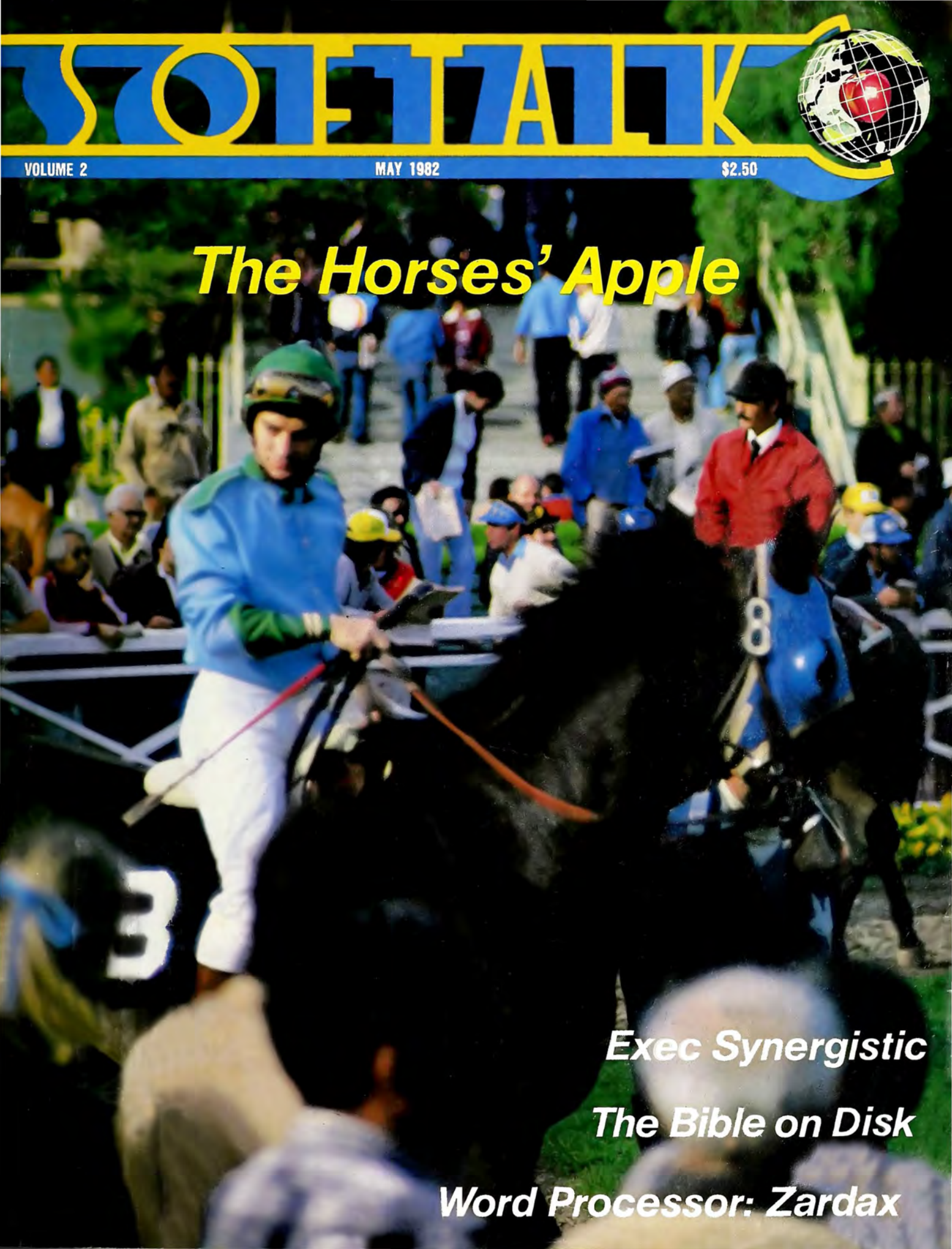
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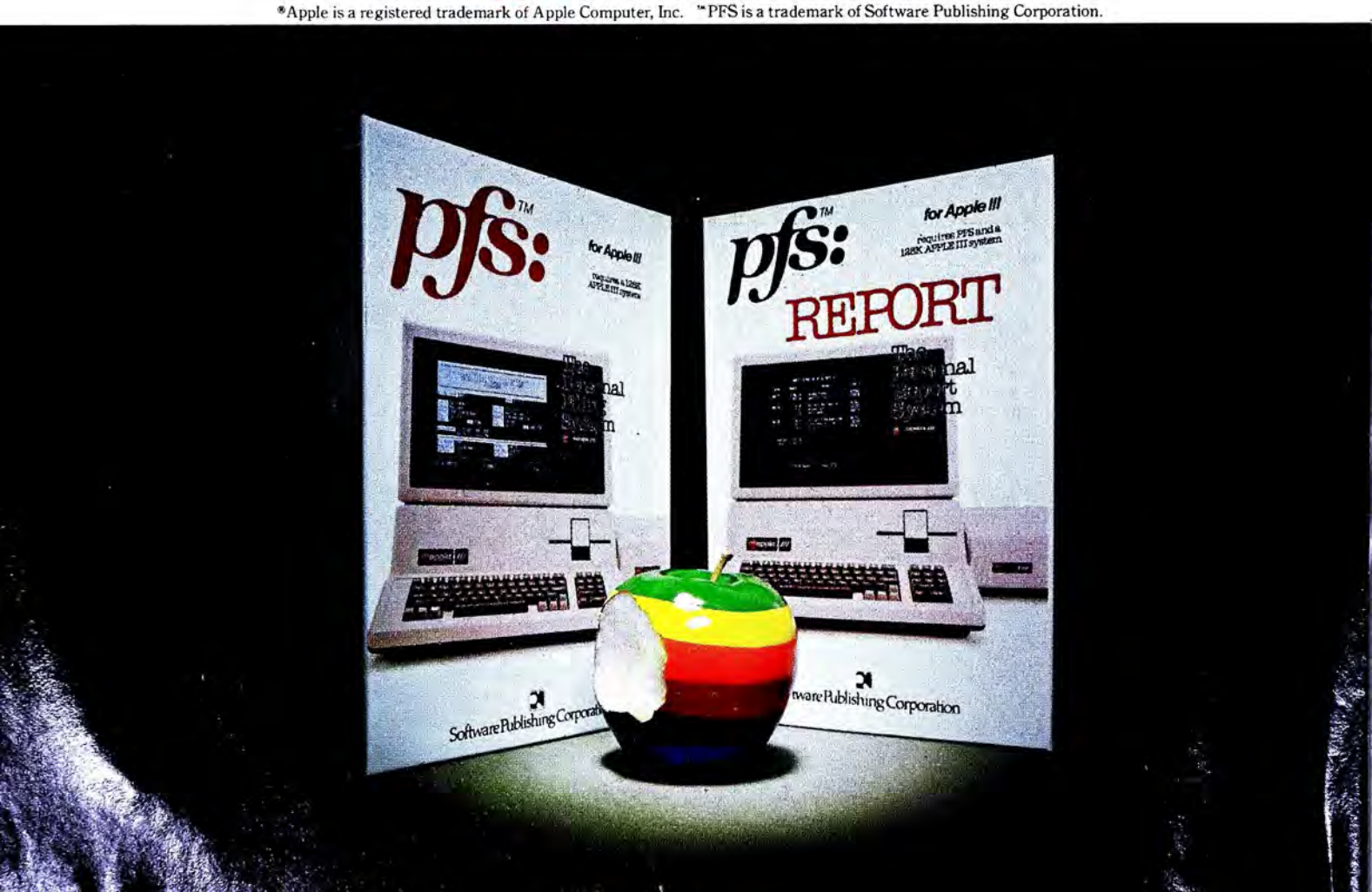
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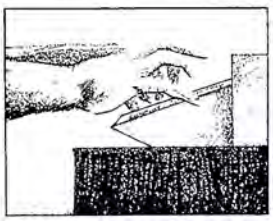
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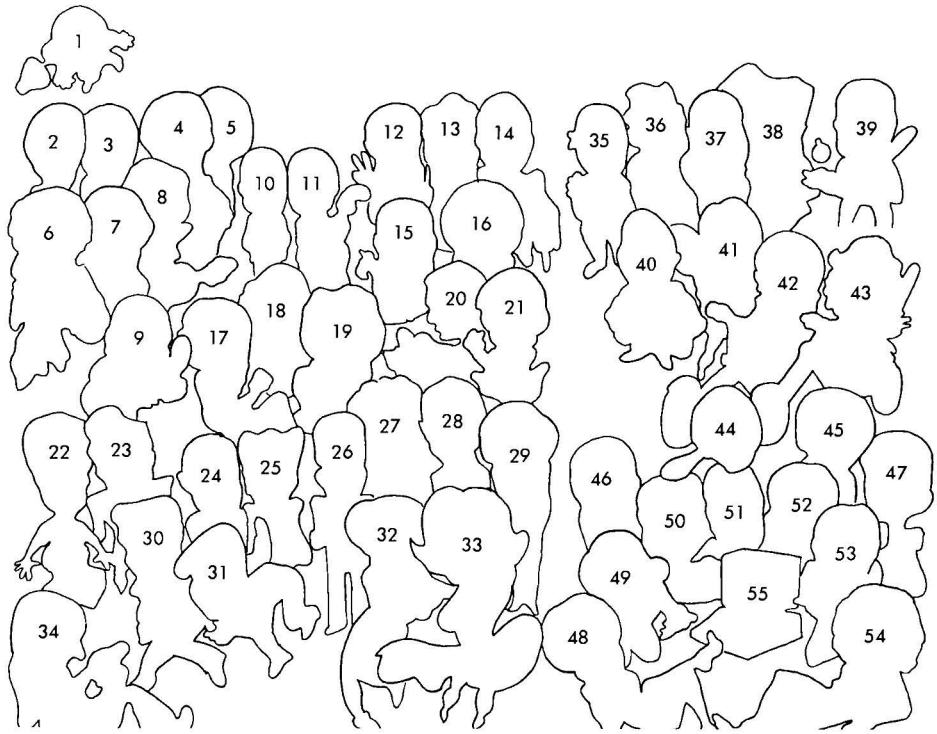
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CONTEST: DIG THE DECADES



The conglomeration of people picnicking on pages 136 and 137 represents some of the outstanding personalities of three decades, 1952 through 1982. Most would be known to anyone at all familiar with those eras; a few require some acquaintance with the Apple world.

The person who names correctly the greatest number of pictured people will win $100 worth of *Softalk*'s advertisers products. In case of a tie, the random number generator will labor again.

Fill in each number on the entry list with the name of the person whose caricature on pages 136 and 137 corresponds to the numbered outline on the drawing on this page.

Be sure that your answers also correspond to the list of anagrammed names that follows. The list is given as an assist but it also acts as a check to be sure you choose the correct name in the event that a person goes by more than one.

The best way to proceed is to note the people you recognize immediately; then find the anagrams corresponding to their names and cross them off. When you're stumped on faces, begin solving the remaining anagrams, looking then to fit the names you discover with the faces.

Deadline for entries is June 15, 1982.

Good luck. ❏■

Send this entry form or a facsimile with your answers to Softalk Caricatures, 11021 Magnolia Boulevard, North Hollywood, CA 91601, by June 15, 1982.

Name:
Address:
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Prizes you'd like:
Dealer's name:
Put your answers here (or on a separate sheet)

Your autograph:

1 _____	15 _____	29 _____	42 _____
2 _____	16 _____	30 _____	43 _____
3 _____	17 _____	31 _____	44 _____
4 _____	18 _____	32 _____	45 _____
5 _____	19 _____	33 _____	46 _____
6 _____	20 _____	34 _____	47 _____
7 _____	21 _____	35 _____	48 _____
8 _____	22 _____	36 _____	49 _____
9 _____	23 _____	37 _____	50 _____
10 _____	24 _____	38 _____	51 _____
11 _____	25 _____	39 _____	52 _____
12 _____	26 _____	40 _____	53 _____
13 _____	27 _____	41 _____	54 _____
14 _____	28 _____		55 _____

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Here are the scrambled names of the faces on pages 136 and 137. The names are in no particular order and first and last names (and middle names where appropriate) are mixed together in the anagram.

VALIDGANSEA
LACEBULLILL
GARSONRIRT
CHILDERDRAYA
DRAWHOTROBEDOE
FRONTBOSBANK
LIPAPIE
LLXCOMMA
NIJJILSANPO
HENJNOONNL
TEETHYLUNCH
VANLUDISEL
THESICKMORDS
LESSVILEPREY
SELLBITAG
BANDRINKLIC
HONYRAWLAD
DREDVIKYBLAIN
ROOMAVISIA
ANBIKINGJELLIE
ONERRRAWEGG
NAMEOFFBAHIB
PEJAHSCHTORCYM
EXMIDNIRIJH
NARYLEMMONORI
SHOPINPENDER
TVKNEESZOWIA
ZANEDIRSA
NANADRY
SKYKEENE
JOKERTRILN
LABBUGZEAL
GLUBDELIB
BYNOLADB
ANOANDJEF
SLAYSUCCIAS
HENMAYDOT
FATPEERDON
VEBOSSJET
CRACKKAJOUE
BRERINJURY
DENNYJHONKE
ENDRAJANCHOIRS
ARTGETINHURLMINK
NELOGHNJN
REGGISHEROORAN
LEADBYRRATWROG
BONKDYNEBYBE
REALGRANDANO
SONNYBRATEE
GOODSTARCULN
CNYTUPEAACLMR
MYMOTHERMOSST
HARDIRONCINX
HOWGENEWHITEDSIR

CONTEST WINNERS

Old Contests Never Die. Last September's Contest Contest is still generating winners. Alan Nayer's ASCII Railroad Contest was chosen as runner-up and was published in February.

Nayer's Contest, which was a word game and a number game and a computer game all rolled into one, brought in a load of entries. Ninety-three people filled in the railroad cars with the correct decimal digits and the random generator was put to use to determine the winners.

Michael Ching of Nashua, New Hampshire, was chosen as first-place winner, and he plans to put his prize money toward On-Line Systems's *Time Zone*. In addition, five runners-up will receive one-year extensions of their free subscriptions to *Softalk*: David and Madalyn Babcock of Cupertino, California; Patti Kirk of Indianapolis, Indiana; Dana T. Ring of West Hartford, Connecticut; Don Gregg of Fort Wayne, Indiana; and Carl Mueller of Murfreesboro, Tennessee.

The ASCII Railroad key, according to Alan Nayer, Michael Ching, and the ninety-two other people who correctly filled in the blanks, is as follows:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
0	4	2	6	2	4	5	0	8	4	1	1	0	0	3	7	1	5	8	5	1	2	4	3	6	3	5

A. Control-D
B. *
C. SUB (character name of ASCII 26)
D. >
E. Control-X
F. –
G. 2
H. Backspace
I. Tee (T)
J. Opcode 29 hex = 41 decimal
K. VT (character name of ASCII 11)
L. Linefeed
M. Control-shift-P, user abort of a Pascal program
N. Control-C
O. %
P. Gee (G)
Q. SI (character name of ASCII 15)
R. :
S. You (U)
T. 3
U. Formfeed
V. Half of Canada = CAN (character name of ASCII 24)
W. +
X. $
Y. ? is an abbreviation for the *print* statement in Applesoft
Z. # means *not* = in Integer and is not available in Applesoft

Sirius Contest: The Sirius folk in Sacramento, California, had more than a few laughs when they judged their very own contest that ran in *Softalk*'s January issue: "Are Chet and David Sirius?" To enter the contest, players had to be somewhat familiar with *Hadron*, designed by Sirius's Larry Miller. *Hadron* features hi-res animated graphics and smooth animation in a space chase to destroy an enemy base. Along the way, the player sees two chatty characters nicknamed Chet and David; part one of the contest required recreating a conversation they might have had in space.

The Sirius rules were broad and loose enought not to stifle any creativity. A wide variety of entries came in, but Joseph Towers, of San Francisco, who incorporated the conversation into a poem, was by far the most creative, original and humorous, said the Sirius judges. For his efforts, Towers will be awarded $250 from Sirius. Second place went to Jim Moore of Golden, Colorado, who wrote his entry in the form of a computer program, using the characters of television newscasters Huntley and Brinkley. Moore will be awarded $100.

And three more runners-up: Jeffrey Meyers of North Miami Beach, Florida, George Wright of Ocean Port, New Jersey, and Frank Weil of Larchmont, New York, were selected for honorable mentions. They will receive any game of their choice from the Sirius catalog.

The second part of this contest required completing the game and identifying the musical theme that heralds

GOTO 171

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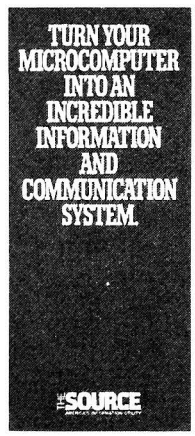
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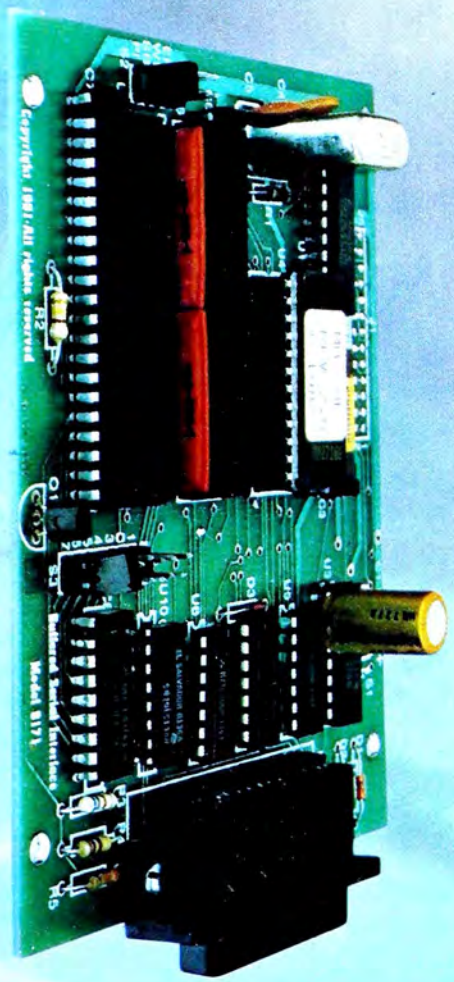
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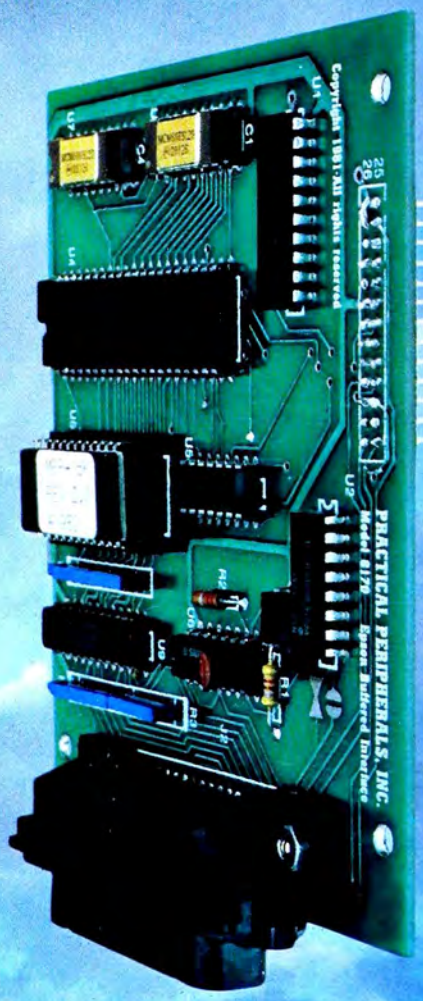
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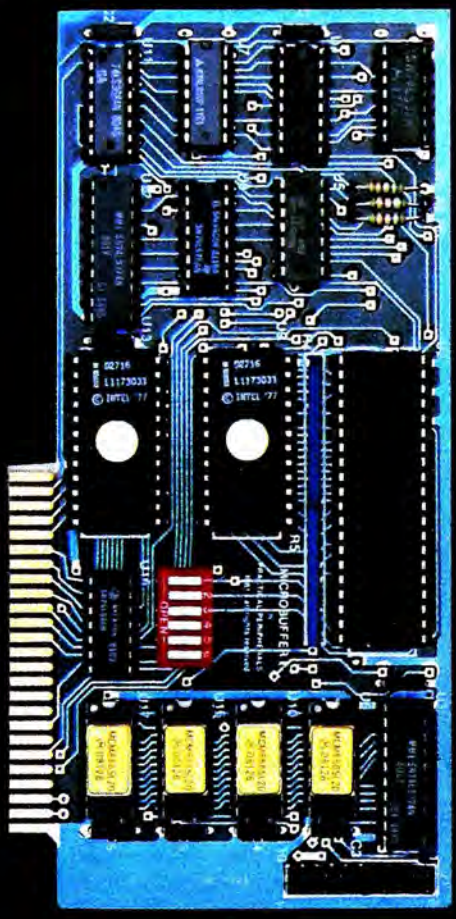
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Compute.

Compute.

Compute.

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Adventure

- **Adventure.** Crowther/Woods. The original text adventure, created on mainframes, contributed to by many over a long time. Very logical within fantasy framework, excellent puzzles, maps; complex, convoluted, and great. Solving problems takes precedence over life/death peril. Several publishers: Microsoft, 10800 NE Eighth, Suite 819, Bellevue, WA 98004. $28.95. Apple Computer, 10260 Bandley Dr., Cupertino, CA 95014. $35. Frontier Computing, Box 402, 666 N. Main, Logan UT 84321. $10.

Apventure to Atlantis. Clardy. The sequel and worthy successor to *Odyssey*. Many refinements, including recruitable entourage of wizards with individual attributes. Included cheat sheet is invaluable. Synergistic, 830 N. Riverside Dr., Renton, WA 98055. $40.

Cyborg. Berlyn. Text adventure with brief action skill game hidden in plot. As a futuristic cyborg—half human, half computer—you're lost in a strange forest, desperately needing human sustenance and a power source for your computer side; find them while seeking clues to your location and purpose—not unlike real life. None of the happenings are random; the game contains the pleasures of a good book. In its realism and use of true plot, it represents one of the most significant advances in adventuring since the original *Adventure* began the genre. Sentient, Box 4929, Aspen, CO 81612. $32.95. *11/81.*

Hi-Res Adventure #2: The Wizard and the Princess. Williams/Williams. Rescue attempt of princess from vengeful wizard features 250 illustrations in full color. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $32.95.

Hi-Res Adventure #3: Cranston Manor. DeWitz/Williams. More full-color adventuring involving the redistribution of wealth. Long on great riddles, short on plot. On-Line, 36576 Mudge Ranch Rd., Coarsegold, CA 93614. $34.95.

Hi-Res Adventure #4: Ulysses and the Golden Fleece. Davis/Williams. Re-creation of the Greek legend, featuring graphics advances and ability to communicate with the characters. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $34.95.

Mummy's Curse. Adventure places you in the desert with nothing but greed and a few dozen ways to die. Good puzzle with amusing hi-res graphics. Highlands, 1422 S.E. 132nd St., Renton, WA 98056. $30.

The Prisoner. Mullich. Superb TV series captured in computer game. Escape from an island requires player to solve logical puzzles, overcome obstacles, and answer riddles. Edu-Ware, Box 22222, Agoura, CA 91301. $29.95. *3/81.*

Space Adventure. Dziabczenko. Hi-res adventure to solve from spaceship cockpit. Onboard computer has six memories to save messages and clues. Animated 3-D color graphics. Sierra, 536 E. Sahara Ave., Las Vegas, NV 89102. $29.95. *1/82.*

Time Zone. Williams/Williams. Epic hi-res adventure featuring ten periods from past and future history all over world and universe on eight double-sided disks. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $99.95. *1/82.*

Zork. Lebling/Blank. Part one of main frame adventure; understands complete compound sentences and questions. Simultaneous manipulation of objects. Text. Infocom, 55 Wheeler St., Cambridge, MA 02138. $39.95. *6/81.*

Zork II. Lebling/Blank. *Zork* came into its own. Great text adventure technique and communication. Infocom, 55 Wheeler St., Cambridge, MA 02138. $39.95. *3/82.*

Business

Accounting Plus II. Software Dimensions. Integrated package: general ledger, accounts receivable and payable, and inventory/purchasing modules. Basic and machine language. Menu driven; prompting. Systems Plus, 3975 East Bayshore Dr., Palo Alto, CA 94303. $995.

Alpha Plot. Kersey/Cassidy. Hi-res graphics text utility; type text on color drawings, charts. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $39.50.

BPI General Ledger. Accounting system for small businesses automates posting of ledgers, financial statement preparation, and closing of books. Includes integrated accounts receivable and payable and all subsidiary ledgers for payroll accounting. Customized set of books can be constructed from available journals and ledgers. BPI, 1600 West 38th St., Suite 444, Austin, TX 78731. $395.

The Data Factory. Passauer. Database management system allows listing files, getting file statistics, selecting another file, transfering records to new database, and adding fields to update forms. Field names limited to five characters; disk swapping required. Excellent product overall; several compatible products available. Micro Lab, 3218 Skokie Valley Rd., Highland Park, IL 60035. $150.

DB Master. Comprehensive database management system with password protection, extensive report creation options. Up to 1,020 characters per record. Stoneware, 50 Belvedere St., San Rafael, CA 94901. $189. MYB, *10/81.*

Dow Jones News and Quotes Reporter. With modem, checks latest financial news and stock quotes for more than 6,000 securities from local Dow Jones databank. Apple Computer, 10260 Bandley Dr., Cupertino, CA 95014. $95. *2/82.*

Personal Filing System. User controls data in totally unstructured database. Up to thirty-two pages (screens) of information in each record. Software Publishing Corp., 1901 Landings Dr., Mountain View, CA 94043. $95. *10/80.*

PFS:Report. Powerful report generator designed for use with *PFS*. Sorts, calculates, totals, formats, prints presentation-quality reports. Software Publishing Corp., 1901 Landings Dr., Mountain View, CA 94043. $95. *10/81.*

- **VisiCalc.** Bricklin, Frankston. Electronic worksheet for any problem involving numbers, rows, and columns. No programming necessary. VisiCorp, 1330 Bordeaux Dr., Sunnyvale, CA 94086. $150.

VisiFile. Creative Computer/Ewing/Zussman. Database management system for organization and retrieval of information, allowing sort and modification of records. VisiCorp, 1330 Bordeaux Dr., Sunnyvale, CA 94086. $250.

VisiPlot. Kapor. Hi-res plotting and graphics package. VisiCorp, 1330 Bordeaux Dr., Sunnyvale, CA 94086. $179.95. *7/81.*

VisiTrend/VisiPlot. Kapor. Combines *VisiPlot* graphics with time-series manipulation, trend forecasting, and descriptive statistics. VisiCorp, 1330 Bordeaux Dr., Sunnyvale, CA 94086. $259.95. *7/81.*

Communications

ASCII Express. Blue. Modem software provides automatic redial, individual macro files, and improved file transfer capabilities. Sends any DOS file; uploads one character or one line at a time. Included utilities convert Integer Basic, Applesoft, or binary programs into text files. Southwestern Data, Box 582-S, Santee, CA 92071. $60. *9/81.*

VisiTerm. Well-planned, comprehensive. Hi-res sixty-character display; wide range of protocols for sending text. VisiCorp, 1330 Bordeaux Dr., Sunnyvale, CA 94086. $129. *9/81.*

Z-Term. Blue. Flexible, customizable communications software written specifically for the CP/M Apple. A quality package. Southwestern Data Systems, Box 582-S, Santee, CA 92071. $99.95. *5/81.*

Fantasy

- **Beneath Apple Manor.** Worth. The original dungeon game for the Apple, created in 1978. Even in lo-res, it still stands up. Quality, 6660 Reseda Blvd., #105, Reseda, CA 91335. $19.95.

Crush, Crumble and Chomp. Freeman/Connelley/Farren. Choose your persona from among six made-in-Japan-type monsters or grow your own, place it in one of world's major cities, and select game objective. Losing is odd sensation; since you're the monster, it's an emotional tradeoff. Automated Simulations, Box 4247, Mountain View, CA 94040. $29.95.

Empire I; World Builders. Mullich. Thinking person's adventure of galactic colonization; characters require food and drink and eventually die of old age—if not before. Interactive Fantasies, EduWare, Box 22222, Agoura, CA 91301. $32.95. *2/82.*

Odyssey: The Compleat Apventure. Clardy. Fantasy adventure far beyond one place and one setting. Castles, catacombs, an ocean voyage, and the orb of power. Synergistic, 5221 120th Ave., S.E., Bellevue, WA 98006. $30. *10/80.*

Ultima. British. Hi-res color adventure, progressing from Middle Ages to beyond the space age. A masterpiece. California Pacific, 7700 Edgewater Dr., Oakland, CA 94621. $39.95.

● **Wilderness Campaign.** Clardy. First fantasy game to leave the dungeon for the great outdoors; first in hi-res; first to bargain with merchants; and more. Synergistic, 5221 120th Ave., S.E., Bellevue, WA 98006. $17.50.

Wizardry. Greenberg/Woodhead. Ultimate role-playing fantasy; ten-level maze in hi-res. Generate twenty characters, six at a time on expeditions. Gripping game, superbly produced. Sir-tech, 6 Main St., Ogdensburg, NY 13669. $49.95. *8/81.*

Graphics

The Complete Graphics System. Pelczarski. A wealth of graphics tools at a reasonable price. Make two-dimensional drawings with game paddles, add text in destructive, nondestructive, or reverse modes, create three-dimensional figures with a panel module, and shape tables with a shape module. Lacks any convenient way to erase; recommended you save frequently. Manual features complete outline of command structure. Penguin, Box 432, West Chicago, IL 60185. $59.95. *7/81.*

Graphics A2-3D1. High-speed 3-D animation package to guide beginner through scene creation, storage, retrieval, movement, and advanced applications. SubLogic, 713 Edgebrook Dr., Champaign, IL 61820. $59.95.

Zoom Grafix. Holle. Graphics printing utility allows display of picture on screen prior to print; prints out selected portion at any size. Phoenix Software, 64 Lake Zurich Dr., Lake Zurich, IL 60047. $39.95. *2/82.*

Home-Arcade

● **Alien Rain (Apple Galaxian).** Suzuki. Monsters in this home-arcade classic seem to take it personally when you gun down one of their kind. Broderbund, 1938 Fourth St., San Rafael, CA 94901. $24.95. *2/81.*

Apple Panic. Serki. Rid a five-story building of crawling Apples and butterflies by running up and down connecting ladders, digging traps in floors, then covering critters over before they can crawl out, fill in holes, jump on your head, and devour you. Extremely addictive, excellent hi-res graphics and play. Broderbund, 1938 Fourth St., San Rafael, CA 94901. $29.95. *9/81.*

Beer Run. Turmell. Catch falling cans of beer as you wend your tortuous way to the thirtieth floor of the Sirius building, evade guzzlers and bouncers through savvy use of ladders and one-way elevators. At the top, catch a blimp to the Olympia Beer building, wherein you repeat the process in reverse. Some benighted souls are still looking for the Artesians. Sirius, 2011 Arden Way, Sacramento, CA 95827. $29.95. *1/82.*

Bez Man. Besnard. Move faster than your adversaries in this improvement on classic eating games. Three hi-res mazes, speed increases with each cleared screen. Bez, 321 Main Street, Irvine, CA 93765. $22.95. 10/81.

Borg. Thompson and Allen. Fight your way through a castle full of gun-toting dragons to find and kill the Grud who controls them. Other dragons tend to shoot each other and run into electrified walls, but Borg is immortal. Amusing hi-res animation and first-rate maze design. Sirius Software, 10364 Rockingham Drive, Sacramento, CA 95827. $29.95.

Bug Attack. Nitchals. Sing along with dagger-wielding ants, blue worms, swarming medflies, a millipede, the 1812 Overture, lots of bright colors, terrific hi-res animation, and bouncy style. Cavalier, Box 2032, Del Mar, CA 92014. $29.95. *11/81.*

Castle Wolfenstein. Warner. First game to fuse successfully best elements of home-arcade and adventure. With naught but a smuggled pistol, you must escape from Nazi stronghold, finding and taking secret plans if you can. Saving game will not help keep you alive, but the pleasures outweigh this minor inconvenience. Room layout changes with each new game. Enemy speaks, in German. Muse, 330 N. Charles St., Baltimore, MD 21201. $29.95. *10/81.*

Ceiling Zero. Warady. Three kinds of alien ships issue from a mothership hovering above a lowering micro-deflection beam, getting smaller and faster and bouncing all over the screen. Fast, smooth, and challenging shoot-'em-up with classy hi-res color and sound effects. Turnkey, 13708 Mindanao Way, Suite 314, Marina del Rey, CA 90291. $29.95. *2/82.*

Crossfire. Sullivan. Aliens come at you from three directions on a grid laid out like city blocks. You can move four directions, shoot in four directions independent of moving. Each alien has four lives and metamorphoses into its next one when shot. Strategy and intense concentration required to monitor continuous action on entire screen and maneuver through alien hordes to bonuses and an ammunition supply. Superb, smooth animation of a dozen pieces simultaneously. One of the great ones. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $29.95. *1/82.*

David's Midnight Magic. Snider. Pinball challenger to *Raster Blaster.* Excellent hi-res graphics and animation. Provision for earning extra balls. Broderbund, 1938 Fourth St., San Rafael, CA 94901. $34.95. *2/82.*

The Eliminator. Anderson. Hi-res home-arcade game pitting your space fighter against numerous adversaries. Adventure International, Box 3435, Longwood, FL 32750. $29.95.

Falcons. Varsanyi/Ball. A hypnotically good home-arcade shoot-'em-up with several levels of complexity. Piccadilly Software, 89 Summit Ave., Summit, NJ 07901. $29.95. *10/81.*

Firebird. Nasir. Put out the fires set by the firebird before the apartment building burns to the ground while simultaneously catching leaping victims and escorting them to a rescue helicopter. Hi-res. Gebelli Software, 1771 Tribute Rd., Suite A, Sacramento, CA 95815. $29.95. *2/81.*

Flight Simulator. Uses aerodynamic equations and airfoil characteristics for realistic simulation of take-off, flight, and landing. SubLogic, 713 Edgebrook Dr., Champaign, IL 61820. $33.50.

Gorgon. Nasir. Home-arcade version of *Defender,* superior in several respects to arcade original. Sirius Software, 10364 Rockingham Dr., Sacramento, CA 95827. $39.95. *8/81.*

Horizon V. Nasir. Okay followup to *Gordon* with superb animation, though not much challenge. Gebelli, 1771 Tribute Rd., Suite A, Sacramento, CA 95815. $34.95.

Jawbreaker. Lubeck. Candy store-oriented eating game with automatically escalated skill levels. A courtroom favorite. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $29.95.

Olympic Decathlon. Smith. Ten standard decathlon events. Hi-res animated athletes, muscle-stirring music; you provide the sweat. Microsoft, 10700 Northup Way, Bellevue, WA 98004. $24.95. *6/81.*

Raster Blaster. Budge. Pinball game as good as real ones. *Softalk* readers' Most Popular Program of 1981. BudgeCo, 428 Pala Ave., Piedmont, CA 94611. $29.95. *5/81.*

Snack Attack. Illowsky. A three-maze eat-'em-up; starts at any of five speed levels. Nonfattening. DataMost, 9748 Cozycroft Ave., Chatsworth, CA 91311. $29.95. *1/82.*

Snake Byte. Arcade action featuring fruit and serpents. Sirius Software, 10364 Rockingham Dr., Sacramento, CA $29.95.

Sneakers. Turmell. Many-layered home-arcade game, one of the best. Stomping sneakers and swarm of other creatures add to the fun. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $29.95. *9/81.*

Space Eggs. Nasir. Invader-type game. Crack floating eggs to get at monsters inside. Then face spiders, fuzz balls, spacewolves, and lips (lips?). One of Nasir's best. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $29.95. *4/81.*

Star Blazer. Suzuki. Bomb-run home-arcade game with five levels, minutely exact animation, and style to burn. A joy. Broderbund, 1938 Fourth St., San Rafael, CA 94901. $31.95. *4/82.*

● **Super Invader.** Hata. The daddy of home-arcades. Still good hi-res, still a challenge. *Softalk* readers' Most Popular Program of 1978-1980. Astar International through California Pacific, 1623 Fifth St., Davis, CA 95616, and Creative Computing, 39 E. Hanover Ave., Morris Plains, NJ 07950. $19.95.

Thief. Flanagan. Shoot robots before they shoot you in hi-res home-arcade. Bouncing ball with evil grin adds more problems. DataMost, 9748 Cozycroft Ave., Chatsworth, CA 91311. $29.95. *11/81.*

Threshold. Schwader/Williams. Another shoot-'em-up. Hi-res graphics, animation, and accurate collisions. Targets include everything from flying maple trees to Volkswagen Bugs, at every speed and flight pattern. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $39.95. *12/81.*

Track Attack. Jochumson. Three-level train

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robbery chase game requiring considerable dexterity. Broderbund, 1938 Fourth St., San Rafael, CA 94901. $29.95. 4/82.

Twerps. Thompson. Home-arcade game with plot, elaborate animation and audio, and severe fuel shortage. Links several different style games together. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $29.95.

Home/Hobby

Apple Speller. Spell-checking program sports listable 31,000 words, extensible up to 5,000 words plus additional volumes. Recognizes contractions, gives file word counts, incidence of a single word, and number of unique words. High marks for clear, logically organized documentation, user friendliness, and simplicity of operation. Sensible, 6619 Perham Dr., West Bloomfield, MI 48033. $75. *1/82.*

DOS 3.3. Increases disk storage capacity more than 20 percent over 3.2. Apple Computer, 10260 Bandley Dr., Cupertino, CA 95014. $60.

DOS Boss. Kersey. Utility to change/shorten DOS commands, customize catalog. Good ideas and witty presentation. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $24. *10/81.*

DOS Tool Kit. Excellent utility package; Apple II Assembler/Editor System and Applesoft Toolkit. Edit, assemble machine language programs; write, edit basic programs. Simplifies graphics, includes character generator. Apple Computer, 10260 Bandley Dr., Cupertino, CA 95014. $75. *10/81.*

Graphtrix. Matrix graphics system designed to add graphics, footnotes, and chapter capabilities to *Apple Writer* text editing system. Data Transforms, 906 E. Fifth Ave., Denver, CO 80218. $65.

Home Accountant. Schoenburg. Thorough and powerful home finance program. Monitors five checking accounts against a common budget, plus credit cards and cash; one-step record of transfer of funds. Continental, 16724 Hawthorne Blvd., Lawndale, CA 90260. $74.95. *4/82.*

Home Money Minder. Schoenburg. Original of *Home Accountant;* bank reconciliation, transactions by month by budget category. Continental, 16724 Hawthorne Blvd., Lawndale, CA 90260. $34.95. *4/81.*

Mastertype. Zweig. Learn to type by playing a game; simple and ingenious. Lightning, Box 11725, Palo Alto, CA 94306. $34.95. 4/81.

Multi-Disk Catalog III. Very fast machine language database program for reading and storing file names, types, and sizes. Fast, powerful sort and search feature. Sensible, 6619 Perham Dr., West Bloomfield, MI 48033. $25. *10/81.*

Personal Finance Manager. Gold. Handles up to 200 entries a month from maximum of fourteen separate accounts. Search/sort/edit routine. Software Dimensions, Apple/Special Delivery, Cupertino, CA 95014. $75. *11/81.*

Super Disk Copy III. Hartley. Easy-to-use menu-driven software library utility; transfers all types of DOS files. Sensible, 6619 Perham Dr., Dept. M, West Bloomfield, MI 48033. $30. *10/81.*

TASC. Peak/Howard. Applesoft compiler. User controls locations of three memory compartments. Microsoft, 10700 Northup Way, Bellevue, WA 98004. $150. *9/81.*

Tax Beater. Lennard/Lennard. Easy-to-use tax software. Adjusts deductions to conform to regulations. Tells whether deductions are high, low, or average for your income. DataMost, 9748 Cozycroft Ave., Chatsworth, CA 91311. $129.95. *4/82.*

Tax Manager. Taso. Modularizes data and saves each module. Complete documented results. Micro Lab, 2310 Skokie Valley Rd., Highland Park, IL 60035. $150. *4/82.*

Tax Preparer. Howard. For accountants and those knowledgeable about tax. Contains eleven IRS forms and ten schedules; can do everything your accountant can. Howardsoft, 8008 Girard Ave., #310, La Jolla, CA 92037. $99. *3/81.*

Typing Tutor. Ainsworth/Baker. Four levels of proficiency; individualized drills created with time response monitoring. Microsoft, 10700 Northup Way, Bellevue, WA 98004. $24.95.

Utility City. Kersey. Twenty-one utilities on one disk. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50.

VisiDex. Jennings. Electronic index card file/agenda program for spontaneous or structured information entry. VisiCorp, 1330 Bordeaux Dr., Sunnyvale, CA 94086. $199.95. *7/81.*

World's Greatest Blackjack Program. Irwin/Cooper/Humble. Teaches basic strategy and card-counting technique for advantage over house. Apple/Special Delivery Software, 10260 Bandley Dr., Cupertino, CA 95014. $50. *11/82.*

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Strategy

Dark Forest. Jewell/Mornini. In cartoony combination of war gaming and fantasy, up to six players try to overcome ubiquitous Gruds to locate treasures in castles. Begins slowly but picks up fast; territorial battle strategies are frequently interrupted by a hungry serpent, a random wizard, and trolls. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $29.95.

Hi-Res Computer Golf. Aronoff. A masterpiece of skill testing, judgment, strategy, and visual acuity. One of the few computer sports simulations that itself requires athletic dexterity. Avant-Garde, Box 30160, Eugene, OR 97403. $29.95.

Pool 1.5. Hoffman / St. Germain / Morock. Make most shots you could on a real table, with the advantages of instant replay and slow motion. Four different games. IDSI, Box 1658, Las Cruces, NM 88004. $34.95. *6/81.*

Robot War. Warner. Strategy game with battling robots is teaching device for programming. Muse, 330 N. Charles St., Baltimore, MD 21201. $39.95. *1/81.*

Sargon II. Spracklen/Spracklen. Computer chess game with seven levels of play. Hayden, 50 Essex St., Rochelle Park, NJ 07662. $34.95.

Southern Command. Keating. Battalion-level Arab/Israeli war game in hi-res color. Strategic Simulations, 465 Fairchild Dr., #108, Mountain View, CA 94043. $59.95.

Word Processing

Apple Writer. The most popular word processing program in town. Type, erase, move words around, save and insert segments from disk, and print out. Easy to use. Apple, 10260 Bandley Dr., Cupertino, CA 95014. $75.

Easy Writer. Word processor; choose 40 or 80 column version. Information Unlimited, 281 Arlington Ave., Berkeley, CA 94707. $99.95.

Letter Perfect. Format-flexible word processor with ability to send control codes within body of program. LJK, Box 10827, St. Louis, MO 63129. $149.95.

Magic Window. Word processing program simulates standard typewriter. Three modes of disk file storage. Softape, 10432 Burbank Blvd., North Hollywood, CA 91601. $99.95.

Screenwriter II. Kidwell/Schmoyer. Formerly *Superscribe II.* No extra hardware for upper-lower case, 70-column display, printer spooling. Edits Basic, text, and binary files; complete search and replace. On-Line, 36575 Mudge Ranch Rd., Coarsegold, CA 93614. $129.95.

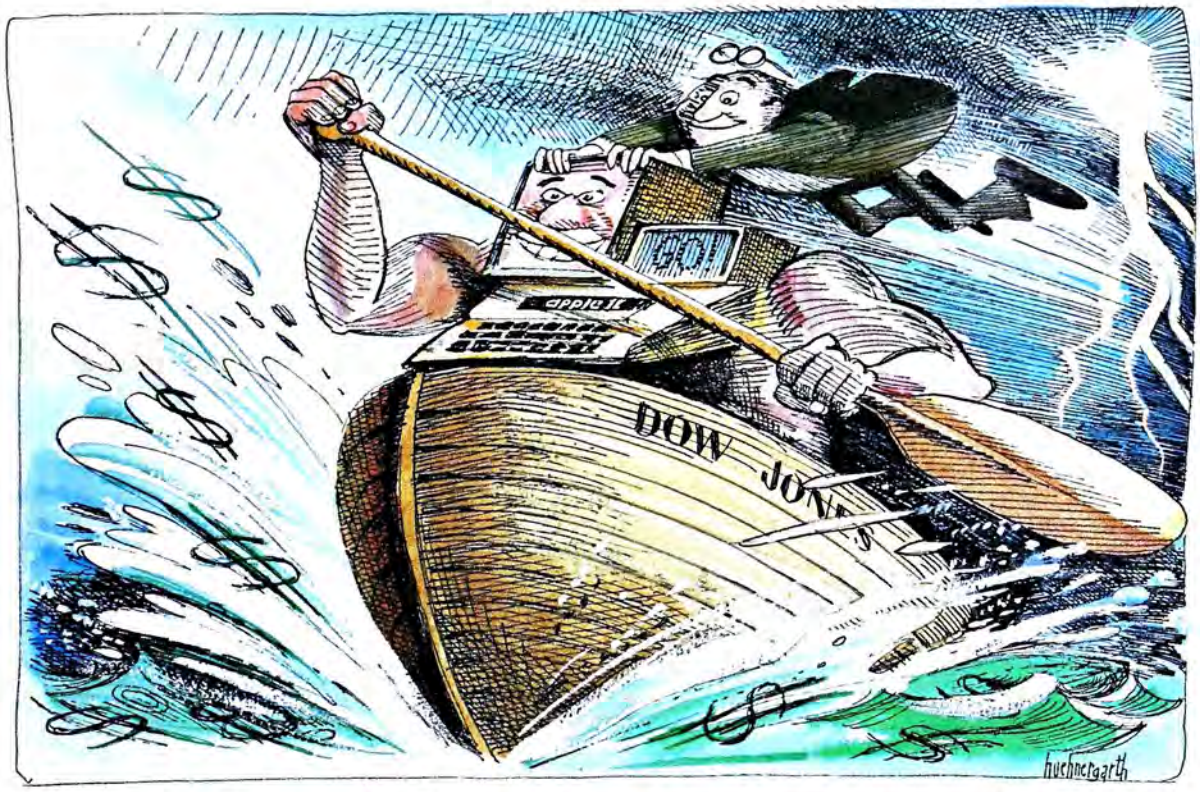
Super-Text II. Zaron. Basics of text editing plus split screen. Character-oriented, floating cursor edit with add, change, math, print, and preview modes. Muse, 330 N. Charles St., Baltimore, MD 21201. $150.

Super-Text III. Zaron. 40/80 column. Latest *Super-Text* update; simplified documentation, footnotes and headers, expandable math mode. Muse, 330 N. Charles St., Baltimore, MD 21201. $175.

Wordstar. Screen-oriented, integrated word processing system in CP/M. Requires SoftCard. MicroPro, 1299 Fourth St., San Rafael, CA 94901. $495.

Zardax. Philips. Highly recommended. Single program includes all standard word processing features with considerable extras including communication by modem. Computer Solutions, Box 397, Mount Gravatt, Queensland, Australia. Available in the U.S. through Action-Research Northwest, 11442 Marine View Drive S.W., Seattle, WA 98146. $295. *5/82.*

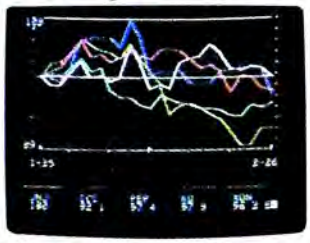
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OPEN DISCUSSION

Peeking at Pictures

I have a solution for Dislocated Memory's dilemma that was mentioned in the Open Discussion section of March '82 *Softalk*. Mr. Arnold stated that long Applesoft programs have a nasty habit of extending into the memory used for hires graphics. Using *lomem* will not help rectify this situation. However, the following scheme will work.

To load a program from disk—and protect the area reserved for *hgr* and *hgr2*, place the following line in your program as the first line (use line number 1 to make sure it comes first):

To protect *hgr* page 1: IF PEEK (104) <> 64 THEN POKE 104,64: POKE 16384,0: PRINT CHR$(4); "RUN name of file"

To protect both *hgr* pages: IF PEEK (104) <> 96 THEN POKE 104,96: POKE 24576,0: PRINT CHR$(4); "RUN name of file"

What this one-liner really does is: (1) *peek 104* looks at the start of program pointer, which normally is 2048. We want it to start at a location above 16384 or 24576, therefore, (2) *poke* this value into the pointer. (3) *Poke 16384* (or *24576*) puts a 00 into the first location of the new program address. This is to buffer the new program from any other data that may be present. (In reality, the program pointer points to the location right after where we think it starts because the pointer low-order byte in 103 is a 01.) (4) Now that the pointer is changed, the program will reload at the requested start location.

With this *peek, poke,* and *print* statement added to your program, the program will load normally, execute the first line, and then reload at the requested location. This allows the program to occupy memory from the end of *hgr* memory space to the maximum available.

I know this procedure works and very well may save some of your readers the time and trouble that I had to go through.
Max (Rich) Crall, San Diego, CA

Tit for Tat

To Steve Nelson and John Butler:

I have the *Apple PIE Text Editor and Formatter* for my Apple and the Epson MX-80/FT printer with Graphtrax. You have helped me so much and I wish to give you some help too.

You can mix all the print codes on one line. Escape-E turns on the emphasized print mode and escape-F cancels it. Escape-S turns on the expanded print mode and escape-T cancels it. You can turn these off and on at random and the mighty Epson will comply with your wishes. You do need to be careful about the spaces with the compressed and expanded mode or you will end up with too much space between words. Just put a space before the print code and then after the print code and you will have no problems.
Marlys Dannenberg, Phoenix, AZ

Sponsorship Is a Phone Call Away

This is a comment on reading my first issue of *Softalk* (March 1982). Unfortunately, the computer store where I purchased my Apple II does not participate in your subscription program. This seems to be the rule rather than the exception in the Chicago area (dozens of computer stores selling Apples, but only a single participating store: Data Domain).

As a Pascal programmer (Apple Pascal) I am extremely interested in the continuing column The Pascal Path. Is there any chance of this becoming a book, or at least of your offering reprints of all the columns at a nominal charge?

A comment on a letter in the March 1982 Open Discussion from Darrell Hunsaker. Regarding his comment on the Videx eighty-column board, my experience is coupled with the Videx lower case enhancer and a Zenith green phosphor monitor. I personally find that this system produces extremely readable upper and lower case characters. The eighty-column board compares favorably with the forty-column output from the Apple on the monitor. Of course any monitor is a substantial improvement over a modulator and TV set combination. I picked the Videx over a ALS Smartterm because of the clarity of the Videx and the lack of true descenders on the Smartterm.
Dave Smaron, Addison, IL

Any dealers may participate in the sponsorship program simply by informing us of their desire to and sending in the names, addresses, and Apple serial numbers of people they wish to sponsor.

Tricky Lifesaver

In response to Paul Robbins's call for "Help!" in your April issue, I am happy to inform him and others who may find themselves in a similar situation that there is hope for people who have a diskette with a damaged catalog.

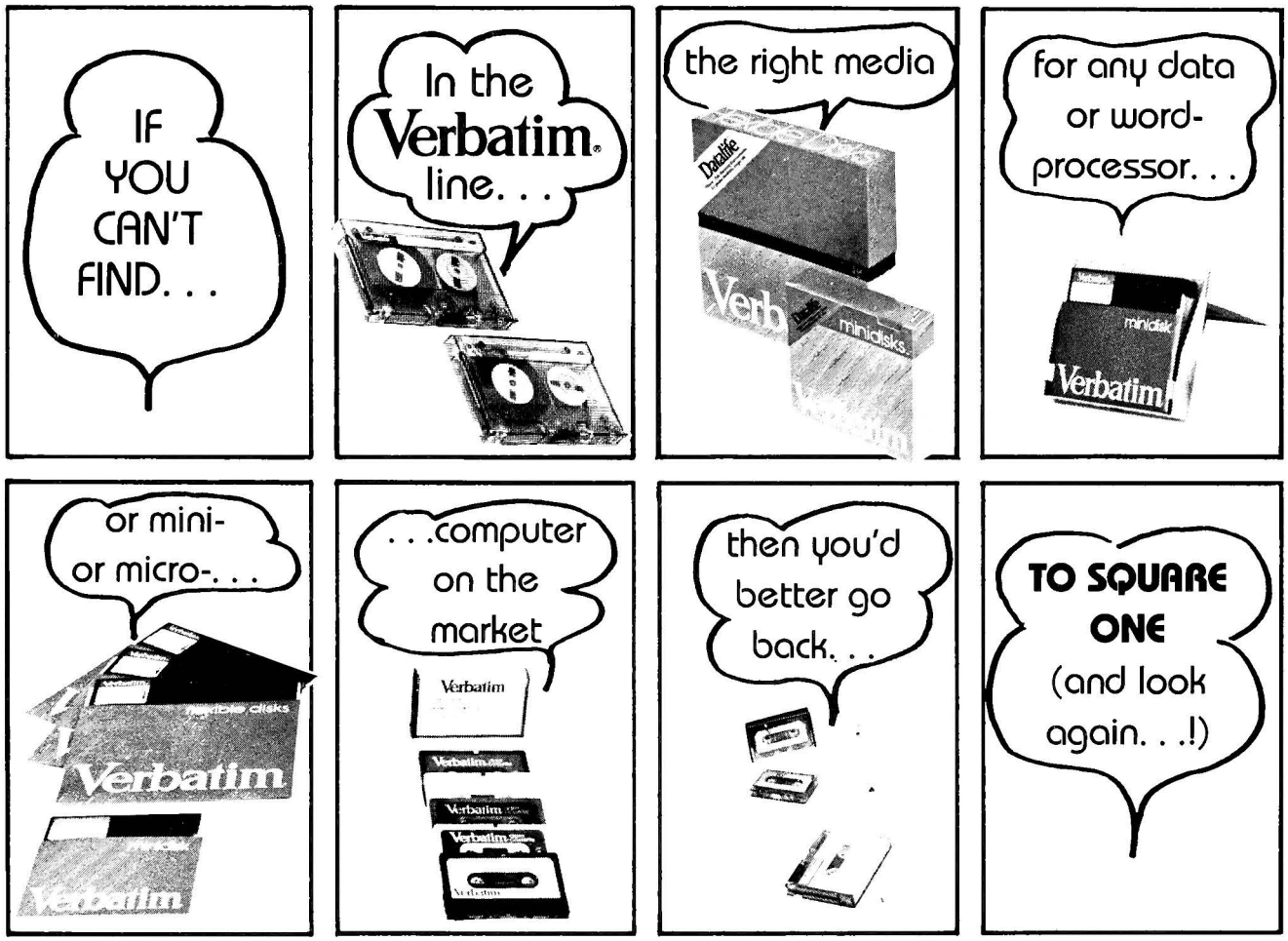
Our latest utility for the Apple, *Bag of Tricks,* includes four powerful and easy-to-use disk utilities, including *Fixcat. Fixcat* works on both thirteen-sector and sixteen-sector diskettes and will work fine on Mr. Robbins's *VisiCalc* storage diskette and any other diskette that has files that were written by the file manager of DOS (all normal diskettes). *Fixcat* checks the integrity of the catalog and file pointers and rebuilds, from

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Future Today
I am writing in response to Steven C. Helms's letter, which appeared in the March 1982, issue. We at SouthWest Ed-Psych Services have a hardware device that we call the Cassette Interface that allows an Apple to start and stop most cassette machines. It plugs into the Apple game paddle port and the cassette remote plug in a matter of seconds. This Cassette Interface can be purchased directly from SWEPS or from local computer stores. Our newest educational software package, entitled *The Reading Machine,* uses this device to achieve the potential for educational applications which Mr. Helms foresaw.
Marley W. Watkins, Ph.D., Phoenix, AZ

Rocky Mountain Low
I have been involved in personal computing for about four years and I write and buy a great deal of software. In the course of searching for a General Ledger package for my business I came upon the *Financial Partner* from the Denver Software Company. First impressions glancing at the documentation in the store were good, and a personal recommendation from another store manager who had seen a demo (but never used the package himself) cinched the transaction. I proceeded to get the package home and after what seemed a fairly long experimentation period (documentation was not as complete or easy to use as I had thought), I intended to open my actual books. Much to my surprise, there was NO way to remove my experimentation files and, in fact, I couldn't open any new accounting period except the period directly following the closed experimentation period. A call to their hot line number confirmed my worst fears:

1. Only one set of books can be run with the package *ever.* If you need additional sets of books (personal accounts, business accounts, etc.), you must buy a separate master disk (generously offered at only $95).

2. No new accounting period can be opened earlier than an existing period.

3. Any practice files or files that you decide need to be redone cannot be removed from the ledger and the data in them can only be negated by inputting offsetting journal entries for each change.

4. The company's paraphrased policy over the phone was that it is the dealer's responsibility to inform you of the software's limitations, to demonstrate it and train you in its use and if you have any problems they should be handled by your dealer who will then deal with Denver Software.

How any dealer can be expected to sit and instruct a potential buyer in the use of each piece of software is beyond me.

I have never before felt driven to write a letter to any magazine, but I felt that this company's approach was so unprofessional that other businessmen and software purchasers should be made aware of this problem before committing their money to a financial package.

The store this package was purchased at has expressed its thanks for having this problem pointed out to them, and has offered to exchange my package for another company's package.
Stephen Abrams, San Diego, CA

Love and Be Lovable and You Will Be Loved
Omega Microware, one of your advertising customers, will not send merchandise. On 2/6/82 I sent a money order for $99.95 for *Locksmith* and to date neither it, nor the money, nor a letter of explanation has arrived. The post office has a tracer on it.

I'd appreciate it if you would inquire as to what their intentions are.

The money order has been cashed long ago.
Bob D. Graham, Buena Park, CA

You are too impatient to begin your copying. Your letter is dated March 15. Most companies require six to eight weeks for delivery of mail-order merchandise. Didn't you ever send for cereal-box goodies?

More on "More on Crystal."
In November 1981 I succumbed to the glorious advertising promises of *Sands of Mars* and *Fantasyland 2041.* Due to their policy of no CODs I plied the plastic and paid the price. I also warned them that I would be moving from Mississauga, Ontario, in February 1982 and of course they promised delivery long before that date. Well, many phone calls and letters later, still no-show. It's likely just as well; I have learned a valuable $150 lesson. To hell with mail-order unless it's COD. And may Crystal find my money and my disks where the sun never shines.
Alex W. Thomas,
Pinawa, Manitoba, Canada

Lonely Hearts and Blue Snakes
The microcomputer software industry is a very young one attracting all types of individuals—some good and some bad. I would like to tell your readers about my experiences with one of each kind. On the negative side, I have had nothing but problems with Crystal Computer. I especially wish to alert readers in any dealings they may have with them in their "User's Club." If you send them a disk, public domain software, and several dollars, they promise to send back a disk of other public domain programs. This I did last July. They took my disk, programs, and quickly cashed my check but they have refused to return the promised soft-

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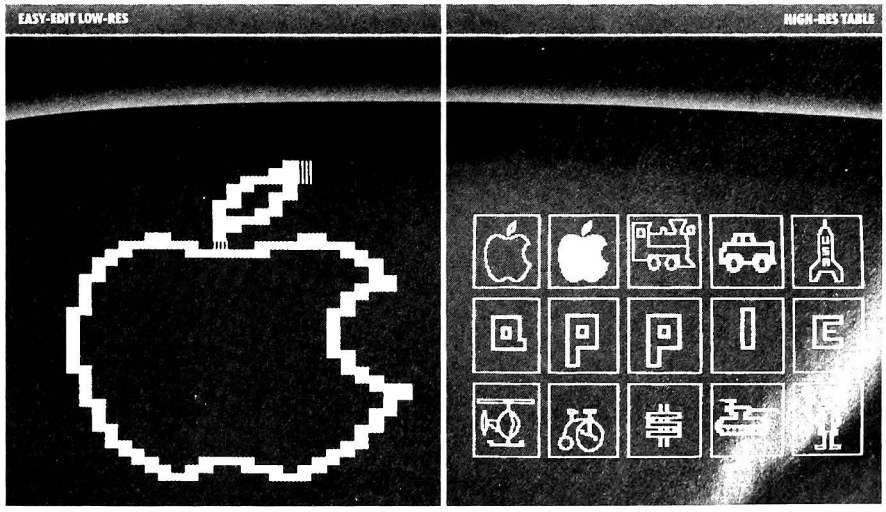
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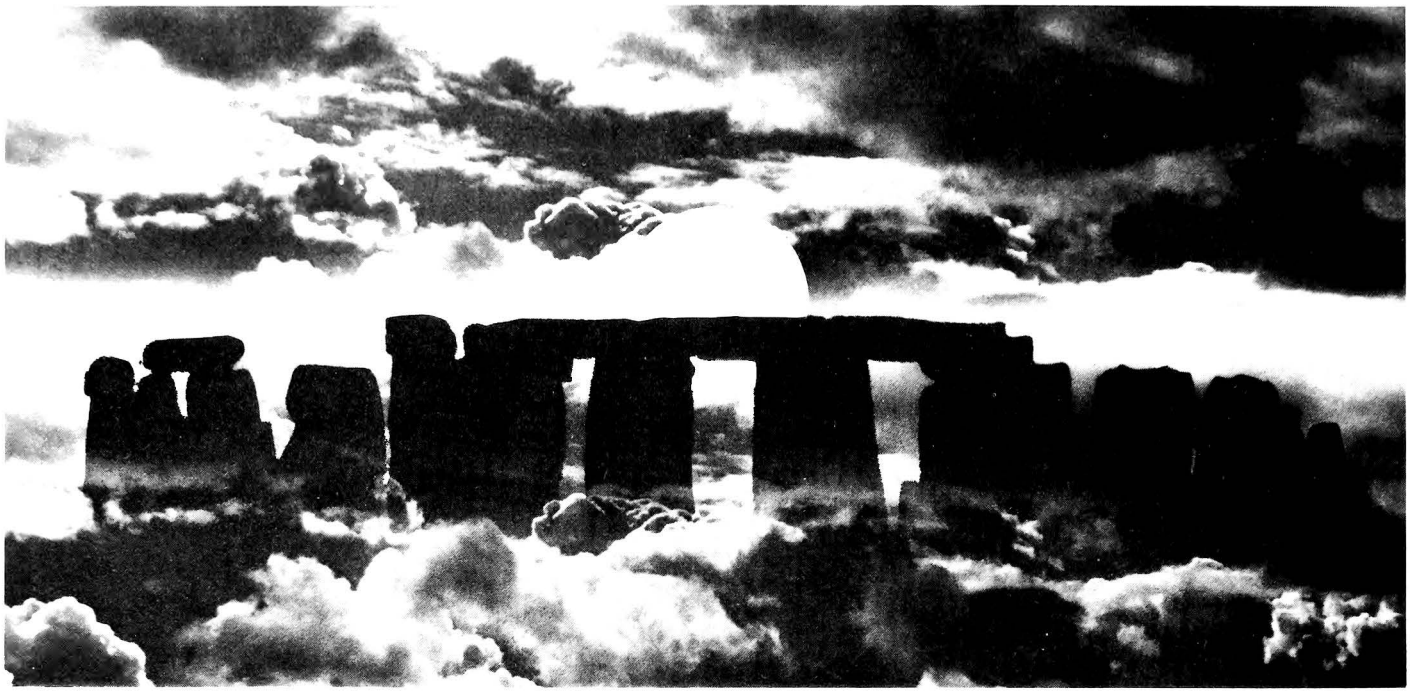
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ware. I have called them three times and written three times. They do not return phone calls (the right person is always "out") or answer my letters. I can live without the software and the amount of money I have lost will not break me, but I do resent the practices of Crystal Computer. In the meantime, I have received several mailings from them in which they crow about their movie contracts, their staff for the software bank, and even a computerized lonely hearts club. They seem to have no time to deliver what they have promised. (Other letters to *Softalk* indicate that they do not feel it is incumbent upon them to correct program bugs.) *Softalk* readers should be warned about dealing with their users' club. (I have since turned the entire matter over to the postal fraud authorities.)

On the other hand, I am very pleased with my dealings with On-Line Systems. I purchased *Superscribe I.* There were several bugs in the copy I had and the manual was very difficult to follow. Several letters to staff members went unanswered and I finally wrote a letter to Ken Williams, their president. The response was immediate. I got a copy of the new version (*Superscribe II*) by express mail along with a letter of apology from their new customer relations manager. He later made several followup calls to make sure everything was satisfactory. The manual was excellent and the program was excellent. I had difficulty in interfacing the program to my Dynatyper and again they were very helpful. As a result, I have recommended *Superscribe II* to others and have since purchased other On-Line programs. Now if I could only get beyond the blue snake.
Saul D. Feldman, San Francisco, CA

Help for the Weary Pascal Printer
In response to Mr. Jim Burke of Iowa City (Open Discussion from January 1982 issue), who expressed his failure to successfully run his printer under Pascal—SSM comes to the rescue!

SSM has several I/O cards for the Apple II computer including the AIO, APIO, ASIO, and AIO-II. All can be implemented under Pascal using SSM's Pascal version 1.1 driver disks (part numbers ADD or ADD-II) for serial or parallel printers, modems, terminals, or even simultaneous usage.
Nina Burns, SSM Microcomputer Products, San Jose, CA

Kudos to Cavalier
The December 1981 issue contains an advertisement on page 10 from Cavalier Computer. For those who haven't seen the ad or possibly just don't remember it, the ad states that Cavalier Computer is offering to bring the readers a free gift for Christmas. In essence, if the reader sends a blank disk to Cavalier, they will return it bearing a copy of *Ring Raiders,* a hi-res arcade-style game.

Well, the ad never stated any deadline date so I gave it a shot and telephoned Cavalier but, as you may have already guessed, the offer was no longer available.

Though I wasn't able to take advantage of this free goodie, I still wanted to take this opportunity to tip my hat and offer a special "thank you" to Cavalier Computer for making such an offer available to us Apple users.

In this day and age of high inflation and high competition, I think it is special indeed when a publishing company will offer any such software program for free. Whether the end purpose was for the sake of publicity and marketing studies, it really doesn't matter. What does matter is that I for one have acquired a bit more respect for Cavalier Computer and will look to them in the future when purchasing software. (By the way, *Star Thief* is, in fact, one of my favorite arcade games!)

With all the controversy regarding the illegal copying and trading of software among computer users, I think that all publishing companies should take a good hard look at their own marketing/software publishing policies. Quite possibly they will find that a more give-and-take attitude is necessary in these times rath-

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er than a get-rich-quick attitude, which is typical of American culture.

'Nuff said. . . .

Martin Halpern, Tustin, CA

Suspicions of an Anonymous Voyee

Please inform Mr. Olivieri to stick to writing columns and stay out of the realm of questionnaires. I don't know who designed this questionnaire but it was almost impossible to comply with; hence this letter. I suggest next time around, format it like a Reader Service Card. These service cards are easily filled out and are easy to follow.

Your peripheral list is quite incomplete. How many disks do I own? Do you want me to count all disks? Including backups? What's a package type? You list most of the categories to the left anyway.

I've noticed throughout the questionnaire that you're quite interested in whose product we own. Why? Isn't a printer a printer? Or perhaps you have been approached by manufacturers and they'd like to know what *Softalk* owners have in detail?

As Bell & Howell say: "Productivity through information." And as Tim Binder likes to say: "Share and enjoy!" Knowledge is the key.

A. Reader

Chatting with Peter

Some months ago you requested that those of us who use our Apples for business purposes advise you so that we might develop a user group with that orientation. I did not get around to responding. Now that you have provided a survey questionnaire I have found the time to fill it in and am returning it herewith.

A major motivation for doing so has been my recent experiences with Jim Howard's *Tax Preparer*, which you feature in the March issue. The copy of my letter to him, dated February 24, 1982, will give you the background. [*The letter told of excellent experience with Howard products the last two years and of shipping delays and bugs in the current version.*] A more recent development has been that the second replacement disk, which I received on March 5, would not even boot.

Jim is having the same kind of problems that many other relatively new business ventures in the fast growing personal computer industry are having. Fast growth coupled with rapid changes cause problems that are hard to cope with. In this case, all of the programs in the Howard line have needed reworking because of the many tax law changes. He is also trying to get out a new line of state tax programs. This effort has required increases in staff and long hours of work. Good business practices, such as returning business telephone calls and replying to correspondence, have not been applied.

Your column, I am hoping, will make a major contribution to the industry by giving it awareness of the need for applying good business methods as well as good technical skills in its operations. Keep up the good work!

C. Gordon Davison,
Fullerton, CA

A Vote for Long Life

I was upset that you did not include Insoft's excellent new language *Transforth* in the list of software to vote for in the January issue. It is an excellent language and deserves a high place in the poll.

It is really a mistake to think of *Transforth* as a kind of Forth. It shares with Forth the reverse Polish syntax, but *Transforth* is a structured, compiled (not interpreted) language that is small and fast and gives you as much control over the Apple as assembly language. It is small, however, because it has no error-checking. Its documentation is not very good, but Insoft provides excellent support and says they will soon begin work on a new manual with a tutorial section and lots of examples.

Maybe I should not write letters of support for *Transforth*. I wrote a letter supporting *Apple PIE* once and that company (Programma) seems to be in financial trouble. I hope I'm not the kiss of death.

Charles Wells, Cleveland, OH

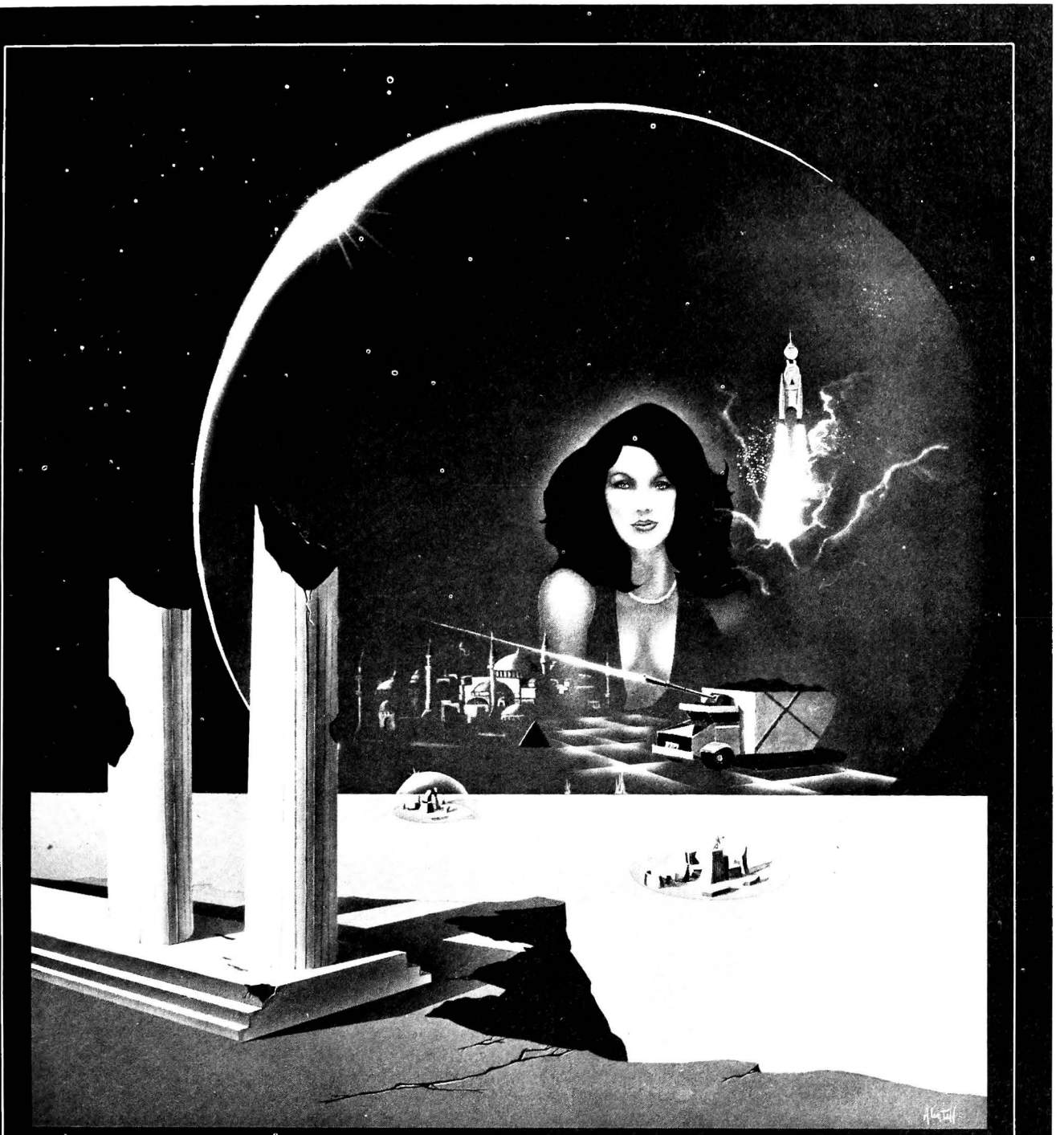
Catching Up with the Times

The November 1981 issue of *Softalk* carried the second portion of Richard Kaapke's review of clock cards for the Apple. In that article, he presented a critique of the Time Machine II card offered by Creative Software Development of West Valley City, Utah.

I was impressed by his description of the Time Machine II features and made a note for reference when I got around to buying a clock card. When that time arrived this month, I ran into some difficulties in placing an order with that particular Creative Software Development company.

The information operator cannot find any listing for Creative Software Development in West Valley City, so I was unable to find a more complete address by telephoning the company. The list of advertisers in *Creative Computing* includes Creative Software Development in Mountain View, California. Since it seemed not too unlikely that the company had moved since Mr. Kaapke's last reference, I called the California company. In that conversation, I was told in no uncertain and rather unfriendly terms that those people dealt only in Commodore software, and would never even consider anything relating to the Apple.

I am somewhat at a loss. I would like to order a Time Machine II card but see no path to that end. Can you offer some help? Perhaps other readers have en-



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By David Mullich, author of THE PRISONER

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Programmed, ready-to-use.

All functions are fully programmed. Insert the Novation Apple II diskette and you're ready to start talking with the world. It's self-prompting. No homework needed.

Set it on automatic

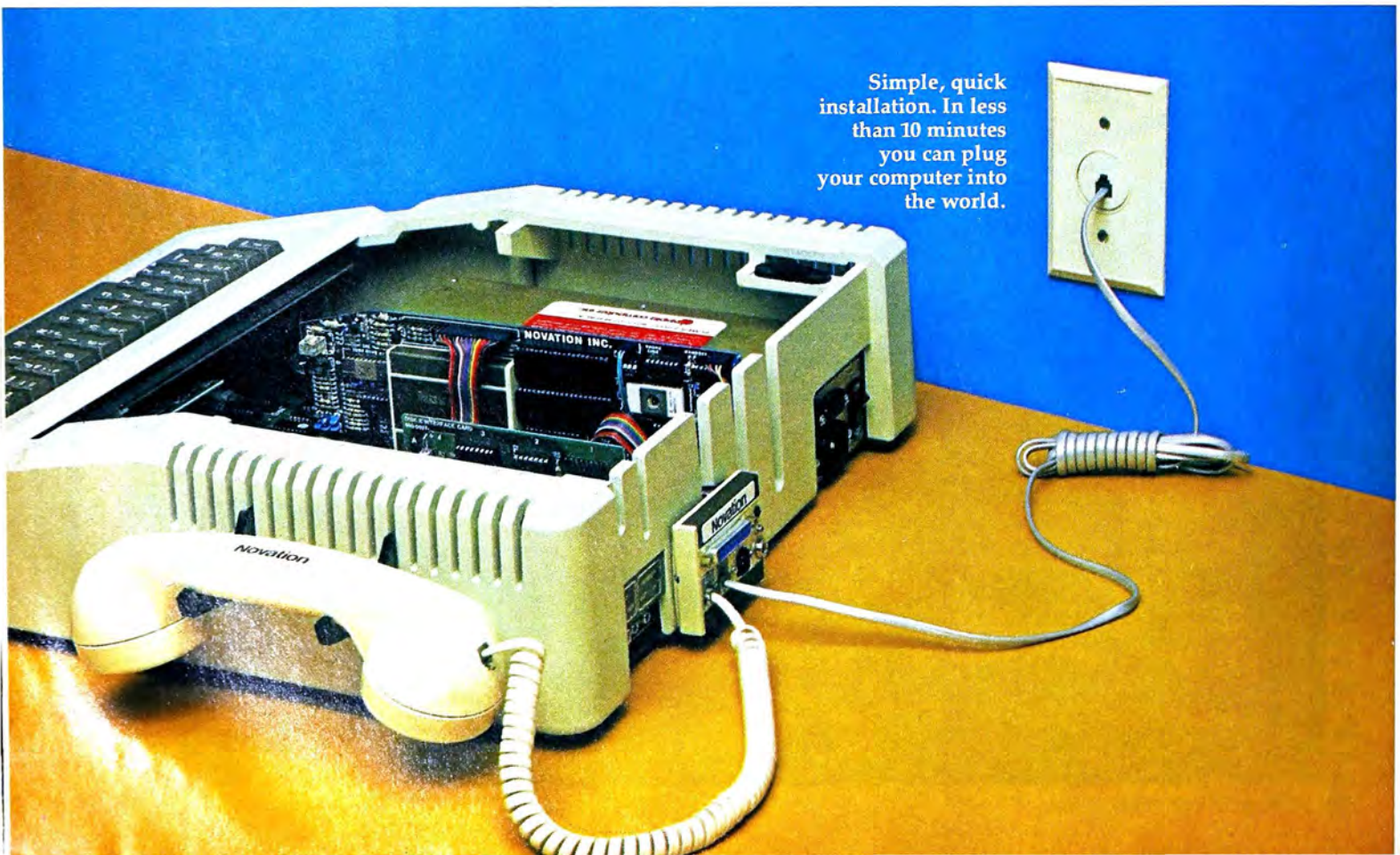
Your Apple can run on its own with automatic dial, answer and disconnect. The system uses your computer memory to hold messages, so you can send and receive automatically any time—including the late hours of the night when line charges are lowest.

And the variety of speeds available lets you save even more. Switch from the standard 110 or 300 baud to 1200 baud (it's 202 compatible) and suddenly you're moving data four times faster.

New full duplex 212 option

Now for the quickest, most convenient communication, 212 full duplex is available. An additional card just slips into your Apple. It comes with a complete 212 Comware II compatible software package which includes current upgrades for the entire system. This can be added to existing Apple-Cat II cards so you can start with a 212 or start with the basic Apple-Cat II and upgrade later.

Put Apple prowl



Simple, quick installation. In less than 10 minutes you can plug your computer into the world.

It's a phone.

With automatic dial, it's a handy intelligent phone for regular use. But also, you can switch from voice to data at any time without losing the connection.

Important "built-ins"

The Serial RS-232 port to run your printer is built-in. No need for the expense and trouble of a separate card.

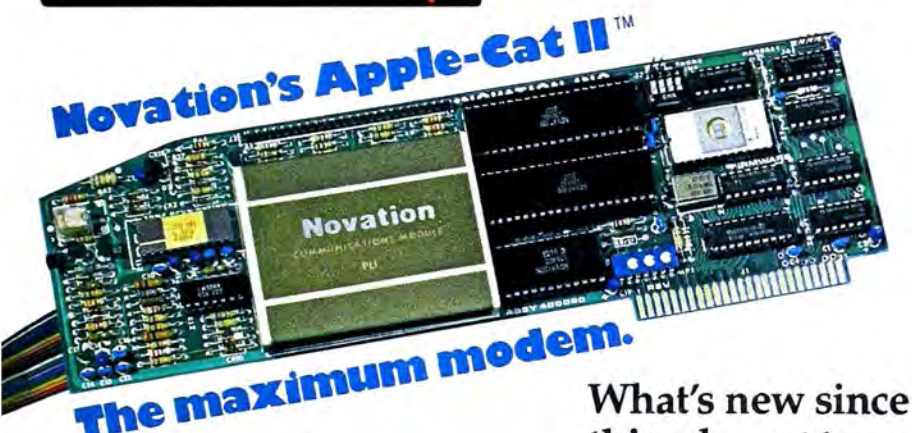
A BSR controller is also built-in. Along with a conventional BSR system, it lets you control electric appliances, lights, whatever through your computer—even by phone. Add a real time clock and you can program it to be activated whenever you want.

your out to



Now to find other Apple-Cat II owners

It couldn't be easier. We have them in our Novation computer system. With your own Apple-Cat II you can simply reach in, pull them up, pick one and give their Apple a call. Our computer number: (213) 881-6880.



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It's the most advanced modem you can put into your computer.

Your computer store has them. Take a close look.

More features than any other modem.

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countered the same problem.
Charles I. Browne,
Los Alamos, NM

Try Creative Software Development at 4657 Thayn Drive, West Valley City, Utah 84120. And you're right; information has no listing.

An Identity for Natty

My hopefully-not-too-late guess as to the location of Jim Merritt's picture is on page 151—the "Turkey" looking disdainfully at the edge of his coffee table.

Incidentally, if the question at the bottom of page 107, "Who Is Natty Dread?" is any sort of contest I believe I have somewhat of an answer. The name Natty Dread often comes up in Jamaican reggae songs associated with the Rastafarian religion. As far as I know, Natty Dread is not a real person, but more of a legendary, heroic outlaw figure such as Robin Hood. The "Dread" part of the name may or may not have something to do with the "dreadlocks," or hairstyle required of Rastafarians. From what I understand though, it is a fairly high honor to be or be like Natty Dread—it is a spirit of living inspired by a big, magnetic, powerful figure.
Brian Carstens, San Luis Obispo, CA

Anger Is the Mother of This Program

In response to *Softalk*'s March Open Discussion, I would like to comment on the greatest irony facing the computer market today.

In the industry's attempt to protect itself from malicious copying of precious software or from casual piracy, publishers have actually opened the door for their own bankruptcy. I can only state my present dilemma. In calling various software companies in an attempt to review various software packages for medical and dental office administration, I was bluntly informed of this fact: if I did not put up (pay) literally hundreds and often thousands of dollars just to look at their software, I could just continue looking. In other words, if I did not care to purchase their software sight unseen, then I just cannot purchase it all.

Correct me if I am wrong, but the old saying still stands even in the computer market, "Let the buyer beware," even to ask to possibly order software business packages for review from your local computer store, you will get the same answer that you received from the software dealer, "If you don't promise to buy, then don't look."

The laugh is on them, however, since I cannot "review," various software packages for my business, I have now decided to write my own software to meet the medical market's needs and to do it so well that I truly hope to become one of their biggest competitors. In fact, I am so mad, at this point, that I am considering selling my business package for as little as $10 plus the price of the diskette to prove that you cannot expect the buyer to purchase software sight unseen. What would have been my present vendor will now be my current competition.

I do hope this letter is published, as I would hope to bring to light this industry absurdity. Maybe in this age of the computer, the saying should be, "Let the protector beware." It is absurd for these software dealers actually to think that everyone is out to get them.
Patricia L. Adler, Boulder, CO

The Other-Made Man (or Woman)

I am a software pirate. It was never my intention or desire to become one when I purchased my Apple II Plus one year ago. I was amazed at the problems and insecurity copy-protected programs cause.

First, one year ago, DOS 3.3 had just been introduced. The copy-protectors were not up to speed yet and all the software I purchased was DOS 3.2 and had to be booted with the Basics disk. I paid $150 for the then-current *VisiCalc,* but quickly obtained a "broken" copy I could boot directly with DOS 3.3. Of course, the *VisiCalc* data disks still had to be in DOS 3.2 format. . . .

Second, I could not back up my software! What computer user in his or her right mind doesn't keep a backup of *all* programs and data files? I purchased a nibble copier, copied everything I could and stored the backups where I work.

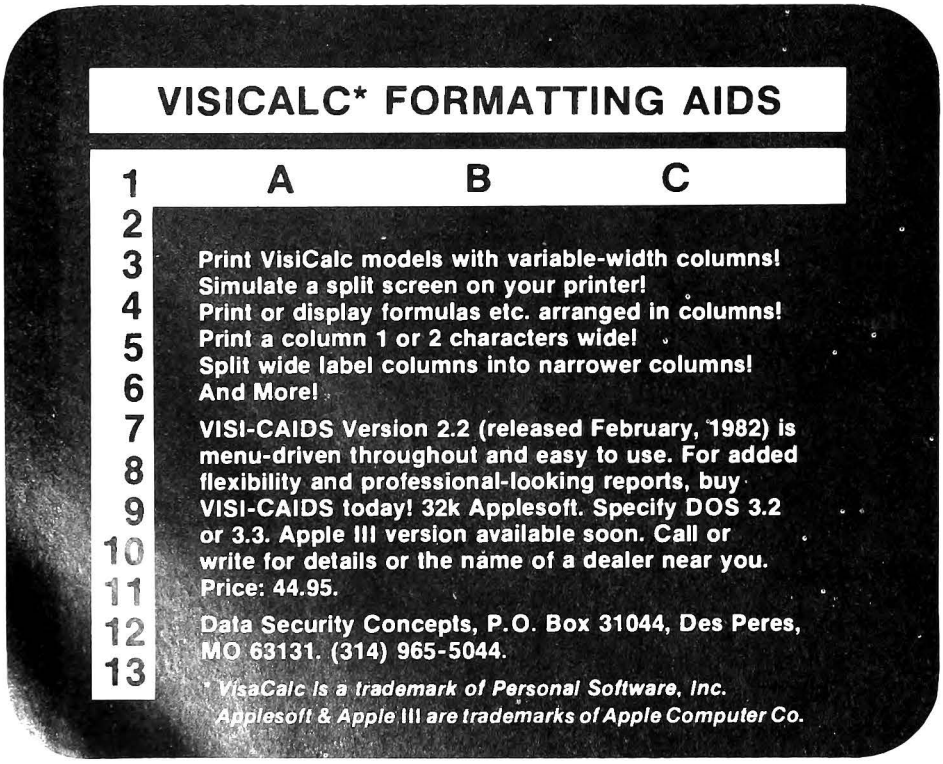
Third, I began purchasing off-the-shelf, "guaranteed to work," copy-protected software. Some had minor bugs or required minor changes to support my interface cards. The manufacturers said, "We are working on the right version for you," or "The manual clearly states we do not support that interface card." So I had to learn to crack the software I purchased.

I began meeting others in the same position and now find myself among the software copiers and crackers. The software protectors have created this class of people.

I am sharing with my new-found friends to recover the cost of the nibble copier, the time spent fixing bug-prone software, and the frustration of constant Basics disk usage.

I'm still not totally happy to be in this position. But let me ask all your readers this, "Why buy a DOS 3.2 version of any software that you cannot backup when I can give you a 'broken' version that boots easily and backs up easily?"

I strongly applaud Penguin Software's policy to release copyable software. I am more than willing to sign license agreements with them not to release a copy of any of their software I purchase. At last, software I can purchase and *easily* tailor to my own needs!
The Reluctant Software Cracker



PROGRAMMING THE APPLE II JUST GOT EASIER!

ANIX v1.0

A UNIX-like DOS 3.3 Compatible Operating System for the Apple II

ANIX 1.0 is a "Tiny-UNIX™" that is completely file structure upwards compatible with DOS 3.3. ANIX incorporates a healthy subset of UNIX'S™ capabilities and a superset of CP/M's™ capabilities. In addition to the ANIX operating system, Lazer provides over 30 utility programs on the ANIX disk. Included are: ADU (ANIX disk utility), DUPDSK, EXPUNGE, DREN, STAT, TYPE, PUTDOS, FREE2, UNDEL, MAKE, SIZE, MON, NOMON, WC (word count), LC (line count), PIE.PATCH, PRINT, BUILD, FIND, BTOT (binary to text conversion), INIT, MAKEAUTO, PAG3, ED, COPY, SETCLK, SETPRTR, SETLOWER, SETINVMODE, TIME, and more! Many of the programs found on the ANIX disk are selling alone for between $30 and $60. Also included are the source listings for several of the utilties. For advanced machine language programmers, the source listing of the entire operating system is available separately. ANIX supports powerful screen editing commands and will automatically time and date stamp files saved to disk (if a clock card is installed). For a complete description of ANIX's capabilities, call or write Lazer.

ANIX is the start of a complete line of system software tools available from Lazer MicroSystems, Inc. All new languages and applications programs available from Lazer will run under the ANIX operating system. Lazer Pascal is available now. Other languages and systems are in the works. Productive programmers are already using ANIX, are you?

Lazer Pascal

The Elegance of Pascal-- The Power of "C"

Lazer Pascal is a unique systems programming language for the Apple II. It combines features found in Pascal and is extended to include several features found in the "C" programming language. The Lazer Pascal compiler is very fast (1500-2000 lines/minute) making the system very easy to use. No longer will the systems programmer or game programmer be forced to use assembly language, Lazer Pascal is here!

Lazer Pascal supports BYTE, CHAR, BOOLEAN, INTEGER, LONG, pointer, string, array, static, and dynamic data types. Lazer Pascal was created to replace 6502 machine language as the choice of systems and game programmers. Included with Lazer Pascal are several sample programs demonstrating the use of Lazer Pascal including: ANIX.P, TSTPARMS.P, LINECOUNT.P, WORDCOUNT.P, CHARCNT.P, EXPAND.P, COMPRESS.P, CRYPT.P, and TRANSLIT.P. Better yet, the source listings for the compiler, P-code interpreter, and other utilities are included.

D/ASM

A High-Powered 6502 Disassembler for the Apple II

DISASM/65 produces a 6502 assembly language source listing from machine code and a set of input commands. Only DISASM/65 supports all the commonly used data types found in machine language programs. We used DISASM/65 to disassemble DOS 3.3 for our popular DOSOURCE 3.3 product-- that should describe DISASM/65's power! DISASM/65 is provided with our popular LISA V2.5 assembler. Several users, however, have reported considerable success using DISASM/65 with the Toolkit assembler, the SC Assembler, TED, and others; so we are offering DISASM/65 separately for these users.

p-SOURCE

for Apple Pascal users

The Internals of the Apple P-code Interpreter Explained

p-SOURCE is a technical manual that describes the internal operation of the Apple Pascal P-code interpreter. Included are descriptions of programming techniques used within the interpreter, hints on how to speed up the interpreter, add your own routines to it, and incorporate hardware floating point. p-SOURCE is absolutely essential to the Pascal programmer.

ANIX, Lazer Pascal, p-SOURCE and DISASM/65 were all written by Randy Hyde, the author of "USING 6502 ASSEMBLY LANGUAGE", LISA, SPEED/ASM, DOSOURCE 3.3, and other fine software products. Additional information on Lazer's software products can be obtained by calling or writing Lazer MicroSystems, Inc.

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Money-Back Blues, and Reviews

May I comment on Dr. Hunsaker's shelf full of problems (March 1982 Open Discussion). While I did not go so far overboard as he appears to have gone, I no doubt had at least one familiar disappointment, and perhaps equal time should be considered.

After anxiously awaiting my Videx eighty-column card, there was considerable distress when the advertised features did not appear on my screen. After two calls to the manufacturer failed to locate the problem, we decided by phone to go at it step by step. The difficulty appeared to be more in my lack of understanding the capability of the unit but, at any rate, the package would be of no use to me. So what did they say? "Let the buyer beware"? "Tough luck, old boy"? No, they said, "Send it back and we'll refund your money." And they did, even though I had not purchased it from them. Today I received a letter from On-Line Systems concerning a new product about which I had inquired. They ended their letter by saying, "Demonstration copies are not available, but we do have a money-back guarantee."

Since many of us live where we simply cannot walk into a store and find the latest revisions of everything on the market, the media and software publishers have obligations to us. The software people need to offer a reasonable money-back guarantee and/or they could offer demonstration packages complete with sample documentation (which so often bombs a good program). While I'm at it, an 800 number for questions and answers would be a most helpful feature, but I could live without that for now. The final one goes directly to you magazine publishers. We need well-researched, well-detailed up-to-the minute reviews, and I do not refer to games. Too often do I see reviews of one package in several different magazines, by equally different authors, that, while failing to scratch the surface, say the same thing, in other words, canned! Another matter in which I find fault is lack of communication between an author (or his publisher) and the software house. Too often lately reviews have ended with "by the time you read this, the latest version will no doubt be out." Well, frankly, if I am to lay out anything over $100, it absolutely *must* be the latest version.

Finally, might I address the letters from Captain Lee and Professor Graham (also March 1982). Mine was what amounted to missionary zeal on behalf of Apple. It is well that management did what they did because there are too many equal or better products coming to market for me to continue directing my friends to what may no longer be in their best interest.

Robert E. Daily, Alma, MI

Counting on You

We at Pear Software wish to express our appreciation for the excellent input in Craig Stinson's Marketalk Reviews (March 1982) regarding our new release, *The Count (A Winning Blackjack System)*. We have decided to incorporate Craig's suggestion to include stats on high and low values in units won or lost at unfavorable, even, and favorable conditions.

At the same time, I'd like to clarify a couple of points regarding *The Count*. The review mentions that I "part company with Thorpe" in the area of correlating the running count with the number of cards played and that in a six deck game the eccentricity of the deck can be significant. Personally, I prefer to include this aspect in blackjack card counting but with *The Count* have tried to provide a simple method of card counting for the casual player. For that reason, I have, over the years, instructed my friends in this simplistic system with strong warning that only single deck play is recommended (because of the eccentricities of multiple deck play).

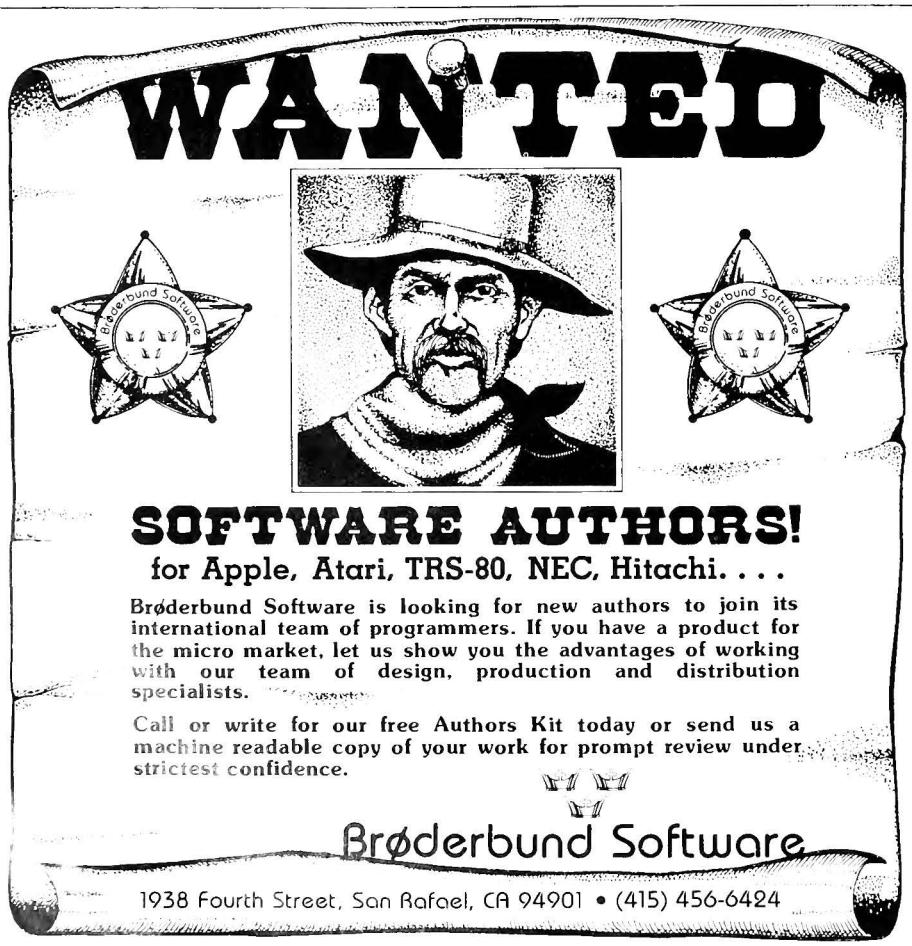
Casual players (my wife included and the person for whom the simple count system was developed) seldom wish to spend the time learning complex count systems. It is also generally difficult to teach people the complexities of the Thorpe system in one or two evenings. Thus, the simple count system in *The Count*, which the review did not mention, advocates a hand-counting system rather than a card-counting system. Many of our friends have learned this system in two evenings under our instruction and then have trekked with us to the casinos for several pleasant, inexpensive days. Though less accurate than complex count systems, *The Count* is extremely easy to learn and gives the player an advantage over the house.

In the automatic play mode it is true that *The Count* employs a very bold betting strategy. In the documentation, however, two other betting strategies are outlined. The conservative strategy is not in the least radical and would seldom result in disastrous short-term losses. Since big winnings are also far less likely, I personally recommend and describe a controlled parlay system in conjunction with *The Count;* it seldom loses and has resulted in some spectacular winnings for me on seven or eight occasions.

Off the subject but of possible interest to your readers: Saving and retrieving strings containing colons and commas can be a real problem when the disk is involved. Input statements don't like them; hence, the *extra ignored* message. By building the initial string using a *get* loop, A$ can be saved and retrieved containing these no-nos if A$ is changed to A$ = CHR$(34) + A$ before sending it to a disk textfile. This "throw-away" quote mark tricks the Apple into the belief that all of the material which follows is part of a literal (which it is?!?). Try it; you'll like it.

M. Max McKee, Pear Software, Ashland, OR

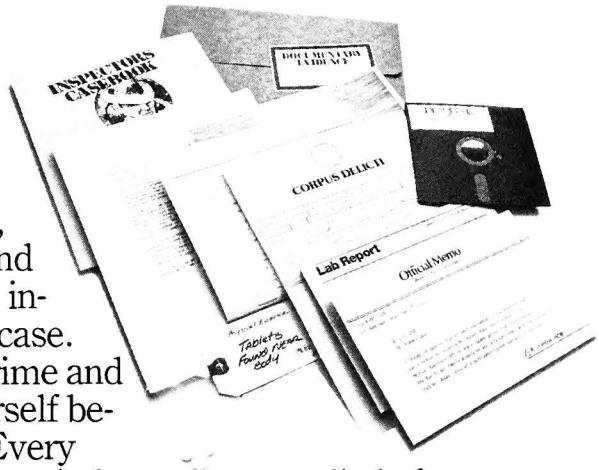
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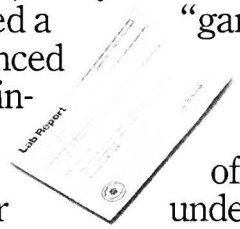
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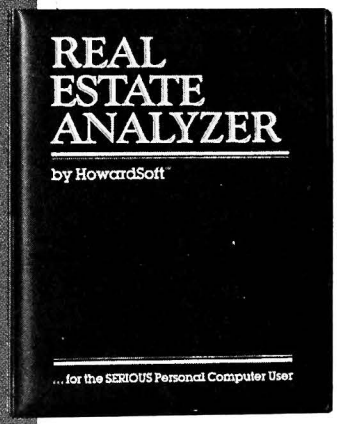


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Mind Your Business

BY PETER OLIVIERI



Hello, again.

Whether you plan to use your computer in an existing business or in starting up a new one, there are some steps you can follow that will help you ensure a successful implementation. We'll begin this month by talking about some of these.

A Plan for Using a Computer in a Small Business: Part II. Let's start with something that sounds awfully theoretical. It can be argued that the three most important characteristics of good management are the ability to plan, the ability to make decisions, and the ability to control operations. In considering how to use the computer, it's a good idea to think of how the computer can help with these three aspects of running a business.

Planning—Hardware. We all have one common starting point. All of us have Apples. However, this does not mean we have the right Apple for the business we're involved in. One of the first steps you must take is determining what hardware best meets the demands you expect to place on your computer system. Question one is: Do you have the right equipment?

Finding the answer to this question calls for both some reflection and some homework. Reflection is required to determine what the future needs of the business might be, while the homework consists of determining the volumes of information you need to make informed decisions about such things as input, output, and storage devices. Given that most of us have Apple IIs or II Pluses with at least one disk drive, it might be quite important to consider the following kinds of questions:

Would a different Apple (that is, the Apple III) be a better machine for your purposes? This machine has more main memory, a specially designed keyboard, and a variety of other features that are oriented toward business applications.

What disk drive arrangement best suits your needs? If you use floppy disks, you really need a minimum of two disk drives. Even with two drives, you may end up having to do a lot of disk swapping if you have extra large data files. Perhaps a hard disk will be necessary.

Will you need additional hardware to provide for backup? For example, if you do choose to use a hard disk, it is sometimes necessary to have a floppy disk drive to prepare backups. Some backup procedures use videotape, so you might even need a videotape recorder.

What kind of printer do you need? Printers come in all shapes and sizes and offer various combinations of capabilities. Some factors to consider concerning a printer are:

1. Do you need a letter-quality printer?
2. Will you need a printer that can print graphics?
3. What size paper do you need (80-column width or 132-column width)?
4. Do you expect to need different types of paper (labels, checks, envelopes, letterhead, and so on)? If so, you'll need a sprocket feed (also called a pin feed) printer.
5. Would you like to have the option of printing in different colors? Some of the printers that have been released recently offer a four-color option.
6. Will the noise associated with a printer present a problem? If so, you'll want to get either a silent (thermal type) printer or one with a sound-deadening cover.
7. What kind of print options do you need? Do you want proportional spacing, different type fonts, or larger than usual letters?
8. Will you need a single-sheet feeder? This is an attachment that allows you to feed single sheets of paper into your printer. If you are planning to print on company letterhead, this attachment is a must.

What miscellaneous equipment do you need or want for your particular application? Some forms of equipment you might consider are a graphics tablet for preparing charts and graphs; a communications card and modem to use in interfacing with another computer or in connecting to an information utility source; and a monitor that allows you to view what is being input and output. In the case of the monitor, you'll need to decide whether you need a color monitor or a black and white, and whether it should be high resolution or low resolution. You'll also need to consider screen size and whether you want a tinted screen (much easier on the eyes).

Here are some other areas to consider when you're thinking about what equipment you need for computerizing your business.

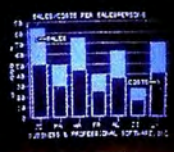
1. What furniture do you need? This area is often overlooked, despite its importance to the health of both computer and operator. A sturdy desk, perhaps one designed to accommodate the computer, disks, monitor, and printer, should be seriously considered.
2. Will you need security devices? Microcomputers are quite attractive and easily transportable. Once yours has been stolen, it's too late to do anything about it.
3. What sort of disks will you use? What brand? How many will you need? Those with a reinforcing ring around the center of the disk are best. In addition, the disks will have to be stored somewhere. You should consider getting either three-ring binder holders or a floppy disk file. Keeping your disks in a dust free environment prolongs the life of both disks and disk drive.
4. What will you need for connecting to a power source? Do you have grounded outlets available? Are the outlets being used on an isolated line? Will you require a power-surge controller?
5. Will any of your applications require the use of a joystick, paddles, light pen, or bar code reader?
6. Do you want your screen to display eight columns of information instead of the unmodified Apple's forty? If so, you'll have to add a board.
7. Do you anticipate needing more memory? For example, if you have a 32K Apple, you may find that some programs you'd like to use won't run on your machine as it is. A very large *VisiCalc* application, for instance, may require additional memory.
8. Should you consider expanding the potential of your machine by adding a language card or the CP/M operating system? These cards do increase significantly the amount of software that will run on your machine, and it's likely we'll discuss them further in a future column.

As you can see, there's much to consider when planning for a computer application. Note how important it is to consider not only the present needs of your business, but also its future needs. What might you need next month? Next year? Five years from now? Remember the four Ps: planning prevents poor performance.

Planning—Software. Planning for equipment is only part of the planning process involved in computerizing your business.

Screen Director

Screen Director™ retrieves and displays any standard image file on your Apple's video monitor, large screen TV or color printer. For only $150, Screen Director™ gives you a filmmaker's finesse in boardroom presentations, management briefings and demonstrations for clients.



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☐ with this printer or plotter: _____

☐ with these other programs: _____

☐ to produce xerox color copies, overhead transparencies and 35mm slides

☐ I am a dealer.

Softalk 5/82

Equipment, no matter how suited to your needs, will do nothing without computer programs, that all-important software. The two most important questions you must ask yourself are: Where will you get your programs? What programs will you get?

There are three ways in which programs are most commonly obtained. First, you can write them yourself; second, you can purchase programs that have already been written by others; and third, you can hire a consultant or programmer to write original programs for you.

Most of us won't (and probably shouldn't) write our own business programs. Those of us who have written programs ourselves know that programming can be a demanding and sometimes tedious task. Writing a program often starts out to be a very simple thing and then grows into something incredibly complex. Unless you've had some experience writing programs or have the time and patience to work quite hard at it, this option is not for you.

Programs that have been written by others will often fit your needs just perfectly. Take mailing list packages, for example. Ninety-nine percent of all mailing list applications have the same requirements. A standardized package that accomplishes your list processing needs can probably be obtained quite easily. Other commercial packages will fill many of your specific needs. The task here is to determine exactly what it is that you need and what it is that the package will provide, a theme we'll consider in more depth later on. Of course, there will be times when an existing package either does not meet your specifications or must be modified to be of any use to you. In cases like this, it is probably best to go for the third option, hiring a programmer or consultant to create programs for you.

Lots of people know how to program. Lots of programmers program very well; lots don't. If you're going to employ a consultant or hire a programmer, take your time in the selection process. Go for experience, not necessarily price. Ask to see some of the programmer's previous work. Talk to someone the programmer has done work for. This person will have considerable influence on what happens in your business once he or she gets started, so be sure before you begin.

Remember, you are not a computer expert, but you should do everything possible to become knowledgeable about computers, programming, system design, and software evaluation. Otherwise, you are indeed in the hands of whoever designs your system. Some of you may be comfortable with this; others will not be. At the very least, be involved in the design of the programs you commission. Ask questions, provide sample data, test programs well, and demand thorough documentation.

Your next question about software is likely to concern what applications (or canned packages) you ought to consider. This is, of course, a question that cannot be answered for you. Rather, you must answer it yourself by determining what applications you are willing to put on the computer, what applications you can put on the computer, and what applications you must put on the computer.

Don't try to do everything at once. At first, just make an effort to identify all the applications that are candidates for computerization. Next, set some priorities as to which of these will be the first you implement. Start with a small, manageable application with which you are thoroughly familiar. If it's an application you know well, you can use it as a means of learning more about your computer system.

It might be interesting to look at the areas in which you might use the computer. The following list is representative of where business users tend to concentrate their automation efforts:

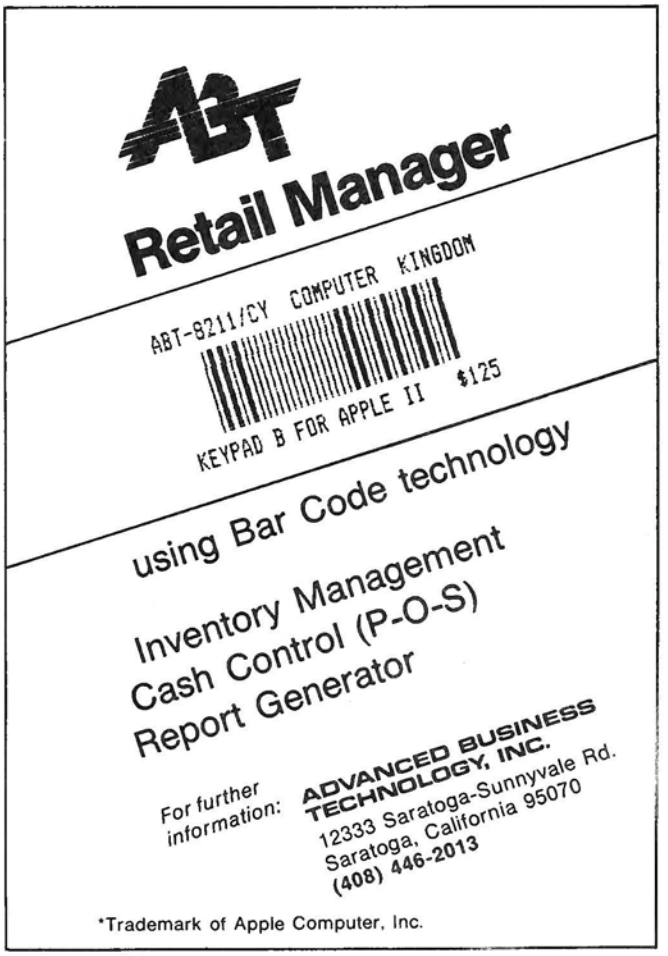
maintaining mailing lists
maintaining customer lists
recording accounts receivable
recording accounts payable
word processing (including report preparation, letter writing, and so on)
estimating the cost of a job
maintaining a payroll
electronic worksheet analysis
project scheduling
chart preparation (graphics applications)
financial forecasting
tax record keeping
inventory control
maintaining a catalogue
performing sales analyses
maintaining price lists

This list can be expanded even further, of course, but the applications shown represent those most in demand. Looking over the list might give you some ideas as to what activities in your organization might be done on the computer.

We'll continue next month with a guide to planning for new (or additional) computer applications. Topics will include planning for growth, personnel needs, data preparation requirements, and planning for the eventual implementation of your system.

Product Review. One of the markets with great potential for growth is the home market. The first application of the "home" computer was games. Next, we began to see applications programs for home money management—in particular, checkbook-type programs that help people balance their personal books. Apple's *Personal Finance Manager* and *The Accountant* are examples of programs from this category.

Now it's time to make way for a new arrival—*The Home Accountant* from Continental Software (16724 Hawthorne Boulevard, Lawndale, California 90260). Those of you who read the Home Finance Roundup in last month's issue are already somewhat familiar with this program; because of its versatility, it merits coverage in this column as well.



To use this program, you must have a 48K Apple II, one or more disk drives, and a printer (the printer must have the standard Apple interface). As you shall see, this package is far more than a checkbook balancer. *The Home Accountant* allows you to find out what you are worth and to keep good records of home finance matters.

An Accounting of the Home Accountant. This well-thought-out package allows the user to do the following things:

1. Maintain up to one hundred budget accounts.
2. Keep track of up to five different checkbooks.
3. Print out checks.
4. Print a personal balance sheet that shows net worth.
5. Produce an income and expense report.
6. Keep up to one hundred transactions on a single disk.
7. Automatically post transactions each month.
8. Divide up a check and spread over several categories.
9. Identify certain categories as tax categories and recall them later.
10. Search for transactions using a variety of criteria (date, check number, and so on).
11. Create and display graphs (bar graphs, line graphs, and trends analyses).
12. Produce a variety of account activity reports.

As you can see, this is a fairly comprehensive package. The program's authors suggest that it will take thirty-five to forty-five minutes each month to maintain your financial records in this fashion. While this sounds like somewhat of an underestimate, it's true that maintaining your financial records using *The Home Accountant* will certainly take you far less time than would be required if you were to do the same thing manually.

Be advised that you will have to invest some time in the beginning gathering data for initial entry into the system. You will have to designate categories in which to place all of your financial information (assets, liabilities, credit cards, income, expenses), and this will be a lot of work. As is the case with most things, however, the success of this venture is directly proportional to the amount of "up-front" work you put into it.

The user's guide begins by defining all the terms used in its pages; thus, you do not need a graduate degree in finance to understand what's going on. In addition, there are plenty of examples throughout, and the authors provide helpful hints every now and then that aid the reader in working with the program.

The screen formats are pleasing, clear, and concise. One particularly nice feature is that each screen has a comment on it that refers the user to the page in the guide that deals with the options listed. The section describing the various graphics options could be improved; it would be significantly enhanced by the inclusion in the manual of actual graphs.

This is a good package. It demands a certain amount of discipline on the part of the user, such as requiring that data be entered regularly throughout the month, so those of us who tend to procrastinate would have some adjustments to make.

If you're considering the acquisition of a home financial package, be sure to ask your dealer for a demonstration of *The Home Accountant.*

The Readers Speak. "I enjoy reading your column (in particular the product reviews). I especially liked the chart you included in an earlier column that listed all the characteristics of the database management packages. This was very useful to me in comparing one package with another. Would it be possible for you to do the same with other packages?" F. B. C., Las Vegas, Nevada.

Tables that summarize the characteristics of different packages are very useful. What makes such comparisons difficult is the fact that these packages don't arrive in what might qualify as megapackages. Thus, it often takes quite some time to look at all the current programs in a particular category. Mind Your Business will regularly include such summaries after enough of a given type of package has been reviewed to make it worthwhile.

Coming Attractions. Over the next few months, this column will include an extensive review of the Apple III. After all, the III was intended for the business market and, since its rerelease, it has been quite favorably received. We'll take a good look at its advantages as a small business computer as well as comparing and contrasting it to the Apple II. If it turns out that the Apple III is the best version of the Apple for business users, we might collectively pursue how to trade up from an Apple II to an Apple III. As part of our review of the III, we'll also be looking at some of the software designed for this machine.

In the meantime, it's becoming apparent that business users need to give serious consideration to the possibility of acquiring a hard disk. It simply makes more sense to have larger storage capacity, faster data retrieval, and efficient backup. The hardware is there, and the associated costs are becoming more reasonable. Thus, we'll spend some time considering the advantages (and disadvantages) of using a hard disk.

Since one of the more common applications of the Apple is word processing, we'll be putting together a tutorial and glossary on word processing software and systems. Included in this column will be a chart that lists the salient characteristics of each of the packages currently available for the Apple.

Once again, thanks for following along with this month's musings. See you again soon. ◨

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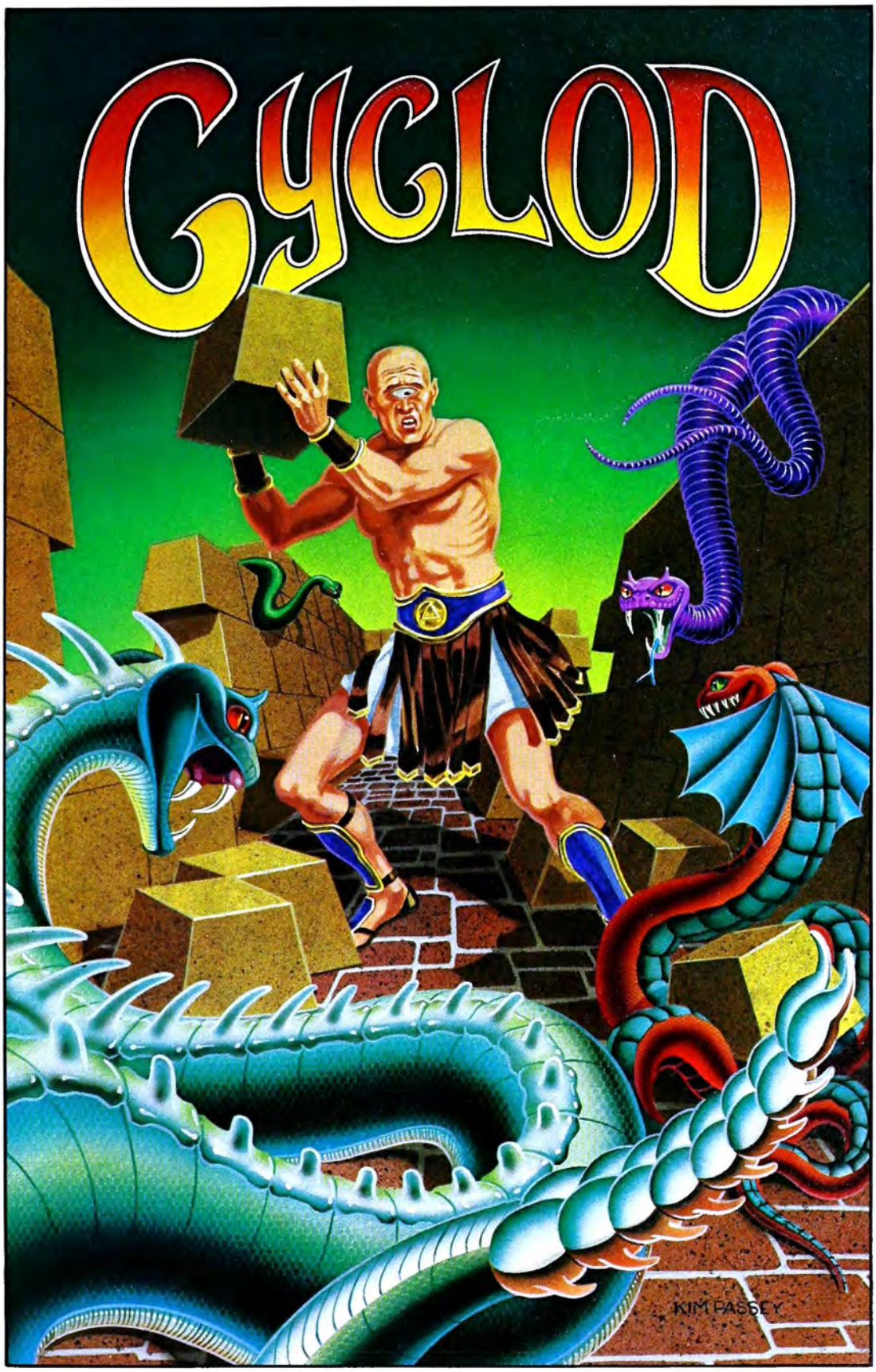
BRILLIG SYSTEMS, INC.
10270 Fern Pool Ct.
Burke, VA 22015
703/323-1339

What's a Cyclod????
Cy•clod (si'kläd) n., pl. cyclods [Gr. < cy, one-eyed and clod, stumble bum] 1. in Ophidian legend, the name of three bug-eyed brick fighters known as Mascara, Glaucoma, and Cornea; 2. In Myopian legend, a cross between a clumsy mason and a one-eyed snake charmer; 3. in Sirius legend, the video representation of a game wherein an eyeball fights snakes with bricks.

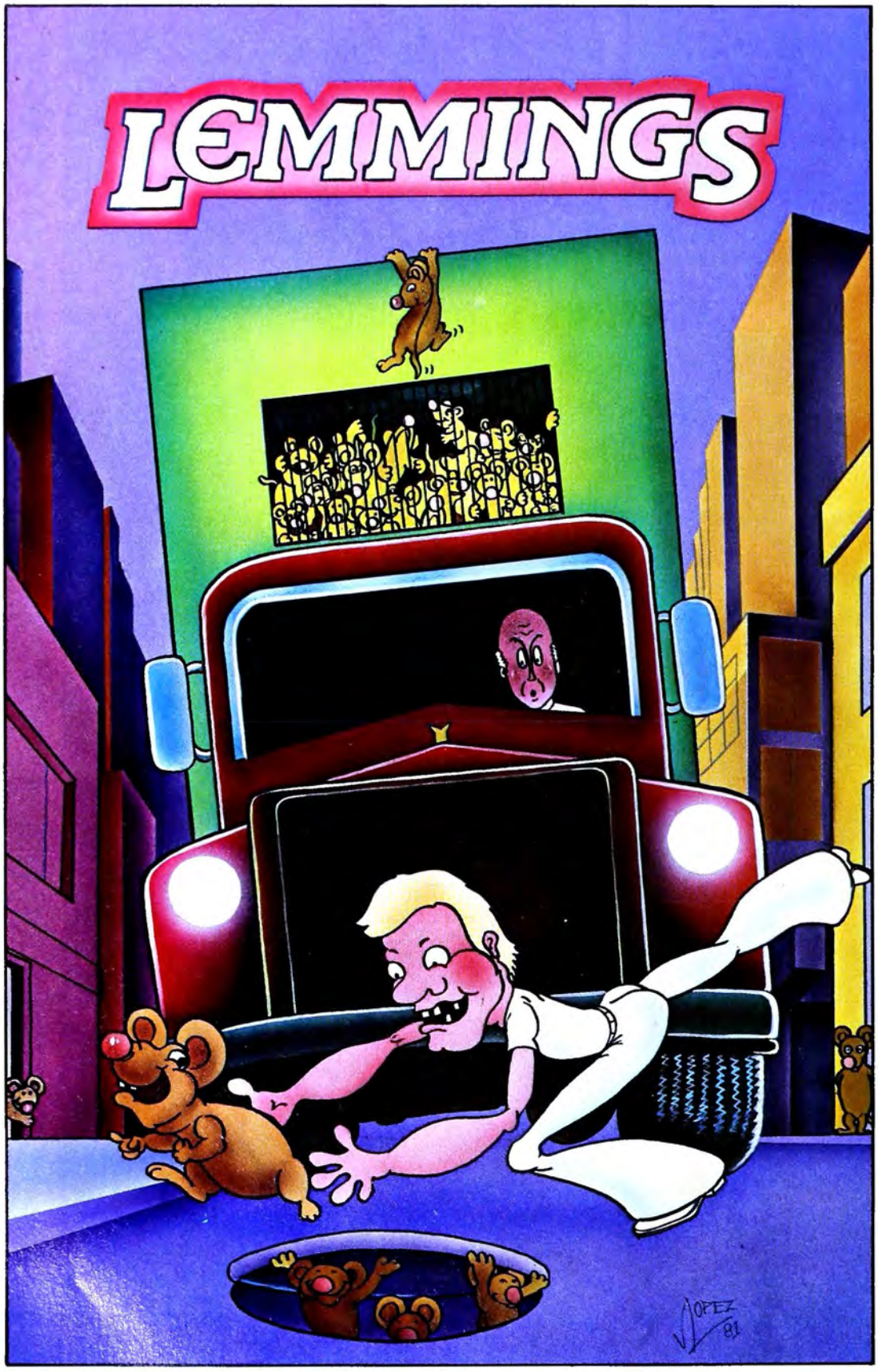
The craziest game yet from the masters of crazies at Sirius. Cyclod requires a 48K Apple II or II+ with one Apple disk drive and is playable with keyboard, Apple-compatible joystick, or Sirius' Joyport and Atari-type joystick.

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Sirius Software, Inc.
Sacramento, California
(916) 366-1195



CY•CLOD (SĪ'KLÄD)



Forget the whales, save the Lemmings! These fuzzy little rodents are in need of some population control. Getting them to mate without over-breeding is enough to drive you crazy. Keeping 'em safely locked up is even worse. You see, you gotta keep the Lemmings from getting hit by trucks or going on a mass suicide jump into the sea. It's not easy! Lemmings — they're everywhere! AAYYYAaaaa!

Lemmings, a new game of wits and action for the committed game player. Lemmings requires a 48K Apple II or II+ computer with an Apple disk drive and is playable with keyboard, Apple-compatible joystick or paddles, or with Sirius' Joyport and Atari-type joystick.

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Sacramento, California
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Join The Mass Migration!



The Grud speaks out for Bandits — "Bandits is the hottest fast-action game to come along since I was just a grudster. The object is to protect the inventory at your lunar supply base by blasting greedy little space bandits to bits. But you gotta be quick! These galactic pickpockets come at you with a non-stop barrage of heat-seaking bullets, napalm bombs, and nerve gas balloons. Every criminal in space is after your supplies — Menaces, Carriers, Nuisants, Torrents and Phalenxes — they're all there. Take my word for it, Bandits will deliver hours of intense video action or my head's not pointed!"

Bandits requires a 48K Apple II or II+ computer with one Apple disk drive and is playable with keyboard or Atari-type joystick with Sirius' Joyport.

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Sacramento, California
(916) 366-1195



"The Game That'll Steal Your Heart"



The Schoolhouse Apple

by Jean Varven

It can't think for itself. It's dumb.

It will do only what you tell it to, they say; no more, no less. It's so literal.

Turn it off (or be the victim of a power outage), and you may have to teach it all over again. In some ways, it just never learns.

They're right, you know, absolutely right. This miniature wonder of the modern world can't think. Why, then, do these same people have (or want) one, or more than one, in their schools, their businesses, their public libraries, their living rooms? Why do they hail its excellence as an educational tool?

A cursory look around confirms that there is indeed an ever-growing enthusiasm among educators, among students, and among the computer-using public for the microcomputer's potential to assist our learning and expand our educational horizons. The state of New Hampshire has declared the week of May 3 to be Computer Education Week and plans on celebrating with a microcomputer fair. In announcing their Second Annual Conference this past February, Talmis, a major market research firm for the data processing/communications industry, predicted that by 1985 microcomputer software sales to the educational marketplace would reach $75 million. It's evident that the microcomputer is being seen by many as an educational tool with no limits to its usefulness and versatility.

Keeping Pace with Our Companions. The action in the educational computing field and the development of software for use in schools, homes, and businesses is catching up to the rest of the fast-growing, ever expanding microcomputer industry. It seems appropriate indeed that this year's Talmis conference bore the subtitle, "The Courseware Industry Gets on Its Feet."

This growth and movement is exciting to witness and take part in but it brings with it problems and challenges. The industry is young. Standards for evaluating the effectiveness of computer-assisted instruction in general and of applications software in particular have not yet been set or are not well known or widely agreed upon. And, as with other aspects of the information explosion, there's the problem of how to keep up with everything that's going on.

Stated simply, we can't. Too much is happening too fast. Instead, as we strive to be informed consumers and creators of educational software and microcomputer technology, our task involves developing discernment in various areas. To do this, we need one another's help, both in arriving at standards to judge materials by and in learning to delineate what information we really want to know and make use of.

In the opening remarks of the ADCIS (Association for the Development of Computer-Based Instructional Systems) brochure, Michael W. Allen, president of this international organization, articulates the current mood and the imperative task: "The recent widespread availability of computers has led to a sometimes maddening rush to explore their potential for instructional uses. Never before has there been such a need for accurate information and the exchange of knowledge and inventions."

Breadcrumbs and Bridges. In this column, one of our main goals will be to make it easier for you to find your way around in the seeming labyrinth, to grasp the esssntials amid the overload of this aspect of the information explosion. We plan to do this in a variety of ways.

In terms of educational software for the Apple, we'll keep you informed about who's doing what, by means of reviews and announcements. Sometimes, we'll review software for a particular subject area from a number of companies; other times, we may talk about the educational philosophy of a particular company as reflected in the software it produces or creates. Occasionally, we'll also announce software programs and packages designed to simplify school administrators' lives.

We'll let you in on applications we learn about that may interest or even inspire you to use your Apple in new ways to aid your children's learning and your own. We'll tell you about educational organizations, publications, and other resources, as well as conferences and other gatherings you'll want to know about.

We'll consider what the present happenings and developments portend for the future of education and learning.

We'll also discuss computer literacy—what is it, anyway?—how to evaluate software, what educators and researchers have to say about effectiveness of computer-assisted learning, and so on.

We'll introduce you to evaluation systems that educators and educational organizations (Microsift, Talmis, and others) have arrived at, and attempt to define standards of our own that take these expert views into account.

We'll also consider such important topics as how to bridge the information gap many parents and children experience when the children are using computers or learning programming at school and the parents are exasperated over computer-generated bills and other frustrations.

We plan to talk about courseware generators and authoring programs—what do they do for you and how? How difficult is it to learn to use them if you're an educator? And what if you're not? We'll also keep you abreast of new interactions of technology—the computer/video disk interface in education, for instance.

But mostly we'll be offering you selected information. Sifting through information that reaches us, we'll attempt to dig out and present the information you want most.

Meet the Press. As a step toward that end, each month we'll provide capsule views of various companies we're acquainted with who produce educational software for the Apple. You've probably read about or purchased learning materials from some of these companies; others may be new to you.

Addison-Wesley Publishing Company
School Division
2725 Sand Hill Road
Menlo Park, CA 94025
(415) 854-0300
(800) 227-1936 (information number)
(800) 982-6140 (information number, California residents)

These well known book people began publishing educational software for elementary and high school students in December of last year. Their software programs are designed to be compatible with their Basal math textbook series, although they can be used independently as well. They sell direct to schools rather than through dealers.

Addison-Wesley Publishing Company
Professional Marketing Department

Reading, MA 01867
(617) 944-3700

As part of their MicroEducation Support System Series, this A-W location publishes software packages for school administrators. They recently released *Bursar,* a student activity fund accounting system. *Equip,* their school equipment inventory system, is due in April or May; and *Purchase,* an annual school purchasing system, is scheduled for May or June release. In addition, this group is publishing a new series of books designed to help educators who are new to computers understand them and make decisions about their use. The series is published in collaboration with Intentional Educations, a nonprofit educational corporation.

Behavioral Engineering
230 Mount Hermon Road #207
Scotts Valley, CA 95066
(408) 438-5649

Established eleven months ago, this company hopes to help people discover more effective ways to learn. The educational software they produce incorporates an applied behavioral technology approach to learning (neurolinguistic programming concepts) into its design. NLP techniques involve helping learners become conscious (and more in command) of the visualization processes they use in learning. NLP techniques help people direct their eye movements in ways that facilitate the learning process. Programs include *Spelling Strategy* and *Math Strategy* (both distributed by Apple Computer's Special Delivery Software, Cupertino, CA) and a composition program designed to unlock writer's block. This is done by using NLP techniques and by prompting writers/learners with words and phrases that will help provide connections among the experiences they are trying to write about. *Contact:* Bill Hanley.

Borg-Warner Educational Systems
600 West University Drive
Arlington Heights, IL 60004
(800) 323-7577 (information number)
(800) 942-6995 (information number, Illinois residents)

This company produces *MicroSystem80* courseware packages, intended primarily for schools or nonprofit organizations to lease or buy (although their packages are available for purchase by individuals). The packages employ a structured learning approach, diagnosing a learner's current achievement level and then prescribing a course of learning that is appropriate to the student's current level of understanding. This prescription is adjusted as necessary, depending upon the student's response. There are three MicroSystem80 programs so far: *Critical Reading, College Entrance Examination Preparation,* and *Word Structure.* Designed to help middle grade and junior high school students learn to communicate in writing, *Word Structure* provides individualized instruction in word analysis. A 1982 courseware catalog is available by calling the appropriate toll-free information number.

EduTech
634 Commonwealth Avenue
Newton Centre, MA
(617) 965-4813

This educational software house specializes in science and has published software for about one and a half years in the areas of physics, math, and astronomy. They believe in applying the computer to subject matter that can benefit most from its use and feel that the dynamic and graphic capabilities of the microcomputer make it ideally suited to the study of motion and other concepts involving processes. Their software, written by experienced teacher/programmers, is sold primarily to the school market. *Contact:* Susan Sasdi, general manager.

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Universal Systems for Education, Inc.
2120 Academy Circle, Suite E
Colorado Springs, Colorado 80909
[303] 574-4575

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Edu-Ware Services, Inc.
Box 22222
Agoura, CA 91301
(213) 706-0661

Founded in 1979, Edu-Ware produces software programs in spelling, mathematics—fractions, decimals, arithmetic skills, and algebra—reading, statistics, and perception. In 1981, they set up test sites in ninety-seven locations around the country to evaluate the effectiveness of their software. Edu-Ware intends this field testing as the first step toward the establishment of a nationwide evaluative board. It is a way of actualizing their commitment to the creation of effective courseware. *Contact:* Wendy Peterson.

Krell Software
21 Millbrook Drive
Stony Brook, NY 11790
(516) 751-5139

In addition to a software series for students preparing to take the competency examination, Krell offers a series of programs for students who are taking the College Board SATs. Two innovative programs appropriate for home use are *Isaac Newton: An Introduction to Scientific Logic* and *Odyssey in Time: A Complex Adventure in History.* A noteworthy new release is *Micro-Deutsch,* a field-tested series of twenty-four grammar lessons covering the material that would be studied in an introductory German course and suitable for use with any high school or college German textbook. In addition, Krell has recently been licensed to distribute M.I.T.'s Logo system for the Apple.

Interpretive Education
157 South Kalamazoo Mall
Kalamazoo, MI 49007
(616) 345-8681

This company directs its attention toward learning materials for special-needs students, including emotionally handicapped, learning disabled, educable and trainable mentally retarded, autistic, elementary gifted, physically handicapped, socially maladjusted, and profoundly deaf. The company has spent ten years in the educational technology field and has recently released six extensively field-tested basic living skills programs for the Apple II. Although intended primarily for use in schools and other institutional learning settings, these software programs (and other materials produced by the company) could be used to advantage by anyone who needs to brush up on basic skills. The basic skills programs for the Apple include *Job Readiness—Assessment and Development; Income Meets Expenses; You Can Bank on It;* and *Money Management Assessment.* Copies of their catalog and of field test results can be obtained by contacting the company. *Contact:* Allen Kemmerer.

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Address_____

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Milton Bradley Company
443 Shaker Road
East Longmeadow, MA 01028
(413) 525-6411

A company that has become nearly a household word for its board games, Milton Bradley has recently entered the educational software market, selling primarily through dealers. Their current programs are intended for young people at grade levels six through eight and include three separate math packages that cover division, mixed numbers, and decimals; and four language skills packages—two on punctuation and two in vocabulary skills.

Science Research Associates
155 North Wacker Drive
Chicago, IL 60606
(312) 984-2053

Cross Clues is a home-use educational word game from SRA. Another product of interest to both home users and educators is the computer literacy program *Computer Discovery.* Part of the Appleblossom packages Apple Computer makes available to schools and other educational institutions, this program is also available separately. The company's educational game programs keyed to grade levels seven through twelve teach language arts skills, arithmetic skills, and math facts, and are available to home users as well, although they are priced somewhat higher ($60 to $150) than some may be used to. In addition, SRA offers a class management-by-objectives-type package for math teachers. *Contact:* Kathy Riemer.

Teach Yourself by Computer
40 Stuyvesant Manor
Geneseo, NY 14454
(716) 243-3005
Contact: Lois Bennett

Formed in 1978, this company may be the oldest educational software company for the Apple Computer. Among TYC's products are tutorial and drill and practice programs for learners in the primary grades through adults, as well as something called *Individual Study Center* that enables you to plug the information you want your children/students (or yourself) to learn into six activities. You can generate the information to be plugged in, or you can use a company-supplied package. TYC also offers a study skills program appropriate for use by junior high school students through adults that applies sound psychological principles to memorization of both facts and logical material.

USE, Inc.
2120-E Academy Circle
Colorado Springs, CO 80909
(303) 574-4575

The company's first product, *PAL,* is a field-tested software package that uses a diagnostic remediation approach to

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teach reading to children at grade levels one through eight. Created by a team consisting of an educator/reading specialist, an experienced software programmer, and a data-processing training consultant, the curriculum package provides remediation for student difficulties in up to forty reading skills and one hundred sixty subskills per grade level. The company has plans to release similarly designed curriculums in mathematics and language arts.

Creative Thinking Nourished Here. The organizations and special interest groups in the educational microcomputing field are many. They offer you support and need yours. We plan to introduce you to at least one each month.

One resource well worth knowing about is the Apple Education Foundation (20525 Mariani Avenue, Cupertino, CA 95014). Established three years ago, this independent agency encourages creative thinking and innovative applications of microcomputer technology to the educational process.

The foundation attempts to have an impact on education in three main ways: first, through a grant program that gives financial aid to people who are developing new methods of learning through the use of small computers; second, through its Educational Program Evaluation Centre, and third, by means of an impressive new publication, *The Journal of Courseware Review*, edited and published by Carolyn Stauffer.

Published quarterly, this beautifully designed journal is an information source that will help educators and home users alike to evaluate educational courseware. The premiere issue (volume 1, number 1) features in-depth reviews by subject-area experts of software programs in music theory, science, beginning Basic, and more. It includes also an informative article on evaluating educational courseware by Joyce Hakansson, the director of computer development at Children's Television Workshop. If the first installment is any indication (and we think it is), the journal will be a valuable reference manual for people who want useful, thought-out, well presented information about software programs and the course of the educational software industry. The journal is available at many microcomputer retailers or directly from the foundation.

Over the last three years, nearly a million dollars has been awarded by the foundation to help support some one hundred fifty courseware development projects in a variety of disciplines. Foundation members are hopeful that the courseware generated by these projects will affect the quality of educational courseware by initiating standards of excellence for other programs to live up to. At present, courseware development projects are being funded in bilingual and foreign language education, business/economics, computer literacy, engineering, fine arts, health sciences, library sciences, mathematics, museum interaction, psychology, reading, science, social studies, and special education.

Among the research areas that are of special interest to the foundation this year are projects that propose to develop courseware for teacher training, vocational education, and microcomputer maintenance/training. Simulations, and programs that help people generate their own courseware, will also be given high priority by the Foundation.

Conference Calendar. The Seventh Annual West Coast Computer Faire held March 19, 20, and 21 at San Francisco Civic Auditorium featured special seminars intended for educators and others with an interest in educational computing issues and applications.

The morning session featured multiple presenters and focused on preschool computing.

Included in a two-part afternoon seminar was a talk by Vicki Carver, an educator from Des Moines, Iowa, offering recommendations for Logo learning centers. A key point in Carver's presentation was the idea that children who are learning Logo often present programs that are based on really good theories (and really good thinking), even though the programs themselves won't run. She stressed the importance of realizing the thinking process behind a child's programming attempts and affirming it, rather than short-sightedly dismissing the worth of the child's reasoning process.

A highlight of the two-part event on educational computing was the presentation by Mary M. Humphrey of Teaching Tools: Microcomputer Services (Box 50065, Palo Alto, CA 94303). Titled "Benefits of Using Computers in Special Education," Humphrey's talk focused on the positive things that can happen when microcomputers are used with hyperactive and learning-disabled children.

Humphrey enumerated the objections many people voice about the use of computers with handicapped learners (such things as, "They have problems with social skills already—don't isolate them further," and, "These kids have attention problems—how will they ever learn to use a computer?") and pointed out that in her experience the computer began to remedy many of the problems that others had feared that it would aid and abet. The social skills, individual attention spans, and motor skills of her students actually improved. And microcomputers are ideal for working with children who have problems paying attention—these patient teachers can wait around nonjudgmentally just about forever and can move as fast as the child is ready to move.

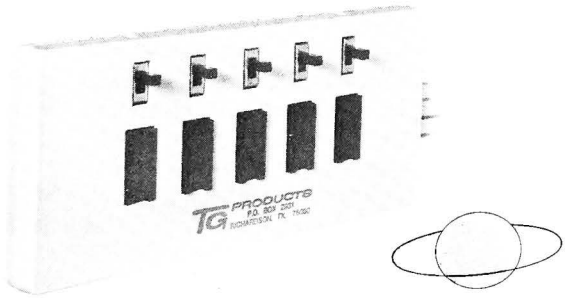
But Humphrey's main emphasis was on how learning-handicapped kids felt about themselves after using the computer and about the influence this had on their attitudes toward learning. Their self-images improved tremendously; they began thinking of themselves as competent. They began to identify themselves with the computer and to see that they were the managers of their own learning, masters of their own fates, in control—the computer did what they told it to do, and was an extension of their capacity, not superior to it.

The message in Humphrey's remarks is applicable to the benefits of microcomputer-aided instruction for all learners. It's true; computers, even magnificent micros, aren't smart. But we are. And microcomputers are tools we human beings use; with their aid, we can become smarter, extend ourselves, use our brain power to the fullest. ■C

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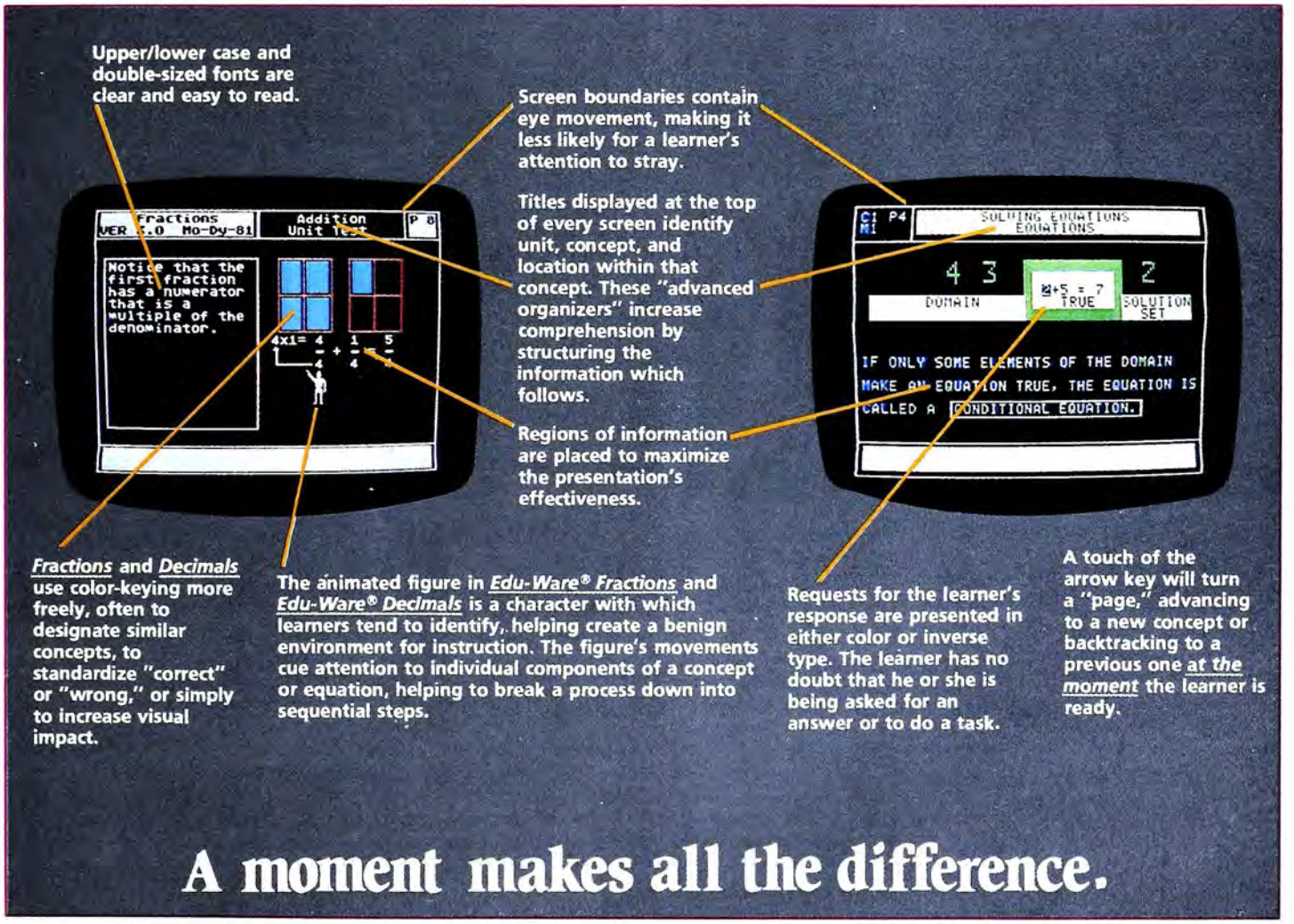
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An Odyssey to Apventure

BY DAVID HUNTER

Ann and Bob Clardy loaded up their station wagon with computers and software and went south. They drove straight down from Seattle to San Francisco and immediately began setting up their booth for the Fifth Annual West Coast Computer Faire.

The two of them looked at many strange things and met many strange people at the fair. They wandered through the labyrinth of booths and exhibits; they got sick and hoarse, exhausted and feverish. Bob's original Apple II, circa 1978, was stolen and they didn't even realize it until later.

This was the Clardys' first big exposure to the wild and unruly legions of buyers that can make or break a software company.

The Clardys met dealers and distributors; they made enough money to break even on the expenses of going to the fair. The Clardys went back to Seattle physically drained, but they had seen the future.

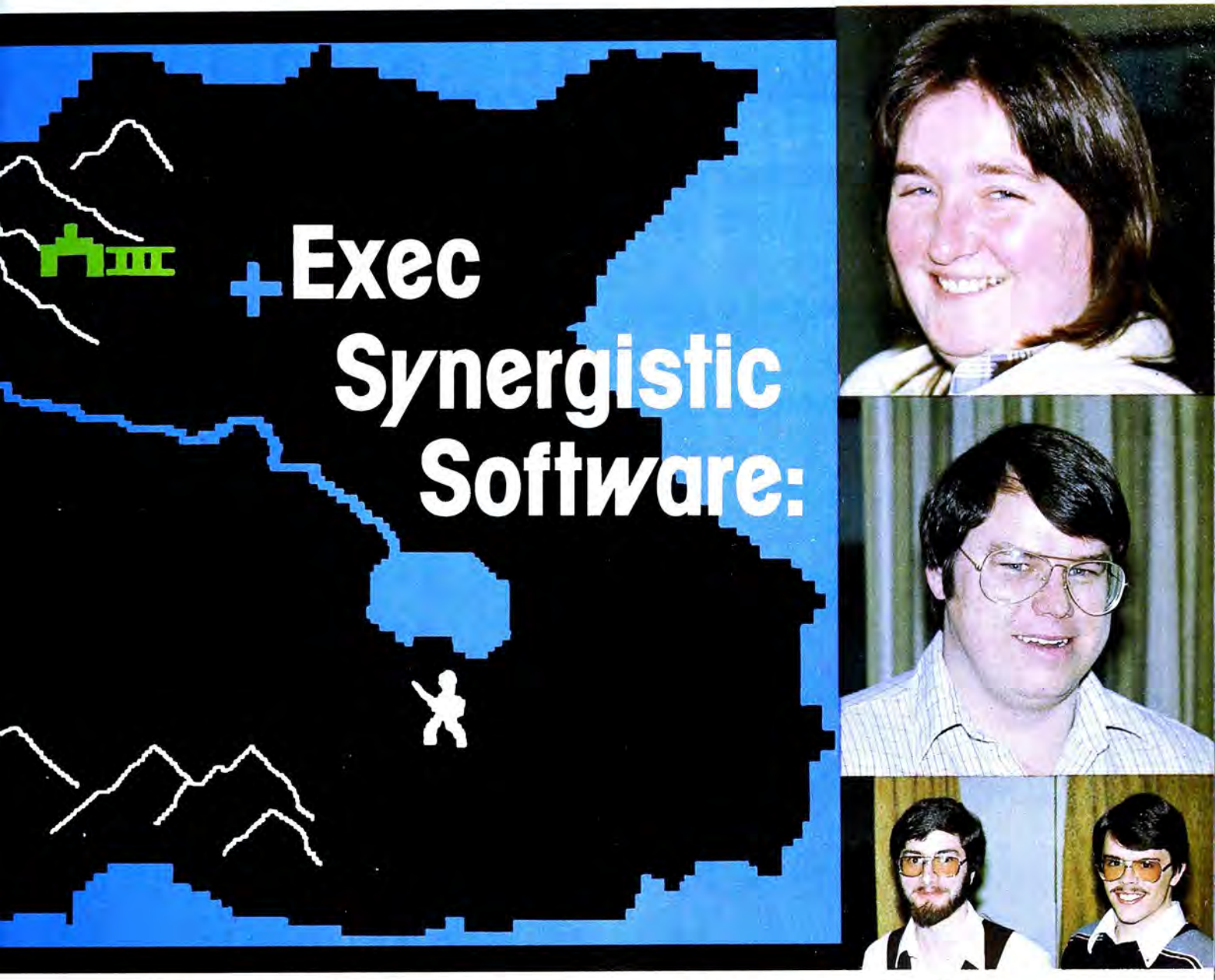
Ann and Bob own and operate Synergistic Software in Renton, Washington. In January 1980, Bob Clardy began writing *Odyssey,* his most successful game to date.

Two long and stormy years later finds Clardy planning the sequel to the sequel to *Odyssey.* Ann Dickens Clardy is devoting a great deal of time to caring for their five-month-old son Derek.

The Big Time. It takes the courage of the Light Brigade to exhibit at a fair the size of San Francisco's annual madhouse. Yet new companies have to crawl out of their isolated lairs and show themselves to public and peers, for better or worse.

Even greater courage is required to make that first move and start a company from scratch. After you've accomplished that, the next part seems easy. Ann and Bob may not think it was so easy, after their San Francisco experience, but learning the laws of the jungle is the only way to survive the perilous search for fame and riches.

Few people would argue that there aren't enough bums in the world. Many more people might argue that there are too many software publishing houses. Synergistic has seen a lot of competitors come and go.



Clockwise from upper right: Ann Clordy, chief executive officer and quality control; Will Clordy, director of marketing; Ron Aldrich, programmer; Dovid Kompschofer, programmer; Becky Clordy, production coordinator; Mike Bronhom, manager of software services and support; Bob Clordy, founder and chief programmer.

How is it that two unassuming, likable people got embroiled in, as Daffy Duck might say, the despicable business of publishing software? It's funny the way people get entangled in this highly competitive profession. They bring it upon themselves.

No Different. Bob was bored with designing radar and Ann was sick of accounting. The prospect of going wacky working on AWACS the rest of his life led Bob to pursue an old love from his college days, computer programming. Ann, his other love from Rice University, had remained with him all along.

One fateful day in September 1978, Bob bought an Apple. Here at last was the chance to learn more about the wild and wonderful world of programming. Clardy dived in.

In true beginner's fashion, Bob thumbed through the legendary red manual and tinkered with the provided listings. Relaxing after a tough day at Boeing, Clardy added to and modified Gary Shannon's simple game from the red book, *Dragon Maze*.

Getting the computer is the first step on the road to ruin. A crazy idea usually follows two weeks later.

He thought it would be fun to write his own game. Who knows what devils were whispering in Clardy's ear as he worked by day and programmed *Dungeon Campaign* by night. They must have been persuasive.

Bob has a natural gift for programming and *Dungeon Campaign* emerged as a pretty entertaining game.

Sealing his fate, he took the important step of seeking peer acceptance. With game in hand, Bob went to a meeting of the Apple PugetSound Program Library Exchange. Foolhardy by nature, Bob gave away copies of *Dungeon Campaign* to club members and other friends.

The game was welcomed with crazed celebration by the primitive software tribe. Clardy's fans encouraged him to add more things to the program and think about marketing it.

The Call of Babylon. It didn't take much to lead Bob to the edge of the fiery chasm. Instead of waiting to be pushed, he made it easy on everybody and jumped headfirst. Not a few people are glad he did.

Clardy bought more memory in order to tackle hi-res graphics. In December 1978 he started work on *Wilderness Campaign*, which is a top contender for being the first true fantasy role-playing game for the Apple. Working evenings and weekends, Bob finished the game fairly fast and decided to market it together with *Dungeon Campaign* on one disk.

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Boeing put Clardy on a swing shift and he spent the daytime hours pushing his disk at local computer stores. He got a pretty encouraging response. One store in Seattle, Empire Electronics, took the disks on consignment, reimbursing Clardy for each package as it was sold.

Seeing dollar signs in their dreams, Bob and Ann seriously began to think about starting a full-time software publishing house. The time was right.

Mountains shook and stars exploded in the heavens. Madness gripped the Clardys; Bob quit his job, figuring they had three months to make a go of software publishing. If at the end of three months they hadn't made it, Bob would just get another job and forget the whole crazy thing.

They didn't have to. After three months they had made more money than they had expected and Synergistic was here to stay.

Choosing a name is an important part of this racket. It was Ann's father who came up with Synergistic. Software combined with a computer is a synergism—a cooperative action of discrete agencies such that the total effect is greater than the sum of the effects taken independently.

In other words, software without a computer is not very useful; neither is a computer without software. The two combined form a powerful tool.

Starting your own business is not easy. Keeping it going is no stroll through the lilies either. Ask any bum on the street and he'll tell you how hard it is to get people to give you money.

Law of Economics. Both the bum and the struggling software publisher could use a million dollars but can survive on much less. Needless to say, the software publisher can get bummed out easily when there's not enough money to go around. Bob decries the lack of proper finances and the subsequent raw look of Synergistic's early advertising, packaging, and promotion.

"In those early days we got a lot of attention, considering we had next to no advertising. If we started over again the same way today, we'd never make it."

Ann and Bob know they could have done some things better. Two people alone together scaling an unconquered peak, they have done a superlative job, all things considered.

Bob was and still is a virtuoso programmer, not scared to take a chance. He wrote and marketed one of the first utility programs for the Apple, *Higher Graphics*, in November 1979.

Other than Apple's *File Cabinet* and a few minor index-card programs, there was not much in early 1980 that you could call database management software. Clardy saw a fat calf and closed in for the kill.

After he quit his regular job at Boeing, Clardy was asked back to write a database program with Christopher Anson, a fan of Clardy's and a clerk in a local stereo store. Anson knew very little about programming and databases, but he was a good salesman. Clardy and Anson completed the job in short order for a fee that, translated into an hourly wage, was double Bob's previous pay rate.

From this outside contract, Bob got the embryo for a database program for the Apple. At the time of its release, *Modifiable Database* was welcomed like *Dungeon Campaign* had been welcomed earlier. It seemed like Clardy could do no wrong.

Tales of the Unexpected. This foray into the world of business software changed the focus of Bob's efforts. He was not really prepared for the amount of support that is needed for business programs. He agreed to do custom adjustments to *Modifiable Database* for a modest fee.

The Clardys found themselves on the phone all the time striving to provide the best user support possible. Bob's creativity slackened and his work on new programs ceased entirely as he performed hundreds of individual modifications.

Contrary to what you might think, Clardy didn't have to bribe Neil Konzen to write *Program Line Editor*. A seventeen-year-old whiz kid out of Bellevue, Konzen became friends with Clardy through the Apple PugetSound club. Konzen wrote *Program Line Editor* for himself and offered it to Synergistic after good response from users.

Leading the pack once again, Synergistic released *Program Line Editor* when there were few programming tools for the Apple on the market. Universally praised, *Program Line Editor* is being rereleased with a few more enhancements by Konzen and a new name, *Global Program Line Editor*.

Thoroughly seduced by the praise heaped on his programs and newly inspired after the Fifth Annual West Coast Computer Faire, Clardy began work on his greatest opus to date.

A dungeon master in college, Bob often borrows from his extensive knowledge of fantasy role-playing games. He brought to *Odyssey* a whole range of experience that makes it a grand adventure with something for everyone.

Bob's goal with *Odyssey* was to create a multigame game. Packing the disk so full he had to dump DOS, Clardy made *Odyssey* very complete. But if Bob thought he was being fanatic about the complexity, he was wrong. Or, more accurately, he wasn't fanatic enough.

The game required you to gather fighters, bearers, and mules, arm the first and feed all, and collect multifarious paraphernalia for your odyssey. Due to the memory limitations of Integer Basic, if you accumulated more than 32,767 units of weight, the program crashed.



The Old and the New: Synergistic's youngest programming stor Derek Clardy gets some tips from dad.

Ann and Bob kept getting angry calls from hard-core gamers who had built up miniature armies of 150 men (it takes much fewer to get off the island). Bob saw the light and rewrote *Odyssey* in Applesoft, but the new version was a long time coming.

Farewell My Lovely. Bob was one of the last programmers to give up Integer Basic for Applesoft. He still likes the older language and wishes more programmers would use it.

Clardy feels that Integer has most of what you need to program games in general and it is faster. It is simple and easy to use. True to his convictions, Bob is currently releasing an Integer Basic compiler authored by Chris Galfo.

Along with the bigger products, Synergistic has put out a steady stream of lesser packages, some of which are, nonetheless, quite good.

Bob and Ann tried the education market several times with programs like *The Linguist* and *The Star Gazer's Guide*. The programs never sold well and, according to Bob, it is the same old story with many schools, whose budgets allow for computers and hardware, but not for software.

Clardy feels that many learning institutions are doing a disservice to the industry that provides them with educational software by devaluating that software through copying.

Some saps never learn. Clardy is taking the uncertain plunge into education again this month, releasing *The Communicator*, a keyboard-oriented speed typing and reading program.

1981 proved to be a year of changes at Synergistic. *Odyssey* was out on the market and raking in the bucks. It was time to get more professional.

Synergistic hired its first full-time employee, programmer analyst Mike Branham, in March. They moved the business

out of Bob and Ann's basement into office space, and they hired Will Clardy, Bob's younger brother, late in the year to handle marketing and advertising.

The failure of *Data Reporter*, an updated version of *Modifiable Database*, to compete favorably against such packages as *DB Master* and *Personal Filing System* was blamed on the advertising and marketing.

Look, Up in the Sky! It was clear that something had to be done and Bob turned to his younger brother Will, whose background, among other things, is in marketing.

Will has owned three different planes and is in love with flying. His first career was as a pilot for a major airline, Texas International. Imperfect eyes made him give up the profession.

If you can't be a pilot, then why not the next best thing? Will was a prime dispatcher with the FAA until 1979 when he quit.

Will has done many different things, from designing and installing an Apple-controlled sign system for airports to spending a year hand-delivering *Odyssey* in his spare time to every computer store he could find in the state of Texas. "Almost everyone bought it."

Big Will's presence has already made a difference at Synergistic. Their advertising has never looked better; *Data Reporter*'s new campaign is just now hitting the publications. Consistency is the name of the game and Will is determined to make the advertising and packaging consistent with the quality of the programs.

Synergistic was one of the last companies to start using copy protection and Bob still feels strongly about the subject of piracy.

"I believe any attempt at copy protection is a waste of time. It takes a thousand programming hours that the user has to pay for but never sees on the screen."

Bob feels that a good back-up policy is the best way to combat most piracy: Quick and cheap replacement. Utilities and some business programs should never be protected because the user has to modify them. But often practical military necessity, in the guise of business practice, warrants stiffer measures.

Synergistic is currently in the process of acquiring a protection scheme that defeats nibble copiers. Clardy hopes that in the future there won't be a need to protect programs; at the moment, he is determined not to lose as much money as he feels he has lost in the past.

At the beginning of 1982, Synergistic continued the upward climb and moved into new quarters. They now occupy most of the top floor of a building in Renton, a curious town nestled in the foothills about thirty minutes from downtown Seattle. A river originating at Mount Rainier flows past the Synergistic building.

The Starting Lineup. Synergistic's staff has swelled to ten and includes some pretty sharp individuals.

Mike Branham worked in a Byte Shop and has done part-time programming for Synergistic several times. He helped Bob do customizing of *Modifiable Database* and was involved in writing portions of *Data Reporter*. Now he's Synergistic's database expert and he's in charge of software services and support.

David Kampschafer is a programmer who has worked on Synergistic's *Planetary Guide* and two new products, *G.A.P.* and *The Communicator*.

Ron Aldrich was fifteen when he began programming professionally for an insurance company. Since then he has produced for Synergistic *Higher Text* and *Higher Text II*. *Escape from Arcturus* was Aldrich's first game for Synergistic, and he has returned with *Nightmare Gallery*. Hired on full-time in April 1981, Aldrich has done numerous machine language programming tasks for a score of Synergistic products.

Ann, in addition to the accounting, is responsible for QC—an old Boeing term meaning quality control. After a game has supposedly been thoroughly tested, it is given to Ann; she has a unique talent for finding bugs. This usually means picking the right place to type in the wrong thing. Bob calls her "a terrific user."

Will's wife Becky joined the company a couple of months ago and has taken on the job of production coordinator.

Another important member of the Synergistic staff, though he doesn't work in Renton, is Ann's brother David Dickens. Situated in Salem, Oregon, Dickens has programmed much of Synergistic's inhouse software.

Rounding out the staff is Lloyd Ollman Jr., Synergistic's Atari programmer; Leslie Hornung, public relations and documentation writing; and Jill Jansson, who is the secretary-receptionist.

These gullible chumps should have their hands full right about now. Synergistic is releasing a barrelful of new products including four new games, two business programs, four utilities, and one educational program.

Adventure to Atlantis is the long-awaited sequel to *Odyssey* and, from all indications, fans of the first game will not be disappointed. Playable with a joystick, *Atlantis* has sections that involve real-time action, improving on the old-style fantasy games. Clardy is not the first programmer to attempt a real-time adventure, but his particular style and flair make *Atlantis* a welcome addition to the genre.

Nightmare Gallery is a home-arcade game written by Ron Aldrich from an idea by Bob. Glen Bredon, the prolific author of Southwestern Data Systems's assembler, *Merlin*, took a hand at 3-D graphics in the home-arcade game, *Procyon Warrior*. Charles Fleishman is a lawyer who worked on *The Linguist* way back when and now has returned with the strategy arcade game, *U-Boat Command*.

For business, Synergistic is releasing *Inventory Manager*, written by Joe Marinello, who is, among other things, a Buddhist monk. Bob Huelsdonk, an engineer for Honeywell and a big fan of the Apple III, has authored *Word Weaver III*—a word processor for the Apple III.

Another new utility package from Synergistic is *Soft Seventy*, a program that gives you seventy columns across the screen without hardware. *G.A.P.* is short for *Game Animation Package*, written by Glen Bredon, David Kampshaffer, and another lawyer/programmer in Synergistic's fold, John Conley.

What was once a two-person company working out of a basement is now a full-fledged software publishing house. Ann and Bob Clardy have really earned the name Synergistic. Before, taken separately, Ann was just another accountant and Bob was just another electrical engineer. Working together they have become much, much more.

Clardy commented in *Softalk*'s prediction story (December 1981) on advanced technology and its possible effect on third world countries. He believes that if underdeveloped countries can acquire advanced technology it will increase the chances for world peace.

It is indicative of Clardy's depth that he felt impelled to address a problem that is far removed from creating games in the small town of Renton, Washington. Yet Clardy is aware that he and his business affect the real world, just as much as the real world affects his life and livelihood.

Switch Hitters. Synergistic Software and its wide range of products is a model for the ideal mix of the escapist and the practical. Clardy could have made a lot more money just writing games, instead of publishing unprotected products like *Program Line Editor*. Some might call this bad business sense. Others will note that Clardy is concerned with helping people and through this making the world a better place.

Ripped off, praised, criticized, loved, and ignored, Bob and Ann Clardy have seen it all. They have gone through the great flame of capitalism unscathed up to this point. There are those who cannot make the same claim.

Entering an important phase in its development, Synergistic Software has the leadership and personnel to compete with newer companies that are starting with much greater resources than those with which the Clardys began.

It's a different ball game now, but the Clardys are determined to get the hits and make the right pitches. All they ask for is a winning season and a chance at the playoffs. ◨

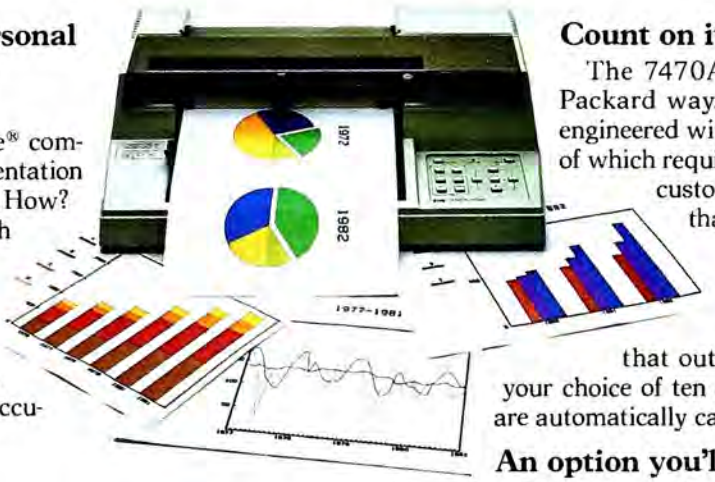
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1202 ST-5

THE PASCAL PATH

By Jim Merritt

Tools of the Craft, Part 11

Character Input from the Keyboard. Getting an individual character from the keyboard is as simple as issuing a call to Read and naming a Char variable as the parameter. Suppose that a variable Ch is declared as being of type Char. Then, *Read(Ch)* causes Pascal to accept exactly one character from the keyboard; Pascal will wait as long as necessary for the user to press a key, then will put the character value associated with that key into Ch. Here is a program that echoes the ASCII value of every character you type at the keyboard:

```
PROGRAM
  EchoASCII;
  CONST
    Blank=    ' ';
    QuitChar= '@';
  VAR
    CH
      :Char;
BEGIN (* EchoASCII *)
  REPEAT
    Read(Ch);
    WriteLn(Blank, Ord(Ch));
  UNTIL (Ch = QuitChar);
END (* EchoASCII *).
```

Notice that you may exit the program and regain the Pascal system main prompt line by pressing the at-sign (@) key (shift-P on the Apple II keyboard). Now compile and execute EchoASCII. Press a few keys and see what happens. Here's a sample run:

S	83	e	101
A	65		32
M	77	#	35
P	112	1	49
I	108	@	64

If you play around with EchoASCII long enough, you may memorize several of the ASCII codes; in fact, should you ever need to drill yourself in ASCII, this program will come in handy. However, the reason for its appearance here is that it's a very good tool for illustrating several aspects of Apple Pascal's input mechanism. Keep this program around; we will need to use it from time to time as we venture farther down the Path. It will help us draw conceptual maps of some hitherto uncharted regions of Apple Pascal. For now, let's do some experiments.

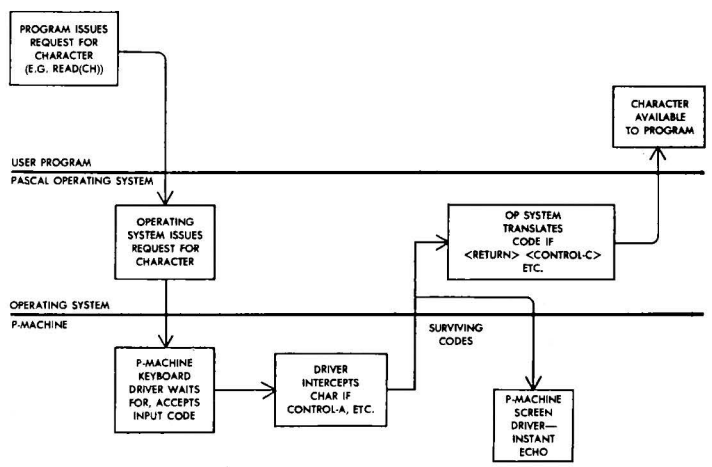
While EchoASCII is running, press the space bar. Make note of the response. Now press the return key. Because the number 32 is reported in either case, you can see that both characters appear as blanks to Pascal, even though the true ASCII code for return—the code that is actually generated by the keyboard—is 13. As we saw last time, Pascal normally sees a blank whenever it comes to the end of a line of characters, and return is taken as signaling end-of-line from the console keyboard.

Now press control-C. Again, you see 32, and this verifies the claim made last month that control-C is also translated into a blank by Pascal. Of course, the computer keyboard actually generates the ASCII code 3 when you press control-C. It is the Pascal system that maps the original character, which it perceives as an end-of-file marker, into a blank.

We Digress To Solve a Mystery. Take a good look at the EchoASCII program. It includes explicit instructions for putting onto the console screen the ASCII value of any character you type at the console keyboard. But when the program is run, what do you actually see on the screen? Not only do you receive the ASCII value of the typed character, but you also get the character itself. To all appearances, there's no instruction in EchoASCII that generates this extra output. The Pascal system itself is responsible for echoing the original character, and it does this even before passing the character along to the EchoASCII program.

Here is the sequence of events that takes place when you Read from the console:

1. Your program tells Apple Pascal that it wants a character; the system takes over and waits to receive a character.
2. You press a key.
3. The keyboard generates an ASCII code corresponding to the pressed key.
4. A small machine language program (the *keyboard driver*), embedded with the p-machine, receives the ASCII code, intercepting control-A (flip screen), control-S (stop display), control-F (flush display), and certain other control codes (for a complete listing and explanation, see the operating system manual). Under normal circumstances, a Pascal program can never receive these special codes, since the driver uses and discards them.
5. The driver sends ASCII codes that it does not intercept to the Pascal operating system. Before doing anything else, the operating system sends a copy of the code it receives back to the *screen driver* (another Apple machine language program within the p-machine) for immediate display on the console screen. Note that the return code is echoed as a return-linefeed couplet. In other words, two separate characters are sent to the screen driver for every press of the return key: CR (carriage return, code 13), which returns the cursor to the leftmost side of the current display line, and LF (linefeed, code 10), which moves the cursor down to the next display line without moving it horizontally. This accounts for the superfluous blank line that appears on the screen when you press return during the execution of EchoASCII.
6. The operating system translates return (control-M), control-C, and control-P into blanks. (Control-P translation isn't as



simple as implied by that statement; more to come on this subject later.)

7. The final character, after operating system translation, is sent to the user program for final disposition.

Special Functions: EOF and EOLn. Even though Pascal translates return and control-C into blanks, it does give you and your program a way to distinguish between regular blanks, blanks that started out as control-C codes, and blanks that were originally return codes. The built-in Boolean function EOLn (End Of Line) will always be True immediately after the Pascal system receives a return code from the console; the built-in function EOF (End Of File) will always be True just after the system receives a control-C.

With slight modification, EchoASCII can not only help you become familiar with the ASCII character set, but can also demonstrate the behavior of EOF and EOLn. To extend EchoASCII so that it reports when EOF or EOLn is True, just substitute the following statement block for the one in the original version:

```
BEGIN (* EchoASCII—version 2 *)
  REPEAT
    Read(Ch);
    Write(Blank, Ord(Ch));
    IF EOLn
      THEN
        Write ('EOLn');
    IF EOF
      THEN
        Write ('EOF');
    WriteLn;
  UNTIL (Ch = QuitChar);
END (* EchoASCII *).
```

Compile and execute EchoASCII, version 2, and notice what happens whenever you press the return key or control-C. After the 32 that corresponds to return, you will see the legend "EOLn." Since the legend is not displayed for previous or succeeding characters, this means that EOLn is True immediately after someone presses the return key but reverts to False when the next key is pressed (unless, of course, the next key pressed is also return). When you press control-C, the program displays both "EOF" and "EOLn." This is because, in Pascal, the end of file—the logical end of information—also implies end of line.

EOF and EOLn are convenient built-in signals that your program may either observe or ignore. They represent the Pascal system's best guess as to whether the end of information or the end of an input line has been reached. In the vast majority of cases, as we'll see, this guess corresponds to physical truth. But there are exceptions, especially with regard to console input. For example, even after control-C has been pressed and EOF becomes True, a program may still issue calls to Read and acquire more characters from the keyboard. You can see this for yourself, while executing EchoASCII, by continuing to type after pressing control-C. The program continues to display the ASCII code for each character that you type.

Notice, however, that once you press control-C, the "EOF" legend is displayed for every succeeding character. Once EOF is turned on, you cannot turn it off as you can EOLn, simply by reading more characters. To restore a value of False to EOF, you must use the built-in procedure Reset, which we'll study soon.

That input data can still be collected from the keyboard after EOF becomes True is a convenient idiosyncrasy of the Apple Pascal system. We are lucky that EchoASCII does not have to observe EOF or EOLn; this fact permitted us to write a simple program and experiment with it, before proceeding to examine two new built-in functions. Next month, you'll see how Read and ReadLn may be used to acquire data from sources other than the keyboard. EOF (and frequently EOLn) will also work for these alternative input sources. However, for nearly all of them, EOF means just what its name implies—the end of all available data. In these cases, you're wise to heed EOF's warning and abandon attempts to acquire input from that source. Before writing programs that deliberately ignore EOF and EOLn, you need to become much more familiar with the behavior of the Pascal system than you are now. Until you have a good working knowledge of the system, you can't, with any certainty, say whether Read or ReadLn will continue to work in a given situation, with a given input source, after EOF or EOLn becomes True.

Another Tool. Many of the programs we will develop along the Path will require the user to supply one or more yes or no answers in order to direct (or alter) program behavior. For example, perhaps a program is about to undertake a particularly sensitive operation, such as eliminating an important data file from the disk. In situations like this, a good program usually asks the user to confirm the desirability of the operation. Since we will be needing yes/no confirmation often, it makes sense to develop a tool that performs the task for us and that we can use in our programs as often as necessary, without having to write it from scratch each time.

Let's first decide how the tool should behave. It should wait for the user to type in a reply that signifies yes or no and return an appropriate representation of the user's response. Ideally it should let the user type a simple Y or N to indicate yes or no, respectively. In addition, the tool should be smart enough to recognize the capital and lower-case versions of these letters as being equivalent.

A lot of people are used to pressing the return key to skip past uninteresting or irrelevant questions; this generally corresponds to an answer of no, and our tool should respect this interpretation of return. However, what if the user presses a key other than Y, N, or return? Should this also be taken as a no answer, or as any answer at all? Probably not. Typographical errors are far too easily made, especially by people who have limited experience with keyboards or computers. Consequent-

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VISA

Applesoft in ROM or a language card is needed for floating point math.

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ly, our tool should ignore unexpected input and wait until it gets one of the three valid responses.

Finally, our tool should let the user know that it has received and recognized a response, to reassure the user that execution is proceeding smoothly.

Here's one version of this tool. Does it meet all of our requirements?

```
  FUNCTION
    Yes
      :Booleon;
  (* Waits for cose-independent 'Y' or 'N' response from console keyboord, ond
     returns True os function volue for 'Y', Folse for 'N.' Return is token os
     equivalent to 'N.' USES FUNCTION Copitol, which must be declared prior to
     this function! *)
VAR
  Ch
    :Chor;
BEGIN (* Yes *)
  REPEAT
    Reod(Ch);
    Ch:=Capital(Ch);
    If EOLn (* Return pressed *)
      THEN
        BEGIN
          Ch:='N'; (* wos blonk *)
          Write ('N'); (* Blonk wos echoed by Poscol *)
        END;
  UNTIL ((Ch = 'Y') OR (Ch = 'N'));
  (* Got response, now report it! *)
  CASE Ch OF
    'Y':
      BEGIN
        Write('es'); (* Finish "Yes" *)
        Yes := True;
      END;
    'N':
      BEGIN
        Write ('o'); (* Finish "No" *)
        Yes := Folse;
      END;
  END (* CASE Ch *)
  WriteLn;
  END (* Yes *);
```

Yes waits for the user to respond with Y, N, or end of line (return). If the response is Y, Yes adds the letters *es* to the display to complete the word *Yes*. If the response is N, the letter o is added to round out *No*. Yes displays the entire word *No* when the user responds with return. All other responses are ignored. Yes calls upon the function Capital, which we developed in a previous column, to coerce all alphabetic response to upper case. It also issues a WriteLn after a valid response, to help it stand out from other information on the screen. For a Y response, Yes's Boolean function value becomes True. For N or return, the value becomes False.

The following illustrates how Yes might be used in an Apple Pascal program:

```
Write('Does this pleose you, Moster? ');
IF Yes
  THEN
    WriteLn('Thonk you, kind sir!')
  ELSE
    WriteLn('A thousond pordons, veneroble one!')
```

You should always issue some type of prompt, prior to using Yes, that indicates what question is being asked. Otherwise the computer will appear to freeze during the call to Yes, and the user will probably have no idea of how to deal with the situation.

Exercises. Here are a couple of projects to keep you busy until next month, when solutions to the problems they pose will appear in the Pascal Path.

1. *Easy for old-timers.* The function Capital in Yes was used to illustrate a point: If we have good tools to use, we can build upon them in creating other tools. What if you didn't have a Capital function? How would you write Yes so that it could ignore differences between upper and lower-case responses?

2. *Easy if you've paid attention this month.* Modify Echo-ASCII to quit, not on receipt of an at-sign, but whenever the user presses control-C.

3. *Tough!* Write a program that includes and uses the Yes function in an interactive dialogue, where the computer tries to guess an integer number that the user has in mind. Here is a sample of such a dialogue:

```
IS THE NUMBER LESS THAN 20? Yes
IS THE NUMBER LESS THAN 10? No
IS THE NUMBER LESS THAN 15? No
IS THE NUMBER LESS THAN 18? Yes
IS THE NUMBER LESS THAN 16? No
IS THE NUMBER LESS THAN 17? Yes
IS THE NUMBER 16? Yes
I KNEW IT!
WANT TO PLAY AGAIN? No
```

You are free to use this sample dialogue as a pattern or ignore it, as you wish. Let the user's number range from 0 to 20. When you have a working program, how would you change it so that the user's number could range from 0 to 32767? (Lame hint: In the most efficient general solution to this problem, you need only change the value of a single constant to extend the range of numbers. But beware! This is also true of one of the least efficient solutions, in which the program counts up or down, one number at a time, until it stumbles upon the user's number.)

Remember to include the Capital function in your declaration area prior to the declaration of Yes, or you will receive a syntax error. If you don't have a copy of Capital handy, you may need to make use of the solution to exercise 1.

How does your program deal, if at all, with a user who lies about her secret number? ◨

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from page 26

OPEN DISCUSSION

The Saga of Barry: Monday. . .
You printed a letter of mine several months ago. In it, I asked a few questions and made a few remarks. I consider the response amazing.

Soon after publication I received several long-distance phone calls giving me helpful advice and encouragement. This proves to me that *Softalk* has a wide and motivated readership. If there is one word I would use to describe us, it would be *intense.*

One person recommended a piece of software (I bought it), one person recommended a club (I joined it), one person gave advice (I took it), and one person (Mr. Trahan) wrote in to you with a reply (you printed it). That person gave me some addresses to write to (I have) for information concerning low-cost voice recognition cards for the Apple.

While I'm here, I'd like to voice some more opinions, if I may.

That hot tub ad is certainly sexist. It is very, very sexist to make that man stand there fully clothed in a tub full of naked women while he focuses on a point 2,000 miles dead ahead.

Type'n'Talk works; that is, I typed in some questions and asked my wife to stand next to the speaker and listen. The questions were typed in, I hit return, the speaker spoke, my wife heard the computer speech for the first time, and it was comprehensible enough for her to answer the questions.

I've had long discussions with friends who are so close to buying a computer but are thinking of alternatives to an Apple. It is very hard to sway people away from the IBM and the Osborne. One looks great and the other is cheap (I forget which is which). My best shot was the true example of the walls of a large downtown computer store in San Francisco. Each wall has software for a certain type computer. One wall had Atari, TRS-80, Osborne, and PET. One wall was IBM but half of the slots were Apple. Of course, the other two walls were filled with Apple software.

We loyal Apple users must persuade our friends to stay with Apple. It will help both of us.

Have you ever seen a Venus's-flytrap with one of its trap-petals clamped onto one of its stalks? Probably not, but it looks as if it is eating itself; it won't, it releases itself after an hour or so. The point is: *Locksmith* can copy itself, and has. Which brings me to copying.

Piracy is a biased word; it implies theft. As they say, it all depends which ox is being gored. Mine is my wallet, so my policy on copying is this: If I can get it, I will.

It's a business to them, right? They will charge as much as the traffic will bear. Too bad for them that their product can be easily duplicated; it goes with the territory. Too bad for us that it takes thousand dollar machines to run the product.

There are some original ideas in this letter; they are encoded on my disks. I forbid anyone (except *Softalk*) from putting alphabet letters into a sequence to form words to form paragraphs which look substantially like this letter. See how absurd these protecting and monopolizing ideas can be?

Copy protection is an indefensible, self-defeating, technically impossible, unenforceable, greedy policy. So do the American Thing! Lower the price, increase volume. I would love to buy a Strategic Simulations game, but for sixty bucks? I would buy six for sixty dollars, but not one.

There appears to be a need, soon, for an, "Apple Modification Shop." This would be a shop where owners could bring their machines to have all the modifications done to them such as new keyboard installed, cards that require cutting wires installed, fans installed, outside joystick connection, big memory installed, etc., etc. Does anybody do that now?
J. Barry Smith, Barstow, CA

. . .Friday
This letter is an addendum to my letter of 22 March 1982. I said something in that letter about copying and now find myself caught up in this moral morass.

I said about programs, "If I can get it, I will." That sounds bad but I have found a new rationalization that eases the guilt. Here it is.

One of my friends was very, very close to buying an Osborne. When I told him that I would give him copies of some basic programs if he buys an Apple, he changed his mind. When he gets his system up and running, I will ask him to write to you explaining why he bought the Apple.

Of course, he will now be buying other Apple software for his machine. The authors of those earlier transferred programs can take solace that they died so that others may live.

The answer to one problem is to include in ROM, or on internal chips, the four basic programs every microcomputer should have:

1. Word processing.
2. Database management.
3. Electronic spreadsheet.
4. Role-playing game.

It costs hundreds of thousands of dollars to produce a $10 record album. A $200,000 program will retail for $60. How much did aural records cost when there were only a million phonographs around? If the early aural records cost the same, relative to time and inflation, I will concede a point to the software publishers.

The whole point, of course, is the producer trying to control a product for as long as possible to milk the most profit out of it. I don't blame them; that's what good businessmen do. Apple did it when they excluded mail order sales. Soon it may be such that only college graduates may purchase computers—after a written test—and a recommendation—and an interview—etc.

Imagine selling an aural record and saying only one member of the family can listen to that particular record on Sundays only. That rule would require many more records to be sold if the whole family wants to hear it every day of the week.

The software contract that stipulates that the buyer can't copy is a nice try to control, but it just makes criminals out of us. Once the product is sold (not leased or rented) the product must be allowed to be used as the buyer sees fit; that is, resold, copied, or used as a frisbee.

When I give my dollars for a program, maybe I should stipulate to the software company that the dollars must not be used for lawyers' fees. I gave them a product which took time and money to produce—dollar bills—now I will control and limit how they use my product. (And no dollar bill paper airplanes either!) The rebuttal to that is dollar bills can't be copied, right? Right! Dollar bills can't be copied and that's the only thing that can't be copied.

I would hope in a few years that this whole question will appear quaint and dated.
J. Barry Smith, Barstow, CA

Honesty Is Not Gray
Your March Open Discussion featured two more contributors to the subject of software piracy. One declared consistent exercise of a verifiable ethical principle to be unacceptable; the other declared ethical principles to be unacceptable, period. Your succinct January appraisal of piracy as theft was characterized as "hypocritical" and "false mo-

rality." You artfully refrained from further comment. Move over. It's my turn.

When one addresses an ethical issue, one owes, as a minimal courtesy to the audience, the presence of mind to name the ethical principle being invoked. Any discussion of "ethics" implies, and requires, a clearly defined mutual ethical standard. It cannot be resolved by reference to peer pressure, personal whims, or private opinion polls.

My dictionary defines the verb *pirate* as: "to appropriate and reproduce (a book, invention, etc.) without authorization or legal right." It defines *defraud* as: "to deprive of a right or property by fraud; cheat." If theft isn't a moral issue, nothing is.

No reader would try to program the 6502 microprocessor with "maybe/maybe not" bits and random "don't-be-too-consistent" bits. It doesn't work that way; neither does the human mind. That is the mental equivalent of dividing by zero; the joker, the wild card.

This letter is really addressed to those who resolved the issue of theft at the age of nine or so, and don't steal, but aren't fully prepared to say why.

There aren't "two sides" to software piracy. Sale of software is a trade; i.e., a mutual (voluntary) exchange of values, and as such requires the full understanding and consent of both parties. Any attempt to obtain value from another without this consent requires an "involuntary trade"; i.e., force or fraud is involved.

Once one claims a "right" to the theft of another's ideas, one might as well go for his property too, and even his life, if he tries to prevent this. There are no principles by which one can claim that software piracy is sometimes justifiable, but that theft of one's own personal computer never is.

One cult figure in the vanguard of the sixties' movements understood this the best of them all: "We got a right to anything we can take." (Huey P. Newton, circa 1964). He had little truck with the whining you-don't-have-to-be-too-consistent, intellectual types. He didn't have to justify nothin'; everybody just sort of understood, and that was, as the man says, that.

So much for division by zero: those who repudiate the "acceptability" of independent and self-sustaining action are physically dependent upon those who don't. They shouldn't count on their victim's sanction. They need the victim more than he needs them, and, unless he doesn't understand what he hears, he'll know this first.

I don't think most readers steal, or need to. I don't think views that theft is okay in a "good" cause, or that discussion of same is hypocritical, are a credible part of this controversy. I think these views are the cause of it.

Penguin Software's new policy of providing copyable, revisable applications software to us will ultimately end either in industrywide return to this practice or in Penguin going belly-up. The outcome depends upon us.

Most of us will respect authors' rights, as we do our own. How? Don't be a second-hander. Decide for yourself. Act accordingly. Don't pay lip service to a double standard you don't personally respect; speak out, or act against it, when you can. One doesn't arbitrate with takers or providers of "hot" merchandise.

Your own self-interest is at stake. Your highest ethical standard is your own life, and your mind is your only means of living it. What you make of all this is your own business, but your choice is between this standard, or Newton's.
Alexander L. Forbes, Oakland, CA

Reader Response

Since you asked for my comments, I will grant your wish.

I feel *any* advertising is permissible and that no advertising is obscene.

I like your product reviews and *comparisons* the most . . . and feel that more pages should be devoted to this.

I feel that articles explaining programs need to be somewhat more detailed and self-explanatory with *examples.*

I strongly recommend binding the cover more securely. Mine is forever coming off of each issue. *This is very annoying.*

Please don't separate stories and break them up as much as you have been doing.

Please try to improve the paper quality and print size since you are now upgrading to charged subscriptions.

Overall I feel you have an excellent magazine and am satisfied with your fair subscription price of $18.

I feel that more program submissions and utilities would enhance the magazine tremendously.
Michael B. Norton, DVM, Dallas, TX

Sticking Your NEC Out

My system is: Apple II Plus, 48K, two drives, keypad, Model 5515 NEC Spinwriter Printer interfaced with Apple high-speed serial board.

My problem: Although I have talked by phone to Mike Morn at the NEC place in Lexington, Massachusetts and called for Henry Hamstra at the Atlanta office several times, being told that he would call me, I still can't learn how to cause the 5515 to print bidirectionally.

This printer is called Diablo-compatible and a graphics program written for the 1660 Diablo works. It will print bidirectionally when running *Supertext III* so the printer and interface are okay, but with present-day write-protected programs I am unable to determine what characters are being sent to the printer.

I know of at least two others who have the same problem. Although it is a fine machine and has given no trouble for fifteen months handling constant real estate appraisal printing, someone should tell NEC that we Apple owners would like to print backward as well as forward. How about it? Anybody know?
C.L. Stokes, Bagdad, FL

Tolerance

First, I'd like you to know I'm a novice to computing. Second, any criticism is meant to be constructive and not to be taken personally. Just so that you know what kind of person you are dealing with, I am a retired auditor (head down, pencil-moving, persnickety type). Since the purchase of my Apple last May I have gotten less tolerant of errors, especially *?syntax errors.* The problem is errors in your January column, "Debut: All About Applesoft."

Number 1: Page 66, paragraph 2: "There is a list of reserved words in Appendix C of the Applesoft manual." Which manual are you referring to? I have four manuals:

1. *The Applesoft Tutorial* #030-0044-C (Appendix C refers to editing features.)
2. *Applesoft II,* #030-0013-E, *Basic Programming Reference Manual* (Appendix C refers to error messages.)
3. *Apple II Reference Manual,* #030-0004-C (Appendix C refers to ROM listings.)
4. *Apple II Basic Programming Manual* #A2L005X (Appendices are not lettered.)

Number 2: Page 66, end of column 1: "Type *run* and presto!" *?Syntax error in 20.* The Apple doesn't like INTRO$, a perfect example of the previous syntax error that you pointed out on page 66, column, paragraph 1. (I got the program to run by changing INTRO$ to RO$.)

Number 3: Page 66, column 2: the first program listing 20 PRINT "THE NUMBER I AM THINKING OF IS"NUMBER%. When I ran it I got "THE NUMBER I AM THINKING OF IS3." I corrected this by putting a space between " and N.

I really enjoy your column. It's the best explanation of Applesoft that I've yet come across—including the Applesoft Tutorial. I hope you take my comments in the spirit that they're meant, as one Apple enthusiast to another.
Richard Sousa, Oceanside, CA

Do we get a gold star for noticing that only the second book on your list is an "Applesoft" "Manual"?

Number 3 will work if you put the space between "is" and the end quotation mark of the print statement.

Plot and Plot and Plot Again

How can I make my own hi-res pictures (that come on the hi-res screen when loaded) without buying a $50 graphics system? If anybody has the answer, please send it to me.
David Scott, Santa Cruz, CA

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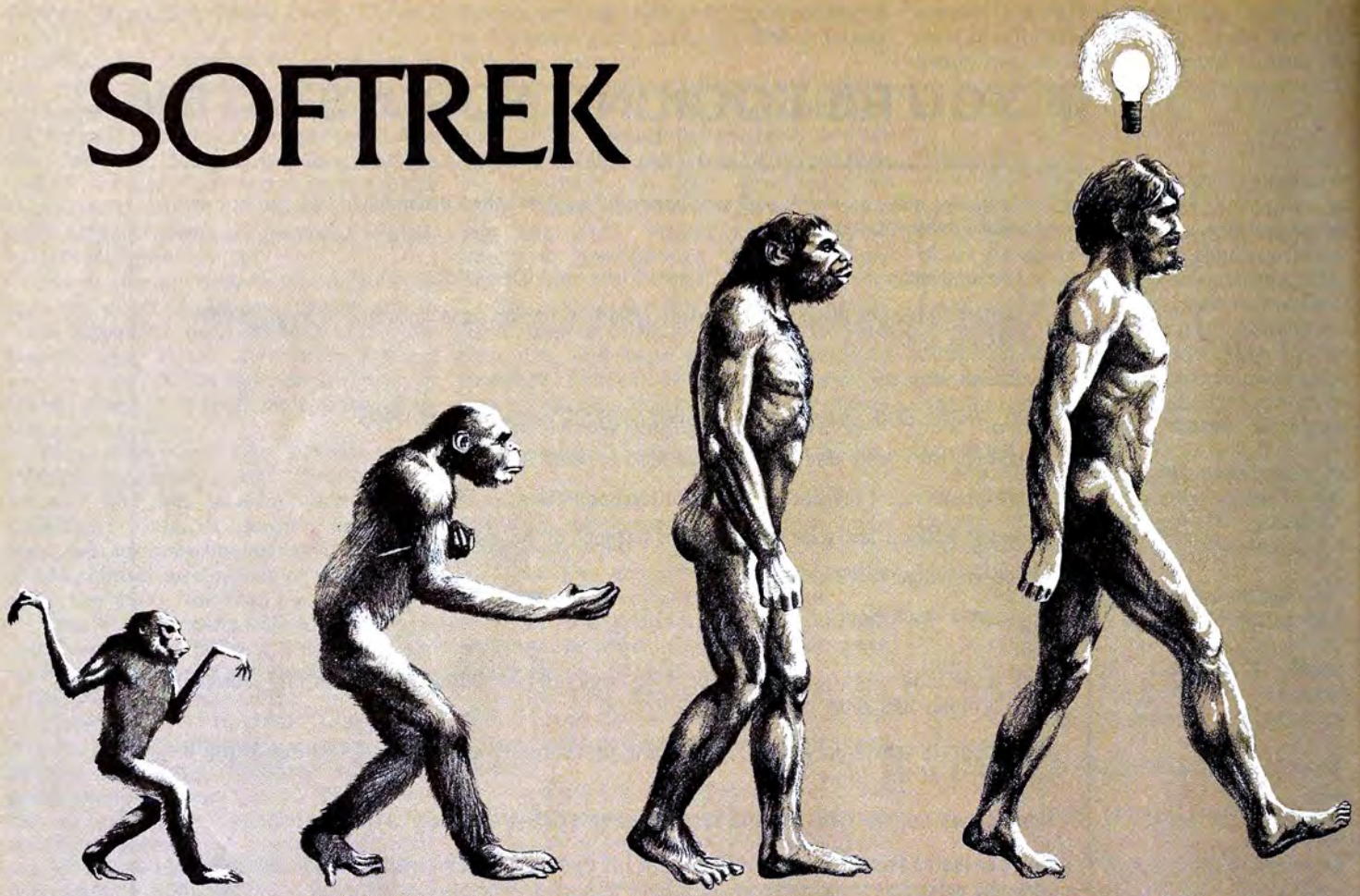


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SOFTREK



There is a newly opened continent, its shores barely charted. No one has yet plumbed its depth or conceived its breadth.

For years the borders of this continent were guarded by priests and priestesses chanting strange formulas. For years the costs of exploring its vastnesses were out of the reach of all but a few who could afford large hulks named IBM, CDC, Sperry-Univac, and others.

Now that has changed. Small, speedy clippers named Apple are afloat, their banners flashing in the sun.

Pioneers manning them already explore along the more accessible rivers and streams. Many have begun to mine the top layers of riches. Even so, the continent lies waiting for those who will dare to test themselves, their knowledge, and their skills.

Of the sturdy souls left behind, many toil at jobs that, at worst, they hate, at best, they enjoy somewhat. They're given directions, orders, instructions, memoranda but, even as they obey, most dream of command.

The dream is common to many people: "I want to be in command of my own destiny." For more and more of these dreamers, exploring the frontiers of software aboard an Apple appears to be a prime way to reach that goal.

Travel Plans. If you have a head for business, you might want to make your way alone, producing and marketing your own programs and building a software publishing company. That's how On-Line Systems began, and Synergistic Software, Muse, Southwestern Data, Turnkey, Horizon, CE Software, BPI, Cavalier, Broderbund, and Penguin.

You may prefer to leave the driving to others, finding established publishers to market your creations. Paul Lutus programs in an Oregon log cabin; he has to carry buckets to a stream for water, but there's plenty of power for his Apple. He leaves production to Apple (*Apple Writer*), United Software of America (*Apple World*), and Insoft. Tony Suzuki, Chris Jochumson, Steve Baker, and Mark Turmell also work this way. Bill Budge and Nasir Gebelli used to, with California Pacific and Sirius respectively; those two have turned entrepreneur since achieving success, with BudgeCo and Gebelli Software.

Whether a software package begins with a programmer in a log cabin, arriving at a publisher in a relatively finished state; grows from a seed in the publisher's mind; or follows some combination of paths, the road to the retail store is long and demanding. To show you how it works, we'll journey with some programs from idea to publication—take a softrek, if you will. We'll become a little bird on Doug Carlston's shoulder to track the development of *Track Attack;* then we'll fly to Chicago to see how *The Complete Graphics System* went from being an experiment to becoming the cornerstone of a new company.

Finally, in the companion story, we'll visit a distributor to see how the middle people view the market and what chances they offer the new programmer.

Here we go: first stop, San Francisco.

Training over Piroshki. It was September 1981, and the San Francisco Apple User's Group meeting had been cancelled. Unfortunately, three men standing in the parking lot had not been informed.

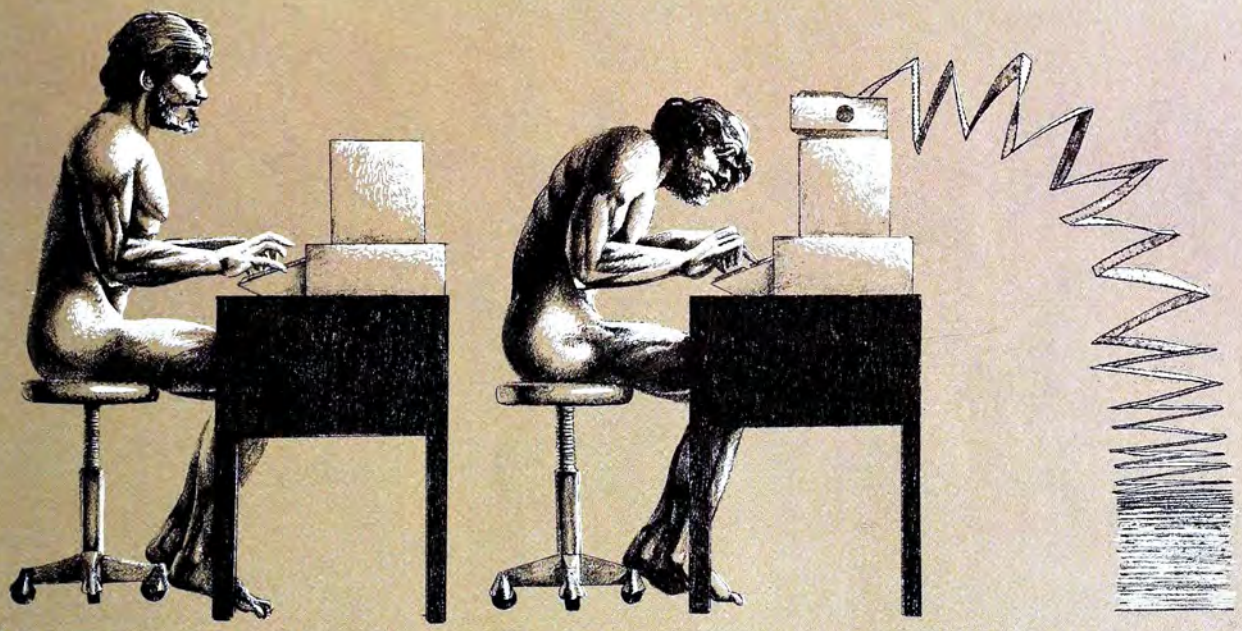
One of them suggested they get a bite to eat before trekking homeward. Thus the Praha Deli at 22nd and Geary became host to some of the most creative people in Appledom. It was here that the games *Track Attack* and *Labyrinth* were both conceived.

Over their piroshki, Doug Carlston, his brother Gary, and Chris Jochumson, all with Broderbund Software, began talking about how to design a game. Doug recalls drawing out a legal pad and taking notes. "Usually I provide a framework. This time, I said, 'Okay, let's talk about a train game.' "

Carlston selected trains because he was looking for motion and with its designer, Jochumson, there, had in mind *Space*

THE EVOLUTION OF SOFTWARE

BY DALE ARCHIBALD



Quarks. Trains, like quarks, are things in a row that follow in a path.

Riding the Rails. "We drew several maps of tracks and tried to figure out what you would do with tracks and a train running around on them.

"One idea was that you'd control the switches at ten different intersections and you'd be steering a little handcar around trying to avoid getting run over. Your only control would be the digits from 0 to 9, and you could use each one of them to flip a switch on the screen. Presumably, there'd be more and more trains as time went on, and you'd have to have some goal. You'd be trying to repair the line or something like that."

Another idea came quickly. "We expanded the map to have roads and tracks intertwined and looked again for interaction that made sense. At first, cars just had to avoid getting run over by trains; that didn't seem like much fun. Then we thought, 'What if you could just shoot the cars right through the trains at different intervals—and why would you want to do that anyway?' "

For a while, then, they just noshed and talked. Maze games were touched on—the result being *Labyrinth.*

The group designed a demolition derby no one liked because it involved too many shapes and having to turn through too many angles. "Unless you did transformation, you'd have to stick all those shapes in separately and then preshift, and that would chew up huge amounts of memory—though I don't see anything wrong with that."

The shapes, Doug says, are typically eighty percent of the program code in terms of memory allocation.

The Play's the Thing. In the next stage of program design, a programmer chooses an idea to play with for a while. Jochumson, Doug remembers, asked for the notes on *Track Attack* and began looking over the mustard-smeared yellow sheet.

"A week or two later, he came in with a screen he wanted to show me. The track and the paths were pretty well laid out—it changed very little since. From that point, if anyone else took an interest in the idea, we'd tell them, 'Forget it, Chris is running with that one.' That prevents two people working on the same thing."

Broderbund looks first for fun in a game. "If it won't be fun, what does it need? Is it too simple, or too complex, or too hard to understand? What game controllers will be used to manipulate the different things on the screen is a limiting factor."

Controls weren't the problem with *Track Attack.* "We decided, however, the game didn't have enough substance. It needed a couple of additional levels."

At the original meeting, an idea of Gary Carlston's had been dismissed; now it was to be reconsidered. "Gary's idea was for the player to control a person trying to run along the roof of a train to the front, jumping over low-lying branches, ducking tunnels, and generally avoiding all kinds of dangers that would be pictured whipping across the screen."

Now, they considered a simplification; Jochumson had figured out how to scroll a big, colorful train across the screen but not how to put in the background without slowing the program down noticeably. They decided to use the simplified version, the only peril being the jump from car to car, as the second level of *Track Attack.*

"To tie it together so it would make sense, we came up with a skeleton story line. In level one, you'd attempt to drive through the box cars to steal gold from the cargo. Presumably, taking the whole train would be a much more efficient way to get all the gold, so, on level two, you attempt to take control of the train and run to a level three. This is not really very difficult to program since it uses the same routines as level one."

Shaving Points. Further refinements followed, including having the score you get on level three dependent on your score from level one.

"The purpose of the multiplier idea was to add the calculation of risk: 'Is this the right time to move on to the next level, or should I lie back here, where it's easier, and keep piling up points, then risk it all in one grand effort?'



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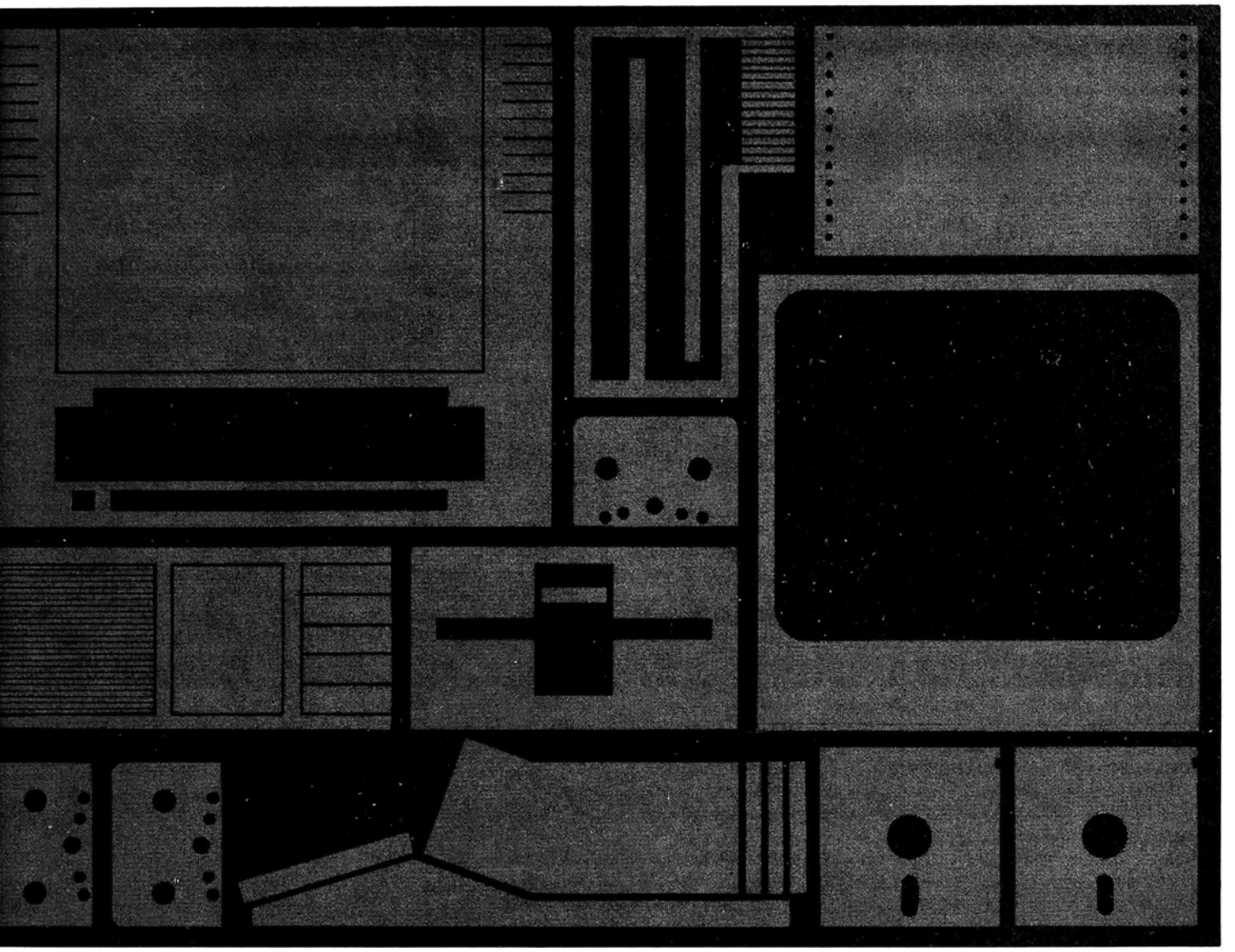
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"What we were trying to do there is fairly intuitive. We're trying to give players an opportunity to calculate risk factors, so that there are more things to consider than just holding the button down and zapping the aliens."

Doug believes this to be crucial to the making of a lasting game. "Most good games have alternative strategies available. If you look at any really decent game, it doesn't have a simple solution that, once handled, makes you master of the game forever and ever."

As Chris continued to work on *Track Attack*, he would bring in various versions. Doug says there were at least twenty over time.

"They were at different stages," Gary says. "We'd all go over them. For example, Chris was real disturbed by flicker; it was causing him to lose interest in the whole game. So we put it to a vote, most of us turned out to consider it insignificant, and the consensus convinced Chris to move on to new things."

True Obsessions. Programmers also become attached to certain parts of a program. "Chris had done a real ding-dong explosion sequence. When the car and train collided, the impact threw up a little white cloud and went 'beep-beep-beep-beep.' Everybody thought it was awful, but Chris loved it. It took us about a month and a half to talk him out of it."

Features are added one at a time. And then there are bugs. "For a long time, level two and level three didn't interface at all. You could look at one and you could look at the other, but you couldn't move between them.

"In an earlier stage, it was almost impossible to get the car through the train to steal the gold. You had to be so precise it was no fun at all. We said, 'Let's just loosen up those windows so that if the car's anywhere near the right spot it will count as having gone through it,' That isn't the place to penalize people.

"We added the phantom watch car in the process of making escalating levels of difficulty. At first, we were going to have no cars, then one watch car, then two, and so on. Ultimately, we decided that two cars made the game slow down too much. In the end, we chose to keep one car in there all the time.

"One of the last additions—this was Chris's idea—was that the phantom car be able to steal your gold from your stockpile; then you could wrest it from the phantom if you could catch it before it put the gold back in stock. That was just a fillip to make one more thing to keep track of. We had had complaints that level one was just a little simple-minded. We try to think of ways to stay within the story line while adding complexity to the game to distract people's focus of attention as much as possible."

It takes about six weeks normally to get everything together at Broderbund once they know what the finished program will look like. *Track Attack* took longer because of recurring bugs. "Programmers go on working on their games: Final version, *final* final, *final* final final."

No Reprieve. "We test programs extensively. After protection is added we test again, because sometimes the protection interferes. Then we add quick-load and test it to death. And we test it here; we don't send games out of house.

"We pass a couple of dozen copies around the office, and people play it all the time, looking for any kind of bugs. We found a lot of them in *Track Attack*, but I don't think there are any in the version that went out."

Jochumson began working on the program in September 1981. By early December, it had essentially been finished.

Simultaneous with the programming, Broderbund had an artist working on the artwork for *Track Attack*.

Meanwhile, Doug says, "We got Chris to write out the rules longhand, so we didn't miss anything. After all, the programmer knows the rules better than anyone else." Gary usually writes the final instructions and story line for Broderbund games. Doug and sister Cathy go over them to find errors. They added a story line to the explanation to give it more flavor. Then the graphics design people designed a package around it.

Disk labels are designed by the same graphics design peo-

I WANT TO BE A SOFTWARE HERO

Bohlig and Associates, Minneapolis, Minnesota, is a stocking distributor—they buy products from a manufacturer, keep them in stock, and sell to retailers. Chuck Bohlig has been in the electronics industry more than twenty years, in computers for four.

While his wife Diane manages the office, Chuck, with sons Steve and Jeffrey, sells throughout Minnesota, Iowa, Wisconsin, and the Dakotas. They handle a number of respected lines, including Microsoft, MicroPro, VisiCorp, Qume, Novation, Zenith Data Systems, and others. They do not sell games.

Because they are respected, the firm receives five or six letters a week from would-be software publishers, Bohlig says. "We are besieged with hardware and software.

"Somebody will call up and say, 'I'm the author of XYZ program for the Apple. I've sold to a couple of dealers and I'd like you to distribute my product.'

"We ask a number of screening questions to find out what he's trying to do, what sort of a level he's gone to in supporting that product."

It's not who you know.

A few of the questions Bohlig asks are:

1. What does it do?
2. What are the features?
3. What sort of equipment does it run on?
4. Did you write it?
5. What sort of languages did you write it in?
6. Is it compatible only with the Apple?
7. Could it be sold with other systems?
8. What sort of documentation is available?
9. How are you marketing it? Is it a product you have to support personally, or is it a mass-market-type product that can be supported by a distributor training dealers who train the customers?

Bohlig warns that the majority of consumers are no longer sophisticated users who know all the ins and outs of a computer. "To sell more and more computers, you have to be able to sell the people who do not understand what DOS 3.3 is, or what the word 'boot' is. You have to be able to give customers software packages with manuals that will allow them to open a package and operate it."

Bohlig answers with no hesitation when asked what most would-be publishers lack: "Documentation! That's the weakest point.

"It's more important to us than 'Does the actual disk work?' We assume that the program has some value, or has some function, but is it friendly enough so that a person can buy it straight from a dealer's shelf, boot it up, and attempt to run it? That's where we see the biggest problem."

Four-Letter Word. From his experience, Bohlig looks for help. "What can you do to help the user? Is there a help menu on the program? Is it understandable, or do they have to look at the screen and refer back to the manual with some degree of difficulty? The easier it is, the better the customer's going to like it.

"Don't even assume the person knows how to insert the disk and turn the machine on. We see some stuff that assumes you know how to boot it up and how to put CP/M on the disk . . . and it doesn't happen that way.

"You have to be able to write for the lowest level," Bohlig stresses.

Other areas of weakness are:

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ple who do the packaging, but Broderbund does the ordering from one of three printers it does business with.

Production, Doug notes, "starts duplicating disks off as soon as we're convinced there are no bugs in the master, often long before we have the packaging. That way they can schedule a steady work flow in the department.

"There were more than three thousand prerelease orders for *Track Attack*, and if we'd waited to duplicate until we had the packaging, it would have been a couple of weeks before we'd have been able to get the shipments out."

The process of marketing doesn't end when the product's shipped.

Advertising, Doug says, hasn't always worked out well. "*Track Attack*, we thought, would be ready about three months before it was. It was supposed to be advertised a month early and, due to the delays, the ads ended up about four months early. *Midnight Magic* wasn't advertised until two weeks after it had been released. Something like *Starblazer* won't be advertised at all."

The company has earmarked a lot of its budget for what Doug calls sneak previews.

"We're sending out enormous numbers of demos around the country as a way of generating interest on the part of the stores. That's where a big chunk of money is going; we're also putting a lot more into shows."

Another growing segment of the ad budget is packaging. "The packaging is a lot more expensive than it was last year. It's heavy cardboard, and we're spending much more on artwork and design. We're basing it on the theory that people are buying the product, and not the hype. We consider the packaging a part of the product, and not part of the hype."

Initial sales figures, generally, are based on advance orders from major distributors. "We sell about ninety-five percent through major distributors, and we have twenty-seven of them." No wonder *Track Attack* is doing well; there are few places where you can't get it if you want it. Yet, barely more than a year ago, Broderbund's distribution representation was less than ten percent of the marketplace.

Now we'll visit a company so young, their duration of widespread distribution must be measured in weeks to get a two-digit number.

Birds Do It. From the wilds of the midwest, twenty seven-year-old Mark Pelczarski of Penguin Software has followed his own program publishing odyssey, with the aid and support of his wife Cheryl.

In 1979, Pelczarski bought an Apple to see what micros could do that big computers couldn't. "Graphics seemed to be one of the big things. The first thing I did, first month or so, was write what turned out to be the framework of *The Complete Graphics System.*"

Pelczarski wrote a shape table generator and a hi-res drawing program, along with the beginnings of the 3-D program. "By today's standards, it was nothing fancy at all, but, after I had polished it up, I took it to some computer stores—I had a 32K Apple and a disk drive, and I wanted to trade for accessories."

Apple Trading Cards. "When I first started selling, I would make up a bunch of packages, take them into stores, and say 'Why don't you give or sell these to your customers—I need 16K more memory,' or a new Integer card, or this and that. That's how I got most of the equipment to put in my original Apple."

Using *Apple Writer* to write the instructions over a two-week period, he recalls, "The original manuals were run off on an IDS printer and Xeroxed."

The rough-and-ready packaging was zip-lock bags "from the local grocery store. Inside was an instruction book Xeroxed on one weight of paper, the cover laid out with press-on lettering and Xeroxed onto heavy, colored cardboard stock.

"I sent copies around to several publishers, magazines, and

GOTO 130

1. Error-trapping. Bohlig judges it "fair-to-middling."

2. Packaging. "Very important to the end sale. If it's a $49.95 program, let it look like a $49.95 program. But if a person's going to lay out $300 to $500 they expect more than a mimeographed sheet. When you're talking that sort of cost, you really should have a typeset manual. Over $100, as a rule of thumb, should be typeset."

3. Terms. "Publishers feel 10 or 15 percent should be adequate for us. They don't understand sometimes that we pay for it on agreed terms, whether C.O.D., net fifteen, net thirty, or whatever. We inventory it on the shelf, and we then offer terms and a discount to the dealer.

"By the time you carry the product for thirty or forty-five days, it starts costing you interest money to handle that. You've got to price the product to be competitive, but also to give your distributors and your dealers adequate margins.

"The better the margin the dealer has, the more he's going to push that product. There's no money in hardware; software's the only other place where you can overcome losses generated by having to compete with mail order and such."

Insect Insurance. He suggests Beta-testing from some "disinterested party" who's not intimately involved with the program is of great help, and the distributor should be notified of the levels of testing it has gone through. What has the company done to ensure that a correction won't cause another bug?

"How do they want to market it? Are they going to bring it in with a handbill flyer, or is the distributor to do all the promotion? Are they going to do some national advertising in the magazines, and are they prepared to do that? If so, how big?" Lack of money will affect this marketing area particularly.

Design weaknesses, Bohlig points out, lie in programmers' "not understanding what they want to accomplish. The mechanics of the program, all the listings, can be outstanding. But the programmer must understand what the target customer needs and what the program will be able to do for them."

Publishers often don't study how a distributor's market is broken down.

"They don't understand the mechanics of distribution. Do they want to be picked up by a large publisher, or publish it themselves? If they have a store, they should use a different name and telephone number for publishing.

"The other thing is the ability to produce the program once they have it all designed and ready for market. Are they going to be able to fulfill the needs?"

Chuck feels premature advertising is disastrous. "All a small company has is credibility, and once it loses that through use of a post office box address or by prematurely advertising a product to see if demand will develop, they're lost."

Crash Course. For novices who would like to sell software or hardware, here are some pointers.

If you have a sales representative handling your product, you will pay a percentage of the sale price to that rep.

If you sell to a distributor, you will have to price your product for them. Each of these so-called breaks (price breaks) are based on the retail price of the package.

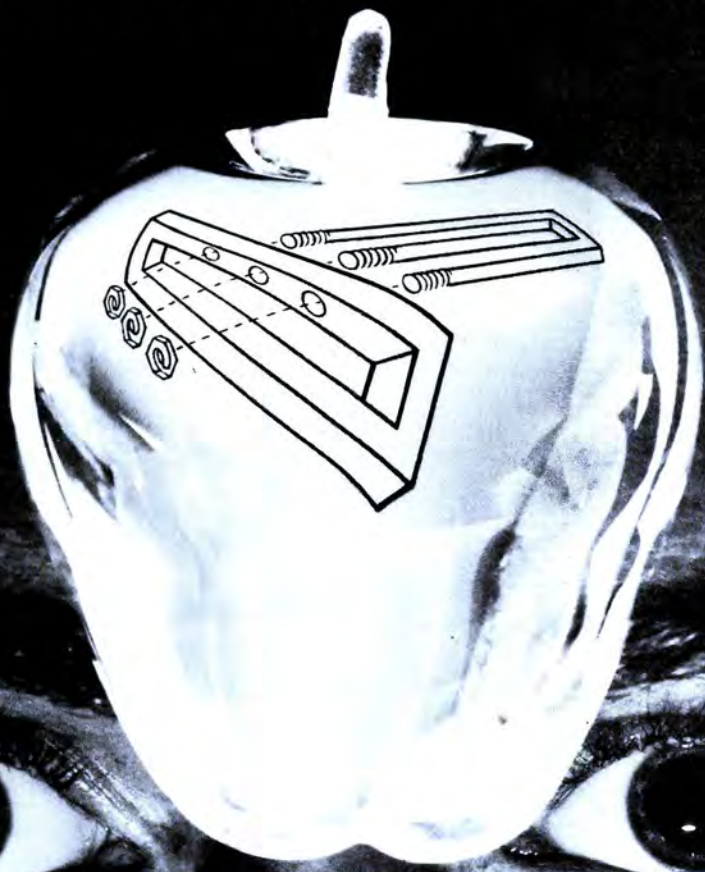
Assume you have a software package you feel should sell for $100. You will be expected to sell that product to a stocking distributor for around 50 percent of retail, or $50. If your sales representative sold the package to the distributor and earns 10 percent commission, you will end up with $45.

The distributor in turn will sell it to a retailer for 25-30 percent off the retail price.

Terms might be Net 30, which means the net total is due in thirty days, EOM for end of month, 2/10 Net 30 for 2 percent off the price if paid within ten days, the net due in thirty, or some other combination.

If you sell your $100 program to a department store, you may be asked to give a 50/10 break. This equates to 50 percent of $100, then another 10 percent off the $50. Should the sales rep also earn 10 percent, you will end up with $40.50 ($100−$50−$5−$4.50=$40.50). ■

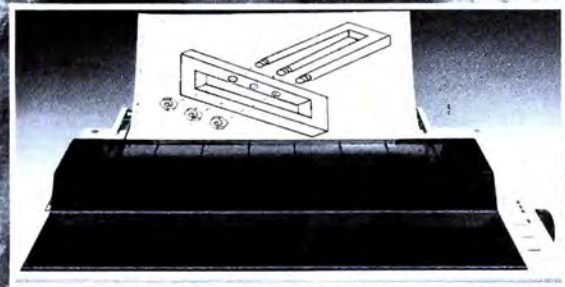
IMAGINE IT..



CAPTURE IT

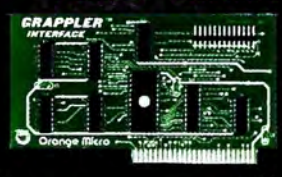
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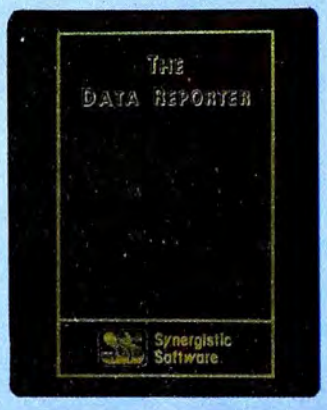
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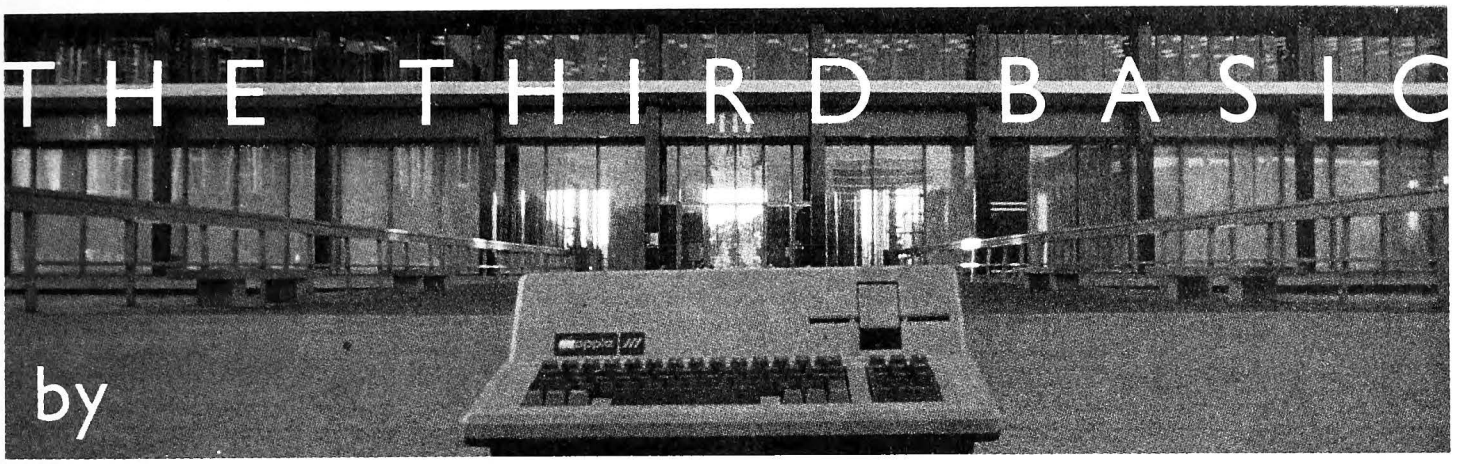


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THE THIRD BASIC

by Taylor Pohlman

Exploring Business Basic, Part 8

All the planning in the world about which Business Basic topics need to be covered can be undone by a simple question from a Basic user. This month's column is devoted to just such a simple question, one from a programmer with a database application to implement, who asks, "How can I use random access files to look up records when the record numbers I want to use are nonnumeric or exceed the 32767 record limit?" Next month we'll return to graphics to explore character sets and animation, but for now, this question is fundamental to the requirements of lots of applications.

Slinging the Hash. The technique our intrepid questioner needs to know about is something called *hashing*. In general, this refers to using some mathematical operation on a value (string or numeric) to obtain a new value that is within the range of desired values. Here's a typical example.

In a file that will maintain records on only one thousand employees, it makes sense to use their social security numbers (nine digits—a billion possible values) as reference numbers for direct lookup of information. In this particular situation, a formula is required to convert the nine-digit number into a three-digit number. The resulting three-digit number then can be used to look up the employee record, providing that the formula resolves each of the social security numbers into a unique three-digit number.

It's in this area of resolving unique record numbers from more complex *key values* that hashing techniques get interesting. In our example, it's easy to imagine simply dropping the first six digits of the number to obtain a three-digit result. In that case, 229-49-7128 becomes simply 128. In this way, 305-47-6024 would refer to 24, and 906-28-2935 would become record 935. Actually, in the case of social security numbers, this technique is not all that bad. Although there are many (a million to be exact) different social security numbers that end in a given three digits, in a random selection of employees, the chances of having many with the same last three digits are fairly small.

In a few minutes we'll see that the phrase "fairly small" is cause for a significant amount of programming effort to deal with duplicates, but for now, consider that other key values (that is, values which are used as keys in looking up records) present even more interesting problems. Dealing with a key value like 305-47-6024 may seem like a straightforward problem, but consider what 290-AR37BH would do to our simple scheme of using the last three digits.

In fact, there is no telling what the structure of many key values might be. Suppose we used part numbers that all varied in the first three digits instead of the last! Each of our three digit hashed keys would be identical, rendering the whole scheme useless. A more ideal technique would be to perform operations on the entire key value, thereby generating a reasonably random value within the range of record numbers our file could contain. If this generated value results in a "random" value, we can assume that the distribution of values in the *data space* (the set of all possible hashed record numbers) is reasonably uniform, with minimum conflicts. Diagram 1 represents the desired result.

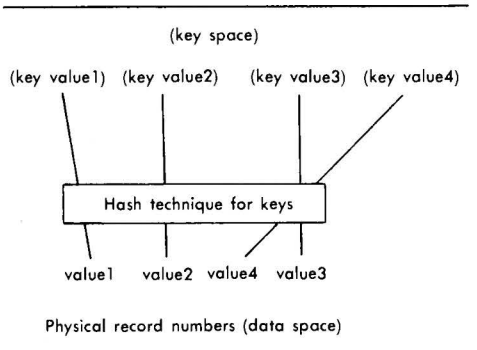


Diagram 1.

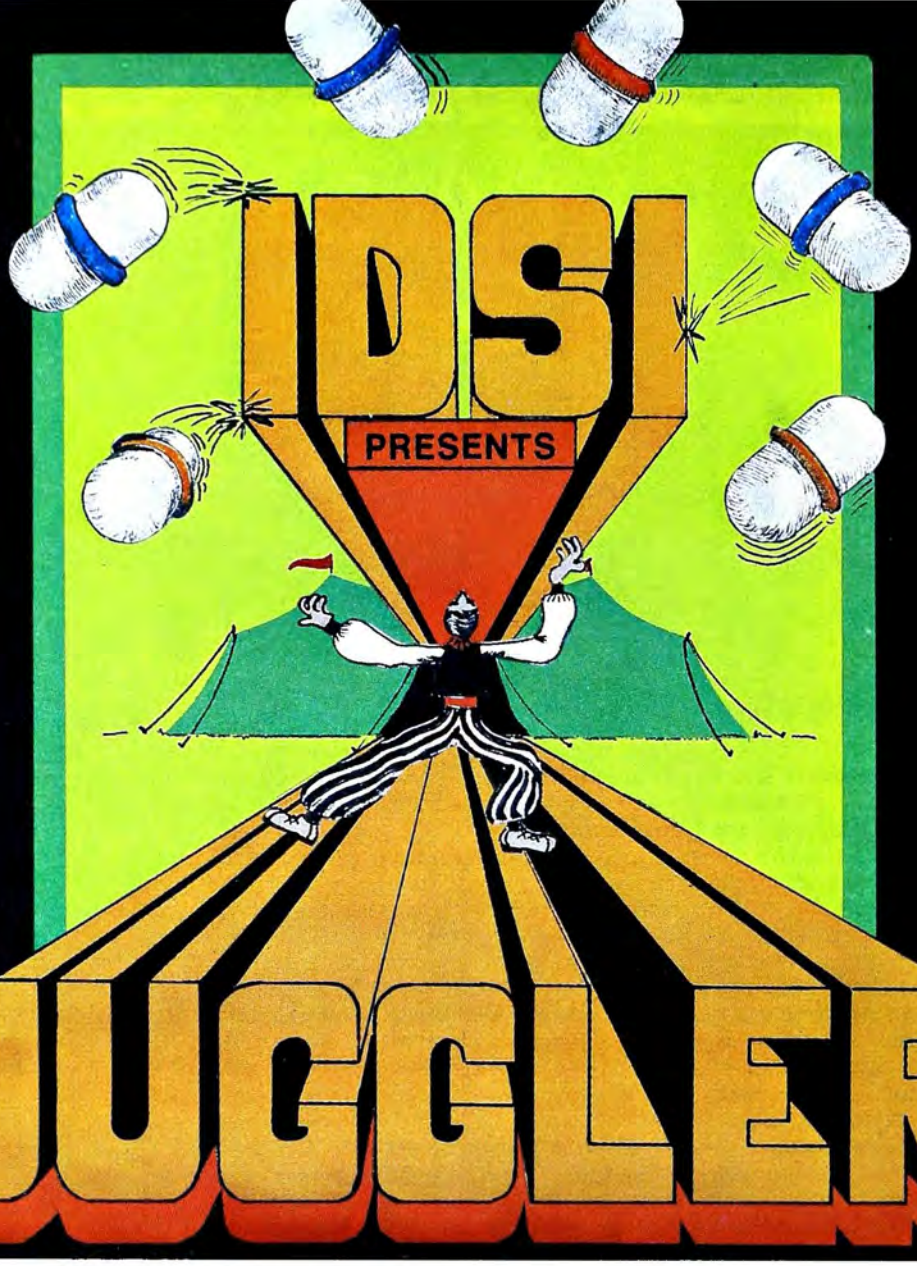
There are many techniques for generating such hashed values from alphanumeric keys. The sample program that follows lets you experiment with one such method.

```
10   PRINT"Hash key create program"
20   INPUT"Maximum recard number: ";r$
22   IF r$="" THEN GOTO
     50:ELSE:recardmax&=CONV&(r$)
25   INPUT"Yaur key value: ";a$
27   IF a$="" THEN 20
28   PRINT"Key length = ";LEN(a$)
30   GOSUB 1500
35   PRINT"Derived value is: "a&" hash is: ";key&
40   GOTO 25
50   END
1500  a&=1;lstring=LEN(a$)
1502  FOR i=1 TO lstring
1505  ascval=ASC(MID$(a$,i,1))
1510   a&=a&+CONV&(ascval*2^i+ascval*
      3^(lstring-i+1))
1520   NEXT i
1525  key&=a& MOD recardmax&
1530  RETURN
```

This program asks first for your maximum record number. This creates a value, *recordmax&*, which is used as the upper limit on hash—key generation. The subroutine at line 1500 actually generates the hash value from the alphanumeric input in line 25. It works by going through each character position in the key and converting it to its ASCII equivalent (line 1505).

Then a number is generated in line 1510 (ascval*2 ^ i+ascval*3 ^ (lstring−i+1) by multiplying the value by a power of two dependent on the character position in the string and adding the product of the value times a power of three equivalent to its position relative to the end of the string. This effectively generates considerably different numbers, even if the original value differed only by one in the last position. It also minimizes duplicates, resulting in reversing the order of the characters, which a simple sum would not.

Once this calculated value is produced, it is reduced to the range of the data space by the modulus function *mod*



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in line 1525. Remember that *mod* gives the remainder of dividing by the *recordmax&* value and thus guarantees a value between 0 and *recordmax&−1*. Line 35 prints the result of this calculation, giving you a feeling for how different hash values can be for some very similar key values. Type this program in and try it for various key values to be sure you understand what's going on.

Once you've tried the program with various key values, try rerunning it with a very small data space. In other words, use something like 11 or 7 for the maximum record number. You'll quickly discover that lots of very different key values will produce the same hash value. This is the fundamental problem with hashing techniques, since each duplicate hash value represents a potential conflict in the file. Ah well, nothing good comes easy!

One way to test the ideal data space sizes against various numbers of records to hash is to use a file of random key values. The following program will create a *junkfile* filled with nine character key values for test purposes:

```
10 PRINT"Randam key generatian pragram"
15 OPEN#1,"junkfile"
25 INPUT"Number af recards ta generate: ";n
30 FOR ival=1 TO n
35 a$=" "
40 FOR j=1 TO 5:SUB$(a$,j,1)
   =CHR$(65+INT(26*RND(1))):NEXT j
45 FOR k=6 TO 9:SUB$(a$,k,1)
   =48+INT(10*RND(1))): NEXT k
47  PRINT a$
60  NEXT ival
80 CLOSE
90 END
```

The only thing of real note in this program is the use of the *sub$* function to speed up the string generation, as compared to the use of the + (concatenation) operator. In any case, this program will generate a file of random keys, with the first five positions alphabetic, and the last four numeric.

This next program will read the file and allow you to experiment with the size of the data space compared to the number of records to be loaded, and print out a simple picture of the number of conflicts.

```
10    PRINT"Hash key evaluatian pragram"
12    PRINT:INPUT"Number af recards in trial data
      space: ";rec
15    recardmax&=CONV&(rec)
20    DIM fill%(1000)
22    OPEN#1,"junkfile"
25    INPUT"number af recards ta read:
      ";n
30    FOR ival=1 TO n
35     INPUT#1;a$
50     GOSUB 1500
52     key=CONV(key&)
55     fill%(key)=fill%(key)+1
60     NEXT ival
65    FOR i=0 TO CONV(recardmax&−1)
70     PRINT fill%(i);
75     NEXT i
85    END
1500  a&=1 : lstring=LEN(a$)
1502  FOR i=1 ta lstring
1505   ascval=ASC(MID$(a$,i,1))
1510  a&=a&+CONV&(ascval*2∧i+ascval*3
      (lstring − i + 1))
1520   NEXT i
1525  key&=a& MOD recardmax&
1530  RETURN
```

A typical run of the program will produce output similar to the following:

```
Hash key evaluatian pragram

Number af recards in trial data space: 100
Number af recards ta read: 50
020000600000000010000300001000040000
300002000010000400002000020000200000
300002000400003000010000 4000
```

As can be seen from the program, each digit position of the printout represents a different key value, and the number in the position represents the number of key values that hashed to that location. Based on the output above, the hashing appears far from random. The conflicts bunch up at intervals of approximately five, with lots of empty space in between. You should get similar results, even with a different *junkfile*. Now try the program again, with a slight change:

```
Hash key evaluatian pragram
Number af recards in trial data space: 97
Number af recards ta read: 50
110220000000001011001000000000010100
110101000102000000001000111000021
012110011000010101230022022102
```

Notice that the entries are not nearly so regular this time. There are still conflicts (indicated by the 2s and 3s in the list), but they are scattered about without a definite pattern. You might argue that this distribution is not random, since there is still bunching up of values. Examine the following program, which does produce a reasonably random distribution, and see what happens.

```
10 PRINT"Randam distributian pragram"
12 PRINT:INPUT"Number af recards in data space:
   ";recardmax
20 DIM fill%(1000)
25 INPUT"Number af randam numbers ta gen-
   erate: ";n
30 FOR ival=1 TO n
50  key=INT(recardmax*RND(1))
55  fill %(key)=fill%(key)+1
60  NEXT ival
65 FOR i=0 TO recardmax−1
70  PRINT fill%(i);
75  NEXT i
85 END
```

The result from your runs should look something like this:

```
Randam distributian pragram

Number af recards in data space: 97
Number af randam numbers ta generate: 50
001002000101111001001000000010001110
111001210101100013002010000001000000
300010110001010210212100001
```

Each time you run this program, the results will be different, but similar. True random distributions tend to be bunchy and definitely nonuniform, in the sense that there will typically be conflicts unless the data space is very large in comparison to the number of entries.

Now comes the real question. If you were following along, you may have tried the last program with the first set of numbers (data space = 100, entries = 50). Notice that the same regular bunching occurs as occurred in the sample run with *junkfile*. This suggests (although the actual proof is something we won't cover here) that more regular distributions can be obtained by using numbers like 97 instead of 100. Yes, there's only a difference of three between them, but there is a much more important difference: 97 is a prime number, while 100 is obviously not. Using nonprime numbers as data space values is almost certain to create nonrandom bunching of record numbers, and thus, lots of conflicts. The simple program that follows will rapidly allow you to pick prime numbers as candidates for data space values in your programs.

```
5  INPUT"Range af prime number search: ";y,z
10 IF z=0 THEN 80
15 FOR j=y TO z
20  IF j/2=INT(j/2) THEN 65
30  FOR i=3 TO SQR(j) STEP 2
40   IF j/i=INT(j/i) THEN 65
50   NEXT i
60  PRINT"The number "j" is prime"
65  NEXT j
70 GOTO 5
80 END
```

If necessary, this program can be converted easily into a subroutine for use in larger programs that need to set data space sizes based on estimates on the total number of expected records in the file.

Summing Up. The enormous volume of expository material you've just waded through was designed to show ways to produce a random record number from an arbitrary collection of characters called a key value. In the process we discussed the potential problem of conflicts, where two (or more) different key values would hash to the same record number. Dealing with these conflicts is the most challenging part of programming file access methods using hashing. Before we get into an actual database program that uses these techniques, it would be worthwhile to think about ways to reduce conflicts and improve performance.

Hash rule number 1: *Use a hash method that obtains as random as possible a distribution of physical record numbers.* Remember that we used prime numbers as divisors in the examples above, in addition to doing a substantial amount of arithmetic on the key values themselves. There are other methods (any good reference will talk about *radix transforms*, and so on), but the prime divisor method is a good all around choice.

Hash rule number 2: *Use as large a data space as possible, compared with the total number of expected records, so*

that the hashed records are spread out with minimum conflict. We are fortunate to have a file system on the Apple III that allocates disk blocks only when they are used. This suggests that the actual overhead of using large data spaces is not very significant.

It's easy to imagine using a data space of approximately five thousand records to contain a probable maximum of 1,000 physical records, since the overhead of such a scheme may only be a few extra index blocks. This kind of five-to-one ratio of data space to physical records will cut conflicts to the point where they do not affect performance. Compare this to randomizing 1,000 records into a 1,200 record space, where nearly every hashed record will conflict with another, and the probabilities are that some may have as many as four or five conflicts.

Hash rule number 3: *For maximum performance, use the extra memory of the Apple III to maintain all conflict tables, and minimize the amount of shuffling of disk records required to resolve conflicts.* This rule seems like common sense, but remember that most hash techniques were developed in the mainframe computer days, when disks were fast and memory expensive. Today's personal computer world is exactly the opposite, and requires restructuring of the approach to hashed file access.

Primary%

	0	1
0	entry caunt	max entries
1	hash value af canflict	link ta secandary

Secandary%

	0	1
0	entry caunt	max entries
1	actual recard number far canflicting hash value	link ta next canflicting entry far hash value

Diogram 2.

A Real Program. So far, everything we've discussed has been theoretical. But if you've done the exercises as we went along, you should be able to absorb the following rather complex program in bite-sized chunks. For the application itself, return with us now to those thrilling days of yesteryear, that is, go back to the October and November columns in which we discussed a simple parts file application program that used four values: part number, description, location and quantity. Observe the following:

```
5  DIM primary%(200,1),secandary%
   (300,1),trial%(100),chron%(1000)
10 GOSUB 1980
15 PRINT"Dotabase progrom using HASH"
20 PRINT:INPUT"File name: ";file$
22 IF file$=" " THEN 200
25 OPEN#1,file$,45
30 GOSUB 2100
```

In line 5 several arrays are set up to deal with pointer mechanisms that will be used later. *Primary%* contains the list of all records which are in conflict with other records previously entered. *Secondary%* contains the physical record numbers where these conflicting records are stored, along with a link to any other conflicting records which hash to the same value. *Trial%* is used later to maintain conflict lists for search purposes, and *chron%* contains a chronological list of all physical record numbers that have been used. The structures of *primary%* and *secondary%* are shown in diagram 2.

The subroutine at line 1980 sets up these initial values and establishes a function (*nospace*) that checks to see if there is room left in the conflict lists for entries:

```
1980 modify=0:recordmox&=4951:
     maxprimary%=200:moxsecondory
     %=300
1982 DEF FN nospace(x)=(primory%
     (0,0)=primary%(0,1))+(secandary
     %(0,0)=secandary%(0,1))
1990 RETURN
```

After requesting the database file name, the subroutine at line 2100 checks to see if the database file is already initialized and, if it is, reads the contents of the conflict and chronological arrays into memory:

```
2100 ON ERR GOTO 2150
2105 datatype=TYP(1):IF datatype
     <>2 THEN 2150
2110 READ#1,0;tatprimary%:IF TYP(1)
     <>2 THEN 2150
2112 READ#1;totsecandary%
2113 ON ERR errorcode=2:GOTO 2140
2115 FOR i=0 TO tatprimory%
2120 READ#1;primary%(i,0),primory%(i,1)
2122 NEXT i
2123 ON ERR errarcade=3:GOTO 2140
2125 FOR i=0 TO tatsecandary%
2130 READ#1;secondary%(i,0),
     secandary%(i,1)
2132 NEXT i
2133 READ#1;chron%(0)
2134 IF chron%(0)=0 THEN 2140
2135 FOR i=1 TO chron%(0)
2136 READ#1;chran%(i)
2137 NEXT i
2138 errorcode=0
2140 OFF ERR:RETURN
2150 errarcade=1:OFF ERR:RETURN
```

The variable *errorcode* is used extensively in this program to pass problem information back to the calling part of the main program. In this case, errors



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are flagged if the beginning of the file does not contain the proper data. Lines 35 through 60 determine if the database is initialized and, if it isn't, take the proper course of action.

```
35 IF errorcode=0 THEN 100
40 IF errorcode<>1 THEN PRINT"The database is
   domoged. Errorcode=";errarcade:STOP
45 PRINT"The file ";file$" is not a dotabose file."
47 If dototype<>0 THEN 20
50 INPUT"Would yau like to make it o dotabose
   file? ";reply$
55 IF reply$<>"Y" AND reply$<>"y" THEN
   CLOSE: DELETE files$:GOTO 20
60 GOSUB 2000
```

If the database is to be created from scratch, the subroutine at line 2000 takes care of the initialization of all arrays and values, and then physically writes them to the newly created file.

```
2000 primary%(0,0)=0:primary%
     (0,1)=maxprimory%
2010 secondary%(0,0)=0:secondary%
     (0,1)=moxsecandary%
2015 chran%(0)=0
2017 WRITE#1,CONV(recardmax&)+120;0
2020 WRITE#1,0;primary%(0,1),
     secondory%(0,1)
2025 FOR i=0 TO primary%(0,1)
2030 WRITE#1;primary%(i,0),
     primory%(i,1)
2035 NEXT i
2040 FOR i=0 TO secandory%(0,1)
2042 WRITE#1;secandary%(i,0),
     secondory%(i,1)
2045 NEXT i
2050 FOR i=0 TO chron%(0)
2055 WRITE#1;chran%(i)
2060 NEXT i
2075 RETURN
```

Those of you who followed the article on *request.inv* a few months ago know of a faster way of doing file reads and writes. In larger implementations of this technique, these high-performance options really come in handy.

After initialization of the internal variables, an option list is presented, and each of the options (*add, delete, find,* and *list*) uses its own subroutine for the particular task:

```
100 PRINT"Type:"
105 PRINT" 1 ta add a recard"
110 PRINT"      2 to delete a record"
115 PRINT"      3 ta find a record"
120 PRINT"      4 to list oll recards"
155 PRINT:INPUT"Yaur selectian: ";a$
160 IF o$="" THEN 200:ELSE:o=CONV(a$)
162 IF a<1 OR a>4 THEN 170
165 ON o GOSUB 500,600,700,900
170 PRINT:GOTO 100
```

Let's look at first things first, examining the *add* routine in the subroutine at line 500:

```
500 PRINT:INPUT"Port number: ";part$
505 IF part$="" THEN RETURN
510 IF LEN(port$)> 10 THEN PRINT"Port number
    taa long, reenter":GOTO 500
520 PRINT:INPUT"Description: ";desc$
530 IF LEN(desc$)>15 THEN PRINT"Description
    too long, reenter":GOTO 520
535 PRINT:INPUT"Lacotion: ";loc$
540 IF LEN(lac$)>10 THEN PRINT"Locatian tao
    long, reenter":GOTO 535
545 PRINT:INPUT"Quantity: ";quon$
550 q=CONV(quon$):IF  q>9999 THEN
    PRINT"quontity too lorge, reenter":GOTO 545
555 quontity%=q
560 PRINT:PRINT"Record is: "port$"|"desc$"
    |"lac$"|"quontity%"|, ak?";
565 INPUT"";o$
570 IF o$<>"Y" AND a$<>"y" THEN
    PRINT:GOTO 500
```

This part is pretty straightforward. It simply accepts the values, does minimal editing for length and value, and then reprints the record in line 560 to allow the user to verify that everything was correctly entered.

Next, things get a bit sticky.

```
575 o$=part$
580 GOSUB 1500
```

Line 1500 contains our old familiar routine, hashing a record number from the part number value:

```
1500 a&=1: lstring=LEN(o$)
1502 FOR i=1 TO lstring
1505  ascval=ASC(MID$(a$,i,1))
1510 a&=o&+CONV&(oscvol*2 ^ i+
      oscvol*3 ^ (lstring-i+1))
1520 NEXT i
1525 key&=o& MOD recardmax&
1530 RETURN
```

The next sequence of events adds one hundred to the resulting record number, clearing all the data we might want to write to the beginning of the file, and then calls the routine at line 1800 to determine and deal with the writing of the record and the conflicts, if any occur:

```
585 recardnum%=CONV%(key&)+100
590 GOSUB 1800
595 IF  errarcade=1  THEN  PRINT"Tobles  full,
    connot odd o canflicting recard." :RETURN
597 PRINT:PRINT"record added.":RETURN
```

The *add* routine at 1800 is nontrivial. It first determines (in line 1800 to line 1810) if a conflicting record already exists in the *primary%* conflict list. Line 1807 is particularly interesting in that, as we shall see later in the *delete* routine, flagging a conflict with a negative sign means that the conflicting record has been deleted and can be reused.

Note that after scanning the table, lines 1815 and 1820 check to see if the physical record contains a string value as its first variable. If it doesn't, the record is considered available. If the record does contain a string value, the record is considered occupied, with the initial string variable equal to the part number, which is actually the element we use as the hash key.

```
1800 FOR i=1 TO primory%(0,0)
1805  IF primory%(i,0)=recardnum% THEN 1830
1807  IF ABS(primory%(i,0))=recordnum% THEN
      primory%(i,0)=recardnum%:GOTO 1815
1810  NEXT i
1815 READ#1,recardnum%
1820 IF TYP(1)<>4 THEN 1900
1821 triolrec%=recordnum%+1:laakup%=0
1822 IF FN naspoce(x) THEN errorcade=1:
     RETURN
1823 primary%(0,0)=primary%(0,0)+1:
     currentp%=primory%(0,0)
1824 primory%(currentp%,0)=recordnum%
1825 secondory%(0,0)=secandary%(0,0)+1:
     currents%=secondory%(0,0)
1826 primory%(currentp%,1)=currents%
1829 GOTO 1855
```

Lines 1821 through 1929 deal with first-time conflicts and create a new primary record, along with locating a place to enter the physical secondary record number. This record number is obtained by the routine starting at line 1855. The routine at 1855 is also used in the event that the normal scan of primary conflict records (line 1805 above) discovers a duplicate entry. The routine at line 1830 searches the list of primary and secondary records until the end of the conflict list is found. At that point *trialrec%* is set to the next suspected available record, and execution goes to 1855 to find a physical record into which to put our entry. Note that line 1837 ensures that deleted entries in the conflict list are automatically reused.

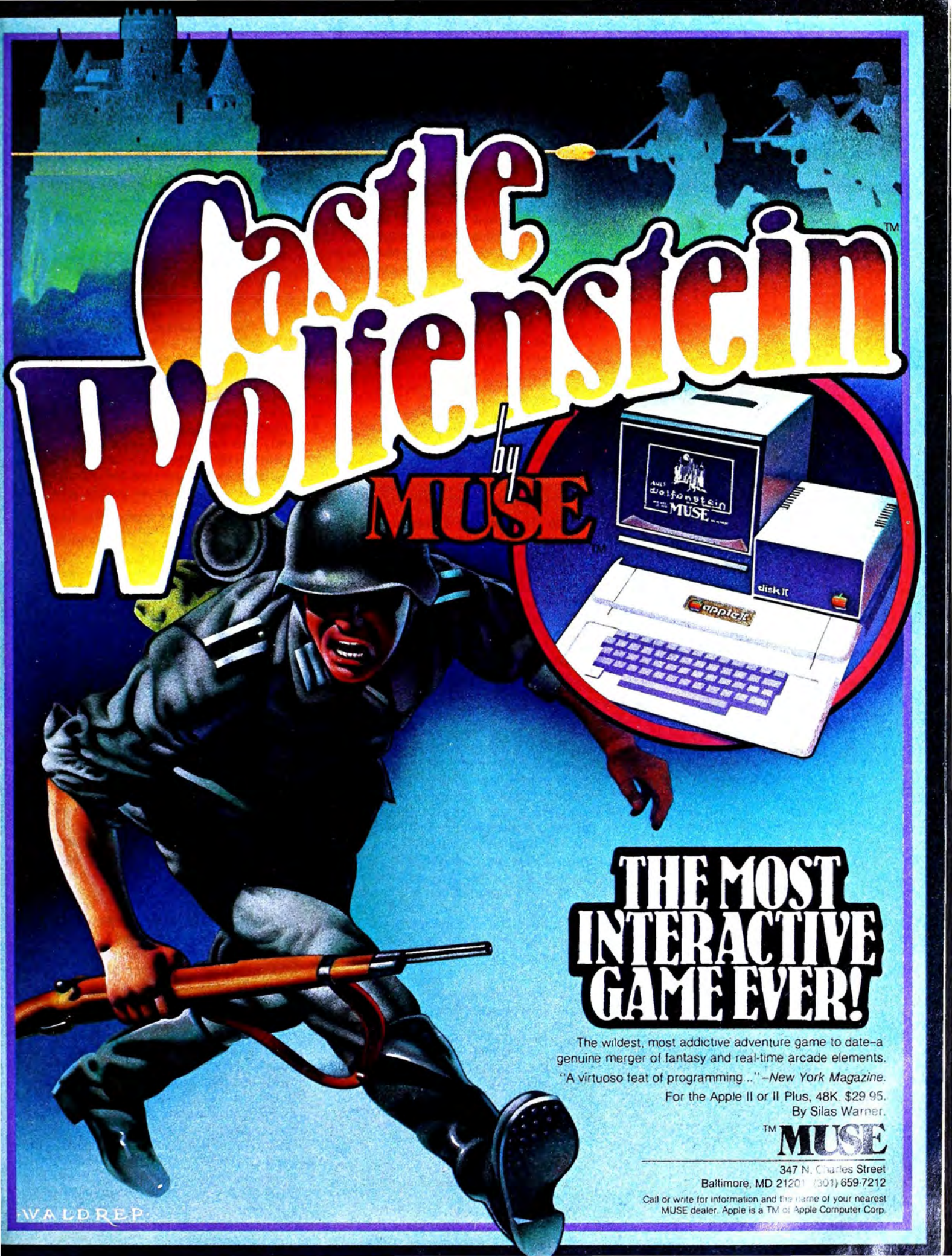
```
1830 IF FN naspace(x) THEN errarcade=1:
     RETURN
1835 lookup%=primory%(i,1)
1837 IF secondory%(lookup%,0)<0
     THEN recordnum%=
     ABS(secandory%
     (lookup%,0)):secandary%(loakup%,0)=
     recordnum%:GOTO 1900
1840 link%=secondory%(laakup%,1)
1845 IF link%<>0 THEN lookup%=
     link%:GOTO 1837
1847 secondory%(0,0)=secandary%(0,0)+
     1:currents%=secondory%(0,0)
1850 trialrec%=secondory%
     (lookup%,0)+1
1855 READ#1,triolrec%
1860 IF TYP(1)<>5 AND TYP(1)<>1 THEN
     trialrec%=triolrec%+1:GOTO 1855
1865 IF lookup%=0 THEN 1880
1870 secondory%(laakup%,1)=currents%
1880 secondory%(currents%,0)=triolrec%
1885 secondory%(currents%,1)=0
1890 recordnum%=triolrec%
```

Note that lines 1865 through 1890 add the new conflict entry to the list in *secondary%* and set the physical record number *recordnum%* to the final trial record value.

```
1900 WRITE#1,recardnum%;port$,
     desc$,loc$,quontity%
1902 chron%(0)=chron%(0)+1:
     chron%(chron%(0))=recordnum%
1905 errarcade=0:madify=1:RETURN
```

Lines 1900 through 1905 then actually write the record values to the file, add the record number to the chronological list, and set the modify flag to let the program know that a change has been made to the file and the arrays.

Notice also that the path through all this code is extremely trivial if there is no conflict in the use of record numbers. In that case, execution sails through the loop in lines 1800 through 1810, checks the record for previous contents in lines 1815 and 1820 and, finding none, jumps to line 1900 to write the record and update the list. As long as there are no conflicts, this


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technique is very fast, and when conflicts do exist, there's a minimum of searching for a free record as long as the data space is significantly larger than the total number of records.

Having covered the use of hashing to add records, finding records becomes somewhat the reverse process of going back through the list.

```
700 PRINT:INPUT"Port number: ";port$
705 IF port$="" THEN RETURN
710 IF LEN(port$)>10 THEN PRINT
    "Port number too long,
    reenter":GOTO 700
712 o$=port$
715 GOSUB 1500
720 recordnum%=CONV%(key&)+100
725 GOSUB 1600
730 If errorcode=1 THEN PRINT
    "Port number not found.":
    GOTO 700
735 PRINT:PRINT"Port number:
    ";port$
740 PRINT"Description: ";desc$
745 PRINT"Locotion: ";loc$
750 PRINT"Quontity: ";quontity%
755 PRINT:INPUT"Press return
    to continue: ";o$
760 RETURN
```

After collecting the part number and generating the hash value using the subroutine at 1500, line 725 goes to a subroutine that looks up records in the database. The tricky part about this is that there may be multiple records that have the same hash key (that is, are in conflict), so that it is necessary to assemble a list of all values from the primary and secondary conflict arrays, and then lines 1671 through 1692 read each record to determine which one is the actual one being sought. Note also that there is code in lines 1607 and 1662 to deal with the deleted entries in the conflict lists.

```
1600 For i=1 TO primory%(0,0)
1605 IF primory%(i,0)=recordnum%
     THEN 1640
1607 IF primory%(i,0)<>ABS(recordnum%)
     THEN 1610
1608 listnum%=0:triol%(0)=0:lookup%=
     primory%(i,1):GOTO 1670
1610 NEXT i
1615 READ#1,recordnum%
1620 IF TYP(1)=4 THEN GOSUB 1690:
     ELSE errorcode=1:RETURN
1622 conflict=0
1625 IF port$=port1$ THEN errorcode=
     0:RETURN:ELSE errorcode=1:RETURN
1640 listnum%=0:triol%(0)=0
1642 triolrec%=recordnum%
1645 lookup%=primory%(i,1)
1650 listnum%=listnum%+1
1655 trial%(listnum%)=triolrec%
1657 trial%(0)=triol%(0)+1
1660 IF lookup%=0 THEN 1670
1662 IF secondory%(lookup%,0)>0 THEN
     triolrec%=secondory%(lookup%,0):
     skip=0:ELSE:skip=1
1665 lookup%=secondory%(lookup%,1)
1667 IF skip THEN 1660 ELSE 1650
1670 conflict=1
1671 FOR i=1 TO triol%(0)
1672 record%=triol%(i)
1673 READ#1,record%
1675 IF TYP(1)<>4 THEN 1680
1676 GOSUB 1690
1677 IF port1$=port$ THEN
     errorcode=0:RETURN
1680 NEXT i
1682 errorcode=1:RETURN
1690 READ#1; port1$,desc$,
     loc$,quontity%
1692 RETURN
```

The last big section of the program deals with deleting records, and while it has been alluded to above, it is being mentioned third in the sequence of functions simply because it uses the *find* routines to locate the record to be deleted.

```
600 PRINT:INPUT"Port number: ";port$
605 IF port$="" THEN RETURN
610 IF LEN(port$)>10 THEN PRINT"Port number
    too long, reenter":GOTO 700
612 o$=port$
615 GOSUB 1500
620 recordnum%=CONV%(key&)+100
625 GOSUB 1600
630 IF errorcode=1 THEN PRINT"Port number not
    found.":GOTO 600
635 PRINT:PRINT"Delete: "port1$"|
    "desc$"|"loc$"|"Quontity%"| ? ";
637 INPUT"";o$
640 IF o$<>"Y" AND o$<>"y" THEN PRINT"Not
    deleted":RETURN
```

The first part of *delete* simply takes the part number information, hashes the key, and then in line 625, *gosubs* to the *find* routine to locate the particular part number record. If the record is found, the user is asked to confirm that it is the proper record to delete, and then the fun begins:

```
645 IF conflict=1 THEN 660
650 record%=recordnum%
655 GOTO 690
```

Conflict is a flag set in the find routine that tells *delete* whether or not there is cleanup work to be done in the conflict lists. If not, the record number is passed to 690 for physical deletion. If there is a conflict, then 660 through 670 find the primary entry and check if that is the physical record number to be deleted. If so, line 675 negates the entry. If not, the secondary list is searched in lines 680 through 688 until the proper entry is found and flagged. Then 690 through 695 physically deletes the record and finds the entry in the chronological list, negating that as well. Because entries are being changed, the modify flag is set in 695.

```
660 FOR i=1 TO primory%(0,0)
665  IF primory%(i,0)=recordnum% THEN 675
670  NEXT i
672 PRINT"Error in delete. Record not
    found":RETURN
675 IF primory%(i,0)=record% THEN
    primory%(i,0)=-record%:GOTO 690
680 lookup%=primory%(i,1)
682 IF secondory%(lookup%,0)=record%
    THEN secondory%(lookup%,0)=
    -record%:GOTO 690
685 IF secondory%(lookup%,1)=0
    THEN 672
687 lookup%=secondory%(lookup%,1)
688 GOTO 682
690 WRITE#1,record%;0
692 FOR i=1 TO chron%(0)
693  IF chron%(i)=record% THEN
     chron%(i). -record%:GOTO 695
694  NEXT i
695 PRINT:PRINT"Record deleted":
    modify=1:RETURN
```

At Last, the End. The final routine in this program is the *list*, which is the simplest of all.

```
900 IF chron%(0)=0 THEN PRINT"No records to
    list":GOTO 930
905 FOR i=1 TO chron%(0)
906  IF chron%(i)<0 THEN 920
907  READ#1,chron%(i)
908  IF TYP(1)<>4 THEN 920
910  READ#1;port$,desc$,loc$,quontity%
915  PRINT USING"10o,2x,15o,2x,10o,x,
     4#";port$,desc$,loc$,quontity%
920  NEXT i
930 PRINT:INPUT"Press RETURN to continue: ";o$
935 RETURN
```

List simply goes through the chronological array, reads the physical record numbers (skipping deleted entries in line 906), and formats the information into a list. What a treat to see a simple, straightforward routine for once!

Final wrap-up is all that is left:

```
200 PRINT:PRINT"end of progrom"
210 IF NOT modify THEN 220
211 count=0
212 FOR i=1 TO chron%(0)
214  IF chron%(i)>0 THEN count=count
     +1:chron%(count)=chron%(i)
216  NEXT i
218 chron%(0)=count
219 GOSUB 2020
220 CLOSE:INVOKE
230 END
```

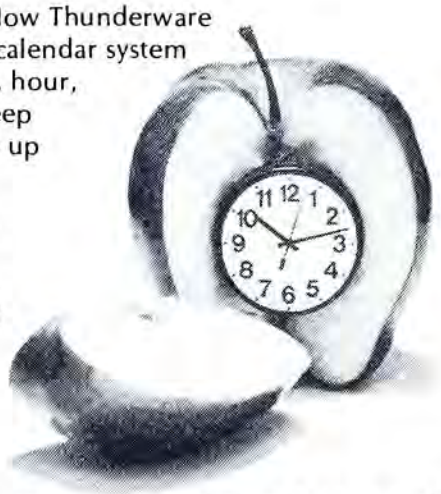
These lines handle quitting, checking the modify flag, and writing out the data if necessary. Note that before writing out the data a cleanup is done on the *chron%* list to remove deleted entries.

Really the End. This has been a long and tough exercise, and you deserve a break. Go off to the refrigerator, get a cool beverage of your favorite persuasion, and consider the fact that the program above can be easily modified to maintain almost any kind of data records, and the list routine can be used in conjunction with sorts and calculations to format almost any kind of report. The fact that this kind of capability can be developed in Basic is a tribute to the power of the Apple III, Business Basic, and SOS, and not a bad testimony on your investment.

Just one word of caution is in order. For simplicity, many of the error checking routines that would be needed to turn this into a real application have been left out. If you get serious about using these kinds of techniques, take the time to anticipate all the things that could go wrong and put in tests for them. Also, to learn more about the techniques alluded to in this article, which fit the general category of access methods, check your library for books on data structures, database theory, and indexed access methods. And then have another cool one. . . .

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```
DISK VOLUME 254

*A 006 HELLO                07/07 16:37
*A 006 CLOCK                06/08 09:07
*A 004 FRAME                06/08 09:08
*A 004 DISK INFO            06/17 16:13
*B 003 BACKOFF              06/17 16:13
*B 005 SCREEN               07/24 17:32
*B 002 TCPUTIL              06/17 16:13
*B 004 SDTIME.O             06/17 16:13
*A 007 ADIGCLK              05/19 08:05
*A 011 SET TIME             06/08 09:08
*I 009 IDIGCLK              05/19 08:05
*A 007 TIME                 06/08 09:08
*A 003 SLOTFINDER           07/07 16:56
*A 014 DEMO                 06/17 16:14
```

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All About Applesoft

by Doug Carlston

Subroutines are miniprograms (or programs within a program) that perform specific functions and then return control to your main program. They are very useful, since you can refer to them time and again within a program, always returning to the precise point from which you left off when you called them.

Let's list this month's new vocabulary and then take a look at an example of a subroutine.

LEN(A$)	RETURN	CALL −958
POS(X)	+	A$(x)
FOR . . . NEXT		

```
10   HOME: GOTO 100
20 REM ***************************************
25 REM                SUBROUTINES
30 REM ***************************************
40 L = LEN(A$): HTAB 20 - L / 2
   : RETURN
.
.
.
95 REM ***************************************
97 REM                MAIN PROGRAM
99 REM ***************************************
100  VTAB 23
110  INPUT "GIVE ME A TITLE: ";A$
120  VTAB 1: GOSUB 40: PRINT
     A$
130 REM NOW UNDERLINE THE TITLE
140  GOSUB 40
150  PRINT "-";: X = X + 1: IF X < L THEN 150
```

This is a simple program that takes any title you give it and centers it at the top of the page. The subroutine that does the centering is located at line 40. The main program begins at line 100 (and is jumped to by line 10). Because of the way Applesoft works, a program will generally execute much faster if subroutines are close to the beginning of a program. Therefore, it is best to leave space for them in the low line numbers and jump to a higher number for the body of your program.

Now let's examine how this program works. Line 10 clears the screen and then jumps to line 100. Line 100 tells the Apple to move the cursor down the page to line 23 near the bottom of the screen (this is so that it doesn't get in the way of the title we are about to create). Then line 110 asks you to input a title and stores the phrase you give it in the string, A$. At line 120 we do a vertical tab back up to the first line on the screen. Then we hit the instruction *gosub 40*.

This instruction transfers control to the subroutine at line 40. This subroutine first finds the *len*gth of A$ and stores the value in L (to check this, type ?L on your computer right now; if you have run the program, L should be a number corresponding to the length of whatever phrase you entered). It then does a horizontal tab equal to 20 (the midpoint of the screen) less half the length of A$. When A$ is printed, therefore, half of it will be to the left of the midline of the screen and half to the right.

The final command in a subroutine is always *return*. This causes program control to return to the exact point it left when the *gosub* command was executed, in this case to the middle of program line 120. The third and final instruction in line 120 is executed next, causing A$ to be printed and the cursor to be moved to the beginning of the next line.

Line 140 then sends us back to the same subroutine a second time. We are on the line below our title but in column 1. In order to underline we need to tab horizontally the correct number of spaces so that we are underneath the first character of the title. That is what subroutine 40 is designed to do.

Line 150 is a simple loop. It prints a dash (and the semicolon in the *print* statement keeps us on the same line). Then it adds 1 to a counter (X) and compares the counter with L (the length of the string A$). If X is still less than L we loop back to line 150 to continue drawing dashes; if X is equal to L we are finished and the program stops.

This routine will work fine as long as the title given is less than forty characters in length. However, try it with a really long title. *?Illegal quantity error in 40* says the computer, and rightly so. Because, if your title is forty or more characters long, then L is equal to 40 or more, and HTAB 20 − L/2 will try to set a horizontal tab at 0 or less, which is more or less impossible. There are two ways of approaching this kind of problem. You can tell everyone likely to use your program to keep his or her titles short; or (better) you can trap the problem in your program. Try adding the following line:

```
115  IF LEN (A$) > 39 THEN PRINT
     "TOO LONG": GOTO 110
```

That should do it. That also serves to illustrate a point about the *if . . . then* statement that may not have been clear before: if the *if* statement is true, then everything following on that line will be executed; however, if it is false, program control will immediately drop down to the next line of the program. In this example, if your title is too long, the message "Too long" is printed. Then control jumps to line 110. However, if the title is not too long, control immediately jumps to line 120. The computer doesn't even look at the rest of the commands on line 115.

Since we have such a nice program going, why don't we just continue. The first thing we want to do is clear off any garbage on the screen other than the title. As you may recall, it is possible to do this from the keyboard by typing ESC-F. The same command from within a program is CALL −958. CALL is the Applesoft command telling the program to jump to a specific location in memory, usually in order to make use of a machine-language subroutine. A certain number of machine-language routines are built into the Apple. Here, we are jumping to a routine that has been built into the Apple ROM (read-only memory), the routine that clears the screen from the cursor on down.

The use of a negative number requires some explanation. As you may recall, a 48K Apple has memory with addresses numbered from 0 to 49151. In addition, Apples have 16K of ROM with addresses going from 49152 to 65536. Now, in the olden days (pre-Applesoft), it was impossible to use a number greater than 32768 (half of 65536) in a program because of the way integers are stored in memory. To test this, try typing the following line on your Apple:

```
A% = 50000
```

See what we mean? Integers run from −32767 to 32768. There-

fore, in order to refer to the high areas of memory, it was necessary to use a subterfuge. Try the following:

```
PRINT PEEK(65535),PEEK(-1)
```

They are the same. What we did was start counting down from the top. What was 65535 became −1, 65534 became −2, and so forth. Vestiges of this counting system linger on, and negative numbers are usually used when we refer to addresses in the ROM.

At any rate, the first line to add to our program should look like this:

```
160 CALL - 958
```

Now let's turn the Apple into a little word processor. Add the following lines:

```
165 PRINT
170 GET A$
180 PRINT A$;: GOTO 170
```

Try this out and see how it works. Not too shabby, eh? Of course, it has a few little problems, like words that wrap around from one line to the next. But we ought to be able to take care of that. Try figuring out a simple solution for yourself before going on.

Here is one way to do it. It won't handle everything, but it is very simple and works about 90 percent of the time. Just change line 170 to read as follows (and now might be a good time to brush up on insert editing; if you've inadvertently deleted that information from your memory space, it's in the February *Softalk*):

```
170 GET A$:COLUMN = COLUMN + 1: IF
    COLUMN > 35 AND A$ = " " THEN
    PRINT :COLUMN = 0: GOTO 170
```

Column is a variable that keeps track of how many characters we have printed on a line. Once it reaches 35 and we are close to the end of the line, we start looking for a blank. If A$ is equal to a space, then *print* jumps us to the beginning of the next line. We reset *column* to zero and then jump to the beginning of the statement again (if we didn't, we would start off printing the next line with a blank space).

This little input routine won't handle everything correctly. If you make a mistake and back up to correct it, *column* goes on incrementing with every character you type (including the left arrow) and you could print a very short-looking line. Or if you like to use very long words, it is entirely possible that you could type one in that was so long that it wrapped around to the next line despite our best efforts to prevent it.

There is an easy way to handle the first objection, using a new Applesoft command: *pos(x)*. The "x" is irrelevant—what is called a dummy variable. Let's edit line 170 one more time:

```
170 GET A$:COLUMN = POS(0): IF...
```

Pos(x) always returns a number from 0 to 39 that represents the current horizontal position of the cursor. Thus, if we back up, *pos(0)* will decrement, and *column* will always store an appropriate value.

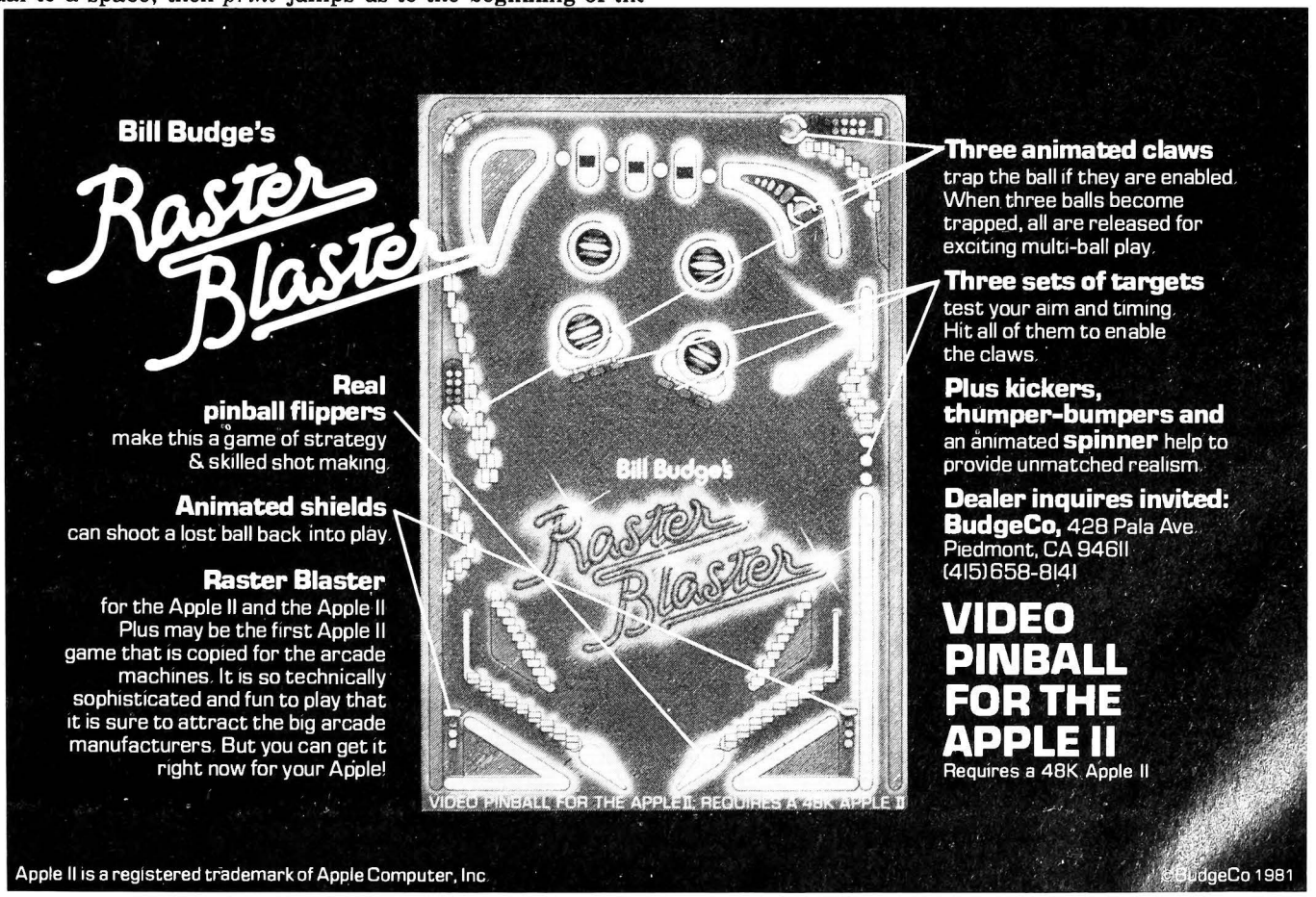
None of this is very useful if we can't store the information we are typing. What we need is to create a new string that will take each character as we type it in and add it to the previous ones ("string them all together" is what almost came out—and of course that's where the name came from). Then we can save the value of this new string on disk or cassette tape or send it to the printer. Let's make one more insertion to line 170:

```
170 GET A$:B$ = B$ + A$: COLUMN =
    POS(0)...
```

B$ is an empty string. Every time we *get* a new value of A$ it gets added to the end of B$. The plus sign is not the same as an arithmetic plus, really (is A plus B equal to C?). A plus sign used with strings just means to add the second string to the end of the first one. So if A$ is equal to "Miss" and B$ equals "issippi" then A$ + B$ would equal "MISSISSIPPI".

Let's add another line so we can test this:

```
175 IF A$ = "@" THEN PRINT: PRINT: PRINT B$: END
```



Here we use the @ symbol to indicate that we are finished typing, at which point the computer will print a couple of spaces and then print the value of B$ and stop. With any luck B$ should closely resemble whatever gobbledygook you typed in before typing the @ sign. Of course, you will have word wrap-around since B$ is just being printed to the screen and not formatted line by line.

As you will quickly discover, however, B$ has some other limitations too—namely, that it can't be more than 255 characters long. That is good enough for short notes and brief memoirs but will hardly do if you are trying to write the great American novel. What we need is some way to store a significant amount of text in memory.

Wouldn't it be peachy if, just when B$ got all filled up, we could remove it to some safe place and start loading up a new string, called C$ (or some other such original name)? And then, when C$ filled up, couldn't we just put it away for safekeeping too and pull out another empty variable, so that no matter how much we had to say, the Apple would patiently sit there tucking it away until we typed the fateful @? Yes indeedy, that would be grand (I hear you say). Enter the array.

An array is a variable with a dimension. More precisely, it is a number of variables with the same name plus a subscript. A$(1) is a string variable just like A$. A$(2) is another string variable, as different from A$(1) as A$ may be from B$.

The advantage of using a subscript to tell one string variable from the next is that you can insert a numerical variable in place of the number—A$(X). Then you can change string variables just by changing the value of X. Let's see how this can help us in our word processor program.

Let's go back once again to faithful old line 170 and remove all references to B$, replacing them with the string variable *text$(kount)*, thus:

```
170 GET A$: TXT$(KOUNT) =
    TXT$(KOUNT) +; A$:COLUMN = POS(0):
    IF COLUMN > 35 AND A$ = " "
      THEN PRINT :COLUMN = 0: GOTO
    170
```

Then add the following two lines:

```
175 IF LEN (TXT$(KOUNT)) > 254 THEN
    KOUNT = KOUNT + 1
176 IF A$ = "@" THEN 200
```

Line 175 checks the length of our string variable. If it is full (greater than 254 characters in length), then we increment *kount* by one, which causes us to start dumping our characters into the next string variable in the array.

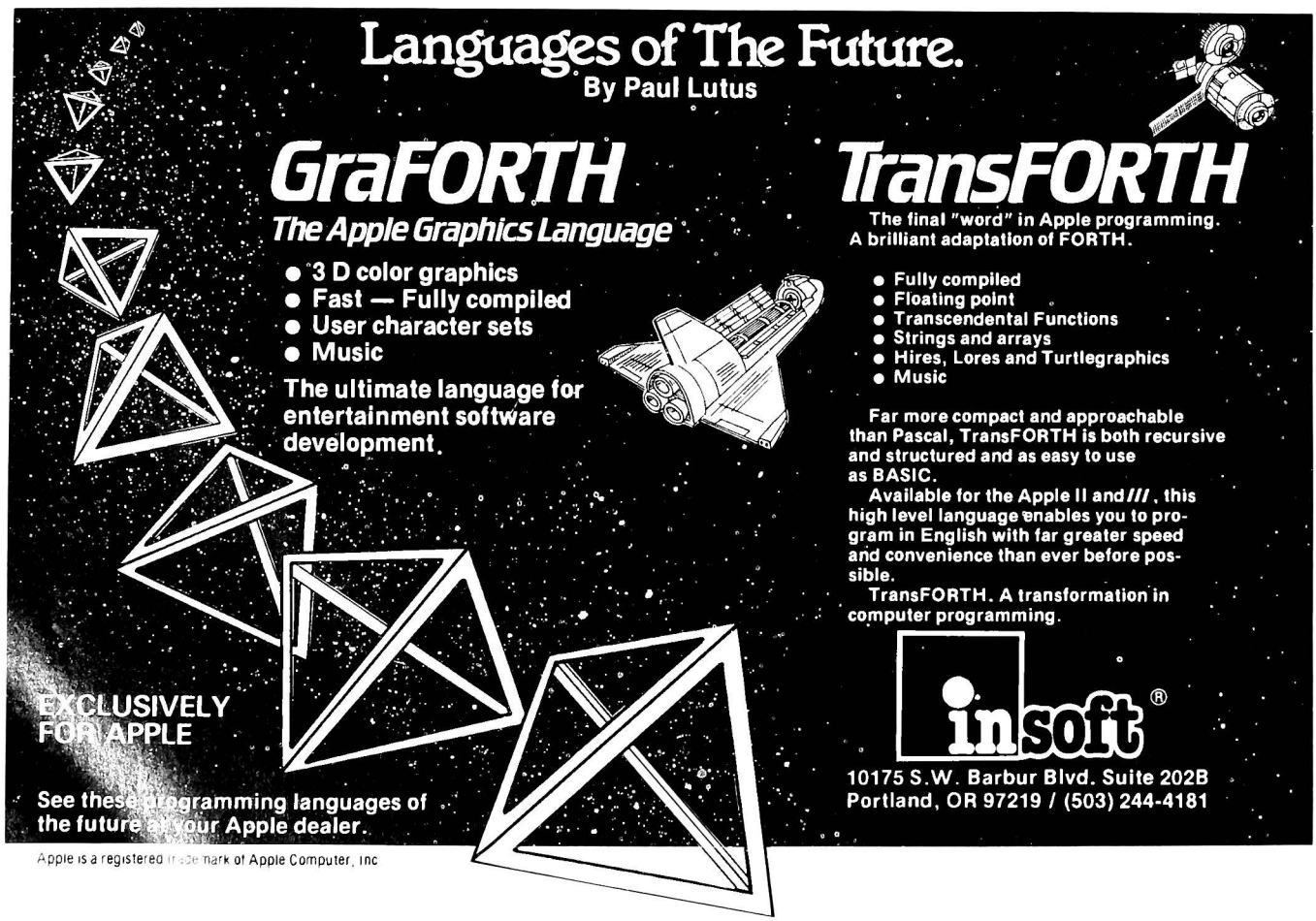
Line 176 jumps us out of the 170 to 180 loop once it recognizes the control character and sends us to line 200, which is the print routine:

```
200 FOR X = 0 TO KOUNT
210 PRINT TXT$(X);
220 NEXT X: END
```

This is a new kind of loop, called the *for . . . next* loop. Line 200 says, "Set X equal to 0, then continue into the program until you reach the command *next X*. At that point, return to this line, add 1 to X and repeat the loop. Keep looping until X is equal to *kount*. At that point there is no next X, so the next time you hit *next X*, just keep on going." That's a lot to say with one little command, which is why this is considered one of the most powerful commands in Applesoft.

To make effective use of this word processor, we still have to learn to dump this array out to a printer or at least onto disk or cassette. We will start getting into these matters (called I/O routines for input/output) in next month's column.

Erratum. There was an error in last month's column. The last statement in line 110 of the program on page 27 should have read DAY = DAY − 1, instead of DAY = DAY + 1. ∎



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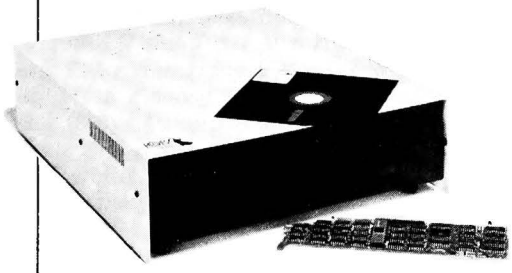
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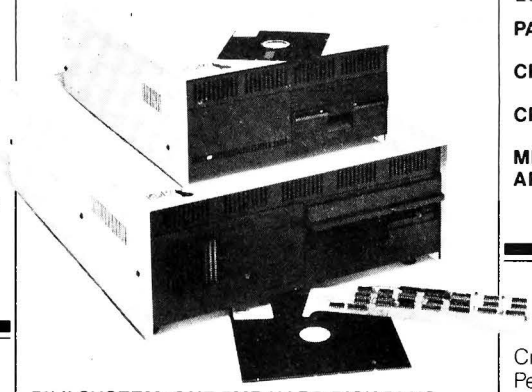
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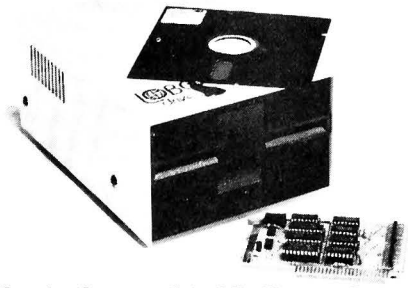
Programs that make heavy use of disk files will get a spectacular performance boost when you plug in up to 8 megabytes of ultra-fast hard disk storage. And imagine the convenience of having all your program and data files immediately available whenever you boot the sytem.

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Running CP/M with Lobo Winchester or 8" floppy systems requires a Microsoft SoftCard, an Apple Language card (or Microsoft RAM Card or equivalent), and the Lobo CP/M disk. Pascal is not currently supported on Lobo Winchester systems.

PASCAL CREATOR DISK AND DOCUMENTATION **$54.00**
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Ordering Information

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The Lobo Warranty

All Lobo hardware products carry a limited 1-year parts and labor warranty. Call or write for complete warranty statement.

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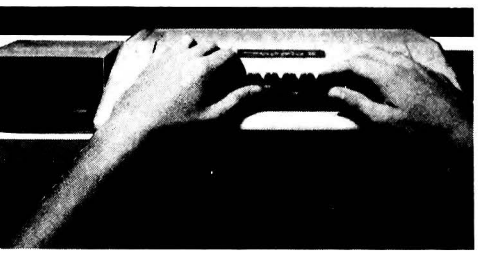
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TRADE TALK



☐ Following their move to larger quarters last month, **Synergistic Software** (Renton, WA) has hired **Rebecca Clardy** as production/shipping coordinator. **Derek Dalton Clardy,** age six months, will report to his immediate superiors, **Ann** and **Robert Clardy,** in the newly created position of executive vice president in charge of abusing diskettes and equipment to test their reliability. Derek brings nine months of related pre-natal experience to his new role.

☐ **Linda Johnson,** administrative vice president of **Software Distributors** (Culver City, CA) has announced the formation of a special software team to provide support "in all aspects of software technical assistance" for their dealers. The team will deal with installation difficulties, defective disks, software bugs, disks configured for the incorrect hardware, and guidance in the proper use of the software.

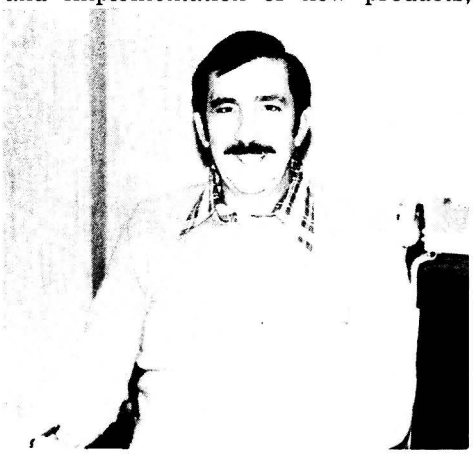
☐ **North America MICA** (San Diego, CA) has initiated a dealer discount plan for its critical path project management and resource management systems, PMS-II and RMS-II. Dealers will receive a 50 percent discount of retail price for their first system, with subsequent discounts ranging from 20 to 65 percent. President **Al Vanderpool** announced the plan, saying, "We recognize that one of the biggest impediments to marketing microcomputer software is the large investment a dealer must make in multiple copies of a software package to get the higher discounts offered by most vendors. Our dealers can order the systems one at a time and still get the higher discount as the total number of systems they order grows."

☐ **On-Line** action: **Teri** and **Ken Malinski** are now with the Coarsegold, California, software firm as software acquisitions director and assistant to the general manager, respectively. **Ardie Lockman,** inventor and computer hobbyist, is also supporting the general manager. **Avis Durgan,** who is engaged to programmer **Jeff Stephenson,** has been named product manager for the company's *Screen-Writer II,* working with the support team of **Vickie Ryan** and **Linda Donathon. Ron Prusek** is the new systems programmer, and **Howard Luthy** is now official hint giver for *Time Zone* and the rest of the *Hi-Res Adventure* series.

In the marketing department, **Bill Pearson** is the new sales manager, bringing with him long experience in domestic and foreign sales and fluency in French, German, and Greek. **Terry Pierce,** one of On-Line's first employees, is now publications manager.

In the executive sector, receptionists **Diana Clark** and **Anona Labans** have been appointed head of the purchasing department and chief of the order and shipping department, respectively. **Laura Kushner** is the new executive secretary and personnel manager, and **Sharon Davison,** wife of operations manager **Rick Davison,** has moved from production to a job in receivables. The Davisons are one of half a dozen husband-and-wife teams at On-Line: "We feel that their work gives a family-style spirit to the place," says marketing director **John Williams.**

☐ **Automated Simulations** (Mountain View, CA) has appointed **Chet Frankenfield** as its new development manager. He will be responsible for the production and implementation of new products,



Chet Frankenfield

aiding in the company's expansion into the computer cartridge market. Mr. Frankenfield was previously employed by Pacific Western Systems, where he was responsible for developing computer controlled memory testers.

☐ **Donna Sexton** brings her retail management experience to **Southwestern Data Systems** (Santee, CA) as dealer sales representative for the company.

☐ **The Project Management Institute,** a society for those practicing, consulting, or teaching in project management, is conducting a survey of project management software systems currently on the market, including scheduling packages, estimating, resource management, materials control, equipment management, and cost control applicable to project-type work. Any service bureau, software vendors, or individuals who wish to have their packages included in the survey should contact **Dr. Francis M. Webster,** 2143 South Hammond Lake Drive, West Bloomfield, Michigan 48033. Deadline for response is June 1, 1982; results and analyses will be published and will be available for purchase from PMI.

☐ **Project SERAPHIM** (Systems Engineering Respecting Acquisition and Propagation of Heuristic Instructional Materials) is being funded by the **National Science Foundation** to set up a model system for the dissemination of instructional materials in chemistry. Using microcomputer-based instructional modules, the program will set procedures for soliciting, evaluating, use-testing, publicizing, and disseminating instructional modules, and will attempt to identify all persons involved. Modules will be tested in classrooms and laboratories, and reviewed by users in the *Journal of Chemical Education.*

The project will also explore the feasibility of using a nationwide timesharing service as a medium for exchange of ideas about instructional programming and for transfer of programs to end users. The project would like to hear from any industrial chemists or engineers who have personal computers and are interested in writing programs that simulate on-the-job experiences. For information, write to **Dr. John W. Moore,** visiting professor, Department of Chemistry, University of Wisconsin at Madison, Madison, WI 53706; or call (608) 262-0215.

☐ **Time Proven Systems** (Willowdale, Ontario, Canada), after eight years of developing, testing, debugging, and running software on Canadian minicomputer systems, is going into the microcomputer software business. The company will concentrate on providing documentation directed at first-time users of its business software, and menu driven programs. Software will be maintained under TPS's special warranty arrangements provided there are no source code modifications, though if the user wishes to modify the source code for custom applications he is free to do so.

☐ **Microsoft** (Bellevue, WA) has filed a copyright infringement suit against **Advanced Logic Systems** (Sunnyvale, CA), alleging that ALS has copied the *Bios* and *Boot* code programs from SoftCard, Microsoft's Apple card for CP/M-based software, selling them as Z-Card and a part of the package called *The Synergizer.* Microsoft's application for a preliminary injunction was continued in U.S. District Court, Northern District of California, on March 11, ALS having agreed not to make, sell, or ship any products which contain the alleged in-

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fringing codes until a final court decision is reached. "We hope this case will help define and strengthen laws governing software copyright enforcement so that professional piracy will not become a major threat to the industry," said Microsoft vice president **Vern Raburn.**

☐ **Dysan** (Santa Clara, CA), originally founded in 1980 to provide precision duplication of software on single-sided, single-density media, has designed, engineered, and built its own automated duplication equipment for its software duplication division. Their software engineering staff has implemented several methods of software protection to meet the needs of the expanding microcomputer software market. The company provides duplication services for most of *Softalk*'s current "Top Ten Business" program distributors.

☐ **TR Visuals—Microproducts** has been formed by TR Visuals of Chicago as a marketing group specializing in microcomputer products and services. The new company, exclusive distributor for **Vital Information's** *VanLoves Directory* in Northern Illinois and Northwest Indiana, will provide software, publications, hardware, and products to over 120 computer retailers and independent sales organizations in the Chicago area.

☐ **Telos Consulting Services** (Santa Clara, CA) has announced the promotion of **Patricia Bailey** to regional manager. Ms. Bailey is currently account manager at the Santa Clara office. Telos provides software consulting services to government, industry, and business.

☐ **Jerry Jewell,** president of **Sirius Software** (Sacramento, CA) has announced the signing of the **Grud** to a lucrative endorsement contract as new company spokesman, catching many national advertising agencies off-guard. The Grud has been approached many times in the past to support a variety of products, but has always refused.

"I have my principles," stated the Grud at a recent press conference, "and I will not endorse a product I don't believe in. I am, however, very familiar with the Sirius product line and I'm very comfortable recommending their computer games.

"Also, they offered me more money than anyone else."

☐ In response to hundreds of inquiries worldwide, **Barry Passen** has decided to move up franchising plans for **Microcon SoftwareCenters** (Watertown, MA). They have retained **Franchise Development Corporation** of Concord, New Hampshire, to coordinate all franchising efforts of the consulting/programming/hardware selection service software retailing concept. Current plans are to place Business SoftwareCenters, which will also provide information and service hotlines, in major population centers and surround them with a cluster of Family SoftwareCenters in suburban mall settings, offering off-the-shelf entertainment and educational software and limited demonstration facilities. Individuals wishing franchise information should contact Franchise Development Corporation, (603) 746-4877.

☐ **Rothchild Consultants** has announced publication of the *Optical Memory Newsletter,* covering all but the consumer entertainment applications of laser videodisc technology, including microcomputer interfaces, image storage and retrieval, as well as direct read-write digital computer mass storage and office automation systems. Said company president **Edward S. Rothchild,** *"Optical Memory Newsletter* will strive to become a trusted clearinghouse of information" for vendors and users of magnetic computer peripherals, microfilm, microfiche, lasers, optics, and software.

☐ **Micro Focus** (Santa Clara, CA) and **Digital Research** (Pacific Grove, CA) have signed an agreement to share marketing and distribution rights for CIS Cobol and Level II Cobol. Digital Research is to market the languages for 8-bit 8080-based and 16-bit 8086 or 8088 based micros running on any of the CP/M-generic operating systems, to OEMs, ISVs, dealers, and distributors. Micro Focus will continue to handle customization of the Cobols to other operating systems, and sales of its software construction and maintenance tools. Sales and marketing of their CP/M-compatible product line will gradually be handed over to Digital Research.

"We started in business about the same time as **Gary Kildall** and **Dorothy McEwen** of Digital Research," said Micro Focus president **Brian Reynolds,** "and both companies have grown at about the same rate and now have very similar organizations. Our people are of a similar age and outlook and we feel that the two companies can work very well together."

"This is a unique opportunity to bring the microcomputer and personal computer up to the standard of commercial systems technology set in the past by mainframes," said **John Rowley,** Digital Research chief operating officer.

☐ **Lifeboat Associates** (New York, NY) has doubled the size of its new products department to assure authors of prompt technical evaluation for their software, contractual negotiations, and other software author requirements. They are also distributing the publication "Guideline for Software Authors."

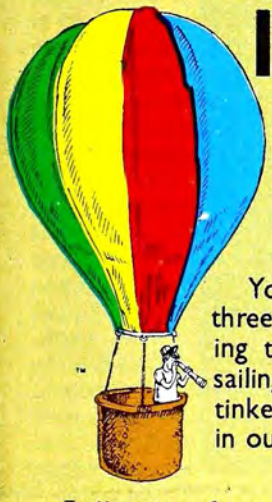
☐ **Applied Software Technology** (Monte Sereno, CA) has signed **Rainbow Systems and Sales** (Bellevue, WA) and **PCMA** (Los Angeles, CA), both manufacturer's representatives for Apple Computer, as regional sales representatives for AST's *VersaForm* business form processor in the Pacific Northwest and Pacific Southwest. Apple III versions of *VersaForm* are currently in final beta test, and will be formally announced in the next two months.

☐ **Arthur Young and Company** (San Jose, CA), one of the Big Eight national accounting firms, has developed *Audit-Computer,* a new audit tool for examining its clients' EDP records, utilizing an Apple III. **Chris Veal,** speaking at the **Management Science America FUTURE** conference in San Francisco, outlined the system's ability to consolidate up to six manual audit functions, enabling an auditor with computer knowledge to review the computer audit for accuracy, tie in with the manual audit, and examine and test client records. The system can access client data over phone lines, connect directly to the client's computer, or read data files off an IBM 3740 diskette. The Apple III serves as the system's central processing and control unit, along with an Altos to read IBM floppies, a 20Mb hard disk drive, and a dot matrix printer. Arthur Young has enhanced audit effectiveness by developing general and customized audit software for the single standardized system.

☐ **The Programmers, Inc.** of Taos, New Mexico, has purchased *The Eureka Learning System,* designed to give educators the use of an Apple personal computer without having to learn programming, from **Elconics,** the developers of the courseware generator. Staffing and support plans are underway, and licensing negotiations are ongoing with IBM and Zenith to market a CP/M version of the system. ◨







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Word Processing:



Lutheran Social Servants Swear by ZARDAX

BY JONATHAN MILLER

One hundred and fifty miles west of the Tri-Cities of Pasco, Kennewick, and Richland, in southwestern Washington state, a feathery plume of steam rises from Mount Saint Helens. Washington's celebrated volcano appears to be quieting down after a weekend tantrum, but the moody mountain's restlessness only adds to the general uncertainty in an area whose economy has gone awry. Those who were here in May 1980 still remember the day the snow-capped giant defied predictions and blew its tapered top, transforming the heavens of the Pacific Northwest into an ashen vision of the Apocalypse.

Dan Haygeman, southeast area director for Lutheran Social Services in Kennewick, was among them. "It was probably the weirdest sky I'd ever seen," says the man who now contends with the family and psychological effects of the economic fallout. "It was like giant roses opening up, with big handfuls of ash dropping down through the clouds. We got only a light dusting here, but, as close as ten miles north, there was no traffic for weeks—engines ground up, just totally destroyed. It was a major economic thing for a lot of farm folks and still is to some extent."

News accounts that compared the mighty blast to the relatively puny force of the first atomic bombs were not lost on Tri-Citians. The plutonium for the bomb dropped on Nagasaki during World War II was processed at the Hanford Federal Nuclear Reservation in Richland, now home to a major nuclear development at the confluence of the Columbia and Snake rivers.

Harnessing nature's awesome power has been this area's historic link with the land. Before the bomb, there was the river—federal hydroelectric projects that tamed the Columbia and helped turn the vast temperate river basin from a desert into an irrigated oasis supporting wheat, potatoes, grapes, and apple orchards. When Uncle Sam began to phase out the Hanford facility in the mid-1960s (plutonium stocks were adequate and a newer plant had been built in Georgia), Tri-City leaders lobbied to give it a new lease on life. At that time, Hanford accounted for 70 percent of the area's payroll. Take away Hanford, they said, and all you'd have was but a big river.

Bailing Out Buck Rogers. In the ensuing years, billions of federal dollars poured into the area to support a variety of high technology projects, including research on breeder reactors and permanent nuclear waste disposal. (Most of the nation's nuclear waste is in temporary storage at Hanford.) By 1980, civic leaders were openly dreaming of the twenty-first century, of a twenty-unit nuclear park that would provide electricity for the entire Northwest. Three reactors were already being developed under the aegis of the Washington Public Power Supply System and two more were in the offing. The Tri-City population, a piddling four thousand in the 1940s, had ballooned to 130,000 and the signs of growth were everywhere: new shopping centers, fast-food restaurants, and trailer parks jammed with new arrivals.

"Nuclear butters the bread of a lot of people," a local labor economist told the *Wall Street Journal* and the statistics bear him out: 20,000 of the area's 74,000-person work force are directly employed by the nuclear industry and Tri-Citians are proud of it. When consumer activist Ralph Nader blew into town in 1979 (the year of Three Mile Island), he was greeted by a throng of 1,020—twenty supporters and a thousand jeering pronuclear demonstrators.

Tri-City residents, as far as Haygeman can discern, still support nuclear power, but the industry itself has fallen on hard times, particularly in Washington, a state whose economic fortunes have long followed the ups and downs of the volatile aerospace and wood product industries. Management miscalculations about electric demand, six fold cost overruns and construction, labor, and regulatory snafus have forced the Washington Public Power Supply System, known locally as Whoops, to abandon one of the Tri-City plants. There are rumors of further cutbacks, says Haygeman, and a creeping sense of insecurity that is spilling over into his bailiwick, the family setting.

Off Off Broadway. "This community has a hefty divorce population, because the Ph.Ds and engineer types are caught up in this nuclear thing," he explains. "They feel they've got to make it work and they just moved to town from another new project and their spouses are unhappy because they were living in New York and could go to the theater and now they're out here and, quote, there's nothing to do. There's a lot to do, but it's not just paying $15 for a ticket. You have to be creative and curious."

Being creative and curious is also the watchword for social service administrators like Haygeman,who is particularly proud of his office's in-home and intensive counseling programs for families and individuals. He has seen his agency budget shrink by a third and is bracing for further reductions as legislators attempt to balance the state's ledgers. Add to that a nationwide recession and massive cutbacks in social welfare, housing, and food programs and you have the classic Catch 22 for a charitable organization: shrinking resources coupled with a greater demand for services.

"We've been called more times on emergencies in the last few months than in the past year and a half," says Haygeman, who adds, "when times are tight, everybody's tight, and that means they're also tight in their giving."

Resource problems of this magnitude demand inspired solutions—creative approaches to fund-raising, budget-balancing, and counseling. Even when the force is with you, you have to harness its power. And in the technological eighties, that means one thing. You buy an Apple and, like any good soldier, you get with the program—in accounting, data management, and word processing.

Shall We Dance. Necessity invents, Apples circumvent.

It is 1981 and Haygeman and his program supervisor Tom Anderson are steeling themselves to the annual ordeal, the budget. They're looking at a mountain of paper and hoping it's not a volcano about ready to erupt. Tomorrow they submit their proposed budget to United Way, which provides roughly 15 percent of their support. And guess what? Two mistakes and a $5,000 imbalance that throws everything off, yet somehow, even at the eleventh hour, they work around it. Then the other shoe drops.

While waiting for word on their United Way allocation, the state informs them

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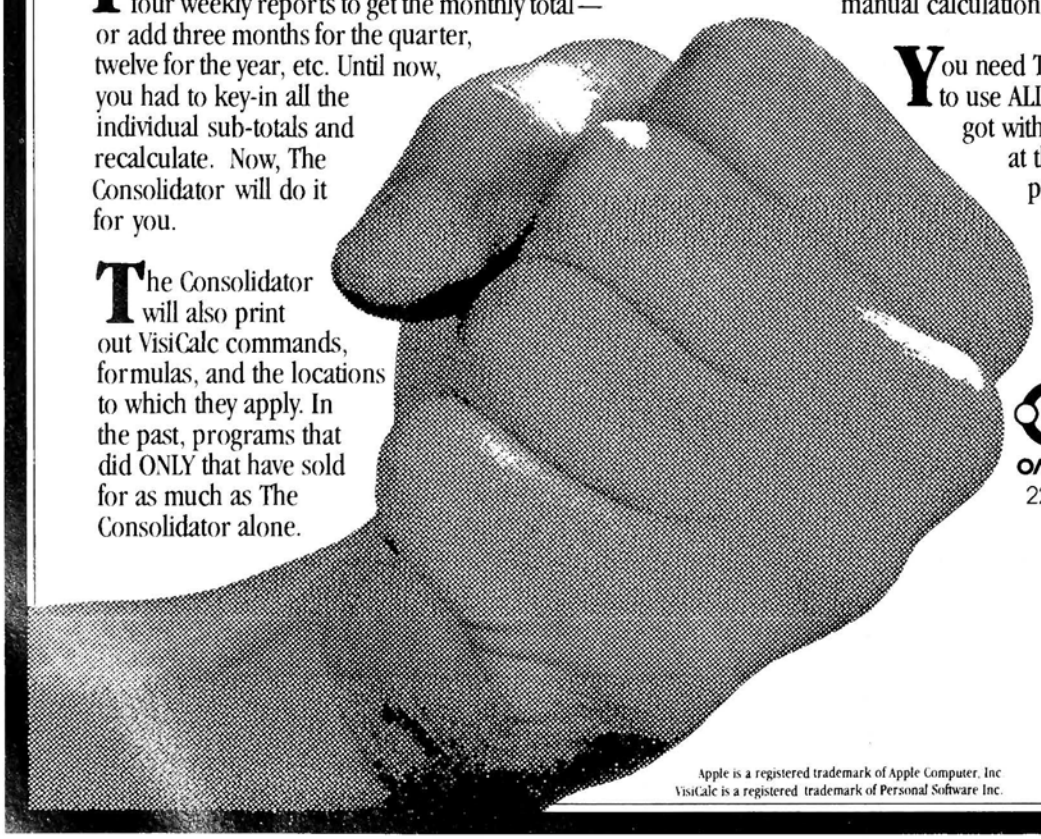
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they are eliminating funding for their $110,000 Voluntary Shelter Care program. "Suddenly, from being a $300,000 area office, we're a $200,000 office, less all the indirect costs that program was carrying for management, rent, and phone. Now, you're already exhausted from this budget process, which you have to psych yourself up for year after year, and now everything is so out of whack, you couldn't plug it with a truck."

Haygeman is beside himself. No, he's talking to himself. "You've got to be kidding. We're not going to be doing this again. All it is is erase, erase, erase." And then the bell rings, the light goes off as the inspiration forms: Haygeman Wants An Apple.

This is not a revolutionary idea in itself, though Haygeman freely admits he doesn't know the difference between PROM and a three-pronged plug. Computers are a part of everyday business life, so he appeals to his agency's home office in Seattle. With an Apple and a few programs, he can revise budgets instantly, gather caseload and workload data to increase efficiency, and even more exciting, perhaps even use it as a diagnostic tool through games and self-administered tests. "We aren't making decisions on how we ought to spend our money or allocate resources," he argues. "We're just trying to make these numbers balance out."

The home office is not altogether unsympathetic to the general idea. They're quite satisfied with the churchwide computerized data service they're tied into back in Minneapolis; they just can't find any money in their budget for area office microcomputers.

Apples and Angels. No money in the state budget, none in his, and no angel to get a computer show on the road. At times like these, a man must look deep within himself—then dig even deeper. "This office got picked to be a pilot Apple program," says Haygeman matter-of-factly, "because several employees and a couple of people in the community were willing to pledge *x* amount of dollars to make the lease payment on a computer."

The phrasing's formal but the modest intent is clear. Heeding the Biblical injunction, Haygeman, Anderson, and fellow employees have helped themselves. They've gone for it, a comprehensive package including an Apple II-Plus, a language card, a Videx card, an NEC 5510 Spin Writer, a thirteen-sector *VisiCalc*, and last (though not finally) an *Easy Writer* word processor, soon to be superseded by *Zardax*.

Now all they have to do is figure how to use the stuff and what better way to begin than by revising the budget. So back to the drawing board they go, only this time the board's the Apple's CRT, its screen greasing over with finger marks as, bleary-eyed, they haggle into the night item by item.



Tom Anderson videotapes a counseling session through a two-way mirror. Clients are fully aware they are being filmed, and the tapes serve several purposes: The social workers can study body language and other visual factors that might help them to better understand the clients; if they have a particularly vexing case they can show the tape to an outside professional for advice; also, periodically, they have a team of professional psychologists evaluate their counseling techniques.

"It was a real pain," recalls Anderson. "Essentially, we were learning to use the computer at the same time we were learning *VisiCalc* and at the same time doing the budget; but then this year when we revised it again, we already had the base of it, and that's the real power for us."

Computer people talk a lot about power, that synergy of speed and memory which is supposed to enhance their control of the environment. *VisiCalc* had given Haygeman and Anderson the power to manipulate office data, but the complete system envisioned by them also called for the manipulation of words. Writing grant proposals in an era of diminished resources is a major undertaking, and revising them can be as time-consuming as budget balancing.

Cursoring the Darkness. "The ability to move whole blocks of paragraphs around gives a lot of flexibility in being able to customize proposals," explains Anderson, as he and Haygeman ("I sound like a salesman for *Zardax* and I only bought one") rave about their newest program acquisition. "With the *Easy Writer* program we used in the past," interjects Haygeman, "if you wanted to move a paragraph, you had to load it, mark it, and load in the buffer, which limited the amount you could move. With *Zardax* you get the cursor to the paragraph you want moved and that's it."

Speed and ease of use—*Zardax* documentation is a model of clear writing in plain English—recommend the menu-driven program, but it also has one other virtue, they say: compatibility both with friendly humans and other programs. "Tom spends a lot of time on writing, but because it's fun, he gets to it and does it,"

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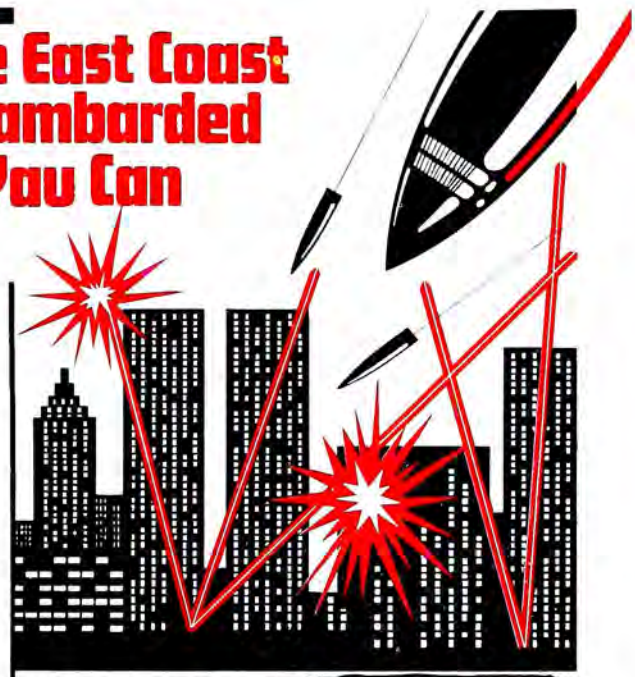
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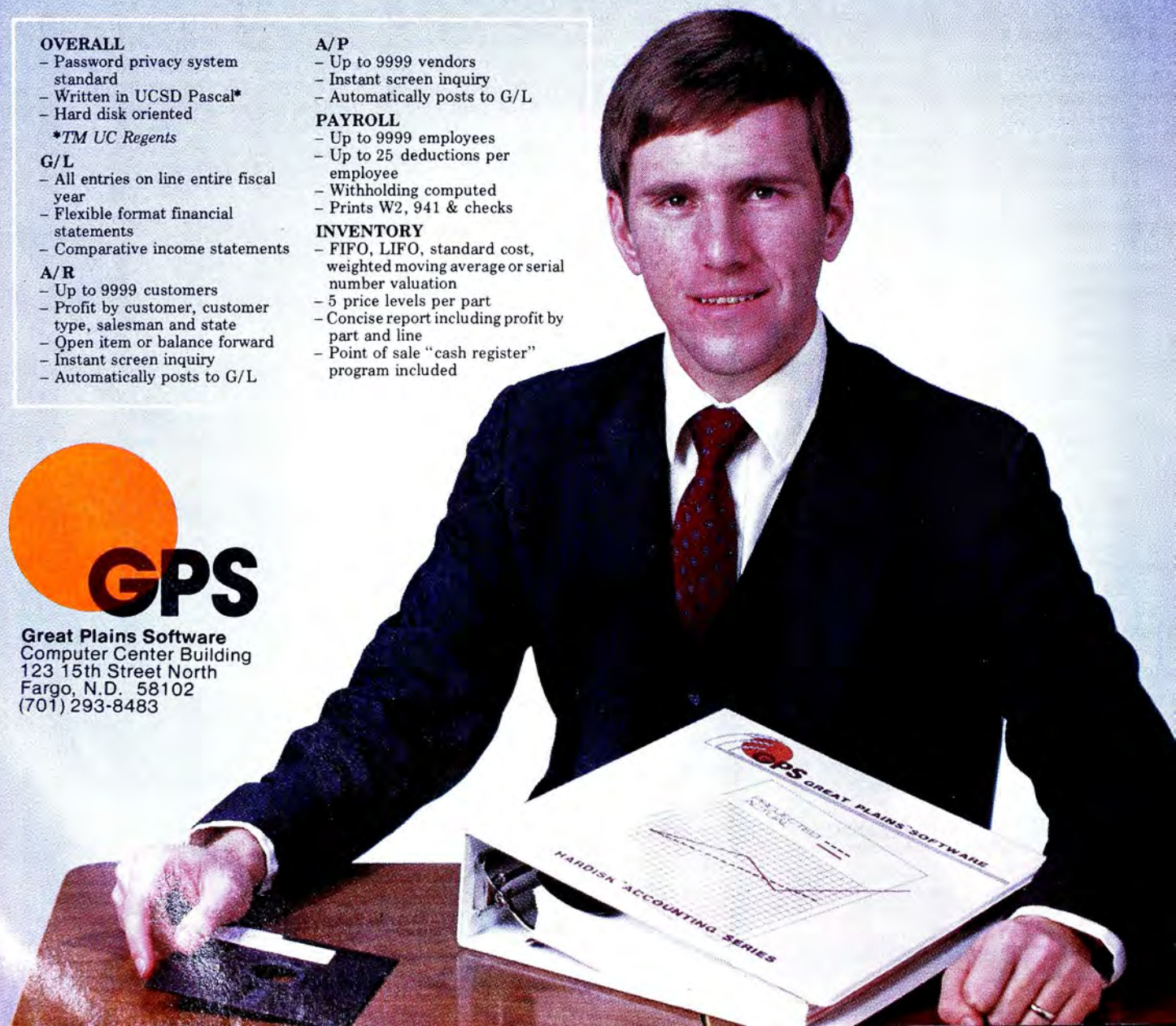
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Haygeman explains. "And I don't think I would spend all day Sunday writing new job descriptions on a regular typewriter. I did enough of that in grad school."

Zardax has been married to Haygeman's mail list program and, in what promises to be a major application, may soon be integrated into a data management program being designed by a programmer with the Tri-City-based Battelle Memorial Research Institute.

"We want a program that will tell us where our clients are coming from, who's seeing them, how they're doing," says Haygeman. "These are the things we desperately need to do, like client follow-ups. If you send out questionnaires to clients you probably won't get many replies, but maybe with a letter we'd have a better chance. If we can interface *Zardax* with the Battelle project, we can get that letter out automatically rather than using a staff person or volunteer."

Count Your Karma. Word processing and budget programs can make an office manager's life easier, but an Apple can also double as a diagnostic tool. Haygeman and company are looking into programs that would enable clients involved in family-oriented services to self-administer psychological tests. They have already had some success using the Synergistic Software *Odyssey* adventure game as a therapeutic device. Anderson relates the story of an adopted fourteen-year-old boy who was not communicating with his parents.

"The patterns of interaction came out when playing the game. Whenever he came to a choice point, he'd want to sit back and wait cautiously or approach friendlily. The positive dialogue he would carry on was, 'I don't want to do anything wrong right here.' His cautiousness about saying anything or making any kind of movement in the family was coming through in his playing of the game."

Haygeman believes games have value both as distractions (youngsters are more approachable when they're absorbed in them) and as moral teachers. "The game keeps track of your karma. It makes sure that if you're really evil and wicked, you run into a lot of like-minded people who are going to surprise you and turn out to be bandits."

Haygeman's eagerness to apply technology to social service work—the Lutheran Center also employs videotape to monitor client behavior and counselor techniques—has raised a few conservative eyebrows in the statewide agency. In fact, it has even earned Haygeman the dubious dubbing of "Mr. Toys," a sobriquet he suffers with wincing good grace, since both he and Anderson are secure in the knowledge that they're getting on with the agenda of the eighties. "Only those agencies that are able to offer a product that people will buy," says Anderson, "will survive when resources are limited. The kinds of tools we can offer



Dan Haygeman, left, and Tom Andersan, seated, intraduce affice manager Bette Christiansen ta the Zardax system.

people—not as a game but in terms of being professional—enhance our credibility as an agency."

Hustling Hope. Haygeman likes doing a job well, which means neatly, logically and efficiently. It was that organizing impulse that drew him to computers in the first place, though his world is anything but neat. "My work has helped me deal with some of my problems," he confides. "It keeps forcing me to confront some of my overly idealistic ways of thinking—of dealing with the difficulty of what's possible and what's desirable, as in my own life, where I have always wanted things better than they are."

When you counsel individuals and families in crisis, as he and Anderson do, you come to distrust easy answers. You recognize the built-in limits of the situation and concentrate on the overriding issue that is causing the pain. "The program here is not designed to wrap everything up nice and neat, because most of the families we see have multiple kinds of problems. All we're trying to do is get them back on track, to focus on *the problem.* Can it be solved or can they learn to live with it? In a time of shrinking resources, you have to focus more on alleviating the suffering than on enhancements."

A lingering recession and state and federal budget cuts are likely to aggravate suffering, but they provide agencies like Haygeman's with an opportunity: to do more with less. And that, adds Haygeman, is a challenge they take in stride. "We were hustling long before Reagan came along." ◨

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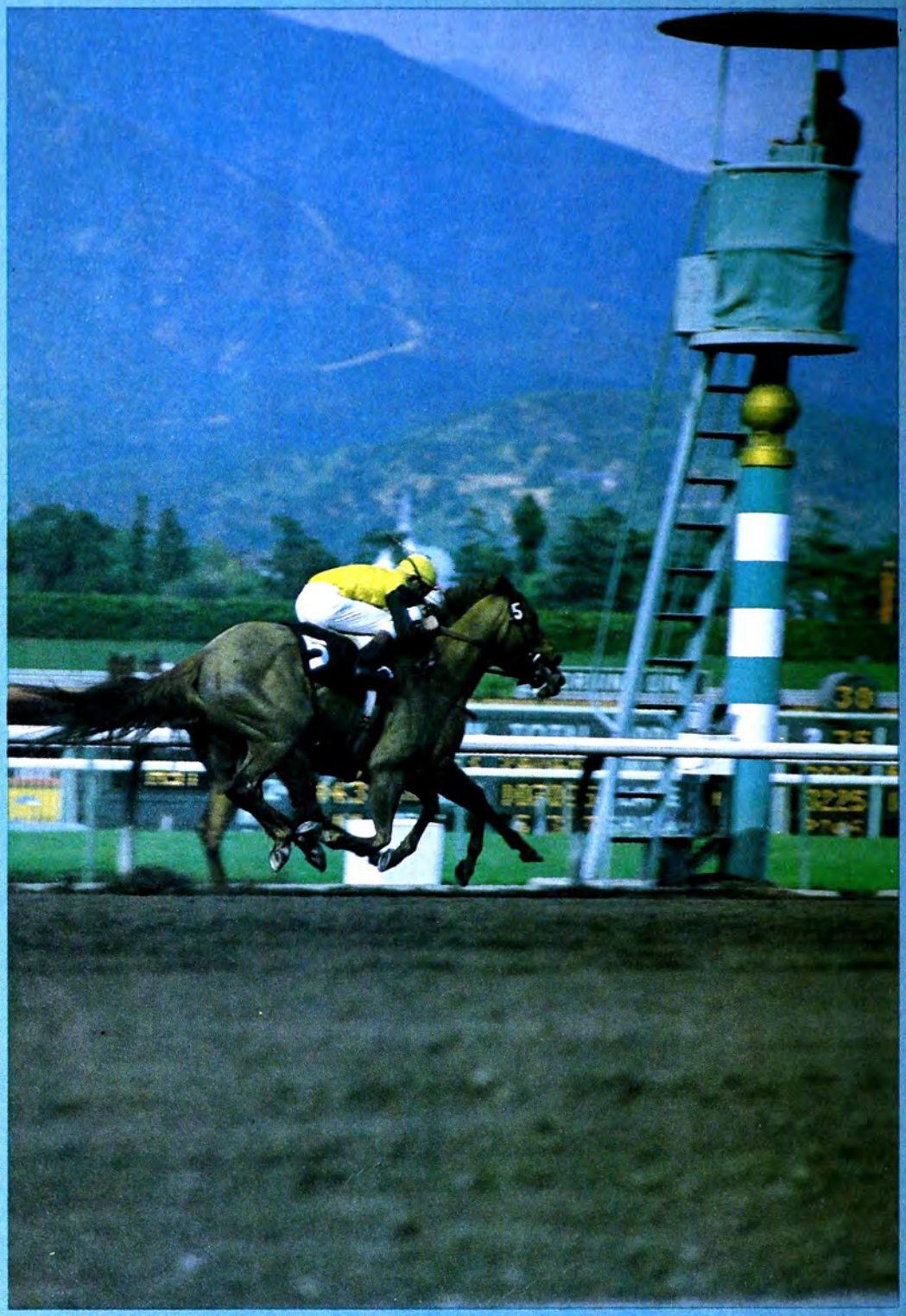
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Waltz in 1:37 3/8 Time



Trainer Darrell Vienna Keeps Records on an Apple

BY ROSS NEWHAN

It is six a.m. and the morning mist envelopes Santa Anita racetrack, obscuring the San Gabriel Mountains. It is cold and wet, but the work goes on, horses and people suddenly emerging, then disappearing again in the ethereal fog.

The city of Arcadia sleeps, but in the city within a city, in the Santa Anita stable area and on the track itself, the beat goes on—regardless of weather, regardless of the early hour.

It is in the morning, in fact, that the most important work is done. Long before the first bet is placed, before the first call to post, the stable is alive with activity.

Finely tuned Thoroughbreds are led to the track for workouts of varying distances. Young colts and fillies are schooled in the starting gate and paddock. Grooms muck out stalls. Hot walkers bathe the panting horses as they return from the track, then cool them off by leading them in a circle for twenty minutes. Trainers move between their barn offices and the stretch turn, the place they call clocker's corner. Jockey agents dog their footsteps, talking in whispers, hoping to book their client on a hot horse.

The routine goes on daily, changing not as much as the people who practice it.

A Horse of a Different Color. Some still picture a horse trainer as a prairie hardboot, a pinch of snuff in his lip, stubble on his cheeks, a lariat hanging from his belt and a crumbled note pad about to fall from his hip pocket.

Now, however, with inflation and industry growth driving purses to impressive heights, with the value of horses at astonishing levels, the training of Thoroughbreds is being done by a wide variety of men and women—some trained on the job, some more formally, some who wear three-piece suits to the afternoon races and some who remain in mud-calked boots and jeans.

Typical of those who embrace both the old and new is Darrell Vienna, a thirty-five-year-old University of California at Los Angeles psychology graduate who was a one-man rodeo team while at Westwood, now takes extension courses in poetry and creative writing, founded (as an undergraduate) and remains part owner of a pharmaceutical company specializing in nutritional products for large animals (from horses to whales), occasionally ruffles the conservative racing establishment as an outspoken advocate of horsemen's rights, and had purse winnings of about one and a quarter million dollars last year, only five years after receiving his trainer's license.

Vienna talks about a "vanguard of younger trainers" who aren't afraid to employ their only weapon—the withholding of entries—in disputes with the state racing board and track management. And he also talks about his affection for and comfort with the "older form of life" on the track backstretch,

Facing page, top left: Don Shoft, farrier, who keeps the Thoroughbreds well-heeled; middle left: Mel Price, identifier, checks tattoo inside horses' lips to prevent the use of ringers—horses that look like other horses but run differently, allowing bettors who know about the substitution to make a bundle; bottom left: jockeys weigh in with their gear both before and after each race; right: a steward watches for infractions and for which nose or hoof will cross the upcoming finish line first. This page: trainer Darrell Vienna chats with assistant trainer Phil Hronec as the Thoroughbreds are saddled in the paddock area before a race.






From left: Vienna at his Apple; the morning bath; coming down the stretch; the ambience of the stable yard at Santa Anita Park.

a community where "respect for ethics and people" represents a less cynical, less harried era.

The (Apple) Cart before the Horse. As a product of both pragmatic and formal education, Vienna believes a Thoroughbred trainer must combine perseverance with "open-minded creativity." He is in the forefront of stable creativity, a pioneer of sorts since he has brought space age technology to the muck and mire of the stable, housing an Apple II computer costing about twenty-five hundred dollars in a battered roll-top desk, the most attractive piece of furniture in his barn office.

Vienna believes the computers (he also has one in his Arcadia home) contribute to his racing success by streamlining his operation, and he predicts that his success will soon lead to the appearance of computers in other barns.

"Every stable runs on small details," Vienna said, sitting behind the desk. "Those details mount up and inevitably become forgotten. You lose a scrap of paper or simply forget to do something because you have so much else on your mind.

"The computer makes us more efficient. I mean, any time you're not missing something that someone else is, you've got an edge, though a stable's success still depends on the type of people working for you."

Throwing the Bull—for Profit. Vienna arrived at his views after studying horses "from many different aspects"—the first as a Glendale youth who found work and recreation in the river-bottom stables near Griffith Park, generating an interest that flowered at Burbank High, where he began attending and participating in rodeos.

A success at that level, Vienna sought a college that offered rodeo as the fourth R. He attended the University of San Francisco briefly, transferred to Pierce College, then became UCLA's one-man representative to competitions sponsored by the National Intercollegiate Rodeo Association, the only college competitions in which the participants collect more than the thrill of victory and agony of defeat.

Competing primarily in bronco and bull riding, Vienna said he made between four thousand and eight thousand dollars a year, operating in a practical laboratory that allowed him to apply some of the lessons received as a psychology major specializing in animal learning.

"To me," Vienna said, "most of psychology is nothing more than mumbo jumbo, not much different from religion.

"With animal learning, you can at least apply a degree of science, a degree of testability, which is all we're really doing as trainers, though at that time I wasn't thinking of becoming one."

While a senior at UCLA, Vienna's education reached a more refined and sophisticated level with his 1970 marriage to the former Kristen Anderson, whose family was involved with show horses and hunters, providing Vienna with yet another aspect of equine handling and a future emblem for his racing stable, the hunted fox.

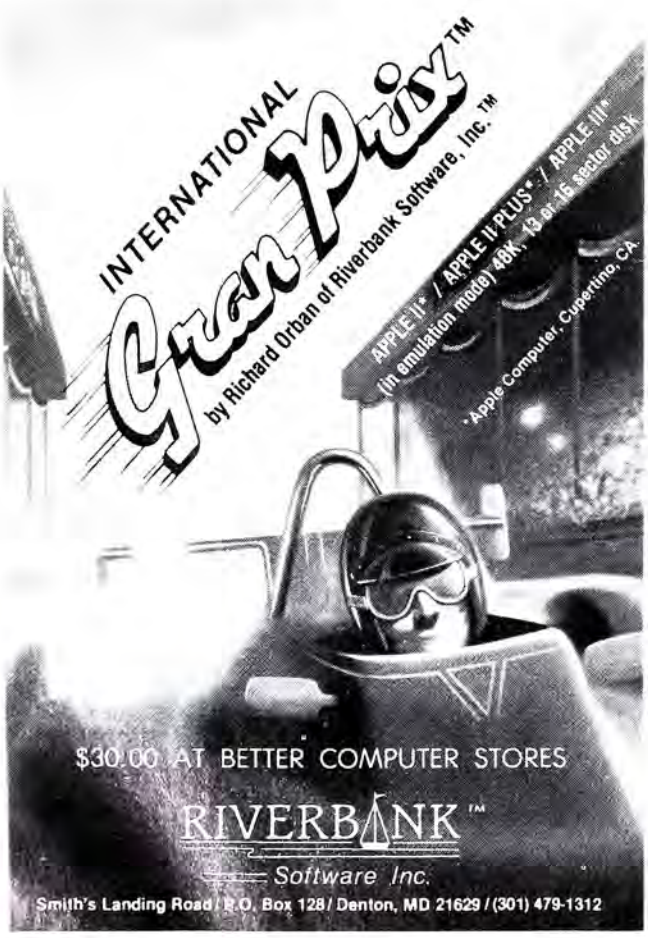
From Bromide to Barn. The marriage also led to the establishment of Vienna's pharmaceutical company, the outgrowth of conversations with Kristen's father in which differing opinions on animal nutrition led to a decision to test their respective views commercially.

Spectrum Media has been a continuous success, according to Vienna, who was involved full-time in its operation until 1976, when he was asked by a friend who had personal problems to take over the training of his one-horse stable.

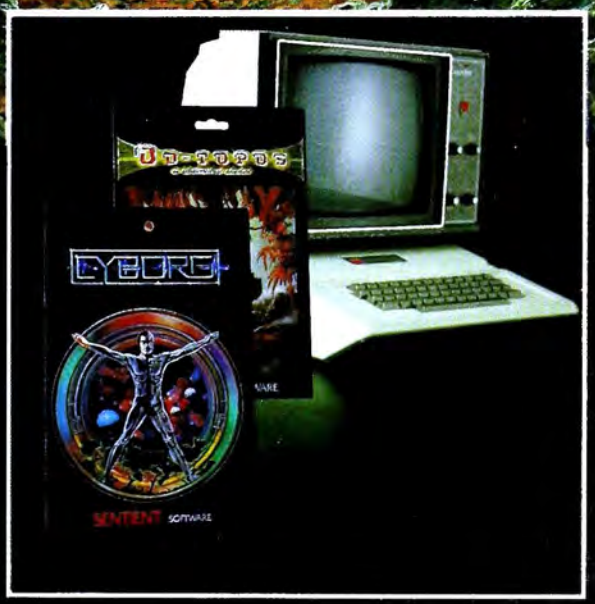
Temporary became permanent and Vienna, while still looking for the handicap star all trainers dream about, now has sixty-nine horses in training at Santa Anita and Hollywood Park, and up to twice that many—some of which he is part owner and others having been entrusted to his care—at breeding farms and training centers.

The rapid growth prompted Vienna to purchase a home computer for billing purposes (son Christopher, age three, has a tough time distinguishing it from his own electronic toys), and Vienna soon enlarged its purpose and value by programming in records of Lexington's Bloodstock Research Agency. Now, for reasons either of breeding, claiming, or purchase, Vienna has the pedigrees of virtually every registered Thoroughbred at his fingertips.

The Forty-Seven Horsepower Apple. Intrigued and satisfied by the savings in cost and time, Vienna then purchased a computer for his barn office and programmed a several-func-



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From left: Before each race, the contenders parade—walk with an escort before the crowd. They end up in the back stretch where they warm up according to their trainers' instructions. Phil Hronec discusses the situation with a horse whose idea of a fine afternoon doesn't include a jockey. A quiet moment in the barn.

Bottom left: Phil Hronec using his favorite tool. Right: Hronec looks in on a horse that just arrived from France.

tion, menu-driven database (he has had no formal training in computer use) in which to store what he estimates is the equivalent of one hundred typewritten pages of information on his sixty-nine horses now in training.

Vienna and staff still keep written records, but there seems to be no question as to the computer's edge in speed and efficiency.

It took Vienna only about two minutes, for instance, to call up a printout of the worming records (date, type, name of vet) on all sixty-nine horses. He estimated that it would take more than an hour to compile the material sorting through a notebook.

Assistant trainer Phil Hronec and foreman Howard Baker do most of the updating and revising. "I've worked in several barns," Baker said, "and I just wish they'd all had a computer. It makes everything a lot easier."

Vienna's computer houses veterinary, equipment, and race records that can be summoned on one or all of the sixty-nine horses. A code prevents anyone unfamiliar with its operation from stealing the material. The operator has the option of receiving material via printout or television screen. And Vienna insists it's all very easy to move when he shifts his operation to Hollywood Park and Del Mar in seasonal pursuit of the Thoroughbreds.

Obviously, there are more sophisticated examples of the computer age, but not in the Santa Anita stable area. And while it has not turned the long and often difficult days into a Vienna waltz, the trainer in Barn 86 believes others in his conservative business will soon be joining him at a keyboard.

Ross Newhan is a sports reporter for the Los Angeles Times. *Currently traveling with the California Angels, he has almost convinced them he is a million dollar hitter, but they remain skeptical.*





Horses Don't Take Weekends Off

BY MARGOT COMSTOCK TOMMERVIK

His workday starts at five a.m. because that's when the horses start to stir. He greets them, feeds them, sees to their health; he attends to the logistics of the morning workouts, training for some, timed works for others, simple gallops for others. After the workouts the horses must be walked to cool down, bathed, scoped, rubbed, curried, and generally loved. He's responsible for all of it.

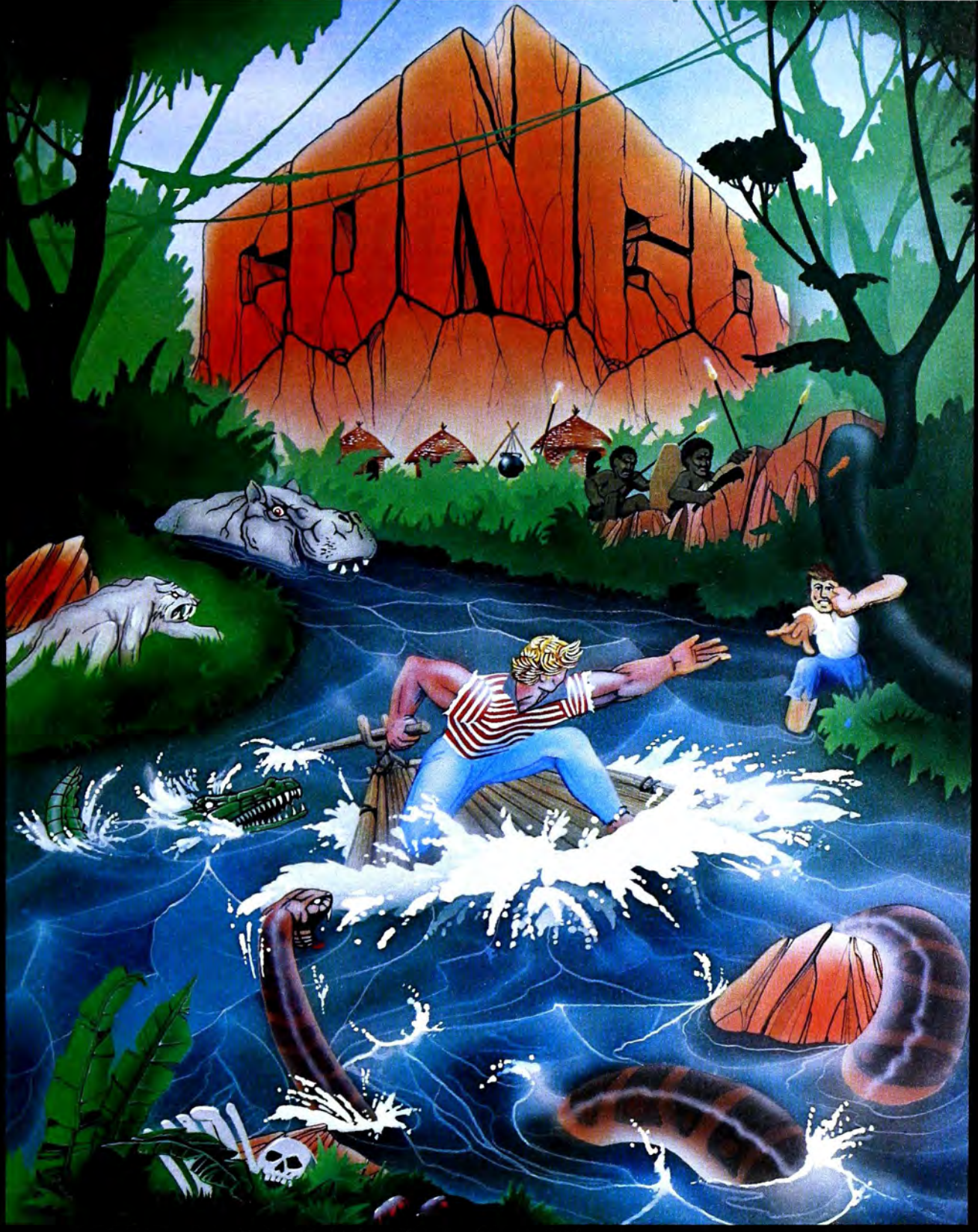
By ten a.m. he's done, and he runs home for a shower, only to return an hour later to ready the entries for the day's races. When all is in order, he has time to work. This work is the business—seeing to supplies, bills owed and owing, arrangements with suppliers like the farrier, the person who keeps the horses shod; the feed suppliers; and the veterinarians, who visit the horses daily.

Somewhere around six p.m., the day's races end and, after one last round of the stables, Phil Hronec can go home.

But you can be sure he'll be back come five o'clock tomorrow morning, regardless of the day of the week. Because horses don't take weekends.

Horses before Kindergarten. When Phil Hronec was five years old, his father bought a horse. It was not Hronec's introduction to horses; his dad was an official for Hollywood Park in Los Angeles for twenty years. But it heralded the beginning of a new era of his life, for pretty soon his dad had acquired several horses and he took Phil with him as he and the horses did the rounds of Northern California's fairgrounds in the summers.

Phil had been around the tracks so much that when he started galloping horses in the mornings at the age of fourteen



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Sentient Software makes CONGO for the Apple computer. See your local software dealer. Requires DOS 3.3 & 48K.

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no one thought anything of it. He wasn't green; it seemed natural. If anyone noticed that the legal age was sixteen and that Phil was on the wrong side of it, they weren't talking.

Soon Phil was riding workouts and training races and his lifelong dream of being a jockey grew more and more real. As it grew, however, so did Phil, and suddenly the dream was shattered. Hronec, who's less than average height, has a strong build; it wasn't his height that was the problem, but his frame. Diets, diuretics, all the tricks jockeys use to keep their weight down could only harm Hronec, and they didn't work anyway.

Hronec had just had time to deal with his disappointment and begin thinking about training when Uncle Sam called. It was 1968 and men were needed in Vietnam. Immediately, Phil requested duty with the cavalry; but there is no cavalry anymore.

In the end, the army recognized Hronec's lifestyle: he got out eighty days early due to "seasonal occupation"—Hollywood Park was opening.

Hronec went back to daily gallops and joined the California Horse Racing Board; during that summer he took his orals before the stewards and won his training license.

Signs of Things To Come? The first horse Trainer Hronec saddled, named Makanski, won. The race was on the fair circuit, and while Hronec had some success training others' horses, it wasn't the answer for him. He came back to Los Angeles and landed a job with Darrell Vienna, training horses at the offtrack; Hronec was working with second-string horses at Hollywood Park when the meeting was at Santa Anita, and vice versa.

When an offer came through for a private job in Arizona, Hronec took it; a year later, it fell through and things began looking down. Just when it seemed something had to give, Vienna called; he wanted Hronec back, this time as his right-hand man.

That was a year ago. Vienna is worried about the hours and the pace required of a man in Hronec's job. But Phil isn't concerned.

"Darrell makes it okay," Hronec says. "He's a good man, a good trainer, and a good person to work for.

"The hours are long, but they're necessary. I love working with good horses. But I wouldn't want to train again on a small basis. You've got to affiliate with people with money, or you're nowhere.

"I enjoy the way it is. I'll stick with Darrell."

Apple in the Ointment. One of Hronec's responsibilities is seeing that each horse gets its proper medication at proper times. Another is running the Apple. The latter makes the former a whole lot easier.

Vienna wrote all the programs for the stables. Every horse's day-to-day medical history is only one of many bits of information you can evoke with a keystroke. Also available is the racing history of each horse, training and workout records. Other programs keep track of the stable's accounts, and Phil uses these regularly too.

Phil and associate Howard Baker input all the data, but it's worth it.

"The Apple saves us huge amounts of time, and keeping track of everything is so much easier," Phil says, which is saying a lot from someone as busy as Phil.

Busy? There were paddles hooked up.

"What do you think we do all afternoon during the races?" barks Hronec. "We have to play sometimes!"

But not a whole lot. Their repertoire of entertainment software consists of the Apple master disk and one of Apple's old contributed disks. Hronec and Baker content themselves with *Starwars*, *Sink the Ship* and *Yahtzee*.

You might think that Phil Hronec has found a new love, second only to the Thoroughbreds.

"I think everyone should have an Apple," Phil says.

Horses and Apples. It's always been a winning combination. ◨



contemplating a byte

Robots are here and they are changing the world we live in. From bulky industrial welders to fantastically complex planetary probes, robots are sure to make our lives a little easier. Robots will get much more sophisticated in the decades to come; by the next century they may be our model citizens.

But will robots be immune from the human weaknesses that usually attend a high level of intelligence? On the cover of our August 1981 issue we fantasized what a humanoid robot may look like in the future. We also gave this highly developed mechanical man the hardest task we could devise—contemplating an object and its significance.

Will robots ever be able to sit and think about something that is not directly related to performing a task?

Softalk can't answer that question for you, but we can help you contemplate the unknown future in a special way. We commissioned graphics artist Robert Zraick to do August's cover with a poster in mind. The robot contemplating a bite is evocative both of Rodin's *The Thinker* and the Genesis passage on the Garden of Eden . . . not to mention the possible significance to our favorite technological fruit.

The artist and *Softalk* are sharing in the profits from the poster. *Softalk* will distribute its proceeds to individuals developing Apple tools to help the handicapped. *Softalk* guarantees 100 percent distribution of its monies.

In addition to the posters, which are sold at $6.00 (plus $1.50 to cover shipping and handling), some of the two hundred artist's proofs, signed by Robert Zraick, are still available at $75 each.

The size of the poster is 24 inches by 34 inches. The artist's proofs are hand-numbered and hand-signed, and each is accompanied by a certificate giving its number and guaranteeing that only 200 are being distributed.

Robert Zraick's art will grace any computer room, and your purchase will help others become more self-sufficient.

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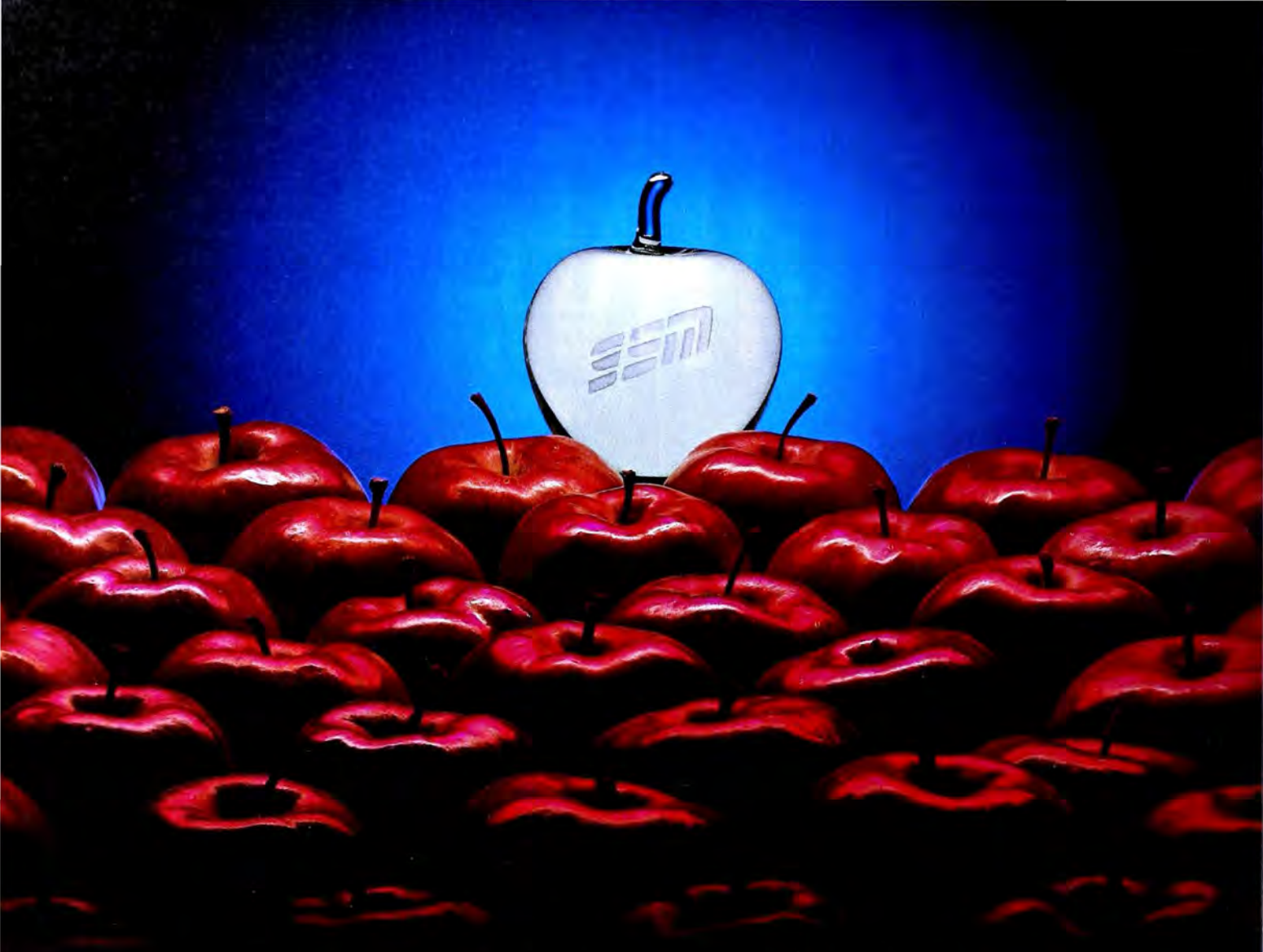
But you're outnumbered! And your attackers are relentless. Your only options are victory or a grave in space.

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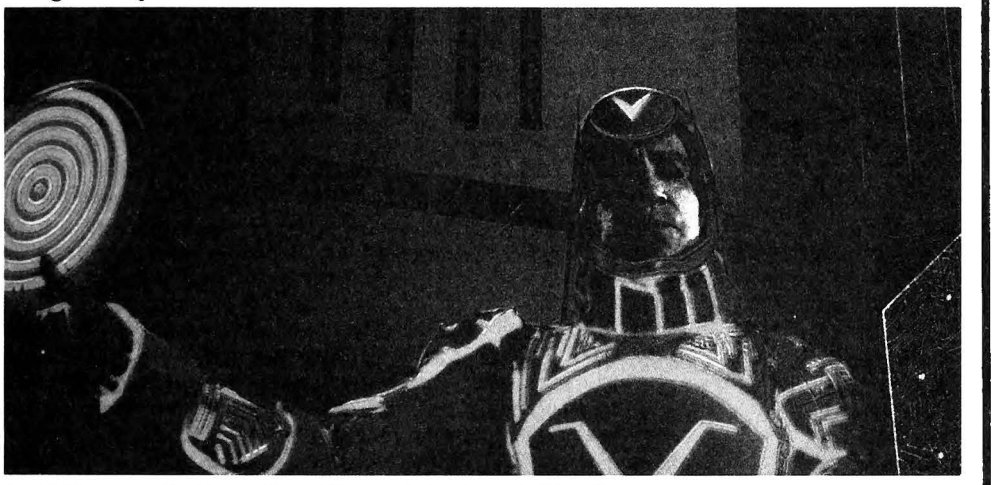
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NEWSPEAK

□ **Mickey Micro.** The big summer movie from Walt Disney Productions this year is *Tron*, in which a game programmer gets his expertise put to the ultimate test when he is blasted into a video game micro-dimension by an evil Master Control Program. He must then recruit the high-tech inhabitants of the realm to seek out and destroy the MCP.

Several computer graphics houses have labored on the effects since July 1981 to have the film ready for its release July 9, and in all likelihood they're still doing so as you read this. The film is set in a world made entirely of computer-generated imagery, one frame of which can require up to seventy-five million computer calculations to create. (One minute of film is composed of 1,240 frames.)



Copyright 1982 Walt Disney Productions.

David Warner as the Master Control Program's henchman in "Tron."

Bally, the nation's largest arcade game manufacturer, has created a *Tron* video game for its 240 Aladdin's Castle arcades as well as theaters that will be exhibiting the film. The finals of the national *Tron* arcade game tournament will be held in New York City during the week the film opens.

□ **Tickets. Money. Action!** The film industry is always borrowing from the latest technology and justly so. Films often mirror the real world and advancements in technology affect just about everyone. Adapting computer technology has not only improved the quality of films, but also the efficiency of how they're made.

Now exhibitors are using new tools to trim their operations and better serve the movie-going public as well. The Pacer Corporation in Bellevue, Washington has spent years developing a system they call Dataticket. Using a Motorola 6809-based computer, Dataticket offers several different features that benefit the theater owner and moviegoer alike.

For the impatient film lover, who abhors waiting in line to buy a ticket, Dataticket allows for the advance sale of tickets. Much like a ticket machine in an airport, Dataticket prints out the actual tickets at the time of purchase. Needless to say, getting your tickets in advance on a general seating basis will not help much if the film is enjoying some degree of popularity. Getting a good seat with a clear view of the screen will still necessitate standing in line.

Likewise, if there is a huge rush to buy tickets, at whatever time, the result will also be ticket buyers waiting in a line. If the advance sales were done automatically at all hours, which they are not as yet, it would truly be helpful to the rushed, impatient, and disorganized filmgoer.

Dataticket offers its most worthwhile features to the exhibitor. With all ticket sales stored in the computer, it would be difficult to miscalculate the inventory. You could lose all the ticket stubs from a given performance and still have a record on the computer of how many tickets were sold.

In addition, the Dataticket system includes a 1,200 baud modem that sends box office data to the home office computer. In a theater chain with more than a dozen or so houses, this eliminates a lot of phone calling and speeds up accounting. It also helps exhibitors determine, faster and more accurately than before, how a film is pulling at the box office.

Only a few large chains are using Dataticket at this point; Plitt Theatres, based in Chicago, is the largest.

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So theater owners now have a way to sell tickets faster, count money easier, and determine better how profitable it is to keep running a film.

Now if they could only put real butter on the popcorn . . .

☐ **Copy Catting.** Making a copy of information while it's being broadcast has become easier, and legitimate. It works through a system called Codart which is composed of a $100 Codart computer, an audio tape recorder, and an FM radio.

Using a catalog, the Codart user selects the programs he or she would like to record, calls the participating station to obtain the program's code number, and punches it in the computer. When the station broadcasts the program, the computer automatically turns on the tape recorder, and then switches it off when the program is over.

Codart was originated by a businessman named Alan Strachan. It's currently in operation in San Francisco, where KQED, a public station, plays Codart programs during its nonbroadcast hours, from one to five a.m. The information available includes sections of the *Wall Street Journal*, articles from *Psychology Today*, NPR's "All Things Considered," jazz and classical music, among others.

Codart users are billed for the shows they record. The fee is split among the holder of the program's copyright, the participating broadcast station, and Codart. Strachan believes that Codart can provide a solution to the economic problem which recording companies face. (By some estimates the recording industry is losing 20 percent of its revenue to home taping.)

The user benefits by putting together a tape through Codart more cheaply than he can purchase one in retail outlets. According to Strachan, Codart also functions to get the would-be recording engineer "past the hassle factor." The computer automatically selects what the user wants to hear, even bleeping out commercials.

This summer, Strachan plans to sell the computers by mail order to residents of the Bay Area. By early next year the service should be available in Los Angeles and other cities around the country.

☐ **Dogging a Job.** SIGI, or system of interactive guidance and information, is currently being used in 140 American colleges and universities as a computer aid in career planning. The system was developed on a PDP-11 and has been converted to other mainframes and microcomputers.

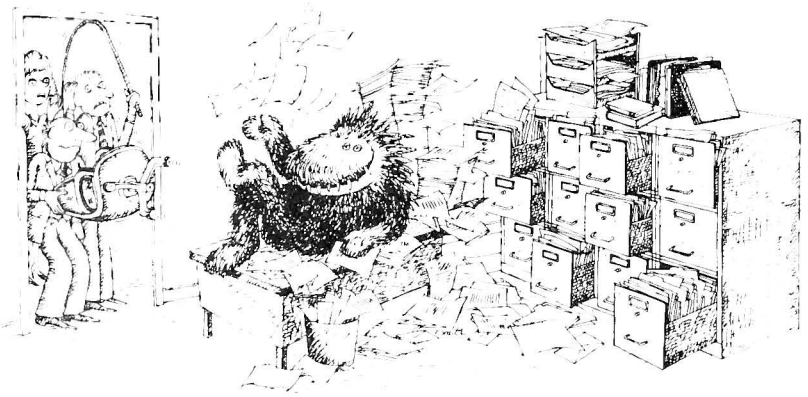
The software for SIGI was developed by Dr. Martin Katz, a research psychologist of the Educational Testing Service (ETS), in New Jersey.

SIGI aids in five processes: identifying and assigning priorities to work values; matching those values to actual occupations; providing specific information about career fields; listing the requirements for entry into particular fields and evaluating occupations in terms of their rewards and drawbacks.

A participant can work with any of six interest fields, including scientific, technical, administrative, personal contact, verbal, and aesthetic.

A simulation aspect of the program places you in an employment agency and requires that you make trade-offs in what you want when choosing among jobs, thereby ordering your values, such as high income, prestige, independence, helping others, security, variety, leadership, working in one's main field of interest, leisure time, and the desire to enter a career field quickly.

At the California State University Northridge campus, SIGI has been in operation for two years. According to Judy Leon, a career counselor at the campus, their four SIGI terminals are "constantly booked." Leon says that "about 80 percent of the people using it are satisfied with the results, while 20 percent feel frustrated. The career center stresses that SIGI is just one resource in the career decision-making process, to be used in conjunction with others." She believes that SIGI's greatest area of usefulness is in helping to clarify values and make career decisions. To that end, SIGI is used by those starting to explore career options, as well as by graduate students, alumni, and career-changers. ■



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LINK SYSTEMS™

Simply powerful software that links it all together



Unless otherwise noted, all products can be assumed to run on the Apple II, Apple II Plus, and Apple III in the emulator mode and to require 48K and one disk drive. The requirement for ROM Applesoft can be met by RAM Applesoft in a language card.

☐ **The Rose-Hulman Institute of Technology** (Terre Haute, IN 47803; 812-877-1511) has announced publication of *Collegiate Microcomputer,* a journal for the needs of microcomputer users in higher education. Papers in any area related to microcomputer use in the undergraduate curricula, announcements, and advertising for the premiere issue (February, 1983) must be submitted by September 1, 1982. Subscriptions $20 per year.

☐ *Resume Righter* from **Acro-Matic** (256 SW 5th Street, Boca Raton, FL 33432; 305-421-0041) takes the user through the resume writing process. Key resume elements are analyzed and must meet requirements before user can proceed. $24.95.

☐ *Editrix 1.0,* a new screen oriented text editor combining expanded features with on-screen documentation for the new user, is now available from **Data Transforms** (616 Washington Street, Denver, CO 90203; 303-832-1501). Types up to 200 words per minute, scrolls horizontally 220 columns wide, can change margins every line or within paragraph. Insert graphics, prints through *Graphtrix 1.3* to nineteen different printers and ten different parallel interface cards. Supports lower-case adapters, keyboard enhancers, and eighty-column boards. Applesoft in ROM, printer, parallel card. $75.

☐ An interactive program designed to stimulate student interest in insect biology, *Orderident* from **Educational Computing** (3144 Valentino Court, Oakton, VA 22124) can identify any North American insect to one of the twenty-six orders of the Class Insecta. Uses multiple entry key techniques, eliminating dichotomous key identification, the use of entomological couplets, and inherent problems in sequential decision making. Self-prompting; permits repeated attempts with sample run. No printer required. $44.95.

☐ *Clear 1,* a spray pump applied antistatic treatment for floors, carpets, work surfaces, and equipment, is available from **Midik Packaging Corporation** (2601 Industrial Parkway, Elkhart, IN 46516; 219-293-6516). Helps eliminate display loss and data distortion due to static electricity in EDP environment. Sixteen ounce spray pump bottle, $6.

☐ *Microcomputers in Education: A Nontechnical Guide to Instructional and School Management Applications* has been published by **Learning Publications** (Box 1326, Holmes Beach, FL 33509). Written by and for educators; covers microcomputer concepts, how to build staff skills, planning a system, classroom applications and special education, financial accounting and reporting systems in administration, new management information systems, and the struggle between vested interests of large computer network systems and those using locally controlled microcomputing. $24.95.

☐ Commemorating the birth of the modern computer in the Delaware Valley of Pennsylvania, **The Philadelphia Area Computer Society** (7014 Horrocks Street, Philadelphia, PA 19149; 215-745-4914) will hold its second annual *Philadelphia Area Computer Show* October 1 to 3 at the Philadelphia Centre Hotel, in conjunction with the city's 300th birthday.

☐ A line of low-cost, high-resolution green phosphor display monitors has been introduced by **USI International** (71 Park Lane, Brisbane, CA 94005; 415-468-4900). *Pi-1* is a nine-inch monitor with minimum sixty-four-character by sixteen-line text display; the twelve-inch *Pi-2* has an eighty-character by twenty-four-line display. With cable adapter. *Pi-1,* $249; *Pi-2,* $275.

☐ **Deco Computer Products** (780 Trimble Road, Suite 207, San Jose, CA 95131; 408-262-1594) has commenced production shipments of its line of fixed media and removable cartridge disk subsystems with SASI interfaces for the Apple II. On-line storage capabilities with built-in, removable backup. Applications software is being added on a continuing basis. Pricing starts at $4,875.

☐ Medical office software from **Andent** (1000 North Avenue, Waukegan, IL 60085; 312-244-0292): *Prescription Form Writer* prepares multiple preprinted prescription blanks; enter drug, dosage, quantity, and instruction. Printer. $20. ☐ *Dental Insurance Form Writer* prepares Universal ADA Insurance Claim Forms, creating master form for each patient. Load, enter proposed treatment, save, and print as preauthorization form. User definable, up to ten practitioners. Printer, either DOS. $100. ☐ *Applointments* (that's what they call it) allows appointments to be viewed on screen and scrolled up or down for entire day, or printed out. User definable start, end times, separations; jump to specified days in appointment book, search by name or partial name, activate/deactivate dates, enter comments. $75.

☐ *Smal/80* is a structured macro assembly language for 8080 microprocessors from **Chromod Associates** (1030 Pak Avenue, Hoboken, NJ 07030; 201-420-1644), adapted from Bell Lab's Smal. Designed to combine logical power, versatility, and convenience of a compiled, structured high-level language with the efficiency and flexibility of assembly language. Incorporates processor-independent symbolic notation system, macro and test pre-processor, compiler/linker, and automatic translator. 136-page user guide. Requires CP/M card. $150. ☐ *Structured Microprocessor Programming,* a tutorial introduction to assembly language programming, structured programming, and Smal/80, is available for $22.50.

☐ **Arrow Micro Software** (11 Kingsford, Kanata, Ontario, K2K 1T5 Canada; 613-592-4609) has introduced three shared space communication programs. *Reflexive VC* allows two Apples to run *VisiCalc* over the telephone. Either operator may type commands, both Apples will react in synch. Requires Applesoft in ROM, Micromodem, *VisiCalc.* $45. ☐ *Pascal File Exchange* does the same thing with Pascal files. Either end may type messages, initiate execution of remote .CODE files, and control selection of files to be sent or received. Requires modem, two disk drives, 3.3 system master. $45. ☐ *DOS File Exchange* incorporates special feature permitting operators to type text messages to each other at the same time as DOS files are being transmitted. Operators may toggle between menu, utility, and graphics display. Applesoft in ROM, modem, 3.3 system master. $45. DOS and Pascal backup copies, $5.

☐ **North America MICA** (11772 Sorrento Valley Road, Suite 260, San Diego, CA 92121; 714-481-6998) is offering *PMS-II,* a critical path project management system now in its fourth release. Prints activity reports with sorting and data selection options, standard GANTT charts, graphic and tabular funding schedules, and the network diagram, eliminating need for extensive redrafting. Meets Corps of Engineers and Armed Services Procurement Regulations. Schedules projects based on three to seven work days per week, omits up to one hundred user defined nonwork periods, maintains budgeted and actual expenses for material, labor, and burdened labor costs. Requires CP/M card. $1,295.

☐ **Digital Microsystems** (1840 Embarcadero, Oakland, CA 94606; 415-532-3683) is distributing a free kit to users of its *HiNet* local area network that illustrates the application of *HiNet* software and hardware to business problems and gives instructions on how to plan a local area network in an office environment.

☐ **Panasonic** (One Panasonic Way, Secaucus, NJ 07094; 201-348-5278) has produced a new seven-inch, high-contrast monochrome display tube. The CRT, designated the *190MB4*, offers high resolution, electrostatic focusing, ninety degree deflection angle, and nonglare face. For use in popular portable CRT terminals, instrumentation, medical equipment, and graphics applications. In lots of one thousand; $21.48 each.

☐ **H & H Trading Company** (Box 549, Clayton, CA 94517; 415-672-3233) is offering an update of its *Stock Tracker* program. Helps investors decide when to buy and sell stocks and other securities utilizing a method of volume analysis based on the law of supply and demand. Designed for integration with its companion program, *Market Tracker*, and is the foundation for additional investment software currently under development. $285.

☐ Four new programs from **Digital Marketing** (2670 Cherry Lane, Walnut Creek, CA 94596; 415-938-2880). *Milestone* is a "critical path" network analysis program which can help you plan and analyze almost any project. $295. ☐ *Datebook II* can schedule up to 27 different appointments. $295. ☐ *Footnote* numbers and formats footnote calls, footnotes, and text using *WordStar*. $125 ☐ *Synopsis* maintains a central index file with information about each text file created by any word processor that permits nonprinting comment lines. $125. All require a CP/M card.

☐ A new system that removes the fear of learning to operate your new Apple is entitled *How to Operate the Apple II Plus* from **Flip Track Training Tapes** (526 N. Main Street, Box 711, Glen Ellyn, IL 60137; 312-790-1117). Consists of three audio cassette lessons, each between one and two hours in length, and takes the novice through the ABCs: how to run programs, enter data, save and organize files, make backup copies, modify programs, and more. The course assumes no technical background and emphasizes operation of the computer, not programming. Apple's system master disk is the source of the course's demonstration programs. Designed for junior high school level and up. $49.95.

☐ **Fiberbilt** (8601 West 26th Street, New York, NY 10001; 212-675-5820) has a new carrying case specifically designed for Apples. Holds two disk drives held on top of the computer with a nonmetallic strap. They can remain connected to a monitor or printer even with the cover closed. Inside the case is foam padding and outside are rubber no-slip bumpers—all of which will help keep your computer from becoming Applesauce. $64.

☐ A new service for users of all types of computers from personal to business mainframes is available from **CCS, Incorporated** (Box 5276, San Antonio, TX 78201; 512-340-8735). Called *Sofsearch*, it is a subscription software locator service which provides customized reports on all software products. The *Sofsearch* database currently contains over ten thousand programs, and five thousand vendors. A *Sofsearch* report consists of the software trade name, the vendor name, the market area served by the vendor, the function of the program, and the activity it's designed for; language, systems that the program fits, price, and more. All of the information is tailored to the criteria specified by the subscriber. A one-year subscription is $125 and entitles the subscriber to all available software that fit the criteria. Individual reports are $15 for subscribers.

☐ From **On-Line** (36575 Mudge Ranch Road, Coarsegold, CA 93614; 209-683-6858), *ScreenWriter II* rises from the litigational ashes of the late *Superscribe* featuring coresident editor and runoff portions and a new, easier-to-read documentation. $129.95. ☐ *The Dictionary* is updating to 2.0, featuring a larger wordbook with more room for user definable words on disk and the ability to look up the correct spelling of a word through the wordbook program. $99.95. ☐ *The General Manager* is upgrading to version 1.5, allowing more flexibility in updating and reporting, and including a disk of sample applications and new documentation. $149.95. ☐ *EPF IV* is a programmer's utility with full screen Applesoft editor, auto numbering, global search and delete, block move, cross reference of variables and line numbers, and copy and delete functions. $79.95. ☐ *Expediter II+*, the updated Applesoft compiler, has been rewritten for greater ease in compiling and to help keep memory requirements down in compiled code. $129.95. ☐ *Marauder* is an arcade/real time adventure in which you must maneuver through laser fire to land on an alien world, then maneuver through robot-filled corridors to seek and destroy the main defense system. Joystick or keyboard. $34.95. ☐ In *Cannonball Blitz*, by Olaf Lubeck, you must climb the walls of Cannonball Castle and capture the enemy's flag. Joystick or keyboard. $34.95. ☐ Finally, *The Artist*, combining the talents of Ken Williams and Warren Schwader, offers the best of the company's graphics and animation routines. $79.95.

☐ *GrafPak II* from **SmartWare** (2281 Cobble Stone Court, Dayton, OH 45431; 513-426-3579) computes feasible scale factors for reproducing hi-res graphic images on the basis of printer carriage width, print head dot density, width of the paper used, and the image cropping you select. Allows reproduction of both pages in a butted, registered panorama or column; cropped image applied identically to both screens. $34.95. ☐ *The Graphic Composer*, using hi-res page 1, positions the image on the screen, crops, borders, frames all or part, provides for window erasure, and annotation with keyboard-entered text. Will also compress hi-res images, decreasing amount of disk storage space required. Ability to specify origin and direction of a string of characters; create additional font sets or adapt existing sets. $34.95.

☐ **The Computing Investor** (29-A Estancia Drive, Marana, AZ 85238), in addition to its free portfolio evaluator (Marketalk News, April), is offering a free demo package, featuring samples from each program in their software series, on a user-supplied 5¼-inch disk, for $1 postage and handling, and an intro-

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WORD PROCESSING

ATARI 400/800 APPLE II & II+

EASY TO USE — Letter Perfect is a single load easy to use program. It is a menu driven, character orientated processor with the user in mind. **FAST** machine language operation, ability to send control codes within the body of the program, mnemonics that make sense, and a full printed page of buffer space for text editing are but a few features. Screen Format allows you to preview printed text. Indented margins are allowed. Data Base Merge with **DATA PERFECT** by LJK, form letters, accounting files and mailing labels only with MAIL MERGE/UTILITY by LJK. **FEATURES** — Proportional/ Incremental spacing * Right Justification * File Merging * Block movement * Headers * Footers * Print Multiple Copies * Auto Page Numbering * Scroll forward/backward * Search and Replaces * Full cursor control * Underlining * Boldface * Superscripts * Subscripts * Auto page numbering * Insert character/line * Delete character/line * Centering * Horizontal tabs/changeable * Multifunction format line (line spacing — left margin — page width — lines/page — change fonts — top/ bot margin adjust) **MUCH MORE!** **$149.95**

ATARI VERSION 2.0 #2001

Uses proportional font, right justified with Atari 825/Centronics 737, 739 printers. Uses EPSON MX* Series + Graftrax/italicized font. Can mix type fonts on same page; mix boldface and enhanced font in same line with justification. Can be used with 16K Atari/400.*

"Compared to the price of many other word processors, this package is a steal. It does everything the advertisement claims and more. On top of this the software is very easy to use." **A.N.A.L.O.G. MAGAZINE**

APPLE VERSION 5.0 #1001

DOS 3.3 compatible — Use 40 or 80 column interchangeably (Smarterm — ALS; Videoterm-Videx; Full View 80 — Bit 3 Inc.; Vision 80 — Vista; Sup-R-Term — M&R Ent.) Reconfigurable at any time for different video, printer, or interface. **USE HAYES MICROMODEM II*** LCA necessary if no 80 column board, need at least 24 K of memory. Files saved as either Text or Binary. Shift key modification allowed. Data Base Merge compatible with **DATA PERFECT*** by LJK.

"For $150, Letter Perfect offers the type of software that can provide quality word processing on inexpensive microcomputer systems at a competitive price." **INFOWORLD**

DATA PERFECT T.M. LJK

APPLE & ATARI introductory price
DATA BASE MANAGEMENT **$99.95**

Complete Data Base System. User orientated for easy and fast operation. 100% Assembly language. Easy to use. You may create your own screen mask for your needs. Searches and Sorts allowed, Configurable to use with any of the 80 column boards of Letter Perfect word processing, or use 40 column Apple video. Lower case supported in 40 column video. Utility enables user to convert standard files to Data Perfect format. Complete report generation capability. **Much More!**

EDIT 6502 T.M. LJK

$29.95

This is a coresident — two pass **ASSEMBLER, DISASSEMBLER, TEXT EDITOR, and MACHINE LANGUAGE MONITOR.** Editing is both character and line oriented. Disassemblies create editable source files with ability to use predefined labels. Complete control with 41 commands, 5 disassembly modes, 24 monitor commands including step, trace, and read/write disk. Twenty pseudo opcodes, allows linked assemblies, software stacking (single and multiple page) plus complete printer control, i.e. paganation, titles and tab setting. User can move source, object and symbol table anywhere in memory. Feel as if you never left the environment of **BASIC.** Use any of the 80 column boards as supported by **LETTER PERFECT,** Lower Case optional with **LCG.**

LJK DISK UTILITY APPLE $29.95

This menu driven program allows the user to manipulate a variety of different file types. Binary, Text, and Source files may be easily converted into each other. The program may be used with **APPLESOFT*, VISCALC***, and other programs. These program files may be readily adapted for multiple use including editing with **LETTER PERFECT** word processings.

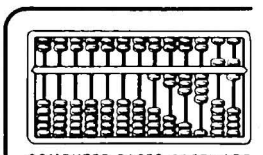
MAIL MERGE/UTILITY ATARI

This menu driven program combined with **LETTER PERFECT** allows user to generate form letters and print mailing labels. With the Atari, you may **CONVERT ATARI DOS FILES,** or Visicalc files compatible for editing with **LETTER PERFECT.** Utility creates Data Base files for Letter Perfect.

LOWER CASE CHARACTER GENERATOR $24.95



Lower Case Character Generator for the Rev. 7, Apple II or II+ computers. When installed, this Eprom will generate lower case characters to the video screen. Lower case characters set has two dot true descenders. Installation instruction included. Manual includes listing of software for full support and complete instructions for shift key modification. Compatible with **LETTER PERFECT.**



COMPUTER BASED SOFTWARE

LJK™ ENTERPRISES INC.

LJK ENTERPRISES INC.
P.O. Box 10827
St. Louis, MO 63129
(314) 846-6124

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ductory text on computer support for the individual investor, sent to anyone who purchases and registers software in *The Computing Investor* series.

☐ **Microcom** (1400A Providence Highway, Norwood, MA 02062; 617-762-9310), is offering a free $100 subscription to the **Source** with any purchase of *Micro-Courier,* the electronic mail software package that enables international Apple-to-Apple transmission of charts, graphs, reports, and programs, and also accesses the **Source**'s database of news, travel service, commodities, educational programs, and electronic games. Offer good until July 1. $250.

☐ **MMD** (4163 Fuller Avenue, Eugene, OR 97402; 503-689-6205) is offering an *RTTY/CW Apple System* for ham radio operators. Consists of a piggy-back plug-in board and cables with all-digital filters under control of program and operator. ASCII/Baudot speeds up to 1200 baud, bandpass adjustable by software or operator. Will receive and buffer incoming data while simultaneously storing to disk. $310.

☐ *The CMX-832 Fiber Optic Multiplexer* is a stand-alone, eight-channel, thirty-two-channel expandable time division multiplexer with synchronous/asynchronous channel data rates of 1.2 to 19.2 Kbps. Fiber optic transmission ensures electrical isolation, data security, and zero EMI radiation or pick-up. Intended for short-haul applications up to 3 km; each channel operates independently with no interaction or waiting. Rack mount adapters available. From **Canoga Data Systems** (21218 Vanowen Boulevard, Canoga Park, CA 91303; 213-888-2003). $2,700.

☐ *Datalok* from **Atlantis Computers** (31-14 Broadway, Astoria, NY 11106; 212-728-6700) is a software protection system that makes the data encryption standard algorithm available to the Apple user, using a WD2001 DES chip on a board configured for the Apple bus. Will encrypt and decrypt any file under Apple DOS and lock or unlock a disk. Interactive software included, no programming required. Either DOS. $349.

☐ **Touch Technology** (315 Chesapeake Avenue, Annapolis, MD 21403; 301-267-8252) has announced availability of touch-sensitive monitors for the Apple. Thirty-two screen areas send a letter or number when touched. Available in twelve- or fifteen-inch; color or green screen. Individual prices start at $1,495.

☐ *Golden Delicious Games for the Apple Computer,* by Howard M. Franklin, Joanne Koltnow, and Leroy Finkel, features never-before-published games, ready-to-use programs for the novice, subroutines that can be embellished by advanced users, and tips on using games as educational tools. Published by **John Wiley and Sons** (605 Third Avenue, New York, NY 10158; 212-850-6497). Paper, $12.95. ☐ *A Basic Programmer's Guide to Pascal,* by Mark J. Bogerson, teaches the conversion of Basic to the more powerful programming language and how to write subsequent programs in Pascal. Basic-Pascal dictionary; data structures and program examples derived from real-world business problems. Paper, $9.95. ☐ New stuff from **Sirius Software** (10364 Rockingham Drive, Sacramento, CA 95827; 916-366-1195): *Audex* is a collection of utility programs allowing creation, editing, and playback of sounds from Basic or assembly language programs. $29.95. ☐ The USS Dogstar, dispatched to recover leaky nuclear warheads from the bottom of the sea, must hold off Soviet subs, octopi, and the *Jellyfish.* Keyboard, paddles, or joystick. $29.95. ☐ Hunter Hancock's *Cyclod* features an eyeball that fights snakes with bricks. Keyboard or joystick in Joyport. $29.95.☐ *Kabul Spy,* by Tim Wilson, is an adventure in which you must cross the Afghanistan border with a pistol, a knife, 300 rubles, and a cyanide pill, to free a captured professor before he can be made to talk. $34.95.

☐ *Compumed* is a patient management system from **Progressive Data Intelligence** (Plaza 7000 Building, Suite B230, 7000 S.W. 62nd Avenue, South Miami, FL 33143; 305-665-9465) designed for the user with no formal training in computers. Menu driven; service codes, drag codes, and insurance codes. Corvus hard disk accommodates 8,700 patients; $1,250 5¼-inch and eight-inch versions available for small practices; $995.

☐ **Dilithium Press** (11000 S.W. 11th Street, Suite E, Beaverton, OR 97005; 503-646-2713) is introducing its line of *Blackbird Software,* featuring *Professional Mailout, Inventory Management, Screen Master Data Base,* and *Number Master Numerical Package.* Most of the software is CP/M based and can be purchased on 8-inch and 5¼-inch disks. Mail order only; free catalog. $29.95 each. ☐ Allowing the personal computer user to translate from one Basic language to another, the *Basic Basic-English Dictionary* by Larry Noonan features 260 definitions, five appendices, twelve tables, and translations of computer graphics. All commonly used Basic commands, statements, operators, and special keys are translated for use on the Apple, Pet, and TRS-80. Paper, $10.95.

☐ The microcomputer user group **Apple-Can** (Box 696, Postal Station B, Willowdale, Ontario, Canada M2K2P9; 416-222-6745) will be holding its *Computer Faire,* featuring dealer, manufacturer, and supplier displays, door prizes, white elephant table, auction sale, and various special interest group displays, June 6, 1982, at L'Amoreaux Collegiate, Scarborough, Ontario.

☐ Written by a frustrated Apple owner who got tired of trying to read the user's manual supplied with a certain make of printer, *The Other Epson Manual* is the first publication from **Cut the Bull Software** (Box 82761, San Diego, CA 92138). Every other page lists a debugged Applesoft program with facing-page commentary intended to clear up the more obscure points of the feature under examination. Covers all twelve print modes, underlining, subscription and superscription, line spacing, vertical tabbing, more. $4.98.

☐ **Avante-Garde** (Box 30160, Eugene, OR 97403; 503-345-3043) announces a free workshop for programmers and others interested in software marketing, production, or sales, in Eugene, August 8 to August 14. Recommends participants bring their Apples; subjects of discussion will include demands of the market, marketability of an idea, bugs, creative blocks, user friendliness, program presentation, documentation, menus, advertising, and distribution. Lodging, $100.

☐ **Eventide** (265 West 54th Street, New York, NY 10019; 212-581-9290), manufacturers of a plug-in spectrum analyzer for the Apple, has released *Specsystem,* providing software enhancement to the analytical powers of the instrument. Reverberation time displays all ISO-standard one-third octave frequencies; three-dimensional spectral surface mode simultaneously displays frequency vs. amplitude vs. time on the hi-res screen. (Thirty-one-band real time-analysis display yields greater resolution and more dynamic range options than previously available. $744; upgrade, $199. ☐ To demonstrate the capabilities of their spectrum analyzers' display resolution and quality, the company has written a free hardware simulator and demo program featuring the spectrum analysis of a simulated audio signal. Interested Apple users are invited to send in a blank 5¼-inch disk.

☐ **Realty Software** (1116 'E' 8th Street, Manhattan Beach, CA 90266; 213-372-9419) has released an enhanced version of the disk-based *Depreciation Analysis,* including the new Accelerated Recovery System to handle three, five, ten, and fifteen year ACRS property types and compare the ACRS deductions to alternative straight line depreciation. Printed output shows each year's deduction for both methods, with accumulated totals from previous years. $75.

☐ Now available from **BWJ Technology** (Box 6214, Arlington, TX 76011; 817-277-2726), *Quietline 6* is a power line conditioner for electronic applications, protecting computers and peripherals from power line interference and surges causing memory loss, reboots, and crashes. Plugs into wall socket, converting to six protected outlets. $39.95.

☐ *Morwe/Graphics* from **Henderson Associates** (980 Henderson Avenue, Sunnyvale, CA 94086; 408-246-8939) gives the Apple Pascal programmer expanded control over the Pascal system character set, providing all twenty-one DOS Tool Kit character sets in Basic and Pascal, plus set editor and a utility to transfer new fonts to the Pascal environment. Speed tips enable development of animation graphics fast enough for real time gaming. Two disk drives, game paddles. $49.95; manual only, $6.95.



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☐ **Davong Systems** (1061 Terra Bella Avenue, Mountain View, CA 94043; 415-965-7130) has announced availability of low-cost 16K RAM expansion cards. Featuring extended burn-in; available through participating retail computer stores. $99.

☐ *XPLO*, a language system from **Computer Sight** (2490 Channing Way, #503, Berkeley, CA 94704; 415-540-6345), is being offered as an alternative to UCSD Pascal; does not require language card or second disk drive. Features chaining, overlays, and library capability; flexible, loose variable-typing. Runs under Apex operating system. $185.

☐ *Modula II*, a modular programming language created as an alternative to Pascal, "C," and Ada in the construction of large programs, is now commercially available from **Volition Systems** (Box 1236, Del Mar, CA 92014; 714-457-3865). Consists of a p-code interpreter, one-pass compiler, library management utility, and standard module library—featuring I/O, strings, storage allocation, program loader, process scheduler, and mathematical functions—providing access to the Apple Pascal file system and the intricacies of UCSD Pascal. Separate compilation with up to fifty modules per program, processes, dynamic array parameters, and low-level machine access. Includes documentation for all components and copy of the ETH-Zurich Modula-2 report; updates and user support via electronic mail. $550.

☐ The second edition of the *Real Estate Analyzer* from **Howard Software Services** (8008 Girard Avenue, Suite 310, La Jolla, CA 92037; 714-454-0121) includes automatic computation of depreciation schedules including ACRS, delayed loan start dates and balloon payments, delayed lease start dates, and financial management rate of return. Profit measures include return on investment, internal rate of return, return and internal rate on equity, total internal rate, and financial management rate of return. Projections based on entries for five different inflation rates. $195.

☐ The *LPS II* light pen system from **Gibson Laboratories** (406 Orange Blossom, Irvine, CA 92714; 714-555-8553) is a true raster-scan light pen featuring *Pentrak* driver allowing simultaneous use of multiple user-defined character sets, *Penpainter* software system with area fill/refill, four hi-res drawing systems, and hi-res text generator. $349.

☐ *Applesound*, a plug-in extension speaker with volume control, is available from **B&B Micro Products** (14711 Lull Street, Van Nuys, CA 91405; 213-881-9175). $26.95.

☐ *The Portrait Subsystem* from **Computer Station** (11610 Page Service Drive, St. Louis, MO 63141; 314-432-7019) creates 9½ by 8 inch computer portraits that may be heat-transferred to T-shirts, posters, and other novelty items. Includes *Dithertizer II* with video camera, *Station Master* printer interface card, cable, software, and ribbons. Two monitors recommended for viewing regular video and digitized image; game paddles used for contrast effects. Centronics or Epson graphic printer required. $1,175.

☐ *Speaking Pascal*, by Kenneth A. Bowen, is an introduction to Pascal programming requiring no technical background or previous experience. Covers elementary and complex data types, use of control structures, procedures, and functions, using structured programming techniques to develop programs. Appendix on UCSD Pascal. Published by **Hayden Book Company** (50 Essex Street, Rochelle Park, NJ 07662; 800-631-0856). Paper, $11.95. ☐ *I Speak Basic* is a computer literacy course designed to introduce students to Basic programming, requiring no previous experience on the part of the instructor. Student text features learning objectives for each unit, definitions of key terms and concepts, and classroom program exercises. Exam set consists of twelve quizzes on spirit duplicating masters. Student text, $7.45; teacher's manual, $16.20; exam set, $12.50; classroom set, $156.25.

☐ *System Saver* from **Kensington Microware** (300 East 54th Street, Suite 3L, New York, NY 10022; 212-490-7691) features line surge suppression with a cooling fan. Dual power outlets control Apple, rear outlets, printer, and monitor from front-mounted power switch. $89.95.

☐ Trust deed/mortgage accounting software for lenders and brokers who service trust deed collections and payments for investors, the *ABS Financier*, available from **Parke-Randall Management** (12218 Morrison Street, North Hollywood, CA 91607; 213-769-2795), interfaces with G/L, A/R, Payroll, A/P, and word processing programs. All machine language, B-Tree file handling. Requires C/PM card. $1,295.

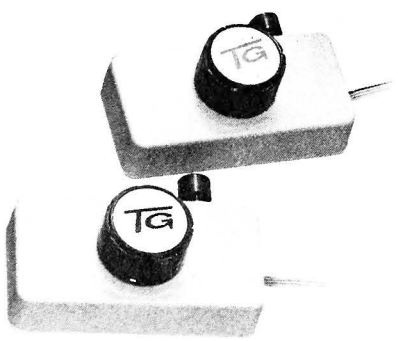
☐ *Personal PEARL*, a new form of application generator from **Relational Systems International** (5002 Commercial Street, SE, Salem, OR 97306; 503-363-8929), allows users with no computer experience to describe their requirements to the computer visually, in English, and generate applications accordingly. Integrates a database manager, forms generator, report generator, and program generator. User can generate a library of horizontal and personal applications without packaged programs or the aid of software technicians. $295.

☐ *Apple Flasher*, a software package for display of hi-res graphics, is now available from **Crow Ridge Associates** (Box 90, New Scotland, NY 12127; 518-482-2990). Rapid access to hi-res files; continuous scan, carousel projector simulation, or continuous display of all screens on one or two drives. $34.50.

☐ **High Technology Software** (Box 14665, 2201 N.E. 63rd Street, Oklahoma City, OK 73113; 405-478-2105) has introduced the *Lab Statistics Package*, introducing students to statistical procedures used in the analysis of raw data. Least squares demo demonstrates curve fitting; statistical calculations program calculates average data and least square fit. Applesoft in ROM. $50. ☐ *The Harmonic Motion Workshop* visually represents simple and damped harmonic motion in hi-res graphics, using the keyboard to alter phase, amplitude, and damping factors. Instantaneous velocity and acceleration vectors, kinetic and potential energy values, and corresponding object in circular motion displayed. $75. ☐ *The Budgeteer* is a financial package that provides actual-to-budget comparisons of expenditures in personal or small business use. Supports multiple accounts or departments; runs on Corvus or floppy disk. $150. ☐ *The Estimator* is a general purpose estimating prod-

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Doug Carlston, Broderbund Software and *Softalk* columnist, February 1982

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Cary W. Bradley, *Softside Review*, February 1982

*"***Hi-Res Secrets** *makes it possible for a programmer with a good idea to write a sophisticated game that will compete with anything on the market in terms of graphics, shapes, sounds, animation and color-fill. How can they sell this for only $125 and not charge a fee for those who might use the routines commercially???!!!"*

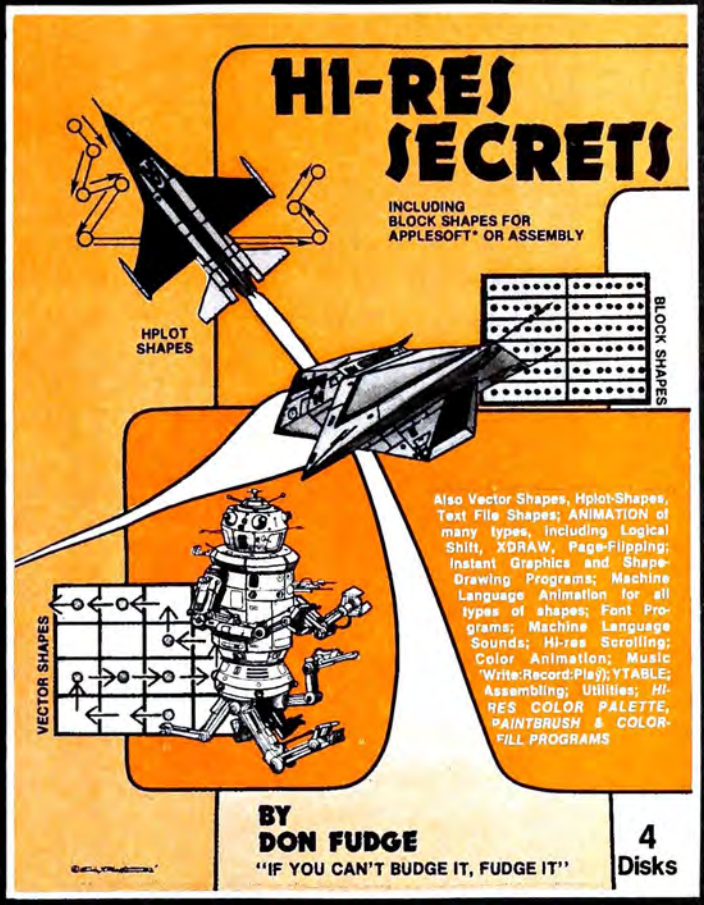
Stanley Crane, author of DB MASTER**, February 1982

"The starring attraction of Hi-Res Secrets is it's manual . . . professionally produced and very well written . . . designed to teach you everything you always wanted to know about graphics . . . a pleasure to read.

There is a great deal of knowledge to be gained from **Hi-Res Secrets.** *If you've finished with your Applesoft manual and feel that you really haven't learned about graphics yet . . . go to the section which interests you, read it and come away smarter . . .*

You can list the programs on the disks . . . an extremely valuable learning tool . . . you have access to a working program that really DOES do animation or music or color-fill and it's there for you to look at . . . this product has no competition on the market . . . "

Peelings II, March 1982



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The following packages have routines from **Hi-Res Secrets** as a basis for their graphics and are available from Avant-Garde Creations:

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- "Perhaps the most unique feature of UltraPlot is its ability to make map charts . . . The use of Pie Charts is made quite easy with UltraPlot . . .A very usable index is provided . . .UltraPlot is comparable to Apple Plot in ease of use. The addition of map charts, stacked bar charts, hi-lo graphs and Pie charts to UltraPlot place it above Apple Plot . . "
  Peelings II, February 1982

RACE FOR MIDNIGHT by Steven Sacks (adventure) $29.95

- "It was close to midnight, the hair on my arms was growing, an essential ingredient of the potion was missing, and I was stuck in a room with an ogre. . . If you enjoy good Hi-Res graphics, unusual sound effects, or exciting adventures, I would suggest **Race for Midnight**."
  Ulf Lundmark, *Softside*, December 1981
- "Generally the colors fill faster, than on any other adventure . . . the key to this phenomenon is revealed for all in Avant-Garde's comprehensive package, **Hi-Res Secrets**."
  Softalk, December 1981

HI-RES COMPUTER GOLF by Stuart Aronoff (computer sports) $29.95

- "Hi-Res Computer Golf is a masterpiece game of judgement, strategy, visual keenness, and skill . . . Besides the excellence of the graphics within the context of the game requirements . . .besides the remarkable integration of outside elements with player input, and in spite of the difficulty of the game, the authors seem to have thought of every possible detail to make playing the game simple and pleasing to the gamester." *Softalk*, February 1982
- SOFTALK BESTSELLER LIST – Strategy 5, February and March 1982

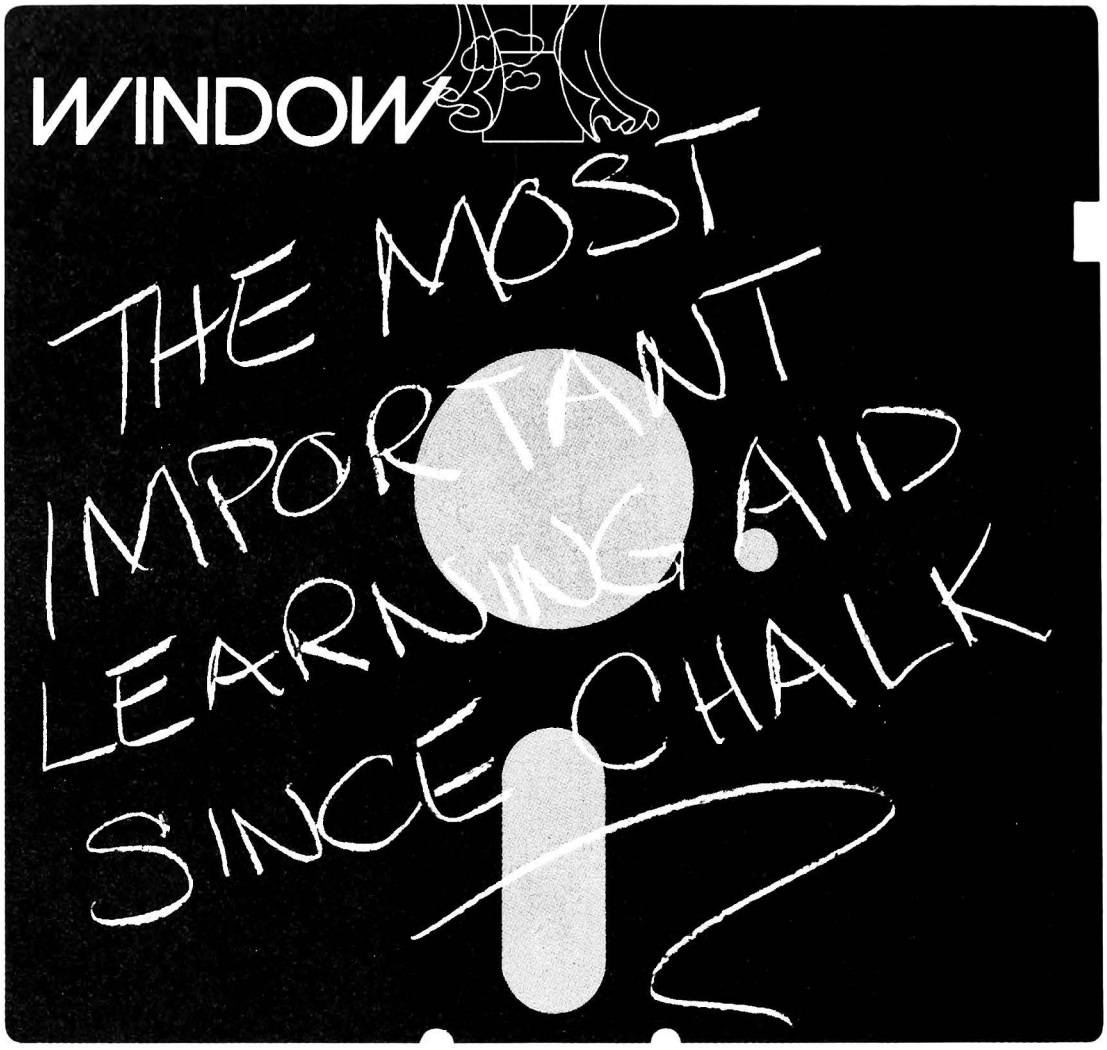
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uct for repetitive unit cost estimating. Each estimate may consist of up to 400 cost items derived from up to 400 resource categories, definable by the user and stored on disk for repetitive use. $395. ☐ *Electronic Secretary* is an integrated set of programs consisting of a word processor, electronic phone book, time manager, and database management system. $395.

☐ **Legend Industries** (2220 Scott Lake Road, Pontiac, Michigan 48054; 313-674-0953) announces *VC-Plus,* providing *VisiCalc* with up to 145K of free memory in conjunction with the company's expansion cards. Available on the 128KDE card demo disk and with the 64KDE system. Alone, $34.95.

☐ *Advi$or*, a portfolio management system with access to all options, stocks, and bonds, with detailed information on each, is available from **Kate's Komputers** (Box 1675, Sausalito, CA 94965; 415-332-9434). Tracks stock performance automatically with phone hookup. $450.

☐ **Success Analysis Corporation** (743 Holly Oak Drive, Palo Alto, CA 94303; 415-494-2613) has introduced *Epset,* enabling Epson-MX80 users to set characters-per-inch, column width, line spacing, and do printer test runs under keyboard control without programming. Tests accuracy in printing ASCII character set and provides menu for instant selection and configuration of the Epson for combinations of single, double, or emphasized strike, characters-per-inch, and line spacing; 32K. Requires CP/M card. $39.95.

☐ *Adventure (Colossal Cave),* originally developed in Fortran, has been translated for the Apple II by **Frontier Computing** (Dept. 0000, 666 North Main, Logan, UT 84321; 801-753-6530). Features over 130 rooms, 15 treasures, and 40 other objects. $10 postpaid.

☐ *TPS Canadian Payroll System* is the first microcomputer software release from **Time Proven Systems** (1210 Sheppard Avenue East, Suite 101, Willowdale, Ontario M2K 1E3; 416-491-6629), a minicomputer business software firm. Can accommodate up to one hundred employees per department, branch, or location with a two-drive system; up to thiry with a single drive, all payroll periods, salaried and hourly, overtime and doubletime. User-defined earnings and deductions; transaction input programs allow for processing of hours, special earnings and deductions, and manually prepared checks and adjustments, calculation of payroll burdens on line-by-line basis, and more. May be reconfigured for DOS 3.2. Introductory price, $450; $550 after July 1.

☐ **Metamorphic Systems** (Box 1541, Boulder, CO 80306; 303-499-6502) has released *MetaCard,* a 16-bit secondary processor card with 64K of dynamic RAM with parity checking. Upgradable to 128K using expansion sockets; up to 384K with external bus connector. Includes C/PM-86; features a real time clock, full-speed multiprocessing, interrupts in both directions between 8088 and 6502, and 2K of on-board EPROM containing initialization and power-up diagnostics. $980.

☐ *Supertext 40/80 Column* is the latest word processing software update from **Muse** (347 North Charles Street, Baltimore, MD 21201; 301-659-7212). Includes option to display eighty-column screen with the use of a Videx board, multifile search-and-replace function, one-key definition of phrases up to thirty characters, and ability to count occurrences of specific words and phrases. Enhanced math mode, split screen, and advanced block operations. $175.

☐ *Apple Logo*, a new implementation of the fundamental language for learning computer programming, is now available through authorized dealers of **Apple Computer** (20525 Mariani Avenue, Cupertino, CA 95014; 408-973-3019). Interactive, discovery-oriented approach used to attract students' attention; makes word-oriented programs as easy to write as numeric ones. Divides programming projects into manageable portions, simplifies debugging, and allows programmer to accumulate libraries of procedures. Extendable, with recursion, list processing, and error and file handling. Disk and backup, language reference manual, and introduction to the Turtle Graphics system. $175.

☐ *The Ramdisk 320K Memory System* from **Axlon** (170 North Wolfe Road, Sunnyvale, CA 94086; 408-730-0216) offers a 5000 percent increase in disk access speed, functioning like two 35K floppy disk drives, reserving 32K of RAM for advanced programming techniques. Features a slot-independent interface board, memory refresh with power off, and rechargeable battery system for three hours of power backup. Software for diagnostics, fast load and copy routines, and business applications. All firmware contained in static RAM on interface board. $1,395.

☐ **Money Disk** (Box 1531, Richland, WA 99352; 509-943-0198) has introduced three business accounting programs. *Accounts Receivable* can handle up to 400 charge customers and allows up to 2,500 entries per month for all customers. In addition to the usual elements of A/R systems, the program also enables the user to enter sales information and print sales invoices and packing slips. Prints four collection form letters, and address labels which the user has the option of breaking into four categories. Account aging up to 90+ days past due, discounts, flagging of closed accounts, printing of promotional headers, and other features are part of the program. $225. ☐ The A/R program is interactive with the general ledger system, called *No-Nonsense Books.* Designed for businesspeople with a high school level bookkeeping education who want to give professional skill to their accounting. Learning time is about two hours. Monthly entries are limited only by diskette capacity. The system keeps complete records of every check written and all journal entries. There are fifty pre-named accounts, and the two checking accounts can be reconciled on the screen. There are over ten different reports which can be printed at any time. A 64-page manual accompanies the system. Requires two disk drives and a 132-column printer. $225. ☐ The *Depreciation* group of programs will handle up to 800 capital assets. The purchase cost can be up to $1 million, and the time factor anywhere from one to ninety-nine years. There are programs for investment tax credit, depreciation schedule and recovered cost list, disposed property list, and equipment inven-

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tory. Provision for a password for security. Fifty-page instruction manual. $225.

☐ Two new products from **Output, Inc.** (P.O. Box 519, Plymouth, MI 48170; 313-397-1633) will enhance your Apple's game-playing ability by enabling you to change game accessories without disassembling your computer. The *Portapple* consists of an 18-inch extension cable and conventional I.C. sockets. $9.95. ☐ The *Outport* is similar, but comes with zero insertion force sockets. $19.95. ☐ The *Port Authority* is a digital joystick interface and port extension that enables you to adapt Atari-type joysticks to the Apple II. It includes a port extension with zero insertion force sockets, and two Atari joysticks that are compatible with all one and two player Sirius *Joyport* games. $34.95.

☐ **Ferox Microsystems** (1701 North Ft. Meyer Drive, Suite 611, Arlington, VA 22209; 703-841-0800) has announced *LogOn,* by Thomas "Dr. Wo" Woteki, a personal computer communications package that converts the Apple into an auto-dial, auto-answer intelligent terminal for intercomputer communications. Text or binary files, electronic mail, program files, or graphic images can be exchanged at 30 to 120 characters per second, depending on equipment. User can construct permanent directory of frequently called numbers and computer configurations, select upper or lower case characters and number of CRT display columns (one to eighty). Supports most acoustic couplers and modems. $150.

☐ *The Basic Handbook,* by Dr. David A. Lien, is an encyclopedia of 500 words covering the dialects used by Basic-speaking computers. Step-by-step guide to translating programs from one computer to another. Second edition, revised, from **Compusoft Publishing** (1050-E Pioneer Way, El Cajon, CA 92020; 800-854-6505). Paper, $19.95.

☐ The *Apple Crate* is a case for computer and two disk drives from **AbCom** (Box 5203, Mission Hills, CA 91345; 213-891-3669). Adapter for hotel/motel television cable; accessory pocket, 3/8-inch closed-cell foam. $95.

☐ **Westware** (2455 S.W. 4th Avenue, Ontario, OR 97914; 503-881-1477) has introduced *Systems II Ex,* an integrated business accounts package including payables, receivables, general ledger, inventory, payroll, and database. Optional job costing and cycle billing modules, all available as stand-alone or configured in various customized combinations. KSAM card permits high-speed searches on key field. $1,495.

☐ **The Source Telecomputing Corporation** (McLean, VA) announces *The Electronic Book Center,* a new subscriber service by which book orders are filled through the Professional Book Center of Portland, Oregon, an organization in computer contact with most major publishing houses and which maintains an inventory of six hundred thousand books in print. Orders filled on a priority basis. Payment through subscriber's credit card and $1.95 p&h. ☐ In addition, **The Source** has introduced a series of "plus" services in answer to subscriber requests: *Legi-Slate,* tracking the course of House and Senate legislation; *Compustar,* an advanced electronic discount shopping service; *Management Contents, Ltd.,* concise abstracts from the twenty-seven leading business publications; *Commodity News Service,* periodic updates on the commodities market; and *Media General,* detailed background information on over 3,100 stocks, updated weekly. Available at higher hourly rates than those for regular **Source** services: $30 for weekday use, $15 evenings and weekends, $10 after midnight. ☐ From **Symtec** (Detroit, MI) comes the *Slimline Light Pen,* providing hi-res in more than 55,000 screen locations. For graphic design and manipulation, interactive video applications, and screen digitization. $249.95. ☐ A new computer interface, the *Videodisc Controller Card,* provides control of video disk players and video tape players. $500. ☐ Also from **Symtec,** and already in use at over forty television stations, is the new *Professional Graphics System,* offering sixteen colors at 256x241 point resolution, and over four thousand colors in a higher res version. Has independent power supply, 32K of dynamic RAM and full NTSC settings for color burst, sync, and timing. With the new screen printer from **Image Data Systems,** the PGS creates high-quality color photos and slides of computer graphics, and image overlays from tape, camera, and video disk or broadcast sources. $3,500.

☐ **Computer Works** (P.O. Box 1111, Harrisonburg, VA) announces the development of a program to teach Apple assembler. *Assembler Teacher* uses on-line lessons, searches and maps the Apple's memory, shows CPU in slow motion, explores hexadecimal, twos-complement, character, and other data representations, instantly translating from any version to all others. Includes RAM mini-assembler. $44.95.

☐ *Airsim-1,* a flight simulator for the Apple II, has been released by **Mind Systems** (P.O. Box 506, Northampton, MA). Includes 3-D scenery of New England coast, six airfields, radar, artificial horizon, and ball-bank indicator; ability to do loops, rolls, and Immelmann turns. $40.

☐ The **GameMaster** driver (Box 1483, Evanston, IL 60204; 312-328-9009) now lets you see the *GameMaster* dungeon and your characters in hi-res graphics and create and print a small map. Transmits faster than three hundred baud. $40. The *House Driver,* featuring the five major rooms, will be available soon. $40.

☐ The North Pulaski Branch of the **Chicago Public Library** (4041 West North Avenue, Chicago, IL 60639; 312-235-2727) has announced an ABBS featuring bulletins on operation and hours of the personal computer center, local library events, potential short courses on microcomputer operation, and more.

☐ *The General Manager* is a database system from **On-Line** (36575 Mudge Ranch Road, Coarsegold, CA 93614; 209-683-6858) that allows the user to design and fill in screens and make comparisons or build totals between data on separate screens. Generates standard text files of the database or selected fields; can be written to in Applesoft and modified without rebuilding the database. $99.95.

☐ **Correction:** The Marketalk News item on page 80 of the March 1982 issue concerning *Mastertype,* the typing instruction game by Bruce Zweig, was in error. It is manufactured by **Lightning Software** (Box 11725, Palo Alto, CA 94306; 415-856-1855) and retails for $39.95. ■

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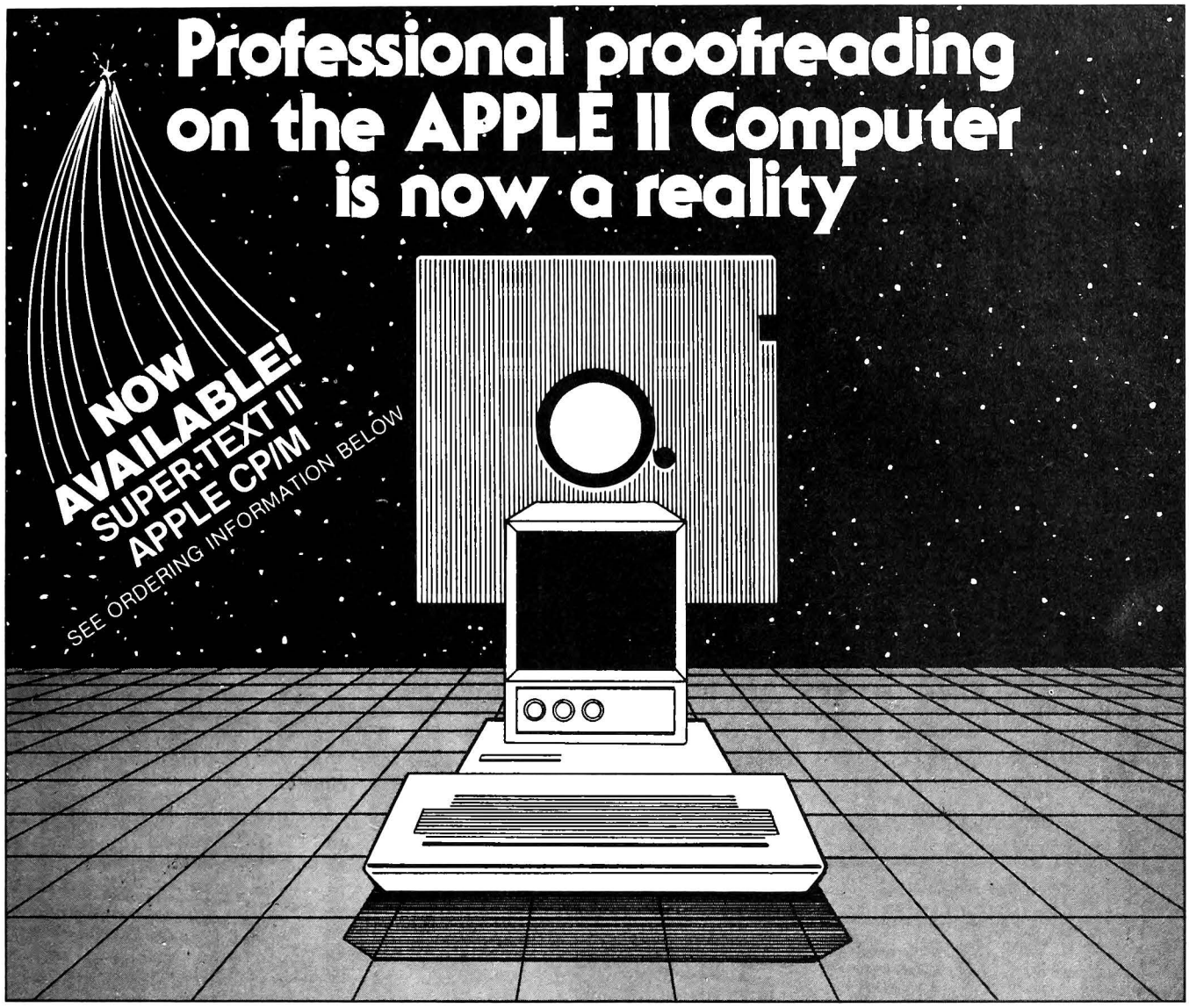
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THE BASIC Solution

By Wm. V. R. Smith

Primitive computers evolved to fill the need for manipulating numbers in a faster, more accurate way. It could almost be said that numbers constitute the blood of a computer system.

Bearing this simple fact in mind, it's no wonder that the calculator and numeric control routines published in recent articles have aroused special interest among Basic Solution readers. Many readers have sent in revisions to the Video Tape Calculator published a few issues back and, more recently, to the Input Calculator published in the February issue.

James Smith of Laguna Niguel, California, found a few shortcomings in the Input Calculator. He managed to alleviate them by means of a slightly expanded version of the program.

The first problem Smith found was that the program did not recognize parentheses used within an arithmetic expression to change the order of precedence of calculation. The second difficulty Smith experienced was that the program did not recognize the character (~), used in numeric expressions involving exponentiation. In his revision, Smith also included the ability to use a quotation mark as the first character in the input entry (as can be done with *VisiCalc*). This allows the routine always to return the input as a string, regardless of its content.

You'll find Smith's version of this program valuable in the future; the routine will be used with a number of other routines to create a useful Basic program—soon!

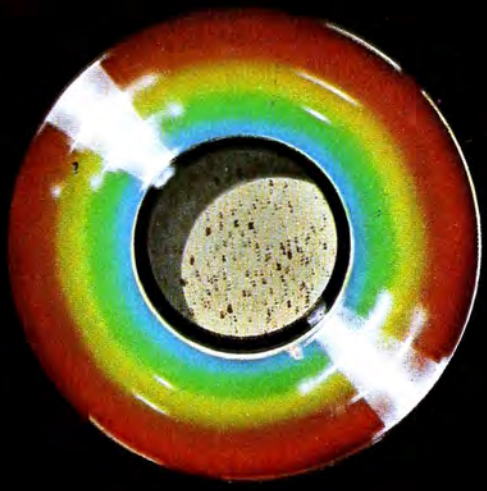
As with any reader who submits a program chosen for the Basic Solution, Smith will receive a $10 credit toward his next purchase at his local computer store.

Send your suggestions and comments to Basic Solution, Softalk, 11021 Magnolia Boulevard, North Hollywood, CA 91601.

```
10  REM *          MODIFICATION          *
11  REM *               OF               *
12  REM *                                *
13  REM *     "INPUT CALCULATOR"         *
14  REM *    COPYRIGHTED (C) 1982        *
15  REM *               BY               *
16  REM *      WILLIAM V R SMITH         *
17  REM *                                *
18  REM *                                *
20  TEXT : HOME : VTAB 2: PRINT "PLEASE ENTER ANY OF THE
    FOLLOWING:"
22  PRINT : PRINT : PRINT TAB( 2);"A LABEL, A VALUE OR A MATH
    EXPRESSION "
24  PRINT : INPUT B$
30  GOSUB 100
40  HTAB 1: VTAB 10: PRINT B$
50  END
75  IF C = 34 or C > 64 THEN MS$ = " LABEL ": GOTO 82
80 MS$ = " VALUE "
82  VTAB 20: HTAB 12: INVERSE : PRINT MS$: NORMAL : VTAB 8:
    HTAB 1 : IF C < > 34 THEN PRINT BB$;:B$ = BB$
84  RETURN
100  REM * ************************
101  REM *       VARIABLE PARSER    *
102  REM * ************************
103 L = LEN (B$):F = 2:A1 = 0:A2 = 0:P = 1:H$ = "":BA$ = "":
    AA$ = "":A$ = "":PP = 1:C2 = 0
105  IF L = 0 THEN RETURN
110  IF ASC ( LEFT$ (B$,1)) = 34 THEN RETURN
112 C$ = B$: GOSUB 400:B$ = A$: RETURN
114 A1 = 0:P = 1
116  GOSUB 500:P = P + 1
118  IF C = 94 THEN GOSUB 200:F = C - 87: GOTO 116
130  IF C > 64 THEN RETURN
132  IF C = 40 THEN GOTO 400
135  IF C = 46 THEN 170
140  IF C > 41 AND C < 48 THEN GOSUB 200:F = C - 41: GOTO
     116
160  IF C < 48 OR C > 57 THEN 200
170 H$ = H$ + CHR$ (C): IF P > LEN (A$) THEN GOSUB 200: GOTO
     600
180  GOTO 116
200 A2 = VAL (H$):H$ = "": GOSUB 300: RETURN
300  REM * ************************
301  REM *                          *
302  REM *  PERFORM MATH FUNCTION   *
303  REM *                          *
304  REM * ************************
305 F1 = F:F = 2
310  ON F1 GOSUB 330,340,320,350,320,370,380
320  RETURN
330 A1 = A1 * A2: RETURN
340 A1 = A1 + A2: RETURN
350 A1 = A1 - A2: RETURN
370 A1 = A1 / A2: RETURN
380 A1 = A1 ^ A2: RETURN
399  END
400 A$ = C$
401  IF PP < = LEN (C$) THEN GOSUB 500: IF C < > 41 THEN AA$
     = AA$ + CHR$ (C):P = P + 1:PP = PP + 1: GOTO 401
402  IF C = 41 THEN GOSUB 408:P = PP: GOTO 400
404  GOSUB 114: RETURN
408 A$ = AA$:P = LEN (A$) + 1
410 P = P - 1: GOSUB 500: IF C < > 40 THEN BA$ = CHR$ (C) +
    BA$: GOTO 410
411 AA$ = "": IF PP > LEN (BA$) + 2 THEN AA$ = LEFT$ (A$,( LEN
    (A$) - ( LEN (BA$) + 1)))
412 A$ = BA$: GOSUB 114:AA$ = AA$ + A$: IF PP < LEN (C$)
    THEN AA$ = AA$ + RIGHT$ ((C$), LEN (C$) - (PP))
414 C$ = AA$:PP = 1:P = 1:AA$ = "":BA$ = "": RETURN
500 C = ASC ( MID$ (A$,P,1)): RETURN
502  RETURN
600 A$ = STR$ (A1)
610  RETURN
```

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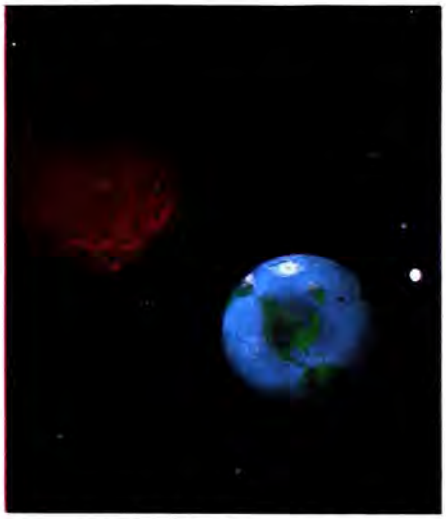
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MARKETALK

Reviews

Microwave. By Jim Nitchals. For too many of us, part of growing up is learning what to stop liking. It isn't sophisticated to like milk, balloons, cheeseburgers, making snowmen, and cartoons. But in reality, it doesn't always work that way. We still like milk and cheeseburgers and the bright colors and silly critters of cartoons; it's just that we won't admit it anymore.

Jim Nitchals remembers those early pleasures, and he's willing to admit he enjoys them still. He's so willing, in fact, that he lowers our guard and takes us along for the fun, all through computer games.

First there was *Bug Attack.* Nitchals coaxed the Apple to give us music while we played, at least a third of the time—music that went well with the brightly colored ants and plants.

Now Nitchals brings us *Microwave,* Cavalier Computer's latest home-arcade game, with the same brightly colored characters and even more sparkly music.

The idea in *Microwave* is to help a tiny teddy bear make his way through a multilevel maze, picking up all the safe objects he finds while he avoids the enemy and the bombs the enemy leaves lying around. You can use a joystick or keyboard to guide Teddy through the maze. The enemy consists of four funny looking, totally imaginative characters who chase you and try to cut you off; contact with any of them is fatal.

Avoidance is the best defense, but you have one weapon as well: your trusty microwave gun. This new-fangled weapon takes some getting used to, of course. You don't really shoot it; you drop the microwave behind you—its beam streaking off as far as it can in the direction from which you've come. Since the bad guys are often chasing you, that's good—you can sometimes get several with one blow.

Prominent in the music—an amalgam of several pieces—are old-time cartoon themes: chase music, getting caught music, laugh-a-lot music. The music is constant, which is quite an achievement on the Apple during a fast action game. Only when all four foes are active and you've just shot a microwave does the action slow down.

Microwave strategy may remind you of some other home-arcade games, but the subject, the details, and the graphics make it definitely its own game.

With its bright, cheerful colors, its silly, happy music, and its very playable, addict-pleasing gamability, *Microwave* looks like a total winner—especially for people who like cartoons. Come on, admit it; who doesn't? MCT

Microwave, by Jim Nitchals, Cavalier Computer (Box 2032, Del Mar, CA; 714-755-8143). $34.95

Night Mission Pinball. By Bruce Artwick. Only two programs appeared on *Softalk*'s bestseller list every month of its first twelve. One is no surprise; it's *VisiCalc.* The other was a continual surprise: *Flight Simulator*, by Bruce Artwick, published by SubLogic. Never far from the top for more than a year, *Flight Simulator* finally gave way to newer fare. But every couple of months it reappears—not so near the top, but anywhere on the top thirty is something to write home about.

Now Bruce Artwick offers another game and proves that, while he may not be prolific, he is definitely able. The game is *Night Mission Pinball* and the verdict is fantastic.

Not satisfied with an ordinary pinball simulation, Artwick has opened many of the options of the pinball creator to the player. You can choose any of ten modes designed by Artwick—or you can design your own mode, and save it. Actually, you can design and save as many as ninety modes of your own, plus ten modifications of SubLogic modes, and still have the original ten modes on disk at the same time.

Among the parameters you can set are ball speed, bounce of bumpers or flippers, duration of hold in trap, visibility of ball trails, tilt sensitivity and effect—and just about everything else. You can even have a detailed history of the ball's path up to the past five thousand or so x,y coordinates.

With so many homemade modes possible, it isn't surprising that you must save them on a separate disk. However, it's a minor irritation that the high score also must be maintained on a separate disk.

All this good stuff wasn't really necessary. *Night Mission Pinball* was quite enough just the way it was designed to begin with.

It has a theme: you are running a night bombing mission over several Pacific cities during World War II. The sound effects greatly augment the theme.

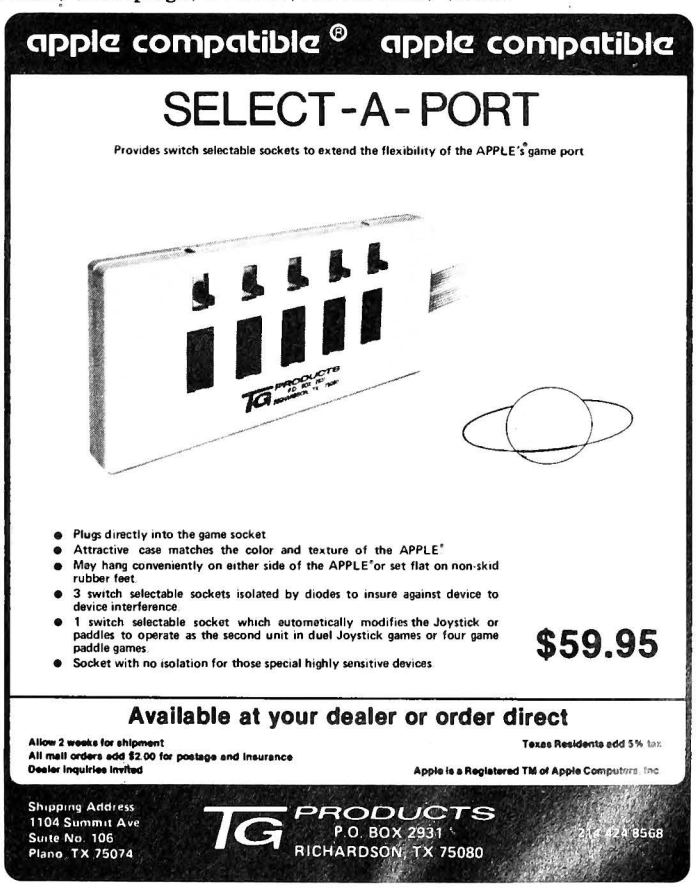
The color hi-res graphics in *Night Mission Pinball* are superb, as is the animation. The configuration of features—placement of bumpers, difficulty of dropping through side, distance between flippers, and so on—is realistic and competitive.

You even have to insert a quarter to play. Luckily, if you just push Q, your Apple will insert it for you. This seemingly unnecessary touch makes winning free games a lot more fun.

Don't miss the Cosmic Mode. It's just what you've always dreamed of since the day you first thought, "Gee, I wish they'd make a pinball machine where all the balls were slinkies."

Bruce Artwick has done it again. MCT

Night Mission Pinball, by Bruce Artwick, SubLogic (713 Edgebrook Drive, Champaign, IL 61820; 217-359-8482.) $29.95.



Apple Spice. *Apple Spice* is a tool to broaden the powers of Applesoft by means of the *&* and *usr* functions. Essentially five new features are added to the language: *print using*, a string search routine, *if-then-else* logic, and expanded input and output formatting.

Print using emulates the print-formatting capability of some larger Basics (like the Apple III's Business Basic). Using *using*, you can control the number of digits displayed, align decimal points, align dollar signs or let them float against the leftmost digit in a figure, print a trail of asterisks to the left of a figure or between a dollar sign and a figure—and a good deal more. The *Apple Spice* version of *print using* comes with a handy option: you can string together in one program statement a group of numbers separated by exclamation points, and the *print using* function will align them vertically according to your specifications.

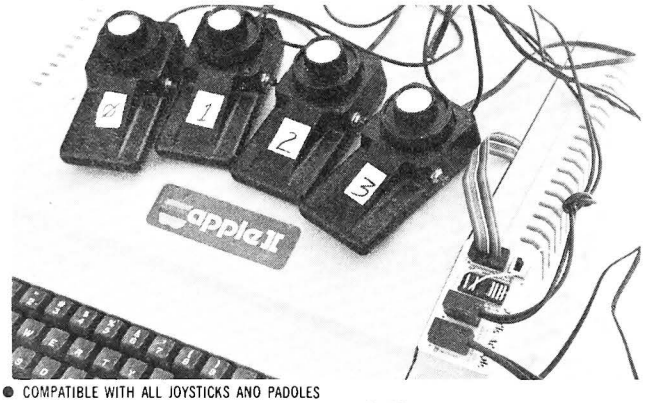
The string search routine gives you the ability to hunt for one string within another. This can be especially useful in a tutorial program or an adventure game where you, the programmer, may only care whether—and not where—a certain word appears in a user's response. To be sure, you could accomplish this string search with a *mid$* statement and a *for*-loop; *Spice*'s routine will do it faster and will also report the position within the target string where the search string is found. It will even allow you to define multiple search strings in the same program statement, much the way the *match* statement in *Pilot* does.

The *if-then-else* logic works just as it does in other Basics, except that when the *if* condition fails, the *else* is allowed to execute several program lines, not merely one.

The extended input package offers such niceties as display of commas and colons within *input* strings, use of the left-arrow key to cancel characters from display as well as from memory, and automatic word wrap. The one sacrifice you have to make in order to get these features is the use of a prompt string within an *input* statement. You'll have to *print* your prompts and reserve *input* for the user's response.

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Finally, the output package provides a number of screen-formatting amenities, including automatic word wrap and double—or other multiple—line spacing. It even gives you an automatic paging capability, by printing a message at the bottom of the screen telling the user to hit return when ready for the next page.

The *Apple Spice* documentation is thorough and clear, and the routines are easy to incorporate within your own programs. All in all, this is a powerful expansion of Applesoft. (S

Apple Spice, by Corey Koak and David Fox, Adventure International (Box 3435, Longwood, FL 32750; 305-862-6917). $29.95.

Congo. By Michael Berlyn with Harry Wilker. Former science fiction author Mike Berlyn has taken a break after producing the superb text adventure, *Cyborg*, to try his hand at the arcades. The result is an excellent beginning with a few twists you may find intriguing.

Congo is a colorful hi-res representation of a raft trip down the Congo river. Your ship was wrecked somewhere upstream; of all your shipmates, you're the only one who's been resourceful enough to build a raft from the debris. Now, as you float downstream, you find your shipmates stranded on islands and along the not-too-friendly shore hoping for a lift. Your task is to rescue them and take them to safe harbors.

Now for the problems. Unfriendly natives frequent the river in canoes; if they come upon you, they'll run you down. Islands and shoals seem to wait to tear apart your raft. White panthers stalk the shore nervously; and many safe harbors harbor unsafe crocodiles. Just as you master navigating the islands and avoiding the natives, more problems arise. Spouting hippos swim upstream in your path, more islands occur, natives paddle faster; eventually, blue water snakes, swift and deadly, begin appearing from behind you.

You control your raft with joystick or keyboard; the scenery moves one way as you move the other when you're going downstream—it works, it looks like you're really moving down the river. When you want to stop or move upstream, the drift keeps you going down but at a much slower rate.

The graphics are not the polished Nasir type, but they are funky and attractive. Occasionally you may be convinced you didn't hit an island that did you in, but you'll soon learn your limitations. Sound effects are few but effective; play at night in an otherwise silent room for best results.

A nice touch is the presentation of extra rafters (playing pieces). Action halts while you're treated to an Apple rendition of "Bongo, Bongo, Bongo, I Don't Want To Leave the Congo"; then your raft is taken to an island, picks up a stranded friend, and deposits him in the spot that tells you how many lives you have left.

Congo begins at a slower pace than shoot 'em ups, but it picks up; and it's lots of fun. Other test players have noted also that Congo is a truly nonviolent arcade game that works. You do not bother the creatures of *Congo;* you are, albeit accidentally, the intruder and your job is to ensure your safety and that of your friends by avoiding these creatures, not by killing them or even disturbing them. If the idea of shooting impossibly imaginary aliens bothers you or if you disapprove of Roadrunner cartoons, you may leap on *Congo* for these reasons. If not, just enjoy *Congo* as the good, unique home-arcade game it is. MCT

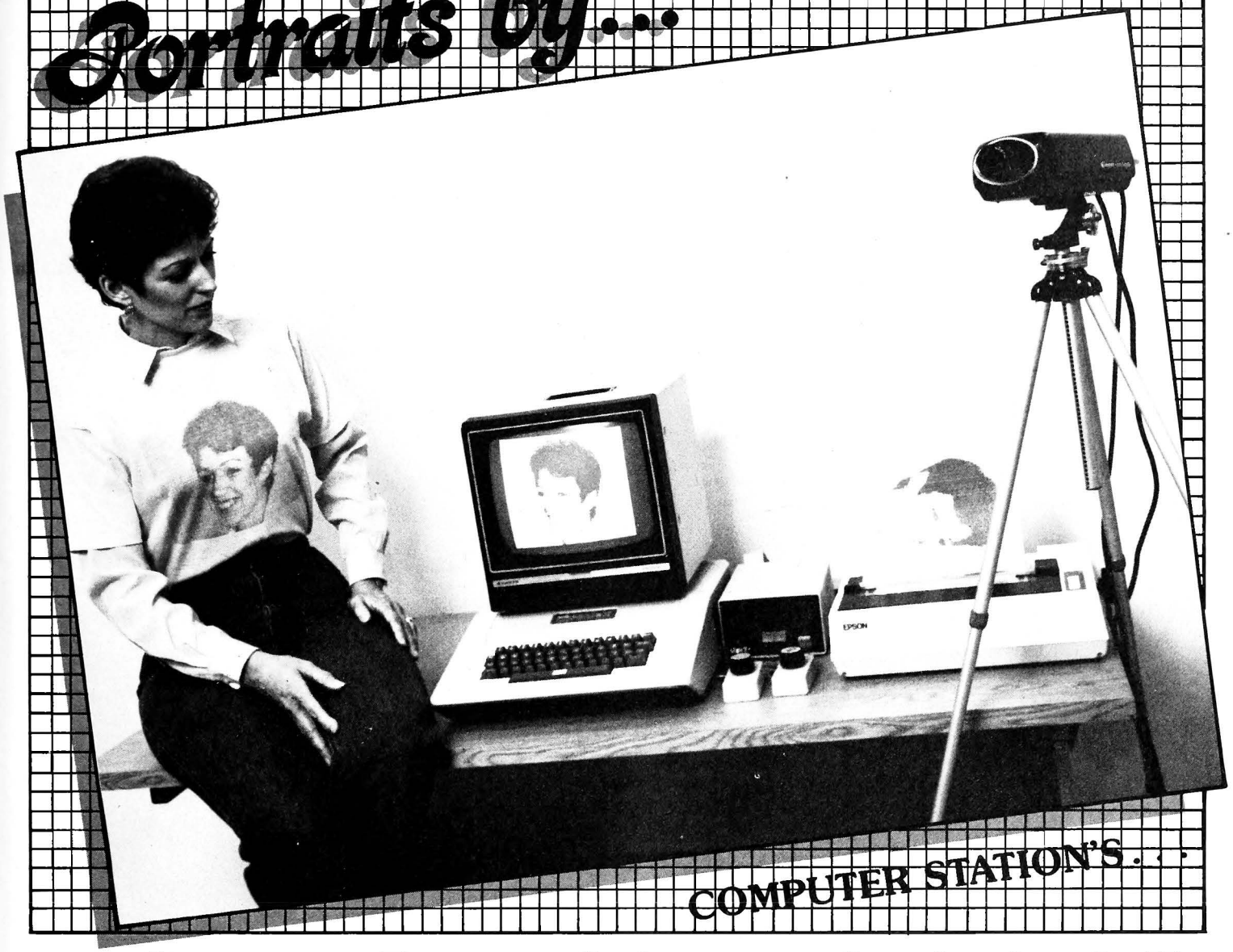
Congo, by Michael Berlyn with Harry Wilker, Sentient Software (Box 4929, Aspen, CO 81612; 303-925-9293). $34.95.

Minotaur. By Larry Miller. Sirius has been marketing a lot of games recently, including *Twerps, Borg, Snake Byte, Computer Foosball*, and *Kabul Spy. Minotaur* is by far the best of the bunch.

This arcade-style game from the author of *Hadron* and *Epoch* puts you in the role of Theseus, hero of Greek mythology, whose task is to search for the Minotaur in a maze and kill the unholy wretch. In *Minotaur*, a maze has four levels (each level is a maze unto itself) connected by stairways; some stairways go up and down, some just go one way.

When you're searching through the maze on foot the screen

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displays you and your immediate whereabouts, about one-twentieth of the level you're on. Trotting along at a brisk pace, you are liable to turn a corner and, without warning, come face to face with Momus, or some other nasty creature. The author thoughtfully gives you ninety-nine lives.

Armed with a laser sword, Theseus has to contend with many ferocious monsters before finding the Minotaur, who's always on level four of a maze. Room monsters like dragons, snakes, cyclops, centaurs, and cobras are confined to certain parts of the maze and don't reappear once you blast them.

On the other hand, hall creatures like furies, skeletons, and Charon are the personal henchmen of the Minotaur and can be found all over the maze. When you are killed by one of the opposition, you lose some of your ninety-nine lives; the number of lives you lose depends on the creature.

It's not all one-sided, though. In addition to your laser sword, you can acquire various things to help you in your search. Skulls and virgins garner you more lives, though you can never have more than ninety-nine lives at one time. Clubs help you to bash through walls and floors. Wings give you the power to fly above the level of the maze you are on and see things you can't see from the ground.

The elixir allows you to leave your body and wander through the maze at will as a spirit. You can go through walls and find out useful information, but look out for Charon, the one hall creature that can only kill you when you're in spirit form.

With all of these good things to help you and so many horrible enemies to smite, *Minotaur* is a game with a lot of punch. You can get pretty fancy in your tactics, like using the elixir and the wings at the same time.

There are five levels of speed and the highest makes for pretty fast action. Once you've killed the Minotaur you start a new maze. There are a total of thirty-two mazes, all with four levels.

Playable with joystick, keyboard, or paddles, *Minotaur* takes a while to play once you get the hang of it. DH

Minotaur, by Larry Miller, Sirius Software (10364 Rockingham Drive, Sacramento, CA 95827; 916-366-1195). $34.95.

Cashbook 2.0. Here's a personal or small-business single-entry accounting system with an Australian accent. Checks are cheques and dates are entered DDMMYY. You may override that default date format to make it match the common American practice of entering the month before the date, but you may well prefer to leave it alone. *Cashbook* is written in such a way as to require a minimum of keystrokes. Recording transactions that have occurred on separate days within the same month is simpler in the Australian manner than it is in the American.

Cashbook is a model of friendliness. The program offers single-key commands to increment or decrement transaction numbers. The rejection of illegal data is accompanied by a polite, informative error message. Should you forget what's expected of you at any point, the escape key will bring down a help message. The manual, while sparse, is lucid enough to bring the newcomer on board with a minimum of hassle.

Transactions are recorded in six fields, including a fifteen-character memo but, unfortunately, no tax flag. Up to five disbursement codes are allowed per transaction so that transactions can be split into separate accounting categories. The program verifies that the total of the disbursements equals the amount on the check or deposit. At the top of the transaction screen, *Cashbook* displays the current checkbook balance along with the totals of outstanding checks and deposits. Items not yet reconciled—through the program's reconcile module—are available for editing.

Transactions are stored on disk in one large file; the maximum number of entries in that file is about 600. To forestall disk overflow and to speed up search and sort operations, the program offers the option of deleting reconciled items. You'll probably want to back up files in toto for individual months or groups of months and delete reconciled material from your working disk. The number of disbursement categories permitted is sixty. The percentages of that allotment and of the available transaction space that you've consumed are revealed when you quit the program.

Additional features include a single-field search capability, the capacity to sort and rearrange data by transaction number, and various kinds of lists—including monthly or yearly summations by disbursement category. One feature that some users will miss is the ability to key in a budget and generate reports of actual expenditures versus projected amounts. CS

Cashbook 2.0. Zofarry Enterprises Pty. Ltd. (35 Northcote Street,, Haberfield, N.S.W., Australia; 02-7978832). $149. Australian (approximately $149. U.S.).

Tumble Bugs. By Bob Bishop. Bishop's back and bugs have brought him. *Tumble Bugs* is a home arcade game, and one of the silliest to come along in a long time. It's also addicting.

At first look, *Tumble Bugs* seems like another eating game, but it isn't. It does take place in a maze and the objects you're collecting (Tanna leaves, although it's irrelevant) look just like dots.

Twist one: You can see the whole maze as it randomly generates—different every time—but as soon as you begin playing, you're treated to a magnifying-glass view of a very small area with you in the center. You can see the rest of the maze behind you, except the crucial part just beyond your magnified view.

This wouldn't be important except that the maze is infested with creepy-crawlies who can't tell Tanna from you.

Twist two: The bugs are dumb and slow. Their paths have nothing to do with where you are; they're neither after you nor frightened by you. They're just relentless. You are much faster than they are, so if you see them in time, and if you're not trapped in a dead end, you can get away easily.

It wouldn't be a problem, if you only could just see a little more!

The bugs do, however, gloat when they get you.

Even the sounds are silly. But then, *Apple Panic* was one of

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Graphics and animation are excellent, as we'd expect from Bob Bishop; the only disappointment is that *Tumble Bugs* doesn't test this fine programmer's limits.

Hours of frustration await you in *Tumble Bugs*. Enjoy it.

MCT

Tumble Bugs, by Bob Bishop, Datasoft (19519 Business Center Drive, Northridge, CA 91324; 213-701-5161). $29.95.

The Graphics Magician. By Chris Jochumson, David Lubar and Mark Pelczarski. One of the most exciting aspects of owning a personal computer is the thrill you can get from creating something you don't have the skills to make without this flexible tool. If you're a sloppy typist, the first time you write a letter with a word processor, edit it, and watch your printer "type" it on your own letterhead far faster and neater than you could do, you're delighted.

If you love music but don't have the coordination to play two correct notes in a row, it's unbelievably exciting to enter your own composition with nine-part polyphony into a music editor and hear your Apple play it through the same stereo you use for Bach, Beethoven and the Beatles.

And if you can't even draw a straight line without a ruler, you'll give yourself a wide smile and a pat on the back the first time that you see a bird you've designed flap its way across your screen and, after it's disappeared, be replaced with a full color, hi-res adventure scene you've drawn yourself.

The comparisons with word editors and music editors are apt, for *The Graphics Magician* is a picture editor designed to make it easy for a programmer to include both multi-color hi-res graphic stills and small animated figures that repetitively move various parts in sequence as the entire figure moves across the screen.

Three separate packages are included: an animation package, an editor for drawing a full screen picture and independently placing one or more objects in that scene (like a desert with a snake that appears and disappears), and a program called *Super Shapes*, designed to extend Applesoft's shape tables.

Within the animation package are three editors. In the first one, seven drawing areas appear in the hi-res graphics window of the screen, with a menu in the text window below. Using the I, J, K and M keys, the user creates on the screen seven slightly different shapes, each of which will be one frame of the animation of the figure. After these are saved, a path editor lets the animator use the same cursor control keys plus four more for diagonal moves to set whatever path the user chooses his figure to take—right, left, up, down, loops, disappearing off the screen for a while and reappearing, and so on. The shape and its path are brought together in the third editor which then performs the actual display. Up to thirty-two different shapes, each with its own path, can be moving about on the screen at a time.

Too old for arcade games but you'd like to write your own high-res-type adventure game? *The Magician*'s second package provides a white "canvas" and a cursor that's manipulated with the game paddles. Button 1 holds a temporary cursor at a point while the working cursor is moved to another. Pushing button zero draws a straight line between them. After an area is completely enclosed by lines, a few key strokes, cursor placement, and pushes of button 0 fill the enclosed space with color.

A palette that is provided offers 108 different colors to choose from. A few of these are solid, but most are mixtures that, because of the Apple's treatment of hi-res colors, appear as plaids rather than as a solid color. With some care, you can turn this drawback into an advantage; a brick wall can be simulated without drawing all the lines, for example.

In a four-row text window at the bottom of the screen is a byte meter that shows how many bytes the picture will take up on the disk. Even a complicated picture doesn't take very many. Instead of storing each dot of the hi-res screen, the *Magician* stores instructions to redraw the picture when it's called from the disk. For example, a large red door the height of the screen required thirty-five bytes—four to start, three for each line no matter how long, five to select the color and fill the rectangle, six to place a black door knob, and eight more to touch up a few dots near the knob that had the wrong color.

As thrilling as it is to see your own seagull flap across your screen or your own multicolored castle, complete with bricks and mortar joints, the *Magician* isn't a toy. It's designed as a tool for programmers to help them design and store graphics files that will be called from their own Basic or machine language programs. As a result, the instruction manual, although clear, is very concise, requiring careful reading and some backtracking; there is no tutorial. Nevertheless, two to three hours should be enough for everyone but a beginner to master either the animation package or the picture/object editor. The actual use of these pictures in a program depends on a person's programming skills. Although competence in machine language isn't necessary, some familiarity with it and a willingness to manipulate program locations within the Apple's memory map are needed; it's not a package for pokephobes.

As a bonus that to some people may be worth the price of the entire disk, the authors have included a utility program that will transfer binary files from one disk to another. This utility—hooray—prints out the starting address and length of the binary file. Every Apple system master disk ought to come with this one.

(L

The Graphics Magician, by Chris Jochumson, David Lubar and Mark Pelczarski, Penguin Software (830 4th Avenue, Geneva, IL 60134; 312-232-1984). $59.95.

Juggler. A long time ago there was a home-arcade game imitating a real arcade game, both called *Clowns and Balloons*. The home reproduction was outstanding, but the game got lost among the mishmash of mediocrity put out by Programma, its publisher. The animation lacked the smoothness of today's but the hi-res graphics were top form for the time.

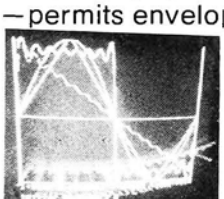
The game consisted of the player controlling a little clown

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INTRODUCTION

This edition the THE BOOK OF APPLE COMPUTER SOFTWARE 1982 combines previous editions (some re-written) and new articles, reviews and evaluations. Judging from the response accorded the first edition, which immediately sold out, there is a great need for a guide to the hundreds of programs that compete for the Apple owner's dollars. With the introduction of the Z80 card, choices get even harder concerning what to purchase: therefore, we dedicate this book to you, the consumer. We hope you will use it for a guide and as a reference to assist you in making intelligent and informed decisions when purchasing software.

Currently, the Apple Computer owner is presented with a bewildering selection of software from which to choose. On the one hand, this should please you in that, as the owner of probably the most popular micro-computer in the world, you have a wide and rapidly growing selection of software from which to choose. On the other hand, this wide and growing selection presents some problems. The vast majority of retail computer store staff people simply just do not have the time to adequately review each new piece of software that comes in their store. The problem is compounded if the new program is an extensive or complicated one, such as an accounting package or a word processing system, or a comprehensive data base management program. This does not mean that store personnel do not want to give you the best service possible; it's just that it is an almost impossible task. If you purchase software through the mail, the risks that you assume, without a reliable guide to assist you should be apparent.

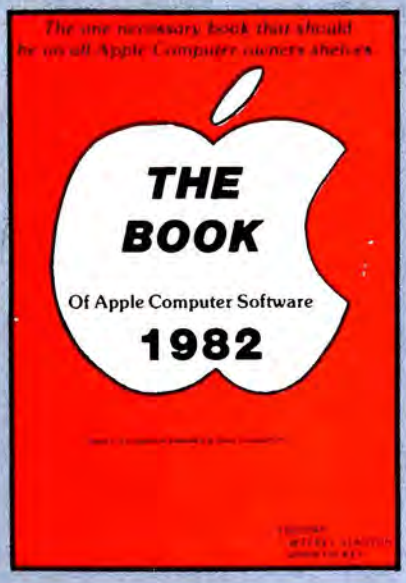
Other pitfalls await the uninformed buyer. For instance, in too many cases you cannot by the appearance of the package whether the program requires Integer Basic or Applesoft Basic or whether it needs 16, 32 or 48K of RAM. It is also often difficult to tell when you purchase a program on tape whether it can be transferred to disk or, if a disk program is purchased, whether it can be copied or not

Another area that can present problems to the buyer is the similarity of software. A well-stocked computer store may possibly offer five different word processing packages, four assemblers, ten different adventure type games and/or several mail list programs, (the choices seem endless); all of which have obvious advantages and disadvantages as well as different prices.

The goal of "The Book" is to eliminate as many of these potential problem areas for the software buyer as possible.

We welcome any comments or criticisms from readers that will help us in reaching this goal.

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Personal Finance Master is available at your local dealer or you may order directly from Spectrum Software. PFM is supplied on a standard DOS 3.3 diskette and includes an extensive 50 page bound instruction manual. PFM requires an Apple II with Applesoft in Rom or an Apple II Plus, 48K RAM, one disk drive (DOS 3.3) and an 80 column or larger printer (optional). If you would like additional information write for our free PFM Factsheet.

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on a mobile seesaw in the circus. Hanging from the rafters of the big top were two rows of balloons. On either side of the ring (screen) were platforms about half way up. When play began, a second little clown would prance out upon one of the platforms and gracefully leap off. The player had to see that the empty end of the seesaw was there to catch him; of course, his landing bounced the original clown into the air, where he would pop as many balloons as he could. Then you'd have to catch him too.

If you missed the little clown, he always landed directly on his head and shouted, "Nu!" You got five of them to start and two more as bonuses before the game, written in Integer, kicked out at 32,747 points. The music was terrific.

Juggler returns to that cotton candy ambiance, except that the equipment is more detailed and more modern and the animation is perfectly smooth. Instead of clowns, you have three circus jugglers. They toss various objects into the air as an aid to keeping the balls and cylinders that they're juggling aloft. If you like, you can toggle off the helping stream of objects and juggle directly with your jugglers' hands, but it's much harder.

Unlike the clowns in *Clowns and Balloons,* the jugglers are never wasted. They merely lose their turn if they miss, and one game has three turns.

It may be nonviolent, but they don't go "Nu!" It's no fun to see little clowns expire, but "Nu!" makes you laugh.

Oh, well, There is not a whole lot to *Juggler*, but what there is is beautifully done; and the challenge to score well is real. Those who enjoy using Pong-type skills are sure to like *Juggler* a lot. MCT

Juggler, IDSI (Box 1658, Las Cruces, NM 88004; 505-522-7373). $29.95.

Psort. By R. J. Long. *Psort* is a utility package for users of the Apple Pascal operating system. It is designed to permit alphabetic sorting and merging of files. *Psort* is provided on disk in three forms: as a compiled (to P-code) program for immediate, independent execution; as the source files for that compiled file for program modification by the user; and as source code for a Psort procedure to be included in user programs.

Files to be sorted can be either text files or files of fixed-length strings. Files of strings are sorted more quickly than text files but may consume more disk space.

The disk is not protected, so the software can be used in conjunction with a Corvus or other hard disk drive. This feature is very useful, since the sorting of large files requires intermediate files on disk that use a good deal of disk real estate.

Psort is designed to operate on files that are viewed as sequences of records, whether those files are simple text files or data files consisting of a sequence of records of some user-defined type. A record consists of one or more fields, each of which is reserved for a particular class of data. Any of these fields can be designated as keys—the fields that will be used to sort the records into order.

The *Psort* system allows you to use either fixed or variable length keys (up to 10 of them) to sort files. A set of parameters you create determines which fields of each record will serve as keys, and in what order the keys are evaluated. These parameters can either be entered by you at the time that *Psort* is executed, or can be stored in a text file that *Psort* accesses at execution time. This text file can be interactively created by you through the execution of the *Sortparm* program, which asks you a series of questions about the nature of the input, the sorting task, and the desired form of the output. The twenty-page manual clearly explains the options and shows you how to use *Psort* and *Sortparm.*

Unfortunately, a number of serious flaws are evident in the current version of *Psort.* In an initial test, *Psort.code* was executed to sort a short (16-block) test file, consisting of 193 records—lines of text—each with two sorting fields. The sort was completed correctly in two minutes and fifty-one seconds: not a speed record, but the package did the job. But when the sorting of a larger file was attempted, a bug was revealed. Large files are sorted into two or more temporary work files by *Psort.* When the initial sorting process is completed, the program is then supposed to merge the intermediate files into a single, larger output file, and to purge the intermediate files. Instead of merging the two temporary files, *Psort* appended one to the other; the output this produced was not a correct sort.

Local Apple dealers we contacted were unfamiliar with *Psort.* Although the hotline expert at Apple told us that early releases had a problem that had been fixed, and that Apple dealers could supply updated disks at no charge, *Psort* disks found at local stores had earlier copyright dates than the one being used for this review.

Examination of the *Psort* disk files revealed an interesting anomaly. The *Psort.code* file was dated 25-Feb-80, while the *Psort.text* file, one of the source code files supposedly included in the compilation of *Psort*, had the later date of 19-Jan-81. Apparently Special Delivery Software was made aware of the merge bug in *Psort*, got the source code correction, but neglected to recompile the program.

Since all the source code files for *Psort* are provided, it is possible to recompile the program. Sixty-eight blocks are required for the source files and twenty-five blocks for the resultant P-code compiled version, so a two (or more) drive Apple II is needed to recompile the program. The revised program appears to be syntactically and semantically correct.

It would be nice to be able to report that no further problems were encountered using the recompiled version of *Psort.* Unfortunately, the program seems to invoke a rarely encountered system bug. This bug seems to crop up once every year or so for developers of large applications programs in Apple Pascal and has something to do with the treatment of page boundaries in the P-code interpreter.

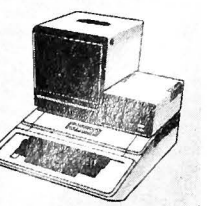
It is possible to defeat the system bug. Simply go back to the program and insert some new source code—say, a few debugging statements in *Psort3.text,* in order to make the code file page boundaries come at different points. With luck the recompiled program will now work correctly.



The Numeric Keypad For Your Apple II

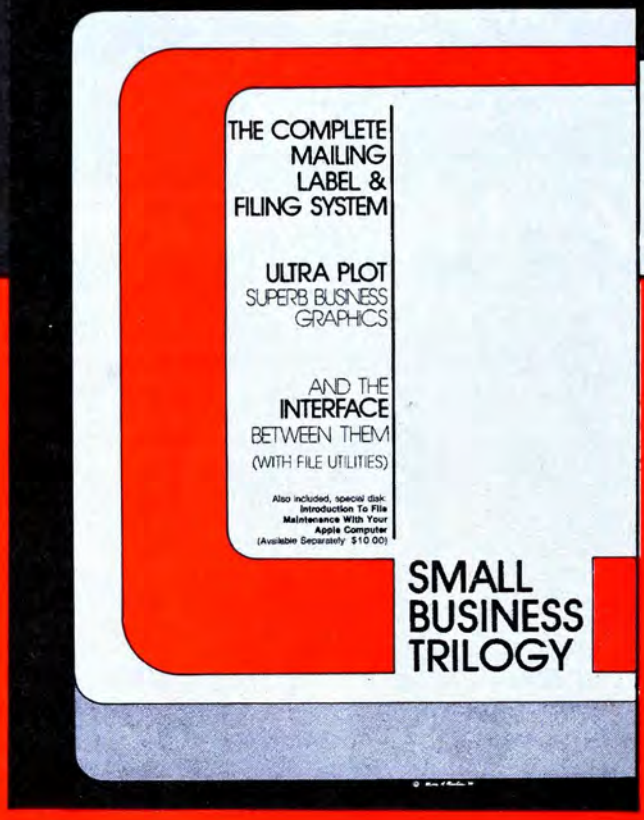
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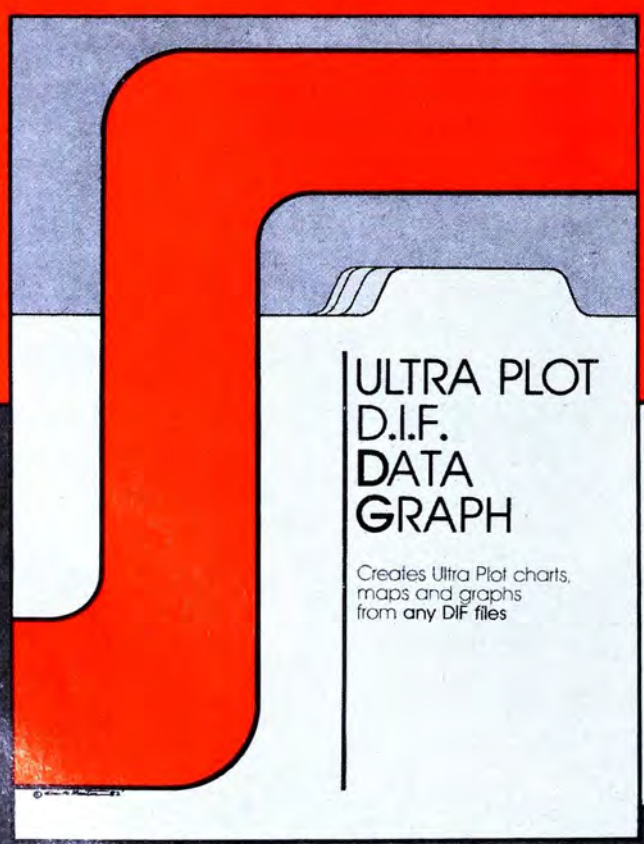
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Optional Concomitant selection criteria may be used in all of the above including (a) range sorts on up to 9 fields, (b) Full-field data-matching on up to 9 fields at once, with up to 9 values inputted for each field, (c) Partial-field data-matching on up to 9 fields at once, with up to 9 values inputted for each partial field

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Requires Apple II* with Applesoft* ROM, 48K, DOS 3.3

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Once the *Psort* program has been compiled in a working version by the user, it works adequately but slowly. Five text files of sixteen to twenty-two blocks were sorted individually, from two minutes, fifty-one seconds to nine minutes, fourteen seconds. The merge feature was then used to merge and combine the resulting sorts into a single file of ninety blocks. This was a slow process (more than twenty minutes), due in part, no doubt, to the newly inserted *write* statements that had mysteriously gotten rid of the page boundary bug.

The *Psort* package is likely to be of use to moderately sophisticated Pascal programmers who are willing to recompile the sources provided, and perhaps to make minor modifications. It is not a practical utility for users who don't have programming experience. AM

Psort, by R. J. Long, Special Delivery Software (10260 Bandley Drive, Cupertino, CA 95014; 800-538-8400; in California, 800-672-1424). $85.

Peeping Tom. By Michael Livesay. On a scale ranging from *Roach Hotel* to *Data Factory*, *Peeping Tom* is about a six. That's okay, for a game. By the way, Micro Lab, company of diversity, brought you the whole scale.

Peeping Tom is Micro Lab's second home-arcade game and by far its best. It's a shoot-'em-upward with a truly new twist: the foe is behind shuttered windows. The ship you control is below the windows but where it can shoot at them. So you must gauge where the enemies are by where their bombs are landing (often on you).

There is hope. As soon as you shoot an enemy, the portion of the window it was behind opens. In the first level, the window is divided in quarters; level two has a window divided vertically into seven or eight long skinny sections. Still higher levels? Who knows?

Each level consists of about eight waves of creatures, each different in looks and behavior. There's a freshly closed window for each flavor of adversary.

Peeping Tom is difficult and challenging, a good twist on an old theme. MCT

Peeping Tom, by Michael Livesay, Micro Lab (2310 Skokie Valley Road, Highland Park, IL 60035; 312-433-7550). $34.95.

Impressions

VC-Manager, by Lawrence Chapman, Micro Decision Systems (Box 1392, Pittsburgh, PA 15219; 412-276-2387). *VisiCalc* offers various ways of consolidating separate worksheets. You can overlay one model with another, or you can send data from one model to another by way of a DIF file. You can even manipulate a worksheet by means of a /PD file. But there isn't any simple way to add one model to another—or to perform any other arithmetic operation on two or more models at once. *VC-Manager* now fills that need.

This utility lets you specify as many as fifteen *VisiCalc* files and perform whatever manipulations you wish on them. You can add file one to file two and divide the sum by file three—or whatever. Individual rows, though not individual cells, may be exempted from the calculation. Files may be either /SS or DIF; if you're combining /SS files, you can specify the global format of the output file, if you wish.

Typical uses for *VC-Manager* might include the summation of data from separate months or years, or the calculation of differences between one period and another. The arithmetic manipulations can include constants as well as file data, so it's possible to divide the difference between one sheet and another by one hundred, as a way of arriving at percent variance.

If the spreadsheets to be combined are not identical in construction, *VC-Manager* will do its best to combine them anyway. If it finds a blank in a cell on one sheet and data in the corresponding cell of another, it will simply treat the blank as a zero and print a message reporting the possible mismatch. Divisions by zero it reports as zero, rather than *error*. Where it finds labels, it will copy the label from the first-named input file into the resulting output file. Where it finds a label in one model aligned with a value in another, it treats the value as a label and processes it accordingly. $65.

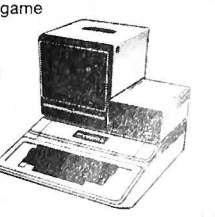
From Chips to Systems: An Introduction to Microprocessors. Book by Rodnay Zaks, Sybex (2344 Sixth Street, Berkeley, CA 94718; 415-848-8233). This may well be the most readable of Zaks's many contributions to the Sybex line. It's an introductory text on microprocessor chips and the chips that cooperate with microprocessors to build computing systems. The book starts out with basic technological concepts, explaining, among other things, the differences between cmos, nmos, pmos, and other technologies; it then proceeds to an explanation of the inner workings of a microprocessor and finally adds a great deal of informative material about the chips that enable a microprocessor to communicate with the outside world. In its detailed discussion of microprocessors, the book uses Intel's 8080 for a model; however, the concepts presented apply to all microprocessors, including the Apple's 6502. This is a compact text that covers a lot of ground, and the lay reader will have to work a little to absorb the material and keep up with Zaks. Fortunately, the writing is clear enough that it won't leave the novice in the dust at chapter one. The abundant illustrations are a big help. $14.95. ◨

Unless otherwise noted, all products can be assumed to run on the Apple II, Apple II Plus, and Apple III in the emulator mode and to require 48K and one disk drive. The requirement for ROM Applesoft can be met by RAM Applesoft in a language card.



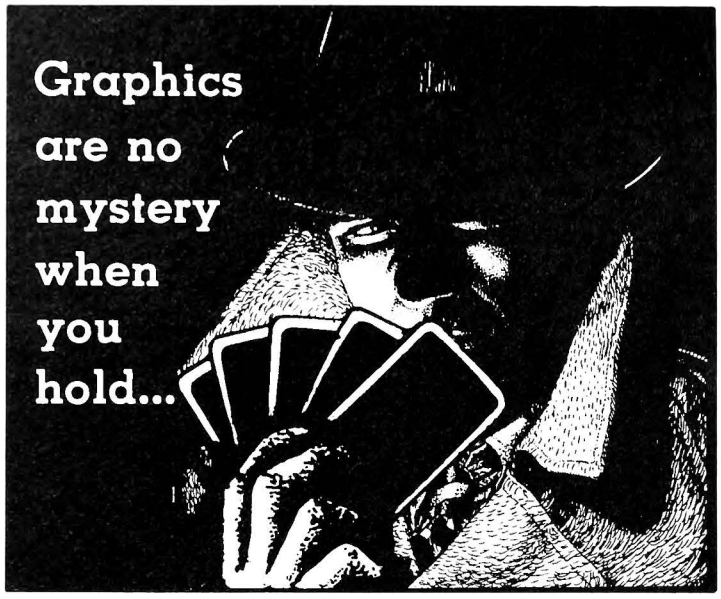
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SOFTREK

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places like that to see if they were interested in software."

Connecting the Dots. "For the next four months," Pelczarski recalls, "I was straight programming full-time, developing a lot of ideas. Many things just seemed to fall into place.

"It was pretty much work on it, stop for lunch, work on it some more, stop for dinner. If we weren't doing anything, work on it until one or two in the morning."

Pelczarski performed Beta-testing by having various friends who were interested in graphics use his program. "I kept all the documentation in *Apple Writer* files. I'd revise the files any time someone said something wasn't clear. I would give them copies of the program and say, 'I'm not going to tell you anything about it.' In several cases, I would sit right behind them and watch what they were doing and find out where they were having trouble. I'd let them play with it without any prompting."

These testers ranged from total beginners through experienced users. "In most cases they were people who hadn't seen any graphics packages before."

Originally, he had planned to send prototypes to established software publishers to generate an income from royalties. But, "When the package came out better than I ever imagined, I started thinking of publishing it myself."

In April 1981, Pelczarski unveiled *The Complete Graphics System.*

Quotable Quotes. "I sent out copies to magazines for review. Several did nice reviews."

At the time there were about one thousand dealers in the industry, and Pelczarski started doing dealer mailings. "To one group of dealers we sent a demo disk that goes through all the features. To another group, we sent copies of the manual. To another, we sent both demo disks and the manual. To another we sent just information saying, 'Here we are, and here's what we've got.'

"The responses were all about the same."

Overall, he doesn't feel the mailings were very significant. "The best returns we had were in advertising. The dealers would pick up the magazines, see the ads, and give us a call.

"We sold quite a few right away, from the ads. Then when the reviews came out in June, we started selling more and more. It just kept building up. By July or August, we were breaking even with everything we'd invested in." Pelczarski also credits Applefest/Boston with helping sales.

Curtain Calls. Response from users has resulted in more than half-a-dozen revisions of the program since its first publication. With each upgrade, the Penguin staff sent a letter offering to replace the older version for five dollars.

"We did have a protection system on the original version until this February," Pelczarski says, then he took it off to allow for easier use.

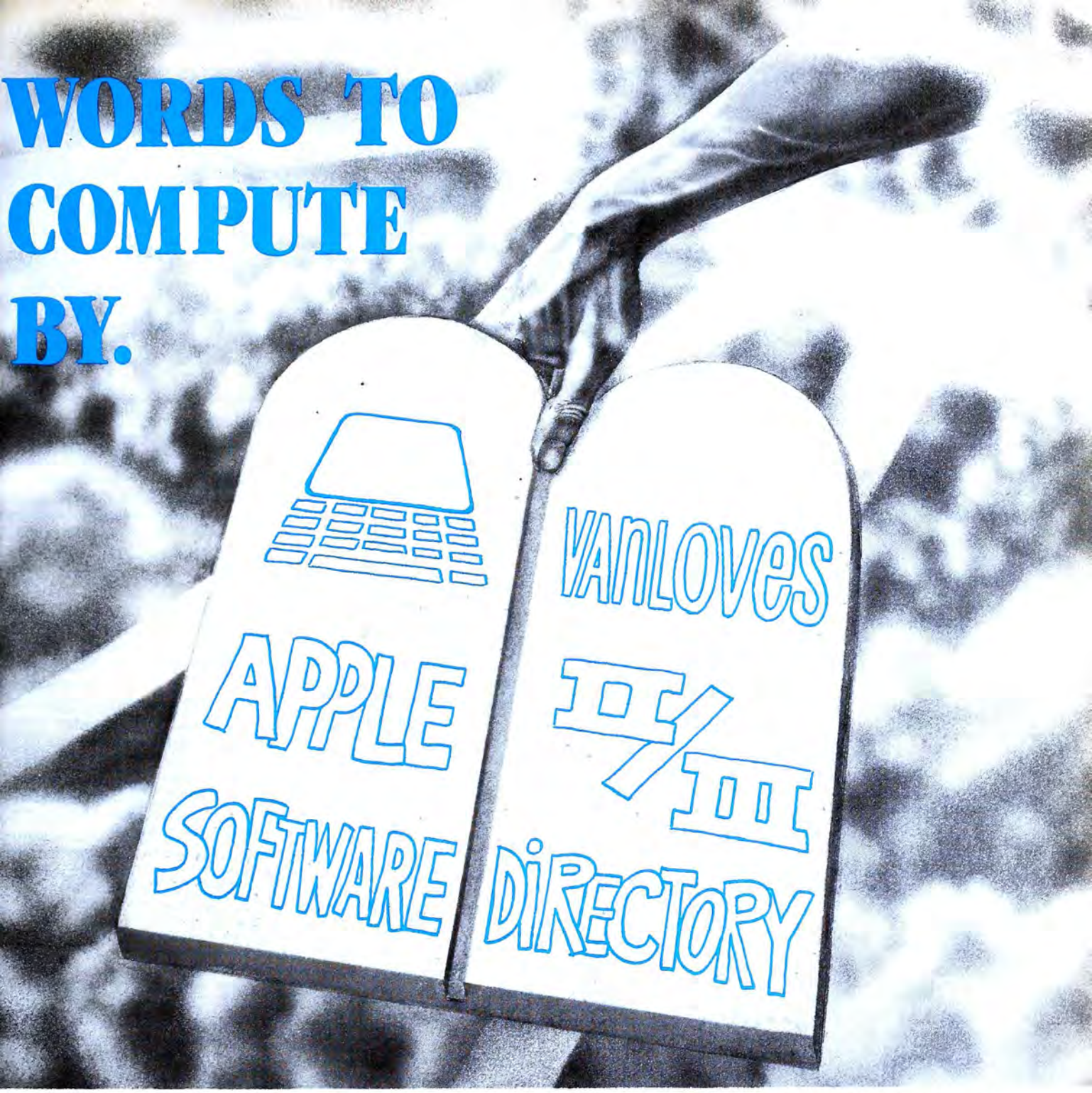
The tiny company now has three Apples to develop software on and is designing some games. Two additional programs, *The Graphics Magician* and *Special Effects,* have been released.

The three programs in the line have given Penguin what Pelczarski believes are "the best in Apple graphics software—a designer's package (*Complete Graphics),* an artist's package (*Special Effects),* and a programmer's package (*Graphics Magician*).

"Dollarwise," he says, "I'd probably be making as much and have fewer headaches if I'd let someone else publish my software. But along with the headaches, there's a great deal of satisfaction from doing it ourselves and having control over matters. Plus the learning. . . ."

Broderbund and Penguin, explorers, small businesspeople, competitors in some ways, yet friendly ones. They help each other. Just as pioneers always have. ◨

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DOSTALK

BY BERT KERSEY



Last month, we crawled inside Apple's DOS, peeked around at its vocabulary, and did some poking to change things just a bit. Hopefully we're still friends, and you and your disks survived. We're about to make some more DOS changes, so get out one of your "expendable" disks (in case of accident) and poke along. Remember, if you follow instructions, the only way anything can possibly go wrong is if:

1. You make a typo.
2. I made a typo.
3. *Softalk* made a typo.

Now, I *know* #2 and #3 have happened before, and I have my *suspicions* about #1. Fear not; you can always reboot if your Apple misbehaves.

Changing DOS's Vocabulary. Remember, DOS resides in the *changeable* memory area (RAM) of your Apple, so we can get in there and fool around with it. Let's start by renaming a DOS command. There are programs that will do sophisticated DOS alterations for you, but you can make some changes yourself without much software. First, type in this program; it's another version of last month's vocabulary peeker:

Note: All programs are written for 48K. If you have 32K, subtract 16,384 from all address values.

```
]10 REM DOS SNOOP
 20 FOR X = 43140 TO 43271
 30 PRINT X; ",";
 40 P = PEEK(X): PRINT P;
 50 IF P > 127 THEN INVERSE
 60 HTAB 12: PRINT CHR$(P): NORMAL
 70 IF P>127 THEN PRINT "-------------"
 80 NEXT X
```

Run the program; use control-S to pause. If you have a printer, make a printout for reference. Here's what you should see (inverse is indicated with parentheses):

```
 43140,73    I
 43141,78    N
 43142,73    I
 43143,212   (T)
----------
 43144,76    L
 43145,79    O
 43146,65    A
 43147,196   (D)
----------
 43148,83    S
 43149,65    A
 43150,86    V
 43151,197   (E)
----------
 43152, etc.
```

You should see all twenty-eight DOS commands spelled out vertically with addresses and values for each letter. Notice how the last letter of each command is the high-byte version of the letter, 128 higher than normal. Without further explanation, let's change the *save* command word. Type the following command with no line number:

```
POKE 43150,70 (return)
```

Now try to *save* the program you typed in previously by typing *Save DOS Snoop* (return). It won't work. In fact, your Apple will hang up completely, eating its cursor (yuck!) and making you hit reset to continue. Now, type *run* and control-S to look at what has happened to *save*, the third command. It has been changed to "safe"! The *poke* we just did inserted an "f", whose ASCII value is 70, at location 43150 (see the ASCII conversion program at the end of this article). Another way to insert the "f" would have been:

```
POKE 43150,ASC("F")
```

So now you can "safe" a program, but you can't "save" it. In most cases, if you change a command word and the original command is typed, your Apple will say "?Syntax error" and hand the flashing cursor back to you. The reason your Apple froze up when "save" was typed is that *save* is the *Applesoft* command for saving data to *cassettes*. Your Apple was waiting for you to press the play and record buttons on your cassette recorder (boy, are you lucky you have a disk drive!).

You can change any letter of any DOS command to any character you want, including control characters. Remember, to change the last letter of a command, you must add 128 to the new letter's low-byte ASCII value. For example, let's change *save* (or *safe*) to *keep*. That can be done with four *pokes*, either in a program or directly from the keyboard, like so:

```
POKE 43148,ASC("K")
POKE 43149,ASC("E")
POKE 43150,ASC("E")
POKE 43151,ASC("P")+128
```

Hit return, of course, after each line. Now save your program by typing *Keep DOS Snoop* (return). You did it! If you want to change a command's length, you'll have to do some semi-hairy manipulations. To shorten a command, slide every character of every *following* command up to fill the gap. To lengthen a command, you'll have to shorten another one first . . . we'll let you cope with that alone. But fool around with it; it's fun!

Saving DOS Changes. Let's say we want to keep "keep" and have it be our *save* command when a certain disk is used. The easiest way to keep it is to *init* a new disk while the *keep* command is in memory. Now when that disk is booted, *keep* will be in effect and *save* will only function as an Applesoft cassette command.

Another way to keep *keep* would be to put the four letter-change *pokes* in your greeting program. For example:

```
]10  HOME: PRINT "GOOD MORNING, GEORGE."
 20  REM (REST OF YOUR GREETING PROGRAM)
1000 POKE 43148,75: POKE 43149,69: POKE 43150,69: POKE 43151,208:
     REM (CHANGES "SAVE" TO "KEEP")
1010 NEW: REM (OPTIONAL; ERASES THIS PROGRAM)
```

Now, assuming this is your greeting program (the one that is automatically run when a disk is booted), the *keep* command will be in effect when anyone boots this disk. When any "normal" disk is booted, the normal *save* command will be reinstated.

Changing commands can be handy for foiling would-be foilers of your programs. How can someone catalog your private disk if you've renamed the *catalog* command "popcorn"? Changing commands can, however, be a big pain in the chips if you forget what you've done!

Load the *DOS Snoop* program into memory again. You can always run this program to check the current status of your DOS commands. For now, let's change Line 20 to reveal different sections of memory. For example:

```
20 FOR X = 43380 TO 43581: REM (DOS error messages)
20 FOR X = 45991 TO 45994: REM (catalog file-type codes)
20 FOR X = 46010 TO 45999 STEP -1: REM (disk volume heading)
```

Notice how error messages are set up like commands, with the last letter having a high-byte value. Normal (as opposed to inverse or flashing) file codes and disk volume headings, however, are made of *only high-byte characters.*

While we've got *DOS Snoop* loaded, we might as well take a peek at good old Applesoft's vocabulary too, even though we can't change it. Change Line 20 in the *DOS Snoop* program to:

```
20 FOR X = 53456 TO 54116
```

Go ahead and try to *poke* some changes into Applesoft. It can't be done because Applesoft is in hardware (ROM), unlike DOS, which is loaded from software (disk) into changeable memory (RAM). If you *poke* 53456,0 and then *print peek*(53456), you don't get a zero, but a 69, because 53456 is a location in "read-only" memory.

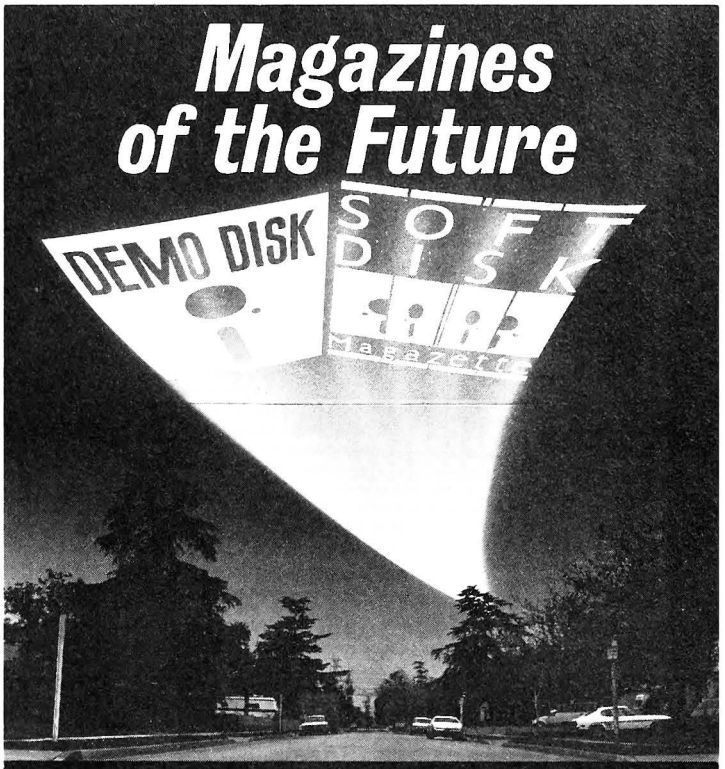
Back to DOS: The two programs that follow are quite good at saying what I've been trying to get across. Give these little utilities a try and analyze what they do. They'll both dress up your catalog presentations while you're at it.

A Catalog Titler. This first program will change the disk volume heading to any title you want and give you the option of printing or not printing the volume number itself. There's apparently no way to change the actual disk volume, but this program will at least let you *fake* the change by making any number you want part of your heading!

```
]5  REM DISK VOLUME HEADING CUSTOMIZER
 7  REM BY BERT KERSEY
 9  REM
10  TEXT : HOME : NORMAL
20  PRINT "CATALOG TITLER": PRINT "----------------": PRINT
30  PRINT "HEADING NOW: ";: FOR X = 46011 TO 45999 STEP - 1: PRINT
    CHR$ ( PEEK (X));: NEXT
40  IF PEEK (44480) = 32 THEN PRINT PEEK (46017): REM (DISK VOLUME #)
50  VTAB 6: HTAB 1: PRINT "NEW HEADING: ";
60  FOR X = 1 TO 12: PRINT CHR$ (95);: NEXT X
70  HTAB 14: INPUT "";A$:L = LEN (A$)
80  IF L < 12 THEN FOR X = 1 TO 12 - L:A$ = A$ + " ": NEXT : REM
    (ADDS SPACES UNTIL 12 CHARACTERS)
90  IF LEN (A$) <  > 12 THEN 10
100  FOR X = 1 TO 12
110  POKE 45999 + 12 - X, ASC ( MID$ (A$,X,1)) + 128: REM (WRITE NEW
    HEADING INTO DOS)
120  NEXT X
130  VTAB 8: PRINT "PRINT VOLUME NUMBER? (Y/N):";: GET Q$: PRINT Q$
140  IF Q$ <  > "Y" AND Q$ <  > "N" THEN 130
150  IF Q$ = "N" THEN POKE 44480,234: POKE 44481,234: POKE
    44482,234: REM (CANCEL DV-NUMBER PRINT)
160  IF Q$ = "Y" THEN POKE 44480,32: POKE 44481,66: POKE 44482,174:
    REM (NORMAL VALUES)
170  PRINT CHR$ (4);"CATALOG"
180  FOR I = 1 TO 40: PRINT "-";: NEXT
190  PRINT "O.K.? (Y/N):";: GET Q$: PRINT Q$: IF Q$ <  > "Y" THEN 10
200  PRINT : PRINT "DONE."
```

Catalog Re-Bait! This program lets you rename your catalog's binary, Applesoft, Integer, and text file-type codes (B, A, I, and T) as well as the locked code (asterisk) and unlocked code (space) to any normal typable text character. Remember, these changes are in RAM only and must be saved by initializing a new disk, so that when that new disk is booted the changes will take effect.

```
]5  REM CATALOG RE-BAIT
 6  REM  BY BERT KERSEY
 8  REM
```

One of the big hits of the Seventh West Coast Computer Faire, Softdisk Magazette is making a repeat performance at Applefest in Boston.

This monthly publication entirely contained on a two-sided floppy disk has many of the regular features you expect to find in a conventional magazine. Stated simply, Softdisk serves its readership. The readers, in turn, help form the contents of each issue with comments and contributed programs.

As many people learned in San Francisco, Softdisk is something not to be passed up. So far the reviews have all been good.

Lucky folks in San Francisco also learned about Demo Disk, a two-sided disk that features short demonstrations of current software. Demo Disk allows you to preview software, everything from education to utilities and entertainment, in the comfort of your own home.

Together, Softdisk and Demo Disk caused quite a crowd to form around the Softalk booth. We expect the same thing to happen again in Boston. Softdisk and Demo Disk will be offered together in a special festival deal. Bring two blank, two-sided disks and you can get your sides of electronic information for five dollars.

Drop by the Softalk booth and you can see both products demonstrated before you decide to buy. If you don't have any blank floppies to spare, you can buy Demo Disk and Softdisk already on disk for a total of ten dollars.

Never fear. For those unfortunate enough to miss both the West Coast Computer Faire and Applefest, you can get the premier issue of Demo Disk by sending $5 to:

Demo Disk Publishing
380½ Aster Street
Laguna Beach, CA 92651
California residents add 6% sales tax.

Likewise, Softdisk is available through its normal distribution. Subscription cost for Softdisk is $10 for the first issue ordered and $5 per subsequent issues when the previous diskette is returned.

To order Softdisk by mail, send ten dollars to:
Softdisk Magazette
3811 St. Vincent
Shreveport, LA 71108

Softdisk requires Applesoft and DOS 3.3. A printer is desirable.

```
10  TEXT : HOME : INVERSE
20 BLOC = 45994:ALOC = 45993:ILOC = 45992:TLOC = 45991:ULOC =
   44508:LLOC = 44515: REM (LOCATIONS OF B,A,I,T,UNLOCK & LOCK
   CODES)
30  PRINT " CATALOG CODE CHANGER ": NORMAL
40  VTAB 4: HTAB 11: PRINT "NORMAL NOW": HTAB 11: PRINT
    "------ ---"
50  PRINT "BINARY.....B.....": CHR$ ( PEEK (BLOC))
60  PRINT "APPLESOFT ...A.....": CHR$ ( PEEK (ALOC))
70  PRINT "INTEGER .....I.....": CHR$ (PEEK (ILOC))
80  PRINT "TEXT.....T.....": CHR$ ( PEEK (TLOC))
90  PRINT "UNLOCKED ....  .....": CHR$ ( PEEK (ULOC))
100  PRINT "LOCKED.....*.....": CHR$ ( PEEK ((LLOC))
110  CALL - 958: VTAB 17
120  PRINT "(Q TO QUIT, OR C TO CATALOG.)": VTAB 15
130  PRINT "CHANGE B,A,I,T,U OR L? ";: GET A$: PRINT A$: CALL - 958:
     PRINT
140  IF A$ = "Q" THEN END
150  IF A$ = "C" THEN PRINT CHR$ (4);"CATALOG": GET A$: GOTO 10
160  HTAB 14: PRINT "NEW CODE: ";: GET B$: PRINT B$:B = ASC (B$) + 128
170  IF A$ = "B" THEN POKE BLOC,B
180  IF A$ = "A" THEN POKE ALOC,B
190  IF A$ = "I" THEN POKE ILOC,B
200  IF A$ = "T" THEN POKE TLOC,B
210  IF A$ = " " OR A$ = "U" THEN POKE ULOC,B
220  IF A$ = "*" OR A$ = "L" THEN POKE LLOC,B
230  GOTO 40
```

PRINT CHR$(192);CATALOG. Another easy-to-poke change, of questionable value, is DOS's control-D command character. Normally, to execute a DOS command such as *catalog* from within a program, you would type:

```
10 PRINT "[control-d]CATALOG" : REM (INVISIBLE control-D)
```

The control-D is invisible between the first quote mark and the word *catalog*. If you want, you could change the control-D to a visible character like "@". You can peek at DOS's command character by typing:

```
PRINT PEEK(43698)
```

This will normally produce a 132, the high-byte value for control-D. Change it to the high-byte value for "@" (192) by typing:

```
POKE 43698,ASC("@") + 128
```

Now you can catalog with:

```
10 PRINT "@CATALOG": REM (ALL VISIBLE)
```

All the changes we have been making are handy if you are into creating your own modified DOS and perhaps interested in disguising your programs. Remember, though, when changing commands, that any time a *normal* DOS command is encountered in a program, it will be unrecognized and unexecuted, presenting you with (if you haven't changed *it too*) a "syntax error" (DOS's version with no question mark). Other changes, like custom file codes, should cause no problem.

ASCII Chart. In case you don't have a high-byte/low-byte ASCII reference chart, here's a program that will write one for you. Jazz it up a bit, if you want, to make it print in two or four columns. If you don't have a lower-case chip in your Apple, characters above ASCII 96 (224) won't print correctly on your screen, but should appear as intended on your printer.

```
]10 TEXT: HOME: INVERSE
 20 PRINT "CHARACTER";: HTAB 11: PRINT "LOW";
 25 HTAB 15: PRINT "HIGH"
 30 NORMAL: POKE 34,1
 40 FOR X = 0 TO 127
 50 IF X < 32 THEN PRINT "CTRL-"; CHR$(X + 64);
 60 IF X > 31 THEN PRINT SPC(5); CHR$(X);
 70 PRINT SPC(4 + (X<100) + (X<10)); X; SPC(2); X + 128
 80 NEXT: TEXT: VTAB 23: END
```

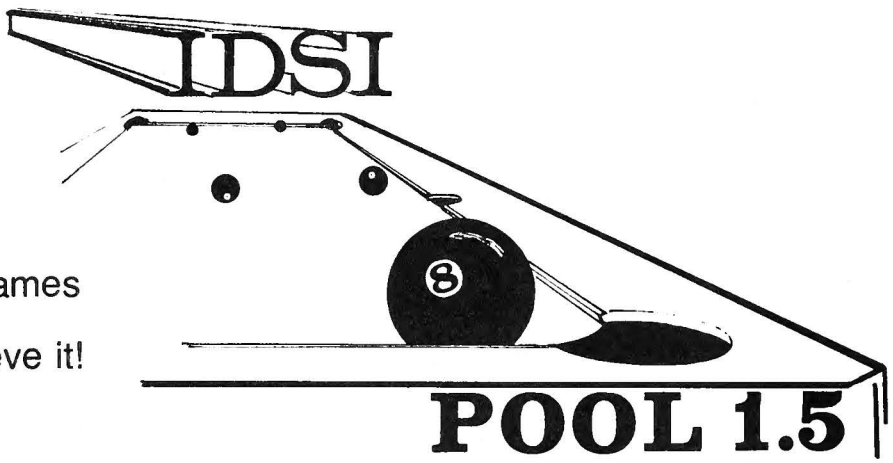
Mystery of the Month. This one isn't really a DOS mystery, but it's another one (in a long series) that many of us can't answer: Suppose you want to turn your printer on from within a program, so your program does a *PR#1*. Now suppose slot 1 is empty—*or* suppose your printer is off-line or just plain turned off. Is there any way to prevent your program from hanging or any way to print an appropriate screen error message?

Meet you here next month with some adventures in reading and writing text files. So long. ◨

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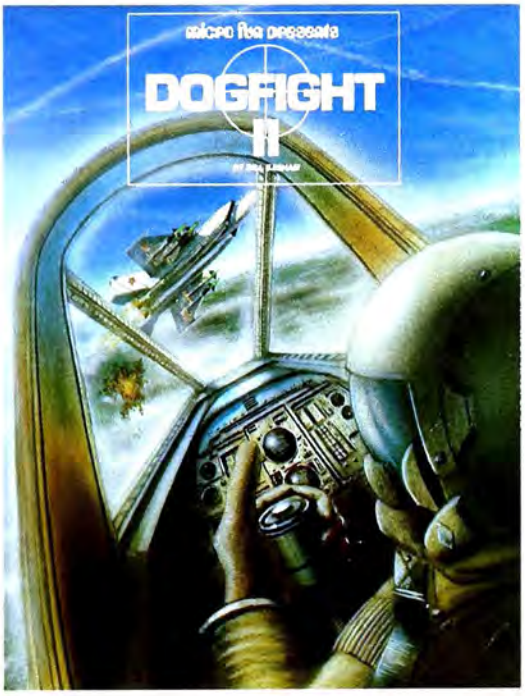
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fritz the cat owns
1982



BY PHILLIP GOOD

In the 1950s, parts of Silicon Valley, the center of the microcomputer industry today, were as arid and deserted as they had been in the days of the Spanish Grandees. ("And the lion still rules the barrancas, and a man there is always alone.") You could buy home-ripened olives in San Jose, and homemade Grenache Rose ($1 a gallon) in Saratoga. Missiles and space had something going and growing in Sunnyvale, but it was all behind barbed wire, so who could tell? Leland Stanford University was down on the farm. Menlo Park was a residential community just to the north of Stanford. Professor Shockley lived there. He was noted for his ideas about transistors rather than for his views on the separation of the races.

The hillsides of South San Francisco were covered with houses—"They were all made out of ticky-tacky and they all looked just the same." Across the bay in Berkeley, they had won three Rose Bowl championships in a row, and women were not allowed in the fifty-yard-line rooting section. Toward the end of the fifties, three coeds infiltrated the reserved seats, the university backed down under pressure, and the critics prophesied decay and anarchy in the decade to come. They were right.

The Sixties. The ticky-tacky spread down the hillside from South San Francisco. Row houses and California-style motel apartments sprouted the length of the peninsula. The missiles and space enclave grew larger despite an extended period of peace and cold war. There were periodic layoffs, but no matter how many men and women were discharged at the main gate, the company continued to advertise for help in all the eastern papers. The aerospace workers didn't complain. If you lost your job in Sunnyvale, you could apply for another in Burbank the same day.

Some folks made the move deliberately. They hoped the new job would be exciting and stimulating, the way they'd been promised at their first preemployment interview. But it never was. The kids adapted readily to the moves; the parents were never the same. Carly Simon recalls: "My father sits at night with no lights on, my mother reads her magazine, I hear her call 'Sweet dreams,' but I forget . . . how to dream." "Anomie," the shrinks sometimes called

Illustration by Kevin McKeon

it; "alienation."

But the married people had it lucky. The singles had no way of making friends. Back home, everyone knew a dozen folks who could introduce you to a pretty girl you chanced to meet downtown. In the Valley, you didn't know anybody. Your coworkers went home to their wives and little league, and you? How the hell did you get married, if you didn't know anybody? How the hell did you get a date?

One answer was the Midpeninsula Free University.

At the Other End of the Universe. The outward revolution was in Berkeley. They had Mario Savio dancing atop the trapped police car and Joan Baez pleading for everyone to keep their cool. They had the confrontation with the Hell's Angels at the Oakland train depot, and People's Park, and James Rector, blinded and dying on the rooftop.

The inward revolution was in Menlo Park just to the north of Stanford. Menlo Park had the Midpeninsula Free University, Baba Ram Dass, David Harris, Robb Crist, Vic Lovell, Mark Lane, four hundred courses, five thousand students, and eighty-four varieties of encounters: "Overcoming your fear of water," "Swedish massage," "Gestalt," "Psycodrama," and, "Hi, I'm Kathy Kirby, help me to know the real me."

They tried everything at the Free U. If it worked, it got ripped off and commercialized at Esalen. Gestalt, total immersion, sensory awareness—they tried them all. Primal screaming went over big later in Beverly Hills. Menlo Park was the testing ground, and the rest of the country was the beneficiary.

On the outer edge of Menlo Park (or was it Atherton?) the Veterans' Administration had a mental hospital. In the early sixties they started experiments with LSD. The drug proved effective for the permanent reversal of depression, and the government banned it. As Mort Sahl put it, "The AMA opposes chiropractors, LSD, and anything else that promises a quick nonprofit cure."

Ken Kesey worked at the Menlo Park VA. So did Vic Lovell. Vic helped start the Free University. Ken had two reactions to his VA experience. First, he wrote a book called *One Flew Over the Cuckoo's Nest* about mental hospitals and Big Nurse and the true nature of imprisonment. Second, he rode around the country dropping acid in other people's punch.

By the seventies, Ken had dropped out ("copped out," some people suggested, implying that Ken had copped a plea in return for some highly publicized antidrug statements). "You don't need drugs to expand your mind," Ken said. In a few more years, with the help of Shockley and Steven Jobs, we found out Ken was right.

The Free University. The Midpeninsula Free University attracted a broad cross section of people of all ages and interests. This was its strength and the source of its early successes. There were cult figures like David Harris and Baba Ram Dass. There were lapsed academics, full professors like Shockley and John McCarthy who thought a Free University might provide something a regular university could not. There were new grads, and old grads, and nongrads. There were aerospace workers, their spouses, and their runaway children. All seemed to know that success and life both required more than the "right" skills.

The forerunner of the Midpeninsula Free University was the Woods Seminar, an informal gathering—wine and cheese and leftist conversation—that originated in the hills in back of Stanford. Among the Woods regulars and Free-U pioneers were Dennis and Mary Allison. Dennis was a computer programmer, one of a thousand faces in the banks of engineers and secretaries they stockpiled at missiles and space. He became better known in the 1970s for his creation of Tiny Basic, the first of the microcomputer higher-order languages.

Other high-tech types at the Free U included Bob Albrecht (later ComputerTown, USA), who taught Greek dancing; Jim Warren, Jr. (later editor of *Dr. Dobb's Journal*, organizer of the West Coast Computer Faire, and publisher of *DataCast*), who led an encounter titled "To Be Gentle;" and Larry Tessler (later with Apple Inc.'s advanced projects group), who taught a prophetic "How To End the IBM Monopoly."

The most prominent of the high-tech types was John McCarthy, then chairman of the computer science department at Stanford. While other computer science departments are still tucked away in mathematics or the business school, Stanford's department has borne that title since the late fifties. John is known for his work in artificial intelligence, a language—LISP, now available in Apple and Atari versions—and a bet he made in the 1960s.

John bet British chess master David Levy that by 1980 there would be a chess-playing computer good enough to beat Levy in repeated play. John lost. He should have made 1981 the target date.

Living the American Dream. Despite the pretentious titles of some of the Free University courses, what the membership liked most was to eat, rap, smoke, lie in the sun, and have a good time. (They not only read about Hobbits, they were Hobbits.) They rapped at council meetings, they rapped at weekend retreats, and they rapped afterward at each other's homes. They went for hikes together in the nearby redwoods or to Mount Tamalpais. They went to rock concerts in Litton Square or commuted to the happenings and the be-ins in San Francisco.

Then, as suddenly as the summer of '67 had produced flower children and festivals and as '68 had produced the nomination of Richard M. Nixon, it was all over.

The Whole Earth Catalog. The seventies began with a whimper. Vic Lovell gave one last course at the Free U entitled "Returning to the Square World." He charged for the course.

Larry Tessler wrote, "I'm getting so tired of being straightened out by encounter classes that I don't know what to do with the rest of my life. I think it's time to clean out my brain and start over. In this last Free University class, we'll go out to topless joints, move to the suburbs, throw cocktail parties, bitch about our mates, buy suits, bras, makeup and the *Ladies Home Journal*, take diet pills, and get into alcoholism, insensitivity, and being uptight, bourgeois, frigid, and completely uninvolved."

For some the seventies were a new beginning. Steve Brand, an ex-Free University instructor ("Earth" and "Fire"), opened the Whole Earth Store around the corner from where the Free University had been. A catalog and a magazine soon followed. It was time for the greening of America, for getting back to the land in an Eddie Bean hat and an REI goose-down parka.

Bob Albrecht stayed in the neighborhood, talking up computers. He even carried a PDP-8 in the back of his van. Finally, he opened a storefront, put in a couple of minis that anyone was welcome to play with, and called it the People's Computer Company.

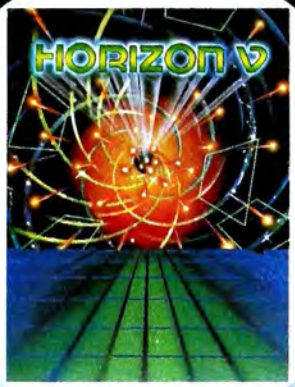
The PCC had a newsletter which became *Dr. Dobb's Journal of Tiny Basic Calisthenics & Orthodontia.* Jim Warren, Jr., who'd edited the Free U's newsletter, took over at *Dr. Dobb's* in February 1976. "Our intent," Jim said, "is to promote the widespread dissemination of *free and very inexpensive software*" (his italics).

Dr. Dobb's was not Jim's only computer-related project. In July of 1977, *Personal Computing* magazine's fourth issue reported, "San Francisco's Civic Auditorium was jam-packed with mobs of personal computing enthusiasts for two days in mid-April. Impresario Jim Warren announced attendance at nearly thirteen thousand.

"The Computer Faire is the first of what promises to be an annual event. We predict the fun will continue year after year as excited newcomers do their own pioneering." The magazine was right.

ComputerTown, USA. By mid 1979, Bob Albrecht, Ramon Zamora, and the People's Computer Company had persuaded the money men at the National Science Foundation that there was merit in personal computers and great merit in placing computers where ordinary people could use them, like the Menlo Park public library. The foundation responded with the

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funds to explore and extend the idea. ComputerTown, USA, was born.

Can you imagine (as Arlo Guthrie might have sung in the sixties) a whole town turned on to computers—in the public library, the boys' club, the high school, and the senior citizens' center! And not just one town, but a dozen towns like San Bernardino, California, Austin, Texas, Baraboo, Wisconsin, Barrington, Illinois, and Munchen, Germany!

And in every one of these towns, groups of individuals met to coalesce, help each other, ask and answer questions, lie in the sun, eat, rap, and create an extended family/good time/party/be-in.

Shades of the Free U! Shades of Socrates and Plato and all that bunch! People helping people helping people enjoy.

There were critics, of course: "And just what is a twelve-year-old child going to do with a computer?"

And a reply for the critics: "Anything she likes."

Keeping the Doctorates Away. You couldn't build a ComputerTown with a brace of used PDP-8s and a hand-soldered IMSAI. It needed the development of computers that were less expensive and a whole lot easier to use.

The first microcomputers were handcrafted marvels, with lots of switches on their front panels and multicolored lights. Mainframe programmers loved them because they so closely resembled the operator's console of a real—read mainframe—computer. Surprisingly, then and now, mainframe programmers aren't allowed near the operators' consoles of their own computers. Too much risk, or congestion, or something. Since the late fifties, mainframe programmers have had to stand in line to submit their programs and, later, stand in line to pick up their results. In some instances, the closest a programmer comes to a "real" computer is a remote job entry station consisting of a card reader and a line printer located a dozen miles or more away from the mainframe.

To the programmer, a *personal computer* meant a computer he could feel and touch. He could flip that computer's switches and guide himself step by step through the thinking process. But for the noninitiate, the average man/woman/lawyer/doctor/businessman/corporate executive, the multiple switches and lights were as much a barrier to computer use as lines and counters and a computer located a dozen miles away.

The computer that Steve Jobs and Steve Wozniak constructed broke tradition in a number of ways. First they used the 6502 chip instead of the then popular 8080. The 6502 had block transfer abilities (a descendent of the 8080, the Z-80 picked these up a chip-generation later). Block transfer was an aid to constructing (and dissolving) high-speed, high-resolution graphics displays.

Second, they built with plastic. Like a bridge over troubled water, plastic touched a warm, reassuring, Barbie doll strain in the American character that cold metal could never reach.

Third, their computer was easy to use. It came with Basic and a simple on-off switch, and you didn't need a year of *Dr. Dobb's* and regular meetings at a hobbyist club to figure out its use. Like the Free University, it was available to the broadest possible cross section of people.

Fourth, the Apple was inexpensive. Elsewhere in the Bay area, at Cromemco and Kentucky Fried Computers (later to become North Star), the accountants reasoned that when demand exceeds supply—chuckle, chuckle—one may charge what the traffic will bear. Jobs and Wozniak sold their computer practically at cost.

Some manufacturers insisted on selling vertical integration packages—software, hardware, even a company magazine. Jobs and Wozniak had nothing but encouragement for the host of software and hardward entrepreneurs that flourished in Apple's wake. The Apple became a symbol for the laid-back, easy-going "Yellow Submarine" of the eighties. (And 50 percent of all sales went to major corporations.)

Doing What Comes Naturally. The movements of the sixties all seemed to start in Menlo Park (or across the Bay in Berkeley), spread up and down the California coast, then bounce like long-range radio waves across the country from New York to Boston to Chicago, seeping into the rural heartland only years and years and years later, by which time smoking paraphernalia was part of the Penney's catalog, and rock was rockabilly.

The spread of the personal computer was far less dependent upon demographic considerations. As mail-order sales testify, the personal computer is as much a part of country living as it is of big city ways.

Of course, many of the folks who live out in the country moved out from the cities in the sixties. If it seems strange that they should be among the first to adopt the new personal computer, consider that most gave up their jobs with missiles and space not because they objected to working with machines, but because they objected to being treated as machines by bosses, co-workers, and an indifferent corporation.

In the winter, when the snow lies deep enough that you need snowshoes just to make the trip from the house to the barn, the commodities market is no further away than a telephone call to CompuServe or the Source. Poor road conditions may forestall a ride to town to pick up the Davenport *Times-Intelligencer* or the Kalamazoo *Gazette*, but the electronic editions of the *Los Angeles Times*, the *New York Times*, and the Saint Louis *Post Dispatch*, are just a call away as well.

The computerized rural farmer may know more about what's going on in town than the average city resident. There is so little to do in the country in the winter—apart from sex, seed catalogs, and watering the stock. There's plenty of time to sit back in an easy chair and flip through screen after screen of gossip columns and scheduled events; there's time to sit back, keyboard in lap, legs propped up on the table, boot-shod or shoe-free (don't make no never mind), wearing jeans or leisure suit (style is something for Sundays at church), and think deep, electronically amplified thoughts. Though much of the personal computer software comes from Silicon Gulch or the extended San Fernando Valley, much comes from the backwoods too, from places like Coarsegold, California, White City, Oregon, Walled Lake, Michigan, and Darby, Montana.

If you want to know what the people are thinking (the ones that voted for Truman and Nixon—first time—and Reagan), listen in on CompuServe's CB; forget the letters in the *New York Times*.

Free To Be You and Me. The movements of the sixties were met with harsh, repressive measures. The personal computer revolution has encountered no direct opposition so far.

A few educators have spoken out against computers, but the majority have shown nothing but enthusiasm. The individual school districts of the state of Minnesota have purchased more than three thousand Apple IIs. Ditto the state of Michigan. And now both states have signed bulk purchase contracts with Atari. These computers are used primarily for student training. (Few, very few, are used for administrative functions, though that will change.) The students learn how to program as well as to read, spell, subtract, type, and identify the states and their capitals with the aid of the appropriate Apple and Atari software.

Fears of a generation of computer-educated kids who'd be intelligent but unable to make friends have proved groundless. The computer, a nonjudgmental instructor, has helped to bring problem students out of themselves. Computers breed success, and success breeds confidence. Computers and confidence have paved the way to relationships as warm and open as any flashed on at a sixties be-in.

The personal computer has had only a marginal effect on America's work habits. Dreams of working at home, exchanging work product, information, and money over the telephone, have proved elusive; so much of work involves the exchange of emotional strokes as well as the exchange of information. Most executives can do without a personal secretary—at least since the arrival of the word processor—but they're unwilling to surrender the prestige that a secretary and subordinates imply.

A few entrepreneurs have made a living, a good one, the

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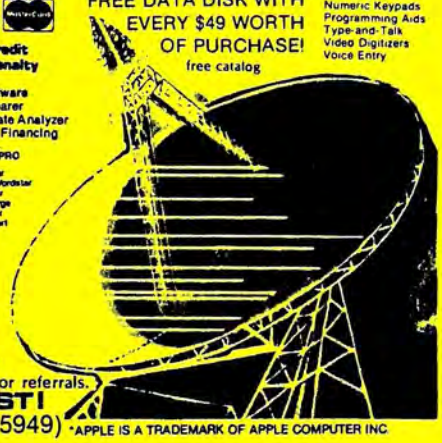
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Visitrend Visiplot
Visidex
Visiterm
Visifile
Software Publishing:
PFS Filing/Data Base
PFS: Report
Stoneware,
DB Master (new version)
Sub Logic
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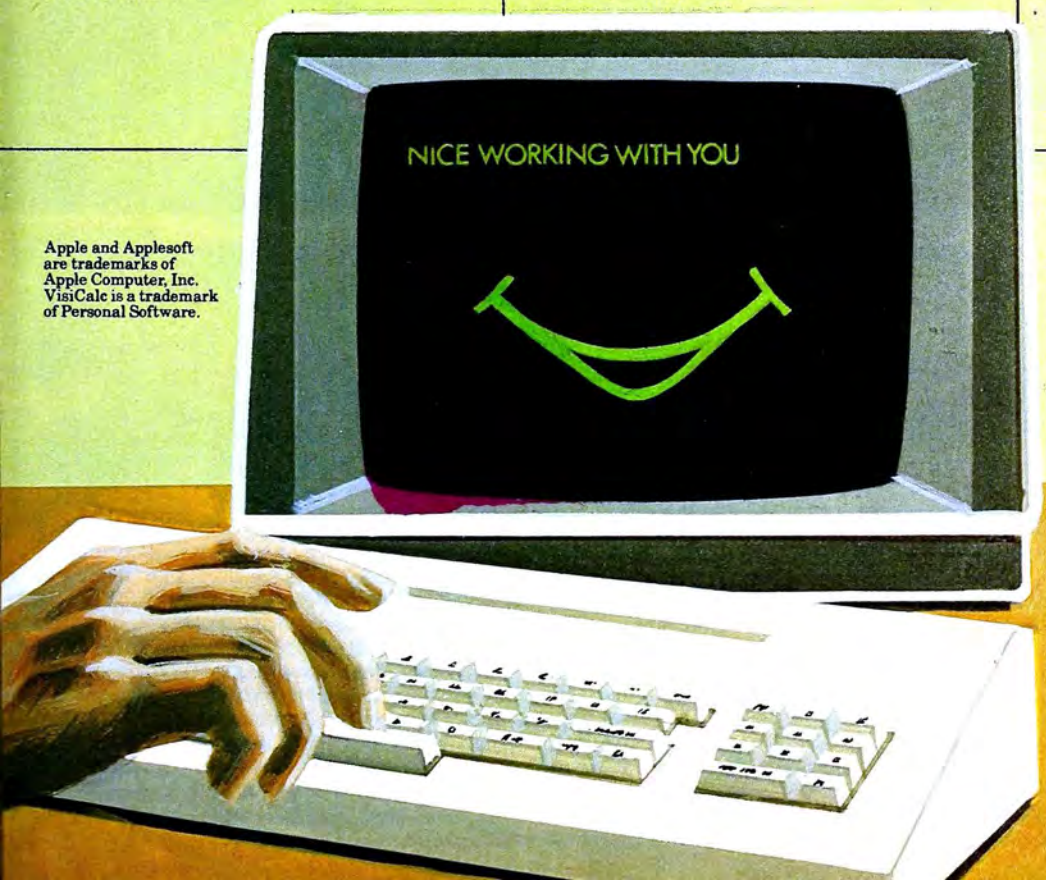
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Merger
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From the left, first row: The maturity of the Apple marketplace was indicated by the snazziness of display areas of key Apple software companies. Participating in the booth wars were On-Line Systems, Sirius Software, Broderbund, Adventure International, and Gebelli Software. Dignitaries from nonexhibiting companies included Bill Gates of Microsoft, Rob Campbell of Apple, and Minoru Nakazawa of Star-Craft. Interesting were the software authors who took their royalties to start their own publishing companies. Among those in attendance were Nasir (Gebelli Software), and pictured in the second row: Mitch Kapor (Lotus Systems), Bob Ramsdell of Pansophics who joined with Kapor to form Professional Software Technology, and Jay Sullivan of Hi-Res Football and Crossfire fame who started Calsoft. New faces on the scene were Steve Brightbill and Mark Capella of International Software Marketing, Jack Leonard who wrote Tax Beater for DataMost, Morgan Caffrey and Dan Fischer who wrote Doubletime Printer for Southwestern Data Systems, Gilman Louie who wrote Star Commander for Voyager, and Dan Illowsky who wrote Snack Attack for DataMost. Bidding to become the next Snack Attack was Cavalier's new entry, Microwave. Third row: Many of the veteran Apple suppliers were present including Bob Clardy of Synergistic, Joel Billings of Strategic Simulations, Steve Baker and Bill Depew of Artsci, Barney Stone of Stoneware and Roger Wagner of Southwestern Data Systems. Some authors went public with their programs for the first time, including Andrew Greenberg of Wizardry fame, shown here with customary front man Robert Woodhead, Bill Blue of ASCII Express and Z-Term fame, and Hal Faulkner, author of Broderbund's business packages. DataMost had two booths, which was none too many as the crowd at this one indicates.











Fourth row: A panorama of the lower level exhibition hall. The blur in the center of the middle picture is Softsel's Bob Leff.

Bottom row: Other booths attracting lots of attention were Penguin Software and Syntauri. Creative Computing and Softalk again participated in the awards ceremony on Saturday. David Ahl made the presentation for Creative; Bill Budge got the readers' vote from Softalk. The fair wasn't all software; some of the peripheral creators present were Roy Hicks of R.H. Electronics, Ted Gillum of TG Products, Jeff Mazur of Westside Electronics, and Dennis Hayes from Hayes Microcomputer.

TAKE ME TO THE FAIR

BY TOMMY GEAR

Crisis? What crisis?

The event was the Seventh Annual West Coast Computer Faire, and these forty-five thousand people over three days—these new pioneers—had come to show, learn, sell, try, and buy wares for small computers. The aura that enveloped it all was wholesome, unsullied, hard-earned pride, and the closest thing to crisis anyone seemed to be experiencing was the struggle to see and take in as much of the event as possible.

For the majority of fair participants, the notion of radical change was probably only a slight inkling in the back of the mind, waiting to be confirmed in scheduled keynote speech. In the meantime, people went about the business at hand.

In the exhibitors' booths—some six hundred and fifty in all—publishers and manufacturers displayed and promoted their newest creations. Fledgling companies exhibited right alongside their larger, better established counterparts, well aware that these "giants of the industry" had been newcomers too just a year ago.

Lured onward by the eye-catching presentations and the prospect of meeting the people responsible for products they had used and enjoyed, curious consumers made the rounds.

Among the peripherals on display was a pressure-sensitive function strip for the Apple II from Videx that plugs into their *Enhancer II* and allows you to add sixteen programmable keys to the keyboard. In addition, Southern California Research Group introduced *The Magic Keyboard,* a device that can change the standard keyboard layout to DVORAK and other arrangements and, within the normal keyboard, assign keys to a ten-key keypad and sixteen-key hex keypad for program-



From the left, top row: Not everything went smoothly at the fair as this sign on the Huntington Computing booth indicates. But those who came a long distance seemed satisfied. They included Dave Culverwell of Prentice Hall's Brady Publishing, Terrapin's Jock McClees from Massachusetts, Penguin's Mark Pelczarski and Micro Co-op's Dave Albert from Chicago, Ken Jones from Advanced Operating Systems in Indianapolis, and Softdisk's Jim Mangham from Louisiana. Middle row: Other dignitaries included Dave Lingwood, an officer of Call-A.P.P.L.E. and Scott Hillman of Softsel. Hitting the West Coast as spectators were Ken Berry and Ken Leonhard from LJK Enterprises. Peripheral manufacturers who drew lots of traffic were Orange Micro and Corona. Third row: Lightning Software had plenty of callers, Vital Information of Kansas City was out in full force with Rolland Love, Gerald Van Diver III, Joe Stueckel, and Bob Schermeister. Lord British in full regalia expounded on his forthcoming sequel to Ultima.

mers.

A hardware/software package from Commsoft called the *Photocaster* lets you print photographs with the Apple. Interfaced with a video camera, the system enables you to print black and white or color images, perform graphic manipulations and transmit the images via telephone.

Strong emphasis on business software and utility programs included the introduction of several program generators for the Appple.

Both hardware- and software-based solutions to slow printout of files were presented. Practical Peripherals demonstrated a 32K buffer that eliminates this inconvenience, and Southwestern Data unveiled *Doubletime Printer,* a software solution that uses the Apple's existing memory capability in a new way.

Some people were disappointed when they found that particular products they'd been looking forward to seeing weren't ready yet. The absence of Apple Inc., said to be busy preparing for the National Computer Conference, was nearly compensated for by the broad exhibitor and user support the company received. Apple staff members roamed the fair, enthusiastic as well.

It is also worth noting that VisiCorp—then Personal Software—and Microsoft, both present at last year's fair, chose not to exhibit this time.

Cutting a colorful figure, forsooth, Lord British appeared at the fair resplendent in medieval trappings. *Wizardry* authors Andrew Greenberg and Robert Woodhead played themselves and two characters they'd created for their game. They called themselves Werdna and Trebor, and wore t-shirts so labeled.

While microcomputer use in the areas of business, utility programs, and games was heralded on the exhibit floor, products with an educational emphasis receded into the background. The seminars that ran throughout the three-day event reflected a more even distribution of emphasis.

The well attended keynote address was delivered by Dr. Seymour Papert, inventor of Logo. Unlike almost everyone else at the West Coast Computer Faire, Papert had a keen sense of crisis.

In his speech, Papert elaborated on the fact that microcomputers are playing an increasingly essential role in our highly technological nation, and the impact of their presence will be felt even more intensely over the next twenty years.

The consequent effect of new tools has always been the reshaping of human relationships, of nations and economies, of ways of thinking, feeling, and perceiving.

What can be learned from the past Papert concluded, is that our tools act upon us in a reflexive way, reshaping all facets of our lives. How much more powerful and drastic will the reshaping be coupled with our use of the computer—an extension of the mind itself.

As individuals or as a nation, the critical element for our survival will be flexibility, to be willing to shift between different ways of thinking. And as we become more conscious of being reshaped by our tools, we face a crisis of decision regarding the consequences of their use and their just application. This responsibility is a uniquely human one—one that cannot be shared by the machines we've created. ∎

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VOWEL "O"



VOWEL "U"



THE TALKING APPLE

When Apple Speaks, Who Listens?

BY MELISSA MILICH

Why would anybody want a computer that could talk back?

The uses for speech are unlimited—anywhere printed output is used, a speech synthesizer can take over. You may have already heard some of these: the telephone operator in some major cities is, surprise! a computer to help with dialing instructions. The Coca-Cola company has a new vending machine that talks—a novelty that is bringing a lot of Uncola fans over to Coke's side. And some cars of the future are being outfitted with cautious voices that remind drivers, "Please fasten your seat belt."

True, Bell Telephone, Coca-Cola, and General Motors can afford more frills than the typical consumer. But if you're an average Apple owner who can't figure out how on earth you could use a speech synthesizer, then ask yourself: Do you play adventure games or have a hobby? Do you live in a house or an apartment? Do you frequently burn the oatmeal? Do you have a business? Do you occasionally oversleep and arrive late for work? Could you or your kids use extra tutoring in spelling or math?

Speech synthesizers can be applied to all these ordinary living situations and predicaments, but they also have some extraordinary uses, so read on. They might work for you.

Milo Street of Street Electronics, which manufactures the

An Overview of Speech Synthesizers

BY ALLEN MUNRO

Computers on television shows almost always accept commands and queries given in ordinary spoken English and reply in the same colloquial fashion with a charming mechanical accent. Unfortunately, the machines that can both understand and produce the full range of natural language don't yet exist beyond the realm of Hollywood scriptwriters' imaginations. Considerable progress toward realizing this idea has been made in recent years, however, and a number of commercial products permit you and your computer to communicate by means of the most natural human communication channel—speech.

Speech output systems allow a computer to speak. *Speech input* systems allow a computer to respond to spoken input. Speech output is one area in which products designed for microcomputers can compete in performance with products available commercially for the most expensive mainframes. In this article, we'll talk about such speech output systems for the Apple II.

Speaking is the most natural human means of communication. Spoken language is a communications system that has evolved over hundreds of thousands of years. Unlike writing, a johnny-come-lately technique with only a few thousand years of history, the human species and human spoken language

II for Apple II

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Speech Synthesizers

have evolved together, and there is no more natural way than speech for people to express and understand requests, commands, questions, and new information.

Technologies and Tradeoffs. Two primary strategies can be used to produce voice output from computers. The sounds made by the human vocal tract can be synthesized and combined to simulate speech, or an actual human voice can be recorded, digitized, stored, retrieved from storage at playback time, and converted back into an analog signal. Both of these techniques are represented in the devices reviewed here. In order to understand how they work, we must first look at what is known about human speech.

Speaking in a pressure-transmissive medium such as air results in vibrations that can be sensed as sounds. Sounds produced by a speaking voice are not at a single-frequency (such as those produced by an electronic tone generator). Instead, the physical energy transmitted through the air during the production of each syllable of human speech is bunched into several tight frequency bands, called *speech formants.* The lowest frequency band is called the first formant, the second lowest the second formant, the next higher one the third formant, and so on.

The absolute frequency of the first formant determines our perception of the pitch of a speaker's voice. Vowel sounds can be discriminated on the basis of the relative frequencies of the first three formants; most consonants affect the transitions from neighboring vowel formants. A *speech spectrogram* plots the voice energy distributed across the audible frequency spectrum over time.

The contrastive speech sounds of a language (/g/ versus /d/ versus /t/, for example) are called *phonemes.* Each phoneme tends to have a characteristic shape in a speech spectogram. The *synthetic approach* to speech production takes into account the formant shapes characteristic of each English phoneme. The shape and placement of the crucial first three formants for the sound /a/ are different from the shape and placement for the sound /o/, for instance. Synthetic speech is accomplished by electronically replicating the formant patterns associated with the different phonemes.

Unlike synthesis techniques, *digital recording* techniques used for voice output from computers are not as dependent on the analysis of speech sounds. Instead, the total sound energy is sampled very quickly—sometimes at a rate of 32,000 times per second or more. The samples are then either stored directly or subjected to mathematical compression techniques and then stored. Of course, if the samples are condensed they must be "reconstituted" at playback time.

Each of these approaches has certain advantages and disadvantages. The synthetic approach permits a very high ratio

When Apple Speaks

Echo II, has identified four basic areas in which an Apple owner could put a speech synthesizer to very good use: home and hobby, business and industry, education, and new strides for the handicapped.

Be It Ever So Humble. Those computerized homes you've been reading so much about lately—the ones that have burglar alarms, light switches, cooking appliances, and lawn sprinklers all tied into a central computer, are now also picking up on the advantages of speech synthesizers.

The CompuHome company in Denver, Colorado for example, has some very satisfied clients whose computers give verbal output such as: "Your oatmeal will burn if you don't turn off the stove now."

For a solar home, this might be handy on a sunny day: "It's getting awfully warm in here. Please close the drapes."

Or how about a built-in burglar alarm system that announces to your intruder: "The lady of the house has a black belt in karate. Please go away."

Street was stuck with a big job when he was asked to name all the different uses for a speech synthesizer. "Nobody can possibly think of them all," he faltered.

Well, how about replacing the recording on your telephone answering machine with the speech synthesizer robot-voice? You might even get more messages left that way.

Another nice feature that no home with a sound sleeper should be without is a talking alarm clock with adjustable volume and a variety of threats. The speech synthesizer can be programmed to say anything.

Double Your Pleasure. Street also acknowledged that some computer games are becoming much more appealing with speech synthesizers. Voice input to warn players of monsters lurking in corridors and other adventure game dangers is being used in some new games on the market, including the new hi-res versions of Scott Adams's original adventure series. The speech synthesizer feature can best be appreciated by hardcore adventure players who hate to be killed prematurely.

Business After Pleasure. Street knows of a number of companies that have recently plugged a speech synthesizer into an Apple computer that was already at work. The addition of a speech synthesizer now allows the Apples that monitor oil drilling rigs at one American company to sound an alarm if a system overloads or encounters any other problem. And depending on how the Apples are programmed, the computer, via the synthesizer, can let the operator know the nature of the problem and how to fix it.

Street pointed out that a feature such as this could save operators and engineers working in the field considerable time; they would not need to be in front of the computer screen to figure out the problem and could go to the trouble source immediately.

If the computers were watchguard over a nuclear reactor when a leak occurred, Street said, those extra moments would be critical. He used the example of the reactor that nearly blew in the movie *China Syndrome* but emphasized he was only generalizing about an important possible use for the built-in alarm system.

Computers, unfortunately, have not yet been programmed to prevent disasters—that's still up to human beings. The role of computers, so far, has been to perform routine tasks, and that is their forte; but coupled with speech synthesizers, computers are starting to do some fairly creative things.

Airline pilots are learning to fly with an Apple computer hooked up to a flight simulator control panel. When the novice pilot flies too low or banks too sharp in a turn, the speech synthesizer butts in and becomes the back-seat driver. Think about that the next time you're flying over the ocean.

And what could be more down to earth than the use of a speech synthesizer for inventory control? A time consuming and always boring task, Street says some businesses could speed up this quarterly process by having the computer read aloud the numbers of items, category by category, by using a speech synthesizer. If workers didn't have to constantly refer to a clipboard, this would free their hands completely for verifying difficult items, such as counting a barrelful of nails in a hardware store.

If the computer were programmed also to receive voice input, the worker could do the entire inventory without ever referring to a clipboard: the worker tells the computer how many nails there are in the bin; if that doesn't match the number the computer originally gave, that section can be flagged so a manager can later resolve the difference; and finally, the task completed, the worker can go on to count the bin of screws, alerted by the computer that there should be 7,693 Phil-

of speech output to stored representation. Such systems use special circuits to translate ordinary text or phonetic codes into sounds. At present, however, the speech sounds produced by synthetic methods leave a great deal to be desired, in terms of naturalness and intelligibility.

The digital recording technique results in quite intelligible speech (if the acoustic data is sampled at a high enough rate). Its primary disadvantage is that the ratio of speech to storage is quite low. That is, each word to be spoken ordinarily takes up a good deal of RAM and disk space. Furthermore, all words to be uttered by the program must be recorded in advance; the user cannot type in a word for pronunciation that has not already been digitized and stored.

Four speech output devices were tested with the Apple II: the Votrax *Type'n'Talk*, the Street Electronics *Echo II*, the Mountain Computer *SuperTalker*, and the Micromint *Micromouth*. Each of these devices employs a different speech output technology, and each has certain advantages and disadvantages relative to the others. In the end, the intended application should determine the choice of speech output device.

The *Type'n'Talk* uses speech-synthesis technology to produce an imitation of human speech. It consists of a small, attractive box (matching the Apple in color) with a separate external power supply. The user must provide either a speaker or a headphone set that can be connected to the *Type'n'Talk*'s acoustic mini jack and an Apple serial interface and cable.

Don't bother opening up your *Type'n'Talk* box to see the goodies. Most of the crucial electronics are potted, and disassembling and reassembling the little unit is not an easy task. The *Type'n'Talk* has its own microprocessor, enough memory for an over-700-character buffer, a text-to-phonetics translation algorithm, and the proprietary Votrax chip that provides format synthesis for speech production. Serial interface circuitry accepts character input.

The text sent to the Votrax unit is translated into speech automatically, thus saving the user the need to learn an arcane phonetic representation for speech. When the Votrax gets a carriage return character, it says the text has been sent.

The *Type'n'Talk* will work with any computer or terminal with a standard serial RS-232-C interface. To work with the Apple II, the *Type'n'Talk* requires that a serial card be installed in one of the peripheral slots. Ideally, this card should be one that supports the full RS-232-C handshaking protocols, such as the California Computer Systems 7710 Asynchronous Communications Card.

This interface and the interface of the *Type'n'Talk* work together to prevent data from being lost. With such a card, you can send data to the *Type'n'Talk* much faster than it can speak. When the *Type'n'Talk*'s buffer is full, it tells the serial card in the Apple to stop sending data. *Type'n'Talk* then signals when it is ready for more data. It is possible to use *Type'n'Talk* with a serial interface that does not provide hand-

lips heads.

People who need information fast, stockbrokers and racetrack bookies, for example, can take advantage of a talking modem. It works much like a telephone answering machine. A client could call the Dow Jones or Churchill Downs computer (if there were one) and request information by punching the appropriate code through the telephone buttons. Statistics, averages, perhaps even the odds on the daily exacta could be theirs instantly.

And advertising! Not that American advertising needs any help, but Street believes the speech synthesizer he used at the last West Coast Computer Faire helped bring people to his booth. He used the speech synthesizer to tell about the speech synthesizer—maybe it wasn't too original an idea, but people flocked to his booth just to find out where the weird voice was coming from.

"A speech synthesizer is a great thing for demos at a show like the Computer Faire. People walk by and hear a talking computer and they want to see it," says Street.

"Graphics and text alone don't make it when you can have a product tell about itself."

The Real Thing. That's also the wisdom behind the new talking Coca-Cola machine that is currently being tested in a few localities around the country. People are dumping quarters in it just for the privilege of hearing it speak a very limited vocabulary.

Street says studies have shown that the quality of learning is enhanced by using speech in the teaching process. Speech is particularly motivating for young children, and computer hi-res graphics applied with speech interaction increases the attention span for very young students.

Preschoolers are learning simple words in their first hour of reading. At UCLA, researchers are working with three and four-year-old children and Apple computers. A letter of the alphabet is flashed on the screen and the synthesizer pronounces it. If the child is learning the letter H, simple words like "hat" and "ham" are illustrated on the computer and pronounced by the synthesizer.

Kids love the computers, says Street, since they don't need to know how to read to use one when a synthesizer is attached.

"Computers aren't really threatening," he says. "They're not like an adult authoritarian figure sitting there and waiting for an immediate response.

"Nope. Computers are completely patient. They won't yell at you if you get the wrong answers—unless you program them to do that."

The kids are doing just fine without the yelling, however. Researchers report that children learn much faster with the computers than with more conventional ways of teaching. There are a wide variety of programs available for use with the synthesizer in other areas besides reading, including spelling and math.

These same programs are being used for people with severe handicaps. Down's syndrome patients, for example, normally have very limited speech. But the hi-res graphics coupled with the voice output acts like a biofeedback device. And the patient computer can stay with the handicapped person as long as need be for each word to be learned.

Milo's Pet Project. Street is particularly interested in applications for the physically disabled, and the speech synthesizer brings the world of computing closer to them. A special audio cursor allows a blind user to go to any point on the screen and hear what is on it.

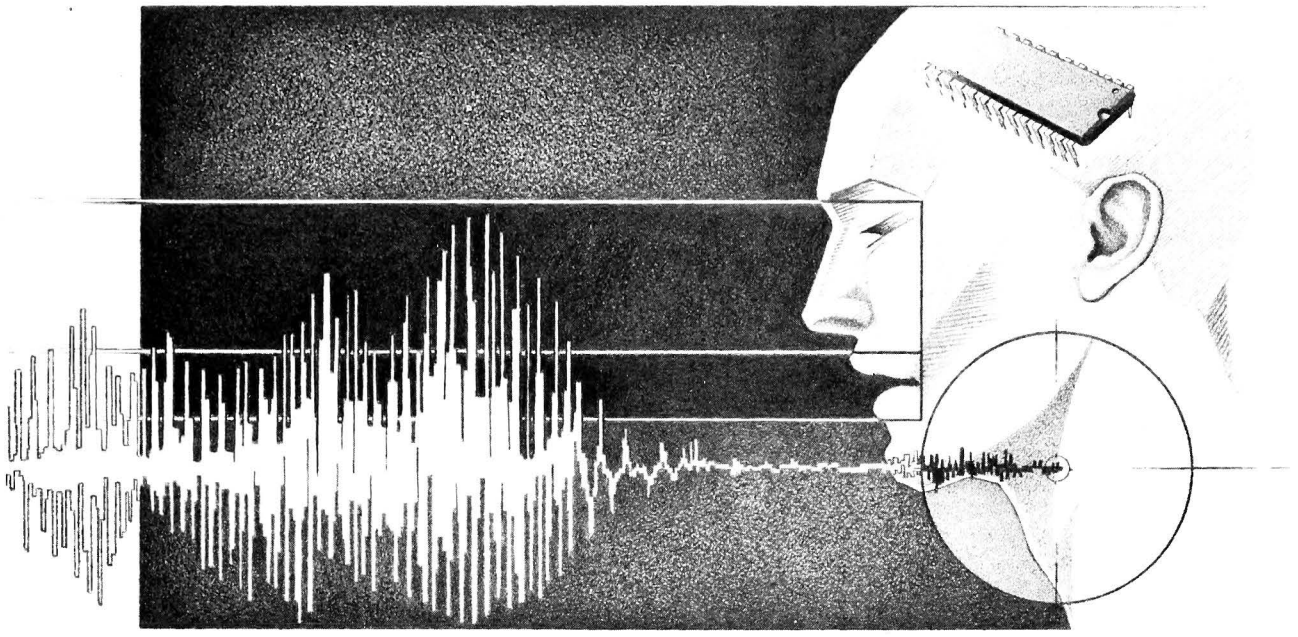
"This enables the blind to use word processors and data management packages. Most people don't think about it but the blind don't have a handy little address book or income ledger they can just flip out of a pocket and look at anytime they want," he explains.

Street also points out that there are 1.5 million people in this country who are unable to speak for reasons ranging from throat cancer to cerebral palsy. "This opens up communication for them. Without the technology we have nowadays, there would be no way for most of these people to talk—to say what was on their minds."

No Voice Lessons Here. There may be four basic areas that synthesizers could be categorized into: home and hobby, business and industry, education, and special uses for the handicapped, but according to Street, the uses for speech synthesizers are absolutely unlimited. As a matter of fact, they can do so many wonderful things, people aren't even complaining that their computers don't sound like Orson Welles or Katharine Hepburn. On the contrary—users like the mechanical, robotic twang with which their Apple pronounces words.

"They don't want a human voice," explains Street. "People say it's a computer, so it should *sound* like a computer—kind of science fiction. They think it sounds neat." ■

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shaking (such as the Apple Communications Card or the Apple Serial Interface Card), but the programmer must then write timing controls to ensure that the Votrax has finished speaking before the next utterance is sent to it.

No interface cable is provided with the unit, presumably because RS-232-C pin assignments are different for different interfaces. In fact, the CCS 7710 card, the Apple II Serial Interface Card, and the Apple Communications Card each require a different cable configuration.

The *Type'n'Talk* documentation provides some guidance for making up the cables, but the user is likely to discover that some alterations will have to be made. For example, both the CCS card and the Apple Serial Interface require that pins 2 and 3 be swapped in the cable connector at one end or the other. Plan on spending a few unhappy hours experimenting to find the pin configuration that works for your interface.

Once the *Type'n'Talk* and the Apple are physically connected, programming is simple. From Apple Basic, you just type *PR#n* (where *n* is 1–7) to send output to the serial interface card in slot *n*. In Apple Pascal, the serial interface card should be installed in slot 2, and the programmer should use the standard system I/O device volume REMOUT as the destination for the text to be spoken.

No special software is required or provided by Votrax for the *Type'n'Talk*. The programmer makes the unit talk simply by directing text output to the serial interface to which it is connected. Two dials on the Votrax cabinet control volume and frequency.

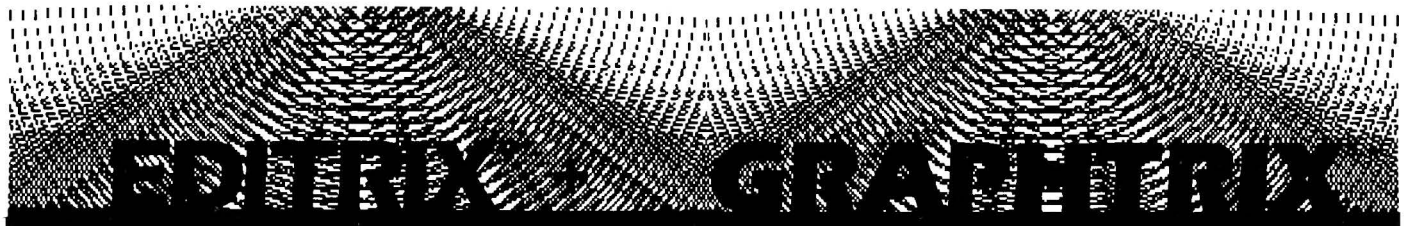
The text-to-speech conversion feature of the Votrax unit makes it easy to use. The conversion algorithm, however, is imperfect. The English spelling system is not very consistent; the same spelling may have two very different pronunciations, depending on the meaning of the word. People know which pronunciation to use when they read the word in a sentence ("The North *wind* blew." versus *Wind* this bandage"). The text-to-speech conversion algorithm is not able to determine speech and meaning in the context of each word, however.

Furthermore, certain words that look similar yet sound quite different—like *dough, cough,* and *rough*— are pronounced incorrectly by the *Type'n'Talk*. The solution to this problem is usually quite simple—just misspell words so that they will be pronounced correctly! (Type in *doe, coff,* and *ruff* to get the pronunciations you want.)

The *Type'n'Talk* also offers a phonetic mode, which is entered by sending the unit an escape sequence. In this mode, ASCII characters are interpreted as phonetic commands, in accord with a table provided in the documentation. Another *Type'n'Talk* option allows you to send text to the unit for conversion, and have it send back the phonetic codes to your Apple. These codes can then be stored and later sent to the Votrax unit for pronunciation in the phonetic mode. If your Apple has a lower-case modification, you might also be interested in making use of an option that causes capitalized strings to be pronounced as acronyms, or strings of letter names. If this mode is selected, "IBM" is pronounced "I-B-M."

Because the *Type'n'Talk* is able to pronounce (or, at least, try to pronounce) any text string, it is appropriate for uses in which the program author does not know in advance what words it will be called upon to speak. If, for example, it is important for the user to be able to type in his or her name and later hear the Apple program say it, then an approach like that of *Type'n'Talk* is the only practical one.

Unfortunately, Votrax speech is not very easy for people to understand the first time they hear it. If users have advance knowledge of what is being said by *Type'n'Talk,* then the sounds produced often seem quite clear. (Some sounds never seem quite right, however; /g/, for example, sounds more like a /d/.) Thus, if the message is written on the screen at the same time that it is spoken, literate users will understand the speech. If, on the other hand, a group of inexperienced listeners is asked to identify a Votrax sentence for the first time,



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by Bob Nacon

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Find substring	Multiple poke decimal	Store 2-byte values
Get 2-byte values	Multiple poke hex	Swap variables
Gosub to variable		

These routines and more can be attached and accessed easily. For example, to allow typing of commas and colons in a response (not normally allowed in Applesoft), you simply attach the Input Anything routine and put this line in your program:

```
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chances are none of them will get every word correctly. Fortunately, understanding Votrax speech is a skill that improves with practice.

Comprehension is easier after about five minutes of exposure to *Type'n'Talk* speech. Applications programmers using Votrax output should consider including a simple tutorial that gives users practice at understanding artificial speech output.

At $375 list, the Votrax is the most expensive of the four speech output peripherals reviewed here. This price does not include a speaker or headphones, which the user must provide. In addition, the effective cost to the user may be even greater if a serial interface card must be purchased for the specific purpose of controlling the *Type'n'Talk*. On the other hand, you can use your *Type'n'Talk* with other computers that have RS-232 interfaces.

Type'n'Talk (and, as we will see, the *Echo II* as well) is an appropriate choice for applications that do not demand perfect intelligibility but do put a premium on having a flexible, unconstrained repertoire of utterances. Very limited memory usage is another virtue of this device.

Street Electronics Echo II. The *Echo II* uses a speech synthesis system that is technologically different from that of the Votrax *Type'n'Talk* but similar in effect. It consists of a printed circuit card designed to be placed in any of the Apple slots (except slot 0). A mini acoustic jack at the rear of the board accepts speaker or headphone plugs. Volume can be controlled on the card with a small screwdriver. An eight-ohm speaker is included, along with a floppy disk with a variety of utility and demonstration programs. The owner of a 48K Apple II with one disk drive needs to provide nothing more to make the system work.

The workhorse of the *Echo II* hardware is the Texas Instruments TMS 5200 speech processor, the more advanced descendent of the speech chip used in the Texas Instruments Speak-and-Spell learning aid for children. An important difference between the two devices is that the Speak-and-Spell chip (the TMC 0280) works with specially compressed representations of actual speech signals, while the TMS 5200 used in the *Echo II* works with the changing parameters of a model of the shape of the human vocal tract.

The *Echo II* software system converts text into the appropriate parameters, driving the hardware to produce a voice. These programs are provided in machine language on a DOS 3.3 disk. A separately available disk offers software support for Apple Pascal users.

The DOS disk offers three utility programs. The *Textalker* program, once installed, converts all text output for the screen to speech. A RAM card version of *Textalker* offers the same performance but takes advantage of the additional memory offered by an Apple language card or compatible 16K memory card, thereby freeing memory for the user's program or text.

Special control-character sequences are used by *Textalker* to control absolute pitch, flat versus variable intonation, speaking rate, what pronunciation will be spoken, and output modes (talk only, print only, or both).

The third utility program is *Speakeasy*, a phoneme generator that is also the core of the two versions of *Textalker*. *Speakeasy* lets the user program on a phonemic level, selecting every phoneme produced in an utterance. One can also select the stress on every syllable, the length of pauses, pitch and rate control, and volume control from software.

In addition to the utility programs, the DOS disk includes five demonstration programs. *Robot Demo* displays a picture of a forbidding robot. Any words or phrases typed in are repeated in the metallic, robot-like sound of the *Echo II* voice. *Sec Demo* is a similar demonstration, allowing the user to input text and then hear it. *List Builder* and *Spelling Test* are two programs that can be used together to prepare and present a spelling test. Finally, the *Talking Typewriter* demonstration simply pronounces any key (other than control or reset) when it is pressed; this might be a very interesting way for very young children to become familiar with the letter names and the keyboard layout.

The Pascal disk for the *Echo II* offers only the *Speakeasy* utility, a documentation file on the use of the *Echo II* with Apple Pascal, and a demonstration program. The demo program shows how to use the Pascal unit *Vox*, which provides the *Speakeasy* features, in a Pascal program.

The *Echo II* documentation is a fourteen-page booklet that explains the use of the demonstration and utility programs. In addition, there are five appendices that show how to misspell certain types of words in *Speakeasy* so as to produce correct pronunciations, present the *Speakeasy* phonemes, give a sample vocabulary in phoneme codes, describe the demonstration programs, and give a technical summary of the *Echo II* system and its utility programs.

Using the *Echo II* is simple. Setup consists of plugging the interface board into one of the Apple's slots, plugging the supplied speaker into the jack on the interface board, and booting with a copy of the *Textalker* disk. The *Textalker* text-to-speech conversion algorithm is similar to the one used in the Votrax *Type'n'Talk*. As with *Type'n'Talk*, certain words must be creatively misspelled in order to obtain proper pronunciation.

The *Echo II* has several other similarities to *Type'n'Talk*. It imposes a very small memory requirement on the system, making it suitable for applications demanding a great deal of memory for program or text. *Speakeasy* alone takes about 3K bytes; if *Textalker* is also used, then a total of about 8K bytes are consumed; this leaves plenty of program memory. Because a text-to-speech algorithm is supplied, *Echo II* is appropriate for applications in which novel utterances must be made at run time. Just as with *Type'n'Talk*, the system is not limited to utterances chosen by the programmer in advance of program execution.

Echo II, like *Type'n'Talk*, requires a little practice listen-

GOTO 172

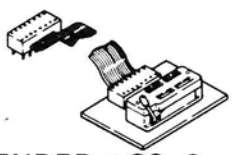
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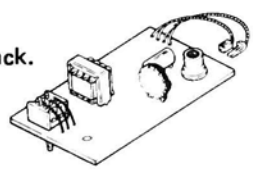
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VENTURES WITH VISICALC

BY JOE SHELTON

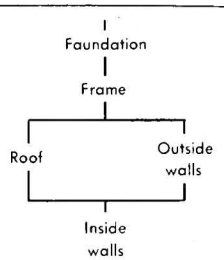
PERT is an acronym for Program Evaluation and Review Technique. In human terms, PERT is a graphical method a project manager can use to help track scheduling, completion dates, and critical dependencies of the many related activities that make up a project.

CPM is an acronym for Critical Path Method. This term refers to the determination of the critical dependencies that affect the final completion date of a project.

PERT and CPM were developed to assist in tracking and scheduling the myriad project activities involved in assembling a nuclear submarine. If you reflect for a moment on the complexities of such a project the need for a method that helps estimate and control scheduling becomes clear.

Any complex project consists of a number of related activities. An *activity* is an operation or task that requires an expenditure of time and resources in its accomplishment. Building a house is an example of a complex project, while digging the foundation of the house is an example of a single activity.

A PERT chart displays all the activities in a project and how they relate to each other. The chart in figure 1 shows a simple network that displays the construction of the main structure of a house. If you start at the first activity and trace the lines to each successive activity, you see a flow of dependency. As you follow a line, you'll see that any activity depicted requires that the previous activity be completed before the next activity is begun. In the example shown in figure 1, the foundation must be laid before the framework can be started, the frame must be completed before the outside walls and roof



Sample PERT Chart Figure 1.

can be begun, and the roof *and* the walls must be completed before the inside walls can be started.

A simple PERT chart allows a contractor to see dependencies and to determine the number of days each activity takes. The PERT chart can then be used in scheduling the individual activities and as a means of knowing the expected completion date of the house.

There are usually one or two paths through a complex network that are called the *critical path.* A critical path is the series (or path) of activities that takes the most days to complete. If any activity on the critical path takes one day more than was allotted, completion of the project will take an extra day as well. If a project manager realizes that an activity on the critical path is going to take longer than was anticipated, the choice can be made to devote additional resources to that activity so it will be completed in time, or the schedule can be rearranged to reflect a later completion date.

One more bit of information can be gleaned from a PERT chart. Most contracts require a final completion date for the entire project. The estimated completion date and the final completion date usually differ. The difference in these two dates is called *project slack.* This is "free" time—time the project can slip and still meet the deadline. In addition, each activity (with the exception of those on the critical path) has an *activity slack.*

Enough of explanations. Here's how *VisiCalc* can be turned into a PERT chart.

The first step is to determine exactly what activities make up a project and what their dependencies are on the completion of other activities. For our purposes, we will first build the simple PERT chart shown in figure 2.

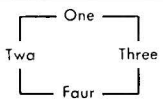


Figure 2.

One is the first activity in the project. Activity one must be completed before either two or three can begin. Activity four cannot begin until *both* two and three are completed. If three is completed before two, activity four still can't begin until two is completed. Each activity will take a different period of time to complete. In order to schedule the project, we will assign the days in table 1 to the activities.

Imagine you are scheduling this project. Without referring to the sample PERT chart in figure 2, try to determine the total days this project will take. If you look at figure 2 you'll see how easy it really is to determine the completion time. Just add one, two and four, and one, three, and four. If only one person is working on each activity, the project will take sixty-one man days, but only 48 calendar days, to complete. The total number of calendar days spent on path one-two-four is forty-five days. The total on one-three-four is forty-eight days. If any activity on the one-three-four path takes longer to complete than shown in table 1, then the project will take that much longer. Yet, if activity two takes one more day, the completion date of the project won't be affected. Path one-three-four is the critical path. If two takes seventeen days, then one-two-four becomes the critical path. Enough already. Let's build it.

Boot *VisiCalc.*
In cell B4 enter: ACTIVITY.
Enter one, two, three, and four in cells B5 through B8.
In cell C4: /FR DAYS
In cells C5 through C8: 10, 13, 16, 22
Next, we must determine a starting day for each activity.
Cell D4: /FR START
And of course, we need an ending day for each activity.
Cell E4: /FR END

Activity	Days to complete
One	10
Two	13
Three	16
Four	22

Table 1.

In D5 through D8 we'll enter the starting days for each activity and in E5 through E8, the ending days. The starting day for activity one is simple. It will start on day 0 (the day the project begins). Activity two will start the day activity one ends. Three will start on the same day. Activity four is a special case; we'll handle it later.

In D5: 0

In D6 and D7: +E5

Now we'll fill in the completion days for one, two, and three.

One starts on day 0 and should end on 0 plus the days it takes to complete the activity.

In E5: +C5 +D5

Replicate that formula into E6 and E7. The commands are:

```
>E5
/R RETURN
E6.E8 RETURN
RR
```

The results are shown in figure 3.

The end day for four is a problem. Does it start after two or three? Of course it should start after three now, but what if we change two to twenty days? Well, *VisiCalc* has an answer to our problem.

Enter in D8: @MAX(E6,E7)

The MAX function will take the larger of the two values. It will ensure that four starts after both two and three are completed because it will choose the maximum value of the two completion dates. Cell E8 shows that the project will take forty-eight days.

	B	C	D	E
4	ACTIVITY	DAYS	START	END
5	ONE	10	0	10
6	TWO	13	10	23
7	THREE	16	10	26
8	FOUR	22		22

Figure 3.

	B	C	D	E
4	ACTIVITY	DAYS	START	END
5	ONE	10	0	10
6	TWO	13	10	23
7	THREE	16	10	26
8	FOUR	22	26	48

Figure 4.

Now we have a chart that shows the beginning and ending dates for each activity. We will use this to determine the critical path. See figure 4.

Critical Path. Our two paths through this PERT chart are one-two-four and one-three-four. We have already determined which is the critical path, but let's see how *VisiCalc* can do it for us.

Move to B10 and enter /FR PATHS

In C10: /FR ACTIVITY

In C11: /FR DAYS

In D10: /FR LOGIC

In E10: /FR CRITICAL

In E11: /FR PATH

Define the paths in B12+B13

In B12: "1-2-4 (This is text!)

In B13: "1-3-4

Now we'll determine the total days for each path.

In C12:+C5+C6+C8

In C13:+C5+C7+C8

VisiCalc has now figured that one-three-four is the critical path (see figure 5) because it has the largest number of days. If C6 is changed to 20, one-two-four becomes the critical path. In actuality, PERT is a little more complicated than this, but

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4	ACTIVITY	DAYS	START	END
5	ONE	10	0	10
6	TWO	13	10	23
7	THREE	16	10	26
8	FOUR	22	26	48
9				
10		PATHS ACTIVITY	LOGIC CRITICAL	
11		DAYS	PATH	
12	1-2-4	45		
13	1-3-4	48		

Figure 5.

we'll see how that works later. We still have to fill in the boolean and critical path columns, but first let's graphically depict our PERT chart.

In D18: ACT.ONE
In C22: ACT.TWO
In E22: ACT.THREE
In D26: ACT.FOUR

Graphics. In order to connect the activities graphically, we will use the graphic capability of *VisiCalc*. Move to D19 and enter: /F* 10.

Look at the result. The cell is now filled with asterisks. The graphic mode will display any number by showing the number as asterisks. If the number is larger than the available characters in the cell, the graphic mode will display the maximum asterisks possible. Enter 2 in the cell and see the result. Enter 10 again and we'll continue to build our model. Enter the following commands to place asterisks into the cells that will depict our dependencies.

Enter in C20, D20, E20, C21, E21, C23, E23, C24, D24, E24, and D25: /F* 10.

We now have a simplified PERT chart. The asterisks show the lines of dependency. We're going to modify them in a while, but in the meantime let's think about the critical path again.

Logic Operators and Functions. We find the critical path by determining whether the largest value is in C12 or C13. The logic column is where we'll determine the critical path.

VisiCalc's logical operators allow you to compare numeric values. If the comparison statement is true, *VisiCalc* will return (display) *true*. If the statement is false, it will return *false*. Here's how it works:

In D12: +C12 > C13
In D13: +C13 > C12

The first cell displays *false*. That's correct; 45 isn't larger than 48. The second cell displays *true* because 48 is larger than 45. If you change any of the amounts in the *days* column so that one of the activity days becomes larger than the other, there will always be a *true* indication for the larger quantity. *VisiCalc* will be able to look for a *true* statement in either column to determine the critical path.

What happens if both values are equal? Both of the logical operators will return a *false*. In actuality, both paths are then critical. We need some method for *VisiCalc* to determine that both paths are critical. There is a logical operator that solves that problem.

In D14: +C12=C13

It shows *false*, indicating that the values in C12 and C13 are not equal.

If you change the values in C6 and C7 to be equal, you will see D14 become *true* while the two cells above show *false*. *VisiCalc* can now determine which paths are critical. We are going to enter formulas in E12 and E13 that will determine the critical path.

The formulas in each cell will have to be able to determine two things. First, is the cell to the left (D12 or D13) displaying *true?* If it is *true*, then *VisiCalc* should display a series of asterisks indicating the critical path. If it is *false*, then *VisiCalc* should either display no asterisks if the other path is critical, or determine if both paths are critical. If both are critical, it should display asterisks.

Sounds like a tall order, but it's relatively simple. The *if* logic function will return a specified value if the logic statement is true. It will return a different specified value if the logical value is false. We can combine two *if* statements in E12 to evaluate the logic values in cells D12 and D14. Two more *if* statements in E13 to evaluate the logic values in D13 and D14 will complete the task.

In E12: @IF(D12,20,0)+@IF(D14,20,0) RETURN /F*
In E13: @IF(D13,20,0)+@IF(D14,20,0) RETURN /F*

That's all there is to it! Go change the values in C6 and C7 and watch the results in E12 and E13; see figure 6.

The first *if* statement looks at the value in the cell to its left. If the value is *true* (indicating a critical path), it will fill the cell with asterisks. It will display no asterisks if the statement is *false*. Then the formula looks at the second *if* statement. It will evaluate the equality statement in D14 for *true* or *false*. If it sees a *true*, indicating both paths are equal (critical) it will return 20 asterisks. If it sees a *false*, indicating one of the paths is critical, it will return 0 asterisks. Asterisks will only be displayed if the cell indicates a critical path.

We could actually have combined D12 and E12 like this: @IF((C12>C13),20,0) + @IF((D12=D13),20,0). We could similarly have combined D13 and E13. Once you understand how to use the functions, you will want to conserve space in your templates by combining functions. Be certain you really are ready to combine functions first because, as you can see by looking at the formula above, it becomes much harder to spot where you have a problem.

By now you might have wondered: if it is so easy to display the critical path graphically, why don't we do it on our PERT chart? Okay, let's. It will be *almost* as simple as replicating the formulas in E12 and E13.

We'll start with the hardest part. Cells D19 and D25 should display asterisks no matter which path is critical. In order to

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4	ACTIVITY	DAYS	START	END
5	ONE	10	0	10
6	TWO	16	10	26
7	THREE	16	10	26
8	FOUR	22	26	48
9				
10		PATHS ACTIVITY	LOGIC CRITICAL	
11		DAYS		PATH
12	1-2-4	48	FALSE	*******
13	1-3-4	48	FALSE	*******
14			TRUE	
15				
16				
17				
18			ACT. ONE	
19			*********	
20		*********	*********	**********
21		*********		**********
22		ACT. TWO		ACT. THREE
23		**********		**********
24		**********	*********	**********
25			*********	
26			ACT. FOUR	

Figure 6.

display the asterisks in those cells, we could simply enter +E12+E13 in the cells that are used by both paths. That would display asterisks if there were values in either cell. But we don't want this to be too easy (although that's usually what you'll want to achieve). Let's try a little more complicated method that offers another chance to use *if* statements.

The *if* statement to enter in D19, D20, D24, and D25 is:

@IF(D14,@SUM(E12...E13,20

Let's see what we've done. The *if* function will evaluate D14 for *true* or *false*. If it is *false*, we can assume that there are more days in one of the two paths and the formula will return the last value in the function: 20. If D14 is *true*, we only know that both paths have an equal number of days. There might or there might not be values entered in those cells. In either case, asterisks will be displayed. If you had summed E5 through E8 instead of E12 and E13, asterisks would only have appeared if there were days assigned to the activities.

If you haven't yet, enter the *if* function into the four cells shown above. Next, copy or replicate the formula in E12 into C20, C21, C23, and C24. Likewise, copy or replicate the formula in E13 into E20, E21, E23, and E24.

We have now completed our very simple PERT chart with CPM (see figure 7). Because of forward referencing (which we discussed last month), it will sometimes take an additional manual recalculation in order to ensure that the model is correct. Try the PERT chart out. Change the activity days in C5 through C8 and watch the critical path change. You will quickly notice that changes to C5 and C8 will not affect the critical path. That's because they are in both paths. Both paths will be defined by asterisks if there are no values in the activity days cells or if the two paths are both critical.

A normal project will be more complex than the one we've just completed, but the principles will be the same. There will be a critical path defined by those activities that are critical to the completion of the project on a specific schedule.

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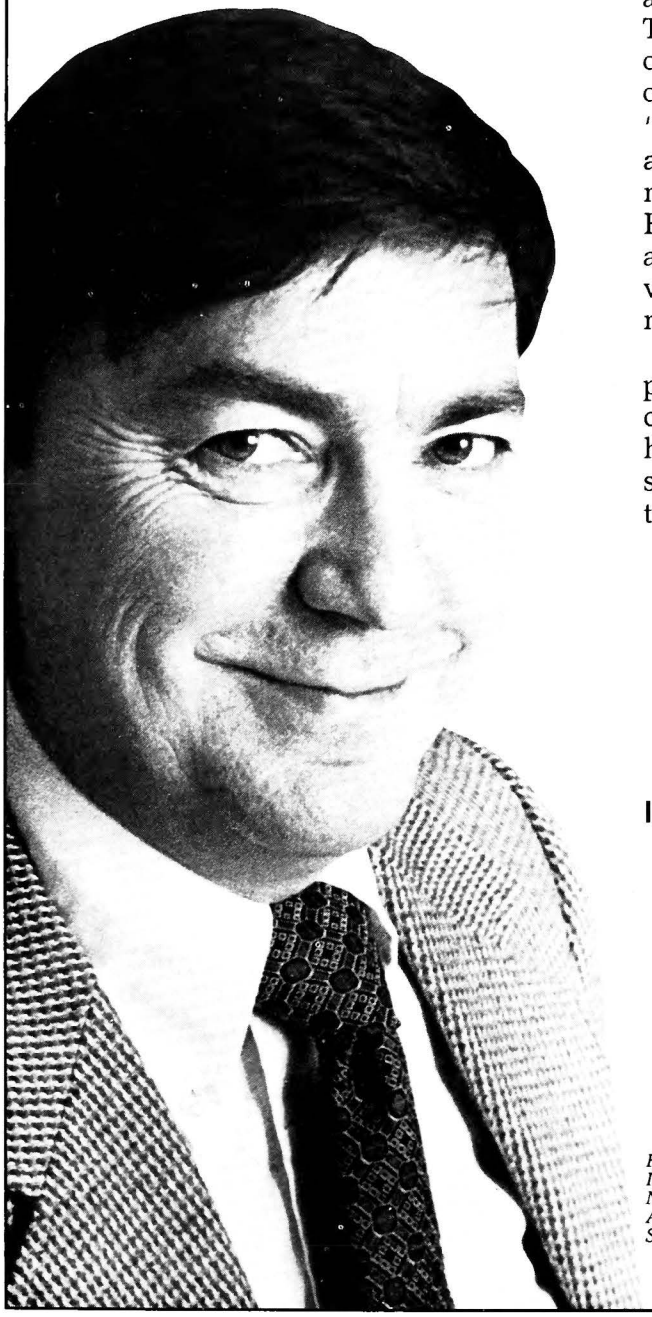
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Richard Hongisto began his political career as Sheriff in San Francisco in 1972. In 1977, he took over as Police Chief in Cleveland, Ohio, and later moved on to New York, where he became Commissioner of Correctional Services. After returning to San Francisco he was elected as a San Francisco City Supervisor on November 7, 1980.

	B	C	D	E
4	ACTIVITY	DAYS	START	END
5	ONE	10	0	10
6	TWO	18	10	28
7	THREE	16	10	26
8	FOUR	22	28	50
9				
10		PATHS ACTIVITY	LOGIC CRITICAL	
11		DAYS		PATH
12	1-2-4	50	TRUE	*******
13	1-3-4	48	FALSE	
14			FALSE	
15				
16				
17				
18			ACT. ONE	
19			********	
20		*********	********	
21		*********		
22		ACT. TWO		ACT. THREE
23		*********		
24		*********	*********	
25			*********	
26			ACT. FOUR	

Figure 7.

Project and Activity Slack. Speaking of completing a project on a schedule, we should still discusss one other concept usually associated with PERT and CPM. As mentioned earlier, projects have a start date and an expected completion date. In addition, projects usually have a contractual date by when the project must be completed. In PERT terms, this contractual date is called the late completion date. If forty-five days are required to complete the project, and the contractual late completion date is fifty-two days, we can say the project has seven days of project slack. That is, the critical path completion day can slip by seven days without extending beyond the contractual (late completion) date.

Likewise, activities can have activity slack. Activity slack is the excess time that an activity can take before it becomes part of the critical path. In table 1, activity two has two days of activity slack before it becomes a critical activity.

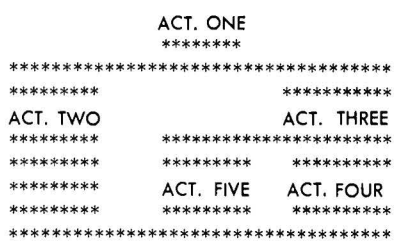


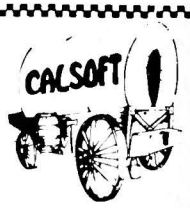
Figure 8.

More Complex PERT Charts. We have completed a very simple PERT chart with Critical Path Management. Most PERT charts are much more complicated than this. The simple logic functions we've used won't be able to handle a more complicated PERT because of the way we determined the critical path. The PERT chart in figure 8 has just one more possible path, and yet it is much more complicated.

Next month we'll complete the PERT shown in figure 8, learn more about logic functions, and learn how to determine both project and activity slack. Your assignment, should you choose to accept it, is to complete the last PERT and then compare your answer to the one that will be given next month. (There's more than one way to do it. Good luck!) ■

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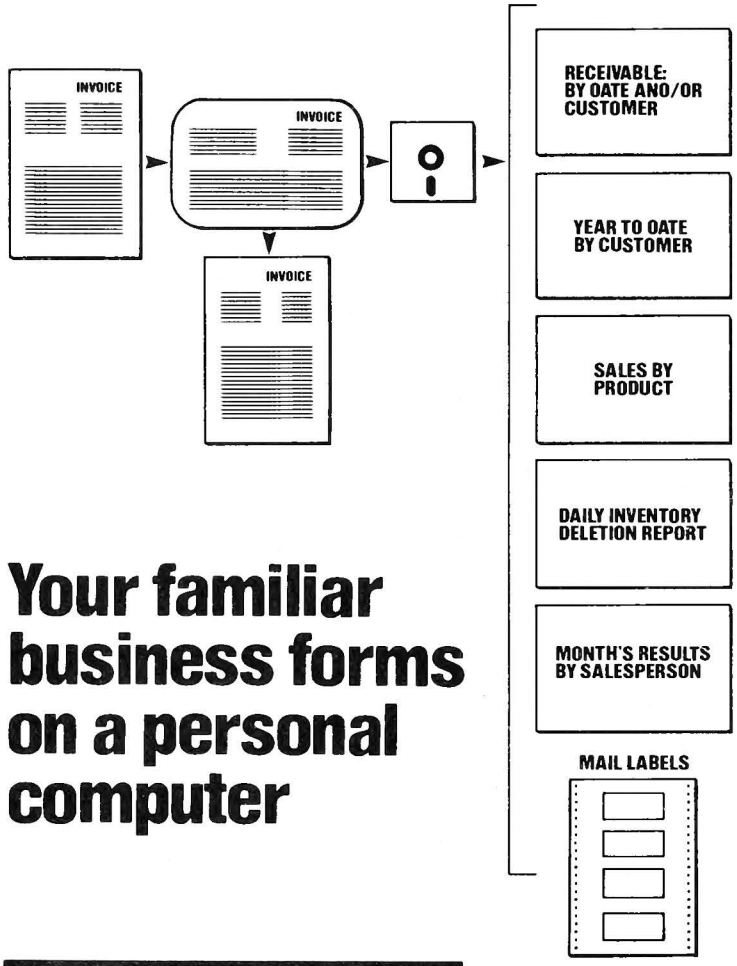
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Graphically Speaking



by Mark Pelczarski

This is the first part of a several part series on graphics and the Apple. The Apple has a lot of nice graphic capabilities that are not very difficult to use, but, as with any programming task, there are tricks that can help you take full advantage of them.

Try not to ask "why?" too much when looking at some of the more odd conventions of Apple graphics; it's easy to ask why now, but let's take a moment instead to appreciate the foresight used in the development of the Apple to include them at all.

A couple of years ago, most "state of the art" games were done in the 16-color, low-resolution block graphic mode . . . and we were impressed. Who would have guessed that hi-res graphic games such as *Raster Blaster* were hiding in the Apple, just waiting to get out, that long ago? Today, various graphic games on the Apple rival their big brothers in the arcades, and the capabilities for those were put there several years back. Amazing.

The first sin has already been committed by starting to talk about the various graphic modes, even using an abbreviation for one, before explaining what they are. There are two types of graphics built into the Apple. There's a low resolution mode that has sixteen colors, with the smallest unit being a block that's half the height and the same width as a text character. (You, too, can use computer jargon now, by calling this mode *lo-res*.) In the lo-res mode, the screen is forty blocks wide and forty-eight blocks in height (text mode has 40 characters across and twenty-four lines of type down the screen). There is also a high resolution mode that uses six colors (the books tell you eight, but they count black and white twice each, for a reason we'll see later). The *hi-res* mode lets you access two hundred-eighty points across the screen and one hundred-ninety two points down (a single text character is made up on a grid seven points across and eight down). It's the hi-res mode that most of these articles will discuss, since it provides much more flexibility with individual access to every point.

There are several commands in Applesoft Basic that give you control over both hi-res and lo-res graphics, but before we get into things you can do with those commands, it may be a good idea to talk about how the graphics work internally and about some of the strangenesses you may encounter. It may also be a little backwards, talking about bits and bytes before using the handy-dandy, ready-to-go Applesoft graphic commands, but it will also answer a lot of questions before they arise, as well as convince some of the more advanced among you that this isn't just going to be a series of using *hplot* and *shape tables*.

The hi-res graphics screen, 280 points by 192 points, corresponds directly to a portion of memory in the Apple. Every one of those points corresponds to a certain *bit* in memory and can be either on or off (lit or black).

A *bit* is the smallest unit of memory in a computer, and it is the result of an electrical state that is in one of two positions. Mathematicians gave numbers to those two positions, 0 and 1,

Making Binary Simple

Binary isn't really very difficult; it's just awkward to use. In a way, it works very much like the standard base 10 system (decimal), where each place stands for a power of 10. In decimal, the number 3,286 means three thousands (3 times 10 to the third), two hundreds (2 times 10 squared), eight tens (8 times 10 to the first), and six ones.

Base 10 — breakdown of the number 3286

10	10	10	10
1000s	100s	10s	1s
3	2	8	6

In binary, each place designates a power of two. The rightmost place is 2 to the zero power, or 1. The next place is 2 to the first, or 2. The next is 2 squared, or 4. The next is 2 to the third, or 8, and so on. The binary number 1101 is equivalent to the base 10 number 13, since it means that there is one 8, one 4, no 2's, and one 1.

Anatomy of a binary number — 1101

Power of 2	2	2	2	2
Decimal Values	8	4	2	1
Binary Number		1	1	0	1
Decimal Equivalent	8	+ 4	+ 0	+ 1	= 13

Another example, you say? How about 1011011?

2	2	2	2	2	2	2
64	32	16	8	4	2	1
1	0	1	1	0	1	1

64 + 0 + 16 + 8 + 0 + 2 + 1 = 91

So 1011011 in binary is the same as 91 decimal.

In one byte you have eight bits (Binary digITS), and the largest number possible is every bit set (=1).

2	2	2	2	2	2	2	2
128	64	32	16	8	4	2	1
1	1	1	1	1	1	1	1

128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 255

And that's the easy way to convert unsightly binary numbers to the nice, familiar decimal variety.

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and hence computers use binary arithmetic, which is base 2 (as opposed to our usual base 10). Eight bits in a group are a byte, and in a byte you can store the numbers 0 (00000000, each bit off) through 255 (11111111, each bit set). "Making Binary Simple" elaborates a little more on binary arithmetic, since it does come in handy when you want to do some tricky graphics, although if you sensibly stick to Applesoft graphics commands for a while, it's not really necessary.

Memory consists of about 64,000 bytes (64K bytes) in most Apples. Each byte has a memory address that lets you refer to it, so you can store things in that location or look and see what's there. Unless you have an additional 16K RAM card, the top 16K of addresses have programs permanently stored there (the programs that make Applesoft and all the "little" functions, like reading keys and putting letters on the screen). That type of memory is known as ROM, or read-only memory. The rest is RAM, or random access memory, in which you can store things and read things to your heart's content. That's the area where programs and data go when they get read from disk.

Most Apples have 48K of RAM. The hi-res graphics screen corresponds to 8K of RAM, or 8,192 bytes (although only 7,680 are actually used). There are two areas of memory that can be used for hi-res graphics, called hi-res page 1 and hi-res page 2. The addresses for page 1 are 8192 through 16383, and the addresses for page 2 are 16384 through 24575.

What does this all mean? Not much, except it perhaps convinces you that there's an actual area in the memory of your computer that has a one-to-one relation with what you see on the hi-res screen. To illustrate graphically, here's a program that does nothing particularly useful, but does show you that there's nothing really magic about displaying graphics.

```
10 HGR : POKE -16301,0
20 FOR L = 8192 TO 16383
30 POKE L,1
40 NEXT L
50 TEXT
```

Hgr is an Applesoft command that switches the display to hi-res page 1 and turns off every bit in page 1 graphics memory, thus clearing the screen to black. The *poke* command makes the bottom four lines of text disappear; more on that later. The loop defined at lines 20 and 40 says to repeat the statements in between with the variable L starting at 8192, increasing by 1 each time, until it reaches 16383 (conveniently, the addresses in graphics page 1 go from 8192 to 16383).

The statement *poke L, 1* says to put the value 1 into the byte with address L. The result should be to turn on one of the eight bits in that byte, and hence turn on one point on the screen. The last statement switches the display back to text, so that you don't think your computer's disappeared into Never-Never Land. Actually, a good hearty reset after things stop happening on the screen would do the same trick.

Try running the program to see what happens. When you put the number 1 into all those locations, a bunch of points should light up. Try changing the 1 in the *poke* statement to 255. That should set every point. How do you get colors? Try using the numbers 42, 85, 170, and 213, which are various concoctions of every other bit being set (00101010, 01010101, 10101010, and 11010101, in that order).

The trick is that points themselves are either on or off. Color depends on two things: position and the leftmost bit. Only seven of the eight bits in each byte are displayed on the screen. The leftmost bit controls the color of the other seven. Bits in even columns on the screen are violet or blue when they're turned on. Bits in odd columns are green or orange when on. If the leftmost bit (high bit) is off, the colors are violet and green. If the high bit is set (on), the colors are blue and orange. There is no actual white. When blue and orange are next to each other, they appear to be white; likewise with violet and green. Hence, there are two different whites possible, and similarly, two different blacks (high bit on and high bit off).

Try different numbers to see what happens. For those who want a challenge, try to find a way to *poke* in values that will make the entire screen orange or blue, and so on. The next article will deal with more conventional graphics commands through Applesoft before we eventually find our way back to bit graphics. ◨

Mark Pelczarski taught school at Sycamore High, Northern University, and DeKalb University in Illinois before they unmasked him as an imposter. Playing a mild-mannered editor for Softside *magazine before bursting into full glory as president of Penguin Software, Mark still believes in Truth, Justice, and the American Way.*

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CONTEST WINNERS

from page 4

your success—or merely your finish. Schroeder would be ashamed, because no one correctly identified Beethoven's Piano Concerto in C Minor.

Chet: Hurtling through space
With egg on your face.
David: I won't deny it
I said I could fly it.
Chet: And now we're lost somewhere
And act as if you don't care.
I'm *squeaking*! I'm cold.
It's all your fault for being so bold!
David: But, whose *idea* was it
To climb through the door and close it?
Chet: *You* said you could work it!
David: *You* completed the circuit!
But look at the sight
In the eternal night
With comets ablaze
And the far stars a haze.
I can't help thinking
With these diamonds blinking
That we're not really stuck
That we're actually in luck!
Wait! Did you see something vaguely awry?
With beings behind windows come hurtling by?
Chet: No silly! Your imagination is stripping your gears.
David: (aside) Small wonder, with company like you for 2000 years.

Merritt's Mug. Many, many readers searched the February *Softalk* for a picture of Jim Merritt, author of The Pascal Path, to enter in Merritt's Mug, and most of them found it. The mug referred to, of course (or so we assured Merritt), was the coffee mug on the table in the picture on page 151. Merritt was seated behind that table, looking (so two entrants mentioned) like someone had just stolen his *Softalk*.

Full page ads, such as the one in which Merritt's picture appeared, often are not numbered. A few apparently young readers dealt with this by locating Merritt on page 150, the number of the opposite page and the only page number on the spread. Since there was no picture at all on page 150, we credited these answers as correct.

Winning depended on being the first correct entry from your time zone, and two time zones produced solo individuals whose postmarks beat all others from their zones. George Bass must have opened right to Merritt when his *Softalk* arrived in Williamsburg, Virginia; and Brad Handler probably played hookey from school in Denver, Colorado, just to get his entry in return mail. Mike Morford (Ames, IA) and Steve Parkinson (Huntington Beach, CA) each had to contend with one other equally rapid responder in the random generator.

Each winner receives $25 credit at his local retailer.

By the way, Jim Merritt, who had no inkling of the contest beforehand, also identified his picture correctly. It was, he said, the absolutely worst picture of himself he had ever seen. Merritt, unfortunately, was too late with his entry to win any prizes. ■

Computerland To Go Fruitless?

Apple Computer Inc. announced late last month that they were severing their contract with Computerland. In a letter to each Computerland franchisee, Apple president Mike Markkula explained that Computerland Corporate's unwillingness to grant the standard location clause required by Apple was the cause for the dissolution.

The contract between Apple and Computerland is an ongoing one and the letter complied with a clause requiring ninety days' notice to terminate. Unless some rapprochement occurs, that means that approximately July 19 all Computerland stores that are not directly recognized as dealers by Apple will cease to have access to Apple product.

The caveat "unless some rapprochement occurs" is advisable here. Computerland dealers contacted for comment seemed relatively unconcerned. Most cited a similar occurrence two years ago that was patched over and believed that Apple's current action was merely, as Max Cook of Computerland of South King County, Washington, put it, "establishing a negotiating position."

Fred Hoar, vice president of communications for Apple, cited the olive branch extended to individual dealers in the letter. That paragraph encourages individual Computerland franchisees to apply for an Apple dealership. Hoar indicated that much of the screening process for new Apple dealer applicants will be waived for existing Computerlands. Several Computerland stores already are recognized by Apple as dealers.

The crux of the impasse is control of the selling environment. Apple seeks to enforce upon Computerland its standard location clause which allows Apple to nix a location too near an existing dealership. Computerland insists on the right to establish their franchises as they see fit.

The issue is fairly crucial for both companies. Should Apple allow Computerland franchises to open at any location, it would tend to devalue independent Apple dealership locations. This has happened at least in Chicago suburbs and Albuquerque.

In the Chicago area, Apple refused a dealer applicant who wanted to open near a successful independent Apple dealer. The applicant then made a deal with Computerland and opened in the previously rejected location.

In Albuquerque, the independent Apple dealer has been bracketed by Computerland and Micro Age franchises.

Computerland, however, will be hard pressed no matter which way the negotiations go. If they accede to Apple's desires, they may be forcing new franchisees that carry Apple into less desirable territories or granting desirable locations without the authority to sell Apples, either way devaluing the franchise. If they elect to go without an Apple agreement, the franchise is likewise devalued by losing one of its two main product lines.

Although the business relationship between the two firms has been rocky at times, each has contributed mightily to the success of the other.

Just a day before Apple released its letter, a midwestern Computerland franchisee was musing on his good fortune, having both the Apple and the IBM to sell. Likewise, Apple overtook Tandy as the leading manufacturer of personal computers largely on the strength of the Computerland merchandising network.

There are no observers who are not saddened by this potential break.

At the present time, the effect on the end user will be nil. But should the contract actually be terminated, some Computerland franchisees may have their supply of Apple products cut off. All Computerland dealers contacted indicated plans to continue carrying products made by and for Apple, but *Softalk* readers should monitor the situation carefully to ensure that their local Computerland will continue to support its installed user base. ■

Speech Synthesizers

from page 156

ing before consistent understanding can be achieved; hence the *Echo II* may be more appropriate for the presentation of longer utterances—phrases or whole sentences—than for single words. Listeners automatically use the context provided by a sentence to determine the meanings of strange-sounding words that would be hard to understand if the system pronounced them in isolation.

The *Echo II* is very easy to set up. It offers a low-cost means of presenting an essentially unlimited set of English sentences, although with imperfect intelligibility, and it imposes low memory overhead.

SuperTalker SD200. *SuperTalker*'s technique for producing speech is very different from that of *Type'n'Talk* or the *Echo II*. Instead of synthesizing speech artificially, *SuperTalker* digitizes real human speech spoken into a microphone, compresses and stores the speech, and later retrieves, decompresses, and plays it back. As a consequence, *SuperTalker* speech can sound more like ordinary human speech.

Two prices must be paid for this naturalness, however. One of these is memory consumption. Every stored word or phrase requires hundreds or even thousands of bytes of memory and mass storage. The second price is flexibility. The only utterances that *SuperTalker* can make are those that have been recorded by the programmer. The user cannot key in a novel text string and hear it said by the computer.

Physically, the *SuperTalker* SD200 system consists of a printed circuit board, a microphone that plugs into one jack on the board, and an eight-ohm speaker that plugs into another jack on the board. In addition, the SD200 disk is provided with utility and demonstration programs. The disk includes a program called *SuperTalker Test* that most users will want to try first. It allows the user simply to record and play back a message. The program can easily be modified for experimenting with different volumes and digitizing rates.

SuperTalker works by measuring the speech input at rapid rates. The user chooses whether to digitize the speech input at ½K bytes per second, 1K bytes per second, 2K bytes per second, or 4K bytes per second. The digitized representation is compressed by means of a technique known as *delta modulation*, and then further compressed by coding repetitive patterns in the data. As a result, stored speech may require only half as much space in memory as the digitization rate would lead one to expect. This means that one second of speech recorded at 4K bytes per second may require only 2K bytes of memory.

For most purposes, only the 2K and 4K byte per second digitization rates are practical. Lower rates do not produce intelligible speech on playback. Reducing the digitization rate adds static to the transmission. Even at 4K bytes per second the speech can be somewhat fuzzy. There is no question, however, that this computer-produced speech is much more intelligible to the unpracticed ear than the two synthesis-based products previously discussed.

One advantage of a recording technique such as *SuperTalker*'s is that it is easy to produce speech with natural expression. A second, possibly greater, advantage is that the technique allows the use of distinctive individual voices and the voices of both sexes.

To use *SuperTalker* for applications, one must employ a two-stage process. First, a *Vocal Preparation System* (*VPS*) is used to record all the words or phrases that will be played back later, under program control. To use this utility, the programmer simply runs *VPS*. A seventy-three page document, the *SuperTalker* Operating Manual, explains how to use *VPS* and how to access from Basic the phrase tables created with *VPS*. The new user will find it necessary to practice with *VPS* for a while before creating and editing phrase tables becomes natural and convenient.

Feotures / Technology	Votrax Type'n'Talk	Street Electronics Echo II	Mountain Computer Supertolker SD200 *	Micromint Micramouth
Technology	Synthesis (formont)	Synthesis (LPC)	Record and playback	Playback pre-recorded
Memory requirements Fixed	0	< 8K bytes	<1K bytes	< 100 bytes
Per spoken word, (in bytes)	2–40	2–40	500–4000	1
Number of possible utterances	Unlimited	Unlimited	Unlimited	144
Approximate number of secs of speech ovoilable withaut disk access	2000	2000	18	180
Programming language compatability				
Basic	Y	Y	Y	Y
Poscal	Y	Y **	N	Y
Intelligibility	Foir	Foir—Good	Very good	Excellent
Hardware requirements	Serial Interface, cable, speaker or headphanes	48K Apple, disk drive	48K Apple, disk drive	Speaker or headphones

Figure 1. A comporison of feotures for four speech output devices for the Apple II

* The memory requirements ond intelligibility estimotes given for the Mountoin Computer Supertolker SD200 ore bosed on o 4K byte per second recording rote. Lower recording rotes reduce both memory requirements ond intelligibility.

** Poscol softwore for the Echo II provides phoneme control only. Text-to-speech olgorithm not ovoiloble for Poscol.

Because *SuperTalker*'s primary strength relative to the speech synthesis products is intelligibility, the memory requirement comparisons made in figure 1 assume digitization at the maximum rate of 4K bytes per second. At lower rates, intelligibility and memory demands both decline.

The demonstration programs provided include *Talking Color Math* and *Accent*. *Talking Color Math* is a voice-output version of Apple's original *Color Math* demo. *Accent* is a program that permits the user to develop foreign language drills using *SuperTalker*. In addition, Mountain Computer markets a separate disk with a spelling drill program. This is the type of application for which the *SuperTalker* is best suited. Only a few words need be loaded from the disk at any one time; the memory requirements of the main program are not very great; and intelligibility is very important, because the words are spoken without context.

SuperTalker is not ideal for applications that require that a good deal of spoken vocabulary remain in memory (because the delay of a disk access to retrieve the speech data is unacceptable). If the program must be able to accept and pronounce arbitrary English strings entered at the keyboard, then one of the speech synthesis products should be chosen.

Micromint Micromouth. The *Micromouth* speech synthesizer interface is the only one of the four described in this article that does not have an unbounded vocabulary. Instead, the user is restricted to 144 "canned" words and phrases contained in two 64K bit ROMS. The payoffs, for those applications that can make use of this restricted vocabulary set, are ease of use, virtually insignificant memory requirements, and very high intelligibility.

Micromouth is instructed to speak by *poking* an address of slots 1 to 7 in the Apple II. Its heart is the National Semiconductor DT-1050 Digitalker speech synthesizer chip set, which includes the two aforementioned 64K bit ROMs and a speech processor chip. The ROMs contain compressed digital recordings of the 144-item vocabulary.

A comprehensive set of compression procedures was applied to a digitized representation of each recorded speech item, in order to achieve the level of speech data packing provided by this chip set. The equipment and algorithms used to

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produce these compressed speech representations are not available to the end user, so the programmer must make do with what is available in ROM from National Semiconductor.

The speech processor chip effectively reverses all of the compression techniques originally applied to the digitized speech at playback time. It then converts the derived digital signal into analog output, which is amplified and can be heard over your headphones or speakers.

Micromouth is instructed to speak by *poking* an address (which one depends upon the slot that *Micromouth* is installed in) with the number of the prerecorded item you want to hear. Item numbers are from 0 to 143. *Poking* with a larger value than 143 can result in some very strange sounds—you might want to try it. If two utterances are to be made in short succession, it is necessary to make sure that *Micromouth* has finished saying the first item before instructing it to say the second. This is done by *peeking* the address until it returns to the "ready to speak" value. Apple Pascal programmers can *poke* and *peek* using a technique based on Pascal's variant record feature.

Several features make it possible to produce utterances other than the basic 144. Certain of the vocabulary items are designed to be combined with others to produce new words. *Kilo-*, for example, has no pause after it, so it can be combined with *gram* or *meter* to produce *kilogram* and *kilometer*. In addition, *-ss* is a plural ending that can be added to nouns in *Micromouth*'s vocabulary. More possibilities are opened up when the programmer takes advantage of English homophony—the fact that many words with different meanings (and different spellings) sound the same. The word *two* can also be uttered to mean *to* and *too*, for example; and *four* can be said for *for*.

The 144 words and phrases encoded in *Micromouth* include the names of the letters of the alphabet, the numbers zero through nineteen, plus twenty, thirty, forty, . . . ninety, hundred, thousand, and million. In addition, some mathematical function words (such as plus, minus, and equal) and many expressions of measurement (pounds, kilo, gram, minute, and others) are included. Other useful words, such as again, cancel, case, check, control, dollar, down, have, higher, lower, left, right, ready, space, speed, star, than, time, and weight are also included. (All but one of the 144 vocabulary items are pronounced in a male voice. Item 0 is "This is Digitalker" in a clearly female voice.)

This collection of utterances can be employed in a surprisingly large number of applications. A talking calculator is one possibility. A number of games could be designed that would make use of the fixed vocabulary. Of course, English text could not be read out loud by the device, except one letter at a time.

Micromouth's clear diction and the low memory demands of the system may make it appropriate for a number of process control applications. Important changes in monitored processes (such as pressure at crucial points in a steam power generation system) could be announced vocally, in addition to or instead of a screen warning.

National Semiconductor will produce new ROM chips for use with the Digitalker speech processor chip. Visually handicapped programmers would benefit from vocabularies that include the reserved words of programming languages such as Basic and Pascal. It would be an easy matter to have a program read aloud by an Apple with a *Micromouth* board with these ROMs installed.

The *Micromouth* speech synthesizer interface is appropriate for applications that require only the 144 words and phrases it provides. It produces very natural-sounding, intelligible speech, while requiring very little memory. ❑■

Micromint, 917 Midway, Woodmere, NY 11598; (800) 645-3479. Mountain Computer, 3800 Harvey West Boulevard, Santa Cruz, CA 95060; (408) 438-6650. Street Electronics, 3152 E. La Palma Avenue, Suite D, Anaheim, CA 92806; (714) 632-9950. Votrax, 500 Stephenson Highway, Troy, MI 48084; (800) 521-1350.

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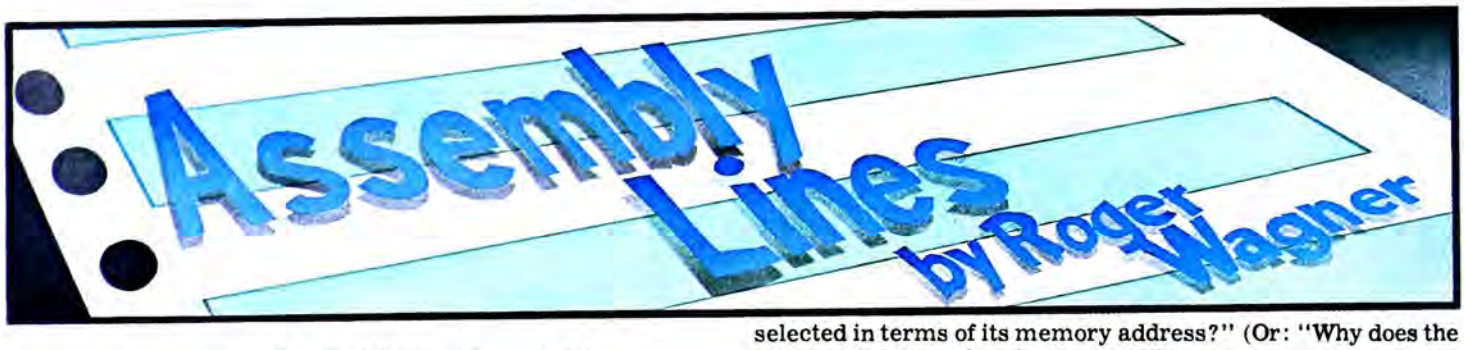
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Everyone's Guide to Assembly Language, Part 20

In the preceding discussions of hi-res graphics, we've relied on the existing Applesoft Basic routines to do the necessary plotting of points from machine language. From your previous experience with Applesoft and even from the last hi-res moving-dot programs presented, you may have noticed certain peculiarities about hi-res graphics. The problems lie in certain intrinsic shortcomings in the explanation of hi-res graphics offered in this column so far.

To explore this area further, let's examine, one by one, a number of problems that can occur—and thus discover the underlying structure of the hi-res display screen.

Loading a Hi-res Screen: the "Fill" Effect. The fundamental question to be answered in this discussion is, "How are individual points plotted on the screen?" It should be relatively easy to accept the notion that to display a screen whose appearance can be arbitrarily changed, the RAM portion of the computer must be used. The area used is the range of memory from $2000 to $3FFF (8192–16383 decimal). This is called the page one hi-res display. The Apple II is also capable of displaying an alternate memory range, however. This is called, cleverly enough, the page two hi-res display. This display is derived from the data contained in the memory range $4000–$5FFF.

This article will focus primarily on page one, although for the most part, page two can be considered to be just a simple offset from page one.

It should also be intuitively obvious that the display must in some way be linked to the actual contents of each byte in the ranges mentioned. This can be easily investigated by doing the following:

From Applesoft Basic, select and clear the page one hi-res display by typing in: *hgr*. If the cursor is not still visible, press return until it reappears at the bottom of the screen.

Now enter the Monitor with a *call −151*. The first thing to do is to fill memory with a sample value. Do this by entering the following:

```
2000:FF
2001<2000.3FFFM
```

When you press return, the screen should rapidly fill to white. Enter control-C to return to Basic. Let's save the screen now by placing a convenient disk in the drive and entering:

```
BSAVE TESTPIC,A$2000,L$1FFF
```

Besides providing the information on how to save a hi-res image, the purpose of this instruction was to allow you to watch the screen fill at a little slower pace. You may have noticed when you filled the screen just now that it did not fill in an exactly continuous pattern, line-by-line from top to bottom. It did happen rather quickly, though.

Clear the screen by typing *hgr* again, and now load the data from disk back into memory by typing:

```
BLOAD TESTPIC
```

This time the screen should fill more slowly, and the somewhat strange pattern this generates will be more apparent. So now our problem is: "How is a vertical screen position (line) selected in terms of its memory address?" (Or: "Why does the screen load in such a funny way?")

Your first impulse might be to say "Well, if I were designing the computer, I'd just multiply the number of the line I wanted by the number of bytes per line to get the base address (the address of the first byte of the line) for the line. For example, if each line took forty bytes (which, by the way, it does), line zero would have a base address of $2000. Line 1 would be $2000 + 1*$28 ($28 = 40 decimal) = $2028. Line 2 would be $2000 + 2*$28 = $2050, and so on.

An additional benefit would show up in the form of some unused bytes on the hi-res page. For 192 lines, the last address used would be $2000 + (192*$28) −1 = $3DFF. Since we've allotted the area from $2000 to $3FFF for page one, this would leave $200 (512 decimal) bytes left over!

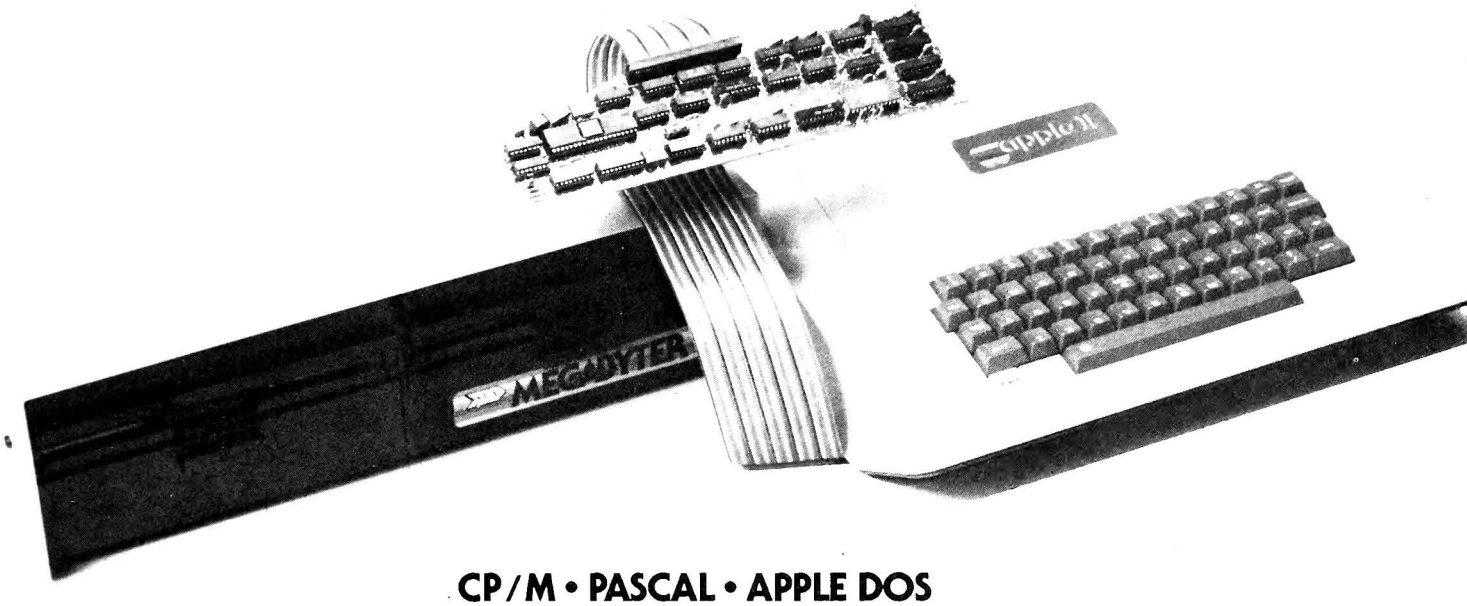
Unfortunately, that's not the way the Apple was set up. It turns out that multiplication routines are kind of a drag in terms of speed and memory usage, unless you're using exact multiples of two. A much more compact (and faster) algorithm is:

```
                      1  ************************
                      2  *  HI-RES BASE ADDRESS  *
                      3  *  CALCULATOR ROUTINE.  *
                      4  ************************
                      5  *
                      6          OBJ   $300
                      7          ORG   $300
                      8  *
                      9  GBAS    EQU   $26
                      10 HPAG    EQU   $E6
                      11 *
                      12 *
0300: 48              13 ENTRY   PHA              ;CALCULATES BASE
0301: 29 C0           14         AND   #$C0       ;ADDRESS FOR Y-COORD
0303: 4A              15         LSR              ;IN ACCUMULATOR.
0304: 4A              16         LSR              ;GBAS = ADDRESS OF
0305: 05 26           17         ORA   GBAS       ;1ST BYTE OF LINE
0309: 68              20         PLA              ;SPECIFIED
030A: 85 27           21         STA   GBAS+1
030C: 0A              22         ASL
030D: 0A              23         ASL
030E: 0A              24         ASL
030F: 26 27           25         ROL   GBAS+1
0311: 0A              26         ASL
0312: 26 27           27         ROL   GBAS+1
0314: 66 26           28         ROR   GBAS
                      29 *
0316: A5 27           30         LDA   GBAS+1
0318: 29 1F           31         AND   #$1F
031A: 05 E6           32         ORA   HPAG
031C: 85 27           33         STA   GBAS+1
                      34 *
031E: 60              35 DONE    RTS
```

Although it's not perhaps obvious how this works, the routine does take any value in the accumulator, from 0 to 191, and return the appropriate base address of the corresponding line in locations $26,27 (GBAS). This code is "stolen" from a similar routine in the Applesoft hi-res routine HPOSN ($F411) mentioned last month.

The overall pattern to the screen filling operation is as follows. The first forty bytes of memory correspond to line 0 of the screen display. The next forty bytes form line 63, and the next forty bytes line 127. At the end of the line 127 is a block of eight unused bytes. (3 * 40 + 8 = 128 bytes). This pattern is re-

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peated sixty-three more times to create all 192 screen lines. (3 * 64 = 192 lines; 64 * 128 bytes = 8,192 bytes per hi-res page.)

When a hi-res page is loaded from disk, the range of memory is filled sequentially from $2000 to $3FFF. What you see on the screen are twenty-four screen blocks, each consisting of eight lines gradually being filled. The twenty-four blocks can also be viewed as eight triplets, with the triplet made up of three lines, one line each at the top, middle, and bottom portions of the screen. The general screen fill pattern then is: 0,63,127; 1,64,128; 2,65,129; . . . 62,126,191.

It is not essential at this point that you be entirely fluent in terms of which line corresponds to which memory range; only that you realize that the screen does not fill in quite the pattern that might otherwise be expected. Fortunately, the routine just given can calculate the base address of any horizontal line we wish to access.

Problem 2: Shifting Colors. Type in the following:

```
HGR
HCOLOR = 1
HPLOT 0,0
CALL 62454
```

```
HCOLOR = 5
HPLOT 0,0 TO 100,100
```

The first two steps are fairly innocent; they merely select and clear the hi-res page, and set the color to green. Trying to plot 0,0 gives the first problem: it doesn't seem to work. This is consistent with the warning given earlier, that even-numbered colors only plot even coordinates, and odd-numbered colors only plot odd coordinates. Green, being an odd-value color, is not plotted at X = 0.

The *call 62454* is a call to a routine that clears the screen to the last color plotted (whether or not the result was visible). After you set the color to orange *(hcolor=5),* an attempt to draw a diagonal line produces a series of rectangles. What accounts for both of these effects?

You'll recall that forty bytes per line are used to hold the data to display the 280 dot positions on each line. There are eight bits in a byte, indicating we have a total of 320 bits to work with. As it happens, only seven of each eight are used in mapping the displayed screen dots (7 * 40 = 280 dots).

Consider the illustration in figure 1.

What the diagram shows is the color and position assign-

Address:	$2000								$2001								$2002							
Bit:	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
	V	G	V	G	V	G	V	0	G	V	G	V	G	V	G	0	V	G	V	G	V	G	V	0
Hcolor:	B	O	B	O	B	O	B	0	O	B	O	B	O	B	O	1	B	O	B	O	B	O	B	1
X coordinate:	0	1	2	3	4	5	6	—	7	8	9	10	11	12	13	—	14	15	16	17	18	19	20	—

Figure 1.

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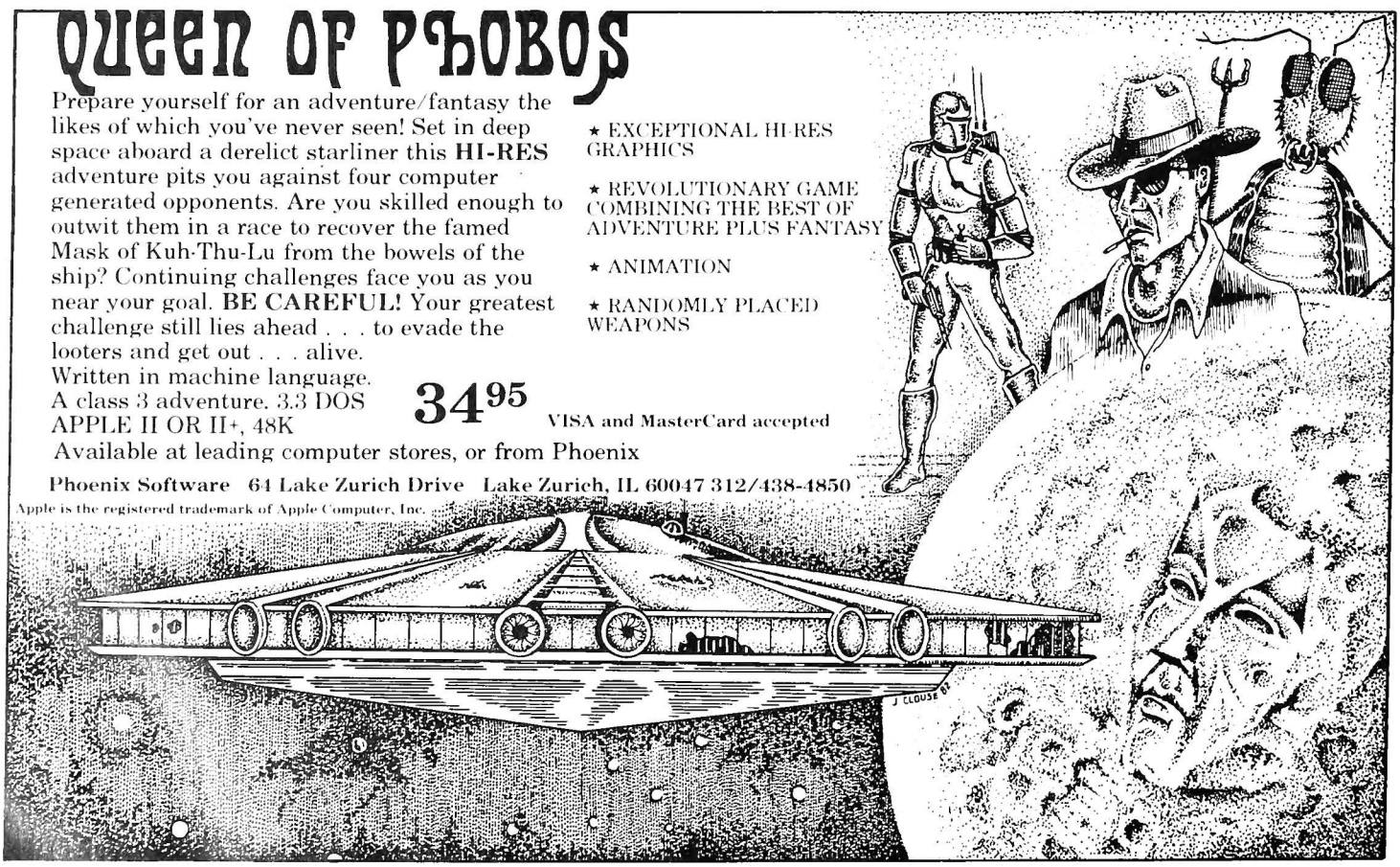
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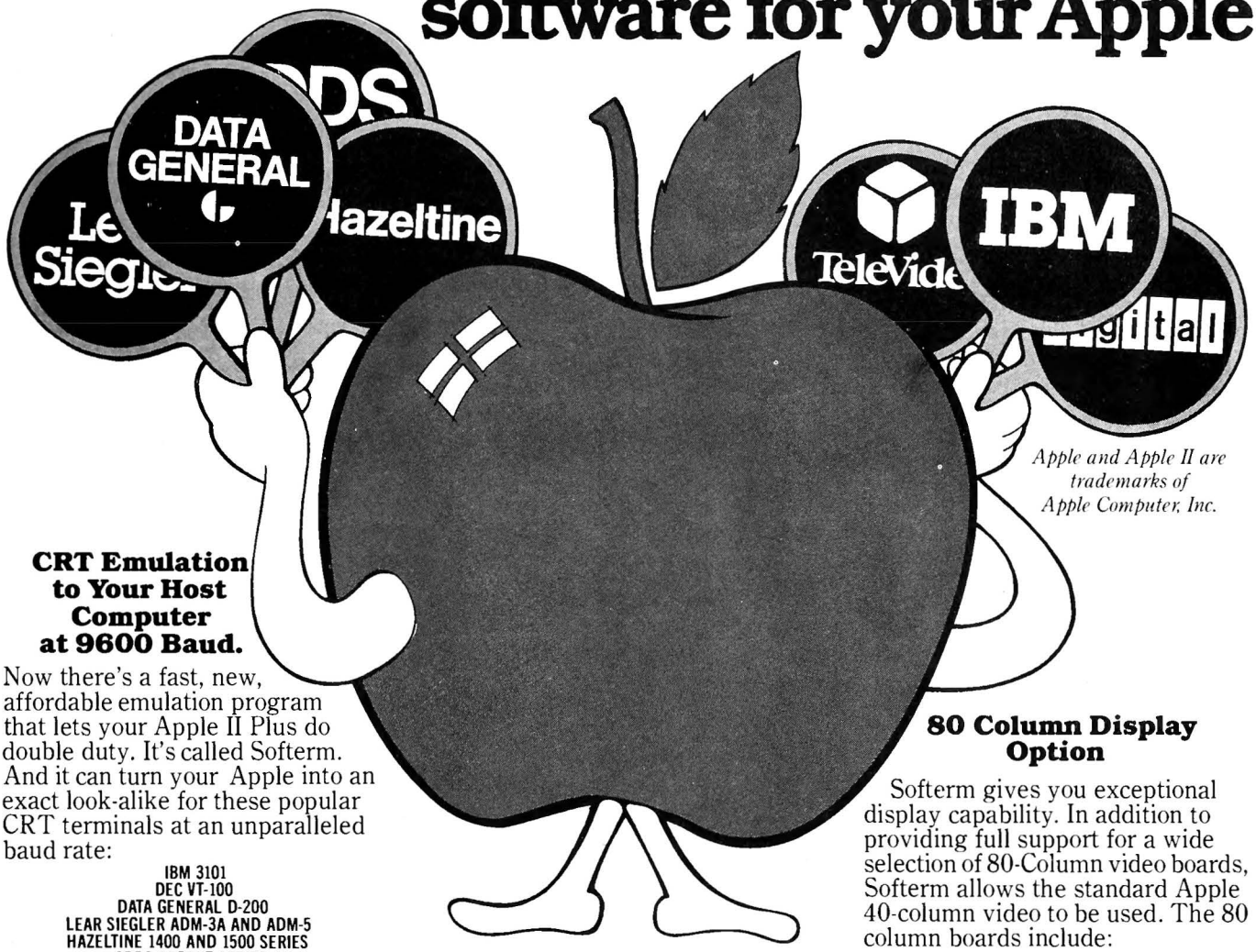
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Set 1	Set 2
0 = Black1	4 = Block 2
1 = Green	5 = Oronge
2 = Violet	6 = Blue
3 = White1	7 = White2

Figure 2.

ment of each bit within the first three bytes of memory for the hi-res screen display. Although only the first three bytes of line 0 are shown, the pattern holds for the entire display.

Note the following major points:

1. Not every color can be displayed at every X coordinate. Specifically, even colors (violet=2, blue=4) are available only on even X coordinates. Odd colors (green=1, orange=5) are available only at odd X coordinates.

2. Within any byte, bit 7 is used to determine which row—top or bottom—is selected. This means that for any particular group of seven dot positions, represented by a single byte, only the colors in *either* the top or bottom rows can be shown at one time. For example, it is *not* possible to have green and orange dots displayed simultaneously within the same seven dot group.

3. The order of the colors within every other byte is reversed with respect to its neighbors. This is to ensure that the individual colors properly alternate with successive X positions, such as between bytes 0 and 1, 1 and 2, and so on.

The color chart is shown in figure 2.

Now perhaps it will make a little more sense. Set 1 colors are all those selected with the high order bit off (bit 7 = 0). Set 2 are all those selected when the high order bit is on (bit 7 = 1).

Any attempt to plot a point from one set will convert any existing dots from the other set, provided all dots are defined within a common byte. Obviously, plotting a dot at X coordinate 7 (byte $2001) will not have any effect on dot positions 0 to 6, since they are stored in a separate byte ($2000).

White is drawn by turning on two adjacent dots, either a violet-green pair for white1, or a blue-orange pair for white2. Conversely, black is formally done by turning off two dots at once, the pair of which would correspond to the ones used for a white plot as just described.

Within a particular byte, bit 7 will always be left in a state determined by the nature of the last color plot, regardless of how many dots were previously in some other particular condition. This is why the diagonal line plot acted so strangely. By clearing the screen to green, every screen byte was set so as to have the green bits on, and the violet bits off (bit 7 = 0). See figure 3.

Location $2000, for example, would hold the value $2A. Since the pattern is shifted for $2001, an all-green dot group would correspond to the value $55. To add to the confusion, remember that figure 1 shows the bits in the reverse order from the notation normally used in this series of articles. Ordinarily, we'd show location $2000 holding a $2A in binary notation as: 00101010. Since the screen dots are displayed by least significant position first, though, this is reversed when showing a screen display, to make it easier to interpret:

$2A = 00101010 => (reverse to motch figure 1) => 01010100

and for the other bytes:

$5A = 01010101 => (reversed) => 10101010

When *hplot* tried to draw an orange dot at 0,0 we would ordinarily expect no effect. However, the high bit was reversed, and this converted the display of all current green dots to orange.

At all odd coordinates the direct plot is successful, but all remaining dots in the particular byte are still converted to their high-bit-on equivalents.

Figure 4 represents the contents of $2000–$2002 after the orange *hplot*.

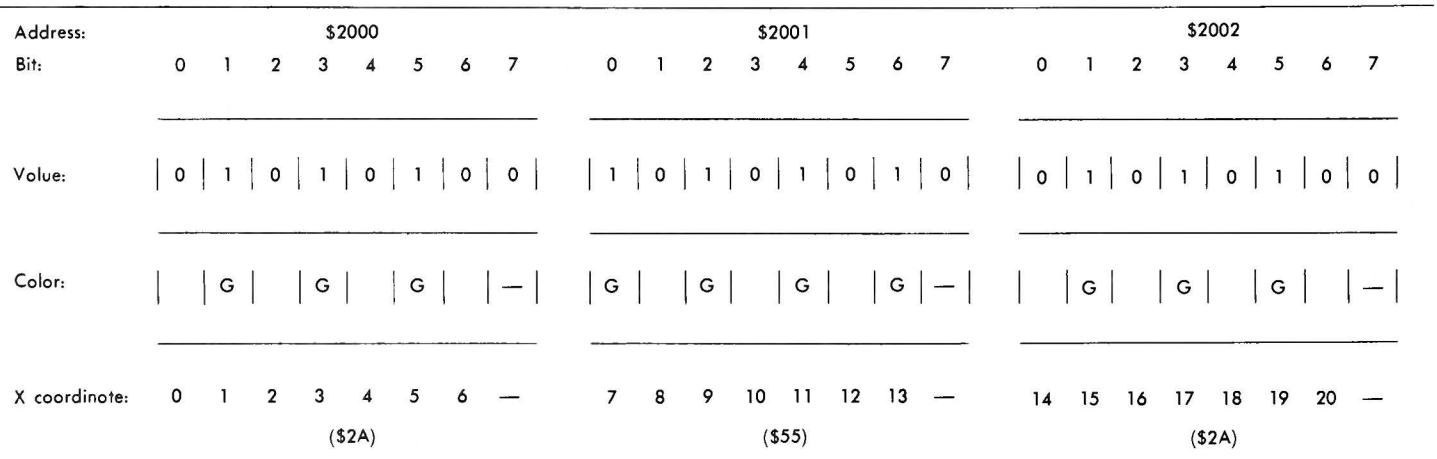


Figure 3.

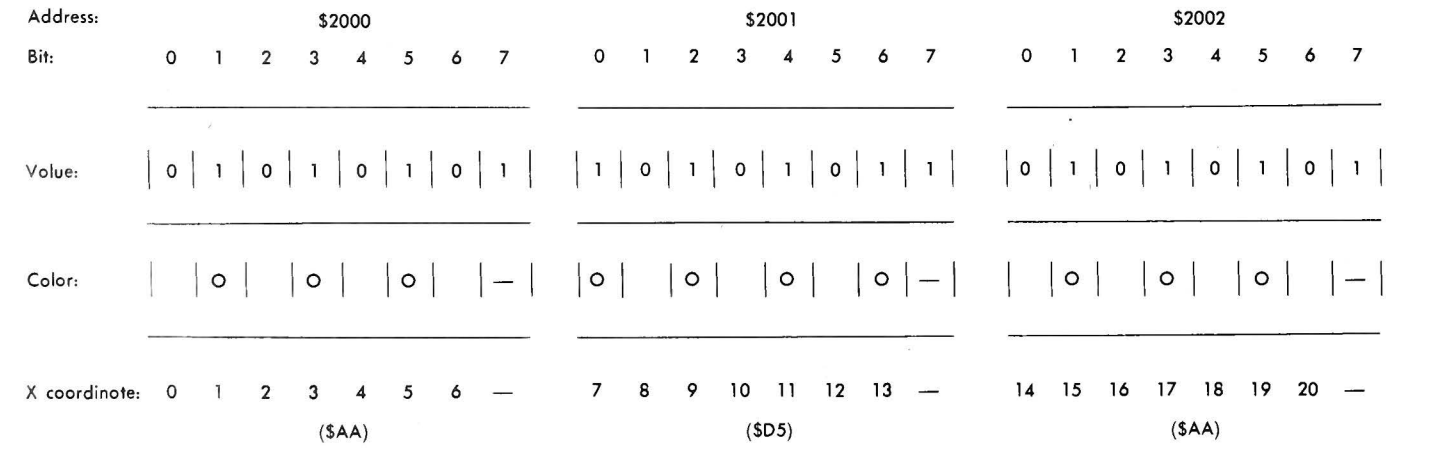
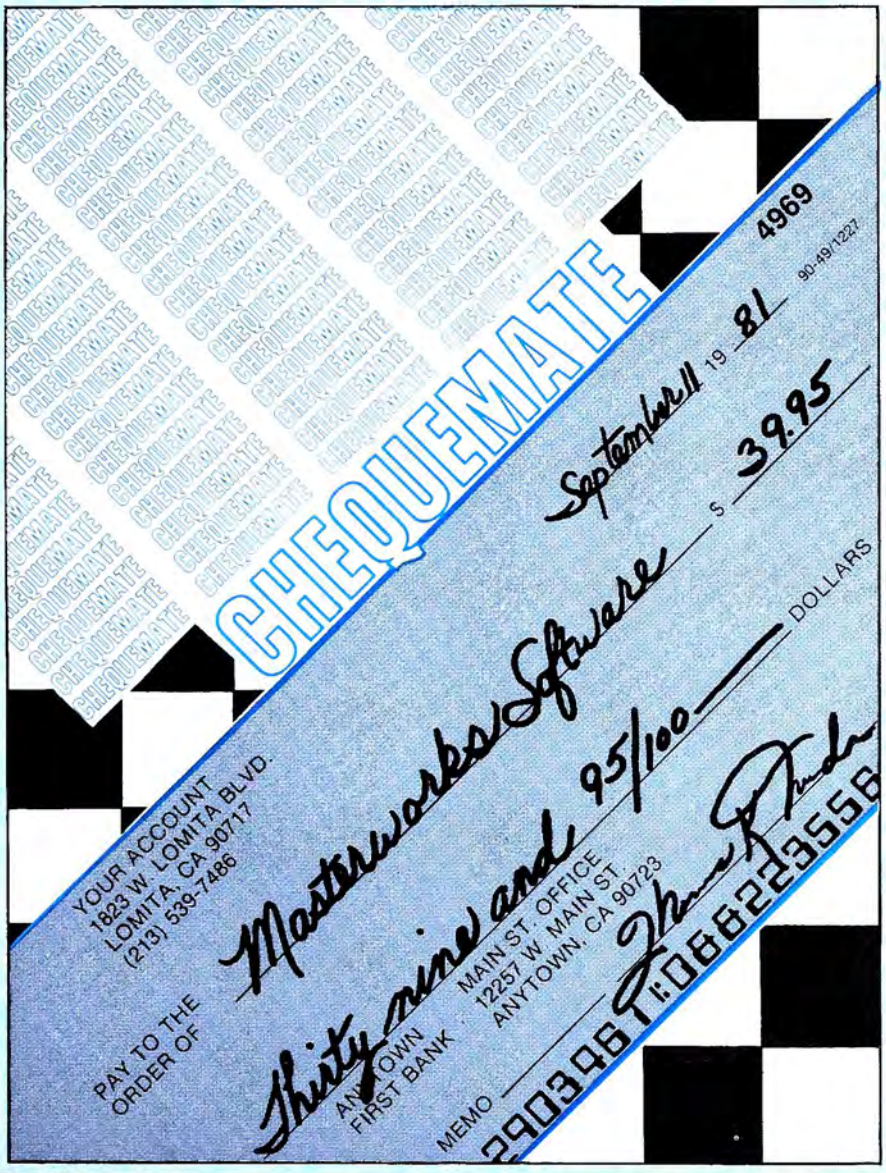


Figure 4.

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Another smaller, but equally annoying example is shown by this simple procedure:

```
HGR
HCOLOR=1: HPLOT 1,0
HCOLOR=5: HPLOT 5,0
HGR
HCOLOR=1: HPLOT 1,0
HCOLOR=5: HPLOT 6,0
HGR
HCOLOR=1: HPLOT 1,0
HCOLOR=5: HPLOT 7,0
```

Step through each statement carefully, noting what happens after the attempt to plot the orange dot. In the first case, the first green dot is converted, even though the dots are visually separated. This is because they are both determined within the same byte. In the second case, even though the second dot is not plotted, the conversion still occurs. In the third case, the second plot uses a second and distinct byte, so the first dot is unaffected, regardless of the color of the second plot.

Other Problems: When Is White Not White? Answer: when you're only plotting one dot at a time.

You may have noticed in the last few programs involving the movement of hi-res dots that at slow speeds the color of the dot alternated between violet and green, depending on its position. Similarly, even though we specified white as the color to be used in the box frame drawn at the beginning of each program, the left vertical line was violet while the right one was green.

This is because white does not actually turn on two dots at once. What it really does is let *either* dot (violet/green or orange/blue) be acceptable for a given *hplot*. White only appears when two adjacent dots get drawn, usually as a result of a line being drawn with some degree of horizontal tilt to it.

In the moving-dot programs, the dot appears white when moving at higher speeds because the alternation between colors occurs fast enough that your eye tends to do the blending on a time basis, rather than the usual positional one.

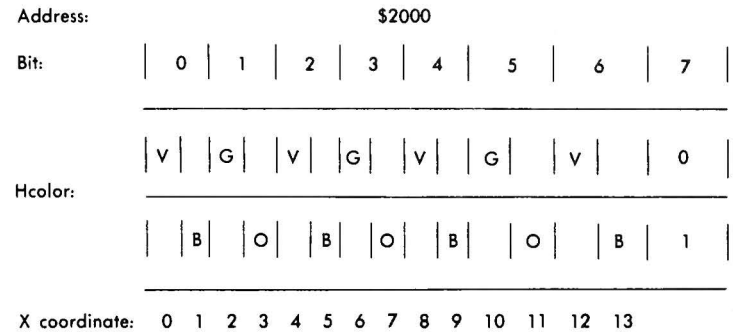
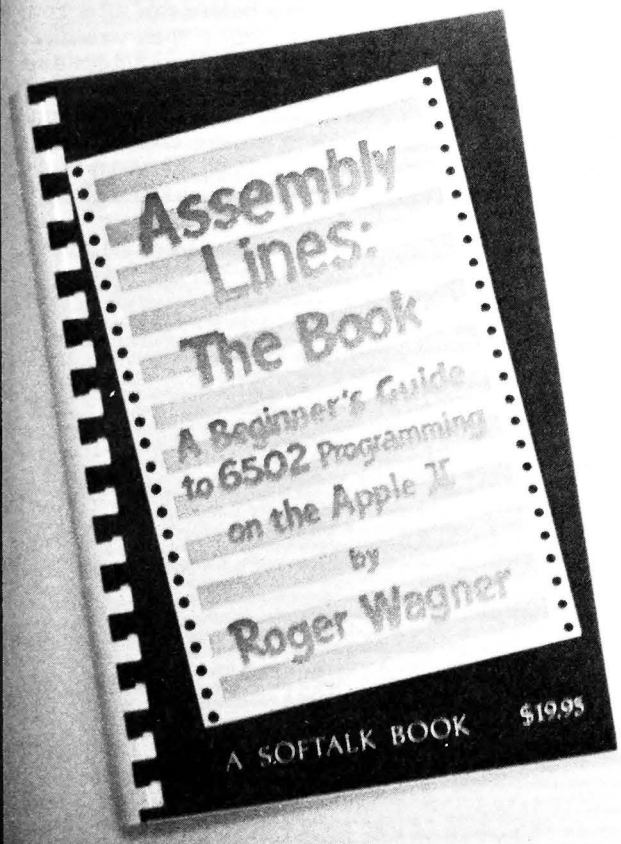


Figure 5.

Super Hi-res Graphics. The last topic for this issue is not a problem, but rather an unheralded benefit of this crazy system of screen displays. You may have noticed in the last example that when the second dot was plotted, the green dot moved slightly to the right when it changed to orange. Up until now, you've been led to believe that the violet/blue or green/orange options for each bit represented a unique screen position—a single dot. For the 280-point model of the screen, they do. Either violet or blue for example, can be plotted with an *hplot 0,0* statement.

In reality, however, a more accurate representation can be constructed as in figure 5.

In this model, you can see that the high-bit-on colors are shifted a half position to the right of the high-bit-off colors. What this means is that you can plot points in a 560-dot mode, giving a much better resolution than the usual 280-point mode. This involves enough calculation that it's best done in machine language. Next month we'll investigate the techniques for plotting in all of these various modes using some new routines.



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Men and women are learning to live as equals in the home as well as the work place. Girl kids (little women) are growing up with strong role models—Billie Jean King, Marlo Thomas, and Lore Harp—believing they are free to be you and me.

At the Computer Faire and at the computer club, respect is based on contribution. As at the Free University, it is not who you are, or how old you are, but the mind-expanding knowledge you can share/learn/teach. With the advent of the robot—a decade to half a century away—we won't need orangutans to labor, and we won't need gorillas to rule. Our planet will be peopled by inquisitive, Hobbitlike thinking chimpanzees.

They'll lie in the sun, eat, program their computers, and exchange computer games. They'll go on hikes, river raft trips, and ocean cruises. They'll like Faires and festivals and any place they can be together as part of an extended happy undemanding family. It's like the sixties tried to be. Isn't it? ◨

an interview on the Fritz

I drove to Menlo Park to visit with Fritz the Cat the other day. Fritz was in and out of everything that was happening back in the sixties. Fritz had been a freak among freaks, a crazy among crazies, and yet there he was in April 1982 posing on the cover of *Venture Capital* magazine.

"Software, man, I'm into software."

Fritz had felt out of place in the sixties. He'd tell us over and over again: "I belong in the fifties, man, riding with Jack (Kerouac) and Neil (Cassidy), digging the chicks, looking for America." He'd leap into his car and make another madcap dash across the country, breaking down in Baton Rouge, hitchhiking on and on across the land.

Now here he was at the hub of an immense commercial venture, a cross between some sort of financial wizard and a labor exploiter in the garment district. Fritz still couldn't keep still. He strode the length of his office, fairly bursting with feline energy: "Layouts," "Stock options," "Take ten thousand OEM or buy out for half-a-mil," "Get me Fylstra," he hollered into his speaker phone. I'd gone through three levels of secretaries just to see his secretary. ("Not secretaries, man; market developers, sales directors. New titles for the new woman.")

Fritz insisted on showing me his "people." We walked past row after row of beardless youths sitting before row after row of terminals like immigrant workers before their treadles. "This is my staff," Fritz said, "I give them computers and they give me love."

Six telephones buzzed continuously, but no human answered them, only a Voc-A-Lyzer's synthetic voice. Young, scantily clad clerks roller skated up and down the aisles, pulling orders from the shelves—cassettes and disks and stringy floppies for the kinky trade.

"Software is where it's at, man," Fritz hollered. He patted one of the video terminals. "You just sit down in front of this little screen, put a disk in the slot, the top of your head blows off, and they can't bust you for it."

"Fritz," I said to him, "remember the sixties? Love in the park. Acceptance. All together now?"

"Forget it, man; Neil and I do software.

"Neil Cassidy," Fritz continued, seeing the incredulous look on my face. "He writes the software, and I sell it. Or rather I market it—distribution is the name of the game."

"Neil Cassidy?"

"Not here, man. Up in Oregon. Once a month we get a disk in the mail. Touch up the documentation a little, put three sexy girls and a hot tub on the cover. His stuff sells like crazy."

"Three sexy girls?"

"That's the general ledger package. Accounts receivable is the one with the two guys and the badger."

Before I left, I tried one last appeal, an attempt at the eloquence that had always eluded me in my own struggle for fame: "You don't belong in an office, Fritz. You belong in Winslow, Arizona: 'There's a girl, my Lord, in a flatbed Ford, slowing down to take a look at me.' You belong with Jack and Neil, out on the highway of life."

But his pose was as rigid as a Tom in heat, and the dollar bills shone in his eyes. ◨

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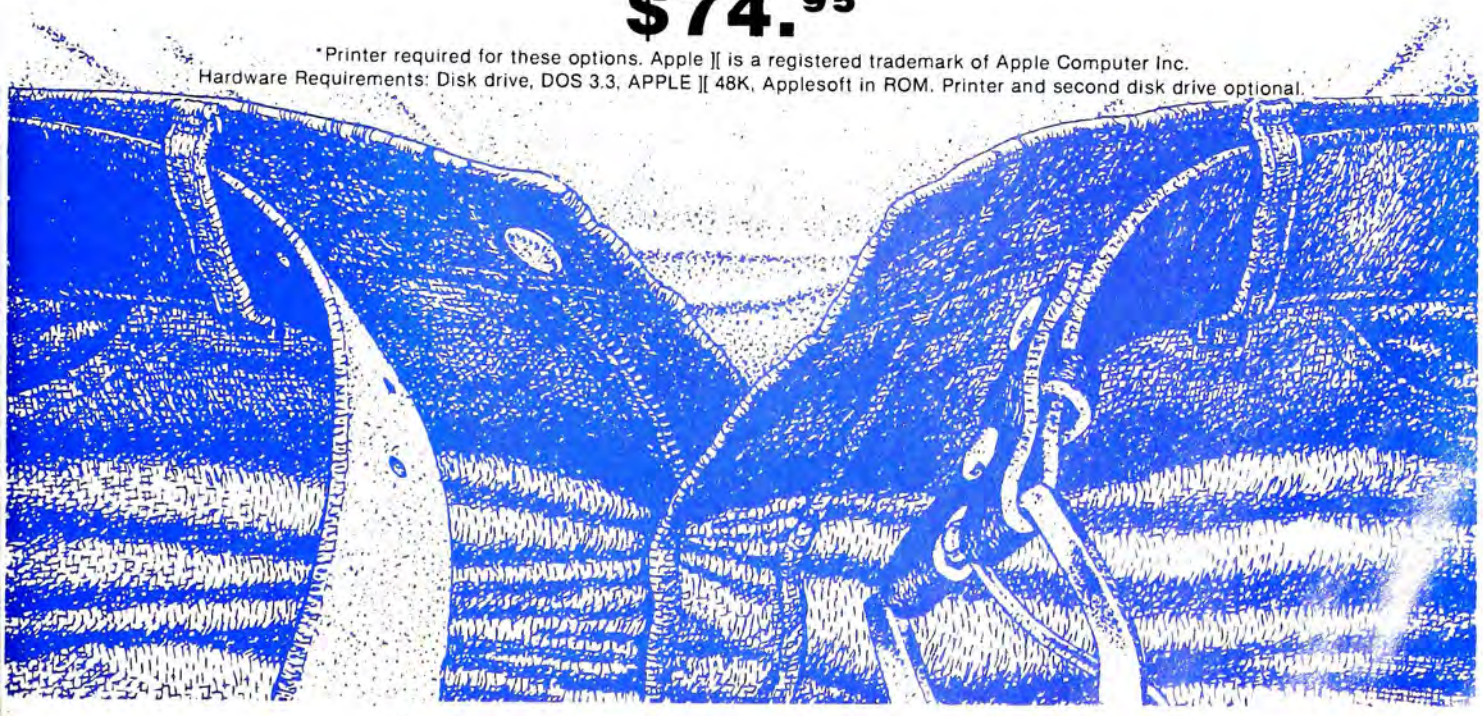
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Hardware Requirements: Disk drive, DOS 3.3, APPLE][48K, Applesoft in ROM. Printer and second disk drive optional.



Ever Seen a Gideon Apple?

How They Got the BIBLE on Disk

BY DAVID HUNTER

Before there could be cheap mass production of books, there had to be paper. The Chinese were the first to master paper making and the Arabs acquired the skill from them more than a thousand years ago.

By the end of the fourteenth century a good method for making paper had reached Europe. The first printing presses followed shortly thereafter. Movable type pioneers Coster, Gutenberg, and Caxton, among others, brought the first modern books into the world.

The mass production of books enormously stimulated the development of free discussion in Europe. Books were no longer an expensive luxury that only the scholar and the noble could afford. The knowledge of reading spread quickly, and a new age in European literature began.

Chips are to computers what paper is to books. Microcomputers, like books, bring greater knowledge to the individual faster. Reading was welcomed half a millenium ago and microcomputing is being greeted today as ways to better understand and shape the society we live in.

It's inevitable that some of the knowledge found in the world's libraries find its way into electronic media. Computers offer the chance to find, manipulate, and arrange data in a much faster and more efficient way than previously possible.

Greatest Story Ever Told. Among the first programs to offer a complete text and the means to manipulate it on the Apple II is *The Word Processor* from Bible Research Systems. The text is the King James version of the Bible; storing both testaments calls for eight double-sided disks. Created by Kent Ochel and Bert Brown, *The Word Processor* runs on one or two disk drives and features database management characteristics that aid the serious Bible student.

It is not surprising that the predominantly Christian society of fifteenth-century Europe required copies of the Bible in great quantities. The first bestseller, the Bible helped many people to learn to read. It is still one of the most widely read and widely studied printed works in the world.

Initially a labor of love more than anything else, *The Word Processor* may have opened up a wealth of future applications. There are a great many works spanning the ages of man; most of them require intense study and would be perfect for manipulation on a computer.

Unholy Matrimony. Religion and science have always been suspicious allies at best, but there's no reason why the two can't coexist in the same world. It would truly be disastrous if in our mad rush to escape our natural tethers we ignored what wisdom we have gained through the ages. *The Word Processor* is a living embodiment of the new, preserving and improving some on the old.

Ochel and Brown may never be as famous as Gutenberg and Caxton, but their accomplishment is nonetheless very significant. They have enormously expanded the range of experience you can find on an Apple by bringing books to the world of the 6502.

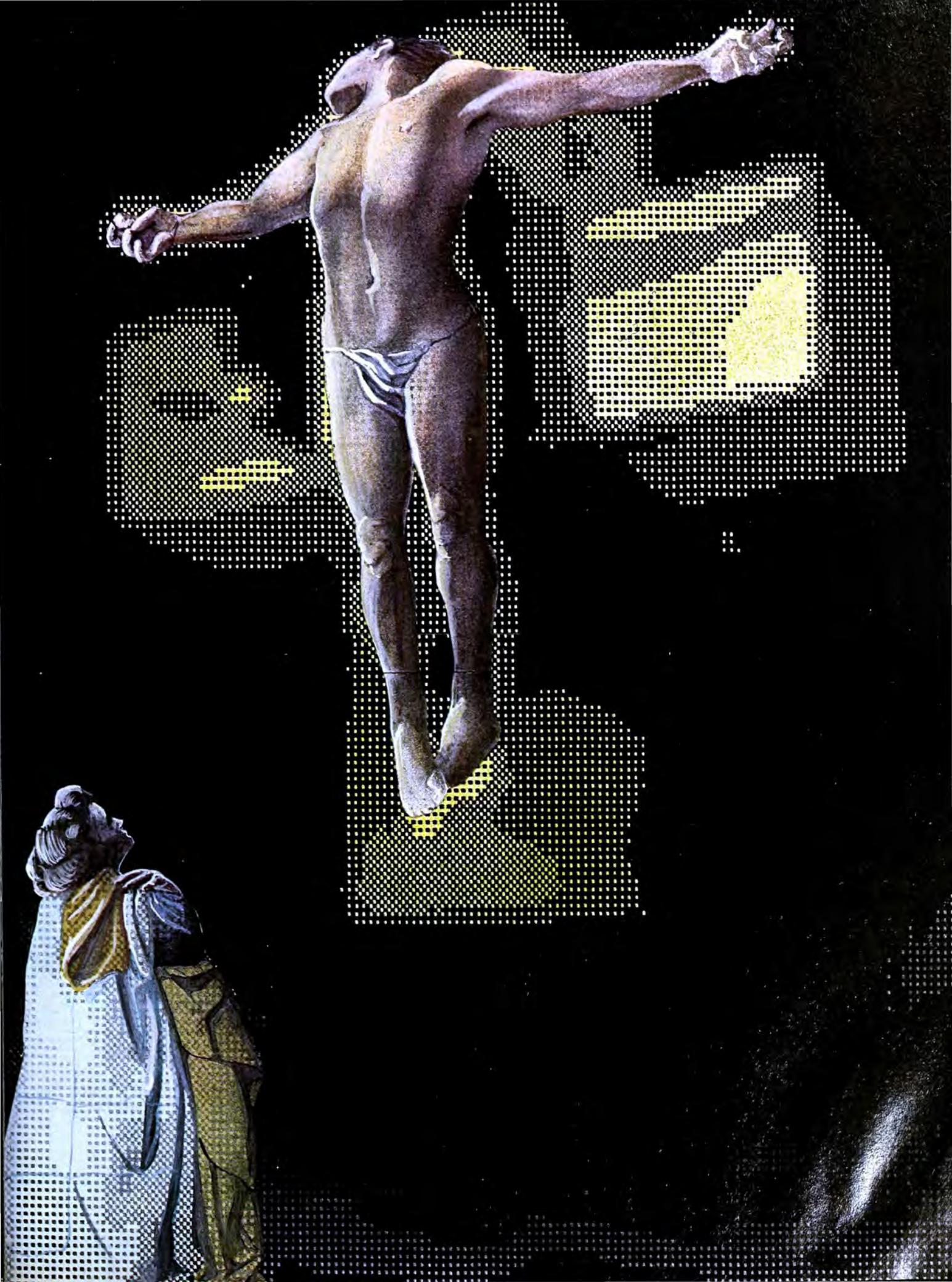
Taking thirty-six million bits of data and compacting it into a marketable size is no small task. The average game seems like an afternoon's work in comparison.

The creators of *The Word Processor* are both experienced programmers and have been on top of the latest improvements in computer technology.

Kent Ochel was a programmer at IBM's T. J. Watson Research Institute during the sixties specializing in database management. Around the end of the sixties, Ochel went to work for the System 2000 Corporation.

After a couple of years he moved over to MRI Systems, where he worked on a System 2000 product line and eventually became executive vice president. In 1978 MRI was acquired by

"Crucifixion Corpus Hypercubus," 1954, by Solvodore Doli.
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Intel. Not long after, Ochel was elected president of Intel systems division, serving for almost three years. He resigned at the end of 1980.

While at MRI, Ochel and his colleague Bert Brown thought it would be worthwhile to put the Bible on a computer. Unfortunately, there were no microcomputers as such at the time.

Brown worked for NASA on the Apollo series, designing the database management system. He joined MRI at about the same time as Ochel; during the merger with Intel, he became product manager for the System 2000 line. Brown bought his Apple in 1979; he left Intel a year and a half ago.

Looking for Consensus. Brown and Ochel bounced the idea of putting the Bible on disk off many people for several years. It was essential to determine what the program should include, taking into consideration that many potential customers would be computer novices.

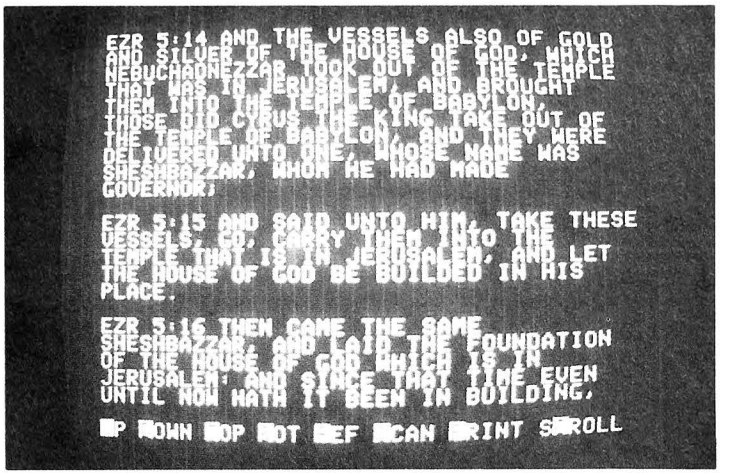
The Bible is not a continually changing work, though it is occasionally retranslated, and this static quality makes managing the data easier. Ochel and Brown decided upon the King James version of the Bible, which hasn't changed in four hundred years. It is not copyrighted and it is still used by many Christians throughout the world.

Ochel and Brown originally contemplated keying in the whole Bible from scratch, but soon realized that this task could take years. There had to be an easier way.

They hit upon the idea of finding a computer tape that had been used to typeset the Bible for conventional book printing.

The tape Ochel and Brown acquired was intended to run on an IBM 370, so they had to create an emulator that would make the Apple look like a terminal to the 370. This involved writing software that would allow communication between the IBM 3805 controller and the Apple serial interface board. The coding for the 370 conversion was the work of Brown.

The transfer rate was of some concern since there are approximately 4.5 million characters (36 million bits) of text in the Bible. If the transfer rate were only 300 baud, the move from IBM to Apple would require thirty-three hours. Ochel and Brown settled for a transfer rate of 2400 baud. The raw transfer filled forty-two standard five-and-a-quarter-inch disks.



Sample text display from the Old Testament—Ezra 5:14-16.

A Sea of Words. The tape transfer was one of the last things to be done in the creation of *The Word Processor*. Ochel and Brown knew that the raw transfer would result in an unwieldly amount of disks and they had planned for this in advance.

Ochel came upon a word frequency analysis study done for the Bible, and that helped immensely. It's nice to know, for instance, that the word *the* appears 63,871 times. There are some 789,000 word occurrences in the Bible, comprised of nearly 14,000 unique words. Twenty percent of all the words begin with the letter *t*.

Eight-bit configurations were assigned to the most frequently occurring words. Analyses of letter sequence occurrences such as *ie, ea, ing,* and many more were made and

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eight-bit configurations were assigned to the sequences with the highest probability of occurrence. Ochel and Brown started coding the assembly language program in October 1981 and finished in early January of this year.

Everything they tried in order to compress the text seemed to be successful. Ochel and Brown reduced the storage requirements to a more reasonable 15 1/3 standard floppies (eight double-sided disks). The compaction rate was approximately one compacted character for each 2.5 original characters. Not too shabby, when you consider that if every word in the Bible were compacted to a single character, those characters would still require four double-sided disks.

Not Bread Alone. Getting the Bible on disk in reasonable shape was one major aspect of the task, but you have to be able to do something with it. Spending several years gathering notes and impressions from computer experts and novices alike, Ochel and Brown developed the processing part of *The Word Processor*. Figuring that a menu-driven program will appeal most to computer novices, Basic was employed for all the user input, and machine language routines were used for all the scanning and searching through the text.

The Word Processor has many things in common with database management software. You can create indexes of any configuration you choose, offering the opportunity to improve on existing concordances. The indexes can be stored on disk and combined using boolean and/or logic. You can search for and highlight word or phrase occurrences. Scrolling through the text can be done several different ways, one verse at a time or much faster if you desire. A print program is included for printing hard copy of any selected Bible text.

All the books of the Bible are given three character codes like 1KI (1 Kings), EZR (Ezra), PSA (Psalms), and JOH (John). This takes a little getting used to, but it is more efficient than typing in the complete name every time. Since the Bible is so unwieldy by virtue of its size, simplification is the name of the game.

Unfortunately, the simplification is so complete that some regular features of the King James Bible were lost. Usually this version of the Bible has each proper name, people and places, broken into syllables with pronunciation marks. Trying to read the Bible aloud without this feature can be difficult unless you know all the names by heart.

Another thing missing is having the words of Jesus Christ printed in red. In many versions of the Bible key words in a verse are italicized; this too was lost in the translation. Minor things, to be sure, but they show where some improvements can be made in the future.

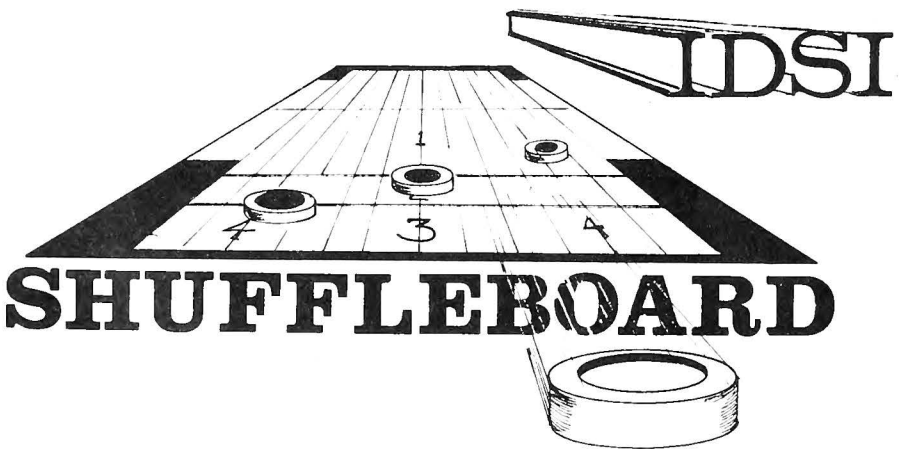
Whither Thou Goest. The display functions of the program are fairly complete, offering a range of options that allow you to move through the text at will. Once you are in a book, you can reference a specific verse, hit return, and the program takes you right there. Likewise, the scan feature is quite handy. You can look for specific words or scan for a specific suffix or prefix. You can also scan for words via smaller words incorporated in them, like *man*kind.

The text manipulation programs are all simple to use and offer no great barrier to understanding the program at hand. Creating, modifying, and combining indexes is equally as easy. Printing out hard copy of Bible text or lists of indexes is no more difficult than it is with the average word processor print program.

By the end of January this year the whole thing was up and running. Brown and Ochel asked people in their local area to look at the product; both experienced computer users and non-users with a strong interest in the Bible were asked to test the system. Ochel personally took the finished product to show to Walter Wilson, site manager of Apple Computer's plant in Dallas. They received good feedback from the people who looked at the program and some improvements were made before marketing it.

The price for *The Word Processor* may seem a little high to someone who is used to paying less than five dollars for a

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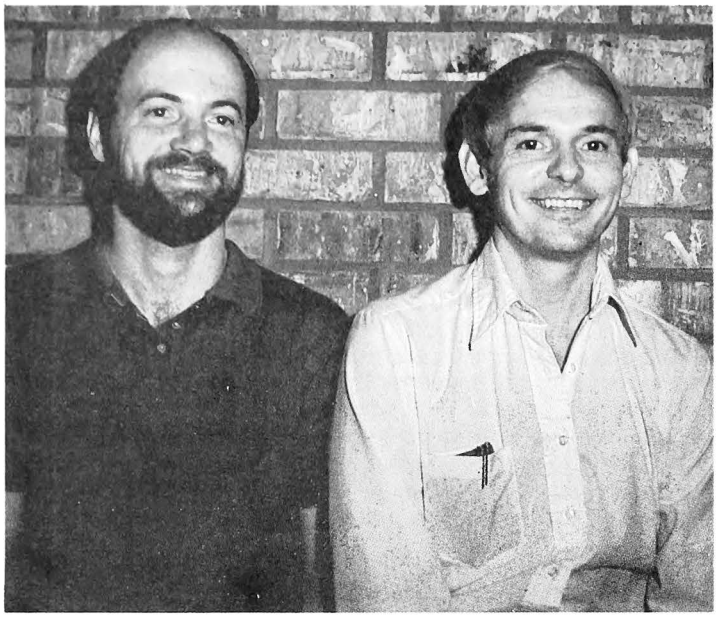
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Bert Brown and Kent Ochel, creators of *The Word Processor* and founders of Bible Research Systems.

paperback book. Nonetheless, for many, $150 is not a barrier to owning a work of art, for instance, that has some personal value above and beyond its perceived value in the real world. Without a doubt, there is no other medium for the Bible that gives you the unique features found in *The Word Processor*.

From the Outside In. Although pleased with their product, Ochel and Brown see some improvements and additions they can make to *The Word Processor*.

Chief among these would be the inclusion of recognized outside reference sources like *Strong's Reference Guide*—a handy volume that takes every word in the Bible and relates it back to the original Greek. Another useful addition would be *Nave's Topical Index*—a volume that directs you to specific topics and where they're found in the Bible. A hard disk version of *The Word Processor* now in the works may include these materials.

Ochel and Brown are also thinking about making other versions of the Bible available, acquiring rights as they can for ones that are copyrighted.

The near future may see all kinds of advances in miniaturization. Ochel is confident that in five or six years you will be able to buy a hand-held device that has the entire Bible on it with a program much like *The Word Processor*. With all the bubble memory research going on at Intel, Ochel believes that by 1988 you should be able to get four megabytes of storage on a hand-held computer.

For the moment though, the Bible on eight disks is basically it. Brown and Ochel have big plans for tomorrow, but they are more than pleased with today. They feel they are providing a much needed product, and so far they have no reason to doubt the success of their venture.

The biggest seller in the history of publishing, the Bible is still the most important book in many peoples' lives. "I look upon the Bible as the manufacturers' handbook," explains Brown. "God built this world and the Bible explains how all the parts fit together and why."

One sincerely hopes that other great works of world literature will find their way into electronic media. Apples offer a lot as it is, but they could offer much more—the chance to get acquainted with our great and glorious past as inhabitants of planet Earth. ■

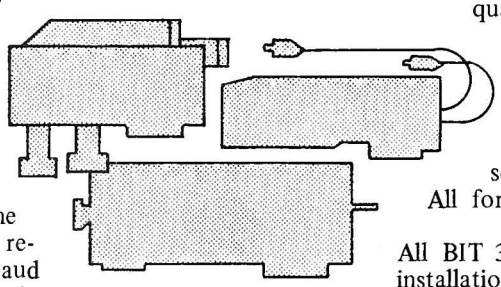
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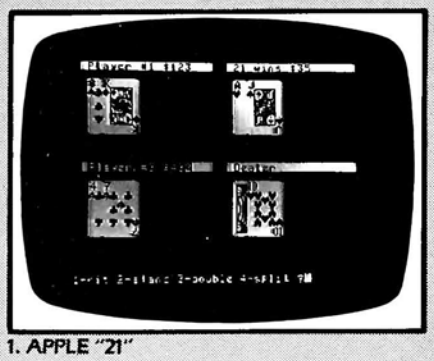
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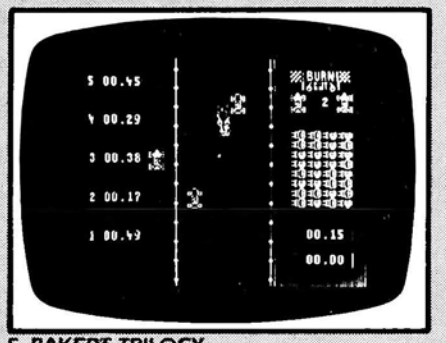
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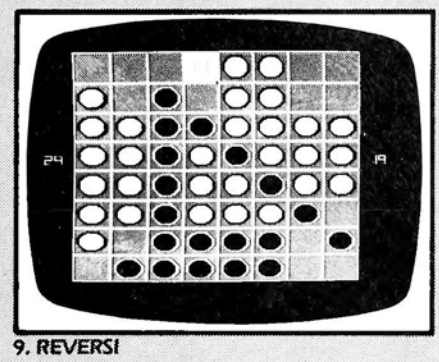
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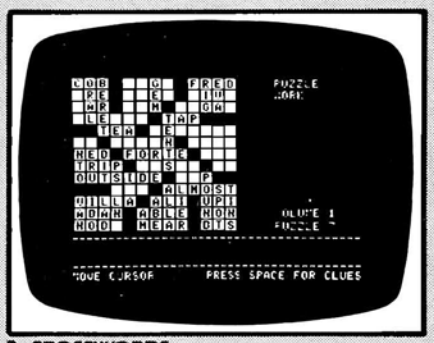
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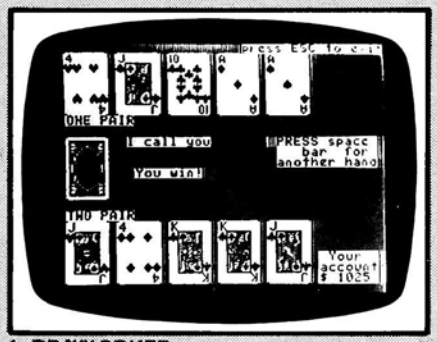
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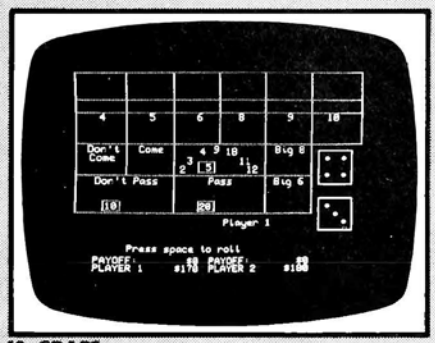
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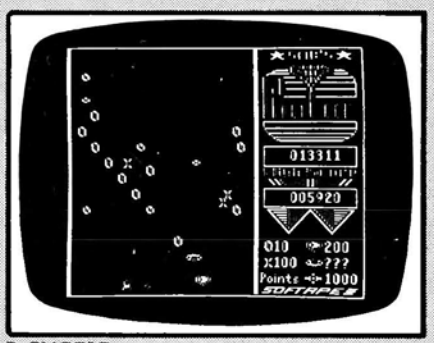
2. CROSSWORDS



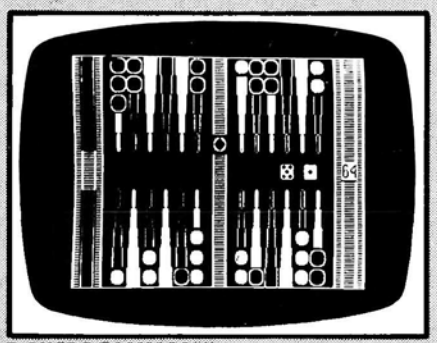
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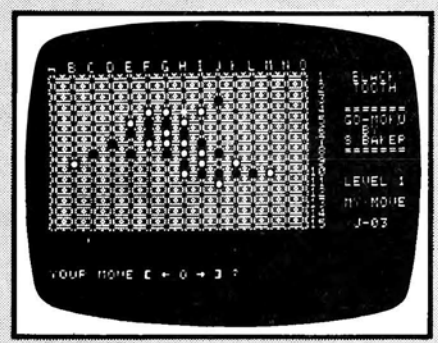
10. CRAPS



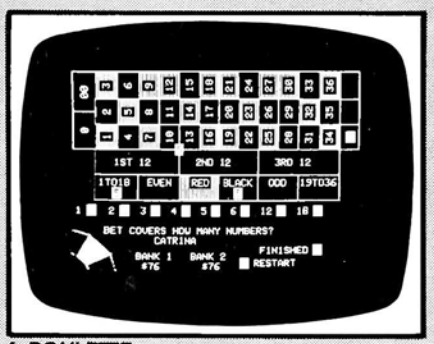
3. PHOTAR



7. MICROGAMMON II



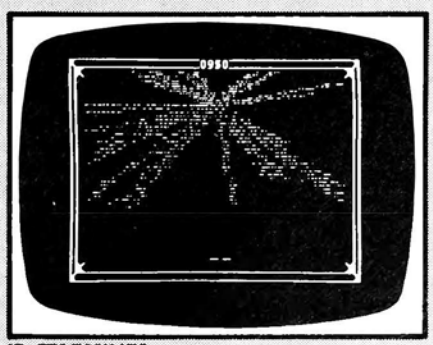
11. GOMOKU



4. ROULETTE



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How the Old Campgrounds Have Changed







BY JANE CANTILLON

It looks like a typical campground on a warm summer day. You see campers canoeing across the clear blue lake and hear children laughing and shouting as they play a rousing game of kickball.

But listen closely. As you approach the cabin area, you hear a gentle clicking coming from some of the cabins. They're the computer cabins and their occupants are training in mental athletics.

You've found your way to a computer camp, one of several that have sprung up across the country during the last two years. The kids have brought their swimsuits, their sleeping bags, and their software; they're ready to embark on a two-week adventure in computer learning.

The New Frontier. One of the first camps to appear on the scene was Computer Camp, Inc., founded by Santa Barbara businessman Denison Bollay in the summer of 1980. Bollay first became fascinated with computers as a teen but became frustrated when he could never find a place to fiddle around with them. Years later, after a successful career with Fractal, a computer consulting firm that conducts research and development projects, Bollay decided to do something about his early frustration. Besides being a good business venture, computer camp is, in Bollay's view, "what America needs."

Computer Camp, Inc., is run in a decidedly democratic manner. Campers, whose ages range from seven to sixteen, vote to determine the camp's curriculum.

For most campers, the day begins with ninety minutes of class. A beginner seven or eight years old usually starts out with Logo, while an older camper ordinarily begins with the introduction to computers course. Every camper's progress is reviewed on a weekly basis so that classes can be reassigned accordingly.

Among the classes are different levels of instruction in Basic, including the introductory course and an intermediate one that deals with catalog functions, certain mathematical calls such as *ABS*, programming methodology, and the creation of group programs. Garry White, vice president of Computer Camp, Inc., explains, "We get a group of kids together. One person writes the menu, another the main part of the program, and the other group members work on the subroutines.

"The kids have to communicate and collaborate as a team to accomplish the goal. It's at this point that we introduce the human factor into the process of programming. The campers are learning to communicate effectively the concepts involved in programming and technological processes."

Finally, there's the advanced Basic instruction. "The advanced group of campers do modular programming, using a sort of extended Basic, what you might call *Basic-plus,* which is a more modular design. They learn how to analyze the problems and to understand and use step-by-step procedures. They can determine Basic algorithms of a projected program, improve them as they learn stepwise refinement, then carry this







Camping tradition mingles with the Information Age, equally comfortable to a new kind of camper. Left page, top: singing around the campfire; lower left, taking the plunge into a cool lake; lower right, how does it work? Right page, top left, skit night—campers use inventiveness and their own resources to produce fully—if unusually—outfitted show; bottom left, horseback riding is second in popularity only to the computers; right, cleanup time in the bunkhouse? Yes, but first, what happens if we do a gosub here and put in a routine. . . .

into pseudocode and finally into a program."

Computer Camp, Inc., also offers classes in electronics and in two levels of Pascal.

In addition to being a place where young people learn about computing, Computer Camp is a camp, a place to play tennis, swim, hike, and generally enjoy the open spaces. There's also time for field sports and arts and crafts.

One particularly unique and popular feature is the electronically oriented crafts class. Members of the class make their own toy robots and the printed circuit boards to run them. The camp also owns a Terrapin Turtle, an upside-down-bowl-like robot that is periodically set up on an Apple II. Using the keyboard and paddles, campers can control the speed and direction of the turtle.

There's also a games and simulations class. Here, the posing and solving of problems involving ecological simulations is combined with nature hikes.

After dinner, campers have free time—time to do homework or to play computer games. They're encouraged to play games they have written themselves. "Therefore," White says, "the children write some incredibly advanced games.

"We also have physical games to better understand concepts of the computer. Bubblesorts is a good example.

"Two teams are chosen at random, and each member of each team must act out the actual programming logic for the team to win the game. The competitors play positions and variables, holding and exchanging value cards. The kids who really understand computers are the winners in this relay race.

"Computer Camp has a balanced camp program, with opportunities for personal growth in all areas—intellectual, emotional, physical, and spiritual."

If children want only to learn more about computers, Garry White suggests that they attend any of the many summer schools that concentrate on computer studies. Computer Camp's goals are broader.

"We want to get the children out of the classroom and into an environment that is more fun and creative. Studying the way our ecosystems work prepares kids for a world of calculators and computers by really going to the meat of it. By studying nature, our kids are getting the big picture of things. Playing rewarding physical games and being grouped together on special projects helps the children grow socially."

Surf and Software. The demand for computer camps has increased substantially in their two-year history, and Computer Camp, Inc., has become a worldwide phenomenon. They have camps in Lake Tahoe, California; Cape Cod, Massachusetts; and London, England. There are even two adult Computer Camps—one in Santa Barbara, California, and one in Mexico.

Computer Camp for Adults began after the parents of many of the campers complained about not understanding what their children were saying when the kids told about camp. Many parents admitted another motive: they can't help wanting to share in their children's excitement about computers.

Club Mediterranee in Ixtapa, Mexico, is an adult Computer Camp site that mixes a luxurious setting with an intensive computer learning session. The Santa Barbara site offers one-week sessions designed for executives, managers, and other business people who want to understand what microcomput-

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ers can do for them now and in the future.

How can your child—or you—get accepted to Computer Camp? "The only prerequisite," says Garry White, "is a desire to learn." The computer is a really great catalyst for turning kids on, and bright kids find this an arena to excel in.

Consecutive sessions for up to ten weeks of computer education are available from Computer Camp, Inc. Ages accepted are seven to seventeen; cost is $795 per two-week session. In Santa Barbara the dates are: June 13 to 25, June 27 to July 9, July 11 to 23, July 25 to August 6, and August 8 to 20. In Lake Tahoe: June 27 to July 9, July 11 to 23, August 1 to 13, August 15 to 27. The East Coast and Adult Camp dates had not been confirmed at press time. Contact: Computer Camp, Inc., 1235 Coast Village Road, Suite G, Santa Barbara, California 93108; 805-969-7871.

Go East, Young People. Across the country, in a little town called East Haddam, Connecticut, lives Computer Camp East. Dr. Arthur Michals, the camp's founder, has an extensive background in education and social work. Computer Camp East evolved out of the camp Michals originally created for learning-disabled children.

"I became very interested in the work of Seymour Papert and his development of artificial intelligence and began looking into the potential of using Logo with the language-impaired and handicapped. Through Logo and artificial intelligence, many learning-disabled people get a chance to prove themselves. It was when I understood this that I began to use computers in our programs."

Computer Camp East was born in the summer of 1981, the natural outgrowth of Michals' previous success in computer education. The camp offers instruction in Basic by means of formal work labs and demonstrations, as well as advanced instruction in Logo, Pilot, and Pascal. 48K Apple IIs hooked up to color television sets, 32K Pets, and TI 99/4s with Logo and monitors are among Computer Camp East's permanent residents.

Pre-teens and teens share in the fun of hiking, swimming in New England's largest pool, and other sports, but 65 percent of campers' time during their two-week stint is devoted to cracking the computer mystique.

"We're the only school and camp that has a specific curriculum in computer ethics and morality," boasts Michals. "We have a discussion with youngsters about computer responsibility—for example, about things like data banks versus privacy. We teach the children not to use the computer for ill-gotten gains or as an inappropriate way of obtaining information."

Computer Camp East is just one of the locations operated by an umbrella organization, Computer Camp International. CCI is operating camps this year in Whitewater, Wisconsin; Denton, Texas; New York; and New Hampshire. In all these locations, Michals promises a computer for every camper; campers won't be admitted if there aren't enough computers to accommodate them. With four two-week sessions of day and residential camp at each of its locations, Computer Camp International is capturing widespread attention.

Computer Camps International has set dates for their Connecticut, Texas, and Wisconsin sessions: June 27 to July 9, July 11 to 23, July 25 to August 6, August 8 to 20. Nine- to seventeen-year-olds will be accepted at $795 per two-week session. Adult weekends at Banner Lodge in East Haddam, Connecticut, are June 25 to 27, July 23 to 25, and August 6 to 8. A one-week seminar/vacation is August 22 to 27. Prices vary. Contact: Computer Camps International, 310 Hartford Turnpike, Suite D, Vernon, Connecticut 06066; 203-871-9227.

Room for More. With the success of the original computer camps, it's no wonder that the University of California at Santa Barbara decided to start a computer camp of its own. In conjunction with its Microcomputer Learning Center, UCSB is holding a ten-week residential summer camp for junior high and high school students.

Established in 1979, the microcomputer laboratory has done innovative research on computer-based instruction for people at all educational levels. Campers—or students—are housed in university residence halls within walking distance of the center and the beach.

UCSB is sponsoring five two-week sesions June 20 to August 28 for campers ages ten to seventeen. Cost is $700 for two weeks. Contact: Diane Fairfield, CompuCamp, P.O. Box 20141, Santa Barbara, California 93120; 805-961-3818.

Other computer camps are springing up across the country. Purdue University will be holding camp for the week of July 25 to 31. They will be accepting up to forty campers, ages fourteen to eighteen, at $250 each. Guest speakers will be featured. Contact Helene Baouendi, AGAD Administration Building, Purdue University, West LaFayette, Indiana 47907; 317-494-8426. National Computer Camps will be holding a four-week session in Simsbury, Connecticut, July 11 to August 6, and a two-week session in Atlanta, Georgia, July 25 to August 6. Cost is $345 per week for campers nine to eighteen years old. Supervised computer learning for up to twelve hours a day. Contact: Dr. Michael Zabriski, P.O. Box 624, Orange, Connecticut 06477; 203-795-3049. For two two-week sessions, July 18 to 31, and August 1 to 14, Marist College will be conducting a summer science camp for campers ages ten to seventeen at $750 each. Limited scholarships are available. Contact: Dr. Lawrence Menapace, Marist College, Poughkeepsie, New York 12601; 914-471-3420, extension 245.

From the look of things, computer camp is definitely not a trend that will fade out the way so many specialty camps do; it's a wave of the future. Our leaders of tomorrow are apt to credit their experiences at today's computer camps for their sound bodies and sound minds—and superb hand-eye coordination. ◨

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BEGINNERS' CORNER



BY CRAIG STINSON

Assembly language is a programming medium ideal for applications where execution speed is critical. Such things as home arcade games, for example, are nearly always programmed in assembly language.

Assembly language is generally not, however, the medium of choice for the beginning programmer. Most newcomers to computing will want to start their programming efforts with a high-level language.

Begin Basically on Multilingual Apple. There are a good many of these available to run on the Apple; Basic, Pascal, Cobol, Fortran, Lisp, Pilot, Forth, and Logo come to mind immediately, although the list could go on from there. Basic is by far the most popular language, with Pascal in second place and gaining. The next couple of installments of this column will focus on these two languages.

When you see the familiar flashing box sitting next to the right-hand bracket, you are said to be *in Basic.* Now what does this particular bit of jargon really mean?

It means that your Apple is running a program called the Basic—specifically the Applesoft Basic—Interpreter. To be just a bit more precise, the Apple is running a composite program consisting of the system Monitor and the Applesoft Interpreter.

It also means that it's your move; the Apple is ready to hear from you.

Under normal conditions, when your Apple is flashing you the bracket and cursor, it's expecting that you'll communicate with it by way of the keyboard and that it will respond to you by way of your television or monitor screen. These conditions are normal in the sense that they are defaults; they are the conditions that prevail unless you override them.

But let's say, for now, that you choose not to override the defaults and that you're sitting at your Apple, gazing into your monitor screen, fingers hovering over the keyboard. You rap out a few keystrokes, and symbols instantly appear on the screen. It feels just as though you're working at an electric typewriter but seeing your work displayed on television.

It's worth noting that that's not what's going on. In fact, some rather interesting activity is taking place to produce the illusion that you're mechanically placing letters and numbers on the monitor screen.

Making the Complex Look Easy. Before you hit a key, the system Monitor is quietly doing its thing, displaying the Applesoft prompt and blinking that little white box. As soon as you stroke the keyboard, you interrupt that soporific display and take the Monitor on a momentary excursion.

The excursion has the following effects. The Monitor notes that a key has been pressed. It checks to see which key was pressed, and then it sends that information off to be stored in a certain location in memory. That location is part of what's called the *keyboard buffer.*

At more or less the same instant, it sends the information about which key was pressed to another memory location, and that second location has the effect of causing a symbol to be displayed on your screen. Assuming all's well, the symbol will correspond accurately to the key you pressed and will appear in the spot where the cursor had been flashing. Having finished that bit of labor, the system Monitor now resumes flashing, only it moves over one position so the cursor now appears to the right of the character you just caused to be displayed—or at the start of the next line, if your character happened to fall at the right side of the screen.

As you keep hitting keys, you keep putting symbols on the screen and you keep loading information into the keyboard buffer. The keyboard buffer collects your keystroke data, storing them all in consecutive memory locations.

Eventually you may use up all the room in the buffer. The buffer, being one *page* (256 addresses) of memory, can store no more than 256 characters. If you hold down some number or letter key and the repeat key at the same time, you'll see that after you've run off a little more than six lines on the screen, the Apple will start to beep. It will beep after you've put 249 characters into the buffer, and it will beep after each successive keystroke until you've hit the 256th character. At that point the Monitor program will display a back-slash, dump the contents of the buffer, and signal you—with an Applesoft prompt and a flashing cursor—to start again.

All the while you're making keystrokes, however, the Monitor is also checking to see if you've pressed return; if you do press return, something quite different happens. In that event, the Monitor takes the contents of the keyboard buffer and sends it en masse up to the high end of memory—to the domain of the Basic Interpreter.

Right of First Refusal Goes to DOS. To make the story more interesting, in many cases there is a sentry standing at the gateway to the Basic Interpreter; that sentry is DOS. If you happen to have booted a disk before engaging in all this keyboard activity, then some form of the disk operating system will have been loaded into memory. And the disk operating system insists on scanning all data headed for the Basic Interpreter.

DOS, however, has a rather limited vocabulary, consisting of two dozen or so little words like *init, verify, rename,* and so on. And it only reads the first few characters in the stream of data going to the interpreter. As soon as it finds a sequence of characters that doesn't correspond to a word in its vocabulary, it gives up and sends the stuff on to the interpreter. So if you hit return after typing *verity* when you mean *verify,* DOS will read the first five characters and then yield the entire word to Basic.

If DOS gets a whole word that it understands, it keeps the word, treats it as a disk command, and attempts to carry out the command. Basic, in that event, never sees the command.

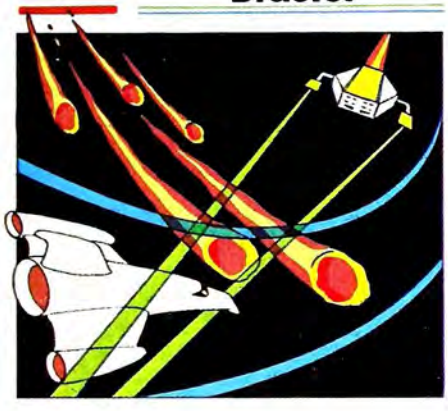
If the contents of the buffer do reach the Basic Interpreter, here's what happens. Basic first attempts to parse the line you've given it. What that means is that it scans everything up to your return code and organizes it into units that it recognizes and understands. What happens next depends on the initial characters of your input.

How Apple Digests What You Feed It. If your line started with anything other than a number, Basic will attempt to interpret your line—it will try to translate it into the form of binary code that the 6502 can execute. If all's gone well and your line of input meets all the syntax requirements of the

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Basic Interpreter, the translation will be successful and the 6502 will execute whatever commands you've specified. If you've typed *print 2 + 2*, for example, you'll see the number 4 appear on your screen.

If, on the other hand, you've given it something indigestible, like *paint 2 + 2*, the interpreter will be unable to translate your request and hence the 6502 will be unable to execute it. The interpreter's stock procedure in such events is to issue the message "?syntax error" and to cause the speaker to beep.

Causing the 6502 to execute a command by way of the Basic Interpreter as soon as you hit return is sometimes described as operating in the *direct* or *immediate execution* mode. Most of Basic's command vocabulary can be used in this fashion.

If, for example, you just type *input A* and hit return, you're issuing a perfectly legal Basic command but using it in the wrong context. In this case your syntax is fine, so you don't get a syntax error message. Instead the interpreter actually does start to execute your command—it puts a question mark on the screen, which is one of the things it does for an *input* command in the appropriate context—but then it balks and gives you the message "Illegal direct error."

If the line that goes to the Basic Interpreter starts with a number, something entirely different happens. The interpreter parses your line as before, but it doesn't make the translation into 6502 code. Instead it stores your parsed line in a region of memory beginning with address 2048. If you type some more lines that start with numbers, the interpreter will treat all of them this way, but it will store them in memory in a numerically ordered fashion, regardless of the order in which you enter them. That is to say, you can type lines starting with, for example, 30, 90, 10, and 75, and the interpreter will tuck them all into memory in ascending order.

Later on at some point, should you wish to see these lines executed, you can type the comand *run*, and the interpreter will pick them back up from memory, translate them, and send them off to be executed—one at a time, in ascending numerical order.

This sort of activity is known as deferred execution. It's also called programming. A series of instructions starting with line numbers constitutes a program in Basic.

When Out of Order Is Okay. To be a little more exact, the interpreter starts program execution with the lowest-numbered line and proceeds in ascending order until some line directs it to do otherwise. Basic's vocabulary includes a *goto* command, by which a programmer can alter the order in which a program would otherwise be executed.

For example, if a program contained the instruction *90 goto 43000*, the interpreter when it got to line 90 would continue execution at line 43000. Presumably if such a program had lines with numbers between 90 and 43000, there would be another *goto* somewhere down the line from 43000 that would return execution to the intervening area.

Gotos are most often used in conditional statements; they effect branches. For example, a programmer may want the computer to evaluate some piece of data supplied by the user and then vary its behavior according to its evaluation.

Basic Beginnings. In the timetable of the computer industry, Basic has a long and distinguished history. The language was invented nearly twenty years ago by a couple of professors at Dartmouth College who were trying to make it easier for students without technical backgrounds to learn computing.

The most widely used programming language of that day was Fortran, which was a monumental achievement of the late fifties. Fortran was and remains a powerful language, particularly for mathematical and engineering applications. The early versions of Fortran, however, were not adept at handling alphabetic information; nor were they very easy to learn—as many an innocent liberal arts student discovered.

The inventors of Basic, John Kemeny and Thomas Kurtz, wanted to produce a language that was more general in scope and easier to learn and that could be a vehicle for teaching computing. They chose the name Basic because it could serve

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as an acronym for Beginner's All-Purpose Symbolic Instruction Code.

The first Basic was a humble tongue, with much less power than the Applesoft we've come to know and love. In the late sixties, however, a number of large computer manufacturers, most notably Digital Equipment Corporation, adopted the language and made it available on their own machines. In the process of refurbishing the language for their own machines, this and later manufacturers usually added a few features that would work only on their machines, and so Basic came to be more a group of related dialects than a single, standardized language.

Much later, in 1978, a standard Basic was established under the auspices of the American National Standards Institute (ANSI). But that standard pertained only to what you might call a core of the language. There are still a myriad of Basics in use, each one an extension of the ANSI standard. Basic, in short, is not a very portable language; a program written in Basic to run on one brand of machine is not likely to run unaltered on some other brand.

The Four Faces of Apple Basic. Even within the context of a single computer brand there may be a variety of Basics in use. There are at least four, for example, running on Apples.

When the Apple II first appeared on the market, it offered Integer Basic in ROM. Integer, written by Steve Wozniak, one of the two founders of Apple Computer, still has a cadre of diehard adherents, although its use in commercial software has all but disappeared in favor of Applesoft, which appeared with the Apple II Plus.

Applesoft is Microsoft Basic adapted for the Apple. Microsoft is the company that has dominated the development of languages for microcomputers. They were the first on the scene with a version of Basic when microcomputers descended on the marketplace in 1976, and most of the Basics now running on microcomputers have evolved in some fashion from that original Microsoft Basic.

Integer and Applesoft are the two Basics available in ROM for the Apple II. A third Basic running on some Apple IIs is Basic-80, which comes on a disk supplied by Microsoft. Basic-80 requires the CP/M operating system, which means that you need an additional piece of hardware in one of your peripheral slots in order to run it.

Finally, for Apple III users, there is Apple Computer's Business Basic, which will do everything that Applesoft and Integer will do but has some powerful additional features that facilitate the creation and use of large data files on disk. Business Basic only runs in the context of the Apple III's Sophisticated Operating System (SOS).

So what's basic about Basic and what accounts for its popularity?

It's in English. For starters, its vocabulary is simple. There isn't much of it—barely a hundred words in Applesoft or Integer—and much of what there is consists either of plain English words or simple contractions of English words.

Furthermore, the parser, for the Apple Basics at any rate, is not too fussy about how you enter your commands. You have to spell the command words correctly and you have to use them appropriately, but you can put spaces around your commands or not, as you like; if you put thirty spaces between the letters of the word *resume,* for example, the parser will sift through those spaces and figure out what you want.

Second, the organization of Basic programs by line number allows you great freedom in your work habits. You don't have to work out all the details of a program before you start programming. You can number your lines in increments of, say, ten and then, should you discover you've left something out, make insertions between the lines, so to speak. It doesn't matter in what chronological order you enter commands, because Basic will automatically line them up and execute them in numerical sequence. If you find you need a large chunk of code between line 20 and line 30, you can put a *goto* at line 25 and write the missing chunk at the end of the program. This is

LOCK-IT-UP 4.1

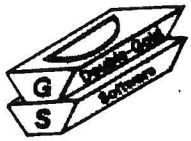
Copy-Protection System for the Apple II by Jeff Gold

If you are serious about selling software for the Apple II, piracy is the leading problem which you will face. According to an article which appeared in SOFTLINE magazine, January 1982, page 21, software piracy increases the distribution of programs by as much as five or six times. This process is facilitated by many of the "nibble" copy programs now available which claim to copy almost all software.

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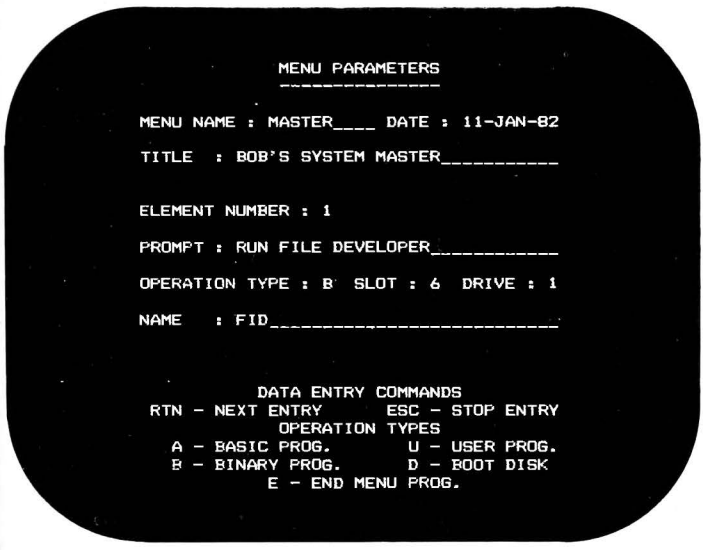
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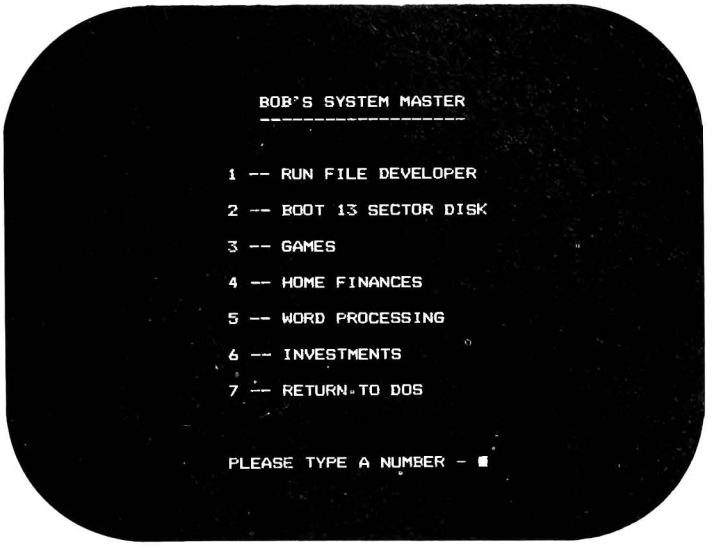
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See MENU GENERATOR on the premier issue of Demo Disk at the Boston Applefest May 14-16, 1982

not recommended programming practice, but it can be done; and the freedom to lay things out in whatever order you like does account in part for Basic's appeal, particularly to beginning or casual programmers.

The Role of the Interpreter. Closely related to this point is perhaps the most crucial factor of all: with Basic you can sit right down at your keyboard and make something happen—immediately. That's because Basic is normally implemented as an interpreted language.

Here's what that means.

High-level languages have to be translated into machine code before they can be meaningful to the microprocessor. This translation can take place by either of two means—a compiler or an interpreter.

A compiler is a machine-language program that scans an entire high-level program and converts it en masse to executable binary code. Fortran is an example of a language that uses a compiler.

An interpreter, on the other hand, translates high-level instructions one line at a time. It waits until each line is executed before translating the next.

From the standpoint of execution speed, there are some definite advantages to going by way of a compiler. A program, once it works correctly, needs only to be compiled once; the translation overhead is paid in advance. An interpreted program, on the other hand, has to be translated and retranslated every time it's run; furthermore if there is code within the program, like a loop of some kind that gets executed more than once, that code will have to be retranslated each time it's to be executed.

The big advantage to the interpretive translation procedure is that it facilitates program development. Using an interpreter, you can try out a small segment of a program, just to see what it does, without having to go to the bother of compiling the whole program. Or you can make minor changes to an existing program and note their effects, again without having to bother with compilation.

Pesticides. If your program should contain, God forbid, a *bug,* you'll probably find the interpreter a great help in *debugging.* Most interpreters have a *trace* feature that tells the interpreter to print the line number of each instruction as it executes that instruction. If you're just trying to locate some bit of code that's causing unwanted behavior in your program, the trace feature can be a pretty handy tool.

Finally, the interpreter allows you to do things in immediate execution. There are times when you don't need to have your computer run a complex program but you do want it to add a column of numbers. No problem; in the immediate execution mode, you can just rap out a command and your Apple will fire back an answer. Another way to say all this is that the interpreter makes your computer an interactive tool.

Have Your Cake and Eat. It may have occurred to you that a programmer would have the best of all worlds by using an interpreter for program development and debugging and then sending the finished program off to a compiler—if a compiler were available. In fact, this is now possible with Applesoft and Integer Basic and with Basic-80. As of this writing there are at least four compilers on the market for Applesoft, one for Integer, and one for Basic-80.

A compiler will increase the execution speed of a Basic program by a factor of anywhere from two up to ten or twenty, depending on the nature of the program.

It's also possible to interleave a Basic program with one or more programs written in assembly language. Basic has a *call* command that transfers control to a machine-language program at a specified address. This *call* procedure is useful for programs that have speed-critical elements but that do not as a whole require the immediate response offered by native machine code.

All in all, Basic is a powerful and flexible programming language. It's grown enormously in sophistication and power since it first arrived in 1963. Basic does have its detractors, however, and we'll look at some of their arguments next month when we introduce you to Pascal. ◨

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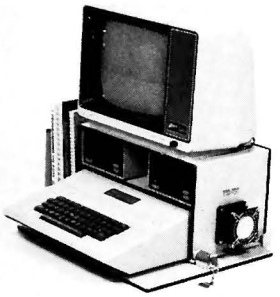
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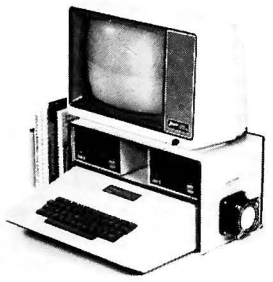
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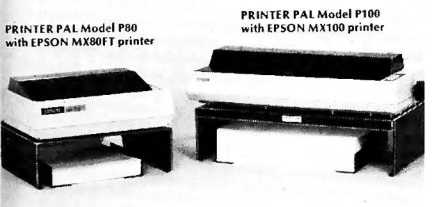
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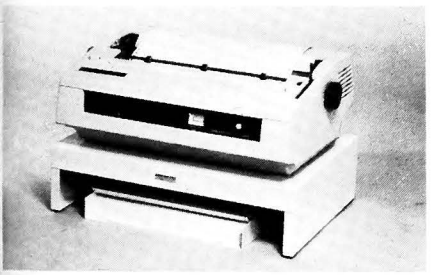
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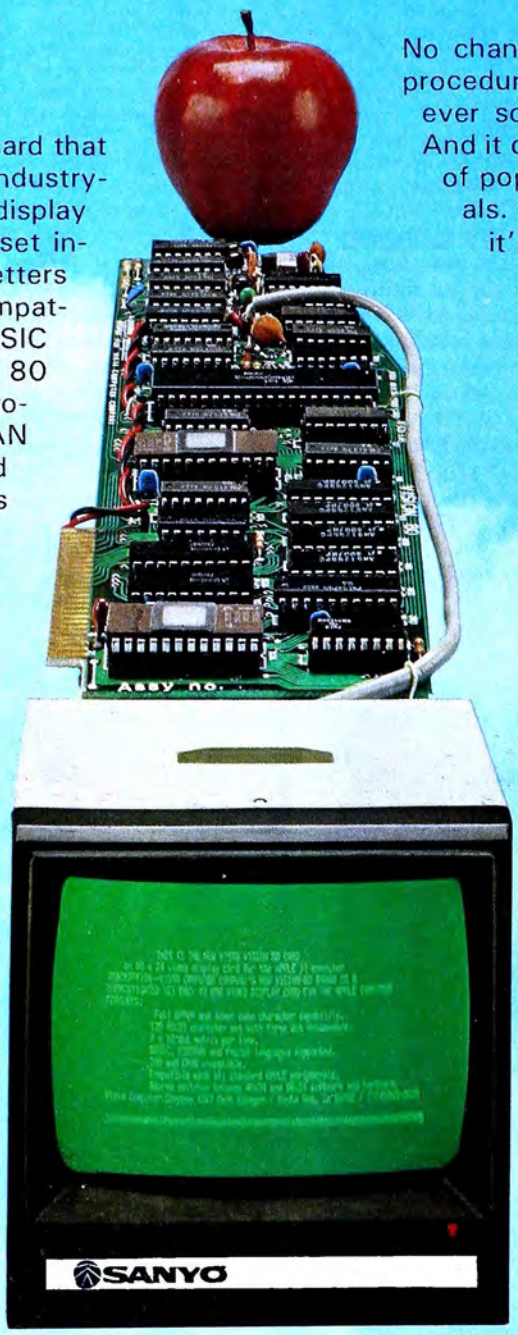
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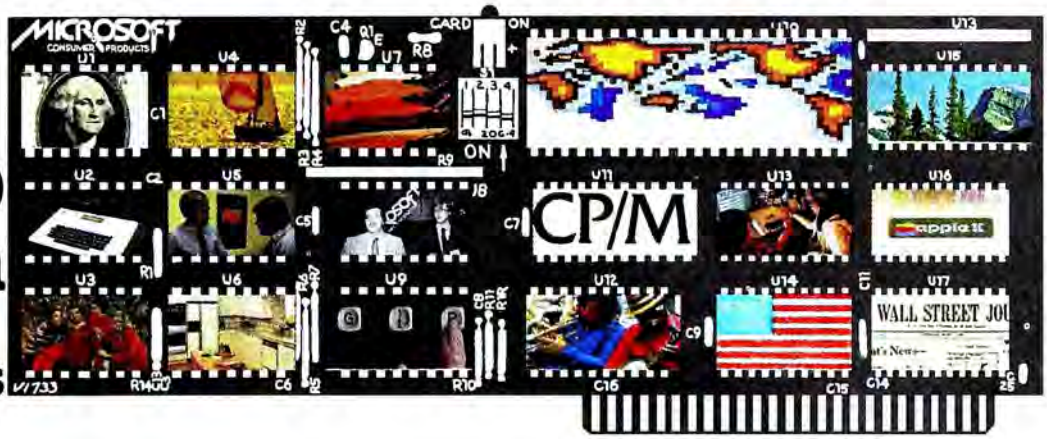
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SOFTCARD Symposium

by Greg Tibbetts



Over the last couple of months, we've been examining the various utility programs supplied with the SoftCard. In keeping with that pattern, our topic for this month will be the utility program *ED.COM* from Digital Research.

ED is the general-purpose text editor supplied with nearly every CP/M system. In the normal classification of text editors, we have all heard the terms *line-oriented*, *character-oriented*, *screen-oriented*, and so on, applied to various text editor programs. Unfortunately, as is the case with a lot of computer terminology, these descriptors mean different things to different people. Keeping that in mind, we'll avoid applying any of them to *ED*. Instead, we'll simply describe the way *ED* works and let each of you apply your own terminology.

Most SoftCard users who have had an experience with *ED* have come away somewhat frustrated and in many cases have thereafter studiously avoided its use. Although *ED* is a complex program, rock solid as far as reliability goes, it cannot be said to be—another oft-used descriptor—*user-friendly*. The lack of such features as right margin justification and automatic word wraparound make it difficult to use for any type of serious word processing. As such, *ED* is not the easiest text editor to work with, nor is it particularly versatile; and it is certainly not in a class with *WordStar* or *Magic Wand*. *ED* is, however, reasonably powerful and, for someone who knows how to use it, a good utility.

The purpose of this month's discussion is to shed some light on the principles and mechanics of *ED* and to help you make the best use of the potential for applications to which it is particularly suited. Those applications seem to be the sort in which certain global command facilities are necessary and where there is no need for the more advanced word processing features at their proportionate cost. The first such use that comes to mind is the preparation and alteration of program source files (Basic, Fortran, Assembler, and so on).

The best way to think of *ED* is to picture it as a window into a text file. The window is actually, of course, a memory buffer, and *ED* makes use of as much memory as has been installed in your system. Material is read in at the bottom of the window by specific commands and written out the top of the window also by specific commands. The material to be brought in comes from the text file specified as the source file, and the material to be written out is written to a temporary file.

When the edit session is complete, the original source file is renamed to "filename.BAK" and the temporary file is renamed to the original text file name. While in the window, information may be displayed, altered, deleted, or moved to allow new information to be inserted. Some helpful diagrams on pages 3-80 and 3-81 in volume 1 of the SoftCard manual graphically illustrate this process.

While in the window, information is stored as a stream of bytes of textual material. The information is accessible by either of two reference methods: by line number or by character position. A line of text is defined as any string of characters terminated by a carriage return/line feed (CRLF) sequence. There are no upper or lower limits on the number of characters in a line; however, in the practical sense, it is difficult to see the virtue of lines much longer than the terminal display or printer carriage. Although *ED* does not store line numbers in the file, it does create and display them during editing sessions so that the user has a convenient way to reference material. While you're editing, therefore, the cursor is located at or in one of the lines of text currently in the memory buffer or edit window. This line is called the *current line*, and its line number is always displayed on the terminal.

Within the current line of text, the cursor is located at an imaginary point called the *character pointer* (identified hereafter as CP). Insertion, deletion, or display of characters is done based on the location of the CP. The CP may be moved back and forth within the current line by different commands, and while material may be deleted either to the right or the left of the CP, material can only be added to its left, since the CP will always move to the right as you type.

To summarize, then, when you're editing a file, all operations are based on the location of the cursor, which is at a specific place (the CP), in a specific line (the current line), in that portion of the file that is in the window (the memory buffer).

The cursor may be moved freely throughout the window, either in character increments, by moving the character pointer back and forth in the current line, or in large increments, by changing to a different current line. Learning to position the cursor in *ED* is often the most frustrating part of the edit session for the new *ED* user, so we'll examine that first. You can benefit most by following along with *ED* on your Apple as you read.

So that all of us will be able to do the same thing, we'll use *ED* to modify the assembler source file *DUMP.ASM*. To perform the examples properly, start with a blank disk and use *FORMAT* and *COPY* to make a copy of your SoftCard master disk. The copy of your master disk is the one you'll work with; this will ensure that you do not destroy anything important if you make a mistake of some sort during the session.

First, delete *MBASIC.COM* or *GBASIC.COM* from the copy to give yourself some room. If you have a printer hooked up to your system, you'll be able to make listings of how the file will appear in various stages in the edit session by typing the command *PIP PRN:=DUMP.ASM*. If you don't have a printer on line, you can still perform the session, but you'll have to follow the text of this column somewhat more closely.

The changes we'll be making to *DUMP* will alter three of its functions. As you know if you have used it, *DUMP* takes a specified COM file and prints—to the screen (or to screen and printer if you type control-P)—a table of addresses and hexadecimal bytes that make up that file. Since *DUMP* prints a four-character address, sixteen two-character hexadecimal numbers, and the necessary spaces between them, the display is longer than forty columns and rather hard to read unless you have an eighty-column board. Our first change, therefore, will be to make *DUMP* automatically distinguish between forty-

column and eighty-column CP/M systems and format its output accordingly. Our second change will be to place a colon after the address to help set it farther apart, and our third change will be to create two spaces between each 128-byte record, also to enhance readability.

To do this, we'll add thirty-six functional lines of assembly code, one line of equate information, and one additional data area. This will add seventy-eight bytes to the length of the *DUMP* program. Undoubtedly, with a little time, we could make this smaller and more efficient; this might be a fun project for those of you with an interest in 8080 assembler.

To get started, the first thing to do is to put *ED* into operation. To do so, simply type the command, *ED DUMP.ASM*. *ED* will respond by printing a colon and an asterisk to the screen. The colon will be printed anytime you are in *ED* and, if the window contains text, it will be preceded by a line number. The asterisk, on the other hand, is *ED*'s prompt character, telling you that it is ready to accept a command. Any time you don't see the asterisk preceding the cursor on your screen, it means you're in insert mode and that what you're typing is being inserted into the file and won't be interpreted as a command.

Our first task now is to get the information from the *DUMP.ASM* file into the window. This is done using the *A* (for *append*) command. When *ED* sees the *A*, it will bring into the window the number of lines specified by the decimal number preceding the *A*. If you wish to bring one hundred lines of a large file into the buffer, the command is *100A*; for two lines, the command is *2A*; and so on. With any of the numeric reference commands of *ED*, it is possible to use a pound sign, #, to represent the number 65,535, the highest number *ED* can deal with. Since *ED* will only act on the number that actually exists, regardless of the number specified, we can use *#A* to bring in the entire *DUMP* file. Do that now.

On your screen now should be the number 1, followed by a colon and the asterisk prompt. We are at the very beginning of the file, and line number 1 is our current line number. From now on, we'll simply refer to it as line 1. The only reason no text is displayed is that we haven't asked for any; the text is still there. To verify this, use the *T* (for *type*) command. Enter *#T*, and watch the entire file list to the screen, ending with the current line reference at line 1 and the asterisk prompt. Now we'll try some cursor movement commands.

There are four methods of moving the cursor from one line to another. First is the *B* (for *buffer*) command. This command moves the cursor either to the beginning of the buffer (line 1 in our case since our entire file is in memory) or to the end. Used by itself or with a plus sign preceding it, *B* will go to the beginning. Used with a minus sign preceding it, *B* will go to the end. Try a *−B* and then a *+B* to verify this. Remember, all *ED* commands must be followed by a carriage return.

The second method of moving the cursor is simply with + or − and some number *n*. A *+n* (the number *n* alone will work since a plus is assumed if there is no sign) will move the cursor *n* lines further down the file, and a *−n* will move it *n* lines backward.

Since we wish to put a new equate statement in the first section between lines 16 and 17, let's move to the beginning of line 17. Since the current line is line 1, we'll need to move sixteen lines ahead, so type the number *16*. You should now see the current line number 17: displayed. If you don't, type *B* to get back to the beginning and then type 16 again. Remember the carriage return after the commands.

The commands we've just examined, *+n* or *−n*, are *relative movement* commands. An additional 16 now would put us at 17 + 16 or line 33. This can sometimes be confusing, so it's good that there is an easier way to move around. By placing a colon after the number, we can turn it into an *absolute movement* command. Try that now by entering *1:* and you're back at line 1. Enter *17:* and you're back at line 17. Both commands have their uses and you'll want to become familiar with them.

The next two movement commands are slightly different from the first two, since they can be preceded by numbers themselves. The first of these is the *L* for *line* command. This command moves the cursor to the beginning of the line that is *+n* lines ahead of the current line or *−n* lines behind the current line. This feature of moving to the beginning of the line will become important to us later.

The last command is the *F* (for *find*) command, used to find some string of text within the window and to place the cursor immediately after that text. Used with a *+n* or *−n* preceding it, *ED* will find the *n*th occurrence of the string before stopping and placing the cursor after that particular string.

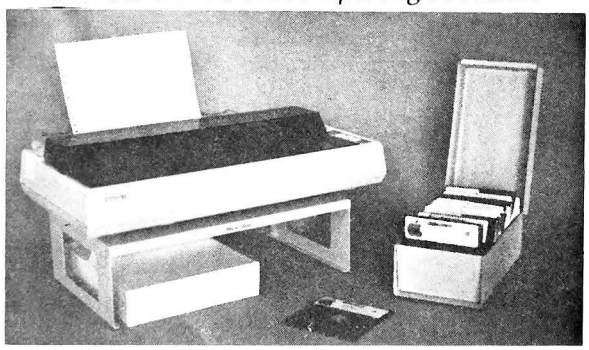
To demonstrate the *L* and *F* commands, let's go back to the beginning of the file with B. Now line 17 has as its first word the label FCB, so, to find line 17, enter *FFCB* and follow it with a carriage return. Now we're back at 17: with our asterisk prompt. But wait, didn't we say that the *F* command put us at the end of the string being searched for? In that case, how come it looks as if we're at the beginning of the line? Again, the reason is that we didn't tell *ED* to print any of the line.

Since the *T* command we used before will display the current line *from the CP to the end of the line*, let's see where we are by entering *T*. Is the whole line displayed? Obviously not.

If preceded by a 0, the *T* command will display the current line up to the CP, so enter *0T* now. There's our *FCB*. Now the use for *L* becomes clearer; if *L* is preceded by a *0*, it moves to the beginning of the current line, so type *0L* now. Now enter *T* and you will see the entire line 17. Had we begun our insert where we were, we'd have been left with two lines in our file that were not correct and that would have resulted in errors in the assembler. When using *ED*, you must always be sure where you are. Before you do inserts, use the *0T* command to verify your position.

It's about time we did what we said we would, so let's go on to the insert process. The *I* for *insert* is the *ED* command used most often. It must be typed at the asterisk prompt and can only be terminated by a control-Z. Anytime a CRLF sequence is generated by your hitting the return key, a new line is

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formed in the file. The only time the CRLF is not included in your file is when you end the insert mode by typing control-Z and following it with a return. That last CRLF will not be placed in the file.

It's easiest to understand this business of returns and control-Zs if you simply picture all the material you wish to insert. Everything between the *I* and the control-Z, will become a part of the file. Of that information, any sequence of characters ended with a return will be a complete line.

You may enter *insert* in one of two ways: by typing *I* followed by a return, or by typing *I*, then the characters you wish to insert, and finally a control-Z return. Both ways have the same general effect; however, the former is recommended for entering whole new lines, because it has a more standard appearance to the user. When you do it that way, after you hit return, *ED* leaves you at the beginning of the current line. If you were at the beginning of the line already, the new current line is the same as the old one. If the CP was somewhere inside the line, all the old information that preceded the CP is now the total contents of that line, the CP is moved to the beginning of the next line, and all the old information that followed the CP is in the new line, still following the CP. Subsequent returns create new line separations at the position of the CP. If you wish to concatenate the material on both sides of the CP, typing a control-Z followed by a return will have that effect.

Since we wish to add a new line 17 and to move all the following lines down one, we'll start inserting at the beginning of line 17 and follow our text with a CRLF. Are you at the beginning of the line? Okay, then enter an *I* and a return. When the line is displayed, enter the following, followed by a return.

```
SLT3:     EQU     0F3BBH          ;SLOT 3 CARD TYPE LOCATION
```

The spaces between the SLT3: and the EQU and the OF3BBH and the ; are actually tab characters created with control-I. If your machine is capable of displaying lower case, you may use it, but it is usually more readable if you enter characters all in upper case. Once you have entered the line and followed it with a return sequence, you will see 18: displayed on the screen. *ED* is now waiting for you to enter a new line 18. Instead, enter control-Z. This will exit insert mode and leave you again with the asterisk prompt. To check your work, enter −1. *ED* will move the cursor to the beginning of line 17 and display the line you just entered. If the line is right, follow on; if not, use the *K* for *kill* command to delete the current line, and start over.

The next lines we wish to add will start at the label OPENOK:, which was line 50 on our original printout. Since we have added a line, OPENOK: will now be line 51. We can go there with a *51:* command, or use FOPENOK: to find it, followed by a *0L* to put us at the beginning of the line. Finally, it's always possible to use relative moves to get to the vicinity and to use the *T* command to type the next few lines until the proper one is spotted.

For present purposes, we want to alter the OPENOK: line, leaving the label and the portion up to the comma intact, but deleting and replacing the portion after the comma. To do that, let's use FOPERATION OK, to find the proper position. You should now see 51:* on your screen. Using *0T*, you can see that the cursor is following the comma. Since we'll want to leave the space after the comma, we need to move the CP one more character over from its present location. To do so, we enter *1C*. Now entering *0T* will show us to be just following the space after the comma. By entering *T*, we can see the rest of the line we wish to delete.

Deletion of characters can be accomplished in two ways. If the characters to be deleted are few in number, you might wish simply to use the number of characters and the *D* for *delete* command, as in *nnD*. You should always do a *T* following a *delete* to make sure that you have deleted all of the characters you meant to (and that you have not miscounted and deleted the CRLF sequence also). Inadvertently deleting the CRLF sequence will take the following line and concatenate it to the

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current line—useful if you're trying to do it, a real hassle if you don't allow for it.

The other method is to use the *K* command. *K* is normally used to delete entire lines or ranges of lines. If any number precedes *K*, then that number of lines, plus or minus, is removed. If no number precedes *K*, the effect depends on whether a plus or minus precedes it. A plus or nothing deletes all characters after the CP *including the CRLF*. A minus deletes all characters preceding the CP.

Since we wish to remove all the characters following the CP, verify your position and enter *K*. Now we'll replace *K* with the following: ISET FOR 40/80 COL. OUTPUT. The *I* is for *insert*, and since we don't want to start a new line after the comma, we didn't enter a return between the *I* and the *set*. Be sure to enter a return after *output* however, since our *K* deleted the old one. When *ED* gives you the next line, terminate insert with a control-Z and use a *−1* to verify that all went okay.

Once you've verified that line, you can go on to add nine more lines following it. By now you should be feeling more comfortable with *ED*, so we'll pick up the pace a little. Do an *L* command to get past your new line 51 and to the beginning of the following line, then an *I* return to go into insert mode.

Enter the following nine lines, exactly as shown, remembering to use tabs between the labels (words followed by colons), the opcodes (the two and three letter words that come in the second column), the operands (words, numbers, and so on following opcodes), and the comments (anything that follows a semicolon). The comments will make it clear to you what we are inserting specifically to do the alteration.

```
        LDA     SLT3    ;GET SLOT 3 CARD TYPE VALUE
        ORA     A       ;SET ZERO FLAG IF ZERO
        JZ      COL40   ;IF ZERO IT'S 40 COLUMN
        SUI     5       ;SET ZERO FLAG IF IT'S 5
        JNZ     ONWRD   ;IF NOT 5 THEN IT'S 80 COLUMN
COL40:  MVI     A,0     ;FLAG=0 FOR 40 COLUMN
        DB      1       ;SKIP 2 BYTES WITH LXI B OPCODE
ONWRD:  MVI     A,0FFH  ;FLAG NON-ZERO FOR 80 COLUMN
        STA     FLAG    ;STORE THE VALUE 40 OR 80 IN FLAG
```

After entering these nine lines, you should be on line 61. Now enter a control-Z to terminate insert. To check your work, do a *−10T* here; this will display the last 10 lines but leave you still on line 61.

Once you have verified your work, you need to go to what used to be (before our insertions) line 66. Since it's now a rather complex matter to figure where you are, you should use the *F* command to find the words LOW 4 BITS in the line preceding the one we wish to alter using the command FLOW 4 BITS. Once we've found what we're looking for, we can go to the beginning of our target line with a simple *L*. By using *T*, we can see the line now says JNZ NONUM. Since we wish the new line to read JZ SKIP ;READY FOR NEW ADDRESS, we can simply delete the old line and add the new one; but to get some practice, let's alter the original line instead. One sequence of commands that would alter this line is an *FJ* return followed by a *1D* return, followed by an FNONUM return, followed by a *−5D* return, followed by an ISKIP<tab>;READY FOR NEW ADDRESS control-Z return. Whew! *ED* makes it easier for us to accomplish this by allowing multiple commands on a single line. A single command line for the sequence we just gave is:

```
FJ Z1DFNONUM^Z-5DISKIP<tab>;READY FOR NEW ADDRESS^Z[RETURN]
```

In the example just given, control-Z has been shown as ^Z for brevity. Try the alteration both ways to verify that it works. To do this, you'll have to reenter the line in its original form.

Once that is done and verified, we'll want to save the results of our session so far. We could write the lines done to date to the temporary file, using the *W* for *write* command in the form *nW*, where *n* is the last line we wish written to the file.

The only problem with this procedure is that it removes those lines from the window, making it impossible for us to see them again. We could also use the *E* for *end* command, which

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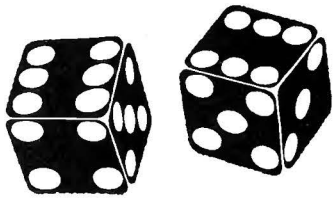
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would write the entire new file, both processed and unprocessed lines, to the temporary file, rename it to the original file name, and rename the original file to the filename.BAK. But that means that we'd have to invoke *ED* all over again to continue. What we want is the *H* for *head of file* command. This is equivalent to issuing an *E* and then reinvoking *ED* on the new file. We will have to issue the *#A* to bring the file contents back into memory, and then go to the line we wish to alter, but our current changes will be saved. Take note of the current line number (it should be the one following the line we just altered), and then do the *H* return and the *#A* linenumber:.

Now that we're back, we're ready to add the next sixteen lines, as follows. They can be done with a simple *I* return.

```
        MOV     C,A     ;SAVE ACCUMULATOR
        LDA     FLAG    ;40 OR 80 COLUMNS?
        ORA     A       ;SET ZERO FLAG IF ZERO
        JNZ     NONUM   ;IF NON-ZERO IT'S 80
        MOV     A,C     ;IT'S 40, GET ACCUMULATOR
        CPI     08H     ;IF WE'VE PRINTED 8, WE'RE AT HALF LINE
        JNZ     NONUM   ;ZERO FLAG TELLS US IF IT IS 08
        CALL    CRLF    ;OTHERWISE WE NEED TO GO TO NEXT LINE
        PUSH    H       ;SAVE THE CURRENT LINE ADDRESS
        MVI     L,5     ;WE NEED TO PRINT 6 SPACES (0-5)
PRSPC:  MVI     A,      ;PUT SPACE VALUE IN ACCUMULATOR
        CALL    PCHAR   ;AND GO PRINT IT
        DCR     L       ;DECREMENT OUR COUNTER
        JNZ     PRSPC   ;IF NOT ZERO, WE STILL HAVE SPACES
        POP     H       ;WE'RE DONE. GET LINE ADDRESS BACK
        JMP     NONUM   ;AND CONTINUE AS BEFORE
```

Once these sixteen lines have been entered and you're positioned at the next line, you can end the insert with control-Z. Do a *−17T* to verify your work, and you're ready for the next change. This involves adding two lines to print the colon after the address number; the lines are inserted after the second call to PHEX, twelve lines from our current location. Rather than go there with relative or absolute moves, however, let's use the *F* command with the number 2 to find the second occurrence of PHEX. By now you should know that the command is *2fphex^zl*. The first part, up to the ^Z, takes us to the end of line we want, and the *L* moves us to the beginning of the next line to start inserting. The two lines to insert are:

```
MVI     A,':'   ;LOAD VALUE FOR : IN ACCUMULATOR
CALL    PCHAR   ;AND GO PRINT IT
```

Be sure to verify your work.

Now we want to alter the line that reads CRLF: and to add four lines after it, so we get there with an FCRLF:return. We alter the line by typing:

```
I<tab>MOV       A,L     ;GET ADDRESS IN ACCUMULATOR[RETURN]
        ORA     A       ;CLEAR CARRY FOR ROTATE
        RAL             ;ROTATE BITS LEFT, IF ADDRESS IS
        ORA     A       ;80 OR 00, THIS SETS THE ZERO FLAG
        JZ      P2      ;IF SO, PRINT TWO CRLFS ^ Z[RETURN]
```

All of the lines above have returns after them, even though only the first and last lines show the return. The last line contains a ^Z to show that we want to terminate the line *without* an extra return since we still have the one that was following CRLF: when we first began inserting. We are now at the beginning of the line that used to follow CRLF:. We wish to put in a blank comment line and add a label CRLF1: at the beginning of our current line. The quickest way to do this is to use the command sequence:

```
I;[RETURN]CRLF1:^ Z[RETURN]
```

As you can see by now, this creates a comment line (empty except for the semicolon), puts the new label at the beginning of our current line, and then concatenates the two sides of the CP by exiting insert mode without another return.

Now it's time for you to do some on your own. However you wish to do it, go to the first of two empty comment lines preceding the label PNIB: and insert the following:

```
;
;
P2:     CALL    CRLF1   ;PRINT EXTRA CRLF
        CALL    CRLF1   ;PRINT EXTRA CRLF
        JMP     CRLF1   ;PRINT ORIGINAL CRLF AND RETURN
```

How did it go? See how easy it is?

The last thing we want to do is to add the new data area, so go to the line immediately preceding the empty comment line just ahead of the comment STACK AREA and add the line:

```
FLAG:   DS      1       ;40/80 COLUMN FLAG
```

Now we're through with the edit session. Print out the file or use the *L* and *T* commands to display it on the screen. Once you're sure all the changes have been made successfully, end the session with an *E*—and that's all there is to it.

Next month, we'll continue with this program in our discussion of the Digital Research assembler *ASM.COM*. Until next month . . .

```
1:      ;       FILE DUMP PROGRAM, READS AN INPUT FILE AND PRINTS IN HEX
2:      ;
3:      ;               COPYRIGHT © 1975, 1976, 1977, 1978 BY
4:      ;               DIGITAL RESEARCH
5:      ;               BOX 579, PACIFIC GROVE, CA 93950
6:      ;               USED WITH PERMISSION
7:      ;
8:              ORG     100H
9:      BDOS    EQU     0005H   ;DOS ENTRY POINT
10:     CONS    EQU     1       ;READ CONSOLE
11:     TYPEF   EQU     2       ;TYPE FUNCTION
12:     PRINTF  EQU     9       ;BUFFER PRINT ENTRY
13:     BRKF    EQU     11      ;BREAK KEY FUNCTION (TRUE IF
                                  CHAR READY)
14:     OPENF   EQU     15      ;FILE OPEN
15:     READF   EQU     20      ;READ FUNCTION
16:     ;
17:     FCB     EQU     5CH     ;FILE CONTROL BLOCK ADDRESS
```


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```
18:  BUFF    EQU   80H        ;INPUT DISK BUFFER ADDRESS
19:  ;
20:  ;       NON GRAPHIC CHARACTERS
21:  CR      EQU   ODH        ;CARRIAGE RETURN
22:  LF      EQU   OAH        ;LINE FEED
23:  ;
24:  ;       FILE CONTROL BLOCK DEFINITIONS
25:  FCBDN   EQU   FCB+0      ;DISK NAME
26:  FCBFN   EQU   FCB+1      ;FILE NAME
27:  FCBFT   EQU   FCB+9      ;DISK FILE TYPE (3 CHARACTERS)
28:  FCBRL   EQU   FCB+12     ;FILE'S CURRENT REEL NUMBER
29:  FCBRC   EQU   FCB+15     ;FILE'S RECORD COUNT (0 TO 128)
30:  FCBCR   EQU   FCB+32     ;CURRENT (NEXT) RECORD
                                NUMBER (0 TO 127)
31:  FCBLN   EQU   FCB+33     ;FCB LENGTH
32:  ;
33:  ;       SET UP STACK
34:          LXI   H,0
35:          DAD   SP
36:  ;       ENTRY STACK POINTER IN HL FROM THE CCP
37:          SHLD  OLDSP
38:  ;       SET SP TO LOCAL STACK AREA (RESTORED AT FINIS)
39:          LXI   SP,STKTOP
40:  ;       READ AND PRINT SUCCESSIVE BUFFERS
41:          CALL  SETUP      ;SET UP INPUT FILE
42:          CPI   255        ;255 IF FILE NOT PRESENT
43:          JNZ   OPENOK     ;SKIP IF OPEN IS OK
44:  ;
45:  ;       FILE NOT THERE, GIVE ERROR MESSAGE AND RETURN
46:          LXI   D,OPNMSG
47:          CALL  ERR
48:          JMP   FINIS      ;TO RETURN
49:  ;
50:  OPENOK:  ;OPEN OPERATION OK, SET BUFFER INDEX TO END
51:          MVI   A,80H
52:          STA   IBP        ;SET BUFFER POINTER TO 80H
53:  ;       HL CONTAINS NEXT ADDRESS TO PRINT
54:          LXI   H,0        ;START WITH 0000
55:  ;
56:  GLOOP:
57:          PUSH  H          ;SAVE LINE POSITION
58:          CALL  GNB
59:          POP   H          ;RECALL LINE POSITION
60:          JC    FINIS      ;CARRY SET BY GNB IF END FILE
61:          MOV   B,A
62:  ;       PRINT HEX VALUES
63:  ;       CHECK FOR LINE FOLD
64:          MOV   A,L
65:          ANI   0FH        ;CHECK LOW 4 BITS
66:          JNZ   NONUM
67:  ;       PRINT LINE NUMBER
68:          CALL  CRLF
69:  ;
70:  ;       CHECK FOR BREAK KEY
71:          CALL  BREAK
72:  ;       ACCUM LSB = 1 IF CHARACTER READY
73:          RRC                ;INTO CARRY
74:          JC    FINIS        ;DON'T PRINT ANY MORE
75:  ;
76:          MOV   A,H
77:          CALL  PHEX
78:          MOV   A,L
79:          CALL  PHEX
80:  NONUM:
81:          INX   H            ;TO NEXT LINE NUMBER
82:          MVI   A,' '
83:          CALL  PCHAR
84:          MOV   A,B
85:          CALL  PHEX
86:          JMP   GLOOP
87:  ;
88:  FINIS:
89:  ;       END OF DUMP, RETURN TO CCP
90:  ;       (NOTE THAT A JMP TO 0000H REBOOTS)
91:          CALL  CRLF
92:          LHLD  OLDSP
93:          SPHL
94:  ;       STACK POINTER CONTAINS CCP'S STACK LOCATION
95:          RET                ;TO THE CCP
96:  ;
97:  ;
98:  ;       SUBROUTINES
99:  ;
100: BREAK:  ;CHECK BREAK KEY (ACTUALLY ANY KEY WILL DO)
101:         PUSH H! PUSH D! PUSH B; ENVIRONMENT SAVED
102:         MVI   C,BRKF
103:         CALL  BDOS
104:         POP B! POP D! POP H; ENVIRONMENT RESTORED
105:         RET
106: ;
107: PCHAR:  ;PRINT A CHARACTER
108:         PUSH H! PUSH D! PUSH B; SAVED
109:         MVI   C,TYPEF
110:         MOV   E,A
111:         CALL  BDOS
112:         POP B! POP D! POP H: RESTORED
113:         RET
114: ;
115: CRLF:
116:         MVI   A,CR
117:         CALL  PCHAR
118:         MVI   A,LF
119:         CALL  PCHAR
120:         RET
121: ;
122: ;
123: PNIB:   ;PRINT NIBBLE IN REG A
124:         ANI   0FH          ;LOW 4 BITS
125:         CPI   10
126:         JNC   P10
127: ;       LESS THAN OR EQUAL TO 9
128:         ADI   '0'
129:         JMP   PRN
130: ;
131: ;       GREATER OR EQUAL TO 10
132: P10:    ADI   'A' - 10
133: PRN:    CALL  PCHAR
134:         RET
135: ;
136: PHEX:   ;PRINT HEX CHAR IN REG A
137:         PUSH  PSW
138:         RRC
```


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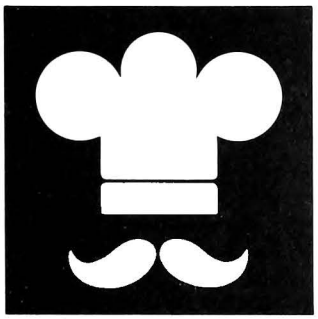
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```
139:            RRC
140:            RRC
141:            RRC
142:            CALL        PNIB        ;PRINT NIBBLE
143:            POP         PSW
144:            CALL        PNIB
145:            RET
146:  ;
147:  ERR:      ;PRINT ERROR MESSAGE
148:  ;         D,E ADDRESSES MESSAGE ENDING WITH "$"
149:            MVI         C,PRINTF    ;PRINT BUFFER FUNCTION
150:            CALL        BDOS
151:            RET
152:  ;
153:  ;
154:  GNB:      ;GET NEXT BYTE
155:            LDA         IBP
156:            CPI         80H
157:            JNZ         G0
158:  ;         READ ANOTHER BUFFER
159:  ;
160:  ;
161:            CALL        DISKR
162:            ORA         A           ;ZERO VALUE IF READ OK
163:            JZ          G0          ;FOR ANOTHER BYTE
164:  ;         END OF DATA, RETURN WITH CARRY SET FOR EOF
165:            STC
166:            RET
167:  ;
168:  G0        ;READ THE BYTE AT BUFF+REG A
169:            MOV         E,A         ;LS BYTE OF BUFFER INDEX
170:            MVI         D,0         ;DOUBLE PRECISION INDEX TO DE
171:            INR         A           ;INDEX=INDEX+1
172:            STA         IBP         ;BACK TO MEMORY
173:  ;         POINTER IS INCREMENTED
174:  ;         SAVE THE CURRENT FILE ADDRESS
175:            LXI         H,BUFF
176:            DAD         D
177:  ;         ABSOLUTE CHARACTER ADDRESS IS IN HL
178:            MOV         A,M
179:  ;         BYTE IS IN THE ACCUMULATOR
180:            ORA         A           ;RESET CARRY BIT
181:            RET
182:  ;
183:  SETUP:    ;SET UP FILE
184:  ;         OPEN THE FILE FOR INPUT
185:            XRA         A           ;ZERO TO ACCUM
186:            STA         FCBCR       ;CLEAR CURRENT RECORD
187:  ;
188:            LXI         D,FCB
189:            MVI         C,OPENF
190:            CALL        BDOS
191:  ;         255 IN ACCUM IF OPEN ERROR
192:            RET
193:  ;
194:  DISKR:    ;READ DISK FILE RECORD
195:            PUSH H! PUSH D! PUSH B
196:            LXI         D,FCB
197:            MVI         C,READF
198:            CALL        BDOS
199:            POP B! POP  D! POP H
200:            RET
201:  ;
202:  ;         FIXED MESSAGE AREA
203:  SIGNON:   DB          'FILE DUMP VERSION 1,4$'
204:  OPNMSG:   DB          CR, LF, 'NO INPUT FILE PRESENT ON DISK$'
205:
206:  ;         VARIABLE AREA
207:  IBP:      DS          2           ;INPUT BUFFER POINTER
208:  OLDSP:    DS          2           ;ENTRY SP VALUE FROM CCP
209:  ;
210:  ;         STACK AREA
211:            DS          64          ;RESERVE 32 LEVEL STACK
212:  STKTOP:
213:  ;
214:            END
```


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HARD TALK

BY JEFFREY MAZUR

When most of us bought our Apples we could hardly wait to start filling up those empty slots within the computer. A few disk drives, RAM cards, and interfaces later, it began to look like those eight slots just might not be enough. For those of you in such a situation, or hoping to avoid it, multifunction boards may be the answer. They offer several advantages over individual cards but also have their drawbacks.

Can the Whole Be Greater Than the Sum of Its Parts? The purpose of a multifunction board is to combine the hardware from several peripherals onto one circuit board. This has numerous advantages because many of the components can be shared by more than one function. Only one circuit board is required (a major cost in any peripheral) and only one slot is used up. For what it offers, a multifunction board will usually consume less power, generate less heat, and cost significantly less than a comparable collection of separate interface boards.

While putting several functions on one board may seem like a good idea, there is the problem of how to access all of them. Most peripherals for the Apple interface through the *IN#* and *PR#* hooks designed for this purpose. This makes it very easy to use them from Basic and only requires that you know which slot the peripheral board is in. With multifunction boards however, there are several input and output devices but only one set of hooks to the slot in which the multicard is placed. This problem has been dealt with by using special hardware or software that makes each device appear to be in different "phantom" slots.

Mountain Computer CPS MultiFunction Card

The CPS card (Clock/Parallel/Serial) was probably the first multifunction board to become popular. As its name implies, it combines a real-time clock/calendar, a parallel port, and a serial interface. Another unique feature of this board is the fact that many of the configuration parameters necessary for its operation are stored in low-power memory on the board, maintained even when the computer is turned off by having its own battery.

Installation of the CPS board requires placing one chip from the Apple's motherboard on a header and running a short cable from it to the card itself. The board can be placed in any slot except zero. The next step is to run the *Setup* program supplied to configure the card to your system. Figure 1 shows the options available with this program.

```
#    OPTION
-    ------
0 — CATALOG
1 — LOAD SETUP FILE
2 — SAVE SETUP FILE
3 — SET DEVICE PARAMETERS
4 — SET SLOT ASSIGNMENTS
5 — SET THE TIME
6 — SET THE DEFAULT INPUT DEVICE
7 — SET THE DEFAULT OUTPUT DEVICE
8 — DISPLAY OR PRINT PARAMETERS
9 — EXIT
```

Figure 1. Setup program primary menu

Options 1 and 2 are used to load and save files that contain a complete set of configuration parameters. For example, if the CPS card is to be used with a Novation CAT modem, the file Modem can be loaded; this will set up the I/O default parameters to work with this device. If you are using some other device, then you will probably use option 3 to set up the proper information as necessary. This option lets you determine the clock data format, serial input and output parameters, and parallel output specifications. In particular, the clock data input can be in one of two formats. Format 1 looks like the Mountain Computer Apple Clock with month/day and hour/minutes/seconds information. Following the seconds are three zeros to represent milliseconds. This is simply for compatibility, since the CPS card does not keep track of milliseconds. In format number 2 the input string includes a day-of-the-week digit and the year.

Serial input and output parameters include setting of the baud rate, parity, word length, and stop bits. Conversion of lower-case letters to upper case is also allowed, as well as setting line length, page length, high bit on/off, and auto line feed for serial output. Similar parameters can also be set for the parallel output device.

Option 4 sets the actual slot assignments for each of the three devices. Except for slot 0 and the boot disk controller slot, any of the CPS devices can be assigned to any one or more slots. If there is already another card in the slot selected, then the CPS "phantom" slot selection will take precedence. Thus, to access the actual board in that slot requires that the phantom slot operation be disabled. Assuming you set up the slots once and don't change things, this technique seems to work adequately. If you often engage in card swapping, however, the phantom slot settings can be an invitation to disaster (it is even possible to make your system incapable of booting!).

The next *Setup* option, of course, is used to set the clock to the correct local time. The next two are then an extension of the slot assignments, in that they determine what device will be accessed when the actual CPS slot is addressed for input or output.

When all information has been entered, a detailed listing of the setup can be printed through option 8. If desired, you can save arrangement to disk; and, finally, when option 9 is executed, the *Setup* program leaves all the parameters set into the battery-backed memory.

Aside from the usual *IN#* and *PR#* commands to initialize the input or output devices, the CPS card also recognizes several further command sequences. These commands are used to change temporarily the default input/output devices or to enable/disable the phantom slots. Whenever the CPS card is selected for output (by the *PR#* command) a special command sequence can be initiated by sending a control-W. This can be accomplished from the keyboard, from within a program, or even from another input device. After the card has received the control-W, one or more of the following letters may be sent to indicate what action the card is to take:

S—stops processing commond sequences (for exomple, to ollow output of the control-W chorocter).

A—selects the clock os the current input device ond ollows output through the CPS boord.

C—selects the clock os the current input device ond suppresses output from the CPS boord.



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I—selects the serial part as the current input device.
O—selects the serial part as the current output device.
P—selects the parallel part as the current output device.
D—disables the currently established phantam slots.
E—enables the currently established phantam slats.

These extra commands make the board easy to use under special circumstances. Instead of going through the entire procedure of the *Setup* program, you can make simple changes through a few keystrokes.

When the serial or parallel port is being used, a number of escape codes are also recognized. These codes are not actually invoked via the escape key; instead they use a control-I (or alternatively, control-A) as a lead-in character. This is similar to the standard schemes used by other Apple I/O interfaces. Figure 2 shows the complete list of escape codes. Note that most of these commands do not conform to the Apple de facto standards; other commands, such as the control-IxxN to set line length, are not recognized at all. This should not pose much of a problem but one can only wonder why a more standard set of codes was not chosen.

C—clears high arder bit.
S—sets high arder bit.
E—enables auta line feed after carriage return.
K—disables auta line feed after carriage return.
F—enters full duplex terminal made.
H—enters half duplex terminal mode.
L—passes lawer-case letters unmadified.
N—ignared.
U—canverts lawer case ta upper case.
R—selects regular videa display.
D—selects special inverse videa display mode.
O—turns aff videa autput.
V—turns an videa autput.
T—enables absalute tabbing.
B—returns ta regular tabbing.
Cantral-A—changes escape character ta cantral-A.
Contral-I—changes escape character ta cantrol-I.

Figure 2.

Most of these functions are self-explanatory, but a couple are unique to the CPS card. The special inverse display mode, for example, prints lower-case letters as normal capital letters and prints upper-case letters in inverse. This can sometimes be useful to those who do not own a lower-case adapter. In the normal display mode, lower-case letters will usually appear as garbage (this is why there is another command to convert lower case into upper case). Another feature of the CPS card is that it offers two types of horizontal tabbing. This is handy because it allows absolute positioning with the Applesoft *tab* function in lines longer than forty characters.

Another feature of the CPS board is its ability to emulate a dumb terminal. This provides a simple means for using the Apple with other computer systems, usually via a modem. Finally the CPS board system disk is a utility program called the *CPS Lister,* which makes use of both the clock and printer port of the CPS card. It allows you to make formatted listings of Applesoft programs with optional time and date stamping at the top of each page as well as sequential page numbering. This can be quite useful when you are working on a program and generating several listings at various stages of development. By glancing at the time stamp on the printout, you can easily determine which listing you're looking at.

As you can tell from the preceding discussion, the CPS MultiFunction Card is a sophisticated device. In fact, in some respects it's a bit too formal. For example, when connecting to the serial port you must provide all the signals specified in the RS-232 standard. This includes all the modem control lines that are normally not used, especially when hooking up a printer. What this means is that you may have to take apart your cable to add some jumper wires to get things to work. Unfortunately, this information is not described in much detail in the manual. The manual leaves much to be desired. There is very little said about hooking up the card to other devices; Three examples are given but they do not provide much insight.

Compatibility Problems. On the first page of its operating manual, Mountain Computer claims that any Basic or machine language software for the Apple II, including *VisiCalc* and software written for the Mountain Computer Apple Clock, will work with the CPS Card. We tried the board with all programs that came on the Apple Clock system disk. None of them worked, because they did not recognize the CPS card as a clock. Digging through the manual, we discovered that a new slot-finding routine was needed. Fortunately, the programs were in Basic so it wasn't too hard to make the necessary modification.

Next we tried *VisiCalc* and *VisiDex.* Although the printer port functioned correctly, the clock did not work with *VisiDex.* This was caused by the CPS card's lack of interrupt-generating capabilities. Also because of this, the clock would also not work with the Mountain Computer Introl X-10 system. So far, the manufacturer's claim seemed considerably overstated.

Further compatibility problems have arisen with the CPS board and other software/hardware combinations. Many of the difficulties reported were due to a design problem in the early versions of the board.

Mountain Computer's technical service department confirmed that there had been a hardware bug but said this problem had been fixed. Many of the bad boards were fixed in the field, and those still experiencing difficulty can have their boards updated if necessary. The other problems concerning software compatibility still seem to exist. Some software manufacturers have been able to modify their programs to work with the board, but others are still incompatible.

Contrary to their advertising, there are several more disappointments with the CPS card. Although the phantom slot idea seems like a novel approach to regain some more slots, it does not truly release any of them. There still are only seven *PR#* and *IN#* hooks that can be used, and any boards in the CPS's phantom slots become more restricted. Another claim is that the clock gives the day of week and year and is compatible with the Apple Clock. While both of these claims individually are correct, they don't tell you that you can't have both formats at the same time. If you plan on using the clock with any existing software, you must configure it to emulate the Apple Clock. In this mode, the day and year information are not available. Even if you wanted to write your own programs to use the other format, you would have to keep running the *Setup* program to change formats between programs.

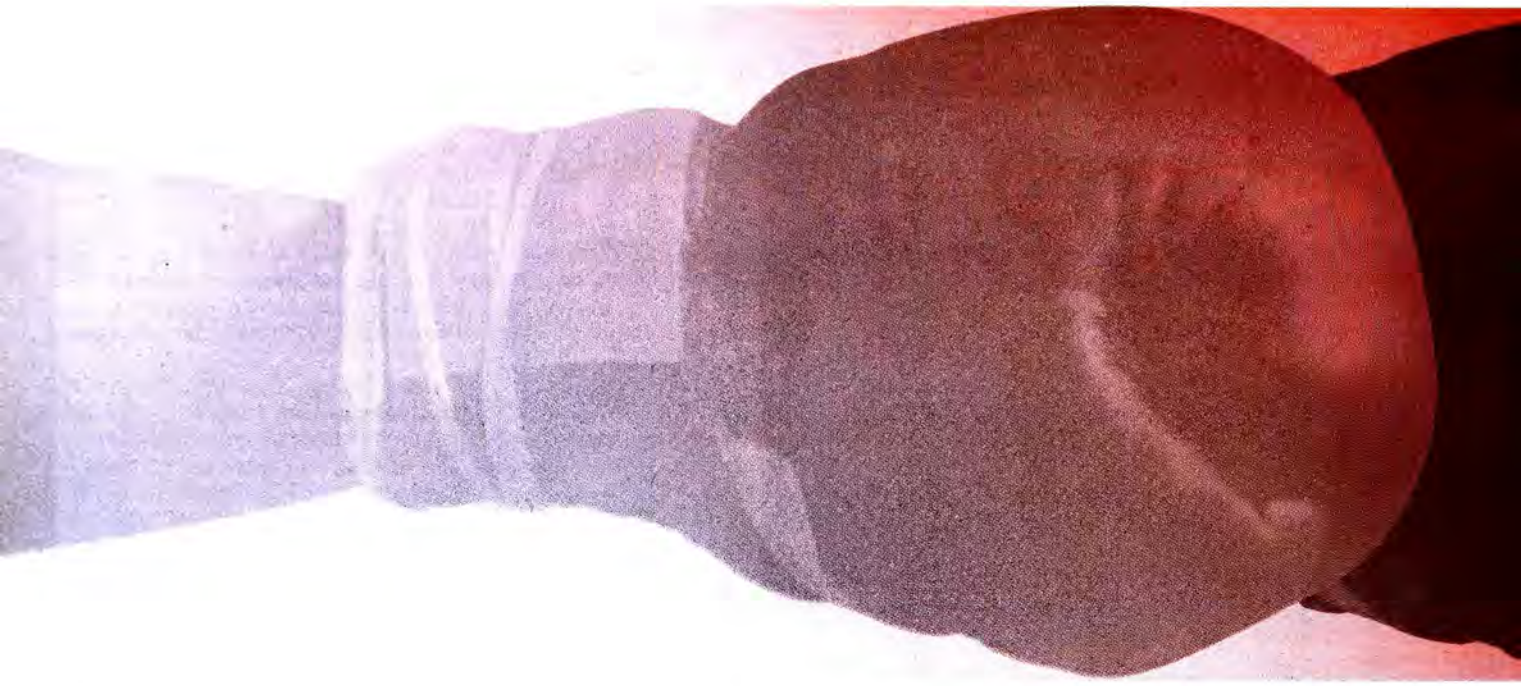
The CPS MultiFunction Card sells for $239. Pascal and CP/M software add another $20 each. Cables for the parallel or serial port are $25.

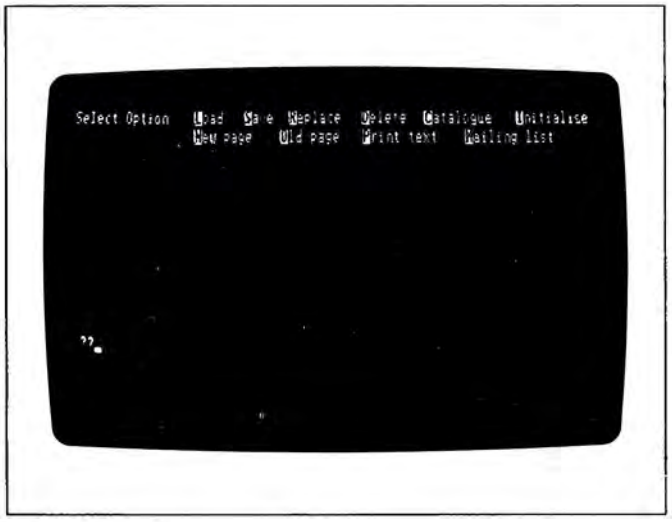
Spies Laboratories Synergy-Card

The Synergy-Card combines on one board 16K or 64K of RAM, a serial port, a parallel port, a clock/calendar, two timers, and a BSR ultrasonic control. In case you don't need all of those functions, the board is available in several reduced forms. In fact, you can buy the Synergy-Card with just the 16K or 64K of RAM. Then as your needs expand, you can add the other functions. Installation in slot 0 is just as with other RAM boards—one RAM chip is transferred from the motherboard and replaced with a jumper plug.

As a RAM board, the Synergy-Card performs as expected, holding the alternate Basic, Pascal, or extra memory for *VisiCalc* or CP/M. With the 64K version, the board appears as four 16K boards that are bank-selectable through a control address. The real power of this board, however, is through the special DOS drivers that get loaded into the normally unused "second 4K bank" of RAM. When any of the optional functions are ordered, special software is included to use the options from DOS, Pascal, and CP/M.

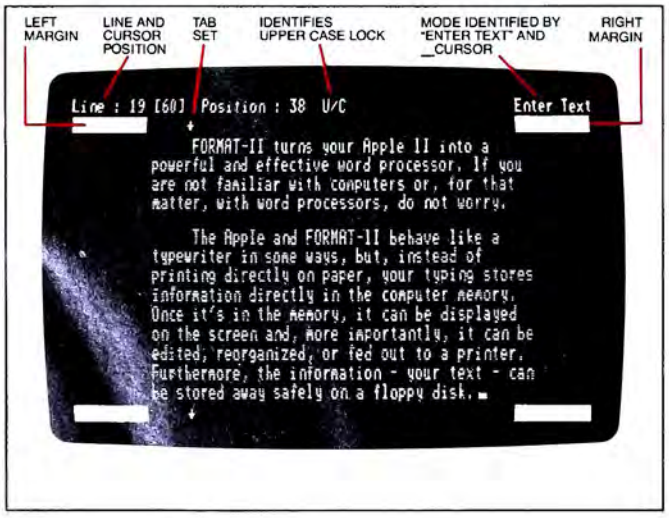
The Synergy-Card and DOS. Most of the expanded features of the Synergy-Card are easily reached through simple DOS commands. For example, operation of the parallel port is specified by the command *PR#8* (preceded by the usual control-D of course). Although this would normally give a range error in DOS, the special Synergy DOS interprets this as a command to





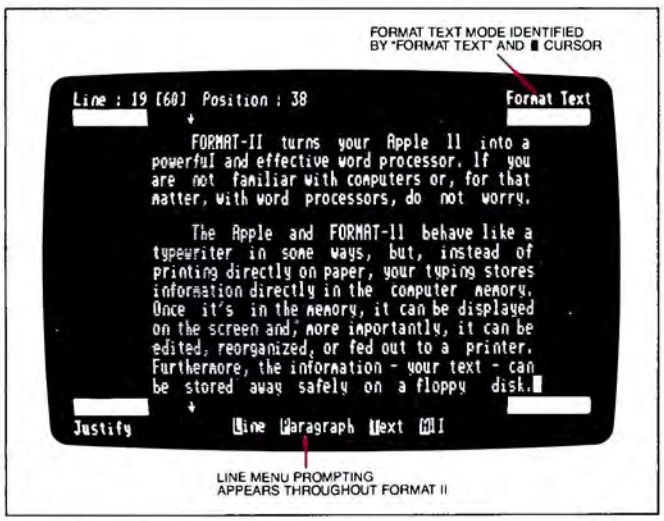
The Main Menu

Commands for the Main Menu, as in all modes of the system, are mnemonic. For example, to create a *New Page*, just touch [N] To *Print Text* touch [P], and so forth.



Entering Text...Easier Than a Typewriter

Enter text quickly and a few commands does it all. As on a typewriter, you access upper case letters with the SHIFT key. But Format-II is better than a typewriter since there is no need to press RETURN at the end of each line. Format-II wraps text from line to line for you.



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[A]lign...a column of numbers
[B]lank...out text.
[C]enter...text.
[D]elete...text.
[E]dit...text.
[F]ind...text on the page.

Illustrated is [J]ustify...text. (Throughout, bottom-of-screen prompting keeps you on track.) The justification on the screen is an exact replica of the printout.

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turn on the parallel port. No control commands are supported by this port, so you must first set up the proper parameters, such as line length, by using a configuration program. A built-in graphics dump routine allows printout of either hi-res screen, plus inverted and/or double size options. A double hi-res dump is also provided, for those with either an Apple III or the Double Hi-Res board manufactured by Spies.

The serial port is selected with the *PR#9* command. This will allow output to a printer, modem, or other serial device. Unfortunately, no similar command is available to use the serial port for input; this can be accomplished from machine language, however. A sample program is included to turn the Apple into a dumb terminal at 300 baud. The port itself is a simple four-wire interface with data in, data out, common, and one extra handshake line. This last line, however, does not conform to the RS-232 signal levels (the manual says this requires adding a 3K resistor but does not describe how). When the serial port is used to drive a printer, this handshake line can be used to detect ready/busy status if the printer has such capability. When used to interface with a modem, this signal would probably indicate connect status.

To call the clock/calendar, two commands are available. The first is *IN#10,* which returns a string of the form:

```
W MO/DD/YY HH;MN;SS.XXX
```

This gives day of week, month, day, year, hour, minutes, seconds, and milliseconds. Another format, more compatible with the Mountain Computer Apple Clock, is available with the command *IN#11.* This returns a string in the format:

```
MO/DD HH;MN;SS.XXX
```

If you do not want the time printed on the screen while it's being read, a *PR#10* or *PR#11* can be used to suppress output. Since the clock chip used on the Synergy-Card only times down to the second, resolving milliseconds is accomplished through an ingenious scheme. One of the two on-board timers is used to count the 1024 Hz signal from the clock chip. This is converted in software to milliseconds and automatically aligned with the clock's seconds counter. Because of this procedure, whenever the reset key is pressed or DOS is restarted (via 3D0G) there is a short delay of up to one second. Another handy feature of the clock is that it can automatically stamp files stored on the disk with time and date. This feature is similar to that found on other clocks, except that the Synergy-Card stores the creation date of any file. This means that if you update a file or store a later version, the original date remains intact.

The two programmable interval timers are called solely through machine language and can be used for real-time programming or for generating interrupts. Each timer represents a sixteen-bit counter clocked by the Apple's 1.0205 MHz crystal-controlled signal. This gives them a range from about one microsecond to more than sixty-four milliseconds. Timer 2 can also be set to count the 1024 Hz signal from the clock giving it an additional range up to sixty-four seconds. Under normal conditions, timer 1 is used for operating the serial ports and timer 2 is dedicated for use with the clock/calendar. Therefore these timers are not really available unless you are willing to give up one of the other features.

Last but not least, there is the BSR ultrasonic controller interface. This port connects to a small microphone that acts as a transmitter to send signals to the BSR command console. To accomplish this, the microphone is first connected to a small plug on the Synergy-Card. Then it is placed in front of the command console so that the ultrasonic signals can activate the BSR system. Sending these commands is accomplished by first selecting the BSR port through a *PR#12* command. Then the desired commands are sent by printing a string of characters, as shown in table 1.

ASCII Character:	Cansale Command:
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
:	10
;	11
<	12
=	13
>	14
?	15
'	16
A	ALL ON
B	BRIGHT
C	ALL OFF
D	DIM
E	ON
F	OFF

Table 1.

These characters were chosen to be compatible with the Mountain Computer Introl/X-10 system. Although the Introl system allows for only four brightness levels, two more commands have been added to the Synergy-Card BSR control. These are the *G* and *H* commands, which send a single bright or dim signal respectively. With these two commands any brightness level can be achieved.

Since there is no PROM firmware on the Synergy-Card, all of the I/O drivers for the various functions are stored in part of the on-board RAM. These drivers are linked into the system through the modified Synergy DOS. Because they are in RAM, it is very easy to change certain parameters within them. Setting up these parameters is the function of the *Config* program. The parallel and serial port parameter selections are fairly standard.

The clock offers MM/DD/YY HH;MM for DOS autodating. This allows you to specify how much of the time string to store in the catalog (starting from the left). For example, selecting eight characters will log only the date for each file.

Here's another handy little trick: Assign *PR#1* to 8 or 9. Many programs assume that a printer card is installed in slot 1. This option allows you to reassign the *PR#1* command to another slot, particularly 8 or 9 for use with the Synergy-Card parallel or serial ports. Of course, you can also leave *PR#1* as a *PR#1,* in case you have another board in slot one.

The Synergy-Card and Pascal. Software is provided to operate the parallel port from Pascal. This is accomplished through Pascal's Attach BIOS protocol, which links the driver directly into the operating system. This driver will work with some printers, such as the Epson MX series, but may require modification for others. This modification requires knowledge of assembly language but is not too difficult.

No attempt has been made to interface with the serial port, nor is there any easy access to the clock. A sample program demonstrating use of the clock is provided, but it is quite messy. The biggest disappointment is that even with the clock/calendar in the Apple, you still have to set the date manually every time you boot.

The Synergy-Card and CP/M. Both the parallel and serial ports are accessible from CP/M. They are assigned the physical devices LPT and UL1 respectively. Either port can be assigned as the printer or the logical device LST. This is done through the CP/M STAT command. For example, *STAT LST:=LPT* would designate the parallel port as the printer interface. If you need to change any of the parallel or serial interface parameters, you must do it under DOS, using the *Config* program. These changes can then be incorporated into CP/M by immediately booting up CP/M and saving the driver file with the command, *Save 17 S.COM.* Installing the Synergy-Card drivers into CP/M is then accomplished by simply

typing *S*. No provisions are provided for calling the clock from CP/M.

The Synergy-Card is quite a package. Besides the large number of functions it offers, there is plenty of software to back it up. Another plus is that assembly language source code is supplied for much of the software. This might be of considerable help in customizing the board for a given program or application.

The biggest drawback to this board is its lack of firmware. While this may be of little consequence to some users, it does present a big problem to anyone running canned programs (especially those with a special DOS). Neither *VisiCalc, VisiDex,* nor *DB Master,* for example, will work directly with the Synergy-Card. For this reason, Spies suggests that the board is geared more toward the OEM (original equipment manufacturer) than the average "plug-and-go" user. Depending upon your needs and compatibility requirements, however, this board can be a powerful addition to your computer.

The 16K Synergy-Card sells for $195. The 64K version goes for $349. Option 1 adds the parallel port, serial port, and timers for $59. Option 2 requires option 1 and adds the clock/calendar for another $49. Option 3 requires the other two and adds BSR X-10 control for an additional $39. No cables are included but they are available for $30 (parallel) or $20 (serial).

Good News, Bad News. Both of the boards reviewed exemplify the problems of multifunction cards. They seem to offer a lot for your money, but they also represent a compromise in usefulness. The CPS Card is quite a bargain if all you need is a simple clock, a parallel interface, and a serial interface. There is no question that three separate interface boards to accomplish the same functions would cost more, draw more power, and take up two extra slots. But this assumes that you really need all three functions; it might be possible to find a better buy if you only needed a clock and printer interface.

More important, with separate boards you can have all the features that you want instead of settling for what's available on the multicard. For example, you might want a parallel interface with on-board buffering so that you can regain use of the computer while you are printing. Or how about built-in firmware to do text formatting or screen dumps? Perhaps you would like automatic date setting in Pascal or interrupt capabilities or full 256-device BSR control with security lockout against unauthorized use. These features are available on other top-of-the-line boards but currently are not possible with most multicards. if you later decide that you want such features, you will probably have to buy another board.

The Spies Laboratories Synergy-Card probably offers the most on one board in terms of hardware. The software supplied is also quite elaborate, although it raises a serious question of compatibility. Since it requires its own special DOS, it immediately becomes useless for much of the software currently on the market. While this may only reflect the poor state of affairs in software standards (brought about by the need to devise copy protection techniques) it does present a real problem to the potential end user.

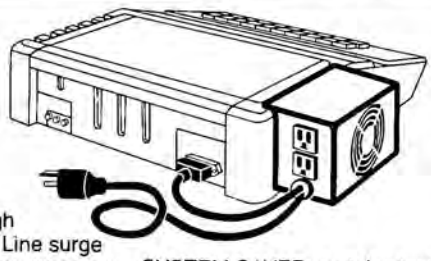
If you are contemplating the purchase of a multifunction card, the key word to remember is *caution.* Make sure you know exactly what you are getting, what software it will work with and what problems, if any, it may cause. Also be sure you will be satisfied, now and in the future, with the features it offers. If there are no major sacrifices, or you are just plain running out of slots, then multifunction cards can be a worthwhile way to expand the capabilities of your computer. ◨

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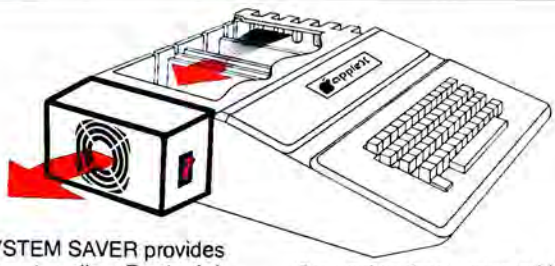
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Softalk Presents The Bestsellers

When the big news concerning bestsellers has to do with *VisiCalc*, it almost falls into the category of "dog bites man."

This refers, of course, to the journalistic maxim that "dog bites man" happens everyday and therefore is not news; however, this truism continues, should an enterprising reporter stumble across a "man bites dog" story he's got himself an unusual occurrence that warrants being called news.

March sales results provided *VisiCalc* with both a "dog bites man" and a "man bites dog" tale.

The more common story is that *VisiCalc* clobbered all other Apple II software packages by an unprecedented margin during the month, doubling the sales of the next closest competitor for the first time since the *Softalk* poll originated twenty months ago. *Softalk* recently initiated the convention of setting the index number of the second-place program near 100 and letting the *VisiCalc* index fall where it would above that level.

Last month*Wizardry* made a concentrated run at *VisiCalc*, but it now appears as though the spreadsheet program needs a new category, perhaps most appropriately called "One of a Kind," rather than a new convention to track its results. Sales of this magnitude seem to reflect both the value of the program and the increasing penetration of the Apple II into serious computing environments as opposed to the home market.

The domination of VisiCorp's bellwether program in the Apple II marketplace only punctuates the anomaly of its second-place finish in *Softalk*'s first poll of Apple III software sales. Last month's statement that *VisiCalc* would not be the perennial leader because it was sold bundled with the Apple III was in error; but the resulting conclusion that it would not be the leading program in the poll turned out to be accurate.

Apple Writer III, surely one of the most powerful microcomputer word processors extant, led sales of Apple III software, with *VisiCalc* second. One explanation for the upset is that most Apple III buyers have been picking up *VisiCalc* at the time of original purchase while *Apple Writer III* was not available when the machine was first introduced.

Word Processors 5

This Month	Last Month	
1.	1.	**SuperScribe II**, David Kidwell, On-Line Systems
2.	4.	**WordStar**, MicroPro
3.	2.	**Magic Window**, Gary Shannon and Bill Depew, Artsci
4.	3.	**Apple Writer**, Apple Computer
5.	5.	**SuperText II**, Ed Zaron, Muse Software

Apple III

1. **Apple Writer III**, Paul Lutus, Apple Computer
2. **VisiCalc III**, Software Arts/Dan Bricklin and Robert Frankston, VisiCorp, Apple Computer
3. **Personal Filing System**, John Page, Software Publishing Corporation
4. **PFS: Report**, John Page, Software Publishing Corporation
5. **Apple III Business Graphics**, Apple Computer
6. **Access III**, Apple Computer
7. **Apple Business Basic**, Apple Computer
8. **Apple III Pascal**, Apple Computer
9. **Great Plains Accounting Software**, Great Plains Software
10. **Mail List Manager**, Apple Computer

Business 10

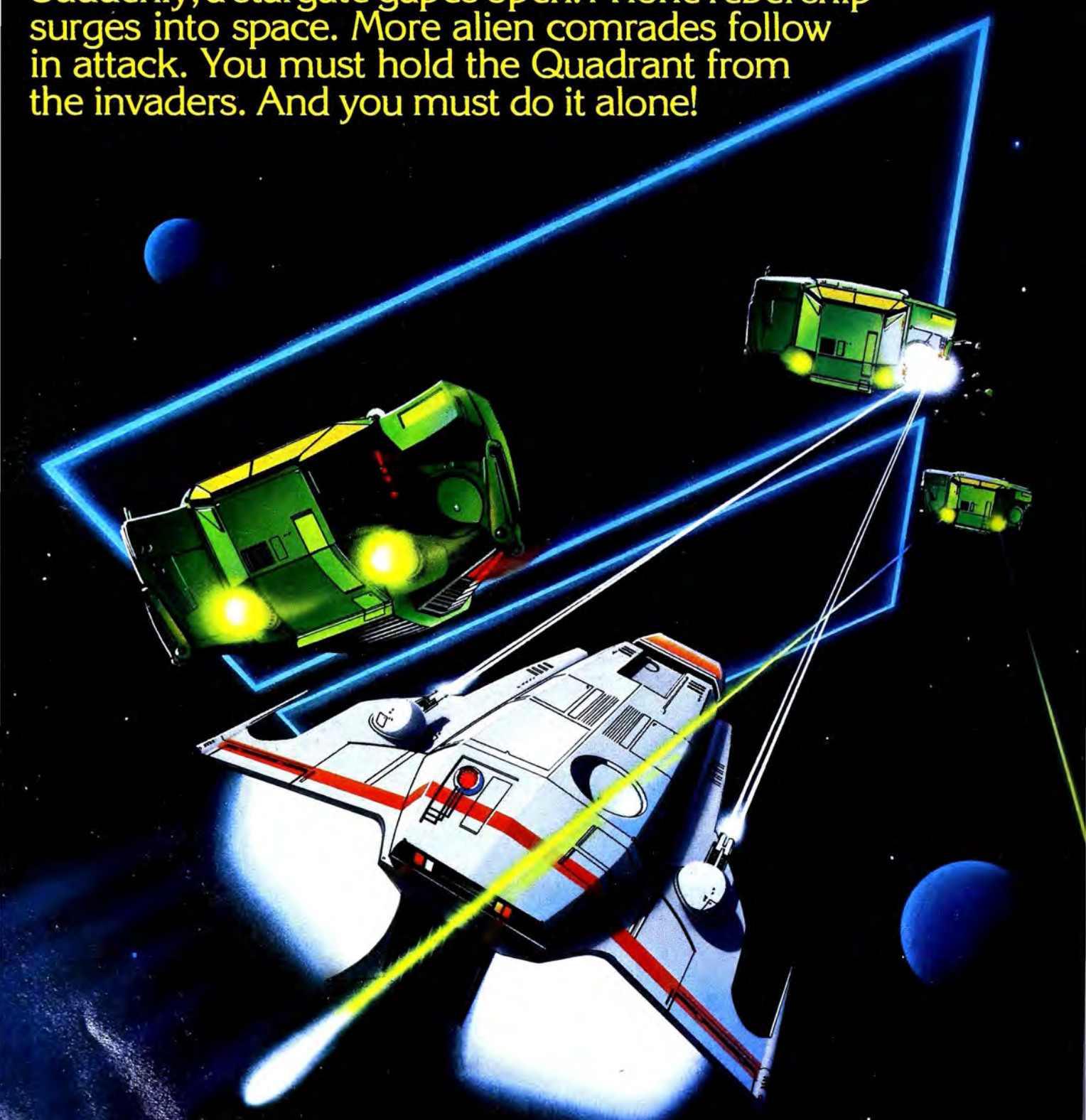
This Month	Last Month	
1.	1.	**VisiCalc**, Software Arts/Dan Bricklin and Robert Frankston, VisiCorp
2.	2.	**Personal Filing System**, John Page, Software Publishing Corporation
3.	3.	**DB Master**, Alpine Software/Stanley Crane and Jerry Macon; and Barney Stone, Stoneware
4.	6.	**VisiFile**, Creative Computer Applications/Colin Jameson and Ben Herman, VisiCorp
5.	8.	**PFS: Report**, John Page, Software Publishing Corporation
6.	5.	**VisiTrend/VisiPlot**, Micro Finance Systems/Mitch Kapor, VisiCorp
7.	4.	**BPI General Ledger**, John Moss and Ken Debower, Apple Computer
8.	—	**BPI Accounts Receivable**, John Moss and Ken Debower, Apple Computer
9.	7.	**Data Factory**, Bill Passauer, Micro Lab
	9.	**Accounting Plus II**, Software Dimensions, Systems Plus



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This train of thought projects that *Apple Writer* will soon saturate that preexisting market and then *VisiCalc* will gain the lead.

Personal Filing System and *PFS: Report* were third and fourth in Apple III sales with *Apple III Business Graphics* fifth, *Access III* sixth, *Apple Business Basic* seventh, *Apple III Pascal* eighth, *Accounting Software* from Great Plains ninth and *Mail List Manager* tenth. The immaturity of the III's marketplace is reflected by the presence of two language systems among the leaders, reflecting the necessity of the user base to write their own rather than buy applications software.

Strategy 5

This Month	Last Month	
1.	1.	**Castle Wolfenstein**, Silas Warner, Muse Software
2.	4.	**Flight Simulator**, Bruce Artwick, SubLogic
3.	—	**Hi-Res Computer Golf**, Stuart Aronoff, Avant-Garde Creations
4.	3.	**Robot War**, Silas Warner, Muse Software
5.	2.	**Sargon II**, Dan and Kathe Spracklen, Hayden

Adventure 5

This Month	Last Month	
1.	5.	**Time Zone**, Roberta and Ken Williams, On-Line Systems
2.	1.	**Hi-Res Adventure #4: Ulysses and the Golden Fleece**, Bob Davis and Ken Williams, On-Line Systems
3.	2.	**Zork II**, Infocom
4.	—	**Kabul Spy**, Tim Wilson, Sirius Software
5.	4.	**Hi-Res Adventure #3: Cranston Manor**, Harold DeWitz and Ken Williams, On-Line Systems

Fantasy 5

This Month	Last Month	
1.	1.	**Wizardry**, Andrew Greenberg and Robert Woodhead, Sir-tech
2.	2.	**Apventure to Atlantis**, Bob Clardy, Synergistic Software
3.	3.	**Ultima**, Lord British, California Pacific
4.	—	**Upper Reaches of Apshai**, Automated Simulations
5.	4.	**Crush, Crumble, and Chomp**, Automated Simulations

One surprise omission from the list is *Word Juggler* from Quark, another powerful word processor.

The dearth of Apple III software is indicated also by the larger percentage penetration of each package into the marketplace. Although there are approximately twenty Apple IIs for each Apple III, two of the bestselling Apple III products would actually have placed in the Apple II Top Thirty. *Apple Writer III* would have been fourteenth and *VisiCalc III* sixteenth.

To put this sales volume in perspective, a program achieving an equal penetration of the Apple II market would achieve an index rating of approximately 900.

In the Apple II marketplace, *Personal Filing System* regained second place from *Wizardry*, which dropped to fifth. *Home Accountant* rose from sixth to third and *Snack Attack* edged up to fourth from fifth to reclaim bragging rights as the leading entertainment package.

Star Blazer jumped from fourteenth to sixth, *Tax Preparer* was seventh, *Castle Wolfenstein* rose from twelfth to eighth, *DB Master* was ninth, and *David's Midnight Magic* remained tenth. Howard Software's *Tax Preparer* was in-

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Avalon Hill	Denver Software	Micro Pro	Sirius Software
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Broderbund	Highlands	Nikrom	Stoneware
Bubblesoft	Howard Software	Omega Microware	Strategic
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where *Upper Reaches of Apshai* climbed into fourth. *Wizardry*, *Apventure to Atlantis*, and *Ultima* retained the top three positions.

There was some shuffling of order among the Word Processor Five, but no changes in the programs listed. Most interesting was *SuperScribe II*'s continued hold on first, even though the program has not shipped for two months. Those continued sales are an indication of the length of the pipeline between the software publisher and the end user.

Another item of note was the renewed challenge of Silicon Valley's *Word Handler*. Probably benefitting from the shortage of *SuperScribe*, with which it is most directly competitive, *Word Handler* rose to a solid sixth and appeared to have the strength to climb higher.

The Business Ten remained relatively stable with the exception of the surge of sales of BPI's *Accounts Receivable* package. The database race continues hot with *PFS*, *DB Master*, and *VisiFile* holding down the second through fourth spots on the list and *Data Factory* still threatening.

The Hobby Ten list underwent significant revision. Beagle Bros made the top of the list their own private preserve with *Utility City* ranking first and *DOS Boss* nailing down second. *TASC*, *Program Line Editor*, and *LISA 2.5* rejoined the list and *Bag of Tricks*, Quality's new entrant from the authors of *Beneath Apple DOS*, rose to eighth in its first month of distribution.

Stability was the hallmark of the Home Ten also, with only *Apple Speller* being displaced and only *Tax Beater* rejoining the list. *Home Accountant* and *Tax Preparer* continued as the dominant one-two punch.

Software sales in March displayed wider geographical disparities than any time since the *Softalk* poll began. Usually, dealers all over the country have similar reports on the volume of business done. In March, however, dealers in the East and West reported almost uniformly slower sales while dealers in the Midwest were crowing about booming software sales.

Almost all dealers reported larger gross sales, however, because of heavy sales of business systems. Business systems usually include extra disk drives, printers, and higher ticket software. ◨

Apple-franchised retail stores representing approximately 8.7 percent of all sales of Apples and Apple-related products volunteered to participate in the poll.

Respondents were contacted early in April to ascertain their sales leaders for the month of March.

The only criterion for inclusion on the list was number of sales made—such other criteria as quality of product, profitability to the computer retailer, and personal preference of the individual respondents were not considered.

Respondents in April represented every geographical area of the continental United States.

Results of the responses were tabulated using a formula that resulted in the index number to the left of the program name in the Top Thirty listing. The index number is an arbitrary measure of relative strength of the programs listed. Index numbers are correlative only for the month in which they are printed; readers cannot assume that an index rating of 50 in one month represents equivalent sales to an index number of 50 in another month.

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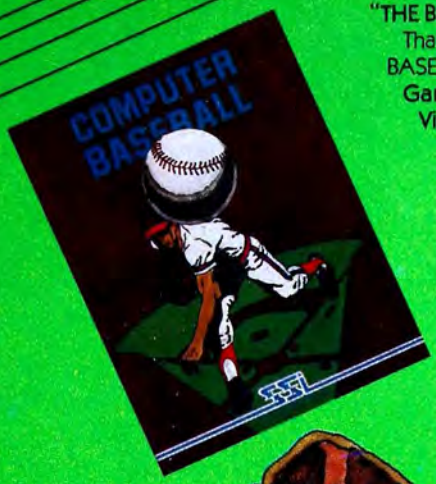
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The Top Thirty

This Month	Last Month	Index	
1.	1.	201.20	**VisiCalc**, Software Arts/Dan Bricklin and Robert Frankston, VisiCorp
2.	4.	98.45	**Personal Filing System**, John Page, Software Publishing Corporation
3.	6.	87.51	**Home Accountant**, Bob Schoenburg, Larry Grodin, and Steve Pollack, Continental Software
4.	5.	83.21	**Snack Attack**, Dan Illowsky, Datamost
5.	2.	71.88	**Wizardry**, Andrew Greenberg and Robert Woodhead, Sir-tech
6.	14.	62.90	**Star Blazer**, Starcraft/Tony Suzuki, Broderbund Software
7.	14.	60.55	**Tax Preparer**, James Howard, Howard Software
8.	12.	59.38	**Castle Wolfenstein**, Silas Warner, Muse Software
9.	7.	56.65	**DB Master**, Alpine Software/Stanley Crane and Jerry Macon; and Barney Stone, Stoneware
10.	10.	51.96	**David's Midnight Magic**, David Snider, Broderbund Software
11.	11.	47.27	**VisiFile**, Creative Computer Appplications/Colin Jameson and Ben Herman, VisiCorp
12.	—	44.54	**PFS: Report**, John Page, Software Publishing Corporation
	18.	44.54	**Apple Panic**, Ben Serki, Broderbund Software
14.	9.	42.58	**VisiTrend/VisiPlot**, Micro Finance Systems/Mitch Kapor, VisiCorp
15.	3.	41.80	**SuperScribe II**, David Kidwell, On-Line Systems
16.	8.	38.28	**BPI General Ledger**, John Moss and Ken Debower, Apple Computer
17.	30.	37.50	**WordStar**, MicroPro
18.	13.	30.86	**Gorgon**, Nasir, Sirius Software
19.	—	30.47	**BPI Accounts Receivable**, John Moss and Ken Debower, Apple Computer
20.	20.	28.91	**Magic Window**, Gary Shannon and Bill Depew, Artsci
	—	28.91	**Raster Blaster**, Bill Budge, BudgeCo
	—	28.91	**Swashbuckler**, Paul Stephenson, Datamost
23.	—	25.00	**Crossfire**, Jay Sullivan, On-Line Systems
	—	25.00	**Jawbreaker**, Olaf Lubeck, On-Line Systems
25.	—	24.22	**Time Zone**, Roberta and Ken Williams, On-Line Systems
	16.	24.22	**Personal Finance Manager**, Jeffrey Gold, Special Delivery Software, Apple Computer
27.	—	23.83	**Flight Simulator**, Bruce Artwick, SubLogic
	—	23.83	**Mastertype**, Bruce Zweig, Lightning Software
29.	15.	23.44	**Twerps**, Dan Thompson, Sirius Software
	17.	23.44	**Track Attack**, Chris Jochumson, Broderbund Software

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WE'RE LOOKING FOR A FEW GOOD DESIGNERS. We're always on the lookout for high-quality games from independent designers. If you have game programs that you'd like SSI to publish on a royalty basis, give us a call at (415) 964-1353 or write to SSI, 465 Fairchild Drive, Suite 108, Mountain View, CA 94043.



FIRST WE GOT RID OF THE LOWER CASE ADAPTER

and put lower case on the screen
– WITHOUT HARDWARE.

THEN WE GOT RID OF THE 80 COLUMN BOARD

and put seventy columns of text on the screen
WITHOUT HARDWARE.

THEN WE GOT RID OF WASTED EDITING TIME

by developing printer spooling
AGAIN WITHOUT HARDWARE!

AND WE'RE ALWAYS LOOKING FOR NEW WAYS TO SAVE YOU TIME AND MONEY.

When ON-LINE SYSTEMS began work on SCREENWRITER II, we wanted to make it the most powerful word processor on the market. We began by putting in boldfacing, underlining, form letter capabilities, global search and replace, support of multiple disk drives, full macro capabilities, generation of up to four indices, complete formatting capabilities, a software based keyboard buffer, full editing capability of any DOS 3.3 text or binary file (including APPLESOFT programs) and all other features you need for professional word processing. That was just the beginning. . . .

Our next step was to make SCREENWRITER II hardware independent, so we eliminated the lower case adapter and the 80 column board. SCREENWRITER II is the only word processor on the market to offer true software based lower case and 70 column screen available today.

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*Printer spooling feature only available for printers with APPLE parallel or SSM AIO interface, and EPSON printers/APPLE II and APPLE II Plus are registered trade marks of APPLE COMPUTER INC.

We Don't Think That Word Processing Should Cost An Arm And A Leg, And At On-Line Systems, We Won't Stand For It.

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