance tool. As part of the new breed of music/computer people who build what they need, Jeff constructed a special box for synchronization between the Apple, Compu-Music System, the Jupitor 8 synthesizer and a 24-track tape machine. All this work was done at home and brought to the studio. Instead of spending hours arranging, rearranging and mixing down the musical score, Jeff was able to accomplish the task in one night. The end result brought positive reviews from the *Los Angeles Times* dance critic, with special mention made of the music.

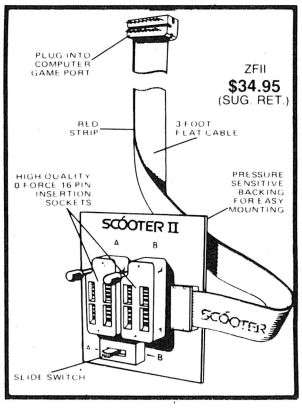
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One of the most elaborate computer music systems for recording in use today belongs to **Herbie Hancock**. Herbie, together with his keyboard engineer, Brian Bell, has created an extremely sophisticated system linking together his Apple, keyboards and specially designed equipment. Herbie is well known as a long-time afficionado of the Apple computer and demonstrated the alpha-

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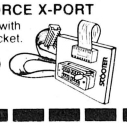
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Herbie Hancock



Photo by Toni Catell

Frank Serafine

Syntauri digital synthesizer at the 1982 NCC.

The question naturally arises: where does one go after having gained fame as an accomplished jazz musician, performed around the world and created a state-of-the-art digital music system? The answer: you become the newest perfect 10 as a rock and roll star. Within the past 2 years, Herbie has become a teenage idol in England with two hit singles. His latest album *Future Shock* is moving up the charts in this country. One song, titled *Rocket* has been released as a single. It's way up on the Black Contemporary charts and moving fast on the dance/pop chart. For this album and specifically for *Rocket*, he used two Apple-based synthesizers. The Chroma and alphaSyntauri. This was the first time he used the alphaSyntauri for a recording session.

As a performer, Herbie finds constant challenge in working with the technology and seeing just how far he can push his equipment. He also sees this technology as a means of giving the professional musician greater control over his/her life. "With software packages for accounting, word processing and data base management, performers get a better idea of their finances, tour arrangements and music library. Instead of handing over control of their lives to a manager, the performer gets involved. This brings a greater flexibility not only to their music, but to the tasks involved with creating music and performance." For his last three-month acoustic tour, Herbie did all the arrangements and budgeting on his Apple. (He just bought a Lisa as a management tool.)

To date, all of Herbie's tours have been on acoustic instruments, but watch out. An electronic or "digital" tour may be in the making. If this comes about, it will include several digital keyboards, his Apple Computer, one or two singers and some new music/dance ideas still in their "underground" phase in New York City.

* * * * *

Frank Serafine was intrigued enough with synthesizers and sound to put together a sound effects and slide projector show at an experimental planetarium in Colorado. From that start grew a career in which he is one of the leaders in the field doing sound effects for *Tron*, and *Star Trek: The Motion Pic-*

ture, special effects for the US Festival and commercials for such companies as Chrysler and CBS. For Frank the ability to combine computer memory with synthesized sound is just the beginning.

For *Tron*, he was able to create part of a unique "bong sound" using the alpha-Syntauri. By using additive synthesis software, he starts with a waveform and adds harmonics, producing the exact sound quality he needs. According to Frank, "digital sound has a particular purity not available on analog synthesizers." The latter systems use filtering which reverses the process by removing harmonics from an already existing sound. In creating sound effects, it is not an either/or situation between analog and digital, rather a case where digital equipment has opened up an entirely new area of possibilities to someone in the sound effect business.

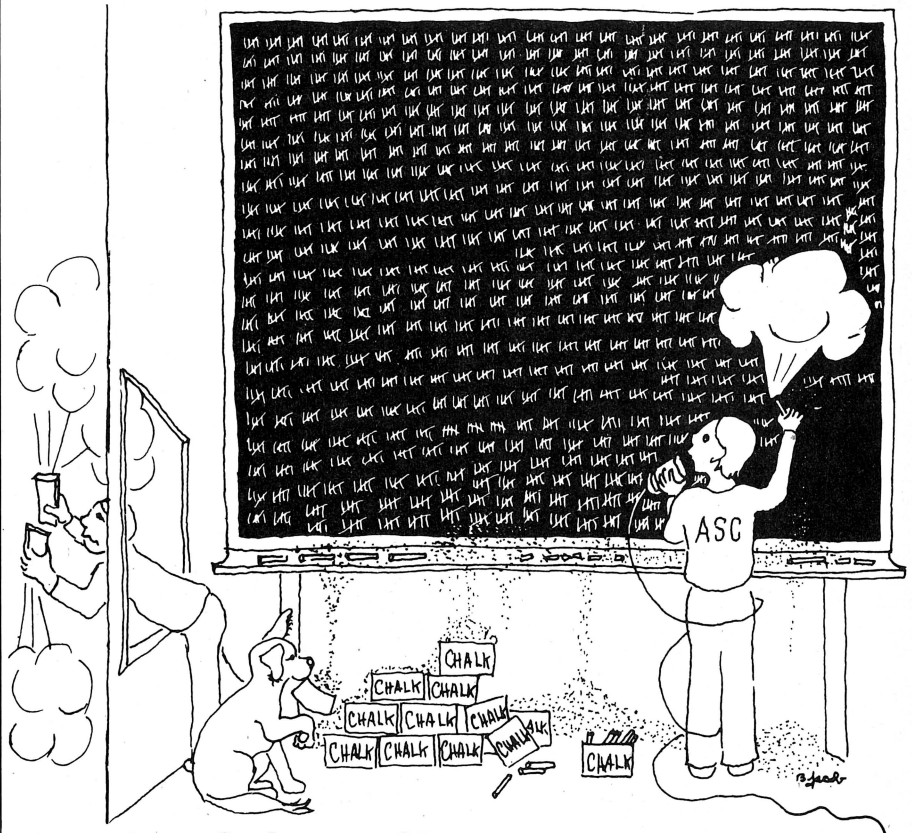
For Frank, the advantage of a synthesizer is its software. He is forever on the lookout for new "sounds" that differ from those commercially available. Using a waveform as the basic building block, followed by recording the sound and its parameters, layering it with other sounds and playing it back, gives digital technology an edge over analog systems.

His present projects involve development and experimentation with the Apple as an intelligent, interactive interface for other machines. One important project is the perfection of SMPTE, a standardized time code method that synchronizes the music or sound effects tape to the exact frame on the film strip. This process coordinates the two aspects of film production and speeds up the editing process. SMPTE stands for Society of Motion Picture and Television Engineers and the concept originated at NASA as a way to log space flights.

For an in depth discussion of how people such as Frank and Brian Bell (Herbie Hancock's engineer) create and use their systems, see the magazine "Recording-Engineer/Producer", Vol. 13, #6, December 1982.

Lenore Wolgelenter is a writer,teacher, and administrator whose expertise has given us not only this article, but coordination of a group of computer music articles in this issue. The Computer Music project was the first of a series of special projects in which we have invited Ms. Wolgelenter to participate.

20K MEMBERS AND GROWING

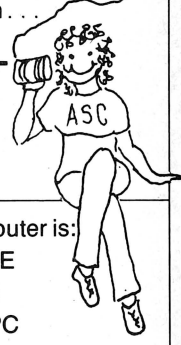


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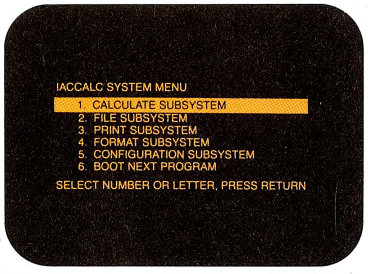
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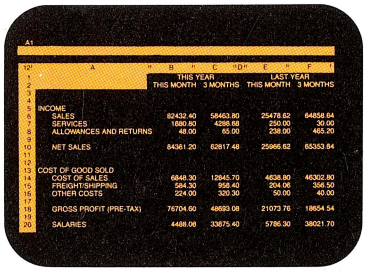
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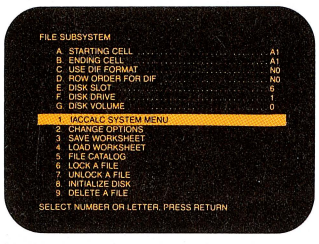


Calculate Subsystem, the interactive worksheet.

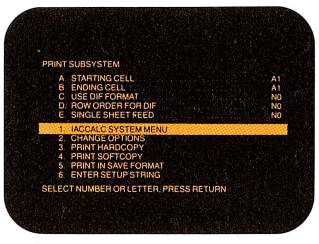
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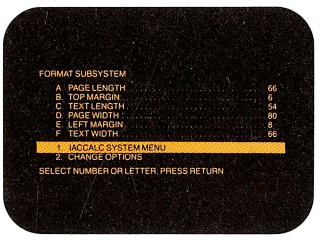
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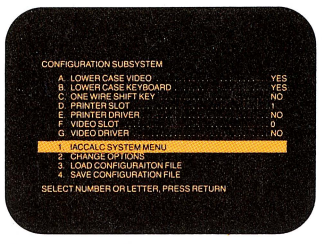
File Subsystem handles disk operations.



Print Subsystem manages data printing.



Format Subsystem defines page layout.



Configuration Subsystem structures IACcalc to your Apple.

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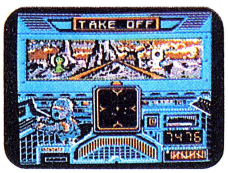


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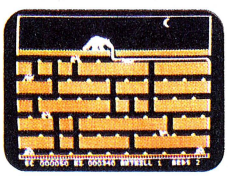


your Apple.*



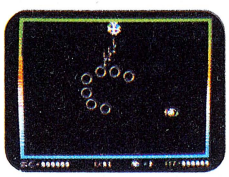
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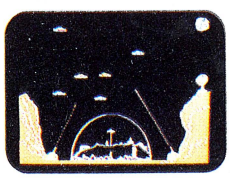
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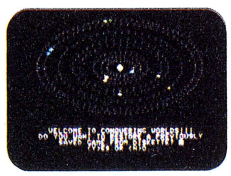
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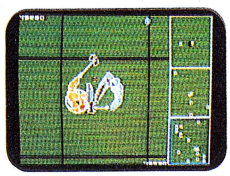
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WPL - The Sleeping Giant

Part II - An Address Book

by Richard Loggins

This second article in our series will start a WPL program we'll call The Address Book. It seems like a useful program to demonstrate some of the advanced techniques that WPL offers. When it's finished, you'll have a series of interactive WPL programs that will allow an address file to be created and maintained. It will include a method to automatically insert the addresses into letters and print them.

This series on WPL, the Word Processing Language which is part of every Applewriter ///, II and //e, began in last month's **Apple Orchard**. We call WPL the "Sleeping Giant" because it is a powerful tool that frankly most people have passed by (and then claimed that AppleWriter was inadequate). Maybe. Or maybe the documentation doesn't go into enough detail; some documentation has been rumored to be less than thorough. Hence this series. To review the first article, get hold of a copy of the October **Apple Orchard**. In this issue, we begin a specific project. When we've finished with The Address Book, if enough of you are interested we'll try our hand at a full fledged database program. So get out your pencils and let us know what you think!

Let's establish what we want our program to do. First, it should be flexible, able to work with more than one file. It must supply a method that will allow all of the addresses to be inserted into letters and printed automatically; as well as add and delete names.

To accomplish all of this, we'll have to learn a few new commands and make sure our programs are compact and efficient. There won't be room for a lot of comments, as WPL programs cannot exceed 2,048 characters in length.

For clarity, all program listings will follow the same format that was used in our first article. When you type in the programs, indent the commands *only one space*. Remember, each extra character will steal valuable program space. We'll examine portions of the program as we go; since there will be too much information to digest at one sitting.

First on our agenda is to establish the initialization portion of our program, the title, and our menu of selections. We'll clear the text editor, and turn off the display with the routine named START. Next, the program title will be printed and a few blank lines will be inserted by the routine named TITLE.

The portion of the program named MENU will provide our menu of selections, determine our choice, and branch to take the appropriate action, including a way to end our program.

WPL PROGRAM: WPL1 (Part I)

```
START NY
   PSZ 0
   PND
   PGO MENU
TITLE PPR(CTRL-Backslash)
   PPR
   PPR        WPL Address Book
   PPR   (C) 1983 - Richard Loggins
   PPR
   PPR
   PPR
   PPR
   PRT
MENU PSR TITLE
   PPR     1 - Print a file (no insertions).
   PPR
   PPR     2 - Print a file (with insertions).
   PPR
   PPR     3 - Use the WPL address program.
   PPR
   PPR     4 - Quit WPL, return to Apple Writer.
   PPR
   PPR
   PPR
   PPR
   PPR
   PIN   Enter your selection by number (1-4): =$D
   PCS/$D/1/
   PGO DOIT
   PCS/$D/2/
   PDO .D1/WPL3
   PCS/$D/3/
   PDO .D1/WPL2
   PCS/$D/4/
   PGO QUIT
   PGO MENU
QUIT
   PQT
```

The first four routines of the address book are enough to introduce a few new commands and techniques. If you'll notice in line one, there is a label *and* a command. This is an example of the two rules that govern labels and commands in WPL. So what's the big deal? Simple: it saves a carriage return. When your program is limited to 2,048 characters, every little bit helps.

The first line clears the text editor memory. The second and third lines set the variable Z to zero and turn off the display. The fourth line is an unconditional branch to the label MENU. The reason for this will become clear as we progress.

The routine named TITLE will clear the WPL display and print the title of our WPL program on the monitor for all to see. This is followed by four blank lines (PPR), and a new command: PRT.

Now, examine the command to the right of the label MENU, which states PSR TITLE. If you remember, line four of our program caused an unconditional branch to the label MENU.

When the program reaches the label MENU, the first instruction is a SUBROUTINE command. The WPL program is directed to GO to the SUBROUTINE named TITLE (PSR TITLE); execute whatever instructions are found, and RETURN to the next instruction. PSR is the command used to execute a SUBROUTINE, and the PRT command is used to indicate that the end of the subroutine has been reached.

In this program, when the command PSR TITLE is executed; the monitor will be cleared, the title will be printed, four blank lines will be placed on the monitor, and the program will resume with the printing of menu selection number one, print a file.

Subroutines offer several advantages. Any time we want the monitor cleared and the title printed, it can be called with the PSR instruction —without duplicating our efforts. More importantly, one subroutine can be used by many different parts of the program, which saves memory.

The four selections are printed on the monitor, five more lines are skipped, and we are asked to enter our selection by number. The entry is placed in the variable $D, and is then subjected to a series of comparisons.

If $D contains the number one, the first comparison test will be valid, and control of the program will branch to the routine named DOIT. If not, an error will be generated, and the branch instruction will be ignored.

Next, $D is compared to see if it contains the number two. If so, our program will load and execute the file named WPL3 that resides on the disk in drive one (caused by the PDO command). It just so happens that WPL3 is another WPL program! In this manner, we can execute an entire series of WPL programs to accomplish a variety of applications.

The last comparison that is performed is looking to see if the number four was entered. If so, the program will branch to the label QUIT, which will end our WPL program.

If the results of all four comparisons are invalid, the user must have entered something other than a number between one and four. In this case, we will send the program back to the routine named MENU, and try again until a valid entry is made.

WPL PROGRAM: WPL1 (Part II)

```
DOIT PSR TITLE
   PIN    Name and location of file (exam: .D1/LETTER): =$A
   PCS/$A//
   PGO MENU
   PPR
   PPR
   PIN    Number of copies to print: =$B
   PCS/$B//
   PGO MENU
   PCS/$B/0/
   PGO MENU
   PSX $B
```

In the routine named MENU, we performed a series of comparisons. If the result of the first comparison was valid, control of the program would branch to the routine named DOIT. This portion of the program will print a file with no insertions. When this is done, the subroutine named TITLE is called to clear the monitor and display the title. Next, you are asked to enter the name and location of the file to be printed. This is assigned to the variable $A.

The variable is compared with a null string (nothing). If the result is valid, the program returns to the menu. If not, two blank lines are printed, and you are asked to enter the number of copies that should be printed.

The number of copies desired is assigned to $B, and is subjected to two comparisons. One to check for a null string, the other to check for a value of zero. If either of these comparisons are valid, the program returns to the menu. If both of the comparisons are invalid, the number in $B is assigned to the variable X.

At this time, we have the name of the file to print, and the number of copies to be printed. Program control passes to the routine labeled L1.

WPL PROGRAM: WPL1 (Part III)

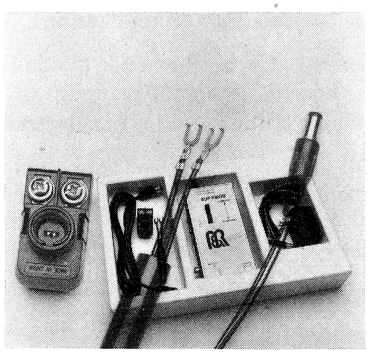
```
L1 PSR TITLE
   PPR
   PPR
   PPR     Printing file: $A . . . .
   PPR
   PPR
   PPR     Number to print: (X)
   PPR
   PPR
   PIN     Press the <RETURN> key to begin:
   NY
   PAS 0=$D
   L $A
   PCS/$B/1/
   PGO PRINT1
   PAS 1=$D
PRINT1
   PNP
   PSX ±1
   P
   PCS/$D/0/
   PGO START
   PSY 2
```

The video display is cleared, the title is printed, and then we do something we haven't done before. When the command "Printing file: $A . . . ." is executed, WPL will print the name of the file contained in the variable $A.

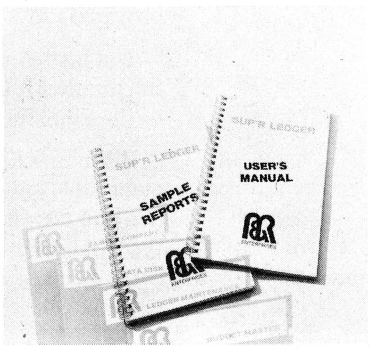
When the command "Number to print: (X)" is executed, instead of printing "(X)", WPL will print the *number contained in the variable X*.

The program will then wait until the «RETURN» key is pressed. The text editor memory will be cleared, and a zero will be assigned to $D. The variable $D will be used as a flag (zero or one) to determine if more than one copy is desired.

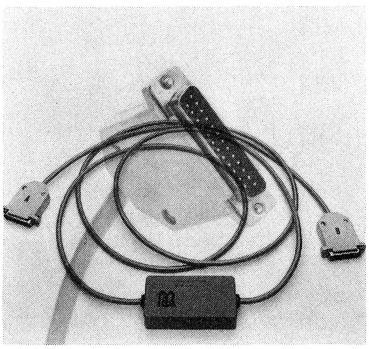
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Next, the file name contained in $A will be loaded into memory. A comparison is then made with the variable $B, which contains the number of copies to be printed. If the result is valid, the program will branch to the routine named PRINT1. Doing so will cause our flag ($D) to be left in its original state - containing a zero.

If the variable $B contains a number greater than one, the program will not branch. This will result in a one being assigned to $D, and control will pass to the routine PRINT1.

The routine at PRINT1 will print the first copy, and decrement X. The instruction immediately following the decrement instruction is a comment. It is used to insure the compare instruction is not skipped when X is decremented.

Now we test our flag ($D) for a zero condition. If this condition is true, then only one copy should be printed. In this case the comparison will be valid, and control will branch to the START of the WPL program.

If the comparison is not valid, the variable Y will be set to equal 2.

WPL PROGRAM: WPL1 (Part IV)

```
PRINTMORE PSR TITLE
   PPR
   PPR
   PPR     Printing file: $A . . . .
   PPR
   PPR
   PPR     Printing number (Y)
   PPR
   PPR
   PCP
   PSX ±1
   PGO NEXT
   PGO START
NEXT PSY +1
   PGO PRINTMORE
```

After the variable Y has been set, the video monitor will be cleared, the file name will be displayed, and the variable Y is used to indicate which copy is currently being printed.

The PCP command is used to continue the printing of the next copy, and the variable X is decremented. If X is greater than zero, control of the program branches to the routine named NEXT. Otherwise, the program branches back to the start. The routine named NEXT simply increments the Y variable and goes back to the PRINTMORE routine where Y is displayed and the next copy is printed.

Now on to bigger and better routines. For the time being, we'll forget selection number two of the menu, which concerns printing a file with insertions. We need to establish our address file before it can be inserted into our letters.

If selection number three is chosen from the main menu, our WPL program will load and execute the WPL program named WPL2. This program will allow the creation of an address file, allow names to be added and deleted, and will also provide a method to keep the file properly numbered.

Rather than explain each line, many of which you have seen several times before, we will only explain the routines that offer something new or different. So without further delay, here is Program WPL2.

WPL PROGRAM: WPL2 (Part I)

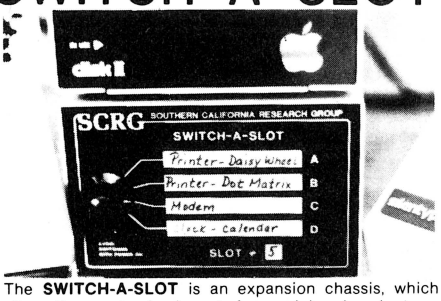
```
START NY
   PND
   PGO MENU
LP1 PPR
   PSZ ±1
   PGO LP1
   PRT
TITLE PPR(CTRL-Backslash)
   PPR       ***** The Address File *****
   PPR
   PPR
   PPR
   PRT
MENU PSR TITLE
   PPR     1 - Create an address file.
   PPR
   PPR     2 - Add a name to the address file.
   PPR
   PPR     3 - Delete a name from the address file.
   PPR
   PPR     4 - Renumber the address file.
   PPR
   PPR     5 - Quit address file, return to WPL menu.
   PPR
   PPR
   PIN     Enter your selection by number (1-5): =$A
   PCS/$A/1/
   PGO CREATE
   PCS/$A/2/
   PGO ADDNAME
   PCS/$A/3/
   PDO .D1/WPL2.1
   PCS/$A/4/
   PDO .D1/WPL2.2
   PCS/$A/5/
   PDO .D1/WPL1
   PGO MENU
CREATE PSR TITLE
   PSZ 8
   PSR LP1
   PIN     Name and location of new file: =$C
   PCS/$C//
   PGO MENU
   PSZ 3
   PSR LP1
   PPR     Creating a new file named: $C
   NY
   B
   F&&±0±(&
   Y?
   S $C
   PGO MENU
```

The routine named LP1 is a general purpose subroutine that will print a specified number of blank lines on the monitor. It is controlled by the variable Z, and operates in a continuous loop until Z is decremented to zero. When this happens, the PGO LP1 instruction is ignored, and the return statement (PRT) is executed.

The routine named MENU displays the options available for this portion of the address book, determines which function is desired, and takes the appropriate action.

SCRG — For Apple][, Apple][+, & Apple //e

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The **SWITCH-A-SLOT** is an expansion chassis, which allows the user to plug in up to four peripheral cards at one time. One of these cards is selected for use, and only that card draws power.

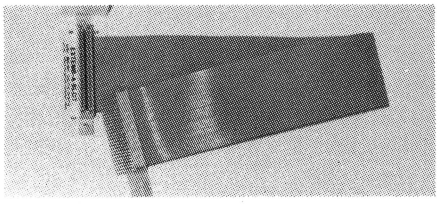
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This hardware product gives the user complete control over all I/O functions in the range $CØØØ through $CØFF.

Examples:

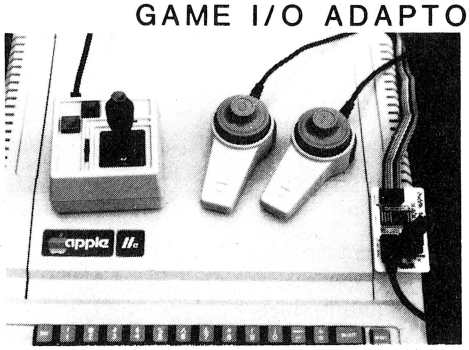
- Switch between TEXT & GRAPHICS
- Switch between Page 1 & Page 2
- Switch between HI-RES & LO-RES
- Turn disk drive ON or OFF
- Select between drives 1 and 2
- Step head in either direction
- Protect or enable language card
- Turn annunciators ON or OFF

D MAnual controller allows all this while programs are running. Commands can be issued (via push-buttons) in the middle of a program, and the desired result occurs immediatly. The process used (known as CYCLE STEALING) allows immediate execution of these commands without interfering with the normal operation of the program. The card is slot independent, and is connected to a control panel by a four foot cable. D MAnual controller is fully described in the book "UNDERSTANDING THE APPLE][" by Jim Sather (copyright 1983 by Quality Software).

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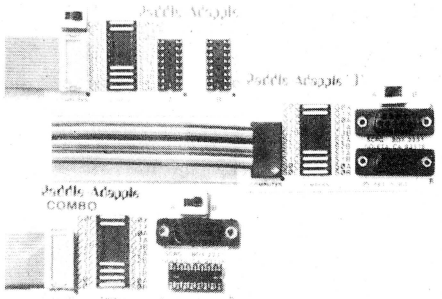
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Now we come to the portion labeled CREATE, which is used to create a new address file. CREATE clears the monitor, prints the title, and sets the variable Z to equal eight.

The subroutine LP1 is called to print eight blank lines, and the name of the new address file is obtained and stored in the variable $C. The file name is checked to see if only the «RETURN» key was pressed, and if so control returns to the menu. If not, three blank lines are printed, and the message indicating the file is being created is displayed.

Now for the actual creation. The text editor memory is cleared with the command NY. The cursor is placed at the first position, and its direction is directed forward by the command B (the inverse arrow of the text editor is pointing to the right of your monitor). This is the same as pressing CONTROL-B from the immediate mode.

THIS IS MOST IMPORTANT: From this point forward, the position and the direction of the cursor will play a key role in the WPL program. We will keep track of how many addresses are contained in our file, all automatically!

Carefully examine the command that reads

```
F&&±0±(&
```

Looks like gibberish, huh? Let's take it apart and find out exactly what it is saying. The first letter is a CONTROL F, which is the find and replace command of Apple Writer. The two ampersands are the delimiters, and are used the same as the virgules (slashes) were used earlier. At this point, Apple Writer is being directed to "find nothing", and prepare to replace it with "–0–" followed by a carriage return (which is symbolized by the left parenthesis). It will immediately do this *without* moving the cursor, since the text editor memory has just been cleared.

When Apple Writer finds the first occurrence of "nothing", it will stop and ask if it should replace the "nothing" with the "–0–" followed by a carriage return. We tell it that this should happen by providing a "Y" in our next program line.

As soon as the "Y" is encountered, the replacement occurs. Just like operation in the immediate mode, if any key other than the «RETURN» key is pressed, the search and replace will terminate. This is exactly what we wish to have happen, so we provide a question mark.

If all has gone well, the text editor memory will have a hyphen followed by a zero, followed by another hyphen and a carriage return. This entire file (only one line) will then be saved (the S command) with the name contained in the variable $C. Your file has now been created, saved on disk, and contains no entries.

Now that we have our address file created, let's take the big plunge and see how names are added to the file. This is accomplished by choosing selection two of the menu, which transfers program control to the routine named ADDNAME.

WPL PROGRAM: WPL2 (Part II)

```
ADDNAME PSR TITLE
   NY
   PSZ 8
   PSR LP1
   PIN     Name of file to work with: =$D
   PSR TITLE
   L $D
   B
   F<<@@@$D%%><
   Y?
   B
   PLS#!-!-!N =$C
   PSX $C
```

The monitor is cleared, the title is displayed, and the name of the file is requested. The file name is placed in the variable $D, and the file is loaded into memory. The cursor is placed at the beginning of the file, and its direction is set forward. And here comes more gibberish.

The find and replace command is used to insert the name of the file into the text editor, on the first line. It's necessary to include a unique arrangement so we will be able to find our file name later on.

For this arrangement, we will precede the file name with "@@@" and follow it with "%%" plus a carriage return. To accomplish this, we'll use a different set of delimiters, the left pointing braces or greater/less than symbols.

Analyzing the command, it reads "find nothing" and prepare to replace it with "@@@" plus the name contained in the variable $D, plus "%%", followed by a carriage return (for which the "}" is a stand-in). The next line of the program will cause the actual replacement and terminate the search (Y?).

Now that we have the file name safely stored, we have to determine what the next address number should be. The first step is to again position the cursor at the beginning of the file, and insure its direction is pointing forward.

To accomplish this, we will use a two step approach. First, we'll load the variable $C with the current number of addresses in the file, then assign it to X.

Notice the statement that reads

```
PLS#!-!-!N =$C
```

Breaking it down, this statement says to load the string (PLS) from memory (#) with whatever lies between the first and second hyphens (!–!–!), and *do not* include the hyphens (N). Assign this to the variable $C.

If you will remember, when we created the address file, we inserted "–0–" into the first position in the text editor memory. This statement will retrieve the zero (assuming this is the first entry) from the text editor memory. And once we have it in $C, it's easy to assign it to the variable X, which is done in the next statement.

To refresh our memories, we now have the file name inserted as a portion of the text editor, and the number of addresses in the file is contained in the variable X.

WPL PROGRAM: WPL2 (Part III)

```
LP2  PSR TITLE
   PSZ 6
   PSR LP1
   PIN     Name          : =$A
   PPR
   PIN     Company       : =$B
   PPR
   PIN     Address       : =$C
   PPR
```

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MY NAME _____

Address _____

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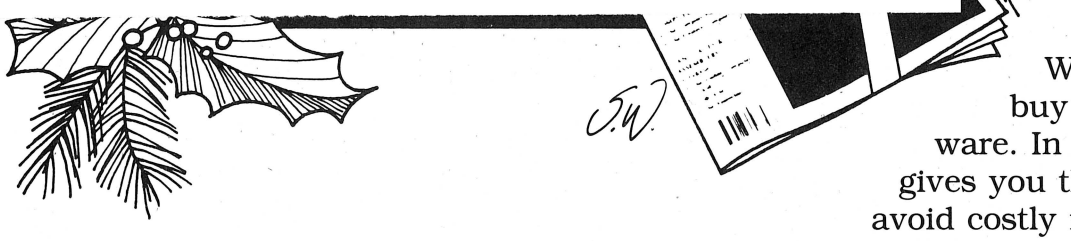
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Now we come to the portion labe
used to create a new address file. CI
itor, prints the title, and sets the va

The subroutine LP1 is called to pri
the name of the new address file is ob
variable $C. The file name is chec
«RETURN» key was pressed, and if
menu. If not, three blank lines are p
indicating the file is being created i

Now for the actual creation. The
cleared with the command NY. The
first position, and its direction is dire
mand B (the inverse arrow of the tex
right of your monitor). This is
CONTROL-B from the immediate m

THIS IS MOST IMPORTANT: Fron
position and the direction of the curs
the WPL program. We will keep trac
are contained in our file, all automa

Carefully examine the command

```
F&&±0±(&
```

Looks like gibberish, huh? Let's t
exactly what it is saying. The first
which is the find and replace comm
two ampersands are the delimiters,
the virgules (slashes) were used ea
Writer is being directed to "find n
replace it with "–0–" followed by a
symbolized by the left parenthesis
this *without* moving the cursor, sinc
has just been cleared.

When Apple Writer finds the first
it will stop and ask if it should repla
"–0–" followed by a carriage return.
happen by providing a "Y" in our

As soon as the "Y" is encountered
Just like operation in the immedia
than the «RETURN» key is presse
will terminate. This is exactly what we wish to have happen, so we provide a question mark.

If all has gone well, the text editor memory will have a hyphen followed by a zero, followed by another hyphen and a carriage return. This entire file (only one line) will then be saved (the S command) with the name contained in the variable $C. Your file has now been created, saved on disk, and contains no entries.

Now that we have our address file created, let's take the big plunge and see how names are added to the file. This is accomplished by choosing selection two of the menu, which transfers program control to the routine named ADDNAME.

WPL PROGRAM: WPL2 (Part II)

```
ADDNAME PSR TITLE
   NY
   PSZ 8
   PSR LP1
   PIN     Name of file to work with: =$D
   PSR TITLE
```

If you will remember, when we created the address file, we inserted "–0–" into the first position in the text editor memory. This statement will retrieve the zero (assuming this is the first entry) from the text editor memory. And once we have it in $C, it's easy to assign it to the variable X, which is done in the next statement.

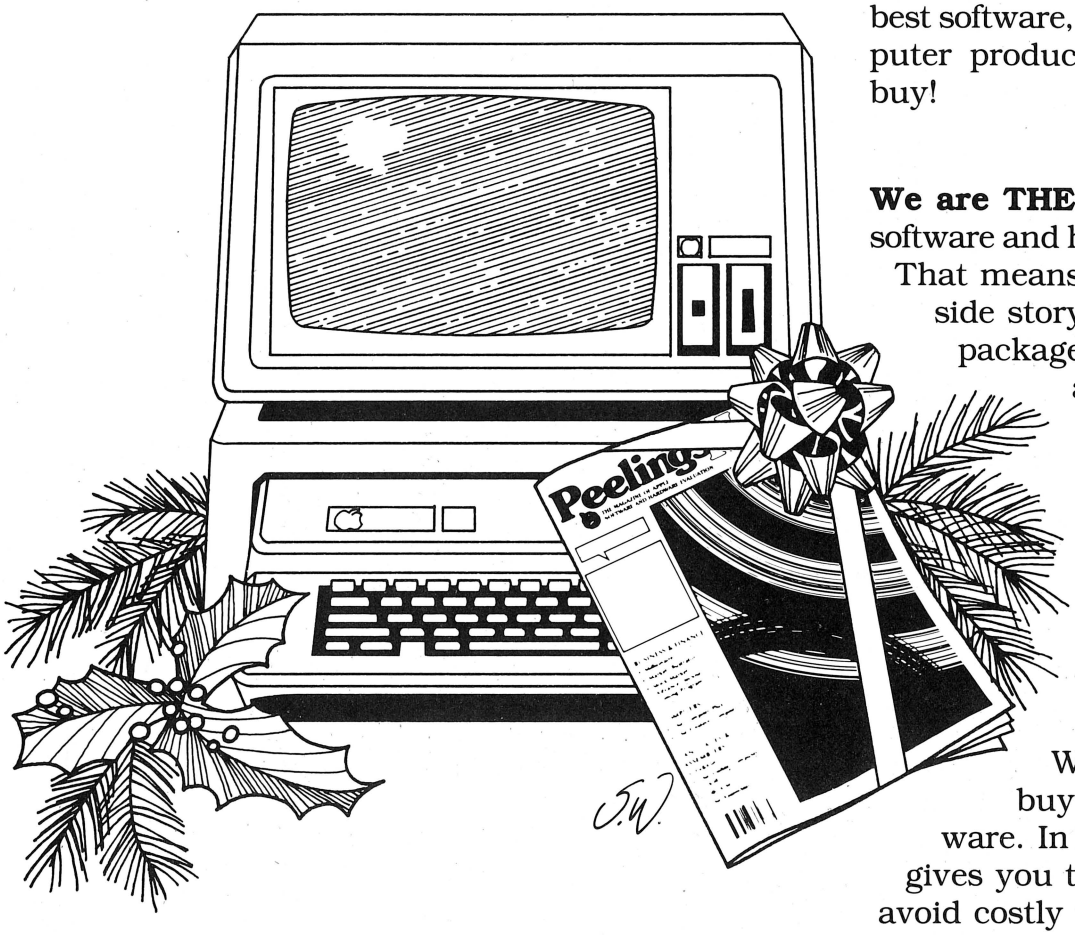
To refresh our memories, we now have the file name inserted as a portion of the text editor, and the number of addresses in the file is contained in the variable X.

WPL PROGRAM: WPL2 (Part III)

```
LP2  PSR TITLE
   PSZ 6
   PSR LP1
   PIN     Name        : =$A
   PPR
   PIN     Company     : =$B
   PPR
   PIN     Address     : =$C
   PPR
```

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Circle HelpCard No. 69

```
PIN     City, State, Zip: =$D
PPR
PPR
PPR
E
D
PSX +1
F##<(X)>%#
Y?
F##@1@$A%#
Y?
F##@2@$B%#
Y?
F##@3@$C%#
Y?
F##@4@$D%#
Y?
PPR
PIN     Add another name to the file ('Y' or 'N'): =$D
PCS/$D/Y/
PGO LP2
PCS/$D/y/
PGO LP2
PSR TITLE
PSZ 4
PSR LP1
```

The portion of the program beginning at the label LP2 is where the actual information about the address is obtained. One item at the time, each item is assigned to $A, $B, $C, and $D respectively. Since all of the string variables are used, you can now see why it was necessary to place the file name into the text editor memory.

After the address information is contained in the string variables, we must place it into the text editor memory, so it will become an integral part of the file.

The first step is to position the cursor at the end of the file. This is done with the command "E". When this command is used, the cursor is placed at the end of the file and its direction is pointing backwards (to the left). The direction of the cursor is changed by using the "D" command, causing it to point forwards (to the right).

Since we are adding a record, the variable X is incremented by one. The find and replace command is used to establish a record number, and translated into English reads: Find nothing (F# #) and prepare to replace it with a left pointing brace, followed by the number contained in the variable X "(X)", followed by a right pointing brace, followed by a carriage return (denoted by the % symbol). The next line (Y?) completes the replacement and terminates the search.

In a similar manner, the information contained in each of the string variables is placed on one line of the text editor. Each line of information is called a "field" and is assigned a field identifier ("@1@", "@2@", etc.). Thus, after the last field has be inserted into the text editor memory, a typical address (say address number 23) would appear as:

```
<23>
@1@Joe Blow
@2@The Widget Company
@3@123 Oak Street
@4@Chicago, IL 60611
```

This provides a unique method to locate any field in any record. In this way, some or all of the information can be accessed to be inserted into the appropriate portion of a letter, as we shall see.

The next action taken by our WPL program is to find out if any more names will be added at this time. The response is compared with both and upper case and lower case "Y", and if valid branches back to the start of LP2.

WPL PROGRAM: WPL2 (Part IV)

```
SAVEIT PPR      Saving new additions to the file . . . . .
   B
   PLS#!@@@!%%!N =$D
   B
   F&@@@ ' %%(&&
   Y?
   B
   F#-$-#-(X)-#
   Y?
   B
   S $D
   P
   NY
   PGO MENU
```

More than just the new names are saved. In reality, the entire file is saved on disk, replacing the old one. Before the file can be saved, the file name must first be retrieved.

This is accomplished by using the PLS command to extract the file name from the text editor, without assigning the delimiters. When this is completed, the portion of the text editor where the file name was is erased.

Translated, the command

```
F&@@@'%%(&&
```

means find the portion of the text editor that begins with "@@@", and is followed by any length and type of characters ('), followed by "%%" and a carriage return, and prepare to replace it with nothing.

After this is accomplished, the cursor is placed at the beginning of the file, and the old number of addresses (with the format of "–0–") is replaced with the current value of X. The command that accomplishes this:

```
F#-$-#-(X)-#
```

means find a hyphen followed by any length of characters, followed by another hyphen, and replace it with a hyphen followed by the value contained in X, followed by another hyphen.

The entire file is then saved on the disk under the name that is contained in $D, memory is erased, and the program returns to the menu.

You now can insert names into our Address Book, save them to a file, and print a letter without insertions ("Dear Mr. Orchard:") In our next article, we'll cover name deletion, file renumbering, and more. As I said above, we'd like to have your questions and comments.

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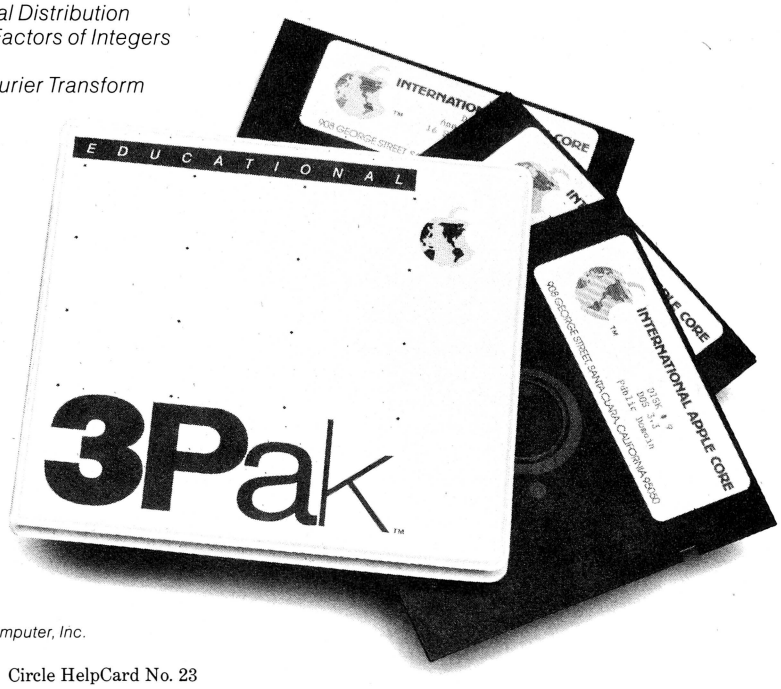
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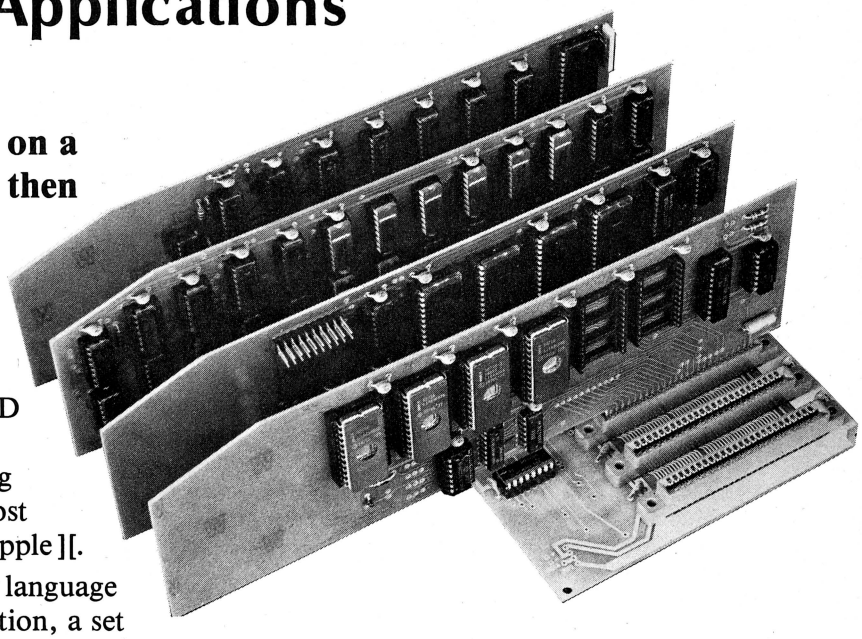
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For people who play piano, guitar, synthesizer, or similar instruments, these machines are powerful tools that can be used to perform many functions, ranging from supplying rhythm tracks for song demos to playing finished drum parts on pop and rock albums. As one might imagine, these digital marvels are not cheap. They're all in the $1,000 range. They are definitely toys for big girls and boys. The E-mu Systems' Drumulator is the least expensive of all of them. The Graphic Rhythm Composer program for the Apple II is designed to extend the capabilities of the Drumulator by allowing you to display rhythm patterns graphically, store songs and patterns on floppy disks, expanding memory capacity.

The Drumulator itself has 12 drum sounds (in two groups of six) stored in ROM: a drum group with bass drum, snare, rim shot, high tom-tom, mid tom-tom, low tom-tom; and a percussion group consisting of claves, cowbell, claps, open hihat, closed hihat, and ride cymbal. You can record up to 36 patterns into solid-state memory. The patterns can consist of any combination of the 12 drum sounds played in any time signature. These rhythm patterns are called segments, and it's possible to record segments that are 99 measures long.

It's possible to group or chain segments together to form songs. The Drumulator's internal memory will hold up to eight song chains. Other little tricks you can do with the machine include programming the dynamics of each drum to vary the overall mix of the drums, insert, delete, and correct segments, and add infinite repeats where required. It is this type of function the Graphic Rhythm Composer (GRC) program is designed to enhance and extend.

The GRC is intended for use with an Apple II, 48K minimum, 64K preferred. The Drumulator interfaces with the Apple via an RS-232 card. The software for the RS-232 is already built into the Drumulator's cassette interface input jack. The GRC is designed to take over the front panel functions of the Drumulator after you've pressed a series of buttons, making the Drumulator appear to have gone dead.

The Apple's monitor will display measures or songs, depending on what mode you've got the GRC in. In measure display mode, it's possible to set the resolution of each line individually. What this means is that the system can be set to correct badly played parts (which are displayed on the screen), and the resolution can be set differently for each line within any given pattern. Resolution itself is set up so that you can only adjust an overall autocorrecting feature, resolv-

ing badly played parts to the same degree (1/8 notes, 1/8-note triplets, 1/16 notes, 1/16-note triplets, 1/32 notes, 1/32-note triplets).

A joystick controller moves a cursor around on the screen. Pressing a button on the joystick will add or delete notes depending on if one was present to begin with or not. The volume of each note is also adjustable over a 0 to 15 range. The dynamics of each note are displayed as varying stem lengths. The longer the stem, the louder the note. Individual dynamics for every note is a very powerful feature that many drum machines (including the un-GRC-extended Drumulator) lack. This function alone makes the program worth its weight in gold for anyone who already owns an Apple II and a Drumulator.

A scroll mode allows you to "turn" through each individual measure, stopping at any point to listen and/or correct a part. That is a very useful editing feature.

Song mode lets you chain the measures that were written in the measure display mode. Why not just chain measures together in the measure display mode to form a song? It's much more economical on available memory space to have a separate song writing/chaining portion of the program, because songs often repeat rhythms, sections, and fills. Repeats would eat up memory space much too fast, so the song portion of the program is used to link measures from the measure "library," thus saving a lot of space. Songs and up to 1,000 measures can be stored on a minifloppy, greatly expanding on the 36 segments and 8 songs that can be stored in the Drumulator's own internal memory.



The Graphic Rhythm Composer software carries a tentative list price of $195.00. If you already own a Drumulator and an Apple II with 48K or 64K memory, don't pass the GRC up. It opens up a whole range of possibilities that are well worth the price. If you're serious about your music and are looking for ways to extend your musical vocabulary, you owe it to yourself to check out a digital drum machine. The Drumulator is as good a place to start as any.

Dominic Milano is a musician and Assistant Editor at Keyboard Magazine.

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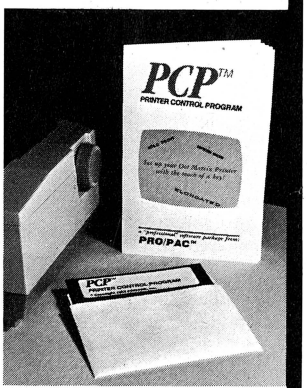
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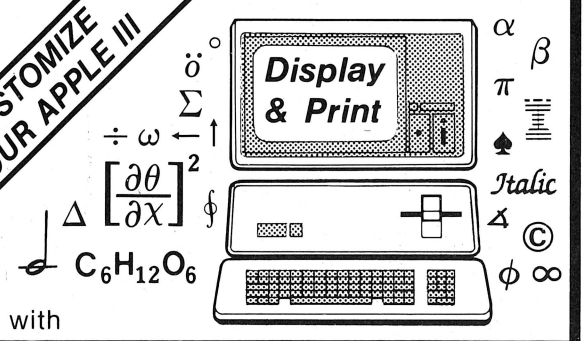
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Portfolio

Review by Morgan P. Caffrey

Distributed by
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With gleeful pounces I used to demand my rents as some hapless player would land on my property, peopled with houses and sometimes hotels. I got rich and went broke with equal calm, or lack of it. This new game, Portfolio, brings equal involvement without the glee (maybe I'm getting older), but with a studied method and depth of information I never even guessed at while playing the older, more famous game.

Portfolio is a game, but survival depends less on the throw of the dice than on understanding the probable effect of rumors, the merciless march of the ticker tape and an ability to interpret the meaning of change. Also, as in all things, it doesn't hurt to have the luck.

Unlike the unmentionable predecessor, which could be depended upon to end sometime during a rainy afternoon, Portfolio takes time. As yet we have not "finished" a full game. Each turn takes a long time, as you inquire of the ticker-tape, analyze rumors, and sometimes are gifted with a news-flash. Once in each turn, you are subject to the whims of an electronic die which moves your piece along a singularly dull playing board to an event which provides opportunity or trouble. The author suggests that 10 minutes is overlong on each turn. Real life presents no optimum time to make decisions and yet here you may ponder the meaning of the various "oracles" for as long as you like before making a decision. Of course if you're playing with more than one player (up to four are allowed) the other players will grow restless if you take too long.

The game presents the following scenario. As each game starts you and your co-players are investment managers about to go to work for any one of 15 companies. Your goal, naturally enough, is to increase your personal wealth, which can best be done by increasing the worth of your company, although there are ways to do this without necessarily benefitting your company.

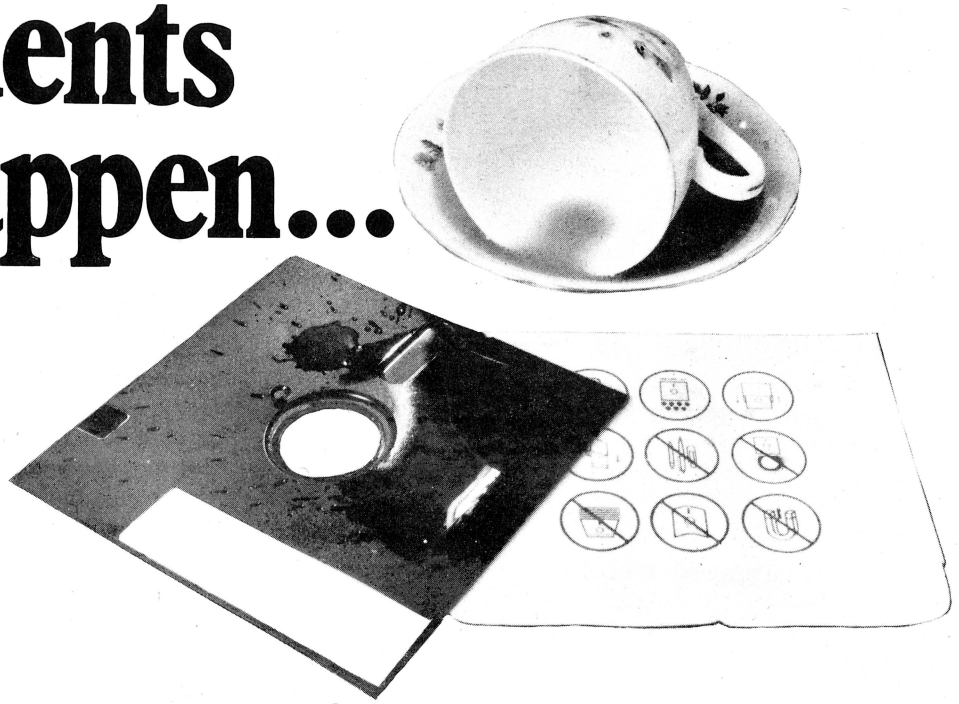
You must select the company to work for and negotiate terms of employment which include an initial retainer, monthly salary and a half-year bonus which pays commensurate with the fiscal health of the company at each half-year mark. Each player must work for a different company and thus, in effect, compete. The buys and sells of each player, along with a healthy surrounding economy are reflected in a ticker tape. The computer throws the dice, the eight balls and generates rumors, news flashes and generally is out of control but with a rather steady pattern.

When you have selected a company and negotiated your terms (unacceptable terms are rejected, politely, and negotiations continue until you have reached an agreement) you are allowed to select economic factors which you will work for in your spare time (month-end days given up at the end of a turn). The effect of your spare time activities increase as your company and personal holdings increase to the point where some companies are subsidiaries of your company. This is because your personal reputation increases as your success becomes apparent.

Everyone starts the game with approximately $10,000,000 divided between cash and and a portfolio of stocks in the 15 companies which comprise this mini-economy. This is in addition to whatever personal capital you managed to acquire during the initial position negotiations. All of a sudden that retainer takes on additional significance.

Each turn is a 20-day work month. In each month you must advance on the board at least once and deal with whatever occurs from that event. You may also buy and sell (but each purchase and sale uses days), review information (which again uses precious time), print (to a printer or video screen)

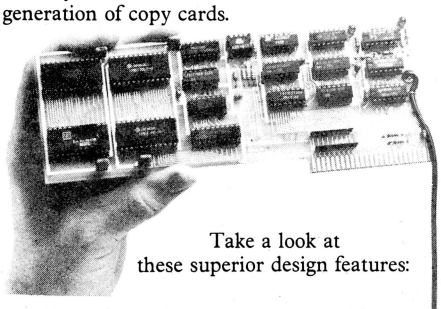
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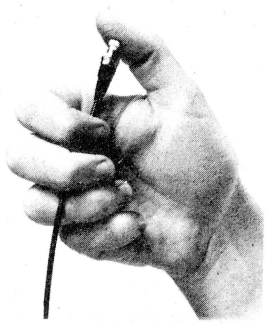
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At the end of each turn (you select when to end, donating remaining days to further economic factors favorable to your company, you hope), you are presented with a synopsis of your accrued interest, brokerage and research fees incurred during the month. At the beginning of the next month you will receive any market forecast information requested during the previous month.

Sometimes while playing, boredom sets in or the phone rings. When this happens, save the game and return to it later (playing for half an hour each evening seemed to suit our needs). Or start another game, or try again from the beginning with the same circumstances and see how a different set of responses will alter your fortunes.

There is nothing simple about the game; I lose money consistently. However, I have begun to more clearly see the relationship among various factors that affect the marketplace. That in itself recommends the game somewhat. The instruction manual makes it clear that as time goes on you may expect to spend less time evaluating information as you begin to analyze information on a more intuitive basis.

The various screen menus are easy to use. I would make a change in the two main menus because in one case the choice is made by moving the cursor from the bottom of the screen and in another, easier menu the selection is by the numbers. I like a uniform selection method within any one software piece.

There isn't much collective information about market activity. The players are expected to analyze rumors and the ticker tape for the majority of decisions without viewing the activity in a broader context. Almost unforgiveable in the Apple environment, Portfolio makes no use of Apple's high resolution graphics to plot market trends.

The documentation includes an instruction manual which is lucid and informative. It contains a skimpy table of contents and no index which makes it almost useless for a quick reference. Over the long term the purpose of the Portfolio piece may mean that the knowledge is important and quick-references won't help much, but I like indexes and object to their absence. Further there is no glossary and not a single reference to other sources of information which might help the player to make progress in understanding the game and the real market.

A secondary document is an Investment Guide which provides, uncommented, information about the ratings of each company and the effect of various economic factors on the rating for that company over several years. I found the information somewhat perplexing, but again this may fade over time.

On the whole I enjoy the game, have learned a good deal from it, and would recommend it to purposeful adults who want to learn about the investment market. I doubt very much that children would take much interest for very long but I might be surprised about that too.

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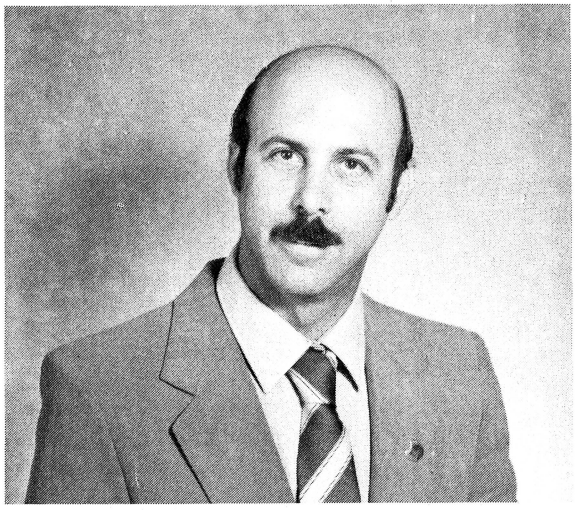
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From the IAC Office . . .

Ken Silverman, Executive Director



In the November issue I talked about the availability of "public domain" software from the International Apple Core. In this issue you will see the first ad dealing with type of software - EDUCATION 3Pak.

In this issue you will see two other ads from the IAC, one dealing with a new high-speed, simple to use, machine-language data base which allows instantaneous calculation and tabulation of competitors, events and results of your favorite sports. SPORTSBOARD provides for the entry of up to 200 competitors, 90 events and scores of up to 249 for each individual event. Just the software to keep track of the upcoming Olympics. It was written for the IAC by Roger Keating.

Rogers has written a great deal of the strategy war games now on the market and is from Australia. The other ad is for IACcalc - a new spreadsheet for your Apple II, II+, or //e. This spreadsheet will let //e owners make use of the Apple 80 column card for a fuller display. A great deal more information is in the ads - please take a look.

One other item for officers of user groups - the IAC now publishes a monthly newsletter called the IAC Express. It's contents deal with club management, helpful ways of improving cash flow, and items to help a group grow. If you are an officer of an IAC group and wish a copy sent to you please write and let us know.

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Region	Area
1	CA zips 94100 & up, WA, OR, NV, HI, AK, & American Samoa
2	Southern California, zips 93999 & lower
3	AZ, MN, TX, OK, AR, MO, LA, MS, TN
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5	WI, IL, MI, IN, KY
6	PA, NJ, FL
7	ME, CT, MA, NH, RI, VT, NY, DC
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7. The owner is International Apple Core, Inc., a non-profit California corporation. There are no stockholders. Mailing address is 908 George Street, Santa Clara, CA 95050.
8. Bondholders, mortgagees, and other security holders: none.
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10. Circulation	Average number of copies of each issue during preceding 12 months	Actual number of copies of single issue published nearest to filing date
A. Total number of copies printed (net press run)	34992	51000
B. Paid Circulation		
1. Sales through Dealers and Carriers,street vendors and counter sales.	21404	27049
2. Mail subscription	7472	8225
C. Total Paid Circulation	28876	35274
D. Free distribution by mail, carrier, or other means. complimentary and other free copies	3941	11471
E. Total Distribution	32817	46745
F. Copies not distributed		
1. Office use, left over, unaccounted, spoiled after printing	2175	4255
2. Returns from news agents	---	---
G. Total	34992	51000

I certify that the statements made by me above are correct and complete.
Peter C. Weiglin, Publisher

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APPLE ORCHARD DECEMBER 1983 EXPIRES MARCH 1, 1984

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   - ☐News Stand
   - ☐Borrowed
   - ☐Subscription
   - ☐Book Store
   - ☐School
2. **I personally use most:**
   - ☐Apple II/II Plus
   - ☐Apple / / /
   - ☐Apple Workalike
   - ☐Apple / /e
   - ☐Lisa
   - ☐IBM PC or workalike
   - ☐Don't own yet
   - ☐Other
3. **I have owned a microcomputer since**
   - ☐before 1977
   - ☐1977
   - ☐1978
   - ☐1979
   - ☐1980
   - ☐1981
   - ☐1982
   - ☐1983
   - ☐not yet
4. **I use my computer primarily for**
   - ☐Home
   - ☐My Business
   - ☐Hobby
   - ☐Education
   - ☐Other
5. **I use my computer primarily with**
   - ☐Word Processor
   - ☐Business Software
   - ☐Modem
   - ☐Graphics
   - ☐Electronic Spreadsheet
   - ☐Data Base
   - ☐Games
   - ☐Control of other Devices
6. **I spent on software in the past 12 months:**
   - ☐less than $100
   - ☐$100 – $300
   - ☐$300 – $600
   - ☐$600 – $1,000
   - ☐More than $1,000
7. **Regarding User Groups:**
   - ☐I belong to a local group
   - ☐I'm active in a User Group
   - ☐I have never belonged to a local group
   - ☐I used to belong to a local group, but don't now
8. **My vote for the best article in this issue is**
   .....
9. **My vote for the best ad in this issue is (Reader Service) number**.....

Check each advertisement for corresponding number and circle below:

001	041	081	121	161	201	241
002	042	082	122	162	202	242
003	043	083	123	163	203	243
004	044	084	124	164	204	244
005	045	085	125	165	205	245
006	046	086	126	166	206	246
007	047	087	127	167	207	247
008	048	088	128	168	208	248
009	049	089	129	169	209	249
010	050	090	130	170	210	250
011	051	091	131	171	211	251
012	052	092	132	172	212	252
013	053	093	133	173	213	253
014	054	094	134	174	214	254
015	055	095	135	175	215	255
016	056	096	136	176	216	256
017	057	097	137	177	217	257
018	058	098	138	178	218	258
019	059	099	139	179	219	259
020	060	100	140	180	220	360
021	061	101	141	181	221	361
022	062	102	142	182	222	362
023	063	103	143	183	223	363
024	064	104	144	184	224	364
025	065	105	145	185	225	365
026	066	106	146	186	226	366
027	067	107	147	187	227	367
028	068	108	148	188	228	368
029	069	109	149	189	229	369
030	070	110	150	190	230	360
031	071	111	151	191	231	361
032	072	112	152	192	232	362
033	073	113	153	193	233	363
034	074	114	154	194	234	364
035	075	115	155	195	235	365
036	076	116	156	196	236	366
037	077	117	157	197	237	367
038	078	118	158	198	238	997
039	079	119	159	199	239	998
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Name _____ **Title** _____

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Address _____

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   - C. ☐ News Stand
   - D. ☐ Borrowed
   - E. ☐ Subscription
   - F. ☐ Book Store
   - G. ☐ School
2. **I personally use most:**
   - A. ☐ Apple II/II Plus
   - B. ☐ Apple / / /
   - C. ☐ Apple Workalike
   - D. ☐ Apple / /e
   - E. ☐ Lisa
   - F. ☐ IBM PC or workalike
   - G. ☐ Don't own yet
   - H. ☐ Other
3. **I have owned a microcomputer since**
   - A. ☐ before 1977
   - F. ☐ 1977
   - B. ☐ 1978
   - G. ☐ 1979
   - C. ☐ 1980
   - H. ☐ 1981
   - D. ☐ 1982
   - I. ☐ 1983
   - E. ☐ not yet
4. **I use my computer primarily for**
   - A. ☐ Home
   - B. ☐ My Business
   - C. ☐ Hobby
   - D. ☐ Education
   - E. ☐ Other
5. **I use my computer primarily with**
   - A. ☐ Word Processor
   - B. ☐ Business Software
   - C. ☐ Modem
   - D. ☐ Graphics
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   - F. ☐ Data Base
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System Saver® didn't become the Apple's® number one selling peripheral by being just a fan.*

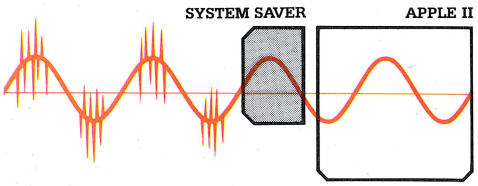
What made over 100,000 Apple owners fall in love with System Saver? The answer is simple. It's the most versatile, most convenient, most useful peripheral ever made for the Apple.

System Saver filters out damaging AC line noise and power surges.

70-90% of all microcomputer malfunctions can be traced to power line problems** Problems your System Saver guards against.

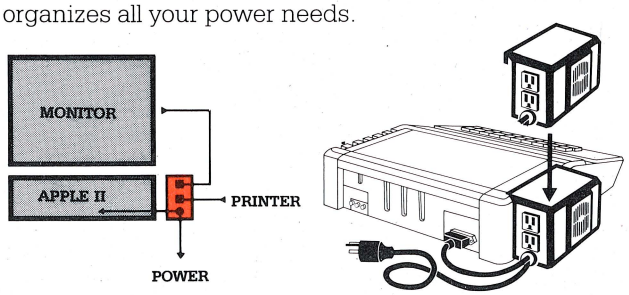
Power line noise can often be interpreted as data. This confuses your computer and produces system errors. Power surges and spikes can cause severe damage to your Apple's delicate circuitry and lead to costly servicing.

System Saver clips surges and spikes at a 130 Volts RMS/175 Volts dc level. A PI type filter attenuates common and transverse mode noise by a minimum of 30 dB from 600 kHz to 20 mHz with a maximum attenuation of 50 dB. You end up with an Apple that's more accurate, more efficient and more reliable.



System Saver makes your Apple more convenient to use.

No more reaching around to the back of your Apple to turn it on. No more fumbling for outlets and cords to plug in your monitor and printer. System Saver organizes all your power needs.

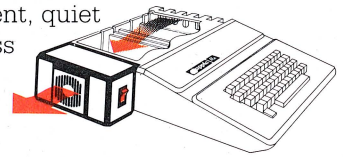


It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

System Saver lets your Apple keep its cool.

Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

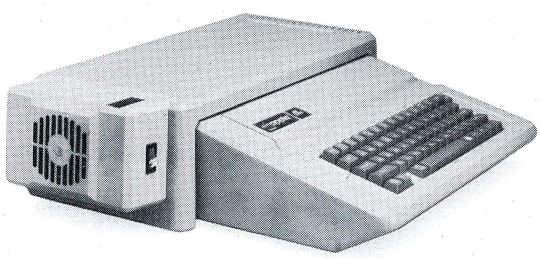
System Saver's efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots. Leaving your Apple cool, calm and running at top speed.





So if you want to keep damaging heat, line noise and power surges out of your system for good, pick up the only peripheral that's in use every second your computer is in use. The System Saver. You'll soon come to think of it as the piece Apple forgot.

Compatible with Apple stand



$89.95 at Apple dealers everywhere.

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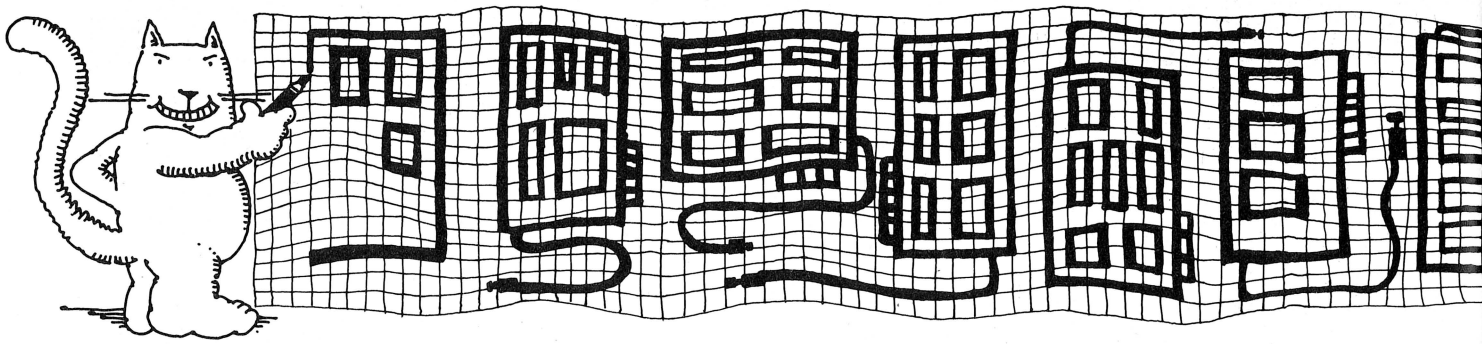
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919 Third Avenue, New York, NY 10022
(212) 486-7707 Telex: 236200 KEN UR

*Softsel Computer Products Hot List. **PC Magazine: March 1983.

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Available in 220/240 Volts, 50/60 Hz.

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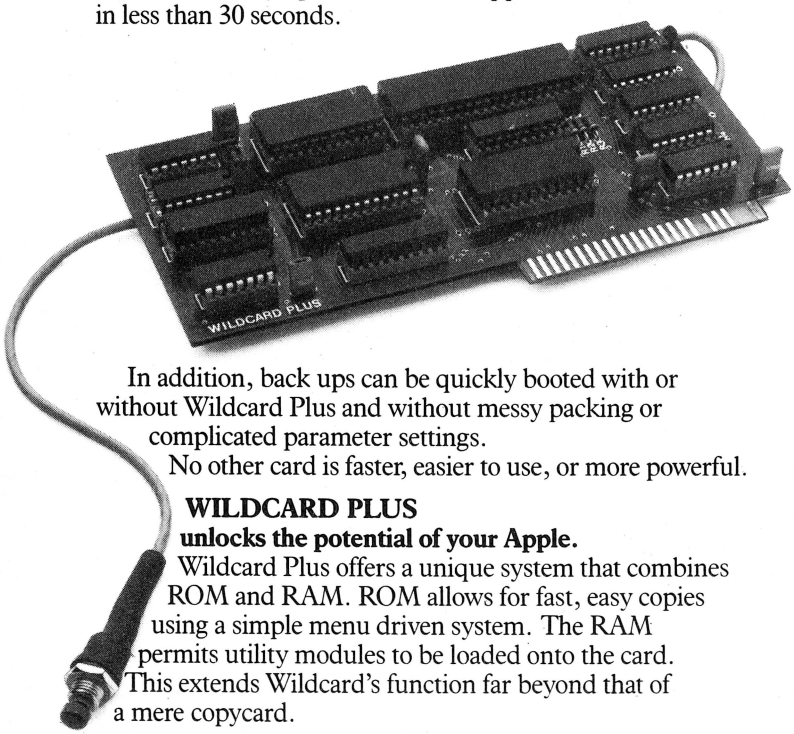
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Manufacturers protect their software.
WILDCARD PLUS protects yours.

You have invested a lot of money in software for your Apple® Wildcard Plus makes sure that this investment is protected by making invaluable archival copies.

Rather than copying disks track by track, Wildcard Plus copies your total load programs right from the computer's memory. This creates an accurate and undetectable copy of the original program.

Now you can back up twice as much in half the time. Because Wildcard Plus doesn't stop at 48K or even 64K, but copies all the way up to 128K on an Apple® IIe. And does it in less than 30 seconds.



In addition, back ups can be quickly booted with or without Wildcard Plus and without messy packing or complicated parameter settings.

No other card is faster, easier to use, or more powerful.

WILDCARD PLUS
unlocks the potential of your Apple.

Wildcard Plus offers a unique system that combines ROM and RAM. ROM allows for fast, easy copies using a simple menu driven system. The RAM permits utility modules to be loaded onto the card. This extends Wildcard's function far beyond that of a mere copycard.

WILDCARD PLUS.
A name that speaks for itself.

Wildcard is the name that stands for uncompromising quality. Which is not surprising when you consider that Wildcard is the runaway leader in the field.

Others compare themselves to the Wildcard, some even copy us. But other copycards can't match the Wildcard's capabilities and reputation.

When you're looking for a copycard you can rely on, look to Wildcard and Wildcard Plus. They are the back up cards that stack the deck in your favor.

Wildcard Plus is available for $189.95. Wildcard for $139.95. Order by phone, (212) 355-2860 or complete the coupon below and send your check, money order, Visa or Mastercard No. to East Side Software Co., 344 E. 63 Street, Suite 14-A, New York City 10021. Dealer inquiries welcome.

Please send _____ **WILDCARD PLUS(S), $189.95 each. Total** _____
Please send _____ **WILDCARD(S), $139.95 each. Total** _____
Include $4.00 for shipping and handling. Outside continental U.S. add $10.00 for shipping and handling. New York State residents add applicable sales tax.
☐ Check enclosed ☐ Visa ☐ Master card

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Name on Card

Name

Address (UPS delivery)

City State Zip Phone

East Side Software Co.
344 E. 63 Street, Suite 14-A
New York, NY 10021

WILDCARD PLUS

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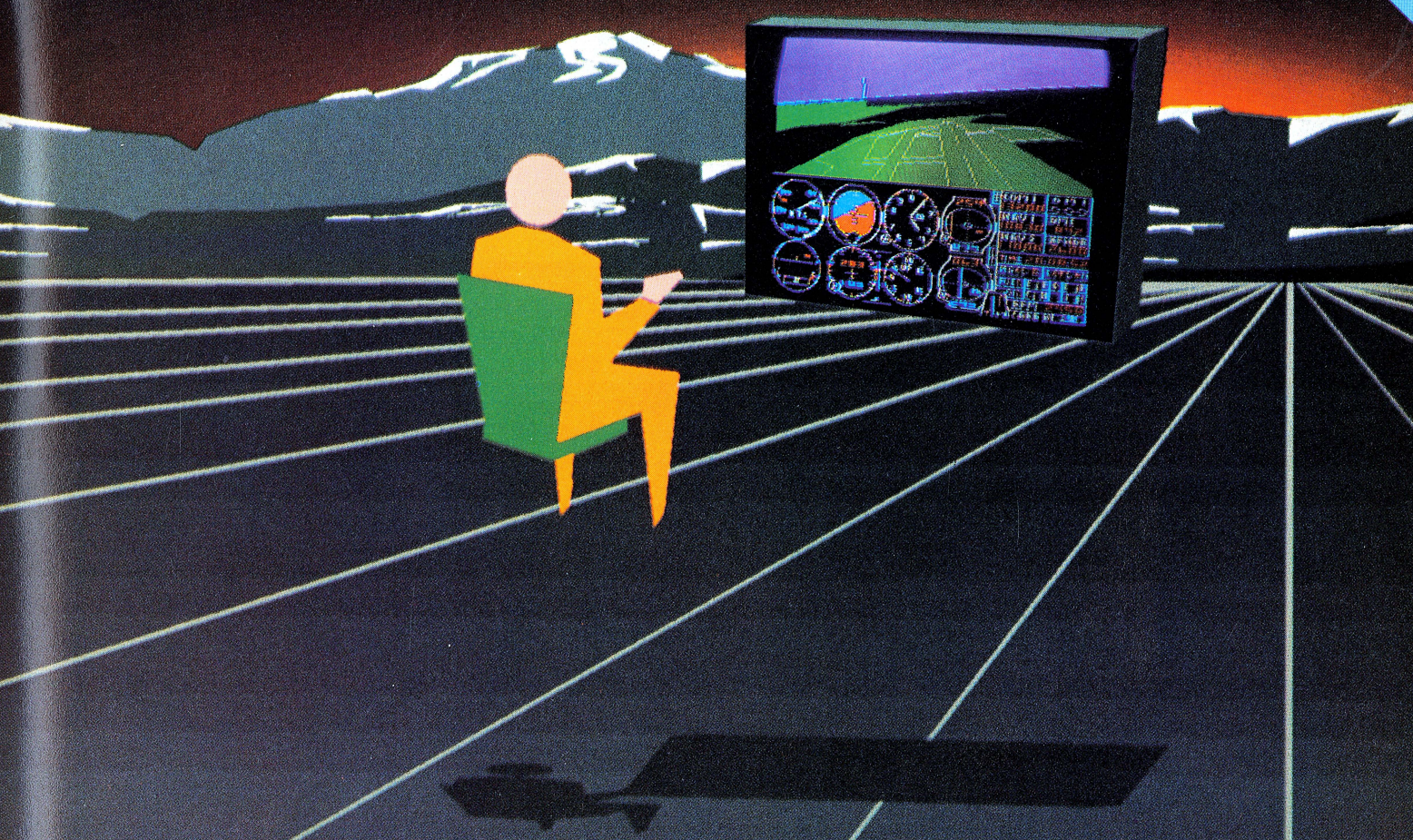
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Flight Simulator II

For Apple II, Apple II+, & Apple IIe



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InfoWorld September 5, 1983

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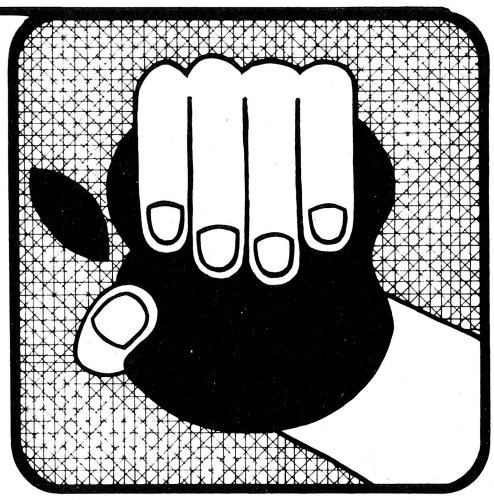
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Circle HelpCard No. 71

The New Stuff



New Products For The Apple

Edited by
Mark L. Crosby

Watch for STOCKING STUFFERS, "Easy-on-the-budget" gift ideas for your favorite computerist! These suggestions are marked on the following pages by Christmas emblems.

Producers of products for Apple Computers should send news releases two months in advance:

NEW PRODUCTS EDITOR
Apple Orchard
908 George St.
Santa Clara, CA 95050

The IAC cannot be held responsible for claims made by manufacturers.

The most comprehensive listing and description of new temptations, delicacies, and necessities for your Apple. Notice too that we've made it even easier for you to find out more about these items; just circle the corresponding number on the Apple Orchard Direct Help Card a bit farther ahead in this issue. We'll forward the requests directly to the manufacturer.

Contents

HARDWARE
- **Interface Cards**
- **Input/Output**
- **Disk Storage**
- **Modems**
- **Printers/Plotters**
- **Memory**
- **Miscellaneous**

SOFTWARE
- **Business (General)**
- **Communications**
- **Educational**
- **Financial**
- **Games/Simulations**
- **Graphics**
- **Languages (Programming)**
- **Personal**
- **Utilities**
- **Word Processing**

BOOKS/CATALOG
MISCELLANEOUS

HARDWARE

Disk Storage

Floppy Disk Services designs complete packages to give you the system capacity you're looking for and the dependability you need. They offer add-on drives for Apple and most other microcomputers. Apple II add on drives are just $275.00. They also carry an 8 inch controller and a dual 8 inch system with controller for the Apple. Also available are half-high 5.25 inch and 8 inch systems and the new Shugart Thinline Dual 8 Inch Drive (Model SA-860). It's a double-density drive, with dual head for a storage capacity of 1.25 megabytes per drive. Includes custom cabinets, fully assembled and tested. For a free catalogue of disk drives and peripherals, call or write.
Circle HelpCard No. 101
Floppy Disk Services, Inc.
741 Alexander Road
Princeton, NJ 08540
(800) 223-0306; (609) 799-4440 (NJ)

Mountain Computer, Inc. has produced the first **hard disk system for the Apple** /// capable of running both Apple /// and Apple II software. It is the most versatile and highest capacity (at 20 MB) Apple /// hard disk system available. It permits users to enter and maintain files in either mode without additional patching. The Apple /// system also accepts both Apple SOS and CP/M software. Available in four storage capacities - 5 ($1,995), 10 ($2,495), 15 ($2,995) and 20MB ($3,495) - the Apple /// Hard Disk System can deliver four times the storage of the ProFile. Features four user-visible partitions which act as user-definable volumes on each disk.
Circle HelpCard No. 102
Mountain Computer, Inc.
300 El Pueblo Road
Scotts Valley, CA 95066
(408) 438-6650

The **Infax 101A** disk drive subsystem has been designed specifically for the Apple personal computer owner. Complete with disk drive, 10 megabyte data cartridge, power supply, cables and personal computer adapter. Software included supports Apple DOS 3.3, Pascal and CP/M. Support software is included for quick copy ing, backup and file management. The 101A also supports auto-boot capability and is slot independent.
Circle HelpCard No. 103
Vufax, Inc.
Decatur, GA 30035
(800) 241-1119; (404) 981-6778

Interface Cards

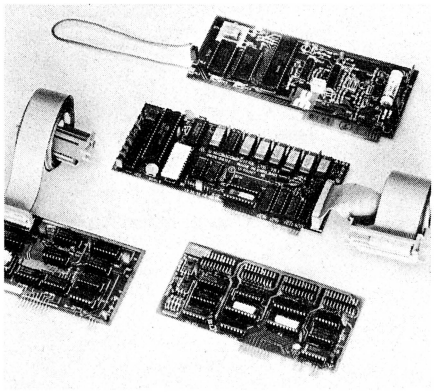
The Dumpling-64 is a high-resolution buffered printer interface card for Apple computers. It has recently been upgraded

to interface with additional printers. They include the Mannesmann Tally MT-160; the DataSouth DS-160; the Gemini 10 and 15; the GX-100; the Epson FX 80 and 100; Okidata 92 and 93 and 84 step 2. In addition to supporting nearly 40 graphic printers, the card interfaces wih any parallel printer for text buffering. Supports all graphics routines needed for rotation, inversion, enlargements, screen dumps as well as including proprietary space compression techniques which allow nearly 250K bytes of data to fit into 64K of RAM. All operating systems are supported including Pascal and CP/M $159.00.
Circle HelpCard No. 104
Microtek, Inc.
4750 Viewridge Avenue
San Diego, CA 92123
(619) 569-0900

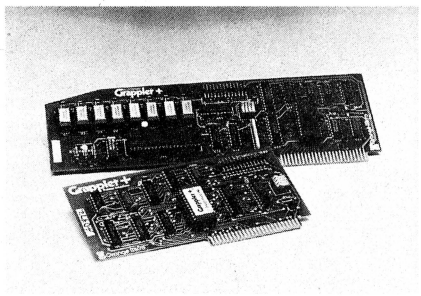
The **Digital Video Multiplexor Board** (DVM-II) plugs into any expansion slot of an Apple II or Apple II Plus computer and is designed to supply RGB output for analog or digital monitors. The board features 15 low-resolution colors (16 with an analog monitor) and two additional high-resolution modes: all white and three-color with pure white. It is color selectable for all green or other colored text. With a simple plug-in installation, it can supply the computer with RGB output. It will provide 80 column capabilities in high-resolution colors with the use of any RS-170 output, 80-column card. Includes two connector cables and one video monitor connector cable to allow the board to be adpated to the monitor $199.00.
Circle HelpCard No. 105
Amdek Corp
2201 Lively Blvd.
Elk Grove Village, IL 60007

The **Orange parallel interface board** features more than 15 firmware commands for text screen dumping and formatting on any Apple II. Compatible with most parallel printers. Offers an 80-column screen dump for the Apple //e. Other commands include a 40-column screen dump, page length and margin sets, add or delete linefeeds. When not in use for formatting, it acts as a standard parallel interface, compatible with virtually all Apple software, CP/M and Pascal $87.00. Includes complete documentation, 5-foot parallel printer cable and a 90 day warranty.
Circle HelpCard No. 106
Orange Micro, Inc.

U-Print16 printer interface card has a 16K buffer for parallel or serial interfacing. The buffer allows the Apple to quicky dump its print and continue computing. It can also print graphics directly to the Epson and Apple dot matrix printers. It incorporates an 8035 on-board micro-processor with 2K firmware. **U-Talk** is a versatile speech synthesis card using National Semiconductor's Digitalker speech system. **U-4DISC** is an Apple compatible disc controller card that allows up to four drives to be attached rather then the usual 2. It can be used as a controller for the many Apple compatible drives now on the market. **U-CENT** is a no frills, low cost parallel (Centronics) printer interface. It comes complete with cable ready to go. It does allow 8 bit data transmission so users can generate their own graphics dump software.
Circle HelpCard No. 107
U-Microcomputers, Inc.
300 Broad Street
Stamford, CT 06901
(800) 243-2475i (203) 359-4236
- or -
U-Microcomputers, Ltd.
Winstanley Industrial Estate
Long Lane
Warrington, Cheshire
England

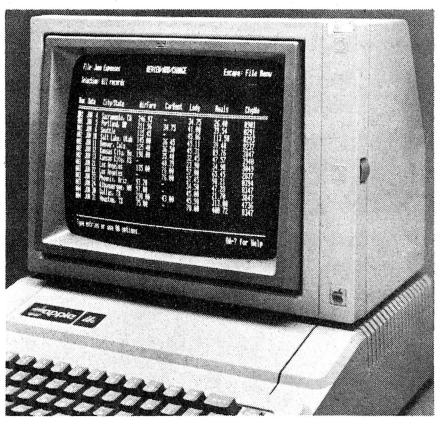


The new **Grappler(PLUS)** and **Buffered Grappler(PLUS)** printer interface provide support for the Apple //e and the newest lines of Epson printers. Provides an 80 column text screen dump that can be performed without disturbing the displayed text screen. Also offers screen dump support for the //e's Double Hi-Res Graphics. A new screen dump command will access any of the many Epson FX or RX aspect ratios, offering a wide variety of graphic resolutions. A DIP switch setting has been added for absolute support of Star printers, putting a screen dump in the center of the page. Standard features include Dual Hi-Res Graphics, Mixed Mode Screen Dumping, emphasized, inverted, rotated and expanded graphics, text formatting, and more. All these features are also found on the Color Grappler(PLUS) for IDS printers. Complete with full documentation and a 5 foot printer cable. Grappler(PLUS) $175.00, Buffered Grappler-(PLUS) $239.00 (16K standard, expandable to 64K). Revision 3.0 EPROMS can be purchased separately for $35.00.
Circle HelpCard No. 106
Orange Micro, Inc.
1400 N. Lakeview
Anaheim, CA 92807
(714) 779-2772



Input/Output

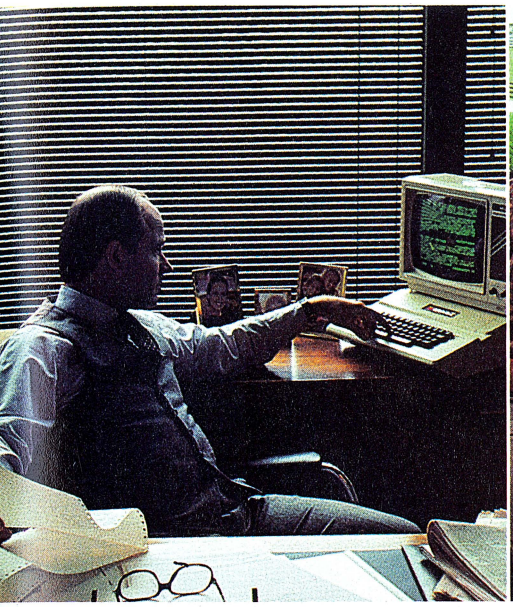
Apple Computer, Inc. has a new **monochrome video display** designed to blend aesthetically with its Apple II family of personal computers. The monitor features superior resolution for 80-column text and graphics display, an anti-reflective, high-contrast screen, and a tilt mechanism for adjusting the screen's angle. It displays up to twenty-four, 80-character lines of text, and high-resolution graphics in P31 green phosphor. Controls include contrast, vertical hold, vertical amplitude and brightness $229. At your local deal er.
Circle HelpCard No. 108
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 973-2042



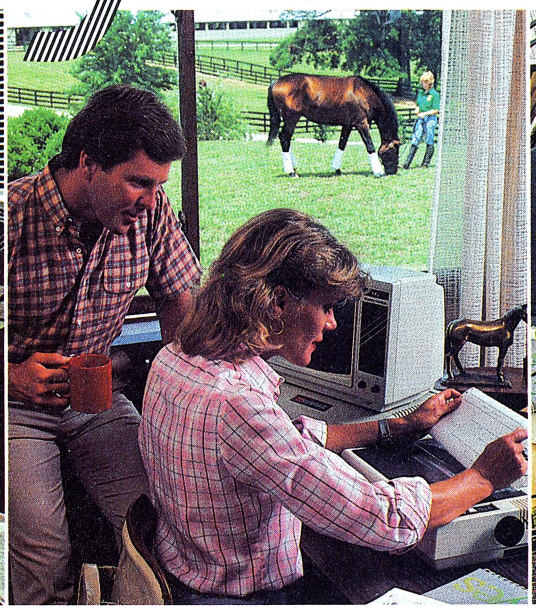
ADC calibrated temperature probes and measurement software automatically monitor and record temperature or relative humidity readings with your computer. Combine accurate measurements with time and power interfaces for full closed-loop control. The Nth Degree system supports 1 to 256 channels with resolution to .01 degree. Standard temperature range is (MINUS)50 to (PLUS)105 degrees C. Other ranges are possible. Rugged sensors may be hundreds of feet from your computer without loss of accuracy. "Thermonitor" software provides graphic and numeric display of temperature with data

Your Apple's telephone.

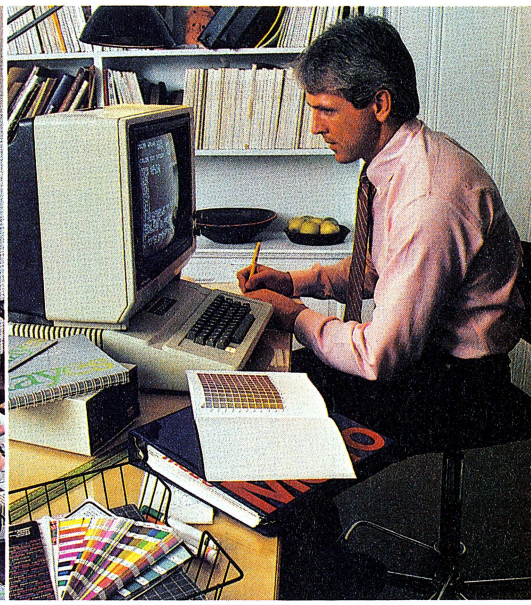
Hayes



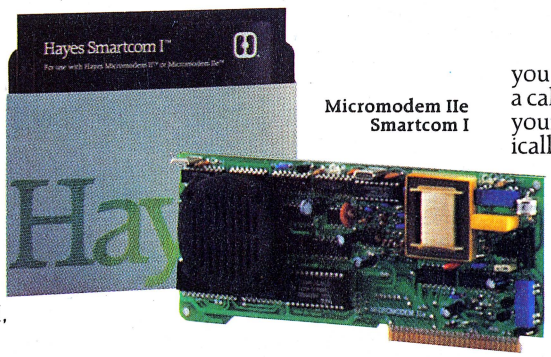
"Thanks for the prompt reply. Sure was a lot faster than waiting for the mail!"



"Gary: The pedigrees for next week's auction are as follows..."



"Attn. Prod., Sales, Purch.: Recommend 50% blue, 30% red screen for closest match."



Micromodem IIe
Smartcom I

A complete plug-in communications system for Apple® computers. From Hayes, the established telecomputing leader: the simple but sophisticated Micromodem IIe™ plug-in board modem and its companion software, Smartcom I.™ Everything you need to expand the world of your Apple II, IIe, II Plus and Apple III. In one, convenient communications package.

With Micromodem IIe and Smartcom I, you can access data bases, bulletin boards, and the varied resources of information services. Plan your travel itinerary via computer, including flight numbers, hotel and rental car reservations. Retrieve and analyze daily stock and options prices. Work at home and send reports to your office. You can even do your gift shopping by computer!

Micromodem IIe. Think of it as your Apple's telephone. It allows your computer to communicate with any Bell-103 type modem over ordinary telephone lines, at 110 or 300 bits per second. Micromodem IIe installs easily in an expansion slot, and requires no outside power source. It connects directly to either a single or multiline modular phone jack, to perform both Touch-Tone® and pulse dialing.

Micromodem IIe dials, answers and disconnects calls automatically. And, unlike some modems, it operates in full or half duplex, for compatibility with most time-sharing systems.

A built-in speaker lets you monitor your calls when dialing. That way, you'll know if a line is busy. With Smartcom I, Micromodem IIe automatically redials your last number.

Discover how Micromodem IIe can help maximize the capabilities of your Apple. While Smartcom I software will minimize *your* efforts.

Smartcom I companion software. For effortless communications. Whether you're a newcomer to personal computing or a seasoned professional, you'll appreciate the ease and speed with which you can perform any communications function. Thanks to Smartcom I!

Let Smartcom I guide you through a few easy-to-answer questions to tailor the program to your particular needs. Then you're ready to go!

Make a selection from the Smartcom I menu to manage your communications, files or printer. Program prompts guide you along the way. And menu selections let you easily make a call, end a call, or answer a call. When you're on the receiving end, your Micromodem IIe answers automatically, even if you're not there!

Convenient! And so is the Smartcom I memory for phone numbers. Smartcom I stores three of your most frequently called telephone numbers and one prefix. Plus, it also remembers the last number dialed.

Smartcom I also provides a directory of the files stored on your disk. And lets you create, list, name, send, receive, print or erase files right from its menu.

Smartcom I is as versatile as you need it to be. It accepts DOS 3.3, Pascal, CP/M™ 3.0 or CP/M Plus™ operating systems. And accommodates up to six disk drives and several printer interface cards.

Like all our products, Smartcom I and Micromodem IIe are backed by excellent documentation and full support. Including a two-year limited warranty on Micromodem IIe and a 90-day warranty on Smartcom I!

Hayes®

See your dealer today. Then plug into the exciting world of telecomputing.

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MICROTEK
COMPUTER PRODUCTS

IF YOU HAVE A GRAPHICS PRINTER YOU MUST HAVE A GRAPHICS INTERFACE.

DUMPLING-GX
GRAPHICS PRINTER INTERFACE

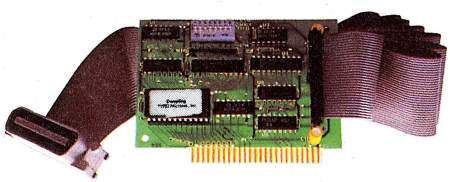
The Dumpling-GX is a DIP Switch Selectable Dual Hi-Resolution Graphics Screen Dump parallel interface card for Apple computers and most popular printers.

At the flick of the DIP switch, The **Dumpling** will interface with: **APPLE ■ EPSON ■ NEC ■ IDS* ■ ANADEX ■ C-ITOH ■ PMC ■ CENTRONICS ■ OKIDATA ■ MANNESMANN TALLEY**

Selectable Strobe and Acknowledge polarities allow use with **any** 8-bit parallel printer in text and block graphics mode.

Microtek's proprietary on-board firmware enables the **Dumpling-GX** to establish intelligent communication between your Apple computer and your printer. Simple commands allow:

- Selection of your printer by DIP switch.
- Selective Dump Page 1, Page 2, or both in either text or graphics mode.
- Chart Recorder Simulation.
- Left & Right Margin Control.
- Line Length/Page Length Selection.
- Block graphics via 8th bit Control.
- Printer bell Control.
- Skip over Perf.
- 90 degree Rotation.
- Double Size Graphics.
- Emphasized Graphics Print.



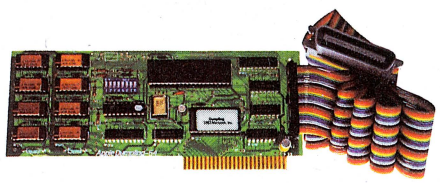
*With special PROM and cable.

DUMPLING-64
GRAPHICS PRINTER SPOOLER

The **Dumpling-64** is the next logical extension to the industry standard Dumpling-GX parallel interface card, allowing the computer to DUMP vast quantities of data into the **Dumpling-64** for later printing, thus freeing up the computer for additional tasks.

The **Dumpling-64** allows full use of all **Dumpling-GX** features. In addition to the standard graphics features, the **Dumpling-64** offers:

- Buffer sizes from 0 K to 64K. User upgradable.
- Graphics Dumps to Buffer. Page 1 and/or 2.
- Multiple Consecutive Screen Dumps to Buffer.
- Software reset to clear Buffer.
- "Space Compression" saves valuable memory taken up by 'spaces' in text or spread sheets.
- Automatic Buffer Size Recognition.
- Pause while printing-immediate.
- Pause while printing-delayed.
- Resume printing.
- REMOTE pause-immediate: hooks up to telephone, switches—etc.
- Buffer ON/OFF control.
- INSERT text editing capability with Pause and Buffer ON/OFF control.



MICROTEK inc.

TECHNOLOGY UPDATE

Circle HelpCard No. 37

MORE MICROTEK COMPUTER PRODUCTS THAN EVER BEFORE.

FOR APPLE/FRANKLIN & other "look-a-likes" (APPLE IIe Compatible)

DUMPLING-GX	Hi-Resolution Graphics Parallel Printer Interface Card with Graphics Features for all major printers
DUMPLING-64	64K Spooler Buffer for Text, Block and Dot Addressable Graphics. Works with all major printers
BAM-128	64K/128K Memory Card
Q-DISC	128K Disc Emulation System
MAGNUM-80	80 Column Video Card
VISI-PAC	A BAM-128, a MAGNUM-80, and Software for maximum use of your VISICALC Spreadsheet
RV-611C	7 or 8 BIT Parallel Printer Interface Card
RAINBOW-256	RGB Board with 256 Output Colors to monitor
BAM-16MM	16K Card with Memory Management System (MOVE-DOS)
VIZ-E-EXPAND	Visicalc Expansion Software
VIZ-E-EXPAND 80	Adds 80 Column Features to VIZ-E-EXPAND

FOR THE IBM PC

The **HAL** Series of IBM compatible memory boards:
HAL-64, 128, 192, 256 Memory Expansion without Parity
HAL-64P, 128P, 192P, 256P Memory Expansion with Parity
The **HAL Parallel Printer Cables**
The **HAL Utility Software Package**

THE VIC-20 and COMMODORE 64

VIM-8/16	8K or 16K Memory Expansion Module
VIM-0	EPROM/RAM User Definable Module
CC-2064	Parallel Printer Cable & Software for the VIC-20/64

FOR ATARI 400 and 800 COMPUTERS

AMB-16	16K Memory Card for Atari
AMB-32A	32K Slot Independent Memory Card
ATC-P	Atari Parallel Printer Cable
ATC-S	Atari Serial or Modem Cable

ALSO

SCAMP SERIES	RS-232C Serial Interface Cables 6', 10', 25'

NEW!

- Stand-alone Printer Buffers with Auto Serial/Parallel Conversion up to 256K!
- Serial Dumplings—with and without Buffer.

MICROTEK products carry a 2 Year Warranty and are available from your local Dealer. For your Dealer's name or for further details call MICROTEK.

MICROTEK inc.
4750 Viewridge Avenue
San Diego, California 92123-1690
(619) 569-0900
Toll Free Outside CA **(800) 854-1081**
TWX 910-335-1269

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Circle HelpCard No. 38

logging on disk or printer. Hooks are provided so that you can customize your own applications. The Strip-Chart recorder program continuously graphs data on the screen in easy-to-read classic format. A special data compression method stores more than 120,000 samples per disk. 1 channel package with probe and software $129.95, 8-channel package wtih 1 probe and software $189.95, Strip-Chart recorder and data logger software $49.95.
Circle HelpCard No. 109
American Data Cable, Inc.
2864 Ray Lawyer Drive #205
Placerville, CA 95667
(916) 622-3465

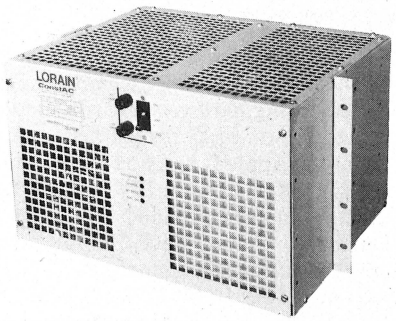
Multiport Controller is a code-activated one to four serial port expander. Each port can operate with a different configuration (different baud rates, stop bits, etc.) Two or more devices can communicate with the controller simultaneously. Features full duplex with RS-232 protocol, baud rates up to 19,200, expansion to 16 ports by cascading. Peripheral ports may be configured by user software $249.00. Other models available.
Circle HelpCard No. 110
Bay Technical Associates, Inc.
P.O. Box 387
Bay St. Louis, MS 39520
(601) 467-8231

Memory

HardRAM never forgets; gives you the convenience of RAM with the security of ROM. Non-volatile memory requires no battery backup. Requires no EPROM programmer. You may alter data one byte at a time or a block at a time. Using HardRAM is as easy as using a standard RAM card. New commands/utilities can be added to DOS or BASIC language with one time entry into HardRAM. They can be called instantly when your system is powered up. DOS can be relocated into HardRAM to give you room for larger programs in dynamic RAM. 2K system $169.95, 16K system $299.95.
Circle HelpCard No. 122
Tinker-Tron
P. O. Box 53128
Lubbock, TX 79452
(806) 745-2228

Miscellaneous

Lorain ConstAC 360VA uninterruptible power system assures continuous operation of essential equipment during blackouts, brownouts, interrupts, and line transients. When AC power is available, the compact unit functions as a battery charger and AC line filter. Automatic transfer occurs in the event of AC line disruption providing no-break, 120 VAC power through the ConstAC UPS from a self-contained battery with a 50-minute reserve. ConstAC uninterruptible power systems are also available in 1, 3, 5, and 10KVA capacities.
Circle HelpCard No. 126
Lorain Products
1122 F. Street
Lorain, OH 44052
(216) 288-1122



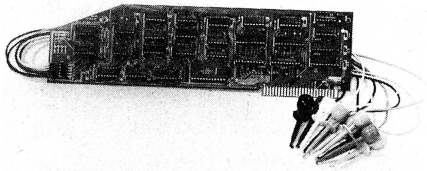
PassKey easily backs up most protected programs - even those which the "nibble copiers" can't handle. It is a hardware card and diskette that dumps the contents of your 48K Apple memory to a copyable backup disk. Uses your 16K RAM card. Copies "total load" programs in which the entire program resides in memory and does not need to reaccess the disk. Simply push a button to make the copy. No programming knowledge is needed. It will create an autobooting disk in just 32 seconds $59.95.
Circle HelpCard No. 123
Seneca Systems
2515 E. Michigan Blvd.
Michigan City, IN 46360
(219) 874-5076



The **Universal Test System** for Apple users measures voltage, current, resistance, capacitance or temperature. Each of 4 channels can be configured to measure any one of these five values. Channels may be viewed and/or recorded to disk simultaneously with optional expansion to suit your needs. Auto Range/Auto Polarity simplifies use to unburden the user. Interfaces to clock card for time controlled readings. A graph mode gives oscilloscope display of parameters vs. time. Fast response time and high accuracy - uses single I/O slot software supplied on unprotected disk. Menu-driven; useful for electronics repair and construction, data logging, production testing, burn-in tracking, prototyping and hobbyists.
Circle HelpCard No. 124
Fast Feedback Technologies
4009 Pacific Coast Highway
Torrance, CA 90505
(213) 540-7705

Half Track cooling system fits and color-matches Apple II computers. The unit comes with a front panel, illuminated on/off switch, and two three-wire grounded auxiliary outlet receptacles mounted on the rear that allow you the convenience of one button power control for the total computer system. The cooling system comes complete with AC surge suppresison circuitry and the fan is rated at 16 cubic feet of air per minute for cooling $79.95.
Circle HelpCard No. 128
Wholesale Technology, Inc.
1530 South Sinclair
Anaheim, CA 92806
(714) 978-9820

The Bus Rider was developed to function as an aid in debugging assembly code and in developing hardware boards and interface software. Features real time monitoring of the Apple II and up to four external signals ranging from −12V to +12V. Operational software provided on a floppy disk loads into the Apple RAM for turnkey operation. Bus Rider monitors all bus signals including 16 bit address, 8 bit data, IRQ, R/W, DMA, NMI and four external lines. Trigger options are provided on board to enable the circuit to trigger on any combination of bus signals and external signals. In addition, separate, pretrigger viewing of up to 510 samples is possible with the system. An operating speed of 1 Mhz allows analysis of 512 samples in either the interrupt mode, resulting in immediate display after acquiring 512 samples, or the passive mode, which displays after referral to the software. Includes the circuit card, reference manual, cables for external inputs, and software $395.00.
Circle HelpCard No. 129
R.C. Electronics, Inc.
5386 Hollister Avenue, Suite D
Santa Barbara, CA 93111
(805) 964-6708



Logic Switch is a software controllable video switch for the Apple II Plus and compatible computers. It is designed to end the hassle of plugging and unplugging cables when switching from Apple's normal output to that of an 80 column display. Compatible with all popular 80 column cards, but especially for boards that do not come with an onboard video switch such as Doublevision, Omnivision, Wizard 80, or the Sup'R Term displays. Plugs into the game I/O port and by providing a parallel socket it allows unobstructed use of the port. Additionally, the switch includes a trimmer to set the output level for the 80 column display. This eliminates the need to adjust the brightness when switching between 40 and 80 column output. Also included is a solder pad for devices using the shift key modification to pin #4 on the game port. A technical data sheet explains the theory of operation, installation, and simple software commands. The switch uses a single command from the keyboard, BASIC, Pascal, or machine language. Specify type of 80 column board when ordering $23.95 plus $2.00 shipping and handling.
Circle HelpCard No. 127
Vytron
P. O. Box 7019
Alhambra, CA 91802
(213) 289-8936



The **Alien Speaker**, placed outside the computer, is designed to generate a louder volume and clearer tone than the speaker inside the Apple II. Comes with the same Molex connector so you can simply unplug the Apple speaker and plug in the Alien speaker in its place. A built-in high-frequency filter switch is designed to allow you to eliminate "spurious" sounds $24.95.
Circle HelpCard No. 130
The Alien Group
27 West 23rd Street
New York, NY 10010
(212) 741-1770

The Alaska Card for the Apple II and IIe copies 48K, 64K and 128K (IIe only) protected software with a simple press of a button. The Alaska Card requires no 16K memory card or utility disk. Your copied disks autoboot in as little as 10 seconds, and can be transferred to a hard disk in standard DOS 3.3 format $129.95.
Circle HelpCard No. 131
Central Point Software, Inc.
P. O. Box 19730-203
Portland, OR 97219
(503) 244-5782

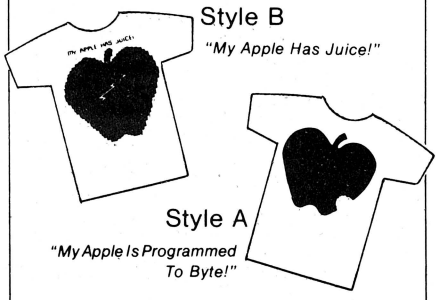
The Computerscope is a simple to use flexible instrument for your work bench. It can be used as a Digital Storage Oscilloscope, Signal Averager, Transient Recorder, Frequency Meter, Strip Chart Recorder (with 16K buffer), Frequency Spectrum Analyzer, Interspike Interval Histogram, Digital Voltmeter, Autocorrelator. In addition to the wide selection of instrumentation modes listed above, it is also a user programmable data acquisition and analysis system for your professional applications. Features high speed Analog to Digital converters, 8 or 14 bit resolution, up to four independent input channels, waveform storage on floppy disk, hardcopy on a high resolution dot matrix printer and pretrigger viewing. Complete with Apple II compatible computer, upper and lower case typewriter style keyboard, 12 key numeric pad and VisiCalc keys, 50 watts power supply with built-in cooling fan $4,895, optional 10 megabyte hard disk drive $2,995.
Circle HelpCard No. 132
RC Electronics, Inc.
5386-D Hollister Avenue
Santa Barbara, CA 93111
(805) 964-6708

Modems

Pro-Modem 1200 has a real time clock/calendar combined with an intelligent full duplex 212A 300/1200 baud telephone modem. Monitor the duration and cost of your phone calls. Send and receive messages at preset times when the rates are lower (even unattended) with or without your computer. Features a Rep Dialer, incoming and outgoing message buffering, mailing list, help mode, programmable operating instructions, a 12-character alphanumeric time and message display, and Pro-Com software.
Circle HelpCard No. 111
Prometheus Products, Inc.
45277 Fremont Blvd.
Fremont, CA 94538
(415) 490-2370

Kleen Line Security System protects your modem by suppressing damaging telephone line spikes caused by lightning, atmospherics or phone office switch gear; uses a modern two stage semi-conductor and gas discharge tube suppression technique. It also employs an isolated ground to protect equipment from damaging lightning discharge current. Standard modular

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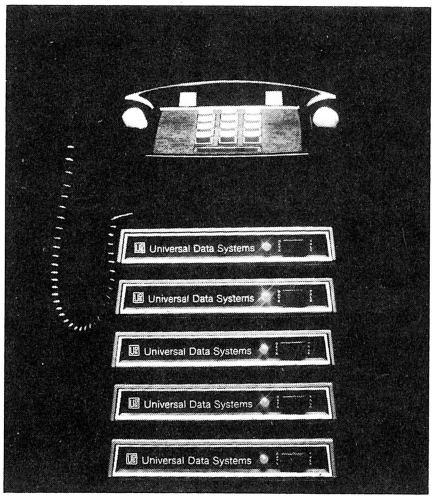
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four pin telephone connectors provide simple, trouble-free hook-up $56.95.
Circle HelpCard No. 112
Electronic Specialists, Inc.
171 South Main Street
Natick, MA 01760
(617) 655-1532

INFO-MATE modem fits beneath a standard telephone. You simply plug it into the data terminal or computer, the telephone line, and a power outlet. Automatically adapts to the host's communication parameters, eliminating many of the system integrating problems that often arise. It incorporates features such as auto-dial (stores up to 52 32-digit telephone numbers or log-on messages for data base access), auto-answer, auto-speed select, auto-parity select, and auto or manual selection of pulse or tone dialing. All commands are entered from the host data terminal or computer over the RS-232C interface using ASCII characters. Also features an "unlisten" command which prevents data from being interpreted as commands during data transmission. 1200 baud, Bell 212A-type modem also electronically detects such call progress tones as dial, busy, ring-back, modem answer tone, and the human voice $595.00.
Circle HelpCard No. 113
Cermetek Microelectronics
1308 Borregas Avenue
Sunnyvale, CA 94089
(408) 734-8150



New **"LP" modems** from UDS are, in fact, powered entirely by the telephone line, eliminating the need for bulky, heat-producing power supplies or plug-in power modules. The result provides full modem functions in an under-telephone package. A mode switch selects "answer" or "originate" and a talk/data switch simplifies transfer of the call from a telephone to the computer. Standard RS-232 connector with standard (modular) telephone connector cable. Built-in connector is provided for a telephone instrument. Five models are offered from 300 to 1200 baud. The model 103 offers 0-300 baud communications (Bell 103/113 protocol) for $145.00. The model 212 (1200 baud) offers Bell 212 protocol for $445.00.
Circle HelpCard No. 114
Universal Data Systems, Inc.
5000 Bradford Drive
Huntsville, AL 35805
(205) 837-8100



Printers/Plotters

The PT-88 jet matrix printer provides consistent print quality in a variety of type styles, high speed (150 cps), tractor or single-sheet plain paper feed, full graphics capability, universal interface with personal or desk computers and modular design for simplified service, if ever required. The PT-88 whispers along at less than 50 dBA so you can accept telephone calls or conduct meetings while it prints - right next to your work place if you wish.
Circle HelpCard No. 115
Siemens Communications Systems, Inc.
Office Terminals Division
186 Wood Avenue South
Iselin, NJ 08830
(201) 321-3400
-or-
240 East Palais Road
Anaheim, CA 92805
(714) 991-9700

The new Transtar 120 printer weighs in at less than 19 pounds, it generates unrivaled print quality and is the size of a standard briefcase. Can be carried almost anywhere. "Plug and Go" compatible with the best-selling word processing programs. Plug the 120 into your personal computer and watch this precision printer purr along at 14 cps. Shannon Text speed producing super- and sub-script, underlining and a true boldface. Automatic single sheet loading $599.00
Circle HelpCard No. 116
Transtar
P. O. Box C-96975
Bellevue, WA 98009

The **Dynax DX-15 letter-quality printer** prints 13 characters per second and has standard features: super- and sub-script, auto-underscore, auto-strikeover, shadow print, two color print and 10, 12 and 15 characters per inch bidirectional printing. Options include a keyboard, tractor feed and auto-cut sheet feed. The 96-character daisywheel comes in cassette form. It requires an RS-232C or Centronics-type parallel interface.
Circle HelpCard No. 117
Dynax
5698 Bandini Blvd.
Bell, CA 90201

MVP printer from Printronix is the only microcomputer line printer versatile enough to handle the needs of every personal computer in the office. Offers different speed for different needs: high resolution characters at 80 lpm for word processing; 150 lpm for data processing; and 200 lpm for compressed print. Flexible graphics capability lets you generate a wide range of customized business graphics - labels, logos, bar codes, enlarged characters, reverse images and more. It prints uniform, overlapping dots to create solid characters. Precision dot placement is possible since the print mechanism is a one-piece unitized assembly with no adjustments.
Circle HelpCard No. 118
Printronix
17500 Cartwright Road
P.O. Box 19559
Irvine, Ca 92713
(800) 556-1234 ext 66; (800) 441-2345 ext 66 (CA)

EXP 550 bi-directional daisy wheel printer offers a 17" paper capacity, 13.2" writing line with carrier feed in units of 1/120" and forward/reverse paper feed in units of 1/48". Other features include bold face, subscript, superscript, a 5-line self test function and 20 cps printing speed. The 4 pitch printer provides letter quality hard copy, quiet operation and a very affordable price. The EXP 550 emulates the Diablo 1610.
Circle HelpCard No. 119
Silver-Reed America, Inc.
8665 Hayden Place
Culver City, CA 90230
(800) 421-4191; (800) 252-7760 (CA)

The **Mannesmann Talley Spirit** is a dot-matrix printer can be used with all major personal computers, including those from Apple, IBM and Tandy. The Spirit uses a combination of Mylar film ribbon and the full space of its 9 x 8 matrix; this results in high-print resolution and intensity. The unique printhead uses square hammers that overlap to form more fully connected horizontal and vertical lines rather than a row of discrete dots. Standard features include tractor as well as friction paper feeds. The tractor width can be adjusted to handle narrow-width label stock or fan-fold business forms up to ten inches wide. The friction feed can be used for single-sheet and letter stock and roll paper. The printer operates at 80 characters per second $399.00.

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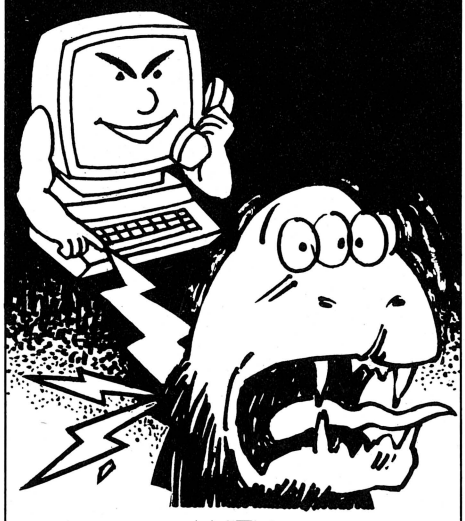
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Circle HelpCard No. 62

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At 160 cps, 100% duty cycle, the **Delta-10 printer** is built for speed. Performs with serial and parallel interfaces as standard. An 8K buffer gives this printer the power to instantaneously store and print data as it frees your computer to continue its job. It can print three crisp copies simultaneously at the continuous speed of 160 cps. Diversity in character fonts, true descenders on lower case and underlining capability.
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SOFTWARE

Business (General)

Compuquote price quoting and cost estimating system lets you prepare cost estimates quickly and professionally with built-in margins. No need for guesswork, pocket calculators, or searching through catalogs. You simply select the appropriate material and labor types from the computer's video monitor using a light pen (included). It will also print an itemized quote clients will appreciate. Features light pen item entry, automatic calculation of prices with up to five levels of quantity discounts, formatted quote printouts, easy price list and quote editing. Uses 16K RAM card if present. Requires a 48K Apple II or compatible computer and at least one disk drive - $275.00 (includes light pen).
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5285 Elam Young Parkway, Suite B-400
Hillsboro, OR 97123
(503) 640-1317

Electronic Circuit Analysis Program (AC Network Analysis Program or ACNAP) analyzes circuits consisting of resistors, capacitors, inductors, a voltage source, and controlled current sources. ACNAP will analyze the response of any linear network consisting of up to 21 nodes and 60 components. Every command is either menu driven or program prompted. Circuit topology data is saved to a named file or retrieved from a previously generated file for further analysis or editing. ACNAP is fast, calculating the response of a typical 5 node circuit in 0.4 seconds. Works with component tolerances to provide Worst Case and MonteCarlo Analysis. Automatically calculates any circuit's Noise Equivalent Bandwidth. Many more features $39.95. Runs on Apple II, TRS-80 Models I/III/IV and USDOS on the Victor 9000, and the IBM-PC. Includes a 23 page manual.
Circle HelpCard No. 134
BV Engineering
P. O. Box 3351
Riverside, CA 92519
(714) 781-0252



Release 2 of VersaForm updates and expands the capabilities of VersaForm, including new features and modifications designed to improve the program's efficiency and increase its applications. The modificaitons include expanded capabilities on the mailing label printer; a "copy by name" feature allowing data to be transferred from one form to another where field names are the same, providing the ability to redesign a form after data has been entered. New report features include the ability to easily change report selection criteria at run time and a "page break" option allows grouped or subtotalled data to be printed on separate pages. You may update your old disk for $29.95 by sending the registration number from the original VersaForm disks and information on the type of computer being used (including the presence or absence of a hard disk).
Circle HelpCard No. 135
Applied Software Technology, Inc.
170 Knowles Drive
Los Gatos, CA 95030
(408) 370-2662

JACKreport generator for the Incredible JACK package uses information from any JACK file to create customized reports. Provides reports in a tabular form up to 36 columns wide with selection, sorting, detail and summary capabilities. It can count the number of entries in a column, calculate a total, or average the column. Subtotals, sub-averages and sub-counts can be reported by field changes. Records can be sorted on up to two fields and reported either sorted or unsorted. Printing capabilities include page headings, column titles, automatic pagination, pagination upon subtotals, screen previews, and variable paper sizes. The package comes with a reference manual, and a tutorial, which gets users started quickly $99.00.
Circle HelpCard No. 136
Business Solutions, Inc.
60 East Main Street
Kings Park, NY 11754
(516) 269-1120

Pickers and Pickers + are for singers and musicians who earn their living through studio and live performing. Pickers contains band scheduling, band log/income and expenses. Pickers + includes these, plus session scheduling, session log/income, expenses, personal inventory, professional credits and action list. **Writers and Writers** + are for composers and songwriters who earn their living through royalties. Writers includes song lyrics, song register and song demos.

Writers + includes these plus royalty income, expenses, song classicication, song releases, awards, and action list. **Tour and Tour** + are for both professional and amateur touring musicians and bands. Tour includes group schedule, club/arena data, concert/show income and expenses. Tour + includes these plus promotional income/expenses, personnel data, contract information, business contracts, fan mailing list, equipment inventory, and promotional inventory.
Circle HelpCard No. 138
Passport Designs, Inc.
116 N. Cabrillo Hwy.
Half Moon Bay, CA 94019
(415) 726-0280



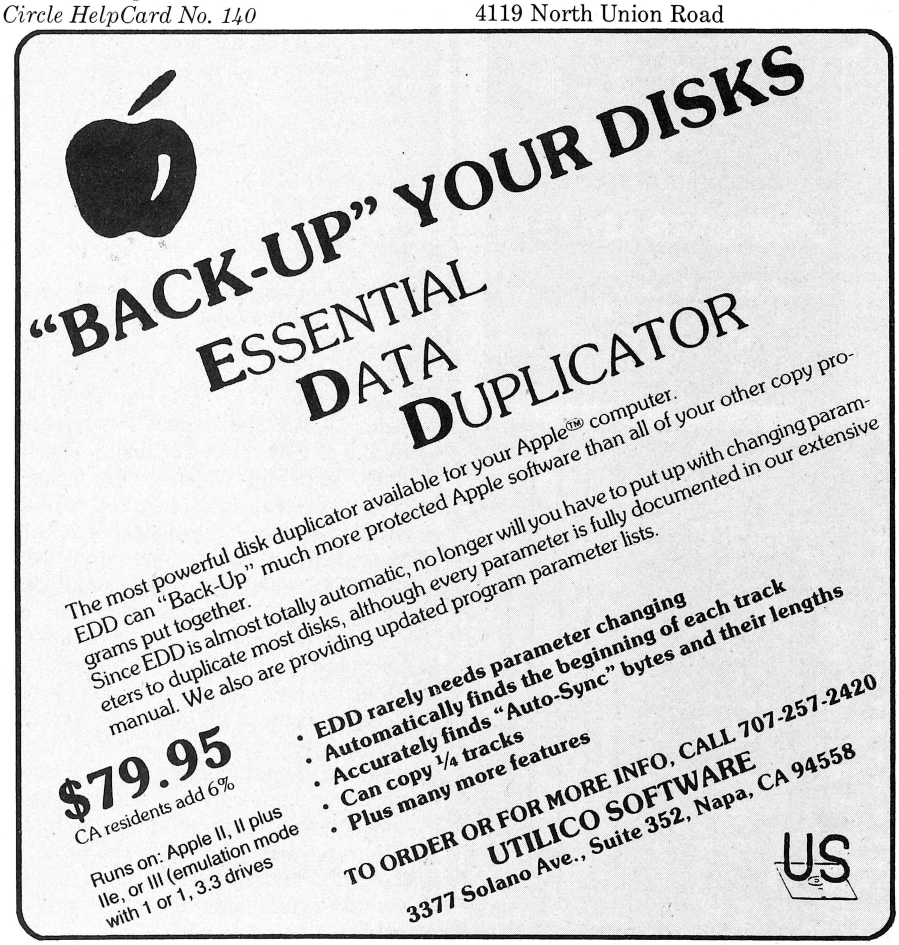
FilePro for Apple II, II Plus and //e with Microsoft CP/M SoftCard is available for $300.00. Features include menu prompting for every operation in a program. Messages and menu selection are in plain English - no programming terms. Files can be organized alphabetically, numerically, by date or by any of 32 categories. Up to ten reports and ten labels or mailing lists can be designed and printed for each file. The program prints reports up to 14 inches wide and 11 inches deep. An individual label can be up to 14 inches wide and eight lines deep and it prints labels from one to six across. Math formulas can be cal-cu lated automatically and can be recalculated en masse in a file or selected group of records. No special expertise is required to design file formats, customize data entry screens and reports and labels, or to enter or alter data. Accepts up to 65,535 records per file; 99 fields, 1,020 characters per record. FilePro is written in Assembly language for high-speed operations.
Circle HelpCard No. 137
The Small Computer Company, Inc.
230 West 41st Street, Suite 1200
New York, NY 10036
(212) 398-9290 (NY); (800) 847-4740 (orders)

Business Planner business modeling package was designed primarily for entrepreneurs who wish to start a new business or expand an existing firm. It provides a simulated model for projection of monthly income/expense figures, budget allocations and sales forecasts. Unlike a standard spreadsheet, however, it lets the user combine projects into alternative models to arrive at predictions about future growth. Features include simulated models of a business, graphical projections, pro forma financial statements, user defined categories and the ability to protect data from prying or accidental change via codeword. An illustrated manual which leads the user through projections for a sample business and explains how to create his/her own model is included in the software package. Available for the Apple II and ///.
Circle HelpCard No. 139
Duosoft Corporation
1803 WoodfieldDrive
Savoy, IL 61874
(217) 356-3111

With **The Landlord** property management software you can do all those clerical and accounting tasks you've been doing by hand easier, faster and more accurately. Print income statements per property and owner; generate lease expiration lists; print rental statements; keep track of expenses per property; print payables checks; record changes and payments for each renter; produce tax analysis reports for each property - adjusted to your personal situation and print current and upcoming vacancy lists. Handles any monthly income property: apartments, offices, shopping centers, mini-storage units, aircraft hangars, marinas, condominiums, single-family homes, duplexes or trailer parks, etc.
Circle HelpCard No. 140
Systems Plus Inc.
120 San Antonio Road
Palo Alto, CA 94303
(415) 969-7047

Communications

Dos File Exchange II (DFX II) allows the user to transfer any standard Apple DOS 3.3 file via modem to another Apple II. Any type of file can be transferred - Applesoft, Integer, binary, text and even relocatable binary files. It also allows users to chat at the same time a file is being transferred. DFX II lets both users view the same VisiCalc worksheet and enter data or formulas in the sheet at the same time via modem. When the save command is issued, the file will be saved on both systems. Just imagine working on a VisiCalc template simultaneously with someone at your home office, building a financial model, making changes. Other features include multiple file selection and transfer, a built-in clock that displays time remaining, block verification and auto-retransission, automatic telephone answering, run other programs under DFX II control, data compression. DFX II can even be transferred to another Apple $79.95.
Circle HelpCard No. 141
Alpha Logic Business Systems, Inc.
4119 North Union Road



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Woodstock, IL 60098
(815) 568-5166

TLX-A-SYST interfaces computers to the domestic and international telex network, TWX, telegram and mailgram, using ordinary phone lines. Menu-driven; very easy to use. No special coding or protocol is required. Archiving and traffic log provided. Directory of telex numbers and a friendly, comprehensive manual are provided. Designed for nontechnical users: help menus simplify training and increase productivity $250.00.
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XYZZY
P. O. Box 9002-116
Boulder, CO 80301
(303) 444-6675

Educational

Multi-Lingual questionnaire generator, **The Great Creator**, is used to create and operate multiple-choice and "fill in the blank" questionnaires (exams, drills, etc.) in 17 different languages. Completely menu driven: no extra hardware needed. Provides for "Word Processor" entry of text with automatic wrap-around. Languages include: Spanish, French, German, Danish/Norwegian, Finnish/Swedish, Hawaiian, Hungarian, Italian, Latin/Dutch, Polish, Portuguese, Turkish, etc. Included: 6 disks, manual, other aids, scoring system, hard copy options. Requires an Apple II Plus or //e and one disk drive. Demo disk available for $5.00.
Circle HelpCard No. 143
The Professor
P. O. Box 301
Swanton, VT 05488
(514) 747-9130

A spelling game in a climb-the-pyramid format allows students to advance up nine levels of 10 to 100 words each by selecting or typing the correct spelling of new vocabulary words or terms from various subjects. **Watchwords spelling authoring system**, with many options, uses word lists created by the parent or teacher and places the words in a game format. A utility program, "Wordisk Maker," allows the parent or teacher to create word lists up to 900 words long on separate diskettes for use with "Watchwords" and other software. Appropriate for any grade level, as well as for learners wtih spelling disabilities and for individuals learning English as a second language. Visual and printed report for each student includes raw score and percent, words needing practice, and options selected by the teacher. $89.90 for the package includes program disks for "Watchwords" and "Wordisk Maker," manuals for each, and a sample work lists diskette with 5440 words.
Circle HelpCard No. 144
Micromedia Software
276 Oakland Street
Wellesley, MA 02181
(617) 237-5630

Now guidance counselors can get a complete college selection system for their students. The addition of **College Directions** 2-Year Version to College Directions 4-Year Version gives high school students an easy to use, individualized system to choose from over 1400 2-Year Vo-Tech, business schools, junior colleges and all the accredited 4-year colleges and universities in the U.S. Each of these two products retail for $250.00 and offer yearly updates. The program runs on the Apple II + and //e, with two disk drives and printer optional, but recommended.
Circle HelpCard No. 145
System Design Associates, Inc.
723 Kanawha Boulevard East
Charleston, WV 25301
(304) 342-0769

Introduction to General Chemistry contains a series of diskettes designed as a stand-alone supplement for students who have no previous chemistry background. Simulated experiments used to develop basic concepts allow students to gain experience in collecting and interpreting data. Graphics and animation help to develop an intuitive feeling for chemical concepts. Problem sets provide extensive practice - beginning with easy structured problems and progressing to more difficult, less structured ones. Diagnostic feedback is provided for student errors, and help is available from the programs when requested. Seven diskettes cover The Chemical Elements, Inorganic Nomenclature, Chemical Formulas and Equations, Atomic Weights, Percent Composition, Chemaze, and Gas Laws $60.00 each except Chemaze $40.00.
Circle HelpCard No. 146
COMPress
P. O. Box 102
Wentworth, NH 03282
(603) 764-5831/5225

Ecological Analysis Programs feature seven menu driven computer programs for any Apple II. It lets students focus on the interpretation of ecological data rather than spending too much time on computation. Includes Life Table Analysis, Community Similarity, Diversity Indices, Capture - Racapture Analysis, Lotka-Volterra Predator-Prey Model, Descriptive Statistics, Regression & Correlation Analysis. These programs make it easy to ask "What if?" questions about various ecological systems $29.95. Also available is Evolution which lets you see the effects of mutation, gene flow, natural selection, and genetic drift on populations $29.95. Algal Growth simulation studies the effects of nitrate-nitrogen, phosphate, turbidity, alkalinity, pH, temperature, ammonia,

and light on algal growth $29.95.
Circle HelpCard No. 147
Oakleaf Systems
318 N. Mill Street
Decorah, IA 52101



The Fourth Leg of the Apple: A Tutorial is a complete user-friendly teaching package for the hobby use of the Apple II Plus or //e. The tutorial starts where the Apple manuals stop to take the Apple user over the next "hump" in the hobby use of the computer. The tutorial begins with a clear explanation of HEX and then proceeds to the 6502, DOS, the memory map, internal input-output, the Monitor through utilities and cards. FORTH was chosen as the alternate higher level language. The disk contains a working introduction to FORTH to complement the written material. Finally, machine-language is fully introduced with an excellent working assembler on the disk $49.95.
Circle HelpCard No. 148
Brinker Computing
2775 Tessmer Road
Ann Arbor, MI 48103
(313) 662-6386



English Grammar is designed to teach parts of speech to students in any grade or age level. This 2 disk program can create student's disks for use in a variety of educational settings. The Student Disk can drill any combination or all parts of speech. It can also be set to use a specified number of sentences in each session. The sentences used can be modified by a parent or teacher to match the reading level of the students. It is an excellent program for home learning and for foreign students learning the English language. Student's results are stored on disk for viewing by teacher or parent $45.00 plus $3.00 shipping and handling. For any Apple II.
Circle HelpCard No. 149
T.H.E.S.I.S.
P.O. Box 147-E
Garden City, MI 48135
(800) 354-0550; (313) 595-4722 (MI)

The CP/M WorkShop is a fast way to get friendly with your personal computer. The WorkShop doesn't just explain how to control your computer - it performs the important commands while you watch. You get realistic interactive practice sessions. Animated diagrams clarify the concepts, with practical examples in a split-screen demo area. You control the pace, and a game-like review session lets you privately validate your progress. Available for Apple and dozens more computers, some of which are still being made. System requirements: CP/M-80 Ver. 2.2; 48K available memory; 24 x 80 cursor-addressable display.
Circle HelpCard No. 150
Datascan
2716 Ocean Park Blvd., Suite 1064
Santa Monica, CA 90405
(213) 452-9114

PLATO Courseware challenges kids to reach their learning goals through such action concepts as darts, pinball, hangman and highly interactive graph. It coaxes and guides students and rewards them with the feeling of accomplishment. All PLATO micro courseware is available for the Apple II or //e. There are lessons in Math, including Basic Number Facts, Whole Numbers, Decimals and Fractions; Foreign Language vocabulary builders in French, German and Spanish; a Physics lesson in elementary mechanics; Computer Literacy that introduces kids and novices to the computer age; Computer Concepts that provide a springboard to more advanced computer lessons; and a Keyboarding lesson that uses the famous Gregg typewriting approach to teach keyboarding techniques.
Circle HelpCard No. 151
Control Data Publishing Co.
P.O. Box 261127
San Diego, CA 92126
(800) 233-3785 (CA); (800) 233-3784

Super Speed Reading teaches you to read up to 10 times faster with improved comprehension. You learn in easy to follow steps. You go from one speed plateau to the next until you reach the high speeds you want. Perhaps 800, 1500 or 3000 words per minute. The on-screen directions include dramatic graphics which make every example crystal clear, even for a youngster. The screen text is in upper & lower case (in your choice of 3 type styles) all without extra hardware. You'll find 120 on-disk story pages for reading practice. Plus sections devoted to business, school and computerist use. There are places to keep everybody's records with charts to show your progress. A special Flash section displays hundreds of phrases at speeds from 100 to 10,000 words per minute $149.00. Includes 2 disks and manual for any Apple II and disk with DOS 3.3.
Circle HelpCard No. 152
Magnum Software
21115 Devonshire Street, Suite 337
Chatsworth, CA 91311
(213) 700-0510

Financial

The Investor's Toolkit introduces sophisticated analysis and price management for your Apple with $330 worth of software for only $199.00. Chart Trader Plus contains single or multiple moving averages, overbought/oversold indicator, high/low price band, moving averages oscillator, percentage price band, constant price band, daily open, high, low, close bar chart, graphs of 10 to 240 days, relative strength index, on-balance volume, and a volume and open interest graph that

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222 So. Riverside Plaza
Chicago, IL 60606
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Pine Brook, NJ 07058
(800) 225-0076; (201) 882-0466 (NJ)
Not-For-Profit Funds Accounting was designed specifically for such organizations as: Chambers of Commerce; Churches and Charities; Municipalities; Professional Societies; Trade Associations; Clubs and Civic Groups. Provides complete financial reporting with up to 99 separate funds. Prints journals and ledgers, balance sheet and revenue/expense statements. Funds Accounting System $750.00, Association Management Package $1000.00.
Circle HelpCard No. 155
Executive Data Systems, Inc.
290 Interstate North, Suite 116
Atlanta, GA 30339
(404) 955-3374

TaxCalc is a tax planning program which allows the computation of income tax variables and actually selects the lowest tax alternative. Using VisiCalc, SuperCalc, 1,2,3, or Multiplen Templates, TaxCalc is compatible with most personal computers now on the market. This spreadsheet template was designed for the rapid calculation of income taxes, tax-planning functions, and to verify existing tax returns. TaxCalc input lines follow IRS forms. Computations include capital gains deductions, capital loss limitations, contribution limitations, and the two-earner married couple deduction. Tax Calc also calculates the income averaging tax, minimum tax, alternative minimum tax (including tax credit limitations), and then selects the lowest alternative. The user can actually see the results of tax variables and "what if?" scenarios. Provides hard copies as a permanent record $125.00.
Circle HelpCard No. 156
TaxCalc
4210 W. Vickery
Fort Worth, TX 76107
(817) 738-3122

Investors Management Information System provides financial brokers and dealers with portfolio management, mail list management, full investor reports, interconnections to external information sources, and word processing. It offers such reports as capital gains and losses schedules, product ledgers, sales information, and maturity & expiration reports. The system has over 30 screens and reports selectable through layered menus. Personalized for each broker/dealer with their name integrated in report and screen titles. The user can further adapt I.M.I.S. to pattern their existing client and securities handling methods. Future options include automatic dividend reinvestment, sales entry with commissions payable, and accounts receivable. Available for the Apple, PC-DOS and most CP/M systems.
Circle HelpCard No. 157
Computer Applications Services, Inc.
12535 Seal Beach Boulevard, Suite 210
Seal Beach, CA 90740
(213) 493-2411

AG COUNT, a farm accounting program is available on demo disks. The $45 cost covers the complete 110-page manual and four demo disks. The manual was written for beginning and experienced Apple Computer users. When the complete $600.00 AG COUNT program is purchased, the $45 demo disk fee will be applied against the full cost. This program was written for the Apple ///, however, there is also a version for any Apple II computer. Farmers and agribusinessmen may obtain free brochures and printouts.
Circle HelpCard No. 158
Ag Plus Software
906 S. Main
Ida Grove, IA 51445
(712) 364-2135

OpVal's stock option software takes just 18 seconds to evaluate 96 options. It's electronic displays combine the ease of menu driven operation with the speed and flexibility of spreadsheet software. OpVal can help refine your grasp of option strategies, track your risk/reward potential and locate better trades. Whether you are a seasoned professional or a novice, put OpVal to work for you. Features include forecasts of adjusted Black-Scholes option prices for stock, index and commodity options, warrants, and convertibles, recall of security information from disk, retrieval of market prices from Dow Jones or keyboard entry and an auto calendar. Prints any page with one keystroke. Analyzes simple strategies and extensive positions. Graphs position vs. future underlying security price or vs. calendar $250.00.
Circle HelpCard No. 159
CalcShop Inc.
P. O. Box 1231
W. Caldwell, NJ 07007
(201) 228-9139

Expense Account Manager is the first microcomputer software package designed specifically to organize and track travel and entertainment expenses for the company executive and individual professional. Features easy entry and corrections of expenses, reminders of expenses that are often overlooked, prompting for specific information required by the IRS and budget projections. For individuals who must charge out their expenses by client or project, an option to provide subtotals in this fashion is included. A table of frequently traveled trips is maintained to allow consistent reporting of auto mileage. The system automatically reconciles travel advances and tracks reimbursements. An interface to VisiCalc is provided to allow ad-hoc reporting of the expense data. The system can also print out of pocket recording sheets that can be used to record expenses as they are incurred. The user can readily change the definitions of the expense items, budget lines and subtotals without any computer programming. For any Apple II - requires 48K and 1 or disk drives and a printer $150.00.
Circle HelpCard No. 160
Adaptive Software
1868 Cavell Avenue
Highland Park, IL 60035
(312) 831-4420

BACK-UP ALMOST ANYTHING!

Products below, when used appropriately, either singly or together, will enable you to copy virtually all software for the relevant computer. The copy-products are intended to be used for back-up purposes only! Products are Apple-compatible unless otherwise indicated.

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Money Street, a new checkbook financial system features up to 100 user-defined charts of accounts, unlimited checking accounts, six items a second search screen, wildcard searches, and screen sorts. It prints 15 different reports, a "trial reconciliation", or account totals. It even creates an easy to access cancelled check file. The program loads quickly - just eight seconds $99.95. Requires an Apple II or IIe or /// in emulation mode.
Circle HelpCard No. 161
Computer Tax Service
PO Box 7915
Incline Village, NV 89450
(702) 831-4300

Three **new templates for VersaForm** are now available: Mailing List Template, Expense Journal/Distribution Template and Cash Receipts Journal Template. Each template includes a user manual, a diskette that provides a screen format, form print formats, a set of preconfigured management reports and a starter set of business forms where appropriate. The Mailing List Template provides a database design for storing, retrieving and printing mailing labels and full features. Expense Journal and Cash Receipts Journal Templates feature screen formats similar to a journal entry page. Provides automatic checking and filling features to ensure consistent and accurate entries. Reports produce sorted, detailed lists or summaries of expenses or cash received by accounts or subaccounts. Each is $39.95 and requires VersaForm.
Circle HelpCard No. 162
Applied Software Technology, Inc.
170 Knowles Drive
Los Gatos, CA 95030
(408) 370-2662



The Tax Byte '83 handles 1983 taxes. It will prompt you for data and print any of the various forms listed: Form 1040 - U.S. individual Income Tax Return, The following schedules: Itemized Deductions (A), Interest and Dividend Income (B), Profit or Loss from Business or Profession (C), Capital Gains and Losses (D), Supplemental Income (E), Income Averaging (G), Deduction for Married Couple when Both Work (W), Supplemental Gains and Losses (FORM 4797), Alternate Minimum Tax (FORM 6151) and Short and/or long Term Installment Sales (Form 6252). Features addition or subtraction ability on tax lines $69.95.
Circle HelpCard No. 163
Century Software Limited
10443 North Cave Creek Road, Suite 105
Phoenix, AZ 85020
(602) 944-5533

The **BPI Personal Accounting System** is an advanced personal money management tool to plan a household budget, reconcile up to ten different checking accounts monthly, record credit card charges on ten different charge accounts, and even print checks automatically on your printer. Generates printed reports for control of personal finances. A profit and loss statement summarizes income and expenses and compares them to your budget, and a listing of your accounts shows their balances and current activity. Generates two different printed statements of net worth that summarize your assets and liabilities - one statement according to cost and the other according to fair market value. Also prints an amortization schedule showing the interest and principal portion of each payment on a loan or mortgage.
Circle HelpCard No. 164
BPI Systems
3423 Guadalupe
Austin, TX 78705
(512) 454-2801

Games/Simulations

The Bilestoad is the only thing worth living or dying for. This is a barbaric game of skill set in future time. Here, in an oppressive future, there is only one glory, honor and worthy achievement. When you enter The Bilestoad you are equipped as a gladiator of the past. Using sheer force, you battle your way from island to island, against another human opponent or computer guided robot. You make use of the hi-tech devices within the nightmarish Bilestoad to fight a game of tactics and strategy covering 39 levels and 44 battlegrounds to finally achieve Master status. Contains explicit violence and bloodletting and may not be suitable for the young or impressionable $39.95.
Circle HelpCard No. 165
Datamost
8943 Fullbright Avenue
Chatsworth, CA 91311-2750
(213) 709-1202



Planetfall is a lighthearted science fiction game from Infocom. It takes players on a colorful and exciting journey into the far reaches of the galaxy. In Planetfall, your humdrum life as an Ensign in the "Stellar Patrol" suddenly takes on new meaning when you're spacewrecked on a doomed and plague-stricken planet. Your challenge will be to save this unknown corner of the universe and, at the same time, keep a straight face. Fortunately, you won't be alone. Once on the planet's surface, you'll soon meet up with a charming and mischievous robot named Floyd, who'll be your constant companion in this highly interactive adventure. The robot character is exuberant, funny and sometimes unpredictable $49.95.
Circle HelpCard No. 172
Infocom, Inc.
55 Wheeler Street
Cambridge, MA 02138
(617) 492-1031

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Chatsworth, CA 91311
(213) 709-1202

The High Gods are searching for a replacement for **Randamn**, the powerful Demigod of random events. Accept the challenge and you enter a universe of randomness. There are 7 totally different worlds in Hi-Res Graphictron animation, including the eerie Graveyard, ancient Stonehenge, and the piratical Undersea Land. In each, it will take all your wits and skill to fight and think your way through 7 stages of ever-increasing difficulty. At each world's seventh stage you meet 7 opponents at once. Which ones? If you win, your reward is great! $34.95. Joystick recommended - for any Apple II.
Circle HelpCard No. 166
Magnum Software
21115 Devonshire Street, Suite 337
Chatsworth, CA 91311
(213) 700-0510

Stellar 7 is the ultimate 3-D strategy arcade game by Damon Slye. Stellar 7 features smooth hi-res animation, a colorful instrument panel, and 7 unique levels, each more challengng than the last. Inside RAVEN, an experimental Agrav Unit, is Earth's only defense against the Imperial Arcturan Armada. Commanding RAVEN, you will face Arcturan laser tanks, pulsars, sandsleds, assault batteries, prowlers, skimmers, seekers, guise mines, and the rest of the rampaging Arcturan assault. Your wits and RAVEN's biphasal thunder cannon are all that stand between a helpless Earth and the wrath of the Arcturan Armada $34.95 plus $2.00 shipping and handling.
Circle HelpCard No. 167
Software Entertainment Company
P. O. Box 10854
Eugene, OR 97440
(503) 342-3495



Forbidden Quest is the first in a series of Artext adventures combining spellbinding prose and five 8.5 x 11 inch original graphic art prints. Clues within the 5 prints must be cleverly deduced and applied to solve your quest. As the hero in this science fiction thriller, you alone are responsible for your fate. You must call upon all of your skill and cunning to prevail against hostile environments and treacherous aliens to attain the ultimate conclusion. The beautiful princess in the illustration is one of the many challenges you will face in conquering the worlds of Forbidden Quest $39.95 plus $1.50 postage.
Circle HelpCard No. 168
Pryority Software, Inc.
25570 Chiquito Place
Carmel, CA 93923





Circle HelpCard No. 26

Ringside Seat packs all the right punches to make it the uncontested heavyweight champion of boxing games. It lets you set up your own championship matches, choosing from among fifty of the best fighters of all time. Now you can answer all the intriguing questions in boxing: Who really was the greatest? Could Joe Louis outwit Muhammed Ali? Could Jack Dempsey outslug Larry Holmes? Ringside Seat recreates every champion's authentic style and the strength, speed and stamina he had in his prime. As his manager, you tell him how to fight: stick and move, cover up, go for the knockout. The semi-animated Hi-Res color display shows you the fight in the ring as it happens, blow-by-blow, round-by-round. This two-player and computer-as-opponent game also allows you to make up your own fighters by rating them for style, speed, aggressiveness, strength and a dozen other factors $39.95. Requires any Apple II with 48K and Applesoft ROM.
Circle HelpCard No. 169
Strategic Simulations, Inc.
883 Stierlin Road, Bldg. A-200
Mountain View, CA 94043
(800) 227-1617 ext 335; (800) 772-3545 ext 335 (CA)



Caves of Olympus is set on the fictional planet Olympus which has been reduced to rubble during a recent invasion. All that remains on the planet is a vast network of caves and caverns. The player assumes the identity of Emperor Anson Argyris, the sole survivor. Argyris must maneuver through the caves, avoid Laren invaders and malevolent robots, board and launch a hidden escape ship, and ultimately leave the planet. Special effects and Hi-Res color graphics, 12-page manual with hints for play $39.95. Requires Apple II compatible system with Applesoft in ROM, DOS 3.3, 48K RAM, and one disk drive.
Circle HelpCard No. 170
Howard W. Sams & Co., Inc.
4300 West 62nd Street
Indianapolis, IN 46268
(317) 298-5400



Windo-Wizardry high resolution display manager for the Apple II is introduced with a new adventure game caled "Legacy of Llylgamyn." Each window has several attributes which allow the software to generate and maintain an image on the screen. These include the window's size, position and priority. When windows overlap, the window with the higher priority is visible while lower priority windows are hidden "behind" it. When windows are moved, the contents of previously obscured windows may become visible. The Wizardry fantasy software series is famous for its depth of play and three-dimensional maze. Legacy of Llylgamyn is a masterful blend of storyline and computer software innovation. It

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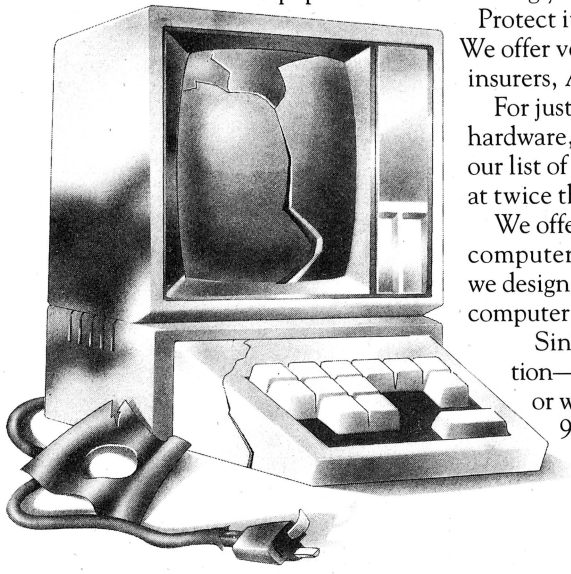
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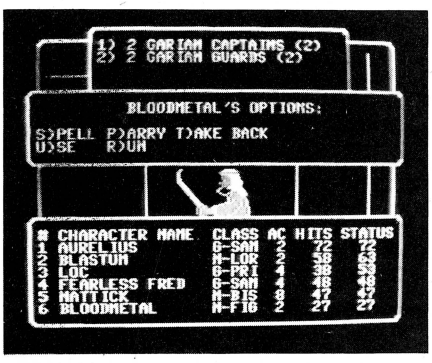
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Buzzard Bait pits the player against up to 3 pairs of amusing but deadly birds who prey on humans in order to feed their young. The player in his ship is on a rescue mission to save the people from their fate. The game can be played with either a joystick or a keyboard. For any Apple II or IBM-PC computer $39.95.
Circle HelpCard No. 173
Sirius Software, Inc.
10364 Rockingham Drive
Sacramento, CA 95827
(916) 366-1195

Graphics

Fontrix extended screen graphics software extends the Apple II Plus-//e Hi-Res screen to sixteen times it usual size. It can generate unlimited fonts, and lets you type and draw directly onto the Hi-Res screen for stunning mixtures of text and graphics. It will print normal and extended graphics to over 24 different dot matrix printers $75.00. You'll have to see the beautiful printouts to believe the high resolution and readability of "typesetting quality" print.
Circle HelpCard No. 174
Data Transforms
616 Washington St., Suite 106
Denver, CO 80203
(303) 932-1501

The **Dithertizer IIe** is an innovative interface card which converts an image focused with a video camera into a digital image which can be displayed by the Apple //e. Its low cost of $649.00 includes video camera necessary for input. Supplied with software for image contouring as well as dithering. Displays up to 64 pseudo gray levels in dither mode. Standard package supplied contains the interface card, software, camera and appropriate cabling. CEGS graphic dump supports 37 printers. Accessory Kit for use with Apple II Plus owners $10.00. Complete Portrait Subsystem $899.00 for Epson MX/FX-80 only.
Circle HelpCard No. 175
Computer Station
11610 Page Service Drive
St. Louis, MO 63146
(800) 325-4019; (314) 432-7120 (MO)

VectorScan 512 color and monochrome graphic controller provides high resolution graphics on any comptuer wih an RS-232 serial port. Features include 512 x 480 pixels x 16 colors/intensities; color lookup table; internal character generator for horizontal and vertical axes; simple ASCII command structure; internal Line, Arc, Circle, Point, Programmable Shape and more. An extra RS-232 connector allows "loopthrough" operation. An internal microprocessor has 8K of firmware and 128K of video RAM. Also provides an internal printer port for hardcopy on low cost matrix printers. Firmware is expandable to 16K, programmable shape table to 3K. RGB output is IBM-PC compatible allowing low cost monitors. Includes firmware for IDS color PRISM printers. Works with Apple and most other computers. Operating systems include: CPM-80, CPM-86, PC-DOS, MS-DOS, UNIX, OASIS, RT-11 $975.00. Programmers manual only $3.00.
Circle HelpCard No. 176
Applied Data Systems
9811 Mallard Drive, Suite 213
Laurel, MD 20708
(301) 953-9326

The Arcade Board is a sprite-graphics and sound effects board for any Apple II computer that generates true aracade-quality color graphics and sound effects. Uses a special-purpose video and sound chips used by many of the popular coin operated video arcade game machines. Features include 16 colors available simultaneously in all 3 graphics modes, two hires modes with a true resolution of 256 x 192, 32 sprites, 35 prioritized planes (higher priority automatically passes over lower priority). 16K on board RAM for storing up to 14 pages of high resolution 16 color graphics, lores mode of 64 x 48, flicker-free viewing, 3 independent tone channels with 9 octave range and separate volume controls, 1 noise generater, automatic envelope control, 16 software selectable filters and only one monitor or TV is required. Interfaces easily to BASIC but with the speed of machine language. Comes with an 80 page manual and tutorial, a demo disk, with over 20 program demos, games and utilites as well as the over 40 extra BASIC commands $225.00.
Circle HelpCard No. 177
Third Millennium Engineering Corp.
1015 Gayley Avenue, Suite 394
Los Angeles, CA 90024
(213) 473-2102

Number Nine Graphics System package provides high quality, low cost computer graphics capabilities by upgrading the color, resolution, and drawing speed of the micro to that of more expensive systems. The system provides resolution up to 1024 x 1024 points, 16 colors at 512 x 512, and an optional 4,096 color lookup table. The processor, operating at a speed of up to 5.5 MHz and a video data rate of 88 MHz, provides fast, vivid, and high quality displays. It frees up memory normally used for graphics display, allowing for expanded program size and capability. Can be connected to any RGB monitor. Software packages offer drawing and design, font generation and display, color print display, video digitizing and colorizing, and a set of primitives callable from BASIC or Pascal. They provide fast execution and the ability to draw arbitrary vectors, arcs, rectangles, and characters. Additional features include pan, scroll, zoom, split screen, area fill, high speed cursor and character zoom and rotation. Software package prices range from $95.00 to $245.00. The Number Nine Graphics board with 512 x 512 resolution with 16 colors is $895.00
Circle HelpCard No. 178
Visual Data Enterprises
P.O. Box 30563
Los Angeles, CA 90030
(213) 250-4977



Artist Designer II is a system for the production of art work on the Apple II microcomputer. It draws with paddles with five ways to draw including dot textures, zigzag and all kinds of curves. Music Designer II is a package for the production of musical compositions on the Apple II computer. Makes full use of the ALF three voice synthesizer including multiple scales, volume, attack, sustain, decay and tone control. They are currently being used at the college level, but they are also appropriate for high school art and music classes as well as for personal enrichment. Both programs can be used independently or

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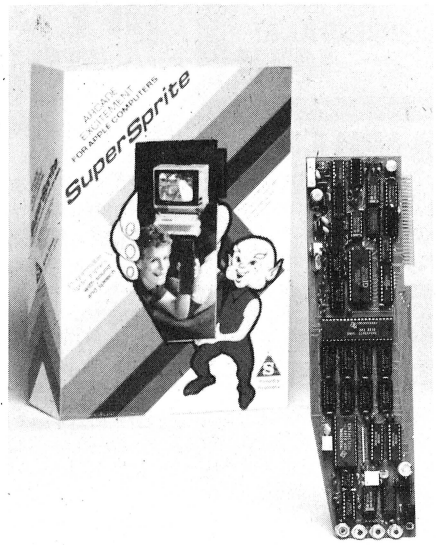
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together. Each has a software interface built-in to allow communication with each other on separate computers. An art performance played by Artist Designer II on one computer can be accompanied by a music performance played by Music Designer II on another computer. Requires 64K memory on any Apple II. Music designer requires a three voice ALF music synthesizer (MC 16). one disk and manual $49.95, one disk, backup disk and manual $56.95, one system interface cable $39.95, shipping $2.50.
Circle HelpCard No. 180
CAPS Software
4024 Alto Street
Oceanside, CA 92056
(619) 724-0492

The **SuperSprite board** allows numerous animated objects to occupy the screen at the same time, each independent of the other or the background graphics; in effect, three-dimensional animated games or educational programs. The animated object (sprite) can be anything the user chooses to create, for example, a rocket ship, race car, dragon, or cartoon character. Provides up to 32 different sprites moving on the screen simultaneously. The animation is fast and flicker-free. Offers sixteen colors for sprites and patterns, and additional colors can be created by mixing two or more standard colors. The Ampersprite language included allows the user to easily program sound effects and graphics from Applesoft. It also contains the Echo II speech synthesizer to add actual speech to the audio and animation sequences. Includes utilities, Operator's manual, Echo II speech synthesizer, a speaker and demo diskettes $395.00.
Circle HelpCard No. 179
Synetix, Inc.
15050 N.E. 95th
Redmond, WA 98052
(206) 881-7110; (800) 426-7412



Demografix is a software package that allows any owner of an Apple II or compatible system the ability to produce a highly professional looking graphics presentation at a fraction of professional costs. With this package and your own Apple graphics, you can simulate a slide-show type of presentation in any of three modes: automatic or unattended with user specified duration, manual or keyboard controlled, or remote using a hand controller. Allows up to 71 different combinations of loading and displaying your slides such as Flash, Melt (3), Scroll (4), Snap, Spiral (2), Fixed display, Shine display, Ghost display (2) and Wrap display (2). Mix and match any load (except flash) with any display for your presentation. Minimum time required for loads are less than two seconds, but many load speeds can be user specified $129.95 (includes hand controller). Requires a 48K Apple II or //e or compatible system, two floppy disk drives, and optional printer and remote hand control unit. Demografix software only $89.95.
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Business Logic
5326 Brookwood
Kentwood, MI 49508
(616) 455-2598

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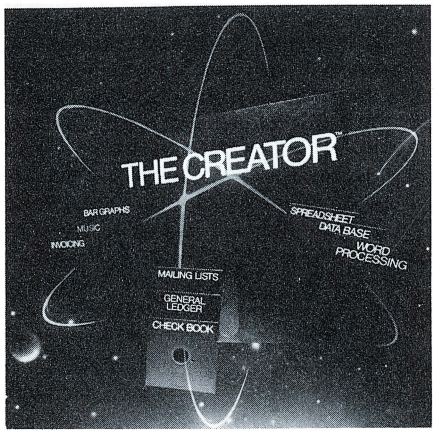
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bitCards
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Plantation, FL 33317
(305) 473-4741



The Astronomy Pac comes with detailed instructions and is simple enough for beginners (recommended for ages 12 through adult) but is so powerful even advanced astronomers will find it invaluable. Perfect for teachers and students. The program generates its own almanac data and contains information on Aries and 57 of the most prominent stars. This enables the user to print the locaation of these stars for any time - 1983 until the year 2000, from any location on Earth. The package also includes a star identificaton program. Anyone who has ever used a mechanical starfinder will delight in the ease of use and precision of this program. Tell the computer the time and date and your approximate position. Then input the height of the star (measured using the simple astrolabe included in this pac), and the aximuth (compass bearing) as measured using the included compass. The computer then determines which star you observed and displays its name and constellation. Complete with software, instructions, astrolabe, compass, and book "The Stars" by H. A. Rey $59.95.
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Circle HelpCard No. 192
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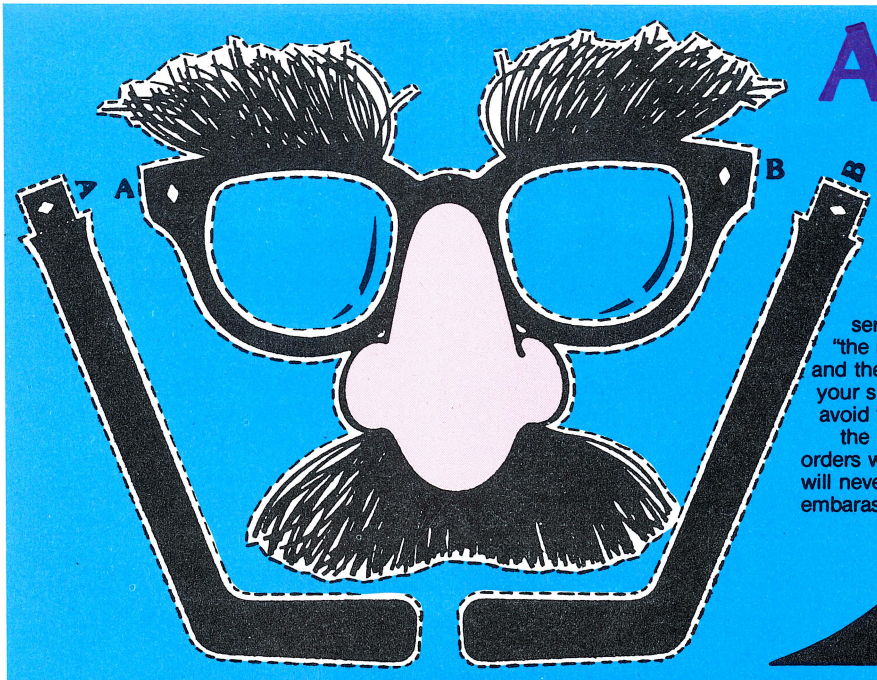
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Utilico Software
3377 Solano Avenue, Suite 352
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(707) 257-2420

DBPlus runs outside of dBASE II, and performs the following important functions on dBASE II data files: Sort, Compress/Decompress, Transform. In most cases all you have to do is move the cursor to the next menu item and press return. It can sort a data file up to 15 times faster than dBASE II on a single field; 32 fields may be sorted in a simgle pass, and each additional field requires 1% more sorting time. Compressed files are generally only 30 to 40% of the original size which saves transmission time and archival storage space. With the transform capability you can now modify the structure of any data file, by adding, deleting, and modifying fields, without any programming knowledge. It can also create a new file which is compatible with WordStar/MailMerge $125.00.
Circle HelpCard No. 195
HumanSoft
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Merrit Software, Inc. specializes in affordable data security solutions. They have implemented the **RSA public key** algorithm with key sizes that begin with 77 digits. A variety of single key systems are also available. DES systems can be vastly improved by using public key technology for key exchange. Other encryption modules or specialized routines can be made available to meet your company's needs. Black box options are available for any system using RS232 serial ports. Also available with your choice of encryption algorithms.
Circle HelpCard No. 197
Merritt Software, Inc.
P. O. Box 1504
Fayetteville, AR 72702
(501) 442-0914

Word Processing

Spellbinder delivers the capabilities and programmability of the most advanced word processing systems. You can create forms - to fill out the forms, just fill in the blanks on your computer screen. Spellbinder can print the information on preprinted forms paper. It will even do the math for invoices, estimates and other documents with numbers. Proportional character spacing is available by just choosing that option. You can define different margins for printing pages back-to-back, and select from many options for page and page title formats, multiple copies, and two-column printing. You can change spacing, fonts, or other features in the same document. Insert addresses in form letters - logs each letter and files it to your disk automatically. A built-in calculator performs addition, subtraction, multiplication and division automatically down columns or across rows. Features cut-and-paste, copy, delete text. Indents whole paragraphs in a single command. You can store commonly used phrases and paragraphs to insert into your text with a single keystroke. Extensive search/replace options. Works under every major 8-bit and 16-bit microcomputer operating system.
Circle HelpCard No. 198
Lexisoft, Inc.
Box 1378
Davis, CA 95616
(916) 758-3630

Word Handler, one of the nation's best-selling word processors is compatible with the Apple //e. It has numerous excellent features, the outstanding one being that you see, on the screen, exactly what the final printout will look like. This includes centering, bold face, underlining and superscript. Other sophisticated functions, such as virtual memory storage, are included. The price has been reduced from $199 to $59.95, along with their List Handler from $99 to $49.95. These two packages are also offered together for $89.95.
Circle HelpCard No. 199
Silicon Valley Systems Inc.
1625 El Camino Real, Suite #4
Belmont, CA 94002
(415) 593-4344

Punctuation & Style takes the worry out of writing by automatically catching dozens of different punctuation errors, both common and obscure. In addition, P&S catches unpaired format commands (underline, boldface, etc.), doubled words, and more. P&S gives you a critique of your writing suggesting alternatives for commonly misused or over-worked phrases. It also shows where active voice can replace passive voice to add clarity and precision. It works easily with most CP/M word processors.
Circle HelpCard No. 200
Oasis Systems

The Word Plus is the standard by which other spelling checkers are measured. It has a real 45,000 word dictionary that shows errors in context. Interactive word loop-up finds correct spelling for you at the push of a button. Hyphenates words automatically too. Solves crosswords, puzzles, and anagrams. Works with almost any CP/M, CP/M-86 or MS/DOS compatible word processing program (WordStar, Magic Wand, Spellbinder, Perfect Writer, Select, Final Word, Volkswriter and more).
Circle HelpCard No. 200
Oasis Systems
2765 Reyard Way
San Diego, CA 92103
(619) 222-1153

FirstDraft adds valuable features to WordStar or your favorite CP/M word processor. New features include an automated table of contents and index with automatic updating. Document-level file naming and status reporting and outline-level control of document contents is accomplished in data base fashion. Uses standard outlines and text templates for repetitive documents recognizing six diferent outlining conventions. It will create outlines and templates from any document file. Manages boilerplates with variable substitution by reference - without text editing. Automatic paragraph renumbering and outline updating are built-in. Whatever word processor you're now using, this software will make it more productive. FirstDraft $195, with optional DocuMentor program $390. Requires an 8-bit CP/M system or an Apple II with CP/M card.
Circle HelpCard No. 201
PromptDoc, Inc.
833 W. Colorado Avenue
Colorado Springs, CO 80905
(303) 471-9875

BOOKS/CATALOGS

Will Someone Please Tell Me What an Apple Can Do? is an introduction to the many computer applications available to you. The purchase of an Apple is a financial commitment. With increased use and multiple applications your computer can be very cost-effective. It will help you maximize the use of the computer in your home or business. $12.95
Circle HelpCard No. 202
Softalk Tell
Box 60
North Hollywood, CA 91603



A new medical newsletter, ***Physician Computer Monthly***, provides information to the growing number of doctors who use micro and minicomputers in their practices. This 12-page, independent periodical covers computer applications for practice management, patient care, continuing medical education, and communications. Written in non-technical language, this monthly emphasizes practical uses of computers by physicians. A one year subscription is $95.00. A sample issue will be provided free to physicians upon receipt of letterhead request. Non-physician samples are $2.00 each.
Circle HelpCard No. 203
Physician Computer Monthly
American Health Consultants
67 Peachtree Park Drive, N.E.
Atlanta, GA 30309
(404) 351-4523

1983-84 Swift's Educational Software Directory - Apple II Edition boasts a 90% increase in software listings. It is organized by subject, with a special Publisher Information section and Master Index, and an enhanced format for entries including Apple IIe software compatibility $18.95.
Circle HelpCard No. 205
Sterling Swift Publishing Company
7901 South I-35
Austin, TX 78744
(512) 282-6840



Don't go to bed without your pajamas.

COMPUTER PAJAMAS from Perfect Fit Enterprises. Finally. A quality way to protect your investment. For your computer, printer and CRT terminal.

This inexpensive top quality cover is an attractive solution to protecting your electronic investment. Helps prevent static generated by your CRT's and printers and eliminates dust and buildup that can cause computer failure and damage of intricate circuitry. Dirt and dust over extended periods of time can harm your computer and reduce its useful life. So why not have it look great and be safe at the same time.

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Combines cleaning formulation with Anti-Static



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- Completely eliminates static.
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☐ Yes, Computer Pajamas and Perfect Vision sound like a great deal. Please send me the below. With my initial order of Computer Pajamas please also send 1 free bottle of Perfect Vision Advanced Anti-Static Cleaner worth $3.50.

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Perfect Vision	_____	(for 1-11 quantity) (for 12 or more)	_____	3.50 2.90	_____ _____
				SUBTOTAL	_____
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				6% Sales Tax for California residents only	
				TOTAL Enclosed $	_____

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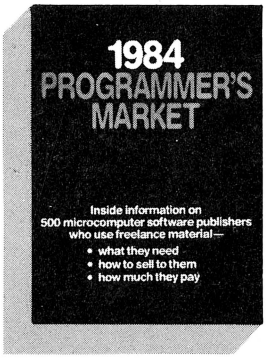
Zip _____

A

Send check or money order:
Perfect Fit Enterprises, 2841 Cazadero Road, Carlsbad, CA 92008, (714) 497-4824.

Circle HelpCard No. 44

WHERE TO SELL YOUR PROGRAMS



Edited by Brad M. McGehee

1984 Programmer's Market is a brand new directory featuring 500+ listings of software and arcade game publishers, plus computer magazines who buy freelance computer programs. Each listing gives contact name, address, submission requirements, pay rates, and tips from the buyers to help you target your efforts.

You'll also find five articles on *how* to sell your programs–how to:

- prepare a query letter and proposal package for submission
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- document your program
- write user-friendly software
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Send to: Writer's Digest Books 9933 Alliance Road Cincinnati, Ohio 45242

1299

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User's Guide to Microcomputer Buzzwords by David H. Dasenbrock is written for people who don't necessarily care what happens inside a microcomputer, but who want to be able to communicate with people who do. This information-packed guide gives the origins and meanings of hundreds of computer terms. From "abort" to "Z-80," the author covers computer vocabulary in clear, concise language, generously illustrated with photos, line drawings and charts. Helps executives, professionals, students, business people and others understand computer terminology and jargon easily $9.95.
Circle HelpCard No. 210
Howard W. Sams & Co., Inc.

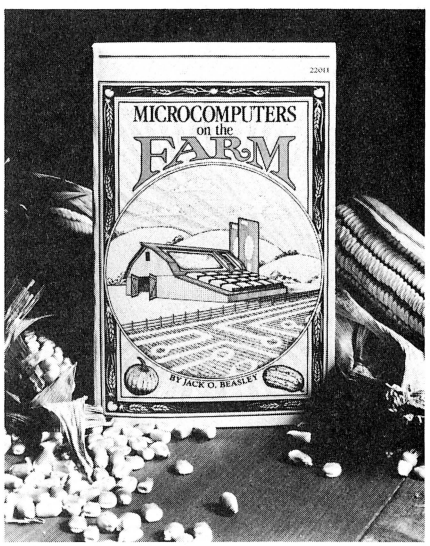


How To Effectively Market Your Computer Software is a sourcebook for those marketing and/or developing computer software. Subjects covered include copyright procedures, license agreements, software distributors, information on over 150 computer magazines and publications, software directories, cassette and disk duplication, software author's markets, and more $19.95.
Circle HelpCard No. 207
Celestial Software
3010 Warrington Avenue
Lakeland, FL 33803
(813) 686-3311

Discover a unique approach to BASIC programming. In ***Computer Literacy***, programming concepts are logically introduced as the student needs them to complete the problems and activities. This book encourages a problem-solving, hands-on exploration of the computer. It also includes a history of computers and a realistic discussion of the computer's effect on society. It's a perfect learning tool for schools, camps, workshops, or individuals. Covers programming and communications with appendices of computer periodicals, directories and examples $15.95 (paper), $18.95 (cloth).
Circle HelpCard No. 208
Reston Publishing Company, Inc.
11480 Sunset Hills Road
Reston, VA 22090
(703) 437-8900

WordStar in Everyday English by Maris H. Goudiss is written specifically for the person who knows absolutely nothing about a computer. This 160 page book is organized by the job that needs doing, not be computer function. Is double spacing needed? In the WordStar manual that is listed under "dot operation" or "printing functions." The category in this book is "double spacing." There are no practice letters or exercises in this book rather, practice is done on the job at hand, and when the first steps are mastered, a useable piece of work will be the result.
Circle HelpCard No. 209
Devin-Adair Publishers

Microcomputers on the Farm is a hardware and software buying guide to farm businesses. It describes how microcomputers can be used in farm operations for such activities as financial analysis, accounting, record keeping, structured decision making and more. The book discusses farm software vendors, dial-up information services and more. A number of appendices provide support: step-by-step tutorials, for example, offer a generalized crop profit-analysis and land lease comparisons. An extensive glossary lists terms for quick reference $14.95.
Circle HelpCard No. 367
Howard W. Sams & Co., Inc.
4300 West 62nd Street
Indianapolis, IN 46268
(317) 298-5400



Wordstar in Everyday English is the long awaited guide to the best-selling word processing software. It is custom-made for businesses, students, and secretaries alike. The first category is devoted to preparation and care of the computer itself. The seemingly complicated procedures for setting up a software disk and priming the computer for action are clearly outlined. Other sections explain the actual tasks of

word processing, such as double spacing, setting margins, three methods of moving paragraphs, finding one's place, and locating words. Trouble-shooting and problem handling are covered in the third section: How to correct errors, how to know when professional help is needed, and where to find the right repair services $9.95, 160 pages.
Circle HelpCard No. 209
Devin-Adair Publishers
143 Sound Beach Avenue
Old Greenwich, CT 06870
(203) 637-4531

The Computer Dictionary responds to the amazingly rapid expansion in the computer industry. It contains clear, nonthreatening definitions of current computer terminology. It includes both basic terms and newly coined computerisms, all in easy to locate alphabetical order. Contains illustrations to help clarify some terms. 128 pages paperback $4.95.
Circle HelpCard No. 211
Running Press Book Publishers
125 South Twenty-Second Street
Philadelphia, PA 19103
(215) 567-5080



The ***1983 COMPress catalog*** contains one of the most comprehensive listings of software programs in the sciences, English, math, statistics and more. Nearly every author is a teacher or professor involved daily with students using CAI on the Apple computer. The programs they produce use animations, graphics - often with color, and the latest instructional techniques. The 24-page catalog features high school and college level programs including educational games, an authoring language, classroom demonstration material, and traditional student "hands-on" CAI packages.
Circle HelpCard No. 212
COMPress
P.O. Box 102
Wentworth, NH 03282
(603) 764-5831/5225

The ***Minute Manual for Apple Writer //e*** is an easy user's guide to the most popular software program for the Apple IIe computer, containing step by step instructions for basic and advanced procedures. The Minute Manual unravels the mystery of the dot matrix printer by explaining how to access the printing commands for the top selling dot matrix printers: Epson FX and MX, Okidata 92, Gemini 10 and 10X, Prowriter, Apple, and NEC. It is designed to get you started using your computer to do word processing fast without needing to read computer, software and printer manuals $7.95. Optional glossary disk contains commands for all of the dot matrix printers listed and a desktop reference chart $9.95. Add $1.00 shipping per item ordered
Circle HelpCard No. 213
MinuteWare



The ***Minute Manual for DB Master*** contains practical explanations, informative tutorials and sound advice along with step-by-step instructions for creating and using a data base. The Minute Manual's goal is to get you working with your software at the highest possible skill level in the shortest amount of time. Two tutorials are presented, one simple and one more advanced. These tutorials will instruct you from the simple tasks of designing a data base to the powerful features of searching, sorting, report generation, and file restructuring that many have found impossible to comprehend on their own. The Minute Manual for DB Master is a valuable guide for beginners and experienced users alike $12.95. Optional data and utility disk contains sample data from the book $9.95. Add $1.00 shipping per item.
Circle HelpCard No. 366
MinuteWare
P.O. Box 2392
Columbia, MD 21045
(301) 995-1166



Computer Shopper newspaper is full of new and used bargains and unusual items. This is a national publication for buying using or selling computer equipment. A partial index shows headings under: Burroughs, Data General, DEC, IBM, and NCR computers, Altos, Apple, Atari, Commodore, IBM-PC, Heath, HP, homebrew, NEC, Northstar, Ohio Scientific, TRS-80, TI, and Xerox microcomputers. It continues with card readers, disk drives, printers, punched card equipment, tape drives, CRT's, terminals, memory, modems, books, software, CP/M, IC's, help wanted, positions wanted, etc. Although there are many advertisements and want ads, etc., this newspaper (averaging 150¢ pages) also carries articles on applications for particular computers, games, national conferences, software reviews, new hardware

USER-FRIENDLY COMMUNICATIONS WITH THE MODEM II™

With user prompts at all levels of command entry, the Multi-Tech Modem II makes data communications from your Apple II* or II plus* easy on even a bare bones computer. And the keyboard dialing makes communication at 110 or 300 bps simple.

Compatible with other smart modems and Bell 103-type equipment, the Modem II is crystal controlled, needs no serial interface card, provides auto-dial and auto-answer and has a built-in speaker to monitor call progress. That means accuracy!

For more information on the Modem II or the Multi-Modem II™ (a 1200/300 bps full duplex modem for your Apple II), call or write:

MULTI-TECH

Multi-Tech Systems, Inc.
82 – Second Avenue SE
New Brighton, MN 55112
(612) 631/3550



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and other interesting topics. By subscribing, you qualify for 50% off the normal classified rates. $1.95 at newstands and computer stores everywhere or $15.00/ year. (*I heartily recommend this excellent newspaper.—MC*)
Circle HelpCard No. 214
Computer Shopper
407 S. Washington Avenue
Titusville, FL 32780
(305) 269-3211

MISCELLANEOUS

Misco Inc. has introduced its own line of "clean room" **decontamination products**. They are designed to help keep the computer environment clean, and free of dust, fibers, dirt and any kind of abrasive particulate matter that can interfere with equipment performance. The new line includes: Anti-Static Spray, CRT Screen Cleaners, Cleaning Swabs, Platen Cleaners, Plastic Gloves and Lint-free Wipes for use with head, disk and screen cleaners. Misco offers a full line of brand name computer and word processing supplies and accessories through its 96 page full color catalog.
Circle HelpCard No. 222
MISCO, Inc.
404 Timber Lane
Marlboro, NJ 07746
(800) 631-2227; (201) 946-3500 (NJ)



Keep your Apple shining with a new **Truguard Dust Cover**. It is designed and custom-fitted specifically for Apple II computers. Truguard is made from a rugged, static resistant, water resistant, washable material with one piece construction to protect your Apple from dust and spills. It goes on and off in seconds and will keep your system (monitor, monitor stand and computer) looking like new for years to come. $16.95 plus $1.95 for shipping and handling.
Circle HelpCard No. 215
Truguard
Box 228
Clifton, NJ 07011

Professional **molded protective case** boasts dual wall construction with a 1 inch protective spacing between inner and outer wall. It has a molded cavity on the left for any Apple II, and two cavities on the right for Apple disk drives. Prevents component shifting. Built-In handle and high quality inner foam padding. Constructed of high-quality polyethylene - rugged and durable, yet lightweight $109.00. Anti-static dust covers (A-41 included with above) A-41 covers Apple II with Apple monitor and one disk drive (set of two covers) $19.90, A-42 covers two Apple disk drives, stacked $10.90, P-61 covers small printers: Okidata U92 and U82, Epson MX-80, Apple Dot Matrix $10.90, P-62 covers Epson FX80 $10.90.
Circle HelpCard No. 216
P. C. A.
16625 Redmond Way, Suite 107
Redmond, WA 98052
(206) 882-0385

The Desktop Organizer work station comes equipped with adjustable shelves and file or binder divider plates. You can attach the disk-drive storage bay to the freestanding terminal stand. The storage bay features an adjustable shelf and side air vents. The work area measure 60 x 30 x 27 inches, with a ten-inch modem shelf, a desktop organizer for storage and retrieval of binders and files and a disk drive storage bay.
Circle HelpCard No. 217
AVM Data Products
609 North Long Beach Road
Rockville Centre, NY 11570
(516) 764-1222

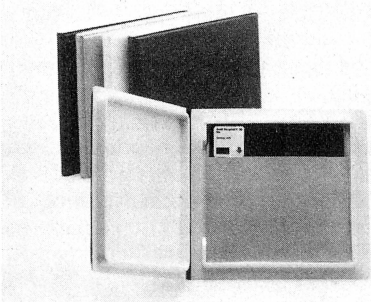
Adding to its line of **Compu-Table** computer tables, Gusdorf Corporation introduces Model 1695. The design of the table makes it suitable for home or office use, computer system or video game equipment. The desk surface can accommodate any keyboard, disk drive or video-game console. An adjustable hutch allows you to place the monitor at a convenient viewing angle. All surfaces are protected from scratches and stains by a Rendura acrylic coating $98.00.
Circle HelpCard No. 218
Gusdorf Corporation
6900 Manchester Avenue
St. Louis, MO 63143
(314) 647-1207

Wake up those over-used diskettes that you have found to be unreliable. The **Bit Scrubber'** can restore used and noisy disks to their original magnetic quality, providing a cost efficient method for "error-free" storage. Help eliminate the expense of purchasing new floppy disks unnecessarily. A strong magnetic field (slot) that you pass the diskette through insures uniform particle orientation as it wipes the diskette "clean" $49.95. Safe for diskettes nearby because it is shielded from producing stray magnetic fields.
Circle HelpCard No. 219
Techstar
8651 N.W. 56th Street
Miami, FL 33166
(305) 592-0201

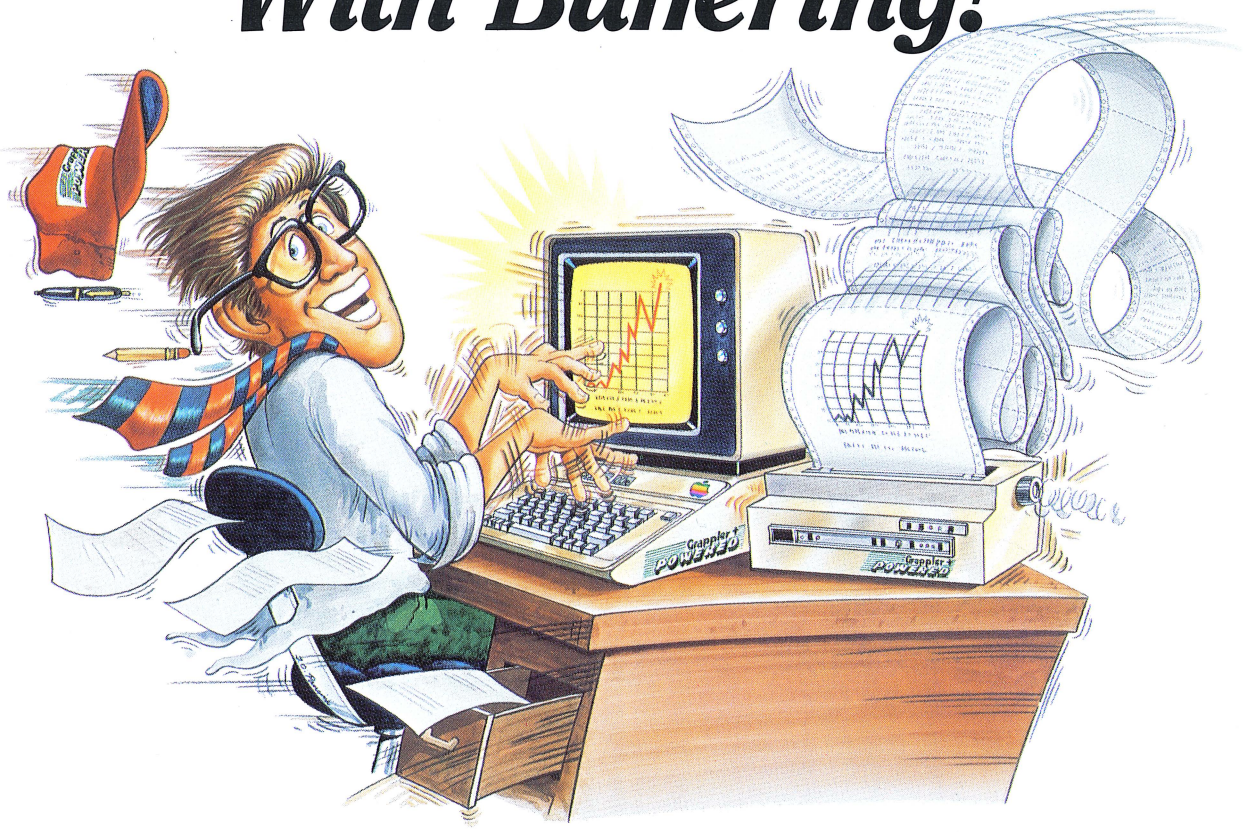
Spectrum Premium quality **diskettes** with jackets in **five brilliant colors** are now available. Diskettes for all 5.25 inch and 8 inch drives are available in fire engine red, canary yellow, bright orange, sky-blue and leprechaun green. Five other subdued pastel colors are also available. Rainbow Packs have two diskettes of each of the five colors for evaluation. Bulk orders of any single color are also available. Use different colors for different jobs such as sky blue for word processing, and leprechaun green for accounting. Or, different colors can be allocated to different people - you'll find dozens of uses.
Circle HelpCard No. 220
Professional Publications
P. O. Box 199
San Carlos, CA 94070
(415) 593-9119

Compucards is a new card game based on binary values. The new deck consists of 64 cards that use binary values (1, 2, 4, 8, 16, etc.) rather than traditional decimal values. 64 cards are distributed in the conventional 4 suits. The new Compucards make old time favorites from simple games like Tug-of-War and Rummy to more complex games like Poker and Bridge easy to play. At the same time it introduces fundamental computer terminology.
Circle HelpCard No. 221
Compucards, Inc.
P. O. Box 4745
Oak Brook, IL 60521
(312) 850-7244

Available in two sizes, this **rigid vinyl case** safely holds 3 or 6 mini diskettes. It can be used as an extra protective covering when mailing or transporting diskettes. Ideal to keep specific diskettes separate, like payroll, taxes, or inventory. Also perfect for schools and libraries; wherever diskettes are handled. PC carrier for 3 mini diskettes (PC-MDC3) - 1 carton of 20 carriers for $65.00. PC carrier for 6 mini diskettes (PC-MDC6) - 1 carton of 12 carriers for $59.40. Available in red, yellow, blue, or white in carton of all one color or assorted. Shipping additional depending on geographic location.
Circle HelpCard No. 223
Ring King Visibles, Inc.
215 West Second Street
Muscatine, IA 52761
(319) 263-8144



Turbo Charge Your Apple® With Buffering!

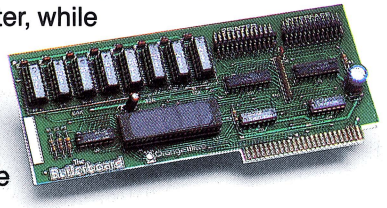


If you use a printer now...

Bufferboard™

For Apples and Printers

The Bufferboard is the original add-on buffer upgrade for existing interfaces. Easily installed, its memory power can store up to 20 pages of your Apple text data at a time. The Bufferboard accepts print data as fast as your Apple can send it. Then the Bufferboard transmits to your printer, while your computer races on to its next task.

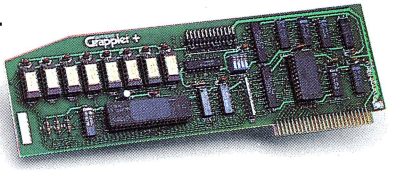


The Bufferboard uses an available Apple slot and "Docks" onto most popular interfaces, including Epson, Apple and Orange Micro Grappler configurations. No external power supplies, no clumsy boxes and cables. It's the easiest and most economical way to add buffering.

If you're just adding a printer...

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The Buffered Grappler+ is the most powerful Apple printer interface you can buy. All the memory features of the Bufferboard have been merged with the smartest interface available... the Grappler+. The Buffered Grappler+ now gives you over 27 different built-in features. Buffer expansion capability allows up to 20 full pages of text memory. Exclusive new features give you special support of IIe 80 column text, screen dumps for Epson graphic aspect ratios, and support of the new IIe Double Hi Resolution Graphics.



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Orange Micro inc.

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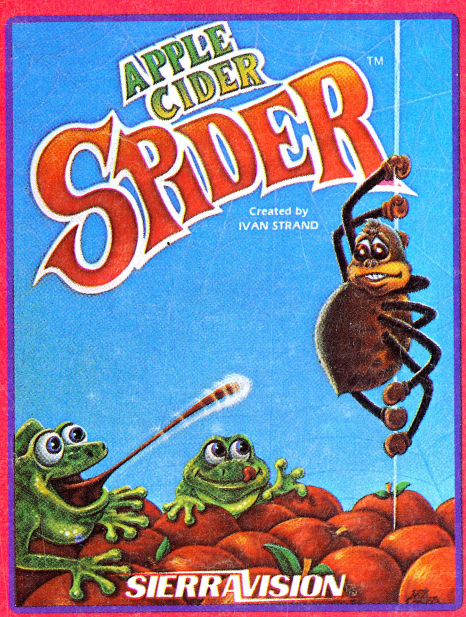
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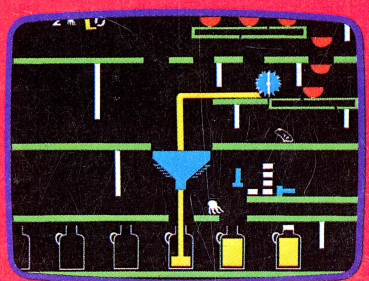
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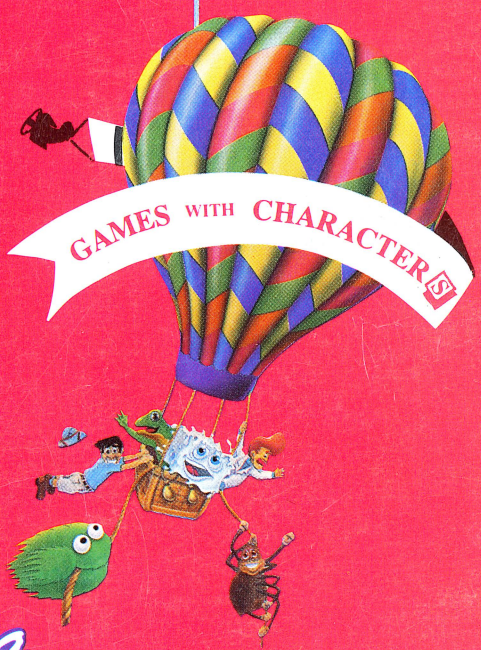


CLIMB TO NEW HEIGHTS WITH APPLE CIDER SPIDER!

Apple Cider Spider's spent a tough day catching pests in the basement of a cider factory, and all he wants is a good night's rest. Leap through streams of cider and avoid the slice smasher on the first floor. Dodge apples and the slicer on the second floor. Steer clear of falling fruit on the third floor. Finally, crawl into your attic web for a final hurrah! The hazards increase with each level: hungry frogs, birds and wasps. A teddy-bear mode lets little ones in on the action. Let Apple Cider Spider put hours of pesky, playful fun into your life!







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209 683 6858

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