October 1984
Vol. 10 No. 10
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COMPUTERS IN EDUCATION

# creative computing®

*the #1 magazine of computer applications and software*

**In-Depth Evaluations:**

- Epson PX-8 Notebook Computer
- Apple IIc
- Acorn Computer
- Havac Computer
- IBM Keyboards
- Software For Preschoolers
- 25 Math Education Packages
- Human Edge Software

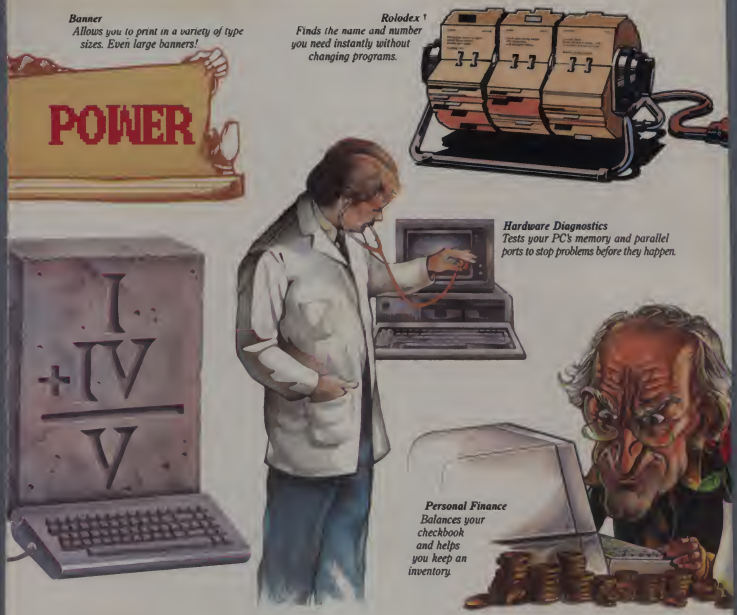
**Special Section: Choosing And Using Integrated Software**

**Computers In Special Education**

**Software Designers Speak Out**

**Structured Programming In Basic**

**A Calculus Game**

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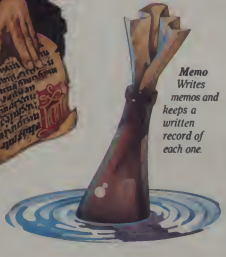

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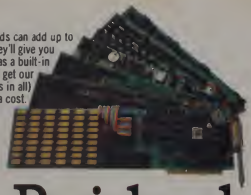

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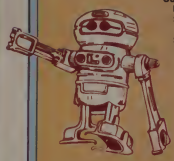

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CIRCLE 178 ON READER SERVICE CARD

# Input/ Output

## Sell Shocked

Dear Editor:

I have a few things to point out in reference to your "Undercover Consumer" article (June 1984).

I am a systems consultant for the largest computer store chain in the St. Louis metropolitan area. We know the machines we sell inside and out. But we are *not* required to learn what any machine can or cannot do if we don't carry it. In fact, we are discouraged from discussing what other machines can do. We naturally might be a little biased, and it would not be fair to let that bias enter into the customer's final decision.

Also, I would like to point out that we are not commissioned employees. We are salaried. That means that if I don't sell a computer to you, or if I don't sell our most expensive system, I will still have dinner on my table. What I am saying is that we are not all "sharks."

Your story makes it sound as though all computer salespeople are sly and underhanded. You are scaring those people who are new to computers and who are considering purchasing one.

Kevin Oesterle
3 Shawn Dr.
Belleville, IL 62221

*Why so defensive, Kevin? Did we say anything about commissions? Did we ever mention sharks or other predators? Did we imply that anyone was sly or underhanded? Did you read the entire article?*

*True, we did say that salespeople should have some knowledge of the competition, and we stand by that assertion. We don't expect you to give a sales pitch for your competitors, but we do think a customer is entitled to an answer to the question "Why is this computer better suited to my needs than the one I can buy across the street for $500 less?" Your policy suggests that the salesperson needs to know less than his customer, and if that is the case, the customer might as well buy mail order and save some money.*

*We thought that our conclusions were, on the whole, positive. After all, we did end by advising buyers to "head for the nearest reputable computer store." And we haven't heard from a single terrified customer yet.* —*EBS*

## Japan Revisited

*We received a tremendous outpouring of letters about the August (all Japan) issue. Most writers were quite favorable, although there were two who said they missed the regular reviews and columns; only one said he "found the issue to be a waste." Several writers favorably compared our comprehensive coverage to the spotty coverage in some of our competitors; for that we are pleased. Another reader wrote to say that she is using parts of the issue in an English class for Japanese businessmen and scientists.*

*However, we received letters from two Japanese people about an issue that ought to be clarified, in particular my statement that there are no minorities in Japan. In fact, there are, and the three or four percent who are in these minorities are subject to persistent discrimination in residence, education, and occupation. The letter below from Chang Kuk Cho sets the matter straight.* —*DHA*

Dear Editor:

You wrote that there are no minorities in Japan and that no foreigner is welcomed in Japan except on a temporary basis. The second part of your statement is true. However, despite Japan's dislike of other racial and ethnic peoples, Japan does have her share of minorities. To begin with, there are the Ainu, the aborigines of the Japanese archipelago. Many Ainu still live in the island of Hokkaido, keeping their distinct culture.

The Okinawans constitute another minority, with a distinct set of languages and culture, occupying a whole prefecture in the southern sea. Then there are the Koreans, many of whose parents were forcibly brought to Japan to become cheap laborers during Japan's colonial control of Korea. They now comprise the largest ethnic minority in Japan, numbering over 1 million. In addition, there are the burakumin, the untouchables of Japanese society. Although they are Japanese in ethnicity, the burakumin, now about 2 million, are treated as a social caste, allowed to have only the most menial kinds of jobs.

The Japanese like to think of Japan as a mono-ethnic nation and consciously or unconsciously avoid talking about the minorities in Japan. If none of the Japanese you met mentioned the existence of over 4 million minority members, I am not surprised. But I am saddened that through your editorial you unintentionally helped to preserve and further spread among the American public the myth of Japanese monoethnicity.

Chang Kuk Cho
Berkeley, CA

## True Grid

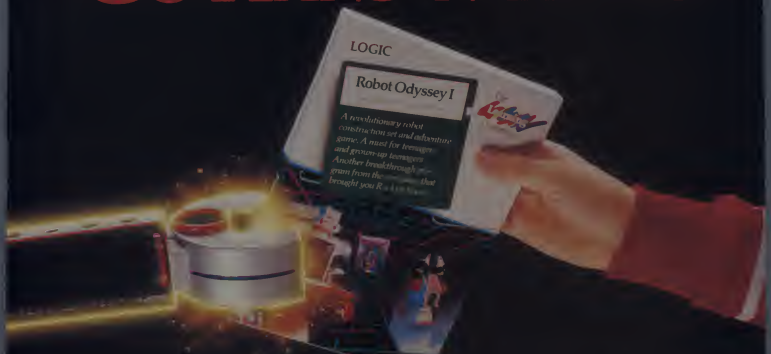
Dear Editor:

Your HP110 article appearing in the July issue was informative and enjoyable but you say the following things about the HP110 that range from incorrect to misleading to personal opinion:

- Your "thoughts ran again and again to the 'ultimate portable.' "
- That "the HP110 is quite simply the finest notebook computer available on the market today."
- That the HP110 is "The most powerful self-contained portable computer system ever offered."
- It has "the sexiest ROM software you have ever imagined."
- It "is absolutely the sturdiest portable we have seen to date."
- It "is probably the first practical means of bringing a serious and powerful computer to the problem...it is built to withstand tough field conditions that no other portable would withstand over term."
- "I have never seen a portable computer with anything remotely approaching the level of help that the 110 offers."
- 384K is "more ROM than any microcomputer has used before."
- "If you have $2995 to spend on a portable, there is no other machine to consider."

Evidently you have never used, seen, or even read about the Grid Compass, particularly the 1129. Granted, the Compasses are primarily AC line powered (one runs only an hour on the

# LEARNING & FUN GO HAND 'N' HAND

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battery pack, which while small is also external to the computer), and "truly" transportable computers would be internally battery powered. It has to be on that one criterion alone that you evaluated the HP110 against the Compass 1129, because every one of your statements above is either false or misleading when the 1129 is considered.

Aside from the one-hour external battery pack, the following comparison of the 1129 and the 110 is much more accurate than yours:

- The 1129 is much closer to the "ultimate computer."
- The 1129 is easily the finest notebook computer on the market today.
- The 1129 is the most powerful self contained portable computer system ever offered; some more tradeoffs come into play here—the 384K bubble in the 1129 (where code can be executed from directly without transferring it into RAM); the Grid portable floppy drive (also capable of being powered by the external battery pack).
- The 1129 has the sexiest ROM software you ever imagined.
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- The help facilities of the 1129 are better than those of the 110.
- The 1129 has 512K of *plugable* ROM storage unlike the 384K *fixed* in the 110.
- If you have *only* $2995 to spend on a portable computer, the 110 is certainly currently the best choice (the 1129 costs several times more).

I suggest that you read the 1129 brochures and have your local rep come over and demonstrate it to you. I guarantee that you will feel more disappointed when he leaves with the 1129 than you were to send back your 110.

Prof. E. Douglas Johnson
Carnegie-Mellon Univ.
Pittsburgh, PA 15213

*The Grid is undeniably a fine machine—but its power-hungry display makes access to an AC line all-important, a fact that makes it less than perfect in our admittedly personal opinion. For the price of the Compass, I'd much rather buy an HP110 and a Toyota Tercel to carry it in.* —JJA

*Furthermore, we have asked Grid for an evaluation unit several times and have never received so much as a reply. Since our reviews are never based on brochures or demonstrations, we have been forced to conclude that Grid has decided that our readers are not interested in their product.* —EBS

# Notices

## $4 Million Giveaway

Scarborough Systems has announced it will sponsor a program designed to provide donated software valued at up to $4 million to public and private schools this fall.

Consumers who purchase one of Scarborough's seven educational software programs between September 15 and December 15 will become donors of another Scarborough program of their choice to any teacher and school they select.

Purchasers of any Scarborough educational product will receive a "donation certificate" entitling them to give a Scarborough product of their choice to a teacher and school of their choosing. To make the donation, consumers will return the certificate with a product warranty card and a handling and mailing fee of $3.50 to Scarborough. The publisher, in turn, will send the designated software program to the school with a gift card indicating the donor's name.

Scarborough programs include *Master-Type*, *Phi Beta Filer*, a list management program for children; *Run for the Money*, a business game with a space-age theme; *Songwriter*, *Picturewriter*, *Patternmaker*, and *Laser Shapes*. Retailing for $39.95 to $49.95, all are or soon will be available for the Apple II family of computers, Commodore 64, IBM PC and PCjr, and Atari.

## Announcing... The Transatlantic Computer Puzzle Challenge

In July 1984, an envelope was placed in a room pictured on the cover of the book, *Microcosm*. The winner of the challenge will be the first person to phone this room

and state the name which is written on a slip of paper in the envelope.

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The puzzle is found in the book and can be solved with the aid of a personal computer. Look for the book in your local bookstore. If you can't find it, watch for an ad in next month's *Creative Computing* that will give an address from which it can be ordered.

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# Epson PX-8 "Geneva"

## HARDWARE EVALUATION

David H. Ahl

Epson, you will remember, introduced the very first notebook computer, the HX-20, in 1982. We were very enthusiastic about the machine despite its diminutive 4-line by 20-character display size. Unfortunately, it got off to a slow start and was soon eclipsed by the Tandy Model 100 with its larger screen and—although some will argue with me—more user-friendly design.

Now, two years later, we have put the second-generation Epson portable, the PX-8 "Geneva," through its paces. Epson has done just about everything right the second time around. Nevertheless, we have mixed feelings about the machine, partially as a result of the competition and partially as a result of, well, overdoing some of the features. "Sounds strange," you say. Read on.

### Nifty Hardware

The PX-8 is a compact machine (8.5" x 11.5" x 1.8") and weighs just over four pounds. In this neat package is a tilt-up 8-line by 80-character LCD screen, micro-cassette recorder, full-size keyboard (with some extras), and, of course, the guts of the computer.

The main mpu is a CMOS version of the 8-bit Z80A, the same chip found in the HX-20 as well as the Tandy 100. A 6301 slave mpu is used as a device controller for the serial interface, LCD display, microcassette drive, and ROM capsules. A second slave mpu (7508) controls the keyboard, clock, and power supply. This should give the computer improved throughput on most tasks although, of course, on our computation-bound benchmark it was no great ball of fire.

| Computer | Time | Accuracy * |
|---|---|---|
| NEC 8201 | 1:44 | .187805 |
| Epson PX-8 | 1:44 | .187805 |
| Epson HX-20 | 2:36 | .0338745 |
| Tandy 100 | 4:54 | .0000002058 |

(* Lower is better)

*Speed and accuracy of the PX-8 and other selected computers.*

The system has 64K of RAM, 32K of ROM, four interfaces (RS-232, serial for disk drive or printer, analog, and bar code reader), built-in speaker, real-time clock, microcassette recorder, and provision to add an external clamp-on "RAM disk" with either 64K or 128K. You might expect the RAM disk to be a couple of plug-in chips in carriers. Not so; it is a unit the full width of the computer that fits under the rear of the PX-8 and elevates it about one inch. Without the RAM disk, two folding legs on the rear of the PX-8 raise it a similar amount to provide a comfortable typing angle.

The packaging bespeaks solid quality. All switches are recessed slightly so nothing

### HARDWARE PROFILE

**Name:** Epson PX-8 "Geneva"
**Type:** Notebook portable
**CPU:** 8-bit Z80A
**RAM:** 64K
**ROM:** 32K
**Keyboard:** 63 key, full stroke
**Display:** LCD, 8 lines x 80 characters
64 x 480 pixels
**Mass Storage:** Built-in microcassette drive
**Ports:** RS-232, serial, bar code, analog
**Operating System:** CP/M 2.2
**Software:** (on ROM pack)
Microsoft Basic
CP/M Utilities
MicroPro WordStar
Portable Calc/Scheduler
**Documentation:** Four manuals
**Dimensions:** 8.5" x 11.5" x 1.8"
**Summary:** Solidly-built notebook portable computer with excellent applications software and many novel features.
**Price:** $995
**Manufacturer:**
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*If you do not have a Duodisk, or use an Apple III, a special cable is available. See your dealer for details.

**Catalyst works on the Apple IIc, IIe and Apple III. It is not compatible with Macintosh.

Photography by Barbara Kasten

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protrudes beyond the edge of the case. Indeed, the reset switch can be pushed only with the tip of a ballpoint pen. Connectors are provided on the back for the RS-232 and serial ports, battery recharger, and other external devices. A slide control beneath the tilt-up LCD screen controls the view angle of the liquid crystal elements, and a similar control on the side controls the speaker volume.

The display measures 1.3" x 8.7" and, depending upon the software being used, can operate in up to four modes. (Characters, incidentally, are formed in a 5 x 7 dot matrix and do not have descenders.) Mode 0 is the standard 80-column character mode. Mode 1 splits the screen into two halves, each 39 characters wide. Mode 2 is also a split screen mode but the widths of the two windows can be set by the user in the range of 8 to 48 characters. Mode 3 is a graphics mode, although text may be displayed in this mode also.

Complicating matters somewhat is the fact that the real screen is actually a window on a virtual screen which may be much larger than the real screen (up to 40 lines and 80 columns). Moreover, in Modes 1 and 2, there are two virtual screens which, in Mode 2, may be viewed independently of one another. In general, unless you are writing applications programs, you will not have to worry about these screen modes. However, a rudimentary understanding of them will give you an insight as to how Portable WordStar, Calc, and Scheduler achieve some remarkable effects. Of course, for the adventuresome, all these screen modes are available from Basic, and to a limited extent, from the CP/M operating system (using CONFIG).

The keyboard has 63 full-stroke keys which have the excellent feel that we have come to expect from Epson. The keyboard uses a hard stroke design and aural feedback is provided by the noise of the key hitting the bottom of its travel. Indeed, the keyboard is rather noisy (like the Model 100) and we felt it would have benefitted from some acoustic damping.

Layout of the keys is perfectly standard with no keys in unexpected places. The orange cursor control keys at the right are arranged in a reasonably logical pattern; in the same area, we find the CLR/DEL, SCRN/INS, and HOME/BS keys. We won't explain the function of each of these special keys, but we were disconcerted to note that they functioned differently in the applications software packages than they did in CP/M and Basic.

A very thoughtful touch is the series of three LEDs above the center of the keyboard which indicate caps lock, numeric keypad on, and insert on. The keyboard provides access to every printing character including 32 graphics characters (lines, circles, card suits, car, plane, man, telephone, etc.). For the most part, these

*Top: LCD screen displays 8 lines of 80 characters.*
*Bottom: Standard layout keyboard has excellent feel.*

characters will not print out unless your printer is equipped with a special ROM. All keys repeat when held down for about one-half second.

Above the standard keyboard is a line of nine rectangular function keys. Leftmost is a red STOP key, which functions in Basic and CP/M but generally not in applications software packages. Three of the function keys have permanent labels: ESC, PAUSE, and HELP. As with STOP, they may or may not be implemented in applications software packages. The other five light gray function keys are programmable and, in conjunction with SHIFT, provide ten functions which may be set in software or from the CONFIG program in CP/M.

The microcassette recorder uses standard tapes and usually is completely under software control, although it is possible to use the function keys for manual operation. We found the recorder useful for saving Basic programs but extremely cumbersome to use with *WordStar*. In fact, in the *WordStar* manual on page 9.17 it says, "The microcassette tape can be used to store files" and five paragraphs later on page 9.18 it says, "You cannot save files onto the microcassette tape." Not very helpful!

A clock module manages the software clock and controls alarm and wake functions which allow the PX-8 to switch on and present a message or start a program running. If the computer is in use, and alarm or wake time is reached, the program being run will be interrupted. A wide range of time options are available for these functions, including a specific date and time, every hour, every 24 hours, once a month, every day for a month, every minute for ten minutes every hour, or practically any combination you can dream up.

The PX-8 uses two sets of batteries. The main NiCad battery pack provides power for running the PX-8, while the back-up batteries hold programs in memory when the main battery voltage falls below a useable level. According to the manual, "The maximum length of use on battery power is 15 hours without input/output operations" (does that mean the keyboard?). The AC charger/adapter will restore a full charge to the batteries in eight hours.

## CP/M Operating System

When the PX-8 is turned on, a number of routes can be taken by the built-in operating system. Most typically, a menu, which lists the command (COM) programs on devices B and C, will appear. These devices are ROM cartridges which plug in the bottom of the PX-8. We used four such cartridges: Basic, CP/M utilities, Portable WordStar and Portable Calc

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(which includes Portable Scheduler). Only two can be plugged in at one time. A program is selected from the menu by moving the cursor over the program name and pressing RETURN. If you prefer to work directly from CP/M, the built-in operating system, the ESC key will exit the menu and bring up the familiar C prompt. This is the approach necessary to load programs from any of the other devices: A is the RAM disk, D through G are floppy disk drives, and H is the microcassette. If you expect to use a program from any of these devices regularly, it is possible to rebuild the menu program to include it.

CP/M functions just as it would on a desktop computer and has the usual commands and utilities, cryptic error messages, and other idiosyncrasies. In addition, it has two programs unique to the PX-8. TERM is a program that allows the use of the PX-8 as a terminal to another computer, remote database, or on-line service bureau. The manual provides extensive instructions for using the PX-8 to communicate with an Epson QX-10 desktop computer although the directions are applicable for other CP/M systems as well.

FILINK is used to transfer files between the PX-8 and other computers. It is more specialized than TERM in that it supports specific protocols and is used solely for sending and receiving files. From the manual, it would appear that FILINK must be used with another computer also running FILINK, and the only other machine for which it is available at the moment is the QX-10.

CP/M was the first microcomputer operating system I ever used (on an Altair in 1976), and thinking about it conjures up all kinds of fond and not-so-fond memories. Some of the latter surfaced when, after using the PX-8 for just 15 minutes, I got the message BDOS ERROR ON D: BAD SECTOR. The manual said to press the RETURN key to ignore the error. Ha! Five presses of the RETURN key later, I had a screen full of the same error message. I tried STOP, ESC, HELP, everything...but there was no escape.

In desperation, I turned the computer off and back on. Ah; finally the menu reappeared, but the minute I tried to select something, the screen filled with the same BDOS ERROR message. Now, in real desperation, I pressed the recessed reset switch. But to no avail. The PX-8 has an excellent memory; it doesn't forget anything—not even error messages. Finally, for no explicable reason, a series of CTRL/ESC keypresses returned me to the operating system. To add insult to injury, the message was "incorrect"; what I had tried to do (by mistake) was write to a write protected disk.

Not being content to leave well enough alone, I experimented with some other commands that I felt an unwitting user might invoke. For example, the system uses double sided disks, so it might be logical to think of side 1 as drive 1 and side two as drive 2. So I tried to save a file to the second drive (E) and got the same BAD SECTOR message that just wouldn't go away. Not nice!

If you shut off the machine while you are in Basic and turn it on later, it will still be in Basic with the same program in memory, a nice feature. However, just try to get directly to CP/M when you power back up. It is not easy. I finally found that the combination of STOP/ESC would usually do it.

Perhaps warnings about all these naughty things are in the manuals—unlike some writers, I am not opposed to reading manuals—however, I do not feel that one should have to read two 300-page manuals before using the computer.

## Basic

The Basic supplied with the PX-8 is "Epson-enhanced Microsoft Basic for the PX-8." Quite a mouthful. In general, it is quite similar to Microsoft GW Basic although, of course, it is oriented to the PX-8 LCD display and lacks certain graphics commands like CIRCLE (although LINE is included). Actually, a variety of graphics statements and functions are included specifically for the 480 by 64 pixel screen. Also, as mentioned earlier, Basic includes statements for using the four screen modes.

A screen editor allows changing program lines without entering a separate edit mode. Basic also has statements that support communication through the RS-232 serial interface and statements that make it possible to use the built-in microcassette recorder like a disk drive.

As in the HX-20, the Basic program area is divided into five parts so five programs can be stored simultaneously. As in a timesharing system (also the HX-20), these areas are accessed via a LOGIN command. One rather nasty problem I had was trying to save programs in these areas. (With the HX-20, the problem is deleting a program.) Actually, after poring over the manual and experimenting at great length, I determined that programs can be saved only to cassette, RAM disk, or floppy disk, and not in the five program areas.

## Portable WordStar

As its name suggests, Portable WordStar is adapted from standard *WordStar* to run on the PX-8. The adaptation was done by MicroPro International, so the product is quite true to the original. It is our custom to write a computer review on the target machine whenever possible. This turned out to be remarkably easy and straightforward on the PX-8 as *WordStar* was familiar and behaved exactly as expected. Yes, some of the more esoteric features are stripped out—after all, the package has to fit in a 32K ROM cartridge—but it is remarkably complete.

Since we assume a basic familiarity with *WordStar*, it is probably easier to list the missing features rather than the included ones. Missing are: help menus, file directory, file renaming, paragraph tab, hyphen help, soft hyphens, column mode, decimal tab, and print control display toggle. Since I rarely use any of these, I did not find Portable WordStar at all limiting.

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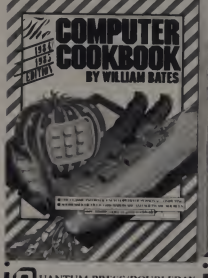


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One thing I found a bit annoying is that the top two lines on the screen are used for the status information (program name, page, line, column, and operating mode) and the ruler line (shows tab stops and margins). Furthermore, the package does not use the bottom line on the screen; hence, only five lines of text are displayed at a time. With a 65-character line length (printer width = screen width) this means that the PX-8 displays exactly the same amount of text as the Model 100 (which has a display half as large)!

As with many other portable computers, moving through a large text file is agony. To scroll through one double-spaced page takes 26 seconds. Hence, to insert a correction in the middle of a 16-page document like this review takes four or five minutes. A command to move the cursor to a particular page would be very welcome (MicroPro, are you listening?).

Portable WordStar comes with a 200-page manual, fold-out menu map, three-panel command reference card, and 26 sticky keytop labels with control key markings.

### Other Applications

Portable Calc is an electronic spreadsheet program and includes the most used spreadsheet functions as found on desktop machines. The design approach was to economize on prompts and messages but try to retain the functions and calculating power of a larger program. We tried a few simple problems but did not put Portable Calc through an exhaustive evaluation. It has a complete array of arithmetic and logical functions, including MAX, MIN, LOOKUP, and AVG. It does not, however, have any statistical, trig, or financial functions. Replicating, inserting, deleting, saving, and printing are all handled quite adequately.

Portable Scheduler is a 25-day appointment scheduler that permits notations to be made in half-hour increments. In addition, alarms can be set at designated times and the next 24 days displayed in graphical form. I confess to being partial to a standard paper calendar and did not make use of this program (other than to make sure it loaded).

### Peripherals

Unlike the situation with the HX-20 in which peripherals and software were not available until the computer had been out for more than a year, Epson is concurrently releasing a battery-operated 3½", double density, double sided, microfloppy disk drive. The drive measures 8.2" x 4.8" x 2" and has built-in NiCad batteries that provide up to 50 hours of service between charges. Formatted capacity is 320K per disk. The drive is connected to the computer through the serial port and tends to be somewhat slower than a standard desktop floppy disk; nevertheless, it is a substantial improvement over nothing at all, and considerably faster than the microcassette recorder.

RAM disk units in capacities of 64K and 128K (60K and 120K usable memory) also will be available almost immediately. Other peripherals promised are a direct connect modem, acoustic coupler, and 80-column thermal printer.

### Pricing

The PX-8 with 64K, built-in CP/M, AC charger, CP/M utility ROM, Basic ROM, Portable WordStar ROM, Portable Calc/Scheduler ROM and four manuals is priced at $995. The disk drive is $599; 60K RAM disk, $329; 120K RAM disk, $460; direct connect modem, $180; acoustic coupler, $120; and thermal printer, $250. We think most people will want to get the basic unit with either a RAM disk or floppy disk drive, thus putting the total price between $1300 and $1600.

### Is It Worth It?

I admitted to having mixed feeling about the PX-8 at the beginning. Some of my uneasiness stems from the eight-line display in the face of other manufacturers introducing 16- and 24-line displays. I understand that this was done to hold the cost of the basic unit under $1000, but is that really a magic price point?

Second, the PX-8 does lots more than the Model 100 and has a "real" operating system (CP/M 2.2) built in but this makes it more difficult to use. The machine has many novel features like the alarm/wakeup facility but it takes nine pages in the manual to describe how to use it. Motoring magazines sometimes say, "the controls fell naturally to hand"; the alarm/wakeup function most decidedly does not.

Facilities like the Password module sound wonderful if you want to protect your computer and files against use by "unauthorized" people. However, this feature is incredibly dangerous since once a password has been assigned, it is impossible to use the machine or remove the password without knowing what it is. Have you ever forgotten a familiar phone number? At least there are phone books; in the case of the PX-8 you have no recourse.

Lest I leave you with negative vibrations, I should say that in general I am most enthusiastic about the PX-8. There is no other computer under $1000 with comprehensive word processing and spreadsheet programs. The built-in microcassette recorder is a real plus, although I would still recommend a RAM disk or floppy disk drive. The unit is solidly built, and with the NiCad rechargeable batteries you need not buy stock in Duracell. If you don't yet have a notebook computer, be sure to give the PX-8 a close look. ■

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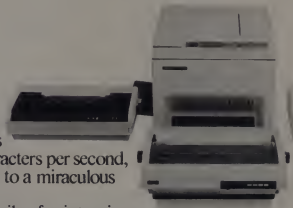

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*Source: *Datamation Magazine 1983 Brand Preference Study* of printer preference by end users and OEMs.

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**CIRCLE 144 ON READER SERVICE CARD**

# A New Keyboard for the PC

## Which One is Right For You?

Russ Lockwood

As the IBM PC moves into more and more offices, more and more touch typists are finding that the wonderful PC has a not-so-wonderful keyboard. We examined the replacement keyboards offered by several manufacturers and discovered that their approaches to solving the problems of the PC keyboard vary greatly.

Actually, we like many of the features of the IBM PC keyboard. It is detachable, which is a major improvement over other computer keyboards. Previously, manufacturers like Apple, Tandy, and Commodore made the keyboard an integral part of the system unit. IBM put the PC keyboard at the end of a six-foot coiled cord, which lets you hold the keyboard on your lap or just move it out of the way. In fact, you can argue that IBM started a trend, since most new computers now feature detachable keyboards.

We like the 10 function keys on the PC keyboard. Again, IBM was one of the first manufacturers to put separate function keys on the keyboard. We also like the separate numeric keypad, which makes for fast data entry. We think the keys are well-sculpted with a nice, solid feel, and the aural feedback is good and loud.

We also like the slant adjustment, which allows you to vary the angle of the keyboard. A nice extra feature is the ridge running across the top of the keyboard. This lets you prop a manual or book between the keyboard and system unit, a feature that can be very, very handy.

Unfortunately, the PC keyboard is far from perfect. Ironically, the PC does not conform to the now-standard IBM Selectric layout, and it aggravates touch typists no end. It places an extra key between the Z and Shift keys and locates the Return key slightly farther above the Shift key than most of us are used to. Why IBM did not follow the layout of their own successful Selectric typewriter keyboard remains a mystery.

### What to Look For

The most important feature is the feel or touch of the keyboard. Touch refers to the tactile sensation you experience as you type. The IBM PC uses a hard touch, which is reminiscent of a typewriter; you must depress each key fully for a character to register. Other keyboards use a soft touch, which requires only a light tap to input a character. If you switch from a hard to a soft touch keyboard, plan on spending a few hours just to accustom yourself to this change.

*If you are a touch typist, you will probably prefer a Selectric layout.*

If you are a touch typist, you will probably prefer a Selectric layout. The misplaced backslash and Return keys on the PC keyboard will slow you down and cause a great deal of frustration. Also, look for word labels rather than cryptic arrows on the Return, Tab, Backspace, and Shift keys.

Sharing cursor control keys with a numeric keypad is adequate, but to manipulate the cursor with greater speed, a separate set of keys is far superior. Better yet, the cursor control keys should be in a logical diamond formation and special text editing keys, such as insert and delete, should be above or below the cursor controls.

LEDs on the Caps Lock and Num Lock keys are also desirable, as are raised bumps on the J and F keys and the 5 on the numeric keypad. An extra Return key on the numeric keypad helps speed data entry considerably.

Do not overlook the weight of the keyboard, especially if you use it on your lap most of the time. The PC keyboard is fairly heavy, and after using it for a few hours, you might feel that circulation to your legs has been cut off. A lighter keyboard reduces fatigue and is easier to move about.

For those with more esoteric tastes, keyboards with a Dvorak layout are available. Unlike QWERTY, the Dvorak layout places, from left to right, the A, O, E, U, I, D, H, T, N, S keys on the home row, with the common letters located near the stronger fingers. The result is that an accomplished Dvorak typist types faster than a QWERTY typist. However, a great deal of retraining is necessary to realize this speed advantage.

Frankly, most people have adapted to the idiosyncrasies of the PC keyboard because they had no other choice. But in this age of better mousetraps, several manufacturers are building keyboards to correct the problems of the PC keyboard.

### Maxi-Switch 8505

The Maxi-Switch 8505 keyboard layout is an exact duplicate of the IBM PC keyboard, with the exception of LEDs on the Caps Lock and Num Lock keys. All the advantages and problems of the

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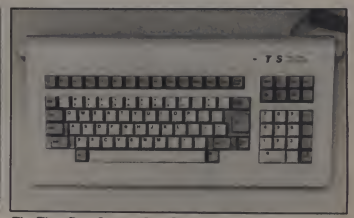
*The Maxi-Switch 8505.*



*The Titan Data Systems Sure-Stroke.*

PC keyboard layout are included.

The keys are well sculpted and the touch is good—not as hard as the PC but much firmer than a soft touch. The keys depress fully, although the throw is not as long as on the PC keyboard, and the distinct click of the PC keyboard is lacking. Overall, we liked the feel of the keyboard very much.

The main inducement for buying the Maxi-Switch is the weight. At 4.3 lbs, it is 16% lighter than the PC keyboard, which weighs in at 5.1 lbs, and it can sit comfortably on your lap for hours on end.

For those who leave the keyboard on the desktop, the Maxi-Switch has a three-position slant adjustment—one position more than the IBM PC keyboard offers. Maxi-Switch wisely kept the ridge along the top of the keyboard.

Maxi-Switch also manufactures the 8506 keyboard, which places the Shift and Return keys in their proper places, labels the Return, Tab, Backspace, and Shift keys, and adds a Return key on the numeric keypad. Maxi-Switch also makes the 8507, a Dvorak keyboard.

### Titan Data Systems Sure-Stroke

After our use test, we were left with mixed feelings about the TDS Sure-Stroke. It had some nice touches which we'll mention later, but also some idiosyncrasies which we found awkward. Others may not. Read on.

We are convinced that the Sure-Stroke has the world's largest Return key—1.5" x 1.5" to be exact. Compared to the 1.5" x 0.5" Return key on the PC keyboard, this is huge. You cannot possibly miss this Return key.

Unfortunately, Titan did not label it as such, preferring to use a cryptic arrow. The Backspace, Tab, and Shift keys are nicely labeled, but not the Return key. Furthermore, the Return key could be better placed. Titan put the tilde (~) key directly above the Shift key. We would have prefered to find the tilde tucked underneath the backslash and Backspace.

Titan places the ten function keys across the top of the keyboard instead of on the lefthand side. If you are used to finding the function keys on the left, you must take time to get used to the change. In addition, the Num Lock, End, Pg Up, Dn, and Scroll Lock keys are also placed on the top—a clumsy arrangement at best.

The numeric keypad has a Return key, although like the giant main Return key, it is labeled with the cryptic arrow. Unfortunately, Titan did not place a raised bump on the 5 key, but did thoughtfully include a multiplication key on the keypad.

***You need the dexterity of a concert pianist to move the cursor with any sort of speed.***

Titan also includes separate cursor control keys, but they are located above the numeric keypad. This awkward placement makes these keys difficult to reach. You must reach over the numeric keypad to use the cursor controls, a clumsy procedure at first, but one to which we quickly become accustomed.

Although three of the cursor keys are in a logical half-diamond formation, the fourth is not. To make cursor control matters worse, the End, Page Up, and Page Down keys are with the function key grouping, located between the Num Lock and Scroll Lock keys. Again, this is awkward and clumsy. You need the dexterity of a concert pianist to move the cursor with any sort of speed.

Finally, the cursor control key grouping has an unmarked, undocumented key to the right of the right arrow. It does not print a character on the screen, move the cursor, or invoke a function, but every alternate press elicited a beeping sound. Frankly, we were baffled.

Then quite by accident, we discovered that the key turns the aural feedback, that beeping noise, on and off. After 10 minutes of typing with this arcade noise toggled on, we were searching for earmuffs. We were pleased to finally determine the function of this key, but it should have been labeled.

Fortunately, the normal keystroke click is subdued and absolutely marvelous. It is not as pronounced as the click on the PC keyboard, but it is reassuring and comes as close to optimum aural feedback as a keyboard can get. The tactile feedback is just as good. The keys require a firm press and have a nice, solid feel to them. We are very impressed with these facets of the Titan keyboard.

The Caps Lock key has an LED, but the Num Lock does not. Of all the keyboards we tested, only Titan features an on/off LED for the keyboard. It is a nice touch.

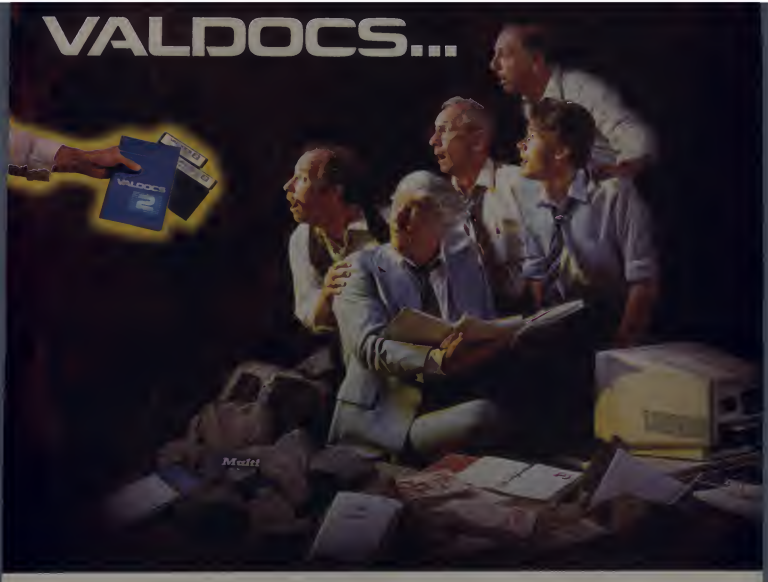
### One Little, Two Little, Three Little Keyboards

Colby sent us an evaluation unit of its Key-2 plug-in keyboard. Unfortunately, after 15 minutes of use, it emitted a death squeal, the LED lights on the Caps Lock and Num Lock keys came on, and it refused to function. Back it went.

The second keyboard also lasted 15 minutes and died with two melancholy LED lights staring at us. That one also went back. At that point, a Colby spokesperson admitted that some of the boards were defective, but claimed the problem had been fixed.

With trepidation, we plugged in the *third* keyboard, which looked exactly like the other two, and booted up the PC. Eureka! It worked.

The Key-2 is the smallest of the keyboards we tested—just 15" wide, compared to the 19" width of the PC keyboard. It is also the lightest, weighing in at 3.5 pounds. This makes the Key-2

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*The Colby Key-2.*

*The Key Tronic KB 5151.*

very easy to move around.

The Key-2 corrects most of the mistakes of the PC keyboard. The Shift and Return keys are in their proper places. The Caps Lock and Num Lock keys have LED lights. The numeric keypad, which doubles as cursor control keys as on the PC keyboard, has its own Return key. The Shift, Tab, Return, and Backspace keys are labeled with arrows and words.

***Once you become accustomed to the feel and tap the keys instead of trying to press them through the bottom of the keyboard, you can type quite fast.***

Colby places the 10 function keys and four extra cursor control keys across the top of the keyboard. Unfortunately, the extra cursor keys are arranged in a line rather than a logical diamond formation, diminishing their effectiveness.

### That's Ergonomics

Unlike other keyboards, the Key-2 keys are enclosed on three sides by a three-quarter inch high wall. In theory, by running your hand along the ridge, you can find the extra cursor control keys in the top left corner, function key 10 in the top right corner, and the Return key on the numeric keypad on the righthand side of the keyboard.

In practice, the wall gives us keyboard claustrophobia—rather like typing in a box. Furthermore, we keep smacking the wall with our left hand, an especially aggravating constriction. After a few hours of typing, we were wishing the wall was not there. By the end of the day, we were ready to take a hacksaw to it.

The feel is adequate, although the keys do not seem as solid as on the PC keyboard. The aural feedback for the Colby keyboard is more subdued than that on the PC keyboard, but again, nothing special.

The Colby keyboard is not slant adjustable. Presumably, the thin profile of the Key-2 does not allow for spring-action legs. It does have three rubber feet on the bottom of the keyboard, which keep it rock steady on the table.

### Key Tronic KB 5151

The Key Tronic KB 5151 is the largest of the four keyboards, measuring a whopping 20.25". With the extra space, it also offers the best layout of the keyboards, dividing the keys into four distinct groupings—alphanumeric, cursor control, numeric keypad, and a row of function and specialty keys.

The KB 5151 corrects the mistakes of the PC keyboard. The Shift and Return keys are located where they should be. The Caps Lock and Num Lock keys have LEDs. The Shift, Return, Tab, and Backspace keys are labeled with words, not arrows, and the F and J and the 5 key on the numeric keypad have raised bumps.

Unfortunately, Key Tronic places the Caps Lock key above the left Shift key and the Control key to the *left* of the Caps Lock key. You must make a mighty long stretch to reach the Control key with your pinky. The placement is awkward and clumsy, and for control key-intensive software, downright aggravating. In addition, one of our testers complained that with her fingers on the home row, she was unable to see the LED on the Caps Lock.

The tactile feel takes some getting used to. At first, the KB 5151 feels mushy because it has a very soft touch. However, once you become accustomed to the feel and tap the keys instead of trying to press them through the bottom of the keyboard, you can type quite fast. We are not saying you can double your typing speed, but the less effort and motion you need to expend, the faster you can type.

The numeric keypad doubles as cursor control keys. Key Tronic adds a Return key for fast data entry.

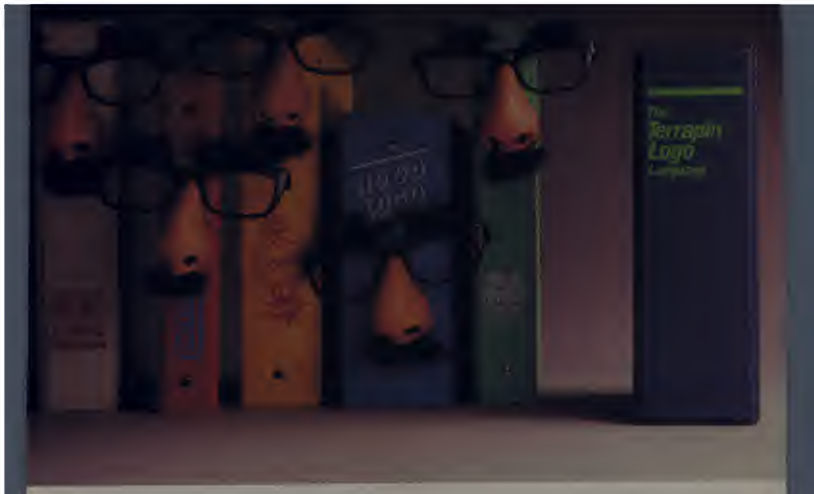
The dedicated cursor control keys are arranged in a logical diamond formation, with the Home, End, Page Up, and Page Down keys in the appropriate spots. The special editing keys, Insert and Delete, are above the cursor keys.

You must toggle the cursor keys on and off with a special Cursor Pad key. When the cursor keys are activated, the numeric keypad automatically switches to numbers. Thus, you use only one set of cursor keys at a time. We wonder why Key Tronic bothers to toggle the dedicated cursor control keys on and off. Not a big point, but we wonder.

***The first question is whether you are dissatisfied with the IBM PC keyboard and want to switch to another.***

The function keys are divided into two groups of five along the top. Next to them are a Pause key, Cursor Pad key, Print Screen key, a key with no name or purpose, and a Reset key. Note: you must hold the Control and Reset keys down to emulate the Control-Alternate-Delete sequence to reboot the system. You also must exert more force to depress the reset key than the other keys on the keyboard.

The KB 5151 is slant adjustable and has a ridge running along the top to

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prop up manuals and books. Key Tronic thoughtfully includes a 16-page operator's manual with the KB 5151.

### Prices

The Maxi-Switch 8505, 8506, and 8507 carry a suggested retail price of $210. The Titan Data Systems Sure-Stroke costs $198. The Colby Key-2 sells for $260. The Key Tronic KB 5151 retails for $255.

### Decisions, Decisions

All the keyboards we tested have advantages and disadvantages. The first question is whether you are dissatisfied with the IBM PC keyboard and want to switch to another. Keyboards are rather personal. Once you get used to one, it can be traumatic and time-consuming to adapt to another.

Another consideration concerns the plastic and cardboard templates that come with many of the most popular software packages. All of those templates are designed to fit around the 10 function keys on the IBM PC keyboard, and they will not fit the function keys as laid out on the Colby Key-2, Key Tronic KB 5151, or Titan Data Sure-Stroke. Only the Maxi-Switch 8505, which duplicates the PC keyboard exactly, can accommodate these templates.

Above all, your personal preferences should guide you in choosing an replacement keyboard. Soft touch, hard touch, standard layout, LEDs, separate cursor control keys—the options are available. You need only choose the features you want. The PC keyboard is adequate, but if you want a replacement keyboard, we are sure one of the four we tested—Maxi-Switch 8505, Titan Data Systems Sure-Stroke, Colby Key-2, or Key Tronic KB 5151—will satisfy your needs. ■

### Manufacturer Addresses

Maxi-Switch
Century Research & Marketing Inc.
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Bloomington, MN 55437
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Titan Data Systems Inc.
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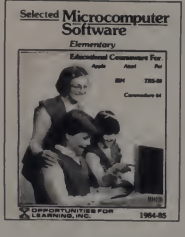


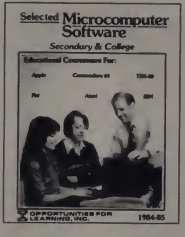


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If you're wondering why BASIC has overshadowed Pascal until this year, the answer is really quite simple. BASIC, as I'm sure most of you know, comes "bundled" with almost every microcomputer it, therefore, became the "default" language.

**In the past, to convert to a usable Pascal was, at the very least, an expensive proposition.**

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*Reinventing the Wheel*

# Apple IIc Revealed

*Owen Linzmayer*

The Apple IIc is like no other Apple computer ever introduced, and yet it is virtually an Apple IIe work-alike. The design of the IIc represents a change of philosophy for Apple. Gone are the expansion slots that hardware hackers loved. In fact, you can't even open the IIc easily. Apple has built a computer that is to be used as an applicance—like a telephone or a tape recorder.

The IIc is "aimed primarily at the consumer market," asserts John Sculley, President and CEO of Apple Computer. Will the IIc find a place in every home? There is no doubt in Apple's mind that the IIc will be their highest volume product ever. Will you be their next customer? Come, let's take a closer look so you can decide.

## Package

The Apple IIc comes complete in one large box. For your hard-earned $1295, you receive a 128K Apple IIc with a built-in 140K disk drive, three instruction manuals, an external power supply, a set of five tutorial disks, and cables and adapters to hook the computer to a television set.

Physically the Apple IIc is one of the most appealing machines on the market. The sleek 12" x 11.5" x 2.5" case was developed by Hartmut Esslinger of Frog Design, the West German firm best known for designing the Sony Walkman. The ivory color, rounded edges, and high-performance look of the IIc have been dubbed the "Snow White" look and will be featured in all new Apple products. It is the look of the 80's, the Pepsi Generation, and you had better get used to it. You will be seeing a lot of it in years to come.

## Keyboard

The layout of the Apple IIc keyboard is identical to that of the IIe, with the exception of the RESET key. Located to the right of the DELETE key on the IIe, RESET is found above the ESC key and is recessed into the case of the IIc. Directly to the right of the RESET key is the 80/40 switch which selects the number of columns of text to be displayed on the screen. The number of columns can also be selected by typing ESC-4 or ESC-8, though software can override the setting of the switch.

The keyboard is arranged in the popular QWERTY (Sholes) fashion but by pressing the keyboard switch, located to the right of the 80/40 switch, you can select the Dvorak layout which offers a much more efficient placing of keys. After switching to the Dvorak mode, you can pull up the keys and reinstall them according to the Dvorak layout. Apple plans to offer a set of Dvorak keycaps that will fit snugly over the existing keys and eliminate this shuffling.

The 63 keys can produce all 128 standard ASCII characters, which include upper- and lowercase alphanumerics, as well as 32 special graphics characters called Mousetext. The full-stroke keyboard offers good tactile feedback and an audible click. In addition, the D and K keycaps have small bumps on them to aid touch typists in correctly positioning their fingers on the home row.

## Motherboard

The Apple IIc is testimony to the fact that you can re-invent the wheel and do a much better job the second time

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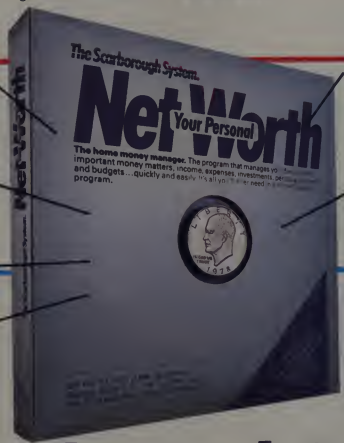


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Available for:

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Apple II + /IIe/IIc (64K)
Commodore 64
Atari (48K)
The Program comes with two disks, one of which has accounts already set up for entry. However, only one disk drive is necessary.

# The Scarborough System.

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*A protective plastic layer makes this a "drool-proof" keyboard.*

*The IIc motherboard: an engineering masterpiece.*

around. Thanks to large scale integration (LSI), the motherboard of the IIc is a masterpiece of engineering—40 custom integrated circuits do the work of well over 100 standard chips. For example, the Integrated Woz Machine (IWM) is a single chip that is equivalent to an entire Apple Disk II controller card.

Only five chips are mounted in sockets; the rest are soldered directly to the motherboard. This reduces costs tremendously and improves reliability. It also reinforces Apple's contention that the IIc isn't a machine for people who want to hack around with the hardware.

The heart of the Apple IIc is an 8-bit 65C02 microprocessor running at 1.02 MHz. The C stands for Complementary Metal-Oxide Semiconductor (CMOS) and means that the CPU draws significantly less power than a standard 6502 and, hence, produces less heat. These are important characteristics for a portable computer. The 65C02 is an enhanced version of the 6502 that has been the mainstay of the Apple II line, yet this new chip performs exactly the same when running the Ahl Benchmark Test. The improvements include 27 additional instructions which speed up graphics and allow for more efficient number crunching. These improvements may cause some compatibility problems (more on this later).

The IIc boasts 128K of on-board RAM which is equivalent to a IIe with an Extended 80-Column Card installed in slot 3. Since the 65C02 has an address range of only 64K, the second 64K of RAM is accessed via a process called bank-switching. According to Apple, the IIc is not expandable beyond 128K of RAM, but third-party developers have been known to do some surprising things with Apple hardware. I wouldn't bet against memory upgrades just yet. The IIc has 16K of ROM which includes the Applesoft Basic interpreter, the system monitor, and 80-column firmware less the diagnostics firmware of the IIe.

### Disk Drive

Built into the righthand side of the IIc case is a half-height, 5.25", single-sided

floppy disk drive. This drive has a 140K formatted storage capacity, of which 124K is available with DOS 3.3, and 137K is available for Pascal and ProDOS users. Thanks to the flexibility of ProDOS, third-party external drives may offer storage capacity in excess of 140K.

The built-in drive is treated as if it were drive 1, in slot 6 of a IIe. The optional external Apple drive ($329) is referenced as drive 2, slot 6. Apparently you will never be able to run more than two floppy disk drives on an Apple IIc, but if it is more on-line storage that you desire, Quark Inc. of Denver has announced a 10Mb Winchester hard disk drive for the IIc called the QC10. The 19-pin D-type connector for the second drive on the back of the IIc contains most of the pinouts to the internal bus, so if memory expansion units or CP/M modifications are ever designed, they will probably plug in here.

### Serial Ports

The IIc has two built-in serial ports located on the back of the unit. These ports are analogous to two Super Serial cards for the IIe. The 5-pin DIN serial connectors are keyed and labeled with icons to eliminate the possibility of connecting a cable incorrectly. Serial port 1 is to be used primarily for output to printers and plotters. You are limited to using only serial printers unless you purchase a serial-parallel adapter unit, several of which are already on the market with prices ranging from $129-$199. The second serial port is devoted to communications using an optional modem.

You may configure the ports to your liking using the system utility disk supplied with the IIc. Parameters such as word length, bit rate (baud), parity, echo output, linefeed, carriage return, and line length are user-definable. Along with the printer and modem presets, your custom configurations can be saved to and recalled from disk, thus eliminating repetitious setting of parameters.

The most commonly voiced complaint concerning the Apple IIc is the lack of expansion slots, which some people take to mean a lack of expandability. Not so. There are many devices that may be attached directly to the serial ports. These include port extenders, home controllers, print buffers, real-time clocks, music systems, sound effects generators,

### HARDWARE PROFILE

**Product:** Apple IIc
**Type:** Desktop/portable
**CPU:** 65C02
**RAM:** 128K/128K
**ROM:** 16K
**Type of Keyboard:** 63-key half-stroke
**Text Resolution:** 80 x 24
**Graphics Resolution:** 560 x 192
**Number of Colors:** 16
**Sound Capability:** Internal speaker with volume control
**Ports:** Two serial, second drive, video expansion, hand controls/mouse
**Dimensions:** 2.25" x 11.5" x 12"
**Documentation:** Four tutorial disks and manuals for neophytes
**Summary:** The home computer of the Pepsi generation.
**Manufacturer:**
Apple Computer, Inc.
20525 Mariani Ave.
Cupertino, CA 95014
(408) 996-1010

and speech synthesizers (see sidebar).

The lack of slots is really a blessing in disguise. It makes the IIc a "closed system." This is the kind of environment for which software developers like to program, since they don't have to worry about all the different cards and hardware kits that you may or may not have in your computer. With a closed system, if the program runs correctly on one IIc, it runs correctly on every IIc. I anticipate that software firms will flock to the IIc. This machine is a programmer's dream—a powerful closed system with a wide range of special features.

### Video Output

There are two video output connectors on the back of the IIc, an RCA phono jack and a 15-pin D-type connector. Using the supplied radio frequency (RF) modulator and switch box, you can use your television set as a display. The modulator, as well as external PAL and SECAM video adapters for overseas use, get their signals from the video expansion connector.

If you want to take advantage of 80-column text or double high-resolution graphics, you will want a composite video monitor. The RCA jack provides the NTSC signal required by both color and monochrome composite monitors. Monochrome monitors are best for crisp displays of alphanumeric information, but don't do justice to color graphics. The reverse is true for color monitors.

If you want both 80-column text and color graphics, you should get a red-green-blue (RGB) monitor. These are expensive ($600+), but the superb picture quality justifies the cost. In addition to the monitor itself, you will need to purchase an RGB adapter for the Apple IIc for about $200.

Perhaps one of the most desirable peripherals for the IIc is the flat-panel liquid crystal display (LCD). Weighing in at 2.5 lbs and measuring a trim 11.5" x 6" x 1.5", the display has a resolution of 560 x 192 bit-mapped pixels. Since each text character is composed on a 7 x 8 matrix, the LCD panel is capable of displaying a full 80 columns by 24 rows of normal, inverse, flashing, and Mousetext characters. The flat-panel display also has full graphics capabilities, including the much touted double high-resolution graphics. All but the fastest and most detailed animated graphics will be within the capabilities of the flat-panel display. Unfortunately, the projected lofty $600 pricetag makes the LCD panel a peripheral for the few rather than the masses.

***This machine is a programmer's dream—a powerful closed system with a wide range of special features.***

### Controller Port

Looking at the rear of the IIc, the controller port is located at the far left. This 9-pin D-type connector is where hand controllers plug into the IIc. Joysticks designed to use the 9-pin controller port of the IIe are 100% compatible with the IIc, but controllers that connect to the internal 16-pin game socket cannot be used without a special adapter.

Other peripherals that use the controller port are mice, paddles, light pens, and port extenders. As software programmers begin to take full advantage of the IIc Mousetext features, a mouse may become a necessity. Packaged with the $99 AppleMouse IIc is *MousePaint*, Bill Budge's adaptation of the incredible Macintosh drawing program, MacPaint. Few programs currently on the market allow mouse input, but you should expect to see many new releases that do.

Instead of a traditional X-Y pointing device, the mouse can be used as a paddle controller if your Basic program uses PDL functions to read the paddles. To use the mouse instead of the paddle, boot DOS 3.3, type PR#4 to turn on the mouse, then type CTRL-A to initialize it, and finally, type PR#0 to restore output to the screen.

### Audio Output

The Apple IIc has an internally mounted $1\frac{7}{8}$" speaker located on the bottom front of the unit. This speaker is slightly smaller than those used in the Apple II line to date, but it provides a comparable response. Luckily, there is a volume control dial on the lefthand side of the IIc, along with a two-channel, monaural, mini-phone jack to accommodate headphones. When the headphones are plugged in, the internal speaker is disconnected.

### Power Supply

One of the most interesting things about the IIc is that it actually has two power supplies: one internal and one external. The 10 lb. external supply is referred to as the floor board unit and comes with a 12' cord. This unit draws a negligible amount of power even when the IIc is turned off, and due to its large size, it dissipates heat rather well.

The floor board unit converts 110V AC from a wall outlet to 15V DC which can be used by the internal power supply. The fact that the computer itself runs on 15V DC allows the IIc to be powered from a car cigarette lighter socket or equivalent power source. If you are on the run, Diswasher sells

*The Apple IIc replete with its family of peripherals.*

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Cari, a $250 carrying case with a built-in battery pack that provides three to five hours of uninterrupted use without a charge. Equipped with Cari and the flat-panel LCD display, the IIc becomes a very powerful portable computer.

### Documentation

Three manuals are supplied with the Apple IIc. They are probably the best computer manuals ever written—for beginners. "Setting Up Your Apple IIc" explains simply and thoroughly how to get your computer out of its box and into operation. "Apple Presents the Apple IIc" is a 144-page spiral-bound interactive introduction to the IIc. It is to be used in conjunction with the four tutorial disks supplied with the system, though it can stand alone if need be.

"Systems Utilities" is a manual that describes the various functions and parameters of the powerful utilities disk included with the computer. The system utilities disk is ProDOS-based, yet the disk management commands contained therein allow it to read Pascal and DOS 3.3 disks.

Unfortunately for hackers and advanced users, detailed descriptions of Applesoft Basic, DOS references, system information, and technical specifications are not supplied with the IIc system. Several independent publishers have released IIc books, but beware, most of these do little more than reiterate the Apple manuals and press releases.

### Compatibility

One of the strongest selling points of the IIc is that it is compatible with the more than 10,000 Apple software programs already on the market. There are, however, many packages that are not fully compatible. The reasons for incompatibility vary. What follows

**Apple Computer plans to sell 500,000 IIc's in 1984 alone.**

is a description of the most common problems.

Software that makes calls to the alternate inverse character set in ROM will boot correctly, but will display strange Mousetext characters instead of the intended text.

If an Apple disk refuses to boot on a IIc, but works fine on other II computers, it probably has a special protection scheme common on entertainment packages. Spiral, synchronous, and half-tracking protection techniques rely on certain Apple Disk II drive idiosyncrasies that are not present in the IIc drives.

Any software that simply "hangs" in operation probably makes use of previously unused memory locations that were reserved for Apple's future use. Programs that rely upon 80-column boards manufactured by third-party vendors will not work correctly either.

All of these problems can be solved by rewriting the code, at which time the software manufacturers can take advantage of special IIc features such as 80/40 columns, 128K RAM, double high-resolution graphics, and mouse technology. I suspect that any existing incompatibilities will be reconciled shortly and that in the future all Apple software introduced will pay special attention to the IIc. As it stands, 80 to 95% of all Apple programs currently available work on the IIc, but the only way to make sure that the program you want functions correctly is to try it yourself at your local Apple dealer.

Apple Computer plans to sell 500,000 IIc's in 1984 alone. Will they make it? Who knows. One thing is for sure: they can count on my order. Although we at *Creative Computing* review several computers a month, I was so impressed with the IIc that I went out and bought one for myself. If you are looking for an Apple-compatible machine and are not too concerned with the fact that the IIc is slotless, this is the computer for you. If, however, you really want expansion slots, pick up a IIe. Either way, you can't lose. ■

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## Apple IIc-Specific Peripherals

Brady Communications Co., Inc.
Bowie, MD 20715
(800) 638-0220
Apple IIc User Guide $14.95

Chalk Board, Inc.
3772 Pleasantdale Rd.
Atlanta, GA 30340
PowerPad $149

Diswasher
1407 N. Providence Rd.
P.O. Box 6021
Columbia, MO 65205
(314) 449-0941
Cari carrying case with battery pack $249.95
Calling Four II $79
Serial-Parallel interface $129

Howard W. Sams & Co., Inc.
4300 W. 62nd St.
P.O. Box 7092
Indianapolis, IN 46206
(800) 428-SAMS
Introducing the Apple IIc $12.95

Koala Technologies
(800) KOA-BEAR
Koala Pad $125
Gibson Light Pen System $249

Pocket Books
Going Places With the New Apple IIc $3.95

Prometheus Products, Inc.
45277 Fremont Blvd.
Fremont, CA 94538
(415) 490-2370
Versabox serial-parallel interface $199

Quark
2525 W. Evans, Suite 220
Denver, CO 80219
(303) 934-2211
QC10 hard disk drive less than $2500

So. Calif. Research Group
P.O. Box 2231-A
Goleta, CA 93118
(800) 635-8310
9-16 Game Port Adapter $14.95

Street Electronics
1140 Mark Ave.
Carpinteria, CA 93013
(805) 684-4593
The Cricket $179.95

Sweet Micro Systems
50 Freeway Dr.
Cranston, RI 02920
(800) 341-8001
Mockingboard D $195

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Plano, TX 75074
(214) 424-8468
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Video-7 Inc.
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Suite 1
Sunnyvale, CA 95070
(408) 725-1433
IIc RGB Interface $195

Wico
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Graphics mode

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**Networking**
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# Acorn

## A Tall Oak in Education

John J. Anderson

You may have heard it said that big oaks from little acorns grow. In the case of the Acorn microcomputer, the proverb is most certainly true. The Acorn has already grown into a mighty oak on the far side of the Atlantic, where it is the most popular educational machine in the United Kingdom.

Certainly having been chosen as the official micro of the BBC (British Broadcasting System) helped it achieve this status. But it was not the fact of having been chosen that made the Acorn grow. It was the quality of the Acorn that caused it to be chosen. Follow?

When you stop to think that the Acorn computer has been in production abroad since 1981, you might think to credit the excellence of its design. Though the original Apple II was shipped with more or less the same design for a record-setting seven years, it is out of production now. The Acorn is still selling well today with an original design dating from 1981. No other machine can make that impressive claim.

Why? Well, it isn't enough just to say the designers had foresight or that their commitment to quality was admirable, though both of those statements are indeed true. The heart of the matter is that the Acorn was designed with a calculated, highly specific goal in mind: to be an educational tool. On that account it succeeds masterfully.

The Acorn is, in fact, built like an oak. It is designed to withstand "institutional" punishment, to offer ease of use without sacrificing the goal of furthering computer literacy, and to present powerful ROM software tools to the beginning programmer.

### Quick Tour of the Hardware

The Acorn is built around a 6502 processor with 32K of RAM and 32K of ROM. In ROM you'll find a variation of Microsoft Basic and a powerful machine code assembler, along with other routines.

Graphics are superlative, with an RGB interface standard (the Acorn was among the first RGB color micros). It sports eight graphics modes: 16 simultaneous colors in 256 x 160 pixel resolution and 840 x 256 pixel resolution in two colors. Graphics

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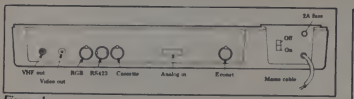
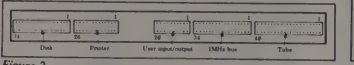



*Figure 1.*

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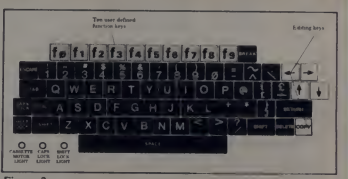


*Figure 3.*

housekeeping is handled by a custom LSI chip.

Sound capabilities include four channels: three for tones and one for noise. Sound quality rivals the Apple II series, with a small speaker internal to the machine. In fact many things about the Acorn will remind you of the Apple II, including its case. The designers of the Acorn certainly used the Apple as at least a partial prototype.

As opposed to the Apple, however, the Acorn presents a number of interfaces standard and has no need for internal card slots. Disk interface, parallel printer port, three types of video output (RF mod, composite, and RGB), RS-423 serial, and Econet interface are all standard on the Acorn. See Figures 1 and 2.

Also standard equipment are a ROM cartridge slot, a 1MHz bus, and another bus dubbed the "Tube." This bus makes the addition of a coprocessor possible—putting the Acorn under control of a Z 80 running CP/M, for example. The idea is that the CPU of the Acorn should never really go out of date, as long as the Tube is around. Acorn is planning a 68000 coprocessor option now, we have heard.

Econet is a communications networking system that allows up to 254 machines to be linked using standard four-wire telephone cable. This low-cost capability is of great interest to educators.

The keyboard layout of the machine is standard QWERTY, though a few of the keys are placed eccentrically (Figure 3). One of the most annoying placements I have encountered is the backspace key on the lower right, and that is exactly where it appears on the Acorn. The layout is non-Selectric, placing the quote as a SHIFT-2 and the apostrophe as SHIFT-7. It takes a bit of getting used to, unless it is what you have been using. There are nine programmable function keys across the top of the machine.

As I mentioned earlier, the Acorn is built to withstand the abuse of the classroom. I cannot recall having seen a sturdier computer. If you are purchasing micros for elementary school use, your machines will be subject to extremes of torture. The Aoorn is ready to stand up to that for years.

## HARDWARE PROFILE

**Product:** Acorn

**Type:** Microcomputer

**CPU:** 6502

**RAM:** 16/32K

**ROM:** 32K

**Type of Keyboard:** 74-key full-stroke QWERTY, 10 function keys

**Text Resolution:** To 80 x 24

**Graphics Resolution:** To 840 x 256

**Number of Colors:** 16

**Sound Capability:** 4 channel—3 tone, 1 noise

**Ports:** Cassette, parallel printer, RS-423, Econet, User I/O, twin custom busses.

**Documentation:** Excellent

**Summary:** As a machine designed for schools and to be used for education at home, the Acorn succeeds magnificently.

**Manufacturer:**
Acorn Computers Corp.
400 Unicorn Park Dr.
Woburn, MA 01801
(617) 935-1190

## Quick Tour of Basic

Why Basic in the Acorn, you ask? Why not Logo or Comal? Well, we must remember that the Acorn was originally designed back in 1981. Even then it was debated whether Basic was the best beginner's language, and there was much disagreement in British academic circles. Basic finally won out, probably because it was already in development for the machine (originally called the Atom) when the BBC chose to back it.

Acorn Basic is much like Microsoft Basic, with a few notable differences. Those differences will not mean much to students learning Basic for the first time, but they make transporting programs somewhat difficult. On the other hand, Acorn Basic has some neat special commands, like REPEAT...UNTIL and a host of dedicated graphics and sound commands. The command ENVELOPE, for example, allows you to define the shapes of sound envelopes for the three tone voices available.

## Other Software

Acorn software developed on these shores was scant up until the beginning of 1984, when many packages began to appear. Acorn has set up a qualified review panel to ensure that Acorn educational packages will conform to a high standard of quality. We made a random sampling of six Acorn/Shiva math packages, along with educational packages from Krell and Acorn itself, and found them quite satisfactory. Acorn tells us that hundreds of packages, including a powerful version of Logo, are now available.

## Documentation

But the Acorn is never a better learning machine than when it is teaching computer literacy. The two-volume User's Guide accompanying the machine is among the best Basic tutorials available. It is clear, unpatronizing, well-paced, thorough, and above all, logically consistent. If you want to learn Basic, or have a youngster who wants to, the Systems User Guide would be a very good place to start.

## Bottom Line

Things change very swiftly in the world of micros, and I have taken to calling six months a generation. The Acorn has been around for seven micro generations now and is still going strong.

I would have liked to have seen the introduction of the machine to the U.S. long before the beginning of this year—it might have pre-empted the inappropriate purchase of many machines less suited to use in education. Now that the Acorn is here, it has already found a niche among smart educational buyers.

The Acorn lists for $999 retail with built-in cassette storage port. A 5.25" disk drive unit with controller lists for $599. ■

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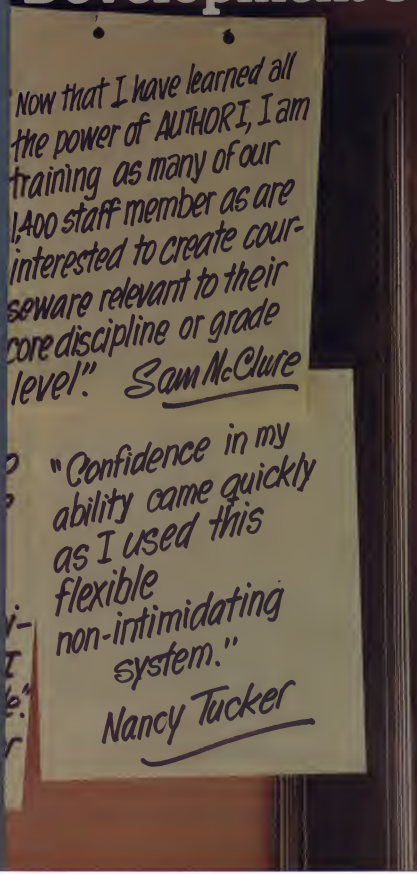

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# HAVAC from Microsci

## HARDWARE EVALUATION

**Owen Linzmayer**

Let's start right off by setting things straight. Havoc is a synonym for destruction. HAVAC is an acronym for Home/Academic Very Affordable Computer. This, my friends, is a review of the 64K Apple-compatible Havac computer from Mircosci. Now that we have dealt with the formalities, on with the review.

### History

The Havac is a new computer with an interesting background. Back in the days of yesteryear, when software publishers were thriving on entertainment program sales, a small hardware firm decided that there was a market for a game machine that would run only Apple entertainment packages.

Since it would only play games, all that was needed was a joystick port and a disk drive to load the programs, reasoned the hardware developers. Unfortunately, more and more new games were being introduced that required keyboard input to work correctly. By the time the need for the keyboard became evident, it dawned upon the designer that he essentially had

### HARDWARE PROFILE

**Product:** Havac
**Type:** Desktop
**CPU:** 6502
**RAM:** 64K/64K
**ROM:** 8K
**Type of Keyboard:** 63-key detachable full-stroke
**Text Resolution:** 40 x 24
**Graphics Resolution:** 280 x 192
**Number of Colors:** 16
**Sound Capability:** Yes
**Ports:** Parallel, serial, disk drive, hand controller
**Dimensions:** 5.5" x 10.75" x 14.5"
**Documentation:** Fair
**Summary:** An alternative Apple worth investigating.

*Microsci Engineering Manager Alan Silver, the proud designer of the Havac.*

**Manufacturer:**
Microsci Corp.
2158 S. Hathaway St.
Santa Ana, CA 92705
(714) 241-5600

an Apple-compatible computer. Why not expand the machine a bit and sell it as a full-blown computer system. That, dear readers, is the story of the Mircosci Havac.

## Reality

The Havac of today is an unexpandable Apple-compatible computer based on the 6502 microprocessor. The main unit sports somewhat cumbersome 10.75" x 14.5" x 5.5" dimensions which encase a single-sided, single-density disk drive along with the computer motherboard. The heavily populated motherboard contains the 64K of RAM and 8K of ROM, as well as joystick, serial, and parallel interfaces. The detachable keyboard is a full-stroke 63-key model with the same layout as an Apple IIe. At $799 retail, the Havac lives up to its billing as a "very affordable computer."

The detachable keyboard of the Havac has 63 full-stroke keys arranged in the same fashion as those on the Apple IIe keyboard. The cable to the main unit is hardwired to the keyboard and has a male 15-pin D-type connector on the other end that plugs into the lefthand side of the Havac. The keyboard unit itself is made of plastic and does not feel very solid.

However, I was pleasantly surprised to find that the response from the keys is excellent. I also like the fact that the caps lock key has a small red LED that lights up to signal when the key is active. In the upper lefthand corner of the keyboard is a Microsci emblem that acts as the power indicator for the computer. My only complaint about the keyboard is that the Tab, Delete, Shift, and Return keys are too small.

Built into the front of the Havac is the

*The layout of the Havac keyboard is identical to that of the Apple IIe with the exception of a small LED on the Caps Lock Key.*

The design philosophy of the Havac is similar to that of the new Apple IIc (see review elsewhere in this issue). Both computers are compatible with the Apple II line of software, neither has expansion slots, and both provide the user with printer and communications ports built-in at no extra cost. The Havac is intended to "meet the needs of the first-time computer user."

While the design philosophy may be the same for both computers, the physical designs are much different. Whereas the IIc is a sleek, low-profile computer, the Havac is a box-like system that resembles an old fashioned breadbox. Although the Havac will never be exhibited in the Museum of Modern Art, the substantial price difference between it and the IIc makes it an attractive alternative.

disk drive. The unit is a typical Apple-compatible single-sided, single-density drive that is accessed as if it were in slot six of an Apple. The $199 optional external second drive is referenced as drive two, slot six. The disk drive closes with a small black lever. When a disk is inserted into the drive, the lever must be turned clockwise to 12 o'clock to engage the drive properly.

A disk containing the Havac disk operating system (DOS) is supplied with the computer. I like the format and features of this DOS, but it is not as useful as Apple's new ProDOS. A Havac DOS disk can hold a maximum of 104 files and display eight at a time in the main menu. Each of the eight files currently displayed by DOS is given a number. At the bottom of the screen are nine DOS commands, each with its own number. By typing a command number followed by a file number, you can perform operations with a minimum of keyboard input. This is excellent for beginning computer users, the main audience for the Havac.

## Compatibility

For any Apple-compatible machine, the most important consideration is just how compatible it really is. After testing quite a few commercial software packages, I estimate that the Havac is about 80% compatible with available Apple II software. The Havac will not run software packages written specifically for the *IIe*, those that use CP/M, nor programs that need ProDOS and Applesoft Basic at the same time.

There are several different boot procedures that must be tried before you can determine whether or not a package will work on the Havac. These take into consideration different memory and language requirements, as well as if the program

***The Havac runs most (but not all) of the software for the Apple.***

can utilize lowercase. If the program needs Basic, you must own a copy of Apple DOS with Applesoft and Integer Basic. The Havac material suggests buying this disk from your local Apple dealer to clear up most compatibility problems that you may encounter.

## Interfaces

The Havac has several ports for interfacing a variety of peripherals. On the back of the main unit are the printer, communications, video, and second drive connectors. On the far left of the rear of the computer is the parallel printer interface. The printer port is a male 15-pin D-type connector. To interface a parallel printer, you must have the appropriate 15-pin to Centronics cable available from Microsci for $40. You can also hook up a serial printer, but this is not as desirable since DIP switches on the bottom of the computer must be changed, and a special interface cable must be acquired.

To the right of the printer port is an RCA phono jack for video output to any standard NTSC composite monitor. If you want to use your television set as a display, you must get an optional RF modulator that plugs into the RCA phono jack.

Adjacent to the video output jack is the serial port. This female DB-25 connector is designed to be compatible with

the RS-232C standard serial interface. Since almost all telecommunications is done in serial, this is where you connect a modem. Of course, many other serial devices are available for the Apple II line of computers, but few use the standard DB-25 connector. If you wish to try to interface these third-party devices, you will have to build your own custom cables.

All the way over on the righthand side of the rear of the Havac is a female DB-25 connector for the second disk drive. *Creative Computing* was supplied with an external disk drive for this review, yet the cable coming out of the drive was too short for the unit to be placed to the right of the computer, the recommended position. I expect that this minor problem will be corrected by the time the Havac goes into full production.

Toward the front of the computer on the righthand side is a 9-pin D-type game socket. This connector is identical to those on the IIe and IIc computers. Any device that plugs into the hand controller socket of the IIe should work with the Havac, but since the IIc controller port leads to special mouse firmware, it is doubtful that all IIc peripherals can be used with the Havac.

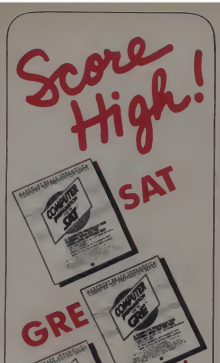
## Support

The software and documentation included with the Havac are woefully inadequate. The word processor and communications package provided on the Havac DOS disk are bare bones programs with very few features. They serve well to introduce the first-time user to these applications, but must be replaced with more powerful packages if you ever wish to do any real work in those areas.

The same holds true for the documentation. The Havac manual is an introduction to the computer, not an in-depth look at how it works. For those interested in the advanced aspects of the Havac, a technical reference manual is available.

Ads for the Havac tout it as "the very personal computer." As far as ease of set-up and interfacing go, the Havac lives up to this claim. Even more important is the price. Several thousand dollars does not a personal computer make, regardless of what IBM might try to tell you. The basic Havac, priced at $799 complete, is a very good buy if you are in the market for an Apple compatible computer.

Like the IIc, Havac lacks expansion slots for exciting peripherals such as digitizers, sound boards, and voice generators. The IIc has the advantage of carrying the Apple logo, which almost guarantees that third-party manufacturers will design dozens of IIc-specific devices. Hopefully adaptors and interfaces will be available so that Havac owners can use the new IIc devices. ■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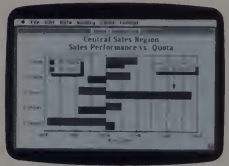


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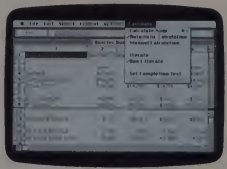

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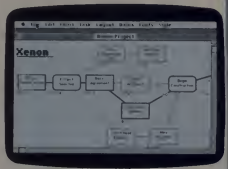
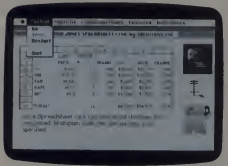
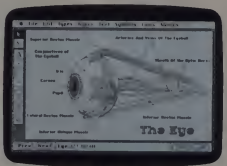



*MacProject.*
*project management.*



*Dow Jones Spreadsheet Link.*
*stock analysis and communications.*

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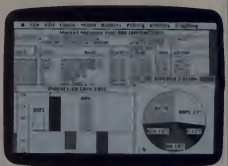
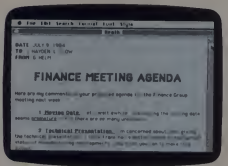


*Dow Jones Market Manager.*
*stock analysis.*

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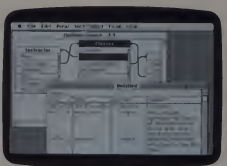
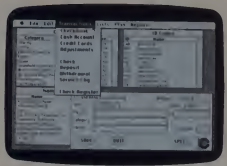
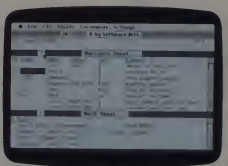


*theBase.*
*database management.*

*MacDraw.*
*graphic illustration.*



*Home Mac Accountant.*
*personal finance.*



*TK! Solver.*
*equation processor.*

*Habadex.*
*database and communications.*

*The programs above are just a few examples of new software for Macintosh. Some are available now, others will be released in the coming weeks. *Available 4th quarter 1984. **Available 1st quarter 1985.*
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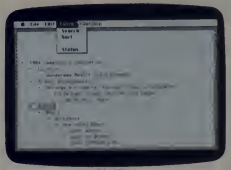
*For an authorized Apple dealer nearest you call* **(800) 538-9696.** *In Canada, call* **(800) 268-7796** *or* **(800) 268-7637.**

# r some important programs.



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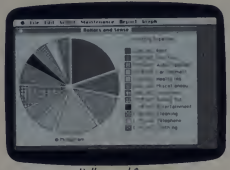
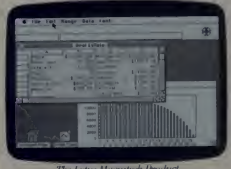
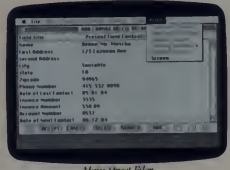
*idea processor.*



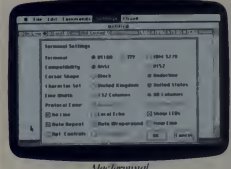
*Dollars and Sense.*
*personal finance.*



*The Lotus Macintosh Product.*
*integrated business software.®*



*Main Street Filer.*
*database management.*



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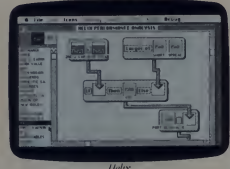
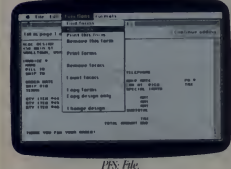
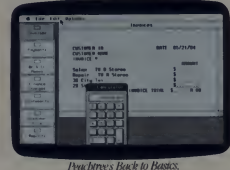
*data communications.*



*Helix.*
*relational database.*



*PFS: File.*
*database management.*



*Peachtree's Back to Basics.*
*accounting package.*

Every business day, a new software program is being developed for the Macintosh™ Personal Computer.

Software for word processing. Spreadsheets. Business graphics. Project management. Database management. And data communications.

As well as software that enables Macintosh to do things that have never been done on a computer before.

Which means the world's easiest-to-use business computer is well on its way to becoming the world's most useful business computer.

Any authorized Apple dealer will gladly demonstrate that fact.

Just ask to see the computer that's software compatible.

With human beings.

# Preschoolers Learn at Home

SOFTWARE EVALUATION

Penny Smith

"Pre-school education" has become a very fashionable concept now that having babies has again become a fashionable pastime. The market for pre-school learning packages is considerable, and the choices available to parents and educators are overwhelming.

We were spurred on in our desire to investigate the potential of some of these programs partly by those guilt-inducing TV commercials which appeared around Christmas and showed a loving father giving his darling pre-schooler "every educational and emotional advantage" and partly by the very real fact that we intend to educate our children at home for the next few years rather than send them to school.

Our reviews, therefore, are written from the viewpoint of parents who want to see their children enjoy what they are doing and remain interested in a program long enough to justify the sometimes substantial cost. We are also looking for the results of these programs in educational terms. In other words, what does the child really seem to learn, if anything? And does this learning correlate with the manufacturer's claims?

We do not use these programs as babysitters. One of our goals is to see how we, as parents, can interact with the computer and the child to enhance the learning process. At times this has not been easy, but at others the process has been exciting and fun as we have watched our children and their friends make new discoveries and grow in their understanding of the world around them.

**One of our goals is to see how we, as parents, can interact with the computer and the child to enhance the learning process.**

(Note: the father and child in the above-mentioned TV commercial campaign must just have booted up their program, because the father is not yet slapping the child's hand in frustration and demanding that he "do it the right way!" This is an almost overwhelming temptation and one that if succumbed to really ruins those warm feelings of giving the child every educational and emotional advantage.)

The following are learning packages that focus on early language and reading skills, specifically letter identification and basic familiarity with the computer keyboard.

## Kids On Keys

*Kids on Keys* is an educational program by Frieda Lekkerkerker designed to introduce children to the computer

*Kids On Keys*

# Meet your kid's new teachers.

At first glance, they look like funny creatures right out of a computer game shoot 'em up. But underneath the funny surface, they represent one of the most serious approaches to home education you've ever heard of.

INTRODUCING SPROUT™ SOFTWARE. GAMES THAT TEACH.

These amazing teachers are called Tink and Tonk. They come from Sprout. Software for kids 4 to 8.

The beauty of Sprout is how we balance entertainment with a healthy dose of education.

While kids are having fun at home, they're reinforcing what they've learned at school. Things like the alphabet, spelling, vocabulary, counting, adding, and pattern recognition.

You'll also like how Sprout prevents boredom. Our games grow up, instead of wear out. As kids get older, the game gets harder—with many variations and many decisions to make.

Sprout didn't learn how to do all this overnight. You see, we've got a hundred years of experience to lean on. (Our parent company is SFN, the country's #1 textbook publisher for elementary and high schools.)

We've also got the experience of Mercer Mayer, who has written or illustrated 80 children's books. He dazzles kids with ideas and pictures that keep them coming back for more.

So let TINK!TONK!™ software teach your kids. And when they play at the computer, they won't be playing around. They'll be learning something.

Compatible with Atari® Commodore® Apple® and IBM®

sprout

Games that grow up. Instead of wear out.

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CIRCLE 173 ON READER SERVICE CARD

keyboard while they learn to identify letters, numbers, and words. It is challenging and stimulating enough to engage the interest of pre-schoolers and adults. Our test players included, among others, a three-year-old and a recent college graduate.

There are three games from which to choose and four levels for each game. There is also an option which allows you to create your own pictures and words for Games 2 and 3.

In Game 1 letters and numbers float from the top of the screen to the bottom at varying rates of speed depending upon the level chosen. The player must type the letter or number before it disappears. After 15 letters and numbers, a balloon carrying a child and displaying a word appears. The player must type the word correctly, and the balloon goes up and bonus points are scored. In Levels 1 and 2 three-letter words are used on the balloon. Those in Levels 3 and 4 are slightly longer.

***Ms. Lekkerkerker's preschool subjects must have taken touch typing at the Better Baby College.***

Game 2 features a group of pictures, which float down the screen and disappear one at a time. The player must type the first letter of the word that identifies the object descending the screen in Level 1. In Levels 2, 3, and 4, the player must type the entire word before the picture disappears. A bonus round in which a partial picture of each object floats its way down allows the player to add extra points to his score.

The third game shows pictures that are numbered from 1 to 5. A word appears on the screen, and the player has to type the number that corresponds to the picture of that word before the word disappears at the bottom of the screen. Three tries are allowed to type the correct answer. The points awarded decrease with each try. Again a bonus round allows the player to gain additional points by identifying by number a partially revealed picture.

The option which allows the player to create his own words and pictures for the second and third games requires a blank disk and a joystick for drawing the pictures. This aspect of the program is really a great deal of fun and expands the life of the program enormously as far as maintaining the child's interest and encouraging creative exploration of the keyboard. These characteristics prolong the life of the program and protect the parent's investment. In our book this is a definite plus. We rate it significant learning tool and an excellent value for the money.

Having said that, we do have a couple of bones to pick with Ms. Lekkerkerker. These center around the concepts being taught and the level of dexterity needed to play the games which teach them. The program is said to be suitable for children ages 3 to 9. We tested it with a reasonably bright three-year-old who became frustrated and anxious at not being able to catch more than two or three of the letters which were showered down at the easiest level of the easiest game. Ms. Lekkerkerker's preschool subjects must have taken touch typing at the Better Baby College because none of the preschoolers we tested (who were, indeed, at the keyboard exploration stage) had a snowball's chance in hell of getting a particularly satisfactory or reinforcing response from the computer. We were able to circumvent this difficulty by having the child call out the letter/number or word to an adult who then typed it on the keyboard. This arrangement worked quite well in the letter/number/word identification category, but was not terribly effective in familiarizing the child with the keyboard, which is one of the avowed objectives of the program.

Another problem we had with Games 2 and 3 was that the lo-res pictures of objects were sometimes difficult to identify in the time it took for the object to descend the screen. Something that might be a coat or a shirt or a jacket or a blouse floats down a bit too quickly to give you a chance to explore all of the alternatives. Kids learn quickly, though, and this does prolong the life of the program. They'll get it next time through!

The partial pictures of the bonus rounds compound this problem. A little shape which might be the toe of a boot or the sleeve of a coat or part of a flower pot floats down the screen. The first few times it is quite frustrating, but even an adult can do it after a while.

### SOFTWARE PROFILE

**Name:** Kids on Keys
**Type:** Educational game
**Suggested Age:** 3 to 9
**System:** 48K Apple, Atari, Commodore 64, IBM PC
**Format:** Disk
**Summary:** Identify letters, numbers and words.
**Price:** $34.95
**Manufacturer:**
Spinnaker Software
215 First St.
Cambridge, MA 02142
(617) 494-1200

### Summary

*Kids on Keys* is an entertaining and imaginative program. It can be interesting even for a parent who will find it necessary to assist a pre-schooler in playing the various games. The Make Pictures option will keep an older child involved for hours experimenting with this aspect of the programming function. With assistance, pre-schoolers can learn letter/number and word identification, and older children can become proficient in keyboard manipulation.

***The children seemed to be incorporating the words they learned playing the games into their vocabularies.***

The primary hang-up appears to be that these two learning steps cannot take place at the same time. A child who is young enough to need to learn letter identification does not normally have the dexterity or familiarity with the keyboard to use the program unaided. One who is able to identify the letter and find it on the keyboard before it sinks into oblivion is usually past the age when letter identification is a significant hurdle.

In short, it is a good package but it requires flexibility and creativity in the adult who is supervising its use and could use some further documentation to help out in this process.

CIRCLE 405 ON READER SERVICE CARD

## Word Pieces

Roger Shank has produced a fill-in-the-blank-type program designed to teach young children to distinguish between letters of the alphabet, to build the child's vocabulary, and to familiarize the child with the letters of the alphabet. This package turned out to be an immediate favorite with our young testers.

The program consists of three sets of two-letter word endings, which are displayed on the screen following the credits. The child selects -AR, -OG, or -IN. The appropriate pair of letters appears on the screen, and the child then attempts to make a complete word by

# PITSTOP II. BECAUSE AUTO RACING IS NOT A SOLO SPORT.

When we introduced Pitstop, we created action in the pits. Now, with PITSTOP II, EPYX introduces true competitive auto racing, both on the track and in the pits. Auto racing is not a one man sport. With PITSTOP II, you can now experience the thrill of speed and competition as you battle your opponent in a race against the clock. Now, more than ever, the strategy of when you make a pit stop and your pit crew's speed and performance, combined with your skill on the track, will determine the winner.

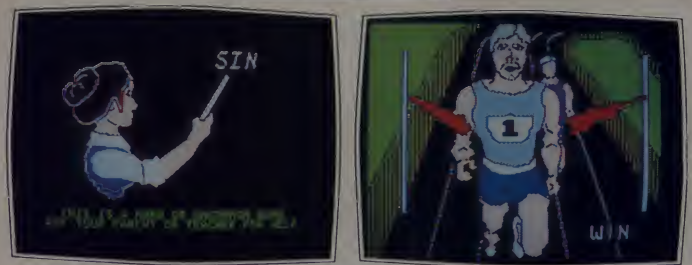
A split screen shows you your position and that of your opponent, a digital clock displays time and a lap counter gives you your race position as you race against each other in pursuit of the checkered flag. You can also play against the computer and take a practice lap or race against the computer controlled pace car as you prepare for real head-to-head competition. Step up to PITSTOP II because auto racing is not a solo sport.

*One or two players; joystick controlled.*

EPYX COMPUTER SOFTWARE

*Strategy Games for the Action-Game Player*

CIRCLE 141 ON READER SERVICE CARD




*Word Pieces*

choosing a letter of the alphabet to go with that word ending. When the child presses a letter key, that letter appears on the screen and moves toward the word ending. If the letter and ending make a complete word, for example, DOG, LOG, or FOG, several things happen to show a successful combination has been made: The word flashes, musical sounds play, and an animated hi-res illustration of the word appears on the screen.

If the child chooses an initial letter that does not combine with the ending to make a complete word, for example, XOG or QOG, a blotch appears and the computer beeps.

This is an easy program for young children to use, and our young testers enjoyed it enormously. The pictures are humorous if a bit ambiguous in their illustration of certain words. How, for example, would you illustrate the word "kin" or "tin?" For certain other words such as GAR, PAR, and SIN, a picture of a school teacher pointing to a blackboard appears with a note to ask a parent or teacher about these more abstract or uncommon words.

It is definitely more rewarding to call forth one of the illustrations rather than rely solely on random selection of letters, and we found that the children did take note of the spellings of their favorite words and were able to produce them independently as well as with the help of the computer. They also seemed to be incorporating the words they learned playing the games into their vocabularies. Therefore, it would appear that this program does, in fact, deliver the type of learning experience it advertises.

Although we tested *Word Pieces* in a home situation, we feel it would be very appropriate in a classroom as well.

There is much to be learned from the concepts presented in this program. The only real misgiving we have about the program is the rather limited scope of the letter combinations allowed. Once a child has gone through the three word families, a feat which can be accomplished in a matter of minutes, he can easily lose interest. However, with a certain amount of creativity on the part of the adult in making up games and new ways to use the information learned, we found that this program actually had a reasonably long life and represented a good value for the money.

**Summary**

*Word Pieces* gets good marks for teaching what it says it's going to teach, good graphics, and a great amount of raw material with which to work in creating games and exercises to reinforce the concepts presented.

The people at Compu-Teach would do well to include some suggestions for alternate approaches to the use of the program in the documentation and expanded the number of word-ending games available in the package.

CIRCLE 406 ON READER SERVICE CARD

### SOFTWARE PROFILE

**Name:** Word Pieces
**Type:** Educational game
**Suggested Age:** 3 to 7
**System:** 48K Apple, IBM PC
**Format:** Disk
**Summary:** Players creates words which are illustrated on screen.
**Price:** $29.95
**Manufacturer:**
Compu-Tech Inc.
240 Bradley St.
New Haven, CT 06511
(213) 777-7738

## Letters and Words

Learning Well's *Letters and Words* is much more interesting than its slightly utilitarian-looking packaging and documentation might lead you to think. The package contains three games of varying difficulty to appeal to children from preschooler age to "up." We tested the program only on pre-schoolers and found that a five-year-old could do all but the most difficult level with relative ease. Our appraisal leads us to be a little more specific and put an age range of 3 to 6 on this particular game package.

There is a fairly long wait between loading the program and the appearance of the first screen. The designers have thoughtfully made it possible to bypass the introductory musical sequence. This is a minor point, but helpful if your child changes his mind a lot about which game he wants to play.

*Letters and Words* is designed to provide practice and reinforcement in three early reading skills. Game 1 teaches the concept of alphabetical order. Game 2 focuses on matching upper-and lowercase letters. Game 3 reinforces sight vocabulary and word picture matching skills.

In each game four boxes appear at the bottom of the screen. The player registers his responses by pressing the spacebar when the appropriate box is highlighted. The first box shows a little "yes man" who nods his head up and down. The second box shows the same little man shaking his head "no". The third box shows a question mark which indicates that the player has doubts about the answer and would like some help.

Pressing the bar when the question

# IMPOSSIBLE MISSION.
# YOUR MISSION–TO SAVE THE WORLD.

As a member of the exclusive Anti-Computer Terrorist Squad (ACT), your mission is to find and reach the infamous Elvin, who is holding the world's population hostage under threat of nuclear annihilation. You must negotiate a path through the rooms and tunnels of his headquarters trying to avoid Elvin's robot protectors.

Should you try to outrun or jump over the next robot or play it safe and take the time to assemble the codes needed to deactivate the robots and then to find and stop Elvin.

Use your camera to photograph as many clues as possible to find the password which will allow you to penetrate Elvin's control room.

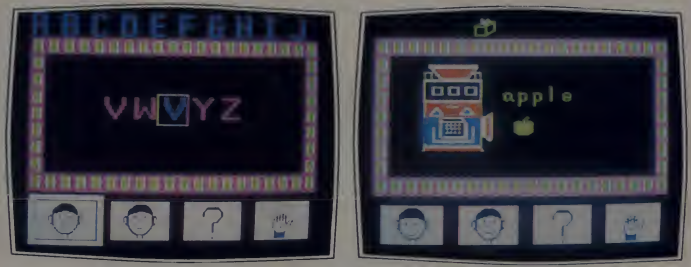
Your Mission—To Save The World, But Hurry!

*One player; joystick controlled.*

EPYX
COMPUTER SOFTWARE

*Strategy Games for the Action-Game Player*

CIRCLE 138 ON READER SERVICE CARD




*Letters and Words*

box is highlighted produces a short instructional sequence after which the game continues. The final box shows a hand waving goodbye. This box returns you to the main menu. It took our testers a little while to get their decision-making processes coordinated with the automatic progression the box highlighter. There is a "utility" option which allows you to decrease the amount of time each box is highlighted. Decreasing the amount of time between highlighted changes, oddly enough, seemed to help the younger children work with this response method. It is nice to have this option available.

Game 1 features alphabetization or the concept that letters come in some sort of order. Four letters drop down from the revolving "letter machine," leaving a space between the second and third letters. The space is filled by a boxed letter, and the player must decide if the letter in the box is in correct alphabetical order.

For example, the letters DE-GH may drop down. The space between E and G might then be filled with an L. If the player makes the correct response (i.e. that the L is not in correct alphabetical order) the letter is X'ed out, a little tune plays, and the player receives a "present" (more about this later).

This is not a difficult game, but it does offer valuable practice in a concept that adults take for granted but of which children sometimes are not aware. During the game, the alphabet marches by on the top of the screen to give additional help.

Game 2 features a "letter splitting machine," which spits out an upper-and a lowercase letter. The player decides if they are correctly matched. Again, if the player gives the right response, he adds another present to his collection.

In the third game an object appears on the screen. Lowercase letters then pop out to form a word. The player must decide if the word describes the picture. A present is the reward for a correct response. This game has three different sets of words which increase in length and difficulty and can be loaded in the Utilities mode. It is this option that makes the package valuable for children above pre-school age.

***Most four-year-olds would prefer a kite, a puppy, a car, and a ring to 4000 points any day.***

## SOFTWARE PROFILE

**Name:** Letters and Words
**Type:** Educational game
**Suggested Age:** Pre-K and up
**System:** 48K Apple, IBM PC, PCjr.
**Format:** Disk
**Summary:** Animated graphics reinforce letter identification, alphabetization and early reading skills.
**Price:** $49.95
**Manufacturer:**
Learning Well
200 South Service Rd.
Roslyn Heights, NY 11577
(516) 621-1540
Methods & Solutions, Inc.,
Woburn, MA 01801

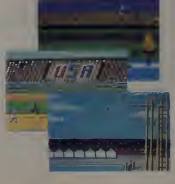
The presents are little gift-wrapped surprise packages which accumulate with each right answer during a game round. Up to ten presents can be acquired each round, and they are stored in the upper lefthand corner of the screen to be opened at the end of the round by a special machine. This is a clever approach to score-keeping. Most four-year-olds would prefer a kite, a puppy, a car, and a ring to 4000 points any day: even if the prizes do vanish when the next round starts. We found one of our testers striving to get at least five points each time since present number 5 in Game 2 is a puppy . . . wishful thinking.

The Utilities section offers three functions in addition to changing the timing of the answer box highlight and loading new word lists as mentioned above. A Performance Summary allows you to review a player's performance on the last round of a game played. This is not so crucial at home, but might be very helpful in a classroom situation. It records the number of questions answered and the exact letters and/or words which were missed in that round. This record is cleared when another round is played or when you press S in the Utilities mode to set all scores at zero.

The Utilities also allow you to control the number of questions presented in each round you play. You can choose up to 10 questions per round.

The documentation ends with four suggested activities to reinforce the concepts and skills in the package. Activities of this sort—yarn writing, alphabet hopscotch, etc.—are pretty standard fare in most nursey schools and kindergartens, but presenting them with the computer learning games is a nice touch and is helpful in encouraging parent/teacher creativity. It also acts as a reminder that the skills presented are not designed

# SUMMER GAMES.
# NOW IT'S YOUR CHANCE TO GO FOR THE GOLD.




You're an Olympic athlete competing in eight key events at the Summer Games. How well can you score in track, swimming, diving, shooting, gymnastics and more? So realistic, there's even an opening ceremony and awards presentation after each event.

Unlike other "Olympics-Like" games, Summer Games has incredible realism, superb state-of-the-art graphics and sound effects (including national anthems from 18 countries), and it is a true action-strategy game. In each event you must plan and execute your game strategy in order to maximize your score. It is not just a matter of how fast you can move the joystick.

So change into your running shoes, grab your joystick and **GO FOR THE GOLD!**

*One or more players; joystick controlled.*

EPYX
COMPUTER SOFTWARE

***Strategy Games for the Action-Game Player***

**CIRCLE 139 ON READER SERVICE CARD**

*A B sCenes*

primarily to roll up high scores on a computer screen but must be reinforced and applied to real-life situations.

**Summary**

*Letters and Words* is an easy program for a child to use and entertaining enough to hold his interest for quite a long time. The documentation is good and includes several helpful suggestions for followup on the skills and concepts presented.

The ingenious scoring and response systems are excellent examples of programming geared to the non-reader. And, finally, it does, indeed, appear to give some value practice in alphabetization and letter recognition skills. Good job, Learning Well.

CIRCLE 407 ON READER SERVICE CARD

## A B sCenes, Level 1

*A B sCenes* operates on the premise that even on the complicated maze of the computer keyboard a young child can remember the location of a key that calls forth a pleasing graphic illustration; and in using that key over and over he will learn to distinguish between letters and discover the symbolic relationships among letters, words, and objects. Amazingly enough, this premise seems to be valid. Even a very young three-year-old who tested the first game for us was successful and was able to produce certain animated pictures at will after a little practice.

The package consists of three games which are represented on the menu screen by an E followed by an egg for Game 1; an egg followed by an E for Game 2; and an egg followed by the word EGG for Game 3.

Game 1 is very simple and designed to encourage familiarity with the computer keyboard as well as discrimination between letters. The child can produce an animated picture of an object by pressing any key on the keyboard. E, obviously, produces an egg which cracks open to reveal a little chick. Q calls forth a picture resembling Elizabeth II and a rendition of "God Save the Queen."

**A B sCenes is a very appealing game which was enjoyed by every child who tested it.**

G is a gate that opens as a sun rises and the "Hallelujah Chorus" plays in the background. ((It would be wise for the parent or teacher to be available to explain that G stands for gate and not sun. This sort of logical mistake on the child's part would certainly be counter-productive as far as learning initial letter sounds. We also found it necessary to explain that X stands for X-ray and not skeleton.)

These two examples notwithstanding, the graphics are extremely clever and imaginative, and the children enjoyed playing this game long after we had become bored with it. At the next sitting they also seemed to remember which letters went with which pictures, so even the very young ones had begun the learning process which the instruction booklet lists as one of the objectives of the package.

Game 2 embellishes the process begun in the first game. This time a picture appears, and the player must type the first letter of the word in order to see the animation and hear the little tune. He must press the Y to get the yoyo to go up and down or the J to make the lid of the jar open and close. This game was beyond the very young players but gave a feeling control that four- and five-year-olds who were more familiar with beginning letter sounds enjoyed.

Game 3 is just like Game 2 except that the player must type the entire word rather than just the first letter. When the first letter is typed, the picture moves slightly, and a series of hyphens appears to indicate the number of letters in the word. When the full word is completed, the picture finishes its animation sequence, and a new object appears.

*A B sCenes* is a very appealing game which was enjoyed by every child who tested it. Since this was one of the first packages we tested, it has received quite a bit of use, and we have been able to observe that the children do seem to progress from one level to the next of their own accord after they have mastered the skills presented at each level. Our five-year-old goes directly to Game 3 to work on complete words rather

### SOFTWARE PROFILE

**Name:** A B sCenes, Level 1
**Type:** Educational game
**Suggested Age:** 3 to 6
**System:** 48K Apple, IBM PC
**Format:** Disk
**Summary:** Letters and beginning reading skills are taught by animated graphics.
**Price:** $29.95
**Manufacturer:**
Compu-Teach Inc.
240 Bradley St.
New Haven, CT 06511
(203) 777-7738

than play on the less challenging levels. While the younger children will return to Game 1 for a time, they seem to be applying the letter sounds learned to the more intentional requirements of Game 2.

These are easy games for a child to play alone or with other children. Apart from the minor explanations noted above, little adult supervision is needed. This is a big plus because the children enjoyed the animated graphics long after the adult were ready to call it quits.

Jordan Mechner has done a terrific job with .the graphics and program design. He has produced a usable and enjoyable package. One observation we should make as far as the learning of letter sounds, however, is that in the spelling game (Game 3) many of the words end in a silent E. As the children play the game, they are building a sight word vocabulary, but they can also be confused by the vagaries of English spelling rules.

### Summary

We consider *A B sCenes* an excellent investment. Although the games are simple and the number of possible graphic presentations necessarily limited to 26, the children with whom we tested it were all enthralled with it and appeared to be polishing their reading and spelling skills as well.

## A B sCenes, Level II

*A B sCenes Level II* is basically identical to *Level I* except that the words used are significantly longer and more difficult than those in the first package. For example, the *Level I* word for K is key. The *Level II* word is kangaroo. In the first level, U is used as the initial letter in the word up. Umbrella is illustrated in Level II.

This difference is not particularly important in Games 1 and 2 since the only factor that comes into play in both programs is the initial letter sound. Up to this point, the child who enjoyed *A B sCenes, Level I* will have a similar, if slightly shorter-lived, love affair with *Level II*.

The problem arises in Game 3 in which the player is required to type the entire word correctly to animate the graphic illustration. In *Level I* it is not too great a step from learning that the initial letter in the word ant is an A to being able to reproduce the sight word "ant." However, it is quite a feat to go from learning the initial letter in kangaroo to being able to type out the entire word. Kangaroo is not a "sight word." It is one that takes a good deal of practice to sound out and spell.

### SOFTWARE PROFILE

**Name:** A B sCenes, Level II
**Type:** Educational game
**Suggested Age:** 3 to 6
**System:** 48K Apple
**Format:** Disk
**Summary:** Letters and beginning reading skills taught by animated graphics.
**Price:** $29.95
**Manufacturer:**
Compu-Teach Inc.
240 Bradley St.
New Haven, CT 06511

### Summary

Although we can give *A B sCenes Level I* an enthusiastic review, *Level II* seems to make too great a jump in skill level between games to achieve the same sort of sequential mastery and self-motivation that make *Level I* so valuable. ■

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CIRCLE 183 ON READER SERVICE CARD

# The Intersection of Sesame Street and Silicon Alley

## CCW Educational Games for the Color Computer

SOFTWARE EVALUATION

Owen Linzmayer

All across America kids sit spellbound in front of their television sets watching educational PBS broadcasts. No, they are not watching Masterpiece Theater, but rather, the Children's Television Workshop's popular series, "Sesame Street." Instead of forcing educational material upon the kids, CTW actually makes it fun to learn. Colorful puppets like Oscar the Grouch, Big Bird, and the lovable couple Ernie and Bert capture the children's imaginations, become their lifelong friends, and in the process, teach the kids about arithmetic and the alphabet.

A close relative of CTW is the Children's Computer Workshop (CCW), which has licensed a series of educational programs for the TRS-80 Color Computer to Radio Shack. Modeled on the popular TV series, the CCW programs incorporate some Sesame Street favorites into the games. Big Bird is one of my all-time favorite characters, so let's start by examining *Big Bird's Special Delivery*.

### Big Bird's Special Delivery

Like all CCW games, *Big Bird's Special Delivery* comes in a color-coded package that denotes the intended age group of the audience. *Special Delivery* is geared toward children between three and six years old. The instruction manual is yellow, and the cassette tape enclosed requires a 16K Color Computer with Extended Basic.

The object of *Big Bird's Special Delivery* is for the child to help Big Bird and Little Bird deliver packages to the correct stores. There are two different games included, and two levels of difficulty for each game.

The first, easier game is called The Same Game, in which Little Bird appears carrying a package on his head. The child must identify what it is Little Bird is carrying, and then locate the store which has the same object displayed in its window.

Using the left and right arrow keys, the child moves Little Bird beneath the correct store, and then presses the up arrow to fly the package to its intended recipient. If the child is correct, the store owner nods his head, and the package is delivered. If, however, the child's guess is wrong, the owner shakes his head No.

**The child must identify what it is Little Bird is carrying, and then locate the store which has the same object displayed in its window.**

The child continues matching the packages with the objects in the windows until all four stores have received their packages, at which point all of the display lights blink on and off and four new window objects appear.

*Big Bird's Special Delivery*

The Same Game is a good starting point to get the child comfortable with the idea of using the keyboard to manipulate objects on screen. Older children will be more challenged by Find the Right Kind, the more difficult game of the two. The premise is the same: the child must deliver packages, but instead of matching pictures, the child must determine what store sells objects similar to the one Little Bird is carrying.

Find the Right Kind is something like the "which of these doesn't belong" game played on Sesame Street. For instance, Big Bird gives Little Bird a banana to deliver. There are pictures of a flower, a dress, a piano, and an apple in the store windows. The child must make the connection that both bananas and apples are fruit and then deliver the banana to the store with the apple in its display.

*Big Bird's Special Delivery* was the favorite package among our playtesters. Pam, a cute four-year-old, loved this one, even though she had to be helped

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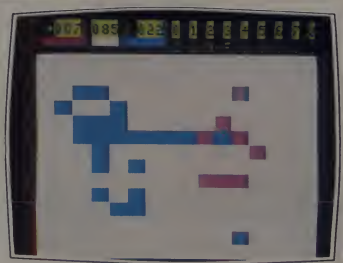
*Grover's Number Rover*



*Flip Side*

sometimes while playing Find the Right Kind.

At first I was a bit skeptical about the Sesame Street characters being used to sell software, thinking it was only a marketing trick, but it seems that the character tie-in really makes the children want to play again and again.

### SOFTWARE PROFILE

**Name:** Big Bird's Special Delivery (RS#26-2525)
**Type:** Educational Game
**System:** Extended Basic TRS-80 Color Computer
**Format:** Cassette
**Summary:** Figure recognition and association
**Price:** $19.95
**Manufacturer:** Tandy-Radio Shack Fort Worth, TX 76102

## Grover's Number Rover

Also designed for the same age group is *Grover's Number Rover*. Grover is blue and looks as though he could be Oscar the Grouch's well-groomed cousin. He pilots a large space ship adorned with ten windows. Strange creatures called Twiddles roam the planet surface beneath the UFO, and the children can move these Twiddles around, as well as suck them up into the space ship. There are several sections to *Grover's Number Rover*, all of which have internal instructions and two levels of play.

The easier levels are intended to familiarize the child with the controls used in play: the arrow keys and ENTER. Once the child has become accustomed to these, more difficult games can be played.

Twiddles Counting is the first game that has any real educational value. In it, the child counts the number of Twiddles on the screen and then presses the number key that tells how many he sees. After pressing the key, the number appears on the screen, and the child can change his answer before pressing the ENTER key. If the child is correct, a big tube beams the Twiddles up into Grover's Number Rover. Not only does this game reinforce the child's counting skills, it helps the child associate the number he speaks while counting with the written number he sees on the keyboard and screen.

Twiddle Away and Twiddle Adding present the child with simple subtraction and addition problems, respectively. These two sections are most advantageous if an adult sits nearby and helps the child when problems crop up.

### SOFTWARE PROFILE

**Name:** Grover's Number Rover (RS#26-2522)
**Type:** Educational game
**System:** Extended Basic TRS-80 Color Computer
**Format:** Cassette
**Summary:** Fundamental mathematics
**Price:** $19.95
**Manufacturer:** Tandy-Radio Shack Fort Worth, TX 76102

It isn't long before even three- and four-year-olds can add and subtract single digit numbers using *Grover's Number Rover*. This gives the child a head start when it comes to learning more advanced concepts in school. While the sound effects and graphics of this package aren't very exciting, they suffice to keep the children interested. *Grover's Number Rover* is well done, and successfully teaches the fundamentals of addition and subtraction at the child's own pace.

***Twiddle Away and Twiddle Adding present the child with simple subtraction and addition problems.***

## Flip Side

*Flip Side* is a CCW game aimed at children ten and older. In addition to Extended Basic, *Flip Side* requires two joysticks to play. The object of the game is for the child to fill the entire board with colored blocks. Whether or not a position is flipped to a certain color block depends upon the surround rules that appear in the upper righthand corner of the game screen. If, for example, an F is located below the number 4, then any position surrounded by four blocks will "F"lip to the other color. Other possibilities are "U"nflip and "N"o change. The players decide upon the surround rules that govern the play of the game.

One or two kids can play *Flip Side*, though there is no computer opponent if

only one child is playing. This is somewhat disappointing, as it is much more fun to compete. The cursors are moved around the board using the joysticks, and a position is claimed by pressing the red button. Once the ENTER key is pressed, the computer scans the board and flips and unflips pieces based upon the surround rules chosen earlier. Sometimes a child may think that he is close to victory, when all of a sudden, the entire board flips over to the opponent's color!

***Sometimes a child may think that he is close to victory, when all of a sudden, the entire board flips over to the opponent's color!***

*Flip Side* is intended for children ten and older. I think it is much better suited for even older kids, maybe even young adults. The concept is interesting, yet it is very difficult to plan a worthwhile strategy. Even Gail, Pam's precocious 12-year-old friend, had difficulty playing *Flip Side*. In fact, I gave the game a whirl and found it challenging, if not frustrating! Instead of making a simple game in which the goal is to have children "look ahead," plan their actions and predict the computer's reactions, CCW has turned *Flip Side* into a very difficult game that becomes frustrating before it becomes fun.

A word about all of the TRS-80 Color Computer CCW educational games: you shouldn't expect to hand any of these packages to your child and send him off to the computer alone. Plan to spend anywhere from 15 minutes to an hour teaching the child how to play the game, which keys to press, and simply encouraging him to try answers even though they are not sure it is correct. Your initial investment of time and attention will pay off, as the child will want to come back later and play the games alone—just for the *fun* of it. If you don't tell the kids that these CCW games are good for them, you won't ruin their fun.

The CCW games should have been released on ROM cartridges, not cassette tapes. As it stands now, someone familiar with the workins of the Color Computer must help the child type the correct commands to load the tape, and then stand by to insure that nothing goes wrong. A ROM pack would be the easiest, fastest, and most efficient way to load these programs. Thanks to the Atari VCS, almost every child in America knows how to insert a cartridge! Let's hope that in the future Radio Shack considers this change in medium. ■

CIRCLE 410 ON READER SERVICE CARD

## SOFTWARE PROFILE

**Name:** Flip side (RS#26-2529)
**Type:** Educational game
**System:** Extended Basic TRS-80 Color Computer
**Format:** Cassette
**Summary:** Too advanced for young users
**Price:** $19.95
**Manufacturer:**
Tandy-Radio Shack
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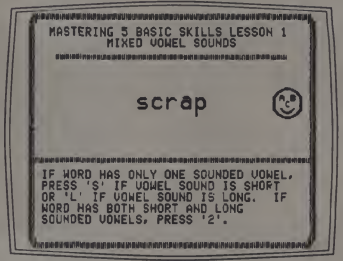
CIRCLE 189 ON READER SERVICE CARD

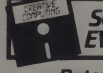
# Growing Up Literate

## Learning to Read and Write by Computer




*Reading*

This month we deal with the first two of the three R's here, while Dave Ahl looks at the third elsewhere in the issue. We have a reading package for third to fifth graders and two grammar packages which should help older students with spoken as well as written English.




**Betsy Staples**

## Reading

*Reading*, program number 1013 from Centurion Software, is subtitled Mastering 5 Basic Word Attack Skills. On the cover of the package, we read that "reading skill is dependent on the ability to apply the primary Word Attack rules of the English language until those rules can be applied automatically . . . " We were puzzled by the reference to word attack skills and, since our education credits are well over a decade old, decided to ask around to see if the designation was a newcomer to the lexicon of educational jargon. We asked several people we thought ought to know, and not one showed a glimmer of recognition, so we called Centurion and asked a woman who sounded as though she thought she knew. She defined word attack skills as those skills one uses to attack words. We thought of offering her a definition of tautology, but gave up with a simple sigh instead.

Be word attack skills what they may, *Reading* is an interesting package that focuses on the components of words. Vowel sounds, consonant blends, compound words, affixes, and syllable counting are drilled in a no-nonsense format that concentrates on letters rather than detailed graphics or catchy tunes (the closest thing to graphics the program offers is a small smiley face that flashes when you proffer the correct answer).

The only frills this program includes are in the menus, of which there are three. The first menu that appears on the screen is the operating menu, which asks for the student's name and the "printer code." If you read the lines at the bottom of the screen, you will learn that to enter either of these bits of information you must press the period key and then enter the name or code ("Contact Centurion for the correct code for your printer"). If you fail to notice the instructions, you will find yourself in the content menu before you can say "user-friendly."

The content menu allows you to choose one of the five subjects; a lesson number; a set of 10, 20, or 30 problems; and a specific series of problems, if desired. With the response menu, you can set the program for study or test mode depending on whether you want problems to be repeated until they are answered correctly or not. You can also decide whether or not to control the amount of time a student is given to answer. If you decide to limit the response time, you can specify a period of from 1 to 99 seconds. And you can specify whether or not you want a tone to indicate right and wrong answers. To make changes in the content and response menus, you must press the period, followed by the C to flip through the choices.

The drills themselves are simple, especially when compared with the configuration exercise set forth in the introductory menus. In Mixed Vowel Sounds, you look at a word displayed in hi-res characters and press one of three keys to indicate if it contains a long vowel, a short vowel, or one of each. In Mixed

### SOFTWARE PROFILE

**Name:** Reading
**Type:** Educational program
**Suggested Age:** Grades 3 to 5
**System:** Apple
**Format:** Disk
**Summary:** Down-to-earth drill and practice
**Price:** $39.95
**Manufacturer:**
Centurion Industries
1526 Main St.
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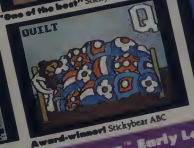


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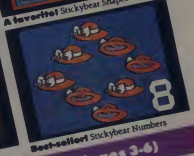


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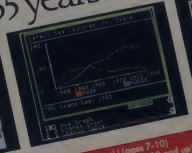

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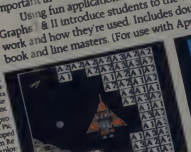

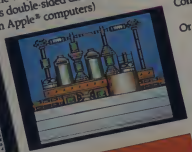

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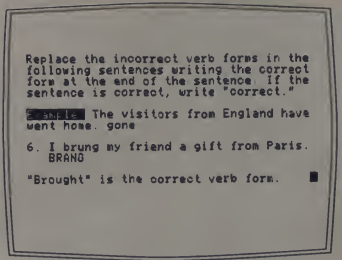
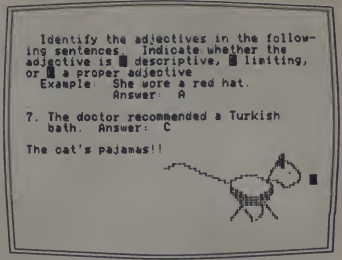



*Principal Parts of Verbs*




*Adjectives*

Position blends, you specify whether a consonant blend is at the beginning or the end of the word.

Identifying Compound Words asks you to decide whether a word is compound or not, and Identifying Affixes asks you to identify plural, prefix, and suffix modifiers—again, simply by pressing a key. Counting Syllables, as the names implies, requires that you press the key number that corresponds to the number of syllables in the object word.

No response requires more than a single keystroke, so knowledge of the keyboard is not necessary, and feedback is instantaneous and unobtrusive. At the end of each lesson, you see your score broken down into the number of each type of answer correct out of number presented and the total elapsed time.

The program includes 1000 words, but there is no provision for adding your own. Presumably, if your attacks on the included words are successful, you can feel confident in your mastery of the word attack skill and move on to other things.

### Documentation

The documentation for the program is a 7" x 18" card printed on both sides and folded into three sections. Most of the text on the card is devoted to operating instructions (how to use the menus) and suggestions for mastering the subject matter. Also included are a list of the 1000 vocabulary words and a short catalog of Centurion products.

The style of the documentation is a bit pedantic—"mastery of the subject has been attained and the skill involved is permanently internalized into memory"—but we had no trouble understanding any of the information in it. When we called Centurion about the title, the woman to whom we spoke volunteered that some users had complained about the documentation, causing Centurion to print a supplementary sheet, which we assume addresses these complaints.

The exercise themselves are self-documenting—at least the first one in each lesson is. You get complete instructions with the first question, but for each succeeding question, you must remember that you press 1 if the vowel has a long sound, s if the sound is short, and 2 if the word contains both long and short sounds or whatever the pattern is for that exercise.

### Summary

*Reading* is a serious, businesslike, drill and practice program. It makes no attempt to explain the subjects being studied and is totally devoid of cuteness. It will not win any awards for innovation or design, but neither will it be accused of unsound pedagogy or inaccurate presentation. It is a safe, solid program.

Although it could easily be used by individual students in the home, it is probably better suited to use in the classroom. The ability to add extra words limits the flexibility of the program a bit, and although 1000 words seems like a great many, we suspect that it will not take students too long to master them. A feature that will make *Reading* especially attractive to classroom teachers is the compact coding that allows the entire program to reside in memory, so that once it is loaded, the disk can be removed and stored safely.

For down-to-earth practice in attacking words, grab your sword and do battle with *Reading* on your Apple.

CIRCLE 413 ON READER SERVICE CARD

### SOFTWARE PROFILE

**Name:** Principal Parts of Verbs
**Type:** Educational program
**Suggested Age:** Junior high
**System:** Apple
**Format:** Disk
**Summary:** Basic drill and practice in an unexciting format
**Price:** $24.95
**Manufacturer:**
Intellectual Software
798 North Ave.
Bridgeport, CT 06606
(800) 232-2224
(203) 335-0906

## Principal Parts of Verbs

*Principal Parts of Verbs* is number 12 in the Practical Grammar series from Intellectual Software. Like *Reading*, it is a no frills package that offers valuable practice in an often neglected subject area.

There is nothing visually or aurally exciting about this program—unless, of course, you are inspired by the Apple II character set. You start by typing in your name and then move on to a menu, which lists the 10 modules included in the program: basic Forms of Verbs, Troublesome Verbs, Exercise 1-2, Exercise 2-3, Lie and Lay, Sit and Set, Rise and Raise, Assignment 1-2, Assignment 2-3, and Progress Test.

The modules are numbered in increments of five, starting with L10, and to select one you must type in the entire three-digit code number of your choice. This is not a friendly approach, and we wonder why a simple 1 through 10 numbering system would not have done as well.

Your module selected, you move into the program itself where you are first

presented with a paragraph explaining the concept under consideration. At the end of the paragraph (while the paragraph is still on the screen) you are drilled on the information you have just learned. The first questions are usually multiple choice; later you may be asked to test your knowledge by typing a specific requested form of a verb, i.e., past tense plus present participle.

If your answer is correct, you are so informed, and a small solid square appears on the right side of the screen to tell you that hitting any key will allow you to go on. We found this convention difficult to get used to and wasted quite a bit of time staring at the screen waiting for the next question to appear when we had simply forgotten to press a key.

If your answer is wrong, the program tells you what the correct answer is and offers a brief explanation. You are never told that the answer is wrong.

The drill sections offer quite a few different types of questions, and while most of them were not difficult to figure out, a few required several tries before we mastered the exact format. In the section on lie and lay, for example, we were asked to "Type the correct form then indicate whether the sentence requires the verb A lie or B lay." Faced with sentence "Mother (has laid, had lain) on that couch often"[the lazy slug!], we were not sure whether to include the auxiliary verb *has* in our answer, and then we typed lie instead of the code letter A, resulting in the recording of an incorrect response in the management section of the program.

Upon completion of each module, the program displays a small chart which tells you the number of items in the module, the number you got correct, and the percentage you got correct.

This package definitely has some rough spots, but the most serious flaw in it is the practice of displaying incorrect forms. When a choice must be made, instead of providing the present tense form of the verb (throw, for example) in a sentence like "The boy—the ball," the program shows you a totally incorrect—often nonexistent—word like "throwed." We think this is a very poor practice.

### Management

For an additional $10, you can buy any of the Intellectual Software grammar series disks with a management system. This is virtually transparent to the student user and provides the parent or teacher with a method of tracking the progress of up to 10 students. Unless you are a classroom teacher who plans to work with only one small group of students at a time, however, this bare bones record keeping feature is probably not worth the extra money.

### Documentation

The manual for the program is an 18-page small format booklet devoted primarily to listing the packages in the series. There are also short sections on running the program and the management system.

The booklet does refer to "the Practical Grammar texts included with Review and Comprehensive Grammar packages," but since we did not receive either of these packages, we cannot comment on it. We can say that the documentation that we received rates as barely adequate.

We would also like to refer the writer of the booklet, whose repeated use of construction such as "... enter his or her name exactly as they did the first time they used the disk" gave us serious misgivings about the entire program before we even booted the disk, to Intellectual Software's program number 7, *Agreement of Pronoun with Antecedent.*

**There is nothing logical about the past participles of most of our irregular verbs, and the only way to learn them is to practice using them over and over.**

### Summary

*Principal Parts of Verbs* lacks the professional polish that we have come to expect in educational programs. If the copyright notice had not been dated 1984, we might have suspected that the disk had fallen into a time warp; it is a program that might have represented the state of the art in 1978.

Although it does offer brief explanations of the topics being drilled, we consider it primarily drill and practice. We do, however, think that principal parts of verbs need to be drilled. There is nothing logical about the past participles of most of our irregular verbs, and the only way to learn them is to practice using them over and over. For this, as we know, computers are well suited.

*Principal Parts of Verbs* is a very basic sort of program, and if you happen to be searching for a program to drill the basic skills it treats, it should be adequate. It is also relatively inexpensive if you don't add the management system. So, if you don't mind students being shown incorrect verb forms, *Principal Parts of Verbs* may be a cost-effective way to provide them with practice in some important skills.

CIRCLE 414 ON READER SERVICE CARD

## Adjectives

*Adjectives: Adding New Ideas to Nouns and Pronouns,* although a member of the Intellectual Software family of grammar programs, has quite a bit more going for it than *Principal Parts of Verbs.* Like *Verbs*, it is a no frills, less than professional effort. Unlike *Verbs*, it has no fatal flaw that we were able to discern.

The modules offered on the main menu include: Introduction, Identify Adjectives, Nouns Modified, Kinds of Adjectives, Kinds-Adjectives II, Position-Adjectives, Nouns as Adjectives, Comparison of Adjectives, Irregular Adjectives, and Review. The selection process is the same as for Verbs.

Again, the program presents an explanatory paragraph and goes on to test your mastery of the information presented with simple exercises. Initially, for example, you see a noun modified by an adjective, and you must type the adjective. Later, you are asked to pick the adjective out of an entire sentence.

As you progress through the program, you learn that there are different kinds of adjectives—limiting, descriptive, predicate, et al.—and you are required to identify them as they appear in context. In the sections on comparison of adjectives and irregular adjectives, you just fill in the blanks: good,—,worst.

Correct answers are rewarded with one of a seemingly endless supply of adjectives and phrases: Cool!, Beautiful,

### SOFTWARE PROFILE

**Name:** Adjectives: Adding New Ideas to Nouns and Pronouns
**Type:** Educational program
**Suggested Age:** Junior high
**System:** Apple, IBM PC
**Format:** Disk
**Summary:** Efficient, if unimaginative, drill on types and uses of adjectives
**Price:** $19.95
**Manufacturer:**
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(800) 232-2224
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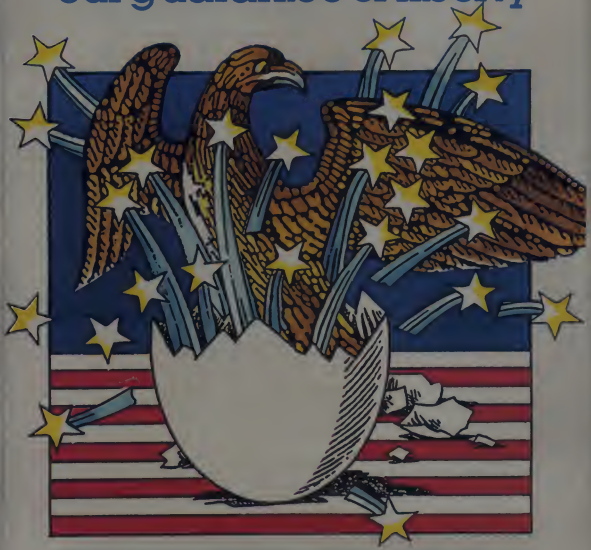
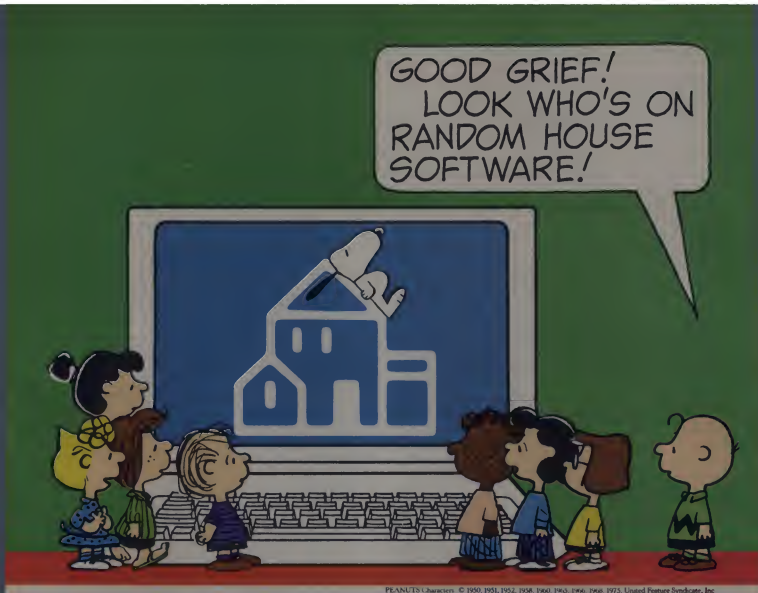


Thoroughbred

Social Science Educational Software

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I can't fool you, and so on. As above, the response to an incorrect answer is simply the correct answer.

The documentation is the same sort of amateurish booklet provided with *Verbs*, and unless you have an IBM PC and need help transferring DOS to the program disk, you will find little of use in it.

The management system is the same as the one reviewed above—save your money and let the kids record their scores on a piece of paper.

**Summary**

Teaching students to identify and use the parts of speech correctly is a task that has been neglected by contemporary teachers of English—partly, perhaps, because it is neither an easy nor an especially interesting topic to teach. As we have said before, we regret this trend and are happy to find the occasional computer program that recognizes the value of some of the "old fashioned" educational concepts.

***We feel quite confident recommending Adjectives to those who share our conviction that learning the mechanics of the English language is still worthwhile.***

Unfortunately, the format of *Adjectives* is uninspiring. It is also inoffensive, however. We prefer straightforward, unpretentious text drill and practice to some of the hokey game formats that manufacturers think secondary school students will tolerate.

We feel quite confident recommending *Adjectives* to parents and teachers who share our conviction that learning the mechanics of the English language is still a worthwhile occupation. ■

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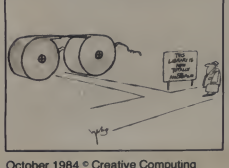



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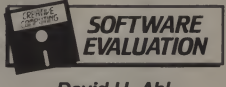
# Software for Learning Mathematics

***We evaluate 25 software packages and find both winners and lemons.***




*David H. Ahl*

In the 18 writeups in this roundup, you will find evaluations of 25 packages consisting of more than 40 individual programs, all aimed at one or another facet of mathematics learning.

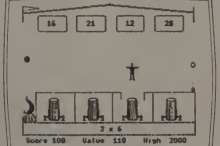
The overall quality of educational packages has steadily improved over the years; however, there are still a disturbing number of packages on the market that can be only described as "swillware." Also, we keep hoping to see more innovation rather than just another batch of arithmetic drill and practice programs in a different guise.

In keeping with our policy of running absolutely honest reviews, we have called a spade a spade and a lemon a lemon. We found excellent packages from both large publishers as well as small, "unknown" vendors, evidence that the software business is still a wide open field. Some of the worst programs had the brightest packaging, proving, again, that you can't judge a book by its cover.

## Math Blaster

*Math Blaster* has been on the educational programs best seller list for months and months, and with good reason. It is an interesting and motivational approach to arithmetic drill and practice with some important extras—in particular, drill on fractions and decimals, and the ability to enter your own problems.

The package comes on two disks, a program disk and data disk. The data disk contains more than 600 math facts/problems: 20 to 30 in each of five skill levels for each of five operations (addition,




*Math Blaster*

subtraction, multiplication, division, and fractions/decimals).

The *Math Blaster* package includes four types of exercises on the disk. The first is called Look and Learn; it displays each math fact, e.g., 4 + 6 = 10 in each file. Each fact stays on the screen for four seconds, although by pressing the arrows, you can increase or decrease the display time.

Build Your Skill presents the math facts as problems (4 + 6 = ?) in groups of ten. At the end of a group, you are presented with your total elapsed time to answer all the questions, number correct, and percentage score.

Challenge Yourself is a similar type of exercise, except that an operand is the missing piece (4 + ? = 10).

Math Blaster itself is an arcade type game in which you are presented with a problem at the bottom of the screen and four possible answers overhead. Using the keyboard or a joystick, you must position a little man over the mouth of the cannon under the correct answer. Pressing the fire button causes the man to be hurled—human cannonball style—at the answer which bursts like a balloon when he hits it.

At the left is a seal bouncing a ball on its nose; this serves as a timer. You must shoot the man before the ball returns to the seal's nose, a considerable challenge if you choose a high playing speed. Also, at higher speeds the problem and answers are displayed for only a second or two rather than remaining on the screen.

You must also watch the descending balloon on the right side; if it hits the needle on the ground it pops and the game ends. You can bounce the balloon back up as it nears the ground, but it

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**212A Modem Comparison Chart***

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| Intelligent Microprocessor | ✓ | ✓ | ✓ | ✓ | ✓ |
| Tone and Pulse Dialing | ✓ | ✓ | ✓ | ✓ | ✓ |
| Hayes Command Compatible (Works with Smartcom™) | ✓ | ✓ | | ✓ | |
| Additional telephone jack with exclusive switching | ✓ | | | | |
| Analog loop back self test | ✓ | ✓ | ✓ | | |
| Self Test at Power Up | ✓ | | | | |
| Call Progress Detection (Busy, Dial Tones, Trunk Busy, etc.) | ✓ | | | | |
| Speaker and External Volume Control | ✓ | ✓ | ✓ | ✓ | |
| Full Complement of Status Lights | ✓ | ✓ | ✓ | | |
| 8 Switch Selectable power-up defaults | ✓ | ✓ | | | |
| Adaptive Dialing | ✓ | | | | |
| Auto Redial on Busy | ✓ | ✓ | ✓ | ✓ | ✓ |
| Ergonomically designed easy to read front display panel | ✓ | | | | |
| Internal Stand-Alone Power Supply | ✓ | | | | |
| Built In Real Time Clock/Calendar | ✓ | | | | |
| Help Command | ✓ | | | | |
| 300 baud connect while maintaining 1200 baud RS-232 link | ✓ | | | | |

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| Buffer, Expandable to 64K | ✓ |
| Auto Logon Macros | ✓ |
| Auto message transmission to groups of numbers | ✓ |
| Records call duration | ✓ |
| 12-character Alphanumeric Display | ✓ |

*Comparison made by Prometheus on the basis of the best information available to Prometheus at time of printing.

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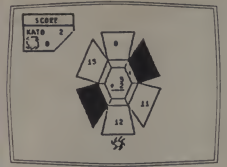



*Tri-Math: Alien Intruder*

*Tri-Math: Digitosaurus*

*Math Maze*

costs you precious time.

At the end of a game, you are shown the total score which is a function of the problems you got correct and the speed of play.

Entering a new data file with problems that may be particularly troublesome to you (or your child) is as easy as simply typing the problem itself. In addition, the file editor includes a mini command set (edit, list, insert, delete, save, get, print, clear, quit, and help).

The program is well-designed and graphically appealing, and it should hold the attention of children in the age range of 6 to 12. All in all, *Math Blaster* is a real blast!

## Tri-Math

As its name implies, *Tri-Math* includes three games that provide drill in arithmetic and problem solving.

Alien Intruder is a game in which you must answer simple arithmetic problems. A problem appears in the center of your circular spaceship. Each wing contains a number, one of which is the right answer. Using the arrow keys, you must select the wing on which the right answer is displayed before the buzzing alien (looks like a spinning spider or circular saw blade) lands on that wing. If you select the correct answer, that wing is filled with anti-alien juice and you move one step closer to warding off the attack. If you select the wrong wing or do not get to it in time, the alien eats it.

At the end of a round, a graphic summary of the score is shown. When you begin, you specify what type of problems you want and the number of wings you want on your ship. You can also use the Pre-Set Control Option to make the game easier or harder by changing the speed of the alien and choosing easier or harder problems.

Digitosaurus is a game in which you must help a creature get older and wiser by choosing the arithmetic expression on the screen with the largest value. After you choose an expression, you must evaluate it. Hence, if you choose 235 + 90, you must enter the value 325.

*Tri-Math: Math Mansion*

Although it may seem that you are only doing one problem of the three, to choose the right expression, you must either calculate or estimate the value of all three. We like this type of game since it reinforces both calculating and estimating skills. As with Alien Intruder, you can use the pre-set option to make the problems easier or harder.

At the outset we must confess that Math Mansion was our favorite program of the three. It is a delightful combination of a graphics adventure game with arithmetic drill. In Math Mansion, you start in the library of a 14-room house. To enter another room, you must complete an arithmetic expression such as 78_ _ = 13. Note that you must supply both the operator and an operand. In most cases, there is more than one way to complete the expression; in the example, both 78 - 65 = 13 and 78 ÷ 6 = 13 would work. Thus, the program is suitable for children with a wide range of math skills.

As with "real" adventure games, many of the rooms contain something that is necessary to solve a later dilemma (for example, the candle scares the bats), but to pick up an object, again, you must complete a math expression correctly. You are not penalized for an incorrect answer; you just stay in one spot.

There are many ways of playing the game. A floor plan is in the instruction manual; use it as you play and you can get out in 15 or 16 moves. Wander around aimlessly and it could take 60 or 70 moves. Or you can systematically keep track with pencil and paper. How you play is up to you, but by the time you get out, you will have learned a little bit about adventuring and a great deal about math expressions. All in all, a very nice package.

## Math Maze

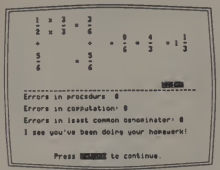
When we first read the instructions, we were tempted to say that *Math Maze* is just another—ho, hum—arithmetic drill and practice game. And in a sense, it is. But in another sense, it is far more because it provides a high level of motivation that keeps kids coming back for more.

To play the game, you move a fly through a maze to pick up numbers to answer a math problem on the lower left of the screen. You may choose to do problems of addition, subtraction, multiplication, or division (only one operation per set of ten problems). You select one of three levels of problem difficulty. For example, in addition drill, you may select sums up to 10, sums up to 20, or metal math (sums with a carry).

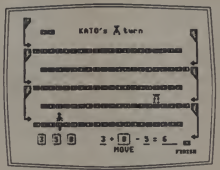
The disk contains 40 mazes of varying degrees of difficulty. Furthermore, you can change these mazes to suit yourself, or you can design your own mazes which can then be stored on a data disk for future use. To make things even more interesting, there are four maze skill levels: 1.) no hazards, 2.) with a spider, 3.) invisible walls, and 4.) spider and invisible walls. The game can be played from the keyboard or with a joystick; at higher skill levels, a joystick is almost mandatory.

The instant a new problem appears, a bonus point display starts counting down from 100. When you complete the problem correctly, you get as many points as are then showing on the display. However, you lose points for an incorrect answer or for being captured by the spider.

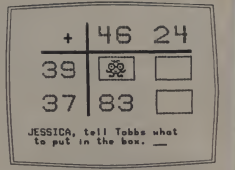
From this description, it should be apparent that *Math Maze* is an interesting game in its own right. The 40 mazes, coupled with those you may choose to create yourself, will keep youngsters coming back for months, honing their arithmetic skills in the process. The only limitation is that the problems tend to be on the simple side; thus we can't see it being used much beyond age 10.




*Success With Math*




*Path Tactics*




*Teasers by Tobbs*

## Success With Math

The *Success With Math* series from CBS Software consists of eight packages ranging from *Addition and Subtraction* (grades 1 to 4) to *Quadratic Equations* (grades 9 to 12). We used four of the packages, but we will just describe *Fractions: Addition and Subtraction* as being representative of the series. (For a detailed description of the higher level packages in the series, see *Creative Computing*, April 1984.)

The program provides drill and practice in addition and subtraction of fractions with unequal denominators. At the start, you select either addition or subtraction and the number of problems you wish to do. If you wish, a tutorial set of instructions will "walk you through" a sample problem.

As each problem is presented, you must decide upon the next step (change to least common denominator, add, or reduce). (In subtraction, there are four possible steps.) The program then takes you step by step through the operation. If you make a mistake, the program gives you a hint the first time and the correct answer the second time.

After each problem, you get a mini-summary of errors in procedure, computation, and led, along with an encouraging remark. At the end of each set of problems, you get a similar summary for the entire set.

These packages have no graphics, no sound effects, and no cutesy frills—just a good, comprehensive, self-paced approach to learning. Perhaps most important, the user always succeeds in solving the problem and knows exactly where errors have been made.

## Path Tactics

*Path Tactics* is one in the first series of five consumer-oriented software packages from MECC. In case you are not familiar with the acronym, MECC stands for the Minnesota Educational Computer Consortium, one of the oldest and largest educational computer using groups in the world.

Long-time readers of *Creative* will recall that several vendors, including Creative Computing Software, used to sell MECC packages. These consumer packages, however, are completely new, although they are based on the same proven educational approaches.

The first five MECC consumer titles are a refreshing change from "more of the same" that we see so often. In addition to *Path Tactics*, the titles are: *The Friendly Computer* (an introduction for children 5 to 8), *Early Addition, Problem-Solving Strategies* (logical thinking for ages 9-15), and *Mind Puzzles* (more logical thinking).

*Path Tactics* is a game designed to teach basic arithmetic skills. You may play against the computer or a friend. You specify what skill you want to practice (addition, division, etc.). Each player selects one of seven robots to make his moves on the field of play.

The playing area is constructed of five girders with 20 spaces on each (100 total). On each turn, you are given two or three numbers with which you must form an expression (4 + 6) and then provide the answer. Depending upon the exercise, either the second number of the expression or the answer is the number of spaces that your robot advances.

Eight spaces on the girders are marked with an "X." If you land on one of these, you drop down a level. Also, if you land on your opponent, you send him back ten spaces. Hence, strategy is a factor as well as completing the problems correctly. If you miss a problem, you are told the correct answer, but you don't get to move.

The animation of the robots is delightful, although after a while, the sound gets a bit tedious (there is a program option to turn it off). The program also has a "program manager" option that lets a parent select the type of problems that are available and allows resetting the winner's list (humans only—the computer does not get its name on the winner's list).

We liked this program very much although we recommend it for two human players rather than a human and the computer. In ten games, the computer won every one even though we didn't make a single mistake; that can be mighty frustrating for a child.

## Teasers by Tobbs

*Teasers by Tobbs* provides the old standby, arithmetic practice (in addition and multiplication only) in the form of a logic game.

Tobbs is a friendly, androgynous character who lays out a 3 by 3 grid of numbers. In the upper left is a sign (+ or x) which indicates the type of problem. The game can be played by from one to four players each of whom, in turn, must determine the number that goes in the box in which Tobbs is standing. Numbers in the top row are always added to (or multiplied by) numbers in the left column to fill in the boxes. For example, in the illustration, Tobbs is standing in a box that requires 39 to be added to 46 for a sum of 85.

There are six skill levels. In the first three levels, the top and side numbers simply get larger, while in levels 4 to 6 numbers may be missing from the top row and left column. This can get quite tricky forcing you, in some cases, to solve for the entire grid just to fill in a single box.

There is no timer in the program, but solo players may wish to see how many points they can accumulate in a given time, say 15 minutes, and try to beat this in future games. The game is suitable for ages 8 and older and should provide many hours of learning fun.

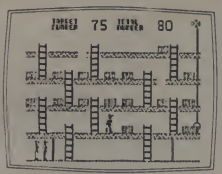
## Math Man

The *Math Man* package contains two games, Math Man and Self Test (which presents the same problems as Math Man but without the game elements).

The opening screens ask you to select (using joystick or keyboard) which game you wish, the difficulty level (1 to 12), and speed (four speeds).

In the Math Man game, you find yourself on a system of girders and ladders. At the top left is a target number (say, 83) and at the top right, a "total" number (say, 28). Around the girders are boxes, each with an arithmetic operation (+, -, x, and ÷) and a number emblazoned on it.

Your job is to maneuver Math Man around the girders and pick up the appro-




*Math Man*

priate boxes to turn the total number into the target number. For example, to turn 28 into 83, we used -7 (28 - 7 = 21), x4 (21 x 4 = 84), +4 and -5. A slowly rising paint bucket on the right side acts as a timer. If it reaches the top before you have calculated the target number, it overturns and drenches the screen in paint, ending your turn.

We found the best playing strategy was to study the problem before pressing the spacebar to start the turn. Once the bucket starts to rise, it is rather nerve racking to deduce a strategy and maneuver Math Man simultaneously.

At lower speeds, either keyboard or joystick is acceptable; at higher speeds, players will surely want to use a joystick.

Completing a problem successfully results in a message "GOT IT" and a few musical notes. We think that a successful player deserves more of a reward than that, perhaps at the end of a round of three problems.

The game is well designed, Math Man is responsive, and the game can be interrupted to change the speed or level. It is a step beyond arithmetic drill and a good prelude to algebra. We recommend it for ages 9 to 14.

## Flower Power

No, *Flower Power* is not a 60's trivia game; it is yet another arithmetic drill and practice game. It is called *Flower Power* because your reward for answering a problem correctly is a bright flower in your garden at the bottom of the screen. An incorrect answer results in—what else?—a weed.

After loading the program, it asks for your first name, the type of numbers with which you wish to work (whole numbers, fractions, decimals, or fraction/decimal conversions), and then the type of operation (+, -, x, ÷).

Ten problems are then presented one by one in the center of the screen. Your

*Flower Power*

score depends both upon the answer you give and the elapsed time. If you answer the early (simple) problems quickly, the program adjusts the difficulty level up. However, if you miss a problem, the level is lowered slightly. Thus, the program should generally provide a sufficient (but not frustrating) level of challenge.

Although the level was self-adjusting, we were not particularly captivated by the program; watching flowers sprout gets old fast. Nor did we like the fact that fractions are written in a straight line (2/3); yes, this is necessary in typing, but most children expect them to be written with the numerator over the denominator. We also think that the program should

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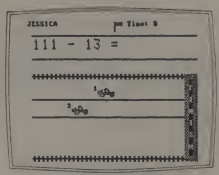
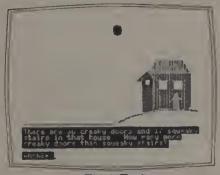



*Race Car 'Rithmetic*

*Race Car 'Rithmetic*




*Think Tank*

accept decimal answers to four or five places; after all, if a child calculates the value of 3/7 to 0.42857 he should not be told that is wrong because the program is looking for 0.429.

Scores are automatically retained on the disk and may be viewed, printed, or erased from the included utility program, Report.

## Race Car 'Rithmetic and Ships Ahoy

*Race Car 'Rithmetic* and *Ships Ahoy* are—you guessed it—drill and practice programs in the four basic arithmetic operations.

In *Race Car 'Rithmetic*, up to four players may race, although we found that it was rather boring for just a single player. Prior to the start of the race, each player enters the type of problems he wants to do, his skill level (1 to 3) and how many seconds he wants for each answer; this allows players of different ages and abilities to compete fairly.

Then, as problems appear, players take turns in answering. An incorrect answer or no answer within the time limit causes the car to move backward or the player to lose a turn. Unfortunately, the program messages to players are divided into short phrases, only one of which appears on the screen at a time; RETURN must be pressed to see each phrase in a sentence, a rather cumbersome procedure. It takes 13 correct answers to inch your car across the screen to the finish line.

Any player who gets a score of 90% or better (0 or 1 wrong) is given an opportunity to play a short arcade-style race game, a reward that should provide good incentive for completing the rather boring problem part of the program.

*Ships Ahoy* has two games which provide math drill for solo players. In the first, correct answers propel a ship safely (and slowly) across the screen similar to the race car game. In the second, Mine Sweeper, you must select one of four mines that contains the correct answer to the problem shown overhead.

A third game on the disk is just for fun and lets you maneuver around an underwater maze collecting treasures within a one-minute time period. A fourth "game" is actually a sort of electronic etch-a-sketch.

All the games on these disks are rather slow paced and punctuated by overly long musical interludes. Non-competitive children who prefer a leisurely pace may like them, but they lack the excitement and motivation of some of the other offerings on the market.

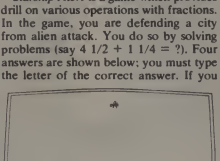
## Starship Alert and others from the Wizard

A series of five math packages has been released by The Wizard.

*Fraction Tutorial* makes extensive use of pie charts and grids to explain how to simplify fractions and perform arithmetic operations on them. The graphics are fine, although we were somewhat put off by the NOPE, TRY AGAIN message that appears after each incorrect response.

This package is aimed at classroom use and has an extensive class management and password system built in. If your name isn't in the class roster, you can't use the disk. However, we don't think that home users should have to go through the cumbersome procedure of building a class file to use the program. (Moreover, on one of our disks, this procedure did not work.)

*Starship Alert* is a game which provides drill on various operations with fractions. In the game, you are defending a city from alien attack. You do so by solving problems (say 4 1/2 + 1 1/4 = ?). Four answers are shown below; you must type the letter of the correct answer. If you




*Starship Alert*

select the right answer, the alien spacecraft is blasted from the sky. The graphics are excellent, and the sound effects okay.

However, we are not enthusiastic about the game. Why not? Except at the lowest speed, it is virtually unplayable. Second, since time is so important, you are tempted to look for an answer that "looks right" instead of making sure it is right. For example, on the illustration, a quick glance suggests that the answer is D; of course, if there was another 5 and something fraction, you would have a more difficult time. Hence, the drill really boils down to one of estimation rather than calculation; we feel this loses much of the educational benefit. We also didn't like the fact that if you miss a problem, the program does not indicate the correct answer.

Another package in the Wizard series, *Think Tank*, presents arithmetic problems in a series of graphics settings. The concept is interesting, but the animation sequences tend to drag on. Moreover, the difficulty level is not user-selectable and ranges all over the place. Thus, while the package lists "grades 4 to 9," only an eighth or ninth grader would be able to play the game without getting very frustrated.

Sorry, Wizard, nice try, but your products just don't make it.

## Exploring Tables and Graphs

There are two packages in the *Exploring Tables and Graphs* series, Level 1 is for ages 7 to 10, and Level 2 is for ages 10 and up. The packages are substantially similar so we'll describe only Level 1.

Upon loading the disk, you are presented with a menu of five choices: getting started, tables, bar graphs, picture graphs, and area (pie) graphs. "Getting started" simply tells you how to use the keyboard and move around the program. Each of the graph sections allows you to choose a short verbal tutorial, a game ("play and learn"), or examples. The flip side of the disk lets you make, save, and print your own tables and graphs.

Once you know how the keys work, the best place to start is with the game. The games are quite simple and can be played

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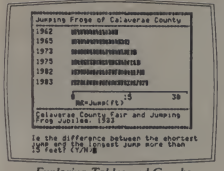
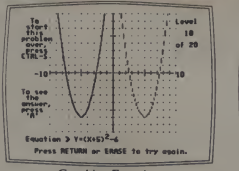
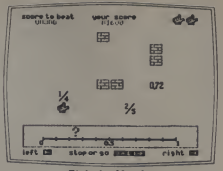



*Exploring Tables and Graphs*




*Graphing Equations*




*Pick the Numbers*

with just two keys (one game is a form of Breakout in a circle, while another requires you to open a parachute at the right moment to hit a target). The purpose of the games is to get a few numerical values for plotting on a graph. Hence, it is best to play at least three or four games. The program then takes your scores and puts them in a table; it asks you to provide the labels (name and date).

The program then draws a graph of the results and asks you to identify the longest bar or biggest wedge. If you make a mistake, the program gives you a mild Brooklyn razz and won't accept it.

If you don't want to generate data by playing the game, you can go directly to the examples where you will find "interesting stuff" such as the results of frog jumping contests, weather data, and lengths of the rivers of the world. There are two or three examples for each type of graph.

As mentioned, on Side 2 of the disk is a program for making your own graphs. It is completely menu driven and extremely easy to use, although you will have an easier time if you read the six pages in the manual describing these procedures.

In addition to the double-sided disk, the package includes a 32-page instruction manual and 12 activity masters for reproduction in schools or for individual use at home.

All in all, *Exploring Tables and Graphs* is an outstanding package and on the same professional level as we have come to expect from Weekly Reader Family Software.

## Graphing Equations

*Graphing Equations* is a disk containing an introductory section and four diverse programs.

The first program, Linear and Quadratic Graphs presents graphs on a grid (-10 to 10) for which you must determine the equations. At the start, you have a choice of five types of equations: lines, parabolas, circles, ellipses, and hyperbolas. You also have a choice of beginning with easy problems and working up to the hard ones, beginning anywhere in the list, or practicing problems of mixed difficulty.

The program then selects a graph and plots it. This target graph is shown in one color, while each equation you write is graphed in a second color. You can make successive tries to see how changes in the equation change the graph. When your equation matches the target graph, the program presents another problem.

Once you are familiar with various types of graphs, you will want to move on to Green Globs. In this game, 13 green globs are scattered around the grid. Your job is to write equations (which the program will draw as graphs) and try to hit all the globs with as few equations as possible. In the expert version of the game, five "shot absorbers" are scattered about the grid. Also, in this version, you are allowed to use trigonometric functions (alone or in combination with other functions).

A second game, Tracker, requires you to locate linear and quadratic graphs that are hidden in the grid and determine their equations. You can use two types of "shots" in this game: probes and trackers. A probe travels along a single horizontal or vertical line and marks a point whenever it crosses the path of a hidden graph. A tracker is an equation which, with a bit of luck, will trace the path of the hidden graph.

The last program on the disk is a general equation plotter which will plot practically any type of equation, even ones with log, trig, and exponential functions.

The programs are very forgiving on input. For example, 3 times x can be written 3x (or even x3) just as it would appear in an algebraic equation. The package is well-designed and should be very useful to students studying equations and graphs.

## Pick the Numbers

*Pick the Numbers* is a package of two games that provide practice in ordering decimals and fractions along a number line in a range of 0 to 1.

In the game, you move a pointing hand through a field of barriers and fractions (or decimals or both). You must guide the hand to pick up the numbers while avoiding the barriers. To score, you must pick the numbers in the correct order.

For the first game, Pick It Smallest, you must pick the number with the smallest value. In Mystery Pick, you must pick the number represented by the question mark on the number line.

If you hit a barrier, you lose a hand (you start with three and get a new hand for each 5000 points scored). The pointing hand moves upward on its own. You can start or stop it with the spacebar and move it left and right with the arrow keys. You score 100 points for each number picked up correctly and 500 points for correctly picking all the numbers in a round.

There are beginner and advanced versions. In the beginner version, fractions have denominators of 2, 3, 4, or 5, while in the advanced version, the denominators range from 2 to 12, and there are more barriers.

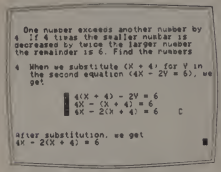
The top ten scores for each game are stored on the disk. The package includes two identical program disks—a thoughtful touch. We found the games were challenging, addictive, and, not incidentally, helpful for learning about decimals and fractions. That's a winning combination!

## Algebra Word Problems

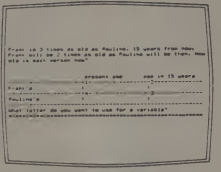
*Algebra Word Problems* is the fifth disk in a set of five on symbols, number systems, and equations from Intellectual Software. At the outset, we should mention that these disks are designed for classroom use, although that by no means precludes their use at home.

This disk contains ten lesson modules ranging from simple, introductory word problems to more complicated equations with two unknowns. The simpler lesson modules have up to ten problems with two or three questions per problem (forming the equation, reducing it, solving it). Later lessons have only two or three problems, but some of them require up to nine steps to solve. The program takes you step by step through each problem—no jumping to conclusions here!

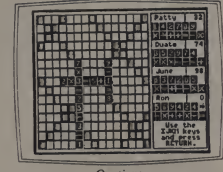
After completing a lesson, the program shows the number of questions that were correct and a percentage score. This summary is also shown if you break out



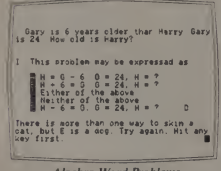

*Algebra Word Problems*



*The Algebra System*




*Quations*




*Algebra Word Problems*

of a lesson by pressing ESC.

Some questions are multiple choice while others require a numeric answer. An incorrect answer brings up an explanation and the question is presented again; a second mistake causes the correct answer to be shown and the program goes on to the next question. In general, there is little feedback—pro or con—except problem explanations and a scoring summary.

For classroom use, the disk contains a classroom management system that records the summary scores of each student on each lesson.

In summary, these are no frills, no nonsense, solid educational programs.

## The Algebra System

*The Algebra System* is a set of programs which gives users practice in solving certain types of one-variable word problems using the "box method."

Upon loading the program, you select one of ten types of problems (three types of age problems, three of rate/time/distance, two of coins, and two of investments). There are more than 20 of each type for a total of more than 2000 on the disk—you won't get bored with this! After selection, the problem is presented on the top part of the screen, and four to six boxes are drawn on the bottom (see example).

Since these are single variable problems, you are asked for the letter you wish to represent the variable and where you wish to place it. The program then asks you to fill in the other boxes with entries (equation fragments) related to the variable. If your response is inappropriate, the program offers the option that you have made a mistake, but it does not give you the correct answer.

When all four boxes have correct entries, you are requested to enter one side of your equation. If the program judges this correct, you are asked for the other side. The computer then solves the equation, but you must calculate the answers to the originally stated word problem. Upon successfully doing so, you are given a short congratulatory message and returned to the problem selection menu.

Frankly, we have never seen a program quite like this one. But not only is it unique, it is easy to use, offers exceptional educational benefit, and is great fun. Our applause to Elaine David for an outstanding package!

## Quations

*Quations* is a game for one to three players (plus the computer) in which players must form equations on a Scrabble type of board. Scholastic terms it a "crossmath" game.

At the start, you select which operations to use (+, -, x, ÷, or a combination). You also determine a time limit for each hand. Each player is dealt six number tiles and seven operation tiles. The objective on each turn is to use as many tiles in your hand as possible, subject to the limitation that only one equal sign may be used. You get points for each number in your equation plus each operation.

Players take turns forming equations which must, of course, intersect with one or more of the equations already on the board. Certain colored squares on the board double and triple the value of the tile or equation placed on them.

After each turn, your hand will be replenished so you always have 13 tiles (until the tile pile is depleted). The game ends when no further equations can be formed. The winner is the one with the most points.

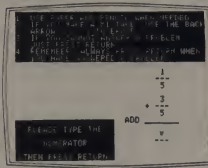
We like *Quations*. The rules are easy to learn and, by varying the operation types and timer, it can be suitable for a wide age range (age 8 to adult). Younger players will want the computer to keep track of scoring, while for older players, tallying up the score of each play is an added challenge (do it wrong and you get no points). Quato, the little androgynous computer player verifies all equations and scores, so no cheating, please.

## The Math Doctor

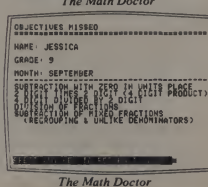
*The Math Doctor* is an unusual program; indeed we know of no others on the market like it. Basically, it is a tailored diagnostic test on number concepts, the four arithmetic operations, and fractions. The test is geared to the grade level of the user.

The test measures a student's mastery of 39 finely defined objectives such as incrementing sequences, rounding numbers, two-digit sums with regrouping, decimal products, multiplying fractions, and adding mixed fractions with regrouping.

The test usually takes from 20 to 45 minutes to complete. After finishing, a parent or teacher (or student) can view




*The Math Doctor*

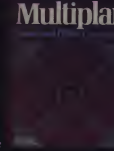



*The Math Doctor*

# Investigate

a

b




c

d

e

f

g

h

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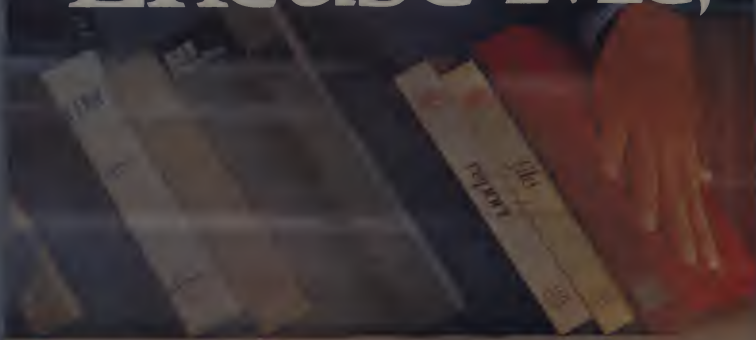
***The newest in computer graphics, reference, word processing, and ideas*** — **e)** A complete package for creating your own computer art file. **f)** The #1 reference source for all computer makes, model and languages. **g)** Everything you need to get the most from MacIntosh word processing and graphics. **h)** The first book written entirely by a computer

## at Waldenbooks

**Check the yellow pages for the one nearest you.**

CIRCLE 202 ON READER SERVICE CARD

# "Excuse Me,



## "Make Way for Hayes' Please."

**An advanced, easy-to-use data management system for the IBM® PC and compatibles.**

Want to get your paperwork out of a clumsy file cabinet and onto your PC's screen, where you can manage it better? Frustrated with data base software that's either too limited or too difficult to use? Hayes offers you a simple word of kindness.

*Please*.™ A powerful, yet easy-to-use, system for organizing and managing your information. *Please* is flexible enough to store any data you enter, and it'll return data to you in exactly the form you need. *Please* does more. It does it all faster. And it's sure to please!

## "The menu, Please?"

**Menus list all your options and tell you exactly which keys to press for every *Please* feature.**

That's to be expected. As the telecomputing leader, Hayes built its reputation on quality design, reliability and customer support. Now these same standards have been applied to a new data management system that is going to instantly change the way you do business!

Say you're looking for an efficient way to maintain sales data. *Please* leads you every step of the way in creating a sales database that might include names, addresses, dates and figures. These categories are called 'fields' in database lingo, and they're the very heart of your database structure.

## "Make it snappy, Please!"

**Need a report fast? You and *Please* can put together a Quick List in a matter of seconds.**

Want last month's total in a particular region? Press a few keys and it's yours! A few more keystrokes and you'll know who's moving product, and what's your biggest seller.

*Please* will supply you with labels for a mailing to selected customers. It can send customer information to your word processor for a promotional letter. And it can receive data from your spreadsheet program. *Please* will even look up a name and company for you, your Hayes Smartmodem* will dial the phone number, and you're ready to talk!

Taking this same sales database, you might also want to define special fields for a custom Output Plan. With a defined field for "COMMISSIONS DUE," *Please* can automatically compute each salesman's commissions, and print them out in a report of your own design. All this and more, just for saying "Please."

And if you ever change your mind and want to change the structure of your database, please feel free. Step-by-step instructions show you how.

You have this same flexibility with any database you and *Please* design. You can store up to 16 million records and 200 custom Output Plans for each database! More than you're likely ever to require. But isn't it nice

*Requirement on key field length and key field [illegible] Please [illegible] trademark [illegible] Microcomputer Products, Inc. *Smartmodem [illegible] *Smartmodem 1200B are trademarks of Hayes Microcomputer [illegible]

# Please"

**"Put it here, Please."**
**Design a special screen format to position data in a particular place.**

knowing all that storage power is there?

Just in case you ever need it?

Now you might think that a data management system that does all this must be difficult to use. Right? Rest assured. *Please* works hard so you don't have to. An easy-to-follow sample disk shows you everything you need to know to create your first database. Three *Please* menus show you which keys to press to access every feature. And whenever you need it, *Please* provides on-screen HELP messages, tailored to a specific task. So you needn't waste time reading through a list of unrelated instructions on your screen. Or stop what you're doing to consult a manual. In no time at all, and with no assistance at all, you'll be a *Please* database pro!

**"Merge these, Please."**
**Combine data from one database into another, without changing your original.**

Everything about *Please* is designed to save you time and effort. So what could make data management even easier? *Please Application Templates*, that's what!

To help you get up-and-running immediately, we've developed a series of practical, pre-designed templates. You'll appreciate their well-thought-out structure and "fill-in-the-blank" ease. Choose several for business and personal use. Including *Mailing List, Membership, Appointments, Household Records, Contacts, Applicants, Employee Files, Inventory, Payroll, Ledger, Invoices, Cash Flow* and *Stocks*. And look for several new templates, before you can say "More, please".

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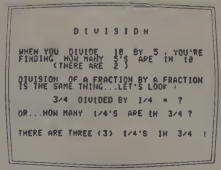
the evaluative results on the screen, print them out, or save them on a data file.

The program does not provide any tutorial material or drill and practice, but points out areas in which either instruction or drill is needed. We feel that the *Math Doctor* is an excellent diagnostic tool and, because of its branching strategy, is much more efficient (and less frustrating for the test taker) than similar pencil-and-paper tests.

## Math Alert

*Math Alert* is a refresher and remedial course in basic arithmetic operations. According to the instructions, "It can help you picture more clearly what really is happening in arithmetic operations."

The disk has 13 modules ranging from number facts to operations with fractions and decimals. Although the manual says you can "work at your own pace" and "move on by pressing the ESC key," we found that this did not work. Thus, you are confined to the rather slow pace of the program.




*Math Alert*

Indeed, this was just one indication that, despite the good intentions of Micro Program Designs, the package was rather poorly executed. For example, the instructions talk about providing "practise." Words continue from one line to the next and are broken whenever column 40 is reached. For example, on the end of a line, we find THI and on the next line, RTY-SEVEN. If you finish one module and want to go on to the next one, you must go through the entire five-screen opening dialog. Even many of the actual explanations were not at all clear—and we're not exactly math dummies. We could go on, but there is not much point in it. Our recommendation: leave this program on the shelf. ■

# Software for Learning Mathematics

| Name<br>System<br>Price | Manufacturer |
|---|---|
| **The Algebra System**<br>TRS 80 III & 4<br>$219.00<br>(demo disk $20.00) | E. David & Associates<br>22 Russet Lane<br>Storrs, CT 06268<br>(203) 429-1785 |
| **Algebra Word Problems**<br>Apple<br>$49.95 | Intellectual Software<br>798 North Ave.<br>Bridgeport, CT 06606<br>(203) 335-0906 |
| **Exploring Tables and Graphs**<br>Apple<br>$34.95 | Weekly Reader Family Software<br>245 Long Hill Rd.<br>Middletown, CT 06457<br>(203) 347-7251 |
| **Flower Power**<br>C64, Apple<br>$39.95 | Software<br>1669 Acapulco Ct.<br>Petaluma, CA 94952<br>(707) 762-2172 |
| **Graphing Equations**<br>Apple<br>$60.00 | Conduit<br>P.O. Box 388<br>Iowa City, IA 52244<br>(319) 353-5789 |
| **Math Alert**<br>Apple<br>$29.50 | Micro Program Designs<br>5440 Crestline Rd.<br>Wilmington, DE 19808<br>(302) 738-3798 |
| **Math Blaster**<br>Apple, IBM PC, C64<br>$49.95 | Davidson & Associates<br>6069 Groveoak Pl. #12<br>Rancho Palos Verdes, CA 90274<br>(213) 378-7826 |
| **The Math Doctor**<br>Apple, TRS-80<br>$40.00 | Modern Education Corporation<br>P.O. Box 721<br>Tulsa, OK 74101<br>(918) 584-7278 |
| **Math Man**<br>Apple, IBM PC, PCjr.<br>$39.95 | Scholastic, Inc.<br>730 Broadway<br>New York, NY 10003<br>(212) 505-3000 |

| Name<br>System<br>Price | Manufacturer |
|---|---|
| **Math Maze**<br>Apple, PCjr, C64, Atari<br>$39.95 | DesignWare, Inc.<br>185 Berry St.<br>San Francisco, CA 94107<br>(415) 546-1866 |
| **Path Tactics**<br>Apple<br>$29.95 | MECC<br>3490 Lexington Ave. N.<br>St. Paul, MN 55112<br>(612) 481-3500 |
| **Pick the Numbers**<br>Apple, C64<br>$45 (school price)<br>$60 (list price) | D.C. Heath & Co.<br>125 Spring St.<br>Lexington, MA 02173<br>(617) 862-6650 |
| **Quations**<br>Apple<br>$39.95 | Scholastic, Inc.<br>730 Broadway<br>New York, NY 10003<br>(212) 505-3000 |
| **Race Car 'Rithmetic**<br>**Ships Ahoy**<br>Apple, IBM PC, PCjr, Atari, C64<br>$30.95 each | Unicorn Software<br>1775 E. Tropicana #8<br>Las Vegas, NV 89109<br>(702) 798-2727 |
| **Starship Alert**<br>Apple<br>$34.95 | The Wizard<br>18584 Carlwyn Dr.<br>Castro Valley, CA 94546<br>(415) 582-8252 |
| **Success with Math**<br>Apple, C64, Atari<br>$24.95 | CBS Software<br>One Fawcett Pl.<br>Greenwich, CT 06836<br>(203) 622-2525 |
| **Teasers by Tobbs**<br>Apple, Atari, TRS-80, TRS-80CC<br>$55 disk<br>$39 cassette | Sunburst Communications<br>39 Washington Ave.<br>Pleasantville, NY 10570<br>(914) 769-5030 |
| **Tri-Math**<br>C64<br>$19.95 | Human Engineered Software<br>150 N. Hill Dr.<br>Brisbane, CA 94005<br>(415) 468-4111 |

# Expert Systems

***Use your microcomputer to better understand yourself and others.***

Expert advice. The human edge. Understanding people. That doesn't sound like the stuff of microcomputers. Indeed, a recent survey found that many executives don't use computers because they feel their jobs deal with people and computers have nothing to offer them. These executives describe their jobs in terms of power, judgment, and interpersonal skills rather than numbers or things.

Until recently, these executives were right on target. But within the past year things have changed dramatically—in both hardware and software. In hardware, 1983 saw the advent of the notebook computer, a forgiving, easy to learn, easy to use, go-anywhere machine. And in software, we are beginning to see programs that go beyond accounting, spreadsheets, and word processors, programs that begin to touch upon human interactions, negotiations, and the emotional side of management.

***I was advised to stop stalls with deadlines, avoid threats, give minimal answers, and use Mr. Mellon's shortcomings to my advantage.***

## The Negotiation Edge

How would you like to enter your next negotiating situation armed with a seven-page document outlining a recommended strategy for success? I recently spent ten minutes before an important financial negotiating session with a new computer program from Human Edge Software. I was rewarded with a document that told me:

"Mr. Jack Mellon will greet you in a cordial, professional manner. Like you, he is confident about his skills and likely to be knowledgeable about the issues under negotiation. He holds strong opinions and is not easily persuaded. This could pose a problem as you, too, are steadfast in your ideas. In order to avoid this, you may have to be flexible and show some acceptance of his position.

"You are both risk-takers and enjoy dealing with a tough competitor. This can be a very engaging, as well as profitable negotiation for you if you can avoid angry confrontations. Stubbornness is a quality you both share which makes arguing pointless."

Following this brief introduction were two pages on planning a negotiating approach including sections on the anticipated counterpart position, details of recommended tactics and strategies. In this section, I was told that Mr. Mellon may use unfair tactics and that it might be worthwhile for me to create an emotional distraction.

Another single-spaced page recommended the approach to take during the actual process of negotiating. With Mr. Mellon, for example, I was advised to avoid deadlocks. "The two of you can be unyielding at times. If you reach an impasse, the simple tactic of taking turns can be used to please all parties. . . ." I was also advised to stop stalls with deadlines, avoid threats, give minimal answers, and use Mr. Mellon's shortcomings to my advantage.

Finally, a one-page section discussed bringing the negotiations to a successful close. I was advised to push Mr. Mellon to settle quickly, use ultimatums as a last resort, make an offer Mr. Mellon couldn't refuse (always good advice), and tie up loose ends. Each of these pieces of advice was backed up by a paragraph describing the likely outlook of both parties and their reactions to various alternative strategies.

Following this five-page negotiation strategy report was a 1½-page summary of the key points titled, Negotiation Game Plan. This was not just a repeat of the subheads in the strategy report but a summary of the key action points: "Find out if Mr. Mellon's time is really limited. Put pressure on Mr. Mellon to make the first offer. Discuss sensitive issues briefly. Meet resistance by explaining the consequences of a failure to agree." In all, there were 15 action points in the game plan.

*David H. Ahl*

### SOFTWARE PROFILE

**Name:** The Negotiation Edge
**Type:** Analysis of human interactions
**Authors:** Michael Rufflo, Kathy Johnson, Shlomo Malin
**System:** IBM PC
**Format:** Disk
**Summary:** Helps give you the edge in various business and personal situations.
**Price:** $295
**Manufacturer:**
Human Edge Software
2445 Faber Pl.
Palo Alto, CA 94303
(415) 493-1593

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CIRCLE 153 ON READER SERVICE CARD

# Home Smart Home

## Smarthome I™ — Home Control Made Easy

A most appealing new concept for your Apple. Now the age of real home management is here with SMARTHOME I from CyberLYNX. Instead of your Apple™ sitting around all day, resting on its software, it could be keeping you — and your home — secure, warm, cozy, and entertained 24 hours a day. SMARTHOME can really make your Apple shine. This icon software and hardware package lets your personal computer install and monitor a fully wireless home security system with window and door sensors, infrared motion sensors, remote controller, and an alarm center. SMARTHOME also automatically controls lights and appliances so you can come home to a warm, safe, well-lit house with soft music playing and the smell of dinner cooking. And SMARTHOME can do all this without parting away any of your Apple's capabilities because it doesn't dedicate the computer. Since it's wireless, installation is a breeze and it's run by icon-graphic software like you've never seen before for the Apple II family. Best of all, it lets the computer do what you really bought it to do — simplify your life.

**Imagine your computer:**

- waking your family in case of a fire and turning the lights on for a safe exit.
- alerting the neighbors to a break-in when you're not home.
- calling out for help in a medical emergency when you aren't able to.
- turning on the TV in time for that favorite show with the popcorn already made.
- switching on the hall lights when your children get up at night and turning them off when they forget.
- lighting up the front steps when you pull in the driveway.

For home security so sophisticated it's simple, and home control so simple it's fun — ask for SMARTHOME and install some peace of mind with your Apple today.

The most exciting new product for intelligent home computers is arriving at your dealer's now — see what everyone is talking about — SMARTHOME from CyberLYNX.

For the name of the SMARTHOME dealer nearest you call

CyberLYNX Computer Products, Inc., 4828 Sterling Drive, Boulder, CO 80301 (303) 444-7733

SMARTHOME I is a registered trademark of CyberLYNX Computer Products, Inc. Apple is a registered trademark of Apple Computer, Inc.

CIRCLE 119 ON READER SERVICE CARD

Using the program is simple. Pop the program disk and data disk into an IBM PC. A colorful menu appears. First step: answer a series of 108 questions about yourself. You need do this only once. Then, you are presented with a series of descriptive adjectives; One keystroke says either, "Yes, this describes my opponent" or "No, it doesn't." As I mentioned above, ten minutes saw me through both sections. Then I selected the printout section, the results of which were described above.

Is the package worth $295? Well, while it won't get the same daily use as a word processor or spreadsheet, if you use it just once, the program will pay for itself. I was tempted to say "use it successfully," but frankly I can't imagine it not being successful.

### Related Family Members

Instead of describing the other members of the Human Edge family in detail, I think a story tells it better. I recently met a young person (X) whose identity will remain secret. X confided that he/she used *The Sales Edge* program prior to asking for a promotion. "I wasn't really expecting it," said X, "and I was astonished when I walked away from the meeting with both a promotion and a raise. The package really works!" 'Nuff said?

The third package in the business series is *The Management Edge*, a program designed to help increase motivation, solve conflicts, tackle behavior problems, boost productivity, improve supervisory techniques, and influence superiors.

## Mind Prober

Combining their extensive experience in the motivations of business negotiations with the interpretation of psychological tests, the principals of Human Edge Software have written a program for practically anyone who would like to create a psychological profile of himself or someone else.

As input, it uses an expanded list of adjectives like that used in the second part of the *Negotiation* package. Generally, after talking with someone (job candidate, peer, friend, or foe) for about one-half hour you will be able to answer most of the descriptive adjectives with a yea or nay. Not all will be absolutely accurate—they never are—but enough probably will be that the program will have adequate information with which to formulate a reasonably accurate profile of the other person.

This profile is formulated by placing the variables in a matrix, one dimension of which is the five basic factors. These include supremacy (leadership, extrovert vs. introvert, and the like); kindness/aggressiveness; emotional stability (do you worry a great deal or are you stable?); conscientiousness/impulsiveness; and a fifth variable which includes culture and intellect—sort of how smart you are and how you apply your skills (would you rather build models or heal people?).

The evaluation matrix has rules and heuristics similar to those that have been in use for years in psychological testing. Once applied, you get a two-page analysis—video or printed—of the subject. Paragraphs describe his career and job involvement, likes and dislikes in other people, personal values, and even his likely attitude toward sex.

For example, about an associate we learned that "Peter often dives into new projects before finishing old ones. He has many irons in the fire, wants to succeed and enjoys being on the fast track.

"Peter has a strong need to seek out excitement in his life, but has difficulty telling others what he needs or wants.

"Peter is a non-conformist—preferring to rebel against authority and social convention . . . Peter loves to do what is shocking and forbidden, and likes to show off his sexual prowess."

The *Mind Prober* package includes a book with seven chapters which describe the basis of expert-based psychological systems, how you can "read" and analyze people and why you should (or shouldn't).

There is more, but this should give you an idea of what you can expect from *Mind Prober*. *VisiCalc* may be the reason you bought your computer, but *Mind Prober* certainly puts the little beast in a new light, doesn't it? ■

CIRCLE 434 ON READER SERVICE CARD

### SOFTWARE PROFILE

**Name:** Mind Prober
**Type:** Analyzes people
**Authors:** Kathy Johnson and Jim Johnson
**System:** Apple, IBM PC, C-64
**Format:** Disk
**Summary:** Provides a psychological profile of yourself and others.
**Price:** $49.95
**Manufacturer:**
Human Edge Software
2445 Faber Pl.
Palo Alto, CA 94303
(415) 493-1593


MAC / APPLE SPECIALS

MACINTOSH

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| Habadex | 195.00 | 155.00 |
| **Infocom:** | | |
| Zork I | 39.95 | 31.95 |
| Zork II | 39.95 | 31.95 |
| Zork III | 39.95 | 31.95 |
| **Living Video Text** | | |
| Think Tank | 145.00 | 116.00 |
| **Main Street:** | | |
| Mainstreet Filer | 250.00 | 200.00 |
| **Memorax** | | |
| 3½" Diskette/box | 60.00 | 48.00 |
| **Microsoft** | | |
| Multiplan | 195.00 | 155.00 |
| Basic | 150.00 | 120.00 |
| Chart | 150.00 | 120.00 |
| **Penguin** | | |
| Transylvania | 39.95 | 31.95 |
| **Prometheus** | | |
| Promodem with Mac Pack | 495.00 | 395.00 |

APPLE

| | Retail Price | Your Price |
|---|---|---|
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| Word Handler | 79.95 | 36.95 |
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| Spell Handler | 59.95 | 29.95 |
| List Handler | 79.95 | 36.95 |
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| Jane | 179.95 | 135.00 |
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| Print Shop Refills | 19.95 | 16.00 |
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| War in Russia | 79.95 | 59.95 |
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CIRCLE 166 ON READER SERVICE CARD

# Computers Make Special Education More Effective and Fun

Glenn M. Kleiman and Mary M. Humphrey

We have often encountered teachers, parents, and administrators who believe that special education students should not use computers. They present negative arguments like the following:

Negative Argument #1: Special education students won't be able to use computers. They are too complex and students will only become frustrated trying to make them work. They can't do math or read; how are they going to operate a computer?

Negative Argument #2: They will break the computer right away. Just look at the mess they make of their books and papers.

Negative Argument #3: Their social skills are poor enough now. If you put them on machines they will become even worse at communicating with other students and teachers.

Negative Argument #4: There is too much for the special education teachers to do already. When will they find time to learn to use the computers themselves, teach the kids, and then make sure the computers are used properly and not damaged?

In this article, we describe the experiences of teachers and students in two special education classes into which computers were successfully introduced. Their experiences convinced us that computers can be especially valuable for students with learning problems.

## Background

We introduced computers into these classrooms as part of a project that involved developing and testing software designed for spelling drill-and-practice. Twenty-nine children, from 7 to 13 years of age, participated in the project. All the children had learning problems which required special remedial instruction. Eighteen of the children came to a resource room from their regular classrooms for one hour each day. The other eleven children had more severe learning problems and spent the entire school day in a special education classroom. Each child used the computer individually three or four times a week, for 15 to 20 minutes each time. The project lasted ten weeks.

All the students had histories of serious problems with their school work. Their books and papers were quite messy, and their interactions with other students and teachers were poor. These children required a great deal of individual attention from teachers, whose time and patience were often strained.

The four negative arguments we have described claim that computers would increase these problems. However, we found that computers helped alleviate them.

The spelling program successfully increased the rate at which the children learned their words. More importantly,

***Computers can be especially valuable for students with learning problems.***

we found that the use of computers led to improvements in the children's self-esteem, their interactions with others, and their feelings about school and learning. These benefits are of far more general significance than the learning of spelling words, and so we will focus upon them in this article.

## Computers Are Easy to Use

Many educators believe that computers are too complex for students with

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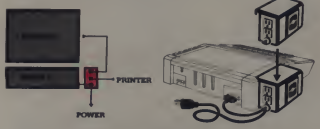


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CIRCLE 131 ON READER SERVICE CARD

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## CCPCMCIA

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| Blue Apple Duodrive™ | NEW | $ 589 $ 425 |
| C130 Controller DOS, & PRODOS | NEW | $ 89 $ 65 |
| µ-SCI ● A2, 143K Disk Drive | $ 345 | $ 219 |
| A2 Controller Card | $ 100 | $ 79 |
| ● A40, 160K Drive | $ 449 | $ 299 |
| MICRO-SCI ● A70, 280K Drive | $ 599 | $ 299 |
| A40/A70 Controller Card | $ 100 | $ 79 |
| TEAC 1/2 HIGH Controller Card by Live!! | $ 110 | $ 49 |
| Rana Elite 1, 163K 40 Track | $ 379 | $ 239 |
| Elite 2, 321K, 80 Track | $ 549 | $ 349 |
| Elite 3, 653K, 160 Track | $ 649 | $ 499 |
| Elite Controller | $ 99 | $ 89 |

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| ● Video, Video Term 80 col. (+ or e) | $ 179 $ 109 |
| ● Ultraterm (+ or e) | $ 279 $ 179 |
| Soft Video Switch (+) | $ 35 $ 25 |
| Enhancer II (+) | $ 149 $ 109 |
| Function Strip (e) | $ 39 $ 29 |
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| ● Microsoft, RAM Card (+) | 16K | $ 100 $ 79 |
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| RAM Card (e) | 64K | $ 425 $ 229 |
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| Software | | Call |

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# SOFTWARE for your APPLE

## BUSINESS & TRAINING

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| ● ALS/Silicon Valley, Word Handler | $ 60 | $ 39 |
| List Handler | $ 60 | $ 39 |
| ● Applied Soft Tech., Versa Form | $ 389 | $ 259 |
| Arithmetics, Jacobi or Wood | $ 295 | $ 195 |
| Jane (IIc) | $ 179 | $ 119 |
| Artpad, Magic Window II | $ 79 | $ 49 |
| ● Ashton Tate, dBase II (Req CP/M 80) | $ 495 | Call |
| Friday (Requires CP/M 80) | $ 395 | $ 259 |
| BPI Systems, GL ARAP, PR or INven | $ 395 | $ 249 |
| ● Brederbund, Bank Street Writer or Speller ea. | $ 70 | $ 49 |
| Business Simulations, Jack 2 (Re) | $ 395 | $ 265 |
| Incredible Jack (Re) | $ 99 | $ 69 |
| Continental, GL ARAP or PR, each | $ 250 | $ 165 |
| Home Accountant | $ 70 | $ 49 |
| CDEX, for Vecalc, Multiplan, Apple Baucalc | $ 60 | $ 40 |
| Dow Jones, Market Analyzer | $ 250 | $ 225 |
| Market Manager | $ 300 | $ 195 |
| Market Microfiler | $ 140 | $ 109 |
| Fox & Geller, Quickcalc or QCGraph, ea. | $ 75 | $ 49 |
| QUickity (for dBase III) | $ 99 | $ 65 |
| Hayden, Pie Writer | $ 70 | $ 49 |
| Harvard, Harvard Project Manager | NEW | $ 395 |
| ● Howard Soft, Tax Preparer, 1984 | $ 250 | $ 165 |
| Knowara, Knowara | NEW | $ 95 $ 64 |
| Lewis Rosenbaum, Think Tank | NEW | $ 195 $ 129 |
| LJK, Letter Perfect w /Mail Merge | $ 150 | $ 99 |
| Micro Pro, (all require CP/M or Card) | | |
| WordStar + + Applicard & C/PM SPECIAL | $ 495 | $ 295 |
| WordStar Advanced, 4 Pak SPECIAL | $ 695 | $ 395 |
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| Microsoft, Multi-Plan (Req DOS or CP/M) | $ 195 | $ 129 |
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| Some Common Basic Programs (Pks ea.) | $ 180 | $ 49 |
| Practical Basic Programs(400 ea.) | $ 180 | $ 49 |
| Peachtree, Requires CP/M & MBasic, 64K | | |
| G/L, A/P, A/R, P/R, & INV, all 3 | $ 395 | $ 239 |
| Perfect, Perfect Writer /Spell 2 pak (CP/M) | $ 399 | $ 199 |
| ● Quark, Wordsearch, Wordsearch Plus | $ 150 | $ 99 |
| Sensible, Sen. Speller or Bookends, ea. | $ 125 | $ 85 |
| Sierra /On-Line, Screenwriter Pro, 2 Pak | $ 129 | $ 89 |
| Screenwriter II | $ 130 | $ 89 |
| The Dictionary | NEW | $ 130 $ 89 |
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| Software Automatic, SSAview (Re ite rte) | $ 299 | $ 179 |
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| Epson, Graphics Dump | $ 15 | $ 9 |
| Hayden, Pie Writer (Req Smartmodem) | $ 100 | $ 69 |
| ● Insoft, GraFORTH II by Paul Lutus | $ 90 | $ 65 |
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| Terrapin, Logo | $ 99 | $ 65 |
| Unidisk SWL, ADDI Express Pro Pro | $ 130 | $ 89 |
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## HOME & EDUCATIONAL

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| Barrons, Study Program for SAT | $ 90 | $ 69 |
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| Dropzie or Lode Runner each | $ 35 | $ 23 |
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| Apple Panic | $ 35 | $ 23 |
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| ● Continental, Home Accountant | $ 75 | $ 49 |
| Davidson, Alien Typer, each | $ 70 | $ 47 |
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| Edu-Ware, Large Inventory | | 35% off list |
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| Scarborough/Lightning, Mastertype | $ 40 | $ 27 |
| Sir Tech, Rescue | $ 40 | $ 27 |
| Sir Tech, Wizardry | $ 50 | $ 35 |
| Spinnaker, Full line in stock, CALL | 35% off list | |
| Sub Logic, Flight Simulator II | $ 50 | $ 37 |
| Night Mission Pinball | $ 40 | $ 22 |
| Terrapin, Logo | $ 99 | $ 65 |

## OVERSTOCK SPECIALS

### APPLE HARDWARE

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| ALS, The CP /M Card (3.0) | $ 399 | $ 169 |
| TG, Thechat | $ 40 | $ 24 |
| Titan/Saturn, 32K RAM Card (8 +) | $ 249 | $ 129 |

### APPLE SOFTWARE

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|---|---|
| Ashton-Tate, dBase II (CP/M | $ 495 $ 269 |
| Broderbund, Early Inventory | Call |
| Datamost, Snark Attack | $ 30 $ 19 |
| Hayden, Pie Writer (Ver. 2.2) | $ 150 $ 89 |
| Quark, LawDesk (Ver) | $ 129 $ 79 |

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| Network II, Wireless + Fiber-surge | $ 70 | $ 59 |

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| | 41C, Calculator | $ 195 $ 149 |
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| 1000 ea. SS/SD, 35 Track (Apple, etc.) | $1245 |
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| 10 ea. DS/DD, 40 Track (IBM-PC Pre-formatted) | $ 39 |
| 100 ea. DS/DD, 40 Track (IBM-PC Pre-formatted) | $ 349 |
| 1000 ea. DS/DD, 40 Track (IBM-PC Pre-formatted) | $2495 |

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| AMDEK, 3" Diskettes, Pac 10 | $ 60 | $ 49 |
| CDC, 100 ea SS/DD, 48" (Apple, IBM) | $ 550 | $ 195 |
| 100 ea SS/DD, 48" (IBM, H/P) | $ 550 | $ 195 |
| 100 ea DS/DD, 48" (IBM, H/P) | $ 750 | $ 295 |
| 100 ea DS/DD, 96" (IBM, H/P) | $ 75 | $ 32 |
| DYSAN, 10 ea SS/DD (Apple etc.) | $ 40 | $ 27 |
| 10 ea DS/DD, 48" (IBM/H/P etc.) | $ 60 | $ 39 |
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| 83A, 132 col. 120 cps | NEW | $ 549 $ 499 |
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### UTILITY & SYSTEM

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learning problems, and therefore will lead to frustration. This fear may be based on misconceptions about the difficulties of using computers or it may stem from experiences with poorly designed software.

Most children, even those with learning difficulties, quickly become comfortable with computers. Some children in our project took only one practice session to learn to operate the computer. These students were then able to serve as tutors for the others.

All the children mastered the procedures for using the computer in a few sessions. They were not at all intimidated by the computer and were quite willing to experiment, pressing different keys to see what could happen. The children seldom encountered problems in operating the computer. When a problem did occur, they re-entered answers, pressed RETURN, repeated LOAD or RUN commands, and so on—they did not become frustrated or give up.

An important factor in the success of our project was that the software was easy for children to use. The difficulty of the drills could be adjusted to an appropriate level for each child. The computer prompted the children at each step and the procedures were simple and consistent. The program waited for the children to signal that they were ready, and it provided feedback that they could understand easily.

### Computers Don't Wear Out

Educators and parents also express concern that since special education students often produce messy work, wear out their books, and break crayons and pencils, they are likely to damage computers. A closer look at the type of wear and tear in these classrooms did not show evidence of any deliberate abuse, but rather the results of problems common among special education students. Many of these children have difficulty with the fine motor coordination required to fold papers, draw within lines, write legibly, and erase mistakes neatly. Consequently, one of the best liked features of the computer was that it did not require any of these skills and did not break, tear, or wrinkle.

Even when children had to "hunt and peck" to enter answers, they found it much easier to type than to write with a pen or pencil. For these children, pressing a key to delete an answer meant that they were able to erase a mistake "without making a hole in the screen."

### Computers Encourage Social Interaction

Another negative argument is based on the view that special education students are withdrawn or socially isolated children who need to be encouraged to initiate interactions. Our experience leads us to believe that this is not the case. Most of the children we worked with demanded a great deal of attention, particularly from the teachers. The amount of time they spent seeking directions and approval from the teacher had been both annoying for the teacher and disrupting for the class as a whole.

While working on the computer, the children were kept busy entering answers, changing mistakes, or moving on to the next part of the lesson. They received frequent and immediate feedback about their answers and continued working on each word until they spelled it correctly. They participated more actively in learning than they did in most of their other lessons.

***The computer project had dramatic effects upon the children's self-esteem and upon how they were regarded by the other children, teachers, and their parents.***

Using the computer allowed the students to be more independent with their work. The teachers felt that this reduced the competition between students for their attention and improved the overall quality of teacher-student interactions.

An important feature of the lesson program was that it responded immediately to incorrect answers. Feelings of failure were lessened since the children did not accumulate a collection of errors before receiving feedback (as usually happens when working paper and pencil lessons that the teacher later checks).

The program also required the students to type each word correctly before going on to the next one. Rather than cause frustration, this practice helped the children avoid making the same mistake repeatedly—a frequent problem for these students. The teachers felt that their students were better able to tolerate failures and showed more patience when working their lessons on the computer. Many times when they had trouble with one of their other lessons, the children asked to be allowed to "work it on the computer."

The computer project had dramatic effects upon the children's self-esteem and upon how they were regarded by the other children, teachers, and their parents. The children came to see themselves as more capable because they were able to operate a "real adult computer." They became more confident and willing to take on challenges, and were less easily frustrated. The teachers began to expect the children to be capable of mastering more difficult lessons.

For the first time, other children in the school (who did not have computers in their classes) were envious of the special education children. The children's parents were interested in the project and expressed pride in their children's ability to use the computer. The number of parents who came to the school on parent-teacher meeting nights increased dramatically.

### Computers Help Teachers

Many teachers are concerned that introducing a computer to their classroom would be a drain upon their time and resources. The time devoted to learning how to use the computer and implementing it in the classroom is less than many teachers expect. The rewards can be well worth the time and effort.

In the classrooms participating in our project, the teachers quickly learned to use the computer. The use of peer-tutors to help other children was efficient for the teachers and contributed to positive interactions among the children. It also led to students helping each other with computer problems that occurred later.

After a schedule was developed, the children took their computer turns without teacher supervision. The teachers found the computer could replace them as monitors and drill-practice technicians, and thereby allowed them to devote more time and effort to teaching.

### Summary

After the ten weeks with computers in their classrooms, the teachers summarized their views as follows:

"In addition to the fun, the children enjoyed improved communication skills, an increased ability to handle frustration, an opportunity to progress in academic areas, and a growing independence within their learning environments. The success that the children experienced at the computer enhanced their self-esteem. Communications between parent and child, teacher and child, and teacher and teacher improved. All of these aspects helped establish a happy, friendly, and positive climate within the classroom."

We have not discussed the details of the software and other aspects of our project, since we believe comparable effects could be obtained with many different applications of computers in special education. However, using computers does not automatically lead to such benefits.

We regard three general factors as critical to the successful introduction of computers into any classroom, and we believe that these factors are even more important for special education classes. First, the computer learning experiences must be integrated into the overall program of instruction. That is, the computer must be treated as a tool for learning, not as a toy for playing games. Second, the teachers and children must

***The computer must be treated as a tool for learning, not as a toy for playing games.***

be given sufficient training in how to operate the computer to become comfortable with it. Third, the software must be well designed and easy to use.

### Positive Arguments

After using computers with special education students, we are convinced that the arguments against doing so are invalid. With good software and proper implementation, computers can have very positive effects. We propose the following five arguments in favor of using computers in special education:

Positive Argument #1: Computers can individualize instruction. They can be programmed to present lessons or drills at a level of difficulty and speed appropriate for each child. They can provide immediate and informative feedback, which is particularly helpful for children with learning problems.

Positive Argument #2: Computers can help special education children become active learners. As they learn to control and interact with the computer, their work habits and study skills improve.

Positive Argument #3: Improved learning skills lead to remarkable changes in children's self-esteem. They have a chance to see learning as fun and easy, and to see themselves as capable and in control. Their expectations for success in other school activities also improve.

Positive Argument #4: As the special education students become more capable and confident, other children, teachers, and parents begin to change their attitudes about these students' abilities.

Positive Argument #5: Special education teachers find their jobs more rewarding as they spend less time keeping records, coaxing and monitoring students, and more time actually teaching. ■




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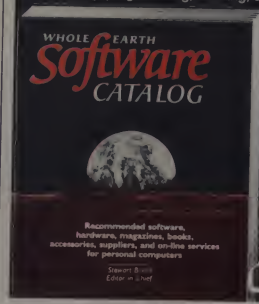


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# Is There a Wufflegump in Your House?

## Creative Computing talks educational software with four top developers.

Sherrie Van Tyle

The amount of educational software on the shelves has multiplied so rapidly in the past few years that winnowing the good educational software from the mountain of chaff can be a harrowing task. For guidelines in choosing educational software, *Creative Computing* asked four leading educational software developers what they think educational software should do and what the future holds.

### Joyce Hakansson

"Learning is the most enjoyable thing I can imagine for children," says Joyce Hakansson, who started her own educational software development firm two years ago in a renovated Victorian house in Berkeley, CA. Since then, the Joyce Hakansson Associates (JHA) team of programmers, educators, musicians, artists, writers, and children has produced 19 educational games distributed by four publishers.

Hakansson designed the Computer Gallery at Sesame Place, a theme park in Pennsylvania, from 1979-81 at the request of the Children's Television Workshop, the originators of "Sesame Street." She began her career in educational software in 1973 when she looked for a more intuitive way to convey math principles to her own young children. She and a parent volunteer started a computer lab in conjunction with the Lawrence Hall of Science at the University of California at Berkeley. The next year, she directed their Computer Education Project, which has taught 30,000 to 40,000 people each year to use computers.

She believes that educational software should be entertaining, an enhancement of the learning process. "Children need positive educational experiences to feel confident with a self-learning tool like a computer. So we put a lot of play, laughter—the theater—into our software. Software should be one more tool in children's lives. But we try not to take it totally seriously."

She acknowledges that "the computer has become an artifact of our culture. But computers do not make kids smarter. Computers can enhance children's self images, their feelings about themselves. But we shouldn't be slavishly tied to the technology."

Space shoot-'em-ups reward aggressive behavior, she says; the player who shoots down the most planes, who is the most aggressive, is the most heavily rewarded. JHA programs, on the other hand, aim to create an environment of learning and play, in which the child is in control rather than in the path of an errant missile.

**Computers do not make kids smarter.**

For example, in *Alf in the Color Cave*, the child controls the joystick and fire button to animate shapes and to make sounds. She calls it a "video busy box." The child manuevers Alf through tunnels, and, if successful, moves through all three screens to the end, where a magic color change occurs. But the game is programmed so that each screen is fun to do in itself. Alf meets an obstacle, a Wufflegump, while on his journey, but she emphasizes "there is no sense of harm, damage, or destruction. He is never scared or running away."

*Joyce Hakansson*

Children need different skills today to prepare them for the world, she points out. The mountain of information means that rote learning is less important than in the past; knowing how to find and use facts, however, has become vital. "Creativity, confidence, acceptance, and adaptability to change, to new contexts are even more important these days."

Instead of writing programs with exercises that have only one correct answer, "JHA creates learning environments. There is no one right way to do it. Children are encouraged to try things, to find that there are many ways to solve a problem. Rather than trying to find concrete answers, the problems usually are open-ended."

She notes that the computer is good at performing repetitive tasks such as computation. Of course, the child still needs to learn the relations between the numbers to evaluate the results.

Some traditional educational tasks are accomplished better without the computer, she points out. For example, in math, learning volume and weights is easier in three dimensions than on the computer. Free drawing is better with crayons and paper; and as yet the fine lines of book illustrations haven't been duplicated by computer graphics. Workbooks and flashcards remain valuable.

As for the future of educational software, "we're going into a time that is very unsettled...I have no crystal ball." For high school students and adults, however, she foresees increasing access to large libraries of information by computer.

JHA's goal is "low threshold" software. "The software is the child's window to the machine; it should be as natural, as intuitive, as barrier-free as possible."

She gives an example: "When you look at a shovel, you know what to do with it—it looks like something you dig with. It is part of our culture. As software producers, we need to use some of the metaphors of our culture as touchstones. Even if the terminology is not exact by engineering standards, software should be natural, friendly, and familiar." Thus, in one JHA program, the instruction "delete"

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was eliminated in favor of "erase," because "delete is not a people word." She elaborates: "We try to validate the individual intuition."

JHA tries to look at the world through a child's eyes. In *Duck's Ahoy*, for example, the player moves gondolas in the canals of Venice to gather ducks. Limited to a 16K cartridge, JHA could show the ducks submerged but could not show them swimming safely to shore. To allay any anxieties in young players, the documentation explains that the ducks went swimming, reached the beach safely, and sunned themselves. "Whenever possible, we concern ourselves with the child's perception of the world."

## Tom Snyder

In preschool software, the adult's feelings about the software may be more important than the child's, according to Tom Snyder, head of his own educational software development company in Cambridge, MA. "If the software isn't intriguing to parents, the parents don't want to be there. We are overrating the value of young kids interacting with the software by themselves. A young kid alone with software is almost not worth talking about.

"I recommend that parents buy software that intrigues them. Then the parent and child can work together. Then the child can choose some software and get the parent involved."

For the preschool child, "nine-tenths of the reason the kid is at the computer is to get lap-time, access to the parents. There are so many teachable moments that arise—when parents can intervene with an example or an explanation." Accordingly, Tom Snyder Productions (TSP) schedules Parent's Nights for young children to bring in their parents to playtest the software.

Snyder became acquainted with computers almost 20 years ago when at the age of 15 he sent one of his designs to IBM. They responded by delivering hardware parts to his home and encouraging him to experiment. Instead, in the late 60's, he became a keyboard musician with a rock 'n roll band under contract to Capitol Records. He majored in French at Swarthmore College and obtained his master's degree in education from Lesley College in Cambridge, MA. He teaches science and music at Shady Hill School in Cambridge. In 1980, he founded the Computer Learning Connection, but changed the name to Tom Snyder Productions (TSP) in 1983 to distinguish the company name from others in the field.

He comments: "Of all the areas, the greatest potential for 'bogusness' exists in the educational market. It is an open invitation for those with no interest or training in education to do brightly colored,

*Tom Snyder*

interactive programs and after the fact, deem them educational."

Snyder aims for the collaborative approach in the classroom. In the *Snooper Troops* series of mysteries, students can work singly, in pairs, or on teams. The teamwork fosters cooperation in reaching a goal.

***A computer is a great laboratory tool, but it should be clear that it is a tool; the computer is a mild servant.***

TSP has also designed simulations for the classroom. In one module Snyder simulates navigation: Groups of kids search for whales and along the way learn to use radar, sonar, and a telescope, and to map in detail. Not only must students cooperate to reach the goal, but they learn the basics of note taking and organizing data. Working with pencil and paper are part of the learning, too.

Snyder believes that "the computer is at its peak value in the classroom when the kid isn't at it. It creates openings in experience: it invites him to look up the Amtrak schedule, to go to another kid and ask how far it is from Detroit to Denver." In terms of teamwork, "you may not learn something unless you repeat it to someone else."

Cooperation would enrich video games, Snyder believes. In the traditional arcade game, "the arcade game player is in a glass sphere. If another person speaks to you, it damages your game. If your eyes leave the screen you die. But if you had a pause button to freeze the action, you could stop, talk about strategy, and get suggestions. Cooperation puts holes in the sphere."

Unfortunately children are usually asked to learn for abstract reasons ("because it's good for you"), Snyder points out. Classroom simulations in which students run a factory or an oil company provide a context of learning for children. Solving a concrete problem serves to motivate the child. One of the students described how much he had learned by playing the factory simulation: "We got to make decisions that really mattered."

Snyder acknowledges that teachers have used games to motivate kids for a long time; the computer provides what Snyder terms "rich, dense opportunities." TSP has a sailing simulation to help teach navigation, in which the stars rise and the earth spins during the program. "When I'm asked why we sweeten it up with sugar, I say that I have to consider the market. Why would anyone buy something that is boring?" he says.

Computers in the classroom should still be considered an experiment he says. "Everyone who can should participate in the experiment. But not to the extent that a great deal of money is spent on computers to replace the curriculum."

Society's expectations for educational software are misguided, he thinks. The boom in the microcomputer market coincided with criticism of the teaching quality in schools. It gave the public the idea that computers can take care of bad education. He says "that's unfair. A computer is a great laboratory tool, but it should be clear that it is a tool; the computer is a mild servant. It can't solve the problem of bad teachers. And we're not in the Toffleresque era of home education. All we have invented is a good alternative to TV. That's a far cry from education."

Snyder foresees more use of Logo. "It helps kids to think procedurally. I also see more and better classroom simulations. The simulations currently available are not advanced; the sailing simulation was done four years ago. I don't know why more hasn't been developed for groups of kids working together. I look for advances in how to structure group dynamics."

## Jan Davidson

"If it can be done as well in a book, we don't want to do it. It must be unique," says Jan Davidson, founder of Davidson & Associates of Rancho Palos Verdes, CA, developers of the popular educational packages *Word Attack!*, *Math Blaster!*, *Speed Reader II*, *Classmate*, and *Spell It*.

Davidson, who holds master's and doctoral degrees in language arts from the University of Maryland, also founded Upward Bound, a nonprofit educational association that offers supplemental math and reading courses as well as SAT preparation. Before that, she was a high school

*Jan Davidson*

and college teacher.

She became interested in computers as a motivational tool. "I have been a teacher for many years and am always looking for a way to motivate students. That's how I got involved with computers. Often, the software will get them started, and they will go on to use books. This is true for both high school students and young children."

**Testing is essential to quality. Educational software needs lots of testing.**

Despite her belief in the computer as a motivational tool, she emphasizes, "if a $5 or $10 book offers the same information as software running on a $1000 computer, it doesn't make sense to invest in the software."

For this reason, Davidson & Associates haven't developed complete SAT preparation programs yet. "The students take the test on paper. They are allowed to mark the booklet, to circle and to underline points. I try to create an environment similar to the one they will be in while taking the test."

She thinks "educational software needs to be more quality-oriented, to attack a particular skill or area." One general characteristic to aim for is multiple activities—more than just one game, each building on the previous one in a logical sequence. In addition, she points out that "data disks extend the life of the programs. The additional words in *Word Attack!* and the stories in *Speed Reader II* also provide users with a cost effective way of expanding their existing software without having to purchase new programs."

A third criterion is an editor feature, in which the user can add his own spelling words or math problems.

Further, "testing is essential to quality. Educational software needs lots of testing." If more programs were tested, we would see higher quality software. It needs to be tested for educational soundness; are the materials presented in a way that will motivate the student? It also needs to be tested for bugs. We try to do all the things to it that a student would to make it crash.

"Our emphasis is on the home end of the software market. I see a trend toward more quality and completeness. That extends the life of the products."

## Sterling Swift

Sterling Swift, of the Sterling Swift Publishing Company, agrees that quality is essential in educational software. "The real issue in my judgment is the quality of product that is developed. I would rather do fewer products and better products. Frankly, that has been a problem in the education market. Quality builds in a confidence level for the consumer. In the past few years in the software market, some people have been a little greedy."

The Austin, TX based company publishes 64 titles of software and books for the classroom market. Swift, who has a degree in marketing from the University of Texas, is a veteran of college textbook publishing; he worked for the Prentice-Hall College Division for 14 years, in the college division of Harper & Row for five years, and managed the second largest college bookstore in the country at the University of Texas in Austin. Because the bookstore sold everything from trade books to women's clothing, his retail experience made him aware of the computer retailer's problems.

In developing software, he also keeps the average teacher in the classroom in mind. "I have been in the classroom on Monday at 9:00 a.m. and seen those blank stares."

The future of educational software is promising. He says "the computer in K-12 is proving to be a valuable tool. Schools have made major financial commitments, and we have pretty conclusive proof that it is assisting in the educational process. But we need to become more sophisticated about videodiscs, for example.

"The sky is the limit for software development. We want to be on the cutting edge and not get bloody. The idea is to produce the software and bring the market with you. The software is becoming better. Some people are good enough to conceptualize it. The Macintosh in 1984 is where the Apple II was in 1977. People must rethink ways to use the computer—to take advantage of what the Mac has to offer—and not just hook up software to a mouse. That is just dumb," he says.

*Sterling Swift*

Swift develops software by helping authors perfect the product, packaging it, and selling it both in the United States and internationally. As enthusiastic as he is about the future of computer software, Swift says "programs that are mostly text, whether they are 40- or 80-columns, are just page-scrolling—nothing but a waste."

**The sky is the limit for software development. We want to be on the cutting edge and not get bloody.**

Further, "we've not even scratched the surface of what can be done graphically. Young people today expect the graphics of MTV—substantial use of the visual arts.

"The computer can be a tremendous reinforcing tool, if the program truly deals with problem-solving, as in a simulation, or in a real tutorial."

He gives the example of *Math Worlds*, a middle school math program that deals with manipulation, algebraic functions, and geometry. Students work with manipulation by using a bag of blocks. And "you can use the computer to give you quick access, as a number cruncher. It extends the analysis of a problem. The whole purpose is to present the analysis and reason behind the math manipulation."

Swift's new program, *Graphic Gradebook*, written by Tom Irby, takes *VisiCalc* cells and adds graphics to produce pie and bar charts from the grade information. ■

# What's New In Hardware

## Desktop Computer from ITT

ITT has introduced the ITT Xtra Personal Computer, an IBM PC-compatible desktop microcomputer. The Xtra uses a 16-bit Intel 8088 microprocessor operating at 4.77 MHz; includes 128K RAM, expandable to 640K; and runs ITT DOS 2.11, an enhanced version of MS-DOS.

The Xtra comes with one 5.25" 360K floppy disk drive and has provision for a second floppy drive or an optional 10Mb hard disk drive. It has one parallel port, one RS-232C serial port, and five expansion slots. A 14" green or amber monochrome monitor, or optional 12" RGB color monitor, mounts on a tilt and swivel pedestal. The Xtra supports an optional 8087 numeric co-processor. The Xtra carries a base price of $2495.

ITT Information Systems, P.O. Box 52016, Phoenix, AZ 85072. (602) 894-7000.

CIRCLE 435 ON READER SERVICE CARD

## Apple Compatible Portable

Comp-U-Save has unveiled the Alex 500A, an Apple and CP/M compatible portable computer. The Alex 500A packs dual 6502 and Z80 microprocessors, 64K RAM, two floppy disk drives, and a 5" green screen monochrome monitor into a 15" x 14" x 5" case. It weighs only 18 pounds.

The Alex 500A also includes four expansion slots, one parallel port, one RS-232C serial port, one game port, an RF modulator, and a speaker. It is capable of presenting text in upper-and lowercase in 40-or 80-column mode. An optional DC power converter is available. The Alex 500A carries a suggested retail price of $2495.

Comp-U-Save, Turtle Creek, P.O. Box 1300, Skyland, NC 28776. (704) 274-3003.

CIRCLE 436 ON READER SERVICE CARD

## IBM PC Compatible from Canon

The Canon Personal Computer, an IBM PC compatible, features a 16-bit 8086 microprocessor, 256K RAM, two half-height floppy disk drives, a serial port, a parallel port, and five expansion slots. It supports either a monochrome or RGB color monitor and includes an 83-key keyboard identical to the IBM PC keyboard.

Canon includes MS-DOS and GW Basic with the PC. The PC is touted as being able to run most IBM PC software without modification and to accept most plug-in boards. The Canon PC has a base price of $2495.

Canon USA, System Div., One Canon Plaza, Lake Success, NY 11042. (516) 488-6700.

CIRCLE 437 ON READER SERVICE CARD

# Meet PROMAL.™ The First Fast Structured Language That Lets You Program The Way You Always Wanted To. And For Only $49.95.

# A New Age Dawns for Microcomputer Programming

**PROMAL™ is innovative.**
PROMAL (PROgrammer's Micro Application Language) was designed to achieve maximum performance from small computers... performance previously impossible except with machine language. And it was developed, specifically, to meet the need for a development system for limited memory environments.

**PROMAL is complete.**
It's a fast, structured programming language. It's also a true development system, complete with its own command-oriented operating system executive, fast one-pass compiler, and full-screen cursor-driven editor. In short, PROMAL is the complete set of tools that microcomputer programmers have been waiting for.

**PROMAL is fast.**

| Commodore 64 Benchmark (Sieve of Eratosthenes) | PROMAL | BASIC | COMAL | FORTH | PASCAL | |
|---|---|---|---|---|---|---|
| Execution Time (secs.) | 30 | 630 | 490 | 51 | 55 | |
| Object Code Size (bytes) | 128 | 255 | 329 | 181 | 415 | |
| Program Load Time (secs.) | 3.9 | 3.8 | 6.3 | 11.9 | 23.5 | |
| Compile Time (secs.) | 8.5 | — | — | 3.9 | 108 | |

As the benchmark results in the table show, PROMAL is much faster than any language tested. From 70% to 2000% faster! And it generates the most compact object code. The PROMAL compiler is so fast that it can compile a 100-line source program in 10 seconds or less. And, not only is it fast in compile and run time, it also speeds programming development time.

**PROMAL is easy.**
It's easier to learn than Pascal or C or FORTH. It makes use of powerful structured statements, like IF-ELSE, WHILE, REPEAT, FOR, and CHOOSE. Indentation of statements is part of the language's syntax, so all programs are neatly and logically written. There are no line numbers to complicate your programming. And comments don't take up memory space, so you can document programs completely. And with the full-screen editor, you can speed through program development with saves to memory and compilation from memory workspace.

**PROMAL is elegant.**
PROMAL overcomes the performance limitations inherent in all small systems. It gives you access to the power of the machine. But it doesn't require the complexity of machine language programming. With PROMAL, you can have performance the easy way, since it was developed from the very beginning to work on small systems...elegantly.

**PROMAL may be the answer to your programming needs.**
Finally, there's an answer to the need for a complete environment for simple and rapid program development. Finally, a new age has begun for microcomputer programmers. Finally, there's PROMAL.

**PROMAL is available for the Commodore 64 now.**

**PROMAL is scheduled for release on the Apple IIe in December, 1984 and on the IBM PC in 1st Quarter, 1985.**

## PROMAL FEATURES

**COMPILED LANGUAGE**
- Structured procedural language w/indentation
- Fast, 1-pass compiler
- Simplified syntax requirements
- No line numbering required
- Long variable names
- Global, Local, & Arg variables
- Byte, Word, Integer types
- Dec. or Hex number types
- Functions w/passed arguments
- Procedures w/passed arguments
- Built in I/O library
- Arrays, strings, pointers
- Control Statements. IF-ELSE, IF, WHILE, FOR, CHOOSE, BREAK, REPEAT, INCLUDE, NEXT, ESCAPE, REFUGE
- Compiler I/O from/to disk or memory

**EXECUTIVE**
- Command oriented, w/line edit
- Memory resident
- Allows multiple user programs in memory at once
- Function key definitions
- Program abort and pause
- 20 Resident system commands, 8 user-defined resident commands, no limit on disk commands
- Prior command recall
- I/O Re-direction to disk or printer (UNIX-like)

**EDITOR**
- Full-screen, cursor driven
- Function key controlled
- Line: insert, delete, search
- String search and replace
- Block copy, move, delete & write to/read from file
- Auto indent, undent support

**LIBRARY**
- 43 Machine-language commands
- Memory resident
- Call by name with arguments
- I/O, Edit, String, Cursor control and much more

PROMAL runs on Commodore 64s with disk drive.

**HOW TO ORDER**

☐ Please send me my copy of PROMAL for the Commodore 64 at $49.95 plus $5.00 for shipping and handling at a total cost of $54.95. Satisfaction guaranteed.

☐ Please send me a PROMAL demo diskette for the Commodore 64 at $10 for the diskette plus $2.50 for postage and handling for a total cost of $12.50. (Non-refundable.)

☐ My check is enclosed. ☐ Please charge my purchase to my... ☐ Visa ☐ MasterCard

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**SMA** *SYSTEMS MANAGEMENT ASSOCIATES*
3700 Computer Drive, Dept. CR-1
Raleigh, North Carolina 27609

CIRCLE 196 ON READER SERVICE CARD

## Fujitsu 16sx

The Fujitsu 16sx features a 16-bit 8086 microprocessor operating at 8 MHz, 348K RAM expandable to 1Mb, one 360K floppy disk drive, and a 10Mb or 20Mb internal hard disk drive. It runs the MS-DOS, CP/M-86, and Concurrent CP/M operating systems.

The 16sx includes five expansion slots, one serial port, and one parallel port, and has interfaces for a light pen, monochrome monitor, and color monitor.

The base price of the Fujitsu 16sx with 10Mb hard disk is $4250.

Fujitsu Microelectronics Inc., Professional Microsystems Div., 3320 Scott Blvd., Santa Clara, CA 95051. (408) 980-0755.

CIRCLE 438 ON READER SERVICE CARD

## Wrist Terminal from Seiko

From the pages of a Dick Tracy comic book is Seiko's Wrist Terminal RC-1000 with accompanying wrist information system.

Worn like a watch, the RC-1000 contains a LCD screen, has a memory capacity of 2K, holds 80 "pages" of 24 characters, and connects to a RS-232C port. It stores phone numbers, flight schedules, memos, or any other information. It is also a watch that keeps time and dates and has an alarm. The lithium battery lasts for 1.5 years.

The RC-1000 connects to a 5.5" x 2.25" x 5/16" pocket keyboard with 61 keys. The keyboard enters information into the RC-1000. A lithium battery in the keyboard lasts for five years.

The RC-1000 can also connect to a larger controller, which features a Z80 equivalent CPU, 4K RAM, and built-in dot matrix printer. Plug-in ROM packs supply Basic and a variety of programs.

The RC-1000, pocket keyboard, and controller carry a suggested retail price of $340.

Hattori Corporation of America, Consumer Electronics Div., 1330 W. Walnut Pkwy., Compton, CA 90220. (213) 640-8728.

CIRCLE 439 ON READER SERVICE CARD

## Personal Robot from Heath

Heath, the company that introduced the Hero Robot, announces a new preprogrammed robot, the Hero Jr.

Hero Jr. contains 32K of built-in routines, a speaker, and an internal 100-year clock. With optional security transmitter and infrared motion detector, Hero Jr. functions as a guard robot. Hero moves by itself or via remote control.

Hero Jr. is programmed to sing "Daisy" and "America" and with optional plug-in cartridges can sing other songs and play various games. Hero Jr. operates for four to six hours between charges, with an optional battery accessory doubling the hours.

Hero Jr. is priced at approximately $1000.

Heath Co., Dept. 150-375, Hilltop Rd., Benton Harbor, MI 49022. (616) 982-3200.

CIRCLE 440 ON READER SERVICE CARD

## New Keyboard for PCjr

IBM has introduced a new full-stroke keyboard for the PCjr to replace the old chiclet keyboard. New buyers of the PCjr will receive both keyboards until the supplies of the chiclet keyboard run out. Owners of the PCjr can obtain the new keyboard free of charge from authorized dealers.

IBM also has released a memory expansion unit and power supply that plugs into the right side of the original system unit, giving the PCjr up to 512K RAM. IBM is also selling a speech synthesizer card.

IBM has set up a hotline to answer questions about the PCjr.

IBM Corp. (800) 222-PCJR.

## Three New Robots from Tomy

Tomy, the toy manufacturer, has introduced three battery-operated robots, named Dingbot, Verbot, and Omnibot, that are geared for children aged four and up.

Dingbot rolls around, bumps into objects, adjusts course, and keeps on

rolling. Verbot is a voice-activated robot that responds to eight separate verbal commands, which can be programmed

into the robot via a remote control microphone transmitter.

The top-of-the-line Omnibot, a two-foot high programmable robot, has a built-in microprocessor, microphone, digital clock, and cassette tape deck, a remote control transmitter, a moving grasping hand, and a detachable serving tray.

Dingbot sells for $10, Verbot for $65, and Omnibot for $250.

Tomy Corp., 901 E. 233 St., P.O. Box 6252, Carson, CA 90749. (213) 549-2721.

CIRCLE 442 ON READER SERVICE CARD

## Three Robot Kits from OWI

OWI has introduced three build-it-yourself robot kits: Memocon Crawler, Mr. Bootsman, and Medusa.

Memocon Crawler, a battery-powered three wheeled robot, can be programmed with a personal computer or

with a special keyboard included in the kit. It holds up to 256 instructions, including sound, light, and movement, in 4K of RAM.

Mr. Bootsman, a battery powered six-legged robot with two speeds, is controlled with a wired control box. Medusa, a battery-powered four legged robot, contains a sound sensor to start it

walking about. It stops after a preset time.

Memcon Crawler carries a suggested retail price of $74.95, Mr. Bootsman sells for $32.95, and Medusa costs $29.95.

OWI Inc., 1160 Mahalo Pl., Compton, CA 90220. (213) 638-4732.

CIRCLE 443 ON READER SERVICE CARD

## 600 CPS Serial Printer

Florida Data has introduced the Office Serial Printer 130, a dot matrix serial printer with three modes of printing: draft at 600 cps, correspondence at 150 cps, and letter quality at 100 cps. The OSP 130 holds up to ten type fonts, including Florentine Script, Mid Century Proportional, and Arabic. Optional graphics capability is available.

The OSP 130 carries a suggested retail price of $3995. The graphics option costs $100.

Florida Data Corp., 600D John Rodes Blvd., Melbourne, FL 32935. (305) 259-4700.

CIRCLE 441 ON READER SERVICE CARD

# What's New In Software

## Legal Accounting System

Tandy has released the *Precedent Legal Accounting System*, an integrated time, billing, general ledger, and cash disbursements package based on American Bar Association accounting standards, for the Radio Shack TRS-80 Model II and 12.

The *Precedent* tracks the billing hours of up to 50 people, provides eight billing formats, and includes a report generator. Radio Shack includes a monograph, "Simplified Accounting Systems and Concepts for Lawyers," published by the Legal Economics Section of the American Bar Association, with each package.

The *Precedent* carries a suggested retail price of $795.

Tandy Corp., 1800 One Tandy Center, Fort Worth, TX 76102. (817) 390-3300.

CIRCLE 444 ON READER SERVICE CARD

## Turbo Toolbox from Borland

Borland International has unveiled *Turbo Toolbox*, a program development package designed to complement its Turbo Pascal compiler for Z80, 8088, and 8086 microprocessors. *Turbo Toolbox* assists programmers in developing Pascal programs containing search and sort capabilities.

*Turbo Toolbox* consists of Turbo-ISAM (Index Sequential Access Method), Quicksort, and General Installation Program (GINST). Borland includes the source code with its programs.

*Turbo Toolbox* carries a suggested retail price of $49.95.

Borland International, 4113 Scotts Valley Dr., Scotts Valley, CA 95066. (408) 438-8400.

CIRCLE 445 ON READER SERVICE CARD

## Potpourri of Programs

American Training International has released two interactive disks, *Spreadsheet Sampler* and *Word Processing Sampler*, demonstrating popular software packages. Each disk offers ten minutes of hands-on use per program and runs on the IBM PC and compatibles.

*Spreadsheet Sampler* contains *Lotus 1-2-3, SuperCalc, Multiplan, VisiCalc, PeachCalc, Microplan, Perfect Calc*, and *EasyPlanner*. *Word Processing Sampler* contains *WordStar, Microsoft Word, MultiMate, Benchmark, EasyWriter II, PeachText, Perfect Writer*, and *Spellbinder*. Each Sampler retails for $12.95.

American Training International, 12638 Beatrice St., Los Angeles, CA 90066. (213) 823-1129.

CIRCLE 446 ON READER SERVICE CARD

## TK! Solver for TRS-80 Model 4

*TK!Solver*, a mathematical analysis package for engineering, finance, and education applications from Software Arts, is now available for the Radio Shack TRS-80 Model 4.

*TK!Solver*, with 34 built-in mathematical functions, solves equations in a fraction of the time it takes by hand. It also uses successive approximations to solve an equation with unknown variables.

*TK!Solver* requires 128K RAM and retails for $299.99.

Software Arts, 27 Mica Ln., Wellesley, MA 02181. (617) 237-4000.

CIRCLE 447 ON READER SERVICE CARD

## MicroPro Releases Three New Titles

MicroPro has added *WordStar for PCjr*, *ChartStar*, and *TelMerge* to their product lines.

*WordStar for PCjr* is a customized version of the *WordStar* word processing program for the IBM PCjr. It includes an on-screen, interactive tutorial and is completely compatible with *WordStar* running on an IBM PC.

*ChartStar* is a complete business graphics package providing line, bar, pie, organizational, scatter, and Gantt charts. It offers three-dimensional pie and bar charts, five different text fonts, and the ability to string several charts together to form a slide show. *ChartStar* can read data files from MicroPro's *CalcStar*, *InfoStar*, and *PlanStar*, as well as *Lotus 1-2-3*, *VisiCalc*, *SuperCalc*, and *Multiplan*. *ChartStar* runs on the IBM PC and requires 192K and a graphics printer or plotter.

*TelMerge* converts *WordStar* document files into standard ASCII files and sends them through electronic mail services. *TelMerge* installs into *WordStar* version 3.3 on the IBM PC.

*ChartStar* sells for $395. Suggested retail prices for *WordStar for PCjr* and *TelMerge* have not been set.

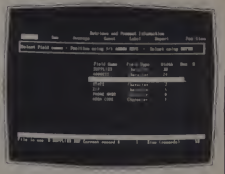
MicroPro International Corp., 33 San Pablo Ave., San Rafael, CA 94903. (415) 499-1200.

CIRCLE 448 ON READER SERVICE CARD

## dBase III for IBM PC

Ashton-Tate has released *dBase III*, a relational database management system for the IBM PC and compatibles. dBase III requires 256K RAM, two disk drives, and PC-DOS 2.0 or greater.

*dBase III* can hold more than two billion records per database with up to 128 fields per record. It uses the same dBase programming language used in *dBase II*, which allows for customized application programs. *dBase III* contains full on-line help and an extensive tutorial.



*dBase III* retails for $695. A demonstration and tutorial disk sell for $9.95.

Ashton-Tate, 10150 West Jefferson Blvd., Culver City, CA 90230. (213) 204-5570.

CIRCLE 449 ON READER SERVICE CARD

## Electronic Mail Program with Voice

Texas Instruments has released *EtherVoice*, a software package that offers users of TI Professional Computers tied into local area networks the option of sending voice messages. *EtherVoice* operates in conjunction with EtherMail electronic mail system and the TI Speech Command system.

*EtherVoice* records voices in two modes: high quality at 9600 baud and normal quality at 2400 baud. *EtherVoice* requires a TI Professional Computer, 256K RAM, hard disk, and the Ether-Series LAN software. The package carries a suggested retail price of $150.

Texas Instruments Inc., Data Systems Group, P.O. Box 809063, Dallas, TX 75380. (800) 527-3500.

CIRCLE 450 ON READER SERVICE CARD

## TRS-80 Utilities

Keene Computing has introduced *XU*, a utilities package for Radio Shack Model I, III, 4, and 4P running LDOS, NEWDOS, MULTIDOS, DOSPLUS, and TRSDOS 1.3 and 6.1. *XU* includes a RAM disk, string search, command file linker, file copier, and ten other utility programs. *XU* costs $45.

Keene Computing Services Co., Box 13044, College Station, TX 77841.

CIRCLE 463 ON READER SERVICE CARD

En Fleur has released *Windowpad*, an integrated windowing and note processing utility for the TRS-80 Model II and III running TRSDOS. *Windowpad* loads into the top of memory, functions independently of Basic programs, and permits short text writing and editing without interrupting the primary program. *Windowpad* sells for $21.25.

En Fleur Corp., 2494 Sun Valley Circle, Silver Spring, MD 20906. (301) 598-4532.

CIRCLE 464 ON READER SERVICE CARD

Scilab has announced *Autoref*, a utility that searches through a manuscript, pulls out citations, and automatically creates a bibliography. *Autoref* runs on the TRS-80 Model I, II, III, 4, 12, and 16 under any operating system. CP/M and MS-DOS versions are also available. *Autoref* retails for $89.95.

Scilab, Inc., P.O. Box 614, Guilderland, NY 12084. (518) 355-3363.

CIRCLE 451 ON READER SERVICE CARD

## Communications Package for TRS-80 Color Computer

Computerware has introduced *Color Connection II for Flex* and *Color Connection II for OS-9*, modem software packages for the TRS-80 Color Computer. Both menu-driven programs support 300 baud with full or half duplex, read and write standard ASCII files, support automatic dialing, and include a user-defined macro feature for fast input of ID and passwords.

*Color Connection II for Flex* and *Color Connection for OS-9* sell for $51.95 each.

Computerware, Box 668, 4403 Manchester Ave., Suite 103, Encinitas, CA 92024. (619) 436-3512.

CIRCLE 452 ON READER SERVICE CARD

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If you're buying a personal computer for the first time, you don't need the biggest and brightest to begin with.

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Game- like computers that are comparably priced can't offer software like Havac can. But if games are your bag, Havac has a Joystick/Paddle port. And a port for RS-232C, Parallel/Serial printer or an additional disk drive. Which we also make. Havac already has one disk drive built in.

So, if the biggest and brightest are beyond your budget, take a look at The Next Best Personal Computer. The Havac from MICROSCI. Ask your dealer for a simple demonstration or write: MICROSCI, 2158 Hathaway, Santa Ana, CA 92705 (714) 241-5600.

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Built in 164K disc d[illegible] 40 [illegible] screen 280 [illegible] 92 dot color graphics 4 [illegible] keys and 2 spe[illegible] keys. Compact and transportable. Made In America

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creative computing
FIRST IN COMPUTER APPLICATIONS
10TH ANNIVERSARY YEAR 1975-1985

# CHOOSING & USING AN INTEGRATED SOFTWARE PACKAGE

How to Buy an Integrated Software Package

Integrated Packages: A Closer Look

Previews of Coming Attractions

Directory of Integrated Software Packages

Manufacturer Listing

# How to Buy an Integrated Software Package

GEORGE BLANK

Last year every software producer was claiming that his software was "user-friendly." This year's glamour term is "integrated." It is much simpler for software to be integrated than it is to be easy to use. All "integrated" implies is that there are two or more functions that work together.

Leaving aside the minimal definition, integration has come to imply more in computer software.

Although integration is claimed for packages that do not meet these standards, we are beginning to expect that integrated software packages will:

- contain several parts that are normally separate application programs.
- share data easily between the parts.
- use a common command set.

Software that meets those three requirements can be, but is not necessarily, more useful than a collection of standalone application programs. If the functions are useful in a common task, as spreadsheets and graphics are useful in producing management reports, then people who have to do that task should find it easier to use one program than two. However, people who need only one of the functions may find it easier to use a package that offers only what they need.

Power in software comes at a price. I need a much more powerful word processing program than my wife does. My documentation writer needs a more powerful program than I do. My wife usually writes only letters and needs a simple program that is easy to learn and use. I use a word processor to write programs. I need to be able to copy and move information easily, especially to take parts of old programs to use in new ones. Our writer prepares software manuals. She needs facilities for processing large documents. I use yet another program for writing articles like this one. It is a little more powerful than my wife's letter writing tool, but easier to use than my programming tool.

If I can't even find a single word processor that will handle all my writing needs, can I expect to find a single integrated program that will handle all my needs? Probably not! It is not enough for an integrated package to "have" the applications you need; it must also be appropriate to your needs and do those applications well.

The second area of concern in integrated software is the ease of sharing data. You should be able to pass data from one application to another as easily as you can copy a sentence from one part of a word processing document to another. There should be no need to access the disk or create a file to go from one application to another. If you do have to create a file, then you should not have to do any intermediate processing of the file.

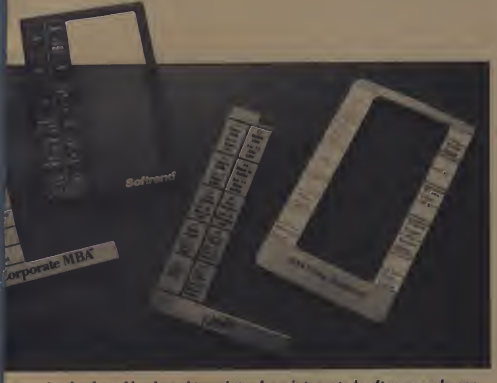
Sometimes you will configure programs or modify them for special purposes. Modifying programs raises another important issue—copy protection. If I modify a program for a specific purpose, I want to keep it separate from the original. I can not do that if the program is copy protected. If you modify a copy protected program and something goes wrong, you have destroyed the disk. Even without modification, all disks fail eventually, and I am unwilling to make the survival of my business dependent on a few magnetic signals in a layer of rust on a single piece of cheap plastic.

When considering how easy it is to pass data from one module of an integrated package to another, it is also important to consider how easy it is to pass that data to a different application program. I had my company mailing list on *Versaform* on the Apple II. When my mailing list got too big for *Versaform*, it was extremely

difficult to transfer and convert to another system—so difficult that I eventually abandoned the list. *Versaform* uses the UCSD operating system, and although I purchased a communications program for that system, I could never get it to work. Therefore, I now avoid the UCSD operating system.

In general, you can expect trouble transferring files between operating systems. *Aladin* claims to be able to read files from both MS-DOS and the UCSD system. I will never again put a significant amount of information into a system that will not write straight ASCII files onto a common operating system. That way, if the program becomes unsuitable, I can at least move the data, over a modem if necessary, to a new program or a new computer.

The third desirable feature of an integrated software package, a common command set, is subject to more limitations. The purpose of separate applications is to do different things. If a word processor performed the same functions as a database manager, you would need only one of them. Because they do have different functions, however, they need different commands. But there are many functions that are common to different




**A selection of keyboard templates from integrated software packages. These handy plastic or cardboard references provide help in remembering the large number of commands necessary to implement the many functions offered by often complex software package.**

applications, including saving and loading files, asking for help, and simple editing.

Newer computers have dedicated keys, like the page up, page down, home, end, insert, and delete keys on the IBM PC. Most applications take advantage of these, and to the extent that they do, there is less need for integrated software. There are even some common uses developing for other keys, such as the F1 for a Help key. But it is unlikely that all the keys will acquire standard uses, and until they do, an integrated software package that uses the same keys to do the same tasks will be easier to learn and use than separate applications. But it is more important to have a *good* command set than it is to have a *common* command set.

I wish selecting a program could be as easy as asking: "What is the best integrated software package?" There can never be such a package, simply because different people have different needs. Unfortunately, there are two questions to be answered: "What are my needs?" and "Is there an integrated software package that meets my needs?" The most popular integrated software packages have three major functions—spreadsheets, word processing, and data base management—and two supporting functions—graphics and data communications. Some have additional functions as well.

In most cases, one of the three major functions is dominant. If your needs revolve around columns of numbers, you will probably find a package built around a spreadsheet, like *Symphony*, best for you. If your needs revolve around word processing, a package built around a word processor, like *PeachText 5000*, might be most useful. You might also want a special purpose integrated package. Perhaps the most ambitious integrated product line is Prentice Hall's *The Profit Center*. It has 21 modules built around an accounting system, which is really a special purpose database.

It is also important to determine if a package has any serious flaws for your application. The day before I wrote this, I was talking to the owner of a Health Food store who keeps his inventory on a TRS-80. With his first inventory package, from Radio Shack, he went to print out a purchase order. Thirty hours later, he pressed the break key. His Radio Shack salesman told him he had ordered too many items from one supplier!

The most elementary serious flaws are missing features. If you need a spreadsheet, a package like *Offix*, which doesn't have one, is not the right package for you. If you do financial calculations frequently, you might insist on a spreadsheet that calculates net present value and internal rate of return. But other flaws can destroy the utility of a program. The *Silicon Office* has many nice features in its word processor. But the response time, including cursor movement through the document, is so slow that I can't bear to use it. The most important rule is: think through your needs thoroughly before you buy.

In general, it is not possible to buy an integrated software package based on either advertisements or reading the manual. During this assignment I wanted to select a package for my own company. Many times I would read a press release, an advertisement, the jacket copy, or a manual and get really excited about a product. Then I would start to use it and find it completely unsuitable.

In particular, I am concerned about absence of problems, ease of use, ease of learning, and speed. For that reason, there are several places on the charts that follow in which I offer my judgment on a program rather than an objective score. For example, though I am not a fast typist, I can't use a word processor that drops characters when typing or overshoots when I am moving the cursor through text. The category 'OK for fast typists?' is my assessment of the problems I encountered. (What was my decision for my own company? I haven't decided yet, but I have narrowed the choices down to *Symphony*, *ITSoftware*, and *InteSoft*.) ■

# Integrated Packages: A Closer Look

## PRODUCTS FOR APPLE COMPUTERS

**III E-Z Pieces/Appleworks/** *III E-Z Pieces* is an integrated software package for the Apple III; Appleworks is the identical package for the Apple II. It combines an excellent database manager with a good spreadsheet and word processor. Although not as fast, powerful, or full featured as *Symphony*, this is a strong business package that should meet most people's needs. It is the only integrated software package that I noticed in daily use at *Creative Computing*. If you own an Apple III, you don't have to wonder which integrated software package to buy. (Apple II owners have a choice.) Haba Systems also sells *Graph'n'Calc*, an add-on for business graphics and is developing a communications program.

**PractiCalc II** *PractiCalc II* is sold as an integrated package for the Apple II series. It has a good spreadsheet with limited database and extremely limited word processing and graphics functions. I wouldn't dream of using their "word processing" for anything other than putting titles on my spreadsheet reports. The manual is poorly done and hard to use.

**Jane** *Jane* brings the graphic icons and mouse from the Macintosh to the Apple II series. While *Jane* includes windows, word processing, spreadsheet, and mailing list management in an integrated package, none of the features is strong enough to stand alone. The list manager limits you to ten fields that cannot exceed 25 characters, the word processor can be used for form letters only if you manually cut and paste the address data from the mailing list to your letter using windows, and the spreadsheet was too limited to run our benchmark.

I did not have the mouse and was not happy using a joystick. It took me more than two minutes to pick up the scissors icon, move to the word Friday in a sample letter, cut (delete) it, pick up the insert icon, move back to my text location, and insert the word Saturday. Fortunately, you can substitute control keys for the icons; Control-E for scissors and Control-W for insert. *Jane* is definitely not a manager's productivity tool. However, it may be one of the few practical home computer applications. It seems to offer a lot that my 11-year-old son can use in doing his school work. This is the first word processing package that I did not consider too intimidating for him. Although the word processing does not work with my 80-column card, the program uses graphics to provide lowercase, using the Escape key to switch case. The manual is clear and well done, mercifully brief, and well illustrated. The program also has a help disk with animated help messages.

## PRODUCTS FOR IBM PERSONAL COMPUTERS

### *IBM PC Part I: Best Buys; Full Featured Products*

**Symphony** Lotus is the current king of the integrated software package makers. After all, it was *1-2-3* that dominated the market last year as the best selling software program. *Symphony* is their attempt to stay on top. There has been some disparagement of *Symphony* by those who say that all Lotus did was add 4 and 5 (word processing and communications) to 1, 2, and 3 (spreadsheet, database, and graphics). *Symphony* may have limits, but it is an excellent program. One problem is that it needs a great deal of memory. Our spreadsheet benchmark ran out of memory at 2145 cells in a 384K Compaq. The other problem with *Symphony* is that it is deeply rooted in the spreadsheet. There are many database functions, but if you need a very powerful database manager, you may need a different program.

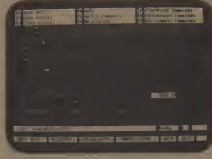
*Symphony* is too powerful to be easy to learn. You must sift through several levels of menus to execute a simple command, and it is not always easy to figure out what sequence of commands to use. *Symphony* has a powerful macro language that allows the creation of complete applications with automatic, prompted input and switching from one task to another.

Lotus has even provided "hooks" into *Symphony* so that other software houses can add machine language features that are not already included. We may be seeing dictionaries added to the word processor or 3-D paint routines added to the graphics. The word processor in *Symphony* is excellent.

**ONE OF THE MOST important questions to ask about integrated software is "Are the applications good enough to stand alone?"**

**ITSoftware series/** Instead of writing a series of integrated software programs, ITSoftware (a division of Martin Marietta Corp.) seems to have licensed some of the best free standing programs on the market and developed an interface to link them. For example, their spreadsheet, Calcit, is licensed from DataMension Corp., and their word processor, Writlt, is actually *MultiMate*. The database manager, Keeplt, was written in-house and is the application used to integrate the rest of the series. Calcit comes with a disk labeled Interface to Keeplt, and Writlt has a format conversion utility to accept ASCII and DIF files.

One of the most important questions to ask about integrated software is "Are the applications good enough to stand alone?" In this case, the answer is an obvious yes. However, the package does exhibit the problems you would expect from integrating separate programs. The programs do not have a common command structure, and the manuals



## *IBM PC Part II: Best Buys; Light duty programs*

are of uneven quality. For example, the WriiIt manual gives a full explanation of setting up your disks, while CalcIt tells you to see the DOS manual for instructions on backing up your disks and makes no mention of putting DOS on your program disk.

Nevertheless, this is one series that I really like. The series is backed by a huge company with a solid background in information processing. The individual applications are outstanding, and interfaces are provided to make them work together. None of the disks is copy protected, but the communications program, LinkIt, contains the best anti-piracy feature I have seen.

The program is designed so that it cannot communicate with a backup of itself. If you look at the spreadsheet benchmark, you will see that CalcIt is one of the fastest spreadsheets. Actually, CalcIt took three seconds to do the calculations and the other five seconds to rewrite the screen! Other packages include MailIt (3270 Electronic Mail using the Irma board), AskIt (a mouse driven front end for KeepIt), ShowIt (graphics), StatIt (statistics), EditIt (program editor), PassIt (file transfer), and SortIt.

**InteSoft series/***InteCalc* is one of the best full featured spreadsheets on the market. It is now serving as the anchor for a series of stand-alone applications that work together. The word processor, InteWord, is also very good, including support for proportional spacing on the printer. About the only feature I didn't like was the inability of the backspace key to wrap to the previous line. InteMate is an integrating shell that can integrate not only the InteSoft applications, but other programs as well, passing data between applications. InteMate also includes customizable menu screens, a calculator, an editor, and a notepad. InteBase, the database manager for this series, has not been released. Each of the packages comes with a huge, heavy, awkward manual with full size pages in a three-ring binder. The presentation of information is good to very good. This series illustrates one of the drawbacks of packages that are *not* copy protected; it took more than two hours of formatting disks and copying files to set up the program and make backup and working disks.

**Electric Desk/***Electric Desk*, from Alpha Software, is a clear winner. Among the packages tested, it is far easier than average to install, learn, and use. The word processing and spreadsheet functions are as strong as stand-alone packages. The database manager is limited, lacking calculated fields, and there are no graphics functions. The first day I tried it, I taught a co-worker to use the word processor in ten minutes.

The program comes on a single disk, and all applications are available at once. If you have enough memory, you can have nine spreadsheets, nine databases, nine word processing documents, and two communication environments open at the same time. It is easy to shift data between applications.

There is a mistake in the installation instructions, which fail to tell you to copy COMMAND.COM to your master disks. The system will not work until you do. This system worked fine in my single drive Compaq, and a version is even available for the PC jr, using a ROM cartridge to make up for the limited memory of that system. Special abilities include automatic phone dialing (with a Smart Modem) using phone numbers from the database, form letters, and a good communications program. Setting up the program for my printer was also quite simple, using the word processor to change the configuration file.

The database allows up to five index fields, and automatically updates the indexes whenever a record is created or changed. There is a powerful search facility. This is a good system for the user who does not need the heavy duty power of the multi-disk systems. Certainly home users, small business people, and managers who need only limited databases should be happy with the *Electric Desk* unless they need graphics.

**The IBM Assistant Series/** IBM's own entry in the integrated software market is a repackaged pfs Series from Software Publishing. These products are best sellers that have been favorably reviewed. Because they are often suggested as good programs for beginners, I recommended *PFS: Write* to a business associate. She has had a great deal of trouble learning to use it, so they may be overrated for novice use. My own assistant blew her only opportunity to make a backup of the Writing Assistant; her backup doesn't work at all and you only get one try. I personally found the packages easy to learn and use, and the manuals adequate, though poorly indexed. The spreadsheet package, Planning Assistant, is not yet available. I would prefer the *Electric Desk* for beginners, but these are good packages.

**Offix/***Offix* is an easy to use, lightweight database manager with minimal word processing and a form letter generator. It comes in a small vinyl package shaped like a file folder, for $149. When you start the program, the screen displays two filing cabinets, with three drawers in each. At first, five drawers are labeled Empty Drawer and one Miscellaneous.

At any time, pressing the F1 key gives you a menu of the commands available at the current screen, and the F2 key provides help messages for the current screen. You select a drawer and press O to open it. You then see eight file folders with titles on top. Again, you select a folder, and press T to take it out. You then press O to open the folder. This will give you a menu of reports in that folder. You then select a report and open it. Now you can do word processing, define a form, do data entry, or make a report.

I love the manual for *Offix*. It is a 16-page, 3" by 6" brochure. The system is easy enough to use, and the tutorial lessons and help screens are good enough that nothing else is needed. Although the word processing is minimal, this is a very handy database system, allowing 100 folders in each of the six drawers with an unlimited number of documents in each folder. Each folder can hold up to 1,000,000 characters on a hard disk or one disk full of characters on a floppy disk. Depending on memory, documents can be from 30,000 to 200,000 characters.

## *IBM PC Part III: Special purpose and other products.*

**The Profit Center/** Probably the most ambitious series of integrated software programs is *The Profit Center*, from Prentice Hall. *The Profit Center* is a series of 21 modules of accounting and business software programs. The four modules I received included General Accounting, Word Processing, Time and Information Management, and a Master Menu. These packages are available bundled as The Complete Office for $375.

The Master Menu is used to access and manage the system, and each application must be installed, a process that generates reference files on each of the other system disks. Each part of the program includes 50 to 100 files. The spread sheet has not yet been released. The Business word processor has a great deal of power, but is not easy to use and has a confusing menu.

**Corporate MBA/***Corporate MBA*, from Context, may be the most powerful package you can use without having to switch disks while using it. It is superb at presenting information graphically on the screen. You can have dozens of graphs packed into individual cells and expand any of those cells to fill a window or even the screen (before expansion, they just display the letters GRF to indicate that a graph is stored in that cell.)

You can have four windows at a time. Thus, if you wanted to use pie charts to display the relative sales of your product mix for a series of years, you could easily select years and display 4 charts on the screen at once. Since you can store a great deal in a single cell, including a letter or a database input form as well as a graph, this is a marvelous tool for a person who thinks graphically.

*Corporate MBA* supports mainframe communications (with the Irma board) and electronic mail. Unlike its predecessor, *Context MBA*, *Corporate MBA* operates under MS-DOS, allowing you to share data created by other programs easily. The data input format for the database is especially easy to use, and MBA's macro command language allows sophisticated turnkey applications to be developed.

I discovered two drawbacks to *Corporate MBA*. First, it can be terribly slow. It took three minutes and eight seconds to recalculate our 2500-cell spreadsheet benchmark. That is 23 times as long as *InteCalc* and Calclt took to perform the exact same operation. Another indication of slow speed was the 15 minutes that program took to replicate a row of 25 formulas into 99 additional rows.

The other drawback is the editor, which, like the other programs reviewed that are written in Pascal, is a modified version of the UCSD editor. Unlike *Jack2* and *Encore!*, the modifications were extensive enough to make the editor acceptable for word processing, but I do not like the design, complexity, potential for losing data, or methodology of that editor. You enter the editor in a command mode and must enter insert mode to enter text, then press Control-C to keep your text and return to command mode. If you press Escape instead of Control-C, even by mistake, you lose your text. You also waste a lot of time going to and from command mode instead of going directly from one operation to another.

**Jack 2/***Jack2* is a reasonably easy to use, light duty integrated package. It has a decent word processor and a good database manager. While it does not have a spreadsheet, the database manager offers most spreadsheet functions. I could get only 1000 of the 2500 cells for the spreadsheet benchmark into my 256K Seequa Chameleon before I ran out of memory.

Bar and line graphs can be produced within the database, but that is the extent of the graphics functions. While I found the word processor tolerable, it is a modified UCSD editor and some simple commands can take several keystrokes. When you type fast, the keystrokes are stored in a buffer until the screen can catch up with the display.

*Jack2* is a fairly sophisticated, yet easy to use database manager. You design a form with your layout, titles, data formats, calculation rules, and even graphs specified. Then you access a record and fill in the data. You can even have processed text and information merged from other records in a form. Because *Jack2* uses the UCSD p-system, has no communications built in, and is not set up for external data, it is not a good choice if you want to use data created by other programs.

**Encore!/***Encore* is an extremely powerful financial modeling system with several flaws. The "word processing" is simply the UCSD Pascal line oriented editor with the prompts translated into plain English. That is an improvement over the original, but it is unsatisfactory for any document larger than a crude memo. The spreadsheet is rule oriented (you enter a calculation rule for a row or column instead of putting a formula in a cell and replicating it).

There was not enough memory in

the 256K Seequa to run the spreadsheet benchmark. After calculating 2000 cells in 21 seconds, the program ran out of memory and locked up. I had to use Ctrl-Alt-Del to restart the program. Since the UCSD p-system makes it hard to import data, the editor is unsatisfactory, and the spreadsheet crashes, I would avoid this system.

However, since the package includes built-in functions for ACRS, straight line and accelerated depreciation, internal rate of return, loan amortization, net present value, tax loss carry-forward, and U.S. Tax schedules for individuals, married couples, corporations, estates and trusts, people who have financial applications will want to consider this program further.

Graphics functions include five types of bar charts, including floating bar charts, point graphs, line and shaded line graphs, pie charts, scatter charts, and Gantt charts. Charts can be sent to a plotter. This is very definitely a financial modeling system rather than a general purpose database manager.

**Window Master** /*Window Master*, from Structured Software group, seems to be a powerful program, but the documentation is so poor that it is extremely difficult to learn. This program allows you to run concurrently up to seven programs, and you can even mix MS-DOS and CP/M-86 programs. Window master alone is $295, but there is a package deal that includes *Window Master*, the *Magic Window* spreadsheet, *Word Right* word processor, *NAD* name and address system, and *Analyst* data entry and report writing system for $495.

One of the most attractive features of this package is its macro programming language, Script, which allows you to develop applications that run automatically with pauses for appropriate user input. You can use the window manager with other programs, including *1-2-3*, and you can transfer data between applications.

After a half day of trying to run this package, I succeeded in running the spreadsheet benchmark only by crashing the demo disk. I never succeeded in installing the word processor or the database manager. The installation instructions in the MS-DOS package were for the CP/M version. While the *Analyst* database manager allows up to 50 fields per record, each record is limited to a maximum of 255 characters. *Window Master* is really an operating environment that competes with Microsoft *Windows*, *VisiOn*, and *Desq*. In general, these windowing packages require accomplished programmers to install them.

**Aladin** /*Aladin* is a powerful database manager. While it does not have a word processor, it has an interface that allows you to use documents created on word processors to produce form letters and reports with *Aladin* data. Although the documentation describes the *Aladin* calculator as a spreadsheet, it is really a report generator for the information in the database. Its modified B-tree index is said to be capable of accessing any one of a million records in less than one second. This product is better positioned as a competitor for *dBase III* than *Framework* or *Symphony*. I would consider *Aladin* for a serious information management application.

**The Ultimate** /*The Ultimate* was really designed as a form letter processor for use with the U.S. Post Office's now discontinued ECOM service. The communications are so specific for that system that they are essentially useless now. The word processor is good for "quick and dirty" jobs like memos or class notes, but it is primarily line oriented and offers little power. The spelling checker is very slow and the database manager is a simple name and address system. Although this system had an original price of $495, our local software store is selling it for $99—mainly to people who ask for a mailing list program.

**T/Maker Integrated Software** /*T/Maker* was one of the earliest database programs. It is organized around the concept of data tables (Table/Maker) and offers its own approach to database management. The new integrated package includes word processing, database, spreadsheet, list processing, graphics, data transfer, file management, and spelling checker. Actually, that list promises more than *T/Maker* delivers. For example, the "graphics" is limited to bar charts, the word processor is a line editor without word wrap, and files are limited to about 800 records, though you can link more than one file in a database.

The center of activity in *T/Maker* is the editor. *T/Maker* is command driven, with cryptic commands and minimal use of prompts and menus. Much of the time, the screen just asks WHAT NEXT? and you must answer with the correct command, though the PC version allows you to enter C for a command menu. *T/Maker* is not up to the competition in the MS-DOS market, but their CP/M 80 products are worth considering.

**Aura** /*Aura* comes on ten disks with word processing, spread sheet, database management, and business graphics. There are two large manuals, a tutorial manual and a reference manual. The system is designed for a hard disk, and although it will work on a floppy based system, it is too clumsy to be usable; it takes five disks just to start using a spreadsheet. Because the system makes direct calls to hardware, it is not recommended for compatibles other than the Compaq; it gave my Seequa indigestion. The system is slow; it took 15 minutes to copy one row of calculations to 99 more rows for our spreadsheet benchmark, then another 15 minutes to delete those rows for the iteration test.

**ONE OF THE MOST attractive features of this package is its macro programming language, Script, which allows you to develop applications that run automatically with pauses for appropriate user input.**

We tested it on a 448K IBM PC, and 63% of memory was still available after entering our benchmark. The system makes good use of color, and has excep-

# Integrated Packages (cont'd)

tional graphics, including a free draw routine. It is organized around the database and offers a good level of integration, allowing you to put individual fields from the database into spreadsheet cells, drop portions of the spreadsheets and graphs into word processing documents, and draw graphs without leaving the spreadsheet. It does not, however, fail gracefully; when I anticipated changing a disk and put it in early, the system just locked up.

**The Silicon Office/***The Silicon Office* claims to be the European leader in integrated software. Instead of copy protecting the software, they provide a circuit board and an encoded ROM cartridge. You can copy the software as much as you want, but unless the right ROM is attached to the circuit board, it won't run. Instead of a three-ring binder, they provide three oversize perfect bound booklets that refuse to lie flat and take up too much space for most work stations.

*Silicon Office* is really a database system with a text editor. There is no spreadsheet, graphics, or communications. I found the response time in the text editor too slow; I would always overshoot when I tried to delete characters or move to a position in the text. The database is powerful, but you have to learn their query language before using it. At the suggested retail price of $795, it offers much less than the competition.

**Executec Series One Plus/** Sometimes you must read between the lines to discover a flaw in a package. With this package, the minimum memory requirement of 192K was also listed as the optimum amount of memory. Later in the manual, the reference to out of memory errors referred to text files approaching 64K, and the spreadsheet benchmark ran out of memory after 1450 cells.

I suspect that this package was designed to limit data to 64,000 characters. This is a serious shortcoming in a spreadsheet or word processor, though it is perfectly reasonable in a database manager, where most information is stored on disk and only the current record is available in memory.

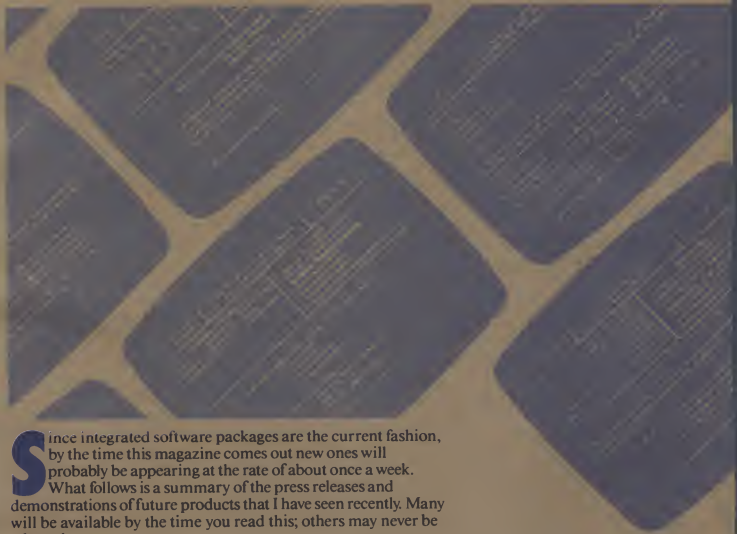
The word processor has problems with overshooting. Since the spreadsheet is also slow, and the command structure is clumsy and inconvenient, this package should be thought of as a database manager with extra functions, not as a competitor to *Symphony*. The report generator, ExecuReporter, is capable of combining data from six files to produce a report with a data format up to 300 characters by 1000 lines. Execulink provides communication to a mainframe. Additional programs include financial analysis for banking and finance institutions. ■

## *INTEGRATING* PROGRAMS VS. *INTEGRATED* PROGRAMS

**IN ADDITION TO THE INTEGRATED SOFTWARE PROGRAMS described in this section, there is another class of programs that is intended to integrate software packages from different suppliers. These packages may offer a number of features, including data transfer between programs; concurrent execution of programs; print spooling; calculators; notepads; windowing; combining text, spreadsheets and graphs into single documents for printing; advanced graphics; and other features. Two of these programs, *InteMate* and *Window Master*, because they are also sold with bundled applications, are described in the reviews. The best known package of this type, *VisiOn* from VisiCorp, is also sold with dedicated applications available. Other contenders in this market are Microsoft *Windows* and *Desq* from Quarterdeck Software.**

***Press'n'Plot*, from American Programmers Guild, combines screen images from graphing programs and text from word processing programs, and allows further processing such as rotating images, moving text around, clipping, and sizing. *Press'n'Plot* sells for $149, and a stripped down version that just captures screen images and prints them is available for $49. ■**

# Previews of Coming Attractions



Since integrated software packages are the current fashion, by the time this magazine comes out new ones will probably be appearing at the rate of about once a week. What follows is a summary of the press releases and demonstrations of future products that I have seen recently. Many will be available by the time you read this; others may never be released.

## SOME LIGHT DUTY PROGRAMS

**Creative Series/** Creative Software released *Creative Writer, Creative Filer,* and *Creative Calc* for the Commodore 64 in early 1984. Versions for the IBM PC and jr and the Apple II are due to be released this year. This is a budget series with a list price of $49.95 for each package. Although the three packages are advertised as integrated, the 32-page booklet that serves as the *Creative Calc* manual makes no mention of using data from or passing it to the other two programs. Nevertheless, this is the obvious choice for Commodore owners, and possibly for Apple owners as well. I recommend *Electric Desk* on the PCjr, but the Creative series will be available for half the price.

**Get Organized/** Electronic Arts has announced *Get Organized,* due in September, with seven applications. These include word processing, telecommunications, data manager, address list, index card file, note pad, and form letters. The package does not have a spreadsheet, and its graphics are limited. *Get Organized* is text oriented rather than database or spreadsheet centered, requires an IBM PC with 256K of memory, and will cost $199.

## MAINSTREAM PRODUCTS

**Framework/***Framework,* from Ashton Tate, was due out in time for this article, but missed its shipping date. This product, which was exhibited at PC Expo, is positioned against *Symphony.* It considers all functions parts of documents and should be taken seriously because Ashton-Tate has developed a large network of applications developers who have

*(continued on page S-14)*

# DIRECTORY OF INTEGRATED SOFTWARE PACKAGES

| FEATURES | PRODUCT: Aladin | Aura | Corporate MBA | Electric Desk |
|---|---|---|---|---|
| Spreadsheet | Y | Y | Y | Y |
| Word processing | Interface only | Y | Y | Y |
| Database | Y | Y | Y | Y |
| Graphics | Y | Y | Y | N |
| Communications | N | N | Y | Y |
| Spelling check | N | N | N | N |
| Price | $595 | $495 | $895 | $345 |
| Minimum memory | 128K | 256K | 384K | 256K (IBM PC) |
| Disk format | 5" | 5" | 5" | Cassette |
| Copy protected? | No | No | Install | Very easy |
| Spreadsheet features | Less extensive | | | |
| Macro speed | | 99 cells/sec | 99 cells/sec | 256 cells/sec |
| Recalc 2500 cells | Could not run | 1:55 | 3:08 | 00:48 |
| Windows | N | 2 | 4 | 2 |
| Variable width columns | | Y (1-35) | Y (3-99) | Y |
| Data alignment | (The Calc function was too quirky | L R C | L R C | L R C |
| Log functions | | 3 | 2 | 0 |
| Trig functions | | 7 | 6 | 0 |
| Goal-seek function | | 7 | 3 | 5 |
| Error functions | Recommended to answer | 1 | 0 | N |
| Statistical functions | | 1 | 3 | 3 |
| IF, THEN | | Y | Y | Y |
| Replicate and copy | | Y | Y | Y (very easy) |
| Text wrap-around columns | | Y | Kludge | N |
| Search and replace | | Y | N | N |
| Iteration | | Y | N | Y |
| Macros | | Advanced | Advanced | N |
| Table lookup | | Y | Y | N |
| **Word Processing functions** | "Bridge" only | | | |
| Query capture | | Y | N | N |
| Spreadsheet formulas | | N | N | N |
| Headers and footers | | Y | N | Y |
| Margins | | Y | Y | Y |
| Underline, bold | | Limited | Y | Y (very) |
| Formatting | | Y | Y | Y |
| Typeover and Insert | | Y | Y | Y |
| OK for fast typists? | | Y | Y | Very good |
| **Database functions** | | | | |
| Files too large for memory | Y | Y | N | Y |
| Spreadsheet format | N | In spreadsheet | Y | N |
| Records per file | 65,535 | 32K (Lotus) | 999 | 64,000 |
| Fields per record | 512 | 255 | 99 | 48 |
| Max record length | 16 per record | 255 | 1,124 | 1,000 |
| Number of sort keys | * | 9 | 4 | * |
| Calculated fields | Y | Y | Y | Y |
| Conditional formatting | N | N | Manual | On search keys |
| Screen generator | Y | Y | Y | Y |
| Report generator | Y | Y | N | Minimal |
| Index type | B-Star Plus Tree | B-Tree | None | B-Tree |
| **Graphics Functions** | | | | |
| Move labels | N | Limited | N | None |
| Bar charts | Y | Y | Y | |
| Pie charts | N | Y | Y | |
| 3D bar charts | N | Y | N | |
| Line charts | N | Y | Y | |
| Customize scales/gridlines | N | (Still buggy) | Y | |
| Log charts | N | No | N | |

| Encore! | IBM Assistant | InteSoft | ITSoftware | Jack2 | Jane | KnowledgeMan |
|---|---|---|---|---|---|---|
| Y | (due 1985) | InteCalc | Calcit | Y | Y | Y |
| Limited | Writing Asst | InteWord | Writit | Y | Y | N |
| Special purpose | Filing/Report | InteBase | Keepit | Y | Y | Y |
| Y | Graphing Asst. | InteGraph | Showit | Y | N | KGraph/KPaint |
| N | N | N | Linkit, Passit | N | N | N |
| N | Y | N | in Writit | N | N | N |
| $675 | $495 each | $295 each | $199, $495 each | $495 | $299 | $180 |
| 256K | 128K | 192K | 256K | 256K | 64K | 128K |
| Y | Limited | N | Y | Y | Automatic loop | Y |
| Good | N | Not as good | Very good | Limited | Very easy | Not tested |
| | | Limited | Limited | (in development) | | |
| 25 lines wide | | 254 x 254 | 254 x 254 | 254 x 254 | 254 x 254 | 254 x 254 |
| 00:21/2,000 cells | (To be released | 00:08 | 00:08 | 00:10/1,000 cells | (only 70 cells) | Not tested |
| 1 | next year) | 4 | 4 | 2 | 4 | N |
| Y | | Y (1–127) | Y | Y | N | Y |
| None | | L R | L R CHor CVer | L R | L R C | ? |
| 4 | | 2 | 3 | 1 | N | 3 |
| 0 | | 6 | 8 | N | N | Y |
| Y | | Y | Y | Y | Y | Y |
| Y | | Y | Y | Y | N | Y |
| Y | | Y | Y | Y | N | Y |
| Y | | Y | Y | Y | N | Y |
| Y | | In User cells | Y | Y | Y | If User Files |
| Y | | Y | Y | Y | Y | Y |
| Y | | Replicate only | N | N | N | Y |
| N | | N | N | Forms only | N | Y |
| Y | | Y | N | N | N | N |
| Advanced | | Exec functions | Exec | N | N | Y |
| Y | | 3 functions | Y (4 functions) | Y | N | Y |
| (IUCSD editor) | Writing Asst | InteWord | Multiwrit | | | None |
| Y | Y | Y | Y | Y | Y | |
| Y | Y | Y | Y | Y | Y | |
| Y | Y | Y | Y | Y | Y | |
| Y | Y | Y | Y | Y | Y | |
| Y | Y | Y | Y | Y | Y | |
| Y | Y | Y | Y | Y | Y | |
| N | Y | Y | Y | Y | Y | |
| Y | Y | Y | Y | Y | Y | |
| N (line editor) | Y | Fair | Y | Y | Probably not | |
| (Specialized) | Filing Assist | InteBase | Keepit | | | |
| N | Y | | Y | Y | Not stated | Y |
| Y | N | | N | Possible | N | Optional |
| Y | Y | | Dial, Link | 2,400 | Not stated | 1,200, 300 |
| 1,024 | Y, general, 1,199 | | 99 | 1,024 | 65 | 255 |
| Y | Not described | Download Y | Y | 255 | 75 | As DIF |
| Y | Y | Use dial | Y | Y | Y | Menu Com-Y |
| Y | Limited | Limited | Y | Y | N | Y |
| Y | Y | | Y | N | N | Y |
| N | Y | | Y | Y | N | Y |
| Y | Reporting Asst | | Y | N | N | Y |
| None | None | | Y unspecified | None | None | 8-Plus free |
| | Graphing Asst | In InteCalc | Showit | | None | |
| Y | N | Y | N | Y | | Y |
| Y | Y | Y | Y | Y | | Y |
| Y | Y | Y | Y | N | | Y |
| N | N | N | N | N | | Y |
| Y | Y | Y | Y | Y | | Y |
| Limited | Y shown | Y | Y shown | N | | Y |
| HP only | 3 shown | N | MOUSE, Pointer | Y | | Y |

# DIRECTORY (CONT'D)

| FEATURES | PRODUCT: Office | 1-2-3 | Peachtext 5000 | ProperCalc II |
|---|---|---|---|---|
| Spreadsheet | N | Y | Y | Y |
| Word processing | Y | N | Y | Limited |
| Database | Y | Y | N | Y |
| Graphics | N | Y | Y | Y |
| Communications | N | N | Y | N |
| Spelling check | N | N | Y | N |
| Price | $149 | $495 | $295 | $[illegible] |
| Minimum memory | 192K | 192K | 256 | 96k |
| PC required | N | Y | Compatible | N |
| Color or mono | Mono | Both | Both tested | Y |
| Spreadsheet features | | | | |
| Memory limited | | 256-[illegible] | [illegible] | [illegible] |
| Rows (2,000 min.) | | 8192 | 1[illegible] | [illegible] |
| Windows | | Y | Y | N |
| Variable width columns | | Y (1-72) | Y (1-999) | Y (1-38) |
| Data alignment | | L R C | L R | L R |
| Log functions | | 3 | 3 | 2 |
| Trig functions | | 7 | 7 | 4 |
| [illegible] | | Y | Y | Y |
| [illegible] | | Y | Y | Y |
| [illegible] | | Y | Y | Y |
| [illegible] | | Y | Y | Y |
| [illegible] | | Y | Y | Y |
| [illegible] | | Y | Only 12 max | Y |
| [illegible] | | Both | N | Columns |
| Search and replace | | Search | N | Search |
| Itemizer | | Y | N | N |
| Macros | | Y | N | N |
| Table lookup | | Y | Y | N |
| **Word Processing Functions** | | | | |
| [illegible] | | Non- | | Very minimal |
| [illegible] | N | | N | Y |
| [illegible] | N | | N | Y |
| [illegible] | N | | Y | N |
| [illegible] | Y | | Y | Y |
| [illegible] | N | | Y | N |
| [illegible] | Y | | Y | Y |
| Type-over and insert | Y | | Y | Replace |
| Ok for text typing? | N | | Y | N |
| **Database Functions** | | | | |
| Files too large for memory | | | Key Manager | |
| Spreadsheet format | Y | N | Y | N |
| Report generator | N | Y | N | Y |
| Relational files | Limited files | Single-file | 63 files | Memory limit |
| Fields per record | 2[illegible] | 2[illegible] | 1[illegible] | Limited only |
| Recordsize limit | 3,[illegible] | 2,[illegible] | [illegible] | [illegible] |
| Number of key fields | 1 | 15 | [illegible] | [illegible] |
| Character fields | Y | Y | Y | Y |
| Calculated fields | Y | Keyboard macros | Y | Y |
| Screen generator | Y | N | Y | N |
| Report generator | Y | N | Y | N |
| Index type | | None | None | None |
| **Graphics Functions** | None | | None | |
| Move labels | | N | | N |
| Use colors | | Y | | Y |
| Pie charts | | Y | | Y |
| XY line charts | | Y | | Y |
| Line charts | | Y | | Y |
| Customize graphs to print | | Limited | | Y |
| Size graphs | | Set sizes | | Y |

| Series One Plus | Symphony | [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|---|---|
| Y | Y | Y | Y | N | Magic Worksheet |
| Y | Y | Y | Y | Y | Word Right |
| Y | Y | Y | Y | Y | NAD & Analyst |
| ExecuPlot | Y | Bar charts | Graph'n'Calc | N | Y |
| ExecuLink | Y | N | Promised | ECOM only | N |
| N | N | Y | N | Y | N |
| $495 (WP DB SS) | $695 | $450 | | $250 | $495 (complete) |
| 192K | 320K | 128K | 128K | 96K | 256K |
| Y | Y | Y (demo disk) | Y | N | N |
| Acceptable | Good | Difficult | Y | Easy | Very difficult |
| ExecuModel | | | | None | Magic Worksheet |
| 256x64 | 256x8191 | 50 x (memory) | 127x999 | | 64x255 |
| 00:55/1,450 cells | 00:05/2,125 cells | Could not run | 00:40 | | 3:45 |
| 2 | 4 | N | 2 | | 2 (H or V) |
| Y (1-72) | Y (1-240) | Y (free form) | Y (2-75) | | Y (3-77) |
| L R C | L R C | L R C | L R C | | L R C |
| 3 | 3 | 3 | 0 | | 3 |
| Pi only | 7 | 4 | 0 | | 7 |
| 5 | 7 | 4 | 2 | | 2 |
| 0 | 11 | Simulated | 0 | | 0 |
| NPV only | 5 | NPV | 2 | | NPV |
| Y | Y | Y | Y | | N |
| Y | Y | N | Y | | Y |
| N | Y | Y | N | | N |
| N | Find | Y | Search | | N |
| N | Y | N | N | | N |
| N | Y | N | N | | Scripts |
| N | Y | Simulated | Y | | Y |
| | | | | | |
| | | | | | Word Right |
| Y | Y | Y | Y | Y | Y |
| Y | Y | N | Y | N | Y |
| Y | Y | Y | Y | Footers | Y |
| Y | Y | Y | NM | Y | Y |
| Y | Y | Y | Y | Some | Y |
| Y | Y | Y | N | Y | Y (with NAD) |
| Line insert | Y | Y | Y | Y | Y |
| Fair | Y | N (Line editor) | Y | Fair | Could not test |
| | | | | | |
| | | | | | Analyst |
| Y | N | Y | N | Y | Y |
| N | Y | Optional | Y | N | N |
| Unspecified | 8,191 | About 800 | (Memory size) | (Disk size) | Disk size |
| 35 | 256 | About 20-100 | 30 | 250 | 50 |
| 78 | 239 | 80 | 79 | 76 | 132 (total 255) |
| 5 | 3 | 1 | 1 | 9 | 1 |
| Interport only | Y (sheet mode) | Y | Y | N | Y |
| N | Y | N | N | N | Script |
| Y | Y | Uses editor | N | N | N |
| ExecuReporter | Y | Y | Y | Form Letters | Y |
| Index file | None | Not specified | None | None | Not mentioned |
| | | | | | |
| ExecuPlot | | | None | None | |
| N | Y | N | | | N |
| Y | Y | Y | | | Y |
| Y | Y | N | | | Y |
| N | N | N | | | N |
| Y | Y | N | | | Y |
| Epson only | Y | N | | | Not described |
| N | Y | N | | | HP7470A only |

# Previews of Coming Attractions (cont'd)

(continued from page S-9)
built applications for *dBase II*. Like *Symphony*, *Framework* will cost $695. *Framework* includes an outline generator that integrates a spreadsheet, forms processing, data management, communications, a word processor, and graphics.

**Open Access/***Open Access* is built around a relational database manager using IBM's Structured Query Language. It has five other modules: spreadsheet, graphics, word processing, communications, and time management. The DBMS offers up to 32,000 records with 55 fields and can have five files open at once. It is available for the IBM PC and the Tandy 2000, and requires 192K of memory and two disk drives.

**Plan Series/**Chang Labs announced *MemoPlan* (word processor), *MicroPlan* (spreadsheet), *FilePlan* (data management), *DocuPlan* (report generator), and *GraphPlan* (Graphics) for the IBM PC, MS-DOS systems, and CP/M systems. These stand-alone packages work in as little as 64K of memory and also work together in an integrated fashion with *LinkPlan*, an integrating environment. The modules cost $195 to $495 each.

**Intuit/***Intuit*, from Noumenon, is a $395 package that combines text editing, directory management, database management and spreadsheet. This package is limited in capacity: the database allows up to 65 fields with two sort keys, and the spreadsheet has 200 rows of 65 columns. The "word processing" requires separate parts to enter and format text. *Intuit* requires 256K of memory

**Benchmark/** At Comdex, Metasoft Corp. announced their *Benchmark* series, ten integrated packages ranging in price from $49 to $395, with package deals available from $395 to $995. The packages include The Administrator (integrating directory program), Word Processor, Spelling Checker, Telecom, Business Graphics, Presentation Graphics, Financial Planner, Data.

**Ovation/***Ovation*, the most preannounced and overhyped software package since *VisiOn*, was originally due this past spring but has been rescheduled for October release. The package claims to work entirely in English with fewer than 30 commands to handle spreadsheets, word processing, graphics, information management, and communications.

## *SOMETIMES, YOU* must read between the lines to discover a flaw in a package.

Changes made to one aspect of a program are to be immediately reflected in all other programs, making the product more closely integrated than its competitors.

**Integrated-7/***Integrated-7* is clearly positioned against *Symphony*, with two extra applications for the same price. The extra applications are mainframe electronic mail and DEC VT52/VT100 or IBM 3101 terminal emulation. The word processor includes a spelling checker with a 35,000-word dictionary. Compared to *Symphony*, the package allows only 1/4 as many rows in the spreadsheet but more than 20 times as many records in the database manager, allowing 100,000 records, with 40 fields per record and up to 60 characters per field. *Integrated-7* requires 320K of memory and two drives or a hard drive. The package will sell for $495 until the end of October; then it will be $695.

**Knowledge Man/**Although we were not able to review *Knowledge Man*, we did have a copy of the tutorial manual, and have listed it in the charts, without the benchmarks.

### HEAVY DUTY SUPPLIERS

**Goldengate/** Cullinet Software previewed *Goldengate* at the June PC Expo, and scheduled it for fall release. This package is probably a bigger threat to *Symphony* than *Framework*. Cullinet was the first public software company on a major stock exchange and has been producing mainframe database software since 1968. Their IDMS is probably the most widely used database in large companies, and *Goldengate* was designed to tie into the database. The Goldengate programs include a spreadsheet, a local database management system, color business graphics, word processing, electronic mail, directory management, and 3270 communications. Its main attraction is the degree of mainframe to workstation integration, particularly when used with IDMS. The programs require a PC with 256K and at least a 5Mb hard disk. Prices were not available, but indications were that they will start in the $1000s.

**20/20/** Another mainframe software supplier producing an integrated package for micros is Access technology. If you are running their SuperComp-Twenty spreadsheet on your IBM mainframe ($9700) or on your Prime, VAX, or Data General ($4800), then you are sure to want *20/20* on your micro to do text processing, spreadsheet modeling, graphics, data management, and scheduling.

**CA-Executive/***CA-Executive* has been advertised in business magazines with four-page color ads as available now. Computer Associates is a large software firm with products for mainframes and minicomputers. The package includes CA-Link for mainframe to micro data transfer, CA-Writer for word processing, CA-Graph color business graphics, CA-Tutor training for the system, CA-Calc spreadsheet, CA-DBMS and CA-Form for the database manager, and the CA-Executive window manager to integrate them all. The advertising lists a price of $6500 for five workstations and the mainframe communications link. The system will work in the IBM PC, PC XT, 3270 PC, and XT/370. It links to CA-Universe, their mainframe database manager.

### OFF THE BEATEN PATH

**DeskMate/** KasTer Corp. has announced a package at the other end of the spectrum from *CA-Executive*. Their integrated MiniCalc, GraphMate, FileMate and NoteBook provide a spreadsheet, graphics, and a database manager for the Casio PB-700 hand held computer. The spreadsheet has 200 cells, and the database can handle 70 records.

**MultiSolver**/*MultiSolver* is a light duty Basic language program generator aimed at the home and small business. This $295 program lets you specify your own database management (20 fields), bar graphs, budget management (28 budget categories), mailing lists (2200 names) and form letters, word processing, general ledger, checkbook manager, and invoicing programs. If you program in Basic, you can then customize the programs further. A master menu with screen prompts integrates the packages. It requires 128K of memory and two double sided disk drives. ■

# Manufacturer Listing

## Integrated Software Products and Suppliers

| PRODUCT, COMPUTER(S). OPERATING SYSTEMS | COMPANY |
|---|---|
| **Aladin** (MS-DOS) | **Advanced Data Institute** 1215 Howe Ave. Sacramento, CA 95825 (916) 925-2229 |
| **Appleworks** (Apple II) | **Apple Computer** 10260 Bandley Dr. Cupertino, CA 95014 (408) 996-1010 |
| **Aura** (PC-DOS) | **Softrend** 87 Indianrock Rd. Windham, NH 03087 (603) 898-1777 |
| **Benchmark** (MS-DOS) | **Metasoft Corp.** 6509 West Frye Rd., Suite 12 Chandler, AZ 85224 (602) 961-0003 |
| **CA-Executive** (MS-DOS) | **Computer Associates International** 125 Jericho Tpke. Jericho, NY 11753 (800) 653-3003 |
| **Canobrain** (CP/M 86) | **Canon USA** One Canon Pl. Lake Success, NY 11042 (516) 488-6700 |
| **Corporate MBA** (MS-DOS) | **Context Management Systems** 23868 Hawthorne Blvd. Torrance, CA 90505 (213) 378-8277 |
| **Creative Series** (IBM, Commodore, Apple) | **Creative Software** 230 E. Caribbean Dr. Sunnyvale, CA 94089 (408) 745-1655 |
| **Desq** (MS-DOS) | **Quarterdeck Office Systems** 1918 Main St. Santa Monica, CA 90405 (213) 392-9851 |
| **DeskMate** (Casio PB-700) | **Kasler Corporation** P.O. Box 117 Alpine, NJ 07620 (201) 784-9430 |
| **Electric Desk** (MS-DOS) | **Alpha Software Corporation** 30 B St. Burlington, MA 01803 (617) 229-2924 |
| **Enable** (MS-DOS) | **The Software Group** Northway Ten Industrial Park Ballston Lake, NY 12019 (518) 877-8600 |
| **Encore!** (IBM UCSD) | **Ferox Microsystems, Inc.** 1701 N. Fort Myer Dr. Arlington, VA 22209 (703) 841-0800 |
| **Framework** (MS-DOS) | **Ashton-Tate** 10150 West Jefferson Blvd. Culver City, CA 90230 (213) 204-5570 |
| **Get Organized** (MS-DOS) | **Electronic Arts** 2755 Campus Dr. San Mateo, CA 94403 (415) 571-7171 |
| **Goldengate** (MS-DOS) | **Cullinet Software, Inc.** 400 Blue Hill Dr. Westwood, MA 02090 (617) 329-7700 |
| **IBM Assistant series** (MS-DOS) | **IBM Corp.** P.O. Box 1328-S Boca Raton, FL 33432 (800) 447-4700 |
| **InteCalc** (MS-DOS) | **Schuchardt Software Systems Inc.** 515 Northgate Dr. San Rafael, CA 94903 (415) 492-9330 |

# Manufacturer Listing (cont'd)

| PRODUCT, COMPUTER(S), OPERATING SYSTEMS | COMPANY |
|---|---|
| **Integrated-7** (PC-DOS) | **Mosaic Software**<br>1972 Massachusetts Ave.<br>Cambridge, MA 02140<br>(617) 491-2434 |
| **Intuit** (PC-DOS) | **Noumenon**<br>512 Westline Dr.<br>Alameda, CA 94501<br>(415) 521-2145 |
| **ITSoftware** (MS-DOS) | **ITSoftware**<br>P.O. Box 2392<br>Princeton, NJ 08540<br>(800) 222-0592 |
| **Jack2** (IBM UCSD) | **Business Solutions, Inc.**<br>60 East Main St.<br>Kings Park, NY 11754<br>(516) 269-1120 |
| **Jane** (Apple II) | **Arktronics Corp.**<br>P.O. Box 4190<br>Ann Arbor, MI 48106<br>(313) 769-7253 |
| **Knowledge Manager** (MS-DOS) | **Micro Data Base Systems**<br>Box 248<br>Lafayette, IN 47902<br>(317) 463-2581 |
| **MultiSolver** (MS-DOS) | **Software Technology for Computers**<br>153 California St.<br>Newton, MA 02158<br>(617) 244-2590 |
| **Offix** (MS-DOS) | **Emerging Technology**<br>2031 Broadway<br>Boulder, CO 80302<br>(303) 447-9495 |
| **Open Access** (MS-DOS) | **Software Products International**<br>10240 Sorrento Valley Rd.<br>San Diego, CA 92121<br>(619) 450-1526 |
| **Ovation** (MS-DOS) | **Ovation Technologies**<br>770 Dedham St.<br>Canton, MA 02140<br>(617) 821-1420 |
| **Peachtext 5000** (MS-DOS) | **Peachtree Software**<br>3445 Peachtree Rd., NE<br>Atlanta, GA 30326<br>(404) 239-3165 |
| **PFS Series** (MS-DOS) | **Software Publishing Corp.**<br>1901 Landings Dr.<br>Mountain View, CA 94043<br>(415) 962-8910 |
| **Plan series** (MS-DOS, CP/M) | **Chang Labs**<br>5300 Stevens Creek Blvd.<br>San Jose, CA 95129<br>(408) 246-8020 |
| **Practi-series** (MS-DOS) | **Practicorp International, Inc.**<br>The Silk Mill<br>44 Oak St.<br>Newton Upper Falls, MA 02164<br>(617) 965-9870 |
| **Press'n'Plot** (MS-DOS) | **American Programmers Guild**<br>55 Mill Plain 17-5<br>Danbury, CT 06811<br>(203) 794-0396 |
| **The Profit Center** (PC-DOS) | **Prentice-Hall, Inc.**<br>Dept. GPD<br>Englewood Cliffs, NJ 07632<br>(201) 592-2704 |
| **Series One Plus** (MS-DOS) | **Executec Corp.**<br>12200 Park Central Dr.<br>Dallas, TX 75251<br>(214) 239-8080 |
| **Silicon Office** (MS-DOS) | **R & S Micro Services, Inc.**<br>864 66th Ave. North<br>Minneapolis, MN 55430<br>(612) 566-7566 |
| **Smart** (MS-DOS, CP/M 86) | **Innovative Software, Inc.**<br>9300 West 110th St. #380<br>Overland Park, KS 66210<br>(800) GET-SMART |
| **SuperCalc3** (MS-DOS) | **Sorcim Corp.**<br>2310 Lundy Ave.<br>San Jose, CA 95131<br>(408) 942-1727 |
| **Symphony and 1-2-3** (MS-DOS) | **Lotus Development Corp.**<br>161 First St.<br>Cambridge, MA 02142<br>(617) 492-7171 |
| **T/Maker III** (CP/M, MS-DOS) | **T/Maker Co.**<br>2115 Landing Dr.<br>Mountain View, CA 94043<br>(415) 962-0195 |
| **Target Financial Modeling** (CP/M, MS-DOS) | **Comshare, Inc.**<br>1935 Cliff Valley Way, Suite 200<br>Atlanta, GA 30329<br>(404) 634-9535 |
| **III E-Z Pieces** (Apple III) | **Haba Systems, Inc.**<br>15154 Stagg St.<br>Van Nuys, CA 91405<br>(213) 901-8828 |
| **20/20** (MS-DOS) | **Access Technology, Inc.**<br>6 Pleasant St.<br>South Natick, MA 01760<br>(617) 655-9191 |
| **The Ultimate** (MS-DOS) | **Computer Creations**<br>766 El Camino Real #D<br>San Carlos, CA 94070<br>(415) 595-4466 |
| **Visi-On** (MS-DOS) | **VisiCorp**<br>2895 Zanker Rd.<br>San Jose, CA 95134<br>(408) 946-9000 |
| **Window Master** (CP/M 86, MS-DOS) | **Structured Systems Group**<br>5204 Claremont Ave.<br>Oakland, CA 94618<br>(415) 547-1567 |
| **Windows** (MS-DOS) | **Microsoft**<br>10700 Northup Way<br>Bellevue, WA 98004<br>(206) 828-8080 |

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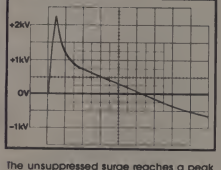
- Multimode suppression systems protect against fast rise time surges, absorbing high power surges quickly.
- Multistage suppression systems guarantee protection whether the "hot" wire, ground wire or both deliver destructive surges.
- RFI filtering isolates your equipment from interfering radio signals on the power line.

The heavy duty Discwasher SpikeMaster is attractively designed for home or office. SpikeMaster incorporates four widely spaced outlets, an on/off switch with indicator light and a 6 1/2 foot power cord.

Independent laboratory tests (to stringent I.E.E.E. standards) confirm that SpikeMaster out performs and out protects suppression devices costing twice as much.

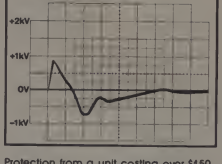
The following oscilloscope tracings measure a 1000 volt surge imposed onto a power line.

**Surge**




The unsuppressed surge reaches a peak of 2,200 volts.

**$150 suppressor**

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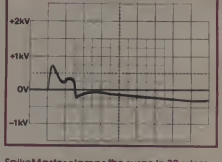


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# Structured Programming In Basic

## Part 5: Control Structures in ANSI Basic

Arthur Luehrmann

The first three articles in this series [May, June, July, 1984] introduced the main ideas of structured programming: (1) the *top-down method* of planning a program and (2) the use of three types of *formal control blocks* to handle all problems of program logic. These ideas were introduced using the version of Basic available on most personal computers. The fourth article showed how the new ANSI Basic language encourages top-down planning and modular programming. This final article describes the formal control structures which come ready-made in ANSI Basic.

### ANSI Basic, Macintosh Basic, True Basic, et al.

As stated in the previous article in this series, microcomputer Basics have been left in the lurch by the past 15 years of advances in the design of programming languages. Since about 1970, nearly all new languages have been based on the concepts of structured programming. Although Pascal is best known, this is also true of C, PL/I, Modula-2, and Ada. But the Basics one finds on nearly all personal computers are relics of a 20-year-old language, the original Dartmouth Basic of 1964. (This historic language is now standardized and has the name Minimal Basic.)

Although microcomputer Basics have remained unchanged, Basic has not. Nearly 15 years ago, Dartmouth Basic added independent subprograms with local variables and a parameter-passing mechanism. About eight years ago, Dartmouth Basic added a full set of control structures, which eliminated the need for using jump statements with line number references—the bane of good programming practice. Unfortunately, all these good developments at Dartmouth went unnoticed by the first developers of microcomputer Basics.

For the past half-dozen years, Committee X3J2 of the American National Standards Institute (ANSI) has been at work developing a draft standard for a modern Basic that includes the above structured programming elements, elaborate file I/O, and device-independent graphics. At this writing, the draft is available for public comment. It things go as expected, a new ANSI standard for Basic will probably become a reality in a year or two.

In the meantime, new commercial products based on the ANSI Basic draft and intended for personal computers should be available by the time this article appears in print. Apple Computer expects its new Macintosh Basic to be in dealers' hands in September. At about the same time, True Basic, Inc., founded by the creators of Basic, John Kemeny and Thomas Kurtz, and a small team of Dartmouth programmers, will deliver an IBM PC version of its product, called True Basic, to Addison Wesley Publishing Company for distribution this fall. A Macintosh version of True Basic will follow shortly thereafter.

The previous article in this series described the elements of ANSI Basic that make top-down design and modular programming attractive and easy to do. The present article discusses the built-in loop and branch control structures that are available to ANSI Basic programmers.

### ANSI Basic Loop Blocks

The June and July articles in this series showed how to build loop and branch control structures out of REM, IF, and GOTO statements. A programming example in the July article was a guessing game in which the computer has a secret word and asks the player to guess again and again, receiving hints each time as to whether the secret word is earlier or later in the dictionary than the guess, and stopping when the guess is correct.

The part of the program that asks again and again for guesses is a loop block, of course. In the Minimal Basic version of the guessing game program, the loop looks like this:

```
410 'LOOP
420     PRINT "WHAT'S YOUR GUESS";
430     INPUT G$
440   IF G$ = S$ THEN 500
450     GOSUB 800' HINT
490     GOTO 410
500 'END LOOP
```

In Minimal Basic, the line number references in the IF and GOTO statements are necessary to exit the loop and to continue the loop. ANSI Basic, on the other hand, has a multi-line loop block already built into the language. Here is how one would write this same loop in ANSI Basic:

```
Do
   Print "What's your guess";
   Input guess$
If guess$ = secret$ then exit do
   Call Hint
Loop
```

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The keywords Do and Loop mark the beginning and end of the block. The computer processes a loop block by performing the body statements in top to bottom order. Note that the If statement ends with the phrase "exit do." If the condition in the If statement is true, the computer skips to the next statement after the Do/Loop block, thus exiting the loop. If the condition is false, the computer continues to perform statements until it reaches the Loop statement. Then the computer jumps back to the beginning of the loop automatically. The process continues until the exit condition becomes true.

A small change in this program will bring out another point about the Do/Loop block. Suppose you wanted the program to begin with the prompt "What's your first guess?" and after that switch to "Next guess?" for the rest of the prompts. Here is one way to do that:

```
Input "What's your first guess?"; guess$
Do
If guess$ = secret$ then exit do
  Call Hint
  Input "Next guess?"; guess$
Loop
```

The Input statement in ANSI Basic allows a user-defined prompt string to substitute for the built-in question mark prompt. The first Input statement is outside the loop; so the first action inside the loop is to see whether or not the guess was correct. Whenever the exit test occurs at the beginning of a loop, ANSI Basic allows this abbreviation:

```
Input "What's your first guess?"; guess$
Do until guess$ = secret$
  Call Hint
  Input "Next guess?"; guess$
Loop
```

Or else this:

```
Input "What's your first guess?"; guess$
Do while guess$ <> secret$
  Call Hint
  Input "Next guess?";guess$
Loop
```

Note that all three versions of this new loop have exactly the same meaning. In every case, the exit test is performed before any body statements are performed. The phrases "until . . . " and "while . . . " may also be appended to the Loop statement when the exit test is to be performed after all the body statements are performed at least once. (Pascal programmers will recognize that these two abbreviations give the Basic programmer the equivalent of the While and the Repeat statements.)

Whether to use these abbreviations is a matter of taste. I prefer to write the exit test explicitly as an If statement, since it seems clearer to me that the test is to be performed at that particular point in the loop. Words like while and until are vague about the time that the test is to happen. Furthermore, during program development it often happens that the exit test migrates around inside the loop. Sometimes it is at the top, sometimes in the middle, sometimes at the bottom. Making such changes is easier if the exit test is on a line by itself and not combined with the Do or Loop lines.

A final point about the Do/Loop block: It is perfectly legal in ANSI Basic for a loop to have more than one exit test. One can have, for example, a while . . . phrase on the Do line, and until . . . phrase on the Loop line, and three If lines with "exit do" phrases. In fact, "exit do" is a statement in its own right and can go anywhere inside a loop. Although legal, these are horrible practices and should be avoided. Loops with multiple or complex exits are unreadable. (I tried to convince my X3J2 colleagues of this, but it was too late in the day.)

## ANSI Basic Branch Blocks

The two most important multi-line control blocks in any programming language are loop blocks and branch blocks. They are the backbone of structured programming. The HINT subroutine in the Minimal Basic version of the guessing game program contains a branch block built from REM, IF, and GOTO statements. Here is how it looks:

```
810 IF S$ < G$ THEN 850
820   'FALSE
830     PRINT "LATER THAN"; G$
840     GOTO 870
850   'TRUE
860     PRINT "EARLIER THAN"; G$
870 'END IF
```

The line number references in the IF and GOTO statements are necessary, first to cause the branch to occur and second to skip over the true branch if the condition was false. ANSI Basic offers a ready-made branch block that needs no line number references. Here is the same branch in ANSI Basic:

```
If secret$ < guess$ then
     Print "Earlier than";guess$
Else
     Print "Later than";guess$
End if
```

The main difference here is in the order of the cases: The true case comes first and the false case is second. However, the meaning of both versions is the same. The computer is to test whether the secret word is less than the guess and then either print one hint or the other one.

In ANSI Basic, a branch block begins with an If statement that ends with the word then. The block ends with an End if statement. The Else statement is optional. The computer begins processing the block by evaluating the condition in the If statement. If it is true, the computer performs the statement or statements between the If statement and the Else statement. If the condition is false, the computer performs the statements between the Else and the End-if statements. (If there is no Else statement and the condition is false, the computer simply skips to the next statement after the entire block.)

## Multiway Branches

The famous Boehm and Jacopini theorem of 1966 assures us that all problems in program logic can be handled by means of only two control structures: a loop block and a branch block. If ANSI Basic offered only the Do/Loop and the If/End-if blocks, therefore, it would give us all the tools necessary for avoiding the wild jumps that make programs hard to read.

In fact, ANSI Basic goes a step further. It gives additional control structures that add greatly to the readability of programs. Essentially, these are not new blocks. Rather, they are just abbreviations for certain commonly occurring situations in which one branch block is nested inside another one.

Suppose, for example, that a program has just received a one-character string input from a user. The program must detect and do different things, depending upon whether the character is a lowercase letter, an uppercase letter, a numeric digit, a plus or minus sign, or anything else. Here is how one might use the two-way branch block to construct the needed five-way branch:

```
Input a$
If "a" <= a$ and a$ <= "z" then
  Call Lowercase
Else
  If "A" <= a$ and a$ <= "Z" then
    Call Uppercase
  Else
    If "0" <= a$ and a$ <= "9" then
      Call Digit
    Else
      If a$ ="+" or a$ = "-" then
        Call Sign
      Else
        Call OtherChar
      End if
    End if
  End if
End if
```

This structure does the job by nesting block inside of block inside of block, and so on. The outermost block is a single two-way branch. However, another completed two-way branch is nested inside the Else part of the outer branch. Furthermore, the Else part of this inner branch contains yet another complete branch block. Finally, four levels deep, there is still another branch block.

Such a structure works, but it is very hard to make sense of. The four End-if lines are especially troublesome. Do we have the right number? Does each one match up with a corresponding If line? It takes close inspection to answer these questions. To make nested Ifs more legible, ANSI Basic allows the following abbreviation of the above five-way branch:

```
Input a$
If "a" <= a$ and a$ <= "z" then
  Call Lowercase
Else If "A" <= a$ and a$ <= "z" then
  Call Uppercase
Else If "0" <= a$ and a$ <= "9" then
  Call Digit
Else If a$ = "+" or a$ = "-" then
  Call Sign
Else
  Call OtherChar
End if
```

Each Else line in the first version is combined with the If line that follows the Else. Furthermore, a single End-if line closes the entire block. The result is both shorter and far easier to read. However, it has exactly the same meaning as the longer version: the conditions in each If line are tested in order until one is found to be true. If none is true, the last Else part is performed.

ANSI Basic offers still another way to write a multiway branch block like this one. Here it is:

```
Input a$
Select case a$
  Case "a" to "z"
    Call Lowercase
  Case "A" to "Z"
    Call Uppercase
  Case "0" to "9"
    Call Digit
  Case "+", "-"
    Call Sign
  Case Else
    Call OtherChar
End Select
```

Again, this version has exactly the same meaning as the two previous ones. The computer performs a Select block by first evaluating the expression after the word Case in the Select line. Then it searches, from the top, for the first case that matches the value of the expression. The first three cases here are ranges. That is, if the string value of a$ is greater or equal to "a" and less than or equal to "z," the computer will perform the first case. Otherwise it will try the second case, and so on. If no match is found and if there is a Case-else statement, that case is the one performed by the computer. If there is no Case-else statement, control passes to the first statement after the Select block.

Note that the fourth case is a list of possible matches. This case will be performed if the value of a$ is either "+" or "-." In general, items in a Case statement may consist of one or more constants or ranges of constants. Constants and ranges may be combined in a single Case statement. Commas separate constants or ranges from one another. It is also possible to have open-ended ranges. For example, the following Select block will tell whether a number is positive, negative, or zero. The phrases "is > 0" and "is < 0" are examples of open-ended ranges.

```
Select case number
  Case is > 0
    Print "Positive"
  Case is < 0
    Print "Negative"
  Case else
    Print "Zero"
End select
```


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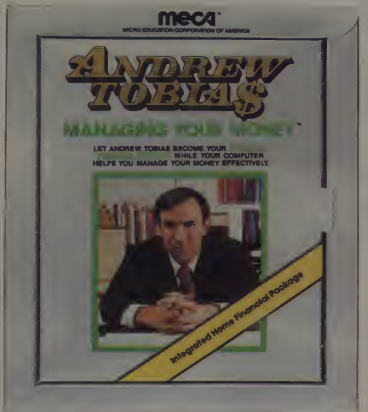


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Again, it is worth pointing out that there is nothing that can be written in the form of a Select block that cannot also be handled with nested two-way If blocks. That, however, is an academic point. The truth is that any multi-way branch that can be put in the form of Select block is vastly more readable that way. (Unfortunately, not all multi-way branches can be recast as Select blocks.)

### A Final Example

Perhaps the best way to wrap up this series on structured programming in Basic is to look at an example written originally in a highly unstructured way in Minimal Basic, and then to look at the same program in ANSI Basic. The problem is this: to write a program that simulates a dice game for a thousand rounds and then reports the number of wins and losses.

***Any multi-way branch that can be put in the form of a Select block is vastly more readable that way.***

In the standard dice game, the player wins on the first roll if it is a 7 or 11. The player loses if the first roll is 2, 3, or 12. If the first roll is anything else, that becomes the player's point. The round continues with more rolls until the player rolls the point (a win) or a 7 (a loss).

Here is how one might write such a program in Minimal Basic without any effort to structure the program:

```
100 DEF FNR = INT(6 RND) + INT(6* RND) + 2
110 LET W = 0
120 LET L = 0
130 RANDOMIZE
140 FOR J = 1 TO 1000
150 LET F = FNR
160 IF F = 7 OR F = 11 THEN 230
170 IF F = 2 OR F = 3 OR F = 12 THEN 250
180 LET P = F
190 LET N = FNR
200 IF N = P THEN 230
210 IF N = 7 THEN 250
220 GOTO 190
230 LET W = W + 1
240 GOTO 260
250 LET L = L + 1
260 NEXT J
270 PRINT "WINS = "; W
280 PRINT "LOSSES = "; L
290 PRINT "% WINS" =":100 * W / (W + L)
300 END
```

Now let's see how to solve the same programming problem by using the principles of structured programming and the elements of ANSI Basic. We begin with an outline of the main parts of the program:

```
Program DiceGame
  initialize variables
  For j = 1 to 1000
    play one round
  Next j
  print statistics
End
```

The next step is to translate the English phrases into Basic. As usual, the best approach is to substitute calls to procedures and then create skeleton procedures for debugging purposes. Since the whole program will be fairly short, we choose to use internal procedures. Here is the next phase of the program development:

```
Program DiceGame
  Call Initialize
  For j = 1 to 1000
    Call OneRound
  Next j
  Call Statistics

  Sub Intialize
    Print "Initialize"
  End sub

  Sub OneRound
    Print "OneRound"
  End Sub

  Sub Statistics
    Print "Statistics"
  End sub
End
```

The next step is to flesh out the body of the three subprograms. The first is easy. The program must keep track of wins and losses, so there are two variables to be initialized to zero. In addition, the random number function needs to be reseeded. Here is subprogram Initialize:

```
Sub Intialize
  Let wins = 0
  Let losses = 0
  Randomize
End sub
```

Next comes the subprogram to play a single round in the series of dice games. The round begins with a single roll of the dice. After that there are three cases: a win on 7 or 11, a loss on 2, 3, or 12, and more rolls on any other point. Here is an outline of subprogram OneRound:

```
Sub OneRound
  roll dice; value = firstroll
  Select case firstroll
    Case 7, 11
      count it a win
    Case 2, 3, 12
      count it a loss
    Case else
      roll some more
  End select
End sub
```

The Select block is a convenient one to use here for the three cases possible in the dice game. The next step is to convert the English phrases into Basic statements. Since the dice roll will be needed in two different places, it is a good idea to make it into a separate function, which we shall call Roll.

The next two phrases are easy to handle with single Let statements. The phrase "roll some more" will contain numerous details about subsequent rolls, so it is best to replace the phrase by a Call statement to a new subprogram. Here is the next phase of development:

```
Sub OneRound
  Let firstroll = Roll
  Select case firstroll
    Case 7, 11
      Let wins = wins + 1
    Case 2, 3, 12
      Let losses = + 1
    Case else
      Call RollAgain
  End select
End sub
```

Before getting bogged down in the details of function Roll and subprogram RollAgain, it is a good idea to finish the original three subprograms. The Statistics subprogram still needs fleshing out. Since it will contain nothing but Print statements, we might as well skip the outline stage. Here is the finished subprogram:

```
Sub Statistics
  Print "Wins ="; wins
  Print "Losses ="; losses
  Print "% Wins ="; 100 * wins / (wins + losses)
End sub
```

Having finished the three original subprograms, it is time to turn attention to function Roll and subprogram RollAgain. The function is quite straightforward, given an understanding of the way the built-in rnd and int functions work. Here it is:

```
Function Roll
  Let Roll = int(6 * rnd) + int(6 * rnd) + 2
End function '
```

Subprogram RollAgain is a good deal more complex. First, it must remember the first roll as the "point" to be made. Next it must use a loop block to roll the dice again and again until either the point is made or the roll is 7. Finally, it must use a branch block to increment either the wins counter or the losses counter, depending on whether or not the point was made. Here is an outline of the subprogram:

```
Sub RollAgain
  Save first roll as point
  Do
    Roll dice
  If roll is point or 7 then exit do
  Loop
  If roll is point then
    Count it a win
  Else
    Count it a loss
  End if
End sub
```

Each phrase above is easily translated into simple Basic statements or calls to procedures already defined. Here is the final version of RollAgain:

```
Sub RollAgain
  Let point = first
  Do
    Let next = Roll
  If next = point or next = 7 then exit do
  Loop
  If next = point then
    Let wins = wins + 1
  Else
    Let losses = losses + 1
  End if
End sub
```

Notice that the Do/Loop block keeps on rolling the dice until the roll is equal to the point or to 7. Once the loop block is finished, a branch block decides whether to increment the wins counter or the losses counter.

The preceding subroutine completes the list of tasks remaining to be done. The dice game program is now complete. Here is the whole program as it might be written in ANSI Basic:

```
Program DiceGame
  Call Initialize
  For j = 1 to 1000
    Call OneRound
  Next j
  Call Statistics

  Sub Intialize
    Let wins = 0
    Let losses = 0
    Randomize
End sub

Sub OneRound
  Let firstroll = Roll
  Select case firstroll
    Case 7, 11
      Let wins = wins + 1
    Case 2, 3, 12
      Let losses = losses + 1
    Case else
      Call RollAgain
  End select
End sub

Sub Statistics
  Print "Wins ="; wins
  Print "Losses ="; losses
  Print "% Wins ="; 100 * wins / (wins
   + losses)
End sub

Function Roll
  Let Roll = int(6 * rnd) + int(6 * rnd) + 2
End function

Sub RollAgain
  Let point = first
  Do
    Let next = Roll
  If next = point or next = 7 then exit do
  Loop
  If next = point then
    Let wins = wins + 1
  Else
    Let losses = losses + 1
  End if
 End sub
End
```

This simple program displays both top-down organization and the use of formal control structures to handle all logical problems. Since ANSI Basic has all these program structuring tools built in, the programmer's job is a good deal simpler than it would be when using Minimal Basic.

## A Final Thought

As ANSI Basic becomes available more widely on personal computers, increasing numbers of people may discover the advantages of thinking about programming as an orderly, constructive design process and not just a brute force effort to get the thing to work. Perhaps . . . just perhaps . . . it may turn out that Basic programmers will no longer deserve the reputation of being, in Professor Dijkstra's phrase, "mentally mutilated beyond the hope of regeneration." ■

# A Calculus Game

***Following the path of a parabola in a stepwise progression can lead to some amazing patterns— almost like a hall of mirrors.***

**Neil M. Wigley**

What happens if you keep repeating something? If you poke your sister in the arm enough times, she'll whack you. If you make enough obscene telephone calls to your neighbor, the police will surely get you. What if you apply a function y = f(x) (straight out of elementary calculus) to a number x, and get a number y; and then you apply f to y and get a new number f(f(x)) = f(y) and then you do the same thing again and again?

***The educational value of this game is a simple example of nonlinearity, a subject which is just beginning to earn some attention in the mathematical community.***

It is not an easy problem to solve mathematically, except in certain special cases; for example, if f(x) ≥ x always, then our numbers will get bigger and bigger. They may go off to infinity or they may slow down (converge) somewhere before.

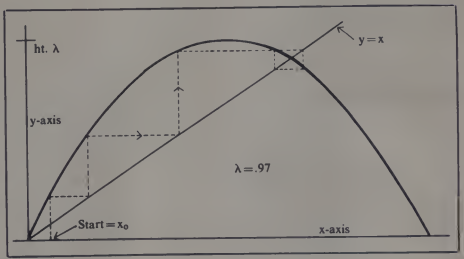


*Figure 1.*

Here we shall consider an elementary example which exhibits some rather exotic behavior. I first learned of this example in *Scientific American* [1].

In Figure 1 we see a parabola and the diagonal line y = x. The height of the parabola is λ, where λ is a number between 0 and 1; later we shall vary λ.

We start with a value of x, call it $x_0$. Geometrically, what we do is start on the x-axis at $x_0$, go up to the parabola, go to the right (left) till the diagonal line, then go up (down) to the parabola, then right (left) to the line, etc. The moving point thus describes a rectangular path. It is the shape of this path which can be so fascinating.

For small values of λ (less than .75) the point describes a sequence of (almost) rectangles which get smaller and smaller, converging on a point (the point where the line crosses the parabola). For larger values of λ, the behavior of the path is chaotic; and for values of λ in between the behavior is, likewise, in between: not chaotic, but not as well organized as for small λ.

The educational value of this game is a simple example of nonlinearity, a subject which is just beginning to earn some attention in the mathematical community. Thus observance of the paths described above can give a rudimentary view of a simple, yet chaotic, nonlinearity.

Let us now do some algebra, and find the equations we want to satisfy, so that we can write a program. We need the

equation of the parabola. We want the parabola which opens down, goes through the points (0,0) and (1,0) on the x-axis, and has maximum height λ above the point (.5,0) on the x-axis. We shall vary λ later, but we insist that $0 \leq \lambda \leq 1$. It should not be a surprise that the equation is

$$y = 4\lambda x(1-x)$$

which is obviously a parabola and gives $y = 0$ when $x = 0$ or 1, and, when $x = .5$, we see that $y = \lambda$. This parabola also opens down, as desired.

Notice that when $0 \leq x \leq 1$, we have $0 \leq y \leq 1$, so that $y$ can't go leaping off to infinity. Moreover, $f(y)$ is defined, and thus so is $f(f(y))$. We have thus defined a sequence, and maybe it will converge. The problem now is to compute what happens to an initial value of $x$, say $x_0$, which we call the *seed*, after it has been hit with $f$ through $x_1 = f(x_0)$, $x_2 = f(x_1)$, etc.

It would be boring and time-consuming to calculate these numbers and compare them after, say, 100 iterations. Let's try using the monitor to see if it can help us.

To see if what is happening on screen agrees with the algebra, we notice that any point on the diagonal line must be of the form $(x,x)$, since $y = x$ there. So we start with a seed $x_0$ which we place at $(x_0,0)$ on the x-axis. Then we go straight up to the parabola and meet it at a point with the same abscissa $x_0$ and with ordinate $y$ where $y = f(x_0)$, which we call $x_1$. To the right (or left) of this point is the point $(y,y)$, which shares the same ordinate (height) and lies on the diagonal line. This point will have the same x-coordinate as it does y-coordinate, and the latter is the same as $x_1 = y = f(x_0)$. Therefore this point will have coordinates $(x_1,x_1)$.

Now we begin our loop. From here we go up (down) to the parabola, then over to the line, and now repeat. Thus it is curve-line-curve-line, etc. As the point moves on, it traces rectangular shapes, two of whose vertices are on the diagonal line.

The question now is what happens to these two vertices on the line after a million iterations. And the results are surprising: it depends a great deal on λ! If λ is small (λ ≤ .75) then things are boring; if λ is greater than .75, things get exciting, and when λ gets near enough to 1 things get absolutely chaotic! Around λ = .8 there are some rather interesting patterns: rectangles within rectangles—like a hall of mirrors.

More mathematical details are available in the excellent article by Hofstadter. One new result is the existence of certain constants which *seem* to depend on the function (in our case, the parabola), but which in fact don't change if you change the function (e.g., a sine wave). These are called universal constants.

Listing 1 is the program as written for an Apple II+. Lines 2 to 100 are subroutines. In lines 1010 to 1030 we define screen coordinates. Then the program begins, with the user selecting one of three functions, one of which is the parabola. Lines 1120 to 1210 plot the curve and the vertical line above the seed. Lines 1250-1310 represent the main do-loop. The menu begins on line 1320 and continues through line 1410.

On the menu are options: select a new lambda or new seed, change the function or quit, clear the screen (which could better have been called erase), and "enlarge," which is an attempt at magnification of the picture when the details get too small. It is with this feature that you can get the rectangles-within-rectangles patterns.

For a universal constant with *your* name on it, just copy the program, run it, and follow the dot. Happy staring! ■

*Listing 1.*

```
1  FOR I = 768 TO 777: READ J: POKE
     I,J: NEXT : HOME : TEXT : GOTO
     1010: REM  CC1AM
2  PRINT "LAMBDA="L", SEED="S", O
     LD L = "OL: PRINT "OLD SEED=
     "OS"  SP-BAR FOR MENU": RETURN

3  POKE  - 16368,0: POKE  - 16368
     ,0: RETURN
4  C$(1) = "F. CHANGE F(X)": C$(2) =
     "L. CHANGE LAMBDA": C$(3) = "
     S. CHANGE SEED": C$(4) = "Q.
     QUIT": C$(5) = "C. CLEAR SCRE
     EN": C$(6) = "E. ENLARGE SCRE
     EN": RETURN
5  YP = 279 - (X - A) * (B - A));
     YP = 159 * (1 - (Y - A) / (B
     - A)): RETURN
97 DEF  FN F(X) = 4 * L * X * (1
     - X): RETURN
98 DEF  FN G(X) = 4 * L * X * (1
     - X): DEF  FN F(X) = FN G(
     FN G(X)): RETURN
99 PI = 3.141592654: DEF  FN F(X)
     = L * SIN (X * PI): RETURN

100  FOR J = 1 TO 9: L(J) = L(J +
     1): NEXT : NL = NL - 1: RETURN

1010  DEF  FN SX(X) = 279 * X
1020  DEF  FN SY(X) = 159 * (1 -
     X)
1030  DEF  FN XL(YP) = 279 - YP *
     (279 / 159)
1050  PRINT : INPUT "WHAT FCT?"
1060  P$(1) = "PARABOLA": P$(2) = "
     QUARTIC": P$(3) = "SIN(X*PI)"

1070  FOR I = 1 TO 3: PRINT TAB(
     9)I", "P$(I): NEXT
1080  GET K: ON K GOSUB 97,98,99
1090  IF  ABS (K - 1) > 1 THEN 10
     70
1100  INPUT "NEW LAMBDA=? ";L
1110  INPUT "NEW SEED=? ";S
1120  TEXT : HGR : HCOLOR= 3: REM
     HPLOT CURVE
1130  GOSUB 2:OS = S
1140  FOR I = 0 TO 279
1150  Y =  FN F(I / 279)
1160  YP =  FN SY(Y)
1170  HPLOT 1,YP: NEXT
1180  HPLOT 279,0 TO 0,159
1190  Y =  FN F(S):YP =  FN SY(Y)
1200  XP =  FN SX(S):X = S
1210  HPLOT X,159 TO XP,YP
1230  REM  CURVE/LINE/CURVE
1250  XP =  FN SX(X):YP =  FN SY(Y

1260  XL =  FN XL(YP):YO = YP

1270  HPLOT XP,YP TO XL,YP
1280  X = Y:Y =  FN F(X)
1290  YP =  FN SY(Y)
1300  HPLOT XL,YO TO XL,YP
1310  IF  PEEK ( - 16384) < 128
     0 THEN 1250
1320  GOSUB 3: TEXT : HOME
1330  GOSUB 4: PRINT TAB( 13)"SE
     LECT FROM:"
1340  PRINT : FOR I = 1 TO 6: PRINT
     TAB( 9)C$(I): NEXT
1350  PRINT : PRINT TAB( 9)"LAMD
     A="L",SEED="S: GET C$
1360  IF C$ = "Q" THEN  TEXT : HOME
     : END
1370  IF C$ = "S" THEN 1110
1380  IF C$ = "C" THEN  TEXT : HGR
     : GOSUB 2: GOTO 1230
1390  IF C$ = "F" THEN 1050
1400  IF C$ = "E" THEN 1600
1410  IF C$ < > "L" THEN 1320
1420  NL = NL + 1: IF NL = 10 THEN
     GOSUB 100
1430  L(NL) = L: FOR I = 1 TO NL
1440  PRINT  TAB( 10)"LAMBDA("I")
     ="L(I)
1450  NEXT :OL = L: PRINT
1460  INPUT "NEW LAMBDA=?";L
1470  PRINT "WANT NEW SEED?(Y/N)"

1480  GET C$: IF C$ = "Y" THEN  PRINT
     "OLD SEED = "S: GOTO 1110
1490  IF C$ > < "N" THEN 1470
1500  GOTO 1120
1600  TEXT : HGR : HCOLOR= 3
1610  A = 1.8 * B: GOSUB 3
1620  FOR I = 1 TO 20:Y =  FN F(X
     )
1630  IF A > X THEN A = X
1632  IF B < X THEN B = X
1640  X = Y: NEXT :Y =  FN F(X)
1650  AB = .5 * (I + A / B):A = AB
     - A
1660  PRINT "A="A",B-A="B - A",LA
     MBDA="L",SEED="S
1670  GOSUB 5: IF B - A > 10 -
     9 THEN  PRINT "UNDERFLOW. HI
     T ANY KEY": GET C$: GOTO 132
     0
1680  XL =  FN XL(YP): POKE 216,0
1690  ONERR  GOTO 1920
1700  HPLOT XP,YP TO XL,YP
1710  X =  FN F(X):Y =  FN F(X)
1720  YL = YP: GOSUB 5
1730  HPLOT XL,YL TO XL,YP
1740  IF  PEEK ( - 16384) < 128
     0 THEN 1680
1750  GOTO 1320
1920  CALL 768: GOTO 1320
9998  DATA 104,168,104,166,223
9999  DATA 154,72,152,72,96
```

## Reference


||| Douglas R. Hofstadter. *Scientific American*, November 1983, "Metamagical Themas."

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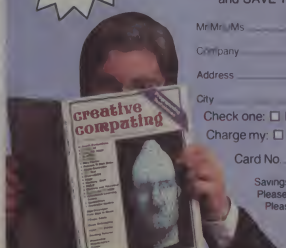


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# Logo Type

James Muller

There is a certain bit of magic in the Logo language that makes learning a lot of fun. Mathematics, geometry, and other subjects are no longer boring school subjects. On the computer screen, they become brain-teasers and other enjoyable discoveries that can help young people learn to think. The value of this learning fun was dramatically demonstrated the summer the Young People's Logo Association was formed.

For several hours each week, a group of young people ranging in age from 6 to 13, met in a Richardson, TX, garage to explore Logo and the computer. Fourth of July fireworks, lunar lander games, and some intriguing graphics were the visible results of these sessions.

But what were the kids learning?

As a very simple experiment, the kids were asked to draw some random angles on blank paper: "If the turtle drew a line on the screen, made 147 turtle turns, and then drew another line, what would the screen look like? What about 217 turns? 313 turns?"

These same questions were then posed to circuit designers, who acknowledged that the kids were able to visualize the angles more accurately than they were. As engineers, they relied on their tools rather than their imaginations to measure angles and distances. However, the engineers did claim credit for drawing straighter lines.

One of the ways to help children learn to visualize angles and distances is through "target practice." A simple way to start is to place stickers on the screen and then see who can move the turtle to the sticker in the fewest moves. A slightly more complex version of the same exercise is to play "turtle baseball." Place four stickers on the screen, one of which is home plate. Then see who can move around the bases with the fewest mistakes. You can make the game as simple or as complex as you choose. The important thing is to practice visualizing angles and distances on the screen.

Atari Logo offers some nice features for making an enjoyable game out of angle and distance practice. Where most other versions have one triangular turtle, Atari Logo has four turtles, each of which can act independently. The language also has collision detection to test if two turtles are touching. In the target practice game shown in Listing 1, one of the turtles is randomly placed on the screen. Then, by typing the word, ZAP, followed by an angle and a distance, a second turtle is "zapped" at the target. If the two touch, the screen flashes and a message appears at the bottom of the screen.

**The Important thing is to get the players to think about what they are doing, to think beyond the limits of the computer keyboard and screen.**

The T procedure sets up the game. RANDOM will not select a negative number. Thus, the statement is written that IF the random number is 0, the computer will select a number between 0 and 110. If not, it will subtract a random number from 0. The result will provide the numbers required for the procedure ANGLE :NUM. The target turtle will turn right the number of degrees selected, and the procedure will then pick a random distance. To keep it interesting the distance ranges from 50 to 110.

Once the target turtle appears on the screen, the player must type in ZAP followed by an angle and a distance. The first turtle then turns right and moves the distance selected. The PX represents Penreverse. In this mode, the turtle draws a line where none exists. However, when asked to move back, it erases any line previously drawn. The computer then tests: IF turtles 1 and 2 are NOT in a CONDition of TOUCHING, then the first will wait 20, move BACK the distance entered, and SETHeading to 0 again.

WHEN turtles 1 and 2 are TOUCHING, control turns over to the CHEERS procedure. The background flashes, and "Congratulations" appears at the bottom of the screen.

Games like this can, of course, be written for any version of Logo. Scoring and multiple-player options can add to the appeal. The important thing is to get the players to think about what they are doing, to think beyond the limits of the computer keyboard and screen. There are few things as exciting as watching a child's imagination in action. However, there is a marvelous quotation of unknown origin which helps put the value of imaginative play into perspective: "He who has imagination without learning has wings but no feet."

The author must have been thinking of Logo. ■

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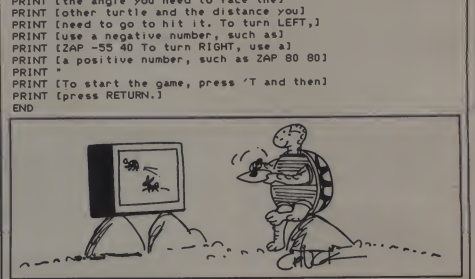
## Logo

*Listing 1. Turtle Target Practice Game.*

```
TO FLASH :CLR
SETBG :CLR
WAIT 5
MAKE "CLR :CLR + 7
IF :CLR > 126 [SETBG 74 STOP]
FLASH :CLR
END

TO CHEERS
CT
REPEAT 5 [PRINT [CONGRATULATIONS!]]
FLASH 7
T
END

TO T
CT
TELL [0 1 2 3] CS
ST
IF 0 = RANDOM 2 [ANGLE RANDOM 111] [ANGLE 0 - ( RANDOM 111 )]
WHEN TOUCHING 1 2 [CHEERS]
END

TO ANGLE :NUM
TELL 2
PENUP
SETH 0
RIGHT :NUM
MAKE "DIS ( ( RANDOM 61 ) + 50 )
FORWARD :DIS
END

TO ZAP :ANG :DIS
ASK 1 [RT :ANG PX FD :DIS]
IF NOT COND TOUCHING 1 2 [ASK 1 [WAIT 20 BACK :DIS SETH 0]]
END

TO START
TS CT
SETCURSOR [0 3]
PRINT [Welcome to the game of...]
SETCURSOR [0 5]
PRINT [* * * * * ZAP THE TURTLE * * * * *]
SETCURSOR [0 8]
PRINT [A turtle will appear somewhere on]
PRINT [the screen. Can you guess the angle]
PRINT [to turn and the distance to]
PRINT [Zap the Turtle?]
PRINT "
PRINT [To play the game, type ZAP and then]
PRINT [the angle you need to face the]
PRINT [other turtle and the distance you]
PRINT [need to go to hit it. To turn LEFT,]
PRINT [use a negative number, such as]
PRINT [ZAP -55 40 To turn RIGHT, use a]
PRINT [a positive number, such as ZAP 80 80]
PRINT "
PRINT [To start the game, press 'T and then]
PRINT [press RETURN.]
END
```



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*A New Face For Western Union*

# Telecommunications Talk

**Brian J. Murphy**

The telegraph company ain't what it used to be.

Western Union, which long ago phased out the uniformed delivery boy on the bicycle, is now entering the business and personal computer arena in a big way with its own computer telecommunications system called EasyLink.

EasyLink places virtually all of Western Union's worldwide communications net at your disposal. With EasyLink you can receive or send messages to or from any Telex terminal. You can use it to send Mailgrams, E-COM mail, Cablegrams, and telegrams. You can send messages on a priority basis and request notification of message delivery. You can also use the system to send a mailing to up to 250 addresses, one of several mass mailing schemes that allows you to hit a broad or selected set of addresses.

EasyLink also includes a service they call F.Y.I. which offers news, sports, weather and human interest features much as you would find on the information utilities. Here we shall concentrate on EasyLink's powerful message system.

When you subscribe to the service you get a set of codes for use in logging onto the system and an 800 number to use to access the network. You also get a mailbox number, and a Telex number. If you have questions Western Union provides an 800 number to call to reach a customer assistance representative.

The most valuable article they send you is the EasyLink user manual, which is without doubt one of the best I have ever seen. Written with the needs of the average user in mind, it explains all the procedures for using the system in precise, unambiguous prose. It will surely abbreviate the amount of time required to learn to use the service. The result of all this attention is the very strong impression that Western Union is going to care and be there if you have problems with the system and need a little hand holding and advice.

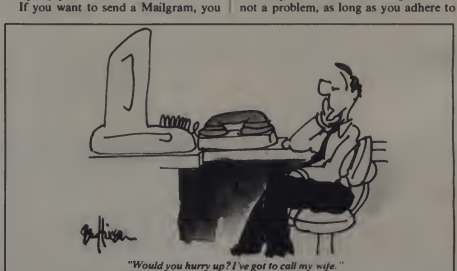
Once you have logged on and entered your various access codes, you see the prompt, PTS (which stands for Proceed To Select). It is here that you enter the correct "address" for the type of EasyLink service you want.

To send a Telex message you enter the telex number and the answerback number. For worldwide Telex you append a country code to the number. To send to an EasyLink mailbox, you simply key in the appropriate eight-digit number for the party you want to reach.

If you want to send a Mailgram, you enter the command /ZIP, then the address of the recipient. For a telegram you enter a /PMS command. /INT is the command for an international Cablegram, and for InfoCom you append the command /ICS.

Computer letters come in three flavors: Computer Letter Service (delivery in three days), E-COM (delivery in two business days or less), and Overseas Priority Letter (delivered in two business days). To send a computer letter you first key in the EasyLink address, 62900396. This must be done before you use a slash command to access one of the three services. Once you get the GA (Go Ahead) prompt you can then enter the /CLS (computer letter service), /ECOM, or /OPL (overseas priority letter) command.

Having decided on the service, the next step is to enter the message. That is not a problem, as long as you adhere to



*"Would you hurry up? I've got to call my wife."*

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***Introducing our new Smartcom II. More connection capabilities. More convenience.***

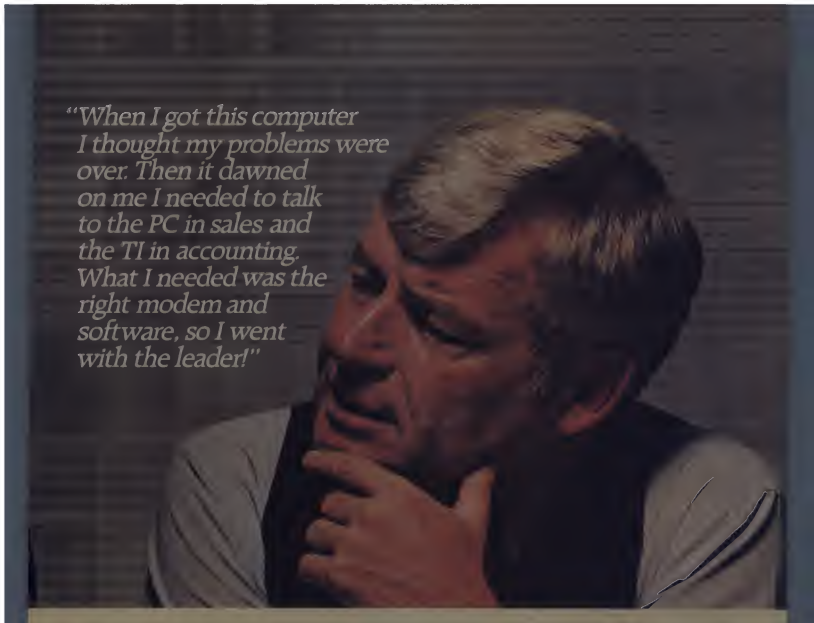
Now Hayes goes even further to streamline your communications and optimize your connections.

Smartcom II software is currently available for more than 16 personal computers (with even more to come). That means you can communicate, Smartcom to Smartcom, with an IBM PC, DEC Rainbow 100, HP 150, TI Professional Computer* and others.

And that's not all! Smartcom II also emulates the DEC VT100 and VT52 terminals, now in widespread use in many businesses. This feature lets your personal computer "pretend" it's a DEC terminal, opening the door to a vast installed base of DEC minicomputers!

***We stand on protocol.***

In addition to the popular Hayes Verification protocol, the new Smartcom II also includes the XMODEM protocol, ensuring accurate transmission to a wide range of personal computers and mainframes at information services. By matching the protocol (or "language") of a remote computer to yours, Smartcom II can transmit information error-free, regardless of interference on the phone lines.




*Voice to data—in the same call!*

With Smartcom II, you can easily switch from voice to data transmission (and back again), all in the same phone call. This saves you time and money, since you don't have to hang up and dial again.

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these text and line width restrictions:

EasyLink and EasyLink Telex—50,000 characters total, no line width restriction.

All Telex—50,000 characters total, 68 characters per line.

Cablegram, Telegram, and Mailgram—15,000 characters total, 68 per line.

Computer Letter Service—No more than 371 lines, 68 characters per line.

E-COM—Total 97 lines, 68 characters per line.

Overseas Priority Letter—363 lines total, 68 characters per line.

The line is ended simply with an ENTER or RETURN, depending on your terminal or computer. The end of the message is signaled by an LLLL at the start of a new line followed by ENTER. If you have made no mistakes in writing your message, the system responds with a MESSAGE ACCEPTED prompt. You may begin a new message right away.

Before I move on to pricing, a word about Telexing. This is one of the most exciting services WU offers. If you have ever seen the big, bulky, blue Telex machine, which performs only one function, you can readily appreciate the advantage of being able to dispense with it all together in favor of your personal computer work station. Add to this the ability to use your personal computer word processor in preparing your message (EasyLink will show you how) and the accessibility of so many other message services and you have a powerful argument in favor of the EasyLink service.

***Western Union claims that some of their own services are actually cheaper on EasyLink than they are by phoning Western Union to send a cable or wire.***

I was all set to tell you that this was an expensive service, but it isn't. In fact, Western Union claims that some of their own services are actually cheaper on EasyLink than they are by phoning Western Union to send a cable or a wire.

There is no subscription fee or start-up expense of any kind. They send all the materials, including the password codes and the loose-leaf manual, at no charge. Nor is there a minimum charge for the first three months of use. You will be billed for each message you send, however, according to the applicable rate structures. Starting with the fourth month there is a $25 monthly minimum use fee.

Here are some sample fees to give you an idea of the pricing of various services (all based on 300 baud transmission):

EasyLink to EasyLink—$.30 minute.

Telegram—$1.80 minute plus $3.00 service charge from 6:00 a.m. to 7:00 p.m., $1.50 from 7:00 p.m. to 6:00 a.m.

Mailgram—First page, $3.00; subsequent pages $.75 each.

E-COM—First page, $1.15; subsequent pages $.30 each.

Telex 1 to any U.S. Telex terminal—$.43 per minute. The service outputs at 400 characters per minute.

My conclusion is that EasyLink works, that it is affordable, and that it is great for businesses and professionals who use the mail frequently. If you can reduce some of your routine long distance calls to written form, you will save on phone expense too.

EasyLink info is available from Western Union, Department 38, 1651 Old Meadow Rd., McLean VA 22102 or by calling (800) 336-3797, ext. 38. ■


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AS-"DOGFOOD" X-3.14159
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AS: 100 200 250 300 ←
X: 10 20 3000 3010
CROSS-REF shows line numbers for each variable/string

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NEW! HI-RES PICTURE-PRINTER NEW!

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| One on One | $29.99 | NA | $29.99 | $29.99 |
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| Pinball Construction | $29.99 | $29.99 | $29.99 | $29.99 |
| Cut & Paste | $39.99 | $39.99 | $39.99 | $39.99 |
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| [illegible] | $29.[illegible] | $[illegible] | $[illegible] | $[illegible] |
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| [illegible] | $29.99 | $29.99 | $29.99 | $29.99 |
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| [illegible] | $[illegible] | $29.99 | $29.99 | $29.99 |
| [illegible] | $[illegible] | $54.99 | $54.99 | $54.99 |
| [illegible] | $[illegible] | $34.99 | $34.99 | $34.99 |
| [illegible] | $[illegible] | $29.99 | $29.99 | $29.99 |
| [illegible] | $[illegible] | $29.99 | $29.99 | $29.99 |
| Donkey Kong | $34.99 | NA | $34.99 | $34.99 |
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| VisiCalc | $159.99 | $159.99 | $159.99 | $159.99 |
| pfs | | | | |
| [illegible] | [illegible] | NA | $49.99 | $49.99 |
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[illegible] ..... $[illegible]
[illegible] ..... $[illegible]

**QUME**

[illegible] ..... $[illegible]
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**SEIKOSHA**

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[illegible] ..... $129.00
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CIRCLE 115 ON READER SERVICE CARD

*A Big Printer, A Tiny Printer, and A Spooler*

# Print About Printers

**John J. Anderson**

Time to put yourself online and dump that buffer. Let's engage in a little hard copy concerning hard copy, okay? Form feeding requires some care, you know. You can't just go around line feeding here and there and always expect to come out at the top of form. That's why we're here.

The warm weather is beginning to wind down in our neck of the woods, and that means just one thing; got to start thinking about stocking up on fan-fold and ribbons. It might be a long winter.

We'll take a look at the Datasouth DS 220 this time around, and catch up a bit on our new products buffer. We'll also reach into the mailbag—so make yourself cozy.

## Going Datasouth

When it comes to premium quality printers, we are rather fanatical here at the lab. If you are going to spend big bucks, you want perfection. Otherwise you might as well go the discount route. Over $1000? Better do things right.

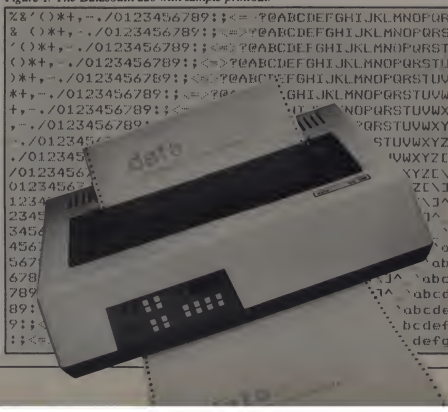
Though the looks of the DS 220 are somewhat reminiscent of an old Frigidaire, the similarity is only skin deep. The Datasouth 220 is a premium quality machine. It offers bidirectional logic-seeking dot matrix print at 220 cps draft quality, so-called "memo-quality" at 100 cps, and near-letter quality at 40 cps. Up to eight different character font and pitch styles may be selected. In addition, the DS 220 offers seven resident international character sets and can accept up to 94 user-defined characters that can be downloaded from the host and stored in non-volatile memory.

The 94 ASCII character set is printed in 9 x 7 matrix in draft mode, 9 x 15 matrix in memo mode, and 18 x 48 matrix in near-letter quality mode. True lowercase descenders and simultaneous underlining are possible because of the nine-wire printhead. The printhead is rated at over a half-billion characters, and can be replaced on-site in a matter of minutes.

An adjustable head-to-platen gap accommodates forms up to six parts in thickness. Fanfold forms from 3 to 15 inches may be fed through the front or bottom of the printer. Manual single sheet feed is possible through the front paper feed, as pinch rollers are incorporated into the paper tractors. The cartridge ribbon is simple to change, and is rated at over 3 million characters.

The most unique facet of the DS 220 is its programmable control panel. LED indicators, a four-character digital display, and a custom keypad make format set-up quick and simple. A non-volatile

*Figure 1. The Datasouth 220 with sample printout.*



# WHAT A RAGING FIRE TAUGHT US ABOUT RELIABLE PERSONAL PRINTERS.

**That's a printer?** We've always known that Okidata makes the toughest printers, but Robert Brannon really proved it. A fire left his Microline 92 looking more like a pile of charred Silly Putty® than a printer, but being an optimist, Mr. Brannon took it to his Okidata dealer to see if anything could be salvaged.

The service department at Wolff Computers in New York City wasn't quite as optimistic, especially when they saw that the heat of the blaze had actually melted the casing and molded the plastic onto the internal workings of the printer.

But willing to try anything once, they plugged the unit into one of their computers, snapped on the print mode, tapped the printhead lightly, and Robert Brannon's smokey, burned, half-melted Okidata did just what it had always done . . . it printed. It printed fast and it printed beautifully.

**Red-hot performance.** We're not surprised. The durability of Okidata printers has become downright legendary. With a printhead that lasts well beyond 200,000,000 characters and a warranty claim rate of less than 1/2 of 1%.

Okidata speed and versatility have become famous as well. The Microline models print data at rates up to 200 characters per second. That's three pages a minute. There's an additional print mode for enhanced or emphasized text. And their letter quality rivals a daisywheel for clarity with full graphics printing capabilities.

Okidata printers are fully compatible with all popular software packages and personal computers. Special configurations are available for IBM and Apple Macintosh™ at no extra cost. And if you're like Mr. Brannon and occasionally need a little service, it's easy to find at Xerox Service Centers nationwide.

Every now and then any printer can have a rough day, but the Okidata Microline printers are built to take it. Call 1-800-OKIDATA (609-235-2600 in NJ) for the Authorized Okidata Dealer nearest you. Okidata, Mt. Laurel, NJ 08054.

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**CIRCLE 167 ON READER SERVICE CARD**

# Now you can get personal with a Datasouth.

Say hello to the Datasouth Personal Printer—an office-quality printer that makes itself right at home next to your personal computer.

Technically speaking, the Personal Printer is "Epson compatible." But it's better than the competing Epson because it also does letter-quality printing.

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CIRCLE 122 ON READER SERVICE CARD

memory retains the settings when power is turned off.

The unit offers serial and parallel interface as standard, along with a 2K buffer. Of course, the DS 220 can also be programmed through software escape codes.

As you might imagine, an impact printer racing along at 220 cps is not the quietest thing in the world. Despite the size and acoustic sealing of the unit, we were disappointed in its raspiness. Still, it would be unfair and inaccurate to compare it to quieter models that don't reach half the speed.

Otherwise, we were quite pleased with the DS 220. It is really fast, and print quality, even in the draft mode, is quite acceptable (Figure 1). The unit qualifies as a truly smart printer—more than 50 separate functions can be coded into the control panel—and remembered by the DS 220.

We didn't get to see the final documentation at press time, so we can't comment on it. The preliminary documentation we did see was adequate.

Rumor has it that IBM has chosen to OEM the DS 220. If they have, we can certainly understand why. The DS 220 may not look like a thoroughbred, but it is a heavy-duty workhorse, designed for maximum throughput in minimum time.

The DS 220 lists for $1695. The DS 180, with maximum print speed of a very respectable 180 cps, lists for $1395. Both models are well worth the investment.

## TTX—Big Little News

TTXpress, the smallest self-contained 80-column printer on the market, has begun reaching retailers. At 11" x 4.5" x 1.75", it fits in even a small camera case. It is designed to work with all popular handheld, portable, and transportable computers.

Nearly more incredible than the diminutive size of the TTXpress is its retail list price of $229. That will make it irresistible to many portable computer owners. Self-contained battery operation (4 alkaline C cells) will power the TTX for up to 5000 lines away from AC power. Of course, an AC adapter is available.

The unit is capable of producing legible 7 x 9 dot matrix hard copy at speeds up to 50 cps (40 cps under battery power). Figure 2 is a sample printout. Condensed printing enables users to produce readable 132-column spreadsheets and other extra-wide printouts on standard 8.5" x 11" paper. Other print modes include bold or double-strike, underline, shadow, and true descenders. It can also produce graphics, at a resolution of 72 dots per inch horizontally and vertically.

As it is a thermal printer, the TTXpress requires special thermal paper to operate. It can handle roll or cut sheet thermal paper with friction feed. A Centronics parallel interface is standard, compatible with Epson MX-80 control codes.

We hope to present a hands-on evaluation of the unit as soon as one arrives at the lab.

TTX also offers a new non-portable low-cost daisywheel printer. Features of the TTX Plus include proportional spacing, internal motor-driven tractor feed, a Diablo compatible 630 interface, and two-color ribbon capability. At $599, the Plus joins the TTX 1014 daisywheel in the TTX product line. The 1014 has been reduced to a list price of $499, making it among the least expensive daisywheel printers around. At the same time, TTX has reported a failure rate of less than .5 percent on the model 1014.

Both models sport wide 15" platens, bidirectional logic-seeking, interchangeable 100-character printwheels, and print speeds of 14 cps. A $399 sheet feeder is also available for both models.

TTX has also announced TTX Macpac, for the Macintosh computer. This system combines a TTX 1014 with a 64K buffer, also accessible by the Imagewriter. It includes all cabling, at a list price of $895.

## Extended Systems ShareSpool

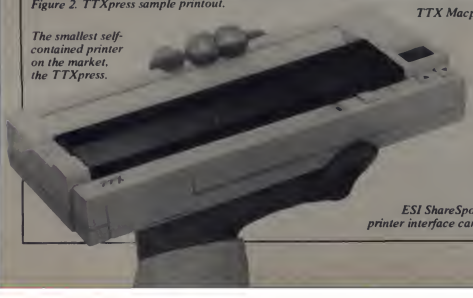
Extended Systems has announced the ESI-2012 and ESI-2014 IBM PC and PC-compatible spooler cards, which allow up to three personal computers to share one printer. The ShareSpool cards act as intelligent printer interfaces, automatically buffering and managing print output. Each requires only one full length option slot in an IBM PC/XT, and no XT "think" time is required. Each user appears to "own" the shared printer exclusively.

The model ESI-2014 ShareSpool offers the ability to share a parallel interfaced printer with up to three personal computers. It appears as a printer interface adapter to the XT, while accepting parallel output from two additional XTs. When print data is first received from an attached computer, a "job" is opened for that computer—and all print data received from that computer are tagged for that "job." The job is closed when no data have been received for ten seconds.

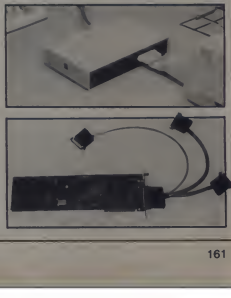
```
I CAN PRINT FOR UP TO 120 MINUTES ON A NEW LOAD OF BATTERIES.
You  can also use your programs right away since my control codes  are
Epson MX-80 compatible.  You may also use such popular word processing
software like Wordstar.
```

*Figure 2. TTXpress sample printout.*

*The smallest self-contained printer on the market, the TTXpress.*



*TTX Macpac.*



*ESI ShareSpool printer interface card.*

Print jobs are executed on a first in-first out basis, and the ESI-2014 can accept and buffer print data from all three computers at the same time.

The ESI-2012 ShareSpool functions like the ESI-2014, except for serial output. Both units are equipped with 64K of spooler buffer space, expandable to 128K. They are priced at $595 each.

### Delta Doc Revisited

The following is a letter I received from Eric van Hall of Star Micronics:

I read with a great deal of interest your article concerning our Delta-10 printer in the June issue of *Creative Computing*. Thank you very much for a very fair and unbiased representation of our product.

I noted your comment concerning the user's manual. Indeed the manual accompanying your printer was "preliminary." Quite often, because we demand that such high quality documentation accompany our product, the time involved to produce such documentation exceeds the introduction date for the product. Because there are occasions when the end-user receives only the preliminary manual, our policy is to mail, at no charge to the end-user, the final user manual when it becomes available.

I am enclosing, for your inspection, the final user's manual for the Delta currently being supplied with the printer. This manual is an example of Star's commitment to quality documentation; hopefully it is the best in the industry.

That's quite a claim, but after looking through the final product, I must agree. It will be my pleasure to hold up the final documentation of the Delta-10 as the standard to which all printer documentation should aspire. Truly a superlative job.

Time for just one more response to a question from the mailbag:

To Dwight Garner, of Wheaton, IL: The decision whether or not to take out a service contract is analogous to buying personal insurance. You can go without it, and then suddenly require a very costly repair. Or you can take out an extensive contract and never have a problem.

There was a time when I would have recommended service contracts on printers without reservation, because they are the most likely component of any computer system to require repair. However, nowadays most quality printers can run for years without requiring a service call.

Determine what your actual duty cycle is. Just how much hard copy do you actually require? As a rough rule of thumb, if you churn out an average of fewer than three pages a day, you probably don't need a service contract. You aren't using your printer all that much.

Instead, I would stress the routine preventive maintenance you can undertake yourself to keep your printer up and running. Keep the inside clean with an air bulb and brush. Make sure the paper path is free of torn bits of paper and paper dust. Keep moving parts well-lubricated (I keep a can of WD-40 nearby).

Talk to you next month. ■

### Firms Mentioned in this Column

Datasouth Computer Corporation
Box 240947
Charlotte, NC 28224
(704) 523-8500

TTX Incorporated
3420 East Third Ave.
Foster City, CA 94404
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Extended Systems
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CIRCLE 198 ON READER SERVICE CARD

# LAST NIGHT WE EXCHANGED LETTERS WITH MOM, THEN HAD A PARTY FOR ELEVEN PEOPLE IN NINE DIFFERENT STATES AND ONLY HAD TO WASH ONE GLASS...

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# TRS-80 Strings

Stephen B. Gray

Checking out Route 67 on the Tandy map, we see it leads to a tired switch, the *Bio Detector* program from Computerware, two kodak systems for photographing CRT graphics, and a third short star-twinkle program.

## The Tired Switch

You have just written some text with a word processing program, and you want to save it. So you type:

```
S XYZ/SCR
```

or something similar. But instead of the text being written to disk, you get this message:

```
Write Protected Disk
```

So of course you take the disk out of the drive to look at it, and of course there is no tab covering the write-protect notch, because you didn't put one there.

So what happened? With a bit of detective work, you find you have been a little lazy. Instead of taking the disk completely out of the drive at the end of a computer session, you just opened the drive door, and pulled the disk out half an inch, so the data don't get scrambled when you turn off the TRS-80.

(At least this is what we have all heard for years is supposed to happen, and all the manuals warn: "Do not place a diskette in the drive while you are turning the system on or off," or words to that effect. Do it often enough, though, and you'll have trouble booting up Basic, or your word processing program, or whatever is on the disk.)

Leaving a disk partially out of the drive is a fairly common practice. We do it often when we use one disk more than the others; we leave it in the drive because it is probably going to be used at the next session.

There is a little microswitch inside the drive that senses whether the write-protect notch is covered or not. Listen as you push a disk into the drive: the microswitch clicks on as it detects the far end of the disk jacket; then clicks off as it drops into the notch (assuming there is no tab covering the write-protect notch).

***After several years, the computer has no way of telling the difference between a tired notch switch and a write-protect tab.***

Now pull the disk forward half an inch; the microswitch clicks on, and it will stay on for hours, or maybe days, until you push the disk forward again.

These microswitches are guaranteed by the manufacturer to operate may thousands of times without error. But just figure out how many times you click that switch in a week. After several years, the write-protect switch is going to get a little tired, and if you insist in leaving it in the on position, it may just decide to stay that way. Which is why you get the Write Protected Disk message: the computer has no way of telling the difference between a tired notch switch in the on position and a write-protect tab.

The next time you turn off your TRS-80 (or any other computer), take the disk all the way out of the drive first. Otherwise you may eventually have to take your machine to a Radio Shack Computer Center to have the microswitch replaced. The current cost of that operation is $30.

## Bio Detector

You've probably read or heard about bio feedback monitoring, how it can measure the stress you're feeling, and how you can use it to lower your stress level.

*Bio Detector* from Computerware is a $34.95 combination of hardware and software that graphs your galvanic skin response on the screen of a 16K Color Computer.

The hardware consists of a Velcro-mounted, adjustable skin sensor with silver contacts, attached to a small "monitor box," which plugs into the joystick jack of your Color Computer. First you load the Biograf program from tape as you wrap the sensors around the first two fingers of one hand.

Then you set four variables, which are displayed on the bottom of the screen. The Scope speed can be set to slow, medium, or fast. The Trace can be displayed as a line or as dots, whichever you prefer. Audio can be turned off, or set to variable (a changing tone that gets

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*Figure 1. This trace, on the Bio Detector display, shows a relaxed period on the left, and higher stress at right (from holding my breath.)*

*Figure 2. The Anxiety Attack game is a real challenge; the higher sensitivity makes it almost impossible to relax enough to flatten the trace appreciably.*

higher as the trace gets higher) or fixed (a beep that sounds more often as the trace gets higher). Mode may be set to Bio (the bio feedback mode) or to AA (for the Anxiety Attack game).

Although the manual dosen't mention it, you use the spacebar to stop the trace, so you can change any of the settings, which depend largely on personal preference; I like a slow line-trace, with variable beep.

## How It Works

*Bio Detector* measures skin resistance and converts this to an analog signal, shown on the screen in an elaborate and colorful display (Figure 1). According to the theory, the more stress, the higher the numbers sent to the computer. *Bio Detector* is said to "help you learn to lower your personal stress level, to observe your reaction to questions or other stimuli. . . It can also be used as a simple lie detector."

As the plotting starts, you adjust the sensitivity control on the monitor box until the trace is near the middle of the screen, vertically. This is the most important adjustment; too high or too low, and the trace flattens out.

To check the operation of the *Bio Detector*, take a deep breath and hold it for as long as you can; this causes stress, and the trace on the screen should rise dramatically.

According to the manual, bio feedback means amplifying any function of your body, to make yourself aware of something you ordinarily might not be aware of. You could, for example, amplify your heartbeat, and then learn to speed it up, or slow it down, at will. The *Bio Detector* measures skin resistance, which is inversely proportional to body stress. The amount of stress it senses is displayed on the screen and heard as a changing tone, so that you can learn to lower (or raise?) your "personal stress level."

The manual claims that "bio feedback has been used to cure people with chronic headaches, ulcers, and many other stress-related problems. People with high stress jobs have learned to relax and deal with their work without as much tension." No suggestions are given on how to relax.

Personally, I found that, with a little practice, I could lower the trace level a fair amount, but not always when I wanted to.

The *Bio Detector* can be accessed from a Basic program, because the Color Computer sees it as a joystick. If the Detector is plugged into the right joystick jack, look at JOYSTK(0). A four-line Basic program is provided to let the computer look at the right joystick port and "make an appropriate tone."

## Lie Detector

Put the skin sensor on another person's fingers, allow him some time to relax, then ask a question. According to the manual, "if the trace does not move up or down very much, the answer was probably the truth. If the trace moves about a half an inch or so, the person may not be telling the whole truth. If the traces moves up more than an inch the answer is probably not true at all."

The manual continues with a disclaimer, "Please remember that this is not guaranteed to produce 100% accurate results. You shouldn't take the responses of the person too seriously. (We don't want to cause any divorces.)" The magazine ad goes even further: "This is a toy. Results not admissible in court."

## Anxiety Attack Game

In AA mode, the computer is much more sensitive to upward movements of the trace. The idea of the Anxiety Attack game (Figure 2) is to get somebody to put on the sensor, then see if you can "get the person . . . to react. Try asking how his car got that huge scratch in it, or make a funny face. (Tickling is not fair!) Do anything you can to make the trace go up." Anything?

The manual suggests you "try this at your next party . . . to see who can hold out the longest without making the screen flash"; flashing means the display turns on and off, alternating rapidly with a blank screen. Anxiety Attack "works especially well when there are a lot of people around. This is a good test to see if you really have learned stress control in the Bio Feedback mode."

The stress level in *Anxiety Attack* is much more difficult to control than in Bio Feedback mode, because of the increased sensitivity.

## Those Color Photos

The color photos illustrating the *Bio Detector* program were taken with Kodak's Instagraphic CRT Imaging Outfit, which makes instant color-print copies of images displayed on 12" or 13" CRT screens.

The Instagraphic Outfit (Figure 3), introduced in 1983, consists of two basic parts: a modified Kodamatic Champ Instant Camera with a close-up lens; and a Kodak Model 12 plastic CRT cone. Also included are two 10-exposure packages of film, a filter to provide "warmer" prints, and brackets for adapting a 35 mm

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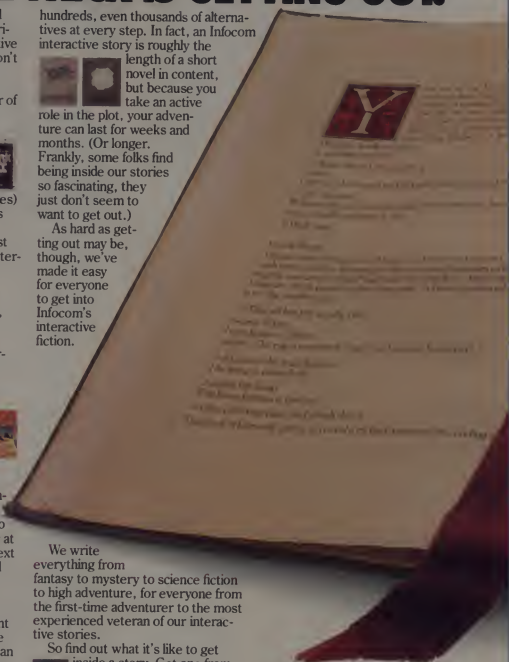

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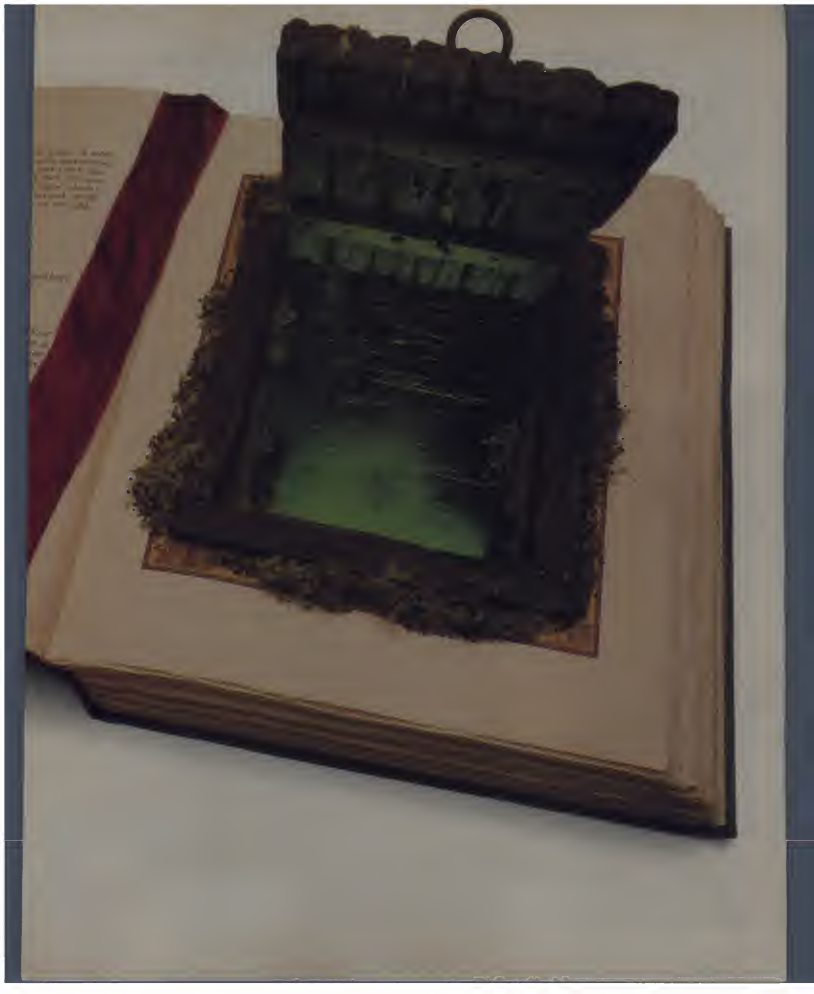

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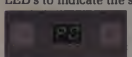


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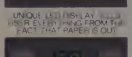


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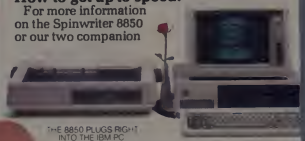

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single lens reflex camera to the cone.

Setting up the Instagraphic is simple: load the camara; mount it on the cone; position the cone against the face of your monitor or TV screen; and hold down the shutter release until you hear a click. The click is from the camera's automatic exposure control, which adjusts the exposure time for screen brightness.

Because tube face sizes and configurations vary, the cone is designed to fit against the frame around the tube, or against the cabinet. Four rubber bumpers are mounted on the corners of the cone-flange face, to provide a nonslip contact between the cone and the CRT frame, and to space the cone flange away from the CRT frame or cabinet.

The outfit also includes foam strips for creating a light baffle between the cone flange and CRT frame. However, the strips are useful only if the room lights are to be left on while the CRT screen is photographed.

With only the bumpers applied to the cone flange, the camera will record the full area of a 12" (diagonal) CRT. With a 13" CRT, the cone will slightly crop the bowed sides of the CRT face; to show the full screen, spacer pads can be added to move the camera back. For the 13" screen of Radio Shack's color TV, four spacers were added under each bumper.

After a few trial exposures, the Instagrahic Outfit is easy to use. Once you've figured out just where to place the cone, all you do is push the button, release it when you hear the click, and wait for the color print to emerge from the camera. The 12-page manual provides plenty of detail on positioning the cone, optimizing focus, adjusting exposure, and using a 35mm camera.

According to the press release, "black-and-white duplicates of the color prints can be made with any high grade office copying machine for inclusion in written reports."

The suggested list price of the outfit is $190, although it can be bought in New York for $168, from the industrial division of one of the large camera stores.

## Second-Generation Imager

Offering a selection of cones in different sizes, Kodak's second-generation Instagraphic CRT "print imager" was announced in May 1984. The modular system offers cones in 9", 12", 13", and 19" sizes.

The new print imager (Figure 4, foreground) has four basic components: a new Kodak Instagraphic camera back, box-shaped "print module," CRT cone, and cone "adapter." The background shows the four adapters, which slide into the cone, and are held in place with a pair of metal snap fasteners.

*Figure 3. Kodak's Instagraphic CRT Imaging Outfit provides an inexpensive way to take photos of computer displays.*

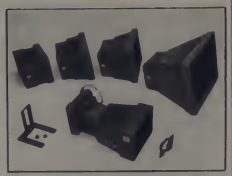

*Figure 4. The new Instagraphic print imager provides four cone adapters of different sizes, to fit CRTs from 9" to 19".*

A bracket is provided for using a 35 mm SLR camera in place of the camera back and print module. A filter-holder is also provided, in case the user wants to color-balance the phosphors of some CRTs.

The camera back of the new print imager is "designed for professional use," according to the press release. The new back and print module will be featured in a professional product later in 1984. The print module includes the shutter and a variable focus lens, and partially corrects for screen distortion.

The new print imager has no automatic focus control, so "one or two test exposures may be required to arrive at the best exposure for the brightness level of the particular CRT."

A close look at the photographs shows three words under the Kodak logo on the camera back and cone: Made in Germany.

Exact list prices have not been established at this writing, but the basic imager will be less than $300, and the cone adapters will be less than $40 each. The original outfit will continue to be available.

There are several other camera-and-cone systems for photographing CRT graphics, but none I've seen is as inexpensive as the Kodak Instagraphic printmakers.

## Short program 51: Twinkle 3

From Ottawa, Ontario, Canada, Tammy Dunlop sent a CoCo version of the twinkle program (Nov. 1983, p. 330), with this letter:

"I finally have gone out and bought myself a TP-10 printer for my Color Computer. I'm not fussy on the thermal paper, but for the price I am willing to put up with it till I can afford something better.

"The program is one I thought of while allowing my mind to wander off work the other day. It uses an array setup to remember the pixel positions, and scanning through it gives the twinkling effect, along with a random selection of pixels on the screen that keeps changing. If you have a good imagination (like the old astronomers) you may see some of the constellations form before your eyes."

Run the program in Listing 1 on a Color Computer and 20 pixels will appear at random locations on the screen, in random colors. As soon as the 20th one appears, the stars—one by one—are randomly turned off and then right back on again, accompanied by a rapid, random note melody that may drive you bonkers within minutes. Each star disappears after several minutes (and several dozen twinkles; actually, 60 twinkles), to be replaced by another star elsewhere on the screen.

Tammy's REMs include: "Twinkle Twinkle, for TRS-80 CoCo 16K Basic. The larger the number for PIXEL, the more stars and the slower they twinkle.

*Listing 1.*

```
30 CLS
32 DIM AX(50),AY(50),AZ(50)
34 AP=1
36 PIXEL=20
38 TT=0
40 RESET(AX(AP),AY(AP))
50 X=RND(62): AX(AP)=X
52 Y=RND(30): AY(AP)=Y
54 Z=RND(8): AX(AP)=Z
56 SET(X,Y,Z)
60 AP=AP+1
65 IF AP>PIXEL THEN GOSUB 90
70 IF TT<>1 THEN 60
71 FOR LOOP=1 TO 4
72 FOR TW=1 TO PIXEL
73 S=RND(100)+100
74 RESET(AX(TW),AY(TW))
75 SOUND S,1
76 SET(AX(TW),AY(TW),AZ(TW))
78 NEXT TW
79 NEXT LOOP
80 GOTO 40
90 AP=1: TT=1
92 RETURN
```

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## TRS-80

LOOP=1 to 3 gives three flashes to each star before going on to pick another random star from the many on the screen. Maximum number of stars is 60, due to size of arrays. Line 34: position in array. Line 36: number of stars; max 60. Line 38: twinkle test. Line 90: Subroutine—set to twinkle, and reset array pointer."

Lines 50-56 set pixels at random locations on the screen in random colors. Lines 60-65 count the number of pixels; if there are fewer than 20 (or whatever number line 36 is set to), line 70 jumps the program to line 80, which jumps back to line 40, to keep on setting pixels.

If the pixel count goes over 20, line 65 calls the subroutine in lines 90-92, which resets the pixel counter to one, and sets TT to one. Now lines 71-79 come into play, to turn off—and right back on—each of the 20 pixels, three times each, in rotation as determined by their locations in the arrays. Also, a random melody is created by lines 73 and 75.

After the third off/on go-around (60 twinkles' worth, or three loops times 20, or LOOP*TW), the program jumps back to line 40, to turn off a pixel for keeps. A new pixel is turned on (to provide a little variety), and the sequence repeats.

In other words, after the program has reached line 79, a pixel is turned off permanently, and a new one is set by line 56 every three twinkles. To prove this, add:

```
58 PRINT @ 0, X;Y;Z
```

and watch the three numbers change rapidly at first until 20 pixels are set, then change only after each round of three twinkles.

The program can be adapted for a TRS-80 Model I/III/4 by dropping the Z or AZ part from lines 32, 56, and 76; dropping lines 54, 73, and 75; changing the 62 in line 50 to 127; and the 30 in line 52 to 47. The "twinkle" will be faster than on the CoCo; these stars don't actually turn completely off, as they do in color.

The TRS-80 Model 4 has the same SOUND statement as the CoCo, so you can leave in lines 73 and 75 if you have a 4. ■

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# Notebook Computing

*David H. Ahl*

This month in our Notebook Computing column we take a look at several new computers, some new peripherals, software and books, as well as the fate of some previous entries in the field.

### Teleram and Dulmont: A New Team

Teleram, makers of the T3000 (see *Creative Computing*, Jan. 1984) has introduced three new family members, the T3500, T4000, and T5000. The T3500 is billed as an office workstation. It consists of an expansion chassis, 12" video monitor, and up to four floppy disk drives and can be used with any of the Teleram portable computers. The CRT displays 24 lines of 80 characters.

The main difference between the three computers is the size of the display. All have 80 characters with the T3000 having four lines; the T4000, eight lines; and the T5000, 16 lines. All three machines have 64K of dynamic RAM, 128K of bubble memory (expandable to 256K), RS-232 port, acoustic coupler, and AC charger. They run CP/M and include word processing and communications software.

In addition, Teleram has become the U.S. distributor for the Australian-made Dulmont Magnum notebook portable computer. The Magnum is available with either an 8- or 16-line LCD screen. It is based on the 16-bit 80186 mpu and has 128K of RAM (expandable to 256K), dual (external) 3¼" floppy disks (720K capacity), one parallel and two serial ports, a real-time clock, and a 74-key full-stroke keyboard. It runs MS-DOS and includes ROM-based word processing, spreadsheet, and planning/diary software as well as Basic.

### Gavilan—Revisited

Although the Gavilan was announced in June of 1983 at NCC, quantity deliveries did not begin until June 1984. We were told there were some bugs to be worked out, some of which resulted in basic changes to the product itself. The computer is based on a 16-bit mpu, the 8088. The basic Gavilan has 96K and a 16-line, 80-character display.

The SC model has 64K and an 8-line display. Memory is expandable to 160K internally and 288K with a clip-on module. The machine has a double-sided 3½" floppy disk drive with quad density for a total formatted capacity of 360K. In addition to a standard keyboard, the machine has a touch panel above the keyboard, which Gavilan refers to as a "solid state mouse."

The machine measures 11.4" x 11.4" x 2.7" and weighs 9 lbs. The internal NiCad battery pack is good for eight hours of use and can be recharged to 80% of capacity in just one hour.

A snap-on thermal printer adds 4.9" to the depth and weighs five pounds. It can print characters or graphics on either thermal or plain paper.

The operating system is MS-DOS and currently-available software includes *WordStar, SuperCalc 2, Acculink, PFS:File, PFS:Report*, Basic, Pascal, C, and Macro, with many additional packages promised by the end of 1984.

Price of the Gavilan is $3995; the SC model is $2995; and the printer $985, with software packages ranging from $125 to $300.

### Departures From the Ranks

As we were putting together our annual computer *Buyer's Guide*, we were struck by the number of manufacturers of notebook portables that we had in our roundup in January that are no longer on the scene. Toshiba withdrew the T100 from the U.S. market and two other Japanese manufacturers, Canon and Casio, never really promoted their machines here in a major way.

Xerox dropped the 1800 (a machine made by Sunrise) altogether, while Convergent Technologies suspended production of the Workslate until current inventories are cleared. MicroOffice, looking for OEMs for their Road Runner, appears to be looking still, and, judging from the announced peripherals for the CC-40 that are not yet available, TI may be having some second thoughts about that unit.

That means that in less than nine months, five to seven systems have bitten the dust. On the other hand, in the same time period, at least eight new systems have been announced. Hence, from the consumer point of view, you have more choice than ever before. Nevertheless, it is probably more important than ever to make a wise choice given the rapidly changing fortunes in this volatile market.

### Micro Floppy Drive and New Software for PC-5000

Sharp has introduced a battery-powered 3½" micro floppy disk drive for the PC-5000 portable computer. The drive uses the standard Sony disk and records double density (40 tracks) on both sides for a total formatted capacity of 360K.

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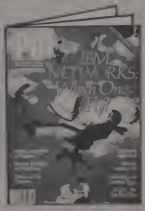

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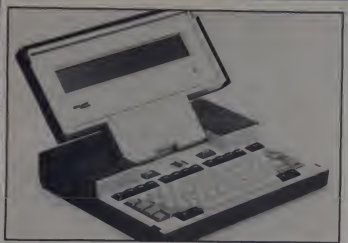

*The Dulmont Magnum notebook portable computer.*

*The Gavilan mobile computer features a built-in 3½" disk drive.*

The unit measures 5.5" x 9.2" x 2.6" and weighs 6.6 lbs. It can be powered by either a rechargeable lead battery (6V) or an AC adaptor. The design is said to minimize battery drain when the drive is not in use. The PC-5000 can interface with one or two disk drives (micro, mini, or one of each).

Sharp also introduced a 256K memory expansion cartridge for the PC-5000. The cartridge plugs into Slot 1 on the bottom of the computer and expands the internal 64K to 320K.

A software package designed by Diversified Computer Systems of Boulder, CO and sold by Sharp, converts the PC-5000 into a DEC VT102 terminal for use with DEC or other mini or mainframe computers.

Sharp is in the process of testing a prototype Unix system on the PC-5000. According to Frank Barbosa of Sharp's System Division, "If test marketing shows an interest, we would proceed next to an EPROM system for added speed and testing toward development of a ROM-based system."

### New Packages from PCSG

We have reviewed several packages from the Portable Computer Support Group for the Model 100 and have been generally impressed with their quality. While we have not seen these new packages, they sound interesting.

*Type+* transforms the Model 100 into an electronic memory typewriter. You see the last line on the screen as it appears on paper, as a virtual window. You can set the screen view area from an entire line to a single word to immediate print as you desire.

*Type+* provides word processing features such as tab, automatic centering, set margins, underline, and boldface. You can also store names and addresses, phrases, or paragraphs, and recall them with a single function key. Price is $69.95.

*Tutor+* is a program to teach touch typing and consists of 30 lessons which present exercises at graded speed. A nice feature of the program is the ability to set your own typing speed and learning pace. It also has a game option which challenges you to save the earth from destruction by typing faster and more accurately. Price is $49.95.

*Disk+* is a program which allows you to use the disk storage on your Apple,

**PCSG Disk + transfers files between a Model 100 and desktop system.**

IBM PC, TRS-80, or CP/M-compatible computer to store and retrieve disk files with a single function key. The program utilizes the RS-232 port with a null modem cable. Price is $69.95.

*Tenkey+* is a program for business analysis. It performs strategic business "what if?" calculations, calculates amortization schedules, solves for any of 12 variables in financial formulae, and generates breakeven analyses, NPV, compound interest, and many other common business calculations. Price is $59.95.

PCSG has a free 14-page catalog which describes these products and several others in detail.

### New Books

Several excellent new books about the Model 100 (and NEC 8201) have recently appeared. The Simon & Schuster *Guide to The TRS-80 Model 100* by Danny Goodman has ten chapters divided into three main parts. The first part has a general introduction to notebook machines followed by a comprehensive comparison of the Model 100 and NEC 8201. The two chapters in Part II cover the nuts and bolts of the hardware and interfacing to the outside world (one of the shallower chapters of the book). Part III, Using Model 100 Software, makes up the last six chapters.

Many authors of books about the Model 100 seem to assume their readers have not read the manual and simply repeat the contents in different words. Fortunately, Danny doesn't slip into this trap and, in most cases, takes the reader one or two steps beyond the manual. On the other hand, some sections stop short of being truly useful. For example, Danny whets your appetite for transferring text files from the Model 100 to another computer and discusses the pitfalls, but doesn't really tell how to do it.

Nevertheless, in the 216 pages, you'll probably find several things that will justify the $9.95 expenditure. ■

### Manufacturers Mentioned in this Column:

Teleram Communications Corp.
2 Corporate Park Dr.
White Plains, NJ 10604
(914) 694-9270

Gavilan Computer Corp.
P.O. Box 5004
Campbell, CA 95008
(408) 379-8000

Sharp Electronics Corp.
10 Sharp Plaza
Paramus, NJ 07652
(201) 265-5600

Portable Computer Support Group
11035 Harry Hines Blvd.
Dallas, TX 75229
(214) 351-0564

# Apple Cart

John J. Anderson and Owen Linzmayer

This month young Mr. Linzmayer and I will divide the honors of hosting the Apple Cart. I will bring you up to date on some Macintosh news, and then Owen will look at an exciting number of new products for the II+ and IIe.

While I have long used an Apple II+ as a word processor and to run graphics and game programs, I have never been an "Apple to the core" person. Rather I have remained an objective admirer. The last time I wrote an Apple Cart (July 1983), I reported on Apple's User Group Conference for IAC brass, where the IIe was introduced. I was impressed. I called the conference "a gracious and thoughtful christening for the new machine." But I saw the IIe as II with lower case, an improved keyboard, and a really low chip count. It was no Apple IV.

What really impressed me at the time was the Lisa. It had some incredible capabilities, though it took about $10,000 to make them your own. I wondered if that technology would or could ever appear in a relatively inexpensive machine.

## Mac: I'm A Believer

Well it took another year, but finally the Macintosh appeared. And I was swiftly converted from an ardent admirer to a true believer. In the time since my review of the Macintosh computer (July 1984), I have grown to know and love the machine. Sure, I'm still waiting for a writer's word processor, with virtual memory storage and things like word counts and print spoolers, but quality Mac software has begun to appear, along with peripheral upgrades that give it formidable powers.

## Second Microfloppy Drive

The Mac is ahead of the schedule I had set for it in my review. Second drives, for example, have now begun shipping in quantity. I walked into my local computer store a few weeks ago and simply walked out with one (I had to pay for it, of course). What a difference it has made in file handling!

Now data files can reside on one disk, while all program and utility files reside on a system master. Tiresome disk swaps are eliminated completely, and psychologically there is a lot more space to stretch out in. Though $495 seems a little steep for a unit that OEMs for so much less, it is well worth it in time saved and annoyance avoided.

## Tecmar Mac Drive

Of course there is another peripheral that can even beat out a second floppy drive for convenience—a hard disk. I have had a Tecmar Mac Drive hooked up for the last few days, and it proves that a hard disk drive is a natural for the Macintosh. With a 5 meg cartridge online, there is more than enough breathing room. And working with the hard disk is just like working with any other disk—it appears as a Mac Drive icon on your desktop.

For my purposes, I would have been happier with the 10 meg fixed disk model, but that is a matter of taste. A removable cartridge increases convenience, security, and versatility. On the other hand, the user is "constrained" to 5 meg hard disk access. I would much rather trade disk space for cartridge portability.

Not everything about the Tecmar drive is ideal, but very few of the disadvantages are the fault of Tecmar. Rather, it is the Macintosh itself and protected software that make the Mac Drive less terrific than it could be.

Because of the internal architecture of the Mac, you can't boot directly from hard disk. That means that you must always begin with a system floppy in the Mac's internal drive. Once the custom System Folder is installed, you can remove the system floppy and insert a data disk. But every session must begin with a boot from the internal drive.

Then there is the question of protected software—a question that has haunted hard disk owners since well before the Macintosh came on the scene. If a piece of software is protected, it cannot be transferred to hard disk, so it must be run from a floppy drive. In many if not most cases, the program floppy must remain in the drive during use as well.

The result of this is that many important applications, including database and spreadsheet programs, are not compatible with a hard disk drive. Oh woe. If only those applications were copyable.

When the Mac first appeared, word had it that most applications, like MacPaint and MacWrite, would be unprotected. Consumers rejoiced. How considerate, enlightened, and generous of Macintosh programmers, to realize the need to copy programs for personal use. All your heavy duty applications would be able to reside entirely on hard disk. You wouldn't need an entire library of applications disks at hand at all times.

Then the debugged version of *Multiplan* showed up, and it was protected. Don't waste time trying to copy it to hard disk. You'll get the icon to transfer, all right. But you'll be asked to insert the system master disk upon execution of the icon. Soon other packages started to come in,

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(4) Communications Software
Total List Price: $957

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The "Help" Screen and "Auto redial if busy" functions make the 1200A convenient to use. The second phone jack for the telephone handset allows switching from voice to data. You get all of this, ready to use, complete with easy to understand documentation, and a telephone cord for only $449.

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As it turns out, MacPaint and MacWrite are about the only two Macintosh packages that aren't protected. What about all those promises, folks?

Well, despite the drawbacks, a hard disk still has a place alongside the Mac. I tried hard to get things to screw up, but couldn't manage to do any real damage. It was fun trying to get the Mac to try to eject the hard disk—but it never caused any harm. Guess the people at Tecmar thought of that.

## Answer the MacPhone

Another neat object that recently appeared at the lab is the MacPhone, a hardware/software system that combines a telephone with Macintosh software that will autodial, keep a personal "phone book," monitor charges, log all calls, even keep an updated calendar. You can type and print messages, print out phone book logs, and use the Mac's internal sound system to dial numbers right out of your directory.

The MacPhone bills itself as "a unique concept in telecommunications," a statement that sent me excitedly looking through the box for a modem cable. Such is not the case. If your definition of telecommunications is talking on the phone, you will have greater enthusiasm for the MacPhone than I did. If, in fact, the product did come with a built-in modem and telecommunications software, it would be a sure winner—combining voice and telecommunications into one integral system. Perhaps this is on the way from maker Intermatrix.

## Mac on MAUG

While we're on the topic of telecommunications, I'd like to take the opportunity to thank Dennis Brothers of MAUG (PCS-51), the Apple user's group on CompuServe on behalf of Macintosh owners everywhere. Dennis offered the first full-featured tele-communications program for the Mac, written in Microsoft Basic. It has gone through many revisions and in recent incarnations allows not only text uploads and downloads, but automatic formatting of text into MacWrite format and transmission as well as decoding of binary MacPaint files.

Dennis did something so "unusual" with his terminal program that even *Time* magazine took notice. He posted it in a MAUG database on CompuServe so that anybody could download it. Sure, the connect time will cost you, but that's it. He didn't even invite "donations."

Thanks, Dennis, for a wonderful program, and an exemplary attitude. You helped get *Creative Computing's* Macintosh online and communicating with its own special interest group (PCS-22). And thanks for fielding all my dumb questions along the way.

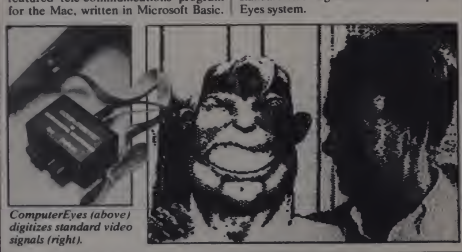
Well I could go on and on, but Owen wants to look at some hardware and software for the Apple II series, so I'd better wrap up. Take it away, Owen!

## ComputerEyes

You can often evaluate a new product simply by noting the decline in general productivity of our editorial staff. When we get something really exciting for review, a crowd usually gathers to see what's up. The longer a new product can hold the attention of the onlookers, the higher the marks the product gets on our preliminary rating scale.

It did not take long for a group to gather 'round the old II+ this morning after I set up the Digital Vision ComputerEyes video acquisition system. With ComputerEyes installed, the Apple can read any standard video signal, as from a video tape recorder, and convert the picture to a black and white digitized computer display.

ComputerEyes is a small (4" x 4" x 1.75") black box that connects to the Apple 16-pin game I/O socket. The RCA phone jack on the back of the box is where the standard video signals enter the ComputerEyes system.



*ComputerEyes (above) digitizes standard video signals (right).*

Any video device that outputs NTSC video or standard non-interlaced industrial video may be used with ComputerEyes. This includes video tape recorders (Beta and VHS), disc players, and those nifty portable cameras. For our review, we used an Olympus VHS tape deck with accompanying hand-held camera.

Supplied with the ComputerEyes hardware is a single disk which contains the acquisition program, *Executive*. This software allows you to adjust the sync of the video source and computer, capture normal and gray-scale images, and save/load these images to/from disk. Operation of ComputerEyes is as simple as point and shoot. Once you have the image from the video source that you want to capture, all you do is press the N key to get a normal high-contrast image. If you use the gray-scale option, eight different images are taken and superimposed upon one another.

Without writing your own applications, all you can do with *Executive* is view the digitized images on the computer screen. Digital Vision President, David Pratt, explains that they "wanted to draw the line between providing the acquisition and the application software" because the possible uses for ComputerEyes are infinite.

"Many applications are obvious. Others are bound to surface, once the product is in the hands of the creative members of the personal computer community" says Mr. Pratt.

ComputerEyes comes with excellent documentation. The 27-page instruction manual covers everything from set-up to theory of operation. ComputerEyes sells for $350 with a black and white video camera, or $130 sans the camera.

## Time-Trax

Is your desk cluttered with scraps of paper with important appointments and dates frantically scrawled on them? If so, Time-Trax may be for you. Manufactured by Creative Peripherals Unlimited (CPU), the $99.95 Time-Trax package consists of a time and date oriented calendar program and a clock module that plugs into the Apple internal 16-pin game I/O socket.

Installation of the Time-Trax clock module, a small 1" x 2" circuit board, is simple. The module is transparent to software that reads the joystick and paddle positions, but can be read by your own Basic and machine language programs. Complete directions for incorporating the clock functions into your code are given in the documentation.

Time-Trax is a menu-driven time management system. The software supplied can monitor several peoples' appointments, errands, holidays, tasks, etc. As the primary user, you can add/review entries, search for entries using a target word, and examine the calendar. The obvious question arises,

"can I justify $100 for a computerized appointment book?" That depends.

Time-Trax offers several features no conventional appointment book can match. Using a printer, it can provide you with a hard-copy to take with you wherever you go. Time-Trax can also be programmed to give you advance notice of an upcoming event. When you miss an event, Time-Trax brings it to your attention.

The clock module is inserted into the 16-pin game socket found on all 48K Apple II computers except the IIc. To initialize the Time-Trax module, you set the time, date, and year using the boot disk. Once set, you can "write-protect" the clock via a switch on the circuit board. The module gets its power from two AA alkaline batteries which mount inside the Apple case. CPU claims that the batteries can provide up to two years of uninterrupted power.

### Voice Box III

The Voice Box III from The Alien Group of NYC is designed for use with Apple II and IIe computers and comes complete with a small controller card, demo disk, external 3.5" speaker, and documentation—all for $130 retail.

Installation of the unit is simple. The Voice Box III controller card slips into expansion slot 3, and the voice output can be routed to the internal Apple speaker, the supplied external speaker, or both. Using the voice driver programs on the demo disk, you can enter regular English text and have the computer speak exactly what is typed. These programs may be easily transferred to another disk for custom use.

Like all voice synthesizers we have tried over the years, the computer voice of the Voice Box III takes some getting used to. The Voice Box III utilizes the new SSI 263 speech chip which generates more natural speech than earlier phoneme synthesizers using the popular SC-01 or TMS 5200 chips. As is typical of most commercial voice synthesizers, some English words must be spelled differently so that the Voice Box III can pronounce them correctly.

The Voice Box III offers several interesting features not found on all voice generators. For instance, you can easily switch between male and female voices. Instant sex change! Also, the computer can be set to automatically add intonation to speech, or you can manually add intonation by inserting numbers into the text to be spoken.

Other options include pauses between words, the speed of voice, and the volume. If it is flexibility that you are looking for, Voice Box III offers it, but you must be prepared to spend a lot of time manually fixing the text to get the computer to speak in a perfectly comprehensible voice. ■

### Firms Mentioned In This Column

The Alien Group
27 W. 23rd St.
New York, NY 10010
(212) 741-1770

Creative Peripherals Unlimited
22952 Alcalde, Suite 160
Laguna Hills, CA 92653
(800) 854-8021

Digital Vision, Inc.
14 Oak St., Suite 2
Needham, MA 02192
(617) 444-9040

Intermatrix
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# Commodore's Port

*John J. Anderson*

Avast, maties! Lower the mains'l and heave to. Put in to Commodore's Port for a short while and replenish your stores of unbiased news, reviews, and applications for your Commodore 64. We've got lots to do, so full steam ahead!

You might have heard by this time that Jack Tramiel, founder and former head of Commodore, is now the head of Atari. Lineups in the microcomputer industry change as quickly as in professional baseball, don't they? Well, we'll see if Jack can keep up the same impressive batting average for a team in Silicon Valley. He certainly has his work cut out for him.

### Talk About Mixing Metaphors!

Got a phone call and a care package from Deep Boat the other day. Though he has watched many of his compatriots jump ship in the latest round of battle, he remains loyally at his station, awaiting further orders. Seems a bit of shanghaiting has been going on, and Commodore is not at all happy with the idea that Mr. Tramiel has assembled his order of command with deserters and mutineers from Commodore itself. But Deep Boat will have none of it. He's a Commodorian through and through. While expressing his respect for Mr. Tramiel, he also underscored his confidence in Commodore—assuring me that they are not about to allow TTL (Tramiel Technologies Ltd.) Atari to wrest away Commodore's claim to number one in home computers. (Read Outpost: Atari for more information regarding the Tramiel take-over.)

### Speak of the Devil

Deep Boat backed up his prediction with some very hard evidence: a beta copy of the arcade game, *Satan's Hollow*, for the C-64. I could hardly believe my eyes when I booted up the game. It compares extremely favorably with the arcade version, which (you may or may not remember) featured absolutely incredible graphics.

Though *Satan's Hollow* is to some degree a rehash of Galaxian, it is an extremely engaging rehash, and it has some neat little features all its own. As an arcade game translation, it is utterly superlative, as Deep Boat assured me it would be. The sound effects of the game are also outstanding—completely true to their arcade namesake. Without a doubt, the Commodore 64 has established itself as a graphics and sound machine of unimpeachable repute.

Deep Boat, best of luck, and keep it coming. You never steer us wrong.

### Simon's Sight and Sound

If you have followed the last couple of columns, you know that we have been running a tutorial series from *Commodore 64 Sight and Sound*, a new book available from Creative Computing Press. This month we excerpt a section on hi-res graphics from Simon's Basic.

You may be one of the few C-64 owners around who still hasn't gotten a hold of Simon's Basic. That's a shame, since you are missing out on just about the finest programmer's learning tool available to you. I strongly recommend that you purchase it (it is priced very reasonably) —along with a copy of *Sight and Sound* of course. If you are having trouble locating the book at your local bookstore or software dealer, give us a call here at the magazine, and order one direct.

Enough shameless plugging. On to the good stuff.

### Hi-Res Graphics

Simon's Basic puts the powers of high-resolution graphics at the fingertips of the beginning programmer. As opposed to low-res character graphics, hi-res allows you to plot geometric shapes. With just a few simple commands, you can build complex, multicolor pictures.

### HIRES

The HIRES command tells the C-64 to go into high-resolution mode and in what screen and plot color to do so. By plot color, we mean the color the C-64 will use to draw on the hi-res background color when we get around to drawing on it. The format is

```
HIRES screen color, plot color
RETURN
```

A HIRES command cannot work on its own, however. It needs some help.

### LINE

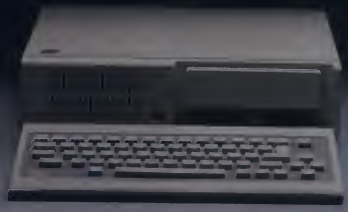
The LINE command allows you to draw a line on the hi-res screen from one point to another. The program

```
10 HIRES 0,1
20 LINE 20, 40, 300, 250, 1
30 GOTO 30
```

draws a diagonal line across the screen. The format for the LINE command is as follows:

```
LINE beg x, beg y, fin x, fin y, plot
type
```

where beg x is the beginning x value of the line, beg y is the beginning y value, fin x is the final x value, fin y is the final



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The computer at the top has a 64K memory.

It has the initials I, B, and M. And you pay for those initials—about $669.

The Commodore 64™ has a 64K memory.

But you don't pay for the initials, you just pay for the computer: $215. About one third the price of the IBM PCjr.™

The Commodore 64 also has a typewriter-type keyboard with 66 typewriter-type keys. (Not rubber chicklet keys like the IBM PCjr.)

It has high resolution graphics with 320 x 200 pixel resolution, 16 available colors and eight 3-dimensional sprites.

It has 9-octave high fidelity sound.

The Commodore 64 is capable of running thousands of programs for home and office. And if you add a printer or color monitor, disk drive and a modem—all together it just about equals the price of the IBM PCjr all alone. With no peripherals.

So you can buy a computer for a lot of money.

Or buy a lot of computer for the money.

**COMMODORE 64**

IT'S NOT HOW LITTLE IT COSTS,
IT'S HOW MUCH YOU GET.

y value, and the plot type is set to 0, 1, or 2. For now we will always use a plot type set to 1.

At first you are bound to be confused by the placement of x and y plots across the screen. Figure 1 may help give you a feel for the hi-res screen.

Play around with the x and y values for line plots. Before long you will develop a rough idea of where plots occur on the hi-res screen.

Now let's get a taste of the animation potential of Simon's Basic in hi-res. The simple program shown here as Listing 1 allows you to create an animated line

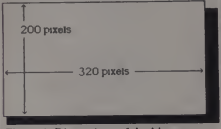



*Figure 1. Dimensions of the hi-res screen.*

plot. You can build on this basic principle to create sophisticated moving pictures. It is used simply here, but can be used in sophisticated ways as well.

As you can see from the listing, all you need to do is build a counter for the x and y values, then set up a loop. Each time through the loop, the line plots to the incremented x and y values. The result: an animated drawing.

## REC

Any guess what the REC command allows you to draw on a hi-res screen? You got it, a rectangle. As with LINE, it takes a while to get used to the numbers you need to use with the rectangle command, but you can get the hang of it with a bit of practice.

First, you tell the computer where you want the top lefthand corner of the rectangle to be. You do this by specifying X and Y coordinates. The only way to get a good feel for these coordinates is to experiment.

Next, you tell the computer how wide and how long you want the rectangle to be. Again, it takes practice to learn what numbers give you the result you want.

Listing 2 is an example of the use of the REC command. Type it in, and see where this set of coordinates places the triangle. The command is

REC beg x,beg y,width,length,plot type

where beg x and beg y are the coordinates of the top lefthand corner of the rectangle, width is the horizontal width of the rectangle, and length is the vertical length of the rectangle.

What about that strange number 1 tacked on the end of the expression? Well it tells the computer that this is a normal plot. We will look at inverse and clear plots just ahead. For now, all you need to know about is plot type 1.

First, look at Listing 3. It puts the REC command to work for you in an animated plot.

Pretty good results for just a wee bit of effort, wouldn't you say? This program is very easy to understand once you get a grip on the REC command. It is a loop, and each time through the loop it increments the corners of the rectangle. The top lefthand corner moves down and to the right, while the bottom righthand corner moves up and to the right. This gives a three-dimensional effect. We stop plotting when X gets to 251, so we won't error out. We actually begin plotting the entire figure again, but you can't see it happen, because it is plotting right over itself.

## A Closer Look at Plot Types

Let's try to gain an understanding of plot types by playing with the plot types in our last example program. We'll change the plot type of the program by changing the last value in the REC statement, the plot type, to 0. What happens?

If we specify a plot type of 0, nothing gets plotted. If a plot type 0 encounters a plotted line, it will actually erase it. This comes in handy for "undrawing" animated shapes. Listing 4 provides an example.

As we saw earlier, a plot type of 1 is a normal plot, drawing a shape in the plot color across the background. No need to look any further at that plot type right now.

A plot type of 2 "inverses" whatever it encounters. It turns a plot off if it is on, and on if it is off. We can use a plot type of 2 to make our animated rectangle change shape continously as it does in Listing 5.

## Multi-Res—Best of Both Worlds

So far we have been looking at the hi-res mode, in which we can put one plot color on top of one background color. Now get ready for the multi-res mode, which allows us to plot in three plotting colors, and with a little sneaky footwork, even more.

The multicolor mode, which we shall call multi-res, is a variant of the hi-res mode—with half the horizontal resolution but three times the color. It is up to you to decide which resolution to use with which graphics trade-offs.

## MULTI

The MULTI command, when used following a call to the HIRES command, will cause all plotting to take place in multi-res. Format for the command is

HIRES plot color, background color:
MULTI color 1, color 2, color 3
plot color = 0 - 15
background color = 0 - 15
color 1 = 0 - 15
color 2 = 0 - 15
color 3 = 0 - 15

Note that a MULTI command must always follow a HIRES command. The three parameters following MULTI define the plot colors you wish to use.

Each plot color is selected by its MULTI command designation as the plot type in a plotting command. We will clarify this just ahead. Listings 6 and 7 are some examples of hi-res graphics transposed into multi-res.

In multi-res, each pixel is twice as wide as it appears in hi-res. As a result, multi-res has half the horizontal resolution of hi-res. Still, multi-res has a pretty respectable look, and the trade off results in the ability to put multicolors on the screen.

## Plot Types in Multi-Res

Plot types work slightly differently in multi-res than they do in hi-res to account for the additional colors available. A plot type of 0 still functions to clear a dot. A plot type of 1 plots a dot in color 1. A plot type of 2 plots in color 2, and a plot type of 3 plots in color 3.

If you specify a plot type of 4, the plot will inverse dot color—in the following fashion:

color 0 changes to color 3
color 1 changes to color 2
color 2 changes to color 1
color 3 changes to color 0

This plot type can give you animated rainbow effects for a small expenditure of code.

Creative use of plot types can make animation a cinch. Listings 8 and 9 are some starting points.

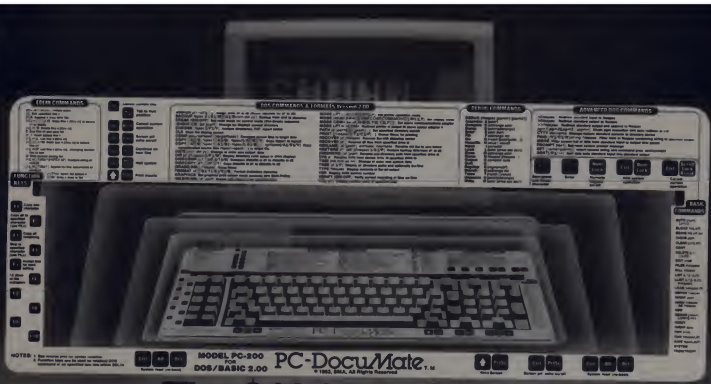
We'll continue our look at hi-res graphics next month. Until then, keep yourself booted up, and enjoy. ■

*Listing 1.*

```
1 REM LISTING 1
2 REM ANIMATED "LINE" PLOT
3 REM
4 REM-----------------------------------
10 HIRES 0,7:Y=0
20 LINE 0,0,300,Y,1
30 Y=Y+4:IF Y>250 THEN 50
40 GOTO 20
50 GOTO 50
```

*Listing 2.*

```
1 REM LISTING 2
2 REM THE "REC" COMMAND
3 REM
4 REM-----------------------------------
10 HIRES 0,7
20 REC 50,50,120,120,1
30 GOTO 30
```

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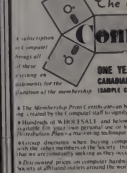


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## Commodore

*Listing 3.*

```
1 REM LISTING 3
2 REM ANIMATED "REC" PLOT
3 REM
4 REM----------
5 X=11Y=38:A=150:B=150
10 HIRES 0,7
20 REC X,Y,A,B,1
30 X=X+5:Y=Y+11:A=A-2:B=B-3
35 IF X>256 THEN 50
40 GOTO 20
50 GOTO 50
```

*Listing 4.*

```
1 REM LISTING 4
2 REM "UNDRAWING" TO ANIMATE
3 REM
4 REM----------
10 HIRES 0,7:X=51:Y=5
20 REC X,Y,X+10,X+10,1
30 FOR Z=1 TO 10:NEXT Z
40 REC X,Y,X+10,Y+10,0
50 X=X+11:Y=Y+1
60 IF X<300 THEN 10
70 GOTO 20
```

*Listing 5.*

```
1 REM LISTING 5
2 REM "REC" PLOT "UNDRAWS" ITSELF
3 REM
4 REM----------
5 HIRES 0,7
10 X=11Y=38:A=150:B=150
20 REC X,Y,A,B,2
30 X=X+5:Y=Y+11:A=A-2:B=B-3
35 IF X>256 THEN 10
40 GOTO 20
```

*Listing 6.*

```
1 REM LISTING 6
2 REM ANIMATED "LINE" PLOT
3 REM IN MULTI-RES
4 REM----------
5 HIRES 0,1:MULTI 4,6,2
10 X=200:Y=81:Z=1
20 LINE 0,0,X,Y,Z
30 X=X+2:Y=Y+3:Z=Z+1
40 IF Z=4 THEN Z=1
50 IF Y>250 THEN 5
60 GOTO 20
```

*Listing 7.*

```
1 REM LISTING 7
2 REM MORE MULTICOLORS
3 REM IN MULTI-RES
4 REM----------
10 HIRES 8,7:MULTI 2,4,8
20 REC 5,5,90,90,2
30 REC 10,10,30,30,1
40 REC 25,25,40,40,3
50 GOTO 50
```

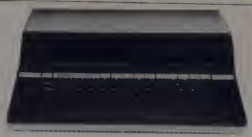
*Listing 8.*

```
1 REM LISTING 8
2 REM MORE ANIMATION USING PLOT TYPE
3 REM IN THE MULTI-RES MODE
4 REM----------
5 HIRES 0,1:MULTI 0,7,5
10 X=100:Y=0
20 LINE 0,0,X,Y,Z
30 X=X+2:Y=Y+3:Z=Z+1
40 IF Z=4 THEN Z=1
50 IF X>250 THEN 10
60 GOTO 20
```

*Listing 9.*

```
1 REM LISTING 9
2 REM STILL MORE ANIMATION
3 REM IN THE MULTI-RES MODE
4 REM----------
5 HIRES 1,8:MULTI 4,1,6
10 X=10
20 REC X,X+10,X+15,X+20,1
30 FOR Z=1 TO 10:NEXT Z
40 REC X,X+10,X+15,X+20,0
50 FOR Z=1 TO 10:NEXT Z
60 REC X,X+10,X+15,X+20,2
70 FOR Z=1 TO 10:NEXT Z
80 REC X,X+10,X+15,X+20,0
90 X=X+11:IF X<70 THEN 10
100 GOTO 20
```

***Jack Tramiel, a look back, a look ahead, and the Amiga Lorraine revisited.***



# Outpost: Atari

## John J. Anderson

It has been nearly a year since I have manned the Outpost, and it feels good to be back. Rest assured that Dave and Sandy Small will return next month, to continue with their Atari machine language tutorial. But I just couldn't resist stepping back into the Outpost to report on Atari's condition following Warner's abrupt sale of the company.

Many of you Atarians who have contacted me through the magazine or visited the *Creative Computing* SIG on CompuServe (PCS-22) know of my continuing loyalty to the Atari machine—and that changing times have not changed those feelings. But undeniably, times have changed for Atari computers. After suffering losses of over a billion dollars in the past two fiscal years, Warner Communications frantically started hunting for a buyer. Their unlikely find was none other than Mr. Jack Tramiel, who as CEO of Commodore International, personally helped

Atari bite the dust in the price wars of 1982. Mr. Tramiel founded Commodore and built it from a storefront operation into a billion dollar company.

He left his brainchild in January, traveled the world for a couple of months, and then negotiated the purchase of Atari Corporation (now under the umbrella of Tramiel Technologies Ltd.) in July. It should be noted that Warner Communications retained the coin-operated arcade game branch of Atari, as well as Ataritel, the experimental telecommunications group. You remember Ataritel, right? Its great claim to fame is that it has survived for nearly three years without ever announcing a product.

So the very man whose name once spelled doom for Atari is now its last chance for salvation. No small irony there, but also cause for hope, I would assert. If there is one thing Mr. Tramiel knows about, it is marketing, and lousy marketing helped kill the old Atari. It may be that Jack's hubris will get the better of him this time, and that nobody can save Atari. Jack may also be the one person in the world who can turn the company around.

I was impressed with his very first moves as CEO and chairman. He laid off almost all middle and upper level managers and treated Atari's recovery as if it was the start-up of a wholly new company. This, I believe, was the only successful way to plan a comeback. If too much of the old Atari remained, the deck would be fatally stacked. The company truly needed a totally fresh start, and the first thing Tramiel did was to see that Atari got it.

Nobody is really sure what Jack Tramiel will do to and for the Atari product line. It seems likely that the Atari 800XL will continue to be sold, at least through early 1985. As for everything else, all bets are off. It is now highly unlikely that the 1450 XL, with built-in parallel bus disk drive and modem, will ever see the light of day.

***The company truly needed a totally fresh start, and the first thing Tramiel did was to see that Atari got it.***

Jack is savvy enough to know that the 1450 is last year's product. He wants to get *next* year's out the door as soon as possible. And the 1450XL is not it. Hence we'll be hunting for another machine to top the Outpost column masthead. We have a hunch, but more on that up ahead.

The only thing we are quite sure of is Tramiel's confidence. "We'll be number one within a year," he told *Infoworld*.

### A Look Back

The Atari was my first computer, and it was probably somewhat due to the Atari that I got a break in the world of microcomputer journalism. Atari was the first computer company I ever wrote about for money. Most of the comment was praise, but I was first critical of

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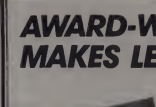


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Atari in an *Infoworld* editorial way back in 1981. Atari was at the time taking full page ads in trade papers telling pirates that "the game is over." Talk about a terminal case of the smuggies and a wrong-headed approach to public relations. Aside from criticizing this, I decried the company's noncrediting of individual programmers on their software packages and wrote that Atari tended toward "schizophrenia" because of its size and the way it competed against itself. I suggested that a new approach was necessary if the company was to avoid a marketing problem and an image problem.

When I finished my first Outpost:Atari in November of 1982, Atari was finishing up a smash hit year. Video games were the American rage, and Atari was *the* video game company. It seemed they could do no wrong, and top-level managers began to believe in their own infallibility. It seemed, too, that the decision had been made to allow the superlative 400 and 800 computers to languish, while the company spent millions promoting games.

Right up until the end, that stupendous miscalculation prevailed: witness the unbelievable introduction of the model 7800 videogame unit weeks before the old company's demise. Meanwhile the computer line had been cheapened and made less compatible with itself. *No-*

**Atari is in a precarious state now with one foot on Jack Tramiel and the other on a banana peel.**

*body* near the mechanism of decision-making (if there was any such mechanism at Atari) ever had much of an idea of what a product line should really be about. And about the last thing they ever would have done was listen to somebody who did.

After a year manning the Outpost, I had grown depressed. My marketing criticisms had become a monthly soap opera and were more caustic each time around. My feelings about Atari the company became counterproductive to the column. My dealings with Atari corporate were at an all-time low, and it seemed as if there was a new public relations director almost weekly. Atari had begun to lose money, you see, and no amount of Maalox would help. The panic stampede had, by then, warmed up to only a weekend jogger's pace, but already everybody had his sneakers on.

A year later, I can't resist getting in a quick "I told them so." If only they had made the 5200 game machine 400/800 compatible and offered an optional keyboard peripheral. If only they had killed the 1200 on the drawing board. If only they had brought out the 1450 last fall. If only they had acted early to change their image. If only they had protected the morale and egos of their most creative minds. If only they had realized that the videogame and the low-end home computer were no longer separate markets. If only they had cut costs without cutting quality. If only the XL series had been truly compatible with the old Ataris.

If only they had done what I was saying all along, right here in this column, they wouldn't have fallen down and gone bing bang boom. And you know what they say about "the bigger they are."

## A Look Ahead

Hey, I *know* it's easy to look back and write history and say "they should have listened to me." The hard part is to see into the future and determine where the *avoidable* mistakes are. The trick is to continue predicting things right. Atari is in a precarious state now with one foot on Jack Tramiel and the other on a banana peel. If it falls again, this time its frail bones will shatter. It will go to that big Chuck E. Cheese parlor in the sky.

In Ridley Scott's vision-of-the future movie "Blade Runner," everywhere you look there are Atari billboards and signs. It must have seemed a safe bet back in 1982 that Atari would be a company to survive well into the 21st century. Videogames made twice as much as movies that year (over $7 billion). Upon viewing the film today, the signs seem dated. Timestamped, you might even say.

What are you going to do, Jack, to revive the battered behemoth? How are you going to get people to stop buying IBMs and Apples and your own darned Commodores and start buying TTL Ataris? Do you know what people want? Do you know some minds who can deliver it? Can you get it down to an attractive cost without sacrificing quality and performance? Can you manufacture it in quantity within a reasonable amount of time?

Certainly not out of the blue, no. You need to find a product worth putting your name on, worth putting the Atari name on. And I've got news for you, Jack. I know what that product is.

What do micro buyers want? Easy. They want 1000K RAM, 10Mb of hard disk space; 3-D color animated graphics with a resolution indistinguishable from broadcast TV; a built-in modem, laser-disk interface, and printer; stereo sound on a par with a Moog; and ease of use like the Macintosh. And they want it for $99.95. Deliver this with a free piece of software like a flight simulator that *really* looks and feels like flying through the sky, and you can have your wish. You can be number one again. And maybe stay there for a while.

But this is a machine for the drawing board. It's not the one available now to supplant the tired old Atari computer line. What to glue your name on in the meantime, while you await the dream machine? You've got to get as close to that set of specifications as you can, at as close to the price. Most important, you

**Using bit-plane animation, an approach used by machines costing upwards of $50,000, the Lorraine creates fluid movement in multi-color hi-res.**

must be willing to take a risk. If you introduce just another IBM-compatible, you will surely go down the tubes. Sure, IBM compatibility would be nice, but you had better be able to do a whole lot more. Fact is, the IBM standard is mediocre, and most of the public knows that by now. You need something more, much more, much more. And now I'll give you the name, address, and telephone number of the company to get in touch with.

## Who'll Stop Lorraine

Way back in the April 1984 issue of *Creative Computing* (p.150), I reported on a new computer from Amiga, a company known only as a manufacturer of joysticks and a kludgy foot-controlled joystick called the Joyboard. I had been ready for another big presentation resulting in a big letdown, but I was surprised. The machine, code-named Lorraine, was a total knockout. I'll stand by the comment I made then: "Suffice to say it is the most amazing graphics and sound machine that will ever have been offered to the consumer market."

The Lorraine is based on a 68000 microprocessor, running at 8MHz—faster than the Macintosh. The CPU is backed up by three custom VLSI

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## Atari

chips to handle graphics, sound, and I/O (sound familiar?), and 128K RAM, expandable to at least 1Mb. A 5.25" internal floppy capable of storing 320K is standard. An expansion box, which will contain a second floppy drive, card slots, and space for an optional hard disk is already planned.

As for the graphics of the Amiga Lorraine, well, they nearly defy description. Using bit-plane animation, an approach used by machines costing upwards of $50,000, the Lorraine creates fluid movement in multi-color hi-res. In my earlier report I stated that the "Lorraine is capable of providing multi-color, real-time animated images on a par with (and probably superior to) Saturday morning cartoons." NTSC and RGB video outputs will be provided, as will 80-column text display. Sound capabilities, you ask? Yes, four-channel stereo with speech capability.

The first time we saw the Lorraine at Winter CES it was a landscape of breadboards. By summer CES, the PROMs were in hand, but development systems were needed to drive them (pay no attention to that man behind the curtain). By the time you read this, the first working prototypes will be in operation. The Lorraine is a reality in search of marketing.

And without the marketing, even a machine like the Lorraine won't get off the ground—even with a custom chip set by Jay Miner (who, incidentally, designed the custom chip set for the Atari 400 and 800 machines). And that is why you are reading about the Lorraine in Outpost: Atari. In April, I called the Lorraine "finally, the next-generation Atari."

Jack, it is up to you now to be wise enough to see that this is true. Get the cost down to $1000 and perhaps someone like Thomas Dolby to be the spokesman. Then get the machine out the door—with your name on it. And remember, Mr. Tramiel, your name is Atari. Do it proud. ■

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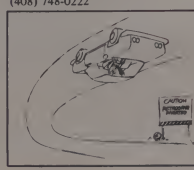

## MegaBasic: Rolls Royce or Subaru?

# IBM Images

Susan Glinert-Cole

### MegaBasic

Billed as the Rolls Royce of Basics, this language is a product of the American Planning Corporation. It features direct addressing of one megabyte of memory, a semi-compiled run-time package for zippy execution and a Forth-like language extensibility. MegaBasic edges into the domain of block structured languages like Pascal by supporting recursion and parameter passing by value or address. Like Morgan Microcomputing's Professional Basic, MegaBasic allows program lines, functions, and procedures to be referred to by name. Up to 64 separate "packages," which can be used either as separate programs or as overlays, can coexist simultaneously in memory.

The version reviewed here is 4.1, which requires an 8086/8088 processor, 128K, one disk drive, CP/M-86, MPM-86, TurboDOS, MS-DOS, or PC-DOS. Although the manual talks about several utilities that were supposed to be on the disk, only one was actually present on my copy: a program size compressor.

Numeric representation is Binary Coded Decimal (BCD) floating point with a range of $-10^{63}$ to $10^{63}$. BCD represents decimal values up to the precision limits exactly. This eliminates the "missing penny" problem resulting from round-off error; BCD is especially suited, therefore, for financial calculations. APC supplies both 8-and 14-digit precision versions of the MegaBasic system on the diskette. Unfortunately, there is no way to use any numeric representation other than BCD that I could find. Integer freaks will be disappointed.

The documentation is a handsome 304-page manual with a table of contents, index, and (bless their hearts) tabbed section dividers. Unfortunately, it is inadequate considering the tremendous number of new functions and statements introduced, not to mention a different editor. Very few examples show actual command usage in proper context, although there are several programs on the disk to study. This wouldn't be a big problem if the syntax were identical to IBM's, but there are subtle differences which you must figure out by trial and error. The documentation is also out of sync with the disk: files mentioned in the manual didn't exist, and several files on the disk were not mentioned. It didn't take too much to figure it out, but I expect the documentation to save me the trouble of having to do that. The manual needs a thorough overhaul before it can be given a passing grade.

**MegaBasic has an impressive range of new functions, statements, and low level system interface tools.**

### Pros

I'll start with the good news: MegaBasic has an impressive range of new functions, statements, and low level system interface tools.

In addition to the usual string functions, like LEN(X$), CHR$(X), and STR(X$), MegaBasic provides a full complement of convenient extras. TRIM (X$) returns the string X$ stripped of all leading and trailing spaces. REV(X$) returns X$ with the characters in reverse order. If you prefer a more exotic order, RESEQ(X$,N) will reorder X$ depending on the value of N. The returned sequence begins with the first byte of X$, followed by the Nth byte, followed by the Nth byte after that and so on. The process wraps around to the beginning of the string and continues until all the bytes have been accessed. The manual points out that this function is useful for restructuring a string from a row/-column order to a column/row order and vice versa, sector translation tables for operating systems, and playing card games. MIN(X&,Y$, . . . ) returns the minimum string expression value listed; MAX(X$,Y$, . . . ) returns the maximum.

The math functions available are comparable to PC-Basic, with several extras. One unusual one is POLY(X,A(),D), which returns the polynomial evaluation of X using coefficient array A() containing D+1 coefficients, where D is the polynomial degree.

A new data definition statement included in APC is ON . . .RESTORE (line list). This statement is a member of the ON . . . GOTO family, permitting multi-way branching based on some boolean value. In this case, the line list is a sequence of line numbers that contain data statements. A data read pointer is set to the first data statement on or after the line number selected in the branch, allowing data selection based on a multi-

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way decision.

Another valuable statement is LOCAL (variable list). LOCAL creates temporary simple variables which can be used within a subroutine, user defined function, or variable. Arrays cannot be used as a LOCAL variable. This would allow you, for example, to declare X in the body of the main program, and use X within a subroutine, without affecting the value of the original X. Variables are not usually permitted scope in Basic, although scope is a regular feature of structured languages.

Two statements are used to create functions and procedures that will be "shared," e.g., available, from outside the main program. This is similar to the assembly language attribute PUBLIC. Functions, whether shared or not, can be multi-line, and do not have to begin with FN.

The segmentation and overlay scheme of MegaBasic is implemented by eight new statements. DEF SHARED (function or procedure) and DEF SHARED DATA (list of variable names) are used to define shared functions, procedures, and variable names. INCLUDE (list of package names) will bring a list of program files containing packages into memory for later execution. LINK (program name) [,(common variables)] will terminate the current program, erase it from memory, load the program specified by the string expression, and execute it. Programs can be dynamically merged during execution with the MERGE (program name) statement. If, for some reason you want to remove program lines after they have been executed, you can do this with the DEL (line number—line number).

A wealth of file and device I/O function, which are sorely missing from PC Basic, are included. DIR$ returns file names, one at a time, from the directory, permitting sequential file processing. FILE(S$) will look up the file S$ in the directory and return a 1 if present, a 0 otherwise. FILEPOS(X) returns the current position of the file pointer from the beginning of the open file X. FILESIZE(X) returns the file size in bytes or, if placed on the left side of an assignment statement, will set the file size to the number of bytes on the righthand side. SPACE(X) returns the number of bytes available on the disk drive.

***The program appears robust; no matter what sort of strange commands I issued, MegaBasic coped without a single lockup.***

The program appears robust; no matter what sort of strange commands I issued, MegaBasic coped without a single lockup. The error messages were not always helpful, but by and large, it was relatively easy to figure out what the problem was.

### Cons

And now folks, for the bad news. As already stated above, the documentation is inadequate. To begin your journey in the Rolls, you are instructed to type BASIC. This results in a FILE NOT FOUND error; there is no file on the disk with such a simple name. Instead, the programs are called mysterious names like MSDBASO8.EXE. A little poking around in the manual will shed some light on the purpose of these files, but it is a bit rude to have the door handle come off in your hand.

The editor in MegaBasic is reminiscent of, but not nearly as good as, EDLIN. Its basic philosophy is very primitive line editing. This is performed by a thoroughly un-mnemonic group of CTRL-letter keystrokes, some of which do not perform as described in the manual. Editing is really weird. You can't move backward and forward on the line; the cursor keys are disabled. Instead, you can enter a line (and do destructive backspacing), or copy an old line letter by letter, word by word, or entirely. Although the manual says you can move backward by word with the CTRL-W command, I found this did a destructive backspace by word (the manual says this is done with CTRL-T). Inserting characters in a line is signaled with a CTRL-Y, which puts a left angle bracket in the line. You enter the desired letters, and emit another CTRL-Y (putting a right angle bracket in the line), when done. Although I entered only short programs, I found editing by this method absolute agony.

In addition to these line commands, MegaBasic has global search move, copy, and replace facilities. There is some mimimal syntax checking when a line is entered; some syntax errors are caught, but others aren't detected until the program is actually run. The superb syntax checking of Professional Basic spoiled me some. After all, IBM Basic doesn't have dynamic syntax checking. I guess I found the half-hearted attempt of MegaBasic more irritating than no error checking at all.

Another problem, which may be due to the poor documentation, is that there doesn't seem to be any way to list a pro-

gram to the printer. Listing 2 was produced by good old Shift-PrtSc. One other point: no sound (not even the primitive but useful beep) or graphics statements are currently implemented.

Listing 1 shows the same PC-Basic Sieve program as last month. This was loaded directly into MegaBasic as an ASCII file. MegaBasic did some partial conversion to its own syntax, (STEP was changed to BY, for example). Other syntax incompatibilities were left for me to change manually (the abbreviated REM statement, for example). After all this, the program ran incorrectly, because of the way MegaBasic handles GOTOS within an IF . . . THEN loop. I couldn't

***If your IBM PC is early vintage, you can give it a silicon facelift with a modest expenditure of $30.***

figure out from the manual how to do it any other way than the kludge in lines 190 and 195. After all this effort, the program times were very disappointing (see Table 1). MegaBasic is not for programmers who want to hear the sound of screeching bits and see smoke issuing from the 8088 during execution.

In short, MegaBasic isn't exactly a Roll Royce. It reminds me more of my Subaru. Bristling with bells, whistles, and knobs to twiddle, it is slow to accelerate, dependable, and runs like a clock.

### Miniature Vignettes

If your IBM PC is early vintage, you can give it a silicon facelift with a modest expenditure of $30 for a new ROM chip. You can tell if your machine is showing its age if its serial number is 0300960 or lower and the BIOS date is 10/19/81 or earlier. The ROM date can be checked with a four-line Basic program:

```
10 DEF SEG = &HFFFF
20 FOR X = 5 TO 15
30 PRINT CHR$(PEEK (X))
40 NEXT X
```

The new BIOS is required if you want to install an expansion chassis or hook your computer into the IBM Cluster. A new BIOS chip is supplied with these two hardware extensions, but you might find some piece of hardware that requires the update. It is available from IBM as part number 1501005; the kit includes a chip puller, instructions and, of course, the chip itself.

```
 10 '                        Sieve of Eratosthenes
 15 '                             PC-BASIC
 20 '
 30   TIME$ = "0:0:0"
 40   DEFINT A-Z: MAXINT = 1000:PRIME = 2
 50   DIM X (MAXINT)
 60   FOR I = 1 TO MAXINT STEP 2
 70     X(I) = I
 80   NEXT I
 90 '
100     PRINT PRIME;
110 '
120   IF PRIME * PRIME > MAXINT THEN 180
130     FOR I = PRIME * PRIME TO MAXINT STEP PRIME + PRIME
140       X(I) = 0
150     NEXT  I
160 '
170   FOR J = PRIME + 1 TO MAXINT
180     IF X(J) > 0 THEN PRIME = J:GOTO 110
190   NEXT J
200   PRINT: PRINT "elapsed time = ";TIME$
210   END
```

*Listing 1.*

```
10 Rem              Sieve of Eratosthenes
20 Rem                   MEGABASIC
30 Rem
40    MAXINT = 1000: PRIME = 2
50    Dim X (MAXINT)
60    For I = 1 to MAXINT by 2
70      X(I) = I
80    Next I
90 Rem
110     Print PRIME,
120 Rem
130   If PRIME * PRIME > MAXINT then 180
140     For I = PRIME * PRIME to MAXINT by PRIME + PRIME
150       X(I) = 0
160     Next  I
170 Rem
180   For J = PRIME + 1 to MAXINT
190     If X(J) > 0 then PRIME = J
195     If X(J) > 0 then Goto 110
220   Next J
230 Rem
240   End
Ready
```

*Listing 2.*

| Basic | Time (in seconds) |
|---|---|
| PC-Basic (interpreted) | 13 |
| PC-Basic (compiled) | 4 (single precision) |
| Professional Basic | 8 |
| MegaBasic (interpreted) | 20 |
| MegaBasic (runtime) | 19 |
| MegaBasic (runtime, crunched) | 18.5 |

*Table 1. Sieve of Eratosthenes.*

If you are tired of the same old black and white in the high-resolution graphics mode, one short instruction will change the foreground color to any of 16 colors. The instruction is:

```
OUT &H3D9, COLOR
```

For example, the statement OUT &H3D9,2 will show a black background and a green foreground display.

In keeping with the above short pro-

```
        $$$  ASTRO  $$$

10 CLS:KEY OFF:WIDTH 80:SCREEN 0,1:COLOR 7,0,0:DEFINT A-Z:
   A$=STRING$(2,219):S=0:S$="Y":P=32:P$="8"
20 I$="Out of Fuel (ENTER)":K$="CRASH ! (ENTER)":F=100
30 Y$=INKEY$:IF Y$="1" THEN N=-1 ELSE IF Y$="2" THEN N=0
   ELSE IF Y$="3" THEN N=1
40 F=F-1:S=S+1:P=P+N:LOCATE 24,80:PRINT:IF P<9 THEN P=9 ELSE
   IF P>80 THEN P=80
50 G=SCREEN(1,P):IF G=219 THEN I$=K$: GOTO 80 ELSE IF G=42
   THEN S=S+10:F=F+25
60 COLOR 7: LOCATE 1,P: PRINT S$;:IF RND(P)<.3 THEN COLOR 7:
   LOCATE 24,RND(P)*76+1: PRINT P$;
70 LOCATE 1,1: PRINT S;"";F;: COLOR RND(P)*6+1:LOCATE 24,
   RND(P)*76+1: PRINT A$;:IF F<>0 THEN 30
80 COLOR 7: LOCATE 1,1: PRINT S;"";F;:LOCATE 2,1:PRINT I$;:
   INPUT Y$: GOTO 10
```

*Listing 3.*

grams, Chris Friedl contributed an eight-line arcade game written in Basic (see Listing 3). This is one of the niftiest tour de forces I have seen in a long time. I have played many games with a code size a thousand times larger which are about a thousand times less fun. His description follows.

### Astro

Astro was developed by Ascalon Software in an attempt to find out just how small a game program could be. Astro was first programmed on a TRS-80 and consisted of eight lines of coding each with fewer than 64 characters per line.

The object of the game is to dodge the asteroids while trying to pick up the fuel pods (*). The player controls the ship by using the number keys 1, 2, and 3. Pressing the 1 key will cause the ship to move left. It will continue to move left until another key is pressed, or the ship is a short distance from the left side of the screen. The 2 key stops the sideways movement of the ship, and pressing 3 causes the ship to move right.

One point is given to the player for each unit of fuel expended. In addition to 10 points for picking up a fuel pod, the player receives an extra 25 units of fuel.

Hint: Remember that the PC has a keyboard buffer. Holding down a key for any length of time starts to fill up the buffer. If you press another key immediately after holding down a key, the new direction command will be delayed. This could cause you to crash or miss an opportunity for extra fuel. For best response just tap the key you want and then release it.

### Feedback

Anyone wishing to pay me a timely compliment can do so in the Compuserve IBM PC Sig or *Creative's* own Sig. I am now tuning in several times a week. ■

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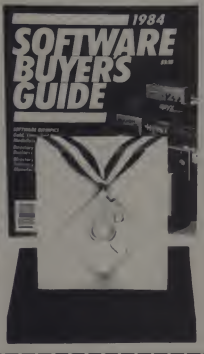


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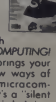

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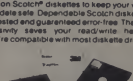

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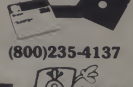

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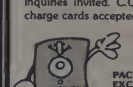

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# Coming Attractions

## November

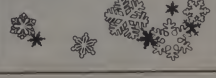
You have been waiting for this for ten years: the incredible tenth anniversary issue of *Creative Computing*. Here is the history and future of personal computing told by the people who made history and who will make the future. An all-star cast of 50 movers and shakers tells you the story from the inside. People like Scott Adams, Rodnay Zaks, Adam Osborne, Peter McWilliams, Carl Helmers, Don Estridge, George Morrow, Clive Sinclair, Seymour Papert, Gordon Bell, John Kemeny, Bill Godbout, and 38 others.

If you are not a subscriber, send in your card today. This one is sure to be a sellout the day it hits the newsstands.

## December

As we barrel forward, this is the month we pause for a second and look back at 1984 and forward to 1985. We will publish our selections for the ten best computers on the market in ten size/price categories, and we will also make our predictions on what will be coming out in 1985.

Our special section will focus on word processing packages—what to look for and getting the most out of a package. Be with us then!



## January

As we start our second decade in earnest, our theme is Technology Today and Tommorrow. Submicron particles, superconductivity, miniaturization, and other futuristic technologies will be explained and examined in depth. Learn what the pioneers in these fields are doing and what impact their work will have on your life.

The special insert section for January will focus on software for forecasting. Barry Keating will discuss what can and cannot be forecast by computer, what programs are available, and how well those programs perform.

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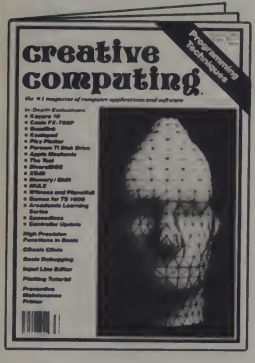


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**2** Circle the number(s) on that card which correspond to the number(s) you'll find at the bottom of the ad(s)/article(s) about which you'd like to learn more. (You'll also find these key numbers on advertised products in this month's Advertiser's Index.)

**3** Stamp and mail the card. The sooner it's sent, the quicker you'll get the literature you're after.

This is an ideal time to subscribe to *Creative Computing*—the #1 magazine of computer applications and software—and save 20%. One year, 12 issues, is just $19.97. (It's usually $24.97.) Just check the box at the bottom of the reply card...and make certain we have your complete present address.

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Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 12 months.

| | 1 *Own* | 2 *Plan to Buy* |
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| Atari | B | M |
| Commodore/PET | C | N |
| Digital Equipment/DEC | D | O |
| Heath/Zenith | E | P |
| IBM | F | Q |
| Radio Shack/Tandy TRS-80 | G | R |
| Texas Instruments | H | S |
| Timex Sinclair | I | T |
| Other (specify) | J | U |
| None | K | V |

3 For what, if any, business application(s) do you use the microcomputer you currently own?_____

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| IBM | F | Q |
| Radio Shack/Tandy TRS-80 | G | R |
| Texas Instruments | H | S |
| Timex Sinclair | I | T |
| Other (specify) | J | U |
| None | K | V |

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| Digital Equipment/DEC | D | O |
| Heath/Zenith | E | P |
| IBM | F | Q |
| Radio Shack/Tandy TRS-80 | G | R |
| Texas Instruments | H | S |
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| Other (specify) | J | U |
| None | K | V |

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